CICS Transaction Server V3.1 Migrating from CICS V2.3

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Notes

CICS® Transaction Server for z/OS® V3.1 introduces a range of major enhancements, which fall into three main areas.

Access to CICS

A group of functions is introduced to enhance access to CICS. Major new support is provided for Web services, by an evolution of the functions previously provided as the SOAP for CICS optional feature. These capabilities allow CICS-based applications to be integrated with a Service Oriented Architecture (SOA), enabling them to be exposed as Web services. Distributed transaction coordination is provided for partners complying with the WS-Atomic transaction specification. Message-level security function that complies with the WS-Security specification will be provided later in this release. New HTTP capabilities are offered as part of CICS Web support, moving the level of specification supported to HTTP 1.1, and adding outbound HTTP function. Security enhancements are provided to the existing support for Secure Sockets Layer (SSL), including support for the TLS 1.0 protocol.

Application transformation

The second important group of enhancements to CICS TS provides new capabilities for the generation of new applications, and the development of existing applications, using contemporary programming languages and techniques. Support is introduced for totally Language Environment®-enabled Assembler application programs. A new mechanism is provided for inter-program data transfer, which offers an alternative that is not subject to the 32-KB restriction of the COMMAREA mechanism. All the EXEC CICS Web API commands have been made threadsafe. Support for the XPLink feature of z/OS enables improved performance of applications written in C/C++. More efficient use of z/OS multiprocessor capabilities is enabled by extension of Open Transaction Environment (OTE) support to use open TCBs. The Information Center is provided as a plug-in to the Eclipse platform. It brings benefits through commonality with this framework now being employed by many other IBM products.

Enterprise management

The third area of enhancements is to the systems management capabilities of CICS TS V3.1. Many improvements are made to the CICSPlex® SM Web User Interface, both providing new functions and enhancing its usability. This makes it the interface of choice for all systems management actions. A new interface is provided for the CICSPlex SM data repository batch update facility. With these enhancements, CICSPlex SM can be configured, set up, and run without involving the TSO or CAS components, saving time and effort for both existing and new users.

General availability of this new version occurred on March 25, 2005

CICS TS V3.1 is recommended for all CICS customers migrating from older releases. The base software prerequisites for CICS TS V3.1 are similar to CICS TS V2.3 (e.g. z/OS V1.4 as a base). The primary consideration on migrating from CICS TS V1.3 or TS V2.2 is the language and compiler level used by the applications. CICS TS V3.1 does NOT support the execution of OS/VS COBOL programs. CICS TS V2.3 continues to support the execution of OS/VS COBOL.

This session will help you answer the following questions:
- · What issues are you facing when migrating from earlier releases?
- · What new CICS functions will require an upgrade to hardware or software levels?
- · What CICS functions have been removed in this release?

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Session Agenda

- **Software prerequisites**

- **General external changes**

  - RDO

  - Application and systems programming interfaces

  - Global user exits

  - Monitoring and statistics

- **Functional changes**

  - Language Environment

  - Obsolete function removal

- **Future planning**

- **Documentation**

- **Summary**

- **Appendix: Considerations for the CICS TS 2.2 user**

CICS Transaction Server V3.1 Elements

- **CICS 0640**

- **CICSPlex SM 310**

- **CICS Information Center**

- **REXX Development System and Runtime Facility for CICS/ESA**

- **CICS Application Migration Aid Version**

- **CICS Integrator Adapter for z/OS**

- **WebSphere Studio Enterprise Developer V5.1 promotion**

  – 1 unrestricted entitlement, no service entitlement

  – Integrated development environment for CICS and WebSphere

    • COBOL, PL/I, Java for CICS and J2EE applications

Notes

In the box when you buy CICS TS 3.1 is:

CICS at functional level CICS TS V3 R1 (Internal level CICS 0640) including:

• ONC RPC support, CICS Web interface, CICS DB2(R) attachment facility, CICS/DDM

CICSPlex(R) SM at functional level CICS TS V3 R1

• Updated to support new levels of function in CICS. CICSPlex SM becomes an exclusive element in CICS TS Release 3. IBM CICSPlex System Manager for MVS/ESA(TM) Version 1 Release 3 continues to be available for customers that are not yet ready to migrate to CICS TS (for example, customer with CICS/ESA(R) Version 4 Release 1 or earlier).

Application Migration Aid at functional level CICS TS V1 R1

• First available in 1990, this element is still available stand-alone as IBM Customer Information Control System (CICS) program offering, CICS Application Migration Aid, program number 5695-061.

REXX for CICS at functional level CICS TS V1 R2 (REXX for CICS/ESA V1R1)

• Separately available as REXX for CICS, program number 5655-B54.

•IBM CICS Integrator Adapter for z/OS

• Server run-time environment to those Adapter services that are modelled, generated and deployed using the Service Flow Modeller plug-in of the WebSphere Developer for zSeries product.

One unrestricted entitlement to Websphere Studio Enterprise Developer V5

Software Prerequisites

- **z/OS V1.4 or later**

  - CICS will not initialize unless the minimum prerequisite level of operating system is installed

  - Some components of CICS are installed in PDSE and HFS files
    - The OMVS address space, Unix Systems Services, must be active in full function mode during the install process
    - The jobs to create the HFS files and directories will require *superuser* authority

  - LE library SCEERUN must be available to CICS during CICS initialization

  - z/OS Conversion Services must be enabled

- **IBM SDK for z/OS, Java 2 Technology Edition, Version 1.4**

  - Must be at the 1.4.2 level
    - PTF UQ90449

Notes

The CICS installation process does not alter if you have data conversion requirements.

However, to get the benefits of z/OS(R) conversion services, if perhaps your system requires support for the conversion of UTF-8 or UTF-16 data to EBCDIC, you must enable the z/OS conversion services and install a conversion image which specifies the conversions that you want CICS to perform.

Refer to the instructions in the *z/OS Support for Unicode: Using Conversion Services* manual SA22-7649 to find out the steps needed to set up and configure conversions supported though the operating system services.

CICS TS 3.1 pre-reqs the IBM® Software Developer Kit for z/OS, Java™ 2 Technology Edition, Version 1.4.2. The 1.4.2 level is available by applying PTF UQ90449.

Software Prerequisites…

- **Optional software minimum levels**

  - WS-Security support
    - The IBM XML Toolkit for z/OS V1.7 is required
  - CICS Universal Client Version 5.0 or later
  - CICS Transaction Gateway Version 5.0 or later
  - DB2 for OS/390 Version 6 or later
  - IMS Database Manager Version 7 or later
  - WebSphere MQ for z/OS Version 5.3
  - Tivoli Business Systems Manager Version 3.1 or later

Notes

For WS-Security support, the IBM XML Toolkit for z/OS V1.7 is required. This is a no-charge product, program number 5655-J51.

The following levels of other products are supported for use with CICS TS for z/OS, Version 3.1:

IMS™ Database Manager V7 (5655-B01), IMS Database Manager V8 (5655-C56), IMS Database Manager V9 (5655-J38)

DB2 Universal Database™ Server for OS/390® V6.1 (5645-DB2). For SQLJ/JDBC support, with PTF for APAR PQ84783 DB2 V6 does not support DB2 Group Attach

DB2 Universal Database Server for OS/390 V7.1 (5675-DB2). For SQLJ/JDBC support, with PTFs for APARs PQ84783 and 86525. For DB2 Group Attach, with APARs PQ44614, PQ45691, and PQ45692

DB2 Universal Database for z/OS V8.1 (5625-DB2). For SQLJ/JDBC support, with PTFs for APARs PQ84783 and 86525.

WebSphere MQ for z/OS V5.3 (5655-F10)

Tivoli® Decision Support for OS/390 (5698-ID9) V1.6, with necessary service applied

Tivoli Business Systems Manager V3.1

CICS Universal Client Version 5.0, or later

CICS Transaction Gateway Version 5.0, or later

Installation Process

- **New default installation process**

  - Common IBM install procedures

    - SMP/E RECEIVE, APPLY, ACCEPT commands

  - Described in the CICS Program Directory

- **DFHISTAR process still available**

  - CICS generated installation job stream

  - Described in the CICS Installation Guide

Notes

This release of CICS(R) Transaction Server is installed using the SMP/E RECEIVE, APPLY, and ACCEPT commands. The SMP/E dialogs may be used to accomplish the SMP/E installation steps.

The process is described in the CICS TS 3.1 Program Directory. It is in line with IBM(R) Corporate Standards, and may be familiar to those who have installed other z/OS(R) products.

The traditional method, DFHISTAR, of installing CICS Transaction Server is still available.

Systems Initialization Table: New parameters

- **CLINTCP**
  - Default client code page when DFHCNV CLINTCP=SYSDEF

- **CRLPROFILE (PK04622)**
  - Name of a profile in the RACF LDAPBIND class

- **LOCALCCSID**
  - Default CCSID for local region

- **MAXSSLTCBS**
  - Maximum number of S8 TCBs for use with SSL

- **MAXXPTCBS**
  - Maximum number of X8 and X9 TCBs for use by XPLINK programs

- **SRVERCP**
  - Default server code page when DFHCNV SRVERCP=SYSDEF

- **SSLCACHE**
  - Specifies scope of SSL caching

Notes

The default values for these parameters are designed to have minimal impact when you are migrating from an earlier release of CICS.

