CICS/ESA

IBM

Server Support for CICS Clients

Version 4 Release 1

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Version 4 Release 1

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Contents

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This book also documents Diagnosis, Modification or Tuning Information provided by CICS.

Diagnosis, Modification or Tuning Information is provided to help you determine the causes of problems in a CICS system.

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Preface

What this book is about

This book describes how to set up a CICS/ESA 4.1 system to act as a server to the CICS Client workstation products. Topics include an overview of the facilities offered by CICS Clients, how to install server support on CICS/ESA 4.1, the definition of intersystem links and remote resources, application programming, and problem determination.

What is not covered by this book

This book describes the CICS/ESA 4.1 (server) side of CICS Client–CICS/ESA 4.1 communication. For information about installing and configuring Clients, see the *CICS Clients: Administration* manual. For information about Client programming, see the *CICS Family: Client/Server Programming* manual.

Who this book is for

The book is intended for planners, system programmers, application developers, and support staff.

What you need to know to understand this book

You need to be familiar with CICS intercommunication facilities and concepts. If you are not, the *CICS Family: Inter-product Communication* manual is a good place to start, followed by the resource definition chapters of the *CICS/ESA Intercommunication Guide.* You may also find some of the example definitions in the *CICS Family: Communicating from CICS on System/390* manual useful.

How to use this book

If you are unfamiliar with the CICS Client products, and would like to see what benefits they could offer your enterprise, read Part 1. To see how to install and configure CICS/ESA 4.1 support for CICS Clients, read Part 2.

Terminology

In this book, the term *CICS on System/390* is used as a generic name for all the CICS 390 products—CICS/ESA, CICS/MVS, and CICS/VSE.

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For CICS books, these softcopy updates appear regularly on the *Transaction Processing and Data Collection Kit* CD-ROM, SK2T-0730-xx. Each reissue of the collection kit is indicated by an updated order number suffix (the -xx part). For

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- Updates to the softcopy are clearly marked by revision codes (usually a "#" character) to the left of the changes.

Bibliography

CICS/ESA 4.1 library

Evaluation and planning		
Release Guide	GC33-1161	April 1997
Migration Guide	GC33-1162	April 1997
General		
CICS Family: Library Guide	GC33-1226	April 1995
Master Index	SC33-1187	October 1994
User's Handbook	SX33-1188	April 1997
Glossary (softcopy only)	GC33-1189	n/a
Administration		
Installation Guide	GC33-1163	April 1997
System Definition Guide	SC33-1164	April 1997
Customization Guide	SC33-1165	April 1997
Resource Definition Guide	SC33-1166	April 1997
Operations and Utilities Guide	SC33-1167	April 1997
CICS-Supplied Transactions	SC33-1168	April 1997
Programming		
Application Programming Guide	SC33-1169	October 1994
Application Programming Reference	SC33-1170	April 1997
System Programming Reference	SC33-1171	April 1997
Sample Applications Guide	SC33-1173	October 1994
Distributed Transaction Programming Guide	SC33-1174	October 1994
Front End Programming Interface User's Guide	SC33-1175	October 1994
Diagnosis		
Problem Determination Guide	SC33-1176	October 1994
Messages and Codes	GC33-1177	April 1997
Diagnosis Handbook	LX33-6093	October 1994
Diagnosis Reference	LY33-6082	April 1997
Data Areas	LY33-6083	April 1997
Supplementary Data Areas	LY33-6081	October 1994
Closely-Connected Program Interface	LY33-6084	November 1996
Communication		
Intercommunication Guide	SC33-1181	April 1997
Server Support for CICS Clients	SC33-1591	February 1996
CICS Family: Inter-product Communication	SC33-0824	October 1996
CICS Family: Communicating from CICS on System/390	SC33-1697	October 1996
Special topics		
Recovery and Restart Guide	SC33-1182	October 1994
Performance Guide	SC33-1183	October 1994
CICS-IMS Database Control Guide	SC33-1184	October 1994
CICS-RACF Security Guide	SC33-1185	October 1994
Shared Data Tables Guide	SC33-1186	October 1994
External CICS Interface	SC33-1390	April 1997
CICS ONC RPC Feature for MVS/ESA Guide	SC33-1119	February 1996
CICS Web Interface Guide	SC33-1892	November 1996

The book that you are reading was republished in hardcopy format in April 1997 to incorporate updated information previously available only in softcopy. The right-hand column in the above table indicates the latest hardcopy editions of the CICS/ESA books available in April 1997. A book with a date earlier than April 1997 remains the current edition for CICS/ESA 4.1. Note that it is possible that other books in the library will be updated after April 1997.

When a new order is placed for the CICS/ESA 4.1 product, the books shipped with that order will be the latest hardcopy editions.

The style of IBM covers changes periodically. Books in this library have more than one style of cover.

The softcopy books are regularly updated to include the latest information.

Other CICS books

- *CICS Application Migration Aid Guide*, SC33-0768
- *CICS Application Programming Primer (VS COBOL II)*, SC33-0674
- *CICS/ESA Facilities and Planning Guide* for CICS/ESA Version 3 Release 3, SC33-0654
- *CICS/ESA XRF Guide* for CICS/ESA Version 3 Release 3, SC33-0661
- *CICS Family: API Structure*, SC33-1007
- *CICS Family: General Information*, GC33-0155
- *IBM CICS Transaction Affinities Utility MVS/ESA*, SC33-1159

CICS Clients
- *CICS Clients: Administration*, SC33-1436
- *CICS Family: Client/Server Programming*, SC33-1435

Part 1. Overview of CICS Clients

This part of the book is for people who are not familiar with the CICS Client products. It briefly describes the functions and benefits that Clients provide. To read about the specifics of CICS/ESA 4.1 support for Clients, turn to Part 2 on page 7.

Chapter 1. Introduction

CICS Clients are a family of workstation products that provide a standard set of functions for **client/server** computing.

What is a CICS Client?

A CICS Client is not a full-function CICS system. But it contains code to enable it to access the services of CICS systems. (By *services*, we mean things like transactions and programs.) CICS systems to which Clients are connected are known as CICS servers.

Each CICS Client is designed to run on a particular operating system. Each can attach to a common range of CICS systems, using a variety of protocols. CICS Clients thus allow users to access resources owned by CICS server-systems, from a variety of operating environments.

There is a CICS Client for each of the following operating systems:

- DOS
- Microsoft Windows
- Microsoft Windows NT
- Microsoft Windows 95
- OS/2
- Macintosh.

Each Client can attach to any or all of the following CICS servers:

- CICS for OS/2 Version 2.0.1
- CICS OS/2 Version 2.0 multi-user ⋆
- CICS for Windows NT Version 2
- CICS/400 Version 3.1
- CICS on Open Systems
- CICS Transaction Server for OS/390
- CICS/ESA Version 4.1
- CICS/ESA Version 3.3 ⋆
- CICS/MVS Version 2.1.2 ⋆
- CICS/VSE Version 2.3
- CICS/VSE Version 2.2 ⋆.

Note: In the above list, the CICS products marked with a star (⋆) offer limited server support. These products support the client External Call Interface (ECI), but not the External Presentation Interface (EPI), nor the Terminal Emulation function. (All the Client functions are described in the next section.)

What functions do CICS Clients provide?

CICS Clients provide a standard set of functions for client/server computing. This section gives an overview of the most important functions; it is not meant to be exhaustive.

The External Call Interface

The External Call Interface (ECI) is an application programming interface (API) that allows a non-CICS program running on a Client to call a CICS program located on a CICS server. This enables the Client to make use of existing server routines that could be used, for example, to make enquiries on a database.

The Client program can make the following types of call to a CICS server:

- Program link calls, which can be **synchronous** (that is, the calling program waits for a response from the linked-to program), or **asynchronous** (that is, the two programs continue to execute independently).

- Calls to retrieve a response from a previous asynchronous call.

- Calls that return a value indicating the status of the CICS system. This allows an application to test for availability of the CICS server or to monitor it by waiting for a change in its status.

The External Presentation Interface

The External Presentation Interface (EPI) is an API that allows a non-CICS Client program to appear to a CICS server as one or more standard 3270 terminals. This enables the Client to access, for example, CICS on System/390 transactions written for 3270 terminals, without needing to change the System/390 code.

The Client program can start CICS transactions and send and receive standard 3270 datastreams to and from the transactions. It can present the 3270 data to the user by emulating a 3270 terminal, or by means of a graphical user interface such as Presentation Manager (OS/2 Clients) or Windows (Windows Clients).

The EPI consists of a set of calls that can be made from a C or COBOL program. The calls are provided in a library that is linked to the application. Among the functions available are calls to:

- Initialize the EPI.

- Terminate the EPI.

- Obtain a list of CICS servers to which a "terminal" may attach.

- Attach a virtual terminal.

- Detach a virtual terminal.

- Start a transaction for a "terminal".

- Send data from a "terminal" to a transaction.

- Obtain details of an "event" that has occurred for a terminal. An example of an event is when the transaction is expecting a reply from the terminal.

- Obtain detailed error information for the last error that occurred for a terminal.

Terminal emulation

CICS Clients can run 3270 terminal emulators. A Client terminal emulator transmits or receives standard CICS transaction routing flows to or from a CICS server. This allows a user to interact with the server, and run transactions, as if the Client were a locally-attached 3270 terminal.

It is possible to run multiple terminal emulators on a single Client. The emulators can be connected to the same CICS server, or to different servers. In the former case, each instance of the emulator requires a unique name and represents a separate terminal to the server.

Users can customize the colors and keyboard mapping of their emulators.

What protocols are supported?

CICS on System/390–CICS Client links must use the LU6.2 (APPC) communication protocol. Single- or parallel-session connections can be used.

On CICS on System/390 systems, you can use autoinstall to define APPC connections to Clients dynamically, on their first use. On CICS/ESA 4.1, you can autoinstall both single-session and parallel-session APPC connections. On all other CICS on System/390 products, only single-session, dependent-LU APPC connections can be autoinstalled. Alternatively, you can use the RDO CEDA DEFINE and INSTALL commands to define connections to Clients statically.

APPC links to CICS Clients support data synchronization levels (sync levels) 0 and 1.

Benefits of Client support

CICS on System/390's support for CICS Clients has the following benefits:

- Company managers can migrate to client/server solutions quickly, in a staged manner, by:

    1. Using the Client 3270 emulator to run existing CICS on System/390 3270 applications.

    2. Using the EPI to add graphical user interface (GUI) front-ends to existing CICS on System/390 3270 applications. This should increase end-user satisfaction and productivity.

    3. Using the ECI to develop new client/server applications in which the display and processing logic is appropriately split between the client and the server.

    Different applications at different stages in the above migration scenario can coexist on the same client.

- The handling of code page translation between EBCDIC (used on CICS on System/390) and ASCII (used on workstations) is simplified.

- CICS on System/390's support for autoinstall of connections and virtual terminals means that systems developers can design large CICS client/server networks without being concerned about the problems of installing and maintaining definitions of all the clients in all the servers; or of installing and maintaining definitions of all the different virtual 3270 terminals in all the clients.

    It also means that system administrators do not have to extend the resource definitions of server systems when a new client is added to the network.

- Users of CICS on System/390 3270 applications benefit from the improved end-user interfaces available to intelligent workstations.

Further information about Clients

For programming information about the Client ECI and EPI APIs, see the *CICS Family: Client/Server Programming* manual, SC33-1435. For information about setting up the Client side of a CICS Client–CICS server link, see the *CICS Clients: Administration* manual, SC33-1436. The remainder of this document deals with setting up and administering the CICS/ESA 4.1 side of the Client–server link.

Part 2. CICS/ESA 4.1 support for CICS Clients

This part of the book contains information about installing and configuring
CICS/ESA 4.1 support for Clients. It assumes that you are familiar with the CICS
Client product or products that you plan to use with CICS/ESA 4.1.

Chapter 2. Installation

The following is a checklist of the things you must do to install CICS/ESA 4.1 support for CICS Clients:

- Ensure that a prerequisite set of Authorized Program Analysis Reports (APARs) has been applied to the CICS/ESA 4.1 base code—see "Prerequisite APARs"

- Install the supplied resource definition group, DFHCLNT—see "DFHCLNT resource group" on page 10

- Define the CSCC transient data queue—see "CSCC transient data queue" on page 10

- Install APPC connections to the Clients—see "Connections to Clients" on page 10

- Install some Client virtual terminals—see "Client virtual terminals" on page 11

- Specify the level of security to be used for Client–CICS/ESA 4.1 links—see "Security" on page 19

- Specify how CICS is to create unique identifiers for Client terminals—see Chapter 3, "System definition" on page 21

- Specify the code pages to be used for data conversion—see Chapter 4, "Data conversion" on page 23.

Prerequisite APARs

Check that the following APARs have been applied to the CICS/ESA 4.1 base code:

- PN 59989
- PN 60733
- PN 64404
- PN 64912
- PN 64950
- PN 66826
- PN 68409
- PN 70076
- PN 71533
- PN 74205

DFHCLNT resource group

You must install the CICS-supplied resource definition group, DFHCLNT, which includes definitions of the CICS/ESA 4.1 internal transactions, CCIN and CTIN, and of the programs they use. CCIN allows Clients to pass information to the server, such as the client code page to be used for data conversion between ASCII and EBCDIC. CTIN is required to install remote definitions of Client virtual terminals.

CSCC transient data queue

Messages relating to Client support are written to the CSCC transient data queue. You must define CSCC in your destination control table (DCT). Copybook DFH$DCTR in the CICS sample library (CICS410.SDFHSAMP) includes a sample macro to define CSCC. The sample defines CSCC as an indirect extrapartition destination, pointing to CSSL.

For further information about transient data queues, see the *CICS/ESA Resource Definition Guide*.

Connections to Clients

You must install APPC connections to the Clients. The connections can be single- or parallel-session links.

Using static definitions

You can use CEDA DEFINE and INSTALL commands to create static definitions.

For information about defining APPC connections to non-System/390 systems, see the *CICS Family: Communicating from CICS on System/390* manual.

Using autoinstall

The preferred method of installing connections to Clients is to use autoinstall. If you use autoinstall, you must create some suitable CONNECTION and SESSIONS template definitions, if these do not already exist.

