IBM InfoSphere Global Name Management

Installation Guide

Version 6 Release 0

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Note
Before using this information and the product it supports, read the information in the Notices section.

Edition

This edition applies to Version 6.0 IBM InfoSphere Global Name Recognition (product number 5724-Q20) and to all subsequent releases and modifications until otherwise indicated in new editions.

Contents

Chapter 1. System requirements

Ensure that all computers meet the hardware and software requirements for the product.

Because other products frequently ship fixes, updates, and new releases, every possible configuration cannot be tested. In general, you can install and run with updates to supported products if those updates are forward-compatible.

Your entitlement to support, if any, is dependent upon your license and maintenance agreements for IBM® InfoSphere® Global Name Management , and is limited to your use of the relevant prerequisite with a supported product.

Software requirements

To obtain the most current information about the software installation requirements, see the system requirements on ibm.com

Note: Verify installation of appropriate system support components. Global Name Management components are built with specific compiler levels so the support files for those compiler levels must be present for these components to operate correctly. The compiler levels are included in the platform names (such as *rhel6-gcc44-release* and *win-vc12-release*).

Hardware requirements

Hardware requirements vary for IBM InfoSphere Global Name Management and depend on the network and the client workstations and server machines that run the applications. Review the following information to better understand the requirements for client workstations and search server machines.

Client workstations

Client workstations run the IBM InfoSphere Global Name Management client end-user and client-side applications.

The IBM WebSphere® Application Server machine hosts the WebSphere Application Server instance of the IBM NameWorks web service. The minimal requirements to support WebSphere Application Server are included in the product package. Physical hardware requirements for client workstations vary for each of the two application types:

end-user applications
: Physical hardware requirements vary for end-user applications. These requirements are entirely dependent on how the end-user application is designed to function. Each end-user application has its own set of requirements that are dependent not only on the resources that the component APIs or the IBM NameWorks package use, but also depend on the other functions that the application performs.

client-side applications
: Because processing occurs on the server machine, physical hardware requirements for client-side applications that communicate with server applications are minimal. These applications provide the ability to support

the communication protocol (TCP/IP or Web services) that connects with the associated server process, as well as the ability to produce messages that are expected by the target server process, such as XML messages and Web service requests.

Search server machine requirements

Search server machines host Distributed Search server applications. The searching aspect of a name search system, as opposed to the name analysis aspect (transliteration, categorization, parsing and culture classification), can be implemented with one or more Distributed Search configurations. The ability to distribute queries across multiple server processes on one or more server machines provides architectural flexibility, simple scaling, and efficient allocation of processing resources.

Each server application has its own set of server machine requirements:

Distributed Search server

Searching with IBM InfoSphere Global Name Management is both memory and processor intensive. A *searcher* process, when processing a search request, typically consumes 100% of a processor core's capacity. For efficient operation a Distributed Search server machine should have at least as many processor cores as the number of searcher processes currently active on that machine.

Each searcher process must load its entire corresponding list of data names into memory. Search performance will degrade rapidly if a searcher process does not have sufficient memory available and resorts to swapping. The amount of physical memory consumed by each searcher process is affected by many factors, including the average length of the input names, amount of ancillary data, whether regularization is used, the percentage of names that include alternate parses and whether organization name queries are searched against both personal and organization data names.

The following values can be used to estimate the amount of memory required to support an individual searcher process:

- 75 MB for application code and reference data
- 10 MB to 50 MB for accumulation of results, depending on the number of data name records managed by a single searcher process and the match threshold (lower thresholds typically increase the number of results)
- 400 to 500 bytes per data name record depending on the hardware platform, percentage of alternate parses found and percentage of data names that generate regularized forms.

For a list containing one million personal names with 10% of the names generating alternate parses and all regularization enabled, roughly 600 MB should be allowed for a single searcher process.

Embedded Search engine

Embedded Search requires roughly the same amount of memory as Distributed Search, although all name preprocessing, including transliteration, categorization, parsing and culture classification, is handled within the single NameWorks-based process. Name preprocessing requires an additional 125 MB of code and reference data. An Embedded Search system requires 200 MB for application code and reference data, along with the following for each individual Datalist:

- 10 MB to 50 MB for accumulation of results, depending on the number of data name records managed by a single searcher process and the match threshold (lower thresholds typically increase the number of results)
- 400 to 500 bytes per data name record depending on the hardware platform, percentage of alternate parses found, and percentage of data names that generate regularized forms.

Enterprise Name Search

You can use the Enterprise Name Search Console and Search applications to distribute name searches and set up parallel processing for search requests. Some of the considerations for Distributed Search (DS) also apply to ENS. For example, ENS is also memory and processor intensive, much more so than network or disk load. The machine must have enough RAM to hold all name list partitions assigned to its ENS searchers. If virtual memory is used for part of the names then performance will be degraded.

Processing resources and overall performance depend on how searches are distributed using functions such as Name List Distribution and Component Configuration. See ENS performance planning.

Requirements for Enterprise Name Search

Enterprise Name Search components can run on a subset of the hardware, operating systems, and databases required for the IBM InfoSphere Global Name Management version 6.0. Heterogeneous, multi-node, distributed environments are not supported for ENS.

Hardware

An ENS environment cannot have some nodes in the implementation using one operating system and architecture and other nodes using a different operating system or architecture. All nodes in the cell should use the same operating system version and patch level, and the same processor architecture.

See http://www-01.ibm.com/support/docview.wss?&uid=swg27019150.

Operating Systems

The following operating system configurations are supported:

Operating System	Arch	Comments
AIX 7.1	pSeries	
RedHat 6	xSeries	
RedHat 7	xSeries	
Ubuntu 14	xSeries	
RedHat 7 for POWER8	pSeries	little endian
Ubuntu 15 for POWER8	pSeries	little endian
RedHat 7 for z Systems	zSeries	
Windows Server 2012 R2 Windows Server 2008 R2	xSeries	Single-node deployment only, not distributed deployment

Note: Verify installation of appropriate system support components. Global Name Management components are built with specific compiler levels so the support files for those compiler levels must be present for these components to operate correctly. The compiler levels are included in the platform names (such as *rhel6-gcc44-release* and *win-vc12-release*).

Databases

- DB2 V10.5 or higher
- Oracle 12c

Web browsers and related frameworks

Web browser requirements are based on Dojo application development requirements and support certification.