CLINTCP={**437**|codepage} Specifies the default client code page to be used by the DFHCNV data conversion table but only if the CLINTCP parameter in the DFHCNV macro is set to SYSDEF.

CRLPROFILE is the 246-character name of a profile in the RACF LDAPBIND class that contains bind information about an LDAP server that will be used by CICS SSL support to obtain certificate revocation list information.

LOCALCCSID={**037**|CCSID}   Specifies the default CCSID for the local region. The CCSID is a value of up to 8 characters. If CCSID value is not specified, the default LOCALCCSID is set to 037.

MAXSSLTCBS={**8**|*number*} Specifies the maximum number of S8 TCBs that can run in the SSL pool. The default is 8, but you can specify up to 1024 TCBs.

•MAXXPTCBS={**5**|*number*} Specifies the maximum number, in the range 1 through 999, of open X8 and X9 TCBs that can exist concurrently in the CICS region.

SRVERCP={**037**|codepage} Specifies the default server code page to be used by the DFHCNV data conversion table but only if the SRVERCP parameter in the DFHCNV macro is set to SYSDEF.

SSLCACHE={**CICS**| SYSPLEX} Specifies whether SSL is to use the local or sysplex caching of session ids.

Systems Initialization Table: Changed parameters

- **ENCRYPTION={<u>STRONG</u> | MEDIUM | WEAK}**

  - Range of available cipher suites for CICS to use
    - For compatibility ENCRYPTION=NORMAL will be treated as ENCRYPTION=MEDIUM

- **FORCEQR**

  - No effect on XPLINK programs or OPENAPI programs which **must** run on their own TCB.

Notes

ENCRYPTION specifies the cipher suites that CICS uses for secure TCP/IP connections. When a secure connection is established between a pair of processes, the most secure cipher suite supported by both is used.

- Use ENCRYPTION=STRONG when you can tolerate the overhead of using high encryption if the other system requires it.

- Use ENCRYPTION=WEAK when you want to use encryption up to 40 bits in length.

- Use ENCRYPTION=MEDIUM when you want to use encryption up to 56 bits in length.

For compatibility with previous releases, ENCRYPTION=NORMAL is accepted as an equivalent to ENCRYPTION=MEDIUM. CICS can use only the cipher suites which are supported by the underlying z/OS or OS/390 operating system.

FORCEQR specifies whether you want CICS to force all   CICSAPI user application programs that are specified as thread safe to run under the CICS QR TCB, as if they were specified as quasi-reentrant programs. This parameter applies to all application programs that are restricted to the current CICS programming interfaces (that is, those which specify API(CICSAPI)) , and does not apply to any of the following:

- Java programs that are run in a JVM,

- C/C++ programs using XPLINK,

- OPENAPI programs,

none of which can run on the QR TCB.

Systems Initialization Table: Obsolete Parameters

- **SSLTCBS**

  – Replaced by MAXSSLTCBS

- **MAXHPTCBS**

  – Support for Java Hot pooling removed. H8 TCBs removed.

- **TCAM**

  – Support for TCAM DCB removed

Notes

MAXHPTCBS

- Run-time support for Java(TM) program objects and hot-pooling (HPJ) has been removed. The system initialization parameter MAXHPTCBS is not required, and is removed. The open TCB mode H8, which was used for hot-pooling Java program objects and was controlled by MAXHPTCBS, no longer exists.

SSLTCBS

- This parameter is now obsolete and is only kept for compatibility. If it is specified, it is rejected with a message and MAXSSLTCBS is assumed.

TCAM

- This parameter is now obsolete and is only kept for compatibility. If it is specified, it is rejected with a message and TCAM=NO is assumed.

CICS Supplied Transactions

- **Changes to CWXN (Web Attach Transaction)**

  – If URIMAP found only invokes analyzer program if specified in URIMAP

  – If HTTP 1.1 performs acceptance checking on request

  – Pre-processes chunked and pipelined messages

  – Persistent connections now the default. Connection only closed if:

    • Web client requests closure

    • Timeout period is reached

    • Web Client is HTTP 1.0 that does not send a Keep-alive header

  – CWXN uses asynchronous receive, terminates after each request

    • Connection remains open without requiring active CWXN task

    • Allows many more concurrent connections

Notes

There are several changes to the processing carried out by the CICS-supplied transaction CWXN, the Web attach transaction. The most significant of these are:

If a matching URIMAP definition is found for an HTTP request, CWXN now invokes the analyzer program only if instructed to do so by the URIMAP definition.

Where the HTTP version of the request is HTTP/1.1, CWXN carries out some of the responsibilities of an HTTP server by performing some basic acceptance checks on the request. In response to these checks, CWXN might take action to return a response to the request without involving a user-written application program.

CWXN pre-processes chunked and pipelined messages received from a Web client, so that user-written applications do not have to perform this processing.

Chunked messages are single messages split up and sent as a series of smaller messages (chunks). CWXN receives and assembles the chunks of the message to create a single HTTP request. CWXN checks that the message is complete before passing it to the user application. The user application can then process the request like any other HTTP request.

Pipelined messages are multiple messages sent in sequence, where the sender does not wait for a response after each message sent. A server must respond to these messages in the order that they are received. To ensure this, CWXN holds pipelined requests and releases them one at a time to the user application. The user application must send a response to the first request before receiving the next request from CWXN.

Persistent connections are now the default behaviour. The connection is only closed if the Web client requests closure, or if the timeout period is reached, or if the Web client is an HTTP/1.0 client that does not send a Keep-Alive header.

New CICS Supplied Transactions

- **CCRL**

  – Download certificate revocation lists

- **CPIH**

  - Internal alias transaction for Web Services (http)
    - CICS as a Web Service provider

- **CPIR**

  - Internal alias transaction for Web Services (WMQ)
    - CICS as a Web Service provider

- **CWXU**

  – New transaction for non-HTTP requests

Notes

CCRL, the certificate revocation lists transaction, is used to create and update the certificate revocation lists (CRLs) that are stored in an LDAP server. You only need to use CCRL if you are implementing SSL in your CICS(R) regions and want each connection checked for a revoked certificate during the SSL handshake.

CPIH, internal alias transaction for inbound Web Services over http.

CPIR, Internal alias transaction for inbound Web Services using WMQ.

In CICS(R) Transaction Server for z/OS(R), Version 3 Release 1, processing for HTTP requests and processing for non-HTTP requests are kept separate. This ensures that CICS can perform basic acceptance checks on HTTP requests and responses, and that non-HTTP requests are not subjected to these checks. Processing for non-HTTP requests must now be carried out under the user-defined (USER) protocol, which is specified on the TCPIPSERVICE definition for the port that receives the requests.

The new CICS-supplied transaction CWXU, the CICS Web user-defined protocol attach transaction, is the default when the protocol is defined as USER. CWXU executes the CICS program DFHWBXN.

CICS Supplied Transactions…

- **New CEMT command options**
  - INQUIRE
    - HOST
    - PIPELINE
    - URIMAP
    - WEBSERVICE
  - SET
    - HOST
    - PIPELINE
    - URIMAP
    - WEBSERVICE
  - DISCARD
    - PIPELINE
    - URIMAP
    - WEBSERVICE
  - PERFORM
    - PIPELINE SCAN

Notes

CEMT supports the standard inquire, set and discard commands for the new Pipeline, Urimap and WebService resources.

A perform pipeline command initiates a scan of the WebService binding directory that is specified in the WSBIND attribute of a pipeline definition.

CICS Supplied Transactions…

- **Changed CEMT command options for**
  - INQUIRE
    - Dispatcher, Doctemplate, Program, System, Tcpip, Tcpipservice, Workrequest
  - SET
    - Dispatcher, Doctemplate, Program, System, Tcpipservice, Workrequest
  - PERFORM
    - Statistics

- **INQUIRE SYSTEM**
  - CICSTSLEVEL returns 030100
  - RELEASE returns 0640

Notes

In terms of obsolete options, inquire/ set commands for dispatcher and program have any parameters relating to Java hotpooling and HP TCBs removed.

The dispatcher command now has new parameters relating to XP TCBS for XPLINK. An SSL TCBs.

For programs, a new APIST keyword shows whether the program is defined as OPENAPI or CICSAPI. The existing RUNTIME keyword has a new value of XPLINK.

For DOCTEMPLATES, the HFSFILE keyword returns the full-qualified name of the HFS file where the template resides.

TCPIP commands support the new CRLSERVER and SSLCACHE keywords.

A new MAXDATALEN parameter for TCPIPSERVICE specifies the maximum length of data that may be received by CICS as an HTTP server as a result of upgrading our support to HTTP 1.1

Statistics now support the new Pipeline and WebService resources.

CICS Supplied Transactions…

- **CETR**

  – Activate Trace for Pipeline Manager Domain (PI)

- **New CICS RACF category 1 transactions**

  – CICS region user ID must be authorized to these transactions

    • CPIH   CICS SOAP HTTP Inbound Router transaction
    • CPIL   CICS SOAP MQ Inbound Listener Transaction
    • CPIQ   CICS SOAP MQ Inbound Router transaction
    • CPIR   CICS Pipeline Resolution Transaction
    • CRTP   CICS Persistent Session signon
    • CWXU CICS Web Attach - User defined protocol

Notes

CETR allows tracing to be activated for the new pipeline manager domain.