For information about autoinstall and defining templates, see the *CICS/ESA Resource Definition Guide*. For information about customizing your autoinstall user program to handle APPC connections, see the *CICS/ESA Customization Guide*.

A connection is autoinstalled on CICS/ESA when the Client initiates communication. (This could be, for example, when the end-user issues a CICSCLI /s=*servername* command to connect to the CICS/ESA server, a CICSTERM /s=*servername* command to start a 3270 emulator session, or when an ECI or EPI program is started on the Client.)

Client virtual terminals

If the EPI or the Client terminal emulator is to be used, the Client virtual terminals must be installed on CICS/ESA. Client virtual terminals are defined to CICS/ESA as remote 3270 terminals.

Note the following:

- CICS Clients do not ship remote terminal definitions to CICS/ESA for use as virtual terminals. Instead, you define the virtual terminals to CICS/ESA as remote 3270 devices, using either static definitions or autoinstall. If you use autoinstall, an autoinstall model is used as the basis for the virtual terminal.

- VTAM definitions are not required for Client virtual terminals.

- Although CICS Clients do not ship definitions of virtual terminals to CICS/ESA, once installed virtual terminals can be shipped by CICS/ESA to connected CICS systems. Therefore transaction routing can be used from a Client virtual terminal.

Using static definitions

You can use CEDA DEFINE and INSTALL commands to create static definitions of Client terminals. When you use static definitions:

- Client EPI programs reserve particular definitions for their use by quoting the TERMIDs on the **NetName** parameter of **CICS_EpiAddTerminal** calls (see "How CICS installs Client terminals" on page 15). For information about the **CICS_EpiAddTerminal** function, see the *CICS Family: Client/Server Programming* manual.

- A workstation user chooses a particular definition for an emulator session by quoting the TERMID on the **/n** (NetName) parameter of the **cicsterm** command used to start the emulator. For information about the **cicsterm** command, see the *CICS Clients: Administration* manual.

Figure 1 on page 12 and Figure 2 on page 13 are example TERMINAL and TYPETERM definitions for Client terminals.

Example Client terminal definition

Note that:

- On the TERMINAL definition:

  - TERMINAL is the name by which the terminal is to be known to the Client—that is, the name that the Client will quote on the **NetName** parameter of **CICS_EpiAddTerminal** calls, or on the **/n** parameter of a **cicsterm** command.

    Note that the terminal names passed by Clients are case-sensitive. That is, if a Client passes a name that contains lower-case letters, CICS does not translate it into upper-case. CICS searches for a remote terminal definition whose TERMINAL name is the same combination of mixed or lower case letters.

  - NETNAME should be allowed to take its default value.

  - REMOTESYSTEM must be the name of the connection to the Client.

- Specify REMOTENAME if you want to use an alias terminal identifier by which the terminal will be known to CICS. (Do not specify REMOTENAME if the TERMINAL definition is to be used as an autoinstall model.)

- USERID must be left blank—you cannot use preset security with Client virtual terminals.

- On the TYPETERM definition, value 2 of the CGCSGID option should specify the code page to be used by the CICS/ESA server for data conversion. You can use value 1 to specify the server character set. Alternatively, by leaving value 1 set to '00000', you can allow CICS to choose a default character set, deduced from the server code page—see page 25.

- On both definitions, some inessential options have been omitted. You can allow these to take their default values.

```
DEFINE TERMINAL(VT12) GROUP(CLEPIVT)
OVERTYPE TO MODIFY
 CEDA DEFine
  TErminal     ==> VT12
  Group        ==> CLEPIVT
  AUTINSTModel ==> No                    No|Yes|Only
  AUTINSTName  ==>
 TERMINAL IDENTIFIERS
  TYpeterm     ==> CLIVT
  NEtname      ==>
  CONSOle      ==> No                    No|0-99
  REMOTESystem ==> CLIA
  REMOTESYsnet ==>
  REMOTEName   ==>
 ASSOCIATED PRINTERS
  PRINTERCopy  ==> No                    No|Yes
  ALTPRINTCopy ==> No                    No|Yes
 PIPELINE PROPERTIES
  TAsklimit    ==> No                    No|1-32767
 OPERATOR DEFAULTS
  OPERPID      ==>
  OPERPriority ==> 000                   0-255
  OPERRsl      ==> 0                     0-24,...
  OPERSecurity ==> 1                     1-64,...
 PRESET SECURITY
  Userid       ==>
 TERMINAL USAGES
  TErmpriority ==> 000                   0-255
  Inservice    ==> Yes                   Yes|No
 SESSION SECURITY
  ATtachsec    ==> Local                 Local|Identify|Verify|
                                         Persistent|Mixidpe
  BINDPassword ==>                       PASSWORD NOT SPECIFIED
  BINDSecurity ==> No                    No|Yes
```

Figure 1. Example TERMINAL definition for statically-defined Client virtual terminal

Here is an example TYPETERM definition to accompany the preceding TERMINAL definition. It is based on the CICS-supplied TYPETERM, DFHLU2.

```
DEFINE TYPETERM(CLIVT) GROUP(CLEPIVT)
OVERTYPE TO MODIFY
CEDA DEFINE
  TYpeterm     ==> CLIVT
  Group        ==> CLEPIVT
 RESOURCE TYPE
  DEVice       ==> LUTYPE2
  TERmmodel    ==> 2
  SESsiontype  ==>
  LDclist      ==>
  SHippable    ==> Yes              No|Yes
 MAPPING PROPERTIES
  PAGesize     ==> 024 , 080        0-999
  ALTPage      ==> 000 , 000        0-999
  ALTSUffix    ==>
  FMhparm      ==> No               No|Yes
  OBOperid     ==> No               No|Yes
 PAGING PROPERTIES
  AUTOPage     ==> No               No|Yes
 DEVICE PROPERTIES
  DEFscreen    ==> 024 , 080        0-999
  AUDiblealarm ==> Yes              No|Yes
  EXtendedds   ==> Yes              No|Yes
  Query        ==> All              No|Cold|All
  SOsi         ==> No               No|Yes
  BAcktrans    ==> No               No|Yes
  CGcsgid      ==> 00000 , 00037    0-65535
 SESSION PROPERTIES
  AScii        ==> No               No|7|8
  SENdsize     ==> 01536            0-30720
  RECEivesize  ==> 00256            0-30720
  BRacket      ==> Yes              Yes|No
  LOGMode      ==>
 DIAGNOSTIC DISPLAY
  ERRLastline  ==> Yes              No|Yes
  ERRIntensify ==> Yes              No|Yes
  ERRColor     ==> No               No|Blue|Red|Pink|Green|
                                    Turquoise|Yellow|NEutral
  ERRHilight   ==> No               No|Blink|Reverse|Underline
 OPERATIONAL PROPERTIES
  AUTOConnect  ==> No               No|Yes|All
  ATi          ==> Yes              No|Yes
  CReatesess   ==> No               No|Yes
  RELreq       ==> Yes              No|Yes
  DIscreq      ==> Yes              Yes|No
 MESSAGE RECEIVING PROPERTIES
  ROutedmsgs   ==> All              All|None|Specific
  LOGOnmsg     ==> Yes              No|Yes
 APPLICATION FEATURES
  BUildchain   ==> Yes              No|Yes
  USerarealen  ==> 000              0-255
  Ioarealen    ==> 00256 , 04000    0-32767
  UCtran       ==> Yes              No|Yes|Tranid
```

Figure 2. Example TYPETERM definition for statically-defined Client virtual terminal

Using autoinstall

The preferred method of defining Client terminals is to use autoinstall, because it is more convenient when many terminals connect to a single server.

Autoinstall models

If you use autoinstall, you may need to create some model terminal definitions (that is, TERMINAL–TYPETERM pairs) for use with Client terminals, unless you have some existing ones that are suitable. The CICS-supplied autoinstall model DFHLU2 may be appropriate (it is the default if the Client does not specify a model name). Value 2 of the CGCSGID option of the TYPETERM definitions should specify the code page to be used by the CICS/ESA server for data conversion.

Note: Because Client virtual terminals are not "seen" by VTAM, there is no need to create matching entries for the autoinstall models in the VTAM LOGMODE table.

The autoinstall model used to install a virtual terminal is determined using the following sequence:

1. **For EPI programs:**
   From the **DevType** parameter of the **CICS_EpiAddTerminal** function, if specified by the Client EPI program. (For details of EPI calls, see the *CICS Family: Client/Server Programming* manual.)

   For the Client terminal emulator:
   From the **/m** (Modelname) parameter of the **cicsterm** command used to start the emulator, if specified by the workstation user. (For details of the **cicsterm** command, see the *CICS Clients: Administration* manual.)

2. The CICS-supplied autoinstall model, DFHLU2.

Terminal identifiers

The terminal identifier (TERMID) used to install a virtual terminal is determined using the following sequence:

1. **For EPI programs:**
   From the **NetName** parameter of the **CICS_EpiAddTerminal** function, if specified by the Client EPI program.

   For the Client terminal emulator:
   From the **/n** parameter of the **cicsterm** command used to start the emulator, if specified by the workstation user.

   Note that the terminal names passed by Clients are case-sensitive—that is, if they contain lower-case letters, these are not translated into upper-case by CICS.

2. A name generated automatically by CICS. You use the VTPREFIX system initialization parameter to ensure that CICS-generated TERMIDs are unique within your transaction routing network—see Chapter 3, "System definition" on page 21.

   Note: Client terminal definitions are not recovered after a restart. Immediately after a restart, no Client terminals are in use, and so when CICS generates TERMIDs it begins again at the start of its sequence. This means that CICS does **not** always generate the same TERMID for any given Client terminal. This in turn means that server applications cannot assume that a particular CICS-generated TERMID always equates to a particular Client terminal.

The autoinstall user program

The autoinstall user program is **not** invoked at install of Client virtual terminals, so cannot be used to specify TERMIDs or autoinstall models.

How CICS installs Client terminals

When an EPI program issues a **CICS_EpiAddTerminal** call, or the workstation user uses the **cicsterm** command to start an emulator session, the Client invokes the CTIN transaction to install or reserve the terminal definition on CICS/ESA.

Table 1 relates the parameters passed by the Client to the way in which CICS installs the Client terminal.

Table 1. How CICS installs definitions of Client virtual terminals					
CICS_EpiAddTerminal parameters or cicsterm specified		**CICS actions**			
NetName	**DevType or Model-name**	**Static definition exists?**	**Result**	**TERMID**	**Autoinstall model**
Yes	No	Yes	Use static definition [1]	Client-specified	–
Yes	No	No	Call fails	–	–
Yes	Yes	No	Autoinstall	Client-supplied	Client-specified
Yes	Yes	Yes	Use static definition [1]	–	–
No	No	–	Autoinstall	CICS-supplied	DFHLU2
No	Yes	–	Autoinstall	CICS-supplied	Client-specified

Note: Definitions of Client virtual terminals are **not** deleted by the CICS/ESA 4.1 timeout delete mechanism that operates on shipped terminal definitions.[2]

---

[1] A static definition is used only if its REMOTESYSTEM attribute points to a connection to the correct Client, and it is not currently in use. If the definition points to an incorrect Client, or is in use, the call fails.

[2] That is, the timeout delete mechanism does not operate on the remote definitions of Client terminals installed on the CICS/ESA system on which the CTIN transaction runs. It does operate on Client definitions that are shipped to a back-end CICS/ESA 4.1 system.

Defining a Client-attached printer

This section tells you how to define a printer that is locally-attached to a Client workstation. As when defining any Client virtual terminal, you can either create a static definition, or use autoinstall. DFHLU3 is a suitable autoinstall model for a Client-attached printer.

Figure 3 on page 17 and Figure 4 on page 18 are example TERMINAL and TYPETERM definitions for a Client-attached printer.

Example static definition of a Client-attached printer

Note that:

- On the TERMINAL definition:

  - TERMINAL is the name by which the terminal is to be known to the Client.

    Note that the terminal names passed by Clients are case-sensitive. That is, if a Client passes a name that contains lower-case letters, CICS does not translate it into upper-case. CICS searches for a remote terminal definition whose TERMINAL name is the same combination of mixed or lower case letters.

  - NETNAME should be allowed to take its default value.

  - REMOTESYSTEM must be the name of the connection to the Client.

  - USERID must be left blank—you cannot use preset security with Client virtual terminals.

  - The PRINTER and ALTPRINTER options are not supported. CICS/ESA 4.1 does not provide support for the CICS print key. Any screen print function must be implemented entirely within the Client in its role as a "TOR"; CICS/ESA is unaware of any such support.

- On the TYPETERM definition, value 2 of the CGCSGID option should specify the code page to be used by the CICS/ESA server for data conversion. You can use value 1 to specify the server character set. Alternatively, by leaving value 1 set to '00000', you can allow CICS to choose a default character set, deduced from the server code page—see page 25.