- Firefox ESR 45: certified support
- Internet Explorer 11: certified support with degraded styling
- Chrome 53: supported, but not certified - will fix bugs found

The following Web application components are installed with ENS:

- IBM Dojo Tookit 1.7.2
- IBM Convergence IDX Framework 1.2
- WebSphere Liberty Application Server 16.0

Performance planning

Performance for the IBM InfoSphere Global Name Management product are hardware dependent.

Performance factors

Performance and throughput are typically proportional to three key factors:

- Number of processors available
- Clock speed of the processor used
- RAM resources

Applications that involve analytics generally require fewer processor cycles and RAM, while applications that involve scoring require a larger number of processors, processor cycles, and RAM.

When using IBM NameWorks on a Microsoft Windows x86 computer, increase the default Java™ Virtual Machine (JVM) RAM space setting to 150 MB. This setting ensures that IBM NameWorks processes that utilize the JVM run as designed under expected loads, and prevents the JVM from stopping due to an insufficient amount of memory.

Performance considerations

Loading large collections of organizational names can take as much as ten times longer than loading personal names only. For example, if loading 1 million personal names takes 3-4 minutes, loading 1 million organizational names can take 30 to 40 minutes.

Configuring organizational name searches to include personal name data can take twice as much memory and load time as searching organizational name data alone, depending on the ratio of the two types of data. For

example, 1 million organizational names and 1 million personal names in a search would require 50% more memory and load time than 2 million organizational names only.

Name Preprocessor can take over 30 hours to preprocess 200 million Personal names. If your data list consists of only personal names, then you can set `doCatergorize = false` in the npp.config file to instruct Name Preprocessor to skip name categorization, effectively reducing processing time.

Chapter 2. Installing Global Name Management Base

The information in these sections guides you through installing or upgrading IBM InfoSphere Global Name Management . Please refer to the product Release Notes for additional updates and considerations before installing. The latest Release Notes and other product updates that you should be aware of before installing are available at the product Support portal at ibm.com.

Supported upgrade versions

You can use the product installer to upgrade only Versions 5.0 or later.

If you are upgrading from Version 3.1 or later, then you must upgrade to Version 5.0 first. If you are upgrading from a version prior to Version 3.1, please contact IBM Software Support.

When upgrading your installation, the installation program upgrades only the components that were already installed in the previous version.

Running the installation program

You must complete the following steps to run the IBM InfoSphere Global Name Management installation program.

Before you begin

You must run the installer from the product media, or copy the product installer package including the executable to a local drive. The product installer cannot be run from a network drive.

Procedure

1. Obtain the IBM InfoSphere Global Name Management product media.
2. Run the install program:

Option	Description
GUI mode	• Navigate to the `/Disk1/InstData/VM/` directory on the product media. • Run the **`install`** executable. **Note:** The install executable must be run in Administrator mode on Windows or it will not be able to write to the installation directory and the installation will fail.

Option	Description
Command line mode	• Open a command prompt or shell window. **Note:** The command prompt or shell window must be opened in Administrator mode on Windows or it will not be able to write to the installation directory and the installation will fail. • Navigate to the `/Disk1/InstData/VM/` directory on the product media. • Run the **`install`** executable with the **`-i console`** option. **`install`** `-i console`

3. Follow the instructions on the installation program wizard.
4. To verify that your installation was successful, check for error messages in the following directory:
   /product_install_location`/installer/logs/`
5. Modify your system path to include the location of the shared Name Data Archive (library filename is NameDataObject). The shared Name Data Archive exists in the following location:

Operating system	System path	Name Data Archive location
Microsoft Windows	PATH	`\`*product_install_location*`\bin`
AIX®	LIBPATH	*/product_install_location*`/lib`
Linux	LD_LIBRARY_PATH	*/product_install_location*`/lib`

6. Optional: If you have selected to install web services, the Name Analyzer tool, or the documentation, run the following script to start the embedded WebSphere Application Server:

Operating system	Script location
Microsoft Windows	`\`*product_install_location*`\bin\`**`startGNMServer.bat`** **Note:** The server must be started in Administrator mode or the server will not start correctly.
AIX	*/product_install_location*`/bin/`**`startGNMServer`**
Linux	*/product_install_location*`/bin/`**`startGNMServer`**

Attention: If the **`startGNMServer`** script does not exist in your installation `bin` directory, check for errors in the installation and configuration log files, which exist in the following directory:*/product_install_location*`/installer/logs/`.

a. To access the Name Analyzer tools, enter the URL for the Name Analyzer tools in the address bar using the following syntax:

`http://appserver_hostname:webserver_port/NameAnalyzer`

appserver_hostname
Application server IP address or host name that you specify when running the installation program.

webserver_port
Web server port number that you specify when running the installation program. The default value for this parameter is `14500`.

Installation panel worksheet

These worksheets include all of the installation panel settings. Use this worksheet to keep a record of your settings.

Installation options

Table 1. Installation options for individual product modules

Setting	Description	My setting
Global Name Recognition	Installs the IBM InfoSphere Global Name Management suite of Scoring and Analytics technologies that manage, search, analyze, and compare multicultural name data sets	(Default setting)
Web Service	Installs the embedded WebSphere Application Server and the IBM NameWorks API, which is an integrated service that provides a Java and Web service interface for name analysis and search functions.	(Default setting)
Name Analyzer	Installs the embedded WebSphere Application Server and the IBM InfoSphere Global Name Management Name Analyzer, which is an interactive encyclopedia web application containing information about personal names and naming conventions from around the world.	(Default setting)

Embedded WebSphere Application Server panel

Table 2. Embedded WebSphere Application Server panel

Setting	Description	My setting
Fully Qualified Host Name	The fully qualified hostname of the server or the IP address of the server hosting the embedded WebSphere Application Server.	
Memory used during deployment (MB)		(Default setting: 1024)

Table 2. Embedded WebSphere Application Server panel (continued)

Setting	Description	My setting
Web server port number (http)		(Default setting: 14500)
Secure web server port number (https)		(Default setting: 14501)
Administration port number		(Default setting: 14502)
Secure administration port number		(Default setting: 14503)
SOAP port number		(Default setting: 14504)
Application server port number		(Default setting: 14505)

Upgrade panel worksheet

These worksheets include all of the upgrade panel settings. Use this worksheet to keep a record of your settings.

Install Name Analyzer

Table 3. Option to install the Name Analyzer tool

Setting	Description	My setting
Name Analyzer	Installs the embedded WebSphere Application Server and the IBM InfoSphere Global Name Management Name Analyzer, which is an interactive encyclopedia web application containing information about personal names and naming conventions from around the world.	(Default setting)

Uninstalling IBM InfoSphere Global Name Management

You remove the product installation by running the uninstallation program.

