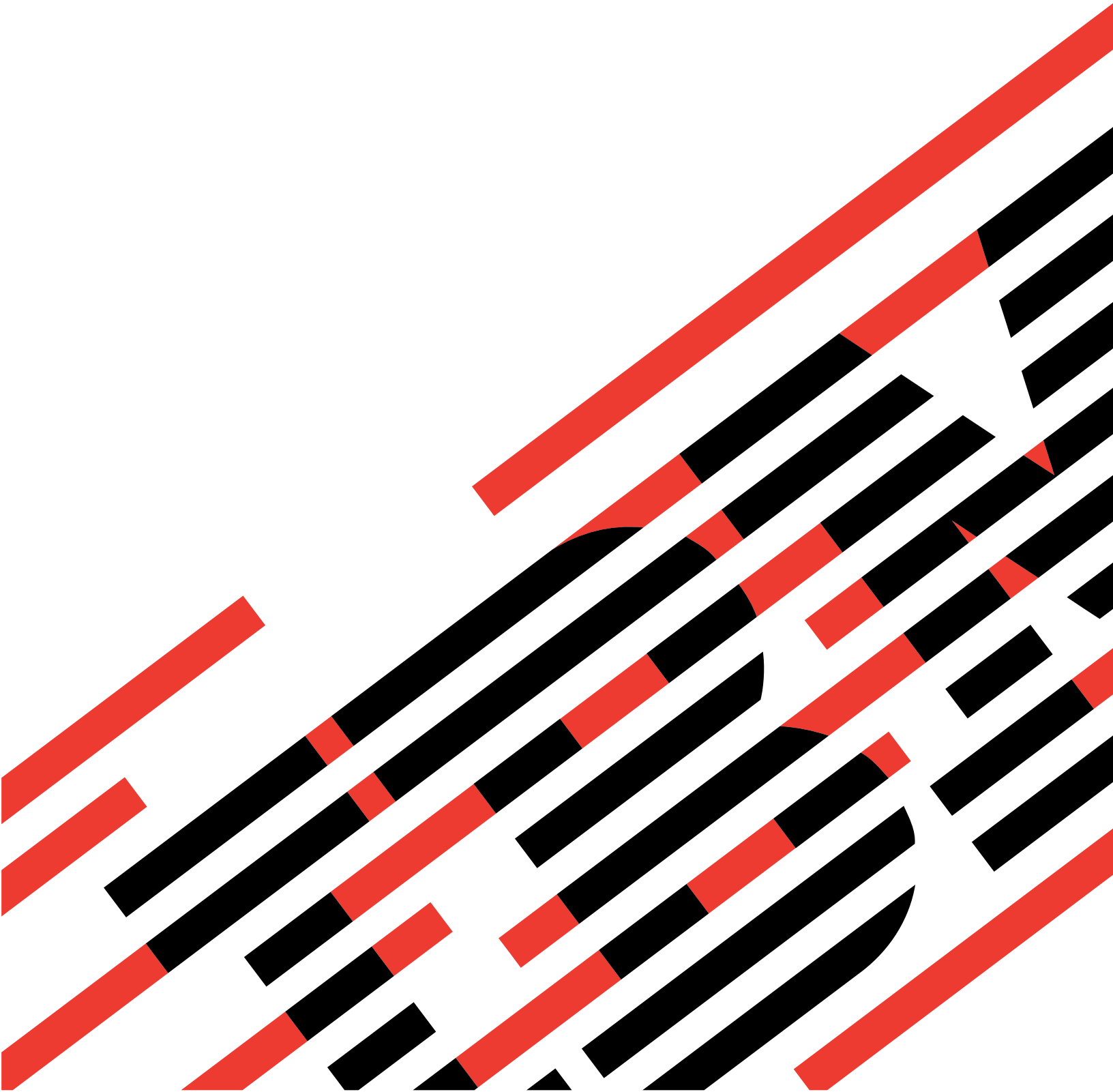
IBM

eserver

iSeries

Lightweight Directory Access Protocol (LDAP) APIs

Version 5 Release 3



IBM

@server

iSeries

Lightweight Directory Access Protocol (LDAP) APIs

Version 5 Release 3

Note

Before using this information and the product it supports, be sure to read the information in "Notices," on page 307.

Sixth Edition (August 2005)

This edition applies to version 5, release 3, modification 0 of Operating System/400 (product number 5722-SS1) and to all subsequent releases and modifications until otherwise indicated in new editions. This version does not run on all reduced instruction set computer (RISC) models nor does it run on CISC models.

Contents

Lightweight Directory Access Protocol (LDAP) APIs

The Lightweight Directory Access Protocol (LDAP) client APIs can be used to access LDAP-enabled directories in a network. Administrative and configuration APIs for IBM(R) Directory Server for iSeries(TM) are included.

Select one of the following for more information:

The Lightweight Directory Access Protocol (LDAP) APIs are:

- "ldap_xlate_local_to_unicode()— Convert String From the Local Code Page to UCS-2 (or UNICODE) Encoding" on page 229 (Convert String From the Local Code Page to UCS-2 (or UNICODE) Encoding)
- "ldap_xlate_local_to_utf8()— Convert String From the Local Code Page to UTF-8 Encoding" on page 230 (Convert String From the Local Code Page to UTF-8 Encoding)
- "ldap_xlate_unicode_to_local() — Convert String From the UCS-2 (or UNICODE) Encoding to Local Code Page" on page 232 (Convert String From the UCS-2 (or UNICODE) Encoding to Local Code Page)
- "ldap_xlate_utf8_to_local() — Convert String From the UTF-8 Encoding to Local Code Page" on page 234 (Convert String From the UTF-8 Encoding to Local Code Page)
- "Configure Directory Server (QgldCfgDirSvr)" on page 236 (Configure Directory Server) creates the initial IBM Directory Server configuration.
- "Change Directory Server Attributes (QgldChgDirSvrA)" on page 239 (Change Directory Server Attributes) changes the configuration of the IBM Directory Server.
- "Export LDIF File (QgldExportLdif)" on page 259 (Export LDIF File) exports the IBM Directory Server contents to an LDIF file.
- "Import LDIF File (QgldImportLdif)" on page 263 (Import LDIF File) imports an LDIF file to the IBM Directory Server.
- "List Directory Server Attributes (QgldLstDirSvrA)" on page 266 (List Directory Server Attributes) retrieves a list of IBM Directory Server attributes.
- "Publish Directory Object (QgldPubDirObj)" on page 273 (Publish Directory Object) publishes an object to an LDAP server.
- "Retrieve Directory Server Attributes (QgldRtvDirSvrA)" on page 279 (Retrieve Directory Server Attributes) retrieves configuration settings for the IBM Directory Server.
- "Synchronize System Distribution Directory to LDAP (QGLDSSDD)" on page 290 (Synchronize System Distribution Directory to LDAP) publishes system distribution directory entries to an LDAP directory.

APIs by category

APIs

These are the APIs for this category.

ldap_abandon()—Abandon an LDAP Operation in Progress

Syntax

```
#include <ldap.h>

int ldap_abandon(
       LDAP            *ld,
       int             msgid)
```

Library Name/Service Program: QSYS/QGLDCLNT

Default Public Authority: *USE

Threadsafe: Yes

The **ldap_abandon()** function is used to abandon or cancel an LDAP operation in progress. The ***msgid*** passed should be the message ID of an outstanding LDAP operation, as returned by a call to an asynchronous LDAP operation such as **ldap_search(), ldap_modify(),** and so on.

The **ldap_abandon()** APIs check to see if the result of the operation has already been returned by the server. If it has, it deletes it from the queue of pending messages. If not, it sends an LDAP abandon operation to the the LDAP server.

The caller can expect that the result of an abandoned operation will not be returned from a future call to **ldap_result()**.

Authorities and Locks

No OS/400 authority is required.

Parameters

ld (Input) The LDAP pointer returned by a previous call to "ldap_init()—Perform an LDAP Initialization Operation" on page 102, "ldap_ssl_init —Initializes an SSL Connection." on page 206, or "ldap_open()—Perform an LDAP Open Operation" on page 133.

msgid (Input) The message ID of an outstanding LDAP operation, as returned by a call to an asynchronous LDAP operation such as "ldap_search()—Perform an LDAP Search Operation" on page 164 or "ldap_modify()—Perform an LDAP Modify Entry Request" on page 108.

Return Value

LDAP_SUCCESS
if the request was successful.

-1 if the request was not successful.

Error Conditions

If **ldap_abandon()** is not successful, ***ld_errno*** will be set to indicate the error. See "LDAP Client API Error Conditions" on page 303 for possible LDAP error codes values and "ldap_get_errno()—Retrieve Error Information" on page 87 function to retrieve the error information.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_abandon API.

Related Information

- "ldap_abandon_ext()—Abandon (abort) an Asynchronous Operation with Controls" on page 8 — Abandon (abort) an asynchronous operation with controls.

API introduced: V4R3

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_abandon_ext()—Abandon (abort) an Asynchronous Operation with Controls

Syntax

```
#include <ldap.h>

int ldap_abandon_ext(
       LDAP            *ld,
       int             msgid,
       LDAPControl     **serverctrls,
       LDAPControl     **clientctrls)
```

Library Name/Service Program: QSYS/QGLDCLNT

Default Public Authority: *USE

Threadsafe: Yes

The **ldap_abandon_ext()** function is used to abandon or cancel an LDAP operation in progress. The *msgid* passed should be the message ID of an outstanding LDAP operation, as returned by a call to an asynchronous LDAP operation such as **ldap_search()**, **ldap_modify()**, and so on.

This API checks to see if the result of the operation has already been returned by the server. If it has, the result is removed from the queue of pending messages. If not, it sends an LDAP abandon operation to the the LDAP server.

The caller can expect that the result of an abandoned operation will not be returned from a future call to **ldap_result()**.

Authorities and Locks

No OS/400 authority is required.

Parameters

ld (Input) The LDAP pointer returned by a previous call to "ldap_init()—Perform an LDAP Initialization Operation" on page 102, "ldap_ssl_init —Initializes an SSL Connection." on page 206, or "ldap_open()—Perform an LDAP Open Operation" on page 133.

msgid (Input) The message ID of an outstanding LDAP operation, as returned by a call to an asynchronous LDAP operation such as **ldap_search** or **ldap_modify**.

serverctrls
(Input) A list of LDAP server controls. This parameter may be set to null. See LDAP Controls for more information about **server controls**.

clientctrls
(Input) A list of LDAP client controls. This parameter may be set to null. See LDAP Controls for more information about **client controls**.

Return Value

LDAP_SUCCESS
if the **ldap_abandon()** was successful.

Other LDAP error code
if the request was not successful.

Error Conditions

If **ldap_abandon_ext()** is not successful, LDAP error code will be returned. See "LDAP Client API Error Conditions" on page 303 for possible LDAP error codes values.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_abandon_ext API.

Related Information

- "ldap_abandon()—Abandon an LDAP Operation in Progress" on page 6 — Abandon (abort) an asynchronous operation.

API introduced: V4R5

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_add()—Perform an LDAP Add Operation

Syntax

```
#include <ldap.h>

int ldap_add(
        LDAP           *ld,
        const char     *dn,
        LDAPMod        **attrs)
```

Library Name/Service Program: QSYS/QGLDCLNT

Default Public Authority: *USE

Threadsafe: Yes

The **ldap_add()** function is used to perform an LDAP add operation.

Authorities and Locks

No OS/400 authority is required. All authority checking is done by the LDAP server.

Parameters

ld (Input) The LDAP pointer returned by a previous call to "ldap_init()—Perform an LDAP Initialization Operation" on page 102, "ldap_ssl_init —Initializes an SSL Connection." on page 206, or "ldap_open()—Perform an LDAP Open Operation" on page 133.

dn (Input) The DN of the entry to add.

attrs (Input) The entry's attributes, specified using the *LDAPMod* structure, as defined for "ldap_modify()—Perform an LDAP Modify Entry Request" on page 108. The *mod_type* and

mod_vals fields should be filled in. The *mod_op* field is ignored unless ORed with the constant **LDAP_MOD_BVALUES**. In this case, the *mod_op* field is used to select the *mod_bvalues* case of the mod_vals union.

Return Value

Message ID of the operation initiated
if the request was successfully sent. A subsequent call to "ldap_result()—Retrieve Result of an Asynchronous LDAP Operation" on page 156, can be used to obtain the result of the operation.

-1 if the request was not successful.

Error Conditions

If **ldap_add()** is not successful, *ld_errno* will be set to indicate the error. See "LDAP Client API Error Conditions" on page 303 for possible LDAP error code values and "ldap_get_errno()—Retrieve Error Information" on page 87 function to retrieve the error information.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_add API.

Related Information

- "ldap_add_s()—Perform an LDAP Add Operation (Synchronous)" on page 15 — Synchronously add an entry.
- "ldap_add_ext()—Perform an LDAP Add Operation with Controls" on page 12 — Asynchronously add an entry with controls.
- "ldap_add_ext_s()—Perform an LDAP Add Operation with Controls (Synchronous)" on page 14 — Synchronously add an entry with controls.
- "ldap_modify()—Perform an LDAP Modify Entry Request" on page 108 — Asynchronously modify an entry.

API introduced: V4R3

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_add_control()—Create a Control and Insert it into the List of LDAP Server Controls

Syntax

```
#include <ldap.h>

int ldap_add_control(
             char        *oid,
             ber_len_t   len,
             char        *value,
             int         isCritical,
             LDAPControl ***ctrlList)
```

Library Name/Service Program: QSYS/QGLDCLNT

Default Public Authority: *USE

Threadsafe: Yes

The **ldap_add_control()** function is used to create a control and insert it into the list of LDAP server controls.

Note: The function will allocate space in the list for the control.

Authorities and Locks

No OS/400 authority is required. All authority checking is done by the LDAP server.

Parameters

oid (Input) Specifies the control type, represented as a string.

len (Input) Specifies the length of the value string.

value (Input) Specifies the data associated with the control.

isCritical
(Input) Specifies whether the control is critical or not.

ctrlList
(Input) Specifies a list of LDAP server controls. See LDAP Controls for more information about server controls.

Return Value

LDAP_SUCCESS
if the request was successful.

LDAP_NO_MEMORY
if the control could not be added.

Related Information

- "ldap_insert_control()—Insert a Control in the Llist of LDAP Server Controls" on page 104 — Insert a control in the list of LDAP server controls.
- "ldap_remove_control()—Remove a Control from the List of LDAP Server Controls" on page 151 — Remove a control from the list of LDAP server controls.

- "ldap_copy_controls()—Make a Copy of the List of LDAP Server Controls" on page 36 — Synchronously add an entry with controls.

API introduced: V5R3

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_add_ext()—Perform an LDAP Add Operation with Controls

Syntax

```
#include <ldap.h>

int ldap_add_ext(
             LDAP        *ld,
             const char  *dn,
             LDAPMod     **attrs,
             LDAPControl **serverctrls,
             LDAPControl **clientctrls,
             int         *msgidp)
```

Library Name/Service Program: QSYS/QGLDCLNT

Default Public Authority: *USE

Threadsafe: Yes

The **ldap_add_ext()** function is used to perform an LDAP add operation with controls.

Authorities and Locks

No OS/400 authority is required. All authority checking is done by the LDAP server.

Parameters

ld (Input) The LDAP pointer returned by a previous call to "ldap_init()—Perform an LDAP Initialization Operation" on page 102, "ldap_ssl_init —Initializes an SSL Connection." on page 206, or "ldap_open()—Perform an LDAP Open Operation" on page 133.

dn (Input) The DN of the entry to add.

attrs (Input) The entry's attributes, specified using the LDAPMod structure, as defined for "ldap_modify()—Perform an LDAP Modify Entry Request" on page 108. The *mod_type* and *mod_vals* fields should be filled in. The *mod_op* field is ignored unless ORed with the constant **LDAP_MOD_BVALUES**. In this case, the *mod_op* field is used to select the *mod_bvalues* case of the mod_vals union.

serverctrls
(Input) A list of LDAP server controls. This parameter may be set to null. See LDAP Controls for more information about server controls.

clientctrls
(Input) A list of LDAP client controls. This parameter may be set to null. See LDAP Controls for more information about client controls.

msgidp
(Output) This result parameter is set to the message ID of the request if the **ldap_add_ext()** call succeeds.

Return Value

LDAP_SUCCESS
if the request was successful. If successful, **ldap_add_ext()** places the message ID of the request in **msgidp*. A subsequent call to "ldap_result()—Retrieve Result of an Asynchronous LDAP Operation" on page 156 can be used to obtain the result of the operation.

another LDAP error code
if the request was not successful.

Error Conditions

If **ldap_add_ext()** is not successful, an LDAP error code will be returned. See "LDAP Client API Error Conditions" on page 303 for possible LDAP error code values. The error code indicates if the operation completed successfully. The "ldap_parse_result()—Extract Information from Results" on page 143 API is used to check the error code in the result.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_add_ext API.

Related Information

- "ldap_add()—Perform an LDAP Add Operation" on page 9 — Asynchronously add an entry.
- "ldap_add_s()—Perform an LDAP Add Operation (Synchronous)" on page 15 — Synchronously add an entry.
- "ldap_add_ext_s()—Perform an LDAP Add Operation with Controls (Synchronous)" on page 14 — Synchronously add an entry with controls.
- "ldap_modify_ext()—Perform an LDAP Modify Entry Request with Controls" on page 110 — Asynchronously modify an entry with controls.

The **ldap_add_ext()** API supports LDAP V3 server controls and client controls.

API introduced: V4R5

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_add_ext_s()—Perform an LDAP Add Operation with Controls (Synchronous)

Syntax

```
#include <ldap.h>

int ldap_add_ext_s(LDAP      *ld,
                   const char  *dn,
                   LDAPMod     **attr,
                   LDAPControl **serverctrls,
                   LDAPControl **clientctrls)
```

Library Name/Service Program: QSYS/QGLDCLNT

Default Public Authority: *USE

Threadsafe: Yes

The **ldap_add_ext_s()** function is used to perform synchronous LDAP add operation with controls.

Authorities and Locks

No OS/400 authority is required. All authority checking is done by the LDAP server.

Parameters

ld (Input) The LDAP pointer returned by a previous call to "ldap_init()—Perform an LDAP Initialization Operation" on page 102, "ldap_ssl_init —Initializes an SSL Connection." on page 206, or "ldap_open()—Perform an LDAP Open Operation" on page 133.

dn (Input) The DN of the entry to add.

attrs (Input) The entry's attributes, specified using the *LDAPMod* structure, as defined for "ldap_modify()—Perform an LDAP Modify Entry Request" on page 108. The *mod_type* and *mod_vals* fields should be filled in. The *mod_op* field is ignored unless ORed with the constant **LDAP_MOD_BVALUES**. In this case, the *mod_op* field is used to select the *mod_bvalues* case of the mod_vals union.

serverctrls
(Input) A list of LDAP server controls. This parameter may be set to null. See LDAP Controls for more information about server controls.

clientctrls
(Input) A list of LDAP client controls. This parameter may be set to null. See LDAP Controls for more information about client controls.

Return Value

LDAP_SUCCESS
if the request was successful.

another LDAP error code
if the request was not successful.

Error Conditions

The **ldap_add_ext_s()** will return an LDAP error code if not successful. See "LDAP Client API Error Conditions" on page 303 for possible LDAP error code values.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_add_ext_s API.

Related Information

- "ldap_add()—Perform an LDAP Add Operation" on page 9 — Asynchronously add an entry.
- "ldap_add_s()—Perform an LDAP Add Operation (Synchronous)" — Synchronously add an entry.
- "ldap_add_ext()—Perform an LDAP Add Operation with Controls" on page 12 — Asynchronously add an entry with controls.
- "ldap_modify_ext_s()—Perform an LDAP Modify Entry Request with Controls" on page 113 — Synchronously modify an entry with controls.

The **ldap_add_ext_s()** API supports LDAP V3 server controls and client controls.

API introduced: V4R5

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_add_s()—Perform an LDAP Add Operation (Synchronous)

Syntax

```
#include <ldap.h>

int ldap_add_s(
        LDAP           *ld,
        const char     *dn,
        LDAPMod        **attrs)
```

Library Name/Service Program: QSYS/QGLDCLNT

Default Public Authority: *USE

Threadsafe: Yes

The **ldap_add_s()** function is used to perform synchronous LDAP add operation.

Authorities and Locks

No OS/400 authority is required. All authority checking is done by the LDAP server.

Parameters

ld (Input) The LDAP pointer returned by a previous call to "ldap_init()—Perform an LDAP Initialization Operation" on page 102, "ldap_ssl_init —Initializes an SSL Connection." on page 206, or "ldap_open()—Perform an LDAP Open Operation" on page 133.

dn (Input) The DN of the entry to add.

attrs (Input) The entry's attributes, specified using the LDAPMod structure, as defined for "ldap_modify()—Perform an LDAP Modify Entry Request" on page 108. The *mod_type* and

mod_vals fields should be filled in. The *mod_op* field is ignored unless ORed with the constant **LDAP_MOD_BVALUES**. In this case, the *mod_op* field is used to select the *mod_bvalues* case of the mod_vals union.

Return Value

LDAP_SUCCESS
if the request was successfully sent.

another LDAP error code
if the request was not successfully sent.

Error Conditions

If **ldap_add_s()** is not successful, *ld_errno* will be set to indicate the error. See "LDAP Client API Error Conditions" on page 303 for possible LDAP error code values.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_add_s API.

Related Information

- "ldap_add()—Perform an LDAP Add Operation" on page 9 — Asynchronously add an entry.
- "ldap_add_ext_s()—Perform an LDAP Add Operation with Controls (Synchronous)" on page 14 — Synchronously add an entry with controls.
- "ldap_add_ext()—Perform an LDAP Add Operation with Controls" on page 12 — Asynchronously add an entry with controls.
- "ldap_modify_s()—Perform an LDAP Modify Entry Request (Synchronous)" on page 115 — Synchronously modify an entry.

API introduced: V4R3

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

---

ldap_app_ssl_client_init_np()—Initialize the LDAP Client for a Secure Connection using DCM

Syntax

```
#include <ldap.h>
#include <ldapssl.h>

int ldap_app_ssl_client_init_np(
                       char *dcm_identifier,
                       int *pSSLReasonCode)
```

Library Name/Service Program: QSYS/QGLDCLNT

Default Public Authority: *USE

Threadsafe: Yes

The **ldap_app_ssl_client_init_np()** is an LDAP V3 function used to initialize the LDAP client using the Digital Certificate Manager (DCM) to control the digital certificate in preparation for making a secure connection (using Secure Sockets Layer (SSL)) to a LDAP server.

ldap_app_ssl_client_init_np() must be called prior to "ldap_app_ssl_init_np —Initializes an SSL Connection" on page 19 to establish a connection, and prior to any kind of **ldap_bind()**, whether it be an "ldap_sasl_bind_s()—Perform an LDAP SASL Bind Request (Synchronous)" on page 161 or an "ldap_simple_bind_s()—Perform a Simple LDAP Bind Request (Synchronous)" on page 201. **ldap_app_ssl_client_init_np()** must be called only once per job, while multiple **ldap_app_ssl_init_np()** or secure connections can be done, allowing one (DCM) initialization to be done for many connections. Once the secure connection is established all subsequent LDAP messages that flow over the secure connection are encrypted, including the **ldap_bind()** parameters, until "ldap_unbind()—Perform an LDAP Unbind Request" on page 211 is called.

Either "ldap_ssl_client_init —Initializes the SSL Library." on page 203 or **ldap_app_ssl_client_init_np()** (but not both) can be called in an application process. If you are not going to use SSL client authentication (LDAP SASL bind with the EXTERNAL mechanism), use "ldap_ssl_client_init —Initializes the SSL Library." on page 203.

Authorities and Locks

*R authority is needed to the selected Certificate Store and *X to the associated directories.

Parameters

dcm_identifier
: (Input) An identifier string that corresponds to a secure application registered with DCM. If NULL is used, then the default Directory Services client application ID will be used (QIBM_GLD_DIRSRV_CLIENT).

pSSLReasonCode
: (Output) A pointer to the SSL Reason Code, which provides additional information in the event that an error occurs during initialization of the SSL stack (when **ldap_app_ssl_client_init_np()** is called). See QSYSINC/H.LDAPSSL for reason codes that can be returned.

Examples

See Code disclaimer information for information pertaining to code examples.

The following scenario depicts the recommended calling sequence where the entire set of LDAP transactions are "protected" by using a secure SSL connection:

```
rc = ldap_app_ssl_client_init_np (dcm_identifier, &reasoncode);
ld = ldap_app_ssl_init_np(ldaphost, ldapport );
rc = ldap_set_option( ld, LDAP_OPT_SSL_CIPHER, &ciphers);
       rc = ldap_sasl_bind_s( ld, NULL, LDAP_MECHANISM_EXTERNAL, NULL, NULL, NULL );

...additional LDAP API calls

rc = ldap_unbind( ld );
```

The following scenario depicts the calling sequence for multiple connections using one DCM identifier:

```
rc = ldap_app_ssl_client_init_np (dcm_identifier, &reasoncode);
ld = ldap_app_ssl_init_np(ldaphost, ldapport );
rc = ldap_set_option( ld, LDAP_OPT_SSL_CIPHER, &ciphers);
       rc = ldap_sasl_bind_s( ld, NULL, LDAP_MECHANISM_EXTERNAL, NULL, NULL, NULL );

  /* For multiple secure connections using the same dcm_identifier. */
```

```
ld1 = ldap_app_ssl_init_np(ldaphost, ldapport );
       rc = ldap_sasl_bind_s( ld, NULL, LDAP_MECHANISM_EXTERNAL, NULL, NULL, NULL );

ld2 = ldap_app_ssl_init_np(ldaphost, ldapport );
       rc = ldap_sasl_bind_s( ld, NULL, LDAP_MECHANISM_EXTERNAL, NULL, NULL, NULL );

...additional LDAP API calls

rc = ldap_unbind( ld );
rc = ldap_unbind( ld1 );
rc = ldap_unbind( ld2 );
```

Return Value

LDAP_SUCCESS
if the request was successful.

another LDAP error code
if the request was not successful.

Error Conditions

If **ldap_app_ssl_client_init_np()** is not successful it will return an LDAP error code. See "LDAP Client API Error Conditions" on page 303 for possible LDAP error code values.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_ssl_client_init_np API.

Related Information

- "ldap_app_ssl_init_np —Initializes an SSL Connection" on page 19 — Initializes an SSL Connection.
- "ldap_app_ssl_start_np()—Start a Secure LDAP Connection using DCM" on page 21 — Start a Secure LDAP Connection using DCM.
- "ldap_ssl_client_init —Initializes the SSL Library." on page 203 — Initializes the SSL Library.
- "ldap_ssl_init —Initializes an SSL Connection." on page 206 — Initializes an SSL connection.
- "ldap_ssl_start()—Start a Secure LDAP Connection" on page 209 — Creates a secure SSL connection (deprecated).
- "ldap_bind()—Perform an LDAP Bind Request" on page 24 — Bind to the directory server.
- "ldap_sasl_bind_s()—Perform an LDAP SASL Bind Request (Synchronous)" on page 161 — Synchronously bind to the directory using Simple Authentication Security Layer (SASL).
- "ldap_unbind()—Perform an LDAP Unbind Request" on page 211 — unbind from the LDAP server and close the connection.

API introduced: V5R1

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_app_ssl_init_np —Initializes an SSL Connection

Syntax

```
#include <ldap.h>
#include <ldapssl.h>

LDAP *ldap_app_ssl_init_np(
       char       *host,
       int        port)
```

Library Name/Service Program: QSYS/QGLDCLNT

Default Public Authority: *USE

Threadsafe: Yes

The **ldap_app_ssl_init_np()** routine is used to initialize a secure SSL session with a server. Note that the server is not actually contacted until an operation is performed that requires it, allowing various options to be set after initialization. Once the secure connection is established, all subsequent LDAP messages that flow over the secure connection are encrypted, including the “ldap_simple_bind()—Perform a Simple LDAP Bind Request” on page 199 parameters, until “ldap_unbind()—Perform an LDAP Unbind Request” on page 211 is called.

Note that when connecting to an LDAP V2 server, one of the “ldap_simple_bind()—Perform a Simple LDAP Bind Request” on page 199 or “ldap_bind()—Perform an LDAP Bind Request” on page 24 calls must be completed before other operations can be performed on the session (with the exception of “ldap_set_option() — Set LDAP Options” on page 192/“ldap_get_option()—Retrieve LDAP Options” on page 92). The LDAP V3 protocol does not require a bind operation before performing other operations.

The ciphers for the encryption of the connection are based on the current Crypto Access Provider licensed program loaded: AC1, AC2 or AC3. See “ldap_get_option()—Retrieve LDAP Options” on page 92 or “ldap_set_option() — Set LDAP Options” on page 192 for more information on setting the ciphers to be used.

Authorities and Locks

*R authority is needed to the selected Certificate Store and *X to the associated directories.

Parameters

host (Input) Several methods are supported for specifying one or more target LDAP servers, including the following:

Explicit Host List	Specifies the name of the host on which the LDAP server is running. The host parameter may contain a blank-separated list of hosts to try to connect to, and each host may optionally be of the form host:port. If present, the :port overrides the *port* parameter. The following are typical examples: ld=ldap_app_ssl_init_np (“server1”, ldaps_port); ld=ldap_app_ssl_init_np (“server2:1200”, ldaps_port); ld=ldap_app_ssl_init_np (“server1:800 server2:2000 server3”, ldaps_port);
Localhost	If the host parameter is null, it is assumed that the LDAP server is running on the local host.

Default Hosts	If the host parameter is set to "ldaps://" the LDAP library will attempt to locate one or more default LDAP servers, with SSL ports, using the SecureWay "ldap_server_locate()— Locate Suitable LDAP Servers" on page 180 function. The *port* specified on the call is ignored, since **ldap_server_locate()** returns the port. For example, the following two are equivalent: ld=ldap_app_ssl_init_np ("ldaps://", ldaps_port); ld=ldap_app_ssl_init_np (LDAPS_URL_PREFIX, LDAPS_PORT); If more than one default server is located, the list is processed in sequence, until an active server is found. The LDAP URL can include a Distinguished Name, used as a filter for selecting candidate LDAP servers based on the server's suffix (or suffixes). If the most significant portion of the DN is an exact match with a server's suffix (after normalizing for case), the server is added to the list of candidate servers. For example, the following will only return default LDAP servers that have a suffix that supports the specified DN: ld=ldap_app_ssl_init_np ("ldaps:///cn=fred, dc=austin, dc=ibm, dc=com", LDAPS_PORT) In this case, a server that has a suffix of "dc=austin, dc=ibm, dc=com" would match. If more than one default server is located, the list is processed in sequence, until an active server is found. If the LDAP URL contains a host name and optional port, the host is used to create the connection. No attempt is made to locate the default server(s), and the DN, if present, is ignored. For example, the following two are equivalent: ld=ldap_app_ssl_init_np ("ldaps://myserver", LDAPS_PORT); ld=ldap_app_ssl_init_np ("myserver", LDAPS_PORT);
Local Socket	If the host parameter is prefixed with "/", the host parameter is assumed to be the name of a UNIX socket (that is, socket family is AF_UNIX) and *port* is ignored. This will fail for ldap_app_ssl_init_np() because UNIX sockets do not support SSL, nor is it necessary since data will not be flowing over the network.

Host with Privileged Port	If a specified host is prefixed with "privport://", then the LDAP library will use the **rresvport()** function to attempt to obtain one of the reserved ports (512 through 1023), instead of an "ephemeral" port. The search for a reserved port starts at 1023 and stops at 512. If a reserved port cannot be obtained, **ldap_app_ssl_init_np()** will fail.
	
	For example: ld=ldap_app_ssl_init_np ("privport://server1, ldaps_port");
	ld=ldap_app_ssl_init_np ("privport://server2:1200", ldaps_port);
	ld=ldap_app_ssl_init_np ("privport://server1:800 server2:2000 privport://server3", ldaps_port);

port (Input) The port number to which to connect. If the default IANA-assigned SSL port of 636 is desired, **LDAPS_PORT** should be specified. The value specified for this parameter is ignored in some situations; see the description for the *host* parameter.

Return Value

Session Handle
if the request was successful. The Session Handle returned by **ldap_app_ssl_init_np()** is a pointer to an opaque data type representing an LDAP session. The "ldap_get_option()—Retrieve LDAP Options" on page 92 and "ldap_set_option() — Set LDAP Options" on page 192 APIs are used to access and set a variety of session-wide parameters; see these APIs for more information.

NULL if the request was not successful.

Error Conditions

ldap_app_ssl_init_np() will return NULL if not successful.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_app_ssl_init_np API.

Related Information

- "ldap_app_ssl_client_init_np()—Initialize the LDAP Client for a Secure Connection using DCM" on page 16 — Initialize the Client for a Secure LDAP Connection using DCM.
- "ldap_ssl_client_init —Initializes the SSL Library." on page 203 — Initializes the SSL library.
- "ldap_app_ssl_start_np()—Start a Secure LDAP Connection using DCM" — Creates a secure SSL connection (deprecated).
- "ldap_ssl_start()—Start a Secure LDAP Connection" on page 209 — Creates a secure SSL connection (deprecated).

Example

See Code disclaimer information for information pertaining to code examples.

The following scenario depicts the recommended calling sequence where the entire set of LDAP transactions are protected by using a secure SSL connection:

```
rc = ldap_app_ssl_client_init_np (dcm_identifier, &reasoncode);
ld = ldap_app_ssl_init_np(ldaphost, ldapport );
rc = ldap_set_option( ld, LDAP_OPT_SSL_CIPHER, &ciphers);
       rc = ldap_sasl_bind_s( ld, NULL, LDAP_MECHANISM_EXTERNAL, NULL, NULL, NULL );

...additional LDAP API calls

rc = ldap_unbind( ld );
```

API introduced: V5R1

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_app_ssl_start_np()—Start a Secure LDAP Connection using DCM

Syntax

```
#include <ldap.h>
#include <ldapssl.h>

int ldap_app_ssl_start_np(LDAP *ld,
                    char *dcm_identifier)
```

Library Name/Service Program: QSYS/QGLDCLNT

Default Public Authority: *USE

Threadsafe: Yes

This is a deprecated API.

The **ldap_app_ssl_start_np()** function is used to start a secure connection (using Secure Sockets Layer (SSL)) to an LDAP server using the Digital Certificate Manager (DCM) to control the digital certificate.

ldap_app_ssl_start_np() must be called after **ldap_open()** and prior to **ldap_bind()**. Once the secure connection is established for the *ld*, all subsequent LDAP messages that flow over the secure connection are encrypted, including the **ldap_bind()** parameters, until **ldap_unbind()** is called.

Authorities and Locks

*R authority is needed to the selected Certificate Store and *X to the associated directories.

Parameters

ld (Input) The LDAP pointer returned by a previous call to "ldap_init()—Perform an LDAP Initialization Operation" on page 102, "ldap_ssl_init —Initializes an SSL Connection." on page 206, or "ldap_open()—Perform an LDAP Open Operation" on page 133.

dcm_identifier
(Input) An identifier string that corresponds to a secure application registered with DCM. The use of NULL assumes that in a prior use of the this API a valid DCM identifier for an application has been used and that it is to be used again for this connection. This allows multiple connections without going through the initialization of SSL with a DCM identifier more than once.

Return Value

LDAP_SUCCESS
if the request was successful.

another LDAP error code
if the request was not successful.

Error Conditions

ldap_app_ssl_start_np() will return an LDAP error code if not successful. See "LDAP Client API Error Conditions" on page 303 for possible LDAP error code values. Depending on the error code, **errno** information also may be available.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_app_ssl_start_np API.

Related Information

- "ldap_app_ssl_client_init_np()—Initialize the LDAP Client for a Secure Connection using DCM" on page 16 — Initialize the Client for a Secure LDAP Connection using DCM
- "ldap_ssl_client_init —Initializes the SSL Library." on page 203 — Initializes the SSL Library
- "ldap_ssl_init —Initializes an SSL Connection." on page 206 — Initializes an SSL connection
- "ldap_ssl_start()—Start a Secure LDAP Connection" on page 209 — Creates a secure SSL connection
- "ldap_bind()—Perform an LDAP Bind Request" on page 24 — Bind to the directory server
- "ldap_unbind()—Perform an LDAP Unbind Request" on page 211 — Unbind from the LDAP server and close the connection
- "ldap_open()—Perform an LDAP Open Operation" on page 133 — Open a connection to an LDAP server

Example

See Code disclaimer information for information pertaining to code examples.

The following scenario depicts the recommended calling sequence where the entire set of LDAP transactions are "protected" by using a secure SSL connection, including the dn and password that flow on the **ldap_simple_bind()**:

```
ld = ldap_open (ldaphost, ldapport );
rc = ldap_app_ssl_start_np(ld, dcm_identifier );
rc = ldap_simple_bind_s(ld, binddn, passwd);

...additional LDAP API calls

rc = ldap_unbind( ld );
```

The following scenario depicts the calling sequence for multiple connections using one DCM identifier:

```
ld = ldap_open (ldaphost, ldapport );
rc = ldap_app_ssl_start_np(ld, dcm_identifier );
rc = ldap_simple_bind_s(ld, binddn, passwd);

    /* For multiple secure connections using the same dcm_identifier.  */

ld1 = ldap_open (ldaphost, ldapport );
       rc = ldap_app_ssl_start_np(ld1, NULL );
rc = ldap_simple_bind_s(ld1, binddn, passwd);

ld2 = ldap_open (ldaphost, ldapport );
rc = ldap_app_ssl_start_np(ld2, NULL );
rc = ldap_simple_bind_s(ld2, binddn, passwd);

...additional LDAP API calls

rc = ldap_unbind( ld );
rc = ldap_unbind( ld1 );
rc = ldap_unbind( ld2 );
```

API introduced: V4R4

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_ber_free()—Free storage allocated by the LDAP library

Syntax

```
#include <ldap.h>

void ldap_ber_free(
                BerElement   *berptr)
```

Library Name/Service Program: QSYS/QGLDCLNT

Default Public Authority: *USE

Threadsafe: Yes

The **ldap_ber_free()** routine is used to free the BerElement pointed to by *berptr*.

Authorities and Locks

No OS/400 authority is required.

Parameters

berptr (Input) The address of the BerElement to be freed, as returned from **ldap_first_attribute()** and **ldap_next_attribute()**.

Return Value

None.

Error Conditions

The **ldap_ber_free()** API does not return an error code.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_ber_free API.

Related Information

- "ldap_first_attribute()—Retrieve First Attribute in an Entry" on page 75 — Retrieve First Attribute in an Entry
- "ldap_next_attribute()—Retrieve Next Attribute in an Entry" on page 127 — Retrieve Next Attribute in an Entry

API introduced: V4R5

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

---

ldap_bind()—Perform an LDAP Bind Request

Syntax

```
#include <ldap.h>

int ldap_bind(
       LDAP            *ld,
       const char      *dn,
       const char      *cred,
       int             method)
```

Library Name/Service Program: QSYS/QGLDCLNT

Default Public Authority: *USE

Threadsafe: Yes

The **ldap_bind()** function provides general authentication routines, where in principle an authentication method can be chosen. In this toolkit, method must be set to **LDAP_AUTH_SIMPLE**.

The **ldap_bind()** function is used to authenticate a distinguished name (DN) to a directory server. When connecting to an LDAP V2 server, after a connection is made by using the **ldap_open()** API, an LDAP bind API must be called before any other LDAP APIs can be called for that connection. Binding the connection is not required for LDAP V3.

ldap_bind() is an asynchronous request. The result of the operation can be obtained by a subsequent call to **ldap_result()**.

Since this API is deprecated, "ldap_simple_bind()—Perform a Simple LDAP Bind Request" on page 199 should be used instead.

Authorities and Locks

No OS/400 authority is required. All authority checking is done by the LDAP server.

Parameters

ld (Input) The LDAP pointer returned by a previous call to "ldap_init()—Perform an LDAP Initialization Operation" on page 102, "ldap_ssl_init —Initializes an SSL Connection." on page 206, or "ldap_open()—Perform an LDAP Open Operation" on page 133.

dn (Input) The distinguished name of the entry to bind as.

cred (Input) The credentials with which to authenticate. Arbitrary credentials can be passed using this parameter. In most cases, this is the user's password.

method
(Input) Selects the authentication method to use. Specify **LDAP_AUTH_SIMPLE** for simple authentication. Simple authentication is the only supported method.

Note that use of the **ldap_bind()** API is deprecated.

Return Value

Message ID of the Initiated Request
if the **ldap_bind()** was successful.

-1 if the request was not successful.

Error Conditions

If **ldap_bind()** is not successful, *ld_errno* will be set to indicate the error. See "LDAP Client API Error Conditions" on page 303 for possible LDAP error code values. Use "ldap_get_errno()—Retrieve Error Information" on page 87 function to retrieve the error information.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_bind API.

Related Information

- "ldap_bind_s()—Perform an LDAP Bind Request (Synchronous)" on page 26 — Synchronously bind to the directory (deprecated).
- "ldap_sasl_bind()—Perform an LDAP SASL Bind Request" on page 159 — Asynchronously bind to the directory using SASL.

- "ldap_sasl_bind_s()—Perform an LDAP SASL Bind Request (Synchronous)" on page 161 — Synchronously bind to the directory using SASL.
- "ldap_simple_bind()—Perform a Simple LDAP Bind Request" on page 199 — Asynchronously bind to the directory using simple authentication.
- "ldap_simple_bind_s()—Perform a Simple LDAP Bind Request (Synchronous)" on page 201 — Synchronously bind to the directory using simple authentication.
- "ldap_unbind()—Perform an LDAP Unbind Request" on page 211 — Asynchronously unbind from the LDAP server and close the connection.
- "ldap_unbind_s()—Perform an LDAP Unbind Request (Synchronous)" on page 214 — Synchronously unbind from the LDAP server and close the connection.
- "ldap_set_rebind_proc()—Set Rebind Procedure" on page 198 — Sets the entry-point of a routine during the chasing of referrals.

API introduced: V4R3

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_bind_s()—Perform an LDAP Bind Request (Synchronous)

Syntax

```
#include <ldap.h>

int ldap_bind_s(
       LDAP            *ld,
       const char      *dn,
       const char      *cred,
       int             method)
```

Library Name/Service Program: QSYS/QGLDCLNT

Default Public Authority: *USE

Threadsafe: Yes

The **ldap_bind_s()** function provide synchronous general authentication routines, where in principle an authentication method can be chosen. In this toolkit, method must be set to **LDAP_AUTH_SIMPLE**.

The **ldap_bind_s()** function is used to authenticate a distinguished name (DN) to a directory server. When connecting to an LDAP V2 server, after a connection is made by using the **ldap_open()** API, an LDAP bind API must be called before any other LDAP APIs can be called for that connection. Binding the connection is not required for LDAP V3.

ldap_bind_s() is synchronous request.

Since this APIs is deprecated, "ldap_simple_bind_s()—Perform a Simple LDAP Bind Request (Synchronous)" on page 201 should be used instead.

Authorities and Locks

No OS/400 authority is required. All authority checking is done by the LDAP server.

Parameters

ld (Input) The LDAP pointer returned by a previous call to "ldap_init()—Perform an LDAP Initialization Operation" on page 102, "ldap_ssl_init —Initializes an SSL Connection." on page 206, or "ldap_open()—Perform an LDAP Open Operation" on page 133.

dn (Input) The distinguished name of the entry to bind as.

cred (Input) The credentials with which to authenticate. Arbitrary credentials can be passed using this parameter. In most cases, this is the user's password.

method
(Input) Selects the authentication method to use. Specify **LDAP_AUTH_SIMPLE** for simple authentication. Simple authentication is the only supported method.

Note that use of the **ldap_bind_s()** APIs is deprecated.

Return Value

LDAP_SUCCESS
if the request was successful.

another LDAP error code
if the request was not successful.

Error Conditions

The **ldap_bind_s()** API will return an LDAP error code if not successful. See "LDAP Client API Error Conditions" on page 303 for possible LDAP error code values.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_bind_s API.

Related Information

- "ldap_bind()—Perform an LDAP Bind Request" on page 24 — Asynchronously bind to the directory (deprecated).
- "ldap_sasl_bind()—Perform an LDAP SASL Bind Request" on page 159 — Asynchronously bind to the directory using SASL.
- "ldap_sasl_bind_s()—Perform an LDAP SASL Bind Request (Synchronous)" on page 161 — Synchronously bind to the directory using SASL.
- "ldap_simple_bind()—Perform a Simple LDAP Bind Request" on page 199 — Asynchronously bind to the directory using simple authentication.
- "ldap_simple_bind_s()—Perform a Simple LDAP Bind Request (Synchronous)" on page 201 — Synchronously bind to the directory using simple authentication.
- "ldap_unbind()—Perform an LDAP Unbind Request" on page 211 — Asynchronously unbind from the LDAP server and close the connection.
- "ldap_unbind_s()—Perform an LDAP Unbind Request (Synchronous)" on page 214 — Synchronously unbind from the LDAP server and close the connection.
- "ldap_set_rebind_proc()—Set Rebind Procedure" on page 198 — Sets the entry-point of a routine during the chasing of referrals.

API introduced: V4R3

ldap_compare()—Perform an LDAP Compare Operation

Syntax

```
#include <ldap.h>


int ldap_compare(
       LDAP           *ld,
       const char     *dn,
       const char     *attr,
       const char     *value)
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_compare()** function is used to perform an LDAP compare operation. The API uses as input the distinguished name (DN) of the entry on which to perform the compare, and uses an *attr* and *value* (the attribute type and value to compare to those found in the entry).

Binary values are not supported by this API. Use "ldap_compare_ext()—Perform an LDAP Compare Operation with Controls" on page 29 if binary values must be compared.

ldap_compare() is an asynchronous request. The result of the operation can be obtained by a subsequent call to "ldap_result()—Retrieve Result of an Asynchronous LDAP Operation" on page 156.

Authorities and Locks

No OS/400 authority is required. All authority checking is done by the LDAP server.

Parameters

ld (Input) The LDAP pointer returned by a previous call to "ldap_init()—Perform an LDAP Initialization Operation" on page 102, "ldap_ssl_init —Initializes an SSL Connection." on page 206, or "ldap_open()—Perform an LDAP Open Operation" on page 133.

dn (Input) The DN of the entry upon which to perform the compare.

attr (Input) The attribute type to use in the comparison.

value (Input) The string attribute value to compare against the value in the entry.

Return Value

Message ID of the Operation Initiated
if the request was successful.

-1 if the request was not successful.

Error Conditions

If **ldap_compare()** is not successful, *ld_errno* will be set to indicate the error. See "LDAP Client API Error Conditions" on page 303 for possible LDAP error code values. Use "ldap_get_errno()—Retrieve Error Information" on page 87 function to retrieve the error information.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_compare API.

Related Information

- "ldap_compare_s()—Perform an LDAP Compare Operation (Synchronous)" on page 33 — Synchronous compare to a directory entry.
- "ldap_compare_ext()—Perform an LDAP Compare Operation with Controls" — Asynchronous compare to a directory entry with controls.
- "ldap_compare_ext_s()—Perform an LDAP Compare Operation with Controls (Synchronous)" on page 31 — Synchronous compare to a directory entry with controls.

API introduced: V4R3

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

---

ldap_compare_ext()—Perform an LDAP Compare Operation with Controls

Syntax

```
#include <ldap.h>

struct berval {
                unsigned long    bv_len;
                char             *bv_val;
 };

int ldap_compare_ext(
                LDAP          *ld,
                const char    *dn,
                const char    *attr,
                const berval  *bvalue,
                LDAPControl  **serverctrls,
                LDAPControl  **clientctrls,
                int           *msgidp)
```

Library Name/Service Program: QSYS/QGLDCLNT

Default Public Authority: *USE

Threadsafe: Yes

The **ldap_compare_ext()** function is used to perform an LDAP compare operation with controls. The **ldap_compare_ext()** API initiates an asynchronous compare operation and returns the constant **LDAP_SUCCESS** if the request was successfully sent, or another LDAP error code if not.

Authorities and Locks

No OS/400 authority is required.

Parameters

ld (Input) The LDAP pointer returned by a previous call to "ldap_init()—Perform an LDAP Initialization Operation" on page 102, "ldap_ssl_init —Initializes an SSL Connection." on page 206, or "ldap_open()—Perform an LDAP Open Operation" on page 133.

dn (Input The distinguished name (DN) of the entry upon which to perform the compare.

attr (Input) The attribute type to use in the comparison.

bvalue (Input) The attribute value to compare against the value in the entry. This is a pointer to a struct berval, making it possible to compare binary values.

serverctrls
(Input) Specifies a list of LDAP server controls. This parameter may be set to null. See LDAP Controls for more information about server controls.

clientctrls
(Input) A list of LDAP client controls. This parameter may be set to null. See LDAP Controls for more information about client controls.

msgidp
(Output) This result parameter is set to the message ID of the request if the **ldap_compare_ext()** call succeeds.

Return Value

LDAP_SUCCESS
if the request was successfully sent. If successful, **ldap_compare_ext()** places the message ID of the request in **msgidp*. A subsequent call to "ldap_result()—Retrieve Result of an Asynchronous LDAP Operation" on page 156 can be used to obtain the result of the operation. Once the operation has completed, "ldap_result()—Retrieve Result of an Asynchronous LDAP Operation" on page 156 returns a result that contains the status of the operation in the form of an error code. The error code indicates if the operation completed successful (**LDAP_COMPARE_TRUE** or **LDAP_COMPARE_FALSE**).

another LDAP error code
if the request was not successful.

Error Conditions

The **ldap_compare_ext()** API will return an LDAP error code if not successful. See "LDAP Client API Error Conditions" on page 303 for possible LDAP error code values.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_compare_ext API.

Related Information

- "ldap_compare()—Perform an LDAP Compare Operation" on page 28 — Asynchronous compare to a directory entry.
- "ldap_compare_s()—Perform an LDAP Compare Operation (Synchronous)" on page 33 — Synchronous compare to a directory entry.
- "ldap_compare_ext_s()—Perform an LDAP Compare Operation with Controls (Synchronous)" — Synchronous compare to a directory entry with controls.

The **ldap_compare_ext()** API supports LDAP V3 server controls and client controls.

API introduced: V4R5

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

---

ldap_compare_ext_s()—Perform an LDAP Compare Operation with Controls (Synchronous)

Syntax

```
#include <ldap.h>

struct berval {
                unsigned long    bv_len;
                char             *bv_val;
 };

int ldap_compare_ext_s(
                LDAP           *ld,
                const char     *dn,
                const char     *attr,
                const berval   *bvalue,
                LDAPControl   **serverctrls,
                LDAPControl   **clientctrls)
```

Library Name/Service Program: QSYS/QGLDCLNT

Default Public Authority: *USE

Threadsafe: Yes

The **ldap_compare_ext_s()** function is used to perform a synchronous LDAP compare operation with controls.

Authorities and Locks

No OS/400 authority is required. All authority checking is done by the LDAP server.

Parameters

ld (Input) The LDAP pointer returned by a previous call to "ldap_init()—Perform an LDAP Initialization Operation" on page 102, "ldap_ssl_init —Initializes an SSL Connection." on page 206, or "ldap_open()—Perform an LDAP Open Operation" on page 133.

dn (Input) The distinguished name (DN) of the entry upon which to perform the compare.

attr (Input) The attribute type to use in the comparison.

bvalue
(Input) The attribute value to compare against the value in the entry. This is a pointer to a struct berval, making it possible to compare binary values.

serverctrls
(Input) A list of LDAP server controls. This parameter may be set to null. See LDAP Controls for more information about server controls.

clientctrls
(Input) A list of LDAP client controls. This parameter may be set to null. See LDAP Controls for more information about client controls.

Return Value

LDAP_COMPARE_TRUE
if the entry contains the attribute value.

LDAP_COMPARE_FALSE
if the entry does not contain the attribute value.

another LDAP error code
if the request was not successful.

Error Conditions

The **ldap_compare_ext_s()** API will return an LDAP error code if not successful. See "LDAP Client API Error Conditions" on page 303 for possible LDAP error code values.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_compare_ext_s API.

Related Information

- "ldap_compare()—Perform an LDAP Compare Operation" on page 28 — Asynchronous compare to a directory entry.
- "ldap_compare_s()—Perform an LDAP Compare Operation (Synchronous)" on page 33 — Synchronous compare to a directory entry.
- "ldap_compare_ext()—Perform an LDAP Compare Operation with Controls" on page 29 — Asynchronous compare to a directory entry with controls.

The **ldap_compare_ext_s()** API supports LDAP V3 server controls and client controls.

API introduced: V4R5

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_compare_s()—Perform an LDAP Compare Operation (Synchronous)

Syntax

```
#include <ldap.h>

int ldap_compare_s(
       LDAP           *ld,
       const char     *dn,
       const char     *attr,
       const char     *value)
```

Library Name/Service Program: QSYS/QGLDCLNT

Default Public Authority: *USE

Threadsafe: Yes

The **ldap_compare_s()** function is used to perform an LDAP compare operation. The API uses as input the distinguished name (DN) of the entry on which to perform the compare, and uses an *attr* and *value* (the attribute type and value to compare to those found in the entry).

Binary values are not supported by this API. Use "ldap_compare_ext_s()—Perform an LDAP Compare Operation with Controls (Synchronous)" on page 31 if binary values must be compared.
ldap_compare_s() is a synchronous request.

Authorities and Locks

No OS/400 authority is required. All authority checking is done by the LDAP server.

Parameters

ld (Input) The LDAP pointer returned by a previous call to "ldap_init()—Perform an LDAP Initialization Operation" on page 102, "ldap_ssl_init —Initializes an SSL Connection." on page 206, or "ldap_open()—Perform an LDAP Open Operation" on page 133.

dn (Input) The distinguished name (DN) of the entry upon which to perform the compare.

attr (Input) The attribute type to use in the comparison.

value (Input) The string attribute value to compare against the value in the entry.

Return Value

LDAP_COMPARE_TRUE
if the entry contains the attribute value.

LDAP_COMPARE_FALSE
if the entry does not contain the attribute value.

another LDAP error code
if the request was not successful.

Error Conditions

The **ldap_compare_s()** API will return an LDAP error code if not successful. See "LDAP Client API Error Conditions" on page 303 for possible LDAP error code values.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_compare_s API.

Related Information

- "ldap_compare()—Perform an LDAP Compare Operation" on page 28 — Asynchronous compare to a directory entry.
- "ldap_compare_ext()—Perform an LDAP Compare Operation with Controls" on page 29 — Asynchronous compare to a directory entry with controls.
- "ldap_compare_ext_s()—Perform an LDAP Compare Operation with Controls (Synchronous)" on page 31 — Synchronous compare to a directory entry with controls.

API introduced: V4R3

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

---

ldap_controls_free()—Free storage allocated by the LDAP library

Syntax

```
#include <ldap.h>

void ldap_controls_free(LDAPControl  **ctrls)
```

Library Name/Service Program: QSYS/QGLDCLNT

Default Public Authority: *USE

Threadsafe: Yes

The **ldap_controls_free()** routine is used to free storage allocated by the LDAP APIs that uses an array of LDAPControl structure.

Authorities and Locks

No OS/400 authority is required.

Parameters

ctrls (Input) The address of an LDAPControl list, represented as a NULL-terminated array of pointers to LDAPControl structures.

Return Value

None.

Error Conditions

The **ldap_controls_free()** API does not return an error code.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_controls_free API.

Related Information

- "ldap_ber_free()—Free storage allocated by the LDAP library" on page 23 — Free storage allocatd for BerElement structure.
- "ldap_memfree()—Free Memory Allocated by LDAP API" on page 106 — Free storage that has been allocated by the LDAP client library.
- "ldap_control_free()—Free storage allocated by the LDAP library" — Free a single LDAPControl structure.
- "ldap_msgfree()—Free LDAP Result Message" on page 122 — Free LDAP Result Message.
- "ldap_mods_free()—Free LDAP Modify Storage" on page 121 — Free an array of pointers to mod structures.
- "ldap_parse_result()—Extract Information from Results" on page 143 — Extract Information from Results

API introduced: V4R5

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_control_free()—Free storage allocated by the LDAP library

Syntax

```
#include <ldap.h>

void ldap_control_free(LDAPControl  *ctrl)
```

Library Name/Service Program: QSYS/QGLDCLNT

Default Public Authority: *USE

Threadsafe: Yes

The **ldap_control_free()** routine is used to free storage allocated by the LDAP APIs that uses an LDAPControl structure.

Authorities and Locks

No OS/400 authority is required.

Parameters

ctrl (Input) The address of an LDAPControl structure.

Return Value

None.

Error Conditions

The **ldap_control_free()** API does not return an error code.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_control_free API.

Related Information

- "ldap_controls_free()—Free storage allocated by the LDAP library" on page 34 — Free an array of LDAPControl structures.
- "ldap_parse_result()—Extract Information from Results" on page 143 — Extract Information from Results

API introduced: V4R5

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

---

ldap_copy_controls()—Make a Copy of the List of LDAP Server Controls

Syntax

```
#include <ldap.h>

int ldap_copy_controls(
             LDAPControl ***to_here,
             LDAPControl **from)
```

Library Name/Service Program: QSYS/QGLDCLNT

Default Public Authority: *USE

Threadsafe: Yes

The **ldap_copy_controls()** function is used to make a copy of the list of LDAP server controls.

Authorities and Locks

No OS/400 authority is required. All authority checking is done by the LDAP server.

Parameters

to_here
(Input) Specifies the location to which to copy the control list. See LDAP Controls for more information about server controls.

from (Input) Specifies the location of the control list to be copied. See LDAP Controls for more information about server controls.

Return Value

LDAP_SUCCESS
if the request was successful.

LDAP_NO_MEMORY
if the control list could not be copied.

Related Information

- "ldap_insert_control()—Insert a Control in the Llist of LDAP Server Controls" on page 104 — Insert a control in the list of LDAP server controls.
- "ldap_add_control()—Create a Control and Insert it into the List of LDAP Server Controls" on page 11 — Add a new LDAP server control.
- "ldap_remove_control()—Remove a Control from the List of LDAP Server Controls" on page 151 — Remove a control from the list of LDAP server controls.

API introduced: V5R3

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

---

ldap_count_attributes()—Retrieve Count of Attributes for an LDAP Entry

Syntax

```
#include <ldap.h>

int ldap_count_attributes(
       LDAP           *ld,
       LDAPMessage    *entry)
```

Library Name/Service Program: QSYS/QGLDCLNT

Default Public Authority: *USE

Threadsafe: Yes

The **ldap_count_attributes()** function returns a count of the number of attributes in an LDAP entry.

Authorities and Locks

No OS/400 authority is required.

Parameters

ld (Input) The LDAP pointer returned by a previous call to "ldap_init()—Perform an LDAP Initialization Operation" on page 102, "ldap_ssl_init —Initializes an SSL Connection." on page 206, or "ldap_open()—Perform an LDAP Open Operation" on page 133.

entry (Input) The attribute information as returned by "ldap_first_entry()—Retrieve First LDAP Entry" on page 77 or "ldap_next_entry()—Retrieve Next LDAP Entry" on page 129.

Return Value

Number of Attributes
if the request was successful.

-1 if the request was not successful.

Error Conditions

The **ldap_count_attributes()** API returns -1 if a null entry is passed as input to **ldap_count_attributes()**.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_count_attributes API.

Related Information

- "ldap_first_attribute()—Retrieve First Attribute in an Entry" on page 75 — Return first attribute name in an entry.
- "ldap_next_attribute()—Retrieve Next Attribute in an Entry" on page 127 — Return next attribute name in an entry.
- "ldap_first_entry()—Retrieve First LDAP Entry" on page 77 — Retrieve First LDAP Entry
- "ldap_next_entry()—Retrieve Next LDAP Entry" on page 129 — Retrieve Next LDAP Entry

API introduced: V4R3

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

---

ldap_count_entries()—Retrieve Count of LDAP Entries

Syntax

```
#include <ldap.h>

int ldap_count_entries(
       LDAP           *ld,
       LDAPMessage    *result)
```

Library Name/Service Program: QSYS/QGLDCLNT

Default Public Authority: *USE

Threadsafe: Yes

The **ldap_count_entries()** API returns the number of entries contained in a search result chain. It can also be used to count the number of entries that remain in a chain if called with a message, entry or continuation reference returned by **ldap_first_message()**, **ldap_next_message()**, **ldap_first_entry()**, **ldap_next_entry()**, **ldap_first_reference()** or **ldap_next_reference()**, respectively.

Authorities and Locks

No OS/400 authority is required.

Parameters

ld (Input) The LDAP pointer returned by a previous call to "ldap_init()—Perform an LDAP Initialization Operation" on page 102, "ldap_ssl_init —Initializes an SSL Connection." on page 206, or "ldap_open()—Perform an LDAP Open Operation" on page 133.

result (Input) The result returned by a call to "ldap_result()—Retrieve Result of an Asynchronous LDAP Operation" on page 156 or by one of synchronous search routines ("ldap_search_s()—Perform an LDAP Search Operation (Synchronous)" on page 171 or "ldap_search_st()—Perform an LDAP Search Operation (Timed Synchronous)" on page 173).

Return Value

Number of Entries
If the request is successful, **ldap_count_entries()** returns the number of entries contained in a search result chain. It can also be used to count the number of entries that remain in a chain if called with a message, entry or continuation reference.

-1 if the request was not successful.

Error Conditions

If **ldap_count_entries()** is not successful, *ld_errno* will be set to indicate the error. See "LDAP Client API Error Conditions" on page 303 for possible LDAP error code values. Use "ldap_get_errno()—Retrieve Error Information" on page 87 function to retrieve the error information.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_count_entries API.

Related Information

- "ldap_first_entry()—Retrieve First LDAP Entry" on page 77 — Return first entry in a chain of search results.
- "ldap_next_entry()—Retrieve Next LDAP Entry" on page 129 — Return next entry in a chain of search results.
- "ldap_get_entry_controls_np()—Extract Server Controls from an Entry" on page 85 — Extract server controls from an entry.
- "ldap_first_reference()—Retrieve First Continuation Reference in a Chain of Search Results" on page 80 — Return first continuation reference in a chain of search results.
- "ldap_next_reference()—Retrieve the next Continuation Reference in a Chain of Search Results" on page 132 — Return next continuation reference in a chain of search results.
- "ldap_count_references()—Count continuation references in a chain of search results" on page 41 — Return number of continuation reference in a chain of search results.
- "ldap_parse_reference_np()—Extract Information from a Continuation Reference" on page 141 — Extract information from a continuation reference.

API introduced: V4R3

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_count_messages()—Count messages in a result chain

Syntax

```
#include <ldap.h>

int ldap_count_messages(LDAP           *ld,
                        LDAPMessage    *result)
```

Library Name/Service Program: QSYS/QGLDCLNT

Default Public Authority: *USE

Threadsafe: Yes

The **ldap_count_messages()** routine is used to step through the list of messages in a result chain, as returned by "ldap_result()—Retrieve Result of an Asynchronous LDAP Operation" on page 156. It is used to count the number of messages returned. The "ldap_msgtype()—Retrieve the Type of an LDAP Message" on page 126 API can be used to distinguish between the different message types.

In addition to returning the number of messages contained in a chain of results, the **ldap_count_messages()** API can be used to count the number of messages that remain in a chain if called with a message, entry, or reference returned by **ldap_first_message()**, **ldap_next_message()**, **ldap_first_entry()**, **ldap_next_entry()**, **ldap_first_reference()** and **ldap_next_reference()**.

Authorities and Locks

No OS/400 authority is required.

Parameters

ld (Input) The LDAP pointer returned by a previous call to "ldap_init()—Perform an LDAP Initialization Operation" on page 102, "ldap_ssl_init —Initializes an SSL Connection." on page 206, or "ldap_open()—Perform an LDAP Open Operation" on page 133.

result (Input) The result returned by a call to **ldap_result()** or one of the synchronous search routines ("ldap_search_s()—Perform an LDAP Search Operation (Synchronous)" on page 171, "ldap_search_st()—Perform an LDAP Search Operation (Timed Synchronous)" on page 173, or "ldap_search_ext_s — Synchronously Search the Directory Using Controls" on page 168).

Return Value

Number of Messages
If the request was successful, **ldap_count_messages()** API retuns the number of messages in a result chain or number of messages that remain in a chain, as returned by **ldap_result()**.

-1 if the request was not successful.

Error Conditions

If **ldap_count_messages()** is not successful, *ld_errno* will be set to indicate the error. See "LDAP Client API Error Conditions" on page 303 for possible LDAP error code values. Use "ldap_get_errno()—Retrieve Error Information" on page 87 function to retrieve the error information.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_count_messages API.

Related Information

- "ldap_first_message()—Retrieve First LDAP Message" on page 79 — Return first message in a result chain.
- "ldap_next_message()—Retrieve Next LDAP Message" on page 130 — Return next message in a result chain.

API introduced: V4R5

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_count_references()—Count continuation references in a chain of search results

Syntax

```
#include <ldap.h>


int ldap_count_references(LDAP         *ld,
                          LDAPMessage  *result)
```

Library Name/Service Program: QSYS/QGLDCLNT

Default Public Authority: *USE

Threadsafe: Yes

The **ldap_count_references()** API is used to count the number of continuation references returned. It can also be used to count the number of continuation references that remain in a chain.

Authorities and Locks

No OS/400 authority is required.

Parameters

ld (Input) The LDAP pointer returned by a previous call to "ldap_init()—Perform an LDAP Initialization Operation" on page 102, "ldap_ssl_init —Initializes an SSL Connection." on page 206, or "ldap_open()—Perform an LDAP Open Operation" on page 133.

result (Input) The result returned by a call to "ldap_result()—Retrieve Result of an Asynchronous LDAP Operation" on page 156 or one of the synchronous search routines ("ldap_search_s()—Perform an LDAP Search Operation (Synchronous)" on page 171, "ldap_search_st()—Perform an LDAP Search Operation (Timed Synchronous)" on page 173, or "ldap_search_ext_s — Synchronously Search the Directory Using Controls" on page 168).

Return Value

Number of continuation reference
If the request was successful, **ldap_count_references()** API returns the number of continuation references in a result chain or number of continuation references that remain in a chain, as returned by **ldap_result()**.

-1 if the request was not successful.

Error Conditions

If **ldap_count_references()** is not successful, *ld_errno* will be set to indicate the error. See "LDAP Client API Error Conditions" on page 303 for possible LDAP error code values. Use "ldap_get_errno()—Retrieve Error Information" on page 87 function to retrieve the error information.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_count_references API.

Related Information

- "ldap_first_reference()—Retrieve First Continuation Reference in a Chain of Search Results" on page 80 — Return first continuation reference in a result chain, as returned by ldap_result.
- "ldap_next_reference()—Retrieve the next Continuation Reference in a Chain of Search Results" on page 132 — Return next continuation reference in a result chain, as returned by ldap_result.

API introduced: V4R5

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

---

ldap_count_values()—Retrieve Count of Attribute Values

Syntax