- On both definitions, some inessential options have been omitted. You can allow these to take their default values.

```
DEFINE TERMINAL(CPR1) GROUP(CLEPIVT)
OVERTYPE TO MODIFY
 CEDA DEFine
  TErminal     ==> CPR1
  Group        ==> CLEPIVT
  AUTINSTModel ==> No                No|Yes|Only
  AUTINSTName  ==>
 TERMINAL IDENTIFIERS
  TYpeterm     ==> CLIATPR
  NEtname      ==>
  CONSOle      ==> No                No|0-99
  REMOTESystem ==> CLIA
  REMOTESYsnet ==>
  REMOTEName   ==>
 ASSOCIATED PRINTERS
  PRINTERCopy  ==> No                No|Yes
  ALTPRINTCopy ==> No                No|Yes
 PIPELINE PROPERTIES
  TAsklimit    ==> No                No|1-32767
 OPERATOR DEFAULTS
  OPERPID      ==>
  OPERPriority ==> 000               0-255
  OPERRsl      ==> 0                 0-24,...
  OPERSecurity ==> 1                 1-64,...
 PRESET SECURITY
  Userid       ==>
 TERMINAL USAGES
  TErmpriority ==> 000               0-255
  Inservice    ==> Yes               Yes|No
 SESSION SECURITY
  ATtachsec    ==> Local             Local|Identify|Verify|
                                     Persistent|Mixidpe
  BINDPassword ==>                   PASSWORD NOT SPECIFIED
  BINDSecurity ==> No                No|Yes
```

Figure 3. Example TERMINAL definition for a Client-attached printer

Here is an example TYPETERM definition to accompany the preceding TERMINAL definition.

```
DEFINE TYPETERM(CLIATPR) GROUP(CLEPIVT)
OVERTYPE TO MODIFY
CEDA DEFINE
  TYpeterm     ==> CLIATPR
  Group        ==> CLEPIVT
 RESOURCE TYPE
  DEVice       ==> LUTYPE3
  TERmmodel    ==> 2
  SESsiontype  ==>
  LDclist      ==>
  SHippable    ==> Yes                No|Yes
 MAPPING PROPERTIES
  PAGesize     ==> 024 , 080          0-999
  ALTPage      ==> 024 , 080          0-999
  ALTSUffix    ==>
  FMhparm      ==> No                 No|Yes
  OBOperid     ==> No                 No|Yes
 PAGING PROPERTIES
  AUTOPage     ==> Yes                No|Yes
 DEVICE PROPERTIES
  DEFscreen    ==> 024 , 080          0-999
  EXtendedds   ==> Yes                No|Yes
  Query        ==> All                No|Cold|All
  SOsi         ==> No                 No|Yes
  BAcktrans    ==> No                 No|Yes
  CGcsgid      ==> 00000 , 00037      0-65535
 SESSION PROPERTIES
  AScii        ==> No                 No|7|8
  SENdsize     ==> 00256              0-30720
  RECEivesize  ==> 00256              0-30720
  BRacket      ==> Yes                Yes|No
  LOGMode      ==>
 OPERATIONAL PROPERTIES
  AUTOConnect  ==> No                 No|Yes|All
  ATi          ==> Yes                No|Yes
  TTi          ==> Yes                Yes|No
  CReatesess   ==> No                 No|Yes
  RELreq       ==> Yes                No|Yes
  DIscreq      ==> Yes                Yes|No
 MESSAGE RECEIVING PROPERTIES
  ROutedmsgs   ==> All                All|None|Specific
  LOGOnmsg     ==> No                 No|Yes
 APPLICATION FEATURES
  BUildchain   ==> No                 No|Yes
  USerarealen  ==> 000                0-255
  Ioarealen    ==> 00512 , 00000      0-32767
  UCtran       ==> No                 No|Yes|Tranid
```

Figure 4. Example TYPETERM definition for a Client-attached printer

Security

> **Important**
>
> CICS intercommunication security is described in detail in the *CICS/ESA CICS-RACF Security Guide.* This section is intended to be read in conjunction with that manual; it describes security considerations that are specific to CICS Clients and CICS/ESA 4.1.
>
> Users of external security managers (ESMs) other than the Resource Access Control Facility (RACF) should read this chapter in conjunction with the documentation for their own ESM.

Bind security

Bind-time security is not supported on CICS Client–CICS/ESA links. Therefore, specify BINDSECURITY(NO) on the CONNECTION definitions that define Clients to CICS/ESA.

Link security

Link security provides the lowest level of resource security for intercommunication links. It defines the total set of resources that can be accessed across the connection.

To specify link security for a CICS Client–CICS/ESA connection:

- On the SECURITYNAME option of the CONNECTION definition, specify a userid for the link.

- Define a profile to your ESM for the link userid, which must be a valid RACF userid. Users of the connection will be able to access only those resources that the link userid is authorized to access.

If you do not specify a userid on SECURITYNAME, the authority of the link is that of the CICS default user.

User security

User (attach-time) security:

- Defines how individual users of an intercommunication link are to be checked

- Affects the resources that individual users are able to access. Unless you specify LOCAL user security (in which case all potential users share the authority of the link userid), you must define user profiles to your ESM.

Specify the level of user-security for a CICS Client–CICS server link on the ATTACHSEC option of the CONNECTION definition that defines the Client to CICS/ESA. The valid values of ATTACHSEC for CICS Client–System/390 links are LOCAL and VERIFY.

If you specify ATTACHSEC(VERIFY), you must also specify USEDFLTUSER(YES). If you do not, the first time the Client tries to initialize the connection to CICS/ESA you see security violation messages DFHZN2701 and DFHZC2047 and an SDUMP is taken. (This is because, when trying to attach the CCIN transaction, the Client does not include the password and userid required by CICS/ESA.)

If a Client does not support VERIFY attach-time security, you must specify
ATTACHSEC(LOCAL) on the CONNECTION definition, and rely on link security.

Note: Do not specify preset security when defining Client virtual terminals or
models used for autoinstalling virtual terminals. Preset security is not supported for
virtual terminals because attach-time security is used to verify users of CICS
Client–CICS/ESA links.

CICS-supplied transactions

CCIN is a category 3 transaction—that is, it is exempt from security checking.

CTIN is a category 2 transaction—that is, it is always associated with a terminal.

You should specify:

To CICS

For CCIN
RESSEC(NO) and CMDSEC(NO) on the transaction resource
definition.

For CTIN
RESSEC(YES) and CMDSEC(YES) on the transaction resource
definition.

The supplied definitions in the DFHCLNT CSD group specify these values.

To your ESM

For CTIN
If your external security manager is RACF, a transaction profile that
specifies UACC(NONE); and an access list that contains the userids
(or groups containing userids) of users who access CICS from Client
workstations. For example:

```
RDEFINE GCICSTRN INTERCOM UACC(NONE)
        ADDMEM(CEHP,CEHS,CPMI, . . . ,CTIN, . . . )
        NOTIFY(security_admin_userid)
        OWNER(userid or groupid)
PERMIT INTERCOM CLASS(GCICSTRN) ID(intrgrp1,..,intrgrpz)
                                     ACCESS(READ)
```

System initialization parameters

To activate security on CICS Client–CICS/ESA links, you need to specify the
following system initialization parameters:

```
DFLTUSER=name,          To specify the CICS default userid    *
SEC=YES,                To turn on security checking          *
XTRAN=YES,              To turn on transaction security       *
```

For detailed information about these parameters, see the *CICS/ESA System
Definition Guide.*

Chapter 3. System definition

A new system initialization parameter, VTPREFIX, is introduced. You use it to ensure that autoinstalled definitions of Client virtual terminals are unique within your transaction routing network.

Note: You can specify VTPREFIX as a system initialization override, or by coding an entry in the system initialization table (SIT).

Table 2. DFHSIT parameters		
	DFHSIT	[TYPE={**CSECT**|DSECT}]
		.
		VTPREFIX={\\\|character}
		.
	END	DFHSITBA

VTPREFIX={\\\|character}
    Code this parameter with the first character to be used for the terminal identifiers (TERMIDs) of autoinstalled virtual terminals. Virtual terminals are used by the External Presentation Interface (EPI) and terminal emulator functions of the CICS Client products.

    TERMIDs generated by CICS for autoinstalled Client terminals consist of a 1-character prefix and a 3-character suffix. The default prefix is '\\'. The suffix can have the values 'AAA' through '999'. That is, each character in the suffix can have the value 'A' through 'Z' or '0' through '9'. The first suffix generated by CICS has the value 'AAA'. This is followed by 'AAB', 'AAC', ... 'AAZ', 'AA0', 'AA1', and so on, up to '999'.

    Each time a Client virtual terminal is autoinstalled, CICS generates a 3-character suffix that it has not recorded as being in use.

    By specifying a prefix, you can ensure that the TERMIDs of Client terminals autoinstalled on this system are unique in your transaction routing network. This prevents the conflicts that could occur if two or more terminal-owning regions (TORs) ship definitions of Client virtual terminals to the same application-owning region (AOR).

    If such a naming conflict does occur—that is, if a Client virtual terminal is shipped to an AOR on which a remote terminal of the same name is already installed—the autoinstall user program is invoked in the AOR. Your user program can resolve the conflict by allocating an alias terminal identifier to the shipped definition. (For details of writing an autoinstall user program to install shipped definitions, see the *CICS/ESA Customization Guide*.) However, you can avoid potential naming conflicts by specifying a different prefix, reserved for virtual terminals, on each TOR on which Client virtual terminals are to be installed.

    You must not use the characters + − * < > = { } or blank.

Notes:

1. The autoinstall user program is not called at install of Client terminals, so cannot be used to specify TERMIDs.

2. When specifying a prefix, ensure that TERMIDs generated by CICS for Client terminals do not conflict with those generated by your autoinstall user program for user terminals, or with the names of any other terminals or connections.

3. Client terminal definitions are not recovered after a restart. Immediately after a restart, no Client terminals are in use, so when CICS generates suffixes it begins again with 'AAA'. This means that CICS does **not** always generate the same TERMID for any given Client terminal. This in turn means that server applications should not assume that a particular CICS-generated TERMID always equates to a particular Client terminal.

4. Clients can override CICS/ESA-generated TERMIDs. (See "How CICS installs Client terminals" on page 15.)

See also the security-related system initialization parameters described on page 20.

Chapter 4. Data conversion

> **Important**
>
> Data conversion between CICS workstation products and CICS on System/390 systems is described in detail in the *CICS Family: Communicating from CICS on System/390* manual. This chapter is intended to be read in conjunction with that manual; it describes considerations specific to conversion between CICS Clients and CICS/ESA 4.1.

The CICS/ESA server must translate between its EBCDIC encoding of character and numeric data, and the ASCII encoding used by the attached Clients.

For the EPI:

- Data conversion is done by the terminal-owning region (TOR)—that is, the CICS/ESA 4.1 region on which the Client virtual terminals are installed.

- No data conversion is performed for TCTUAs or COMMAREAs; these are not returned to Client programs.

- Only standard conversion—that is, conversion handled by the CICS/ESA conversion program, DFHCCNV, using supported code pages—is possible. Non-standard conversion—that is, conversion that relies on user-code in the user-replaceable program, DFHUCNV—is not supported.

For the ECI:

- Data conversion is done by the application-owning region (AOR)—that is, the region in which the server programs run.

- Both standard and non-standard conversion is supported.

The client code page

This section describes the client code pages supported for the ECI, EPI, and Client terminal emulator.

The ECI

The client code pages supported for the ECI are the same as those supported by CICS/ESA 4.1 for distributed program link (DPL) requests. They are listed in the *CICS Family: Communicating from CICS on System/390* manual.

The client code page is specified by the Client. For example, for OS/2 Clients the client code page is that specified in the workstation's CONFIG.SYS file, or as redefined by a CHCP command. For DOS or Windows Clients, it is the code page specified in the workstation's AUTOEXEC.BAT file, or as redefined by a CHCP command.

The EPI and terminal emulator

The client code pages supported for the EPI and the terminal emulator function are shown in Table 3. They are a subset of those supported for the ECI.

The client code page is specified by the Client, as described for the ECI.

For the EPI and terminal emulator, if the client code page is invalid, CICS uses code page 850.

National language group	Supported client code pages for EPI	Default server code page
Arabic	864 1089	420 420
Cyrillic	855 866 915	1025 1025 1025
Greek	813 869	875 875
Hebrew	856 916	424 424
Japanese	932 942 954	930 930 930
Korean	934 944 949 970	933 933 933 933
Latin-1	437 819 850	500 500 500
Latin-2	852 912	870 870
Latin-5	857 920	1026 1026
Simplified Chinese	946 1381	935 935
Traditional Chinese	938 948 950 964	937 937 937 937

Table 3. EPI code pages. The client code pages supported by CICS/ESA 4.1 for the EPI, and the default server code page for each one.

The server code page and character set

This section describes the server code pages and character sets supported for the ECI, EPI, and Client terminal emulator.

The ECI

The server code pages supported for the ECI are the same as those supported by CICS/ESA 4.1 for DPL requests. They are listed in the *CICS Family: Communicating from CICS on System/390* manual.

The server code page is determined from the conversion table, DFHCNV, installed on CICS/ESA.

The EPI and terminal emulator

The server code pages and character sets supported for the EPI and the terminal emulator function are shown in Table 4 on page 26. The code pages are a subset of those supported for the ECI.

The server code page is determined from value 2 of the CGCSGID option of the TYPETERM used to install the virtual terminal definition. If the server code page, or the combination of client and server code pages, is invalid, the installation of the virtual terminal is rejected. If no server code page is specified, CICS uses a default, which it deduces from the value of the client code page, as shown in Table 3 on page 24.

You can use value 1 of the CGCSGID field of the TYPETERM definition to specify the server character set for the EPI. If you specify an invalid character set, the installation of the virtual terminal is rejected. Alternatively, you can use the default character set supplied by CICS/ESA 4.1. Table 4 on page 26 shows the server character sets and code pages supported for the EPI, and the default character set deduced from each server code page.

National language group	Supported character sets for EPI and default	Supported server code pages for EPI	Character set used by CICS for DBCS	Code page used by CICS for DBCS
Arabic	235	420	—	—
Cyrillic	1150	1025	—	—
Greek	925	875	—	—
Hebrew	941	424	—	—
Japanese	1172	930	1001	300
	1172	931	1001	300
	1172	939	1001	300
Korean	1173	933	934	834
Latin-1	697	037	—	—
	697	273		
	697	277		
	697	278		
	697	280		
	697	284		
	697	285		
	697	297		
	697	500		
	697	871		
Latin-2	959	870	—	—
Latin-5	1152	1026	—	—
Simplified Chinese	1174	935	937	837
Traditional Chinese	1175	937	935	835

Table 4. EPI character sets and server code pages. The character sets and server code pages supported by CICS/ESA 4.1 for the EPI, and the default character set for each server code page.

Binary data conversion

For the ECI, binary data is converted, or not, as specified by the Client.

For the EPI, there is no binary data that needs to be converted.

Defining code pages to CICS/ESA

Bearing in mind the rules outlined above, this is what you code in your DFHCNV table, in the region or regions in which your server programs run, for each program invoked by the ECI:

- A DFHCNV TYPE=ENTRY entry, on which the SRVERCP operand specifies the server code page to be used to translate the communications area (COMMAREA).

- DFHCNV TYPE=FIELD entries, on which the DATALEN and DATATYP operands specify, respectively, the length and type of each data field in the COMMAREA.