Procedure

1. Navigate to the *product_install_location*/_uninst directory.

Option	Description
AIX, Linux	Enter the following command: **GNM**
Microsoft Windows	Run the **GNM.exe** executable to start the uninstallation program, or use the Windows **Add or Remove Programs** option.

2. Follow the instructions on the uninstall program wizard.
3. Alternatively, you can just delete the schema and the folders that you specified and populated at ENS installation time.

Chapter 3. Installing Enterprise Name Search

Enterprise Name Search has a separate installation program that guides you through the installation and configuration process.

See also Requirements for Enterprise Name Search.

Enterprise Name Search architecture overview

Enterprise Name Search provides efficient and practical NameWorks-based name searches and search management for large name lists in a high-volume, redundant, distributed environment. The architecture is designed to support large-scale enterprise customers who require horizontal scaling based on performance needs, high system availability with failover, and client integration with existing user applications or other third-party software.

Enterprise Name Search provides the power of IBM NameWorks name searches packaged as modular components, enabling efficient and distributed redundant name searches against very large name lists. The following terms are used in describing some of the basic parts of the ENS environment:

ENS node
: Any host machine on which one or more ENS servers are run. If the ENS cell is configured in distributed mode, then there can be multiple ENS nodes accessing the same ENS server profile. All ENS nodes in a cell must use the same operating system and processing architecture.

ENS server profile
: A profile for WebSphere Liberty that is configured to localize temporary files, lock files, and log files to host-specific directories. The set of ports must be unique to each ENS server profile.

ENS server
: An instance of an ENS server profile running on a specific ENS node. If multiple ENS servers need to be run on the same ENS node to create a high-availability environment, then the two servers must use different ENS server profiles with different ports.

ENS cell
: The overall environment where ENS is deployed. This can be a single ENS server or a collection of multiple ENS servers running on one or more physical hosts to create the ENS implementation. In distributed mode, it includes a shared file system directory where most of the files are deployed and a local file system directory where log files and other ENS server-specific files are located. There is only one cell for an ENS environment.

The following diagram shows the basic architecture and relationships between the components in an ENS environment.

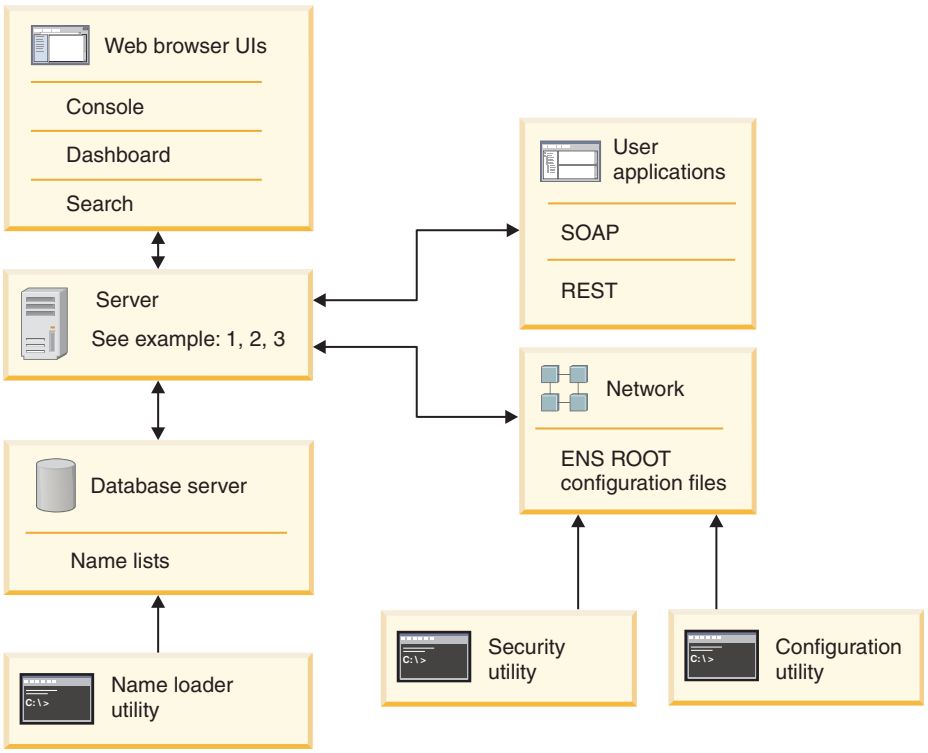

Figure 1. Enterprise Name Search architecture

Web browser UI - Console

Used to configure an ENS cell. Administrators can configure which ENS servers run "Dashboards", "Dispatchers", and "Searchers". The Console enables configuring redundancy for names in name lists and distributing the names across one or more Searchers to maintain performance.

The parallel architecture of the system includes one or more Dispatcher components that accept Web services requests from clients and then dispatch the work for those requests across one or more Searcher components that perform the work.

The configuration Console also allows administrators and operators to monitor the performance of the ENS servers and their configured components. Using this interface, authorized users can start, stop, and reconfigure ENS servers as needed to maintain peak performance.

Web browser UI - Dashboard

Used to view and monitor the Enterprise Name Search cell. Authorized users can quickly see the current status of each ENS server and the status of each component configured on that server: Dispatchers, Searchers, Dashboards, or the Configuration console. Additionally, the Dashboards provide helpful performance statistics such as the number of name searches performed in a given time period.

Web browser UI - Search

Used to specify name searches and view results. A Search browser-based user interface is included. You can develop your own name search user interface using ENS APIs.

ENS Host

An ENS host is a physical machine where one or more ENS servers are

deployed.

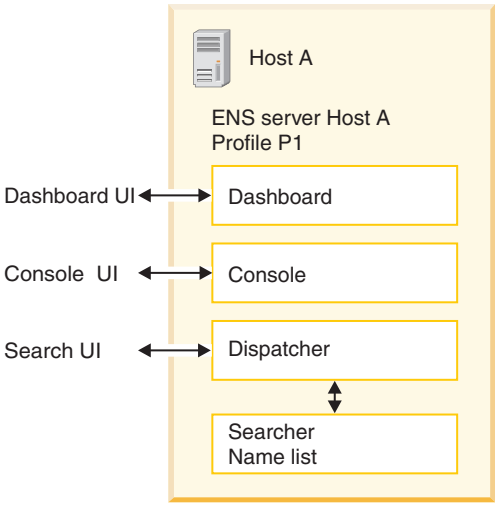

Figure 2. Hosts in Enterprise Name Search architecture

ENS server

An ENS server is a set of ENS components deployed in an instance of WebSphere Liberty. These components may include a dispatcher, searcher, dashboard, and console. Ports and other configuration information for the server are as specified in some ENS profile definition. Logically, you can think of the server as a particular ENS server profile running on a particular host machine.