```
#include <ldap.h>


int ldap_count_values(
          char          **vals)
```

Library Name/Service Program: QSYS/QGLDCLNT

Default Public Authority: *USE

Threadsafe: Yes

The **ldap_count_values()** function returns the number of values in the array returned by the "ldap_get_values()—Retrieve a Set of Attribute Values from an Entry" on page 99 function.

Authorities and Locks

No OS/400 authority is required.

Parameters

vals (Input) A pointer to a null-terminated array of attribute values, as returned by "ldap_get_values()—Retrieve a Set of Attribute Values from an Entry" on page 99.

Return Value

Number of Values
if the request is successful, **ldap_count_values()** returns the number of values in the array returned by the "ldap_get_values()—Retrieve a Set of Attribute Values from an Entry" on page 99 function.

-1 if the request was not successful.

Error Conditions

If **ldap_count_values()** is not successful, *ld_errno* will be set to indicate the error. See "LDAP Client API Error Conditions" on page 303 for possible LDAP error code values. Use "ldap_get_errno()—Retrieve Error Information" on page 87 function to retrieve the error information.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_count_values API.

Related Information

- "ldap_get_values()—Retrieve a Set of Attribute Values from an Entry" on page 99 — Return an attribute's values.
- "ldap_get_values_len()—Retrieve a Set of Binary Attribute Values" on page 100 — Return an attribute's binary values.
- "ldap_count_values_len()—Retrieve Count of Binary Attribute Values" on page 44 — Return number of binary values.
- "ldap_value_free()—Free Memory Allocated by ldap_get_values()" on page 225 — Free memory allocated by ldap_get_values.
- "ldap_value_free_len()—Free Memory Allocated by ldap_get_values_len()" on page 226 — Free memory allocated by ldap_get_values_len.

API introduced: V4R3

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_count_values_len()—Retrieve Count of Binary Attribute Values

Syntax

```
#include <ldap.h>

struct berval {
        unsigned long bv_len;
        char  *bv_val;
};

int ldap_count_values_len(
          struct berval **bvals)
```

Library Name/Service Program: QSYS/QGLDCLNT

Default Public Authority: *USE

Threadsafe: Yes

The **ldap_count_values_len()** function returns the number of values in the array returned by the "ldap_get_values_len()—Retrieve a Set of Binary Attribute Values" on page 100 function. The array of values returned can be freed by calling "ldap_value_free_len()—Free Memory Allocated by ldap_get_values_len()" on page 226.

Authorities and Locks

No OS/400 authority is required.

Parameters

bvals (Input) A pointer to a null-terminated array of pointers to berval structures, as returned by "ldap_get_values_len()—Retrieve a Set of Binary Attribute Values" on page 100.

Return Value

Number of Values
if the request is successful, **ldap_count_values_len()** returns the number of values in the array returned by the "ldap_get_values_len()—Retrieve a Set of Binary Attribute Values" on page 100 function.

-1 if the request was not successful.

Error Conditions

if **ldap_count_values_len()** is not successful, *ld_errno* will be set to indicate the error. See "LDAP Client API Error Conditions" on page 303 for possible LDAP error code values. Use "ldap_get_errno()—Retrieve Error Information" on page 87 function to retrieve the error information.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_count_values_len API.

Related Information

- "ldap_get_values()—Retrieve a Set of Attribute Values from an Entry" on page 99 — Return an attribute's values.
- "ldap_get_values_len()—Retrieve a Set of Binary Attribute Values" on page 100 — Return an attribute's binary values.
- "ldap_count_values()—Retrieve Count of Attribute Values" on page 42 — Return number of values.
- "ldap_value_free()—Free Memory Allocated by ldap_get_values()" on page 225 — Free memory allocated by ldap_get_values().
- "ldap_value_free_len()—Free Memory Allocated by ldap_get_values_len()" on page 226 — Free memory allocated by ldap_get_values_len().

API introduced: V4R3

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

---

ldap_create_page_control()—Create a Paged Results Control used when paging search results

Syntax

```
#include <ldap.h>

int ldap_create_page_control(
             LDAP          *ld,
             unsigned long pageSize,
             struct berval *cookie,
             const char    isCritical,
             LDAPControl   **control)
```

Library Name/Service Program: QSYS/QGLDCLNT

Default Public Authority: *USE

Threadsafe: Yes

The **ldap_create_page_control()** function is used to create a paged results control used when paging search results.

See LDAP Paged Results for usage information about the functions used to perform paging of entries returned from the server following an LDAP search operation.

Note: cookie and control must be freed by the caller.

Authorities and Locks

No OS/400 authority is required. All authority checking is done by the LDAP server.

Parameters

ld (Input) Specifies the LDAP pointer returned by previous call to ldap_init(), ldap_ssl_init() or ldap_open(). Must not be NULL.

pageSize
(Input) Specifies the number of entries to be returned for this paged results search result.

cookie (Input) For the first call to ldap_create_page_control() for a particular paged search, cookie should be set to NULL. On subsequent calls to ldap_create_page_control() for a particular paged search, cookie should be set by the preceeding call to ldap_parse_page_control(). See the example at LDAP Paged Results.

isCritical
(Input) Specifies the criticality of paged results on the search. This determines what happens when the server does not support paged results. If the criticality is set to TRUE ('T') and the server does not support paged results, then the search does not continue. However, if the criticality is set to FALSE ('F') the search will continue without paged results.

control
(Output) Specifies the result parameter that is filled in with an allocated array of one control for the paging function. The control must be freed by calling ldap_control_free().

Return Value

LDAP_SUCCESS
if successful.

LDAP_NO_MEMORY
if memory cannot be acquired.

LDAP_PARAM_ERROR
if ld or control is NULL.

Related Information

- "ldap_parse_page_control()—Retrieve Values in a Paged Results Control" on page 138 — Retrieve values in a paged results control.
- "ldap_create_sort_keylist()—Create a Structure with Sort Key Values used when Sorting Search Results" on page 49 — Create a structure with sort key values.
- "ldap_free_sort_keylist()—Free all Memory used by the Sort Key List" on page 82 — Free all memory used by the sort key list.
- "ldap_create_sort_control()—Create a Sorted Results Control used when Sorting Search Results" on page 47 — Create a sorted results control.
- "ldap_parse_sort_control()—Retrieve Values in a Sorted Results Control" on page 147 — Retrieve values in a sorted results control.
- "ldap_search()—Perform an LDAP Search Operation" on page 164 — Asynchronously search the directory.
- "ldap_search_ext —Asynchronously Search the Directory Using Controls" on page 166 — Asynchronously search the directory with controls.
- "ldap_search_ext_s — Synchronously Search the Directory Using Controls" on page 168 — Synchronously search the directory with controls.
- "ldap_parse_result()—Extract Information from Results" on page 143 — Extract information from results.
- "ldap_init()—Perform an LDAP Initialization Operation" on page 102 — Initializes a session with an LDAP server.
- "ldap_ssl_init —Initializes an SSL Connection." on page 206 — Initializes an SSL connection
- "ldap_open()—Perform an LDAP Open Operation" on page 133 — Open a connection to an LDAP server
- "ldap_control_free()—Free storage allocated by the LDAP library" on page 35 — Free a single LDAPControl structure.
- "ldap_controls_free()—Free storage allocated by the LDAP library" on page 34 — Free an array of LDAPControl structures.

API introduced: V5R3

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_create_sort_control()—Create a Sorted Results Control used when Sorting Search Results

Syntax

```
#include <ldap.h>

int ldap_create_sort_control(
             LDAP        *ld,
             LDAPsortkey **sortKeyList,
             const char  isCritical,
             LDAPControl **control)
```

Library Name/Service Program: QSYS/QGLDCLNT

Default Public Authority: *USE

Threadsafe: Yes

The **ldap_create_sort_control()** function is used to create a sorted results control used when sorting search results.

See LDAP Sort for usage information about the functions used to perform sorting of entries returned from the server following an LDAP search operation.

Authorities and Locks

No OS/400 authority is required. All authority checking is done by the LDAP server.

Parameters

ld (Input) Specifies the LDAP pointer returned by previous call to ldap_init(), ldap_ssl_init() or ldap_open(). Must not be NULL.

sortKeyList
(Input) Specifies the pointer to an array of LDAPsortkey structures, which represent attributes that the server uses to sort returned entries. This is obtained by a previous call to ldap_create_sort_keylist().

isCritical
(Input) Specifies the criticality of sort on the search. If the criticality of sort is FALSE, and the server finds a problem with the sort criteria, the search continues but entries returned are not sorted. If the criticality of sort is TRUE, and the srver finds a problem with the sort criteria, the search does not continue, no sorting is done, and no entries are returned. If the server does not find any problem with the sort criteria, the search and sort continues and entries are returned sorted.

control
(Output) Specifies the result parameter that is filled in with an allocated array of one control for the sort function. The control must be freed by calling ldap_control_free().

Return Value

LDAP_SUCCESS
if the request was successful.

LDAP_PARAM_ERROR
if ld, sortKeyList or control is NULL.

LDAP_NO_MEMORY
if memory cannot be acquired.

LDAP_ENCODING_ERROR
if an underlying ber encoding function fails.

Related Information

- "ldap_create_sort_keylist()—Create a Structure with Sort Key Values used when Sorting Search Results" on page 49 — Create a structure with sort key values.
- "ldap_free_sort_keylist()—Free all Memory used by the Sort Key List" on page 82 — Free all memory used by the sort key list.
- "ldap_parse_sort_control()—Retrieve Values in a Sorted Results Control" on page 147 — Retrieve values in a sorted results control.
- "ldap_create_page_control()—Create a Paged Results Control used when paging search results" on page 45 — Create a paged results control.
- "ldap_parse_page_control()—Retrieve Values in a Paged Results Control" on page 138 — Retrieve values in a paged results control.
- "ldap_search()—Perform an LDAP Search Operation" on page 164 — Asynchronously search the directory.
- "ldap_parse_result()—Extract Information from Results" on page 143 — Extract information from results.
- "ldap_init()—Perform an LDAP Initialization Operation" on page 102 — Initializes a session with an LDAP server.
- "ldap_ssl_init —Initializes an SSL Connection." on page 206 — Initializes an SSL connection
- "ldap_open()—Perform an LDAP Open Operation" on page 133 — Open a connection to an LDAP server

API introduced: V5R3

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_create_sort_keylist()—Create a Structure with Sort Key Values used when Sorting Search Results

Syntax

```
#include <ldap.h>

int ldap_create_sort_keylist(
             LDAPsortkey ***sortKeyList,
             const char  *sortString)
```

Library Name/Service Program: QSYS/QGLDCLNT

Default Public Authority: *USE

Threadsafe: Yes

The **ldap_create_sort_keylist()** function is used to create a structure with sort key values used when sorting search results.

See LDAP Sort for usage information about the functions used to perform sorting of entries returned from the server following an LDAP search operation.

Authorities and Locks

No OS/400 authority is required. All authority checking is done by the LDAP server.

Parameters

sortKeyList
(Output) On return will point to an array of LDAPsortkey structures, which represent attributes that the server uses to sort returned entries. Input when used for ldap_create_sort_control() and ldap_free_sort_keylist(). This list must be freed by the caller by calling ldap_free_sort_keylist.

sortString
(Input) Specifies the string with one or more attributes to be used to sort entries returned by the server. Multiple sort keys are separated with a space character. (e.g. ″sn -givenname″)

Return Value

LDAP_SUCCESS
if the request was successful.

another LDAP error code
if the keylist could not be created.

Related Information

- “ldap_free_sort_keylist()—Free all Memory used by the Sort Key List” on page 82 — Free all memory used by the sort key list.
- “ldap_create_sort_control()—Create a Sorted Results Control used when Sorting Search Results” on page 47 — Create a sorted results control.
- “ldap_parse_sort_control()—Retrieve Values in a Sorted Results Control” on page 147 — Retrieve values in a sorted results control.
- “ldap_create_page_control()—Create a Paged Results Control used when paging search results” on page 45 — Create a paged results control.

- "ldap_parse_page_control()—Retrieve Values in a Paged Results Control" on page 138 — Retrieve values in a paged results control.
- "ldap_search()—Perform an LDAP Search Operation" on page 164 — Asynchronously search the directory.
- "ldap_parse_result()—Extract Information from Results" on page 143 — Extract information from results.

API introduced: V5R3

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_default_dn_get()— Retrieve the User's Default DN

Syntax

```
#include <ldap.h>

int ldap_default_dn_get(
       char           **default_dn,
       char           *filename)
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_default_dn_get()** API is used to retrieve the user's default DN. To free the returned string, use "ldap_memfree()—Free Memory Allocated by LDAP API" on page 106.

An application stores the default DN on disk by calling "ldap_default_dn_set()— Store the User's Default DN" on page 51. For OS/400 the default file (used when *filename* is NULL) where the default DN stored is called **ldap_user_info** and will be found in the user's home directory. A user's home directory is specified in the user's profile.

Authorities and Locks

The caller must have Execute (*X) authority to each directory in the path name preceding the name of the user information file. The caller must have Read (*R) authority to the user information file.

Parameters

default_dn
(output) Specifies the user's default Distinguished Name. Free **default_dn* with "ldap_memfree()—Free Memory Allocated by LDAP API" on page 106 when no longer needed.

filename
(Input) Specifies an alternative location for the user's default Distinguished Name storage. If only a filename is given for the *filename* parameter then the file will be checked in the current directory, otherwise, if a path is given as well as a filename as part of the *filename* parameter, the file will be checked following the given path. If *filename* is NULL, a file called **ldap_user_info** in the user's home directory will be read.

Return Value

LDAP_SUCCESS
if the default DN was retrieved.

another LDAP error code
if the request was not successful.

Error Conditions

The **ldap_default_dn_get()** API will return an LDAP error code if not successful. See "LDAP Client API Error Conditions" on page 303 for possible LDAP error code values.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_default_dn_get API.

Related Information

- "ldap_default_dn_set()— Store the User's Default DN" — Store the User's Default DN.
- "ldap_enetwork_domain_set()— Store the User's Default eNetwork Domain Name" on page 61 — Store the User's Default eNetwork Domain Name.
- "ldap_enetwork_domain_get()— Retrieve the User's Default eNetwork Domain Name" on page 59 — Retrieve the User's Default eNetwork Domain Name.
- "ldap_memfree()—Free Memory Allocated by LDAP API" on page 106 — Free Memory Allocated by LDAP API

API introduced: V4R5

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

---

ldap_default_dn_set()— Store the User's Default DN

Syntax

```
#include <ldap.h>

int ldap_default_dn_set(
       char           *default_dn,
       char           *filename)
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_default_dn_set()** API is used to store the user's default DN. The DN can be obtained by calling "ldap_default_dn_get()— Retrieve the User's Default DN" on page 50.

The default DN is stored on disk. For OS/400 the default file the information will be stored in will be called **ldap_user_info** and will be put into the user's home directory. A user's home directory is specified

in the user's profile. The home directory must be created prior to calling **ldap_default_dn_set()** and is not created as part of the creation of a user's profile. It will be stored in the local character set format.

Authorities and Locks

The caller must have Execute (*X) authority to each directory in the path name preceding the name of the user information file. The caller must have Write (*W) authority to the user information file. If the *filename* file doesn't exist in the directory when calling **ldap_default_dn_set**, the caller must have Write (*W) authority to the file's parent directory.

Parameters

default_dn
(input) Specifies the user's default Distinguished Name.

filename
(Input) Specifies an alternative location for the user's default Distinguished Name storage. If only a filename is given for the *filename* parameter then a file will be created in the current directory, otherwise, if a path is given as well as a filename as part of the *filename* parameter, the file will be created following the given path. If *filename* is NULL, a file called **ldap_user_info** will be created into the user's home directory.

Return Value

LDAP_SUCCESS
if the request was successful.

another LDAP error code
if the request was not successful.

Error Conditions

The **ldap_default_dn_set()** API will return an LDAP error code if not successful. See "LDAP Client API Error Conditions" on page 303 for possible LDAP error code values.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of the ldap_default_dn_set API.

Related Information

- "ldap_default_dn_get()— Retrieve the User's Default DN" on page 50 — Retrieve the User's Default DN.
- "ldap_enetwork_domain_set()— Store the User's Default eNetwork Domain Name" on page 61 — Store the User's Default eNetwork Domain Name.
- "ldap_enetwork_domain_get()— Retrieve the User's Default eNetwork Domain Name" on page 59 — Retrieve the User's Default eNetwork Domain Name.

API introduced: V4R5

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_delete()—Perform an LDAP Delete Operation

Syntax

```
#include <ldap.h>

int ldap_delete(
   LDAP           *ld,
   const char     *dn)
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_delete()** routine initiates an asynchronous LDAP operation to delete a leaf entry. The result of the operation can be obtained by a subsequent call to "ldap_result()—Retrieve Result of an Asynchronous LDAP Operation" on page 156.

Note that the entry to delete must be a leaf entry (that is, it must have no children). Deletion of entire subtrees in a single operation is not supported by LDAP.

Authorities and Locks

No OS/400 authority is required. All authority checking is done by the LDAP server.

Parameters

ld (Input) Specifies the LDAP pointer returned by a previous call to "ldap_init()—Perform an LDAP Initialization Operation" on page 102, "ldap_ssl_init —Initializes an SSL Connection." on page 206, or "ldap_open()—Perform an LDAP Open Operation" on page 133.

dn (Input) Specifies the DN of the entry to be deleted.

Return Value

Message ID of the Operation Initiated
If the request was successful.

-1 If the request was not successful.

Error Conditions

If **ldap_delete()** is not successful, *ld_errno* will be set to indicate the error. See "LDAP Client API Error Conditions" on page 303 for possible LDAP error code values. Use "ldap_get_errno()—Retrieve Error Information" on page 87 function to retrieve the error information.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_delete API.

Related Information

- "ldap_delete_s()—Perform an LDAP Delete Operation (Synchronous)" on page 57 — Synchronous delete an entry.
- "ldap_delete_ext()—Perform an LDAP Delete Operation with Controls" — Asynchronous delete an entry with controls.
- "ldap_delete_ext_s()—Perform an LDAP Delete Operation with Controls" on page 56 — Synchronous delete an entry with controls.

API introduced: V4R3

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_delete_ext()—Perform an LDAP Delete Operation with Controls

Syntax

```
#include <ldap.h>

int ldap_delete_ext(LDAP           *ld,
                    const char     *dn,
                    LDAPControl    **serverctrls,
                    LDAPControl    **clientctrls,
                    int            *msgidp)
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_delete_ext()** routine initiates an asynchronous LDAP operation to delete a leaf entry with controls.

Note that the entry to delete must be a leaf entry (that is, it must have no children). Deletion of entire subtrees in a single operation is not supported by LDAP.

Authorities and Locks

No OS/400 authority is required. All authority checking is done by the LDAP server.

Parameters

ld (Input) Specifies the LDAP pointer returned by a previous call to "ldap_init()—Perform an LDAP Initialization Operation" on page 102, "ldap_ssl_init —Initializes an SSL Connection." on page 206, or "ldap_open()—Perform an LDAP Open Operation" on page 133.

dn (Input) Specifies the Distinguished Name (DN) of the entry to be deleted.

serverctrls
(Input) Specifies a list of LDAP server controls. This parameter may be set to null. See LDAP Controls for more information about server controls.

clientctrls
(Input) Specifies a list of LDAP client controls. This parameter may be set to null. See LDAP Controls for more information about client controls.

msgidp (Output) This result parameter is set to the message id of the request if the **ldap_delete_ext()** call succeeds.

Return Value

LDAP_SUCCESS
if the request was successfully sent, **ldap_delete_ext()** places the message id of the request in **msgidp*. A subsequent call to "ldap_result()—Retrieve Result of an Asynchronous LDAP Operation" on page 156 can be used to obtain the result of the operation. Once the operation has completed, "ldap_result()—Retrieve Result of an Asynchronous LDAP Operation" on page 156 returns a result that contains the status of the operation (in the form of an error code). The error code indicates if the operation completed successfully.

another LDAP error code
if the request was not successfully.

Error Conditions

The **ldap_delete_ext()** API will return an LDAP error code if not successful. See "LDAP Client API Error Conditions" on page 303 for possible LDAP error code values.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_delete_ext API.

Related Information

- "ldap_delete()—Perform an LDAP Delete Operation" on page 53 — Asynchronous delete an entry.
- "ldap_delete_s()—Perform an LDAP Delete Operation (Synchronous)" on page 57 — Synchronous delete an entry.
- "ldap_delete_ext_s()—Perform an LDAP Delete Operation with Controls" on page 56 — Synchronous delete an entry with controls.

The **ldap_delete_ext()** API supports LDAP V3 server controls and client controls.

API introduced: V4R5

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_delete_ext_s()—Perform an LDAP Delete Operation with Controls

Syntax

```
#include <ldap.h>

int ldap_delete_ext_s(LDAP           *ld,
                      const char     *dn,
                      LDAPControl    **serverctrls,
                      LDAPControl    **clientctrls)
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_delete_ext_s()** routine initiates a synchronous LDAP operation to delete a leaf entry with controls.

Note that the entry to delete must be a leaf entry (that is, it must have no children). Deletion of entire subtrees in a single operation is not supported by LDAP.

Authorities and Locks

No OS/400 authority is required. All authority checking is done by the LDAP server.

Parameters

ld (Input) Specifies the LDAP pointer returned by a previous call to "ldap_init()—Perform an LDAP Initialization Operation" on page 102, "ldap_ssl_init —Initializes an SSL Connection." on page 206, or "ldap_open()—Perform an LDAP Open Operation" on page 133.

dn (Input) Specifies the Distinguished Name (DN) of the entry to be deleted.

serverctrls
(Input) Specifies a list of LDAP server controls. This parameter may be set to null. See LDAP Controls for more information about server controls.

clientctrls
(Input) Specifies a list of LDAP client controls. This parameter may be set to null. See LDAP Controls for more information about client controls.

Return Value

LDAP_SUCCESS
if the request was successful.

another LDAP error code
if the request was not successful.

Error Conditions

The **ldap_delete_ext_s()** API will return an LDAP error code if not successful. See "LDAP Client API Error Conditions" on page 303 for possible LDAP error code values.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_delete_ext_s API.

Related Information

- "ldap_delete()—Perform an LDAP Delete Operation" on page 53 — Asynchronous delete an entry.
- "ldap_delete_s()—Perform an LDAP Delete Operation (Synchronous)" — Synchronous delete an entry.
- "ldap_delete_ext()—Perform an LDAP Delete Operation with Controls" on page 54 — Asynchronous delete an entry with controls.

The **ldap_delete_ext_s()** API supports LDAP V3 server controls and client controls.

API introduced: V4R5

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_delete_s()—Perform an LDAP Delete Operation (Synchronous)

Syntax

```
#include <ldap.h>

int ldap_delete_s(
   LDAP           *ld,
   const char     *dn)
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_delete_s()** routine initiates a synchronous LDAP operation to delete a leaf entry.

Note that the entry to delete must be a leaf entry (that is, it must have no children). Deletion of entire subtrees in a single operation is not supported by LDAP.

Authorities and Locks

No OS/400 authority is required. All authority checking is done by the LDAP server.

Parameters

ld (Input) Specifies the LDAP pointer returned by a previous call to "ldap_init()—Perform an LDAP Initialization Operation" on page 102, "ldap_ssl_init —Initializes an SSL Connection." on page 206, or "ldap_open()—Perform an LDAP Open Operation" on page 133.

dn (Input) Specifies the Distinguished Name (DN) of the entry to be deleted.

Return Value

LDAP_SUCCESS
if the request was successful.

another LDAP error code
if the request was not successful.

Error Conditions

The **ldap_delete_s()** will return an LDAP error code if not successful. See “LDAP Client API Error Conditions” on page 303 for possible LDAP error code values.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_delete_s API.

Related Information

- “ldap_delete()—Perform an LDAP Delete Operation” on page 53 — Asynchronous delete an entry.
- “ldap_delete_ext()—Perform an LDAP Delete Operation with Controls” on page 54 — Asynchronous delete an entry with controls.
- “ldap_delete_ext_s()—Perform an LDAP Delete Operation with Controls” on page 56 — Synchronous delete an entry with controls.

API introduced: V4R3

Top | “Lightweight Directory Access Protocol (LDAP) APIs,” on page 1 | APIs by category

---

ldap_dn2ufn()—Convert a Distinguished Name into a User Friendly Name

Syntax

```
#include <ldap.h>

char *ldap_dn2ufn(
               const char  *dn)
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_dn2ufn()** function takes a distinguished name (DN) and converts into a ″friendlier″ representation by removing the attribute type that is associated with each relative distinguished name (RDN). For example, the DN ″cn=John Doe,ou=Widget Division,ou=Austin,o=IBM,c=US″ would be returned in its ″friendlier″ form as ″John Doe, Widget Division, Austin, IBM, US″. Space for the user-friendly name will have been obtained by the API, and should be freed by the caller with a call to “ldap_memfree()—Free Memory Allocated by LDAP API” on page 106.

Authorities and Locks

No OS/400 authority is required.

Parameters

dn (Input) Specifies the DN to be converted (as returned from "ldap_get_dn()—Retrieve the Distinguished Name of an Entry" on page 84).

Return Value

Character String
if the request was successful.

NULL if the request was not successful.

Error Conditions

If **ldap_dn2ufn()** is not successful, then there was no memory available for the character string.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_dn2ufn API.

Related Information

- "ldap_get_dn()—Retrieve the Distinguished Name of an Entry" on page 84 — Extract the DN from an entry.
- "ldap_explode_rdn()—Break a Relative Distinguished Name into Its Components" on page 68 — Break a Relative Distinguished Name into Its Components.

API introduced: V5R1

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_enetwork_domain_get()— Retrieve the User's Default eNetwork Domain Name

Syntax

```
#include <ldap.h>

int ldap_enetwork_domain_get(
       char           **edomain,
       char           *filename)
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_enetwork_domain_get()** API is used to retrieve the user's default eNetwork domain name. To free the returned string, use "ldap_memfree()—Free Memory Allocated by LDAP API" on page 106.

The eNetwork domain name (along with the user's default Domain Name Service (DNS) domain name) is used to identify the user's LDAP authentication domain. For example, if a user's eNetwork domain name is "chicago", and the user's DNS domain is midwest.illinois.com, then information can be published in DNS that associates ldap.chicago.midwest.illinois.com with a collection of LDAP servers (master(s) and replicas). This permits applications to easily find an appropriate LDAP authentication server, by using the "ldap_server_locate()— Locate Suitable LDAP Servers" on page 180 API.

An application stores the eNetwork domain name on disk by calling "ldap_enetwork_domain_set()— Store the User's Default eNetwork Domain Name" on page 61. For OS/400 the default file where the eNetwork domain name stored is called **ldap_user_info** and will be found in the user's home directory. A user's home directory is specified in the user's profile.

Authorities and Locks

The caller must have Execute (*X) authority to each directory in the path name preceding the name of the user information file. The caller must have Read (*R) authority to the user information file.

Parameters

edomain
: (Output) Specifies the name of the eNetwork domain to which the user belongs.

filename
: (Input) Specifies an alternative location for the user's default eNetwork domain name. If only a filename is given for the *filename* parameter then the file will be found in the current directory, otherwise, if a path is given as well as a filename as part of the *filename* parameter, the file will be found by following the given path.

Return Value

LDAP_SUCCESS
: if the request was successful.

another LDAP error code
: if the request was not successful.

Error Conditions

The **ldap_enetwork_domain_get()** will return an LDAP error code if not successful. See "LDAP Client API Error Conditions" on page 303 for possible LDAP error code values.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_enetwork_domain_get API.

Related Information

- "ldap_default_dn_set()— Store the User's Default DN" on page 51 — Store the User's Default DN.
- "ldap_default_dn_get()— Retrieve the User's Default DN" on page 50 — Retrieve the User's Default DN.
- "ldap_enetwork_domain_set()— Store the User's Default eNetwork Domain Name" on page 61 — Store the User's Default eNetwork Domain Name.

API introduced: V4R5

ldap_enetwork_domain_set()— Store the User's Default eNetwork Domain Name

Syntax

```
#include <ldap.h>

int ldap_enetwork_domain_set(
       char           *edomain,
       char           *filename)
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_enetwork_domain_set()** API is used to store the user's default eNetwork domain name (specified as a NULL terminated string).

The eNetwork domain name (along with the user's default Domain Name Service (DNS) domain name) is used to identify the user's LDAP authentication domain. For example, if a user's eNetwork domain name is "chicago", and the user's DNS domain is midwest.illinois.com, then information can be published in DNS that associates ldap.chicago.midwest.illinois.com with a collection of LDAP servers (master(s) and replicas). This permits applications to easily find an appropriate LDAP authentication server, by using the "ldap_server_locate()— Locate Suitable LDAP Servers" on page 180 API.

An application can retrieve the eNetwork domain name by calling "ldap_enetwork_domain_get()— Retrieve the User's Default eNetwork Domain Name" on page 59.

The eNetwork domain name is stored on disk. For OS/400 the default file the information will be stored in will be called **ldap_user_info** and will be put into the user's home directory. A user's home directory is specified in the user's profile. The home directory must be created prior to calling **ldap_enetwork_domain_set()** and is not created as part of the creation of a user's profile. It will be stored in the local character set format.

Authorities and Locks

The caller must have Execute (*X) authority to each directory in the path name preceding the name of the user information file. The caller must have Write (*W) authority to the user information file. If the file doesn't exist in the directory, the caller must have Write (*W) authority to the file's parent directory.

Parameters

edomain
(Input) Specifies the name of the eNetwork domain to which the user belongs.

filename
(Input) Specifies an alternative location for the user's default eNetwork domain name. If only a

filename is given for the *filename* parameter then a file will be created in the current directory, otherwise, if a path is given as well as a filename as part of the *filename* parameter, the file will be created following the given path.

Return Value

LDAP_SUCCESS
if the request was successful.

another LDAP error code
if the request was not successful.

Error Conditions

The **ldap_enetwork_domain_set()** API will return an LDAP error code if not successful. See "LDAP Client API Error Conditions" on page 303 for possible LDAP error code values.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_enetwork_domain_set API.

Related Information

- "ldap_default_dn_set()— Store the User's Default DN" on page 51 — Store the User's Default DN.
- "ldap_default_dn_get()— Retrieve the User's Default DN" on page 50 — Retrieve the User's Default DN.
- "ldap_enetwork_domain_get()— Retrieve the User's Default eNetwork Domain Name" on page 59 — Retrieve the User's Default eNetwork Domain Name.

API introduced: V4R5

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

---

ldap_err2string()—Retrieve LDAP Error Message String

Syntax

```
#include <ldap.h>

char *ldap_err2string(
        int          error)
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_err2string()** function is used to retrieve the text description corresponding to an LDAP error code.

The text description returned will be provided in English only.

The string returned from **ldap_err2string()** should not be freed when use of the string is complete.

Authorities and Locks

No OS/400 authority is required.

Parameters

error (Input) Specifies the LDAP error code returned by a previous call to "ldap_result2error()—Retrieve LDAP Error Information" on page 158, "ldap_get_errno()—Retrieve Error Information" on page 87, or a synchronous LDAP API.

Return Value

LDAP error description String
a textual description of the LDAP error code.

Error Conditions

The **ldap_err2string()** API will return ″Unknown Error″ if the LDAP error code is unknown. See "LDAP Client API Error Conditions" on page 303 for possible LDAP error codes and their description.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_err2string API.

Related Information

- "ldap_get_errno()—Retrieve Error Information" on page 87 — Retrieve Error Code set.
- "ldap_perror()—Print LDAP Error Information" on page 148 — Print an LDAP error indication to standard error.
- "ldap_result2error()—Retrieve LDAP Error Information" on page 158 — Extract LDAP error indication from LDAP result.

API introduced: V4R3

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_explode_dn()—Break a Distinguished Name into Its Components

Syntax

```
#include <ldap.h>

char **ldap_explode_dn(
                const char  *dn,
                int          notypes)
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_explode_dn()** function uses the distinguished name in local codepage returned by "ldap_get_dn()—Retrieve the Distinguished Name of an Entry" on page 84 and breaks it up into its component parts. Each part is known as a Relative Distinguished Name (RDN). If the dn is in UTF8, use "ldap_explode_dn_utf8()—Break a UTF8 codepage Distinguished Name into Its Components" on page 66.

ldap_explode_dn() returns a NULL-terminated array, each component of which contains an RDN from the DN. The *notypes* parameter is used to request that only the RDN values be returned, not their types.

For example, the distinguished name cn=Bob,c=US would return as either ″cn=Bob″,″c=US″,NULL or ″Bob″,″US″, NULL depending on whether *notypes* was 0 or 1, respectively. The result can be freed by calling "ldap_value_free()—Free Memory Allocated by ldap_get_values()" on page 225.

Authorities and Locks

No OS/400 authority is required.

Parameters

dn (Input) Specifies the DN to be exploded (as returned from "ldap_get_dn()—Retrieve the Distinguished Name of an Entry" on page 84).

notypes
(Input) Specifies if type information is to be returned with each RDN. If non-zero, the type information will be stripped. If zero, the type information is retained. For example, setting *notypes* to 1 would result in the RDN ″cn=Fido″ being returned as ″Fido″.

Return Value

Relative Distinguished Name (RDN)
if the request was successful.

NULL if the request was not successful.

Error Conditions

If **ldap_explode_dn()** is not successful, then there was no memory available for either the array or its component parts.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_explode_dn API.

Related Information

- "ldap_get_dn()—Retrieve the Distinguished Name of an Entry" on page 84 — Extract the DN from an entry.
- "ldap_explode_dn_utf8()—Break a UTF8 codepage Distinguished Name into Its Components" on page 66 — Break a UTF8 Distinguided Name into its components.
- "ldap_explode_rdn()—Break a Relative Distinguished Name into Its Components" on page 68 — Break a Relative Distinguished Name into its components.

API introduced: V4R3

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_explode_dns()—Break a DNS-style Distinguished Name into Its Components

Syntax

```
#include <ldap.h>

char **ldap_explode_dns(
                  const char  *dn)
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_explode_dns()** function takes a Domain Name System (DNS)-style distinguished name and breaks it up into its component parts.

ldap_explode_dns() returns a NULL-terminated array of character strings.

For example, the DNS-style distinguished name rochester.ibm.com would be returned as an array of components ″rochester″,″ibm″,″com″,NULL. The result can be freed by calling "ldap_value_free()—Free Memory Allocated by ldap_get_values()" on page 225.

Authorities and Locks

No OS/400 authority is required.

Parameters

dn (Input) Specifies the DNS-style DN to be exploded.

Return Value

An array of character strings.
if the request was successful.

NULL if the request was not successful.

Error Conditions

If **ldap_explode_dns()** is not successful, no memory is available for the array or its components.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_explode_dns API.

Related Information

- "ldap_explode_dn()—Break a Distinguished Name into Its Components" on page 64 — Break a Distinguished Name into its components.
- "ldap_explode_dn_utf8()—Break a UTF8 codepage Distinguished Name into Its Components" — Break a UTF8 codepage Distinguished Name into Its Components
- "ldap_explode_rdn()—Break a Relative Distinguished Name into Its Components" on page 68 — Break a Relative Distinguished Name into its components.
- "ldap_explode_rdn_utf8()—Break a UTF8 codepage Relative Distinguished Name into Its Components" on page 69 — Break a UTF8 codepage Relative Distinguished Name into Its Components

API introduced: V5R1

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

---

ldap_explode_dn_utf8()—Break a UTF8 codepage Distinguished Name into Its Components

Syntax

```
#include <ldap.h>

char **ldap_explode_dn_utf8(
                char  *dn,
                int    notypes)
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_explode_dn_utf8()** function uses the distinguished name in UTF8 characters returned by "ldap_get_dn()—Retrieve the Distinguished Name of an Entry" on page 84 and breaks it up into its component parts. Each part is known as a Relative Distinguished Name (RDN). If the dn is in local codepage, use "ldap_explode_dn()—Break a Distinguished Name into Its Components" on page 64.

ldap_explode_dn_utf8() returns a NULL-terminated array, each component of which contains an RDN from the DN. The *notypes* parameter is used to request that only the RDN values be returned, not their types.

For example, the distinguished name cn=Bob,c=US would return as either ″cn=Bob″,″c=US″,NULL or ″Bob″,″US″, NULL depending on whether *notypes* was 0 or 1, respectively. The result can be freed by calling “ldap_value_free()—Free Memory Allocated by ldap_get_values()” on page 225.

Authorities and Locks

No OS/400 authority is required.

Parameters

dn (Input) The DN to be exploded in UTF8 codepage (as returned from “ldap_get_dn()—Retrieve the Distinguished Name of an Entry” on page 84).

notypes

(Input) Whether type information is to be returned with each RDN. If non-zero, the type information is stripped. If zero, the type information is retained. For example, setting *notypes* to 1 would result in the RDN ″cn=Fido″ being returned as ″Fido″.

Return Value

Relative Distinguished Name (RDN)

The request was successful.

NULL The request was not successful. The “ldap_get_errno()—Retrieve Error Information” on page 87 API can be used to obtain the error code.

Error Conditions

If **ldap_explode_dn_utf8()** is not successful, *ld_errno* is set to indicate the error. See “LDAP Client API Error Conditions” on page 303 for possible LDAP error code values. Use the “ldap_get_errno()—Retrieve Error Information” on page 87 function to retrieve the error information.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_explode_dn_utf8 API.

Related Information

- “ldap_explode_dn()—Break a Distinguished Name into Its Components” on page 64 — Break a Distinguished Name into Its Components.
- “ldap_explode_rdn()—Break a Relative Distinguished Name into Its Components” on page 68 — Break a Relative Distinguished Name into Its Components.
- “ldap_explode_rdn_utf8()—Break a UTF8 codepage Relative Distinguished Name into Its Components” on page 69 — Break a UTF8 codepage Relative Distinguished Name into Its Components.

API introduced: V5R1

Top | “Lightweight Directory Access Protocol (LDAP) APIs,” on page 1 | APIs by category

ldap_explode_rdn()—Break a Relative Distinguished Name into Its Components

Syntax

```
#include <ldap.h>

char **ldap_explode_rdn(
                const char  *rdn,
                int          notypes)
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_explode_rdn()** function uses the relative distinguished name (RDN) in the local CCSID (as returned by "ldap_explode_dn()—Break a Distinguished Name into Its Components" on page 64, for example) and breaks it up into its component parts. If the RDN is in UTF8, use "ldap_explode_rdn_utf8()—Break a UTF8 codepage Relative Distinguished Name into Its Components" on page 69.

ldap_explode_rdn() returns a NULL-terminated array of character strings. The *notypes* parameter is used to request that only the component values be returned, not their types.

For example, the RDN "ou=Research+cn=Bob" would return as either {"ou=Research", "cn=Bob", NULL} or {"Research","Bob", NULL}, depending on whether *notypes* was 0 or 1, respectively. The result can be freed by calling "ldap_value_free()—Free Memory Allocated by ldap_get_values()" on page 225.

Authorities and Locks

No OS/400 authority is required.

Parameters

rdn (Input) Specifies the RDN to be exploded (perhaps as returned by "ldap_explode_dn()—Break a Distinguished Name into Its Components" on page 64). Multiple RDNs can be concatenated using a plus sign ('+').

notypes
(Input) Specifies if type information is to be returned with each RDN. If non-zero, the type information will be stripped. If zero, the type information is retained. For example, setting *notypes* to 1 would result in the RDN "cn=Fido" being returned as "Fido".

Return Value

Components of Relative Distinguished Name (RDN)
if the request was successful.

NULL if the request was not successful.

Error Conditions

If **ldap_explode_rdn()** is not successful, then there was no memory available for either the array or its component parts.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_explode_rdn API.

Related Information

- "ldap_explode_dn()—Break a Distinguished Name into Its Components" on page 64 — Break a Distinguished Name into its components.
- "ldap_explode_rdn_utf8()—Break a UTF8 codepage Relative Distinguished Name into Its Components" — Break a UTF8 Relative Distinguished Name into its components.

API introduced: V4R5

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_explode_rdn_utf8()—Break a UTF8 codepage Relative Distinguished Name into Its Components

Syntax

```
#include <ldap.h>

char **ldap_explode_rdn_utf8(
                char  *rdn,
                int    notypes)
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_explode_rdn_utf8()** function uses the relative distinguished name (RDN) in UTF8 characters (as returned by, "ldap_explode_dn_utf8()—Break a UTF8 codepage Distinguished Name into Its Components" on page 66, for example) and breaks it up into its component parts. If the RDN is in local codepage, use "ldap_explode_rdn()—Break a Relative Distinguished Name into Its Components" on page 68.

ldap_explode_rdn_utf8() returns a NULL-terminated array of character strings. The *notypes* parameter is used to request that only the component values be returned, not their types.

For example, the RDN "ou=Research+cn=Bob" would return as either {"ou=Research", "cn=Bob", NULL} or {"Research","Bob", NULL}, depending on whether *notypes* was 0 or 1, respectively. The result can be freed by calling "ldap_value_free()—Free Memory Allocated by ldap_get_values()" on page 225.

Authorities and Locks

No OS/400 authority is required.

Parameters

rdn (Input) The RDN to be exploded (perhaps as returned by "ldap_explode_dn_utf8()—Break a UTF8 codepage Distinguished Name into Its Components" on page 66). Multiple RDNs can be concatenated using a plus sign ('+').

notypes
(Input) Whether type information is to be returned with each RDN. If non-zero, the type information is stripped. If zero, the type information is retained. For example, setting *notypes* to 1 would result in the RDN ″cn=Fido″ being returned as ″Fido″.

Return Value

Components of Relative Distinguished Name (RDN)
The request was successful.

NULL The request was not successful. The "ldap_get_errno()—Retrieve Error Information" on page 87 API can be used to obtain the error code.

Error Conditions

If **ldap_explode_rdn_utf8()** is not successful, *ld_errno* will be set to indicate the error. See "LDAP Client API Error Conditions" on page 303 for possible LDAP error code values. Use the "ldap_get_errno()—Retrieve Error Information" on page 87 function to retrieve the error information.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_explode_rdn_utf8 API.

Related Information

- "ldap_explode_dn()—Break a Distinguished Name into Its Components" on page 64 — Break a Distinguished Name into Its Components.
- "ldap_explode_dn_utf8()—Break a UTF8 codepage Distinguished Name into Its Components" on page 66 — Break a UTF8 codepage Distinguished Name into Its Components.
- "ldap_explode_rdn()—Break a Relative Distinguished Name into Its Components" on page 68 — Break a Distinguished Name into Its Components.

API introduced: V5R1

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_extended_operation()—Perform extended operations.

Syntax

```
#include <ldap.h>

int ldap_extended_operation(
             LDAP                 *ld,
             const char           *reqoid,
             const struct berval  *reqdata,
             LDAPControl         **serverctrls,
             LDAPControl         **clientctrls,
             int                  *msgidp)
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_extended_operation()** function is used to initiate an asynchronous extended operation, which returns LDAP_SUCCESS if the extended operation was successfully sent, or an LDAP error code if not. If successful, the **ldap_extended_operation()** API places the message id of the request in **msgid*. A subsequent call to “ldap_result()—Retrieve Result of an Asynchronous LDAP Operation” on page 156 can be used to obtain the result of the extended operation, which can then be passed to “ldap_parse_extended_result()—Parse extended result” on page 136 to obtain the Object IDentifier (OID) and data contained in the response.

If the LDAP server does not support the extended operation, the server will reject the request. To determine if the requisite extended operation is supported by the server, get the rootDSE of the LDAP server, and check for the supportedExtension attribute. If the values for this attribute include the OID of your extended operation, then the server supports the extended operation. If the supportedExtension attribute is not present in the rootDSE, then the server is not configured to support any extended operations.

Authorities and Locks

No OS/400 authority is required. All authority checking is done by the LDAP server.

Parameters

ld (Input) Specifies the LDAP pointer returned by a previous call to “ldap_init()—Perform an LDAP Initialization Operation” on page 102, “ldap_ssl_init —Initializes an SSL Connection.” on page 206, or “ldap_open()—Perform an LDAP Open Operation” on page 133.

reqoid (Input) Specifies the dotted-OID text string that identifies the extended operation to be performed by the server.

reqdata (Input) Specifies the arbitrary data required by the extended operation (if NULL, no data is sent to the server).

serverctrls
(Input) Specifies a list of LDAP server controls. This parameter may be set to null. See LDAP Controls for more information about server controls.

clientctrls
(Input) Specifies a list of LDAP client controls. This parameter may be set to null. See LDAP Controls for more information about client controls.

msgidp (Output) This result parameter is set to the message id of the request if the **ldap_extended_operation()** call succeeds.

Return Value

LDAP_SUCCESS
if the request was successful. **ldap_extended_operation()** places the message id of the request in **msgidp*. To check the result of this operation, call "ldap_result()—Retrieve Result of an Asynchronous LDAP Operation" on page 156 and "ldap_parse_extended_result()—Parse extended result" on page 136 APIs. The server may also return an OID and result data.

another LDAP error code
if the request was not successful.

Error Conditions

If **ldap_extended_operation()** is not successful, will return a -1 instead of a valid msgid, setting the session error in the LD structure, which can be obtained by using "ldap_get_errno()—Retrieve Error Information" on page 87.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_extended_operation API.

Related Information

- "ldap_add_ext()—Perform an LDAP Add Operation with Controls" on page 12 — Asynchronously add an entry with controls.
- "ldap_add_ext_s()—Perform an LDAP Add Operation with Controls (Synchronous)" on page 14 — Synchronously add an entry with controls.
- "ldap_compare_ext()—Perform an LDAP Compare Operation with Controls" on page 29 — Asynchronous compare to a directory entry with controls.
- "ldap_compare_ext_s()—Perform an LDAP Compare Operation with Controls (Synchronous)" on page 31 — Synchronous compare to a directory entry with controls.
- "ldap_delete_ext()—Perform an LDAP Delete Operation with Controls" on page 54 — Asynchronous delete an entry with controls.
- "ldap_delete_ext_s()—Perform an LDAP Delete Operation with Controls" on page 56 — Synchronous delete an entry with controls.
- "ldap_modify_ext()—Perform an LDAP Modify Entry Request with Controls" on page 110 — Asynchronously modify an entry with controls.
- "ldap_modify_ext_s()—Perform an LDAP Modify Entry Request with Controls" on page 113 — Synchronously modify an entry with controls.
- "ldap_parse_extended_result()—Parse extended result" on page 136 — Parse extended result.

- "ldap_sasl_bind()—Perform an LDAP SASL Bind Request" on page 159 — Asynchronously bind to the directory using the Simple Authentication Security Layer (SASL).
- "ldap_sasl_bind_s()—Perform an LDAP SASL Bind Request (Synchronous)" on page 161 — Synchronously bind to the directory using the Simple Authentication Security Layer (SASL).
- "ldap_search_ext —Asynchronously Search the Directory Using Controls" on page 166 — Asynchronously search the directory with controls.
- "ldap_search_ext_s — Synchronously Search the Directory Using Controls" on page 168 — Synchronously search the directory with controls.
- "ldap_rename()—Asynchronously Rename an Entry" on page 152 — Asynchronously rename an entry with controls.
- "ldap_rename_s()—Synchronously Rename an Entry" on page 154 — Synchronously rename an entry with controls.
- "ldap_unbind_ext()—Perform an LDAP Unbind Request" on page 212 — Unbind with controls.

The **ldap_extended_operation()** API supports LDAP V3 server controls and client controls.

API introduced: V5R1

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_extended_operation_s()—Perform extended operations synchronously

Syntax

```
#include <ldap.h>

int ldap_extended_operation_s(
             LDAP                  *ld,
             const char            *reqoid,
             const struct berval   *reqdata,
             LDAPControl          **serverctrls,
             LDAPControl          **clientctrls,
             char                 **retoidp,
             struct berval        **retdatap)
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_extended_operation_s()** function is used to perform a synchronous LDAP extended operation, which returns LDAP_SUCCESS if the extended operation completed successfully, or an LDAP error code if not. The *retoid* and *retdata* parameters are filled in with the Object IDentifier (OID) and data from the response. If no OID or data was returned, these parameters are set to NULL, respectively.

If the LDAP server does not support the extended operation, the operation will fail. To determine if the requisite extended operation is supported by the server, get the rootDSE of the LDAP server and check for the supportedExtension attribute. If the values for this attribute include the object identifier of your extended operation, then the server supports the extended operation. If the supportedExtension attribute is not present in the rootDSE, then the server is not configured to support any extended operations.

Authorities and Locks

No OS/400 authority is required. All authority checking is done by the LDAP server.

Parameters

ld (Input) Specifies the LDAP pointer returned by a previous call to "ldap_init()—Perform an LDAP Initialization Operation" on page 102, "ldap_ssl_init —Initializes an SSL Connection." on page 206, or "ldap_open()—Perform an LDAP Open Operation" on page 133.

reqoid (Input) Specifies the dotted-OID text string that identifies the extended operation to be performed by the server.

reqdata (Input) Specifies the arbitrary data required by the extended operation (if NULL, no data is sent to the server).

serverctrls
(Input) Specifies a list of LDAP server controls. This parameter may be set to null. See LDAP Controls for more information about server controls.

clientctrls
(Input) Specifies a list of LDAP client controls. This parameter may be set to null. See LDAP Controls for more information about client controls.

retoidp (Output) This result parameter is set to point to a character string that is set to an allocated, dotted-OID text string returned from the server. This string should be disposed of using the "ldap_memfree()—Free Memory Allocated by LDAP API" on page 106 API. If no OID is returned, **retoidp* is set to NULL.

retdatap
(Output) This result parameter is set to a pointer to a berval structure pointer that is set to an allocated copy of the data returned by the server. This struct berval should be disposed of using **ber_bvfree()**. If no data is returned, **retdatp* is set to NULL.

Return Value

LDAP_SUCCESS
if the request was successful.

another LDAP error code
if the request was not successful.

Error Conditions

If **ldap_extended_operation_s()** is not successful, it will return the LDAP error code resulting from the operation.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_extended_operation_s API.

Related Information

- "ldap_add_ext()—Perform an LDAP Add Operation with Controls" on page 12 — Asynchronously add an entry with controls.
- "ldap_add_ext_s()—Perform an LDAP Add Operation with Controls (Synchronous)" on page 14 — Synchronously add an entry with controls.

- "ldap_compare_ext()—Perform an LDAP Compare Operation with Controls" on page 29 — Asynchronous compare to a directory entry with controls.
- "ldap_compare_ext_s()—Perform an LDAP Compare Operation with Controls (Synchronous)" on page 31 — Synchronous compare to a directory entry with controls.
- "ldap_delete_ext()—Perform an LDAP Delete Operation with Controls" on page 54 — Asynchronous delete an entry with controls.
- "ldap_delete_ext_s()—Perform an LDAP Delete Operation with Controls" on page 56 — Synchronous delete an entry with controls.
- "ldap_modify_ext()—Perform an LDAP Modify Entry Request with Controls" on page 110 — Asynchronously modify an entry with controls.
- "ldap_modify_ext_s()—Perform an LDAP Modify Entry Request with Controls" on page 113 — Synchronously modify an entry with controls.
- "ldap_sasl_bind()—Perform an LDAP SASL Bind Request" on page 159 — Asynchronously bind to the directory using the Simple Authentication Security Layer (SASL).
- "ldap_sasl_bind_s()—Perform an LDAP SASL Bind Request (Synchronous)" on page 161 — Synchronously bind to the directory using the Simple Authentication Security Layer (SASL).
- "ldap_search_ext —Asynchronously Search the Directory Using Controls" on page 166 — Asynchronously search the directory with controls.
- "ldap_search_ext_s — Synchronously Search the Directory Using Controls" on page 168 — Synchronously search the directory with controls.
- "ldap_rename()—Asynchronously Rename an Entry" on page 152 — Asynchronously rename an entry with controls.
- "ldap_rename_s()—Synchronously Rename an Entry" on page 154 — Synchronously rename an entry with controls.
- "ldap_unbind_ext()—Perform an LDAP Unbind Request" on page 212 — Unbind with controls.

The **ldap_extended_operation_s()** API supports LDAP V3 server controls and client controls.

API introduced: V5R1

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_first_attribute()—Retrieve First Attribute in an Entry

Syntax

```
#include <ldap.h>

char *ldap_first_attribute(
                LDAP         *ld,
                LDAPMessage  *entry,
                BerElement  **berptr)
```

Library Name/Service Program: QSYS/QGLDCLNT

Default Public Authority: *USE

Threadsafe: Yes

The **ldap_first_attribute()** function returns the first attribute in an entry. The **ldap_first_attribute()** and "ldap_next_attribute()—Retrieve Next Attribute in an Entry" on page 127 functions are used to step through the attributes in an LDAP entry.

ldap_first_attribute() takes an entry returned by “ldap_first_entry()—Retrieve First LDAP Entry” on page 77 or “ldap_next_entry()—Retrieve Next LDAP Entry” on page 129 and returns a pointer to a buffer containing a null terminated string that is the first attribute type in the entry. This buffer must be freed when its use is completed using “ldap_memfree()—Free Memory Allocated by LDAP API” on page 106. **berptr* also must be freed when its use is completed using “ldap_ber_free()—Free storage allocated by the LDAP library” on page 23.

Authorities and Locks

No OS/400 authority is required.

Parameters

ld (Input) The LDAP pointer returned by a previous call to “ldap_init()—Perform an LDAP Initialization Operation” on page 102, “ldap_ssl_init —Initializes an SSL Connection.” on page 206, “ldap_app_ssl_init_np —Initializes an SSL Connection” on page 19, or “ldap_open()—Perform an LDAP Open Operation” on page 133.

entry (Input) The attribute information as returned by “ldap_first_entry()—Retrieve First LDAP Entry” on page 77 or “ldap_next_entry()—Retrieve Next LDAP Entry” on page 129.

berptr (Output) A pointer to a BerElement that will be allocated to keep track of the current position. It is an input and output parameter for subsequent calls to “ldap_next_attribute()—Retrieve Next Attribute in an Entry” on page 127. The BerElement structure is opaque to the application. Free **berptr* when its use is completed using **ber_free**.

Return Value

Pointer to a buffer containing the first attribute type in the entry
if the request was successful.

NULL if the request was not successful.

Error Conditions

If **ldap_first_attribute()** is not successful, NULL is returned, and *ld_errno* will be set to indicate the error. See “LDAP Client API Error Conditions” on page 303 for possible LDAP error code values. Use “ldap_get_errno()—Retrieve Error Information” on page 87 function to retrieve the error information.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_first_attribute API.

Related Information

- “ldap_first_entry()—Retrieve First LDAP Entry” on page 77 — Retrieve first LDAP entry.
- “ldap_next_entry()—Retrieve Next LDAP Entry” on page 129 — Retrieve next LDAP entry.
- “ldap_count_attributes()—Retrieve Count of Attributes for an LDAP Entry” on page 37 — Retrieve count of attributes for an LDAP entry.
- “ldap_next_attribute()—Retrieve Next Attribute in an Entry” on page 127 — Return next attribute name in an entry.
- “ldap_get_values()—Retrieve a Set of Attribute Values from an Entry” on page 99 — Retrieve a set of attribute values from an entry.

- "ldap_get_values_len()—Retrieve a Set of Binary Attribute Values" on page 100 — Retrieve a set of binary attribute values.

API introduced: V4R3

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_first_entry()—Retrieve First LDAP Entry

Syntax

```
#include <ldap.h>

LDAPMessage *ldap_first_entry(
                LDAP          *ld,
                LDAPMessage   *result)
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_first_entry()** function takes the result from a call to "ldap_result()—Retrieve Result of an Asynchronous LDAP Operation" on page 156, "ldap_search_s()—Perform an LDAP Search Operation (Synchronous)" on page 171, or "ldap_search_st()—Perform an LDAP Search Operation (Timed Synchronous)" on page 173 and returns a pointer to the first entry in the result.

The **ldap_first_entry()**, "ldap_next_entry()—Retrieve Next LDAP Entry" on page 129, and "ldap_count_entries()—Retrieve Count of LDAP Entries" on page 38 functions are used to parse results received from "ldap_result()—Retrieve Result of an Asynchronous LDAP Operation" on page 156 or the synchronous LDAP search functions "ldap_search_s()—Perform an LDAP Search Operation (Synchronous)" on page 171 and "ldap_search_st()—Perform an LDAP Search Operation (Timed Synchronous)" on page 173.

Authorities and Locks

No OS/400 authority is required.

Parameters

ld (Input) The LDAP pointer returned by a previous call to "ldap_init()—Perform an LDAP Initialization Operation" on page 102, "ldap_ssl_init —Initializes an SSL Connection." on page 206, or "ldap_open()—Perform an LDAP Open Operation" on page 133.

result (Input) The result returned by a call to "ldap_result()—Retrieve Result of an Asynchronous LDAP Operation" on page 156 or one of the synchronous search routines ("ldap_search_s()—Perform an LDAP Search Operation (Synchronous)" on page 171 or "ldap_search_st()—Perform an LDAP Search Operation (Timed Synchronous)" on page 173).

Return Value

Pointer to the next entry in the result
if the request was successful.

NULL if the request was not successful.

Error Conditions

If **ldap_first_entry()** is not successful, NULL is returned, *ld_errno* will be set to indicate the error. See "LDAP Client API Error Conditions" on page 303 for possible LDAP error code values. Use "ldap_get_errno()—Retrieve Error Information" on page 87 function to retrieve the error information.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_first_entry API.

Related Information

- "ldap_next_entry()—Retrieve Next LDAP Entry" on page 129 — Return next entry in a chain of search results.
- "ldap_count_entries()—Retrieve Count of LDAP Entries" on page 38 — Return number of entries in a chain of search results.
- "ldap_get_entry_controls_np()—Extract Server Controls from an Entry" on page 85 — Extract server controls from an entry.
- "ldap_first_reference()—Retrieve First Continuation Reference in a Chain of Search Results" on page 80 — Return first continuation reference in a chain of search results.
- "ldap_next_reference()—Retrieve the next Continuation Reference in a Chain of Search Results" on page 132 — Return next continuation reference in a chain of search results.
- "ldap_count_references()—Count continuation references in a chain of search results" on page 41 — Return number of continuation reference in a chain of search results.
- "ldap_parse_reference_np()—Extract Information from a Continuation Reference" on page 141 — Extract information from a continuation reference.
- "ldap_first_message()—Retrieve First LDAP Message" on page 79 — Retrieve first LDAP message.
- "ldap_next_message()—Retrieve Next LDAP Message" on page 130 — Retrieve next LDAP message.
- "ldap_msgfree()—Free LDAP Result Message" on page 122 — Free LDAP result message.
- "ldap_msgtype()—Retrieve the Type of an LDAP Message" on page 126 — Retrieve Type of an LDAP Message

API introduced: V4R3

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_first_message()—Retrieve First LDAP Message

Syntax

```
#include <ldap.h>

LDAPMessage *ldap_first_message(LDAP          *ld,
                                LDAPMessage   *result)
```

Library Name/Service Program: QSYS/QGLDCLNT

Default Public Authority: *USE

Threadsafe: Yes

The **ldap_first_message()** routine is used to step through the list of messages in a result chain, as returned by "ldap_result()—Retrieve Result of an Asynchronous LDAP Operation" on page 156. It is used to return a pointer to the first message in the list.

Authorities and Locks

No OS/400 authority is required.

Parameters

ld (Input) The LDAP pointer returned by a previous call to "ldap_init()—Perform an LDAP Initialization Operation" on page 102, "ldap_ssl_init —Initializes an SSL Connection." on page 206, or "ldap_open()—Perform an LDAP Open Operation" on page 133.

result (Input) The result returned by a call to "ldap_result()—Retrieve Result of an Asynchronous LDAP Operation" on page 156 or one of the synchronous search routines ("ldap_search_s()—Perform an LDAP Search Operation (Synchronous)" on page 171, "ldap_search_st()—Perform an LDAP Search Operation (Timed Synchronous)" on page 173, or "ldap_search_ext_s — Synchronously Search the Directory Using Controls" on page 168).

Return Value

LDAPMessage *
Pointer to the first message.

NULL when no message exists in the result set or if an error occurs.

Error Conditions

If **ldap_first_message()** is not successful, *ld_errno* will be set to indicate the error. See "LDAP Client API Error Conditions" on page 303 for possible LDAP error code values. Use "ldap_get_errno()—Retrieve Error Information" on page 87 function to retrieve the error information.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_first_message API.

Related Information

- "ldap_count_messages()—Count messages in a result chain" on page 40 — Return the number of message in a result chain.
- "ldap_first_entry()—Retrieve First LDAP Entry" on page 77 — Retrieve first LDAP entry.
- "ldap_first_reference()—Retrieve First Continuation Reference in a Chain of Search Results" — Return first continuation reference in a chain of search results.
- "ldap_msgfree()—Free LDAP Result Message" on page 122 — Free LDAP result message.
- "ldap_msgid()—Retrieve the Message ID Associated with an LDAP Message" on page 124 — Retrieve message ID associated with an LDAP message.
- "ldap_msgtype()—Retrieve the Type of an LDAP Message" on page 126 — Retrieve type of an LDAP message.
- "ldap_next_message()—Retrieve Next LDAP Message" on page 130 — Retrieve next LDAP message.
- "ldap_result2error()—Retrieve LDAP Error Information" on page 158 — Retrieve LDAP error information

API introduced: V4R5

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

---

ldap_first_reference()—Retrieve First Continuation Reference in a Chain of Search Results

Syntax

```
#include <ldap.h>

LDAPMessage *ldap_first_reference(LDAP           *ld,
                                  LDAPMessage    *result)
```

Library Name/Service Program: QSYS/QGLDCLNT

Default Public Authority: *USE

Threadsafe: Yes

The **ldap_first_reference()** is used to return the first continuation reference from the search result chain.

Authorities and Locks

No OS/400 authority is required.

Parameters

ld (Input) The LDAP pointer returned by a previous call to "ldap_init()—Perform an LDAP Initialization Operation" on page 102, "ldap_ssl_init —Initializes an SSL Connection." on page 206, or "ldap_open()—Perform an LDAP Open Operation" on page 133.

result (Input) The result returned by a call to "ldap_result()—Retrieve Result of an Asynchronous LDAP Operation" on page 156 or one of the synchronous search routines ("ldap_search_s()—Perform an LDAP Search Operation (Synchronous)" on page 171, "ldap_search_st()—Perform an LDAP Search Operation (Timed Synchronous)" on page 173, or "ldap_search_ext_s — Synchronously Search the Directory Using Controls" on page 168).

Return Value

LDAPMessage *
Pointer to the first continuation reference. The pointer returned from **ldap_first_reference()** should be supplied on a subsequent call to "ldap_next_reference()—Retrieve the next Continuation Reference in a Chain of Search Results" on page 132 to get the next continuation reference.

NULL when no more continuation references exist in the result set to be returned.

Error Conditions

If **ldap_first_reference()** is not successful, *ld_errno* will be set to indicate the error. See "LDAP Client API Error Conditions" on page 303 for possible LDAP error code values. Use "ldap_get_errno()—Retrieve Error Information" on page 87 function to retrieve the error information.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_first_reference API.

Related Information

- "ldap_first_entry()—Retrieve First LDAP Entry" on page 77 — Return first entry in a chain of search results.
- "ldap_next_entry()—Retrieve Next LDAP Entry" on page 129 — Return next entry in a chain of search results.
- "ldap_count_entries()—Retrieve Count of LDAP Entries" on page 38 — Return number of entry in a chain of search results.
- "ldap_get_entry_controls_np()—Extract Server Controls from an Entry" on page 85 — Extract server controls from an entry.
- "ldap_count_references()—Count continuation references in a chain of search results" on page 41 — Return the number of continuation reference in a chain of search results.
- "ldap_next_reference()—Retrieve the next Continuation Reference in a Chain of Search Results" on page 132 — Return next continuation reference in a chain of search results.
- "ldap_parse_reference_np()—Extract Information from a Continuation Reference" on page 141 — Extract information from a continuation reference.

API introduced: V4R5

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_free_sort_keylist()—Free all Memory used by the Sort Key List

Syntax

```
#include <ldap.h>

void ldap_free_sort_keylist(
             LDAPsortkey **sortKeyList)
```

Library Name/Service Program: QSYS/QGLDCLNT

Default Public Authority: *USE

Threadsafe: Yes

The **ldap_free_sort_keylist()** function is used to free all the memory used by the sort key list. This function must be called after the ldap_create_sort_control() function has completed.

See LDAP Sort for usage information about the functions used to perform sorting of entries returned from the server following an LDAP search operation.

Authorities and Locks

No OS/400 authority is required. All authority checking is done by the LDAP server.

Parameters

sortKeyList

(Input) Specifies the pointer to an array of LDAPsortkey structures, which represent attributes that the server uses to sort returned entries. Input when used for ldap_create_sort_control() and ldap_free_sort_keylist().

Return Value

NONE

Related Information

- "ldap_create_sort_keylist()—Create a Structure with Sort Key Values used when Sorting Search Results" on page 49 — Create a structure with sort key values.
- "ldap_create_sort_control()—Create a Sorted Results Control used when Sorting Search Results" on page 47 — Create a sorted results control.
- "ldap_parse_sort_control()—Retrieve Values in a Sorted Results Control" on page 147 — Retrieve values in a sorted results control.
- "ldap_create_page_control()—Create a Paged Results Control used when paging search results" on page 45 — Create a paged results control.
- "ldap_parse_page_control()—Retrieve Values in a Paged Results Control" on page 138 — Retrieve values in a paged results control.
- "ldap_search()—Perform an LDAP Search Operation" on page 164 — Asynchronously search the directory.
- "ldap_parse_result()—Extract Information from Results" on page 143 — Extract information from results.

API introduced: V5R3

ldap_free_urldesc()—Free an LDAP URL Description

Syntax

```
#include <ldap.h>

typedef struct ldap_url_desc {
    char    *lud_host;      /* LDAP host to contact */
    int      lud_port;      /* port on host */
    char    *lud_dn;        /* base for search */
    char   **lud_attrs;     /* NULL-terminate list of attributes */
    int      lud_scope;     /* a valid LDAP_SCOPE_... value */
    char    *lud_filter;    /* LDAP search filter */
    char    *lud_string;    /* for internal use only */
} LDAPURLDesc;

void ldap_free_urldesc(
  LDAPURLDesc  *ludp)
```

Library Name/Service Program: QSYS/QGLDCLNT

Default Public Authority: *USE

Threadsafe: Yes

The **ldap_free_urldesc()** function is called to free an LDAP URL description that was obtained from a call to the "ldap_url_parse()—Parse an LDAP URL" on page 215 function.

Authorities and Locks

No OS/400 authority is required.

Parameters

ludp (Input) Points to the LDAP URL description, as returned by "ldap_url_parse()—Parse an LDAP URL" on page 215.

Return Value

None.

Error Conditions

The **ldap_free_urldesc()** API does not return an error code.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_free_urldesc API.

Related Information

- "ldap_is_ldap_url()—Verify LDAP URL" on page 105 — Check a URL string to see if it is an LDAP URL.
- "ldap_url_parse()—Parse an LDAP URL" on page 215 — Break up an LDAP URL string into its components.
- "ldap_url_search()—Perform an LDAP URL Search Operation" on page 219 — Asynchronously search using an LDAP URL.
- "ldap_url_search_s() — Perform an LDAP URL Search Operation (Synchronous)" on page 221 — Synchronously search using an LDAP URL.
- "ldap_url_search_st()—Perform an LDAP URL Search Operation (Timed Synchronous)" on page 223 — Synchronously search using an LDAP URL and a timeout.

API introduced: V4R3

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

---

ldap_get_dn()—Retrieve the Distinguished Name of an Entry

Syntax

```
#include <ldap.h>

char *ldap_get_dn(
         LDAP         *ld,
         LDAPMessage  *entry)
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_get_dn()** function takes an entry as returned by "ldap_first_entry()—Retrieve First LDAP Entry" on page 77 or "ldap_next_entry()—Retrieve Next LDAP Entry" on page 129 and returns a copy of the entry's Distinguished Name (DN). Memory for the DN will have been allocated and should be freed by a call to "ldap_memfree()—Free Memory Allocated by LDAP API" on page 106.

Authorities and Locks

No OS/400 authority is required.

Parameters

ld (Input) Specifies the LDAP pointer returned by a previous call to "ldap_init()—Perform an LDAP Initialization Operation" on page 102,"ldap_ssl_init —Initializes an SSL Connection." on page 206, or "ldap_open()—Perform an LDAP Open Operation" on page 133.

entry (Input) The entry whose dn is to be retrieved, as returned by Specifies the LDAP pointer returned by a previous call to "ldap_first_entry()—Retrieve First LDAP Entry" on page 77 or "ldap_next_entry()—Retrieve Next LDAP Entry" on page 129.