Note: It is **not** necessary to code, on the CLINTCP and SRVERCP operands of the DFHCNV TYPE=INITIAL macro, the code pages used with CICS Clients.

For definitive information about coding DFHCNV macros to specify code pages, see the *CICS Family: Communicating from CICS on System/390* manual.

Chapter 5. Application programming

This chapter gives advice on writing CICS/ESA server programs to be invoked from CICS Clients.

ECI server programs

Writing a server program to be invoked by the Client External Call Interface (ECI) is similar to writing one to be invoked by a distributed program link (DPL) request. ECI server programs can issue the same subset of EXEC CICS commands as DPL server programs (except that they cannot issue syncpoints, whereas DPL servers can do so if the client program specifies SYNCONRETURN on the LINK command). Thus, the commands an ECI server program *cannot* issue are:

- Terminal-control commands referring to its principal facility
- Commands that set or inquire on terminal attributes
- BMS commands
- Signon and signoff commands
- Batch data interchange commands
- Commands addressing the TCTUA
- Syncpoint commands.

For further information about writing DPL server programs, see the *CICS/ESA Intercommunication Guide* and the *CICS/ESA Application Programming Reference* manual.

EPI server programs

The following restrictions apply to CICS/ESA server programs that are invoked from the Client External Presentation Interface (EPI):

- They must not use:
    - A terminal control (TC) data stream that includes structured fields
    - The terminal control commands EXEC CICS ISSUE DISCONNECT or EXEC CICS ISSUE PASS
    - Basic mapping support (BMS) partition support
    - BMS paging.
- A Client virtual terminal cannot be a target of an EXEC CICS ROUTE command.
- A Client virtual terminal cannot be the target of the CMSG message-routing transaction.
- If you are using CICS-generated TERMIDs, your server programs must not rely on TERMIDs being allocated consistently to particular Client terminals. (If, on the other hand, TERMIDs are always nominated, in a consistent way, by your Client EPI programs, this restriction may not apply.)

    A Client terminal can be deleted by the Client sending a **CICS_EpiDelTerminal** request, by an end-user shutting down a Client terminal emulator or the Client

itself, or if a connection failure occurs. When it is reinstalled, CICS does not necessarily generate the same TERMID as it had previously.

This has implications for the way in which your server programs are written. For example:

– Your server programs derive temporary storage queue names from the TERMID (to associate each queue with a particular end-user). Problems of data mismatch could occur if the queue is not deleted by transaction end (possibly due to a failure).

The best solution is for your application programs always to check before creating a temporary storage queue whether a queue of the same name already exists, and, if so, to delete it.

– Your server programs record TERMIDs for later use. For example, an application might issue an EXEC CICS START TERMID command, with a time interval after which the transaction is to be initiated against the named terminal. If, during the delay interval, the terminal definition is deleted, and re-installed with a different TERMID, the started transaction could fail because the TERMID no longer exists.

The safest solution is for application programs that may be invoked from Client terminals not to rely on TERMIDs being consistently allocated to particular terminals.

Client-attached printers

A CICS/ESA application can communicate with a Client-attached printer by starting a transaction against it, using an EXEC CICS START TERMID command.

A Client-attached printer accepts a 3270 data stream which contains set buffer address (SBA) commands, and a 3270 write control character (WCC) with the print bit set on. An application can use any of the following command sequences, followed by EXEC CICS PRINT, to print data successfully:

• BMS SEND MAP or SEND TEXT with the PRINT option specified

• BMS SEND MAP or SEND TEXT without the PRINT option, followed by BMS SEND CONTROL with the PRINT option

• TC SEND of an appropriate data stream, with the CTLCHAR option.

There are some restrictions:

• It is not possible for an application to initiate printing indirectly by starting the basic mapping support (BMS) paging transaction against the printer by a BMS ROUTE command, followed by BMS SEND MAP or SEND TEXT commands with the PRINT and PAGING options, followed by a BMS SEND PAGE command.

• A Client-attached printer does not support the NLEOM data stream (generated by BMS SEND MAP or SEND TEXT with the NLEOM option).

Chapter 6. Problem determination

This chapter contains Diagnosis, Modification or Tuning Information.

This chapter contains information about Client-related:

- Trace points
- Messages, on page 34
- Abend codes, on page 49.

Trace points

Table 5 shows the trace points added for Client support.

Note: Turning on TC level 2 tracing causes the amount of trace information produced to increase significantly. Turning on TC level 2 tracing when you are using DBCS code pages with client virtual terminals causes the amount of trace information to increase substantially.

Table 5 (Page 1 of 4). AP domain trace entries for CICS Client support				
Point ID	**Module**	**Lvl**	**Type**	**Data**
AP 3000	DFHZCN1	TC 1	Entry	**1** None
AP 3001	DFHZCN1	TC 1	Exit	**1** Connection netname **2** CCIN output
AP 3002	DFHZCN1	Exc	Invalid function	**1** Connection netname **2** Data received
AP 3003	DFHZCN1	Exc	Invalid synclevel	**1** Connection netname
AP 3004	DFHZCN1	Exc	Length error	**1** Connection netname **2** Length received
AP 3005	DFHZCN1	Exc	DFHZCN2 install error	**1** Connection netname
AP 3006	DFHZCN1	Exc	DFHZCN2 uninstall error	**1** Connection netname
AP 3007	DFHZCN1	Exc	Disaster	**1** Connection netname
AP 3008	DFHZCN1	Exc	Invalid start type	**1** Start type
AP 3009	DFHZCN1	Exc	Logic error	**1** Connection netname
AP 300A	DFHZCN1	Exc	Install canceled	**1** Connection netname
AP 300B	DFHZCN1	Exc	Invalid version	**1** Connection netname **2** Data received
AP 300C	DFHZCN1	Exc	Invalid principal facility	**1** TCZFCAAA
AP 300D	DFHZCN1	Exc	Invalid group	**1** Connection netname **2** Data received
AP 300E	DFHZCN1	Exc	Invalid data	**1** Connection netname **2** Data received
AP 300F	DFHZCN1	Exc	No code page given	**1** Connection netname **2** CCIN input
AP 3010	DFHZCN2	TC 1	Entry	**1** DFHZCN2 input parameters
AP 3011	DFHZCN2	TC 1	Exit	**1** DFHZCN2 output parameters
AP 3014	DFHZCN2	Exc	Invalid function	**1** Connection netname **2** Data received
AP 3015	DFHZCN2	Exc	Cond. enqueue failed	**1** None
AP 3016	DFHZCN2	Exc	Recovery entered	**1** DFHZCN2 parameter list **2** Kernel error data
AP 3018	DFHZCN2	Exc	CDTS attach failed	**1** CCIN input **2** Termid **3** Connection netname
AP 3019	DFHZCN2	Exc	CDTS timeout	**1** CCIN input **2** Termid **3** Connection netname
AP 301A	DFHZCN2	Exc	Invalid capabilities	**1** Connection netname **2** CCIN input
AP 301C	DFHZCN2	Exc	Surrogate busy	**1** CCIN input

Point ID	Module	Lvl	Type	Data
				2 Termid
				3 Connection netname
AP 3020	DFHZCT1	TC 1	Entry	**1** None
AP 3021	DFHZCT1	TC 1	Exit	**1** CTIN input
				2 Termid
				3 Netname
				4 CTIN output
AP 3022	DFHZCT1	Exc	Receive failed	**1** Netname
				2 Data length
AP 3023	DFHZCT1	TC 1	Input data	**1** Netname
				2 CTIN input
AP 3024	DFHZCT1	Exc	CTIN group is not for event	**1** Netname
				2 CTIN input
AP 3025	DFHZCT1	Exc	CITS attach failed	**1** CTIN input
				2 Termid
				3 Netname
				4 CTIN output
				5 RWE
AP 3026	DFHZCT1	Exc	Duplicate found	**1** CTIN input
				2 Termid
				3 Netname
				4 CTIN output
				5 RWE
AP 3027	DFHZCT1	Exc	CITS timeout	**1** CTIN input
				2 Termid
				3 Netname
				4 CTIN output
				5 RWE
AP 3028	DFHZCT1	Exc	CDTS attach failed	**1** CTIN input
				2 Termid
				3 Netname
				4 CTIN output
				5 RWE
AP 3029	DFHZCT1	Exc	CDTS timeout	**1** CTIN input
				2 Termid
				3 Netname
				4 CTIN output
				5 RWE
AP 302A	DFHZCT1	Exc	Invalid start type	**1** Start type
AP 302B	DFHZCT1	Exc	Invalid synclevel	**1** Netname
AP 302D	DFHZCT1	Exc	Data length error	**1** Netname
				2 Data length
AP 302E	DFHZCT1	Exc	Install surrogate in use	**1** CTIN input
				2 Termid
				3 Netname
				4 CTIN output
AP 302F	DFHZCT1	Exc	Delete surrogate in use	**1** CTIN input
				2 Termid
				3 Netname
				4 CTIN output
AP 3030	DFHZCT1	Exc	CITS abend	**1** CTIN input
				2 Termid
				3 Netname
				4 CTIN output
				5 RWE
AP 3031	DFHZCT1	Exc	Get BPS failed	**1** CTIN input
				2 Termid
				3 Netname
				4 CTIN output
AP 3032	DFHZCT1	Exc	Invalid principal facility	**1** TCZFCAAA
AP 3033	DFHZCT1	Exc	Invalid data	**1** Netname
				2 CTIN input
AP 3034	DFHZCT1	Exc	Invalid function	**1** Netname

Table 5 (Page 3 of 4). AP domain trace entries for CICS Client support				
Point ID	**Module**	**Lvl**	**Type**	**Data**
AP 3035	DFHZCT1	Exc	Invalid code page	**2** CTIN input
				1 CTIN input
				2 Termid
				3 Netname
				4 CTIN output
				5 CGCSGID
AP 3036	DFHZCT1	Exc	Wrong version	**1** Netname
				2 CTIN input
AP 3037	DFHZCT1	Exc	Netname missing for delete	**1** Netname
				2 CTIN input
AP 3038	DFHZCT1	Exc	Unexpected response from DFHCCNV	**1** CTIN input
				2 Termid
				3 Netname
				4 CTIN output
				5 DFHC32 commarea
AP 3039	DFHZCT1	Exc	CTIN remote	**1** Netname
AP 3040	DFHZCN1	Exc	No capabilities given	**1** Connection netname
				2 CCIN input
AP 3041	DFHZCN1	Exc	CCIN remote	**1** Connection netname
AP 3050	DFHCCNV3	TC 1	Check client code page entry	**1** Client code page
AP 3051	DFHCCNV3	TC 1	Check client code page exit	**1** Response, reason
AP 3052	DFHCCNV3	TC 1	Check convertible entry	**1** Client code page
				2 Server character set
				3 Server code page
AP 3053	DFHCCNV3	TC 1	Check convertible exit	**1** Conversion token
				2 Response, reason
AP 3054	DFHCCNV3	TC 1	Entry	**1** None
AP 3055	DFHCCNV3	TC 1	Exit	**1** Response, reason
AP 3056	DFHCCNV3	Exc	Invalid function	**1** Function
AP 3057	DFHCCNV3	TC 1	Convert 3270 data stream for entry	**1** Target
				2 Conversion token
				3 Data length
				4 Length of data converted
				4 Erase (Yes|No)
AP 3058	DFHCCNV3	TC 2	Convert 3270 data stream for entry	**1** Data
AP 3059	DFHCCNV3	TC 2	Convert 3270 data stream for exit	**1** Data converted
AP 305A	DFHCCNV3	TC 1	Convert 3270 data stream for exit	**1** Response, reason
				2 Data converted
				2 Length of data converted
AP 305B	DFHCCNV3	Exc	3270 data length zero	**1** Data length
AP 305C	DFHCCNV3	Exc	Target invalid	**1** Target
AP 305D	DFHCCNV3	Exc	Conversion token has bad checker field	**1** Conversion token
AP 305E	DFHCCNV3	Exc	Conversion token has bad client index	**1** Conversion token
AP 305F	DFHCCNV3	Exc	Conversion token has bad server index	**1** Conversion token
AP 3060	DFHCCNV3	Exc	Conversion token not for SBCS	**1** Conversion token
AP 3061	DFHCCNV3	Exc	3270 SBA incomplete	**1** Offset in data
				2 Data after offset
				3 Data before offset
AP 3062	DFHCCNV3	Exc	3270 SF incomplete	**1** Offset in data
				2 Data after offset
				3 Data before offset
AP 3063	DFHCCNV3	Exc	3270 SFE/MF incomplete	**1** Offset in data
				2 Data after offset
				3 Data before offset
AP 3064	DFHCCNV3	Exc	3270 SA incomplete	**1** Offset in data
				2 Data after offset
				3 Data before offset
AP 3065	DFHCCNV3	Exc	3270 RA incomplete	**1** Offset in data
				2 Data after offset
				3 Data before offset
AP 3066	DFHCCNV3	Exc	3270 GE used	**1** Offset in data
				2 Data after offset
				3 Data before offset

Table 5 (Page 4 of 4). AP domain trace entries for CICS Client support

Point ID	Module	Lvl	Type	Data
AP 3067	DFHCCNV3	Exc	3270 EUA incomplete	**1** Offset in data **2** Data after offset **3** Data before offset
AP 3068	DFHCCNV3	TC 1	Convert 3270 AID entry	**1** 3270 AID **2** Target
AP 3069	DFHCCNV3	TC 1	Convert 3270 AID exit	**1** Response, reason **2** Converted AID
AP 306A	DFHCCNV3	Exc	Invalid target	**1** Target
AP 306B	DFHCCNV3	TC 1	Free conversion token entry	**1** Conversion token
AP 306C	DFHCCNV3	TC 1	Free conversion token exit	**1** Response, reason
AP 306D	DFHCCNV3	Exc	Getmain failure	**1** None
AP 306E	DFHCCNV3	Exc	Freemain failure	**1** None
AP 306F	DFHCCNV3	Exc	SBA too high for screen size	**1** Offset in data **2** Data after offset **3** Data before offset
AP 3070	DFHCCNV3	TC 2	Before DBCS screen map update	**1** DBCS screen map
AP 3071	DFHCCNV3	TC 2	After DBCS screen map update	**1** DBCS screen map
AP 3072	DFHCCNV3	TC 1	Get conversion token entry	**1** Terminal token **2** Client code page **3** Server character set **4** Server code page **5** Screen columns **6** Screen rows
AP 3073	DFHCCNV3	TC 1	Get conversion token exit	**1** Response, reason **2** Conversion token
AP 3074	DFHCCNV3	Exc	Conversion token has invalid token storage address	**1** Conversion token
AP 3075	DFHCCNV3	Exc	Length of 3270 data converted is zero	**1** Length of data converted

Messages

Messages relating to Client support are written to the CSCC transient data queue. New messages are shown below.