A given host can have more than one ENS server running on it, but each one must be based on a different profile, so that they use different ports.

In the ENS console GUI, ENS servers are shown as rows on the Server Status tab. Each row indicates the host by its IP address and the profile by the server profile name.

Before an ENS server on some host can be configured in the console, it must be started up at least once by an operator or administrator physically running its ENS start script on that host. When a server is started up, it registers its presence in the cell with the database. Once this has happened, the console can be aware of its existence.

Dispatchers

A dispatcher receives name search requests from client applications, delegates the name searching to one or more searchers, aggregates the results, and returns a response to the client. The ENS search GUI is an example of such a client, but customers can use ENS search services from their own client applications. These client applications can make web service requests using either SOAP or REST APIs.

Searchers

A searcher is a component that holds an instance of GNM NameWorks, containing some list of names to be searched. This is typically a subset of the complete name collection in the ENS installation; typically that collection is partitioned and distributed across multiple searchers, to allow scaling and redundancy.

Database server

ENS uses a database (DB2 or Oracle) to hold name data to be loaded into

searcher memory. The database also holds information about the configuration and status of components. All components in an ENS cell talk to the same database. Each searcher loads its own subset of the name collection from the database into memory when it starts up. Once it is running, it monitors a revisions list and picks up additional names that have been added to the database using web services.

NameLoader utility

The ENS NameLoader loads names from csv data files into the database. It uses GNM NameWorks to analyze names as they are loaded. It persists both original source-name data and analyzed forms suitable for loading into NameWorks in searchers.

The NameLoader utility is a stand-alone Java program launched by a batch or shell command file. Its behavior is controlled by command-line arguments and a configuration file. The default configuration file created at ENS installation time is named "loader.config".

ENS root configuration files

Contains all the root files needed to run Enterprise Name Search, such as database connection information, ENS server profile information, and security.

This root configuration information is shared over the network, although it resides in only one location. So it is easy to manage for administrators and easily accessed by all the database, hosts, ENS server profiles, components, web browser user interfaces, utilities, and user applications using SOAP or REST web services.

Configuration utility

Used to update and configure root configuration parameters after installation. Use this command-line utility to add, delete, and modify ENS server profiles that define Enterprise Name Search nodes in the WebSphere Liberty product. Each ENS server in an ENS cell is an instance of WebSphere Liberty, configured with an ENS server profile. An administrator typically adds and manages these ENS server profiles after ENS installation.

More information about configuration of the ENS components with consideration for redundancy and performance is found in "Enterprise Name Search performance planning."

Enterprise Name Search performance planning

Enterprise Name Search allows organizations to more effectively organize and distribute name searches and facilitate parallel processing of search requests and thereby improve overall performance. Several factors should be considered when planning for performance or resolving performance problems.

Choosing search redundancy type and number of Searchers

Enterprise Name Search performance is dependent on how name lists are divided up and run on Searchers. When running, Searchers keep the name lists in memory. The total number of names in a name list and how the name list is partitioned and distributed for searches affects performance and is especially dependent on the amount of available memory. The number of Searchers, therefore, also affects memory and performance.

ENS provides an interface that makes it easier to configure the components in the environment and distribute work, primarily in how you can divide and process name lists. For example, you might have multiple name lists such as CUSTOMERS, EMPLOYEES, VENDORS, WATCHLIST. When loading these name lists into the ENS database, duplicate names will be consolidated. ENS sorts out repeated names (for example, JOHN SMITH) in a given list or names that appear on two or more lists and builds one master name list in the database that has no duplicates. For example, JOHN SMITH appears only once in the master search list, but the database keeps track of which source name lists that JOHN SMITH originally appeared in. When ENS Searchers start up, only the master search list is used, reducing the processor and memory required.

This master name list can also be partitioned and sent to different Searchers in order to improve performance, distribute computing resource load, or provide redundancy. This ability to spread name list searches across servers in the cell is referred to as Redundancy type. There are two options: Mirrored and Overlapping.

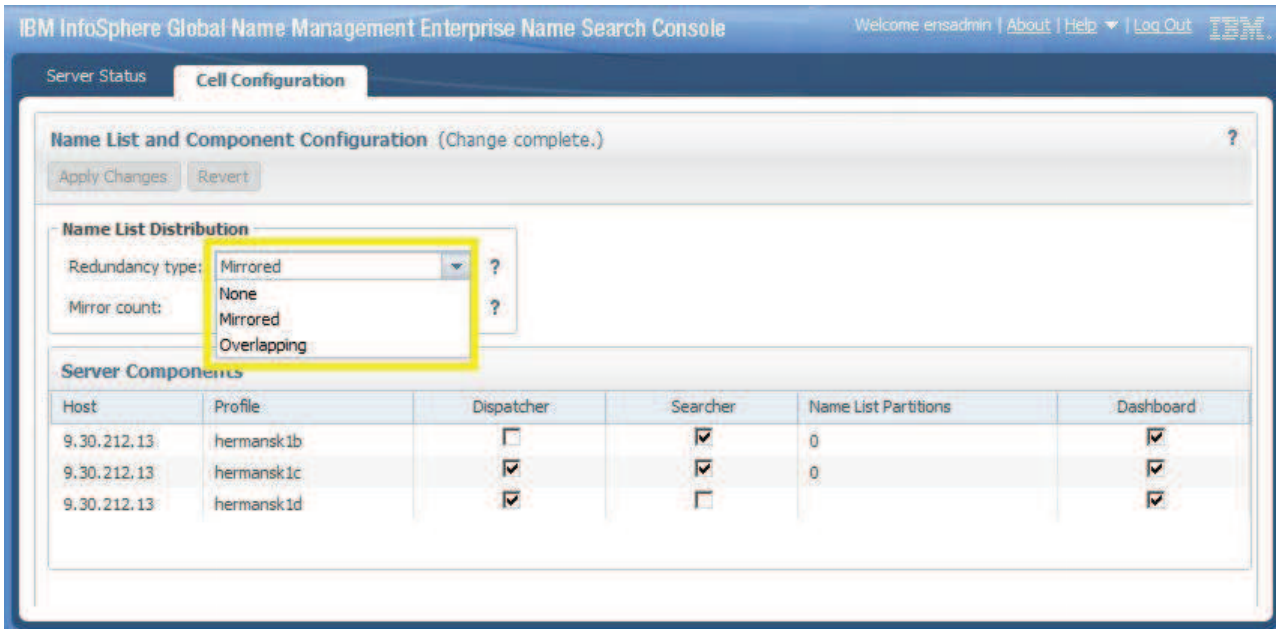

Figure 3. Name List Distribution - Redundancy Type selection

Mirrored

Takes a full copy of the name list and automatically splits it into *n* partitions depending on the number of searchers available. Mirrored redundancy is set with a parameter called **mirrorCount**, which can directly affect the number of partitions created. For example, if you have 2 Searchers and set the mirror count to 2, the full name list is processed on each:

```
Searcher 1: [0]
Searcher 2: [0]
```

Where [0] represents a single partition of the full name list.