There are some new CICS(R) internal system transactions added to the list of category one transactions. These are the transactions that need to be defined to RACF(R), and to which the CICS region user ID must be authorized, to enable CICS to initialize successfully when you are running CICS with security enabled (SEC=YES).

Resource Definition

- **CICS System Definition (CSD)**

  - Define New CSD

  - REPRO existing CSD to new dataset

  - Run DFHCSDUP UPGRADE

    - Use DFHCSDUP SCAN command to check for user changes
    - Review CEE group

  - Sharing the CSD

    - CICS TS 3.1 CSD can be shared with prior releases
      - No requirement for a DFHCOMPx group to share with CICS TS 2.3

Notes

Run the DFHCSDUP utility program, specifying the UPGRADE command, to upgrade the CICS-supplied definitions in your CSD to the latest CICS TS level. You can create a new CSD using the DFHCSDUP INITIALIZE command.

Upgrading other IBM-supplied resource definitions

If you have resource definitions in your CSD that support other IBM products, you may need to upgrade these also. For example, if your Language Environment resource definitions are not at the **z/OS(R) Version 1 Release 4** level, you are recommended to delete and replace the CSD group containing these.

You can find the Language Environment resource definitions in the SCEESAMP library in member CEECCSD

Resource Definition…

- **Obsolete IBM supplied resource groups**

    - DFHAUGRP   CICS Affinities utility group removed

    - DFH$JAVA   Sample application group removed

    - DFH$AFFY   Sample defs for affinities utility removed

Notes

DFH$JAVA

IBM-supplied sample application program group DFH$JAVA is removed. This group contained the resource definitions needed for the sample applications for Java(TM) support using VisualAge(R) for Java, Enterprise Edition for OS/390(R). The same sample applications are defined for use with a JVM by the DFH$JVM group.

DFHAUGRP

IBM-supplied group DFHAUGRP is removed. This group contained the resource definitions for the CICS(R) transaction affinities utility.

DFH$AFFY

IBM-supplied sample group DFH$AFFY is removed. This group contained sample resource definitions for the CICS transaction affinities utility that you could modify to suit your requirements.

Removing obsolete definition groups from start-up group lists.

Obsolete definition groups have been removed from the CICS-supplied default start-up group list, DFHLIST.

If you use customized startup group lists, you must remove any obsolete definition groups from them.

Changes to Resource Definition

- **CORBASERVER**
  - CIPHERS added
  - OUTPRIVACY removed

- **DOCTEMPLATE**
  - HFSFILE added

- **PROGRAM**
  - HOTPOOL removed
  - API added

- **TCPIPSERVICE**
  - CIPHERS added
  - MAXDATALEN added
  - PRIVACY removed
  - PROTOCOL new USER value
  - SOCKETCLOSE (changed socketclose(0) recommendation)

Notes

CORBASERVER   CIPHERS Keyword added
- • Specifies a string of up to 56 hexadecimal digits that is interpreted as a list of up to 28 2-digit cipher suite codes. The attribute value is automatically populated with the list of acceptable codes, depending on what level of encryption has been specified by the ENCRYPTION system initialization parameter. For ENCRYPTION=WEAK, the default value is 03060102. For ENCRYPTION=MEDIUM, the default value is 0903060102.For ENCRYPTION=STRONG, the default value is 0504352F0A0903060102.

DOCTEMPLATE   HFSFILE attribute
- • Allows template to reside on an HFS file

PROGRAM   API attribute
- • Specifies what application programming interfaces the program will use.
  - • CICSAPI means the program uses CICS application programming interfaces only. CICS determines whether the program runs on the quasi-reentrant (QR) TCB, or on another TCB. This depends upon the value of the CONCURRENCY attribute in the PROGRAM resource definition. If the program is defined as threadsafe it may run on whichever TCB, in use by CICS at the time, is determined as suitable.
  - • OPENAPI means the program is not restricted to the CICS application program interfaces. CICS executes the program on its own L8 or L9 mode open TCB dependent upon the value of the EXECKEY attribute in the PROGRAM resource definition. If, while executing a CICS command, CICS requires a switch to the QR TCB, it returns to the open TCB before handing control back to the application program. OPENAPI requires the program to be coded to thread safe standards and defined with CONCURRENCY(THREADSAFE).

Notes

TCPIPSERVICE   CIPHERS keyword added

Specifies a string of up to 56 hexadecimal digits that is interpreted as a list of up to 28 2-digit cipher suite codes. The attribute value is automatically populated with the list of acceptable codes, depending on what level of encryption has been specified by the ENCRYPTION system initialization parameter. For ENCRYPTION=WEAK, the default value is 03060102. For ENCRYPTION=MEDIUM, the default value is 0903060102.For ENCRYPTION=STRONG, the default value is 0504352F0A0903060102.

TCPIPSERVICE   MAXDATALEN keyword added

Defines the maximum length of data that can be received by CICS as an HTTP server, on the HTTP protocol or the USER protocol. The default value is 32K. The minimum is 3K, and the maximum is 524288K. To increase security for CICS Web support, specify this option on every TCPIPSERVICE definition for the HTTP protocol. It helps to guard against denial of service attacks involving the transmission of large amounts of data.

TCPIPSERVICE   USER value added to protocol keyword

Processing for all non-HTTP requests must now be carried out under the USER protocol. No parsing is carried out for messages received on the USER protocol, and requests that have been divided up for transmission across the network are not automatically assembled. This is the same behaviour as when handling non-HTTP messages in earlier CICS releases.

Notes

TCPIPSERVICE   Change of recommendation for SOCKETCLOSE(0)

In previous releases the recommendation was that if you are using the TCPIPSERVICE for CICS Web Support and are processing only standard HTTP requests, SOCKETCLOSE(0) should be specified to avoid unnecessary CWXN transactions remaining in the system.

However in CICS TS 3.1, the socket can remain open without involving a CWXN transaction taking up a max task slot. Also with the upgrade to HTTP 1.1 the recommendation is if you are using a TCPIPSERVICE for CICS Web Support with the HTTP protocol, SOCKETCLOSE(0) should not be specified. A zero setting for SOCKETCLOSE means that CICS closes the connection immediately after receiving data from the Web client, unless further data is waiting. This means that persistent connections cannot be maintained

Resource Definition…

- **New definitions**
  - PIPELINE
  - URIMAP
  - WEBSERVICE

Notes

PIPELINE definition

•A PIPELINE resource definition is used when a CICS application is in the role of a Web service provider or requester. It provides information about the message handler programs that act on a service request and on the response. Typically, a single PIPELINE definition defines an infrastructure that can be used by many applications. The information about the processing nodes is supplied indirectly: the PIPELINE specifies the name of an HFS file which contains an XML description of the nodes and their configuration. An inbound Web service request (that is, a request by which a client invokes a Web service in CICS) is associated with a PIPELINE resource by the URIMAP resource.

UIRMAP definition

•URIMAP definitions are resource definitions that match the URIs of HTTP or Web service requests, and provide information on how to process the requests. URIMAP definitions are used to provide three different Web-related facilities in CICS:

•Requests from a Web client, to CICS as an HTTP server.
•Requests to a server, from CICS as an HTTP client.
•Web service requests.

WEBSERVICE definition

•A WEBSERVICE resource defines aspects of the run time environment for a CICS application program deployed in a Web services setting, where the mapping between application data structure and SOAP messages has been generated using the CICS Web services assistant. Although CICS provides the usual resource definition mechanisms for WEBSERVICE resources, they are typically installed dynamically, using the output produced by the assistant. The aspects of the run time environment that are defined by the WEBSERVICE resource are:

•A pipeline
•A Web service binding file
•A Web service description

Application Programming Interface

- **EXEC CICS**

  – SIGNON / SIGNOFF

    • Since CICS TS V2 operation is terminal related only
    • Executing transaction security and user ID set at task attach time
      – XSNEX Global User Exit (migration aid retained for compatibility)

  – VERIFY PASSWORD

    • CICS now enforces the revoked status of a user ID or a user's group connection.

Notes

In CICS TS 1.3 and earlier, CICS recognizes the sign-on immediately, and establishes the specified user's security and operating attributes for the terminal. The transaction (and any associated task-related user exits, function shipping, or distributed transaction processing) may have invoked other resource managers (for example, IMS(TM), DB2(R), or VSAM). It is unpredictable whether these other RMs recognize the sign-on before the transaction terminates, and thus you can only be sure that the new user attributes apply for all resource managers invoked by subsequent transactions at the terminal. Hence since CICS TS V2, the behaviour of EXEC CICS ISGNON and SIGNOFF changed in that a SIGNON and SIGNOFF command does *not* affect the current transaction issuing the command.

If you have applications that cannot tolerate the change in the SIGNON and SIGNOFF process, CICS provides a global user exit point (XSNEX) and sample global user exit program that will enable CICS to handle EXEC CICS SIGNON and SIGNOFF as in CICS TS 1.3 and earlier releases. Note that XSNEX is a migration aid only, and you should consider removing all application dependency on the old behaviour. CICS TS 3.1 continues to ship this migration aid.