Return Value

Copy of the entry's DN
if the request was successful.

NULL if the request was not successful.

Error Conditions

If **ldap_get_dn()** is not successful, *ld_errno* will be set to indicate the error. See "LDAP Client API Error Conditions" on page 303 for possible LDAP error code values. Use "ldap_get_errno()—Retrieve Error Information" on page 87 function to retrieve the error information.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_get_dn API.

Related Information

- "ldap_explode_dn()—Break a Distinguished Name into Its Components" on page 64 — Convert a DN into its component parts.
- "ldap_explode_dn_utf8()—Break a UTF8 codepage Distinguished Name into Its Components" on page 66 — Break a UTF8 codepage Distinguished Name into its components

API introduced: V4R5

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

---

ldap_get_entry_controls_np()—Extract Server Controls from an Entry

Syntax

```
#include <ldap.h>

int ldap_get_entry_controls_np(
                        LDAP           *ld,
                        LDAPMessage    *entry,
                        LDAPControl    ***serverctrlsp)
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_get_entry_controls_np()** routine is used to retrieve an array of server controls returned in an individual entry in a chain of search results.

Note the suffix "_np" which shows the API is in a preliminary implementation, and is not documented in the Internet Draft. The Internet community may standardize this API in the future.

Authorities and Locks

No OS/400 authority is required.

Parameters

ld (Input) Specifies the LDAP pointer returned by a previous call to "ldap_init()—Perform an LDAP Initialization Operation" on page 102, "ldap_ssl_init —Initializes an SSL Connection." on page 206, or "ldap_open()—Perform an LDAP Open Operation" on page 133.

entry (Input) Specifies a pointer to an entry returned on a previous call to "ldap_first_entry()—Retrieve First LDAP Entry" on page 77 or "ldap_next_entry()—Retrieve Next LDAP Entry" on page 129.

serverctrlsp
(Input) Specifies a pointer to a result parameter that is filled in with an allocated array of controls copied out of the entry. The control array should be freed by calling "ldap_controls_free()—Free storage allocated by the LDAP library" on page 34.

Return Value

LDAP_SUCCESS
if the call was successful

another LDAP error code
if the call was not successful.

Error Conditions

The **ldap_get_entry_controls_np()** API will return LDAP error code if not successful. See "LDAP Client API Error Conditions" on page 303 for possible LDAP error code values.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_get_entry_controls_np API.

Related Information

- "ldap_first_entry()—Retrieve First LDAP Entry" on page 77 — Return first entry in a chain of search results.
- "ldap_next_entry()—Retrieve Next LDAP Entry" on page 129 — Return next entry in a chain of search results.
- "ldap_count_entries()—Retrieve Count of LDAP Entries" on page 38 — Return the number of entry in a chain of search results.
- "ldap_first_reference()—Retrieve First Continuation Reference in a Chain of Search Results" on page 80 — Return first continuation reference in a chain of search results.
- "ldap_next_reference()—Retrieve the next Continuation Reference in a Chain of Search Results" on page 132 — Return next continuation reference in a chain of search results.
- "ldap_count_references()—Count continuation references in a chain of search results" on page 41 — Return number of continuation reference in a chain of search results.
- "ldap_parse_reference_np()—Extract Information from a Continuation Reference" on page 141 — Extract information from a continuation reference.

API introduced: V4R5

ldap_get_errno()—Retrieve Error Information

Syntax

```
#include <ldap.h>

int ldap_get_errno(
         LDAP        *ld)
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_get_errno()** function retrieves information about the most recent error that occurred for an LDAP operation. This function can be called for any LDAP API that does not return an error.

The "ldap_get_lderrno()—Retrieve Error Information" on page 89 API returns more error information than **ldap_get_errno()**.

Authorities and Locks

No OS/400 authority is required.

Parameters

ld (Input) Specifies the LDAP pointer returned by a previous call to "ldap_init()—Perform an LDAP Initialization Operation" on page 102, "ldap_ssl_init —Initializes an SSL Connection." on page 206, or "ldap_open()—Perform an LDAP Open Operation" on page 133.

Return Value

LDAP error code
See "LDAP Client API Error Conditions" on page 303 for possible LDAP error codes values.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_get_errno API.

Related Information

- "ldap_err2string()—Retrieve LDAP Error Message String" on page 62 — Convert LDAP error indication to a string.
- "ldap_get_lderrno()—Retrieve Error Information" on page 89 — Retrieve Error Information.
- "ldap_perror()—Print LDAP Error Information" on page 148 — Print an LDAP error indication to standard error.

- "ldap_result2error()—Retrieve LDAP Error Information" on page 158 — Extract LDAP error indication from LDAP result.

API introduced: V4R3

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_get_iconv_local_codepage()— Get the Active LDAP Code Page

Syntax

```
#include <ldap.h>

char *
ldap_get_iconv_local_codepage ( )
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: No

The **ldap_get_iconv_local_codepage()** API is used to obtain the active LDAP code page. It returns the value of a global variable *ldap_global_codepage* set by "ldap_set_iconv_local_codepage() — Set the Active LDAP Code Page" on page 187. To free the returned string, use "ldap_memfree()—Free Memory Allocated by LDAP API" on page 106.

Authorities and Locks

No OS/400 authority is required.

Parameters

No parameter are passed to ldap_get_iconv_local_codepage().

Return Value

LDAP Code page
if the request was successful.

NULL if the request was not successful.

Error Conditions

If **ldap_get_iconv_local_codepage()** is not successful, it returns NULL.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_get_iconv_local_codepage API.

Related Information

- "ldap_xlate_local_to_utf8()— Convert String From the Local Code Page to UTF-8 Encoding" on page 230 — Convert String From the Local to UTF-8 Code Page.
- "ldap_xlate_utf8_to_local() — Convert String From the UTF-8 Encoding to Local Code Page" on page 234 — Convert String From UTF-8 to Local Code Page.
- "ldap_xlate_local_to_unicode()— Convert String From the Local Code Page to UCS-2 (or UNICODE) Encoding" on page 229 — Convert String From the Local to UCS-2 Code Page.
- "ldap_xlate_unicode_to_local() — Convert String From the UCS-2 (or UNICODE) Encoding to Local Code Page" on page 232 — Convert String From UCS-2 to Local Code Page.
- "ldap_set_iconv_local_codepage() — Set the Active LDAP Code Page" on page 187 — Set the Active LDAP Code Page.
- "ldap_set_iconv_local_charset()— Set the Active LDAP Character Set" on page 185 — Set the Active LDAP Character set.
- "ldap_set_locale() — Change the Locale Used by LDAP" on page 190 — Change the Locale Used by LDAP.
- "ldap_get_locale()— Get Active LDAP Locale" on page 91 — Get the Locale Used by LDAP.

API introduced: V4R5

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_get_lderrno()—Retrieve Error Information

Syntax

```
#include <ldap.h>

int ldap_get_lderrno(
         LDAP        *ld,
         char        **dn,
         char        **errmsg)
```

Library Name/Service Program: QSYS/QGLDCLNT

Default Public Authority: *USE

Threadsafe: Yes

The **ldap_get_lderrno()** function retrieves information about the most recent error that occurred for an LDAP operation. This function can be called for any LDAP API that does not return an error.

When an error occurs at the LDAP server, the server returns both an LDAP result code and a message containing any additional information about the error from the server. If the error occurred because an entry specified by a Distinguished Name (DN) could not be found, the server may also return the portion of the DN that identifies an existing entry. Use **ldap_get_lderrno()** to obtain both the message containing error information and the matched DN.

Authorities and Locks

No OS/400 authority is required.

Parameters

ld (Input) Specifies the LDAP pointer returned by a previous call to "ldap_init()—Perform an LDAP Initialization Operation" on page 102, "ldap_ssl_init —Initializes an SSL Connection." on page 206, or "ldap_open()—Perform an LDAP Open Operation" on page 133.

dn (Output) The distinguished name (DN) that identifies an existing entry, indicating how much of the name in the request was recongnized by the server. The DN is returned when an **LDAP_NO_SUCH_OBJECT** error is returned from the server on some previous operation. The matched DN string should be freed by calling "ldap_memfree()—Free Memory Allocated by LDAP API" on page 106.

errmsg (Output) The text of the error message, as returned from the server. The error message string should be freed by calling "ldap_memfree()—Free Memory Allocated by LDAP API" on page 106.

Return Value

LDAP error code
See "LDAP Client API Error Conditions" on page 303 for possible LDAP error codes values.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_get_lderrno API.

Related Information

- "ldap_err2string()—Retrieve LDAP Error Message String" on page 62 — Convert LDAP error indication to a string.
- "ldap_get_errno()—Retrieve Error Information" on page 87 — Obtain information from most recent error.
- "ldap_perror()—Print LDAP Error Information" on page 148 — Print an LDAP error indication to standard error.
- "ldap_result2error()—Retrieve LDAP Error Information" on page 158 — Extract LDAP error indication from LDAP result.
- "ldap_set_lderrno() — Set Error Information" on page 189 — Set Error Information

API introduced: V5R1

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_get_locale()— Get Active LDAP Locale

Syntax

```
#include <ldap.h>

char *ldap_get_locale( )
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: No

The **ldap_get_locale()** API is used to obtain the active LDAP locale. To free the returned string, use "ldap_memfree()—Free Memory Allocated by LDAP API" on page 106.

Authorities and Locks

No OS/400 authority is required.

Parameters

No parameters are passed to ldap_get_locale()

Return Value

Active LDAP Locale
if the request was successful.

NULL if the request was not successful.

Error Conditions

If **ldap_get_locale()** is not successful, it returns NULL.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_get_locale API.

Related Information

- "ldap_xlate_local_to_utf8()— Convert String From the Local Code Page to UTF-8 Encoding" on page 230 — Convert String From the Local to UTF-8 Code Page.
- "ldap_xlate_utf8_to_local() — Convert String From the UTF-8 Encoding to Local Code Page" on page 234 — Convert String From UTF-8 to Local Code Page.
- "ldap_xlate_local_to_unicode()— Convert String From the Local Code Page to UCS-2 (or UNICODE) Encoding" on page 229 — Convert String From the Local to UCS-2 Code Page.
- "ldap_xlate_unicode_to_local() — Convert String From the UCS-2 (or UNICODE) Encoding to Local Code Page" on page 232 — Convert String From UCS-2 to Local Code Page.
- "ldap_get_iconv_local_codepage()— Get the Active LDAP Code Page" on page 88 — Get the Active LDAP Code Page.

- "ldap_set_iconv_local_codepage() — Set the Active LDAP Code Page" on page 187 — Set the Active LDAP Code Page.
- "ldap_set_iconv_local_charset()— Set the Active LDAP Character Set" on page 185 — Set the Active LDAP Character set.
- "ldap_set_locale() — Change the Locale Used by LDAP" on page 190 — Change the Locale Used by LDAP.

API introduced: V4R5

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

---

ldap_get_option()—Retrieve LDAP Options

Syntax

```
#include <ldap.h>

int ldap_get_option(
                LDAP  *ld,
                int   optionToGet,
                void  *optionValue)
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_get_option()** function is used to query settings associated with the specified LDAP connection.

Authorities and Locks

No OS/400 authority is required.

Parameters

ld (Input) The LDAP pointer returned by a previous call to "ldap_init()—Perform an LDAP Initialization Operation" on page 102, "ldap_ssl_init —Initializes an SSL Connection." on page 206, or "ldap_open()—Perform an LDAP Open Operation" on page 133. If a NULL ld is passed in, the default value for the option is retrieved.

optionToGet
(Input) The option value that is to be queried on the **ldap_get_option()** call. See below for the list of supported options.

optionValue
(Input) The address of the storage in which to return the queried value using **ldap_get_option()**.

The following session settings can be get using the **ldap_get_option()** API:

LDAP_OPT_SIZELIMIT	maximum number of entries that can be returned on a search operation
LDAP_OPT_TIMELIMIT	maximum number of seconds to wait for search results.
LDAP_OPT_REFHOPLIMIT	maximum number of referrals in a sequence that the client can follow
LDAP_OPT_DEREF	rules for following aliases at the server.

LDAP_OPT_REFERRALS	whether or not referrals should be followed by the client.
LDAP_OPT_DEBUG	debug options.
LDAP_OPT_SSL_CIPHER	SSL ciphers to use.
LDAP_OPT_SSL_TIMEOUT	SSL timeout for refreshing session keys
LDAP_OPT_REBIND_FN	address of application's setrebindproc procedure.
LDAP_OPT_PROTOCOL_VERSION	LDAP protocol version to use (V2 or V3).
LDAP_OPT_SERVER_CONTROLS	default server controls.
LDAP_OPT_CLIENT_CONTROLS	default client library controls.
LDAP_OPT_UTF8_IO	mode for converting string data between the local code page and UTF-8
LDAP_OPT_HOST_NAME	current host name
LDAP_OPT_ERROR_NUMBER	error number
LDAP_OPT_ERROR_STRING	error string
LDAP_OPT_EXT_ERROR	extended error code
LDAP_OPT_EXT_GSS_ERR	GSSAPI extended error code

Additional details on specific options for **ldap_get_option()** are provided in the following sections.

LDAP_OPT_SIZELIMIT

Specifies the maximum number of entries that can be returned on a search operation. Note: the actual size limit for operations is also bounded by the maximum number of entries that the server is configured to return. Thus, the actual size limit will be the lesser of the value specified on this option and the value configured in the LDAP server. The default sizelimit is unlimited, specified with a value of zero (thus deferring to the sizelimit setting of the LDAP server).

Examples:

```
sizevalue=50;
ldap_set_option( ld, LDAP_OPT_SIZELIMIT, &sizevalue);
ldap_get_option( ld, LDAP_OPT_SIZELIMIT, &sizevalue );
```

LDAP_OPT_TIMELIMIT

Specifies the number of seconds to wait for search results. Note: the actual time limit for operations is also bounded by the maximum time that the server is configured to allow. Thus, the actual time limit will be the lesser of the value specified on this option and the value configured in the LDAP server. The default is unlimited (specified with a value of zero).

Examples:

```
timevalue=50;
ldap_set_option( ld, LDAP_OPT_TIMELIMIT, &timevalue);
ldap_get_option( ld, LDAP_OPT_TIMELIMIT, &timevalue );
```

LDAP_OPT_REFHOPLIMIT

Specifies the maximum number of hops that the client library will take when chasing referrals. The default is 5.

Examples:

```
hoplimit=7;
ldap_set_option( ld, LDAP_OPT_REFHOPLIMIT, &hoplimit);
ldap_get_option( ld, LDAP_OPT_REFHOPLIMIT, &hoplimit);
```

LDAP_OPT_DEREF

Specifies alternative rules for following aliases at the server. The default is **LDAP_DEREF_NEVER**.

Supported values:

LDAP_DEREF_NEVER	0
LDAP_DEREF_SEARCHING	1
LDAP_DEREF_FINDING	2
LDAP_DEREF_ALWAYS	3

Examples:

```
int deref = LDAP_DEREF_NEVER;
ldap_set_option( ld, LDAP_OPT_DEREF, &deref);
ldap_get_option( ld, LDAP_OPT_DEREF, &deref);
```

LDAP_OPT_REFERRALS

Specifies whether the LDAP library will automatically follow referrals returned by LDAP servers or not. It can be set to one of the constants **LDAP_OPT_ON** or **LDAP_OPT_OFF**. By default, the LDAP client will follow referrals.

Examples:

```
int value;
ldap_set_option( ld, LDAP_OPT_REFFERALS, (void *)LDAP_OPT_ON);
ldap_get_option( ld, LDAP_OPT_REFFERALS, &value);
```

LDAP_OPT_DEBUG

Specifies a bit-map that indicates the level of debug trace for the LDAP library.

Supported values:

LDAP_DEBUG_OFF	0x000
LDAP_DEBUG_TRACE	0x001
LDAP_DEBUG_PACKETS	0x002
LDAP_DEBUG_ARGS	0x004
LDAP_DEBUG_CONNS	0x008
LDAP_DEBUG_BER	0x010
LDAP_DEBUG_FILTER	0x020
LDAP_DEBUG_CONFIG	0x040
LDAP_DEBUG_ACL	0x080
LDAP_DEBUG_STATS	0x100
LDAP_DEBUG_STATS2	0x200
LDAP_DEBUG_SHELL	0x400
LDAP_DEBUG_PARSE	0x800
LDAP_DEBUG_ANY	0xffff

Examples:

```
int value;
int debugvalue= LDAP_DEBUG_TRACE | LDAP_DEBUG_PACKETS;
ldap_set_option( ld, LDAP_OPT_DEBUG, &debugvalue);
ldap_get_option( ld, LDAP_OPT_DEBUG, &value );
```

LDAP_OPT_SSL_CIPHER

Specifies a set of one or more ciphers to be used when negotiating the cipher algorithm with the LDAP server. The first cipher in the list that is common with the list of ciphers supported by the server is chosen. For the export version of the library, the value used is ″0306″. For the domestic version of the library, the default value is ″05040A090306″. Note that the cipher string supported by the export version of the LDAP client library is fixed and cannot be modified.

Supported ciphers:

LDAP_SSL_RC4_MD5_EX	03
LDAP_SSL_RC2_MD5_EX	06
LDAP_SSL_RC4_SHA_US	05 (Non-export only)
LDAP_SSL_RC4_MD5_US	04 (Non-export only)
LDAP_SSL_DES_SHA_US	09 (Non-export only)
LDAP_SSL_3DES_SHA_US	0A (Non-export only)
LDAP_SSL_AES_SHA_US	2F (Non-export only)

Examples:

```
char *setcipher = "2F090A";
char *getcipher;
ldap_set_option( ld, LDAP_OPT_SSL_CIPHER, setcipher);
ldap_get_option( ld, LDAP_OPT_SSL_CIPHER, &getcipher );
```

Use “ldap_memfree()—Free Memory Allocated by LDAP API” on page 106 to free the memory returned by the call to **ldap_get_option()**.

LDAP_OPT_SSL_TIMEOUT

Specifies in seconds the SSL inactivity timer. After the specified seconds, in which no SSL activity has occurred, the SSL connection will be refreshed with new session keys. A smaller value may help increase security, but will have a small impact on performance. The default SSL timeout value is 43200 seconds.

Examples:

```
value = 100;
ldap_set_option( ld, LDAP_OPT_SSL_TIMEOUT, &value );
ldap_get_option( ld, LDAP_OPT_SSL_TIMEOUT, &value)
```

LDAP_OPT_REBIND_FN

Specifies the address of a routine to be called by the LDAP library when the need arises to authenticate a connection with another LDAP server. This can occur, for example, when the LDAP library is chasing a referral. If a routine is not defined, referrals will always be chased using the anonymous identity. A default routine is not defined.

Examples:

```
extern LDAPRebindProc proc_address;
LDAPRebindProc value;
ldap_set_option( ld, LDAP_OPT_REBIND_FN, &proc_address);
ldap_get_option( ld, LDAP_OPT_REBIND_FN, &value);
```

LDAP_OPT_PROTOCOL_VERSION

Specifies the LDAP protocol to be used by the LDAP client library when connecting to an LDAP server. Also used to determine which LDAP protocol is being used for the connection. For an application that uses “ldap_init()—Perform an LDAP Initialization Operation” on page 102 to create the LDAP connection the default value of this option will be **LDAP_VERSION3** for communicating with the LDAP server. The default value of this option will be **LDAP_VERSION2** if the application uses the deprecated

"ldap_open()—Perform an LDAP Open Operation" on page 133 API. In either case, the **LDAP_OPT_PROTOCOL_VERSION** option can be used with "ldap_set_option() — Set LDAP Options" on page 192 to change the default. The LDAP protocol version should be reset prior to issuing the bind (or any operation that causes an implicit bind).

Examples:

```
version2 = LDAP_VERSION2;
version3 = LDAP_VERSION3;
/* Example for Version 3 application setting version to version 2 */
ldap_set_option( ld, LDAP_OPT_PROTOCOL_VERSION, &version2);
/* Example of Version 2 application setting version to version 3 */
ldap_set_option( ld, LDAP_OPT_PROTOCOL_VERSION, &version3);
ldap_get_option( ld, LDAP_OPT_PROTOCOL_VERSION, &value);
```

The value returned by **ldap_get_option()** when **LDAP_OPT_PROTOCOL_VERSION** is specified can be used to determine how parameters should be passed to the "ldap_set_option() — Set LDAP Options" on page 192 call. The easiest way to work with this compatibility feature is to guarantee that calls to "ldap_set_option() — Set LDAP Options" on page 192 are all performed while LDAP_OPT_PROTOCOL_VERSION is set to the same value. If this cannot be guaranteed by the application, then follow the format of the example below when coding the call to "ldap_set_option() — Set LDAP Options" on page 192:

Examples:

```
int sizeLimit=100;

int protocolVersion;

ldap_get_option( ld, LDAP_OPT_PROTOCOL_VERSION, &protocolVersion );

if ( protocolVersion == LDAP_VERSION2 ) {
 ldap_set_option( ld, LDAP_OPT_SIZELIMIT, (void *)sizeLimit );
} else { /* the protocol version is LDAP_VERSION3 */
 ldap_set_option( ld, LDAP_OPT_SIZELIMIT, &sizeLimit );
}
```

LDAP_OPT_SERVER_CONTROLS

Specifies a default list of server controls to be sent with each request. The default list can be overridden by specifying a server control, or list of server controls, on specific APIs. By default, there are no settings for Server Controls.

Example:

```
ldap_set_option( ld, LDAP_OPT_SERVER_CONTROLS, &ctrlp);
```

LDAP_OPT_CLIENT_CONTROLS

Specifies a default list of client controls to be processed by the client library with each request. Since client controls are not defined for this version of the library, the ldap_set_option() API can be used to define a set of default, non-critical client controls. If one or more client controls in the set is critical, the entire list is rejected with a return code of **LDAP_UNAVAILABLE_CRITICAL_EXTENSION**.

LDAP_OPT_UTF8_IO

Specifies whether the LDAP library will automatically convert string data to and from the local code page. It can be set to one of the constants **LDAP_UTF8_XLATE_ON** or **LDAP_UTF8_XLATE_OFF**. By default, the LDAP library will convert string data.

When conversion is disabled, the LDAP library assumes that data received from the application by LDAP APIs is already represented in UTF-8. Similarly, the LDAP library assumes that the application is prepared to receive string data from the LDAP library represented in UTF-8 (or as binary).

When **LDAP_UTF8_XLATE_ON** is set (the default), the LDAP library assumes that string data received from the application by LDAP APIs is in the default (or explicitly designated) code page. Similarly, all string data returned from the LDAP library (back to the application) is converted to the designated local code page.

Notes:

1. Only string data supplied on connection-based APIs will be translated (that is, only those APIs that include an **ld** will be subject to translation).
2. Translation of strings from a UTF-8 encoding to local code page may result in loss of data when one or more characters in the UTF-8 encoding cannot be represented in the local code page. When this occurs, a substitution character replaces any UTF-8 characters that cannot be converted to the local code page.

Example:

```
int value;
ldap_get_option( ld, LDAP_OPT_UTF8_IO, &value);
```

LDAP_OPT_HOST_NAME

This is a read-only option that returns a pointer to the hostname for the original connection (as specified on "ldap_init()—Perform an LDAP Initialization Operation" on page 102, "ldap_open()—Perform an LDAP Open Operation" on page 133, or "ldap_ssl_init —Initializes an SSL Connection." on page 206).

Example:

```
char *hostname;
ldap_get_option( ld, LDAP_OPT_HOST_NAME, &hostname);
```

Use "ldap_memfree()—Free Memory Allocated by LDAP API" on page 106 to free the memory returned by the call to **ldap_get_option()**.

LDAP_OPT_ERROR_NUMBER

This is a read-only option that returns the error code associated with the most recent LDAP error that occurred for the specified LDAP connection.

Example:

```
int error;
ldap_get_option( ld, LDAP_OPT_ERROR_NUMBER, &error);
```

LDAP_OPT_ERROR_STRING

This is a read-only option that returns the text message associated with the most recent LDAP error that occurred for the specified LDAP connection.

Example:

```
char *error_string;
ldap_get_option( ld, LDAP_OPT_ERROR_STRING, &error_string);
```

Use "ldap_memfree()—Free Memory Allocated by LDAP API" on page 106 to free memory returned by the call to **ldap_get_option()**.

LDAP_OPT_EXT_ERROR

This is a read-only option that returns the extended error code. For example, if an SSL error occurred when attempting to call an "ldap_search_s()—Perform an LDAP Search Operation (Synchronous)" on page 171 API, the actual SSL error can be obtained by using **LDAP_OPT_EXT_ERROR**.

Example:

```
int exterror;
ldap_get_option( ld, LDAP_OPT_EXT_ERROR, &exterror);
```

Returns errors reported by the SSL library.

LDAP_OPT_EXT_GSS_ERR

This is a read-only option that returns the extended error code from SASL binds using the GSSAPI mechanism.

Example:

```
int gsserror;
ldap_get_option( ld, LDAP_OPT_EXT_GSS_ERR, &gsserror);
```

Return Value

LDAP_SUCCESS
if the request was successful.

another LDAP error code
if the request was not successful.

Error Conditions

The **ldap_get_option()** API will return an LDAP error code if not successful. See "LDAP Client API Error Conditions" on page 303 for possible values for LDAP error codes.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_get_option API.

Related Information

- "ldap_init()—Perform an LDAP Initialization Operation" on page 102 — Initializes a session with an LDAP server.
- "ldap_set_option() — Set LDAP Options" on page 192 — Set an option associated with an LDAP descriptor.
- "ldap_version — Obtain LDAP Version and SSL Cipher Information" on page 227 — Obtain LDAP version and SSL cipher information.

API introduced: V4R3

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_get_values()—Retrieve a Set of Attribute Values from an Entry

Syntax

```
#include <ldap.h>

char **ldap_get_values(
                LDAP          *ld,
                LDAPMessage   *entry,
                const char    *attr)
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_get_values()** function is used to retrieve attribute values from an LDAP entry as returned by “ldap_first_entry()—Retrieve First LDAP Entry” on page 77 or “ldap_next_entry()—Retrieve Next LDAP Entry” on page 129. **ldap_get_values()** uses the entry and the attribute attr whose values are wanted and returns a NULL-terminated array of the attribute’s values. The returned array should be freed with “ldap_value_free()—Free Memory Allocated by ldap_get_values()” on page 225 when it is no longer needed.

Use “ldap_get_values_len()—Retrieve a Set of Binary Attribute Values” on page 100 to get binary attribute values.

Authorities and Locks

No OS/400 authority is required.

Parameters

ld (Input) Specifies the LDAP pointer returned by a previous call to “ldap_init()—Perform an LDAP Initialization Operation” on page 102, “ldap_ssl_init —Initializes an SSL Connection.” on page 206, or “ldap_open()—Perform an LDAP Open Operation” on page 133.

entry (Input) Specifies an LDAP entry as returned from “ldap_first_entry()—Retrieve First LDAP Entry” on page 77 or “ldap_next_entry()—Retrieve Next LDAP Entry” on page 129.

attr (Input) Specifies the attribute whose values are desired.

Return Value

Array of Values
if the request was successful.

NULL if the request was not successful.

Error Conditions

The **ldap_get_values()** API will return NULL and set the *ld_errno* error code, if not successful. See “LDAP Client API Error Conditions” on page 303 for possible LDAP error code values.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_get_values API.

Related Information

- "ldap_get_values_len()—Retrieve a Set of Binary Attribute Values" — Return an attribute's binary values.
- "ldap_count_values()—Retrieve Count of Attribute Values" on page 42 — Return number of values.
- "ldap_count_values_len()—Retrieve Count of Binary Attribute Values" on page 44 — Return number of binary values.
- "ldap_value_free()—Free Memory Allocated by ldap_get_values()" on page 225 — Free memory allocated by ldap_get_values().
- "ldap_value_free_len()—Free Memory Allocated by ldap_get_values_len()" on page 226 — Free memory allocated by ldap_get_values_len().

API introduced: V4R3

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_get_values_len()—Retrieve a Set of Binary Attribute Values

Syntax

```
#include <ldap.h>

struct berval {
        unsigned long bv_len;
        char  *bv_val;
};

struct berval **ldap_get_values_len(
                LDAP         *ld,
                LDAPMessage  *entry,
                const char   *attr)
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_get_values_len()** function is used to retrieve attribute values that are binary in nature from an LDAP entry as returned by "ldap_first_entry()—Retrieve First LDAP Entry" on page 77 or "ldap_next_entry()—Retrieve Next LDAP Entry" on page 129.

The **ldap_get_values_len()** API uses the same parameters as "ldap_get_values()—Retrieve a Set of Attribute Values from an Entry" on page 99, but returns a NULL-terminated array of pointers to berval structures, each containing the length of and a pointer to a value. Use "ldap_value_free_len()—Free Memory Allocated by ldap_get_values_len()" on page 226 to free the returned attribute values when they are no longer needed.

Authorities and Locks

No OS/400 authority is required.

Parameters

ld (Input) Specifies the LDAP pointer returned by a previous call to "ldap_init()—Perform an LDAP Initialization Operation" on page 102, "ldap_ssl_init —Initializes an SSL Connection." on page 206, or "ldap_open()—Perform an LDAP Open Operation" on page 133.

entry (Input) Specifies an LDAP entry as returned from "ldap_first_entry()—Retrieve First LDAP Entry" on page 77 or "ldap_next_entry()—Retrieve Next LDAP Entry" on page 129.

attr (Input) Specifies the attribute whose values are desired.

Return Value

NULL-terminated array of pointers to berval structures
if the request was successful.

NULL if the request was not successful.

Error Conditions

The **ldap_get_values_len()** API will return NULL and set the *ld_errno* error code if not successful. See "LDAP Client API Error Conditions" on page 303 for possible LDAP error code values.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_get_values_len API.

Related Information

- "ldap_get_values()—Retrieve a Set of Attribute Values from an Entry" on page 99 — Return an attribute's values.
- "ldap_count_values()—Retrieve Count of Attribute Values" on page 42 — Return number of values.
- "ldap_count_values_len()—Retrieve Count of Binary Attribute Values" on page 44 — Return number of binary values.
- "ldap_value_free()—Free Memory Allocated by ldap_get_values()" on page 225 — Free memory allocated by ldap_get_values().
- "ldap_value_free_len()—Free Memory Allocated by ldap_get_values_len()" on page 226 — Free memory allocated by ldap_get_values_len().

API introduced: V4R3

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_init()—Perform an LDAP Initialization Operation

Syntax

```
#include <ldap.h>

LDAP *ldap_init(
                char  *host,
                int    port)
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_init()** API is used to allocate an LDAP structure, which is used to identify the connection and to maintain per-connection information.

The **ldap_init()** API returns a pointer to an LDAP structure, which should be passed to subsequent calls to other LDAP functions such as ldap_bind() and ldap_search().

ldap_init() initializes a session with an LDAP server. The server is not actually contacted until an operation is performed that requires it, allowing various options to be set after initialization, but before actually contacting the host. It allocates an LDAP structure which is used to identify the connection and maintain per-connection information. Although still supported, the use of "ldap_open()—Perform an LDAP Open Operation" on page 133 is deprecated. Use of **ldap_init()** instead of "ldap_open()—Perform an LDAP Open Operation" on page 133 is recommended.

Authorities and Locks

No OS/400 authority is required.

Parameters

host (Input) Several methods are supported for specifying one or more target LDAP servers, including the following:

Explicit Host List Specifies the name of the host on which the LDAP server is running. The *host* parameter may contain a blank-separated list of hosts to try to connect to, and each host may optionally be of the form *host:port*. If present, the *:port* overrides the *port* parameter.

The following are typical examples:

```
ld=ldap_init ("server1", ldap_port);
ld=ldap_init ("server2:1200", ldap_port);
ld=ldap_init ("server1:800 server2:2000 server3", ldap_port);
```

Localhost If the *host* parameter is **NULL**, the LDAP server will be assumed to be running on the local host.

Default Hosts If the *host* parameter is set to **LDAP_URL_PREFIX** ("ldap://") the LDAP library will attempt to locate one or more default LDAP servers, with non-SSL ports, using the SecureWay "ldap_server_locate()— Locate Suitable LDAP Servers" on page 180 function. The port specified on the call is ignored, since **ldap_server_locate()** returns the port.

For example, the following two are equivalent:

```
ld=ldap_init ("ldap://", ldap_port);
ld=ldap_init (LDAP_URL_PREFIX, LDAP_PORT);
```

If more than one default server is located, the list is processed in sequence, until an active server is found.

The LDAP URL can include a Distinguished Name (DN), used as a filter for selecting candidate LDAP servers based on the server's suffix (or suffixes). If the most significant portion of the DN is an exact match with a server's suffix (after normalizing for case), the server is added to the list of candidate servers. For example, the following will only return default LDAP servers that have a suffix that supports the specified DN:

```
ld=ldap_init ("ldap:///cn=fred, dc=austin, dc=ibm, dc=com", LDAP_PORT);
```

In this case, a server that has a suffix of "dc=austin, dc=ibm, dc=com" would match. If more than one default server is located, the list is processed in sequence, until an active server is found.

If the LDAP URL contains a host name and optional port, the host is used to create the connection. No attempt is made to locate the default server(s), and the DN, if present, is ignored.

For example, the following two are equivalent:

```
ld=ldap_init ("ldap://myserver", LDAP_PORT);
ld=ldap_init ("myserver", LDAP_PORT);
```

Local Socket If the *host* parameter is prefixed with "/", the *host* parameter is assumed to be the name of a UNIX socket (that is, socket family is AF_UNIX) and *port* is ignored. Use of a UNIX socket requires the LDAP server to be running on the local host. In addition, the LDAP server must be listening on the specified UNIX socket. The OS/400 Secureway Directory Services server listens on the **/tmp/s.slapd** local socket, in addition to any configured TCP/IP ports.

For example:

```
ld=ldap_init ("/tmp/s.slapd", ldap_port);
```

port Specifies the port number to which to connect. If the default IANA-assigned port of 389 is desired, **LDAP_PORT** should be specified.

Return Value

Pointer to an LDAP structure
if the request was successful.

NULL if the request was not successful.

Error Conditions

The **ldap_init()** API will return NULL if not successful.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_init API.

Related Information

- "ldap_open()—Perform an LDAP Open Operation" on page 133 — Open a connection to an LDAP server (deprecated).
- "ldap_ssl_init —Initializes an SSL Connection." on page 206 — Initializes an SSL Connection
- "ldap_set_option() — Set LDAP Options" on page 192 — Set an option associated with an LDAP descriptor.
- "ldap_get_option()—Retrieve LDAP Options" on page 92 — Get an option associated with an LDAP descriptor.
- "ldap_version — Obtain LDAP Version and SSL Cipher Information" on page 227 — Obtain LDAP version and SSL cipher information.

API introduced: V4R3

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

---

ldap_insert_control()—Insert a Control in the Llist of LDAP Server Controls

Syntax

```
#include <ldap.h>

int ldap_insert_control(
             LDAPControl *newControl,
             LDAPControl ***ctrlList)
```

Library Name/Service Program: QSYS/QGLDCLNT

Default Public Authority: *USE

Threadsafe: Yes

The **ldap_insert_control()** function is used to insert a control in the list of LDAP server controls.

Note: The function will allocate space in the list for the control, but will not allocate the actual control.

Authorities and Locks

No OS/400 authority is required. All authority checking is done by the LDAP server.

Parameters

newControl

(Input) Specifies the LDAP server control to be inserted. See LDAP Controls for more information about server controls.

ctrlList
(Input) Specifies a list of LDAP server controls. See LDAP Controls for more information about server controls.

Return Value

LDAP_SUCCESS
if the request was successful.

LDAP_NO_MEMORY
if the control could not be inserted.

Related Information

- "ldap_add_control()—Create a Control and Insert it into the List of LDAP Server Controls" on page 11 — Add a new LDAP server control.
- "ldap_remove_control()—Remove a Control from the List of LDAP Server Controls" on page 151 — Remove a control from the list of LDAP server controls.
- "ldap_copy_controls()—Make a Copy of the List of LDAP Server Controls" on page 36 — Synchronously add an entry with controls.

API introduced: V5R3

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

---

ldap_is_ldap_url()—Verify LDAP URL

Syntax

```
#include <ldap.h>

int ldap_is_ldap_url(
             char  *url)
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_is_ldap_url()** function is used to check a string to verify if it could be an LDAP URL. It can be used as a quick check for an LDAP URL.

Authorities and Locks

No OS/400 authority is required.

Parameters

url (Input) Specifies a pointer to the URL string.

Return Value

NON-ZERO
if url begins with ″ldap://″ or ″ldaps://″.

ZERO if not LDAP URL.

Error Conditions

The **ldap_is_ldap_url()** API return a ZERO if the input string (url) does not begin with ″ldap://″ or ″ldaps://″.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_is_ldap_url API.

Related Information

- “ldap_free_urldesc()—Free an LDAP URL Description” on page 83 — Frees an LDAP URL description.
- “ldap_url_parse()—Parse an LDAP URL” on page 215 — Break up an LDAP URL string into its components.
- “ldap_url_search()—Perform an LDAP URL Search Operation” on page 219 — Asynchronously search using an LDAP URL.
- “ldap_url_search_s() — Perform an LDAP URL Search Operation (Synchronous)” on page 221 — Synchronously search using an LDAP URL.
- “ldap_url_search_st()—Perform an LDAP URL Search Operation (Timed Synchronous)” on page 223 — Synchronously search using an LDAP URL and a timeout.

API introduced: V4R3

Top | “Lightweight Directory Access Protocol (LDAP) APIs,” on page 1 | APIs by category

---

ldap_memfree()—Free Memory Allocated by LDAP API

Syntax

```
#include <ldap.h>

void ldap_memfree(
  char  *mem)
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_memfree()** API is used to free storage that is allocated by some of the LDAP APIs. Refer to the specific LDAP API documentation to see which memory free API to use for any memory allocated.

Authorities and Locks

No OS/400 authority is required.

Parameters

mem (Input) Specifies the address of storage that was allocated by the LDAP library.

Return Value

NONE

Error Conditions

The **ldap_memfree()** API does not return an error code.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_memfree API.

Related Information

- "ldap_ber_free()—Free storage allocated by the LDAP library" on page 23 — Free the BerElement structure.
- "ldap_control_free()—Free storage allocated by the LDAP library" on page 35 — Free a single LDAPControl structure.
- "ldap_controls_free()—Free storage allocated by the LDAP library" on page 34 — Free an array of LDAPControl structures.
- "ldap_free_urldesc()—Free an LDAP URL Description" on page 83 — Free an LDAP URL Description
- "ldap_mods_free()—Free LDAP Modify Storage" on page 121 — Free an array of pointers to mod structures.
- "ldap_msgfree()—Free LDAP Result Message" on page 122 — Free the LDAPMessage structure.
- "ldap_server_free_list()— Free the List of LDAP Servers" on page 178 — Free the List of LDAP Servers
- "ldap_value_free()—Free Memory Allocated by ldap_get_values()" on page 225 — Free memory allocated by ldap_get_values
- "ldap_value_free_len()—Free Memory Allocated by ldap_get_values_len()" on page 226 — Free Memory Allocated by ldap_get_values_len

API introduced: V4R3

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_modify()—Perform an LDAP Modify Entry Request

Syntax

```
#include <ldap.h>

typedef struct ldapmod {
          int  mod_op;
          char *mod_type;
          union {
            char **modv_strvals;
            struct berval **modv_bvals;
          } mod_vals;
} LDAPMod;

#define mod_values mod_vals.modv_strvals
#define mod_bvalues mod_vals.modv_bvals

int ldap_modify(
                LDAP        *ld,
                const char  *dn,
                LDAPMod    **mods)
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_modify()** API is an asynchronous request. The result of the operation can be obtained by a subsequent call to "ldap_result()—Retrieve Result of an Asynchronous LDAP Operation" on page 156.

The *mod_op* field is used to specify the type of modification to perform and should be one of the following:

LDAP_MOD_ADD	0x00
LDAP_MOD_DELETE	0x01
LDAP_MOD_REPLACE	0x02

This field also indicates the type of values included in the mod_vals union. For binary data, you must also bitwise OR the operation type with **LDAP_MOD_BVALUES** (0x80). This indicates that the values are specified in a NULL-terminated array of struct berval structures. Otherwise, the mod_values will be used (that is, the values are assumed to be a NULL-terminated array of NULL-terminated character strings).

The *mod_type* field specifies the name of attribute to add, delete, or replace.

The *mod_vals* field specifies a pointer to a NULL-terminated array of values to add, modify or delete respectively. Only one of the mod_values or mod_bvalues variants should be used, with mod_bvalues being selected by ORing the *mod_op* field with the constant **LDAP_MOD_BVALUES**. *mod_values* is a NULL-terminated array of NULL-terminated strings and *mod_bvalues* is a NULL-terminated array of berval structures that can be used to pass binary values such as images.

For **LDAP_MOD_ADD** modifications, the given values are added to the entry, creating the attribute if necessary.

For **LDAP_MOD_DELETE** modifications, the given values are deleted from the entry, removing the attribute if no values remain. If the entire attribute is to be deleted, the *mod_values* field should be set to **NULL**. The server will return an error if the attribute doesn't exist.

For **LDAP_MOD_REPLACE** modifications, the attribute will have the listed values after the modification, having been created if necessary, or removed if the *mod_values* field is **NULL**. The server will NOT return an error if the value doesn't exist.

All modifications are performed in the order in which they are listed.

Authorities and Locks

No OS/400 authority is required. All authority checking is done by the LDAP server.

Parameters

ld (Input) Specifies the LDAP pointer returned by a previous call to "ldap_init()—Perform an LDAP Initialization Operation" on page 102, "ldap_ssl_init —Initializes an SSL Connection." on page 206, or "ldap_open()—Perform an LDAP Open Operation" on page 133.

dn (Input) Specifies the Distinguished Name (DN) of the entry to be modified.

mods (Input) Specifies a NULL-terminated array of modifications to make to the entry. Each element of the mods array is a pointer to an LDAPMod structure.

Return Value

Message ID of the Operation Initiated
if the request was successful. A subsequent call to "ldap_result()—Retrieve Result of an Asynchronous LDAP Operation" on page 156, can be used to obtain the result of the modify.

-1 if the request was not successful.

Error Conditions

If **ldap_modify()** is not successful, *ld_errno* will be set to indicate the error. See "LDAP Client API Error Conditions" on page 303 for possible LDAP error code values. Use "ldap_get_errno()—Retrieve Error Information" on page 87 function to retrieve the error information.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_modify API.

Related Information

- "ldap_add()—Perform an LDAP Add Operation" on page 9 — Asynchronously add an entry.
- "ldap_delete()—Perform an LDAP Delete Operation" on page 53 — Perform an LDAP Delete Operation.
- "ldap_modify_s()—Perform an LDAP Modify Entry Request (Synchronous)" on page 115 — Synchronous modify to a directory entry.
- "ldap_modify_ext()—Perform an LDAP Modify Entry Request with Controls" on page 110 — Asynchronous modify to a directory entry with controls.
- "ldap_modify_ext_s()—Perform an LDAP Modify Entry Request with Controls" on page 113 — Synchronous modify to a directory entry with controls.

- "ldap_modrdn()—Perform an LDAP Modify RDN Request" on page 117 — Asynchronously modify the RDN of an entry.
- "ldap_modrdn_s()—Perform an LDAP Modify RDN Request (Synchronous)" on page 119 — Synchronously modify the RDN of an entry.

API introduced: V4R3

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_modify_ext()—Perform an LDAP Modify Entry Request with Controls

Syntax

```
#include <ldap.h>

typedef struct ldapmod {
          int  mod_op;
          char *mod_type;
          union {
            char **modv_strvals;
            struct berval **modv_bvals;
          } mod_vals;
} LDAPMod;

#define mod_values mod_vals.modv_strvals
#define mod_bvalues mod_vals.modv_bvals


int ldap_modify_ext( LDAP           *ld,
                     const char     *dn,
                     LDAPMod        **mods,
                     LDAPControl    **serverctrls,
                     LDAPControl    **clientctrls,
                     int            *msgidp)
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_modify_ext()** routine initiates an asynchronous modify operation with controls. *dn* is the Distinguished name of the entry to modify, and *mods* is a NULL-terminated array of modifications to make to the entry. Each element of the *mods* array is a pointer to an LDAPMod structure.

The *mod_op* field is used to specify the type of modification to perform and should be one of the following:

LDAP_MOD_ADD	0x00
LDAP_MOD_DELETE	0x01
LDAP_MOD_REPLACE	0x02

This field also indicates the type of values included in the mod_vals union. For binary data, you must also bitwise OR the operation type with **LDAP_MOD_BVALUES** (0x80). This indicates that the values

are specified in a NULL-terminated array of struct berval structures. Otherwise, the mod_values will be used (that is, the values are assumed to be a NULL-terminated array of NULL-terminated character strings).

The *mod_type* field specifies the name of attribute to add, delete, or replace.

The *mod_vals* field specifies a pointer to a NULL-terminated array of values to add, replace, or delete. Only one of the mod_values or mod_bvalues variants should be used, with mod_bvalues being selected by ORing the mod_op field with the constant **LDAP_MOD_BVALUES**. *mod_values* is a NULL-terminated array of NULL-terminated strings and *mod_bvalues* is a NULL-terminated array of berval structures that can be used to pass binary values such as images.

For **LDAP_MOD_ADD** modifications, the given values are added to the entry, creating the attribute if necessary.

For **LDAP_MOD_DELETE** modifications, the given values are deleted from the entry, removing the attribute if no values remain. If the entire attribute is to be deleted, the *mod_values* field should be set to NULL. The server will return an error if the attribute doesn't exist.

For **LDAP_MOD_REPLACE** modifications, the attribute will have the listed values after the modification, having been created if necessary, or removed if the *mod_vals* field is NULL. The server should NOT return an error if the value doesn't exist.

All modifications are performed in the order in which they are listed.

Authorities and Locks

No OS/400 authority is required. All authority checking is done by the LDAP server.

Parameters

ld (Input) Specifies the LDAP pointer returned by a previous call to "ldap_init()—Perform an LDAP Initialization Operation" on page 102, "ldap_ssl_init —Initializes an SSL Connection." on page 206, or "ldap_open()—Perform an LDAP Open Operation" on page 133.

dn (Input) Specifies the Distinguished Name of the entry to be modified.

mods (Input) Specifies a NULL-terminated array of modifications to make to the entry. Each element of the mods array is a pointer to an LDAPMod structure.

serverctrls
(Input) Specifies a list of LDAP server controls. This parameter may be set to NULL. See LDAP Controls for more information about server controls.

clientctrls
(Input) Specifies a list of LDAP client controls. This parameter may be set to NULL. See LDAP Controls for more information about client controls.

msgidp (output) This result parameter is set to the message id of the request if the **ldap_modify_ext()** call succeeds.

Return Value

LDAP_SUCCESS
if the request was successfully sent. If successful, **ldap_modify_ext()** places the message id of the request in **msgidp*. A subsequent call to "ldap_result()—Retrieve Result of an Asynchronous LDAP Operation" on page 156 can be used to obtain the result of the operation. Once the operation has completed, *ldap_result()* returns a result that contains the status of the operation (in

the form of an error code). The error code indicates whether or not the operation completed successfully. The "ldap_parse_result()—Extract Information from Results" on page 143 API is used to check the error code in the result.

another LDAP error code
if the request was not successful.

Error Conditions

The **ldap_modify_ext()** API will return an LDAP error code if not successful. See "LDAP Client API Error Conditions" on page 303 for possible LDAP error code values.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_modify_ext API.

Related Information

- "ldap_add_ext()—Perform an LDAP Add Operation with Controls" on page 12 — Asynchronously add an entry with controls.
- "ldap_delete_ext()—Perform an LDAP Delete Operation with Controls" on page 54 — Perform an LDAP delete operation with controls.
- "ldap_modify()—Perform an LDAP Modify Entry Request" on page 108 — Asynchronous modify to a directory entry.
- "ldap_modify_s()—Perform an LDAP Modify Entry Request (Synchronous)" on page 115 — Synchronous modify to a directory entry.
- "ldap_modify_ext_s()—Perform an LDAP Modify Entry Request with Controls" on page 113 — Synchronous modify to a directory entry with controls.
- "ldap_modrdn()—Perform an LDAP Modify RDN Request" on page 117 — Asynchronously modify the RDN of an entry.
- "ldap_modrdn_s()—Perform an LDAP Modify RDN Request (Synchronous)" on page 119 — Synchronously modify the RDN of an entry.

The **ldap_modify_ext()** API supports LDAP V3 server controls and client controls.

API introduced: V4R5

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_modify_ext_s()—Perform an LDAP Modify Entry Request with Controls

Syntax

```
#include <ldap.h>

typedef struct ldapmod {
          int  mod_op;
          char *mod_type;
          union {
            char **modv_strvals;
            struct berval **modv_bvals;
          } mod_vals;
} LDAPMod;

#define mod_values mod_vals.modv_strvals
#define mod_bvalues mod_vals.modv_bvals


int ldap_modify_ext_s(
             LDAP           *ld,
             const char     *dn,
             LDAPMod        **mods,
             LDAPControl    **serverctrls,
             LDAPControl    **clientctrls)
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_modify_ext_s()** API initiates a synchronous modify operation with controls. *dn* is the Distinguished name of the entry to modify, and *mods* is a NULL-terminated array of modifications to make to the entry. Each element of the mods array is a pointer to an LDAPMod structure.

The *mod_op* field is used to specify the type of modification to perform and should be one of the following:

LDAP_MOD_ADD	0x00
LDAP_MOD_DELETE	0x01
LDAP_MOD_REPLACE	0x02

This field also indicates the type of values included in the mod_vals union. For binary data, you must also bitwise OR the operation type with **LDAP_MOD_BVALUES** (0x80). This indicates that the values are specified in a NULL-terminated array of struct berval structures. Otherwise, the mod_values will be used (that is, the values are assumed to be a NULL-terminated array of NULL-terminated character strings).

The *mod_type* field specifies the name of attribute to add, delete, or replace.

The *mod_vals* field specifies a pointer to a NULL-terminated array of values to add, modify or delete respectively. Only one of the mod_values or mod_bvalues variants should be used, with mod_bvalues being selected by ORing the *mod_op* field with the constant **LDAP_MOD_BVALUES**. *mod_values* is a NULL-terminated array of NULL-terminated strings and *mod_bvalues* is a NULL-terminated array of berval structures that can be used to pass binary values such as images.

For **LDAP_MOD_ADD** modifications, the given values are added to the entry, creating the attribute if necessary.

For **LDAP_MOD_DELETE** modifications, the given values are deleted from the entry, removing the attribute if no values remain. If the entire attribute is to be deleted, the *mod_values* field should be set to **NULL**. The server will return an error if the attribute doesn't exist.

For **LDAP_MOD_REPLACE** modifications, the attribute will have the listed values after the modification, having been created if necessary, or removed if the *mod_values* field is **NULL**. The server will NOT return an error if the value doesn't exist.

All modifications are performed in the order in which they are listed.

Authorities and Locks

No OS/400 authority is required. All authority checking is done by the LDAP server.

Parameters

ld (Input) Specifies the LDAP pointer returned by a previous call to "ldap_init()—Perform an LDAP Initialization Operation" on page 102, "ldap_ssl_init —Initializes an SSL Connection." on page 206, or "ldap_open()—Perform an LDAP Open Operation" on page 133.

dn (Input) Specifies the Distinguished Name of the entry to be modified.

mods (Input) Specifies a NULL-terminated array of modifications to make to the entry. Each element of the mods array is a pointer to an LDAPMod structure.

serverctrls
(Input) Specifies a list of LDAP server controls. This parameter may be set to null. See LDAP Controls for more information about server controls.

clientctrls
(Input) Specifies a list of LDAP client controls. This parameter may be set to null. See LDAP Controls for more information about client controls.

Return Value

LDAP_SUCCESS
if the request was successfully sent.

LDAP error code
if the request was not successfully sent.

Error Conditions

The **ldap_modify_ext_s()** will return an LDAP error code if not successful. See "LDAP Client API Error Conditions" on page 303 for possible LDAP error code values.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_modify_ext_s API.

Related Information

- "ldap_add_ext_s()—Perform an LDAP Add Operation with Controls (Synchronous)" on page 14 — Synchronously add an entry with controls.
- "ldap_delete_ext_s()—Perform an LDAP Delete Operation with Controls" on page 56 — Perform an LDAP Delete Operation with Controls (Synchronous)
- "ldap_modify()—Perform an LDAP Modify Entry Request" on page 108 — Asynchronous modify to a directory entry.
- "ldap_modify_s()—Perform an LDAP Modify Entry Request (Synchronous)" — Synchronous modify to a directory entry.
- "ldap_modify_ext()—Perform an LDAP Modify Entry Request with Controls" on page 110 — Asynchronous modify to a directory entry with controls.
- "ldap_modrdn()—Perform an LDAP Modify RDN Request" on page 117 — Asynchronously modify the RDN of an entry.
- "ldap_modrdn_s()—Perform an LDAP Modify RDN Request (Synchronous)" on page 119 — Synchronously modify the RDN of an entry.

API introduced: V4R5

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_modify_s()—Perform an LDAP Modify Entry Request (Synchronous)

Syntax

```
#include <ldap.h>

typedef struct ldapmod {
          int  mod_op;
          char *mod_type;
          union {
            char **modv_strvals;
            struct berval **modv_bvals;
          } mod_vals;
} LDAPMod;

#define mod_values mod_vals.modv_strvals
#define mod_bvalues mod_vals.modv_bvals

int ldap_modify_s(
                LDAP        *ld,
                const char  *dn,
                LDAPMod    **mods)
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_modify_s()** performs a synchronous request.

The *mod_op* field is used to specify the type of modification to perform and should be one of the following:

LDAP_MOD_ADD	0x00
LDAP_MOD_DELETE	0x01
LDAP_MOD_REPLACE	0x02

This field also indicates the type of values included in the mod_vals union. For binary data, you must also bitwise OR the operation type with **LDAP_MOD_BVALUES** (0x80). This indicates that the values are specified in a NULL-terminated array of struct berval structures. Otherwise, the mod_values will be used (that is, the values are assumed to be a NULL-terminated array of NULL-terminated character strings).

The *mod_type* field specifies the name of attribute to add, delete, or replace.

The *mod_vals* field specifies a pointer to a NULL-terminated array of values to add, modify or delete respectively. Only one of the mod_values or mod_bvalues variants should be used, with mod_bvalues being selected by ORing the *mod_op* field with the constant **LDAP_MOD_BVALUES**. *mod_values* is a NULL-terminated array of NULL-terminated strings and *mod_bvalues* is a NULL-terminated array of berval structures that can be used to pass binary values such as images.

For **LDAP_MOD_ADD** modifications, the given values are added to the entry, creating the attribute if necessary.

For **LDAP_MOD_DELETE** modifications, the given values are deleted from the entry, removing the attribute if no values remain. If the entire attribute is to be deleted, the *mod_values* field should be set to **NULL**. The server will return an error if the attribute doesn't exist.

For **LDAP_MOD_REPLACE** modifications, the attribute will have the listed values after the modification, having been created if necessary, or removed if the *mod_values* field is **NULL**. The server will NOT return an error if the value doesn't exist.

All modifications are performed in the order in which they are listed.

Authorities and Locks

No OS/400 authority is required. All authority checking is done by the LDAP server.

Parameters

ld (Input) Specifies the LDAP pointer returned by a previous call to "ldap_init()—Perform an LDAP Initialization Operation" on page 102,"ldap_ssl_init —Initializes an SSL Connection." on page 206, or "ldap_open()—Perform an LDAP Open Operation" on page 133.

dn (Input) Specifies the Distinguished Name of the entry to be modified.

mods (Input) Specifies a NULL-terminated array of modifications to make to the entry. Each element of the mods array is a pointer to an LDAPMod structure.

Return Value

LDAP_SUCCESS
if the request was successful.

another LDAP error
if the request was not successful.

Error Conditions

The **ldap_modify_s()** API will return an LDAP error code if not successful. See "LDAP Client API Error Conditions" on page 303 for possible LDAP error code values.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_modify_s API.

Related Information

- "ldap_add_s()—Perform an LDAP Add Operation (Synchronous)" on page 15 — Perform an LDAP add operation (synchronous).
- "ldap_delete_s()—Perform an LDAP Delete Operation (Synchronous)" on page 57 — Perform an LDAP delete operation (synchronous).
- "ldap_modify_s()—Perform an LDAP Modify Entry Request (Synchronous)" on page 115 — Perform an LDAP modify entry request.
- "ldap_modify_ext()—Perform an LDAP Modify Entry Request with Controls" on page 110 — Asynchronous modify to a directory entry with controls.
- "ldap_modify_ext_s()—Perform an LDAP Modify Entry Request with Controls" on page 113 — Synchronous modify to a directory entry with controls.
- "ldap_modrdn()—Perform an LDAP Modify RDN Request" — Asynchronously modify the RDN of an entry.
- "ldap_modrdn_s()—Perform an LDAP Modify RDN Request (Synchronous)" on page 119 — Synchronously modify the RDN of an entry.

API introduced: V4R3

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_modrdn()—Perform an LDAP Modify RDN Request

Syntax

```
#include <ldap.h>

int ldap_modrdn(
                LDAP        *ld,
                const char  *dn,
                const char  *newrdn,
                int          deleteoldrdn)
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_modrdn()** function is used to perform an LDAP modify relative distinguished name (RDN) operation. The function takes the distinguished name of the entry whose RDN is to be changed, and *newrdn*, the new RDN to give the entry. The *deleteoldrdn* parameter is used as a boolean value to indicate whether the old RDN values should be deleted from the entry or not.

ldap_modrdn() performs an asynchronous request. The result of the operation can be obtained by a subsequent call to "ldap_result()—Retrieve Result of an Asynchronous LDAP Operation" on page 156.

In LDAP V2, the **ldap_modrdn()** and "ldap_modrdn_s()—Perform an LDAP Modify RDN Request (Synchronous)" on page 119 APIs were used to change the name of an LDAP entry. They could only be used to change the least significant component of a name (the RDN or relative distinguished name). LDAP V3 provides the Modify DN protocol operation that allows more general name change access. The "ldap_rename()—Asynchronously Rename an Entry" on page 152 and "ldap_rename_s()—Synchronously Rename an Entry" on page 154 routines are used to change the name of an entry, and the use of the **ldap_modrdn()** and "ldap_modrdn_s()—Perform an LDAP Modify RDN Request (Synchronous)" on page 119 routines are deprecated.

Authorities and Locks

No OS/400 authority is required. All authority checking is done by the LDAP server.

Parameters

ld (Input) Specifies the LDAP pointer returned by a previous call to "ldap_init()—Perform an LDAP Initialization Operation" on page 102, "ldap_ssl_init —Initializes an SSL Connection." on page 206, or "ldap_open()—Perform an LDAP Open Operation" on page 133.

dn (Input) Specifies the DN of the entry whose RDN is to be changed.

newrdn
(Input) Specifies the new RDN to be given to the entry.

deleteoldrdn
(Input) Specifies a boolean value. When set to 1, the old RDN value is to be deleted from the entry. When set to 0, the old RDN value should be retained as a non-distinguished value.

Return Value

Message ID of the Operation Initiated
if the request was successful. A subsequent call to "ldap_result()—Retrieve Result of an Asynchronous LDAP Operation" on page 156, can be used to obtain the result of the modify.

-1 if the request was not successful.

Error Conditions

If **ldap_modrdn()** is not successful, *ld_errno* will be set to indicate the error. See "LDAP Client API Error Conditions" on page 303 for possible LDAP error code values. Use the "ldap_get_errno()—Retrieve Error Information" on page 87 function to retrieve the error information.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_modrdn API.

Related Information

- "ldap_add()—Perform an LDAP Add Operation" on page 9 — Perform an LDAP add operation.
- "ldap_delete()—Perform an LDAP Delete Operation" on page 53 — Perform an LDAP delete operation.
- "ldap_modify()—Perform an LDAP Modify Entry Request" on page 108 — Asynchronous modify to a directory entry.

- "ldap_modrdn_s()—Perform an LDAP Modify RDN Request (Synchronous)" — Synchronously modify the RDN of an entry.
- "ldap_rename()—Asynchronously Rename an Entry" on page 152 — Asynchronously rename an entry.

API introduced: V4R3

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_modrdn_s()—Perform an LDAP Modify RDN Request (Synchronous)

Syntax

```
#include <ldap.h>

int ldap_modrdn_s(
                LDAP        *ld,
                const char  *dn,
                const char  *newrdn,
                int          deleteoldrdn)
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_modrdn_s()** function is used to perform an LDAP modify relative distinguished name (RDN) operation. The function takes the distinguished name of the entry whose RDN is to be changed, and *newrdn*, the new RDN to give the entry. The *deleteoldrdn* parameter is used as a boolean value to indicate whether the old RDN values should be deleted from the entry or not.

ldap_modrdn_s() performs a synchronous request.

In LDAP V2, the **ldap_modrdn()** and "ldap_modrdn_s()—Perform an LDAP Modify RDN Request (Synchronous)" APIs were used to change the name of an LDAP entry. They could only be used to change the least significant component of a name (the RDN or relative distinguished name). LDAP V3 provides the Modify DN protocol operation that allows more general name change access. The "ldap_rename()—Asynchronously Rename an Entry" on page 152 and "ldap_rename_s()—Synchronously Rename an Entry" on page 154 routines are used to change the name of an entry, and the use of the **ldap_modrdn()** and "ldap_modrdn_s()—Perform an LDAP Modify RDN Request (Synchronous)" routines are deprecated.

Authorities and Locks

No OS/400 authority is required. All authority checking is done by the LDAP server.

Parameters

ld (Input) Specifies the LDAP pointer returned by a previous call to "ldap_init()—Perform an LDAP Initialization Operation" on page 102, "ldap_ssl_init —Initializes an SSL Connection." on page 206, or "ldap_open()—Perform an LDAP Open Operation" on page 133.

dn (Input) Specifies the DN of the entry whose RDN is to be changed.

newrdn
(Input) Specifies the new RDN to be given to the entry.

deleteoldrdn
(Input) Specifies a boolean value. When set to 1, the old RDN value is to be deleted from the entry. When set to 0, the old RDN value should be retained as a non-distinguished value.

Return Value

LDAP_SUCCESS
if the request was successful.

another LDAP error
if the request was not successful.

Error Conditions

The **ldap_modrdn_s()** will return an LDAP error code if not successful. See "LDAP Client API Error Conditions" on page 303 for possible LDAP error code values.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_modrdn_s API.

Related Information

- "ldap_add()—Perform an LDAP Add Operation" on page 9 — Perform an LDAP add operation.
- "ldap_delete()—Perform an LDAP Delete Operation" on page 53 — Perform an LDAP delete operation.
- "ldap_modify()—Perform an LDAP Modify Entry Request" on page 108 — Asynchronous modify to a directory entry.
- "ldap_modrdn()—Perform an LDAP Modify RDN Request" on page 117 — Asynchronously modify the RDN of an entry.
- "ldap_rename_s()—Synchronously Rename an Entry" on page 154 — Synchronously rename an entry.

API introduced: V4R3

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_mods_free()—Free LDAP Modify Storage

Syntax

```
#include <ldap.h>

void ldap_mods_free(
                LDAPMod  **mods,
                int        freemods)
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_mods_free()** function is used to free storage associated with the "ldap_modify()—Perform an LDAP Modify Entry Request" on page 108 and related LDAP APIs.

ldap_mods_free() can be used to free each element of a NULL-terminated array of modification structures. If *freemods* is nonzero, the *mods* pointer itself is freed, otherwise freeing *mods* is left to the caller.

Authorities and Locks

No OS/400 authority is required.

Parameters

mods (Input) Specifies a NULL-terminated array of modifications to make to the entry. Each element of the *mods* array is a pointer to an LDAPMod structure.

freemods
(Input) Specifies whether or not the *mods* pointer is to be freed in addition to the NULL-terminated array of LDAPMod structures.

Return Value

None

Error Conditions

The **ldap_mods_free()** API does not return an error code.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_mods_free API.

Related Information

- "ldap_ber_free()—Free storage allocated by the LDAP library" on page 23 — Free the BerElement structure.

- “ldap_control_free()—Free storage allocated by the LDAP library” on page 35 — Free a single LDAPControl structure.
- “ldap_controls_free()—Free storage allocated by the LDAP library” on page 34 — Free an array of LDAPControl structures.
- “ldap_free_urldesc()—Free an LDAP URL Description” on page 83 — Free an LDAP URL Description
- “ldap_mods_free()—Free LDAP Modify Storage” on page 121 — Free an array of pointers to mod structures.
- “ldap_memfree()—Free Memory Allocated by LDAP API” on page 106 — Free storage allocated by the LDAP client library.
- “ldap_modify()—Perform an LDAP Modify Entry Request” on page 108 — Perform an LDAP modify entry request.
- “ldap_msgfree()—Free LDAP Result Message” — Free the LDAPMessage structure.
- “ldap_server_free_list()— Free the List of LDAP Servers” on page 178 — Free the List of LDAP Servers
- “ldap_value_free()—Free Memory Allocated by ldap_get_values()” on page 225 — Free memory allocated by ldap_get_values
- “ldap_value_free_len()—Free Memory Allocated by ldap_get_values_len()” on page 226 — Free Memory Allocated by ldap_get_values_len

API introduced: V4R3

Top | “Lightweight Directory Access Protocol (LDAP) APIs,” on page 1 | APIs by category

ldap_msgfree()—Free LDAP Result Message

Syntax

```
#include <ldap.h>

int ldap_msgfree(
          LDAPMessage  *msg)
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_msgfree()** routine is used to free the memory allocated for an LDAP message by “ldap_result()—Retrieve Result of an Asynchronous LDAP Operation” on page 156, “ldap_search_s()—Perform an LDAP Search Operation (Synchronous)” on page 171, “ldap_search_ext_s — Synchronously Search the Directory Using Controls” on page 168 or “ldap_search_st()—Perform an LDAP Search Operation (Timed Synchronous)” on page 173. It takes a pointer to the result to be freed and returns the type of the message it freed.

Authorities and Locks

No OS/400 authority is required.

Parameters

msg (Input) Specifies pointer to the memory allocated for an LDAP message by “ldap_result()—Retrieve Result of an Asynchronous LDAP Operation” on page 156, “ldap_search_s()—Perform an LDAP Search Operation (Synchronous)” on page 171,

"ldap_search_ext_s — Synchronously Search the Directory Using Controls" on page 168 or "ldap_search_st()—Perform an LDAP Search Operation (Timed Synchronous)" on page 173.

Return Values

Message Type
the type of the message freed.

ZERO if the input pointer to LDAPMessage structure is NULL.

Error Conditions

The **ldap_msgfree()** API returns ZERO if the input pointer to LDAPMessage structure is NULL.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_msgfree API.