If you have 12 Searchers and set the mirrorCount to 2, 6 partitions will be created, and each partition will be mirrored twice:

```
Searcher  1: [0]
Searcher  2: [0]
Searcher  3: [1]
```

```
Searcher  4: [1]
Searcher  5: [2]
Searcher  6: [2]
Searcher  7: [3]
Searcher  8: [3]
Searcher  9: [4]
Searcher 10: [4]
Searcher 11: [5]
Searcher 12: [5]
```

Assuming the number of searchers is 12, mirrored redundancy would divide and process a name list as follows: If mirrorCount = 3 then 4 partitions will be created and each partition will be mirrored 3 times. If mirrorCount = 4 then 3 partitions will be created and each partition will be mirrored 4 times.

The number of searchers and 'mirrorCount' together determine the number *n* of partitions.

Overlapping

Used with two or more ENS servers because it allocates and staggers the partition indexes on each server. As the number of Searchers goes up, the number of partitions that the name list is divided into goes up as well. Generally, smaller splits of the list can result in better name search performance and availability, but only up to a point. Overlapping is more memory intensive. For example, in the case of 8 Searchers, each Searcher must load 7/8 of the name list into memory. At some point, the number of Searchers and the percentage of name list loaded into each will increase the RAM requirements to the point that performance will degrade. If each searcher machine has enough memory to hold the whole master name list (or a large fraction of it, in this case 7/8ths), then you can do overlapping. You should not have more Searchers running on a single machine than the machine's count of processor cores.

For example, if you have 2 Searchers the resulting name list partitioning would look like this:

```
Searcher 1: [0,1]
Searcher 2: [1,0]
```

When processing a single name search request, Searcher 1 can process the first half of the name list (partition 0) while Searcher 2 simultaneously processes the second half (partition 1). This can return results in nearly half the time. In addition, if one of the two Searchers were to experience an outage, the remaining Searcher can still complete name searches over the entire name list, allowing the ENS cell to remain available with degraded performance.

If you had 8 Searchers, the name list would be partitioned and run as follows:

```
Searcher 1: [0,1,2,3,4,5,6]
Searcher 2: [1,2,3,4,5,6,7]
Searcher 3: [2,3,4,5,6,7,0]
Searcher 4: [3,4,5,6,7,0,1]
Searcher 5: [4,5,6,7,0,1,2]
Searcher 6: [5,6,7,0,1,2,3]
Searcher 7: [6,7,0,1,2,3,4]
Searcher 8: [7,0,1,2,3,4,5]
```

Choosing the redundancy policy of your ENS cell (mirrored vs. overlapping), as well as allocating Searchers versus Dispatchers among servers is complex and

might require experimentation and consultation with IBM.

Determining the number of ENS profiles and Searchers

There are other configuration and performance considerations related to determining whether to use mirrored or overlapping redundancy.

Load type - Batch loads or real-time concurrent loads?

If you intend to mostly use one client running a large batch of name searches (one after another), you would likely want to create at least as many ENS WebSphere profiles as the machine has physical processor cores. You would then start each of these profiles on the machine and use the ENS Console to configure an ENS Searcher for each profile so that the name list can be divided between all of the Searchers. For example, if the machine has four physical processor cores, then you would create four ENS profiles. Each profile would be started on the machine and have a Searcher assigned to search 1/4 of all the names in parallel with the other Searchers.

If the typical workload is more likely to be many concurrent clients performing one-off searches in support of a real-time system that integrates ENS name searching, it might be more practical to configure fewer ENS profiles. For example, using the 4-core system example above, if you configured one ENS profile, with one Searcher holding all the names, then that Searcher would have to search the entire name list for each request. However, it would be able to simultaneously serve multiple concurrent requests, at least up to the machine's physical core count without performance degradation.
The ideal ratio of ENS profiles, Searchers, and physical processor cores for this type of load might require some experimentation and depend on the hardware in the ENS cell. This is especially true for machines that have 1:2 or 1:4 ratio of physical processor cores to logical processor cores. A processor with a 1:4 ratio by default (logical core count is 4X physical core count) might allow the machine to effectively handle multiple concurrent name search request in excess of the physical core count.

Determining the number of Dispatchers

Based on testing, you should typically have more than one Dispatcher configured and running to distribute the load. Dispatcher servers that handle distribution among the search servers can be mirrored to accommodate scaling to large numbers of clients. For high availability, you must run at least two Dispatchers on separate machines. Searches can continue even if one Dispatcher fails. If you need to allow for seamless client application failure between the URLs of two or more Dispatchers, you must set up the Dispatchers to be accessed through an external load balancer or reverse proxy.

Size of name lists and memory considerations

How many names to include per ENS server for optimal performance can vary depending on server specifications. 5 million names is typically recommended because it translates into a about 2 GB of memory, which is typical of many servers and should not cause problems. As long as the server has enough memory, there is no reason to limit names to 5 million.

ENS will consume less name memory in cases where there are many duplicate names. The total number of names should be based upon the de-duplicated master

search list in the ENS database (the number of rows in the ENS_SEARCH_NAME database table). ENS is likely to use as much memory for each name in the de-duplicated list as distributed search uses for each name, which is approximately:

- 75 MB for application code and reference data.
- 10 MB to 50 MB for accumulation of results, depending on the number of data name records managed by a single searcher process and the match threshold. Lower thresholds typically increase the number of results.
- 400 to 500 bytes per data name record depending on the hardware platform, percentage of alternate parses found, and the percentage of data names that generate regularized forms.

For a given search server machine, the name list RAM requirement would be the total calculated in the above paragraph divided by the number of name list partitions times the number of unique name list partitions assigned to the Searchers on the machine.

In addition to the above, there will be a memory impact for each ENS WebSphere profile started on the machine. This could be as much as 128MB to 150MB per an ENS WebSphere profile running on the machine, assuming one per a ENS Searcher.