When the command EXEC CICS VERIFY PASSWORD is issued, CICS now enforces the revoked status of a user ID or a user's group connection. For example, if a user has tried to log on too many times, the id is revoked and the user cannot access the system or resources

Application Programming Interface…

- **High Performance Java (HPJ) Programs**

  – Non-IIOP applications

    • Must be converted to JVM programs

- **C/C++ Programs**
  • Can now use XPLINK capability
    • Activated via XPLINK compiler option
    • New CICS supplied procedures for Translate, compile and linkedit
    • Programs run on X8 or X9 TCBs using MVS LE services
    • Programs **<u>must</u>** be Threadsafe to use XPLINK and defined as Threadsafe

Notes

Run-time support for Java(TM) program objects and for hot-pooling (HPJ) is withdrawn in CICS TS 3.1. Any Java programs that you had processed using the VisualAge(R) for Java, Enterprise Edition for OS/390(R) bytecode binder (hpj) to run as Java program objects in CICS, must be migrated to run in a Java Virtual Machine (JVM).

CICS provides support for C and C++ programs compiled with the XPLINK option by using the multiple TCB feature in the CICS Open Transaction Environment (OTE) technology. X8 and X9 mode TCBs are defined to support XPLink tasks in CICS key and USER key respectively. Each instance of an XPLink program uses one X8 or X9 TCB.

To use XPLink, your C or C++ application code must be reentrant and threadsafe. The same code instance can be executing on more than one MVS TCB and, without threadsafe mechanisms to protect shared resources, the execution behaviour of application code is unpredictable. **This cannot be too strongly emphasized.**

CICS provides procedures DFHYITFL for C programs, and DFHYITGL for C++ Programs wanting to use XPLINK.

Systems Programming Interface

- **New and changed commands**

  – Changes similar to the CEMT changes

- **EXEC CICS EXTRACT STATISTICS**

  – PIPELINE

  – URIMAP

  – WEBSERVICE

Notes

Changes to the System Programming Interface SPI) are the same as those listed earlier for CEMT.

A new SPI command, EXTRACT STATISTICS, handles statistics for URIMAP, PIPELINE, and WEBSERVICE resources. Use the EXTRACT STATISTICS command to retrieve the current statistics for a single resource, or global statistics for a class of resources. The EXTRACT STATISTICS command performs a function equivalent to COLLECT STATISTICS, for the URIMAP, PIPELINE, and WEBSERVICE resources. To collect statistics for other resources use the existing COLLECT STATISTICS command. The syntax of the EXTRACT STATISTICS differs from that of COLLECT STATISTICS.

All CICS SPI commands are restricted in the number of distinct options they can support. As new resources have been added to CICS over time, the limit has been reached for the COLLECT STATISTICS command, and it is not possible to accommodate the new URIMAP, PIPELINE, and WEBSERVICE resources on the existing command.

The EXTRACT STATISTICS command uses the RESTYPE option, with a CVDA, to specify a CICS resource. As a result, there is no limit on the number of resources that the command can potentially support, although in this release, only the three new resources are supported

Global User Exits

- ***It is HIGHLY recommended that ALL global user exits be analyzed to ensure that they are THREADSAFE and that their PROGRAM definitions changed to specify CONCURRENCY(THREADSAFE)***

  – XRMIIN, XRMIOUT, XEIIN and XEIOUT are most important

  - OTE considerations

- **Changes to the standard parameter list (DFHUEPAR)**

  – UEPGIND, task indicator field

  - L9, X8, X9 and SP
  - H8 no longer available

Notes

All user programs defined by a program resource definition have a concurrency attribute, which can be either QUASIRENT or THREADSAFE. By default, global user programs are defined as quasi-reentrant, which means they are given control on the CICS QR TCB. If the task under which the global user exit is invoked is executing on an open TCB, and the exit program is defined as quasi-reentrant, CICS switches back to the QR TCB for the execution of the exit program.

To avoid unnecessary TCB switching, you are strongly recommended to make sure that your global user programs conform to threadsafe programming standards. When you are satisfied that your exit programs are threadsafe, ensure that they are defined as CONCURRENCY(THREADSAFE). This is particularly important for exits that are invoked by tasks that are using the CICS DB2(R) interface and running under an L8 TCB.

Exit parameter UEPGIND passed to global user exits includes reference to the mode of the TCB the exit is running on. With the new types of open TCB introduced, exits can now run on these new type of TCB is they are threadsafe and defined to CICS as such.

Global User Exits…

- **New global user exits**

  - XWBOPEN

    - Called during WEB OPEN, before the session is established
      - Can be used to bar access to a whole host

  - XWBSNDO

    - Called during WEB SEND or WEB CONVERSE
      - Enables systems administrators to specify a security policy for HTTP requests by CICS

Notes

There are two new global user exits for CICS as an HTTP client: XWBOPEN in the WEB OPEN command, and XWBSNDO in the WEB SEND command. (Note that XWBSNDO only applies when the WEB SEND command is used for CICS as an HTTP client, and not for CICS as an HTTP server.)

XWBOPEN enables systems administrators to specify proxy servers that should be used for HTTP requests by CICS as an HTTP client, and to apply a security policy to the host name specified for those requests. XWBOPEN is called during processing of an EXEC CICS WEB OPEN command, which is used by an application program to open a connection with a server.

XWBSNDO enables systems administrators to specify a security policy for HTTP requests by CICS as an HTTP client. XWBSNDO is called during processing of an EXEC CICS WEB SEND or EXEC CICS WEB CONVERSE command. The host name and path information are passed to the exit, and a security policy can be applied to either or both of these components.

Global User Exits…

- **Changed global user exits**

  – Parameter list changes

    - Existence bits with channel name passed to exits
      - XICEREQ, XICEREQC
      - XPCREQ, XPCEREQC
      - XPCTA, XPCFTCH, XPCHAIR, XPCABND
    - Exits may not access contents of channels

  – XPlink programs

    - XPCTA does not allow a resume address
      - New flag PCUE_NO_RESUME, in PCUE_CONTROL_BITS

    - XPCFTCH does not allow a modified entry address
      - New flag PCUE_NO_MODIFY, in PCUE_CONTROL_BITS
      - Alternative is CEEBXITA

Notes

Global user exit programs cannot access containers created by application programs. They can, however, create their own channels and pass them to programs which they call.

When the exit XPCTA is invoked from a C or C++ programs that was compiled with the XPLINK option, a flag is set indicating that a resume address, if specified by the exit, will be ignored. This is because XPLINK runs with MVS LE which has it own recovery procedures which percolates to CICS. By the time CICS recovery gets control, the program environment has gone.

When the exit XPCFTCH is invoked from a C or C++ programs that was compiled with the XPLINK option, a flag is set indicating that any modified entry point address, if specified by the exit, will be ignored. It is not supported because XPLINK uses MVS LE with CEEPIPI pre initialised interface and PIPI will reject the signature of any assembler program.

Global User Exits…

- **Removed global user exits**
  - XTCTIN and XTCTOUT
    - TCAM network support

Notes

XTCTIN Terminal control program
This exit was invoked on TCAM input events. It is no longer called because CICS TS 3.1 does not support the TCAM/ACB interface, and it only supports the TCAM/DCB interface indirectly.

XTCTOUT Terminal control program
This exit was invoked on TCAM output events. It is no longer called because CICS TS 3.1 does not support the TCAM/ACB interface, and it only supports the TCAM/DCB interface indirectly.

User Replaceable Modules

- **Removed URMs**
  - DFHAPH8O (HPJ Hotpooling)
  - DFHJHPAT (HPJ)

- **New URMs**
  - DFHAPXPO (XPLINK)

- **Changed URMs**
  - User-replaceable programs cannot access containers created by application code
  - DFHCNV
    - Added SYSDEF operand to TYPE=INITIAL

Notes

The user-replaceable programs DFHAPH8O and DFHJHPAT are removed.

- •DFHAPH8O was provided to allow you to alter the default Language Environment run-time options for the Language Environment® enclave where a Java™ program object was to be run.

- •DFHJHPAT was optional and could be used for your own purposes, such as tracing. It was called before a Java program object was invoked.

New User replaceable module DFHAPXPO allows you to alter the default Language Environment run-time options for the Language Environment enclave where an XPLINK program is to run.

The new operand SYSDEF has been added to the TYPE=INITIAL and TYPE=ENTRY macro parameters CLINTCP and SRVERCP. These macros define the user-replaceable data conversion table DFHCNV. The DFHCNV TYPE=INITIAL macro defines the beginning of the conversion table. It gives a list of valid code pages. The DFHCNV TYPE=ENTRY macro specifies a name and type to uniquely identify a data resource. There must be one for each resource for which conversion is required.

Monitoring and Statistics

- **Performance class data**

  - Record size increases to 1836 bytes

    - Reduce using INCLUDE and EXCLUDE option on the MCT

- **Changes to statistics record**

  - New and changed DSECTs

    - DFHCHNL   Container usage
    - DFHPROG   Program statistics
    - DFHSOCK   TCP/IP statistics
    - DFHTASK   Task statistics
    - DFHWEBB   Web support statistics

Notes

Some performance data fields are added to performance class data records. The result of all these additions is that record length of performance class data records has increased significantly, with the maximum record length now up to 1836 bytes per record.