DFHZC3202 E *date time applid* **Transaction CCIN - VTAM netname** *netname***. The value** *codepage* **in the codepage parameter is not supported.**

Explanation: A CCIN transaction has been run from a CICS client. The codepage which the CICS client has requested is not supported.

netname is the VTAM netname of the CICS client.

System Action: CICS cannot perform the translations required to support the CICS client with the requested character set and codepage. CICS continues but uses a default codepage instead of the supplied one. For details of the default codepage, see the *CICS/ESA Server Support for CICS Clients* manual.

The request to install the CICS client continues, but uses the default codepage. A response code of EXCEPTION and a reason code of INVALIDCODEPAGE is sent to the client.

User Response: See the *CICS Family: Communicating from CICS on System/390* manual for a list of the client codepage values which are supported. It may be necessary to reconfigure the client locale.

Destination: CSCC

Modules: DFHZCN2

XMEOUT Parameters: *date, time, applid, netname, codepage*

DFHZC3203 E *date time applid* **Transaction CCIN - VTAM netname** *netname*. **The capabilites parameter is not valid.**

Explanation: A CCIN transaction has been run from a CICS client. The capabilities which have been received are not valid. The CICS client has specified that it supports features which no CICS client is supposed to support. The CICS client is violating the CICS client communications architecture.

netname is the VTAM netname of the CICS client.

System Action: Exception trace point AP301A is written.

The request to install the CICS client is rejected. A response code of DISASTER and a reason code of INVALIDREQUEST is sent to the client.

User Response: You need further assistance from IBM to resolve this problem. See Part 4 of the *CICS/ESA Problem Determination Guide* for guidance on how to proceed.

Destination: CSCC

Modules: DFHZCN2

XMEOUT Parameters: *date, time, applid, netname*

DFHZC3204 E *date time applid* **Transaction CCIN - VTAM netname** *netname*. **The codepage parameter has not been specified.**

Explanation: A CCIN transaction has been run from a CICS client. One of the parameters which must be supplied is the codepage which the CICS client intends to use. This parameter is missing.

netname is the VTAM netname of the CICS client.

System Action: Exception trace point AP301B is written.

The request to install the CICS client is rejected. A response code of DISASTER and a reason code of INVALIDREQUEST is sent to the client.

User Response: You need further assistance from IBM to resolve this problem. See Part 4 of the *CICS/ESA Problem Determination Guide* for guidance on how to proceed.

Destination: CSCC

Modules: DFHZCN1

XMEOUT Parameters: *date, time, applid, netname*

DFHZC3205 E *date time applid* **Transaction CTIN - virtual terminal** *termid* **VTAM netname** *netname*. **CICS cannot support the** *{n.a. | n.a. | n.a. | combination of client and virtual terminal codepage. | client codepage. | virtual terminal codepage.}*

Explanation: A CTIN install request has been received from a CICS client as a result of a CICS_EpiAddTerminal function or terminal emulator operation.

CICS was checking the codepage specified by the CICS client and the codepage specified by the virtual terminal. However one of the following occurred:

1 – 3 *n.a.* - not applicable and should not occur.

4 *unsupported combination of CICS client and virtual terminal codepage.* indicates that the two codepages above are known about but CICS does not support data conversion between the CICS client codepage and the virtual terminal codepage.

5 *unsupported CICS client codepage* indicates that CICS is unable to support the codepage supplied by the CICS client in the CCIN or CTIN transaction.

6 *unsupported virtual terminal codepage* indicates that the CGCSGID parameter defining the virtual terminal codepage is not supported for CICS data conversion. If the virtual terminal was autoinstalled, CGCSGID was specified in the autoinstall

model requested by the CICS client. If the virtual terminal was defined, CGCSGID was defined in the TYPETERM named by the virtual terminal definition.

CICS cannot perform the translations required to support the CICS client with the requested codepage.

netname is the VTAM netname of the CICS client.

System Action: Exception trace point AP3035 is written.

4 *unsupported combination of CICS client and virtual terminal codepage.*

A response code of ERROR and a reason code of INSTALLCANCELLED is sent to the client. The virtual terminal is NOT installed.

5 *unsupported CICS client codepage.*

The request to install the virtual terminal continues and the invalid codepage is replaced by a default as specified in the *CICS/ESA Server Support for CICS Clients* manual.

A response code of EXCEPTION and a reason code of INVALIDCODEPAGE is sent to the client.

6 *unsupported virtual terminal codepage.*

A response code of ERROR and a reason code of INSTALLCANCELLED is sent to the client. The virtual terminal is NOT installed.

User Response: See the *CICS Family: Communicating from CICS on System/390* manual and check the list of the client codepage values then reconfigure the workstation locale or correct the virtual terminal TYPETERM definition.

The exception trace point AP3035 contains the CICS client codepage and the virtual terminal CGCSGID values.

Destination: CSCC

Modules: DFHZCT1

XMEOUT Parameters: *date, time, applid, termid, netname, {1=n.a., 2=n.a., 3=n.a., 4=combination of client and virtual terminal codepage., 5=client codepage., 6=virtual terminal codepage.}*

DFHZC3206 E *date time applid* **Transaction CTIN - virtual terminal** *termid* **VTAM netname** *netname*. **The client's terminal install limit has been exceeded.**

Explanation: A CTIN install request has been received from a CICS client as a result of a CICS_EpiAddTerminal function or terminal emulator operation. However the CICS client whose VTAM netname is *netname* already has 512 virtual terminals.

termid is the name that would have been given to the new virtual terminal. If the CICS client did not supply the name it is blank.

System Action: The request to install the virtual terminal is rejected. A response code of DISASTER and a reason code of INVALIDREQUEST is sent to the client.

User Response: Check why the CICS client has sent so many CTIN installs without corresponding CTIN uninstall functions.

To correct the problem the CICS client must send a CTIN uninstall for each virtual terminal that needs to be deleted.

Destination: CSCC

Modules: DFHZCT1

XMEOUT Parameters: *date, time, applid, termid, netname*

DFHZC3207 E *date time applid* **Transaction CTIN - VTAM netname** *netname*. **The request has failed because CCIN has not been run.**

Explanation: A CTIN install request has been received from a CICS client as a result of a CICS_EpiAddTerminal function or terminal emulator operation. However there was no previous CCIN install request for the CICS client with the VTAM netname of *netname*. CCIN must always run before CTIN.

This may have been caused by a CICS restart.

netname is the VTAM netname of the CICS client.

System Action: The CTIN transaction abnormally terminates with abend code AZAI.

User Response: The CICS client must carry out CCIN uninstall/install before the next CTIN install.

Destination: CSCC

Modules: DFHZCT1

XMEOUT Parameters: *date, time, applid, netname*

DFHZC3208 E *date time applid* **Transaction CTIN - virtual terminal** *termid* **VTAM netname** *netname*. **Model** *modelid* **cannot be found.**

Explanation: A CTIN install request has been received from a CICS client as a result of a CICS_EpiAddTerminal function or terminal emulator operation. However CICS was unable to find the model *modelid* which was specified in the CICS_EpiAddTerminal DEVTYPE parameter or terminal emulator ModelId parameter.

netname is the VTAM netname of the CICS client.

System Action: The request to install the virtual terminal is rejected. A response code of ERROR and a reason code of UNKNOWNMODEL is sent to the client.

User Response: Either correct the DevType in the CICS_EpiAddTerminal function or terminal emulator parameter or install a model of this name using RDO to define the autoinstall model with the RDO TERMINAL and TYPETERM definitions.

Destination: CSCC

Modules: DFHZCT1

XMEOUT Parameters: *date, time, applid, termid, netname, modelid*

DFHZC3209 E *date time applid* **Transaction CTIN - VTAM netname** *netname*. **CICS cannot supply a terminal name because all available names are in use.**

Explanation: A CTIN install request has been received from a CICS client as as a result of a CICS_EpiAddTerminal function or terminal emulator operation. The parameter list did not supply a NetName indicating that CICS should supply the name. However there are only 46,656 possible names available and they are all currently in use.

netname is the VTAM netname of the CICS client.

System Action:

The request to install the virtual terminal is rejected. A response code of ERROR and a reason code of INSTALLCANCELLED is sent to the client.

User Response: As CICS clients issue CTIN uninstalls for autoinstalled virtual terminals these termids will be freed.

It is possible that some of the CICS clients were switched off leaving autoinstalled virtual terminals around. When these are switched back on again they should issue CCIN install which will free the virtual terminals if they are not in use.

DISCARD can be used to delete a virtual terminal - but this should be done with discretion.

If the SIT VTPREFIX coincides with the first character of the termid allocated to a normal autoinstall terminal by the autoinstall URM (default DFHZATDX), there may be some names reserved because the autoinstall terminal existed when CTIN install tried to use the same name. Avoid doing this if possible because the only way to free these names is to restart CICS.

Destination: CSCC

Modules: DFHZCT1

XMEOUT Parameters: *date, time, applid, netname*

DFHZC3210 E *date time applid* **Transaction CTIN - virtual terminal** *termid* **VTAM netname** *netname*. **CICS cannot attach the CITS transaction.**

Explanation: A CTIN install request has been received from a CICS client as a result of a CICS_EpiAddTerminal function or terminal emulator operation. As part of the installation process the CITS transaction is called to create a virtual terminal *termid*. However CICS was unable to attach the CITS transaction.

netname is the VTAM netname of the CICS client.

System Action: Exception trace point AP3025 is written.

The request to install the virtual terminal is rejected. A response code of ERROR and a reason code of INSTALLCANCELLED is sent to the client.

User Response: Check that the CITS transaction and the DFHZATS program are defined correctly as specified in the DFHSPI IBM supplied group and are installed.

Destination: CSCC

Modules: DFHZCT1

XMEOUT Parameters: *date, time, applid, termid, netname*

DFHZC3211 E *date time applid* **Transaction CTIN - virtual terminal** *termid* **VTAM netname** *netname*. **The NetName parameter starts with an invalid character.**

Explanation: A CTIN install request has been received from a CICS client as a result of a CICS_EpiAddTerminal function or terminal emulator operation. The NetName parameter *termid* starts with a character that conflicts with CICS standards.

netname is the VTAM netname of the CICS client.

System Action: The request to install the virtual terminal is rejected. A response code of DISASTER and a reason code of INVALIDREQUEST is sent to the client.

User Response: Change the NetName to start with a different character. It can start with any character that is valid for a normal terminal name except for <,> or -. If the NetName was specified correctly, check the input to the CTIN transaction.

Destination: CSCC

Modules: DFHZCT1

XMEOUT Parameters: *date, time, applid, termid, netname*

DFHZC3212 E *date time applid* **Transaction CTIN - virtual terminal** *termid* **VTAM netname** *netname*. **The transaction has timed out waiting for CITS to run.**

Explanation: A CTIN install request has been received from a CICS client as a result of a CICS_EpiAddTerminal function or terminal emulator operation. As part of the installation process the CITS transaction is called to create virtual terminal *termid*. However the CTIN transaction has waited for one minute for the CITS transaction to run.

netname is the VTAM netname of the CICS client.

System Action: Exception trace point AP3027 is written.

The request to install the virtual terminal is rejected. A response code of ERROR and a reason code of INSTALLCANCELLED is sent to the client.

User Response: Investigate why the CITS transaction was unable to start or was hanging.

You may need to increase MAXTASK or the CITS TRANCLASS allocation.

Destination: CSCC

Modules: DFHZCT1

XMEOUT Parameters: *date, time, applid, termid, netname*

DFHZC3213 E *date time applid* **Transaction CTIN - virtual terminal** *termid* **VTAM netname** *netname***. CICS cannot attach the CDTS transaction.**

Explanation: A CTIN uninstall request has been received from a CICS client as a result of a CICS_EpiDelTerminal function or terminal emulator operation. As part of the delete process the CDTS transaction is called to delete virtual terminal *termid*. However CICS was unable to attach the CDTS transaction.

netname is the VTAM netname of the CICS client.

System Action: Exception trace point AP3028 is written. The attempt to delete the virtual terminal is rejected.

User Response: Check to see if the CDTS transaction and the DFHZATS program are defined correctly as specified in IBM supplied group DFHSPI and that they are installed.

Destination: CSCC

Modules: DFHZCT1

XMEOUT Parameters: *date, time, applid, termid, netname*

DFHZC3214 E *date time applid* **Transaction CTIN - virtual terminal** *termid* **VTAM netname** *netname***. The CTIN transaction has timed out waiting for CDTS to run.**

Explanation: A CTIN uninstall request has been received from a CICS client as a result of a CICS_EpiDelTerminal function or terminal emulator operation. As part of the installation process the CDTS transaction is called to delete virtual terminal *termid*. However the CTIN transaction has waited for the CDTS transaction for one minute and so ends with this message.

netname is the VTAM netname of the CICS client.

System Action: Exception trace point AP3029 is written. The CDTS attempt to delete the virtual terminal continues and will occur when the CDTS transaction starts or is 'unsuspended'.

User Response: Check to see why the CDTS transaction was unable to start or was hanging.

You may need to increase MAXTASK or the CDTS TRANCLASS allocation.

Destination: CSCC

Modules: DFHZCT1

XMEOUT Parameters: *date, time, applid, termid, netname*

DFHZC3215 E *date time applid* **Transaction CTIN - virtual terminal** *termid* **VTAM netname** *netname*. **The terminal is in use by another transaction.**

Explanation: A CTIN install request has been received from a CICS client as a result of a CICS_EpiAddTerminal function or terminal emulator operation. However the virtual terminal *termid* is in use, that is the surrogate TCTTE indicates that a transaction is still running against this terminal.

netname is the VTAM netname of the CICS client.