Database server considerations

ENS requires a database server in addition to the one or more searcher servers. The database server should have enough RAM to hold a significant percentage of all the names in memory. At least Gigabit networking speeds should be used between search servers and the database server.

For a Highly Available (HA) configuration, the database server should utilize HA features for fail-over for their chosen supported database platform. At least two search servers will be needed in this case so that each name list partition can be assigned to at least two machines (Mirrored and Overlapping redundancy configurations).

Before installing the product

Enterprise Name Search can be installed in either a distributed or local configuration. Before you can run the Enterprise Name Search installer, you should complete several tasks to prepare the environment for a successful installation.

Enterprise Name Search can be installed in two different configuration types:

Local installation
A local installation is typically used for a basic test configuration or if the system is being set up on a Microsoft Windows platform. A local installation can have multiple profiles but they all run on a single host machine.

Distributed installation
For UNIX platforms only, a distributed installation provides an extendable configuration that allows the system to grow to meet changing needs. Installation is performed on one machine, but the ENS Cell will automatically be usable by each host in the cell. Maintenance is performed once, but is automatically applied to all ENS Servers in the ENS Cell after the servers are restarted. The **Start**and **Stop** of the servers must be run on each particular machine in the ENS cell.

Before running the ENS installer, you should check the system requirements for ENS, identify the machines that you are installing on, and the database system that will be used.

Operating systems in the ENS cell

All of the servers and clients that work together in your ENS system are referred to as a *cell*. If running in distributed mode, all machines used in the set up must have the same operating system, version, and patch level. The database client should be installed to the same location. For example, DB2DIR must point to the same place on all machines.

See Requirements for Enterprise Name Search.

Preparing the database

You must set up and configure the database system for ENS prior to installation. DB2DIR (or DB2_HOME) or ORACLE_HOME must be defined and the database must be created. See:

- "DB2 environment variables" on page 20
- "Oracle environment variables" on page 21

DB2DIR (or DB2_HOME) or ORACLE_HOME must be defined before running the installation. The database must be created.

Preparing for a distributed install

Additional pre-installation tasks for a distributed install:

- Designate two disk locations:
  1. A network location that will contain all the shared code and configuration information. This shared location must be reachable from each physical machine using the same path on each.. For example: `/mounteddrive/ens/`.
  2. A local directory that exists with the same path on each machine, but is not in a mounted drive location. This location will contain all the log files for the particular ENS servers running on this particular host. For example: `/opt/ens`.
- Create an alias on each physical host that has ROOT administrative permission on a UNIX or Windows platform. On each physical machine, add an alias by editing the Unix or Windows hosts file. Use the same alias (by convention, "enshost") on each machine, but on each machine associate that alias with the IP address of that particular machine. Typically, the alias is "enshost".

For example, in a system with two hosts, this is an example of the updated `/etc/hosts` file.

```
Hostname1:

9.30.212.188  hostname1.ibm.com hostname1

9.30.212.188 enshost

Hostname2:

9.30.212.111 hostname2.ibm.com hostname2

9.30.212.111 enshost
```

DB2 environment variables

Set all of the following required environment variables for your operating system on the target machine.

AIX environment variables

Note: You must ensure these environment variable values prepend any existing entries of the same environment variables.

All environment variables must be capitalized.

Table 4. AIX environment variables for DB2 databases

Environment Variable	Value	Conditions
DB2DIR	DB2® software installation path	where *DB2DIR* is the location where the DB2 client/server software is installed.
DB2INSTANCE	DB2 database instance name	where *DB2INSTANCE* is the name of the DB2 database instance you have created.
LIBPATH	$*DB2DIR*/lib64: *INSTALLDIRECTORY*/lib	where *DB2DIR* is the location where the DB2 client/server software is installed, and where *INSTALLDIRECTORY* is the location where the product will be installed.

Linux 64-bit environment variables

Table 5. Linux 64-bit environment variables for DB2 databases

Environment Variable	Value	Conditions
DB2DIR	DB2 software installation path	where *DB2DIR* is the location where the DB2 client/server software is installed.
DB2INSTANCE	DB2 database instance name	where *DB2INSTANCE* is the name of the DB2 database instance you have created.
LD_LIBRARY_PATH	$*DB2DIR*/lib64	where *DB2DIR* is the location where the DB2 client/server software is installed, and where *INSTALLDIRECTORY* is the location where the product will be installed.

Microsoft Windows environment variables

You must use the Microsoft Windows 8.3 naming convention when setting up environment variables in a Microsoft Windows environment. The environment variables must not contain any spaces.

Table 6. Microsoft Windows environment variables for DB2 databases

Environment Variable	Value	Conditions
DB2DIR or *DB2_HOME*	DB2 software installation path	where *{DB2 database instance directory}* is the location where the DB2 instance was created.
DB2INSTANCE	DB2 database instance name	where *DB2INSTANCE* is the name of the DB2 database instance you have created.
DB2CODEPAGE	Set equal to the CODEPAGE value of the DB2 database.	A mismatch can cause encoding issues for Latin-1/UTF-8 data on data-load.

Oracle environment variables

Set all of the following required environment variables for your operating system on the target machine.

Note: You must ensure these environment variable values prepend any existing entries of the same environment variables.

All environment variables must be capitalized.

AIX environment variables

Table 7. AIX environment variables for Oracle databases

Environment Variable	Value	Conditions
ORACLE_HOME	Oracle client software installation directory	where *ORACLE_HOME* is the location where the Oracle client software is installed.
LIBPATH	`$ORACLE_HOME/lib:<product_install_directory>/lib`	where *ORACLE_HOME* is the Oracle client software installation directory, and where *<product_install_directory>* is the location where the product will be installed.

Linux 64-bit environment variables

Table 8. Linux 64-bit environment variables for Oracle databases

Environment Variable	Value	Conditions
ORACLE_HOME	Oracle client software installation directory	where *ORACLE_HOME* is the location where the Oracle client software is installed.

Table 8. Linux 64-bit environment variables for Oracle databases (continued)

Environment Variable	Value	Conditions
LD_LIBRARY_PATH	*$ORACLE_HOME*/lib:*<product_install_directory>*/lib	where *ORACLE_HOME* is the Oracle client software installation directory, and where *<product_install_directory>* is the location where the product will be installed.

Microsoft Windows environment variables

You must use the Microsoft Windows 8.3 naming convention when setting up environment variables in a Microsoft Windows environment. The environment variables must not contain any spaces.