Related Information

- "ldap_ber_free()—Free storage allocated by the LDAP library" on page 23 — Free the BerElement structure.
- "ldap_control_free()—Free storage allocated by the LDAP library" on page 35 — Free a single LDAPControl structure.
- "ldap_controls_free()—Free storage allocated by the LDAP library" on page 34 — Free an array of LDAPControl structures.
- "ldap_free_urldesc()—Free an LDAP URL Description" on page 83 — Free an LDAP URL Description
- "ldap_memfree()—Free Memory Allocated by LDAP API" on page 106 — Free storage allocated by the LDAP client library.
- "ldap_mods_free()—Free LDAP Modify Storage" on page 121 — Free an array of pointers to mod structures.
- "ldap_result()—Retrieve Result of an Asynchronous LDAP Operation" on page 156 — Retrieve result of an asynchronous LDAP operation.
- "ldap_search_ext_s — Synchronously Search the Directory Using Controls" on page 168 — Synchronously search the directory using controls.
- "ldap_search_s()—Perform an LDAP Search Operation (Synchronous)" on page 171 — Perform an LDAP search operation (synchronous).
- "ldap_search_st()—Perform an LDAP Search Operation (Timed Synchronous)" on page 173 — Perform an LDAP search operation (timed synchronous).
- "ldap_server_free_list()— Free the List of LDAP Servers" on page 178 — Free the List of LDAP Servers
- "ldap_value_free()—Free Memory Allocated by ldap_get_values()" on page 225 — Free memory allocated by ldap_get_values
- "ldap_value_free_len()—Free Memory Allocated by ldap_get_values_len()" on page 226 — Free Memory Allocated by ldap_get_values_len

API introduced: V4R3

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_msgid()—Retrieve the Message ID Associated with an LDAP Message

Syntax

```
#include <ldap.h>


int ldap_msgid(
       LDAPMessage       *msg)
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_msgid()** routine returns the message ID associated with an LDAP message. Use **ldap_msgid()** to match the result(s) of an asynchronous operation with the original operation.

Authorities and Locks

No OS/400 authority is required.

Parameters

msg (Input) Specifies a pointer to a result, as returned from "ldap_first_message()—Retrieve First LDAP Message" on page 79, "ldap_next_message()—Retrieve Next LDAP Message" on page 130, "ldap_first_entry()—Retrieve First LDAP Entry" on page 77, "ldap_next_entry()—Retrieve Next LDAP Entry" on page 129, "ldap_first_reference()—Retrieve First Continuation Reference in a Chain of Search Results" on page 80, or "ldap_next_reference()—Retrieve the next Continuation Reference in a Chain of Search Results" on page 132.

Return Value

Message ID
if the call was successful.

ZERO if the input pointer to LDAPMessage structure is NULL.

Error Conditions

ldap_msgid() returns ZERO if the input pointer to LDAPMessage structure is NULL.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_msgid API.

Related Information

- "ldap_add()—Perform an LDAP Add Operation" on page 9 — Perform an LDAP add operation.
- "ldap_add_ext()—Perform an LDAP Add Operation with Controls" on page 12 — Perform an LDAP add operation with controls.

- “ldap_bind()—Perform an LDAP Bind Request” on page 24 — Perform an LDAP bind request.
- “ldap_compare()—Perform an LDAP Compare Operation” on page 28 — Perform an LDAP compare operation.
- “ldap_compare_ext()—Perform an LDAP Compare Operation with Controls” on page 29 — Perform an LDAP compare operation with controls.
- “ldap_delete()—Perform an LDAP Delete Operation” on page 53 — Perform an LDAP delete operation.
- “ldap_delete_ext()—Perform an LDAP Delete Operation with Controls” on page 54 — Perform an LDAP delete operation with controls.
- “ldap_extended_operation()—Perform extended operations.” on page 71 — Perform extended operations.
- “ldap_first_entry()—Retrieve First LDAP Entry” on page 77 — Retrieve first LDAP entry.
- “ldap_first_message()—Retrieve First LDAP Message” on page 79 — Retrieve First LDAP message.
- “ldap_first_reference()—Retrieve First Continuation Reference in a Chain of Search Results” on page 80 — Return first continuation reference in a chain of search results.
- “ldap_modify()—Perform an LDAP Modify Entry Request” on page 108 — Perform an LDAP modify entry request.
- “ldap_modify_ext()—Perform an LDAP Modify Entry Request with Controls” on page 110 — Perform an LDAP modify entry request with controls.
- “ldap_modrdn()—Perform an LDAP Modify RDN Request” on page 117 — Perform an LDAP modify RDN request.
- “ldap_msgtype()—Retrieve the Type of an LDAP Message” on page 126 — Returns the type of an LDAP message.
- “ldap_next_entry()—Retrieve Next LDAP Entry” on page 129 — Retrieve next LDAP entry.
- “ldap_next_message()—Retrieve Next LDAP Message” on page 130 — Retrieve Next LDAP message.
- “ldap_next_reference()—Retrieve the next Continuation Reference in a Chain of Search Results” on page 132 — Retrieve next continuation reference in a chain of search results.
- “ldap_rename()—Asynchronously Rename an Entry” on page 152 — Asynchronously rename an entry.
- “ldap_result()—Retrieve Result of an Asynchronous LDAP Operation” on page 156 — Wait for result from an asynchronous operation.
- “ldap_sasl_bind()—Perform an LDAP SASL Bind Request” on page 159 — Perform an LDAP SASL bind request.
- “ldap_search()—Perform an LDAP Search Operation” on page 164 — Perform an LDAP search operation.
- “ldap_search_ext —Asynchronously Search the Directory Using Controls” on page 166 — Asynchronously search the directory using controls.
- “ldap_simple_bind()—Perform a Simple LDAP Bind Request” on page 199 — Perform a simple LDAP bind request.

API introduced: V4R5

Top | “Lightweight Directory Access Protocol (LDAP) APIs,” on page 1 | APIs by category

ldap_msgtype()—Retrieve the Type of an LDAP Message

Syntax

```
#include <ldap.h>


int ldap_msgtype(
       LDAPMessage       *msg)
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_msgtype()** API returns the type of an LDAP message.

Authorities and Locks

No OS/400 authority is required.

Parameters

msg (Input) Specifies a pointer to a result, as returned from "ldap_first_message()—Retrieve First LDAP Message" on page 79, "ldap_next_message()—Retrieve Next LDAP Message" on page 130, "ldap_first_entry()—Retrieve First LDAP Entry" on page 77, "ldap_next_entry()—Retrieve Next LDAP Entry" on page 129, "ldap_first_reference()—Retrieve First Continuation Reference in a Chain of Search Results" on page 80, or "ldap_next_reference()—Retrieve the next Continuation Reference in a Chain of Search Results" on page 132.

Return Value

Message Type
if the call was successful. Message types are as follows:

LDAP_RES_BIND (0x61)	Result of an LDAP bind operation.
LDAP_RES_SEARCH_ENTRY (0x64)	An entry.
LDAP_RES_SEARCH_RESULT (0x65)	Result of an LDAP search operation (LDAP v3).
LDAP_RES_MODIFY (0x67)	Result of an LDAP modify operation.
LDAP_RES_ADD (0x69)	Result of an LDAP add operation.
LDAP_RES_DELETE (0x6b)	Result of an LDAP delete operation.
LDAP_RES_MODRDN (0x6d)	Result of an LDAP modrdn operation.
LDAP_RES_COMPARE (0x6f)	Result of an LDAP compare operation.
LDAP_RES_SEARCH_REFERENCE (0x73)	A search reference.
LDAP_RES_EXTENDED (0x78)	Result of an LDAP extended operation (LDAP v3).
LDAP_RES_REFERRAL (0xa3)	A referral.

ZERO if the input pointer to LDAPMessage structure is NULL.

Error Conditions

The **ldap_msgtype()** API returns ZERO if the input pointer to LDAPMessage structure is NULL.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_msgtype API.

Related Information

- "ldap_first_entry()—Retrieve First LDAP Entry" on page 77 — Retrieve first LDAP entry.
- "ldap_first_message()—Retrieve First LDAP Message" on page 79 — Retrieve first LDAP message.
- "ldap_first_reference()—Retrieve First Continuation Reference in a Chain of Search Results" on page 80 — Retrieve first continuation reference in a chain of search results.
- "ldap_msgid()—Retrieve the Message ID Associated with an LDAP Message" on page 124 — Returns the ID of an LDAP message.
- "ldap_next_message()—Retrieve Next LDAP Message" on page 130 — Retrieve next LDAP message.
- "ldap_result()—Retrieve Result of an Asynchronous LDAP Operation" on page 156 — Wait for result from an asynchronous operation.

API introduced: V4R5

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_next_attribute()—Retrieve Next Attribute in an Entry

Syntax

```
#include <ldap.h>

char *ldap_next_attribute(
                LDAP            *ld,
                LDAPMessage     *entry,
                BerElement      *berptr)
```

Default Public Authority: *USE
Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_next_attribute()** function returns the next attribute in an entry.

The **ldap_next_attribute()** function takes an entry returned by "ldap_first_entry()—Retrieve First LDAP Entry" on page 77 or "ldap_next_entry()—Retrieve Next LDAP Entry" on page 129 and returns a pointer to a buffer containing the next attribute type in the entry. This string must be freed when its use is completed using "ldap_memfree()—Free Memory Allocated by LDAP API" on page 106.

The "ldap_first_attribute()—Retrieve First Attribute in an Entry" on page 75 and **ldap_next_attribute()** functions are used to step through the attributes in an LDAP entry.

Authorities and Locks

No OS/400 authority is required.

Parameters

ld (Input) Specifies the LDAP pointer returned by a previous call to "ldap_init()—Perform an LDAP Initialization Operation" on page 102, "ldap_ssl_init —Initializes an SSL Connection." on page 206, or "ldap_open()—Perform an LDAP Open Operation" on page 133.

entry (Input) The attribute information as returned by "ldap_first_entry()—Retrieve First LDAP Entry" on page 77 or "ldap_next_entry()—Retrieve Next LDAP Entry" on page 129.

berptr (Input/Output) This parameter specifies a pointer to a BerElement that was allocated by "ldap_first_attribute()—Retrieve First Attribute in an Entry" on page 75 to keep track of the current position. The BerElement structure is opaque to the application. The caller should free *berptr* using "ldap_ber_free()—Free storage allocated by the LDAP library" on page 23 when finished.

Return Value

Pointer to a buffer containing the next attribute type in the entry
if the request was successful.

NULL When there are no attributes left to be retrieved.

Error Conditions

If **ldap_next_attribute()** is not successful, NULL is returned, and *ld_errno* will be set to indicate the error. See "LDAP Client API Error Conditions" on page 303 for possible LDAP error code values. Use "ldap_get_errno()—Retrieve Error Information" on page 87 function to retrieve the error information. It is left to the user to free outstanding BerElements using "ldap_first_entry()—Retrieve First LDAP Entry" on page 77.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_next_attribute API.

Related Information

- "ldap_first_attribute()—Retrieve First Attribute in an Entry" on page 75 — Retrieve first attribute in an entry.
- "ldap_first_entry()—Retrieve First LDAP Entry" on page 77 — Retrieve first LDAP entry.
- "ldap_next_entry()—Retrieve Next LDAP Entry" on page 129 — Retrieve next LDAP entry.
- "ldap_count_attributes()—Retrieve Count of Attributes for an LDAP Entry" on page 37 — Retrieve count of attributes for an LDAP entry.
- "ldap_get_values()—Retrieve a Set of Attribute Values from an Entry" on page 99 — Retrieve a set of attribute values from an entry.
- "ldap_get_values_len()—Retrieve a Set of Binary Attribute Values" on page 100 — Retrieve a set of binary attribute values.

API introduced: V4R3

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_next_entry()—Retrieve Next LDAP Entry

Syntax

```
#include <ldap.h>

LDAPMessage *ldap_next_entry(
                LDAP         *ld,
                LDAPMessage  *entry)
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_next_entry()** function takes the result from a previous call to “ldap_first_entry()—Retrieve First LDAP Entry” on page 77 or **ldap_next_entry()** and returns a pointer to the next entry in a chain of results.

The entry returned by **ldap_next_entry()** can be used by functions such as “ldap_get_dn()—Retrieve the Distinguished Name of an Entry” on page 84, “ldap_first_attribute()—Retrieve First Attribute in an Entry” on page 75, and “ldap_get_values()—Retrieve a Set of Attribute Values from an Entry” on page 99, as well as other functions to obtain additional information about the entry.

Authorities and Locks

No OS/400 authority is required.

Parameters

ld (Input) Specifies the LDAP pointer returned by a previous call to “ldap_init()—Perform an LDAP Initialization Operation” on page 102,“ldap_ssl_init —Initializes an SSL Connection.” on page 206, or “ldap_open()—Perform an LDAP Open Operation” on page 133.

entry (Input) Specifies a pointer to an entry returned on a previous call to “ldap_first_entry()—Retrieve First LDAP Entry” on page 77 or **ldap_next_entry()**.

Return Value

Pointer to the next entry in the result
if the request was successful.

NULL When there are no attributes left to be retrieved.

Error Conditions

If **ldap_next_entry()** is not successful, NULL is returned, *ld_errno* will be set to indicate the error. See “LDAP Client API Error Conditions” on page 303 for possible LDAP error code values. Use “ldap_get_errno()—Retrieve Error Information” on page 87 function to retrieve the error information.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_next_entry API.

Related Information

- "ldap_first_entry()—Retrieve First LDAP Entry" on page 77 — Return first entry in a chain of search results.
- "ldap_count_entries()—Retrieve Count of LDAP Entries" on page 38 — Return number of entries in a chain of search results.
- "ldap_get_entry_controls_np()—Extract Server Controls from an Entry" on page 85 — Extract server controls from an entry.
- "ldap_first_reference()—Retrieve First Continuation Reference in a Chain of Search Results" on page 80 — Return first continuation reference in a chain of search results.
- "ldap_next_reference()—Retrieve the next Continuation Reference in a Chain of Search Results" on page 132 — Return next continuation reference in a chain of search results.
- "ldap_count_references()—Count continuation references in a chain of search results" on page 41 — Return number of continuation reference in a chain of search results.
- "ldap_parse_reference_np()—Extract Information from a Continuation Reference" on page 141 — Extract information from a continuation reference.

API introduced: V4R3

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

---

ldap_next_message()—Retrieve Next LDAP Message

Syntax

```
#include <ldap.h>

LDAPMessage *ldap_next_message(
                      LDAP           *ld,
                      LDAPMessage    *msg)
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_next_message()** function is used to step through the list of messages in a result chain, as returned by "ldap_result()—Retrieve Result of an Asynchronous LDAP Operation" on page 156 and "ldap_first_message()—Retrieve First LDAP Message" on page 79. It is used to return a pointer to the next message from the list.

Authorities and Locks

No OS/400 authority is required.

Parameters

ld (Input) Specifies the LDAP pointer returned by a previous call to "ldap_init()—Perform an LDAP Initialization Operation" on page 102, "ldap_ssl_init —Initializes an SSL Connection." on page 206, or "ldap_open()—Perform an LDAP Open Operation" on page 133.

msg (Input) Specifies the message returned by a previous call to "ldap_first_message()—Retrieve First LDAP Message" on page 79 or **ldap_next_message()**.

Return Value

LDAPMessage *
pointer to the next message in list.

NULL when no more messages exist in the result set to be returned or if an error occurs.

Error Conditions

If **ldap_next_message()** is not successful, *ld_errno* will be set to indicate the error. See "LDAP Client API Error Conditions" on page 303 for possible LDAP error code values. Use the "ldap_get_errno()—Retrieve Error Information" on page 87 function to retrieve the error information.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_next_message API.

Related Information

- "ldap_count_messages()—Count messages in a result chain" on page 40 — Return the number of messages in a result chain.
- "ldap_first_entry()—Retrieve First LDAP Entry" on page 77 — Retrieve first LDAP entry.
- "ldap_first_message()—Retrieve First LDAP Message" on page 79 — Retrieve first LDAP message.
- "ldap_first_reference()—Retrieve First Continuation Reference in a Chain of Search Results" on page 80 — Return first continuation reference in a chain of search results.
- "ldap_msgfree()—Free LDAP Result Message" on page 122 — Free LDAP Result Message.
- "ldap_msgid()—Retrieve the Message ID Associated with an LDAP Message" on page 124 — Retrieve Message ID Associated with an LDAP Message.
- "ldap_msgtype()—Retrieve the Type of an LDAP Message" on page 126 — Retrieve Type of an LDAP Message.
- "ldap_result2error()—Retrieve LDAP Error Information" on page 158 — Retrieve LDAP Error Information.

API introduced: V4R5

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_next_reference()—Retrieve the next Continuation Reference in a Chain of Search Results

Syntax

```
#include <ldap.h>

LDAPMessage *ldap_next_reference(
                     LDAP           *ld,
                     LDAPMessage    *result)
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_next_reference()** function is used to return the next continuation reference from the search result chain.

Authorities and Locks

No OS/400 authority is required.

Parameters

ld (Input) Specifies the LDAP pointer returned by a previous call to "ldap_init()—Perform an LDAP Initialization Operation" on page 102, "ldap_ssl_init —Initializes an SSL Connection." on page 206, or "ldap_open()—Perform an LDAP Open Operation" on page 133.

result (Input) Specifies the result returned by a call to ldap_result() or one of the synchronous search routines ("ldap_search_s()—Perform an LDAP Search Operation (Synchronous)" on page 171, "ldap_search_st()—Perform an LDAP Search Operation (Timed Synchronous)" on page 173, or "ldap_search_ext_s — Synchronously Search the Directory Using Controls" on page 168).

ref (Input) Specifies a pointer to a search continuation reference returned on a previous call to "ldap_first_reference()—Retrieve First Continuation Reference in a Chain of Search Results" on page 80 or **ldap_next_reference()**.

Return Value

LDAPMessage *
pointer to the next continuation reference.

NULL when no more continuation references exist in the result set to be returned.

Error Conditions

If **ldap_next_reference()** is not successful, *ld_errno* will be set to indicate the error. See "LDAP Client API Error Conditions" on page 303 for possible LDAP error code values. Use the "ldap_get_errno()—Retrieve Error Information" on page 87 function to retrieve the error information.

Error Messages

The following message may be sent from this function

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_next_reference API.

Related Information

- "ldap_first_entry()—Retrieve First LDAP Entry" on page 77 — Return first entry in a chain of search results.
- "ldap_next_entry()—Retrieve Next LDAP Entry" on page 129 — Return next entry in a chain of search results.
- "ldap_count_entries()—Retrieve Count of LDAP Entries" on page 38 — Return number of entry in a chain of search results.
- "ldap_get_entry_controls_np()—Extract Server Controls from an Entry" on page 85 — Extract server controls from an entry.
- "ldap_count_references()—Count continuation references in a chain of search results" on page 41 — Return the number of continuation reference in a chain of search results.
- "ldap_first_reference()—Retrieve First Continuation Reference in a Chain of Search Results" on page 80 — Return first continuation reference in a chain of search results.
- "ldap_parse_reference_np()—Extract Information from a Continuation Reference" on page 141 — Extract information from a continuation reference.

API introduced: V4R5

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

---

ldap_open()—Perform an LDAP Open Operation

Syntax

```
#include <ldap.h>

LDAP *ldap_open(
                char  *host,
                int    port)
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_open()** function opens a connection to an LDAP server and allocates an LDAP structure, which is used to identify the connection and to maintain per-connection information.

The **ldap_open()** function returns a pointer to an LDAP structure, which should be passed to subsequent calls to other LDAP functions such as "ldap_bind()—Perform an LDAP Bind Request" on page 24 and "ldap_search()—Perform an LDAP Search Operation" on page 164.

Although still supported, the use of **ldap_open()** is deprecated. The **ldap_open()** API allocates an LDAP structure and opens a connection to the LDAP server. Use of "ldap_init()—Perform an LDAP Initialization Operation" on page 102 instead of **ldap_open()** is recommended.

As a rule of thumb, the LDAP application is typically running as LDAP version 2 when it uses **ldap_open()** to create the LDAP connection. The LDAP application is typically running as LDAP version

3 when it uses **ldap_init()** to create the LDAP connection. However, it was possible with the LDAP V2 API to call **ldap_init()** so that there may be cases where this rule of thumb is not true.

Authorities and Locks

No OS/400 authority is required.

Parameters

host (Input) Several methods are supported for specifying one or more target LDAP servers, including the following:

Explicit Host List Specifies the name of the host on which the LDAP server is running. The *host* parameter may contain a blank-separated list of hosts to try to connect to, and each host may optionally be of the form *host:port*. If present, the *:port* overrides the *port* parameter.

The following are typical examples:

```
ld=ldap_open ("server1", ldap_port);
ld=ldap_open ("server2:1200", ldap_port);
ld=ldap_open ("server1:800 server2:2000 server3", ldap_port);
```

Localhost If the *host* parameter is **NULL**, the LDAP server will be assumed to be running on the local host.

Default Hosts If the *host* parameter is set to **LDAP_URL_PREFIX** ("ldap://") the LDAP library will attempt to locate one or more default LDAP servers, with non-SSL ports, using the SecureWay "ldap_server_locate()— Locate Suitable LDAP Servers" on page 180 function. The port specified on the call is ignored, since **ldap_server_locate()** returns the port.

For example, the following two are equivalent:

```
ld=ldap_open ("ldap://", ldap_port);
ld=ldap_open (LDAP_URL_PREFIX, LDAP_PORT);
```

If more than one default server is located, the list is processed in sequence, until an active server is found.

The LDAP URL can include a Distinguished Name (DN), used as a filter for selecting candidate LDAP servers based on the server's suffix (or suffixes). If the most significant portion of the DN is an exact match with a server's suffix (after normalizing for case), the server is added to the list of candidate servers. For example, the following will only return default LDAP servers that have a suffix that supports the specified DN:

```
ld=ldap_open ("ldap:///cn=fred, dc=austin, dc=ibm, dc=com", LDAP_PORT);
```

In this case, a server that has a suffix of "dc=austin, dc=ibm, dc=com" would match. If more than one default server is located, the list is processed in sequence, until an active server is found.

If the LDAP URL contains a host name and optional port, the host is used to create the connection. No attempt is made to locate the default server(s), and the DN, if present, is ignored.

For example, the following two are equivalent:

```
ld=ldap_open ("ldap://myserver", LDAP_PORT);
ld=ldap_open ("myserver", LDAP_PORT);
```

Local Socket If the *host* parameter is prefixed with "/", the *host* parameter is assumed to be the name of a UNIX socket (that is, socket family is AF_UNIX) and *port* is ignored. Use of a UNIX socket requires the LDAP server to be running on the local host. In addition, the LDAP server must be listening on the specified UNIX socket. The OS/400 Secureway Directory Services server listens on the **/tmp/s.slapd** local socket, in addition to any configured TCP/IP ports.

For example:

```
ld=ldap_open ("/tmp/s.slapd", ldap_port);
```

Host with Privileged Port If a specified host is prefixed with "privport://", then the LDAP library will use the rresvport() function to attempt to obtain one of the reserved ports (512 through 1023), instead of an "ephemeral" port. The search for a reserved port starts at 1023 and stops at 512. If a reserved port cannot be obtained, the function call will fail.

For example:

```
ld=ldap_open ("privport://server1,ldap_port");
ld=ldap_open ("privport://server2:1200", ldap_port);
ld=ldap_open ("privport://server1:800 server2:2000 privport://server3", ldap_port);
```

port (Input) Specifies the TCP port number the server is listening on. If the default IANA-assigned port of 389 is desired, LDAP_PORT should be specified. To use the default SSL port 636 for SSL connections, use LDAPS_PORT.

Return Value

Pointer to an LDAP structure
if the request was successful.

NULL if the request was not successful.

Error Conditions

The **ldap_open()** API will return NULL and set the *ld_errno* error code, if not successful. See "LDAP Client API Error Conditions" on page 303 for possible LDAP error codes values.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_open API.

Related Information

- "ldap_init()—Perform an LDAP Initialization Operation" on page 102 — Initializes a session with an LDAP server.
- "ldap_set_option() — Set LDAP Options" on page 192 — Set an option associated with an LDAP descriptor.
- "ldap_get_option()—Retrieve LDAP Options" on page 92 — Get an option associated with an LDAP descriptor.

- "ldap_version — Obtain LDAP Version and SSL Cipher Information" on page 227 — Obtain LDAP version and SSL cipher information.

API introduced: V4R3

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_parse_extended_result()—Parse extended result

Syntax

```
#include <ldap.h>

int ldap_parse_extended_result(
      LDAP                        *ld,
             LDAPMessage  *res,
             char   **resultoidp,
             struct berval  **resultdatap,
             int   freeit)
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_parse_extended_result()** function is used to parse the result of an extended operation intiated by "ldap_extended_operation()—Perform extended operations." on page 71.

Authorities and Locks

No OS/400 authority is required.

Parameters

ld (Input) Specifies the LDAP pointer returned by a previous call to "ldap_init()—Perform an LDAP Initialization Operation" on page 102, "ldap_ssl_init —Initializes an SSL Connection." on page 206, or "ldap_open()—Perform an LDAP Open Operation" on page 133.

res (Input) Specifies the result of an LDAP operation as returned by "ldap_first_message()—Retrieve First LDAP Message" on page 79 or "ldap_next_message()—Retrieve Next LDAP Message" on page 130 where the message type is **LDAP_RES_EXTENDED**.

resultoidp
(Input) This result parameter specifies a pointer which is set to point to an allocated, dotted-OID text string returned from the server. This string should be disposed of using the "ldap_memfree()—Free Memory Allocated by LDAP API" on page 106 API. If no OID is returned, **resultoidp* is set to NULL.

resultdatap
(Input) This result parameter specifies a pointer to a berval structure pointer that is set to an allocated copy of the data returned by the server. This struct berval should be disposed of using **ber_bvfree()**. If no data is returned, **resultdatap* is set to NULL.

freeit (Input) Specifies a boolean value that determines if the LDAP result (as specified by *res*) is to be freed. Any non-zero value will result in *res* being freed after the requested information is extracted. Alternatively, the "ldap_msgfree()—Free LDAP Result Message" on page 122 API can be used to free the result at a later time.

Return Value

LDAP_SUCCESS
if the request was successful.

another LDAP error code
if the request was not successful.

Error Conditions

If **ldap_extended_result()** is not successful, *ld_errno* will be set to indicate the error. See "LDAP Client API Error Conditions" on page 303 for possible LDAP error code values. "ldap_get_errno()—Retrieve Error Information" on page 87 function to retrieve the error information.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_parse_extended_result API.

Related Information

- "ldap_extended_operation()—Perform extended operations." on page 71 — Perform extended operation
- "ldap_extended_operation_s()—Perform extended operations synchronously" on page 73 — Perform extended operations synchronously.
- "ldap_first_message()—Retrieve First LDAP Message" on page 79 — Retrieve first LDAP message.
- "ldap_msgtype()—Retrieve the Type of an LDAP Message" on page 126 — Retrieve the type of an LDAP message.
- "ldap_next_message()—Retrieve Next LDAP Message" on page 130 — Retrieve next LDAP message.
- "ldap_result()—Retrieve Result of an Asynchronous LDAP Operation" on page 156 — Retrieve Result of an Asynchronous LDAP Operation

The **ldap_parse_extended_result()** API supports LDAP V3 server controls and client controls.

API introduced: V5R1

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_parse_page_control()—Retrieve Values in a Paged Results Control

Syntax

```
#include <ldap.h>

int ldap_parse_page_control(
             LDAP          *ld,
             LDAPControl   **serverControls,
             unsigned long *totalCount,
             struct berval **cookie)
```

Library Name/Service Program: QSYS/QGLDCLNT

Default Public Authority: *USE

Threadsafe: Yes

The **ldap_parse_page_control()** function is used to retrieve the values in a paged results control used when paging search results.

See LDAP Paged Results for usage information about the functions used to perform paging of entries returned from the server following an LDAP search operation.

Note: serverControls, and cookie must be freed by the caller.

Authorities and Locks

No OS/400 authority is required. All authority checking is done by the LDAP server.

Parameters

ld (Input) Specifies the LDAP pointer returned by previous call to ldap_init(), ldap_ssl_init() or ldap_open(). Must not be NULL.

serverControls
(Input) Specifies a list of LDAP server controls. See LDAP Controls for more information about server controls. These controls are returned to the client when calling the ldap_parse_result() function on the set of results returned by the server. ServerControls can be freed immediately after the call to ldap_parse_page_control() with a call to ldap_controls_free().

totalCount
(Output) Specifies the estimate of the total number of entries for this search. The value can be zero if the estimate cannot be provided.

cookie (Output) Specifies an opaque structure returned by the server. The cookie should be passed into ldap_parse_page_control() as a NULL pointer. Upon return the value of the cookie indicates if there are more pages of results for this search stored on the server. An empty cookie upon return indicates that all results have been returned. Otherwise, this value must be passed into a subsequent call to ldap_create_page_control to get the next page of results. Thereafter, the cookie must be freed with a call to ber_bvfree().

Return Value

LDAP_SUCCESS
if the request was successful.

another LDAP error code
if the control could not be parsed.

Related Information

- "ldap_create_page_control()—Create a Paged Results Control used when paging search results" on page 45 — Create a paged results control.
- "ldap_create_sort_keylist()—Create a Structure with Sort Key Values used when Sorting Search Results" on page 49 — Create a structure with sort key values.
- "ldap_free_sort_keylist()—Free all Memory used by the Sort Key List" on page 82 — Free all memory used by the sort key list.
- "ldap_create_sort_control()—Create a Sorted Results Control used when Sorting Search Results" on page 47 — Create a sorted results control.
- "ldap_parse_sort_control()—Retrieve Values in a Sorted Results Control" on page 147 — Retrieve values in a sorted results control.
- "ldap_search()—Perform an LDAP Search Operation" on page 164 — Asynchronously search the directory.
- "ldap_search_ext —Asynchronously Search the Directory Using Controls" on page 166 — Asynchronously search the directory with controls.
- "ldap_search_ext_s — Synchronously Search the Directory Using Controls" on page 168 — Synchronously search the directory with controls.
- "ldap_parse_result()—Extract Information from Results" on page 143 — Extract information from results.
- "ldap_init()—Perform an LDAP Initialization Operation" on page 102 — Initializes a session with an LDAP server.
- "ldap_ssl_init —Initializes an SSL Connection." on page 206 — Initializes an SSL connection
- "ldap_open()—Perform an LDAP Open Operation" on page 133 — Open a connection to an LDAP server
- "ldap_control_free()—Free storage allocated by the LDAP library" on page 35 — Free a single LDAPControl structure.
- "ldap_controls_free()—Free storage allocated by the LDAP library" on page 34 — Free an array of LDAPControl structures.

API introduced: V5R3

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_parse_pwdpolicy_response()—Obtain the LDAP Password Policy Error or Warning Codes

Syntax

```
#include <ldap.h>

int ldap_parse_pwdpolicy_response(
             LDAPControl **serverControls,
             int         *controlerr,
             int         *controlwarn,
             int         *controlres)
```

Library Name/Service Program: QSYS/QGLDCLNT

Default Public Authority: *USE

Threadsafe: Yes

The **ldap_parse_pwdpolicy_response()** function is used to obtain the LDAP password policy error or warning codes from the password policy response control asociated with an LDAPMessage message. The two possible warnings are *timebeforeexpiration* and *graceloginsremaining*. For warnings, the function can also be used to obtain the LDAP password policy warning result code (the number of seconds value) associated with the warning code.

Authorities and Locks

No OS/400 authority is required. All authority checking is done by the LDAP server.

Parameters

serverControls

(Input) Specifies an array of LDAPCONTROL pointers returned by a previous call to "ldap_parse_result()—Extract Information from Results" on page 143. See LDAP Controls for more information about server controls.

controlerr

(Input) Specifies a pointer to the result parameter that is filled in with the LDAP Password Policy error code. This can be used as input to "ldap_pwdpolicy_err2string()—Convert the Numeric LDAP Password Policy Error or Warning Code into a String" on page 149 to obtain a text description of the error. Possible controlerr values:

LDAP_PASSWORD_EXPIRED	0x03
LDAP_ACCOUNT_LOCKED	0x04
LDAP_CHANGE_AFTER_RESET	0x05
LDAP_TIME_BEFORE_EXPIRE	0x06
LDAP_NEED_OLD_PASSWORD	0x07
LDAP_INVALID_PASS_SYNTAX	0x08
LDAP_PASSWORD_TOO_SHORT	0x09
LDAP_PASSWORD_TOO_YOUNG	0x0A
LDAP_PASSWORD_IN_HISTORY	0x0B

controlwarn

(Input) Specifies a pointer to the result parameter that is filled in with the LDAP Password Policy warning code. This can be used as input to "ldap_pwdpolicy_err2string()—Convert the Numeric

LDAP Password Policy Error or Warning Code into a String" on page 149 to obtain a text description of the warning. Possible controlwarn values:

LDAP_TIME_BEFORE_EXPIRE	0x01
LDAP_GRACE_LOGINS	0x02

controlres
(Input) Specifies a pointer to the result parameter that is filled in with the LDAP Password Policy warning result value.

Error Conditions

The **ldap_parse_pwdpolicy_response()** function returns an LDAP error code if it encounters an error parsing the result. See "LDAP Client API Error Conditions" on page 303 for possible LDAP error code values. The error code indicates if the operation completed successfully.

Related Information

- "ldap_pwdpolicy_err2string()—Convert the Numeric LDAP Password Policy Error or Warning Code into a String" on page 149 — Convert the numeric LDAP Password Policy error or warning code into a string.
- "ldap_parse_result()—Extract Information from Results" on page 143 — Extract information from results

API introduced: V5R3

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

---

ldap_parse_reference_np()—Extract Information from a Continuation Reference

Syntax

```
#include <ldap.h>

int ldap_parse_reference_np(LDAP          *ld,
                            LDAPMessage   *ref,
                            char          ***referralsp,
                            LDAPControl   ***serverctrlsp,
                            int           freeit)
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_parse_reference_np()** function is used to retrieve the list of alternate servers returned in an individual continuation reference in a chain of search results. This routine is also used to obtain an array of server controls returned in the continuation reference.

Note the suffix "_np" which shows the API is in a preliminary implementation, and is not documented in the Internet Draft. The internet community may standardize this API in the future.

Authorities and Locks

No OS/400 authority is required.

Parameters

ld (Input) Specifies the LDAP pointer returned by a previous call to "ldap_init()—Perform an LDAP Initialization Operation" on page 102, "ldap_ssl_init —Initializes an SSL Connection." on page 206, or "ldap_open()—Perform an LDAP Open Operation" on page 133.

ref (Input) Specifies a pointer to a search continuation reference returned on a previous call to "ldap_first_reference()—Retrieve First Continuation Reference in a Chain of Search Results" on page 80 or "ldap_next_reference()—Retrieve the next Continuation Reference in a Chain of Search Results" on page 132.

referralsp
(Output) Specifies a pointer to a result parameter that is filled in with the contents of the referrals field from the LDAPMessage *ref*, indicating zero or more alternate LDAP servers where the request should be retried. The referrals array should be freed by calling "ldap_value_free()—Free Memory Allocated by ldap_get_values()" on page 225. NULL may be supplied for this parameter to ignore the referrals field.

serverctrlsp
(Input) Specifies a pointer to a result parameter that is filled in with an allocated array of controls copied out of the LDAPMessage *ref*. The control array should be freed by calling "ldap_controls_free()—Free storage allocated by the LDAP library" on page 34.

freeit (Input) Specifies a boolean value that determines if the LDAP result chain (as specified by *ref*) is to be freed. Any non-zero value will result in the LDAP result chain being freed after the requested information is extracted. Alternatively, the "ldap_msgfree()—Free LDAP Result Message" on page 122 API can be used to free the LDAP result chain at a later time.

Return Value

LDAP_SUCCESS
if the call was successful.

another LDAP error code
if the call was not successful.

Error Conditions

The **ldap_parse_reference_np()** function will return an LDAP error code if not successful. See "LDAP Client API Error Conditions" on page 303 for possible LDAP error code values.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_parse_reference_np API.

Related Information

- "ldap_first_entry()—Retrieve First LDAP Entry" on page 77 — Return first entry in a chain of search results.

- "ldap_next_entry()—Retrieve Next LDAP Entry" on page 129 — Return next entry in a chain of search results.
- "ldap_count_entries()—Retrieve Count of LDAP Entries" on page 38 — Return number of entry in a chain of search results.
- "ldap_get_entry_controls_np()—Extract Server Controls from an Entry" on page 85 — Extract server controls from an entry.
- "ldap_count_references()—Count continuation references in a chain of search results" on page 41 — Return the number of continuation reference in a chain of search results.
- "ldap_first_reference()—Retrieve First Continuation Reference in a Chain of Search Results" on page 80 — Return first continuation reference in a chain of search results.
- "ldap_next_reference()—Retrieve the next Continuation Reference in a Chain of Search Results" on page 132 — Return next continuation reference in a chain of search results.

API introduced: V4R5

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_parse_result()—Extract Information from Results

Syntax

```
#include <ldap.h>

int ldap_parse_result(
       LDAP            *ld,
       LDAPMessage     *res,
       int             *errcodep,
       char            **matcheddnp,
       char            **errmsgp,
       char            ***referralsp,
       LDAPControl     ***servctrlsp,
       int             freeit)
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_parse_result()** routine is used to:

- Obtain the LDAP error code field associated with an LDAPMessage *res*.
- Obtain the portion of the DN that the server recognizes for a failed operation.
- Obtain the text error message associated with the error code returned in an LDAPMessage *res*.
- Obtain the list of alternate servers from the referrals field.
- Obtain the array of controls that may be returned by the server.

Authorities and Locks

No OS/400 authority is required.

Parameters

ld (Input) Specifies the LDAP pointer returned by a previous call to "ldap_init()—Perform an LDAP

Initialization Operation" on page 102, "ldap_ssl_init —Initializes an SSL Connection." on page 206, or "ldap_open()—Perform an LDAP Open Operation" on page 133.

res (Input) Specifies the result of an LDAP operation as returned by "ldap_result()—Retrieve Result of an Asynchronous LDAP Operation" on page 156 or one of the synchronous LDAP API operation calls.

errcodep
(Output) Specifies a pointer to the result parameter that will be filled in with the LDAP error code field from the LDAPMessage *res*. The LDAPResult message is produced by the LDAP server, and indicates the outcome of the operation. NULL can be specified for *errcodep* if the error code is to be ignored.

matcheddnp
(Output) Specifies a pointer to a result parameter. When LDAP_NO_SUCH_OBJECT is returned as the LDAP error code, this result parameter will be filled in with a Distinguished Name indicating how much of the name in the request was recognized by the server. NULL can be specified for *matcheddnp* if the matched DN is to be ignored. The matched DN string should be freed by calling "ldap_memfree()—Free Memory Allocated by LDAP API" on page 106.

errmsgp
(Output) Specifies a pointer to a result parameter that is filled in with the contents of the error message from the LDAPMessage *res*. The error message string should be freed by calling "ldap_memfree()—Free Memory Allocated by LDAP API" on page 106.

referralsp
(Output) Specifies a pointer to a result parameter that is filled in with the contents of the referrals field from the LDAPMessage *res*, indicating zero or more alternate LDAP servers where the request should be retried. The referrals array should be freed by calling "ldap_value_free()—Free Memory Allocated by ldap_get_values()" on page 225. NULL may be supplied for this parameter to ignore the referrals field.

serverctrlsp
(Ourput) Specifies a pointer to a result parameter that is filled in with an allocated array of controls copied out of the LDAPMessage *res*. The control array should be freed by calling "ldap_controls_free()—Free storage allocated by the LDAP library" on page 34.

freeit (Input) Specifies a boolean value that determines if the LDAP result chain (as specified by *res*) is to be freed. Any non-zero value will result in the LDAP result chain being freed after the requested information is extracted. Alternatively, the "ldap_msgfree()—Free LDAP Result Message" on page 122 API can be used to free the LDAP result chain at a later time.

Return Value

LDAP_SUCCESS
if the result was successfully located and parsed.

another LDAP error code
if not successfully parsed.

Error Conditions

The **ldap_parse_result()** function will return an LDAP error code if not successful. See "LDAP Client API Error Conditions" on page 303 for possible LDAP error code values.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_parse_result API.

Related Information

- "ldap_first_message()—Retrieve First LDAP Message" on page 79 — Retrieve first LDAP message.
- "ldap_next_message()—Retrieve Next LDAP Message" on page 130 — Retrieve next LDAP message.
- "ldap_parse_extended_result()—Parse extended result" on page 136 — Parse extended result.
- "ldap_parse_sasl_bind_result()—Extract Server Credentials from SASL Bind Results" — Extract server credentials from SASL bind results.
- "ldap_result()—Retrieve Result of an Asynchronous LDAP Operation" on page 156 — Retrieve result of an asynchronous LDAP operation.

API introduced: V4R5

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_parse_sasl_bind_result()—Extract Server Credentials from SASL Bind Results

Syntax

```
#include <ldap.h>

int ldap_parse_sasl_bind_result(
       LDAP            *ld,
       LDAPMessage     *res,
       struct berval   **servercredp,
       int             freeit)
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_parse_sasl_bind_result()** function is used to obtain server credentials, as a result of an attempt to perform mutual authentication.

Authorities and Locks

No OS/400 authority is required.

Parameters

ld (Input) Specifies the LDAP pointer returned by a previous call to "ldap_init()—Perform an LDAP Initialization Operation" on page 102, "ldap_ssl_init —Initializes an SSL Connection." on page 206, or "ldap_open()—Perform an LDAP Open Operation" on page 133.

res (Input) Specifies the result of an LDAP operation as returned by "ldap_result()—Retrieve Result of an Asynchronous LDAP Operation" on page 156 or one of the synchronous LDAP API operation calls.

servercredp
(Output) Specifies a pointer to a result parameter. For SASL bind results, this result parameter

will be filled in with the credentials returned by the server for mutual authentication (if returned). The credentials, if returned, are returned in a struct berval. NULL may be supplied to ignore this field.

freeit (Input) Specifies a boolean value that determines if the LDAP result chain (as specified by *ref*) is to be freed. Any non-zero value will result in the LDAP result chain being freed after the requested information is extracted. Alternatively, the "ldap_msgfree()—Free LDAP Result Message" on page 122 API can be used to free the LDAP result chain at a later time.

Return Value

LDAP_SUCCESS
if the result was successfully located and parsed.

another LDAP error code
if not successfully parsed.

Error Conditions

The **ldap_parse_sasl_bind_result()** function will return an LDAP error code if not successful. See "LDAP Client API Error Conditions" on page 303 for possible LDAP error code values.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_parse_sasl_bind_result API.

Related Information

- "ldap_first_message()—Retrieve First LDAP Message" on page 79 — Retrieve first LDAP message.
- "ldap_next_message()—Retrieve Next LDAP Message" on page 130 — Retrieve next LDAP message.
- "ldap_parse_result()—Extract Information from Results" on page 143 — Extract information from results.
- "ldap_sasl_bind()—Perform an LDAP SASL Bind Request" on page 159 — Perform an LDAP SASL bind request.
- "ldap_sasl_bind_s()—Perform an LDAP SASL Bind Request (Synchronous)" on page 161 — Perform an LDAP SASL bind request (synchronous).

API introduced: V4R5

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_parse_sort_control()—Retrieve Values in a Sorted Results Control

Syntax

```
#include <ldap.h>

int ldap_parse_sort_control(
             LDAP          *ld,
             LDAPControl   **serverControls,
             unsigned long *sortRC,
             char          **attribute)
```

Library Name/Service Program: QSYS/QGLDCLNT

Default Public Authority: *USE

Threadsafe: Yes

The **ldap_parse_sort_control()** function is used to retrieve the values in a sorted results control used when sorting search results.

See LDAP Sort for usage information about the functions used to perform sorting of entries returned from the server following an LDAP search operation.

Authorities and Locks

No OS/400 authority is required. All authority checking is done by the LDAP server.

Parameters

ld (Input) Specifies the LDAP pointer returned by previous call to ldap_init(), ldap_ssl_init() or ldap_open(). Must not be NULL.

serverControls
(Input) Specifies a list of LDAP server controls. See LDAP Controls for more information about server controls. These controls are returned to the client when calling the ldap_parse_result() function on the set of results returned by the server.

sortRC
(Output) Specifies the LDAP return code retrieved from the sort results control returned by the server.

attribute
(Output) Specifies the name of the attributed in error returned by the server.

Return Value

LDAP_SUCCESS
if the request was successful.

another LDAP error code
if the control could not be parsed.

Related Information

- "ldap_create_sort_keylist()—Create a Structure with Sort Key Values used when Sorting Search Results" on page 49 — Create a structure with sort key values.

- "ldap_free_sort_keylist()—Free all Memory used by the Sort Key List" on page 82 — Free all memory used by the sort key list.
- "ldap_create_sort_control()—Create a Sorted Results Control used when Sorting Search Results" on page 47 — Create a sorted results control.
- "ldap_create_page_control()—Create a Paged Results Control used when paging search results" on page 45 — Create a paged results control.
- "ldap_parse_page_control()—Retrieve Values in a Paged Results Control" on page 138 — Retrieve values in a paged results control.
- "ldap_search()—Perform an LDAP Search Operation" on page 164 — Asynchronously search the directory.
- "ldap_parse_result()—Extract Information from Results" on page 143 — Extract information from results.

API introduced: V5R3

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_perror()—Print LDAP Error Information

Syntax

```
#include <ldap.h>

void ldap_perror(
                LDAP        *ld,
                const char  *s)
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_perror()** function prints an indication of the error on standard error. The error string printed out will be in English only.

Authorities and Locks

No OS/400 authority is required.

Parameters

ld (Input) Specifies the LDAP pointer returned by a previous call to "ldap_init()—Perform an LDAP Initialization Operation" on page 102, "ldap_ssl_init —Initializes an SSL Connection." on page 206, or "ldap_open()—Perform an LDAP Open Operation" on page 133.

s (Input) Specifies the message prefix, which is prepended to the string form of the error code stored in the LDAP structure. The string form of the error is the same string that would be returned by a call to "ldap_err2string()—Retrieve LDAP Error Message String" on page 62.

Return Value

None

Error Conditions

The **ldap_perror()** API does not return an error code.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_perror API.

Related Information

- "ldap_get_errno()—Retrieve Error Information" on page 87 — Retrieve error code set.
- "ldap_get_lderrno()—Retrieve Error Information" on page 89 — Retrieve error information.
- "ldap_err2string()—Retrieve LDAP Error Message String" on page 62 — Convert LDAP error indication to a string.
- "ldap_result2error()—Retrieve LDAP Error Information" on page 158 — Extract LDAP error indication from LDAP result.

API introduced: V4R3

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_pwdpolicy_err2string()—Convert the Numeric LDAP Password Policy Error or Warning Code into a String

Syntax

```
#include <ldap.h>

char *ldap_pwdpolicy_err2string(
             int err)
```

Library Name/Service Program: QSYS/QGLDCLNT

Default Public Authority: *USE

Threadsafe: Yes

The **ldap_pwdpolicy_err2string()** function is used to convert a numeric LDAP password policy error or warning code, as returned by "ldap_parse_pwdpolicy_response()—Obtain the LDAP Password Policy Error or Warning Codes" on page 140, into a NULL-terminated character string that describes the error or warning. The character string is returned as static data and must not be freed by the caller.

The text description returned will be provided in English only.

Authorities and Locks

No OS/400 authority is required..

Parameters

err (Input) Specifies an integer value returned from "ldap_parse_pwdpolicy_response()—Obtain the LDAP Password Policy Error or Warning Codes" on page 140 containing the password policy warning or error code.

Return Value

LDAP error description String
a textual description of the LDAP error code.

Error Conditions

The **ldap_pwdpolicy_err2string()** API will return ″Unknown Error″ if the LDAP error code is unknown. See "LDAP Client API Error Conditions" on page 303 for possible LDAP error codes and their description.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_pwdpolicy_err2string API.

Related Information

- "ldap_parse_pwdpolicy_response()—Obtain the LDAP Password Policy Error or Warning Codes" on page 140 — Obtain the LDAP Password Policy error or warning codes.
- "ldap_err2string()—Retrieve LDAP Error Message String" on page 62 — Convert LDAP error indication to a string.
- "ldap_result()—Retrieve Result of an Asynchronous LDAP Operation" on page 156 — Retrieve result of an asynchronous LDAP operation.
- "ldap_bind()—Perform an LDAP Bind Request" on page 24 — Asynchronously bind to the directory (deprecated).
- "ldap_sasl_bind()—Perform an LDAP SASL Bind Request" on page 159 — Asynchronously bind to the directory using SASL. ldap_err2string, ldap_result

API introduced: V5R3

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_remove_control()—Remove a Control from the List of LDAP Server Controls

Syntax

```
#include <ldap.h>

int ldap_remove_control(
             LDAPControl *delControl,
             LDAPControl ***ctrlList,
             int         freeit)
```

Library Name/Service Program: QSYS/QGLDCLNT

Default Public Authority: *USE

Threadsafe: Yes

The **ldap_remove_control()** function is used to remove a control from the list of LDAP server controls.

Note: If *freeit* is not 0, the control will be freed. If *freeit* is set to 0, the control will not be freed.

Authorities and Locks

No OS/400 authority is required. All authority checking is done by the LDAP server.

Parameters

delControl
(Input) Specifies the control to be deleted. See LDAP Controls for more information about server controls.

ctrlList
(Input) Specifies a list of LDAP server controls. See LDAP Controls for more information about server controls.

freeit (Input) Specifies whether or not to free the control. If set to TRUE, the control will be freed. If set to FALSE, the control will not be freed.

Return Value

LDAP_SUCCESS
if the request was successful.

LDAP_NO_MEMORY
if the control could not be removed.

Related Information

- "ldap_insert_control()—Insert a Control in the Llist of LDAP Server Controls" on page 104 — Insert a control in the list of LDAP server controls.
- "ldap_remove_control()—Remove a Control from the List of LDAP Server Controls" — Add a new LDAP server control.
- "ldap_copy_controls()—Make a Copy of the List of LDAP Server Controls" on page 36 — Synchronously add an entry with controls.

API introduced: V5R3

ldap_rename()—Asynchronously Rename an Entry

Syntax

```
#include <ldap.h>

int ldap_rename(
       LDAP            *ld,
       const char      *dn,
       const char      *newrdn,
       const char      *newparent,
       int             deleteoldrdn,
       LDAPControl     **serverctrls,
       LDAPControl     **clientctrls,
       int             *msgidp)
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_rename()** routine initiates an asynchronous modify DN operation

In LDAP version 2, the "ldap_modrdn()—Perform an LDAP Modify RDN Request" on page 117 API was used to change the name of an LDAP entry. It could only be used to change the least significant component of a name (the RDN or relative distinguished name). The LDAP version 3 protocol provides the Modify DN protocol operation that allows more general name change access. The **ldap_rename()** routine is used to change the name of an entry. The **ldap_modrdn()** routine is deprecated.

Authorities and Locks

No OS/400 authority is required. All authority checking is done by the LDAP server.

Parameters

ld (Input) Specifies the LDAP pointer returned by a previous call to "ldap_init()—Perform an LDAP Initialization Operation" on page 102, "ldap_ssl_init —Initializes an SSL Connection." on page 206, or "ldap_open()—Perform an LDAP Open Operation" on page 133.

dn (Input) Specifies the DN of the entry whose DN is to be changed.

newrdn
(Input) Specifies the new RDN to be given to the entry.

newparent
(Input) Specifies the new parent, or superior entry. If this parameter is NULL, only the RDN of the entry is changed. The root DN may be specified by passing a zero length string, "". The newparent parameter should always be NULL when using version 2 of the LDAP protocol; otherwise the server's behavior is undefined.

deleteoldrdn
(Input) Specifies a boolean value. When set to 1, the old RDN value is to be deleted from the entry. When set to 0, the old RDN value should be retained as a non-distinguished value. This parameter only has meaning if *newrdn* is different from the old RDN.

serverctrls
(Input) Specifies a list of LDAP server controls. This parameter may be set to null. See LDAP Controls for more information about server controls.

clientctrls
(Input) Specifies a list of LDAP client controls. This parameter may be set to null. See LDAP Controls for more information about client controls.

msgidp (Output) This result parameter is set to the message id of the request if the **ldap_rename()** call succeeds.

Return Value

LDAP_SUCCESS
if the request was successfully sent. **ldap_rename()** places the message id of the request in **msgidp*. A subsequent call to "ldap_result()—Retrieve Result of an Asynchronous LDAP Operation" on page 156 can be used to obtain the result of the operation. Once the operation has completed, **ldap_result()** returns a result that contains the status of the operation (in the form of an error code). The error code indicates if the operation completed successfully. The "ldap_parse_result()—Extract Information from Results" on page 143 API is used to check the error code in the result.

another LDAP error code
in case of an error.

Error Conditions

If **ldap_rename()** is not successful, an error code will be returned. See "LDAP Client API Error Conditions" on page 303 for possible LDAP error code values.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_rename API.

Related Information

- "ldap_rename_s()—Synchronously Rename an Entry" on page 154 — Synchronously rename an entry.
- "ldap_result()—Retrieve Result of an Asynchronous LDAP Operation" on page 156 — Retrieve result of an asynchronous LDAP operation.
- "ldap_modrdn()—Perform an LDAP Modify RDN Request" on page 117 — Asynchronously modify the RDN of an entry (deprecated).
- "ldap_modrdn_s()—Perform an LDAP Modify RDN Request (Synchronous)" on page 119 — Synchronously modify the RDN of an entry (deprecated).

The **ldap_rename()** API supports LDAP V3 server controls and client controls.

API introduced: V4R5

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_rename_s()—Synchronously Rename an Entry

Syntax

```
#include <ldap.h>

int ldap_rename_s(
       LDAP            *ld,
       const char      *dn,
       const char      *newrdn,
       const char      *newparent,
       int             deleteoldrdn,
       LDAPControl     **serverctrls,
       LDAPControl     **clientctrls)
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_rename_s()** routine performs a synchronous modify DN operation.

In LDAP version 2, the "ldap_modrdn_s()—Perform an LDAP Modify RDN Request (Synchronous)" on page 119 API was used to change the name of an LDAP entry synchronously. It could only be used to change the least significant component of a name (the RDN or relative distinguished name). The LDAP V3 protocol provides the Modify DN protocol operation that allows more general name change access. The **ldap_rename_s()** routine is used to change the name of an entry, and the use of the **ldap_modrdn_s()** routine is deprecated.

Authorities and Locks

No OS/400 authority is required. All authority checking is done by the LDAP server.

Parameters

ld (Input) Specifies the LDAP pointer returned by a previous call to "ldap_init()—Perform an LDAP Initialization Operation" on page 102, "ldap_ssl_init —Initializes an SSL Connection." on page 206, or "ldap_open()—Perform an LDAP Open Operation" on page 133.

dn (Input) Specifies the DN of the entry whose DN is to be changed.

newrdn
(Input) Specifies the new RDN to be given to the entry.

newparent
(Input) Specifies the new parent, or superior entry. If this parameter is NULL, only the RDN of the entry is changed. The root DN may be specified by passing a zero length string, "". The *newparent* parameter should always be NULL when using version 2 of the LDAP protocol; otherwise the server's behavior is undefined.

deleteoldrdn
(Input) Specifies a boolean value. When set to non-zero, the old RDN value is removed from the entry. When set to 0, the old RDN value will be retained as a non-distinguished value. This parameter only has meaning if *newrdn* is different from the old RDN.

serverctrls
(Input) Specifies a list of LDAP server controls. This parameter may be set to null. See LDAP Controls for more information about server controls.

clientctrls
(Input) Specifies a list of LDAP client controls. This parameter may be set to null. See LDAP Controls for more information about client controls.

Return Value

LDAP_SUCCESS
if the request was successfully.

another LDAP error code
in case of an error.

Error Conditions

If **ldap_rename_s()** is not successful, an error code will be returned. See "LDAP Client API Error Conditions" on page 303 for possible LDAP error code values.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_rename_s API.

Related Information

- "ldap_rename()—Asynchronously Rename an Entry" on page 152 — Asynchronously rename an entry.
- "ldap_modrdn()—Perform an LDAP Modify RDN Request" on page 117 — Asynchronously modify the RDN of an entry (deprecated).
- "ldap_modrdn_s()—Perform an LDAP Modify RDN Request (Synchronous)" on page 119 — Synchronously modify the RDN of an entry (deprecated).

The **ldap_rename_s()** API supports LDAP V3 server controls and client controls.

API introduced: V4R5

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_result()—Retrieve Result of an Asynchronous LDAP Operation

Syntax

```
#include <sys/time.h>
#include <ldap.h>

int ldap_result(
                LDAP            *ld,
                int              msgid,
                int              all,
                struct timeval  *timeout,
                LDAPMessage    **result)
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_result()** function is used to wait for and return the result of an operation previously initiated by one of the LDAP asynchronous operation functions (such as “ldap_search()—Perform an LDAP Search Operation” on page 164 and “ldap_modify()—Perform an LDAP Modify Entry Request” on page 108).

Authorities and Locks

No OS/400 authority is required.

Parameters

ld (Input) Specifies the LDAP pointer returned by a previous call to “ldap_init()—Perform an LDAP Initialization Operation” on page 102, “ldap_ssl_init —Initializes an SSL Connection.” on page 206, or “ldap_open()—Perform an LDAP Open Operation” on page 133.

msgid (Input) Specifies the message ID of the operation whose results are to be returned. The parameter can be set to LDAP_RES_ANY if any result is desired.

all (Input) This parameter only has meaning for search results. For search results, all is used to specify how many search result messages will be returned on this call to **ldap_result()**. Specify LDAP_MSG_ONE to retrieve one search result message (for example, a single entry). Specify LDAP_MSG_ALL to request that all results of a search be received. **ldap_result()** will wait until all results are received before returning the results in a single chain. Specify LDAP_MSG_RECEIVED to indicate that all results retrieved so far should be returned in the result chain.

timeout
(Input) Specifies how long in seconds to wait for results (as identified by the supplied *msgid*) to be returned from ldap_result. A NULL value causes **ldap_result()** to wait until results for the operation identified by *msgid* are available. To poll, the timeout parameter should be non-NULL, pointing to a zero-valued timeval structure.

result (Output) Contains the result of the asynchronous operation identified by *msgid*. This value should be freed by “ldap_msgfree()—Free LDAP Result Message” on page 122 when the result is no longer needed.

Return Value

-1 If **ldap_result()** was unsuccessful, sets the appropriate LDAP error, and "ldap_get_errno()—Retrieve Error Information" on page 87 API can be used to obtain the error code.

0 If ldap_result() times out or there is no message available.

If successful,
it returns one of the following result types:

LDAP_RES_BIND	0x61L
LDAP_RES_SEARCH_ENTRY	0x64L
LDAP_RES_SEARCH_RESULT	0x65L
LDAP_RES_MODIFY	0x67L
LDAP_RES_ADD	0x69L
LDAP_RES_DELETE	0x6bL
LDAP_RES_MODRDN	0x6dL
LDAP_RES_COMPARE	0x6fL
LDAP_RES_SEARCH_REFERENCE	0X73L
LDAP_RES_EXTENDED	0X78L
LDAP_EXTENDED_RES_NAME	0X8aL
LDAP_EXTENDED_RES_VALUE	0X8bL
LDAP_RES_REFERRAL	0Xa3L
LDAP_RES_ANY	(-1L)

Error Conditions

If **ldap_result()** is not successful, *ld_errno* will be set to indicate the error. See "LDAP Client API Error Conditions" on page 303 for possible values of *ld_errno* field. Use "ldap_get_errno()—Retrieve Error Information" on page 87 function to retrieve the error information.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_result API.

Related Information

- "ldap_count_messages()—Count messages in a result chain" on page 40 — Count messages in a result chain.
- "ldap_first_entry()—Retrieve First LDAP Entry" on page 77 — Retrieve first LDAP entry.
- "ldap_first_message()—Retrieve First LDAP Message" on page 79 — Retrieve first LDAP message.
- "ldap_first_reference()—Retrieve First Continuation Reference in a Chain of Search Results" on page 80 — Retrieve first continuation reference in a chain of search results.
- "ldap_msgfree()—Free LDAP Result Message" on page 122 — Free LDAP result message.
- "ldap_msgid()—Retrieve the Message ID Associated with an LDAP Message" on page 124 — Retrieve the message ID associated with an LDAP message.
- "ldap_msgtype()—Retrieve the Type of an LDAP Message" on page 126 — Returns the type of an LDAP message.

- "ldap_msgid()—Retrieve the Message ID Associated with an LDAP Message" on page 124 — Returns the ID of an LDAP message.
- "ldap_parse_result()—Extract Information from Results" on page 143 — Extract information from results.

API introduced: V4R3

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_result2error()—Retrieve LDAP Error Information

Syntax

```
#include <ldap.h>

int ldap_result2error(
                LDAP         *ld,
                LDAPMessage  *res,
                int           freeit)
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_result2error()** API takes a result as produced by "ldap_result()—Retrieve Result of an Asynchronous LDAP Operation" on page 156 or "ldap_search_s()—Perform an LDAP Search Operation (Synchronous)" on page 171, and returns the corresponding error code.

Authorities and Locks

No OS/400 authority is required.

Parameters

ld (Input) Specifies the LDAP pointer returned by a previous call to "ldap_init()—Perform an LDAP Initialization Operation" on page 102, "ldap_ssl_init —Initializes an SSL Connection." on page 206, or "ldap_open()—Perform an LDAP Open Operation" on page 133.

res (Input/Output) Specifies the result, as produced by "ldap_result()—Retrieve Result of an Asynchronous LDAP Operation" on page 156, to be converted to the error code with which it is associated.

freeit (Input) Specifies whether or not the result, *res*, should be freed as a result of calling **ldap_result2error()**. If non-zero, the result, *res*, will be freed by the call. If zero, *res* will not be freed by the call.

Return Value

LDAP error code
The result of the ldap request in *res*.

Error Conditions

The **ldap_result2error()** function will return an LDAP error code. See "LDAP Client API Error Conditions" on page 303 for possible LDAP error codes.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_result2error API.

Related Information

- "ldap_err2string()—Retrieve LDAP Error Message String" on page 62 — Convert LDAP error indication to a string.
- "ldap_get_errno()—Retrieve Error Information" on page 87 — Retrieve error information.
- "ldap_perror()—Print LDAP Error Information" on page 148 — Print an LDAP error indication to standard error.
- "ldap_result()—Retrieve Result of an Asynchronous LDAP Operation" on page 156 — Retrieve result of an asynchronous LDAP operation.
- "ldap_search_s()—Perform an LDAP Search Operation (Synchronous)" on page 171 — Perform an LDAP search operation (synchronous).

API introduced: V4R3

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_sasl_bind()—Perform an LDAP SASL Bind Request

Syntax

```
#include <ldap.h>

int ldap_sasl_bind(
                LDAP                 *ld,
                const char           *dn,
                const char           *mechanism,
                const struct berval  *cred,
                LDAPControl         **serverctrls,
                LDAPControl         **clientctrls,
                int                  *msgidp)
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_sasl_bind()** function is used to authenticate a distinguished name (DN) to a directory server using Simple Authentication Security Layer (SASL).

After a connection is made to an LDAP V2 server an LDAP bind API must be called before any other LDAP APIs can be called for that connection. For LDAP V3 servers, binding is optional.

ldap_sasl_bind() is an asynchronous request. The result of the operation can be obtained by a subsequent call to "ldap_result()—Retrieve Result of an Asynchronous LDAP Operation" on page 156.

The asynchronous version of this API only supports the LDAP_SASL_SIMPLE mechanism. You must use "ldap_sasl_bind_s()—Perform an LDAP SASL Bind Request (Synchronous)" on page 161 for other mechanisms.

Authorities and Locks

No OS/400 authority is required. All authority checking is done by the LDAP server.

Parameters

ld (Input) Specifies the LDAP pointer returned by a previous call to "ldap_init()—Perform an LDAP Initialization Operation" on page 102, "ldap_ssl_init —Initializes an SSL Connection." on page 206, or "ldap_open()—Perform an LDAP Open Operation" on page 133.

dn (Input) Specifies the Distinguished Name of the entry to bind as.

mechanism
(Input) This value can be set to NULL to perform a simple bind. Other mechanisms (EXTERNAL, CRAM-MD5, and GSSAPI) are implemented, but do not support the asynchronous SASL bind. You must use "ldap_sasl_bind_s()—Perform an LDAP SASL Bind Request (Synchronous)" on page 161 for other mechanisms.

cred (Input) Specifies the credentials with which to authenticate. Arbitrary credentials can be passed using this parameter. In most cases, this is the user's password.

serverctrls
(Input) Specifies a list of LDAP server controls. This parameter may be set to null. See LDAP Controls for more information about server controls.

clientctrls
(Input) Specifies a list of LDAP client controls. This parameter may be set to null. See LDAP Controls for more information about client controls.

msgidp (Output) This result parameter is set to the message id of the request if the **ldap_sasl_bind()** call succeeds.

Return Value

Message ID of the operation initiated
if the request was successfully sent. A subsequent call to "ldap_result()—Retrieve Result of an Asynchronous LDAP Operation" on page 156, can be used to obtain the result of the operation.

-1 if the request was not successful.

Error Conditions

If **ldap_sasl_bind()** is not successful, an error code will be returned. See "LDAP Client API Error Conditions" on page 303 for possible LDAP error code values.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_sasl_bind API.

Related Information

- "ldap_sasl_bind_s()—Perform an LDAP SASL Bind Request (Synchronous)" on page 161 — Synchronously bind to the directory using the Simple Authentication Security Layer (SASL).

- "ldap_simple_bind()—Perform a Simple LDAP Bind Request" on page 199 — Asynchronously bind to the directory using simple authentication.
- "ldap_simple_bind_s()—Perform a Simple LDAP Bind Request (Synchronous)" on page 201 — Synchronously bind to the directory using simple authentication.
- "ldap_unbind()—Perform an LDAP Unbind Request" on page 211 — Asynchronously unbind from the LDAP server and close the connection.
- "ldap_unbind_s()—Perform an LDAP Unbind Request (Synchronous)" on page 214 — Synchronously unbind from the LDAP server and close the connection.