System Action: Exception trace point AP302E is written.

The request to install the virtual terminal is rejected. A response code of ERROR and a reason code of ALREADYINSTALLED is sent to the client.

User Response: Investigate why a transaction is still running for the virtual terminal.

Destination: CSCC

Modules: DFHZCT1

XMEOUT Parameters: *date, time, applid, termid, netname*

DFHZC3216 E *date time applid* **Transaction CTIN - virtual terminal** *termid* **VTAM netname** *netname*. **CICS cannot find the terminal.**

Explanation: A CTIN install request has been received from a CICS client as a result of a CICS_EpiAddTerminal function or terminal emulator operation. CTIN specified that a pre defined virtual terminal *termid* should be used, but CICS cannot find it and no ModelId was provided (DevType) so an autoinstall was not attempted.

netname is the VTAM netname of the CICS client.

System Action: The request to install the virtual terminal is rejected. A response code of ERROR and a reason code of UNKNOWNTERMINAL is sent to the client.

User Response: Ensure that there is an installed predefined terminal for *termid* that has a remote system parameter (REMOTESYSTem) specifying the name of this CICS clients connection and that the VTAM NETNAMEs match. Then install the definition with the correct parameters.

Destination: CSCC

Modules: DFHZCT1

XMEOUT Parameters: *date, time, applid, termid, netname*

DFHZC3217 E *date time applid* **Transaction CTIN - VTAM netname** *netname*. **The specified function is not valid.**

Explanation: A CTIN request has been received from a CICS client with a VTAM netname of *netname*. However the function specified was not INSTALL or UNINSTALL.

System Action: Exception trace point AP3034 is written. The CTIN transaction abnormally terminates with abend code AZAI.

User Response: Determine where the request originated. Ensure that the input has not been corrupted. You may need further assistance from IBM. See Part 4 of the *CICS/ESA Problem Determination Guide* for guidance on how to proceed.

Destination: CSCC

Modules: DFHZCT1

XMEOUT Parameters: *date, time, applid, netname*

DFHZC3218 E *date time applid* **Transaction CTIN - virtual terminal** *termid* **VTAM netname** *netname***. A resource with the same name as the terminal is already installed.**

Explanation: A CTIN install request has been received from a CICS client as a result of a CICS_EpiAddTerminal function or terminal emulator operation. CTIN specified that a virtual terminal *termid* should be autoinstalled. However another resource was installed with the same name after the CTIN transaction had ensured that the name was free.

netname is the VTAM netname of the CICS client.

System Action: Exception trace point AP3026 is written.

The request to install the virtual terminal is rejected. A response code of ERROR and a reason code of ALREADYINSTALLED is sent to the client.

User Response: Investigate where the duplicate resource came from. It is possible that the terminal/APPC autoinstall URM created the name dynamically. If NetName was specified in the CTIN parameters, ensure that the CICS client names do not conflict with existing CICS terminal or connection names. If NetName was not specified, examine the SIT VTPREFIX override to check that the URM does not create names starting with the VTPREFIX character.

Destination: CSCC

Modules: DFHZCT1

XMEOUT Parameters: *date, time, applid, termid, netname*

DFHZC3219 E *date time applid* **Transaction CTIN - virtual terminal** *termid* **VTAM netname** *netname***. The terminal is already in use.**

Explanation: A CTIN install request has been received from a CICS client as a result of a CICS_EpiAddTerminal function or terminal emulator operation. CTIN supplied a NetName *termid* but CICS found a resource with the same name which is either an existing virtual terminal for this client, an existing virtual terminal for another client or another CICS terminal or connection resource.

netname is the VTAM netname of the CICS client.

System Action: The request to install the virtual terminal is rejected. A response code of ERROR and a reason code of ALREADYINSTALLED is sent to the client.

User Response: Investigate where the duplicate resource came from. It is possible that the terminal/APPC autoinstall URM created the name dynamically and that the CICS client used a name that clashes with the URM.

It is also possible that a client created the virtual terminal and then tried to reuse it without an intervening uninstall, via CCIN or CTIN.

Destination: CSCC

Modules: DFHZCT1

XMEOUT Parameters: *date, time, applid, termid, netname*

DFHZC3220 E *date time applid* **Transaction CTIN - virtual terminal** *termid* **VTAM netname** *netname***. The terminal has already been installed.**

Explanation: A CTIN install request has been received from a CICS client as a result of a CICS_EpiAddTerminal function or terminal emulator operation. CTIN specified that the virtual terminal *termid* should be autoinstalled. However, the virtual terminal was already installed.

netname is the VTAM netname of the CICS client.

System Action: The request to install the virtual terminal is rejected. A response code of ERROR and a reason code of ALREADYINSTALLED is sent to the client.

User Response: The CICS client should issue CTIN uninstall before any attempt to issue another CTIN install for the same NetName.

Destination: CSCC

Modules: DFHZCT1

XMEOUT Parameters: *date, time, applid, termid, netname*

DFHZC3221 E *date time applid* **Transaction CTIN - virtual terminal** *termid* **VTAM netname** *netname***. The name specified is already in use by another CICS resource.**

Explanation: A CTIN install request has been received from a CICS client as a result of a CICS_EpiAddTerminal function or terminal emulator operation. CTIN specified that the virtual terminal *termid* should be autoinstalled. However, the name specified is already in use by another CICS resource.

netname is the VTAM netname of the CICS client.

System Action: The request to install the virtual terminal is rejected. A response code of ERROR and a reason code of ALREADYINSTALLED is sent to the client.

User Response: Investigate where the duplicate resource came from. It is possible that the terminal/APPC autoinstall URM created the name dynamically.

If NetName was specified on the CTIN install ensure that NetName does not conflict with other CICS resources.

If NetName was not specified, examine the SIT VTPREFIX override to check that the URM does not create names starting with the VTPREFIX character.

Destination: CSCC

Modules: DFHZCT1

XMEOUT Parameters: *date, time, applid, termid, netname*

DFHZC3222 E *date time applid* **Transaction CTIN - virtual terminal** *termid* **VTAM netname** *netname***. The CITS task has terminated abnormally.**

Explanation: A CTIN install request has been received from a CICS client as a result of a CICS_EpiAddTerminal function or terminal emulator operation. CICS attempted to autoinstall the virtual terminal *termid*. However, the CITS task which was attached to install the virtual terminal, abended.

If this ABEND was an AZVE, this is because a resource already exists with that name. However, this only occurs if the duplicate resource was added after this CTIN transaction started and checked for any duplicate.

netname is the VTAM netname of the CICS client.

System Action: Exception trace point AP3030 is written.

The request to install the virtual terminal is rejected. A response code of ERROR and a reason code of INSTALLCANCELLED is sent to the client.

User Response: Investigate where the duplicate resource came from. It is possible that the terminal/APPC autoinstall URM created the name dynamically.

If NetName was specified on the CTIN install, ensure that the names do not conflict.

If NetName was not specified, examine the SIT VTPREFIX override to check that the URM does not create names starting with the VTPREFIX character.

For any other abend, see the description of the abend code for further guidance.

Destination: CSCC

Modules: DFHZCT1

XMEOUT Parameters: *date, time, applid, termid, netname*

DFHZC3223 E *date time applid* **Transaction CTIN - virtual terminal** *termid* **VTAM netname** *netname***. The surrogate TCTTE is in use and cannot be deleted.**

Explanation: A CTIN uninstall request has been received from a CICS client as a result of a CICS_EpiDelTerminal function or terminal emulator operation. However, the surrogate TCTTE attached to the virtual terminal is still in use and cannot be deleted.

netname is the VTAM netname of the CICS client.

System Action: Exception trace point AP302F is written. The attempt to delete the virtual terminal is rejected.

User Response: Either wait for the transaction to finish or PURGE the transaction. Once the transaction has ended the virtual terminal will be deleted when the client issues CCIN install or uninstall.

Destination: CSCC

Modules: DFHZCT1

XMEOUT Parameters: *date, time, applid, termid, netname*

DFHZC3224 E *date time applid* **Transaction CTIN - virtual terminal** *termid* **VTAM netname** *netname***. The terminal specified for deletion cannot be found.**

Explanation: A CTIN uninstall request has been received from a CICS client as a result of a CICS_EpiDelTerminal function or terminal emulator operation. However the virtual terminal *termid* does not exist as a remote terminal for this CICS client.

netname is the VTAM netname of the CICS client.

System Action: The attempt to delete the virtual terminal is rejected.

User Response: Determine why a CICS client requested that a non existent virtual terminal be deleted.

If the CTIN uninstall was issued correctly and the virtual terminal should exist, examine the CICS log for message DFHZC5966 and for DFHZC32*xx* messages referring to this terminal.

Destination: CSCC

Modules: DFHZCT1

XMEOUT Parameters: *date, time, applid, termid, netname*

DFHZC3225 E *date time applid* **Transaction CTIN - VTAM netname** *netname***. The terminal cannot be deleted because the NetName parameter is missing.**

Explanation: A CTIN uninstall request has been received from a CICS client as a result of a CICS_EpiDelTerminal function or terminal emulator operation. However the NetName parameter, defining which virtual terminal is to be deleted, is missing.

netname is the VTAM netname of the CICS client.

System Action: Exception trace point AP3037 is written – data 2 contains the data received. The attempt to delete the virtual terminal is rejected.

User Response: Examine the input to CTIN. You may need further assistance from IBM. See Part 4 of the *CICS/ESA Problem Determination Guide* for guidance on how to proceed.

Destination: CSCC

Modules: DFHZCT1

XMEOUT Parameters: *date, time, applid, netname*

DFHZC3226 E *date time applid* **Transaction CTIN - virtual terminal** *termid* **VTAM netname** *netname***. CICS cannot access the builder parameter set.**

Explanation: A CTIN install request has been received from a CICS client as a result of a CICS_EpiAddTerminal function or terminal emulator operation. CICS is attempting to extract the details from the virtual terminal that has just been created and return them back to the CICS client. However the attempt to extract the details in the form of a builder parameter set (BPS) failed.

netname is the VTAM netname of the CICS client.

System Action: Exception trace point AP3031 is written.

The request to install the virtual terminal is rejected. A response code of ERROR and a reason code of INSTALLCANCELLED is sent to the client.

User Response: You need further assistance from IBM to resolve this problem. See Part 4 of the *CICS/ESA Problem Determination Guide* for guidance on how to proceed.

Destination: CSCC

Modules: DFHZCT1

XMEOUT Parameters: *date, time, applid, termid, netname*

DFHZC3227 E *date time applid* **Transaction CTIN - VTAM netname** *netname***. The client data is longer than expected.**

Explanation: A CTIN install request has been received from a CICS client as a result of a CICS_EpiAddTerminal function or terminal emulator operation. However the data received was longer than expected. *netname* is the VTAM netname of the CICS client.

System Action: Exception trace point AP302D is written – data 2 contains the length that was received. The CTIN transaction abnormally terminates with abend code AZAI.

User Response: Examine the data sent to CICS from the CICS client. You may need to contact IBM for assistance. See Part 4 of the *CICS/ESA Problem Determination Guide* for guidance on how to proceed.

Destination: CSCC

Modules: DFHZCT1

XMEOUT Parameters: *date, time, applid, netname*

DFHZC3228 E *date time applid* **Transaction CTIN - VTAM netname** *netname***. The client header data contains an invalid group.**

Explanation: A CTIN install request has been received from a CICS client as a result of a CICS_EpiAddTerminal function or terminal emulator operation. However the header contains an invalid group. *netname* is the VTAM netname of the CICS client.

System Action: Exception trace point AP3024 is written – data 2 contains the data received. The CTIN transaction abnormally terminates with abend code AZAI.

User Response: Examine the data sent to CICS from the CICS client. You may need to contact IBM for assistance. See Part 4 of the *CICS/ESA Problem Determination Guide* for guidance on how to proceed.

Destination: CSCC

Modules: DFHZCT1

XMEOUT Parameters: *date, time, applid, netname*

DFHZC3229 E *date time applid* **Transaction CTIN - VTAM netname** *netname*. **CICS has received invalid data from the client.**

Explanation: A CTIN install request has been received from a CICS client as a result of a CICS_EpiAddTerminal function or terminal emulator operation. CICS attempted to parse this data but found a discrepancy between the number of parameters, the length of the parameters and the length of the data received. *netname* is the VTAM netname of the CICS client.

System Action: Exception trace point AP3033 is written – data 2 contains the data received. The CTIN transaction abnormally terminates with abend code AZAI.

User Response: Examine the data sent to CICS from the CICS client. You may need further assistance from IBM. See Part 4 of the *CICS/ESA Problem Determination Guide* for guidance on how to proceed.

Destination: CSCC

Modules: DFHZCT1

XMEOUT Parameters: *date, time, applid, netname*

DFHZC3230 E *date time applid* **Transaction CTIN - VTAM netname** *netname*. **CICS has received a client request on an unsupported sync level.**

Explanation: A CTIN request has been received on a conversation which is not at synchronization level 0 or 1. *netname* is the VTAM netname of the CICS client.

System Action: Exception trace point AP302B is written. The CTIN transaction abnormally terminates with abend code AZAI.

User Response: Ensure that the CICS client converses at sync level 0 or 1.

Destination: CSCC

Modules: DFHZCT1

XMEOUT Parameters: *date, time, applid, netname*

DFHZC3231 E *date time applid* **Transaction CTIN - VTAM netname** *netname*. **The client header data contains an invalid version number.**

Explanation: A CTIN install request has been received from a CICS client as a result of a CICS_EpiAddTerminal function or terminal emulator operation. However there is an invalid version number in the header. *netname* is the VTAM netname of the CICS client.

System Action: Exception trace point AP3036 is written – data 2 contains the data received. The CTIN transaction abnormally terminates with abend code AZAI.

User Response: Since the version used in the CICS client must match with the version used by the server, one or the other is at the wrong level and should be changed. You may need further assistance from IBM. See Part 4 of the *CICS/ESA Problem Determination Guide* for guidance on how to proceed.