SMF data sets can quickly fill with unwanted data.You can reduce the amount of data written to SMF by using a monitoring control table (MCT) to selectively include or exclude specified fields

There are changes to CICS statistics records. These are usually because of new domains, or they are a result of enhancements to CICS. As a result, a number of statistics DSECTs have new or changed fields. The changed DSECTs are:

DFHDSGDS Dispatcher global statistics

DFHPIPDS Pipeline resource statistics

DFHPIWDS Webservice resource statistics

DFHWBSDS Urimap global statistics

DFHMNTDS Transaction performance monitoring resource statistics.

DFHWBRDS Urimap resource statistics

DFHSORDS TCP/IP resource statistics

Monitoring and Statistics…

- **XPLINK CPU time will be included in CICS 110 records**
  - X8 CPU, Dispatch and delay times
  - X9 CPU, Dispatch and delay times

- **OPENAPI**
  - New L9 CPU, Dispatch and delay times as well as existing L8 times

- **SP and S8 CPU time**
  - SP time will be included in miscellaneous
  - S8 CPU, Dispatch and dispatch delay times

Notes

The CICS 110 record includes new fields to record the cpu time consumed on X8 and X9 TCBs used by XPLINK programs. These contribute to the overall cpu total for the transaction.

Similarly for openapi programs, L9 TCBs contribute to the overall time, as well as the existing L8 TCBs.

For SSL a new SP TCB and S8 TCBS CPU time is captured.

CICS SOAP Feature

- **Not orderable with CICS TS V3.1**
  - Existing Version 2 feature may be used with 3.1
    - Intent is to aid migration
    - Not intended as a substitute for Web Services

Notes

If you use the SOAP for CICS feature, you can continue to do so; the feature continues to be fully supported in CICS TS 3.1 independently of Web services in CICS.

The SOAP for CICS feature can interoperate with the support for Web services in CICS TS for z/OS, Version 3.1: the feature can be the service requester or the service provider.

CICSPlex Systems Manager

- **CICSPlex migrations similar to previous releases**

  – CAS, CMAS and MAS agent code must all be at 3.1 level

  – WUI Server and its connected CMAS must be at 3.1 level
    - Migrate contents of WUI Server repository
      – At prior CICS level, export view set and menu definitions
      – Create a new WUI server repository for 3.1
      – Start the 3.1 WUI server
      – Import the new starter set definitions
      – Review the new view formats with your changes
        > Import previous release view set and menu definitions
        > Specify SKIP on Duplicate Names field of COVC panel

  – Maintenance point CMAS must be upgraded first

Notes

You must migrate your CICSPlex SM CMAS to CICS TS Version 3.1 at the same time as you migrate the CICS system on which it runs. This is because since CICS Transaction Server for z/OS, Version 2 Release 3 a CICSPlex SM CMAS will run only in a CICS system at the same release level.

Both the Web User Interface server and the CMAS that it connects to must be at the highest level of CICSPlex SM within the CICSplex. This means that both must be at the same level as the maintenance point CMAS.

Before you migrate a Web User Interface server, you must migrate the CMAS that it connects to. You must migrate the Web User Interface server before you migrate any other MASs. If the CMAS that the Web User Interface server connects to is not the maintenance point CMAS, you must migrate the maintenance point CMAS at the same time.

As the CICS system that acts as your Web User Interface server is a local MAS, all the considerations that apply to a local MAS also apply to a Web User Interface server.

Language Environment

- **CICS TS 2.2 announcement:**

  - *Translator support for the earlier (pre-Language Environment) compilers is withdrawn in this release*

  - *"It is planned that run-time support for OS/VS COBOL programs, regardless of run-time library used, and for any other programs running under pre-Language Environment run-time libraries will be withdrawn in the next release."*

- **CICS TS 2.3**

  - CICS interfaces for the VS COBOL II, OS PL/I and C/370 runtimes removed

    - Need run-time libraries distributed with LE to execute current load modules

- **CICS TS 3.1**

  - CICS interfaces for the OS/VS COBOL are removed

    - CICS will terminate any OS/VS COBOL program with an ALIK abend

  - Support for LE conforming Assembler main programs added

Notes

Run-time support for OS/VS COBOL programs is withdrawn. OS/VS COBOL programs, which had runtime support in CICS Transaction Server for z/OS®, Version 2, cannot run under CICS TS 3.1.

OS/VS COBOL programs must be upgraded to Language Environment conforming COBOL, and recompiled against a level of COBOL compiler supported by CICS. Enterprise COBOL for z/OS and OS/390® Version 3 is the recommended compiler.

You can now produce assembler MAIN programs which are Language Environment conforming. Until now, the only way to use Language Environment conforming assembler programs within CICS was to use a call from a COBOL, PLI, or C Language Environment conforming program and linkedit the assembler program with the high-level language (HLL) program. This made the assembler program a Language Environment subroutine. It had to have MAIN=NO on CEEENTRY. The user had to specify NOPROLOG and NOEPILOG and then code the CEEENTRY and CEETERM calls separately. A CICS PROGRAM resource could not be defined as both ASM and LE370.

CICS now supports the coding of Language Environment conforming assembler MAIN programs. A new translator option LEASM causes Language Environment function to be used to set up the program's environment. Such programs must be linkedited with stub DFHELII rather than DFHEAI.

This support also enables use of the Debugger for Assembler programs.

Language Environment…

- **Review ERDSA specification for CICS LE requirements**
  - Minimum of 3500K

- **Review RDO definitions for LE programs**
  - LE language interface modules
    - Definitions are in the CEE group
      - Automatically created if DFHCOMDS is run during CICS installation
      - Supplied in CEECCSD member of the SCEESAMP library

- **Define the LE transient data destinations, CESE, and CESO**
  - DD names CEEMSG and CEEOUT
  - RDO group DFHDCTG, contains entries for CESE and CESO

- **Define the LE runtime libraries on the CICS STEPLIB and DFHRPL DD statements as follows:**
  - Add the SCEERUN2 before SCEERUN to STEPLIB or to LNKLST concatenation
  - Add the SCEECICS, SCEERUN2 and SCEERUN libraries to DFHRPL
    - SCEECICS concatenated before SCEERUN2 before SCEERUN
      - XPLINK requires the addition of SCEERUN2 to DFHRPL

Notes

To enable Language Environment support to be installed correctly by CICS:

Specify enough storage for the ERDSA to run CICS and Language Environment together. They need a minimum of 3500KB. To this minimum, add an amount of storage sufficient for your own requirements.

Ensure the CICS-Language Environment interface module, CEECCICS, and the Language Environment modules CEEPIPI and CEECTCB are installed in an APF-authorized library defined in the STEPLIB concatenation in the CICS startup JCL. You can do this by including the Language Environment SCEERUN library in an APF-authorized library in the STEPLIB concatenation of your CICS startup job (for example, in the CICSTS31.CICS.SDFHAUTH library), or in an APF-authorized library in the MVS LNKLSTnn concatenation.

Ensure that the program resource definitions for the Language Environment language interface modules have been added to the CICS CSD. These definitions are in the CEE group. The CEE group is added automatically to the CSD and to the grouplist DFHLIST during CICS installation, as part of the DFHCOMDS job. The definitions are also supplied as DEFINE statements in the CEECCSD member of the SCEESAMP library. You can add the CEE group to any CICS startup group list named in the GRPLIST system initialization parameter.

Define the Language Environment transient data destinations, CESE, and CESO (DD names CEEMSG and CEEOUT). The CICS-supplied resource definition group, in the CSD, DFHDCTG, contains entries for CESE and CESO. For information about the attributes needed for Language Environment transient data destinations, see the *IBM(R) Language Environment for MVS & VM Programming Guide*, SC26-4818.

Define the Language Environment runtime libraries on the CICS STEPLIB and DFHRPL DD statements as follows: Add the SCEERUN library, which contains CEECCICS and CEECTCB, and the SCEERUN2 library, which contains support that is required for the IBM Java(TM) Virtual Machine (JVM) and also support for other programming languages, to STEPLIB or to a library in the MVS LNKLSTnn concatenation. Both the libraries, SCEERUN and SCEERUN2, must be APF-authorized. Add the SCEECICS, SCEERUN2, and SCEERUN libraries to DFHRPL, with SCEECICS and SCEERUN2 concatenated *before* SCEERUN.

Open Transaction Environment

- **OPENAPI and C/C++ XPLINK applications have to be THREADSAFE**
  - CICS will ensure thread safe access to its managed resources
    - VSAM files, TS, TD, DLI databases and DB2 tables
  - Applications have to ensure thread safe access to their resources
    - Shared storage (e.g. CWA, GETMAIN SHARED)

- **Ensure applications are read-only**
  - Put them in the CICS read only DSA (link edit with RENT)
  - Set SIT option RENTPGM=PROTECT

- **Serialize access to shared resources**
  - CWA or shared storage
    - Use the load module scanner to look for use of global storage
  - Use services such as EXEC CICS ENQUEUE and DEQUEUE

Notes

Applications wanting to use XPLINK or OPENAPI support must be coded to threadsafe standards. Applications have to worry about concurrent access to their resources such as shared storage. Unless an application requires to overwrite itself (in which case it has to provide serialisation of such code - it is a type of shared storage) then ensure applications are readonly. The CICS readonly DSA can be used to ensure this.