API introduced: V4R5

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

---

ldap_sasl_bind_s()—Perform an LDAP SASL Bind Request (Synchronous)

Syntax

```
#include <ldap.h>

int ldap_sasl_bind_s(
                LDAP                 *ld,
                const char           *dn,
                const char           *mechanism,
                const struct berval  *cred,
                LDAPControl         **serverctrls,
                LDAPControl         **clientctrls,
                struct berval       **servercredp)
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_sasl_bind_s()** function can be used to do general authentication over LDAP through the use of the Simple Authentication Security Layer (SASL).

After a connection is made to an LDAP V2 server an LDAP bind API must be called before any other LDAP APIs can be called for that connection. For LDAP V3 servers, binding is optional.

ldap_sasl_bind_s() performs a synchronous request.

Authorities and Locks

For the **EXTERNAL** mechanism, *R authority is needed to the selected Certificate Store and *X authority is needed to each directory of its path.

Parameters

ld (Input) The LDAP pointer returned by a previous call to "ldap_init()—Perform an LDAP Initialization Operation" on page 102, "ldap_ssl_init —Initializes an SSL Connection." on page 206, or "ldap_open()—Perform an LDAP Open Operation" on page 133.

dn (Input) The Distinguished Name of the entry to bind as, may be NULL.

mechanism
(Input) Although a variety of mechanisms have been IANA registered, the mechanisms supported by the library at this time are:

- **LDAP_MECHANISM_EXTERNAL** mechanism, represented by the string ″EXTERNAL″.
- **LDAP_MECHANISM_CRAMMD5** mechanism, represented by the string ″CRAM-MD5″.
- **LDAP_MECHANISM_GSSAPI** mechanism, represented by the string ″GSSAPI″.
- **LDAP_SASL_SIMPLE**, represented by the empty string.

By setting *mechanism* to a NULL pointer, the SASL bind request will be interpreted as a request for simple authentication (equivalent to using “ldap_simple_bind_s()—Perform a Simple LDAP Bind Request (Synchronous)” on page 201).

The **LDAP_MECHANISM_EXTERNAL** mechanism indicates to the server that information external to SASL should be used to determine whether the client is authorized to authenticate. For this implementation, the system providing the external information must be SSL. The server will use the identity from the client's X.509 certificate that was chosen using the “ldap_ssl_client_init —Initializes the SSL Library.” on page 203 and “ldap_ssl_init —Initializes an SSL Connection.” on page 206 or “ldap_app_ssl_client_init_np()—Initialize the LDAP Client for a Secure Connection using DCM” on page 16 API. The *dn* and *cred* parameters must be NULL.

The **LDAP_MECHANISM_CRAMMD5** mechanism is used to authenticate with the server using a challenge/response protocol that protects the ″clear-text″ password over the wire. This mechanism is useful only when the LDAP server can retrieve the user's password. The contents of the *cred* berval must be a UTF8 representation of the password. See “ldap_xlate_local_to_utf8()— Convert String From the Local Code Page to UTF-8 Encoding” on page 230 for converting local data to UTF8.

The **LDAP_MECHANISM_GSSAPI** mechanism is used to enable Kerberos authentication. The *dn* parameter must be NULL. If the *cred* parameter is NULL, then it is assumed that the user has already authenticated to a Kerberos security server and has obtained a Ticket Granting Ticket (TGT) using a program such as kinit. The GSSAPI credential handle used to initiate a security context on the LDAP client side is obtained from the current login context. The *cred* parameter can also point to a berval containing a GSSAPI credential handle that will be used to initiate a security context with the LDAP server. For example, a server application can call **ldap_sasl_bind_s** with a credential handle that the server received from a client as a delegated credential handle.

cred (Input) Specifies the credentials with which to authenticate. Arbitrary credentials can be passed using this parameter. In most cases, this is the user's password.

serverctrls
(Input) Specifies a list of LDAP server controls. This parameter may be set to null. See LDAP Controls for more information about server controls.

clientctrls
(Input) Specifies a list of LDAP client controls. This parameter may be set to null. See LDAP Controls for more information about client controls.

servercredp
(Output) This result parameter will be set to the credentials returned by the server. If no credentials are returned, it will be set to NULL.

Return Value

LDAP_SUCCESS
if the request was successful.

another LDAP error code
if the request was not successful.

Error Conditions

If **ldap_sasl_bind_s()** is not successful, an error code is returned. See "LDAP Client API Error Conditions" on page 303 for possible LDAP error code values.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_sasl_bind_s API.

Related Information

- "ldap_init()—Perform an LDAP Initialization Operation" on page 102 — Perform an LDAP initialization operation,
- "ldap_ssl_client_init —Initializes the SSL Library." on page 203 — Initializes the SSL library.
- "ldap_ssl_init —Initializes an SSL Connection." on page 206 — Initializes an SSL connection.
- "ldap_app_ssl_client_init_np()—Initialize the LDAP Client for a Secure Connection using DCM" on page 16 — Initialize the LDAP client for a secure connection using DCM.
- "ldap_app_ssl_init_np —Initializes an SSL Connection" on page 19 — Initializes an SSL connection.
- "ldap_sasl_bind()—Perform an LDAP SASL Bind Request" on page 159 — Asynchronously bind to the directory using the Simple Authentication Security Layer (SASL).
- "ldap_simple_bind()—Perform a Simple LDAP Bind Request" on page 199 — Asynchronously bind to the directory using simple authentication.
- "ldap_simple_bind_s()—Perform a Simple LDAP Bind Request (Synchronous)" on page 201 — Synchronously bind to the directory using simple authentication.
- "ldap_unbind()—Perform an LDAP Unbind Request" on page 211 — Asynchronously unbind from the LDAP server and close the connection.
- "ldap_unbind_s()—Perform an LDAP Unbind Request (Synchronous)" on page 214 — Synchronously unbind from the LDAP server and close the connection.

API introduced: V4R5

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_search()—Perform an LDAP Search Operation

Syntax

```
#include <ldap.h>

int ldap_search(
                LDAP        *ld,
                const char  *base,
                int          scope,
                const char  *filter,
                char       **attrs,
                int          attrsonly)
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_search()** function is used to perform an LDAP search operation.

ldap_search() is an asynchronous request. A subsequent call to "ldap_result()—Retrieve Result of an Asynchronous LDAP Operation" on page 156 can be used to obtain the results from the search.

Authorities and Locks

No OS/400 authority is required. All authority checking is done by the LDAP server.

Parameters

ld (Input) Specifies the LDAP pointer returned by a previous call to "ldap_init()—Perform an LDAP Initialization Operation" on page 102, "ldap_ssl_init —Initializes an SSL Connection." on page 206, or "ldap_open()—Perform an LDAP Open Operation" on page 133.

base (Input) Specifies the DN of the entry at which to start the search.

scope (Input) Specifies the scope of the search. It can be **LDAP_SCOPE_BASE** (to search the *base* object itself), or **LDAP_SCOPE_ONELEVEL** (to search the *base* object's immediate children), or **LDAP_SCOPE_SUBTREE** (to search the *base* object and all its descendents).

filter (Input) Specifies a string representation of the filter to apply in the search. Simple filters can be specified as attributetype=attributevalue. More complex filters are specified using a prefix notation according to the following BNF:

```
<filter>     ::= '(' <filtercomp> ')'
<filtercomp> ::= <and> | <or> | <not> | <simple>
<and>        ::= '&' <filterlist>
<or>         ::= '|' <filterlist>
<not>        ::= '!' <filter>
<filterlist> ::= <filter> | <filter> <filterlist>
<simple>     ::= <attributetype> <filtertype> <attributevalue>
<filtertype> ::= '=' | '~=' | '<=' | '>='
```

The '~=' construct is used to specify approximate matching. The representation for <attributetype> and <attributevalue> are as described in RFC 2252, "Lightweight Directory Access Protocol (v3): Attribute Syntax Definitions." In addition, <attributevalue> can be a single * to achieve an attribute existence test, or can contain text and *'s interspersed to achieve substring matching.

For example, the filter ″(mail=*)″ will find any entries that have a mail attribute. The filter ″(mail=*@student.of.life.edu)″ will find any entries that have a mail attribute ending in the specified string.

More complex filters are created using the & and | operators. For example, the filter ″(&(objectclass=person)(mail=*))″ will find any entries that have an objectclass of person and a mail attribute. To put parentheses or asterisks in a filter, escape them with a backslash '\' character. See RFC 2254, ″A String Representation of LDAP Search Filters,″ for a more complete description of allowable filters.

attrs (Input) Specifies a null-terminated array of character string attribute types to return from entries that match *filter*. If NULL is specified, all attributes will be returned.

attrsonly
(Input) Specifies attribute information. *Attrsonly* should be set to 1 to request attribute types only. Set to 0 to request both attributes types and attribute values.

Return Value

Message ID of the Operation Initiated
if the request was successful. A subsequent call to "ldap_result()—Retrieve Result of an Asynchronous LDAP Operation" on page 156, can be used to obtain the result.

-1 if the request was not successful.

Error Conditions

If **ldap_search()** is not successful, -1 will be returned setting the session error(*ld_errno*) parameters in the LDAP structure appropriately. See "LDAP Client API Error Conditions" on page 303 for possible values for the error codes. Use "ldap_get_errno()—Retrieve Error Information" on page 87 to obtain the error code *ld_errno*.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_search API.

Related Information

- "ldap_result()—Retrieve Result of an Asynchronous LDAP Operation" on page 156 — Retrieve result of an asynchronous LDAP operation.
- "ldap_search_s()—Perform an LDAP Search Operation (Synchronous)" on page 171 — Synchronously search the directory.
- "ldap_search_ext —Asynchronously Search the Directory Using Controls" on page 166 — Asynchronously search the directory with controls.
- "ldap_search_ext_s — Synchronously Search the Directory Using Controls" on page 168 — Synchronously search the directory with controls.
- "ldap_search_st()—Perform an LDAP Search Operation (Timed Synchronous)" on page 173 — Synchronously search the directory with timeout.

API introduced: V4R3

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_search_ext —Asynchronously Search the Directory Using Controls

Syntax

```
#include <ldap.h>

int ldap_search_ext(
      LDAP             *ld,
      const char       *base,
      int               scope,
      const char       *filter,
      char            **attrs,
      int               attrsonly,
      LDAPControl     **serverctrls,
      LDAPControl     **clientctrls,
      struct timeval   *timeout,
      int               sizelimit,
      int              *msgidp)
```

*Default Public Authority: *USE*

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_search_ext()** routine initiates an asynchronous search operation.

Authorities and Locks

No OS/400 authority is required. All authority checking is done by the LDAP server.

Parameters

ld (Input) Specifies the LDAP pointer returned by a previous call to "ldap_init()—Perform an LDAP Initialization Operation" on page 102, "ldap_ssl_init —Initializes an SSL Connection." on page 206, or "ldap_open()—Perform an LDAP Open Operation" on page 133.

base (Input) Specifies the DN of the entry at which to start the search.

scope (Input) Specifies the scope of the search. It can be **LDAP_SCOPE_BASE** (to search the *base* object itself), or **LDAP_SCOPE_ONELEVEL** (to search the *base* object's immediate children), or **LDAP_SCOPE_SUBTREE** (to search the *base* object and all its descendents).

filter (Input) Specifies a string representation of the filter to apply in the search. Simple filters can be specified as attributetype=attributevalue. More complex filters are specified using a prefix notation according to the following BNF:

```
<filter>     ::= '(' <filtercomp> ')'
<filtercomp> ::= <and> | <or> | <not> | <simple>
<and>        ::= '&' <filterlist>
<or>         ::= '|' <filterlist>
<not>        ::= '!' <filter>
<filterlist> ::= <filter> | <filter> <filterlist>
<simple>     ::= <attributetype> <filtertype> <attributevalue>
<filtertype> ::= '=' | '~=' | '<=' | '>='
```

The '~=' construct is used to specify approximate matching. The representation for <attributetype> and <attributevalue> are as described in RFC 2252, "Lightweight Directory Access

Protocol (v3): Attribute Syntax Definitions." In addition, <attributevalue> can be a single * to achieve an attribute existence test, or can contain text and *'s interspersed to achieve substring matching.

For example, the filter "(mail=*)" will find any entries that have a mail attribute. The filter "(mail=*@student.of.life.edu)" will find any entries that have a mail attribute ending in the specified string.

More complex filters are created using the & and | operators. For example, the filter "(&(objectclass=person)(mail=*))" will find any entries that have an objectclass of person and a mail attribute. To put parentheses or asterisks in a filter, escape them with a backslash '\' character. See RFC 2254, "A String Representation of LDAP Search Filters," for a more complete description of allowable filters.

attrs (Input) Specifies a null-terminated array of character string attribute types to return from entries that match *filter*. If NULL is specified, all attributes will be returned.

attrsonly
(Input) Specifies attribute information. *Attrsonly* should be set to 1 to request attribute types only. Set to 0 to request both attributes types and attribute values.

serverctrls
(Input) Specifies a list of LDAP server controls. This parameter may be set to null. See LDAP Controls for more information about server controls.

clientctrls
(Input) Specifies a list of LDAP client controls. This parameter may be set to null. See LDAP Controls for more information about client controls.

sizelimit
(Input) Specifies the maximum number of entries to return. Note that the server may set a lower limit which is enforced at the server.

timeout
(Input) The local search timeout value and the operation time limit that is sent to the server within the search request.

msgidp (Output) This result parameter is set to the message id of the request if the ldap_search_ext() call succeeds.

Return Value

Message ID of the Operation Initiated
if the request was successful. A subsequent call to "ldap_result()—Retrieve Result of an Asynchronous LDAP Operation" on page 156 can be used to obtain the result.

another LDAP error code
if the request was not successful.

Error Conditions

If **ldap_search_ext()** is not successful, an error code will be returned. See "LDAP Client API Error Conditions" on page 303 for possible LDAP error codes.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_search_ext API.

Related Information

- "ldap_result()—Retrieve Result of an Asynchronous LDAP Operation" on page 156 — Retrieve result of an asynchronous LDAP operation.
- "ldap_search_s()—Perform an LDAP Search Operation (Synchronous)" on page 171 — Synchronously search the directory.
- "ldap_search()—Perform an LDAP Search Operation" on page 164 — Asynchronously search the directory.
- "ldap_search_ext_s — Synchronously Search the Directory Using Controls" — Synchronously search the directory with controls.
- "ldap_search_st()—Perform an LDAP Search Operation (Timed Synchronous)" on page 173 — Synchronously search the directory with timeout.

The **ldap_search_ext()** API supports LDAP V3 server controls, client controls, and allow varying size and time limits to be easily specified for each search operation.

API introduced: V4R5

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

---

ldap_search_ext_s — Synchronously Search the Directory Using Controls

Syntax

```
#include <ldap.h>

int ldap_search_ext_s(
       LDAP            *ld,
       const char      *base,
       int             scope,
       const char      *filter,
       char            **attrs,
       int             attrsonly,
       LDAPControl     **serverctrls,
       LDAPControl     **clientctrls,
       struct timeval  *timeout,
       int             sizelimit,
       LDAPMessage     **res)
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_search_ext_s()** routine initiates a synchronous search operation, allowing LDAP controls to be sent to the server and client.

Authorities and Locks

No OS/400 authority is required. All authority checking is done by the LDAP server.

Parameters

ld (Input) Specifies the LDAP pointer returned by a previous call to "ldap_init()—Perform an LDAP

Initialization Operation" on page 102, "ldap_ssl_init —Initializes an SSL Connection." on page 206, or "ldap_open()—Perform an LDAP Open Operation" on page 133.

base (Input) Specifies the DN of the entry at which to start the search.

scope (Input) Specifies the scope of the search. It can be **LDAP_SCOPE_BASE** (to search the object itself), or **LDAP_SCOPE_ONELEVEL** (to search the object's immediate children), or **LDAP_SCOPE_SUBTREE** (to search the object and all its descendents).

filter (Input) Specifies a string representation of the filter to apply in the search. Simple filters can be specified as attributetype=attributevalue. More complex filters are specified using a prefix notation according to the following BNF:

```
<filter>     ::= '(' <filtercomp> ')'
<filtercomp> ::= <and> | <or> | <not> | <simple>
<and>        ::= '&' <filterlist>
<or>         ::= '|' <filterlist>
<not>        ::= '!' <filter>
<filterlist> ::= <filter> | <filter> <filterlist>
<simple>     ::= <attributetype> <filtertype> <attributevalue>
<filtertype> ::= '=' | '~=' | '<=' | '>='
```

The '~=' construct is used to specify approximate matching. The representation for <attributetype> and <attributevalue> are as described in RFC 2252, "Lightweight Directory Access Protocol (v3): Attribute Syntax Definitions." In addition, <attributevalue> can be a single * to achieve an attribute existence test, or can contain text and *'s interspersed to achieve substring matching.

For example, the filter "(mail=*)" will find any entries that have a mail attribute. The filter "(mail=*@student.of.life.edu)" will find any entries that have a mail attribute ending in the specified string.

More complex filters are created using the & and | operators. For example, the filter "(&(objectclass=person)(mail=*))" will find any entries that have an objectclass of person and a mail attribute. To put parentheses or asterisks in a filter, escape them with a backslash '\' character. See RFC 2254, "A String Representation of LDAP Search Filters," for a more complete description of allowable filters.

attrs (Input) Specifies a null-terminated array of character string attribute types to return from entries that match *filter*. If NULL is specified, all attributes will be returned.

attrsonly
(Input) Specifies attribute information. *Attrsonly* should be set to 1 to request attribute types only. Set to 0 to request both attributes types and attribute values.

serverctrls
(Input) Specifies a list of LDAP server controls. This parameter may be set to null. See LDAP Controls for more information about server controls.

clientctrls
(Input) Specifies a list of LDAP client controls. This parameter may be set to null. See LDAP Controls for more information about client controls.

sizelimit
(Input) Specifies the maximum number of entries to return. Note that the server may set a lower limit which is enforced at the server.

timeout
(Input) The local search timeout value and the operation time limit that is sent to the server within the search request.

res (Output) Contains the result of the synchronous search operation. This result should be passed to the LDAP parsing routines (see "ldap_first_entry()—Retrieve First LDAP Entry" on page 77,

"ldap_next_entry()—Retrieve Next LDAP Entry" on page 129, and so on). The caller is responsible for freeing *res* with "ldap_msgfree()—Free LDAP Result Message" on page 122.

Return Value

LDAP_SUCCESS
if the request was successful.

another LDAP error
if the request was not successful. The code can be interpreted by "ldap_perror()—Print LDAP Error Information" on page 148 or "ldap_err2string()—Retrieve LDAP Error Message String" on page 62.

Error Conditions

If **ldap_search_ext_s()** is not successful, an error code will be returned. See "LDAP Client API Error Conditions" on page 303 for possible values for the error codes.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_search_ext_s API.

Related Information

- "ldap_first_entry()—Retrieve First LDAP Entry" on page 77 — Retrieve first LDAP entry.
- "ldap_first_reference()—Retrieve First Continuation Reference in a Chain of Search Results" on page 80 — Return first continuation reference in a chain of search results.
- "ldap_count_entries()—Retrieve Count of LDAP Entries" on page 38 — Return number of entries in a chain of search results.
- "ldap_msgfree()—Free LDAP Result Message" on page 122 — Free LDAP result message.
- "ldap_search_s()—Perform an LDAP Search Operation (Synchronous)" on page 171 — Synchronously search the directory.
- "ldap_search()—Perform an LDAP Search Operation" on page 164 — Asynchronously search the directory.
- "ldap_search_ext —Asynchronously Search the Directory Using Controls" on page 166 — Asynchronously search the directory with controls.
- "ldap_search_st()—Perform an LDAP Search Operation (Timed Synchronous)" on page 173 — Synchronously search the directory with timeout.

The **ldap_search_ext_s()** API supports LDAP V3 server controls, client controls, and allows varying size and time limits to be easily specified for each search operation.

API introduced: V4R5

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_search_s()—Perform an LDAP Search Operation (Synchronous)

Syntax

```
#include <ldap.h>

int ldap_search_s(
                LDAP          *ld,
                const char    *base,
                int            scope,
                const char    *filter,
                char         **attrs,
                int            attrsonly,
                LDAPMessage   **res)
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_search_s()** function is used to perform a synchronous LDAP search operation.

Authorities and Locks

No OS/400 authority is required. All authority checking is done by the LDAP server.

Parameters

ld (Input) Specifies the LDAP pointer returned by a previous call to "ldap_init()—Perform an LDAP Initialization Operation" on page 102, "ldap_ssl_init —Initializes an SSL Connection." on page 206, or "ldap_open()—Perform an LDAP Open Operation" on page 133.

base (Input) Specifies the DN of the entry at which to start the search.

scope (Input) Specifies the scope of the search. It can be **LDAP_SCOPE_BASE** (to search the object itself), or **LDAP_SCOPE_ONELEVEL** (to search the object's immediate children), or **LDAP_SCOPE_SUBTREE** (to search the object and all its descendents).

filter (Input) Specifies a string representation of the filter to apply in the search. Simple filters can be specified as attributetype=attributevalue. More complex filters are specified using a prefix notation according to the following BNF:

```
<filter>     ::= '(' <filtercomp> ')'
<filtercomp> ::= <and> | <or> | <not> | <simple>
<and>        ::= '&' <filterlist>
<or>         ::= '|' <filterlist>
<not>        ::= '!' <filter>
<filterlist> ::= <filter> | <filter> <filterlist>
<simple>     ::= <attributetype> <filtertype> <attributevalue>
<filtertype> ::= '=' | '~=' | '<=' | '>='
```

The '~=' construct is used to specify approximate matching. The representation for <attributetype> and <attributevalue> are as described in RFC 2252, "Lightweight Directory Access Protocol (v3): Attribute Syntax Definitions." In addition, <attributevalue> can be a single * to achieve an attribute existence test, or can contain text and *'s interspersed to achieve substring matching.

For example, the filter "(mail=*)" will find any entries that have a mail attribute. The filter "(mail=*@student.of.life.edu)" will find any entries that have a mail attribute ending in the specified string.

More complex filters are created using the & and | operators. For example, the filter "(&(objectclass=person)(mail=*))" will find any entries that have an objectclass of person and a mail attribute. To put parentheses or asterisks in a filter, escape them with a backslash '\' character. See RFC 2254, "A String Representation of LDAP Search Filters," for a more complete description of allowable filters.

attrs (Input) Specifies a null-terminated array of character string attribute types to return from entries that match *filter*. If NULL is specified, all attributes will be returned.

attrsonly
(Input) Specifies attribute information. *Attrsonly* should be set to 1 to request attribute types only. Set to 0 to request both attributes types and attribute values.

res (Output) Contains the result of the synchronous search operation. This result should be passed to the LDAP parsing routines (see "ldap_first_entry()—Retrieve First LDAP Entry" on page 77, "ldap_next_entry()—Retrieve Next LDAP Entry" on page 129, and so on). The caller is responsible for freeing *res* with "ldap_msgfree()—Free LDAP Result Message" on page 122.

Return Value

LDAP_SUCCESS
if the request was successful.

another LDAP error
if the request was not successful. The code can be interpreted by "ldap_perror()—Print LDAP Error Information" on page 148 or "ldap_err2string()—Retrieve LDAP Error Message String" on page 62.

Error Conditions

If **ldap_search_s()** is not successful, an error code will be returned. See "LDAP Client API Error Conditions" on page 303 for possible LDAP error codes values.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_search_s API.

Related Information

- "ldap_first_entry()—Retrieve First LDAP Entry" on page 77 — Retrieve first LDAP entry.
- "ldap_first_reference()—Retrieve First Continuation Reference in a Chain of Search Results" on page 80 — Return first continuation reference in a chain of search results.
- "ldap_count_entries()—Retrieve Count of LDAP Entries" on page 38 — Return number of entries in a chain of search results.
- "ldap_msgfree()—Free LDAP Result Message" on page 122 — Free LDAP result message.
- "ldap_search()—Perform an LDAP Search Operation" on page 164 — Asynchronously search the directory.
- "ldap_search_ext_s — Synchronously Search the Directory Using Controls" on page 168 — Synchronously search the directory with controls.

- "ldap_search_ext —Asynchronously Search the Directory Using Controls" on page 166 — Asynchronously search the directory with controls.
- "ldap_search_st()—Perform an LDAP Search Operation (Timed Synchronous)" — Synchronously search the directory with timeout.

API introduced: V4R3

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_search_st()—Perform an LDAP Search Operation (Timed Synchronous)

Syntax

```
#include <sys/time.h>
#include <ldap.h>

int ldap_search_st(
                LDAP            *ld,
                const char      *base,
                int              scope,
                const char      *filter,
                char           **attrs,
                int              attrsonly,
                struct timeval  *timeout,
                LDAPMessage    **res)
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_search_st()** function is used to perform an LDAP search operation.

Authorities and Locks

No OS/400 authority is required. All authority checking is done by the LDAP server.

Parameters

ld (Input) Specifies the LDAP pointer returned by a previous call to "ldap_init()—Perform an LDAP Initialization Operation" on page 102, "ldap_ssl_init —Initializes an SSL Connection." on page 206, or "ldap_open()—Perform an LDAP Open Operation" on page 133.

base (Input) Specifies the DN of the entry at which to start the search.

scope (Input) Specifies the scope of the search. It can be **LDAP_SCOPE_BASE** (to search the object itself), or **LDAP_SCOPE_ONELEVEL** (to search the object's immediate children), or **LDAP_SCOPE_SUBTREE** (to search the object and all its descendents).

filter (Input) Specifies a string representation of the filter to apply in the search. Simple filters can be specified as attributetype=attributevalue. More complex filters are specified using a prefix notation according to the following BNF:

```
<filter>     ::= '(' <filtercomp> ')'
<filtercomp> ::= <and> | <or> | <not> | <simple>
<and>        ::= '&' <filterlist>
```

```
<or>         ::= '|' <filterlist>
<not>        ::= '!' <filter>
<filterlist> ::= <filter> | <filter> <filterlist>
<simple>     ::= <attributetype> <filtertype> <attributevalue>
<filtertype> ::= '=' | '~=' | '<=' | '>='
```

The '~=' construct is used to specify approximate matching. The representation for <attributetype> and <attributevalue> are as described in RFC 2252, "Lightweight Directory Access Protocol (v3): Attribute Syntax Definitions." In addition, <attributevalue> can be a single * to achieve an attribute existence test, or can contain text and *'s interspersed to achieve substring matching.

For example, the filter "(mail=*)" will find any entries that have a mail attribute. The filter "(mail=*@student.of.life.edu)" will find any entries that have a mail attribute ending in the specified string.

More complex filters are created using the & and | operators. For example, the filter "(&(objectclass=person)(mail=*))" will find any entries that have an objectclass of person and a mail attribute. To put parentheses or asterisks in a filter, escape them with a backslash '\' character. See RFC 2254, "A String Representation of LDAP Search Filters," for a more complete description of allowable filters.

attrs (Input) Specifies a null-terminated array of character string attribute types to return from entries that match *filter*. If NULL is specified, all attributes will be returned.

attrsonly
(Input) Specifies attribute information. *Attrsonly* should be set to 1 to request attribute types only. Set to 0 to request both attributes types and attribute values.

timeout
(Input) The local search timeout value.

res (Output) Contains the result of the synchronous search operation. This result should be passed to the LDAP parsing routines (see "ldap_first_entry()—Retrieve First LDAP Entry" on page 77, "ldap_next_entry()—Retrieve Next LDAP Entry" on page 129, and so on). The caller is responsible for freeing *res* with "ldap_msgfree()—Free LDAP Result Message" on page 122.

Return Value

LDAP_SUCCESS
if the request was successful.

another LDAP error code
if the request was not successful.

Error Conditions

If **ldap_search_st()** is not successful, an error code will be returned. See "LDAP Client API Error Conditions" on page 303 for possible LDAP error codes.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_search_st API.

Related Information

- "ldap_first_entry()—Retrieve First LDAP Entry" on page 77 — Retrieve first LDAP entry.
- "ldap_first_reference()—Retrieve First Continuation Reference in a Chain of Search Results" on page 80 — Return first continuation reference in a chain of search results.
- "ldap_count_entries()—Retrieve Count of LDAP Entries" on page 38 — Return number of entries in a chain of search results.
- "ldap_msgfree()—Free LDAP Result Message" on page 122 — Free LDAP result message.
- "ldap_search_s()—Perform an LDAP Search Operation (Synchronous)" on page 171 — Synchronously search the directory.
- "ldap_search()—Perform an LDAP Search Operation" on page 164 — Asynchronously search the directory.
- "ldap_search_ext —Asynchronously Search the Directory Using Controls" on page 166 — Asynchronously search the directory with controls.
- "ldap_search_ext_s — Synchronously Search the Directory Using Controls" on page 168 — Synchronously search the directory with controls.

API introduced: V4R3

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_server_conf_save()— Store Server Information into Local Configuration

Syntax

```
#include <ldap.h>

typedef struct LDAP_Server_Info {
    char    *lsi_host;        /* LDAP server's hostname */
    unsigned short lsi_port;  /* LDAP port              */
    char    *lsi_suffix;      /* Server's LDAP suffix   */
    char    *lsi_query_key;   /* service_key[.edomain]*/
    char    *lsi_dns_domain;  /* Publishing DNS domain  */
    int      lsi_replica_type;/* master or replica      */
#define LDAP_LSI_MASTER  1    /* LDAP Master            */
#define LDAP_LSI_REPLICA 2    /* LDAP Replica           */
    int      lsi_sec_type;    /* SSL or non-SSL         */
#define LDAP_LSI_NOSSL   1    /* Non-SSL                */
#define LDAP_LSI_SSL     2    /* Secure Server          */
    unsigned short lsi_priority; /* Server priority     */
    unsigned short lsi_weight; /* load balancing weight */
    char    *lsi_vendor_info;  /* vendor information    */
    char    *lsi_info;        /* LDAP Info string       */
    struct LDAP_Server_Info *prev; /* linked list previous ptr */
    struct LDAP_Server_Info *next; /* linked list next ptr     */
} LDAPServerInfo;

int ldap_server_conf_save(
       char            *filename,
       unsigned long    ttl,
       LDAPServerInfo  *server_info_listp );
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_server_conf_save()** API is used to store server information for the local configuration.

Authorities and Locks

Object Authorities

The caller must have Execute (*X) authority to each directory in the path name preceding the name of the configuration file. The caller must have Write (*W) authority to the configuration file.

Parameters

server_info_listp

(input) A linked list of LDAPServerInfo structures. Each LDAPServerInfo structure defined in the list contains information on an LDAP server. This information will be stored in a file and can be retrieved using "ldap_server_locate()— Locate Suitable LDAP Servers" on page 180. The LDAPServerInfo structure contains the following fields:

lsi_host	Fully-qualified hostname of the target server (NULL-terminated string).
lsi_port	Integer representation of the LDAP server's port.
lsi_suffix	String that specifies a supported suffix for the LDAP server (NULL-terminated string).

lsi_query_key Specifies the The eNetwork domain to which the LDAP server belongs, prefixed by the service key. For example, if service key is ldap and eNetwork domain is sales, then lsi_query_key would be set to ldap.sales. If the server is not associated with an eNetwork domain (as published in DNS), then lsi_query_key consists solely of the service key value.

lsi_dns_domain DNS domain in which the LDAP server was published. For example, the DNS search may have been for ldap.sales.tcp.austin.ibm.com, but the resulting server(s) has a fully-qualified DNS host name of ldap2.raleigh.ibm.com. In this example, lsi_host would be set to ldap2.raleigh.ibm.com whilst lsi_dns_domain would be set to austin.ibm.com. The actual domain in which the server was ″ published″ may be of interest, particularly when multiple DNS domains are configured (or supplied as input).

lsi_replica_type Specifies the type of server, LDAP_LSI_MASTER or LDAP_LSI_REPLICA. If set to zero, the type is unknown.

lsi_sec_type Specifies the port's security type, LDAP_LSI_NOSSL or LDAP_LSI_SSL. This value is derived from the ″ldap″ or ″ldaps″ prefix on the LDAP URL. If the LDAP URL is not defined, the security type is unknown and lsi_sectype is set to zero.

lsi_priority The priority value obtained from the SRV RR (or the ″pseudo-SRV″ TXT RR). Set to zero if unknown or notavailable.

lsi_weight The weight value obtained from the SRV RR (or the ″pseudo-SRV″ TXT RR). Set to zero if unknown or not available.

lsi_vendor_info NULL-terminated string obtained from the ldapvendor TXT RR (if defined). May be used to identify the LDAP server vendor/version information.

lsi_info NULL-terminated information string obtained from the ldapinfo TXT RR (if defined). If not defined, lsi_info is set to NULL. This information string can be used by the LDAP or network administrator to publish additional information about the target LDAP server.

filename
(input) The configuration filename. Specify NULL to get the default filename, /QIBM/UserData/OS400/DirSrv/ldap_server_info.conf.

ttl (input) Specifies the time-to-live (in minutes) for server information saved in the configuration file. Set *ttl* to zero if it is intended to be a permanent repository of information.

Return Value

LDAP_SUCCESS
if the request was successful.

another LDAP error code
if the request was not successful.

Error Conditions

If **ldap_server_conf_save()** is not successful, an LDAP error code will be returned. See "LDAP Client API Error Conditions" on page 303 for possible LDAP error code values.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_server_conf_save API.

Related Information

- "ldap_init()—Perform an LDAP Initialization Operation" on page 102 — Perform an LDAP initialization operation.
- "ldap_server_locate()— Locate Suitable LDAP Servers" on page 180 — Locate suitable LDAP servers.

- "ldap_server_free_list()— Free the List of LDAP Servers" — Free the list of LDAP servers.

API introduced: V4R5

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_server_free_list()— Free the List of LDAP Servers

Syntax

```
#include <ldap.h>

int  ldap_server_free_list(
        LDAPServerInfo   *server_info_listp );
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_server_free_list()** API is used to free the linked list of LDAPServerInfo structures (and all associated storage) as returned from the "ldap_server_locate()— Locate Suitable LDAP Servers" on page 180 API.

Authorities and Locks

No OS/400 authority is required.

Parameters

server_info_listp
(Input) The address of a linked list of LDAPServerInfo structures to be freed.

Return Value

LDAP_SUCCESS
if the request was successful.

another LDAP error code
if the request was not successful.

Error Conditions

If **ldap_server_free_list()** is not successful, an error code will be returned. See "LDAP Client API Error Conditions" on page 303 for possible LDAP error code values.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_server_free_list API.

Related Information

- "ldap_server_conf_save()— Store Server Information into Local Configuration" on page 176 — Store server information into local configuration.
- "ldap_server_locate()— Locate Suitable LDAP Servers" on page 180 — Locate suitable LDAP servers.

API introduced: V4R5

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_server_locate()— Locate Suitable LDAP Servers

Syntax

```
#include <ldap.h>

typedef struct LDAP_Server_Request {
    int     search_source;      /* Source for server info     */
#define LDAP_LSI_CONF_DNS  0    /* Config first, then DNS (def)*/
#define LDAP_LSI_CONF_ONLY 1    /* Local Config file only     */
#define LDAP_LSI_DNS_ONLY  2    /* DNS only                   */
    char    *conf_filename;     /* pathname of config file    */
    int     reserved;           /* Reserved, set to zero      */
    char    *service_key;       /* Service string             */
    char    *enetwork_domain;   /* eNetwork domain (eDomain)  */
    char    **name_servers;     /* Array of name server addrs */
    char    **dns_domains;      /* Array of DNS domains       */
    int     connection_type;    /* Connection type            */
#define LDAP_LSI_UDP_TCP 0      /* Use UDP, then TCP (default)*/
#define LDAP_LSI_UDP 1          /* Use UDP only               */
#define LDAP_LSI_TCP 2          /* Use TCP only               */
    int     connection_timeout; /* connect timeout (seconds)  */
    char    *DN_filter;         /* DN suffix filter           */
    unsigned char reserved2[64]; /* reserved fields, set to 0 */
} LDAPServerRequest;


typedef struct LDAP_Server_Info {
    char    *lsi_host;        /* LDAP server's hostname */
    unsigned short lsi_port;  /* LDAP port              */
    char    *lsi_suffix;      /* Server's LDAP suffix   */
    char    *lsi_query_key;   /* service_key[.edomain]*/
    char    *lsi_dns_domain;  /* Publishing DNS domain  */
    int      lsi_replica_type;/* master or replica      */
#define LDAP_LSI_MASTER  1    /* LDAP Master            */
#define LDAP_LSI_REPLICA 2    /* LDAP Replica           */
    int      lsi_sec_type;    /* SSL or non-SSL         */
#define LDAP_LSI_NOSSL   1    /* Non-SSL                */
#define LDAP_LSI_SSL     2    /* Secure Server          */
    unsigned short lsi_priority; /* Server priority     */
    unsigned short lsi_weight; /* load balancing weight */
    char    *lsi_vendor_info;  /* vendor information    */
    char    *lsi_info;        /* LDAP Info string       */
    struct LDAP_Server_Info *prev; /* linked list previous ptr */
    struct LDAP_Server_Info *next; /* linked list next ptr     */
} LDAPServerInfo;


int ldap_server_locate (
       LDAPServerRequest  *server_request,
       LDAPServerInfo    **server_info_listpp );
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_server_locate()** API is used to locate one or more suitable LDAP servers. In general, an application will use the **ldap_server_locate()** API as follows:

- Prior to connecting to an LDAP server in the enterprise, use **ldap_server_locate()** to obtain a list of one or more LDAP servers that have been published in DNS (or in the local configuration file). Typically an

application can simply use the default request settings (by passing a NULL for the LDAPServerRequest parameter). By default, the API will look for server information in the local configuration file first (/QIBM/UserData/OS400/DirSrv/ldap_server_info.conf), then move on to DNS if the local configuration file doesn't exist (or has expired).

- Once the application has obtained the list of servers, it should walk the list, using the first server that meets its needs. This will maximize the advantage that can be derived from using the priority and weighting scheme implemented by the administrator. The application may not want to use the first server in the list for several reasons:
  - The client needs to specifically connect using SSL (or non-SSL). In this case, the server needs to walk the list until it finds a server entry with the appropriate type of security type. Note that an LDAP server may be listening on both an SSL and non-SSL port. In this case, the server will have two entries in the server list.
  - The client specifically needs to connect to a Master (or Replica).
  - The client needs to connect to a server that supports a particular suffix. NOTE that the list of server's returned in the list can be filtered by specifying DN_filter, which filters out servers that do not have a suffix under which the DN resides.
  - There is some other characteristic associated with the desired server (perhaps defined in the ldapinfo string).
- Once the client has selected a server, it then issues the "ldap_init()—Perform an LDAP Initialization Operation" on page 102 or "ldap_ssl_init —Initializes an SSL Connection." on page 206 API. If the selected server is unavailable, the application is free to move down the list of servers until it either finds a suitable server it can connect to, or the list is exhausted.

Authorities and Locks

Object Authorities

The caller must have Execute (*X) authority to each directory in the path name preceding the name of the configuration file (/QIBM/UserData/OS400/DirSrv). The caller must have Read (*R) authority to the configuration file (ldap_server_info.conf).

Parameters

server_request

(Input) Specifies a pointer to an LDAPServerRequest structure. If the default behavior is desired for all possible input parameters, simply set *server_request* to NULL. Otherwise, supply the address of the LDAPServerRequest structure, which contains the following fields:

search_source

Specifies where to find the server information.

The options are:

- First access the local LDAP DNS configuration file. If the file is not found, or the file does not contain information for a combination of the service_key, eDomain and any of the DNS domains (as specified by the application), then access DNS.
- Search the local LDAP DNS configuration file only.
- Search DNS only.

conf_filename

Specifies an alternative configuration filename. Specify NULL to use the default filename and location.

service_key

Specifies the search key (that is, the service name string) to be used when obtaining a list of SRV, "pseudo-SRV TXT" or CNAME alias records from DNS. If not specified, the default is "ldap". Administrators are encouraged to use the ldap default when setting up information in DNS servers, to maximize a client application's ability to find LDAP servers that have been published in DNS.

enetwork_domain

Indicates that LDAP servers belonging to the specified eNetwork domain are to be located. The criteria for searching DNS to locate the appropriate LDAP server(s) is constructed by concatenating the following information:

- search_key (defaults to ldap)
- enetwork_domain
- DNS domain
- ″tcp″

For example, if:

- The default search_key of ldap is used
- The eNetwork domain is sales5
- The client's default DNS domain is midwest.acme.com

Then the DNS ″value″ used to search DNS for the set of LDAP servers belonging to the sales5 domain is ldap.sales5.midwest.acme.com.tcp.
If enetwork_domain is set to zero, the following steps are taken to determine the enetwork_domain:

- The locally configured default, if set, will be used (as set with the
- "ldap_enetwork_domain_set()— Store the User's Default eNetwork Domain Name" on page 61 API).
- If a locally configured default is not set, then a platform-specific value is used. On Windows NT, the user's logon domain is used.
- If a platform-specific eNetwork domain is not defined, then the eNetwork domain component in the DNS ″value″ is omitted. In the above example, this would result in the following string being used: ldap.midwest.acme.com.tcp.

If enetwork_domain is set to a NULL string, then the eNetwork domain component in the DNS ″value″ is omitted. This might be useful for finding a default eNetwork domain (when a specific edomain name is not known).

name_servers

Specifies an array of one or more string representations of DNS name server IP address (in dotted decimal format; for example, ″122.122.33.49″). If not specified, the locally configured DNS name server(s) will be used.

dns_domains

Specifies an array of one or more DNS domain names. If not specified, the local DNS domain configuration is used.

Note that domain names supplied here can take the following forms:

- austin.ibm.com (standard DNS format)
- cn=fred, ou=accounting, dc=austin, dc=ibm, dc=com

With respect to providing a domain name, these are equivalent. Both result in a domain name of ″austin.ibm.com″. This approach makes it easier for an application to locate LDAP servers to which it needs to bind (based on a user name space mapped into the DNS name space).

DNS DOMAINS and CONFIGURATION FILE

The local configuration file may contain server information for combinations of the following:

- Service key (typically set to ldap)
- eNetwork domain
- DNS domains

When the application sets search_source to LDAP_LSI_CONFIG_DNS, the ldap_server_locate() API will attempt to find server information in the configuration file for the designated service key, eNetwork domain and DNS domain(s).

If the configuration file does not contain information that matches this criteria, the locator API will search DNS, using the specified service key, eNetwork domain and DNS domain(s). For example:

- The application supplies the following three DNS domains:
  - austin.ibm.com
  - raleigh.ibm.com
  - miami.ibm.com
- plus, the application uses the default service key (that is, ldap and specifies sales for the eNetwork domain).
- The configuration file contains server information for austin.ibm.com and miami.ibm.com (with the default service key and eNetwork domain of sales).
- The search_source parameter is set to LDAP_LSI_CONFIG_DNS, which indicates that both the configuration file and DNS are to be used if necessary.
- The locator API will build a single ordered list of server entries, with the following:
  - Server entries for the austin.ibm.com DNS domain, as extracted from the configuration file.
  - Server entries for the raleigh.ibm.com DNS domain, as obtained from DNS over the network.
  - Server entries fo rthe miami.ibm.com DNS domain, as extracted from the configuration file.

In other words, the resulting list of servers will contain all the austin.ibm.com servers first, followed by the raleigh.ibm.com servers, followed by the miami.ibm.com servers. Within each grouping of servers (by DNS domain), the entries are sorted by priority and weight.

connection_type
Specifies the type of connection to use when communicating with the DNS name server. The following options are supported:

- Use UDP first. It no response is received, or data truncation occurs, then use TCP.
- Only use UDP.
- Only use TCP.

If set to zero, the default is to use UDP first (then TCP).

UDP is the preferred connection type, and typically performs well. You might want to consider using TCP/IP if:

- The amount of data being returned will not fit in the 512-byte UDP packet.
- The transmission and receipt of UDP packets turns out to be unreliable. This may depend on network characteristics.

connection_timeout
Specifies a timeout value when querying DNS (for both TCP and UDP). If LDAP_LSI_UDP_TCP is specified for connection_type and a response is not received in the specified time period for UDP, TCP will be attempted. A value of zero results in an infinite timeout. When the LDAPServerRequest parameter is set to NULL, the default is ten seconds. When passing the LDAPServerRequest parameter, this parameter should be set to a non-zero value if an indefinite timeout is not desired.

DN_filter
Specifies a Distinguished Name to be used as a filter, for selecting candidate LDAP servers based on the server's suffix (or suffixes). If the most significant portion of the DN is an exact match with a server's suffix (after normalizing for case), an LDAPServerInfo structure is returned for the server/suffix combination. If it doesn't match, an LDAPServerInfo structure is not returned for the server/suffix combination.

reserved2
Represents a reserved area for future function, which should be initialized to zero.

server_info_listpp
(output) Specifies the address that will be set to point to a linked list of LDAPServerInfo structures. Each LDAPServerInfo structure defined in the list contains server information obtained from either:

- DNS
- Local configuration

Upon successful return from **ldap_server_locate()**, *server_info_listpp* points to a linked list of LDAPServerInfo structures. The LDAPServerInfo structure (as defined above), contains the following fields:

lsi_host
Fully-qualified hostname of the target server (NULL-terminated string).

lsi_port
Integer representation of the LDAP server's port.

lsi_suffix
String that specifies a supported suffix for the LDAP server (NULL-terminated string).

lsi_query_key
Specifies the The eNetwork domain to which the LDAP server belongs, prefixed by the service key. For example, if service key is ldap and eNetwork domain is sales, then lsi_query_key would be set to ldap.sales. If the server is not associated with an eNetwork domain (as published in DNS), then lsi_query_key consists solely of the service key value.

lsi_dns_domain
DNS domain in which the LDAP server was published. For example, the DNS search may have been for ldap.sales.tcp.austin.ibm.com, but the resulting server(s) has a fully-qualified DNS host name of ldap2.raleigh.ibm.com. In this example, lsi_host would be set to ldap2.raleigh.ibm.com whilst lsi_dns_domain would be set to austin.ibm.com. The actual domain in which the server was "published" may be of interest, particularly when multiple DNS domains are configured (or supplied as input).

lsi_replica_type
Specifies the type of server, LDAP_LSI_MASTER or LDAP_LSI_REPLICA. If set to zero, the type is unknown.

lsi_sec_type
Specifies the port's security type, LDAP_LSI_NOSSL or LDAP_LSI_SSL. This value is derived from the "ldap" or "ldaps" prefix on the LDAP URL. If the LDAP URL is not defined, the security type is unknown and lsi_sectype is set to zero.

lsi_priority
The priority value obtained from the SRV RR (or the "pseudo-SRV" TXT RR). Set to zero if unknown or not available.

lsi_weight The weight value obtained from the SRV RR (or the ″pseudo-SRV″ TXT RR). Set to zero if unknown or not available.

lsi_vendor_info NULL-terminated string obtained from the ldapvendor TXT RR (if defined). May be used to identify the LDAP server vendor/version information.

lsi_info NULL-terminated information string obtained from the ldapinfo TXT RR (if defined). If not defined, lsi_info is set to NULL. This information string can be used by the LDAP or network administrator to publish additional information about the target LDAP server.

Return Value

LDAP_SUCCESS
if the request was successful.

another LDAP error code
if the request was not successful.

Error Conditions

If **ldap_server_locate()** is not successful, an error code will be returned. See “LDAP Client API Error Conditions” on page 303 for possible LDAP error code values.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_server_locate API.

Related Information

- “ldap_init()—Perform an LDAP Initialization Operation” on page 102 — Perform an LDAP initialization operation.
- “ldap_server_conf_save()— Store Server Information into Local Configuration” on page 176 — Store server information into local configuration.
- “ldap_server_free_list()— Free the List of LDAP Servers” on page 178 — Free the list of LDAP servers.

API introduced: V4R5

Top | “Lightweight Directory Access Protocol (LDAP) APIs,” on page 1 | APIs by category

ldap_set_iconv_local_charset()— Set the Active LDAP Character Set

Syntax

```
#include <ldap.h>

int
ldap_set_iconv_local_charset ( char *charset )
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_set_iconv_local_charset()** API checks if the character set is supported. If supported, the API calls "ldap_set_iconv_local_codepage() — Set the Active LDAP Code Page" on page 187 to set the global variable *ldap_global_codepage* to a corresponding codepage value.

A limited set of the IANA character sets will be supported. Character sets supported include:

Character Set Name	Locale	Codepage
ISO-8859-1	EN_US	819
ISO-8859-2	HU_HU	912
ISO-8859-5	RU_RU	915
ISO-8859-6	AR_AA	1089
ISO-8859-7	EL_GR	813
ISO-8859-8	IW_IL	916
ISO-8859-9	TR_TR	920
IBM437	n/a	437
IBM850	EN_US	850
IBM852	n/a	852
IBM857	n/a	857
IBM862	n/a	862
IBM864	n/a	864
IBM866	n/a	866
IBM869	n/a	869
TIS-620	TH_TH	874
EUC-JP	JA_JP	954
EUC-KR	KO_KR	970
EUC-CN	ZN_CN	1383
EUC-TW	ZH_TW	964
Shift-JIS	JA_JP	932
GBK	ZH_CN	1386
Big5	ZH_TW	950

Authorities and Locks

No OS/400 authority is required.

Parameters

charset (input) specifies character set value.

Return Value

LDAP_SUCCESS
if the request was successful.

Other LDAP error code
if the request was not successful.

Error Conditions

The **ldap_set_iconv_local_charset()** API returns an LDAP error code if not successful. See "LDAP Client API Error Conditions" on page 303 for possible values for LDAP error codes.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_set_iconv_local_charset API.

Related Information

- "ldap_xlate_local_to_utf8()— Convert String From the Local Code Page to UTF-8 Encoding" on page 230 — Convert String From the Local to UTF-8 Code Page.
- "ldap_xlate_utf8_to_local() — Convert String From the UTF-8 Encoding to Local Code Page" on page 234 — Convert String From UTF-8 to Local Code Page.
- "ldap_xlate_local_to_unicode()— Convert String From the Local Code Page to UCS-2 (or UNICODE) Encoding" on page 229 — Convert String From the Local to UCS-2 Code Page.
- "ldap_xlate_unicode_to_local() — Convert String From the UCS-2 (or UNICODE) Encoding to Local Code Page" on page 232 — Convert String From UCS-2 to Local Code Page.
- "ldap_get_iconv_local_codepage()— Get the Active LDAP Code Page" on page 88 — Get the Active LDAP Code Page.
- "ldap_set_iconv_local_codepage() — Set the Active LDAP Code Page" — Set the Active LDAP Code Page.
- "ldap_set_locale() — Change the Locale Used by LDAP" on page 190 — Change the Locale Used by LDAP.
- "ldap_get_locale()— Get Active LDAP Locale" on page 91 — Get the Locale Used by LDAP.

API introduced: V4R5

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_set_iconv_local_codepage() — Set the Active LDAP Code Page

Syntax

```
#include <ldap.h>

int
ldap_set_iconv_local_codepage ( char *codepage )
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_set_iconv_local_codepage()** API is used to set a global variable, *ldap_global_codepage*, to a value passed by *codepage* or to a value associated with a locale if *codepage* is NULL.

NOTE that the word local in the API refers to the value of the global variable *ldap_global_codepage* if it is set or a codepage value associated with the current locale.

Authorities and Locks

No OS/400 authority is required.

Parameters

codepage
(input) specifies local code page value.

Return Value

LDAP_SUCCESS
if the request was successful.

Other LDAP error code
if the request was not successful.

Error Conditions

The **ldap_set_iconv_local_codepage()** API will return an LDAP error code if not successful. See "LDAP Client API Error Conditions" on page 303 for possible values for LDAP error codes.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_set_iconv_local_codepage API.

Related Information

- "ldap_xlate_local_to_utf8()— Convert String From the Local Code Page to UTF-8 Encoding" on page 230 — Convert string from the local to UTF-8 code page.
- "ldap_xlate_utf8_to_local() — Convert String From the UTF-8 Encoding to Local Code Page" on page 234 — Convert string from UTF-8 to local code page.
- "ldap_xlate_local_to_unicode()— Convert String From the Local Code Page to UCS-2 (or UNICODE) Encoding" on page 229 — Convert string from the local to UCS-2 code page.
- "ldap_xlate_unicode_to_local() — Convert String From the UCS-2 (or UNICODE) Encoding to Local Code Page" on page 232 — Convert string From UCS-2 to local code page.
- "ldap_get_iconv_local_codepage()— Get the Active LDAP Code Page" on page 88 — Get the active LDAP code page.
- "ldap_set_iconv_local_charset()— Set the Active LDAP Character Set" on page 185 — Set the active LDAP character set.
- "ldap_set_locale() — Change the Locale Used by LDAP" on page 190 — Change the locale used by LDAP.
- "ldap_get_locale()— Get Active LDAP Locale" on page 91 — Get the locale used by LDAP.

API introduced: V4R5

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_set_lderrno() — Set Error Information

Syntax

```
#include <ldap.h>

int ldap_set_lderrno(
        LDAP        *ld,
        int          error,
        const char  *dn,
        const char  *errmsg )
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_set_lderrno()** function sets an error code and other information about an error in the specified LDAP structure.

Authorities and Locks

No OS/400 authority is required.

Parameters

ld (Input) Specifies the LDAP pointer returned by a previous call to "ldap_init()—Perform an LDAP Initialization Operation" on page 102, "ldap_ssl_init —Initializes an SSL Connection." on page 206, or "ldap_open()—Perform an LDAP Open Operation" on page 133.

error (Input) The LDAP error code to be set in the *ld*.

dn (Input) The distinguished name (DN) that identifies an existing entry. Normally, it is used to indicate how much of the name in the request is recongnized by a server on an **LDAP_NO_SUCH_OBJECT** error. However, in this case since it is an input to this API it should be a DN consistent with the *error* and *errmsg* parameters input on this API.

errmsg (Input) The text of the error message, as if returned from a server.

Return Value

LDAP error code

See "LDAP Client API Error Conditions" on page 303 for possible LDAP error codes values.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_set_lderrno API.

Related Information

- "ldap_err2string()—Retrieve LDAP Error Message String" on page 62 — Convert LDAP error indication to a string.

- "ldap_perror()—Print LDAP Error Information" on page 148 — Print an LDAP error indication to standard error.
- "ldap_get_errno()—Retrieve Error Information" on page 87 — Obtain information from most recent error.
- "ldap_get_lderrno()—Retrieve Error Information" on page 89 — Retrieve Error Information
- "ldap_result2error()—Retrieve LDAP Error Information" on page 158 — Extract LDAP error indication from LDAP result.

API introduced: V5R1

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_set_locale() — Change the Locale Used by LDAP

Syntax

```
#include <ldap.h>

int  ldap_set_locale(
         char           *locale )
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: No

The **ldap_set_locale()** API is used to change the locale used by LDAP for conversions between the local code page and UTF-8 or Unicode. Unless explicitly set with the **ldap_set_locale()** API, LDAP will use the application's default locale. To force the LDAP library to use another locale, specify the appropriate locale string.

Note that the specified locale is applicable to all conversions by the LDAP library within the applications address space. The LDAP locale should be set or changed only when there is no other LDAP activity occuring within the application on other threads.

Authorities and Locks

*R authority is needed to the selected locale file and *X to the associated directories.

Parameters

locale (Input) The locale to be used by LDAP when using conversion apis to convert local text to/from UTF-8 or Unicode. If the locale is not explicitly set, the LDAP library will use the application's default locale. To force the LDAP library to use another locale, specify the appropriate locale string.

You can set the value of *locale* to C, "", LC_C or the IFS pathname of a *LOCALE object. A *locale* value of C indicates the default C environment. A locale value of "" tells **ldap_set_locale()** to use the default locale for the implementation.

Examples:

```
rc = ldap_set_locale(LC_C);

rc = ldap_set_locale("/qsys.lib/en_us.locale");
```

Return Value

LDAP_SUCCESS
if the request was successful.

another LDAP error code
if the request was not successful.

Error Conditions

The **ldap_set_locale()** API will return LDAP error code if not successful. See "LDAP Client API Error Conditions" on page 303 for possible values for LDAP error codes.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_set_locale API.

Related Information

- "ldap_xlate_local_to_utf8()— Convert String From the Local Code Page to UTF-8 Encoding" on page 230 — Convert string from the local to UTF-8 code page.
- "ldap_xlate_utf8_to_local() — Convert String From the UTF-8 Encoding to Local Code Page" on page 234 — Convert string From UTF-8 to local code page.
- "ldap_xlate_local_to_unicode()— Convert String From the Local Code Page to UCS-2 (or UNICODE) Encoding" on page 229 — Convert string from the local to UCS-2 code page.
- "ldap_xlate_unicode_to_local() — Convert String From the UCS-2 (or UNICODE) Encoding to Local Code Page" on page 232 — Convert string from UCS-2 to local code page.
- "ldap_get_iconv_local_codepage()— Get the Active LDAP Code Page" on page 88 — Get the active LDAP code page.
- "ldap_set_iconv_local_codepage() — Set the Active LDAP Code Page" on page 187 — Set the active LDAP code page.
- "ldap_set_iconv_local_charset()— Set the Active LDAP Character Set" on page 185 — Set the active LDAP character set.
- "ldap_get_locale()— Get Active LDAP Locale" on page 91 — Get the locale used by LDAP.

API introduced: V4R5

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_set_option() — Set LDAP Options

Syntax

```
#include <ldap.h>

int ldap_set_option(
                LDAP       *ld,
                int         optionToSet,
                const void *optionValue )
```

Library Name/Service Program: QSYS/QGLDCLNT

Default Public Authority: *USE

Threadsafe: Yes

The **ldap_set_option()** function is used to set options for the specified LDAP connection.

Authorities and Locks

No OS/400 authority is required.

Parameters

ld (Input) An LDAP pointer returned by a previous call to "ldap_init()—Perform an LDAP Initialization Operation" on page 102, "ldap_ssl_init —Initializes an SSL Connection." on page 206, or "ldap_open()—Perform an LDAP Open Operation" on page 133. If a NULL *ld* is passed in, the default option value is set. Later calls to "ldap_init()—Perform an LDAP Initialization Operation" on page 102, "ldap_ssl_init —Initializes an SSL Connection." on page 206, or "ldap_open()—Perform an LDAP Open Operation" on page 133 will use the set value as the default for the option.

optionToSet
(Input) The option value to be set. See below for the list of supported options.

optionValue
(Input) The address of the value. For LDAP V3 client options, *optionValue* is the actual value to be set.

The following session settings can be set using the **ldap_set_option()** API:

LDAP_OPT_SIZELIMIT	Mmaximum number of entries that can be returned on a search operation
LDAP_OPT_TIMELIMIT	Maximum number of seconds to wait for search results
LDAP_OPT_REFHOPLIMIT	Maximum number of referrals in a sequence that the client can follow
LDAP_OPT_DEREF	Rules for following aliases at the server
LDAP_OPT_REFERRALS	Whether referrals should be followed by the client
LDAP_OPT_DEBUG	Client debug options
LDAP_OPT_SSL_CIPHER	SSL ciphers to use
LDAP_OPT_SSL_TIMEOUT	SSL timeout for refreshing session keys
LDAP_OPT_REBIND_FN	Address of application's setrebindproc procedure
LDAP_OPT_PROTOCOL_VERSION	LDAP protocol version to use (V2 or V3)
LDAP_OPT_SERVER_CONTROLS	Default server controls.
LDAP_OPT_CLIENT_CONTROLS	Default client library controls
LDAP_OPT_UTF8_IO	String Data type UTF-8 option

The value returned by "ldap_get_option()—Retrieve LDAP Options" on page 92 when **LDAP_OPT_PROTOCOL_VERSION** is specified can be used to determine how parameters should be passed to the **ldap_set_option()** call. The easiest way to work with this compatibility feature is to guarantee that calls to **ldap_set_option()** are all performed while the **LDAP_OPT_PROTOCOL_VERSION** is set to the same value. If this cannot be guaranteed by the application, then follow the format of the example below when coding the call to **ldap_set_option()**:

```
int sizeLimit=100;

int protocolVersion;

ldap_get_option( ld, LDAP_OPT_PROTOCOL_VERSION, &protocolVersion );

if ( protocolVersion == LDAP_VERSION2 ) {
   ldap_set_option( ld, LDAP_OPT_SIZELIMIT, (void *)sizeLimit );
} else { /* the protocol version is LDAP_VERSION3 */
   ldap_set_option( ld, LDAP_OPT_SIZELIMIT, &sizeLimit );
}
```

Additional details on specific options for **ldap_set_option()** are provided in the following sections.

LDAP_OPT_SIZELIMIT

Specifies the maximum number of entries that can be returned on a search operation. Note: the actual size limit for operations is also bounded by the maximum number of entries that the server is configured to return. Thus, the actual size limit will be the lesser of the value specified on this option and the value configured in the LDAP server. The default sizelimit is unlimited, specified with a value of zero (thus deferring to the sizelimit setting of the LDAP server).

Examples:

```
sizevalue=50;
ldap_set_option( ld, LDAP_OPT_SIZELIMIT, &sizevalue);
ldap_get_option( ld, LDAP_OPT_SIZELIMIT, &sizevalue);
```

LDAP_OPT_TIMELIMIT

Specifies the number of seconds to wait for search results. Note: the actual time limit for operations is also bounded by the maximum time that the server is configured to allow. Thus, the actual time limit will be the lesser of the value specified on this option and the value configured in the LDAP server. The default is unlimited (specified with a value of zero).

Examples:

```
timevalue=50;
ldap_set_option( ld, LDAP_OPT_TIMELIMIT, &timevalue);
ldap_get_option( ld, LDAP_OPT_TIMELIMIT, &timevalue);
```

LDAP_OPT_REFHOPLIMIT

Specifies the maximum number of hops that the client library will take when chasing referrals. The default is 5.

Examples:

```
hoplimit=7;
ldap_set_option( ld, LDAP_OPT_REFHOPLIMIT, &hoplimit);
ldap_get_option( ld, LDAP_OPT_REFHOPLIMIT, &hoplimit);
```

LDAP_OPT_DEREF

Specifies alternative rules for following aliases at the server. The default is LDAP_DEREF_NEVER.

Supported values:

0	LDAP_DEREF_NEVER
1	LDAP_DEREF_SEARCHING
2	LDAP_DEREF_FINDING
3	LDAP_DEREF_ALWAYS

Examples:

```
int deref = LDAP_DEREF_NEVER;
ldap_set_option( ld, LDAP_OPT_DEREF,&deref);
ldap_get_option( ld, LDAP_OPT_DEREF, &deref);
```

LDAP_OPT_REFERRALS

Specifies whether the LDAP library will automatically follow referrals returned by LDAP servers or not. It can be set to one of the constants **LDAP_OPT_ON** or **LDAP_OPT_OFF**. By default, the LDAP client will follow referrals.

Examples:

```
int value;
ldap_set_option( ld, LDAP_OPT_REFFERALS, (void *)LDAP_OPT_ON);
ldap_get_option( ld, LDAP_OPT_REFFERALS, &value);
```

LDAP_OPT_DEBUG

Specifies a bit-map that indicates the level of debug trace for the LDAP library.

Supported values:

/* Debug levels */	
LDAP_DEBUG_OFF	0x000
LDAP_DEBUG_TRACE	0x001
LDAP_DEBUG_PACKETS	0x002
LDAP_DEBUG_ARGS	0x004
LDAP_DEBUG_CONNS	0x008
LDAP_DEBUG_BER	0x010
LDAP_DEBUG_FILTER	0x020
LDAP_DEBUG_CONFIG	0x040
LDAP_DEBUG_ACL	0x080
LDAP_DEBUG_STATS	0x100
LDAP_DEBUG_STATS2	0x200
LDAP_DEBUG_SHELL	0x400
LDAP_DEBUG_PARSE	0x800
LDAP_DEBUG_ANY	0xffff

Examples:

```
int value;
int debugvalue= LDAP_DEBUG_TRACE | LDAP_DEBUG_PACKETS;
ldap_set_option( ld, LDAP_OPT_DEBUG, &debugvalue);
ldap_get_option( ld, LDAP_OPT_DEBUG, &value );
```

An alternative way to set the debug level is to set the LDAP_DEBUG environment variable in the job that the client application will run in. The environment variable is set to the same numerical value that the

value variable would be set to if **ldap_set_option()** was used. An example of enabling client trace for an application using the LDAP_DEBUG environment variable:

```
ADDENVVAR ENVVAR(LDAP_DEBUG) VALUE(0X0003)
```

After the client application has run, use

```
DMPUSRTRC jobnumber-of-the-client-job
```

Then, to display the trace information interactively, use

```
DSPPFM QAP0ZDMP QP0Znnnnnn -- where nnnnnn is the job number.
```

LDAP_OPT_SSL_CIPHER

Specifies a set of one or more ciphers to be used when negotiating the cipher algorithm with the LDAP server. The first cipher in the list that is common with the list of ciphers supported by the server is chosen. For the export version of the library, the value used is "0306". For the domestic version of the library, the default value is "05040A090306". Note that the cipher string supported by the export version of the LDAP client library is fixed and cannot be modified.

Supported ciphers:

LDAP_SSL_RC4_MD5_EX	03
LDAP_SSL_RC2_MD5_EX	05 (Non-export only)
LDAP_SSL_RC4_SHA_US	04 (Non-export only)
LDAP_SSL_RC4_MD5_US	06
LDAP_SSL_DES_SHA_US	09 (Non-export only)
LDAP_SSL_3DES_SHA_US	0A (Non-export only)
LDAP_SSL_AES_SHA_US	2F (Non-export only)

Examples:

```
char *setcipher = "2F090A";
char *getcipher;
ldap_set_option( ld, LDAP_OPT_SSL_CIPHER, setcipher);
ldap_get_option( ld, LDAP_OPT_SSL_CIPHER, &getcipher );
```

LDAP_OPT_SSL_TIMEOUT

Specifies in seconds the SSL inactivity timer. After the specified seconds, in which no SSL activity has occurred, the SSL connection will be refreshed with new session keys. A smaller value may help increase security, but will have a small impact on performance. The default SSL timeout value is 43200 seconds.

Examples:

```
value = 100;
ldap_set_option( ld, LDAP_OPT_SSL_TIMEOUT, &value );
ldap_get_option( ld, LDAP_OPT_SSL_TIMEOUT, &value );
```

LDAP_OPT_REBIND_FN

Specifies the address of a routine to be called by the LDAP library when the need arises to authenticate a connection with another LDAP server. This can occur, for example, when the LDAP library is chasing a referral. If a routine is not defined, referrals will always be chased using the anonymous identity. A default routine is not defined.

Examples:

```
extern LDAPRebindProc proc_address;
LDAPRebindProc value;
ldap_set_option( ld, LDAP_OPT_REBIND_FN, &proc_address);
ldap_get_option( ld, LDAP_OPT_REBIND_FN, &value);
```

LDAP_OPT_PROTOCOL_VERSION

Specifies the LDAP protocol to be used by the LDAP client library when connecting to an LDAP server. Also used to determine which LDAP protocol is being used for the connection. For an application that uses "ldap_init()—Perform an LDAP Initialization Operation" on page 102 to create the LDAP connection the default value of this option will be LDAP_VERSION3 for communicating with the LDAP server. The default value of this option will be LDAP_VERSION2 if the application uses the deprecated "ldap_open()—Perform an LDAP Open Operation" on page 133 API. In either case, the **LDAP_OPT_PROTOCOL_VERSION** option can be used with **ldap_set_option()** to change the default. The LDAP protocol version should be reset prior to issuing the bind (or any operation that causes an implicit bind).

Examples:

```
version2 = LDAP_VERSION2;
version3 = LDAP_VERSION3;
/* Example for Version 3 application setting version to version 2 */
ldap_set_option( ld, LDAP_OPT_PROTOCOL_VERSION, &version2);
/* Example of Version 2 application setting version to version 3 */
ldap_set_option( ld, LDAP_OPT_PROTOCOL_VERSION, &version3);
ldap_get_option( ld, LDAP_OPT_PROTOCOL_VERSION, &value);
```

LDAP_OPT_SERVER_CONTROLS

Specifies a default list of server controls to be sent with each request. The default list can be overridden by specifying a server control, or list of server controls, on specific APIs. By default, no server controls will be sent.

Example:

```
ldap_set_option( ld, LDAP_OPT_SERVER_CONTROLS, &ctrlp);
```

LDAP_OPT_CLIENT_CONTROLS

Specifies a default list of client controls to be processed by the client library with each request. Since client controls are not defined for this version of the library, the **ldap_set_option()** API can be used to define a set of default, non-critical client controls. If one or more client controls in the set is critical, the entire list is rejected with a return code of **LDAP_UNAVAILABLE_CRITICAL_EXTENSION**.

LDAP_OPT_UTF8_IO

Specifies whether the LDAP library will automatically convert string data to and from the local code page. It can be set to one of the constants **LDAP_UTF8_XLATE_ON** or **LDAP_UTF8_XLATE_OFF**. By default, the LDAP library will convert string data.

When conversion is disabled, the LDAP library assumes that data received from the application by LDAP APIs is already represented in UTF-8. Similarly, the LDAP library assumes that the application is prepared to receive string data from the LDAP library represented in UTF-8 (or as binary).

When **LDAP_UTF8_XLATE_ON** is set (the default), the LDAP library assumes that string data received from the application by LDAP APIs is in the default (or explicitly designated) code page. Similarly, all string data returned from the LDAP library (back to the application) is converted to the designated local code page.

It is important to note that only string data supplied on connection-based APIs will be translated (that is, only those APIs that include an **ld** will be subject to translation). For example, string values passed in to "ldap_search()—Perform an LDAP Search Operation" on page 164 will be converted, but string values passed in to "ldap_init()—Perform an LDAP Initialization Operation" on page 102 will not.

It is also important to note that translation of strings from a UTF-8 encoding to local code page may result in loss of data when one or more characters in the UTF-8 encoding cannot be represented in the local code page. When this occurs, a substitution character replaces any UTF-8 characters that cannot be converted to the local code page.

For more information on explicitly setting the locale for conversions, see "ldap_set_locale() — Change the Locale Used by LDAP" on page 190.