Table 9. Microsoft Windows environment variables for Oracle databases

Environment Variable	Value	Conditions
ORACLE_HOME	Oracle client software installation directory	where *ORACLE_HOME* is the location where the Oracle client software is installed.

Initial information gathering and security considerations

To protect web-based applications and web services, ENS uses WebSphere Liberty security.

You can manage access and security with the following elements:

The `users.xml` file

Information about users, groups, and passwords is kept in a file-based credential store in <ensroot>/ibm-home/wlp/users.xml. The ENS installer configures all ENS server profiles in an installation to use a single copy of this file. In a multiple-server system, this file is located in a shared folder.

This file-based repository maintains a local store of user names, passwords, and roles without requiring you to integrate with the operating system repository.

Initial ENS administrator

The ENS installer prompting you to provide a username and password to be used for a primary ENS administrator user. The suggested name for the user is “ensadmin”, but you can specify a different name.

When the installer creates the users.xml file, it includes an entry defining this user and associating them with the “admins” group within ENS. A user in this group can perform administrative functions in the ENS console Web application, including configuring, starting, and stopping the cell and its components. This user also has full access to all search and name management services in ENS.

You can use ENS with just this userid, or after installation you can edit the users.xml file to add and modify other users, and to make them members of different groups according to the permissions they need. Users need to provide credentials with appropriate permissions whether interacting with ENS via the GUI or via web services. After prompting you to define the

primary ENS administrative user, the ENS installer prompts you to define an additional different userid/password combination for some infrequently-used WebSphere Liberty administrative purposes. This is not stored in the users.xml file and is not part of the ENS users/groups scheme

Running the product installation program for Enterprise Name Search

Complete the following steps to run the product installation program to install Enterprise Name Search.

Before you begin

You must run the installer from the product media, or copy the product installer package including the executable to a local drive. The product installation program cannot be run from a network drive.

Procedure

1. Obtain the IBM InfoSphere Global Name Management - Entity Name Search product media.
2. Run the installation program:

Option	Description
GUI mode	1. Navigate to the `/Disk1/InstData/VM/` directory on the product media. 2. Run the install executable: `install.exe` or `install.bin`.
Command line mode	1. Open a command prompt or shell window. 2. Navigate to the `/Disk1/InstData/VM/` directory on the product media. 3. Run the install executable with the -i console option. For example: `install -i console`.

3. Follow the instructions on the product installation program wizard to install ENS.

Results

Verify your installation was successful by checking that `<install>/installer/logs/ens_configure.log` produces a completion code of rc=0.

After installing Enterprise Name Search

After you install Enterprise Name Search, you must complete several tasks before you can begin configuring the product.

Procedure

1. Configure user security for Enterprise Name Search by creating users and passwords and assigning role-based security groups to each user. To learn more about this task and Name Loader utility, search for *Creating users and assigning security groups* in the InfoSphere Global Name Recognition Information Center.

You can assign a user to the admin role to configure the Enterprise Name Search cell in the Configuration console, or use the admin user that you created during installation.

2. If you did not create a profile during installation, you must do so now. See Creating, updating, or deleting server profiles.
3. Use the Name Loader utility to load names into the database. To learn more about this utility, search for *Loading names from name lists using the Name Loader utility* in the InfoSphere Global Name Recognition Information Center.
4. Start each ENS server profile on each host machine. On each host machine, navigate to `<install>/bin` and run the start scripts for each server profile defined:

   `start-`*`profilename`*

   profilename is the name given to the profile during installation.

   On Microsoft Windows, use the **start-profilename.bat** command. Use the **stop-profilename.sh** command to stop an ENS server. The start script registers each ENS server on this host machine with the Enterprise Name Search cell and displays it in the Configuration console, ready to be configured.
5. From a web browser, enter the URL for the Configuration console. Typically, the URL looks something like this:

   `hostname:`*`http_port_number`*`/ws/console/`

   http_port_number is the HTTP port number that you specified during installation. By default, the port number for the Configuration console is set to 14510. The Configuration console login screen displays.
6. Use the initial ENS administrator userid and password set during the installation to log in to the console. The default value for userid is `ensadmin`.

Adjusting database settings

Database settings are usually best done by a DBA, but if you are on your own with your own database in a demo situation, the following DB2 settings changes can help ENS performance when running NameLoader, when starting up searchers, and when performing searches. If you have a DBA, this section contains suggestions for their consideration.

This example assumes a database and schema named “ensdemo” and “ens” respectively.

```
db2 update db cfg for ensdemo using LOGFILSIZ 200000
db2 update db cfg for ensdemo using LOGPRIMARY 3
db2 connect to ensdemo
db2 alter table ens.ens_search_name append on
db2 alter table ens.ens_source_name append on
db2 alter table ens.ens_search_source_name append on
db2set DB2_APPENDERS_PER_PAGE=1
db2set DB2_INLIST_TO_NLJN=yes
```

and possibly:

```
db2set DB2_LOGGER_NON_BUFFERED_IO=ON
db2stop or db2stop force (assuming you're not sharing the database)
db2start
```

If using DB2, make sure your database does not have the setting DB2_KEEPTABLELOCK=CONNECTION. This is not compatible with ENS, and can cause deadlocks during server startup in a multi-server ENS installation.

In addition to these settings, it is very important for performance reasons to update database statistics after loading names—or even after loading a portion of your names—as described in Updating Database Statistics.

Managing ENS configuration parameters post-installation

The Enterprise Name Search configuration utility is a command line utility used by administrators to configure or modify the configuration parameters for the ENS database and ENS profiles.

Using the Enterprise Name Search configuration utility, you can:

- Update or configure database connection properties.
- Initialize database contents (if this was not done during installation).
- Add, update, or delete Enterprise Name Search server profiles.

The configuration connection properties that you can update or modify include:

- Database Host/IP
- Database Port
- Database Name/SID/Service Name
- DB2 Schema (optional)
- Type-4 JDBC Driver Location
- Database User Name
- Database Password

The **Database Properties Configuration** menu allows you to enter or change the following parameters for your ENS system:

Starting the configuration utility

You can start the configuration utility from a command line in the folder where ENS is installed.

Navigate to the `<install>/bin` directory and run the `enscu` application. Optionally you can enable logging by adding a `-l log_file_name` parameter to the command.

Exiting the configuration utility

To exit the configuration utility, you can either enter `exit` on any screen or enter `5` **Exit** from the **Main Menu**.

Updating and configuring ENS database properties

You can use the ENS configuration utility to change the database connectivity information for an Enterprise Name Server configuration including host name, port number, path to the jdbc driver, database name, and schema name. The ENS configuration utility makes the ENS application aware of changes that you have previously made in the database.