CICS provides a load module scanner utility with a sample table called DFHEIDTH which looks for applications that issues EXEC CICS ADDRESS CWA, EXEC CICS GETMAIN SHARED or EXEC CICS EXTRACT EXIT. All these commands give access to shared storage and hence have the potential for the application logic not being threadsafe if the storage is not subsequently updated in a threadsafe way. Applications can use ENQUEUE and DEQUEUE to serialise updates to shared storage. In assembler applications compare and swap instructions can be used.

Function Removal

- **Common Connector Framework (CCF):**
  - CCF has been available in CICS TS V2 as the CICS Connector for CICS TS
    - Customers should migrate their applications to the CCI Connector for CICS TS

- **ECI Base Classes (ECIREQUEST)**
  - Recommended replacement is the CCI Connector for CICS TS

- **Transaction affinity detector and reporter**
  - Now incorporated in CICS Interdependency Analyzer 1.3
  - Load module scanner remains in CICS TS 3.1

Notes

Support for the CICS® Connector for CICS TS, introduced in CICS TS for z/OS®, Version 2.1, is withdrawn.

A CICS connector is a software component that allows a Java™ client application to invoke a CICS application. CICS TS for z/OS, Version 2.3 introduced a new CICS connector, the CCI Connector for CICS TS, that performs a similar role to the CICS Connector for CICS TS—that is, it enables a Java program or enterprise bean running on CICS Transaction Server for z/OS to link to a CICS server program. However, whereas the old CICS Connector for CICS TS implemented the IBM-proprietary Common Connector Framework (CCF) interface, the new CCI Connector for CICS TS implements the industry-standard Common Client Interface (CCI) defined by the J2EE Connector Architecture Specification, Version 1.0.

The ECI Base Classes (ECIREQUEST, which were introduced for compatibility with the CICS Transaction Gateway), are not included in CICS TS V3.1. The recommended replacement is the COMMON CLIENT INTERFACE CONNECTOR FOR CICS TS (CCI Connector for CICS TS), introduced in CICS TS V2.3, when it was announced that ECIREQUEST would be removed.

CICS TS V3.1 does not include the detector and reporter components previously provided as part of the CICS Transaction Affinities utility. These components are now incorporated in IBM® CICS Interdependency Analyzer for z/OS V1.3, announced in August 2004, which has the capability of analyzing both interdependencies and affinities. The load library scanner component of the CICS Transaction Affinities utility remains in CICS TS V3.1, and can produce reports on application programs which have potential affinities.

Migrating from CICS TS V2 to V3

Function Removal…

- **One-byte console ID support**

- **TCAM support**
  - Support for ACF/TCAM (DCB)
    - Application Owning Region support remains
- **High Performance Java (HPJ) program objects**

- **BTAM support**
  - Support for BTAM applications
    - BTAM network support was removed in CICS/ESA V3.1
- **CICSPlex SM remote MAS support for Windows**

Notes

Support for defining terminals using the 1-byte console id is withdrawn. The CONSOLE attribute on the TERMINAL resource definition is obsolete, but is supported to provide compatibility with earlier releases of CICS. You can define terminals using the CONSNAME(*name*) attribute on the TERMINAL resource definition.

If you have a network of terminals connected by the ACB interface of TCAM to a back-level CICS TOR, you will not be able (as you were in previous CICS releases) to route transactions from them to a CICS TS for z/OS(R), Version 3.1 AOR. You must migrate your connections to use TCAM/DCB or (preferably) ACF/VTAM, or route to a previous version of CICS. (All terminals that support TCAM/ACB also support ACF/VTAM.)

If you have a network of terminals connected by the DCB interface of TCAM to, for example, a CICS TS 2.3 TOR, you will not be able to migrate the TOR to CICS TS for z/OS, Version 3.1. To do so, you must migrate your connections to use ACF/VTAM.

If you have a network of terminals connected by the DCB interface of TCAM to a back-level CICS TOR, you will (as in previous CICS releases) be able to route transactions from them to a CICS TS for z/OS, Version 3.1 AOR. However, you are recommended to migrate your connections to use ACF/VTAM.

If you have a network of BTAM terminals connected to a back-level CICS terminal-owning region (TOR), you will not be able (as you were in previous CICS releases) to route transactions from them to a CICS TS for z/OS(R), Version 3.1 application-owning region (AOR). You must either upgrade your terminals or route to a previous version of CICS.

Planning Information

- **CICSPlex SM TSO End User Interface**

  – Will be removed in the next release of CICS TS for z/OS

- **ONC RPC feature**

  – Will be removed in a future release of CICS TS for z/OS

- **CICS Web Interface COMMAREA interfaces**

  – Will be removed in a future release of CICS TS for z/OS

- **CICS Web Server plug-in**

  – Will be removed in a future release of CICS TS for z/OS

Notes

From the CICS TS 3.1 announcement letter:

TSO End User Interface: Equivalent functions to the TSO End User Interface are now provided, in a more usable form, by the Web User Interface. The TSO End User Interface is stabilized at the CICS TS V2.3 level and does not support new capabilities introduced since. It will be removed in the next release of CICS TS for z/OS.

Removal of ONC RPC in a future release: CICS support for Open Network Computing Remote Procedure Call (ONC RPC) clients will be removed in a future release of CICS TS. The recommended migration path is to access CICS using the new support for Web services.

CWI commarea interface removal: Notice is given that the support for passing HTTP requests and responses via commareas between applications and CICS will be removed in a future release of CICS TS. This mechanism, which was part of the initial CICS Web Interface, was superseded by the CICS Web Support APIs in CICS TS V1.3. Web-aware programs and converters using this interface should be migrated to use the EXEC CICS WEB commands designed for HTTP server applications.

DFHWBCLI commarea interface removal: As previously indicated in the announcement of the SOAP for CICS feature, the DFHWBCLI function introduced to provide outbound HTTP support will be withdrawn in a future release of CICS TS. Consideration should be given to migrating applications that link to DFHWBCLI, to use the new CICS Web Support EXEC CICS WEB SESSTOKEN() commands for HTTP client applications, made available in this release.

Web server plug-in removal: The CICS WebServer plug-in, DFHWBAPI, will be removed in a future release of CICS TS. This is the CICS supplied plug-in program that enables a pass-through mechanism from the IBM HTTP Server, via the EXCI, into CICS Web support using the CICS business logic interface. Users are recommended to migrate to use the CICS Transaction Gateway.

Documentation

- **CICS TS 3.1 Release Guide, SC34-6421**
- **CICS TS 3.1 Migration Guide(s)**
- **CICS TS 3.1 URLs**
  - "Home Page"
    - http://www.ibm.com/software/htp/cics/tserver/v31/
  - Library
    - http://www.ibm.com/software/htp/cics/library/cicstsforzos31.html
  - LE Questions and Answers:
    - http://www.ibm.com/software/htp/cics/library/whitepapers/LE_Q_and_A.pdf
  - Support
    - http://www.ibm.com/software/htp/cics/support/
- **Java**
  - New IBM Technology featuring Persistent Reusable JVM, SC34-6201
- **Language Environment**
  - IBM Language Environment for MVS & VM Programming Guide, SC26-4818
  - IBM Language Environment for OS/390 Customization Guide, SC28-1941

Notes

Here is a list of documentation references that will assist in planning the migration to CICS TS 3.1.

The primary source of the content of the release is the CICS TS 3.1 Release Guide, SC34-6421 Migration from prior CICS releases is available with the CICS information Center, There are separate guides for CICS TS 1,3, CICS TS 2.2 and CICS TS 2.3.

There is addition information on the CICS TS migration available from the CICS TS 3.1 Home Page located at:

http://www.ibm.com/software/htp/cics/tserver/v31/

There is an extensive paper on the implications of Language Environment when migrating to CICS TS 3.1 located at:

http://www.ibm.com/software/htp/cics/library/whitepapers/LE_Q_and_A.pdf

Technotes are technical documents that have been written to address a specific topic. The support area has a number of topics on CICS TS 3.1 in the Technotes section.

Documentation…

- **CICS Information Center**

  – Primary source of CICS information

  – Eclipse based workbench

    • Shipped on a CD
    • Accessed with a web browser
    • Extensive search capabilities
    • Bookmarks can be set

  – Existing CICS library available in both HTML and PDF formats

- **Hardcopy Publications (shipped with order)**

  – CICS TS for z/OS Release Guide   GC34-6421

  – CICS TS for z/OS Installation Guide   GC34-6426

  – CICS TS for z/OS Licensed Specifications   GC34-6608

  – CICS TS for z/OS Memo to Licensees   GI10-2585

  – CICS TS for z/OS Program Directory   GI10-2586

Other manuals available as separate priced feature

Notes

In CICS Transaction Server for z/OS, Version 3 Release 1, the CICS Information Center runs within the WebSphere Studio WorkBench User Assistance system, an Eclipse framework that contains a number of documentation plug-ins that make up the information center. The new look and feel of the information center, in particular the welcome page, is now consistent with other product information centers.