Examples:

```
int value;
ldap_set_option( ld, LDAP_OPT_UTF8_IO, (void *)LDAP_UTF8_XLATE_ON);
ldap_get_option( ld, LDAP_OPT_UTF8_IO, &value);
```

Return Value

LDAP_SUCCESS
if the request was successful.

another LDAP error code
if the request was not successful.

Error Conditions

The **ldap_set_option()** function will return an LDAP error code if not successful. See "LDAP Client API Error Conditions" on page 303 for possible LDAP error codes values.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_set_option API.

Related Information

- "ldap_get_option()—Retrieve LDAP Options" on page 92 — Retrieve an option associated with an LDAP descriptor.
- "ldap_init()—Perform an LDAP Initialization Operation" on page 102 — Initializes a session with an LDAP server.
- "ldap_open()—Perform an LDAP Open Operation" on page 133 — Open a connection to an LDAP server (deprecated).
- "ldap_set_rebind_proc()—Set Rebind Procedure" on page 198 — Set rebind procedure
- "ldap_version — Obtain LDAP Version and SSL Cipher Information" on page 227 — Obtain LDAP version and SSL cipher information.

API introduced: V4R5

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_set_rebind_proc()—Set Rebind Procedure

Syntax

```
#include <ldap.h>

void ldap_set_rebind_proc(
                LDAP           *ld,
                LDAPRebindProc  rebindproc )
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_set_rebind_proc()** function is used to set the entry-point of a routine that will be called back to obtain bind credentials for use when a new server is contacted during the following of an LDAP referral. Note that this function is only useful when the **LDAP_OPT_REFERRALS** option is set (this is the default). If **ldap_set_rebind_proc()** is never called, or if it is called with a NULL *rebindproc* parameter, an unauthenticated simple LDAP bind will always be done when chasing referrals.

rebindproc should be a function that is declared like this:

```
int rebindproc( LDAP *ld, char **whop, char **credp,
    int *methodp, int freeit );
```

The LDAP library will first call the rebindproc to obtain the referral bind credentials, and the *freeit* parameter will be zero. The function must set *whop*, *credp*, and *methodp* as appropriate. If the rebindproc returns **LDAP_SUCCESS**, referral processing continues, and the rebindproc will be called a second time with *freeit* non-zero to give your application a chance to free any memory allocated in the previous call.

If anything but **LDAP_SUCCESS** is returned by the first call to the rebindproc, referral processing is stopped and that error code is returned for the original LDAP operation.

Authorities and Locks

No OS/400 authority is required.

Parameters

ld (Input) Specifies the LDAP pointer returned by a previous call to "ldap_init()—Perform an LDAP Initialization Operation" on page 102, "ldap_ssl_init —Initializes an SSL Connection." on page 206, or "ldap_open()—Perform an LDAP Open Operation" on page 133.

rebindproc
(Input) Specifies the entry-point of a routine that will be called to obtain bind credentials used when a new server is contacted during the following of an LDAP referral.

Return Value

None

Error Conditions

The **ldap_set_rebind_proc()** API does not return an error code.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_set_rebind_proc API.

Related Information

- "ldap_bind()—Perform an LDAP Bind Request" on page 24 — Asynchronously bind to the directory (deprecated).
- "ldap_bind_s()—Perform an LDAP Bind Request (Synchronous)" on page 26 — Synchronously bind to the directory (deprecated).
- "ldap_sasl_bind()—Perform an LDAP SASL Bind Request" on page 159 — Asynchronously bind to the directory using SASL.
- "ldap_sasl_bind_s()—Perform an LDAP SASL Bind Request (Synchronous)" on page 161 — Synchronously bind to the directory using SASL.
- "ldap_simple_bind()—Perform a Simple LDAP Bind Request" — Asynchronously bind to the directory using simple authentication.
- "ldap_simple_bind_s()—Perform a Simple LDAP Bind Request (Synchronous)" on page 201 — Synchronously bind to the directory using simple authentication.
- "ldap_unbind()—Perform an LDAP Unbind Request" on page 211 — Asynchronously unbind from the LDAP server and close the connection.
- "ldap_unbind_s()—Perform an LDAP Unbind Request (Synchronous)" on page 214 — Synchronously unbind from the LDAP server and close the connection.

API introduced: V4R3

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_simple_bind()—Perform a Simple LDAP Bind Request

Syntax

```
#include <ldap.h>

int ldap_simple_bind(
                LDAP       *ld,
                const char *dn,
                const char *passwd )
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_simple_bind()** function is used to authenticate a distinguished name (DN) to a directory server.

For LDAP V2 servers, after a connection is made to an LDAP server by using the "ldap_open()—Perform an LDAP Open Operation" on page 133, "ldap_init()—Perform an LDAP Initialization Operation" on page 102

page 102, or “ldap_ssl_init —Initializes an SSL Connection.” on page 206 APIs, an LDAP bind API must be called before any other LDAP APIs can be called for that connection. For LDAP V3 servers, the bind is optional.

ldap_simple_bind() is an asynchronous request. The result of the operation can be obtained by a subsequent call to “ldap_result()—Retrieve Result of an Asynchronous LDAP Operation” on page 156.

Authorities and Locks

No OS/400 authority is required. All authority checking is done by the LDAP server.

Parameters

ld (Input) Specifies the LDAP pointer returned by a previous call to “ldap_init()—Perform an LDAP Initialization Operation” on page 102, “ldap_ssl_init —Initializes an SSL Connection.” on page 206, or “ldap_open()—Perform an LDAP Open Operation” on page 133.

dn (Input) Specifies the Distinguished Name of the entry to bind as.

passwd (Input) Specifies the password used in association with DN of the entry in which to bind.

Return Value

Message ID of the Operation Initiated
if the request was successful. A subsequent call to “ldap_result()—Retrieve Result of an Asynchronous LDAP Operation” on page 156, can be used to obtain the result.

-1 if the request was not successful, setting the session error parameters in the LDAP structure appropriately, which can be obtained by using “ldap_get_lderrno()—Retrieve Error Information” on page 89.

Error Conditions

If **ldap_simple_bind()** is not successful, -1 will be returned setting the session error (*ld_errno*) parameters in the LDAP structure appropriately. See “LDAP Client API Error Conditions” on page 303 for possible LDAP error code values. Use “ldap_get_lderrno()—Retrieve Error Information” on page 89 to obtain the error code *ld_errno*.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_simple_bind API.

Related Information

- “ldap_bind()—Perform an LDAP Bind Request” on page 24 — Asynchronously bind to the directory (deprecated).
- “ldap_bind_s()—Perform an LDAP Bind Request (Synchronous)” on page 26 — Synchronously bind to the directory (deprecated).
- “ldap_sasl_bind()—Perform an LDAP SASL Bind Request” on page 159 — Asynchronously bind to the directory using SASL.
- “ldap_sasl_bind_s()—Perform an LDAP SASL Bind Request (Synchronous)” on page 161 — Synchronously bind to the directory using SASL.
- “ldap_simple_bind_s()—Perform a Simple LDAP Bind Request (Synchronous)” on page 201 — Synchronously bind to the directory using simple authentication.

- "ldap_unbind()—Perform an LDAP Unbind Request" on page 211 — Asynchronously unbind from the LDAP server and close the connection.
- "ldap_unbind_s()—Perform an LDAP Unbind Request (Synchronous)" on page 214 — Synchronously unbind from the LDAP server and close the connection.
- "ldap_set_rebind_proc()—Set Rebind Procedure" on page 198 — Sets the entry-point of a routine during the chasing of referrals.

API introduced: V4R3

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

---

ldap_simple_bind_s()—Perform a Simple LDAP Bind Request (Synchronous)

Syntax

```
#include <ldap.h>

int ldap_simple_bind_s(
  LDAP   *ld,
                const char *dn,
                const char *passwd)
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_simple_bind_s()** function is used to authenticate a distinguished name (DN) to a directory server.

For LDAP V2 servers, after a connection is made to an LDAP server by using the "ldap_open()—Perform an LDAP Open Operation" on page 133, "ldap_init()—Perform an LDAP Initialization Operation" on page 102, or "ldap_ssl_init —Initializes an SSL Connection." on page 206 APIs, an LDAP bind API must be called before any other LDAP APIs can be called for that connection. For LDAP V3 servers, the bind is optional.

ldap_simple_bind_s() performs a synchronous request.

Authorities and Locks

No OS/400 authority is required. All authority checking is done by the LDAP server.

Parameters

ld (Input) Specifies the LDAP pointer returned by a previous call to "ldap_init()—Perform an LDAP Initialization Operation" on page 102, "ldap_ssl_init —Initializes an SSL Connection." on page 206, or "ldap_open()—Perform an LDAP Open Operation" on page 133.

dn (Input) Specifies the Distinguished Name of the entry to bind as.

passwd (Input) Specifies the password used in association with DN of the entry in which to bind.

Return Value

LDAP_SUCCESS
if the request was successful.

another LDAP error
if the request was not successful.

Error Conditions

If **ldap_simple_bind_s()** is not successful, it returns an LDAP error code. See "LDAP Client API Error Conditions" on page 303 for possible LDAP error code values.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_simple_bind_s API.

Related Information

- "ldap_bind()—Perform an LDAP Bind Request" on page 24 — Asynchronously bind to the directory (deprecated).
- "ldap_bind_s()—Perform an LDAP Bind Request (Synchronous)" on page 26 — Synchronously bind to the directory (deprecated).
- "ldap_sasl_bind()—Perform an LDAP SASL Bind Request" on page 159 — Asynchronously bind to the directory using SASL.
- "ldap_sasl_bind_s()—Perform an LDAP SASL Bind Request (Synchronous)" on page 161 — Synchronously bind to the directory using SASL.
- "ldap_simple_bind()—Perform a Simple LDAP Bind Request" on page 199 — Asynchronously bind to the directory using simple authentication.
- "ldap_unbind()—Perform an LDAP Unbind Request" on page 211 — Asynchronously unbind from the LDAP server and close the connection.
- "ldap_unbind_s()—Perform an LDAP Unbind Request (Synchronous)" on page 214 — Synchronously unbind from the LDAP server and close the connection.
- "ldap_set_rebind_proc()—Set Rebind Procedure" on page 198 — Sets the entry-point of a routine during the chasing of referrals.

API introduced: V4R3

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_ssl_client_init —Initializes the SSL Library.

Syntax

```
#include <ldap.h>
#include <ldapssl.h>

int ldap_ssl_client_init(
       char       *keyring,
       char       *keyring_pw,
       int         ssl_timeout,
       int        *pSSLReasonCode)
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_ssl_client_init()** routine is used to initialize the SSL protocol stack for an application process. It should be called once, prior to making any other LDAP calls. Once **ldap_ssl_client_init()** has been successfully called, any subsequent invocations will return a return code of **LDAP_SSL_ALREADY_INITIALIZED**.

A related API, "ldap_app_ssl_client_init_np()—Initialize the LDAP Client for a Secure Connection using DCM" on page 16 is available for using Digital Certificate Manager (DCM) Application IDs when authenticating the client to the server. Either **ldap_ssl_client_init()** or **ldap_app_ssl_client_init_np()** (but not both) can be called in an application process.

Although still supported, the use of the "ldap_ssl_start()—Start a Secure LDAP Connection" on page 209 API is now deprecated. The **ldap_ssl_client_init()** and "ldap_ssl_init —Initializes an SSL Connection." on page 206 or "ldap_app_ssl_client_init_np()—Initialize the LDAP Client for a Secure Connection using DCM" on page 16 and "ldap_app_ssl_init_np —Initializes an SSL Connection" on page 19 APIs should be used instead.

Authorities and Locks

Read, *R, authority is needed to the selected Certificate Store and Execute, *X, to the associated directories.

Parameters

keyring

(Input) Specifies the name of a key database file (with ″kdb″ extension). The key database file typically contains one or more certificates of certification authorities (CAs) that are trusted by the client. These types of X.509 certificates are also known as trusted roots. A key database can also be used to store the client's private key(s) and associated client certificate(s). A private key and associated client certificate are required only if the LDAP server is configured to require client and server authentication. If the LDAP server is configured to provide only server authentication, a private key and client certificate are not required.

A fully-qualified path and filename is recommended. If a filename without a fully-qualified path is specified, the LDAP library will look in the current directory for the file. The key database file specified here must have been created using the Digital Certificate Manager (DCM). If a key database is not supplied, *keyring* is null, the *SYSTEM Certificate Store is used.

keyring_pw
(Input) Specifies the password that is used to protect the contents of the key database. This password is important since it protects the private key stored in the key database. The password was specified when the key database was initially created. A NULL pointer to the password is accepted.

ssl_timeout
(Input) Specifies the SSL timeout value in seconds. The timeout value controls the frequency with which the SSL protocol stack regenerates session keys. If *ssl_timeout* is set to 0, the default value **SSLV3_CLIENT_TIMEOUT** will be used. Otherwise, the value supplied will be used, provided it is less than or equal to 86,400. If *ssl_timeout* is greater than 86,400, **LDAP_PARAM_ERROR** is returned.

pSSLReasonCode
(Input) Specifies a pointer to the SSL Reason Code, which provides additional information in the event that an error occurs during initialization of the SSL stack (when **ldap_ssl_client_init()** is called). See QSYSINC/H.LDAPSSL for reason codes that can be returned.

Example

See Code disclaimer information for information pertaining to code examples.

The following scenario depicts the recommended calling sequence where the entire set of LDAP transactions are ″protected″ by using a secure SSL connection, including the dn and password that flow on the “ldap_simple_bind()—Perform a Simple LDAP Bind Request” on page 199:

```
rc = ldap_ssl_client_init(keyfile, keyfile_pw, timeout, &sslrc);
ld = ldap_ssl_init(ldaphost, ldapport, label );
rc = ldap_set_option( ld, LDAP_OPT_SSL_CIPHER, &ciphers);
rc = ldap_simple_bind_s(ld, binddn, passwd);

...additional LDAP API calls

rc = ldap_unbind( ld );
```

The following scenario depicts using the SASL EXTERNAL mechanism for authenticating the client to the server using the credentials in the SSL certificate:

```
rc = ldap_ssl_client_init(keyfile, keyfile_pw, timeout, &sslrc);
ld = ldap_ssl_init(ldaphost, ldapport, label );
rc = ldap_set_option( ld, LDAP_OPT_SSL_CIPHER, &ciphers);
rc = ldap_sasl_bind_s( ld, NULL, LDAP_MECHANISM_EXTERNAL, NULL, NULL, NULL );

...additional LDAP API calls

rc = ldap_unbind( ld );
```

Note that the sequence of calls for the deprecated APIs is **ldap_open/init()**, **ldap_ssl_start()**, followed by **ldap_bind()**.

The following ciphers are attempted for the SSL handshake by default, in the order shown.

```
(Export Version)

  RC4_MD5_EXPORT
  RC2_MD5_EXPORT

(Non-export Version)

  RC4_SHA_US
  RC4_MD5_US
```

```
DES_SHA_US
3DES_SHA_US
RC4_MD5_EXPORT
RC2_MD5_EXPORT
```

See "ldap_get_option()—Retrieve LDAP Options" on page 92/"ldap_set_option() — Set LDAP Options" on page 192 for more information on setting the ciphers to be used.

The **ldap_ssl_client_init()** API includes RSA software. RSA is a trademark of RSA Data Security, Inc.

Return Value

LDAP_SUCCESS
if the request was successful.

another LDAP error
if the request was not successful.

Error Conditions

If **ldap_ssl_client_init()** is not successful, it returns an LDAP error code. See "LDAP Client API Error Conditions" on page 303 for possible values for the error codes.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_ssl_client_init API.

Related Information

- "ldap_app_ssl_client_init_np()—Initialize the LDAP Client for a Secure Connection using DCM" on page 16 — Initialize the LDAP Client for a secure connection using DCM.
- "ldap_ssl_init —Initializes an SSL Connection." on page 206 — Initializes an SSL connection.
- "ldap_ssl_start()—Start a Secure LDAP Connection" on page 209 — Creates a secure SSL connection (deprecated).

API introduced: V4R5

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_ssl_init —Initializes an SSL Connection.

Syntax

```
#include <ldap.h>
#include <ldapssl.h>

LDAP *ldap_ssl_init(
       char       *host,
       int        port,
       char       *name)
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_ssl_init()** routine is used to initialize a secure SSL session with a server. The server is not actually contacted until an operation is performed that requires it, allowing various options to be set after initialization. Once the secure connection is established for the *ld*, all subsequent LDAP messages that flow over the secure connection are encrypted, including the “ldap_simple_bind()—Perform a Simple LDAP Bind Request” on page 199 parameters, until “ldap_unbind()—Perform an LDAP Unbind Request” on page 211 is called.

Although still supported, the use of the “ldap_ssl_start()—Start a Secure LDAP Connection” on page 209 API is now deprecated. The “ldap_ssl_client_init —Initializes the SSL Library.” on page 203 and **ldap_ssl_init()** or “ldap_app_ssl_client_init_np()—Initialize the LDAP Client for a Secure Connection using DCM” on page 16 and “ldap_app_ssl_init_np —Initializes an SSL Connection” on page 19 APIs should be used instead.

Authorities and Locks

Read, *R, authority is needed to the selected Certificate Store and Execute, *X, to the associated directories.

Parameters

host

(Input) Several methods are supported for specifying one or more target LDAP servers, including the following:

Explicit Host List
Specifies the name of the host on which the LDAP server is running. The host parameter may contain a blank-separated list of hosts to try to connect to, and each host may optionally be of the form host:port. If present, the :port overrides the port parameter. The following are typical examples:

```
ld=ldap_ssl_init ("server1", ldaps_port, cert_label);
ld=ldap_ssl_init ("server2:1200", ldaps_port, cert_label);
ld=ldap_ssl_init ("server1:800 server2:2000 server3", ldaps_port, cert_label);
```

Localhost
If the host parameter is null, the LDAP server will be assumed to be running on the local host.

Default Hosts

If the host parameter is set to "ldaps://" the LDAP library will attempt to locate one or more default LDAP servers, with SSL ports, using the SecureWay "ldap_server_locate()—Locate Suitable LDAP Servers" on page 180 function. The port specified on the call is ignored, since ldap_server_locate() returns the port. For example, the following two are equivalent:

```
ld=ldap_ssl_init ("ldaps://", ldaps_port, cert_label);
ld=ldap_ssl_init (LDAPS_URL_PREFIX, LDAPS_PORT, cert_label);
```

If more than one default server is located, the list is processed in sequence, until an active server is found.

The LDAP URL can include a Distinguished Name, used as a filter for selecting candidate LDAP servers based on the server's suffix (or suffixes). If the most significant portion of the DN is an exact match with a server's suffix (after normalizing for case), the server is added to the list of candidate servers. For example, the following will only return default LDAP servers that have a suffix that supports the specified DN:

```
ld=ldap_ssl_init ("ldaps:///cn=fred, dc=austin, dc=ibm, dc=com", LDAPS_PORT, cert_label);
```

In this case, a server that has a suffix of "dc=austin, dc=ibm, dc=com" would match. If more than one default server is located, the list is processed in sequence, until an active server is found.

If the LDAP URL contains a host name and optional port, the host is used to create the connection. No attempt is made to locate the default server(s), and the DN, if present, is ignored. For example, the following two are equivalent:

```
ld=ldap_ssl_init ("ldaps://myserver", LDAPS_PORT, cert_label);
ld=ldap_ssl_init ("myserver", LDAPS_PORT, cert_label);
```

Local Socket

If the host parameter is prefixed with "/", the host parameter is assumed to be the name of a UNIX socket (that is, socket family is AF_UNIX) and port is ignored. This will fail for ldap_ssl_init() because UNIX sockets do not support SSL, nor is it necessary since data will not be flowing over the network.

Host with Privileged Port

If a specified host is prefixed with "privport://", then the LDAP library will use the rresvport() function to attempt to obtain one of the reserved ports (512 through 1023), instead of an "ephemeral" port. The search for a reserved port starts at 1023 and stops at 512. If a reserved port cannot be obtained, the function call will fail. For example:

```
ld=ldap_ssl_init ("privport://server1, ldaps_port, cert_label");
ld=ldap_ssl_init ("privport://server2:1200", ldaps_port, cert_label);
ld=ldap_ssl_init ("privport://server1:800 server2:2000 privport://server3",
                                                    ldaps_port, cert_label);
```

port (Input) The port number to which to connect. If the default IANA-assigned SSL port of 636 is desired, LDAPS_PORT should be specified.

name (Input) The name, or label, associated with the client private key/certificate pair in the key database. It is used to uniquely identify a private key/certificate pair, as stored in the key database, and may be something like: Digital ID for Fred Smith.

If the LDAP server is configured to perform Server Authentication, a client certificate is not required (and name can be set to null). If the LDAP server is configured to perform Client and Server Authentication, a client certificate is required. *name* can be set to null if a default certificate/private key pair has been designated as the default (using Using Ikmgui). Similarly, *name* can be set to null if there is a single certificate/private key pair in the designated key database.

Example

See Code disclaimer information for information pertaining to code examples.

The following scenario depicts the recommended calling sequence where the entire set of LDAP transactions are "protected" by using a secure SSL connection, including the dn and password that flow on the **ldap_simple_bind()**:

```
rc = ldap_ssl_client_init (keyfile, keyfile_pw, timeout, reasoncode);
ld = ldap_ssl_init(ldaphost, ldapport, label );
rc = ldap_set_option( ld, LDAP_OPT_SSL_CIPHER, &ciphers);
rc = ldap_simple_bind_s(ld, binddn, passwd);

...additional LDAP API calls

rc = ldap_unbind( ld );
```

The sequence of calls for the deprecated APIs is **ldap_open/init()**, **ldap_ssl_start()**, followed by **ldap_bind()**.

See "ldap_get_option()—Retrieve LDAP Options" on page 92 or "ldap_set_option() — Set LDAP Options" on page 192 for more information on setting the ciphers to be used.

Return Value

Session Handle
: if the request was successful. If successful, the Session Handle returned by **ldap_ssl_init()** is a pointer to an opaque data type representing an LDAP session. The "ldap_get_option()—Retrieve LDAP Options" on page 92 and "ldap_set_option() — Set LDAP Options" on page 192 APIs are used to access and set a variety of session-wide parameters. See "ldap_get_option()—Retrieve LDAP Options" on page 92 and "ldap_set_option() — Set LDAP Options" on page 192 for more information.

NULL if the request was not successful.

Error Conditions

ldap_ssl_init() will return NULL if not successful.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_ssl_init API.

Related Information

- "ldap_init()—Perform an LDAP Initialization Operation" on page 102 — Perform an LDAP initialization operation.
- "ldap_ssl_client_init —Initializes the SSL Library." on page 203 — Initializes the SSL library.
- "ldap_app_ssl_init_np —Initializes an SSL Connection" on page 19 — Initializes an SSL Connection.
- "ldap_ssl_start()—Start a Secure LDAP Connection" on page 209 — Creates a secure SSL connection (deprecated).

API introduced: V4R5

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_ssl_start()—Start a Secure LDAP Connection

Syntax

```
#include <ldap.h>
#include <ldapssl.h>

int ldap_ssl_start(
                LDAP  *ld,
                char  *keyring,
                char  *keyring_pw,
                char  *name )
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_ssl_start()** function is used to start a secure connection (using Secure Sockets Layer (SSL)) to an LDAP server. **ldap_ssl_start()** accepts the *ld* from an "ldap_open()—Perform an LDAP Open Operation" on page 133 and performs an SSL handshake to a server. **ldap_ssl_start()** must be called after **ldap_open()** and prior to **ldap_bind()**. Once the secure connection is established for the *ld*, all subsequent LDAP messages that flow over the secure connection are encrypted, including the **ldap_bind()** parameters, until "ldap_unbind()—Perform an LDAP Unbind Request" on page 211 is called.

Although still supported, the use of the "ldap_ssl_start()—Start a Secure LDAP Connection" API is now deprecated. The "ldap_ssl_client_init —Initializes the SSL Library." on page 203 and "ldap_ssl_init —Initializes an SSL Connection." on page 206 or "ldap_app_ssl_client_init_np()—Initialize the LDAP Client for a Secure Connection using DCM" on page 16 and "ldap_app_ssl_init_np —Initializes an SSL Connection" on page 19 APIs should be used instead.

Authorities and Locks

Read, *R, authority is needed to the selected Certificate Store and Execute, *X, to the associated directories.

Parameters

ld (Input) Specifies the LDAP pointer returned by a previous call to "ldap_init()—Perform an LDAP Initialization Operation" on page 102, "ldap_ssl_init —Initializes an SSL Connection." on page 206, or "ldap_open()—Perform an LDAP Open Operation" on page 133.

keyring

(Input) Specifies the name of a key database file (with ″kdb″ extension). The key database file typically contains one or more certificates of certification authorities (CAs) that are trusted by the client. These types of X.509 certificates are also known as trusted roots. A key database can also be used to store the client's private key(s) and associated client certificate(s). A private key and associated client certificate are required only if the LDAP server is configured to require client and server authentication. If the LDAP server is configured to provide only server authentication, a private key and client certificate are not required.

Note: Although still supported, use of the **ldap_ssl_start()** is discouraged (its use has been deprecated). Any application using the **ldap_ssl_start()** API should only use a single key database (per application process).

A fully-qualified path and filename is recommended. If a filename without a fully-qualified path is specified, the LDAP library will look in the current directory for the file. The key database file

specified here must have been created using Digital Certificate Manager, DCM. If a key database is not supplied, the default roots are used for trusted Certification Authorities (CAs).

keyring_pw
(Input) Specifies the password that is used to protect the contents of the key database. This password is important since it protects the private key stored in the key database. The password was specified when the key database was initially created. A NULL pointer is accepted.

name (Input) Specifies the name, or label, associated with the client private key/certificate pair in the key database. It is used to uniquely identify a private key/certificate pair, as stored in the key database.

If the LDAP server is configured to perform Server Authentication, a client certificate is not required (and *name* can be set to null). If the LDAP server is configured to perform Client and Server Authentication, a client certificate is required. *name* can be set to null if a default certificate/private key pair has been designated as the default (using Using DCM). Similarly, name can be set to *null* if there is a single certificate/private key pair in the designated key database.

Return Value

Skit error code
if the request was successful.

-1 if *ld* is not set (NULL).

Error Conditions

If *ld* is not NULL, **ldap_ssl_start()** returns Skit error code, otherwise it returns -1. See gskssl.h for possible values of skit error codes.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_ssl_start API.

Related Information

- "ldap_ssl_init —Initializes an SSL Connection." on page 206 — Initializes an SSL connection.
- "ldap_ssl_client_init —Initializes the SSL Library." on page 203 — Initializes the SSL library.

The **ldap_ssl_start()** API includes RSA software. RSA is a trademark of RSA Data Security, Inc.

API introduced: V4R3

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_unbind()—Perform an LDAP Unbind Request

Syntax

```
#include <ldap.h>

int ldap_unbind(
          LDAP  *ld )
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_unbind()** function is used to end the connection to the LDAP server and free the resources contained in the *ld* structure.

Once it is called, any open connection to the LDAP server is closed, and the *ld* structure is invalid. The "ldap_unbind_s()—Perform an LDAP Unbind Request (Synchronous)" on page 214 and **ldap_unbind()** APIs are both synchronous, and can be used interchangeably.

Authorities and Locks

No OS/400 authority is required.

Parameters

ld (Input) Specifies the LDAP pointer returned by a previous call to "ldap_init()—Perform an LDAP Initialization Operation" on page 102, "ldap_ssl_init —Initializes an SSL Connection." on page 206, or "ldap_open()—Perform an LDAP Open Operation" on page 133.

Return Value

LDAP_SUCCESS
if the request was successful.

LDAP error
if the request was not successful.

Error Conditions

If **ldap_unbind()** is not successful, it returns an LDAP error code other than LDAP_SUCCESS. See "LDAP Client API Error Conditions" on page 303 for possible LDAP error code values.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_unbind API.

Related Information

- "ldap_bind()—Perform an LDAP Bind Request" on page 24 — Asynchronously bind to the directory (deprecated).

- "ldap_bind_s()—Perform an LDAP Bind Request (Synchronous)" on page 26 — Synchronously bind to the directory (deprecated).
- "ldap_sasl_bind()—Perform an LDAP SASL Bind Request" on page 159 — Asynchronously bind to the directory using SASL.
- "ldap_sasl_bind_s()—Perform an LDAP SASL Bind Request (Synchronous)" on page 161 — Synchronously bind to the directory using SASL.
- "ldap_simple_bind()—Perform a Simple LDAP Bind Request" on page 199 — Asynchronously bind to the directory using simple authentication.
- "ldap_simple_bind_s()—Perform a Simple LDAP Bind Request (Synchronous)" on page 201 — Synchronously bind to the directory using simple authentication.
- "ldap_unbind_ext()—Perform an LDAP Unbind Request" — Perform an LDAP Unbind Request
- "ldap_unbind_s()—Perform an LDAP Unbind Request (Synchronous)" on page 214 — Synchronously unbind from the LDAP server and close the connection.
- "ldap_set_rebind_proc()—Set Rebind Procedure" on page 198 — Sets the entry-point of a routine during the chasing of referrals.

API introduced: V4R3

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_unbind_ext()—Perform an LDAP Unbind Request

Syntax

```
#include <ldap.h>

int ldap_unbind_ext(
                LDAP         *ld,
                LDAPControl **servctrls,
                LDAPControl **clientctrls )
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_unbind_ext()** function is used to end the connection to the LDAP server and free the resources contained in the *ld* structure.

Once it is called, any open connection associated with the LDAP session handle, *ld*, to the LDAP server is closed, and any resources associated with the handle are disposed of before returning. The *ld* structure is invalid and cannot be used for any further api calls. The **ldap_unbind_ext()** is synchronous and allows server and client controls to be included. Note that since there is no server response to an unbind there is no way to receive a response to a server control sent with an **ldap_unbind_ext()**.

Authorities and Locks

No OS/400 authority is required.

Parameters

ld (Input) Specifies the LDAP pointer returned by a previous call to "ldap_init()—Perform an LDAP

Initialization Operation" on page 102, "ldap_ssl_init —Initializes an SSL Connection." on page 206, or "ldap_open()—Perform an LDAP Open Operation" on page 133.

serverctrls
(Input) Specifies a list of LDAP server controls. This parameter may be set to null. See LDAP Controls for more information about server controls.

clientctrls
(Input) Specifies a list of LDAP client controls. This parameter may be set to null. See LDAP Controls for more information about client controls.

Return Value

LDAP_SUCCESS
if the request was successful.

LDAP error
if the request was not successful.

Error Conditions

If **ldap_unbind_ext()** is not successful, it returns an LDAP error code other than LDAP_SUCCESS. See "LDAP Client API Error Conditions" on page 303 for possible LDAP error code values.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_unbind_ext API.

Related Information

- "ldap_bind()—Perform an LDAP Bind Request" on page 24 — Asynchronously bind to the directory (deprecated).
- "ldap_bind_s()—Perform an LDAP Bind Request (Synchronous)" on page 26 — Synchronously bind to the directory (deprecated).
- "ldap_sasl_bind()—Perform an LDAP SASL Bind Request" on page 159 — Asynchronously bind to the directory using SASL.
- "ldap_sasl_bind_s()—Perform an LDAP SASL Bind Request (Synchronous)" on page 161 — Synchronously bind to the directory using SASL.
- "ldap_simple_bind()—Perform a Simple LDAP Bind Request" on page 199 — Asynchronously bind to the directory using simple authentication.
- "ldap_simple_bind_s()—Perform a Simple LDAP Bind Request (Synchronous)" on page 201 — Synchronously bind to the directory using simple authentication.
- "ldap_unbind_s()—Perform an LDAP Unbind Request (Synchronous)" on page 214 — Synchronously unbind from the LDAP server and close the connection.

API introduced: V5R1

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_unbind_s()—Perform an LDAP Unbind Request (Synchronous)

Syntax

```
#include <ldap.h>

int ldap_unbind_s(
             LDAP  *ld)
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_unbind_s()** function is used to end the connection to the LDAP server and free the resources contained in the *ld* structure.

Once it is called, any open connection to the LDAP server is closed, and the *ld* structure is invalid. The **ldap_unbind_s()** and "ldap_unbind()—Perform an LDAP Unbind Request" on page 211 APIs are both synchronous and can be used interchangeably.

Authorities and Locks

No OS/400 authority is required.

Parameters

ld (Input) Specifies the LDAP pointer returned by a previous call to "ldap_init()—Perform an LDAP Initialization Operation" on page 102, "ldap_ssl_init —Initializes an SSL Connection." on page 206, or "ldap_open()—Perform an LDAP Open Operation" on page 133.

Return Value

LDAP_SUCCESS
if the request was successful.

another LDAP error
if the request was not successful.

Error Conditions

If **ldap_unbind_s()** is not successful, it returns another LDAP error code. See "LDAP Client API Error Conditions" on page 303 for possible LDAP error code values.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_unbind_s API.

Related Information

- "ldap_bind()—Perform an LDAP Bind Request" on page 24 — Asynchronously bind to the directory (deprecated).

- "ldap_bind_s()—Perform an LDAP Bind Request (Synchronous)" on page 26 — Synchronously bind to the directory (deprecated).
- "ldap_sasl_bind()—Perform an LDAP SASL Bind Request" on page 159 — Asynchronously bind to the directory using SASL.
- "ldap_sasl_bind_s()—Perform an LDAP SASL Bind Request (Synchronous)" on page 161 — Synchronously bind to the directory using SASL.
- "ldap_simple_bind()—Perform a Simple LDAP Bind Request" on page 199 — Asynchronously bind to the directory using simple authentication.
- "ldap_simple_bind_s()—Perform a Simple LDAP Bind Request (Synchronous)" on page 201 — Synchronously bind to the directory using simple authentication.
- "ldap_unbind()—Perform an LDAP Unbind Request" on page 211 — Asynchronously unbind from the LDAP server and close the connection.

API introduced: V4R3

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_url_parse()—Parse an LDAP URL

Syntax

```
#include <ldap.h>

typedef struct ldap_url_desc {
    char    *lud_host;      /* LDAP host to contact */
    int      lud_port;      /* port on host */
    char    *lud_dn;        /* base for search */
    char   **lud_attrs;     /* NULL-terminate list of attributes */
    int      lud_scope;     /* a valid LDAP_SCOPE_... value */
    char    *lud_filter;    /* LDAP search filter */
    char    *lud_string;    /* for internal use only */
} LDAPURLDesc;

int ldap_url_parse(
    char          *url,
    LDAPURLDesc  **ludpp)
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_url_parse()** function breaks down the LDAP URL passed in *url* into its component pieces. The URLs passed in to **ldap_url_parse()** must be in the local codepage. Use "ldap_url_parse_utf8()—Parse a UTF8 codepage LDAP URL string" on page 217 for UTF-8 URLs.

The LDAPURLDesc structure returned by this API should be freed with "ldap_free_urldesc()—Free an LDAP URL Description" on page 83.

This routine supports the use of LDAP URLs (Uniform Resource Locators). Supported LDAP URLs look like this, where sections in brackets are optional:

```
ldap[s]://[hostport][/[dn[?[attributes][?[scope][?[filter]]]]]]
```

where:

- **hostport** is a host name with an optional ″:portnumber″
- **dn** is the base DN to be used for an LDAP search operation
- **attributes** is a comma separated list of attributes to be retrieved
- **scope** is one of these three strings: base one sub (default=base)
- **filter** is LDAP search filter as used in a call to **ldap_search**

For example:

```
ldap://example.ibm.com/c=US?o,description?one?o=ibm
```

URLs that are wrapped in angle-brackets and/or preceded by ″URL:″ are also tolerated, including the form *url:ldapurl*.

For example:

```
URL:ldaps://example.ibm.com/c=US?o,description?one?o=ibm
```

This form also is allowed: *<url:ldapurl>*

For example:

```
<URL:ldap://example.ibm.com/c=US?o,description?one?o=ibm>
```

Authorities and Locks

No OS/400 authority is required.

Parameters

url (Input) Specifies a pointer to the URL string.

ludpp (Output) This result parameter will be set to a LDAPURLDesc structure containing the parsed URL.

Return Value

LDAP_SUCCESS
If successful, an LDAP URL description is allocated, filled in, and *ludpp* is set to point to it.

other LDAP Error code
If an error occurs, one of these values is returned:

LDAP_URL_ERR_NOTLDAP	URL doesn't begin with ″ldap://″
LDAP_URL_ERR_BADSCOPE	URL scope string is invalid
LDAP_URL_ERR_MEM	can't allocate memory space

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_url_parse API.

Related Information

- "ldap_free_urldesc()—Free an LDAP URL Description" on page 83 — Frees an LDAP URL description.

- "ldap_is_ldap_url()—Verify LDAP URL" on page 105 — Check a URL string to see if it is an LDAP URL.
- "ldap_url_parse_utf8()—Parse a UTF8 codepage LDAP URL string" — Parse a UTF8 codepage LDAP URL string
- "ldap_url_search()—Perform an LDAP URL Search Operation" on page 219 — Asynchronously search using an LDAP URL.
- "ldap_url_search_s() — Perform an LDAP URL Search Operation (Synchronous)" on page 221 — Synchronously search using an LDAP URL.
- "ldap_url_search_st()—Perform an LDAP URL Search Operation (Timed Synchronous)" on page 223 — Synchronously search using an LDAP URL and a timeout.

API introduced: V4R3

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_url_parse_utf8()—Parse a UTF8 codepage LDAP URL string

Syntax

```
#include <ldap.h>

typedef struct ldap_url_desc {
    char    *lud_host;      /* LDAP host to contact */
    int      lud_port;      /* port on host */
    char    *lud_dn;        /* base for search */
    char   **lud_attrs;     /* NULL-terminate list of attributes */
    int      lud_scope;     /* a valid LDAP_SCOPE_... value */
    char    *lud_filter;    /* LDAP search filter */
    char    *lud_string;    /* for internal use only */
} LDAPURLDesc;

int ldap_url_parse_utf8(
    char          *url,
    LDAPURLDesc  **ludpp)
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_url_parse_utf8()** function breaks down the UTF8 codepage LDAP URL string passed in *url* into its component pieces. To parse URLs in the local codepage, use "ldap_url_parse()—Parse an LDAP URL" on page 215.

The LDAPURLDesc structure returned by this API should be freed with "ldap_free_urldesc()—Free an LDAP URL Description" on page 83.

This routine supports the use of LDAP URLs (Uniform Resource Locators). Supported LDAP URLs look like this, where sections in brackets are optional:

```
ldap[s]://[hostport][/[dn[?[attributes][?[scope][?[filter]]]]]]
```

where:

- **hostport** is a host name with an optional ":portnumber"

- **dn** is the base DN to be used for an LDAP search operation
- **attributes** is a comma separated list of attributes to be retrieved
- **scope** is one of these three strings: base one sub (default=base)
- **filter** is LDAP search filter as used in a call to **ldap_search**

For example:

```
ldap://example.ibm.com/c=US?o,description?one?o=ibm
```

URLs that are wrapped in angle-brackets and/or preceded by ″URL:″ are also tolerated, including the form *url:ldapurl*.

For example:

```
URL:ldap://example.ibm.com/c=US?o,description?one?o=ibm
```

This form also is allowed: <*url:ldapurl*>.

For example:

```
<URL:ldap://example.ibm.com/c=US?o,description?one?o=ibm>
```

Authorities and Locks

No OS/400 authority is required.

Parameters

url (Input) A pointer to the UTF8 codepage URL string.

ludpp (Output) This result parameter will be set to a LDAPURLDesc structure containing the parsed URL.

Return Value

LDAP_SUCCESS
If successful, an LDAP URL description is allocated, filled in, and *ludpp* is set to point to it.

other LDAP Error code
If an error occurs, one of these values is returned:

LDAP_URL_ERR_NOTLDAP	URL doesn't begin with ″ldap://″
LDAP_URL_ERR_BADSCOPE	URL scope string is invalid
LDAP_URL_ERR_MEM	can't allocate memory space

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_url_parse_utf8 API.

Related Information

- "ldap_url_parse()—Parse an LDAP URL" on page 215 — Parse an LDAP URL.
- "ldap_free_urldesc()—Free an LDAP URL Description" on page 83 — Frees an LDAP URL description.

- "ldap_is_ldap_url()—Verify LDAP URL" on page 105 — Check a URL string to see if it is an LDAP URL.
- "ldap_url_search()—Perform an LDAP URL Search Operation" — Asynchronously search using an LDAP URL.
- "ldap_url_search_s() — Perform an LDAP URL Search Operation (Synchronous)" on page 221 — Synchronously search using an LDAP URL.
- "ldap_url_search_st()—Perform an LDAP URL Search Operation (Timed Synchronous)" on page 223 — Synchronously search using an LDAP URL and a timeout.

API introduced: V5R1

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_url_search()—Perform an LDAP URL Search Operation

Syntax

```
#include <ldap.h>

int ldap_url_search(
                LDAP  *ld,
                char  *url,
                int    attrsonly)
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_url_search()** function is used to perform an asynchronous LDAP search based on the contents of the *url* parameter.

This function acts like "ldap_search()—Perform an LDAP Search Operation" on page 164 except that the search parameters are specified by the URL.

This routine supports the use of LDAP URLs (Uniform Resource Locators).

LDAP URLs look like this:

```
ldap[s]://[hostport][/[dn[?[attributes][?[scope][?[filter]]]]]]
```

where:

- **hostport** is a host name with an optional ":portnumber"
- **dn** is the base DN to be used for an LDAP search operation
- **attributes** is a comma separated list of attributes to be retrieved
- **scope** is one of these three strings: base one sub (default=base)
- **filter** is LDAP search filter as used in a call to **ldap_search**

For example:

```
ldap://example.ibm.com/c=US?o,description?one?o=ibm
```

URLs that are wrapped in angle-brackets and/or preceded by ″URL:″ are also tolerated, including the form *url:ldapurl*.

For example:

```
URL:ldap://example.ibm.com/c=US?o,description?one?o=ibm
```

This form also is allowed: <*url:ldapurl*>.

For example:

```
<URL:ldap://example.ibm.com/c=US?o,description?one?o=ibm>
```

Notes:

1. For search operations, if hostport is omitted, host and port for the current connection are used. If hostport is specified, and is different from the host and port combination used for the current connection, the search is directed to that host and port, instead of using the current connection. In this case, the underlying referral mechanism is used to bind to hostport.
2. If the LDAP URL does not contain a search filter, the filter defaults to ″(objectClass=*)″.

Return Value

Message ID of the Operation Initiated
if the request was successful. A subsequent call to “ldap_result()—Retrieve Result of an Asynchronous LDAP Operation” on page 156, can be used to obtain the result.

-1 if the request was not successful.

Error Conditions

If **ldap_url_search()** is not successful, -1 will be returned setting the session error parameters (*ld_error*) in the LDAP structure appropriately, which can be obtained by using “ldap_get_lderrno()—Retrieve Error Information” on page 89. See “LDAP Client API Error Conditions” on page 303 for possible LDAP error code values.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_url_search API.

Related Information

- “ldap_free_urldesc()—Free an LDAP URL Description” on page 83 — Frees an LDAP URL description.
- “ldap_is_ldap_url()—Verify LDAP URL” on page 105 — Check a URL string to see if it is an LDAP URL.
- “ldap_url_parse()—Parse an LDAP URL” on page 215 — Break up an LDAP URL string into its components.
- “ldap_url_search_s() — Perform an LDAP URL Search Operation (Synchronous)” on page 221 — Synchronously search using an LDAP URL.
- “ldap_url_search_st()—Perform an LDAP URL Search Operation (Timed Synchronous)” on page 223 — Synchronously search using an LDAP URL and a timeout.

API introduced: V4R3

ldap_url_search_s() — Perform an LDAP URL Search Operation (Synchronous)

Syntax

```
#include <ldap.h>

int ldap_url_search_s(
                LDAP   *ld,
                char   *url,
                int     attrsonly,
                LDAPMessage  **res)
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_url_search_s()** function is used to perform a synchronous LDAP search based on the contents of *urlparameter*.

This function acts like "ldap_search_s()—Perform an LDAP Search Operation (Synchronous)" on page 171 except that the search parameters are specified by the URL.

This routine support the use of LDAP URLs (Uniform Resource Locators).

LDAP URLs look like this:

```
ldap[s]://[hostport][/[dn[?[attributes][?[scope][?[filter]]]]]]
```

where:

- **hostport** is a host name with an optional ":portnumber"
- **dn** is the base DN to be used for an LDAP search operation
- **attributes** is a comma separated list of attributes to be retrieved
- **scope** is one of these three strings: base one sub (default=base)
- **filter** is LDAP search filter as used in a call to **ldap_search**

For example:

```
ldap://example.ibm.com/c=US?o,description?one?o=ibm
```

URLs that are wrapped in angle-brackets and/or preceded by "URL:" are also tolerated, including the form *url:ldapurl*.

For example:

```
URL:ldap://example.ibm.com/c=US?o,description?one?o=ibm
```

This form also is allowed: *<url:ldapurl>*.

For example:

```
<URL:ldap://example.ibm.com/c=US?o,description?one?o=ibm>
```

Notes:

1. For search operations, if hostport is omitted, host and port for the current connection are used. If hostport is specified, and is different from the host and port combination used for the current connection, the search is directed to that host and port, instead of using the current connection. In this case, the underlying referral mechanism is used to bind to hostport.
2. If the LDAP URL does not contain a search filter, the filter defaults to "(objectClass=*)".

Authorities and Locks

No OS/400 authority is required. All authority checking is done by the LDAP server.

Parameters

ld (Input) Specifies the LDAP pointer returned by a previous call to "ldap_init()—Perform an LDAP Initialization Operation" on page 102, "ldap_ssl_init —Initializes an SSL Connection." on page 206, or "ldap_open()—Perform an LDAP Open Operation" on page 133.

url (Input) Specifies a pointer to the URL string.

attrsonly
(Input) Specifies attribute information. Set to 1 to request attribute types only. Set to 0 to request both attribute types and attribute values.

res (Output) Contains the result of the synchronous search operation. This result should be passed to the LDAP parsing routines (see "ldap_first_entry()—Retrieve First LDAP Entry" on page 77, "ldap_next_entry()—Retrieve Next LDAP Entry" on page 129, and so on). The caller is responsible for freeing *res* with "ldap_msgfree()—Free LDAP Result Message" on page 122.

Return Value

LDAP_SUCCESS
if the request was successful.

another LDAP error
if the request was not successful.

Error Conditions

If **ldap_url_search_s()** is not successful, it returns an LDAP error code other than LDAP_SUCCESS. See "LDAP Client API Error Conditions" on page 303 for possible LDAP error code values.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_url_search_s API.

Related Information

- "ldap_free_urldesc()—Free an LDAP URL Description" on page 83 — Frees an LDAP URL description.
- "ldap_url_parse()—Parse an LDAP URL" on page 215 — Extract information from results.
- "ldap_is_ldap_url()—Verify LDAP URL" on page 105 — Check a URL string to see if it is an LDAP URL.
- "ldap_url_search()—Perform an LDAP URL Search Operation" on page 219 — Asynchronously search using an LDAP URL.

- "ldap_url_search_st()—Perform an LDAP URL Search Operation (Timed Synchronous)" — Synchronously search using an LDAP URL and a timeout.

API introduced: V4R3

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_url_search_st()—Perform an LDAP URL Search Operation (Timed Synchronous)

Syntax

```
#include <sys/time.h>
#include <ldap.h>

int ldap_url_search_st(
                LDAP            *ld,
                char            *url,
                int             attrsonly,
                struct timeval  *timeout,
                LDAPMessage     **res )
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_url_search_st()** function is used to perform a synchronous LDAP search with a specified timeout based on the contents of the *url* parameter.

This function acts like "ldap_search_st()—Perform an LDAP Search Operation (Timed Synchronous)" on page 173 except that the search parameters are retrieved from the URL.

This routine supports the use of LDAP URLs (Uniform Resource Locators).

LDAP URLs look like this:

```
ldap[s]://[hostport][/[dn[?[attributes][?[scope][?[filter]]]]]]
```

where:

- **hostport** is a host name with an optional ":portnumber"
- **dn** is the base DN to be used for an LDAP search operation
- **attributes** is a comma separated list of attributes to be retrieved
- **scope** is one of these three strings: base one sub (default=base)
- **filter** is LDAP search filter as used in a call to **ldap_search**

For example:

```
ldap://example.ibm.com/c=US?o,description?one?o=ibm
```

URLs that are wrapped in angle-brackets and/or preceded by "URL:" are also tolerated, including the form *url:ldapurl*.

For example:

```
URL:ldap://example.ibm.com/c=US?o,description?one?o=ibm
```

This form also is allowed: *<url:ldapurl>*.

For example:

```
<URL:ldap://example.ibm.com/c=US?o,description?one?o=ibm>
```

Notes:

1. For search operations, if hostport is omitted, host and port for the current connection are used. If hostport is specified, and is different from the host and port combination used for the current connection, the search is directed to that host and port, instead of using the current connection. In this case, the underlying referral mechanism is used to bind to hostport.
2. If the LDAP URL does not contain a search filter, the filter defaults to "(objectClass=*)".

Authorities and Locks

No OS/400 authority is required. All authority checking is done by the LDAP server.

Parameters

ld (Input) Specifies the LDAP pointer returned by a previous call to "ldap_init()—Perform an LDAP Initialization Operation" on page 102, "ldap_ssl_init —Initializes an SSL Connection." on page 206, or "ldap_open()—Perform an LDAP Open Operation" on page 133.

url (Input) Specifies a pointer to the URL string.

attrsonly
(Input) Specifies attribute information. Set to 1 to request attribute types only. Set to 0 to request both attribute types and attribute values.

timeout
(Input) Specifies a timeout value for a synchronous search issued by the **ldap_url_search_st()** routine.

res (Output) Contains the result of the synchronous search operation. This result should be passed to the LDAP parsing routines (see "ldap_first_entry()—Retrieve First LDAP Entry" on page 77, "ldap_next_entry()—Retrieve Next LDAP Entry" on page 129, and so on). The caller is responsible for freeing *res* with "ldap_msgfree()—Free LDAP Result Message" on page 122.

Return Value

LDAP_SUCCESS
if the request was successful.

another LDAP error
if the request was not successful.

Error Conditions

If **ldap_url_search_st()** is not successful, it returns an LDAP error code other than LDAP_SUCCESS. See "LDAP Client API Error Conditions" on page 303 for possible LDAP error code values.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_url_search_st API.

Related Information

- "ldap_free_urldesc()—Free an LDAP URL Description" on page 83 — Frees an LDAP URL description.
- "ldap_url_parse()—Parse an LDAP URL" on page 215 — Extract information from results.
- "ldap_is_ldap_url()—Verify LDAP URL" on page 105 — Check a URL string to see if it is an LDAP URL.
- "ldap_url_search()—Perform an LDAP URL Search Operation" on page 219 — Asynchronously search using an LDAP URL.
- "ldap_url_search_s() — Perform an LDAP URL Search Operation (Synchronous)" on page 221 — Synchronously search using an LDAP URL.

API introduced: V4R3

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

---

ldap_value_free()—Free Memory Allocated by ldap_get_values()

Syntax

```
#include <ldap.h>

void ldap_value_free(
            char  **vals)
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_value_free()** function frees the memory allocated by the "ldap_get_values()—Retrieve a Set of Attribute Values from an Entry" on page 99 function.

Authorities and Locks

No OS/400 authority is required.

Parameters

vals (Input) Specifies a pointer to a null-terminated array of attribute values, as returned by "ldap_get_values()—Retrieve a Set of Attribute Values from an Entry" on page 99.

Return Value

None

Error Conditions

ldap_value_free() API does not return an error code.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_value_free API.

Related Information

- "ldap_get_values()—Retrieve a Set of Attribute Values from an Entry" on page 99 — Return an attribute's values.
- "ldap_get_values_len()—Retrieve a Set of Binary Attribute Values" on page 100 — Return an attribute's binary values.
- "ldap_count_values()—Retrieve Count of Attribute Values" on page 42 — Return number of values.
- "ldap_count_values_len()—Retrieve Count of Binary Attribute Values" on page 44 — Return number of binary values.
- "ldap_value_free_len()—Free Memory Allocated by ldap_get_values_len()" — Free memory allocated by **ldap_get_values_len()**.

API introduced: V4R3

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

---

ldap_value_free_len()—Free Memory Allocated by ldap_get_values_len()

Syntax

```
#include <ldap.h>

struct berval {
        unsigned long bv_len;
        char  *bv_val;
};

void ldap_value_free_len(
        struct berval   **vals)
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_value_free_len()** function frees the memory allocated by the "ldap_get_values_len()—Retrieve a Set of Binary Attribute Values" on page 100 function.

Authorities and Locks

No OS/400 authority is required.

Parameters

bvals (Input) Specifies a pointer to a null-terminated array of pointers to berval structures, as returned by "ldap_get_values_len()—Retrieve a Set of Binary Attribute Values" on page 100.

Return Value

None

Error Conditions

ldap_value_free_len() API does not return an error code.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_value_free_len API.

Related Information

- "ldap_get_values()—Retrieve a Set of Attribute Values from an Entry" on page 99 — Return an attribute's values.
- "ldap_get_values_len()—Retrieve a Set of Binary Attribute Values" on page 100 — Return an attribute's binary values.
- "ldap_count_values()—Retrieve Count of Attribute Values" on page 42 — Return number of values.
- "ldap_count_values_len()—Retrieve Count of Binary Attribute Values" on page 44 — Return number of binary values.
- "ldap_value_free_len()—Free Memory Allocated by ldap_get_values_len()" on page 226 — Free memory allocated by **ldap_get_values()**.

API introduced: V4R3

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_version — Obtain LDAP Version and SSL Cipher Information

Syntax

```
#include <ldap.h>
#include <ldapssl.h>

int ldap_version(
         LDAPVersion  *version )
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_version()** routine is used to return the toolkit version (multiplied by 100). It also sets information in the LDAPVersion structure.

Authorities and Locks

No OS/400 authority is required.

Parameters

version
(Input) Specifies the address of an LDAPVersion structure that contains the following returned values:

sdk_version	Toolkit version, multiplied by 100.
protocol_version	Highest LDAP protocol supported, multiplied by 100.
SSL_version	SSL version supported, multiplied by 100.
security_level	Level of encryption supported, in bits. Set to **LDAP_SECURITY_NONE** if SSL not enabled.
ssl_max_cipher	A string containing the default ordered set of ciphers supported by this installation. See "LDAP_OPT_SSL_CIPHER" on page 195 in **ldap_set_option()** for more information about changing the set of ciphers used to negotiate the secure connection with the server.
sdk_vendor	A pointer to a static string that identifies the supplier of the LDAP library. This string should not be freed by the application.
sdk_build_level	A pointer to a static string that identifies the build level, including the date when the library was built. This string should not be freed by the application.

Return Value

Software Developer Toolkit Version
Sets information in the LDAPVersion structure and return the SDK VERSION.

Error Conditions

The **ldap_version()** API does not return an error code.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_version API.

API introduced: V4R5

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_xlate_local_to_unicode()— Convert String From the Local Code Page to UCS-2 (or UNICODE) Encoding

Syntax

```
#include <ldap.h>

int  ldap_xlate_local_to_unicode(
         char           *inbufp,
         unsigned long  *inlenp,
         char           *outbufp,
         unsigned long  *outlenp )
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_xlate_local_to_unicode()** API is used to convert a string from the local code page to the UCS-2 encoding as defined by ISO/IEC 10646-1. This same set of characters is also defined in the UNICODE standard.

Authorities and Locks

No OS/400 authority is required.

Parameters

inbufp (Input) A pointer to the address of the input buffer containing the data to be translated.

inlenp (Input) Length in bytes of the *inbufp* buffer. This value is decremented when the conversion is done, such that on return it indicates the length of *inlenp* buffer that is left to be translated.

outbufp
(Output) A pointer to the address of the output buffer for translated data.

outlenp
(Output) Length in bytes of the *outbufp* buffer. This value is decremented when the conversion is done, such that on return it indicates the length of *outlenp* buffer space left available for translated data.

Note that in general, the output buffer should be three times as large as the input buffer if the intent is to translate the entire input buffer in a single call.

Return Value

LDAP_SUCCESS
if the request was successful.

another LDAP error code
if the request was not successful.

Error Conditions

The **ldap_xlate_local_to_unicode()** API will return an LDAP error code other than LDAP_SUCCESS if not successful. See “LDAP Client API Error Conditions” on page 303 for possible LDAP error code values.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_xlate_local_to_unicode API.

Related Information

- "ldap_xlate_utf8_to_local() — Convert String From the UTF-8 Encoding to Local Code Page" on page 234 — Convert string from UTF-8 to local code page.
- "ldap_xlate_local_to_utf8()— Convert String From the Local Code Page to UTF-8 Encoding" — Convert string from local to UTF-8 code page.
- "ldap_xlate_unicode_to_local() — Convert String From the UCS-2 (or UNICODE) Encoding to Local Code Page" on page 232 — Convert string from UCS-2 to local code page.
- "ldap_get_iconv_local_codepage()— Get the Active LDAP Code Page" on page 88 — Get the active LDAP code page.
- "ldap_set_iconv_local_codepage() — Set the Active LDAP Code Page" on page 187 — Set the active LDAP code page.
- "ldap_set_iconv_local_charset()— Set the Active LDAP Character Set" on page 185 — Set the active LDAP character set.
- "ldap_set_locale() — Change the Locale Used by LDAP" on page 190 — Change the locale used by LDAP.
- "ldap_get_locale()— Get Active LDAP Locale" on page 91 — Get the locale used by LDAP.

API introduced: V4R5

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

---

ldap_xlate_local_to_utf8()— Convert String From the Local Code Page to UTF-8 Encoding

Syntax

```
#include <ldap.h>

int  ldap_xlate_local_to_utf8(
         char           *inbufp,
         unsigned long  *inlenp,
         char           *outbufp,
         unsigned long  *outlenp )
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_xlate_local_to_utf8()** API is used to convert a string from the local code page to a UTF-8 encoding (which is used by LDAP when communicating with an LDAP V3 compliant server).

Authorities and Locks

No OS/400 authority is required.

Parameters

inbufp (Input) A pointer to the address of the input buffer containing the data to be translated.

inlenp (Input) Length in bytes of the *inbufp* buffer. This value is decremented when the conversion is done, such that on return it indicates the length of *inlenp* buffer that is left to be translated.

outbufp
(Output) A pointer to the address of the output buffer for translated data.

outlenp
(Output) Length in bytes of the *outbufp* buffer. This value is decremented when the conversion is done, such that on return it indicates the length of *outlenp* buffer space left available for translatd data.

Note that in general, the output buffer should be three times as large as the input buffer if the intent is to translate the entire input buffer in a single call.

Return Value

LDAP_SUCCESS
if the request was successful.

another LDAP error code
if the request was not successful.

Error Conditions

The **ldap_xlate_local_to_utf8()** will return an LDAP error code if not successful. See "LDAP Client API Error Conditions" on page 303 for possible LDAP error code values.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_xlate_local_to_utf8 API.

Related Information

- "ldap_xlate_utf8_to_local() — Convert String From the UTF-8 Encoding to Local Code Page" on page 234 — Convert string from UTF-8 to local code page.
- "ldap_xlate_local_to_unicode()— Convert String From the Local Code Page to UCS-2 (or UNICODE) Encoding" on page 229 — Convert string from the local to UCS-2 code page.
- "ldap_xlate_unicode_to_local() — Convert String From the UCS-2 (or UNICODE) Encoding to Local Code Page" on page 232 — Convert string from UCS-2 to local code page.
- "ldap_get_iconv_local_codepage()— Get the Active LDAP Code Page" on page 88 — Get the active LDAP code page.
- "ldap_set_iconv_local_codepage() — Set the Active LDAP Code Page" on page 187 — Set the active LDAP code page.
- "ldap_set_iconv_local_charset()— Set the Active LDAP Character Set" on page 185 — Set the active LDAP character set.
- "ldap_set_locale() — Change the Locale Used by LDAP" on page 190 — Change the locale used by LDAP.

- "ldap_get_locale()— Get Active LDAP Locale" on page 91 — Get the locale used by LDAP.

API introduced: V4R5

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_xlate_unicode_to_local() — Convert String From the UCS-2 (or UNICODE) Encoding to Local Code Page

Syntax

```
#include <ldap.h>

int  ldap_xlate_unicode_to_local(
         char           *inbufp,
         unsigned long  *inlenp,
         char           *outbufp,
         unsigned long  *outlenp )
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_xlate_unicode_to_local()** API is used to convert a UCS-2 encoded string to the local code page encoding.

It is important to note that translation of strings from a UCS-2 (or UNICODE) encoding to local code page may result in loss of data when one or more characters in the UCS-2 encoding cannot be represented in the local code page. When this occurs, a substitution character replaces any UCS-2 characters that cannot be converted to the local code page.

Authorities and Locks

No OS/400 authority is required.

Parameters

inbufp (Input) A pointer to the address of the input buffer containing the data to be translated.

inlenp (Input) Length in bytes of the *inbufp* buffer. This value is decremented when the conversion is done, such that on return it indicates the length of *inlenp* buffer that is left to be translated.

outbufp
(Output) A pointer to the address of the output buffer for translated data.

outlenp
(Output) Length in bytes of the *outbufp* buffer. This value is decremented when the conversion is done, such that on return it indicates the length of *outlenp* buffer space left available for translated data.

Note that in general, the output buffer should be three times as large as the input buffer if the intent is to translate the entire input buffer in a single call.

Return Value

LDAP_SUCCESS
if the request was successful.

another LDAP error code
if the request was not successful.

Error Conditions

The **ldap_xlate_unicode_to_local()** API will return an LDAP error code if not successful. See "LDAP Client API Error Conditions" on page 303 for possible LDAP error code values.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_xlate_unicode_to_local API.

Related Information

- "ldap_xlate_utf8_to_local() — Convert String From the UTF-8 Encoding to Local Code Page" on page 234 — Convert string from UTF-8 to local code page.
- "ldap_xlate_local_to_utf8()— Convert String From the Local Code Page to UTF-8 Encoding" on page 230 — Convert string from local to UTF-8 code page.
- "ldap_xlate_local_to_unicode()— Convert String From the Local Code Page to UCS-2 (or UNICODE) Encoding" on page 229 — Convert string from local to UCS-2 code page.
- "ldap_get_iconv_local_codepage()— Get the Active LDAP Code Page" on page 88 — Get the active LDAP code page.
- "ldap_set_iconv_local_codepage() — Set the Active LDAP Code Page" on page 187 — Set the active LDAP code page.
- "ldap_set_iconv_local_charset()— Set the Active LDAP Character Set" on page 185 — Set the active LDAP character set.
- "ldap_set_locale() — Change the Locale Used by LDAP" on page 190 — Change the locale used by LDAP.
- "ldap_get_locale()— Get Active LDAP Locale" on page 91 — Get the locale used by LDAP.

API introduced: V4R5

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

ldap_xlate_utf8_to_local() — Convert String From the UTF-8 Encoding to Local Code Page

Syntax

```
#include <ldap.h>

int  ldap_xlate_utf8_to_local(
         char           *inbufp,
         unsigned long  *inlenp,
         char           *outbufp,
         unsigned long  *outlenp )
```

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDCLNT

Threadsafe: Yes

The **ldap_xlate_utf8_to_local()** API is used to convert a UTF-8 encoded string to the local code page encoding.

It is important to note that translation of strings from a UTF-8 encoding to local code page may result in loss of data when one or more characters in the UTF-8 encoding cannot be represented in the local code page. When this occurs, a substitution character replaces any UTF-8 characters that cannot be converted to the local code page.

Authorities and Locks

No OS/400 authority is required.

Parameters

inbufp (Input) A pointer to the address of the input buffer containing the data to be translated.

inlenp (Input) Length in bytes of the *inbufp* buffer. This value is decremented when the conversion is done, such that on return it indicates the length of the *inlenp* buffer that is left to be translated.

outbufp
(Output) A pointer to the address of the output buffer for translated data.

outlenp
(Output) Length in bytes of the *outbufp* buffer. This value is decremented when the conversion is done, such that on return it indicates the length of *outlenp* buffer space left available for translated data.

Note that in general, the output buffer should be three times as large as the input buffer if the intent is to translate the entire input buffer in a single call.

Return Value

LDAP_SUCCESS
if the request was successful.

another LDAP error code
if the request was not successful.

Error Conditions

The **ldap_xlate_utf8_to_local()** will return an LDAP error code if not successful. See “LDAP Client API Error Conditions” on page 303 for possible LDAP error code values.

Error Messages

The following message may be sent from this function.

Message ID	Error Message Text
CPF3CF2 E	Error(s) occurred during running of ldap_xlate_utf8_to_local API.

Related Information

- “ldap_xlate_local_to_utf8()— Convert String From the Local Code Page to UTF-8 Encoding” on page 230 — Convert string from the local to UTF-8 code page.
- “ldap_xlate_local_to_unicode()— Convert String From the Local Code Page to UCS-2 (or UNICODE) Encoding” on page 229 — Convert string from the local to UCS-2 code page.
- “ldap_xlate_unicode_to_local() — Convert String From the UCS-2 (or UNICODE) Encoding to Local Code Page” on page 232 — Convert string from UCS-2 to local code page.
- “ldap_get_iconv_local_codepage()— Get the Active LDAP Code Page” on page 88 — Get the active LDAP code page.
- “ldap_set_iconv_local_codepage() — Set the Active LDAP Code Page” on page 187 — Set the active LDAP code page.
- “ldap_set_iconv_local_charset()— Set the Active LDAP Character Set” on page 185 — Set the active LDAP character set.
- “ldap_set_locale() — Change the Locale Used by LDAP” on page 190 — Change the locale used by LDAP.
- “ldap_get_locale()— Get Active LDAP Locale” on page 91 — Get the locale used by LDAP.

API introduced: V4R5

Top | “Lightweight Directory Access Protocol (LDAP) APIs,” on page 1 | APIs by category

Configure Directory Server (QgldCfgDirSvr)

Required Parameter Group:	
1	Input data
Input	Char(*)
2	Length of input data
Input	Binary(4)
3	Format name
Input	Char(8)
4	Error code
I/O	Char(*)
Default Public Authority: *USE	
Library Name/Service Program: QSYS/QGLDUAPI	
Threadsafe: No	

The Configure Directory Server (QgldCfgDirSvr) API creates the initial directory server configuration. This includes identifying the library that will contain the underlying database objects, the administrator of the server, and the initial set of suffixes to be present on the server.

Authorities and Locks

*ALLOBJ and *IOSYSCFG special authority is required to use this API.

Required Parameter Group

Input data
INPUT; CHAR(*)

Data that describes the desired directory server configuration. The content and format of this structure are determined by the format name. See "Format of Input Data" on page 237 for a description of these formats.

Length of input data
INPUT; BINARY(4)

The length of the input data structure.

Format name
INPUT; CHAR(8)

The content and format of the input configuration data. The possible format name follows:

CFGD0100 Configure Directory Server.

See "Format of Input Data" on page 237 for a description of these formats.

Error code
I/O; CHAR(*)

The structure in which to return error information. For the format of the structure, see Error Code Parameter.

Format of Input Data

For details about the format of the input data, see the following sections. For details about the fields in each format, see "Field Descriptions."

CFGD0100 Format

This format is used to provide initial configuration data about the directory server.