Destination: CSCC

Modules: DFHZCT1

XMEOUT Parameters: *date, time, applid, netname*

DFHZC3240 E *date time applid* **Transaction CCIN - VTAM netname** *netname*. **CICS has received a client request on an unsupported sync level.**

Explanation: A CCIN request has been received on a conversation which is not at synchronization level 0 or 1. *netname* is the VTAM netname of the CICS client.

System Action: Exception trace point AP3003 is written. The CCIN transaction abnormally terminates with abend code AZAF.

User Response: Ensure that the CICS client converses at sync level 0 or 1.

Destination: CSCC

Modules: DFHZCN1

XMEOUT Parameters: *date, time, applid, netname*

DFHZC3241 E *date time applid* **Transaction CCIN - VTAM netname** *netname***. The client data is longer than expected.**

Explanation: A CCIN install request has been received from a CICS client. However the data received was longer than expected. *netname* is the VTAM netname of the CICS client.

System Action: Exception trace point AP3004 is written – data 2 contains the length that was received. The CCIN transaction abnormally terminates with abend code AZAF.

User Response: Examine the data sent to CICS from the CICS client. You may need further assistance from IBM. See Part 4 of the *CICS/ESA Problem Determination Guide* for guidance on how to proceed.

Destination: CSCC

Modules: DFHZCN1

XMEOUT Parameters: *date, time, applid, netname*

DFHZC3242 E *date time applid* **Transaction CCIN - VTAM netname** *netname***. The client header data contains an invalid group.**

Explanation: A CCIN request has been received from a CICS client. However there is an invalid group in the header. *netname* is the VTAM netname of the CICS client.

System Action: Exception trace point AP3002 is written – data 2 contains the data received. The CCIN transaction abnormally terminates with abend code AZAF.

User Response: Examine the data sent to CICS from the CICS client.

Destination: CSCC

Modules: DFHZCN1

XMEOUT Parameters: *date, time, applid, netname*

DFHZC3243 E *date time applid* **Transaction CCIN - VTAM netname** *netname***. The client header data contains an invalid version number.**

Explanation: A CCIN install request has been received from a CICS client. However the header contains an invalid version value. *netname* is the VTAM netname of the CICS client.

Either the CICS client is setting up the CCIN header incorrectly or a new version of the CICS client software is being used which is not supported on CICS/ESA 4.1.

System Action: Exception trace point AP300B is written – data 2 contains the data received. The CCIN transaction abnormally terminates with abend code AZAF.

User Response: Since the version used in the CICS client must match with the version used by the server, one or the other is at the wrong level and should be changed. You may need further assistance from IBM. See Part 4 of the *CICS/ESA Problem Determination Guide* for guidance on how to proceed.

Destination: CSCC

Modules: DFHZCN1

XMEOUT Parameters: *date, time, applid, netname*

DFHZC3244 E *date time applid* **Transaction CCIN - VTAM netname** *netname*. **The client header data contains an invalid function.**

Explanation: A CCIN request has been received from a CICS client. However there is an invalid function in the header. *netname* is the VTAM netname of the CICS client.

System Action: Exception trace point AP3002 is written - data 2 contains the data received. The CCIN transaction abnormally terminates with abend code AZAF.

User Response: Investigate why the CICS client has sent an unknown function call to CCIN. You may need further assistance from IBM. See Part 4 of the *CICS/ESA Problem Determination Guide* for guidance on how to proceed.

Destination: CSCC

Modules: DFHZCN1

XMEOUT Parameters: *date, time, applid, netname*

DFHZC3245 E *date time applid* **Transaction CCIN - VTAM netname** *netname*. **The capabilities parameter has not been specified.**

Explanation: A CCIN transaction has been run from a CICS client. One of the parameters which must be supplied is the CAPABILITIES parameter which specifies the capabilities the CICS client can support. This parameter is missing.

netname is the VTAM netname of the CICS client.

System Action: The request to install a CICS client is rejected. A response code of DISASTER and a reason code of INVALIDREQUEST is sent to the client.

User Response: You need further assistance from IBM to resolve this problem. See Part 4 of the *CICS/ESA Problem Determination Guide* for guidance on how to proceed.

Destination: CSCC

Modules: DFHZCN1

XMEOUT Parameters: *date, time, applid, netname*

DFHZC3246 *date time applid* **Transaction CCIN - virtual terminal** *termid* **VTAM netname** *netname*. **CICS cannot attach the CDTS transaction.**

Explanation: A CCIN request has been received from a CICS client. As part of the processing, the CDTS transaction was called to delete virtual terminal *termid*. However CICS was unable to attach the CDTS transaction.

netname is the VTAM netname of the CICS client.

System Action: The attempt to delete the virtual terminal fails. If this is a CCIN install request, the install continues.

User Response: Ensure that the CDTS transaction and the DFHZATS program are defined correctly as specified in IBM supplied group DFHSPI and that they are installed.

Destination: CSCC

Modules: DFHZCN2

XMEOUT Parameters: *date, time, applid, termid, netname*

DFHZC3247 *date time applid* **Transaction CCIN - virtual terminal** *termid* **VTAM netname** *netname***. The CCIN transaction has timed out waiting for CDTS to run.**

Explanation: A CCIN request has been received from a CICS client. As part of the processing, the CDTS transaction is called to delete virtual terminal *termid*. However the CCIN transaction has waited for the CDTS transaction for one minute and has timed out.

netname is the VTAM netname of the CICS client.

System Action: The CDTS attempt to delete the virtual terminal continues and occurs when the CDTS transaction starts or is 'unsuspended'.

If this is a CCIN install request, the install continues.

User Response: Check to see why the CDTS transaction was unable to start or was hanging.

You may need to increase MAXTASK or the CITS TRANCLASS allocation.

Destination: CSCC

Modules: DFHZCN2

XMEOUT Parameters: *date, time, applid, termid, netname*

DFHZC3248 E *date time applid* **Transaction CCIN - virtual terminal** *termid* **VTAM netname** *netname***. The surrogate TCTTE is in use and cannot be deleted.**

Explanation: A CCIN request has been received from a CICS client. There should not be any virtual terminals installed, however, one or more were located. The surrogate TCTTE attached to the virtual terminal is still in use and cannot be deleted. If this was caused by an immediate shut down of the client the transaction abend might not have completed before CICS attempted to delete the client.

netname is the VTAM netname of the CICS client.

System Action: Exception trace point AP301C is written. The attempt to delete the virtual terminal is rejected.

If this is a CCIN install request, the install continues.

User Response: Determine why the virtual terminal was installed when CCIN was run.

Either wait for the transaction to finish or PURGE the transaction. Once the transaction completes the virtual terminall will be deleted at the next CCIN install/uninstall.

Destination: CSCC

Modules: DFHZCN2

XMEOUT Parameters: *date, time, applid, termid, netname*

DFHZC3249 E *date time applid* **Transaction CCIN - VTAM netname** *netname***. CICS has received invalid data from the client.**

Explanation: A CCIN install request has been received from a CICS client. CICS attempted to parse this data but found a discrepancy between the number of parameters, the length of the parameters, and the length of the data received. *netname* is the VTAM netname of the CICS client.

System Action: Exception trace point AP300E is written – data 2 contains the data received. The CCIN transaction abnormally terminates with abend code AZAF.

User Response: Examine the data sent to CICS from the CICS client. You may need further assistance from IBM. See Part 4 of the *CICS/ESA Problem Determination Guide* for guidance on how to proceed.

Destination: CSCC

Modules: DFHZCN1

XMEOUT Parameters: *date, time, applid, netname*

Abend codes

The following abend codes relate to CICS Clients:

AXTP

Explanation: An exception response has been returned to the DFHXTP module from DFHCCNV FUNCTION(CONVERT_DS3270_FOR_SBCS). The module was called for a CICS client virtual terminal which requested conversion from ASCII to EBCDIC for data coming from the client. However, the conversion failed.

System Action: The transaction routing request is terminated and a message is sent to the terminal owning region (TOR) to indicate that the transaction routing request has failed. The CICS security manager issues a DFHSN*nnnn* message to the transient data queue, CSCS.

User Response: Examine the response and reason returned in the DFHCCNV commarea DFHC32. The client and server codepages will have already been validated so this may be a CICS error. You may need to contact IBM for further assistance. See Part 4 of the *CICS/ESA Problem Determination Guide* for guidance on how to proceed.

Module(s): DFHXTP

AXTQ

Explanation: An exception response has been returned to the DFHXTP module from DFHCCNV FUNCTION(CONVERT_DS3270_FOR_SBCS). The module was called for a CICS client virtual terminal which requested conversion from EBCDIC to ASCII for data to be sent to the client. However the conversion failed.

System Action: The transaction routing request is terminated and a message is sent to the terminal owning region (TOR) to indicate that the transaction routing request has failed. The CICS security manager issues a DFHSN*nnnn* message to the transient data queue, CSCS.

User Response: Examine the response and reason returned in the DFHCCNV commarea DFHC32. The client and server codepages will have already been validated so this may be a CICS error. You may need to contact IBM for further assistance. See Part 4 of the *CICS/ESA Problem Determination Guide* for guidance on how to proceed.

Module(s): DFHXTP

AXTR

Explanation: An exception response has been returned to the DFHXTP module from DFHPGLE FUNCTION(LOAD_EXEC) while trying to load EXEC program DFHCCNV.

System Action: The transaction routing request is terminated and a message is sent to the terminal owning region (TOR) to indicate that the transaction routing request has failed. The CICS security manager issues a DFHSN*nnnn* message to the transient data queue, CSCS.

User Response: Examine the response and reason returned from DFHPGLE to determine why CICS was unable to call DFHCCNV.

Module(s): DFHXTP

AZAD

Explanation: DFHZCN1 has been started from an unexpected system. The CCIN transaction can only be issued by a client.

System Action: The transaction is abnormally terminated. Exception trace point AP3008 is written. Data1 holds the XMIQ start type.

User Response: Issue the CCIN transaction only from a client.

Module(s): DFHZCN1

AZAE

Explanation: DFHZCN1 was started from a terminal facility, but not an LU6.2 session. The CCIN transaction may only be issued by a client.

System Action: The transaction is abnormally terminated.

User Response: Issue the CCIN transaction only from a client.

Module(s): DFHZCN1

AZAF

Explanation: DFHZCN1 was started for transaction CCIN. However either the environment is wrong or the client architecture has been violated. This abend is always issued in conjuction with a DFHZC32nn message which explains the problem in more detail.

System Action: Exception trace point AP30xx is written. The transaction is abnormally terminated.

User Response: Look for a DFHZC32nn message on the console or CSNE and look for exception trace points AP30xx. Use these to diagnose the problem.

Module(s): DFHZCN1

AZAG

Explanation: DFHZCT1 has been started from an unexpected system. The CTIN transaction can only be issued by a client.

System Action: The transaction is abnormally terminated with a CICS transaction dump. Exception trace point AP302A is written. Data1 holds the XMIQ start type.

User Response: Issue the CTIN transaction only from a client.

Module(s): DFHZCT1

AZAH

Explanation: DFHZCT1 was started from a terminal facility, but not an LU62 session. The CTIN transaction can only be issued by a client.

System Action: The transaction is abnormally terminated with a CICS transaction dump. Exception trace point AP3032 is written. Data1 holds the principal facility address.

User Response: Issue the CTIN transaction only from a client.

Module(s): DFHZCT1

AZAI

Explanation: DFHZCT1 was started for transaction CTIN. However either the environment is wrong or the client architecture has been violated. This abend is always issued in conjuction with a DFHZC32nn message which explains the problem in more detail.

System Action: Exception trace point AP30xx is written. The transaction is abnormally terminated.

User Response: Look for a DFHZC32nn message on the console or CSNE and look for exception trace points AP30xx. Use these to diagnose the problem.

Module(s): DFHZCT1

AZAJ

Explanation: DFHZCN1 was started for transaction CCIN. However, the CCIN transaction is being started on a surrogate, which means that it has been defined as a remote transaction. CCIN must be a local transaction and be run on a CICS region which is directly connected to a client.

System Action: Exception trace point AP3041 is written. The transaction is abnormally terminated.

User Response: Either use the default definitions for CCIN or ensure that it is defined as a local transaction.

Module(s): DFHZCN1

AZAK

Explanation: DFHZCT1 was started for transaction CTIN. However, the CTIN transaction is being started on a surrogate, which means that it has been defined as a remote transaction. CTIN must be a local transaction and be run on a CICS region which is directly connected to a client.

System Action: Exception trace point AP3039 is written. The transaction is abnormally terminated.

User Response: Either use the default definitions for CTIN or ensure that it is defined as a local transaction.

Module(s): DFHZCT1

For general information about how to interpret CICS abend codes, see the *CICS/ESA Messages and Codes* manual.

Chapter 7. Recovery after a restart of CICS

This chapter describes how users of attached Client workstations are affected if CICS/ESA is restarted.

After a restart of CICS/ESA, sessions to CICS Clients are recovered automatically.

Note: If CICS/ESA is using VTAM persistent sessions support, VTAM holds on to the sessions to the Client until the restart occurs; they are then unbound by CICS. (Using persistent sessions causes a restart to take slightly longer than it otherwise would.)

There are some restrictions on the use of persistent sessions with CICS Clients—see Chapter 8, "Restrictions on Client support" on page 55.

The Client terminal emulator

If CICS/ESA is restarted it is not necessary to restart the Client terminal emulator. The user should:

1. Hit ENTER after CICS/ESA has crashed.

   The following is displayed on the emulator screen:

   ```
   CCL7045E Connection lost with server 'CICSSNA'
   CCL7020I Press Clear to continue
   ```

2. Hit the CLEAR key.

   'CCL7045E' is displayed on the operator information line.

3. Wait for a minute or so after CICS has come back up while CICS reacquires the connection.

4. If the restart interrupted a Client transaction, rerun the transaction, if necessary. To discover whether a rerun is required, it may be necessary to investigate whether any updates to resources were completed successfully.

Client EPI and ECI programs

In the event of a failure and restart of CICS/ESA, Client EPI and ECI programs are responsible for:

- Displaying appropriate messages on the workstation
- Taking any recovery actions that may be necessary.