The CICS TS 3.1. documentation is contained in a single plug-in. You also have the option of installing any or all of the CICS tooling products - there is one plug-in per tooling product. The information center, also known as a help system, runs in two modes. You can start it locally on your workstation, or you can start it as a server with remote access via a browser.

From the welcome page you can access information about the latest functionality in CICS, find out about highlights of the product and link to CICS resources on the Web.

From the navigation, you can access information on CICS by functional area or by looking for a user goal that matches the task you are performing. You can also view the books in HTML and PDF by selecting Library and PDFs.

There are only three hardcopy manuals shipped with CICS ST 3.1; the CICS Release Guide, the CICS Installation Guide and the Program Directory.

Summary

- **Installation**

  – Similar to previous releases

    • Standard installation procedure or DFHISTAR

  – Additional Unix System Services and HFS components

- **Migration**

  – Application Programmers

    • OS/VS COBOL considerations
    • C/C++ Threadsafe considerations for XPLINK usage
    • Threadsafe considerations for OPENAPI usage

  – Systems Programmers

    • Function Removal
    • Review ALL GLUEs, TRUEs and URMs
      – Threadsafe considerations

Notes

The installation of CICS TS 3.1 is similar to previous releases of the product. New in CICS TS 3.1 is the use of the standard IBM installation procedure using an SMP/E RECEIVE, APPLY and ACCEPT process. To accommodate users familiar with the CICS based installation process DFHISTAR is still available.

For application programmers, the migration to CICS TS 3.1 will consist of taking an inventory of their OS/VS COBOL programs and converting them to an LE compatible level. The Debug Tool Utilities & Advanced Functions for z/OS provides assistance in converting your older COBOL applications programs.

For systems programmers, the migration to CICS TS 3.1 is business as usual. All exits need to be reviewed for parameter list changes and thread safe applicability. Regions must be analyzed to determine if function removed in CICS TS 3.1 is being utilized and Independent Software Vendor (ISV) products must be review to determine the correct release levels required to support CICS ST 3.1.

Good luck in your migration efforts.

Appendix: Considerations for the CICS TS 2.2 user

- **General external changes**

  - Systems Initialization Table

  - CICS Supplied Transactions

  - RDO

  - User Exits

  - Java

Notes

There are a few additional considerations for the user migrating from CICS TS 2.2 to CICS TS 3.1.

The additional changes fall into the areas of systems initialization table changes, new and changed CICS supplied transactions, resource definition changes, new user exits and changes to the CICS Java interface.

Systems Initialization Table: New parameters

- **DEBUGTOOL**
  - Specifies if debugging profiles will be used to select programs

- **INFOCENTER**
  - Universal Resource Locator for the CICS Information Center
  - Used to provide help information for the web based application debugging profile manager

- **JVMCCPROFILE**
  - JVM profile for the master JVM that initializes the shared class cache

- **JVMCCSIZE**
  - Size of the shared class cache

- **JVMCCSTART**
  - Specifies how the shared class cache is to be started
    - Auto: at CICS initialization
    - Yes: at first JVM request
    - No: by CEMT PERFORM CLASSCACHE START

- **JVMPROFILEDIR**
  - Specifies the HFS directory that contains the CICS JVM profiles

- **JVMLEVEL0TRACE, JVMLEVEL1TRACE, JVMLEVEL2TRACE**
  - Specifies the default level for JVM level 0. 1 and 2 tracing, corresponds to CICS SJ trace levels 29-31

- **JVMUSERTRACE**
  - Specifies the default level for JVM user tracing, corresponds to CICS SJ trace level 32

Notes

The default values for these parameters are designed to have minimal impact when you are migrating from an earlier release of CICS.

DEBUGTOOL {**NO**|YES} Specifies whether debugging profiles will be used to select programs that will run under the control of a debugging tool.

INFOCENTER {infocenter_url } Specifies the Universal Resource Locator (URL) of the root of the CICS Information Center directory structure.

JVMCCPROFILE {**DFHJVMCC**|*profile*}   Specifies the JVM profile to be used for the master JVM that initializes the shared class cache.

JVMCCSIZE {**24M**|number} Specifies the size of the shared class cache on an initial or cold start of CICS.

JVMCCSTART {**AUTO**|YES|NO} Determines whether or not the shared class cache is started during CICS initialization, and sets the status of autostart for the shared class cache.

JVMLEVEL0TRACE, JVMLEVEL1TRACE, JVMLEVEL2TRACE, JVMUSERTRACE {*option*} Specify the default options for the JVM trace levels.

JVMPROFILEDIR {**/usr/lpp/cicsts/cicsts23/JVMProfiles**|*directory*} Specifies the name of an HFS directory that contains the JVM profiles for CICS.

Systems Initialization Table: Changed parameters

- **EDSALIM**
  - Default size is now 30M

- **MAXJVMTCBS**
  - Specifies the maximum number of J8 and J9 TCBs
    - Minimum value now 1
    - Master JVM (JM) does not count towards MAXJVMTCBS

- **Tracing options (STNTR, STNTRxx, SPCTR, SPCTRxx)**
  - New domain specifications
  - The JVM domain (SJ) now has trace levels 29-30 corresponding to JVM trace levels 0, 1, 2 plus a user definable JVM trace level
  - Recommendation is to only use SPCTRSJ to activate JVM tracing due to the amount of output trace data

Notes

EDSALIM {**30M**|number} The default value is now 30M

MAXJVMTCBS {**5**|number} specifies the maximum number of open TCBs that CICS can create in the pool of J8- and J9-mode TCBs for use by Java programs that run in a JVM (the JVM pool). Within this limit, there are no constraints on how many of the TCBs in the JVM pool are J9 TCBs, and how many are J8 TCBs. .

STNTR, STNTRxx, SPCTR and SPCTRxx {level numbers} The SJ component (JVM domain) now has trace levels 29-32, that are reserved to indicate the JVM trace levels 0, 1, and 2, plus a user-definable JVM trace level. You are recommended to use only the SPCTRSJ system initialization parameter to activate JVM tracing, so that it is only activated for *special* transactions. Selecting tracing levels 29, 30, 31, 32 or ALL for *standard* tracing for the JVM domain (SJ) component (using the STNTR or STNTRSJ system initialization parameters) is not recommended, because JVM trace can produce a large amount of output.

CICS Supplied Transactions

- **New CEMT commands…**
  - PERFORM CLASSCACHE
  - INQ / SET
    - CLASSCACHE
    - JVMPOOL
    - SYSTEM DEBUG | NODEBUG
    - WORKREQUEST
- **New CETR commands**
  - Changes to support the new Domains
  - Controlling tracing for the JVMs
- **CICS RACF category 1 transaction**
  - CICS region user ID must be authorized to these transactions
    - CJMJ: CICS master JVM transaction

Notes

There are changes to a few of the CICS supplied transactions.

INQUIRE CLASSCACHE The INQUIRE CLASSCACHE command is added to give you information about the active shared class cache in the CICS region, and report the presence of any old shared class caches that are awaiting deletion.

INQUIRE JVM The INQUIRE JVM command is added to enable you to identify JVMs in a CICS region and get information about their status.

INQUIRE WORKREQUEST The INQUIRE WORKREQUEST command is added to enable you to track EJB tasks. You can:

> determine which transactions are associated with a single request

> correlate all transactions associated with a single request (for example, for accounting purposes)

PERFORM CLASSCACHE The PERFORM CLASSCACHE command is added to enable you to start and reload the shared class cache, or to phase out, purge or forcepurge the shared class cache and the worker JVMs associated with it. While you are performing one of these operations, you can also change the size of the shared class cache, the JVM profile that is used for the master JVM, or the autostart status of the shared class cache.

SET CLASSCACHE The SET CLASSCACHE command is added to enable you to set the status of autostart for the shared class cache.

SET WORKREQUEST The SET WORKREQUEST command is added to enable you to track EJB tasks. You can:

> purge selected work requests

CETR has new option screens to display and update trace settings for JVMs. The default JVM trace options that are provided in CICS use the JVM trace point level specifications. The default settings for JVM Level 0 trace, JVM Level 1 trace, and JVM Level 2 trace specify LEVEL0, LEVEL1, and LEVEL2 respectively, so they map to the Level 0, Level 1 and Level 2 trace point levels for JVMs. A Level 0 trace point is very important, and this classification is reserved for extraordinary events and errors. Note that unlike CICS exception trace, which cannot be switched off, the JVM Level 0 trace is normally switched off unless JVM tracing is required. The Level 1 trace points and Level 2 trace points provide deeper levels of tracing.

There is a new CICS internal system transaction added to the list of category one transactions. These are the transactions that need to be defined to RACF, and to which the CICS region user ID must be authorized, to enable CICS to initialize successfully when you are running CICS with security enabled (SEC=YES). The new transactions is:

CJMJ--CICS master JVM transaction

Resource Definition

- **Sharing the CSD**

  - CICS TS 3.1 CSD can be shared with 2.2
    - Use DFHCOMPA group

- **PROGRAM**

  - EXECKEY now applies to Java programs
  - JVM debug option moved to JVM profile
  - JVMPROFILE refers to files in the JVMPROFILEDIR
    - Case matters!