Offset			
Dec	**Hex**	**Type**	**Field**
0	0	BINARY(4)	Offset to database path
4	4	BINARY(4)	Length of database path
8	8	BINARY(4)	Offset to administrator distinguished name (DN)
12	C	BINARY(4)	Length of administrator DN
16	10	BINARY(4)	Offset to administrator password
20	14	BINARY(4)	Length of administrator password
24	18	BINARY(4)	Offset to suffixes
28	1C	BINARY(4)	Number of suffixes
32	20	BINARY(4)	Reserved
		CHAR(*)	Database path
		CHAR(*)	Administrator DN
		CHAR(*)	Administrator password
Suffixes:			
0	0	BINARY(4)	Displacement to next suffix
4	4	BINARY(4)	Displacement to suffix name
8	8	BINARY(4)	Length of suffix name
		CHAR(*)	Suffix name

Field Descriptions

Administrator DN. The distinguished name of a directory object that has access to all objects in the directory. This field is specified in UTF-16 (CCSID 13488).

Administrator password. The password used when you connect to the directory as the administrator. This field is specified in UTF-16 (CCSID 13488).

Database path. The path to an existing library containing the directory database objects. This is an integrated file system path name, for example, /QSYS.LIB/QDIRSRV.LIB. The library must exist in a system ASP or a basic user ASP (ASP value of 1 to 32). The library cannot exist in an independent ASP (ASP value greater than 32). This field is specified in UTF-16 (CCSID 13488).

Displacement to next suffix. The displacement, in bytes, from the start of the current suffix entry to the next suffix entry.

Displacement to suffix name. The displacement, in bytes, from the start of the current suffix entry to the suffix name field.

Length of administrator DN. The length, in UTF-16 (CCSID 13488) characters, of the administrator DN

Length of administrator password. The length, in UTF-16 (CCSID 13488) characters, of the administrator password field.

Length of database path. The length, in UTF-16 (CCSID 13488) characters, of the database path field.

Length of suffix name. The length, in UTF-16 (CCSID 13488) characters, of the suffix name field.

Number of suffixes. The number of suffixes present in the suffix list.

Offset to administrator DN. The offset, in bytes, from the start of the input data to the administrator DN field.

Offset to administrator password. The offset, in bytes, from the start of the input data to the administrator password field.

Offset to database path. The offset, in bytes, from the start of the input data to the database path field.

Offset to suffixes. The offset, in bytes, from the start of the input data to the list of suffixes.

Reserved. A reserved field. This field must be set to zero.

Suffixes. The list of suffixes to be present on the server. At least one must be present in the initial configuration.

Suffix name. The distinguished name of the root of a directory tree present on the server.This field is specified in UTF-16 (CCSID 13488).

Error Messages

Message ID	Error Message Text
CPF2209 E	Library &1 not found.
CPFA0DB E	Object name not a QSYS object.
CPFA314 E	Memory allocation error.
GLD0205 E	Administrator DN not valid.
GLD020A E	Suffix not valid.
GLD021C E	*ALLOBJ and *IOSYSCFG special authority required.
GLD0223 E	Database path not valid.
GLD0228 E	Validation list not created.
GLD022A E	Server configuration cannot be modified while the server is active.
GLD0236 E	Database library must be in system ASP or basic user ASP.

API introduced: V4R3

Top | UNIX-Type APIs | APIs by category

Change Directory Server Attributes (QgldChgDirSvrA)

Required Parameter Group:	
1	Input data
Input	Char(*)
2	Length of input data
Input	Binary(4)
3	Format name
Input	Char(8)
4	Error code
I/O	Char(*)

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDUAPI

Threadsafe: No

The Change Directory Server Attributes (QgldChgDirSvrA) API changes the directory server configuration. It can be used to change the following server properties:

- General server properties
- Suffixes served by this server
- Encrypted connection configuration. The Secure Sockets Layer (SSL) is used for encrypted communication.
- Performance settings

Authorities and Locks

*ALLOBJ and *IOSYSCFG special authority is required to use this API with formats CSVR0100, CSVR0200, CSVR0300, CSVR0400, CSVR0500, CSVR0600, CSVR0800, or CSVR0900. *AUDIT special authority is required to use this API with format CSVR0700.

Required Parameter Group

Input data
INPUT; CHAR(*)

A variable that contains the input data. See "Format of Input Data" on page 240 for a description of the data associated with a specific format name.

Length of input data
INPUT; BINARY(4)

The length of the input data area.

Format name
INPUT; CHAR(8)

The format name identifying the type of information to be changed. The possible format names follow:

CSVR0100 Basic server configuration

CSVR0200 Add or remove suffixes from this server
CSVR0300 Add, change, or remove directory indexing rules
CSVR0400 Add or change the attributes for publishing users in an LDAP directory.
CSVR0500 Add or change the network server publishing attributes associated with the LDAP server.
CSVR0600 Add or change referral server information
CSVR0700 Server auditing information
CSVR0800 IP address information
CSVR0900 Server administration information

See "Format of Input Data" for a description of these formats.

Error code
I/O; CHAR(*)

The structure in which to return error information. For the format of the structure, see Error Code Parameter.

Format of Input Data

For details about the format of the input data, see the following sections. For details about the fields in each format, see "Field Descriptions" on page 246.

CSVR0100 Format

This format is used to change basic server configuration information.

Offset			
Dec	**Hex**	**Type**	**Field**
0	0	BINARY(4)	Read only
4	4	BINARY(4)	Server is replica
8	8	BINARY(4)	Security
12	C	BINARY(4)	Nonencrypted port number
16	10	BINARY(4)	Encrypted port number
20	14	BINARY(4)	Current cipher protocols
24	18	BINARY(4)	Search time limit
28	1C	BINARY(4)	Search size limit
32	20	BINARY(4)	Maximum connections
36	24	BINARY(4)	Reserved
40	28	BINARY(4)	Referral port
44	2C	BINARY(4)	Password format
48	30	BINARY(4)	Offset to referral server
52	34	BINARY(4)	Length of referral server
56	38	BINARY(4)	Offset to administrator DN
60	3C	BINARY(4)	Length of administrator DN
64	40	BINARY(4)	Offset to administrator password
68	48	BINARY(4)	Length of administrator password
72	48	BINARY(4)	Offset to update DN
76	4C	BINARY(4)	Length of update DN
80	50	BINARY(4)	Offset to update password
84	54	BINARY(4)	Length of update password

Offset		Type	Field
Dec	Hex		
88	58	BINARY(4)	Offset to key ring file
92	5C	BINARY(4)	Length of key ring file
96	60	BINARY(4)	Offset to database path
100	64	BINARY(4)	Length of database path
104	64	BINARY(4)	Level indicator
Additional fields if level indicator is equal to 1 or greater:			
108	68	BINARY(4)	SSL authentication method
112	70	BINARY(4)	Number of database connections
116	74	BINARY(4)	Schema checking level
120	78	BINARY(4)	Offset to master server URL
124	7C	BINARY(4)	Length of master server URL
128	80	BINARY(4)	Change log indicator
132	84	BINARY(4)	Maximum number of change log entries
136	88	BINARY(4)	Terminate idle connections
140	8C	BINARY(4)	Reserved
Additional fields if level indicator is equal to 2 or greater:			
144	90	BINARY(4)	Kerberos authentication indicator
148	94	BINARY(4)	Offset to Kerberos key tab file
152	98	BINARY(4)	Length of Kerberos key tab file
156	9C	BINARY(4)	Kerberos to DN mapping indicator
160	A0	BINARY(4)	Offset to Kerberos administrator ID
164	A4	BINARY(4)	Length of Kerberos administrator ID
168	A8	BINARY(4)	Offset to Kerberos administrator realm
172	AC	BINARY(4)	Length of Kerberos administrator realm
176	B0	BINARY(4)	Event notification registration indicator
180	B4	BINARY(4)	Maximum event registrations for connection
184	B8	BINARY(4)	Maximum event registrations for server
188	BC	BINARY(4)	Maximum operations per transaction
192	C0	BINARY(4)	Maximum pending transactions
196	C4	BINARY(4)	Transaction time limit
200	C8	BINARY(4)	ACL model
204	CC	BINARY(4)	Reserved
Additional fields if level indicator is equal to 3 or greater:			
208	D0	BINARY(4)	Level of authority integration
212	D4	BINARY(4)	Offset to projected suffix
216	D8	BINARY(4)	Length of projected suffix
Additional fields if level indicator is equal to 4 or greater:			
220	DC	BINARY(4)	Read only schema
224	E0	BINARY(4)	Read only Projected suffix
228	E4	BINARY(4)	Log client messages

Offset		Type	Field
Dec	Hex		
232	E8	BINARY(4)	Maximum age of change log entries «
Variable length string fields:			
		CHAR(*)	Referral server
		CHAR(*)	Administrator DN
		CHAR(*)	Administrator password
		CHAR(*)	Update DN
		CHAR(*)	Update password
		CHAR(*)	Key ring file
		CHAR(*)	Database path
		CHAR(*)	Master server URL
		CHAR(*)	Kerberos key tab file
		CHAR(*)	Kerberos administrator ID
		CHAR(*)	Kerberos administrator realm
		CHAR(*)	Projected suffix

CSVR0200 Format

This format is used to add or remove suffixes from the server. The input data consists of a header and a series of change entries. The header identifies the number of suffixes to be added or removed. Each change entry identifies a suffix and the action to be performed (add or remove the suffix).

Note: Removing a suffix from a server will result in the loss of all directory entries with that suffix.

Offset		Type	Field
Dec	Hex		
0	0	BINARY(4)	Offset to change entries
4	4	BINARY(4)	Number of change entries
			Change entries
Suffix change entries:			
0	0	BINARY(4)	Displacement to next entry
4	4	BINARY(4)	Action
8	8	BINARY(4)	Displacement to suffix
12	C	BINARY(4)	Length of suffix
		CHAR(*)	Suffix

CSVR0300 Format

This format is used to add, change, or remove directory indexes. Creating indexes for one or more attributes allows for faster retrieval of directory entries based on those attributes. The input data consists of a header and a series of change entries. The header identifies the number of indexes to be added, changed, or removed. Each change entry identifies an attribute and the action to be performed (add, change, or remove the indexes).

Starting with V4R5M0, this format is not supported. Database index information is to be changed using an LDAP client or the Directory Management Tool (DMT) starting with V4R5M0.

Offset		Type	Field
Dec	Hex		
0	0	BINARY(4)	Offset to change entries
4	4	BINARY(4)	Number of change entries
			Change entries
Add or change attribute index entries:			
0	0	BINARY(4)	Displacement to next entry
4	4	BINARY(4)	Action
8	8	BINARY(4)	Displacement to attribute name
12	C	BINARY(4)	Length of attribute name
16	10	BINARY(4)	Index type
20	14	BINARY(4)	Reserved
		CHAR(*)	Attribute name
Delete attribute index entries:			
0	0	BINARY(4)	Displacement to next entry
4	4	BINARY(4)	Action
8	8	BINARY(4)	Displacement to attribute name
12	C	BINARY(4)	Length of attribute name
16	10	BINARY(4)	Reserved
		CHAR(*)	Attribute name

CSVR0400 Format

This format is used to set the attributes for publishing users in an LDAP directory. User information from the System Distribution Directory (SDD) can be published to an LDAP server by the Synchronize System Distribution Directory to LDAP (QGLDSSDD) API and from iSeries Navigator. The publishing attributes define how to publish user information.

Offset		Type	Field
Dec	Hex		
0	0	BINARY(4)	Offset to the server name
4	4	BINARY(4)	Length of server name
8	8	BINARY(4)	LDAP port number
12	C	BINARY(4)	Connection type
16	10	BINARY(4)	Offset to parent distinguished name
20	14	BINARY(4)	Length of parent distinguished name
24	18	BINARY(4)	Reserved
Variable length string fields:			
		CHAR(*)	Server name
		CHAR(*)	Parent distinguished name

CSVR0500 Format

This format is used to set the network server publishing attributes associated with the server.

Offset		Type	Field
Dec	Hex		
0	0	BINARY(4)	Offset to change entries
4	4	BINARY(4)	Number of change entries
			Change entries
Add or change publishing agent change entries:			
0	0	BINARY(4)	Displacement to next entry
4	4	BINARY(4)	Action
8	8	BINARY(4)	Displacement to publishing agent name
12	C	BINARY(4)	Length of publishing agent name
16	10	BINARY(4)	Displacement to server name
20	14	BINARY(4)	Length of server name
24	18	BINARY(4)	Displacement to bind DN
28	1C	BINARY(4)	Length of bind DN
32	20	BINARY(4)	Displacement to bind credentials
36	24	BINARY(4)	Length of bind credentials
40	28	BINARY(4)	LDAP port number
44	2C	BINARY(4)	Connection type
48	30	BINARY(4)	Displacement to parent distinguished name
52	34	BINARY(4)	Length of parent distinguished name
56	38	BINARY(4)	Disable publishing agent
60	3C	BINARY(4)	Level indicator
Additional fields if level indicator is equal to 1			
64	40	BINARY(4)	Kerberos authentication indicator
68	44	BINARY(4)	Displacement to Kerberos key tab file
72	48	BINARY(4)	Length of Kerberos key tab file
76	4C	BINARY(4)	Displacement to Kerberos principal
80	50	BINARY(4)	Length of Kerberos principal
84	54	BINARY(4)	Displacement to Kerberos realm
88	58	BINARY(4)	Length of Kerberos realm
		CHAR(*)	Publishing agent name
		CHAR(*)	Server name
		CHAR(*)	Bind DN
		CHAR(*)	Bind credentials
		CHAR(*)	Parent distinguished name
		CHAR(*)	Kerberos key tab file
		CHAR(*)	Kerberos principal
		CHAR(*)	Kerberos realm
Delete publishing agent change entries:			

Offset		Type	Field
Dec	Hex		
0	0	BINARY(4)	Displacement to next entry
4	4	BINARY(4)	Action
8	8	BINARY(4)	Displacement to publishing agent name
12	C	BINARY(4)	Length of publishing agent name
16	10	BINARY(4)	Reserved
		CHAR(*)	Publishing agent name

CSVR0600 Format

This format is used to change referral server configuration information. The input data consists of a header and a series of change entries. The header identifies the master server information and the number of referral servers. This replaces the referral server information, if any, that is currently configured.

Offset		Type	Field
Dec	Hex		
0	0	BINARY(4)	Offset to change entries
4	4	BINARY(4)	Number of change entries
			Change entries
Referral server change entries:			
0	0	BINARY(4)	Displacement to next entry
4	4	BINARY(4)	Displacement to referral server URL
8	8	BINARY(4)	Length of referral server URL
		CHAR(*)	Referral server URL

CSVR0700 Format

This format is used to change the server auditing configuration information.

Offset		Type	Field
Dec	Hex		
0	0	BINARY(4)	Security audit option for objects
4	4	BINARY(4)	Reserved

CSVR0800 Format

This format is used to change the IP address configuration information. The input data consists of a header and a series of change entries. The header identifies the number of IP addresses in the list. This replaces the IP address information that is currently configured. At least one IP address value must be specified for the server.

Offset		Type	Field
Dec	Hex		
0	0	BINARY(4)	Offset to change entries
4	4	BINARY(4)	Number of change entries
			Change entries
IP address entries:			
0	0	BINARY(4)	Displacement to next entry
4	4	BINARY(4)	Displacement to IP address
8	8	BINARY(4)	Length of IP address
		CHAR(*)	IP address

CSVR0900 Format

This format is used to change the server administration information.

Offset		Type	Field
Dec	Hex		
0	0	BINARY(4)	Offset to server administration URL
4	4	BINARY(4)	Length of server administration URL
8	8	BINARY(4)	Reserved
		CHAR(*)	Server administration URL

Field Descriptions

ACL model. Indicator of the ACL model to use. The following special values may be specified:

-1 The value of this field does not change.

1 Use the ACL model that supports attribute-level ACL permissions. This may cause compatibility problems with replication and applications that manage access-class level permissions defined in releases prior to V5R1M0. Once enabled, this capability can be disabled only by reconfiguring your server and deleting the directory database.

Note: Starting with V5R3M0, this field is ignored for format CSVR0100.

Action. The action to be performed for a given entry. The following values may be specified:

1 Add suffix, index rule, or publishing agent

2 Change index rule or publishing agent

3 Remove suffix, index rule, or publishing agent

Note: Change is valid only for the CSVR0300 and CSVR0500 formats.

Administrator DN. A distinguished name that has access to all objects in the directory. When either the administrator DN or the administrator password field is changed, both must be specified. This field is specified in UTF-16 (CCSID 13488). To leave the value unchanged, specify a length and offset to this field of zero.

Administrator password. The password used when connecting to the directory server using the administrator DN. When either the administrator DN or the administrator password field is changed, both must be specified. This field is specified in UTF-16 (CCSID 13488). To leave the value unchanged, specify a length and offset to this field of zero.

Attribute index entries. The list of changes to be made to the attribute indexes.

Attribute name. The name of a directory object attribute for which database indexes will be created. This field is specified in UTF-16 (CCSID 13488). The following special value may be specified:

**DEFAULT*	Specifies the index types to be created for those attributes that have no explicit rules defined.

Note: The *DEFAULT attribute entry may be removed or added. Adding or removing *DEFAULT attribute is equivalent to not creating any indexes, or creating indexes for all attributes, depending on the index types specified.

Bind credentials. The password used when connecting to the directory server using the bind DN. When either the bind DN or the bind credentials field is changed, both must be specified. This field is specified in UTF-16 (CCSID 13488). To leave the value unchanged, specify a length and displacement to this field of zero.

Bind DN. A distinguished name to use when publishing objects to the directory. When either the bind DN or the bind credentials field is changed, both must be specified. This field is specified in UTF-16 (CCSID 13488). To leave the value unchanged, specify a length and displacement to this field of zero.

Change entry. A structure identifying a change to be made. The structure identifies the suffix, attribute, or publishing agent and the operation to be performed (add, change, or delete).

Change log indicator. The indicator of whether to have a change log for entries that are added, changed or deleted. The following values may be specified:

0	No, do not have a change log
1	Yes, have a change log
-1	The value remains the same

Connection type. The type of connection to use to the LDAP server. The following values may be specified:

1	Nonsecure
2	Secured, using SSL
-1	The value remains the same

Current cipher protocols. The cipher protocols that the server will allow when using encrypted connections. The following values may be specified:

-1	The value remains the same

Or the sum of one or more of the following values:

0x0100	Triple Data Encryption Standard (DES) Secure Hash Algorithm (SHA) (U.S.)
0x0200	DES SHA (U.S.)
0x0400	Rivest Cipher 4 (RC4) SHA (U.S.)
0x0800	RC4 Message Digest 5 (MD5) (U.S.)
0x1000	RC2 MD5 (export)

0x2000 RC4 MD5 (export)
0x4000 Advanced Encryption Standard (AES) SHA (U.S.)

Database path. The path to an existing library containing the directory database objects. This is an integrated file system path name, for example, /QSYS.LIB/DIRSRV.LIB. By changing this field, you make the current directory contents inaccessible. By changing the field back to its original value, you restore the original directory contents. The library must exist in a system ASP or a basic user ASP (ASP value of 1 to 32). The library cannot exist in an independent ASP (ASP value greater than 32). This field is specified in UTF-16 (CCSID 13488). To leave the value unchanged, specify a length and offset to this field of zero.

Disable publishing agent. Indicates whether or not the publishing agent is disabled. The following values may be specified:

0 The publishing agent is enabled.
1 The publishing agent is disabled.

Displacement to attribute name. The displacement, in bytes, from the start of the current entry to the attribute name field.

Displacement to bind credentials. The displacement, in bytes, from the start of the current entry to the bind credentials field.

Displacement to bind DN. The displacement, in bytes, from the start of the current entry to the bind DN field.

Displacement to IP address. The displacement, in bytes, from the start of the current entry to the IP address field.

Displacement to Kerberos key tab file. The displacement, in bytes, from the start of the current entry to the Kerberos key tab file field.

Displacement to Kerberos principal. The displacement, in bytes, from the start of the current entry to the Kerberos principal field.

Displacement to Kerberos realm. The displacement, in bytes, from the start of the current entry to the Kerberos realm field.

Displacement to next entry. The displacement, in bytes, from the start of the current entry to the next entry in the input data.

Displacement to parent distinguished name. The displacement, in bytes, from the start of the current entry to the parent distinguished name field.

Displacement to publishing agent name. The displacement, in bytes, from the start of the current entry to the publishing agent name field.

Displacement to referral server URL. The displacement, in bytes, from the start of the current entry to the referral server URL field.

Displacement to server name. The displacement, in bytes, from the start of the current entry to the server name field.

Displacement to suffix. The displacement, in bytes, from the start of the current entry to the suffix field.

Encrypted port number. The port number to use for encrypted connections. The standard port number for encrypted connections (SSL) is 636. Valid port numbers are in the range 1 to 65535. The following special value may be specified:

-1	The value of this field does not change.

Event notification registration indicator. Indicator of whether to allow client to register for event notification. The following special values may be specified:

-1	The value of this field does not change.
0	Do not allow clients to register for event notification.
1	Allow clients to register for event notification.

Index type. The kind of database indexes that will be created for an attribute. Creating database indexes improved the performance of directory searches on those attributes. The following values may be specified:

0	No indexes will be maintained for the specified attribute
1	Equal

Note: For a delete request, 0 must be specified for this field.

» **IP address.** The IPv4 or IPv6 address of the client for which the directory server will accept connections. The IP address must already exist to be specified. A value of hexadecimal zeroes and leading zeroes is not allowed. An IPv4 address is expressed in standard dotted-decimal form www.xxx.yyy.zzz; for example, 130.99.128.1. An IPv6 address always has at least one occurrence of a colon (':') in the format. Some possible IPv6 address formats would be: ::x (for example, ::1) or ::w.xxx.y.zzz (for example, ::9.130.4.169). For further IPv6 examples and explanation, refer to the Usage Notes section in the Convert IPv4 and IPv6 Addresses Between Text and Binary Form (inet_pton) API. This field is specified in UTF-16 (CCSID 13488).

«

The following special value may be specified:

**ALL*	All IP addresses defined on the local system will be bound to the server.

Kerberos administrator ID. The name of the Kerberos administrator. This field is specified in UTF-16 (CCSID 13488). The following special value may be specified:

**NONE*	No value is specified.

To leave the value unchanged, specify a length and offset to this field of zero.

Kerberos administrator realm. The realm where the kerberos administrator is registered. This field is specified in UTF-16 (CCSID 13488). The following special value may be specified:

**NONE*	No value is specified.

To leave the value unchanged, specify a length and offset to this field of zero.

Kerberos authentication indicator. The following special values may be specified:

-1 The value of this field does not change.
0 Do not support Kerberos authentications.
1 Support Kerberos authentications. Ensure all Kerberos fields are specified.

Kerberos key tab file. The integrated file system path name for the key tab file that contains the server's secret key used for authentication. The QDIRSRV user profile is given authorization to read this file. This field is specified in UTF-16 (CCSID 13488). The following special value may be specified:

**NONE* No value is specified.

To leave the value unchanged, specify a length and offset or displacement to this field of zero.

Kerberos principal. The principal in the key tab file to use for authentication. This field is specified in UTF-16 (CCSID 13488). The following special value may be specified:

**NONE* No value is specified.

To leave the value unchanged, specify a length and offset or displacement to this field of zero.

Kerberos realm. The realm where the principal is registered to use for authentication. This field is specified in UTF-16 (CCSID 13488). The following special value may be specified:

**NONE* No value is specified.

To leave the value unchanged, specify a length and offset or displacement to this field of zero.

Kerberos to DN mapping indicator.

-1 The value of this field does not change.
0 Map the Kerberos ID to pseudo DN. A pseudo DN can be used to uniquely identify an LDAP user object of the form 'ibm-kerberosName=principal@realm" or 'ibm-kn=principal@realm".
1 Use associated DN in directory. The LDAP server will attempt to find an entry in the directory that contains the kerberos principle and realm as one of its attributes. Once found, this DN will then be used to determine the client's authorizations to the directory.

Key ring file. The path name of the SSL key ring file. A key ring file must be configured when using SSL. The following special value may be specified:

**NONE* No value is specified.

Note: Starting with V4R4M0, this field is ignored for format CSVR0100. This field is specified in UTF-16 (CCSID 13488).

To leave the value unchanged, specify a length and offset to this field of zero.

LDAP port number. The LDAP server's TCP/IP port. The following values may be specified:

-1 The value remains the same

Length of administrator DN. The length, in UTF-16 (CCSID 13488) characters, of the administrator DN field.

Length of administrator password. The length, in UTF-16 (CCSID 13488) characters, of the administrator password field.

Length of attribute name. The length, in UTF-16 (CCSID 13488) characters, of the the attribute name field.

Length of bind credentials. The length, in UTF-16 (CCSID 13488) characters, of the bind credentials field.

Length of bind DN. The length, in UTF-16 (CCSID 13488) characters, of the bind DN field.

Length of database path. The length, in UTF-16 (CCSID 13488) characters, of the database path field.

Length of IP address. The length, in UTF-16 (CCSID 13488) characters, of the IP address field.

Length of Kerberos administrator ID. The length, in UTF-16 (CCSID 13488) characters, of the Kerberos administrator ID field.

Length of Kerberos administrator realm. The length, in UTF-16 (CCSID 13488) characters, of the Kerberos administrator realm field.

Length of Kerberos key tab file. The length, in UTF-16 (CCSID 13488) characters, of the Kerberos key tab file field.

Length of Kerberos principal. The length, in UTF-16 (CCSID 13488) characters, of the Kerberos principal field.

Length of Kerberos realm. The length, in UTF-16 (CCSID 13488) characters, of the Kerberos realm field.

Length of key ring file. The length, in UTF-16 (CCSID 13488) characters, of the key ring file field.

Length of master server URL. The length, in UTF-16 (CCSID 13488) characters, of the master server URL field.

Length of parent distinguished name. The length, in UTF-16 (CCSID 13488) characters, of the parent distinguished name field.

Length of projected suffix. The length, in UTF-16 (CCSID 13488) characters, of the projected suffix field.

Length of publishing agent name. The length, in UTF-16 (CCSID 13488) characters, of the publishing agent name. The length can be at most 50 characters.

Length of referral server. The length, in UTF-16 (CCSID 13488) characters, of the referral server name.

Length of referral server URL. The length, in UTF-16 (CCSID 13488) characters, of the referral server URL field.

» **Length of server administration URL.** The length, in UTF-16 (CCSID 13488) characters, of the server administration URL field. «

Length of server name. The length, in UTF-16 (CCSID 13488) characters, of the server name field.

Length of suffix. The length, in UTF-16 (CCSID 13488) characters, of the suffix field.

Length of update DN. The length, in UTF-16 (CCSID 13488) characters, of the update DN field.

Length of update password. The length, in UTF-16 (CCSID 13488) characters, of the update password field.

Level indicator. The level indicator of the data supplied for a format. See the format descriptions for possible uses and values of this field.

» **Level of authority integration.** The level of OS/400 authority integration to use to determine if a distinguished name (DN) can become an LDAP administrator. Allowing a user profile to become an LDAP administrator can be done by setting the 'Level of authority integration' to '1' and then authorizing specific user profiles to the 'Directory Server Administrator' function of the operating system through iSeries Navigator's Application support. The Change Function Usage Information (QSYCHFUI) API, with a function ID of QIBM_DIRSRV_ADMIN, can also be used to change the list of users that are allowed to be an LDAP administator. The user profile can be mapped to a DN as a projected user (for example, for user profile 'FRED', and the projected suffix of 'systemA', the projected user's DN would be os400-profile=FRED,cn=accounts,os400-sys=systemA). «

The following special values may be specified:

-1	The value of this field does not change.
» *0*	Do not apply 'Directory Server Administrator' function identifier to bound distinguished names to determine LDAP administrators.
1	Allow bound distinguished names that refer directly to user profiles to become LDAP administrators if the user profile is identified in the 'Directory Server Administrator' function identifier. «

» **Log client messages.** Whether the directory server will log client messages in the server joblog. The following values may be specified:

-1	The value of this field does not change.
0	The directory server will not log client messages in the server joblog.
1	The directory server will log client messages in the server joblog. «

Master server URL. The uniform resource locator (URL) of the master server. This field is specified in UTF-16 (CCSID 13488). The following special value may be specified:

**NONE*	No value is specified.

To leave the value unchanged, specify a length and offset to this field of zero.

Maximum connections. The maximum number of simultaneous connections that can be established with the server. The following special values may be specified:

-1	The value of this field does not change.
0	Do not limit the number of connections.

Note: Starting with V5R1M0, this field is no longer supported and is ignored if a value is passed.

Maximum event registrations for connection. The following special values may be specified:

-1	The value of this field does not change.
0	Do not limit the number of event registrations for connection.

Maximum event registrations for server. The following special values may be specified:

-1 The value of this field does not change.
0 Do not limit the number of event registrations for server.

Maximum age of change log entries. The maximum age, in seconds, of change log entries that can be stored. If the maximum is reached, the change log entries will be deleted starting with the oldest entry. This value only used if 'Change log indicator' is set to 1. The following special values may be specified:

-1 The value of this field does not change.
0 Do not limit the age of change log entries.

Maximum number of change log entries. The maximum number of change log entries that can be stored. If the maximum is reached, the change log entries will be deleted starting with the oldest entry. This value only used if 'Change log indicator' is set to 1. The following special values may be specified:

-1 The value of this field does not change.
0 Do not limit the number of change log entries.

Maximum operations per transaction. The maximum number of operations that are allowed for each transaction. Transaction support allows a group of directory changes to be handled as a single transaction. The following special values may be specified:

-1 The value of this field does not change.

Maximum pending transactions. The maximum number of pending transactions allowed. Transaction support allows a group of directory changes to be handled as a single transaction. The following special value may be specified:

-1 The value of this field does not change.

Nonencrypted port number. The port number to be used for nonencrypted connections. The standard port number is 389. Valid port numbers are in the range 1 to 65535. The following special value may be specified:

-1 The value of this field does not change.

Number of change entries. The number of change entries present in the input data.

Number of database connections. The number of database connections used by the server. Valid numbers are in the range 4 to 32. The following special value may be specified:

-1 The value of this field does not change.

Offset to administrator DN. The offset, in bytes, from the start of the input data area to the administrator DN field.

Offset to administrator password. The offset, in bytes, from the start of the input data area to the administrator password field.

Offset to change entries. The offset, in bytes, from the start of the input data area to the the first change entry.

Offset to database path. The offset, in bytes, from the start of the input data area to the database path field.

Offset to Kerberos administrator ID. The offset, in bytes, from the start of the input data area to the Kerberos administrator ID field.

Offset to Kerberos administrator realm. The offset, in bytes, from the start of the input data area to the Kerberos administrator realm field.

Offset to Kerberos key tab file. The offset, in bytes, from the start of the input data area to the Kerberos key tab file field.

Offset to key ring file. The offset, in bytes, from the start of the input data area to the key ring file field.

Offset to master server URL. The offset, in bytes, from the start of the input data area to the master server URL field.

Offset to parent distinguished name. The offset, in bytes, from the start of the input data area to the parent distinguished name field.

Offset to projected suffix. The offset, in bytes, from the start of the input data area to the projected suffix field.

Offset to referral server. The offset, in bytes, from the start of the input data area to the referral server field.

» **Offset to server administration URL.** The offset, in bytes, from the start of the input data to the server administration URL field. «

Offset to server name. The offset, in bytes, from the start of the input data to the server name field.

Offset to suffix. The offset, in bytes, from the start of the input data area to the suffix field.

Offset to update DN. The offset, in bytes, from the start of the input data area to the update DN field.

Offset to update password. The offset, in bytes, from the start of the input data area to the update password field.

Parent distinguished name. The parent distinguished name for published objects. For example, if the parent distinguished name is ″ou=rochester, o=ibm, c=us″, a published directory object for user John Smith might be ″cn=john smith, ou=rochester, o=ibm, c=us″. This field is specified in UTF-16 (CCSID 13488). To leave the value unchanged, specify a length and offset to this field of zero.

Password format. The format of the encrypted password. The following values may be specified:

-1	The value of this field does not change.
1	Unencrypted.
2	SHA. (Default)
3	MD5.
4	Crypt (The password is one-way hashed using a modified DES algorithm. The ″crypt″ algorithm originally was used by many Unix operating systems for password protection.)

Projected suffix. The suffix under which all projected objects for this server reside including user and group profiles. This field is specified in UTF-16 (CCSID 13488).

Publishing agent name. The agent that will publish information to a directory server and parent distinguished name. This field is specified in UTF-16 (CCSID 13488).

Read only. Whether the directory server will allow updates to be made to the directory contents. The following values may be specified:

-1	The value of this field does not change.
0	Places the directory server into update mode to allow directory updates. This is the normal mode of operation.
1	Places the directory server into read-only mode.

» **Read only projected suffix.** Whether the directory server will allow updates to be made to the projected suffix. The following values may be specified:

-1	The value of this field does not change.
0	Places the directory server projected suffix into update mode to allow updates. This is the normal mode of operation.
1	Places the directory server projected suffix into read-only mode. «

» **Read only schema.** Whether the directory server will allow updates to be made to the directory schema. The following values may be specified:

-1	The value of this field does not change.
0	Places the directory server schema into update mode to allow updates. This is the normal mode of operation.
1	Places the directory server schema into read-only mode. «

Referral port. An optional port number to be returned to a client when a request is made for a directory object that does not reside on this server. The referral port and referral server together are used to form a referral URL. The referral server and port fields must be configured when changing the Server is replica field to make this server a replica. Valid port numbers are in the range 1 to 65535.

Starting with V4R5M0, this field is ignored for format CSVR0100. Referral server information can be changed using the CSVR0600 format of the QgldChgDirSvrA API. The following special values may be specified:

0	No port number is returned as part of the referral.
-1	The value of this field does not change.

Referral server. The IP name or address of a server to return to a client when a request is made for a directory object that does not reside on this server. The referral port and referral server are used together to form a referral URL. The referral server and port fields must be configured when changing the Server is a replica field to make this server a replica. In this case, the referral is typically to the master server. The following special value may be specified:

**NONE*	No value is specified.

Note: Starting with V4R5M0, this field is ignored for format CSVR0100. This field is specified in UTF-16 (CCSID 13488). To leave the value unchanged, specify a length and offset to this field of zero.

Referral server URL. The uniform resource locator (URL) of the referral server. This field is specified in UTF-16 (CCSID 13488).

Reserved. A reserved field. This field must be set to zero.

Schema checking level. The level of schema checking performed by the server. The following values may be specified:

-1	The value does not change.
0	None.
1	LDAP version 2.
2	LDAP version 3 strict.
3	LDAP version 3 lenient.

Search size limit. The maximum number of entries that the server will return for a given search request. The following special values may be specified:

-1	The value of this field does not change.
0	Do not limit the number of entries returned.

Search time limit. The maximum time, in seconds, that the server will spend performing a given search request. The following special values may be specified:

-1	The value of this field does not change.
0	Do not limit the search time.

Security. Whether the server should use encrypted connections. The following values may be specified:

-1	The value does not change
1	Allow nonencrypted connections only
2	Allow encrypted connections only
3	Allow both encrypted and nonencrypted connections

» **Security audit option for objects.** When the QAUDCTL system value is set to *OBJAUD, then object auditing can be done in the directory. See the iSeries Security Reference book for information about Directory Server auditing. The following special values may be specified: «

-1	The value of this field does not change.
0	Do not do object auditing of the directory objects.
1	Audit changes to directory objects.
2	Audit all access to directory objects. This includes search, compare and change.

Server is replica. Whether the server is a master server or a replica server. When this field is changed to make the server a replica, the update DN, update password, and referral fields must be specified. The following values may be specified:

-1	The value of this field does not change.
0	The server is a master for the directory suffixes present on the server.
1	The server is a replica server for the directory suffixes present on the server.

» **Server administration URL.** The server administration URL. This field is specified in UTF-16 (CCSID 13488). To leave the value unchanged, specify a length and offset to this field of zero. «

Server name. The name of the server. This field is specified in UTF-16 (CCSID 13488). To leave the value unchanged, specify a length and offset to this field of zero.

SSL authentication method. The method used during SSL authentication. The following values may be specified:

-1	The value does not change.
1	Server authentication.
3	Server and client authentication.

Suffix. The name of the directory suffix to be added or removed from the server. This field is specified in UTF-16 (CCSID 13488).

Suffix change entries. The list of suffixes to be added or deleted.

Terminate idle connections. The server will terminate idle connections when necessary.

Starting with V5R1M0, this field is no longer supported and is ignored if a value is passed. The following values may be specified:

0	Do not terminate idle connections.
1	Terminate idle connections.

Transaction time limit. The maximum time, in seconds, that the server will spend performing a transaction request. Transaction support allows a group of directory changes to be handled as a single transaction. The following special values may be specified:

-1	The value of this field does not change.

Update DN. The distinguished name that the master server must use when propagating directory updates to this replica server. This field may be specified only when the server is a replica. When either the update DN or the update password field is changed, both must be specified. This field is specified in UTF-16 (CCSID 13488). The following special value may be specified:

**NONE*	No value is specified.

To leave the value unchanged, specify a length and offset to this field of zero.

Update password. The password used when connecting to this server using the update DN. This field may be specified only when the server is a replica. When either the update DN or the update password field is changed, both must be specified. This field is specified in UTF-16 (CCSID 13488). To leave the value unchanged, specify a length and offset to this field of zero. The following special value may be specified:

**NONE*	No value is specified.

Error Messages

Message ID	Error Message Text
CPF2209 E	Library &1 not found.
CPFA0A9 E	Object not found.
CPFA0DB E	Object name not a QSYS object.
CPFA314 E	Memory allocation error.
GLD0204 E	Attribute name not valid.
GLD0205 E	Administrator DN not valid.

Message ID	Error Message Text
GLD0208 E	Key ring file name not valid.
GLD0209 E	Update DN not valid.
GLD020A E	Suffix not valid.
GLD020B E	Referral server name not valid.
GLD020D E	Index rule already defined for attribute.
GLD020E E	Index rule not found for attribute.
GLD0211 E	Value &1 specified at offset &2 in input format &3 is not valid.
GLD0212 E	Field &1 required when server is using SSL.
GLD0215 E	IBM Directory Server for iSeries server has not been configured.
GLD0217 E	A value was specified in list entry &1 that is not valid. Reason code &2.
GLD0219 E	Administrator DN and password both required.
GLD021A E	Field not allowed when server is not a replica.
GLD021B E	Field is required when server is a replica.
GLD021C E	The caller of the API must have *ALLOBJ and *IOSYSCFG special authority to configure the server.
GLD021D E	Error occurred when processing the input list of entries.
GLD021E E	&1 password is not valid.
GLD021F E	The caller of the API must have *AUDIT special authority to set the server auditing information.
GLD0221 E	Offset &1 specified in input data is not valid.
GLD0222 E	Length &1 specified in input data is not valid.
GLD0223 E	Database path not valid.
GLD0227 E	Distinguished names cannot be modified while the server is active.
GLD0229 E	Validation list not found.
GLD022D E	Publishing &1 agent not found.
GLD022E E	Publishing agent &1 is already configured.
GLD022F E	Format not supported.
GLD0231 E	Cannot set the password for a projected user.
GLD0232 E	Configuration contains overlapping suffixes.
GLD0233 E	Cannot set database library to /QSYS.LIB/QUSRDIRCL.LIB.
GLD0235 E	IP address is not valid.
GLD0236 E	Database library must be in system ASP or basic user ASP.

API introduced: V4R3

Top | UNIX-Type APIs | APIs by category

Export LDIF File (QgldExportLdif)

Required Parameter Group:	
1	Input data
Input	Char(*)
2	Length of input data
Input	Binary(4)
3	Format name
Input	Char(8)
4	Error code
I/O	Char(*)
Default Public Authority: *USE	
Library Name/Service Program: QSYS/QGLDUAPI	
Threadsafe: No	

The Export LDIF File (QgldExportLdif) API exports the directory server contents to a Lightweight Directory Access Protocol Data Interchange Format (LDIF) file.

Authorities and Locks

Directory Authority

» The caller must provide the administrator DN and password if the caller does not have *ALLOBJ and *IOSYSCFG special authorities and the caller is not a Directory Server administrator. The caller is a Directory Server administrator if the IBM Directory Server for iSeries has been configured to grant administrator access to authorized users and the caller is authorized to the 'Directory Server Administrator' function of the operating system.

«

Object Authorities

The caller must have Execute (*X) authority to each directory in the path name preceding the name of the LDIF file. The caller must have Write (*W) authority to the LDIF file.

Required Parameter Group

Input data

INPUT; CHAR(*)

Input data required to identify the LDIF file and the administrator name and password. The content and format of this structure are determined by the format name. See "Format of Input Data" on page 260 for a description of these formats.

Length of input data

INPUT; BINARY(4)

The length of the input data structure.

Format name

INPUT; CHAR(8)

The content and format of the input data. The possible format name follows:

LDIF0100 Export LDIF file
LDIF0200 Export LDIF file

See "Format of Input Data" for a description of this format.

Error code
I/O; CHAR(*)

The structure in which to return error information. For the format of the structure, see Error Code Parameter.

Format of Input Data

For details about the format of the input data, see the following section. For details about the fields in each format, see "Field Descriptions" on page 261.

LDIF0100 Format

Offset		Type	Field
Dec	Hex		
0	0	BINARY(4)	Offset to LDIF file
4	4	BINARY(4)	Length of LDIF file
8	8	BINARY(4)	Offset to administrator DN
12	C	BINARY(4)	Length of administrator DN
16	10	BINARY(4)	Offset to administrator password
20	14	BINARY(4)	Length of administrator password
24	18	BINARY(4)	Offset to subtree DN
28	1C	BINARY(4)	Length of subtree DN
		CHAR(*)	LDIF file
		CHAR(*)	Administrator DN
		CHAR(*)	Administrator password
		CHAR(*)	Subtree DN

LDIF0200 Format

Offset		Type	Field
Dec	Hex		
0	0	BINARY(4)	Offset to LDIF file
4	4	BINARY(4)	Length of LDIF file
8	8	BINARY(4)	Offset to administrator DN
12	C	BINARY(4)	Length of administrator DN
16	10	BINARY(4)	Offset to administrator password
20	14	BINARY(4)	Length of administrator password
24	18	BINARY(4)	Offset to subtree DN
28	1C	BINARY(4)	Length of subtree DN

Offset		Type	Field
Dec	Hex		
32	20	BINARY(4)	Level indicator
Additional fields if level indicator is equal to 1 or greater:			
36	24	BINARY(4)	Include cn=localhost
40	28	BINARY(4)	Include cn=pwdpolicy
44	2c	BINARY(4)	Include nested replication contexts
Variable length string fields:			
		CHAR(*)	LDIF file
		CHAR(*)	Administrator DN
		CHAR(*)	Administrator password
		CHAR(*)	Subtree DN

Field Descriptions

Additional fields indicator. Additional fields supplied for a format. See the format descriptions for possible uses and values of this field.

Administrator DN. The distinguished name of the server administrator. This field is specified in UTF-16 (CCSID 13488).

Administrator password. The password for the server administrator. This field is specified in UTF-16 (CCSID 13488).

Include cn=localhost. Indicates whether data located under the distinguished name cn=localhost should be included in the exported data. If format LDIF0100 is used, cn=localhost is not included in the exported data. The following values may be specified:

0 The contents of cn=localhost are not included in the exported data.
1 The contents of cn=localhost are included in the exported data.

Include cn=pwdpolicy. Indicates whether data located under the distinguished name cn=pwdpolicy should be included in the exported data. If format LDIF0100 is used, cn=pwdpolicy is not included in the exported data. The following values may be specified:

0 The contents of cn=pwdpolicy are not included in the exported data.
1 The contents of cn=pwdpolicy are included in the exported data.

Include nested replication contexts. Indicates whether nested replication contexts should be included in the exported data. For example, if a directory contains the replication contexts o=acme and cn=external users,o=acme, this option can be used to export data under the distinguished name o=acme while excluding all entries under the distinguished name cn=external users,o=acme. If format LDIF0100 is used, nested replication contexts are included in the exported data. The following values may be specified:

0 Data from nested replication contexts is not included in the exported data.
1 Data from nested replication contexts is included in the exported data.

LDIF file. The integrated file system path name of the LDIF file to be used. This field is specified in UTF-16 (CCSID 13488).

Length of administrator DN. The length, in UTF-16 (CCSID 13488) characters, of the administrator DN field.

Length of administrator password. The length, in UTF-16 (CCSID 13488) characters, of the administrator password field.

Length of LDIF file. The length, in UTF-16 (CCSID 13488) characters, of the LDIF file field.

Length of subtree DN. The length, in UTF-16 (CCSID 13488) characters, of the subtree DN field.

Level indicator. The level indicator of the data supplied for a format. See the format descriptions for possible uses and values of this field. «

Offset to administrator DN. The offset, in bytes, from the start of the input data to the administrator DN field.

Offset to administrator password. The offset, in bytes, from the start of the input data to the administrator password field.

Offset to LDIF file. The offset, in bytes, from the start of the input data to the LDIF file field.

Offset to subtree DN. The offset, in bytes, from the start of the input data to the subtree DN field.

Subtree DN. The distinguished name (DN) of the root of a directory subtree to export to the LDIF file. This object, and all descendant objects will be exported. To export the entire directory tree, specify 0 (zero) for the offset to subtree DN and length of subtree DN fields. This field is specified in UTF-16 (CCSID 13488).

Error Messages

Message ID	Error Message Text
GLD0202 E	Administrator DN or password not correct.
GLD0213 E	Error opening or creating file.
GLD0215 E	Server has not been configured.
GLD0218 E	*ALLOBJ and *IOSYSCFG special authorities required.
GLD022B E	Cannot find object &1.

API introduced: V4R3

Top | UNIX-Type APIs | APIs by category

Import LDIF File (QgldImportLdif)

Required Parameter Group:	
1	Input data
Input	Char(*)
2	Length of input data
Input	Binary(4)
3	Format name
Input	Char(8)
4	Error code
I/O	Char(*)

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDUAPI

Threadsafe: No

The Import LDIF File (QgldImportLdif) API imports directory server data from a Lightweight Directory Access Protocol Data Interchange Format (LDIF) file.

The IBM Directory Server must be stopped to use this API. To stop the server, use the End TCP/IP Server (ENDTCPSVR SVR(*DIRSRV)) command.

Authorities and Locks

Directory Authority

» The caller must provide the administrator DN and password if the caller does not have *ALLOBJ and *IOSYSCFG special authorities and the caller is not a IBM Directory Server administrator. The caller is a IBM Directory Server administrator if the IBM Directory Server for iSeries has been configured to grant administrator access to authorized users and the caller is authorized to the 'Directory Server Administrator' function of the operating system.

«

Object Authorities

The caller must have Execute (*X) authority to each directory in the path name preceding the name of the LDIF file. The caller must have Read (*R) authority to the LDIF file.

Required Parameter Group

Input data

INPUT; CHAR(*)

Input data required to identify the LDIF file and the administrator name and password. The content and format of this structure are determined by the format name. See "Format of Input Data" on page 264 for a description of these formats.

Length of input data

INPUT; BINARY(4)

The length of the input data structure.

Format name

INPUT; CHAR(8)

The content and format of the input data. The possible format name follows:

LDIF0100 Import LDIF file
LDIF0200 Import LDIF file with options

See "Format of Input Data" for a description of this format.

Error code

I/O; CHAR(*)

The structure in which to return error information. For the format of the structure, see Error code parameter.

Format of Input Data

For details about the format of the input data, see the following section. For details about the fields in each format, see "Field Descriptions" on page 265.

LDIF0100 Format

Offset		Type	Field
Dec	Hex		
0	0	BINARY(4)	Offset to LDIF file
4	4	BINARY(4)	Length of LDIF file
8	8	BINARY(4)	Offset to administrator DN
12	C	BINARY(4)	Length of administrator DN
16	10	BINARY(4)	Offset to administrator password
20	14	BINARY(4)	Length of administrator password
		CHAR(*)	LDIF file
		CHAR(*)	Administrator DN
		CHAR(*)	Administrator password

LDIF0200 Format

Offset		Type	Field
Dec	Hex		
0	0	BINARY(4)	Offset to LDIF file
4	4	BINARY(4)	Length of LDIF file
8	8	BINARY(4)	Offset to administrator DN
12	C	BINARY(4)	Length of administrator DN
16	10	BINARY(4)	Offset to administrator password
20	14	BINARY(4)	Length of administrator password
24	18	BINARY(4)	Level indicator
Additional fields if level indicator is equal to 1 or greater:			
28	1C	BINARY(4)	Replicate imported data

Offset		Type	Field
Dec	Hex		
Variable length string fields:			
		CHAR(*)	LDIF file
		CHAR(*)	Administrator DN
		CHAR(*)	Administrator password

Field Descriptions

Additional fields indicator. Additional fields supplied for a format. See the format descriptions for possible uses and values of this field.

Administrator DN. The distinguished name of the server administrator. This field is specified in UTF-16 (CCSID 13488).

Administrator password. The password for the server administrator. This field is specified in UTF-16 (CCSID 13488).

LDIF file. The integrated file system path name of the LDIF file to be used. This field is specified in UTF-16 (CCSID 13488).

Length of administrator DN. The length, in UTF-16 (CCSID 13488) characters, of the administrator DN field.

Length of administrator password. The length, in UTF-16 (CCSID 13488) characters, of the administrator password field.

Length of LDIF file. The length, in UTF-16 (CCSID 13488) characters, of the LDIF file field.

Level indicator. The level indicator of the data supplied for a format. See the format descriptions for possible uses and values of this field.

Offset to administrator DN. The offset, in bytes, from the start of the input data to the administrator DN field.

Offset to administrator password. The offset, in bytes, from the start of the input data to the administrator password field.

Offset to LDIF file. The offset, in bytes, from the start of the input data to the LDIF file field.

Replicate imported data. Indicates whether imported data should be replicated to replica servers. This option could be used, for example, when initializing an additional master server so that it does not attempt to replicate data to servers already containing this data. If format LDIF0100 is used, imported data is replicated. The following values may be specified Whether the directory server will replicate imported data. The following values may be specified:

0 Imported data is not replicated.
1 Imported data is replicated. The value 1 can only be specified if a subtree DN is specified.

Error Messages

Message ID	Error Message Text
GLD0125 E	IBM Directory Server failed for reason code &4.
GLD0202 E	Administrator DN or password not correct.
GLD0213 E	Error opening or creating file.
GLD0215 E	Server has not been configured.
GLD0218 E	*ALLOBJ and *IOSYSCFG special authorities required.
GLD0225 E	&1 items added to directory, &2 items not added.
GLD0226 E	LDAP server is read-only.

API introduced: V4R3

Top | UNIX-Type APIs | APIs by category

List Directory Server Attributes (QgldLstDirSvrA)

Required Parameter Group:

1	Qualified user space name
Input	Char(20)
2	Format name
Input	Char(8)
3	Error code
I/O	Char(*)

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDUAPI

Threadsafe: No

The List Directory Server Attributes (QgldLstDirSvrA) API retrieves a list of directory server attributes including the following:

- Suffixes present on the server
- Attribute indexes maintained by the underlying database
- Network server publishing attributes associated with the LDAP server.
- IP address information

Authorities and Locks

User Space Library Authority
*EXECUTE

User Space Authority
*CHANGE

User Space Lock
An exclusive, no-read lock is obtained on the list space.

Required Parameter Group

Qualified user space name
INPUT; CHAR(20)

The user space that is to receive the created list. The first 10 characters contain the user space name, and the second 10 characters contain the name of the library where the user space is located. The content and format of this space is determined by the format name. See "Format of Output Data" for a description of these formats.

Format name
INPUT; CHAR(8)

The content and format of the data to be retrieved. The possible format names follow:

LSVR0200	Retrieve a list of suffixes on the server.
LSVR0300	Retrieve a list of database indexes maintained by the server.
LSVR0500	Retrieve a list of network server publishing attributes associated with the LDAP server.
LSVR0600	Retrieve a list of referral servers.
LSVR0800	Retrieve a list of IP addresses

See "Format of Output Data" for a description of these formats.

Error code
I/O; CHAR(*)

The structure in which to return error information. For the format of the structure, see Error Code Parameter.

Format of Output Data

The user space contains:

- A user area
- A generic area
- An input parameter section
- A header section
- A list data section:
  - LSVR0200
  - LSVR0300
  - LSVR0500
  - LSVR0600
  - LSVR0800

For details about the user area and generic header, see User Space Format for List APIs. For details about the remaining items, see the following sections. For detailed descriptions of the fields in the list that is returned, see "Field Descriptions" on page 270.

When you retrieve list entry information from the list space, do not use the entry size that is returned in the generic header. Instead, use the displacement to next entry field that is returned in each list entry. If you do not use the displacement to next entry field, the results may not be valid.

LSVR0200 Format

The LSVR0200 format is used to retrieve a list of the directory suffixes present on this server.

Offset		Type	Field
Dec	Hex		
0	0	BINARY(4)	Displacement to next entry
4	4	BINARY(4)	Displacement to suffix
8	8	BINARY(4)	Length of suffix
12	C	BINARY(4)	Reserved
		CHAR(*)	Suffix

LSVR0300 Format

The LSVR0300 format is used to retrieve information about database indexes maintained by the server. The indexes are used to speed up retrieval of objects when a directory server client searches for specified object attributes.

Starting with V4R5M0, this format is not supported. Database index information is to be retrieved using an LDAP client or the Directory Management Tool (DMT) starting with V4R5M0.

Offset		Type	Field
Dec	Hex		
0	0	BINARY(4)	Displacement to next entry
4	4	BINARY(4)	Displacement to attribute name
8	8	BINARY(4)	Length of attribute name
12	C	BINARY(4)	Index type
16	10	BINARY(4)	Reserved
		CHAR(*)	Attribute name

LSVR0500 Format

The LSVR0500 format is used to retrieve the network server publishing attributes associated with the server.

Offset		Type	Field
Dec	Hex		
0	0	BINARY(4)	Displacement to next entry
16	10	BINARY(4)	Displacement to publishing agent name
12	C	BINARY(4)	Length of publishing agent name
16	10	BINARY(4)	Displacement to server name
20	14	BINARY(4)	Length of server name
24	18	BINARY(4)	Displacement to bind DN
28	1C	BINARY(4)	Length of bind DN
32	20	BINARY(4)	LDAP port number
36	24	BINARY(4)	Connection type
40	28	BINARY(4)	Displacement to parent distinguished name
44	2C	BINARY(4)	Length of parent distinguished name

Offset		Type	Field
Dec	Hex		
48	30	BINARY(4)	Publishing agent disabled
52	34	BINARY(4)	Reserved
56	38	BINARY(4)	Kerberos authentication indicator
60	3C	BINARY(4)	Displacement to Kerberos key tab file
64	40	BINARY(4)	Length of Kerberos key tab file
68	44	BINARY(4)	Displacement to Kerberos principal
72	48	BINARY(4)	Length of Kerberos principal
76	4C	BINARY(4)	Displacement to Kerberos realm
80	50	BINARY(4)	Length of Kerberos realm
		CHAR(*)	Publishing agent name
		CHAR(*)	Server name
		CHAR(*)	Bind DN
		CHAR(*)	Parent distinguished name
		CHAR(*)	Kerberos key tab file
		CHAR(*)	Kerberos principal
		CHAR(*)	Kerberos realm

LSVR0600 Format

The LSVR0600 format is used to retrieve a list of referral servers.

Offset		Type	Field
Dec	Hex		
0	0	BINARY(4)	Displacement to next entry
4	4	BINARY(4)	Displacement to referral server URL
8	8	BINARY(4)	Length of referral server URL.
12	C	BINARY(4)	Reserved
		CHAR(*)	Referral server URL.

LSVR0800 Format

The LSVR0800 format is used to retrieve a list of the IP addresses to which the directory server connects.

Offset		Type	Field
Dec	Hex		
0	0	BINARY(4)	Displacement to next entry
4	4	BINARY(4)	Displacement to IP address
8	8	BINARY(4)	Length of IP address
		CHAR(*)	IP address

Field Descriptions

Attribute name. The name of a directory object attribute for which database indexes will be maintained. This field is specified in UTF-16 (CCSID 13488). The following special value may also be returned:

**DEFAULT* The rules for this attribute apply to all attributes for which no explicit rules have been defined.

Bind DN. A distinguished name to use when publishing objects to the directory.This field is specified in UTF-16 (CCSID 13488). The following special value may be specified:

**NONE* No value is specified.

Connection type. The type of connection to use to the LDAP server. The following values may be returned:

1 Nonsecure
2 Secured, using SSL

Displacement to attribute name. The displacement, in bytes, from the start of the current entry to the attribute name field.

Displacement to bind DN. The displacement, in bytes, from the start of the current entry to the bind DN field.

Displacement to IP address. The displacement, in bytes, from the start of the current entry to the IP address field.

Displacement to Kerberos key tab file. The displacement, in bytes, from the start of the current entry to the Kerberos key tab file field.

Displacement to Kerberos principal. The displacement, in bytes, from the start of the current entry to the Kerberos principal field.

Displacement to Kerberos realm. The displacement, in bytes, from the start of the current entry to the Kerberos realm field.

Displacement to next entry. The displacement, in bytes, from the start of the current entry to the next entry.

Displacement to parent distinguished name. The displacement, in bytes, from the start of the current entry to the parent distinguished name field.

Displacement to publishing agent name. The displacement, in bytes, from the start of the current entry to the publishing agent name field.

Displacement to referral server URL. The displacement, in bytes, from the start of the current entry to the referral server URL field.

Displacement to server name. The displacement, in bytes, from the start of the current entry to the server name field.

Displacement to suffix. The displacement, in bytes, from the start of the current entry to the suffix.

Format name specified. The format name specified on the call to this API.

Index type. The kind of database indexes that will be created for an attribute. Creating database indexes improved the performance of directory searches on those attributes. The following values may be returned:

0 No indexes will be created for the attribute.
1 Equal

IP address. » The IPv4 or IPv6 address of the client for which the directory server will accept connections. The IP address must already exist to be specified. A value of hexadecimal zeroes and leading zeroes is not allowed. An IPv4 address is expressed in standard dotted-decimal form www.xxx.yyy.zzz; for example, 130.99.128.1. An IPv6 address always has at least one occurrence of a colon (':') in the format. Some possible IPv6 address formats would be: ::x (for example, ::1) or ::w.xxx.y.zzz (for example, ::9.130.4.169). For further IPv6 examples and explanation, refer to the Usage Notes section in the Convert IPv4 and IPv6 Addresses Between Text and Binary Form (inet_pton) API. This field is specified in UTF-16 (CCSID 13488).

The following special value may be returned:

«

**ALL* All IP addresses defined on the local system will be bound to the server.

Kerberos authentication indicator. The following special values may be specified:

0 Do not support Kerberos authentications.
1 Support Kerberos authentications.

Kerberos key tab file. The integrated file system path name for the key tab file that contains the server's secret key used for authentication. The QDIRSRV user profile is given authorization to read this file. This field is specified in UTF-16 (CCSID 13488). The following special value may be specified:

**NONE* No value is specified.

Kerberos principal. The principal in the key tab file to use for authentication. This field is specified in UTF-16 (CCSID 13488). The following special value may be specified:

**NONE* No value is specified.

Kerberos realm. The realm where the principal is registered to use for authentication. This field is specified in UTF-16 (CCSID 13488). The following special value may be specified:

**NONE* No value is specified.

LDAP port number. The LDAP server's TCP/IP port.

Length of attribute name. The length, in UTF-16 (CCSID 13488) characters, of the attribute name field.

Length of bind DN. The length, in UTF-16 (CCSID 13488) characters, of the bind DN field.

Length of IP address. The length, in UTF-16 (CCSID 13488) characters, of the IP address field.

Length of Kerberos key tab file. The length, in UTF-16 (CCSID 13488) characters, of the Kerberos key tab file field.

Length of Kerberos principal. The length, in UTF-16 (CCSID 13488) characters, of the Kerberos principal field.

Length of Kerberos realm. The length, in UTF-16 (CCSID 13488) characters, of the Kerberos realm field.

Length of parent distinguished name. The length, in UTF-16 (CCSID 13488) characters, of the parent distinguished name field.

Length of publishing agent name. The length, in UTF-16 (CCSID 13488) characters, of the publishing agent name field.

Length of referral server URL. The length, in UTF-16 (CCSID 13488) characters, of the referral server URL field.

Length of server name. The length, in UTF-16 (CCSID 13488) characters, of the server name field.

Length of suffix. The length, in UTF-16 (CCSID 13488) characters, of the suffix field.

Length of update DN. The length, in UTF-16 (CCSID 13488) characters, of the update DN field.

Parent distinguished name. The parent distinguished name to be used. This field is specified in UTF-16 (CCSID 13488).

Publishing agent name. The agent which will publish information to a directory server and parent distinguished name. This field is specified in UTF-16 (CCSID 13488).

Publishing agent disabled. Indicates whether or not the publishing agent is disabled. The configuration data still exists, but publishing has been disabled for the publishing agent. The following values may be returned:

0	The publishing agent is enabled.
1	The publishing agent is disabled.

Referral server URL. The uniform resource locator (URL) of the referral server. This field is specified in UTF-16 (CCSID 13488).

Reserved. A reserved field. This field must be set to zero.

Server name. The name of the server. This field is specified in UTF-16 (CCSID 13488).

Suffix. The directory name for the starting point of a directory information tree.This field is specified in UTF-16 (CCSID 13488).

Error Messages

Message ID	Error Message Text
CPF24B4 E	Severe error while addressing parameter list.
GLD0215 E	Server has not been configured.
GLD022F E	Format not supported.

API introduced: V4R3

Publish Directory Object (QgldPubDirObj)

Required Parameter Group:

1	Input data
Input	Char(*)
2	Length of input data
Input	Binary(4)
3	Format name
Input	Char(8)
4	Error code
I/O	Char(*)

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDPAPI

Threadsafe: No

The Publish Directory Object (QgldPubDirObj) API publishes objects to the directory server. It can be used to perform the following publishing requests:

- Add a new object to the directory.
- Delete an object from the directory.
- Change an object in the directory.
- Change the relative distinguished name of an object in the directory server.

Before this API can be called, the Directory Services property page for the system must be configured. This can be done from iSeries Navigator or by using the Change Directory Server Attributes (QgldChgDirSrvA) API. The directory server indicates the server to which objects will be published. The parent distinguished name indicates the suffix in the directory to which objects will be published. This parent distinguished name is referred to as a publish point.

Authorities and Locks

*ALLOBJ special authority is required to use this API.

Required Parameter Group

Input data
INPUT; CHAR(*)

A variable that contains the input data. See “Format of Input Data” on page 274 for a description of the data associated with a specific format name.

Length of input data
INPUT; BINARY(4)

The length of the input data area. The maximum value for this parameter is 16 776 704.

Format name

INPUT; CHAR(8)

The format name identifying the type of publishing request. The possible format names follow:

POBJ0100	Add a new object to the directory server.
POBJ0200	Delete an object from the directory server.
POBJ0300	Change an object in the directory server.
POBJ0400	Change the relative distinguished name of an object in the directory server.

See "Format of Input Data" for a description of these formats.

Error code

I/O; CHAR(*)

The structure in which to return error information. For the format of the structure, see Error Code Parameter.

Format of Input Data

For details about the format of the input data, see the following sections. For details about the fields in each format, see "Field Descriptions" on page 276.

POBJ0100 Format

This format is used to add a new object to the directory server.

Offset			
Dec	**Hex**	**Type**	**Field**
0	0	BINARY(4)	Offset to publishing agent name
4	4	BINARY(4)	Length of publishing agent name
8	8	BINARY(4)	Offset to object RDN
12	C	BINARY(4)	Length of object RDN
16	10	BINARY(4)	Offset to attribute entries
20	14	BINARY(4)	Number of attribute entries
24	18	CHAR(40)	Reserved
		CHAR(*)	Publishing agent name
		CHAR(*)	Object RDN
Attribute entries:			
0	0	BINARY(4)	Displacement to next entry
4	4	BINARY(4)	Displacement to attribute name
8	8	BINARY(4)	Length of attribute name
12	C	BINARY(4)	Displacement to attribute values
16	10	BINARY(4)	Number of attribute values
20	14	BINARY(4)	Attribute value data type
24	18	CHAR(8)	Reserved
		CHAR(*)	Attribute name
Attribute values:			
0	0	BINARY(4)	Displacement to next value
4	4	BINARY(4)	Displacement to attribute value
8	8	BINARY(4)	Length of attribute value

Offset		Type	Field
Dec	Hex		
12	C	CHAR(4)	Reserved
		CHAR(*)	Attribute value

POBJ0200 Format

This format is used to delete an object from the directory server.

Offset		Type	Field
Dec	Hex		
0	0	BINARY(4)	Offset to publishing agent name
4	4	BINARY(4)	Length of publishing agent name
8	8	BINARY(4)	Offset to object RDN
12	C	BINARY(4)	Length of object RDN
16	10	BINARY(4)	Delete directory subtree
20	14	CHAR(44)	Reserved
		CHAR(*)	Publishing agent name
		CHAR(*)	Object RDN

POBJ0300 Format

This format is used to change an object in the directory server.

Offset		Type	Field
Dec	Hex		
0	0	BINARY(4)	Offset to publishing agent name
4	4	BINARY(4)	Length of publishing agent name
8	8	BINARY(4)	Offset to object RDN
12	C	BINARY(4)	Length of object RDN
16	10	BINARY(4)	Offset to modification entries
20	14	BINARY(4)	Number of modification entries
24	18	BINARY(4)	Add object if it does not exist
28	1C	CHAR(36)	Reserved
		CHAR(*)	Publishing agent name
		CHAR(*)	Object RDN
Modification entries:			
0	0	BINARY(4)	Displacement to next entry
4	4	BINARY(4)	Change type
8	8	BINARY(4)	Displacement to attribute entries
12	C	BINARY(4)	Number of attribute entries
Attribute entries:			
0	0	BINARY(4)	Displacement to next entry

Offset		Type	Field
Dec	Hex		
4	4	BINARY(4)	Displacement to attribute name
8	8	BINARY(4)	Length of attribute name
12	C	BINARY(4)	Displacement to attribute values
16	10	BINARY(4)	Number of attribute values
20	14	BINARY(4)	Attribute value data type
24	18	CHAR(8)	Reserved
		CHAR(*)	Attribute name
Attribute values:			
0	0	BINARY(4)	Displacement to next value
4	4	BINARY(4)	Displacement to attribute value
8	8	BINARY(4)	Length of attribute value
12	C	CHAR(4)	Reserved
		CHAR(*)	Attribute value

POBJ0400 Format

This format is used to change the relative distinguished name (RDN) of an object in the directory server.

Offset		Type	Field
Dec	Hex		
0	0	BINARY(4)	Offset to publishing agent name
4	4	BINARY(4)	Length of publishing agent name
8	8	BINARY(4)	Offset to object RDN
12	C	BINARY(4)	Length of object RDN
16	10	BINARY(4)	Offset to new object RDN
20	14	BINARY(4)	Length of new object RDN
24	18	BINARY(4)	Delete old RDN
28	1C	CHAR(36)	Reserved
		CHAR(*)	Publishing agent name
		CHAR(*)	Object RDN
		CHAR(*)	New object RDN

Field Descriptions

Add object if it does not exist. Create the object if a request is made to modify an object that does not exist. The following values may be specified:

0 Do not create the object if it does not exist.

1 Create the object if it does not exist. All required attributes for the object must be specified on the API in order for the object to be successfully created.

Attribute name. The name of a directory object attribute. This field is specified in UTF-16 (CCSID 13488).

Attribute value. The value of a directory object attribute.

Attribute value data type. The type of data for the attribute values. The following values may be specified.

1	The attribute values are specified in UTF-16 (CCSID 13488).
2	The attribute values contain binary data.
3	The attribute values contain integer data.
4	The attribute values contain boolean data.