About this task

To configure or update connectivity between your ENS components and the database, start the ENS configuration utility and then follow these steps.

Note: The **Database Properties Configuration** option includes some powerful commands and should only be used by someone who understands the resulting consequences. For example, you can specify an entirely new database to use with an ENS server. ENS will no longer have information about previously created profiles and you would have to either: manually delete/recreate previously existing profiles or re-insert (possibly via db restore command) records into the appropriate profiles table.

Procedure

1. Navigate to the `<install>/bin` directory and enter commands from the command line.
2. Enter: enscu
3. From the Enterprise name search configuration utility **Main Menu**, enter `2` to go to the **Database Properties Configuration** screen.

```
1- Database Host/IP:
2- Database Port:
3- Database Name/SID:
4- DB2 Schema (optional):
5- Type-4 JDBC Driver Location:
6- Database User Name:
7- Database Password:

8- Test Connection
[Not Applicable]- Revert to original values
[Not Applicable]- Apply changes
```

4. From the **Database Properties Configuration** screen, enter the number and follow the prompts for the database properties that you want to change.
5. After making the changes in the previous step, you must select "Apply changes". You must restart all the ENS servers in order for the applied changes to take effect.
6. Enter `back` to return to the **Main Menu** or enter `exit` to exit the configuration utility.

Initializing ENS database contents

The ENS configuration utility can be used to initialize database content, creating the tables, views, indexes, and other schema elements needed to configure and run an Enterprise Name Search environment. This SQL script should be used if the database was not configured during ENS installation. You can also use the script to update the schema.

About this task

If the database was not configured during installation then you can select the option (3) for **Database Content Initialization**. The configuration utility provides the following options:

```
1- Introduction / Instructions
2- Database Properties Configuration
3- Database Content Initialization
4- Profiles
5- Log Detail

7- Exit
```

Procedure

1. After starting the ENS configuration utility, select `3` from the **Main Menu**.

2. From the Database Content Initialization screen, enter the number that corresponds to the action you want to perform:

```
Use this screen to create the tables, views, indexes, and so on needed to run
the enterprise name server.
Option 1 creates and runs the database initialization script now.
Option 2 creates the database initialization script and places it in the
/(ENS install path...)/ENS/sql directory. You can review and edit the script
before manually running the script at a later time.

1- Create and run the database initialization script
2- Create, but do not run, the database initialization script

ENTER NUMBER, "back", or "exit": 2
```

   a. To create and run the initialization script, enter 1.
   b. To only create the initialization script now but not run it, enter 2. The configuration utility tells you if the script has been successfully created and where it is located. You can review and edit the script before running it. Before any of the schema changes take affect, you must manually run the initialization script.
3. Enter `back` to return to the **Main Menu** or enter `exit` to exit the configuration utility.

Creating, updating, or deleting server profiles

During the installation process you can add up to one ENS server profile from the installation program. However, typical ENS cells use more than one ENS server profile in large scale environments. Use the ENS configuration utility to add, delete, or modify ENS server profiles.

Before you begin

You must shut down the ENS cell and the WebSphere Application Server before applying patches or hot fixes. Then start the ENS configuration utility. Note that you cannot change the name of an ENS server profile with this configuration utility.

Procedure

1. From the ENS configuration utility **Main Menu**, enter `4`.
2. From the **Enterprise Name Server Profiles List** screen, enter the number of the profile you would like to edit or the number for **Create a new profile**.
   - To update a server profile
     a. Enter the number next to the ENS server profile to update.
     b. From the Profile Configuration screen, update the parameters you want to change. For example:

```
Use this screen to modify an existing Enterprise Name Search profile.
Server Profile Name: testsrv1
1- Web server port number (http): 44110
2- Secure web server port number (https): 44111
```

     c. Save changes by entering `4` **Apply changes**, or cancel all changes by entering `3` **Revert to original values**.
   - To create a new server profile
     a. Enter the number that corresponds with **Create a new profile** (typically listed last).
     b. From the **Profile Configuration** screen, provide values for:

```
Server Profile Name:
Web server port number (http):
Secure web server port number (https):
```

c. Save the new profile by entering "Y" at the prompt:

```
Do you want to create a new profile with those values?
"Y" to create profile / "N" to edit above values / "back" to return to
Profiles Screen: __
```

- To delete a server profile
  a. From the Enterprise Name Server Profiles List screen, enter the number next to the ENS server profile to be deleted.
  b. Enter 5 to delete the server profile and then enter “Y” at the prompt: Are you sure you want to delete this profile (Y/N)?
  c. When you complete all the updates, enter `back` to return to the **Enterprise Name Server Profiles List** screen.

  Note: Consider all of the consequences of deleting a profile. For example, what happens when a server/searcher based on a deleted profile is the *only* server/searcher that contains an existing name list partition? First, the related searches will no longer work.

3. Enter `back` to return to the **Main Menu** or enter `exit` to exit the configuration utility.

What to do next

Restart the WebSphere Application Server.

Restart the ENS cell. If you created a server profile, you must register that server profile and then configure the components to run on that server profile in the ENS Search console. If you updated a server profile, restart that server.

Applying patches or hot fixes for Enterprise Name Search

Administrators can update the EAR file for their ENS installation using the ENS configuration utility.

Before you begin

You must shut down the ENS cell before applying patches or hot fixes. Then start the ENS configuration utility.

About this task

Hot fixes and fix packs include a readme doc that describes the changes made and includes any special instructions or notifications.

Procedure

1. From the ENS configuration utility **Main Menu**, enter `5`.
2. From the **File Paths for Patches or Hot Fixes** screen, enter `1`.
3. Enter the full path to the EAR file that contains the hot fix or patch to apply.
4. Enter `back` to return to the **Main Menu** or enter `exit` to exit the configuration utility.

What to do next

Restart the ENS cell.

If the README file for the hot fix or patch indicates that there are schema changes (tables, views, or indexes), apply those changes first by creating and running the SQL script . Then restart the Enterprise name search cell.

Uninstalling Enterprise Name Search

You remove the ENS component product installation by running the uninstallation program.

Procedure

1. Navigate to the *product_install_location*/_uninst directory.

Option	Description
AIX, Linux	Enter the following command: **ENS**
Microsoft Windows	Run the **ens.exe** executable to start the uninstallation program, or use the Windows **Add or Remove Programs** option.

2. Follow the instructions on the uninstall program wizard.
3. Alternatively, you can just delete the schema and the folders that you specified and populated at ENS installation time.

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