For information about writing Client EPI and ECI programs, see the *CICS Clients: Client/Server Programming* manual.

If a restart interrupts a Client EPI or ECI program, the end-user may need to rerun the associated transaction. Note that CICS Clients do not support synchronization level (synclevel) 2 conversations. Therefore, to discover whether a rerun is required, it may be necessary to investigate whether any updates to resources were completed successfully.

Chapter 8. Restrictions on Client support

There are some restrictions on CICS/ESA support for CICS Clients.

The following general restrictions apply:

- The CCIN and CTIN transactions (invoked by the Client to exchange connection details with the server and to install Client terminals) can run only on a CICS system that is directly connected to the Client. A CICS system that is directly connected to the Client can, however, use normal transaction routing and function shipping flows to communicate with any other CICS system.

  If an EPI request is routed to a back-end AOR, the AOR can be any currently-supported release of CICS.

  If an ECI request is shipped to a back-end AOR, the AOR must be a CICS/ESA 3.3 or later system. (This is because data conversion for the ECI is done in the AOR.) Also, the Client must support the use of APPC to pass information, such as the client code page, between CICS/ESA systems. (This is because the information passed by the Client to CICS/ESA by means of the CCIN transaction is not passed by CICS/ESA to a back-end AOR.)

- APPC connections to Clients support data synchronization levels (sync levels) 0 and 1 only.

- When acting as a server to a CICS Client using the EPI, CICS/ESA:

  - Does not support the use of a PF key specified on the TASKREQ option of a TRANSACTION definition to start the transaction from a Client virtual terminal.

  - Does not support use of the print key specified on the PRINT system initialization parameter from a Client virtual terminal.

  - Does not display the good morning panel when a Client terminal is installed. Note that you can use the CICSTERM command to specify the initial transaction for a CICS Client.

- You can make only limited use of VTAM persistent sessions support to recover connections to Clients automatically after a failure. If you define your Client connections to use persistent sessions, the only sessions that are recovered are those on:

  - Statically-defined connections
  - Autoinstalled single-session connections.

  These sessions are recovered only if:

  - No virtual terminals were installed on the connection at the time of the failure.

  - For autoinstalled connections, the value of the AIRDELAY system initialization parameter is greater than zero.

- You can use the execution diagnostic facility (EDF) in single-terminal mode from a Client emulator, to test a CICS/ESA server transaction.

  EDF in two-terminal mode is supported only when both of the terminals and the transaction reside on the same CICS system; that is, when no Client terminal is involved.

- When running a Client emulator, you cannot use the CESN or CESF transactions to sign on to (or off from) the CICS region to which the Client is directly attached.

- EPI server transactions running in the CICS region to which the Client is directly attached cannot issue EXEC CICS SIGNON or SIGNOFF commands.

- You cannot use preset security with Client virtual terminals.

- You cannot use the EXEC CICS or CECI ISSUE PASS command with Client virtual terminals. (ISSUE PASS is used to disconnect a VTAM terminal from CICS, and transfer it to another CICS terminal-owning region.)

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- The CEMT INQUIRE TERMINAL command does not return information about Client virtual terminals. However, the EXEC CICS INQUIRE TERMINAL command does.

- If you reinstall a (statically-defined or autoinstalled) connection to a Client workstation, and the connection is in use, the workstation end user must shut down and restart the Client before being able to continue.

- If you reinstall a (statically-defined or autoinstalled) Client virtual terminal, and the CTIN transaction has been run to install or reserve the terminal but not to release it, the workstation end user must restart the EPI program or terminal emulator that uses the virtual terminal, if the user wants to continue to use it.

As well as these general restrictions, there are some restrictions on server programs invoked from the ECI and EPI—see Chapter 5, "Application programming" on page 29.

Chapter 9. Migration considerations

This chapter describes the effects that CICS/ESA support for CICS Clients could have on an existing CICS/ESA 4.1 system.

Moving to a client/server environment

When you first install Client support, it is likely that most, if not all, of your existing CICS/ESA transactions use 3270 data streams. To migrate to client/server solutions in a staged manner, you could use the following sequence:

1. Use the Client 3270 emulator to run, unchanged, existing CICS on System/390 3270 applications.

2. Use the EPI to add graphical user interface (GUI) front-ends to existing CICS on System/390 3270 applications.

3. Use the ECI to develop new client/server applications in which the display and processing logic is appropriately split between the client and the server.

Server applications

You need to decide which of your CICS/ESA applications are suitable for use as servers to CICS Clients. See Chapter 5, "Application programming" on page 29.

Data conversion

You should review your use of CICS/ESA data conversion facilities.

The External Call Interface

If the ECI is used by a Client, consider the following:

- Data conversion is done in the application-owning region.

- The **client** code page is *always* specified by the Client. Any client code page specified in the CICS conversion table, DFHCNV, is overridden by the Client. (The code page overridden is the value of the CLINTCP option on the DFHCNV TYPE=ENTRY macro for the server program.)

- The **server** code page is that specified in the DFHCNV conversion table (on the DFHCNV TYPE=ENTRY macro for the server program).

- For binary data conversion, the default binary format defined on DFHCNV TYPE=FIELD entries is overridden by the Client.

The External Presentation Interface

If the EPI is used by a Client, consider the following:

- Data conversion is done in the terminal-owning region.

- The **client** code page is specified by the Client. If the Client specifies an invalid code page, code page 850 is used.

- The **server** code page is determined from CICS/ESA's remote definition of the virtual Client terminal. The second value of the CGCSGID option of the

TYPETERM definition is used, if specified. If a value is specified, it must be a code page that is supported by CICS/ESA. If no value is specified, a default code page is used, as shown in Table 4 on page 26.

- No binary data conversion is required for the EPI.

For more information about defining code pages and conversion tables for data conversion between CICS on System/390 and non-System/390 systems, see the *CICS Family: Communicating from CICS/ESA and CICS/VSE* manual.

Glossary

This glossary defines special terms used in this book.

If you cannot find the word you are looking for, try the *IBM Dictionary of Computing*, published by McGraw-Hill.

A

APPC. See *Advanced Program-to-Program Communication*.

Advanced Program-to-Program Communication (APPC). An implementation of the SNA/SDLC LU 6.2 protocol that allows interconnected systems to communicate and share the processing of programs. The APPC protocol is used for communication between IBM CICS Clients and CICS on System/390 systems.

attach. In SNA, the request unit that flows on a session to initiate a conversation.

autoinstall. A facility that enables terminal definitions to be created automatically in a CICS server on request. The definition is deleted when the Client terminal logs off.

On CICS on System/390 systems, APPC connections to Clients can be autoinstalled too.

autoinstall model. On CICS/ESA, a pair of TERMINAL and TYPETERM (or CONNECTION and SESSIONS) definitions that can be used as a template to install terminals (or connections) dynamically, when they log on to CICS.

B

BIND. In SNA, a request to activate a session between two logical units (LUs).

business logic. The part of a distributed application that is concerned with the application logic rather than the user interface of the application. See *presentation logic*.

C

CCIN. A CICS/ESA internal transaction, invoked when a CICS Client initiates or ends communication with CICS/ESA. It is used to update the connection definition on CICS/ESA.

CICS Clients. A family of CICS workstation products that provide a standard set of functions for *client/server* computing. Each CICS client is designed to run on a

particular operating system. Each can attach to a range of CICS *server* systems, and provides access to resources owned by the servers. See *External Call Interface* and *External Presentation Interface*.

CICS on Open Systems. A term used to refer generically to the products: CICS/6000, CICS for HP 9000, and CICS for DEC OSF/1 AXP.

CICS on System/390. A term used to refer generically to the products: CICS/ESA, CICS/MVS, and CICS/VSE.

client. See *client/server* and *CICS Clients*.

client/server. A distributed application design model, in which the client sends a request to its partner, the server, which executes the request and returns the results to the client. This design model is associated typically with cooperative processing.

client initialization file. A file containing configuration information used to inform the CICS Client of the CICS servers it can connect to, and the communication protocols to be used.

COMMAREA. A communication area that is used for passing data both between programs within a transaction and between transactions.

connection. In data communication, an association established between functional units for conveying information.

control table. In CICS, a storage area used to describe or define the configuration or operation of the system.

conversation. (1) The communication between a CICS Client and a CICS server. (2) In APPC, a connection between two transaction programs over an LU-LU session that allows them to communicate with each other while processing a transaction. See also *session*.

cooperative processing. A subset of *distributed processing,* in which at least the user interface (presentation) aspect of the application runs on a programmable workstation.

CTIN. A CICS/ESA internal transaction, invoked as a result of a Client EPI program issuing a **CICS_EPIAddTerminal** or **CICS_EPIDelTerminal** request, or a workstation user starting or shutting down a Client terminal emulator. It is used to install, reserve, or delete a virtual terminal definition on CICS/ESA.

D

DBCS.   See *double-byte character set*.

distributed application.   An application for which the component application programs are distributed between two or more interconnected processors.

distributed processing.   The processing of different parts of the same application in different systems, on one or more processors.

double-byte character set (DBCS).   A set of characters in which each character is represented by 2 bytes. Languages such as Japanese, Chinese and Korean, which contain more symbols than can be represented by 256 code points, require double-byte character sets. Because each character requires 2 bytes, the typing, display, and printing of DBCS characters requires hardware and programs that support DBCS. Contrast with *single-byte character set*.

E

ECI.   See *external call interface*.

emulator, emulation program.   A program that allows a host system to communicate with a workstation in the same way as it would with the emulated terminal. In IBM CICS Clients, the terminal emulation function allows client workstations to run CICS transactions that use 3270 data flows.

EPI.   See *external presentation interface*.

external call interface (ECI).   An application programming interface that allows a non-CICS program to link to a CICS program. Data is exchanged in a COMMAREA as for normal CICS interprogram communication.

external presentation interface (EPI).   An application programming interface that allows a non-CICS program to appear to CICS as one or more standard 3270 terminals. 3270 data can be presented to the user by emulating a 3270 terminal or by using a graphical user interface.

K

keyboard mapping file.   A file used by IBM CICS Clients to customize the keyboard mapping of client workstations.

L

logical unit (LU).   In SNA, a port through which an end user accesses the SNA network to communicate with another end user and through which the end user accesses the functions provided by system services control points (SSCP). An LU can support at least two sessions, one with an SSCP and one with another LU, and may be capable of supporting many sessions with other logical units. See *network addressable unit*.

LU 6.2.   See *APPC*.

M

mode.   In SNA, a set of parameters that defines the characteristics of a session between two LUs.

N

network address.   In SNA, an address, consisting of subarea and element fields, that identifies a link, link station, or network addressable unit (NAU). Subarea nodes use network addresses; peripheral nodes use local addresses. The boundary function in the subarea node to which a peripheral node is attached transforms local addresses to network addresses and vice versa. See also *network name*.

network addressable unit (NAU).   In SNA, a logical unit, a physical unit, or a system services control point. The NAU is the origin or the destination of information transmitted by the path control network. See also *logical unit, network address, network name*.

network name.   In SNA, the symbolic identifier by which end users refer to a network addressable unit (NAU), link station, or link. See also *network address*.

P

parallel session.   In SNA, two or more concurrently active sessions between the same two LUs using different pairs of network addresses. Each session can have independent session parameters.

PIP.   See *program initialization parameters*.

presentation logic.   The part of a distributed application that is concerned with the user interface of the application. See *business logic*.

principal facility.   To a transaction, the session that activates it.

program initialization parameters.   In CICS distributed transaction programming, specially formatted

data passed to a back-end transaction on the CONNECT PROCESS command.

S

SAA. See *Systems Application Architecture*.

SBCS. See *single-byte character set*.

server. The member of the *client/server* partnership that executes the request and returns the results to the client.

session. In SNA, a logical connection between two network addressable units (NAUs) that can be activated, tailored to provide various protocols, and deactivated as requested. The session activation request and response can determine options for such things as rate and concurrency of data exchange, control of contention and error recovery, and characteristics of the data stream. Sessions compete for network resources, such as links within the path control network. For routing purposes, each session is identified by the network or local addresses of the session partners.

shippable terminal. A terminal whose definition can be shipped to another CICS system as and when the other system requires a remote definition of that terminal.

single-byte character set. A character set in which each character is represented by 1 byte.

SIT. See *system initialization table*.

SNA. See *Systems Network Architecture*.

synchronization level. The level of synchronization (0, 1, or 2) established for an APPC session.

synchronization point. In the processing of a transaction, a point at which resources are declared to be in a consistent state.

syncpoint. Abbreviation of *synchronization point*.

system initialization table. In CICS on System/390, a table of user-specified data that controls how CICS is initialized.

Systems Application Architecture (SAA). A set of IBM software interfaces, conventions, and protocols that provide a framework for designing and developing applications across multiple computing environments.

Systems Network Architecture (SNA). The description of the logical structure, formats, protocols, and operational sequences for transmitting information units through, and controlling the configuration and operation of, networks.

T

terminal emulation. The capability of a microcomputer or personal computer to operate as if it were a particular type of terminal linked to a processing unit and to access data.

trace. (1) A record of data that provides a history of events that occurred in a system. (2) The process of recording the sequence in which the statements in a program are executed and, optionally, are the values of the program variables used in the statements.

transaction routing. A type of CICS intercommunication in which terminal operators of a CICS system can run transactions in a connected CICS system.

V

Virtual Telecommunications Access Method (VTAM). A set of programs that maintains control of the communication between terminals and applications running under an operating system.

virtual terminal. A remote terminal definition installed on CICS/ESA to support a Client EPI program or terminal emulator. Virtual terminals can be statically defined to CICS/ESA, or autoinstalled on request from a Client.

VTAM. See *Virtual Telecommunications Access Method*.

W

Windows NT. An operating system for IBM-compatible personal computers.

workstation. A personal computer or intelligent terminal with some local processing capabilities.

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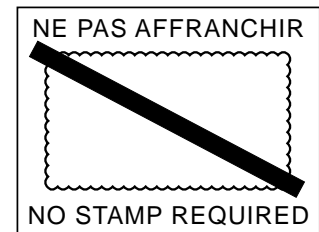
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