Change type. The type of change being made to a directory object. The following values may be specified:

1	Add a new attribute
2	Delete an attribute
3	Replace an attribute
4	Add an attribute if it does not exist
5	Add an attribute value if it does not exist
6	Delete an attribute if it exists
7	Delete an attribute value if it exists

Delete directory subtree. The directory object and any child directory objects should be deleted. The following values may be specified:

0	Do not delete the directory subtree. Only the directory object itself will be deleted.
1	Delete the directory subtree.
2	Delete the directory subtree. The root of the subtree will not be deleted.

Delete old RDN. The old relative distinguished name (RDN) of a directory object should be deleted. The following values may be specified:

0	Do not delete the old RDN. The old RDN attribute value will be retained as an attribute of the object.
1	Delete the old RDN.

Displacement to attribute entries. The displacement, in bytes, from the start of the current entry to the attribute entries.

Displacement to attribute name. The displacement, in bytes, from the start of the current entry to the attribute name field.

Displacement to attribute value. The displacement, in bytes, from the start of the current entry to the attribute value field.

Displacement to attribute values. The displacement, in bytes, from the start of the current entry to the attribute values.

Displacement to next entry. The displacement, in bytes, from the start of the current entry to the next entry in the input data.

Displacement to next value. The displacement, in bytes, from the start of the current value to the next value in the input data.

Length of attribute name. The length, in Unicode characters, of the attribute name field.

Length of attribute value. The length of the attribute value field. If the attribute value is specified in UTF-16 (CCSID 13488), this is the length in Unicode characters. If the attribute value contains binary data, this is the length in bytes. If the attribute value contains integer or boolean data, this field must contain the value 4.

Length of new object RDN. The length, in Unicode characters, of the new object RDN field.

Length of object RDN. The length, in Unicode characters, of the object RDN field.

Length of publishing agent name. The length, in Unicode characters, of the publishing agent name field.

New object RDN. The new relative distinguished name (RDN) of the directory object. This field is specified in UTF-16 (CCSID 13488).

Number of attribute entries. The number of attribute entries.

Number of attribute values. The number of attribute values.

Number of modification entries. The number of modification entries.

Object RDN. The relative distinguished name (RDN) of the directory object being published. This name, combined with the publishing point specified during configuration, form a distinguished name (DN). This field is specified in UTF-16 (CCSID 13488). For example, if the publishing point is 'O=ACME Corp., C=US' and the object RDN is 'CN=Bart', the object DN to be published is 'CN=Bart, O=ACME Corp., C=US'.

Offset to attribute entries. The offset, in bytes, from the start of the input data area to the attribute entries.

Offset to modification entries. The offset, in bytes, from the start of the input data area to the modification entries.

Offset to new object RDN. The offset, in bytes, from the start of the input data area to the new object RDN field.

Offset to object RDN. The offset, in bytes, from the start of the input data area to the object RDN field.

Offset to publishing agent name. The offset, in bytes, from the start of the input data area to the publishing agent name field.

Publishing agent name. The agent making the publishing request. This determines where in the directory the object will be published. The publishing agent information must be configured using the QgldChgDirSvrA API before calling this API. This field is specified in UTF-16 (CCSID 13488).

Reserved. A reserved field. This field must be set to binary zero.

Error Messages

Message ID	Error Message Text
CPFA314 E	Memory allocation error.
CPFB802 E	The caller of the API must have *ALLOBJ special authority.
CPFB803 E	Publishing agent &1 is not configured or has been disabled.
CPFB805 E	Value specified in input data is not valid.

API introduced: V4R4

Retrieve Directory Server Attributes (QgldRtvDirSvrA)

Required Parameter Group:	
1	Receiver variable
Output	Char(*)
2	Length of receiver variable
Input	Binary(4)
3	Format name
Input	Char(8)
4	Error code
I/O	Char(*)

Default Public Authority: *USE

Library Name/Service Program: QSYS/QGLDUAPI

Threadsafe: No

The Retrieve Directory Server Attributes (QgldRtvDirSvrA) API retrieves information about the directory server configuration. It can be used to retrieve information about:

- General server properties
- Encrypted communications configuration. The Secure Sockets Layer (SSL) is used for encrypted communications.
- Performance settings
- Auditing settings

Authorities and Locks

No OS/400 authority is required for all formats.

Required Parameter Group

Receiver variable
OUTPUT; CHAR(*)

The variable to receive output data. See "Format of Output Data" on page 280 for a description of the format of the output data associated with a specific format name.

Length of receiver variable
INPUT; BINARY(4)

The length of the receiver variable area.

Format name
INPUT; CHAR(8)

The format name identifying the type of information to be retrieved. The possible format names follow:

RSVR0100	Basic server configuration
RSVR0400	Attributes for publishing users in an LDAP directory
RSVR0700	Server auditing information
RSVR0900	Server administration information

See "Format of Output Data" for a description of these formats.

Error code

I/O; CHAR(*)

The structure in which to return error information. For the format of the structure, see Error Code Parameter.

Format of Output Data

For details about the format of the output data, see the following sections. For details about the fields in each format, see "Field Descriptions" on page 283.

RSVR0100 Format

This format is used to retrieve basic server configuration information.

Offset			
Dec	**Hex**	**Type**	**Field**
0	0	BINARY(4)	Bytes returned
4	4	BINARY(4)	Bytes available
8	8	BINARY(4)	Version
12	C	BINARY(4)	Read only
16	10	BINARY(4)	Server is replica
20	14	BINARY(4)	Security
24	18	BINARY(4)	Unencrypted port number
28	1C	BINARY(4)	Encrypted port number
32	20	BINARY(4)	Current cipher protocols
36	24	BINARY(4)	Installed cipher protocols
40	28	BINARY(4)	Search time limit
44	2C	BINARY(4)	Search size limit
48	30	BINARY(4)	Maximum connections
52	34	BINARY(4)	Reserved
56	38	BINARY(4)	Referral port
60	3C	BINARY(4)	Password format
64	40	BINARY(4)	Offset to referral server
68	44	BINARY(4)	Length of referral server
72	48	BINARY(4)	Offset to administrator distinguished name (DN)
76	4C	BINARY(4)	Length of administrator DN
80	50	BINARY(4)	Offset to update DN
84	54	BINARY(4)	Length of update DN
88	58	BINARY(4)	Reserved

Offset		Type	Field
Dec	Hex		
92	5C	BINARY(4)	Reserved
96	60	BINARY(4)	Offset to database path
100	64	BINARY(4)	Length of database path
104	68	BINARY(4)	Reserved
108	6C	BINARY(4)	SSL authentication method
112	70	BINARY(4)	Number of database connections
116	74	BINARY(4)	Schema checking level
120	78	BINARY(4)	Offset to master server URL
124	7C	BINARY(4)	Length of master server URL
128	80	BINARY(4)	Change log indicator
132	84	BINARY(4)	Maximum number of change log entries
136	88	BINARY(4)	Terminate idle connections
140	8C	BINARY(4)	Kerberos authentication indicator
144	90	BINARY(4)	Offset to Kerberos key tab file
148	94	BINARY(4)	Length of Kerberos key tab file
152	98	BINARY(4)	Kerberos to DN mapping indicator
156	9C	BINARY(4)	Offset to Kerberos administrator ID
160	A0	BINARY(4)	Length of Kerberos administrator ID
164	A4	BINARY(4)	Offset to Kerberos administrator realm
168	A8	BINARY(4)	Length of Kerberos administrator realm
172	AC	BINARY(4)	Event notification registration indicator
176	B0	BINARY(4)	Maximum event registrations for connection
180	B4	BINARY(4)	Maximum event registrations for server
184	B8	BINARY(4)	Maximum operations per transaction
188	BC	BINARY(4)	Maximum pending transactions
192	C0	BINARY(4)	Transaction time limit
196	C4	BINARY(4)	ACL model
200	C8	BINARY(4)	Level of authority integration
204	CC	BINARY(4)	Offset to projected suffix
208	D0	BINARY(4)	Length of projected suffix
» 212	D4	BINARY(4)	Read only schema
216	D8	BINARY(4)	Read only projected suffix
220	DC	BINARY(4)	Log client messages
224	E0	BINARY(4)	Maximum age of change log entries «
		CHAR(*)	Referral server
		CHAR(*)	Administrator DN
		CHAR(*)	Update DN
		CHAR(*)	Database path
		CHAR(*)	Master server URL
		CHAR(*)	Kerberos key tab file

Offset		Type	Field
Dec	Hex		
		CHAR(*)	Kerberos administrator ID
		CHAR(*)	Kerberos administrator realm
		CHAR(*)	Projected suffix

RSVR0400 Format

This format is used to retrieve the attributes for publishing users in an LDAP directory. User information from the system distribution directory can be published to an LDAP server by the Synchronize System Distribution Directory to LDAP (QGLDSSDD) API and from iSeries Navigator. The publishing attributes define how to publish user information.

Offset		Type	Field
Dec	Hex		
0	0	BINARY(4)	Bytes returned
4	4	BINARY(4)	Bytes available
8	8	BINARY(4)	Offset to server name
12	C	BINARY(4)	Length of server name
16	10	BINARY(4)	LDAP port number
20	14	BINARY(4)	Connection type
24	18	BINARY(4)	Offset to parent distinguished name.
28	1C	BINARY(4)	Length of parent distinguished name.
		CHAR(*)	Server name
		CHAR(*)	Parent distinguished name.

RSVR0700 Format

This format is used to retrieve server auditing configuration information.

Offset		Type	Field
Dec	Hex		
0	0	BINARY(4)	Bytes returned
4	4	BINARY(4)	Bytes available
8	8	BINARY(4)	Security audit option for objects

RSVR0900 Format

This format is used to retrieve server administration information.

Offset		Type	Field
Dec	Hex		
0	0	BINARY(4)	Bytes returned
4	4	BINARY(4)	Bytes available

Offset		Type	Field
Dec	Hex		
8	8	BINARY(4)	Offset to server administration URL
12	C	BINARY(4)	Length of server administration URL
		CHAR(*)	Server administration URL

Field Descriptions

ACL model. The ACL model that is being used. The following special values may be returned:

0 The ACL model being used supports access-class level permissions. This is the ACL model the directory server used prior to V5R1M0.
1 The ACL model being used supports both access-class level permissions and attribute-level ACL permissions.

Administrator DN. A distinguished name (DN) that has access to all objects in the directory. This field is specified in UTF-16 (CCSID 13488).

Bytes available. The number of bytes of data available to be returned. All available data is returned if enough space is provided.

Bytes returned. The number of bytes of data returned.

Change log indicator. The indicator of whether a change log exists for entries that have been added, changed and deleted. The following values may be returned:

0 No, a change log does not exist
1 Yes, a change log exists

Connection type. The type of connection to use to the LDAP server. The following values may be returned:

1 Nonsecure
2 Secured, using SSL

Current cipher protocols. The cipher protocols that the server allows when using encrypted connections. The value is the sum of zero or more of the following values:

0x0100 Triple Data Encryption Standard (DES) Secure Hash Algorithm (SHA) (U.S.)
0x0200 DES SHA (U.S)
0x0400 Rivest Cipher 4 (RC4) SHA (U.S.)
0x0800 RC4 Message Digest (MD) 5 (U.S.)
0x1000 RC2 MD5 (export)
0x2000 RC4 MD5 (export)
0x4000 Advanced Encryption Standard (AES) SHA (U.S.)

Database path. The integrated file system path name of the library containing the directory database. This field is specified in UTF-16 (CCSID 13488).

Encrypted port number. The port number to use for encrypted connections. The standard port number for encrypted connections is 636.

Event notification registration indicator. Indicator of whether to allow client to register for event notification. The following special values may be returned:

0 Do not allow clients to register for event notification.
1 Allow clients to register for event notification.

Installed cipher protocols. The cipher protocols installed on the system. Refer to the current cipher protocols field for a description of the values.

Kerberos administrator ID. The name of the Kerberos administrator. This field is specified in UTF-16 (CCSID 13488). The following special value may be returned:

**NONE* No value is specified.

Kerberos administrator realm. The realm in which the kerberos administrator is registered. This field is specified in UTF-16 (CCSID 13488). The following special value may be returned:

**NONE* No value is specified.

Kerberos authentication indicator. The following special values may be returned:

0 Do not support Kerberos authentications.
1 Support Kerberos authentications.

Kerberos key tab file. The integrated file system path name for the key tab file that contains the server's secret key used for authentication. This field is specified in UTF-16 (CCSID 13488). The following special value may be returned:

**NONE* No value is specified.

Kerberos to DN mapping indicator.

0 Map the Kerberos ID to pseudo DN. A pseudo DN can be used to uniquely identify an LDAP user object of the form 'ibm-kerberosName=principal@realm' or 'ibm-kn=principal@realm'.
1 Use associated DN in directory. The LDAP server will attempt to find an entry in the directory that contains the kerberos principle and realm as one of its attributes. Once found, this DN will then be used to determine the client's authorizations to the directory.

LDAP port number. The LDAP server's TCP/IP port.

Length of administrator DN. The length, in UTF-16 (CCSID 13488) characters, of the administrator DN field.

Length of database path. The length, in UTF-16 (CCSID 13488) characters, of the database path field.

Length of Kerberos administrator ID. The length, in UTF-16 (CCSID 13488) characters, of the Kerberos Administrator ID field.

Length of Kerberos administrator realm. The length, in UTF-16 (CCSID 13488) characters, of the Kerberos administrator realm field.

Length of Kerberos key tab file. The length, in UTF-16 (CCSID 13488) characters, of the Kerberos key tab file field.

Length of master server URL. The length, in UTF-16 (CCSID 13488) characters, of the master server URL field.

Length of parent distinguished name. The length, in UTF-16 (CCSID 13488) characters, of the parent distinguished name field.

Length of projected suffix. The length, in UTF-16 (CCSID 13488) characters, of the projected suffix field

» **Length of server administration URL.** The length, in UTF-16 (CCSID 13488) characters, of the server administration URL field. «

Length of server name. The length, in UTF-16 (CCSID 13488) characters, of the server name field.

Length of referral server. The length, in UTF-16 (CCSID 13488) characters, of the referral server field.

Length of update DN. The length, in UTF-16 (CCSID 13488) characters, of the update DN field.

Level of authority integration. The level of OS/400 authority integration to use to determine if a distinguished name (DN) can become an LDAP administrator. The following special values may be specified:

» *0* Do not apply 'Directory Server Administrator' (QIBM_DIRSRV_ADMIN) function identifier to bound distinguished names to determine LDAP administrators.

1 Allow bound distinguished names that refer directly to user profiles to become LDAP administrators if the user profile is identified in the 'Directory Server Administrator' (QIBM_DIRSRV_ADMIN) function identifier. «

» **Log client messages.** Whether the directory server will log client messages in the server joblog. The following values may be returned:

0 The directory server will not log client messages in the server joblog.

1 The directory server will log client messages in the server joblog. «

Master server URL. The uniform resource locator (URL) of the master server. This field is specified in UTF-16 (CCSID 13488). The following special value may be returned:

**NONE* No value is specified.

Maximum connections. Returns the maximum number of simultaneous connections that can be established with the server.

Starting with V5R1M0, this field is no longer supported and the value returned is 0. The following special value may be returned:

0 Do not limit the number of connections.

Maximum event registrations for connection. The following special values may be returned:

0 Do not limit the number of event registrations for connection.

Maximum event registrations for server. The following special values may be returned:

0 Do not limit the number of event registrations for server.

» **Maximum age of change log entries.** The age, in seconds, of change log entries that can be stored. If the maximum is reached, the change log entries will be deleted starting with the oldest entry. This value only valid if 'Change log indicator' is set to 1. The following special values may be returned:

0 The age of change log entries is not limited. «

Maximum number of change log entries. The maximum number of change log entries that can be stored. If the maximum is reached, the change log entries will be deleted starting with the oldest entry. This value only valid if 'Change log indicator' is set to 1. The following special values may be returned:

0 The number of change log entries is not limited.

Maximum operations per transaction. The maximum number of operations that are allowed for each transaction. Transaction support allows a group of directory changes to be handled as a single transaction.

Maximum pending transactions. The maximum number of pending transactions allowed. Transaction support allows a group of directory changes to be handled as a single transaction.

Number of database connections. The number of database connections used by the server.

Offset to administrator DN. The offset, in bytes, from the start of the receiver variable to the administrator DN field.

Offset to database path. The offset, in bytes, from the start of the receiver variable to the database path field.

Offset to Kerberos administrator ID. The offset, in bytes, from the start of the input data area to the Kerberos administrator ID field.

Offset to Kerberos administrator realm. The offset, in bytes, from the start of the input data area to the Kerberos administrator realm field.

Offset to Kerberos key tab file. The offset, in bytes, from the start of the input data area to the Kerberos key tab file field.

Offset to master server URL. The offset, in bytes, from the start of the receiver variable to the master server URL field.

Offset to parent distinguished name. The offset, in bytes, from the start of the receiver variable to the parent distinguished name field.

Offset to projected suffix. The offset, in bytes, from the start of the input data area to the projected suffix field.

Offset to referral server. The offset, in bytes, from the start of the receiver variable to the referral server field.

» **Offset to server administration URL.** The offset, in bytes, from the start of the receiver variable to the server administration URL field. «

Offset to server name. The offset, in bytes, from the start of the receiver variable to the server name field.

Offset to update DN. The offset, in bytes, from the start of the receiver variable to the update DN field.

Parent distinguished name. The parent distinguished name for published objects. For example, if the parent distinguished name is 'ou=rochester, o=ibm, c=us', a published directory object for user John Smith might be 'cn=john smith, ou=rochester, o=ibm, c=us'. This field is specified in UTF-16 (CCSID 13488).

Password format. The format of the encrypted password. The following values may be returned:

1	Unencrypted.
2	SHA. (Default)
3	MD5.
4	Crypt (The password is one-way hashed using a modified DES algorithm. The 'crypt' algorithm originally was used by many UNIX operating systems for password protection.)

Projected suffix. The suffix under which all projected objects for this server reside including user and group profiles. This field is specified in UTF-16 (CCSID 13488).

Read only. Whether the directory server allows changes to be made to the directory contents. The following values may be returned:

0	The directory server is not read only. Updates are allowed to the directory.
1	The directory server is read only. Updates are not allowed to the directory.

» **Read only projected suffix.** Whether the directory server will allow updates to be made to the projected suffix. The following values may be returned:

0	The directory server projected suffix is not read only. Updates are allowed to the projected suffix.
1	The directory server projected suffix is read only. Updates are not allowed to the projected suffix.

«

» **Read only schema.** Whether the directory server will allow updates to be made to the directory schema. The following values may be returned:

0	The directory server schema is not read only. Updates are allowed to the schema.
1	The directory server schema is read only. Updates are not allowed to the schema. «

Referral port. An optional port number to be returned to a client when a request is made for a directory object that does not reside on this server. The referral port and referral server together are used to form a referral URL. The following special value may be returned:

0	The LDAP port is not specified, the client should use the default LDAP port.

Referral server. The IP name of a server to return to a client when a request is made for a directory object that does not reside on this server. This field is specified in UTF-16 (CCSID 13488). The referral port and referral server are used together to form a referral URL. The following special value may be returned:

**NONE*	No value is specified.

Reserved. A reserved field. This field must be set to zero.

Schema checking level. The level of schema checking performed by the server. The following values may be returned:

0 None.
1 LDAP version 2.
2 LDAP version 3 strict.
3 LDAP version 3 lenient.

Search size limit. The maximum number of entries that the server will return for a given search request. The following special value may be returned:

0 Do not limit the number of entries returned.

Search time limit. The maximum time, in seconds, that the server will spend performing a given search request. The following special value may be returned:

0 Do not limit the search time.

Security. Whether the server is to use encrypted connections. The following values may be returned:

0 Allow unencrypted connections only.
1 Allow encrypted connections only.
2 Allow both encrypted and unencrypted connections.

Note: SSL is used for encrypted connections to the server.

» **Security audit option for objects.** When the QAUDCTL system value is set to *OBJAUD, then object auditing can be done in the directory. See the iSeries Security Reference book for information about Directory Server auditing. The following special values may be returned: «

0 Do not do object auditing of the directory objects.
1 Audit changes to directory objects.
2 Audit all access to directory objects. This includes search, compare and change.

Server is replica. Whether the server is a master server or a replica server. The following values may be returned:

0 The server is a master server for the directory suffixes present on the server.
1 The server is a replica server for the directory suffixes present on the server.

» **Server administration URL.** The server administration URL. This field is specified in UTF-16 (CCSID 13488). «

Server name. The name of the server. This field is specified in UTF-16 (CCSID 13488).

SSL authentication method. The method used during SSL authentication. The following values may be returned:

1 Server authentication.
3 Server and client authentication.

Terminate idle connections. The server will terminate idle connections when necessary. The following values may be returned:

0 Do not terminate idle connections.
1 Terminate idle connections.

Note: Starting with V5R1M0, this field is no longer supported and the value returned is 0.

Transaction time limit. The maximum time, in seconds, that the server will spend performing a transaction request. Transaction support allows a group of directory changes to be handled as a single transaction.

Unencrypted port number. The port number to be used for unencrypted connections. The standard port number is 389.

Update DN. The distinguished name that the master server must use when propagating directory updates to this replica server. This field is specified in UTF-16 (CCSID 13488). The following value may be returned:

**NONE* No value is specified.

Use encrypted connections. Whether this server should use encrypted connections when making updates to the replica server. The following values may be returned:

0 Use unencrypted connections.
1 Use encrypted connections.

Version. Returns the version of the LDAP server.

Error Messages

Message ID	Error Message Text
CPFA314 E	Memory allocation error.
GLD0215 E	Server has not been configured.

API introduced: V4R3

Top | UNIX-Type APIs | APIs by category

Synchronize System Distribution Directory to LDAP (QGLDSSDD)

Required Parameter Group:	
1	Option
Input	Char(10)
2	LDAP user ID
Input	Char(1024)
3	LDAP user ID password
Input	Char(128)
4	No longer used
Input	Char(1024)
5	No longer used
Input	Char(128)
6	Error Code
I/O	Char(*)
Default Public Authority: *EXCLUDE	
Threadsafe: No	

The Synchronize System Distribution Directory to LDAP (QGLDSSDD) API publishes system distribution directory entries to an LDAP directory and keeps the LDAP directory synchronized with changes made in the system distribution directory. The following users from the system distribution directory are published:

- Local users
- Remote users that have been added to the local system and have a Simple Mail Transfer Protocol (SMTP) address

The system distribution directory users that are not published are:

- Shadowed users
- Remote users that do not have a SMTP address

The Directory Services property page must be set up. In V4R4 and later, users are automatically published when you set up users in the Directory Services property page for the LDAP server to publish under. Prior to V4R4, this API (QGLDSSDD) must be called regularly to publish the users because publishing users is not automatic prior to V4R4. See “Usage Notes” on page 296 for the procedures for setting up the Directory Services property page.

If you are using SSL, the SSL key database information is configured using Digital Certificate Manager. See “Usage Notes” on page 296 for information on accessing the Digital Certificate Manager.

When using a V4R4 or later iSeries Navigator client to publish users to a V4R4 or later server, the following no longer applies because this is done automatically. The synchronization is restricted to one LDAP server and one distinguished name to publish to. If you need to change the LDAP server or distinguished name that the system distribution directory information gets published to, first end the synchronization (using option value *END). Then change the LDAP server attributes from iSeries

Navigator or from the Change Directory Server Attributes (QgldChgDirSrvA) API. You can then use option *ALL to initialize all the system distribution directory data to the new LDAP server or distinguished name.

Before users can be published, the host and domain name must be set using the Change TCP/IP Domain (CHGTCPDMN) command. The keywords that must be set are HOSTNAME and DMNNAME.

LDAP uses the distinguished name (dn) as the key for the user. For the system distribution directory entries in LDAP, the distinguished name is the common name (cn) combined with the distinguished name that LDAP is being published to. See "Distinguished Name (dn) and Common Name (cn)" on page 292 for more information.

Note that if changes are made in the LDAP directory, these changes are not synchronized back to the system distribution directory.

Some entries are automatically prevented from being published to LDAP. They are the *ANY system distribution directory entries and some other entries that are IBM-supplied starting with Q (QSECOFR, QDOC, QSYS, QDFTOWN, QUSER for example). A specific user can be prevented from being published to LDAP by doing the following:

1. Add the user-defined field QREPL QLDAP to the system distribution directory. This needs to be done only once per system.

   ```
   CHGSYSDIRA USRDFNFLD((QREPL QLDAP *ADD *DATA 4))
   ```

2. Specify *NO as the value for the QREPL QLDAP user-defined field for those users that you do not want to replicate to LDAP. Any other value or absence of the QREPL QLDAP user-defined field will replicate the user. It is recommended that you either leave the QREPL QLDAP value blank or specify *YES if you want the user to be replicated.

   For example, using Work with Directory Entries (WRKDIRE), option 1 to add a user or option 2 to change a user, press the F20 key to specify user-defined fields. When using the ADDDIRE or CHGDIRE commands, specify USRDFNFLD((QREPL QLDAP *NO)) to prevent the user from being replicated.

3. If the user is already replicated to LDAP, and *NO is specified in the QREPL QLDAP user-defined field, then the user will be deleted from the LDAP directory. Likewise, if the value of the QREPL QLDAP user-defined field is changed to anything but *NO, then the user will be added to the LDAP directory.

As an administrator, you must understand some additional items that are needed to synchronize the system distribution directory to LDAP. These include the following:

- inetOrgPerson and publisher object classes used in synchronization.
- How the system distribution directory fields map to LDAP attributes.
- What is a distinguished name and common name and why they are important for synchronization.
- How the OS/400 user profile field is used in LDAP.

See Directory Services (LDAP): Question and Answers for additional information on publishing users.

inetOrgPerson and publisher Object Class

If your LDAP server is not on OS/400, you must ensure that the inetOrgPerson and publisher object classes are defined in the schema file of the server. The inetOrgPerson object class is used in LDAP to store the system distribution directory information. The publisher object class requires a new attribute, publisherName. See SecureWay Directory Schema for documentation on the inetOrgPerson and publisher object class.

System Distribution Directory to LDAP Mapping

The system distribution directory entry is published to the LDAP directory by using the inetOrgPerson object class. The following table describes the mapping of system distribution directory fields to attributes of the inetOrgPerson object class.

Table 1: System Distribution Directory Fields Mapped to LDAP Attributes	
System Distribution Directory Field	**LDAP Attribute**
User profile	UID
Descriptions	description
Last name	sn (surname), cn (common name)
First name	givenName, cn (common name)
Preferred name	cn (common name)
Full name	cn (common name)
User ID	cn (common name)
Department	departmentNumber
Job title	title
Telephone number 1 & 2	telephoneNumber
FAX telephone number	facsimileTelephoneNumber
Office	roomNumber
Address lines 1-4	registeredAddress
SMTP name	mail

If the field is blank in the system distribution directory, then the attribute is not created in LDAP for that user, with the following exceptions:

- Last name: If last name is blank, then the user ID is used in the LDAP directory for the surname (sn) attribute.
- SMTP name: When a user has a SMTP name, the SMTP userID (SMTPAUSRID) and SMTP domain (SMTPDMN), or SMTP route (SMTPRTE) is used in the following format: SMTPAUSRID@SMTPDMN or SMTPRTE if they just have a route. For local users, if the SMTP name is blank, then the User ID and address fields are used for the mail attribute in the format 'UserID?Address@Domain'. Domain is the value specified on the Change TCP/IP Domain (CHGTCPDMN) command and the '?' is the default SMTP User ID delimiter value specified on the Change SMTP Attributes (CHGSMTPA) command.

Distinguished Name (dn) and Common Name (cn)

LDAP uses the distinguished name (dn) as the key for the user. For the system distribution directory entries in LDAP, the **distinguished name** is the common name (cn) combined with the distinguished name that LDAP is being published to.

The user will have the following common names in LDAP. The first nonblank one will be used in the distinguished name:

1. 'First name' 'Middle Name' 'Last name'
2. 'Preferred name' 'Last name'
3. 'Full name'
4. 'UserID'

For example, if a user has the following field values in the system distribution directory,

- First name: Jonathan

- Middle name: T.
- Preferred name: John
- Last name: Smith
- Full name: Smith, John T.
- User ID: JSMITH

the user will have the following common names (cn):
- cn=Jonathan T. Smith
- cn=John Smith
- cn="Smith, John T."
- cn=JSMITH

If the distinguished name that LDAP is being published to is 'ou=chicago,o=acme,c=us', then the distinguished name of this user is 'cn=Jonathan T. Smith,ou=chicago,o=acme,c=us' using the first cn in the list. The cn value is enclosed in quotation marks if it contains a comma, pound sign, plus sign, equal sign, less than or greater than sign, or a semicolon. Leading blanks from the system distribution directory fields are removed for the cn value. For example, if the first name is ' Jane', the cn value will use 'Jane'. Also, the system distribution directory field values containing quotation marks will not be used when deriving the cn values as described above.

Attention: If you have two users in the system distribution directory that will resolve to the same distinguished name, they will overlay each other in the LDAP directory. Sometimes overlaying names is what you want if you are merging multiple system distribution directories into one LDAP directory. If you have different users with the same name, ensure they have different distinguished names to prevent overlaying each other.

This API can run on other OS/400 systems to synchronize the system distribution directory on those systems to the same LDAP server and distinguished name being published to. If you have the same user on multiple OS/400 systems, they will become one user in the LDAP directory. The distinguished name (dn) identifies the user. Note that you can run this API from multiple OS/400 systems to different directory servers or to the same directory server, but different distinguished name that LDAP is being published to. You may want to do this if you would like to ensure that information from different system distribution directories does not overlay each other.

User Profile (UID) for OS/400 Users

For local users, the user profile field is used to set the UID attribute in the LDAP directory. This API does not publish passwords for security reasons. Therefore, when the LDAP server is on an OS/400, the UID attribute is used to see if that user exists on the OS/400. The password is verified with the password that is passed from the client.

If you are publishing the system distribution directory information to a different OS/400 or to a system that is not an OS/400, then you will need to set the userPassword attribute for those users that you want to access the LDAP directory. You would set the userPassword attribute for the user after you use the QGLDSSDD API to publish the system distribution directory users. The following shows a client command from a UNIX shell that is used to set the userPassword attribute of two users:

```
ldapmodify -h ldapserver -f /path/filename
           -D cn=Admin -w password
```

The ldapserver is the server name that was configured in the Directory Services system property. The /path/filename file contains the distinguished name and password for the users. An example file with two user entries would be:

```
dn:cn=Jonathan T. Smith,ou=chicago,o=acme,c=us
changetype: modify
replace: userPassword
```

```
userPassword:secret

dn:cn=Barb Jones,ou=chicago,o=acme,c=us
changetype: modify
replace: userPassword
userPassword:secret
```

Authorities and Locks

*ALLOBJ and *IOSYSCFG special authority is required to use this API.

Required Parameter Group

Option

INPUT; CHAR(10)

The option to use for publishing system distribution directory information to the LDAP directory. The valid values are:

**ALL*
: All the local users and all the remote users that have been added from this system and that have an SMTP name will be replicated from the system distribution directory to the LDAP directory. The LDAP directory is on the LDAP server specified in the Directory Services dialog of iSeries Navigator. These users will be placed in the LDAP tree under the distinguished name that is specified in the Directory Services dialog. See "System Distribution Directory to LDAP Mapping" on page 292 for information concerning the system distribution directory fields that will be used in the LDAP directory.

  The *ALL option value also sets up the necessary objects needed to synchronize the system distribution directory changes to the LDAP directory after the LDAP directory is replicated.

  You must request the *ALL option value first, but it can be specified more than once. For example, to reload the LDAP directory, you would use the *CHG option value to send any pending changes to the LDAP directory followed by the *ALL option value. If you change which LDAP server or distinguished name you want the system distribution directory entries to be replicated to, you can use the *ALL option value to replicate to that server or distinguished name.

**CHG*
: The system distribution directory entries that were added, changed, removed, or renamed since the *ALL or previous *CHG option value was used are updated in the LDAP directory.

  Changes made to the system distribution directory users in the LDAP directory are overwritten by changes made in the system distribution directory for the attributes listed above. All other attributes of inetOrgPerson that are changed in LDAP by using an LDAP client are not overwritten by the *CHG option value.

**END*
: End the synchronization of the system distribution directory to LDAP.

  If the LDAP user ID is passed in, then this first synchronizes any changes from the system distribution directory to the LDAP directory since the last synchronization request. For example,

  ```
  CALL PGM(QSYS/QGLDSSDD)
  PARM(*END 'LDAPuserID' 'LDAPpassword' 0 0 0)
  ```

  If the LDAP user ID is not passed in, then the synchronization is just ended and the changes left in the queue from the last synchronization request are not published. For example,

  ```
  CALL PGM(QSYS/QGLDSSDD)
       PARM(*END 0 0 0 0 0)
  ```

  The users in the LDAP directory where publishing is being ended are not deleted. They are left in the LDAP directory. Changes made to the system distribution directory after publishing is ended are no longer queued.

  To start replication again after this value is used, call this API with the *ALL option value. A *CHG option value will result in an error.

**RESET* Ensures that all the objects exist for this replication function and clears the queue that keeps track of the changes made to the system distribution directory.

Specify zero for the LDAP user ID, LDAP user ID password, key database file, and key database password when you use this value. For example,

```
CALL PGM(QSYS/QGLDSSDD)
     PARM(*RESET 0 0 0 0 0)
```

LDAP user ID

INPUT; CHAR(1024)

The LDAP user ID that has administrator authority to add, change, and remove entries in the LDAP entry. The valid values are:

**CFG* Use the configured LDAP user ID that can be specified when publishing users (using iSeries Navigator). To use kerberos authentication, you must configure publishing users to authenticate using kerberos. When *CFG is specified for LDAP user ID, then depending on what has been configured to authenticate for users will be used whether that is an administrator ID and password or kerberos.

See "Usage Notes" on page 296 for the procedure of configuring the Directory Services property page. If the Directory Services property page is not configured, and the *CFG value is passed, then error GLD0310 with reason code 12 is signalled. If a value is passed in other than *CFG and kerberos authentication was configured, then error GLD0310 will occur.

A null-terminated string containing the LDAP user ID that has administrator authority to add, change, and remove entries in the LDAP entry.

An example user ID is cn=Admin. Specify a zero-length string if the LDAP server does not require authority checking or the option value *RESET is specified.

LDAP user ID password

INPUT; CHAR(128)

The password for the LDAP user ID. The valid values are:

**CFG* Use the configured LDAP user ID password that can be specified when publishing users (using iSeries Navigator). Specify *CFG if kerberos authentication was configured.

See "Usage Notes" on page 296 for the procedure of configuring the Directory Services property page. If the Directory Services property page is not configured, and the *CFG value is passed, then error GLD0310 with reason code 12 is signalled. If a value is passed in other than *CFG and kerberos authentication was configured, then error GLD0310 will occur.

A null-terminated string containing the password for the LDAP user ID.

Specify a zero-length string if the LDAP server does not require authority checking or the option value *RESET is specified.

No longer used (Formerly 'Key database file')

INPUT; CHAR(1024)

Specify zero (0) as a placeholder for this parameter as it is no longer used.If a value is specified, it will be ignored for compatibility reasons. If you need SSL key database information configured, it is now configured using Digital Certificate Manager. See "Usage Notes" on page 296 below for more information on Digital Certificate Manager.

No longer used (Formerly 'Key database password')

INPUT; CHAR(128)

Specify zero (0) as a placeholder for this parameter as it is no longer used.If a value is specified, it will be ignored for compatibility reasons. If you need SSL key database information configured, it is now configured using Digital Certificate Manager. See "Usage Notes" on page 296 below for more information on Digital Certificate Manager.

Error code

I/O; CHAR(*)

The structure in which to return error information. For the format of the structure, see Error code parameter.

Note: All character data is assumed to be represented in the CCSID (coded character set identifier) currently in effect for the job. If the CCSID of the job is 65535, the data is assumed to be represented in the default CCSID of the job.

Usage Notes

If the system distribution directory field values for two users result in the same distinguished name, then these names will overlay each other in the LDAP directory. To ensure this does not happen when not intended, you must have unique names for your users before you synchronize the system distribution directory to an LDAP directory.

Use the Convert SMTP Names (CVTNAMSMTP) command if you have not already done so to convert the Simple Mail Transfer Protocol (SMTP) fields to the system distribution directory. The SMTP information is loaded when the option value *ALL is used from this API. If, however, you do not do CVTNAMSMTP when you change the SMTP information using the Work with Names for SMTP (WRKNAMSMTP) command, those changes do not go to the LDAP directory. After you use the CVTNAMSMTP command, the SMTP name is in the system distribution directory in the user-defined fields SMTPAUSRID SMTP, SMTPDMN SMTP, and SMTPRTE SMTP. When these fields are updated by using the system distribution directory commands (WRKDIRE, ADDDIRE, CHGDIRE), then LDAP is kept synchronized. If you cannot do CVTNAMSMTP, then the other option is to periodically use the option value *ALL to reload the LDAP directory to update all the system distribution directory information including the SMTP information.

Synchronization Procedure

A procedure of synchronizing the system distribution directory with an LDAP directory is as follows:

1. The Directory Services property page for the LDAP server to publish to must be set up. Use iSeries Navigator, select 'Properties' of the system, and then 'Directory Services'. In V4R4 and later, Directory Services will bring up a list of information to publish. Select 'Users' from this list to configure this information. If your iSeries Navigator or system is prior to V4R4, then just the Directory Services properties are set and no list is displayed.

   The LDAP server to publish to must be specified and must exist. The distinguished name to publish under must be specified and must be one the server supports. All the users in the system distribution directory will be placed under the distinguished name (DN) that is specified.

   See the Directory Services (LDAP) topic for more information on using iSeries Navigator to configure the system properties for Directory Services.

   Configuring the Directory Services property also can be done using the Change Directory Server Attributes (QgldChgDirSrvA) API.
2. If you are synchronizing the system distribution directory to an LDAP server that is not on an OS/400, then you need to ensure that the inetOrgPerson and publisher object classes are defined in the schema file for the server. The publisher object class requires a new attribute, publisherName, so be sure publisherName is also defined in a schema file. See SecureWay Directory Schema for documentation on the inetOrgPerson and publisher object class.
3. Ensure the TCP/IP host and domain name are set. Use the Change TCP/IP Domain (CHGTCPDMN) command and prompt by using F4.
4. Use Change SMTP Attribute (CHGSMTPA) command to set the user ID delimiter value. You can keep the default set to '?'. Be sure you press Enter so the SMTP attributes are created.

5. If you need SSL certificate information configured, it is configured using Digital Certificate Manager. You can get to Digital Certificate Manager from iSeries Navigator under 'Network - Internet - Digital ID'.
6. If you are on V4R4 or later, and selected 'Users' in the list when configuring Directory Services property page, then the system distribution directory users will automatically be published to LDAP and you will not need to do the following step. You could optionally call it to reinitialize system distribution directory data to an LDAP server if needed.

   Call the Synchronize System Distribution Directory to LDAP API with the *ALL option value. For example, from the command line, type:

   ```
   CALL PGM(QSYS/QGLDSSDD)
        PARM(*ALL 'LDAPuserID' 'LDAPpassword' 0 0 0)
   ```

   The LDAP user ID must have sufficient authority to add, change, and remove entries in the LDAP directory.

   If you have the LDAP user ID and password configured in the Directory Services property page, you can call the API using *CFG. For example, from the command line, type:

   ```
   CALL PGM(QSYS/QGLDSSDD)
        PARM(*ALL *CFG *CFG  0 0 0)
   ```

   For security reasons, it is recommended that you call this API using the *CFG option if the call is being logged in a job log.
7. If you are on V4R4 or later, and selected 'Users' in the list when configuring Directory Services property page, then the system distribution directory users will automatically be published to LDAP and you will not need to do the following step (although you can optionally call it manually).

   Periodically call QGLDSSDD to synchronize the LDAP directory with the system distribution directory. The command to synchronize the LDAP directory is:

   ```
   CALL PGM(QSYS/QGLDSSDD)
        PARM(*CHG 'LDAPuserID' 'LDAPpassword' 0 0 0)
   ```

   If you have the LDAP user ID and password configured in the Directory Services property page, you can call the API using *CFG. For example, from the command line, type:

   ```
   CALL PGM(QSYS/QGLDSSDD)
        PARM(*CHG *CFG *CFG  0 0 0)
   ```

   For security reasons, it is recommended that you call this API using the *CFG option if the call is being logged in a job log.

   The CL program can be run from a job schedule entry to automatically run with scheduled frequency. Use the Add Job Schedule Entry (ADDJOBSCDE) command or the Work with Job Schedule Entries (WRKJOBSCDE) command to automatically schedule jobs.

Error Messages

Message ID	Error Message Text
CPF3C90 E	Literal value cannot be changed.
CPF3CF1 E	Error code parameter not valid.
GLD0301 E	Error encountered when accessing the LDAP Directory Server.
GLD0302 E	Input option *CHG currently unavailable.
GLD0303 E	The caller of this API must have &1 and &2 special authorities.
GLD0304 E	Unable to export the system distribution directory entry &1 &2 to the LDAP Directory Server.
GLD0305 C	Synchronization between the system distribution directory and the LDAP directory server completed.
GLD0309 E	Value not valid for input parameter &1.
GLD0310 E	Error occurred with QGLDSSDD API. Reason code &1.
GLD0311 E	Input parameter &1 is not valid. Reason code &2.
GLD0312 D	Error encountered when setting up a secure connection to an LDAP server. The error number is &1.

API introduced: V4R3

Concepts

These are the concepts for this category.

LDAP API Overview

Lightweight Directory Access Protocol (LDAP) is an Internet protocol to access directory servers. The directories on the Internet may be ″pure″ LDAP directories; that is, they only communicate through LDAP, or they may be X.500 or other types of servers that allow access through LDAP. Access to servers that are not pure LDAP servers is accomplished through an LDAP gateway. Gateways from LDAP to other protocols also are common. Client programs that allow a user to access an LDAP directory are called LDAP clients. Applications that extract information from an LDAP directory are referred to as **LDAP-enabled**.

The LDAP client is part of the OS/400(R). The LDAP client is used by OS/400 and customer applications for access to LDAP-enabled directories in the network. The directories being accessed may or may not be located on an OS/400 server. The applications access the LDAP client by using these client APIs. TCP/IP is always used to access remote directories, and the administrator can configure the connection to use the Secure Sockets Layer (SSL). Also, the administrator can select to use Kerberos.

The LDAP APIs are designed to provide a suite of functions that can be used to develop directory enabled applications. Directory-enabled applications typically connect to one or more directories and perform various directory-related operations, such as:

- Adding entries
- Searching the directory and obtaining the resulting list of entries
- Deleting entries
- Modifying entries
- Renaming entries

The type of information that is managed in the directory depends on the nature of the application. Directories are often used to provide public access to information about people, including:

- Phone numbers
- E-mail addresses
- Fax numbers
- Mailing addresses

Increasingly, directories are being used to manage and publish other types of information, including:

- Configuration information
- Public key certificates (managed by certification authorities)
- Access control information
- Locating information (how to find a service)

The LDAP APIs provide for both synchronous and asynchronous access to a directory. Asynchronous access makes it easy for your application to do other work while waiting for the results of a potentially lengthy directory operation to be returned by the server.

Typical API Usage

The basic interaction is as follows. A connection is made to an LDAP server by calling **ldap_init** (or **ldap_ssl_init**, which is used to establish a secure connection over Secure Sockets Layer (SSL)).

An LDAP bind operation is performed by calling **ldap_simple_bind** or **ldap_sasl_bind**. The bind operation is used to authenticate to the directory server. Note that the LDAP V3 API and protocol permits the bind to be skipped, in which case the access rights associated with anonymous access are obtained.

Next, other operations are performed by calling one of the synchronous or asynchronous routines (that is, **ldap_search_s** or **ldap_search** followed by **ldap_result**).

Results returned from these routines are interpreted by calling the LDAP parsing routines, which include operations such as:

- ldap_first_entry, ldap_next_entry
- ldap_get_dn
- ldap_first_attribute, ldap_next_attribute
- ldap_get_values
- ldap_parse_result (new for LDAP V3)
- etc.

The LDAP connection is terminated by calling ldap_unbind.

The ldap_set_rebind_proc routine can be used to define the entry-point of a routine to be called when an LDAP bind operation needs to occur when handling a client referral to another server.

Displaying Results

Results obtained from the ldap search routines can be accessed by calling **ldap_first_entry** and **ldap_next_entry** to step through the entries returned, **ldap_first_attribute** and **ldap_next_attribute** to step through an entry's attributes, **ldap_get_values** to retrieve a given attribute's value, and then calling printf or some other display or usage method to display the values.

Uniform Resource Locators (URLS)

The **ldap_is_ldap_url** routines can be used to test a URL to see if it is an LDAP URL, to parse LDAP URLs into their component pieces, and to initiate searches directly using an LDAP URL.

Examples of these routines are ldap_url_parse, ldap_url_search_s, and ldap_is_ldap_url.

Secure Socket Layer (SSL) Support

The LDAP APIs have been extended to support connections that are protected by the Secure Socket Layer (SSL) protocol. This can be used to provide strong authentication between the client and server, as well as data encryption of LDAP messages that flow between the client and the LDAP server. The ldap_ssl_client_init() and ldap_ssl_init() APIs are provided to initialize the SSL function, and to create a secure SSL connection (respectively).

When using "ldap_ssl_client_init —Initializes the SSL Library." on page 203, the application ID used is QIBM_GLD_DIRSRV_CLIENT, identified as client application "Directory Services Client" in Digital Certificate Manager (DCM). To use OS/400 application IDs other than the default which have an association to a certificate store and a particular certificate in that store, the following OS/400-specific APIs are provided:

Version 2 API

- ldap_app_ssl_start_np() (deprecated)

Version 3 API

- ldap_app_ssl_client_init_np()

When using ldap_ssl_init(), the server is not contacted until the connection is used; that is, by ldap_bind() or ldap_search(). If an SSL error occurs while trying to connect, the SSL error code can be retrieved for the connection with the "ldap_get_option()—Retrieve LDAP Options" on page 92 API using the **LDAP_OPT_EXT_ERROR** option.

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

LDAP Version Support

The LDAP toolkit has been enhanced to support both LDAP Version 2 and LDAP Version 3 APIs and protocols. The LDAP toolkit APIs and protocols are based on the Internet Draft, which is classified as a ″work in progress.″

The LDAP APIs provide typical directory functions such as read, write, and search. With the advent of support for LDAP Version 3 APIs and protocols, the following features are also supported:

- LDAP V3 referrals
- Improved internationalization with UTF-8 support for Distinguished Names (DNs) and strings that are passed into, and returned from the LDAP APIs (when running as an LDAP V3 application and LDAP_OPT_UTF8_IO is set to LDAP_UTF8_XLATE_OFF). The default, when running as an LDAP V3 or V2 application, for DNs and strings that are passed into or returned from LDAP APIs is limited to the local codepage character set.

  In general, the connection-associated LDAP Version 3 APIs (APIs that have **ld** as one of their parameters) are designed to accept and return string data in either **UTF-8** encoded format or in the **local code page** format, depending on the **LDAP_OPT_UTF8_IO** option value set using the ldap_set_option() API to **LDAP_UTF8_XLATE_ON** (the default) or **LDAP_UTF8_XLATE_OFF**.

  The following LDAP APIs (and related APIs) accept and return **UTF-8** encoded string data when the **LDAP_OPT_UTF8_IO** option is set to **LDAP_UTF8_XLATE_OFF**. Otherwise, they accept or return string data in the **local code page** (the default).

  – ldap_add (and family)
  – ldap_bind (and family)
  – ldap_compare (and family)
  – ldap_delete (and family)
  – ldap_parse_reference_np
  – ldap_get_dn
  – ldap_get_values
  – ldap_modify (and family)
  – ldap_parse_result
  – ldap_rename (and family)
  – ldap_search (and family)
  – ldap_url_search (and family)

  APIs that are **NOT** associated with a connection (APIs that **do not** have **ld** as one of their parameters), always expect and return string data (DNs, for example) in local code page.
  The following LDAP APIs (and related APIs) will accept and return string data in the **local code page**.

  – ldap_init
  – ldap_ssl_init
  – ldap_explode_dn
  – ldap_explode_rdn

- ldap_server_locate
- ldap_server_conf_save
- ldap_is_ldap_url
- ldap_default_dn_set/get

As a non-standard extension to the API set on OS/400(R) only, two APIs have been added that allow input of string data in UTF8. These are:

- ldap_explode_dn_utf8
- ldap_explode_rdn_utf8

- The ability for an application to access schema information published by LDAP V3 servers (see Accessing Schema Information).
- The ability for certain **LDAP Version 3** operations to be extended with the use of **controls**. Controls can be sent to a server, or returned to the client with any LDAP message. This type of control is called a server control.

  The LDAP API also supports a client-side extension mechanism, which can be used to define client controls. The client-side controls affect the behavior of the LDAP client library, and are never sent to the server. Note that client-side controls are not defined for this client library.

  A common data structure is used to represent both server-side and client-side controls:

```
typedef struct ldapcontrol {
        char            *ldctl_oid;
        struct berval   ldctl_value;
        char            ldctl_iscritical;
} LDAPControl, *PLDAPControl;
```

  The LDAPControl fields have the following definitions:

  ldctl_oid
  The control type, represented as a string.

  ldctl_value
  The data associated with the control. The control may not include data.

  ldctl_iscritical
  Whether the control is **critical** or **not**. If the field is non-zero, the operation is carried out only if it is recognized and supported by the server (or the client for client-side controls).

  If using any of the ber_xxx functions to set up the berval structure, you must specify QSYS/QGLDBRDR as one of the the bind service programs when creating the program.

With this toolkit, an application that uses the **ldap_open** API defaults to the LDAP V2 protocol. In this way, existing LDAP applications will continue to work, and can interoperate with both LDAP V2 servers and LDAP V3 servers.

An application that uses the **ldap_init** API defaults to the LDAP V3 protocol (with optional bind). An LDAP V3 application will not necessarily interoperate with an LDAP server that supports only LDAP V2 protocols.

An application can use the **ldap_set_option API** to change its LDAP protocol version. This should be done after using **ldap_open** or **ldap_init** but before issuing a bind or other operation that results in contacting the server.

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

Accessing Schema Information

LDAP V3 servers permit applications to access schema and other related information. For example, the ldapsearch utility can be used to obtain the subschemasubentry, attributeTypes, and objectClasses from IBM(R) SecureWay(R) Directory Server. First use ldapsearch to get the root DSE to find the entry containing the schema (called the subschemasubentry) for the server, as follows:

```
ldapsearch -V 3 -h hostname -p port
           -s base -b "" "objectClass=*" subschemaSubentry
```

The subschemasubentry on SecureWay directories is cn=schema by default. To retrieve the schema itself, search on the subschemasubentry entry, as follows:

```
ldapsearch -V 3 -h hostname -p port
           -s base -b "cn=schema" "objectclass=*"
```

The ″-V 3″ option is used to force ldapsearch to bind as an LDAP V3 application.

"Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

API Prototype Changes

For many of the LDAP APIs, the prototype has changed. On many of the API prototypes where a ″**char ***″ is used, the prototype has changed to use a ″**const char ***″. This is the result of changes to the standards. OS/400(R) is providing a way to transition to the new prototypes. Inserting

#define _QGLDNOCONST

in applications code prior to the include of ldap.h causes the definition of the old prototypes that use ″**char ***″ to be made available. If _QGLDNOCONST, which is the default, is not defined, the definition of the new prototypes that use ″**const char ***″ is made available.

In some future release, the use of _QGLDNOCONST will be withdrawn.

"Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

Deprecated APIs

The following is a list of APIs that are still supported, although their use is deprecated. Use of the newer replacement APIs is strongly encouraged.

- **ldap_ssl_start()** - use **ldap_ssl_client_init()** and **ldap_ssl_init()**
- **ldap_open()** - use **ldap_init()**
- **ldap_bind()** - use **ldap_simple_bind()**
- **ldap_bind_s()** - use **ldap_simple_bind_s()**
- **ldap_modrdn()** - use **ldap_rename()**
- **ldap_modrdn_s()** - use **ldap_rename_s()**
- **ldap_result2error()** - use **ldap_parse_result()**
- **ldap_perror()** - use **ldap_parse_result()**

OS/400(R)-specific APIs:

- **ldap_app_ssl_start_np()** - use **ldap_app_ssl_client_init_np()** and **ldap_app_ssl_init_np()**.

"Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

LDAP Client API Error Conditions

When most LDAP APIs fail to complete successfully, ld_errno usually indicates one of the following errors. Under some conditions, ld_errno could indicate an error other than those listed here.

LDAP_SUCCESS	0x00 - The request was successful.
LDAP_OPERATIONS_ERROR	0x01 - An operations error occurred.
LDAP_PROTOCOL_ERROR	0x02 - A protocol violation was detected.
LDAP_TIMELIMIT_EXCEEDED	0x03 - An LDAP time limit was exceeded.
LDAP_SIZELIMIT_EXCEEDED	0x04 - An LDAP size limit was exceeded.
LDAP_COMPARE_FALSE	0x05 - A compare operation returned false.
LDAP_COMPARE_TRUE	0x06 - A compare operation returned true.
LDAP_STRONG_AUTH_NOT_SUPPORTED	0x07 - The LDAP server does not support strong authentication.
LDAP_STRONG_AUTH_REQUIRED	0x08 - Strong authentication is required for the operation.
LDAP_PARTIAL_RESULTS	0x09 - Partial results only returned.
LDAP_REFERRAL	0X0A - Referral returned.
LDAP_ADMIN_LIMIT_EXCEEDED	0X0B - Administration limit exceeded.
LDAP_UNAVAILABLE_CRITICAL_EXTENSION	0X0C - Critical extension not supported.
LDAP_NO_SUCH_ATTRIBUTE	0x10 - The attribute type specified does not exist in the entry.
LDAP_UNDEFINED_TYPE	0x11 - The attribute type specified is not valid.
LDAP_INAPPROPRIATE_MATCHING	0x12 - Filter type not supported for the specified attribute.
LDAP_CONSTRAINT_VIOLATION	0x13 - An attribute value specified violates some constraint (for example, a postal address has too many lines, or a line that is too long).
LDAP_TYPE_OR_VALUE_EXISTS	0x14 - An attribute type or attribute value specified already exists in the entry.
LDAP_INVALID_SYNTAX	0x15 - An attribute value was specified that is not valid.
LDAP_NO_SUCH_OBJECT	0x20 - The specified object does not exist in the directory.
LDAP_ALIAS_PROBLEM	0x21 - An alias in the directory points to a nonexistent entry.
LDAP_INVALID_DN_SYNTAX	0x22 - A distinguished name was specified that is syntactically not valid.
LDAP_IS_LEAF	0x23 - The object specified is a leaf.
LDAP_ALIAS_DEREF_PROBLEM	0x24 - A problem was encountered when dereferencing an alias.
LDAP_INAPPROPRIATE_AUTH	0x30 - Inappropriate authentication was specified (for example, LDAP_AUTH_SIMPLE was specified and the entry does not have a user password attribute).
LDAP_INVALID_CREDENTIALS	0x31 - Credentials that are not valid were presented (for example, the wrong password).
LDAP_INSUFFICIENT_ACCESS	0x32 - The user has insufficient access to perform the operation.
LDAP_BUSY	0x33 - The directory system agent is busy.
LDAP_UNAVAILABLE	0x34 - The directory system agent is unavailable.
LDAP_UNWILLING_TO_PERFORM	0x35 - The directory system agent is unwilling to perform the operation.
LDAP_LOOP_DETECT	0x36 - A loop was detected.
LDAP_NAMING_VIOLATION	0x40 - A naming violation occurred.
LDAP_OBJECT_CLASS_VIOLATION	0x41 - An object class violation occurred (for example, a must attribute was missing from the entry).
LDAP_NOT_ALLOWED_ON_NONLEAF	0x42 - The operation is not allowed on a nonleaf object.
LDAP_NOT_ALLOWED_ON_RDN	0x43 - The operation is not allowed on a relative distinguished name.
LDAP_ALREADY_EXISTS	0x44 - The entry already exists.

LDAP_NO_OBJECT_CLASS_MODS	0x45 - Object class modifications are not allowed.
LDAP_RESULTS_TOO_LARGE	0x46 - Results too large.
LDAP_AFFECTS_MULTIPLE_DSAS	0X47 - Affects multiple DSAS.
LDAP_OTHER	0x50 - An unknown error occurred.
LDAP_SERVER_DOWN	0x51 - The LDAP API cannot contact the LDAP server.
LDAP_LOCAL_ERROR	0x52 - Some local error occurred. This usually indicates that either the LDAP support (OS/400 option 32) is not installed on the system, or a malloc() operation has failed
LDAP_ENCODING_ERROR	0x53 - An error was encountered while the API was encoding parameters to send to the LDAP server.
LDAP_DECODING_ERROR	0x54 - An error was encountered while the API was decoding a result from the LDAP server.
LDAP_TIMEOUT	0x55 - A time limit was exceeded while API was waiting for a result.
LDAP_AUTH_UNKNOWN	0x56 - The authentication method specified to ldap_bind() is not known.
LDAP_FILTER_ERROR	0x57 - A filter that is not valid was supplied to ldap_search() (for example, unbalanced parentheses).
LDAP_USER_CANCELLED	0x58 - User cancelled
LDAP_PARAM_ERROR	0x59 - An LDAP API was called with a bad parameter (for example, a NULL ld pointer).
LDAP_NO_MEMORY	0x5A - A memory allocation (for example, a malloc() call) failed in an LDAP API.
LDAP_CONNECT_ERROR	0x5b - Connection error
LDAP_NOT_SUPPORTED	0x5c - Not Supported
LDAP_CONTROL_NOT_FOUND	0x5d - Control not found
LDAP_NO_RESULTS_RETURNED	0x5e - No results returned
LDAP_MORE_RESULTS_TO_RETURN	0x5f - More result to return
LDAP_URL_ERR_NOTLDAP	0x60 - URL doesn't begin with ldap://
LDAP_URL_ERR_NODN	0x61 - URL has no DN (required).
LDAP_URL_ERR_BADSCOPE	0x62 - URL scope string is invalid.
LDAP_URL_ERR_MEM	0x63 - can't allocate memory space.
LDAP_CLIENT_LOOP	0x64 - Client loop
LDAP_REFERRAL_LIMIT_EXCEEDED	0x65 - Referral limit exceeded
LDAP_SSL_ALREADY_INITIALIZED	0x70 - ldap_ssl_client_init successfully called previously in this process.
LDAP_SSL_INITIALIZE_FAILED	0x71 - SSL initialization call failed.
LDAP_SSL_INITIALIZE_NOT_CALLED	0x72 - Call ldap_ssl_client_init before attempting to use an ssl connection.
LDAP_SSL_PARAM_ERROR	0x73 - An invalid ssl parameter was previously specified.
LDAP_SSL_HANDSHAKE_FAILED	0x74 - Failed to connect to ssl server.
LDAP_SSL_GET_CIPHER_FAILED	0x75 - Failed to identify the maximum SSL encryption level for this host.
LDAP_SSL_NOT_AVAILABLE	0x76 - The SSL library cannot be loaded.
LDAP_SSL_KEYRING_NOT_FOUND	0x77 - SSL Keyring file not found
LDAP_SSL_PASSWORD_NOT_SPECIFIED	0x78 - SSL password not specified
LDAP_NO_EXPLICIT_OWNER	0x80 - No explicit owner found
LDAP_NO_LOCK	0x81 - Could not obtain lock
LDAP_DNS_NO_SERVERS	0x85 - No LDAP servers found
LDAP_DNS_TRUNCATED	0x86 - Warning truncated DNS results
LDAP_DNS_INVALID_DATA	0x87 - Invalid DNS Data
LDAP_DNS_RESOLVE_ERROR	0x88 - Can't resolve system domain or nameserver
LDAP_DNS_CONF_FILE_ERROR	0x89 - DNS Configuration file error
LDAP_XLATE_E2BIG	0xA0 - Output buffer overflow
LDAP_XLATE_EINVAL	0xA1 - Input buffer truncated
LDAP_XLATE_EILSEQ	0xA2 - Unusable input character

LDAP_XLATE_NO_ENTRY	0xA3 - No codeset point to map to
LDAP_REG_FILE_NOT_FOUND	0xB0 - NT Registry - file not found
LDAP_REG_CANNOT_OPEN	0xB1 - NT Registry - cannot open
LDAP_REG_ENTRY_NOT_FOUND	0xB2 - NT Registry entry not found
LDAP_CONF_FILE_NOT_OPENED	0xC0 - Plugin configuration file not opened
LDAP_PLUGIN_NOT_LOADED	0xC1 - Plugin library not loaded
LDAP_PLUGIN_FUNCTION_NOT_RESOLVED	0xC2 - Plugin function not resolved
LDAP_PLUGIN_NOT_INITIALIZED	0xC3 - Plugin library not initialized
LDAP_PLUGIN_COULD_NOT_BIND	0xC4 - Plugin function could not bind
LDAP_SASL_GSS_NO_SEC_CONTEXT	0xD0 - gss_init_sec_context failed

Top | "Lightweight Directory Access Protocol (LDAP) APIs," on page 1 | APIs by category

Appendix. Notices

This information was developed for products and services offered in the U.S.A.

IBM may not offer the products, services, or features discussed in this document in other countries. Consult your local IBM representative for information on the products and services currently available in your area. Any reference to an IBM product, program, or service is not intended to state or imply that only that IBM product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any IBM intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any non-IBM product, program, or service.

IBM may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not grant you any license to these patents. You can send license inquiries, in writing, to:

```
IBM Director of Licensing
IBM Corporation
North Castle Drive
Armonk, NY  10504-1785
U.S.A.
```

For license inquiries regarding double-byte (DBCS) information, contact the IBM Intellectual Property Department in your country or send inquiries, in writing, to:

```
IBM World Trade Asia Corporation
Licensing
2-31 Roppongi 3-chome, Minato-ku
Tokyo 106-0032, Japan
```

The following paragraph does not apply to the United Kingdom or any other country where such provisions are inconsistent with local law: INTERNATIONAL BUSINESS MACHINES CORPORATION PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some states do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. IBM may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

Any references in this information to non-IBM Web sites are provided for convenience only and do not in any manner serve as an endorsement of those Web sites. The materials at those Web sites are not part of the materials for this IBM product and use of those Web sites is at your own risk.

IBM may use or distribute any of the information you supply in any way it believes appropriate without incurring any obligation to you.

Licensees of this program who wish to have information about it for the purpose of enabling: (i) the exchange of information between independently created programs and other programs (including this one) and (ii) the mutual use of the information which has been exchanged, should contact:

IBM Corporation
Software Interoperability Coordinator, Department YBWA
3605 Highway 52 N
Rochester, MN 55901
U.S.A.

Such information may be available, subject to appropriate terms and conditions, including in some cases, payment of a fee.

The licensed program described in this information and all licensed material available for it are provided by IBM under terms of the IBM Customer Agreement, IBM International Program License Agreement, IBM License Agreement for Machine Code, or any equivalent agreement between us.

Any performance data contained herein was determined in a controlled environment. Therefore, the results obtained in other operating environments may vary significantly. Some measurements may have been made on development-level systems and there is no guarantee that these measurements will be the same on generally available systems. Furthermore, some measurements may have been estimated through extrapolation. Actual results may vary. Users of this document should verify the applicable data for their specific environment.

All statements regarding IBM's future direction or intent are subject to change or withdrawal without notice, and represent goals and objectives only.

This information contains examples of data and reports used in daily business operations. To illustrate them as completely as possible, the examples include the names of individuals, companies, brands, and products. All of these names are fictitious and any similarity to the names and addresses used by an actual business enterprise is entirely coincidental.

COPYRIGHT LICENSE:

This information contains sample application programs in source language, which illustrate programming techniques on various operating platforms. You may copy, modify, and distribute these sample programs in any form without payment to IBM, for the purposes of developing, using, marketing or distributing application programs conforming to the application programming interface for the operating platform for which the sample programs are written. These examples have not been thoroughly tested under all conditions. IBM, therefore, cannot guarantee or imply reliability, serviceability, or function of these programs.

If you are viewing this information softcopy, the photographs and color illustrations may not appear.

Trademarks

The following terms are trademarks of International Business Machines Corporation in the United States, other countries, or both:
Advanced 36
Advanced Function Printing
Advanced Peer-to-Peer Networking
AFP
AIX
AS/400
COBOL/400
CUA
DB2
DB2 Universal Database
Distributed Relational Database Architecture
Domino
DPI

DRDA
eServer
GDDM
IBM
Integrated Language Environment
Intelligent Printer Data Stream
IPDS
iSeries
Lotus Notes
MVS
Netfinity
Net.Data
NetView
Notes
OfficeVision
Operating System/2
Operating System/400
OS/2
OS/400
PartnerWorld
PowerPC
PrintManager
Print Services Facility
RISC System/6000
RPG/400
RS/6000
SAA
SecureWay
System/36
System/370
System/38
System/390
VisualAge
WebSphere
xSeries

Microsoft, Windows, Windows NT, and the Windows logo are trademarks of Microsoft Corporation in the United States, other countries, or both.

Java and all Java-based trademarks are trademarks of Sun Microsystems, Inc. in the United States, other countries, or both.

UNIX is a registered trademark of The Open Group in the United States and other countries.

Other company, product, and service names may be trademarks or service marks of others.

Terms and conditions for downloading and printing publications

Permissions for the use of the information you have selected for download are granted subject to the following terms and conditions and your indication of acceptance thereof.

Personal Use: You may reproduce this information for your personal, noncommercial use provided that all proprietary notices are preserved. You may not distribute, display or make derivative works of this information, or any portion thereof, without the express consent of IBM(R).

Commercial Use: You may reproduce, distribute and display this information solely within your enterprise provided that all proprietary notices are preserved. You may not make derivative works of this information, or reproduce, distribute or display this information or any portion thereof outside your enterprise, without the express consent of IBM.

Except as expressly granted in this permission, no other permissions, licenses or rights are granted, either express or implied, to the information or any data, software or other intellectual property contained therein.

IBM reserves the right to withdraw the permissions granted herein whenever, in its discretion, the use of the information is detrimental to its interest or, as determined by IBM, the above instructions are not being properly followed.

You may not download, export or re-export this information except in full compliance with all applicable laws and regulations, including all United States export laws and regulations. IBM MAKES NO GUARANTEE ABOUT THE CONTENT OF THIS INFORMATION. THE INFORMATION IS PROVIDED ″AS-IS″ AND WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO IMPLIED WARRANTIES OF MERCHANTABILITY, NON-INFRINGEMENT, AND FITNESS FOR A PARTICULAR PURPOSE.

By downloading or printing information from this site, you have indicated your agreement with these terms and conditions.

Code disclaimer information

This document contains programming examples.

SUBJECT TO ANY STATUTORY WARRANTIES WHICH CANNOT BE EXCLUDED, IBM(R), ITS PROGRAM DEVELOPERS AND SUPPLIERS MAKE NO WARRANTIES OR CONDITIONS EITHER EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OR CONDITIONS OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, AND NON-INFRINGEMENT, REGARDING THE PROGRAM OR TECHNICAL SUPPORT, IF ANY.

UNDER NO CIRCUMSTANCES IS IBM, ITS PROGRAM DEVELOPERS OR SUPPLIERS LIABLE FOR ANY OF THE FOLLOWING, EVEN IF INFORMED OF THEIR POSSIBILITY:

1. LOSS OF, OR DAMAGE TO, DATA;
2. SPECIAL, INCIDENTAL, OR INDIRECT DAMAGES, OR FOR ANY ECONOMIC CONSEQUENTIAL DAMAGES; OR
3. LOST PROFITS, BUSINESS, REVENUE, GOODWILL, OR ANTICIPATED SAVINGS.

SOME JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO SOME OR ALL OF THE ABOVE LIMITATIONS OR EXCLUSIONS MAY NOT APPLY TO YOU.

Printed in USA