- **New IBM groups**

  - DFHDP
    - Application debugging profile manager 3270 interface
  - DFHWB
    - Application debugging profile manager web interface

Notes

Most releases of CICS make changes to the IBM-supplied groups of resource definitions that are included in the DFHLIST group list. In all such cases, the old versions of the CICS resource definitions are retained in compatibility groups, which are needed to support earlier releases if you share the CSD between different levels of CICS.

If, after upgrading a CSD, you plan to share the CSD with earlier releases of CICS, include the appropriate DFHCOMPx compatibility groups in your start-up group list to provide the required support for earlier releases.

There are changes to the PROGRAM definition:

PROGRAM EXECKEY({USER|CICS})
The EXECKEY attribute now applies to programs that run in a JVM. You can use the same JVM profile to invoke a JVM in either of the keys.

JVMPROFILE({DFHJVMPR|name})
The JVM profiles that you specify using the JVMPROFILE attribute are now files in the HFS directory that is specified by the system initialization parameter JVMPROFILEDIR, and you need to specify the name using the same combination of upper and lower case characters that is present in the HFS file name

There are new groups of resource definitions added to your CSD when you run the UPGRADE command:

DFHDP
IBM-supplied group DFHDP contains the resource definitions for the new Application debugging profile manager 3270 interface (the CADP transaction), and for the Inactivate debugging profiles utility.

DFHDPWB
IBM-supplied group DFHDPWB contians the resource definitions for the new application debugging profile manager web interface.

Global User Exits

- ## New global user exits

  - ### XICERES

    - Enables the user to determine the availability of resources in a remote region for dynamically routed starts

  - ### XPCERES

    - Enables the user to determine the availability of resources in a remote region for dynamic Distributed Program Links

Notes

There are two new global user exit points:

XICERES is invoked by the interval control program, before CICS processes a non-terminal-related EXEC CICS START request that has been dynamically routed to this region.

XPCERES is invoked by the EXEC interface program, on the target region, before CICS processes either of the following kinds of dynamically-routed link request:

> A distributed program link (DPL) call
> A Link3270 bridge request

Language Environment

- **OS/VS COBOL**

  – Support has been removed

  – Programs using this level of COBOL will abend ALIK

- **CICS interfaces for the VS COBOL II, OS PL/I and C/370 runtimes are removed**

  – Will need run-time libraries distributed with LE to execute current load modules

Notes

Run-time support for OS/VS COBOL programs is withdrawn.

OS/VS COBOL programs, which had runtime support in CICS Transaction Server for z/OS, Version 2, cannot run under CICS TS for z/OS, Version 3. OS/VS COBOL programs must be upgraded to Language Environment conforming COBOL, and recompiled against a level of COBOL compiler supported by CICS.

Enterprise COBOL for z/OS and OS/390 Version 3 is the recommended compiler. Appendix B of the CICS Application Programming Guide provides assistance with converting OS/VS COBOL programs to Language Environment conforming COBOL.

A new abend code ALIK indicates an attempt to use an OS/VS COBOL program. In this situation, CICS abnormally terminates the task and disables the program, and CICS processing continues.

In CICS Transaction Server for z/OS Version 3 Release 1, interfaces to the VS COBOL II, OS PL/I and C/370 runtimes are removed. Applications compiled and linked with these non Language Environment conforming products usually execute successfully under Language Environment in compatibility mode.

Language Environment…

- **Review ERDSA specification for CICS LE requirements**
  - Minimum of 3500K

- **Review RDO definitions for LE programs**
  - LE language interface modules
    - Definitions are in the CEE group
      - Supplied in CEECCSD member of the SCEESAMP library

- **Define the LE transient data destinations, CESE, and CESO**
  - DD names CEEMSG and CEEOUT
  - RDO group DFHDCTG, contains entries for CESE and CESO

- **Define the LE runtime libraries on the CICS STEPLIB and DFHRPL DD statements as follows:**
  - Add the SCEERUN and SCEERUN2 to STEPLIB or to LNKLST concatenation
  - Add the SCEECICS, and SCEERUN libraries to DFHRPL
    - SCEECICS concatenated before SCEERUN
    - SCEERUN2 library does not need to be added to DFHRPL

Notes

This is a high level overview of the steps necessary to provide LE run time support within CICS. Please consult the Language Environment documentation for additional detail.

Java

- **Language migration issues**
  - http://java.sun.com/j2se/1.4/compatibility.html
  - http://java.sun.com/products/jdk/1.3/compatibility.html#incompatibilities1.3

- **CICS migration considerations**
  - SDFJAUTH must be added to STEPLIB
    - PDSE version of SDFHAUTH
  - JVM Profiles
    - Now stored as HFS files
    - Stored in a HFS directory
      - Specified by JVMPROFILEDIR
    - CICS supplied programs have their own profile
      - DFHJVMCD

Notes

CICS Transaction Server for z/OS Version 3 Release 1 supports the JVM created by the IBM Software Developer Kit for z/OS, Java 2 Technology Edition, Version 1.4.2 at or later, which features the persistent reusable JVM technology.

CICS Transaction Server for z/OS, Version 2 Release 2 supported the JVM created by the IBM Developer Kit for OS/390 Java 2 Technology Edition Version 1.3.1s, which also featured the persistent reusable JVM technology. Java programs that ran under CICS Transaction Server for z/OS, Version 2 Release 2 can also run under CICS Transaction Server for z/OS Version 3 Release 1.

The library SDFJAUTH is now required for Java support. SDFJAUTH is the partitioned data set extended (PDSE) version of SDFHAUTH, and it contains some of the components of the SJ domain. A separate library is needed because these components are now built using XPLink (Extra Performance Linkage). As for the SDFHAUTH library, the SDFJAUTH library must be APF-authorized by adding it to the list of APF-authorized libraries in an appropriate member in SYS1.PARMLIB, and a STEPLIB DD statement must be provided for it in your startup job stream.

JVM profiles, which contain the JVM initialization options, are now kept as HFS files, rather than as members of a partitioned data set (PDS). The DFHJVM DD card in the CICS startup JCL, which referred to the PDS for the JVM profiles, is no longer required and should be removed. You can use several different JVM profiles in the same CICS region, and each is stored as a separate HFS file. The name of each JVM profile (that is, the name of the HFS file) must still be eight characters or less, so that it can be used in program definition. Use the JVMPROFILE attribute of a PROGRAM resource definition to name the JVM profile which is used to construct the JVM that runs the program.

CICS-defined programs now have their own JVM profile, DFHJVMCD, to make them independent of any changes you make to the default JVM profile DFHJVMPR. DFHJVMCD is used by the default request processor program DFJIIRP, which is used by the CICS-supplied CIRP request processor transaction, and by DFJIIRQ, the CICS-key equivalent of DFJIIRP. DFHJVMCD has an associated JVM properties file, dfjjvmcd.props. You need to make changes to DFHJVMCD and dfjjvmcd.props to ensure that the settings in them are suitable for your installation (including the configuration for your JNDI nameserver).

Java…

- **CICS migration considerations**
  - Review program definition EXECKEY
    - Storage protection now applies to Java programs
  - Shared Class Cache
    - Check the semaphore options in BPXPRMxx member of PARMLIB
      - Master JVM uses a single ID, and requests a set of 32 semaphores
        - > MNIDS, maximum number of semaphore IDs in use
        - > MNSEMS, maximum number of semaphores per ID

Notes

The EXECKEY parameter on the PROGRAM resource definition is no longer ignored for Java programs. In CICS Transaction Server for OS/390, Version 1 Release 3 and CICS Transaction Server for z/OS, Version 2 Release 2, CICS made all Java programs execute in CICS key, but they now execute as specified by the EXECKEY parameter. The default for this parameter is EXECKEY(USER), which means that the program runs in a JVM that executes in user key. (A new type of open TCB, the J9 TCB, is used for these JVMs.) As running applications in user key extends CICS storage protection, it could be beneficial to let most of your Java programs run in a JVM in user key.

Before setting up the shared class cache, you need to check the options for semaphores that you have set in the BPXPRMxx members of SYS1.PARMLIB. The master JVM that initializes the shared class cache uses a single semaphore ID, and requests a set of 32 semaphores, so you need to:

Ensure that the MNIDS value is enough for the maximum number of semaphore IDs that are in use at one time, including the shared class cache. Depending on the frequency with which you expect to reload the shared class cache, you might want to allow two or possibly three semaphore IDs for the shared class cache. One semaphore ID would be used by the master JVM that controls the active shared class cache, and the remainder would be used by a master JVM that controls a shared class cache that is being phased out, or by a new master JVM that controls a shared class cache that is being loaded. It is unlikely that you would need more than two semaphore IDs for the shared class cache, except in a CICS region that is being heavily used for development and testing.

Ensure that the MNSEMS value is enough for the maximum number of semaphores that the master JVM requests in a semaphore set—the value must be 32 or greater. If you need to change the MNIDS value, you can do this by using the IPCSEMNSEMS parameter that is in the BPXPRMxx members of SYS1.PARMLIB.