IBM z/OS Debugger

API User's Guide and Reference

Version 14.0

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> **Note!**
>
> Before using this information and the product it supports, be sure to read the general information under "Notices" on page 49.

Fourth Edition (June 2017)

This edition applies to IBM z/OS Debugger, Version 14.0 (Program Number 5724-T07 with the PTF for APAR PI79208), which supports the following compilers:

- AD/Cycle C/370™ Version 1 Release 2 (Program Number 5688-216)
- C/C++ for MVS/ESA Version 3 (Program Number 5655-121)
- C/C++ feature of OS/390 (Program Number 5647-A01)
- C/C++ feature of z/OS Version 1 (Program Number 5694-A01)
- C/C++ feature of z/OS Version 2 (Program Number 5650-ZOS)
- OS/VS COBOL, Version 1 Release 2.4 (5740-CB1) - with limitations
- VS COBOL II Version 1 Release 3 and Version 1 Release 4 (Program Numbers 5668-958, 5688-023) - with limitations
- COBOL/370 Version 1 Release 1 (Program Number 5688-197)
- COBOL for MVS & VM Version 1 Release 2 (Program Number 5688-197)
- COBOL for OS/390 & VM Version 2 (Program Number 5648-A25)
- Enterprise COBOL for z/OS and OS/390 Version 3 (Program Number 5655-G53)
- Enterprise COBOL for z/OS Version 4 (Program Number 5655-S71)
- Enterprise COBOL for z/OS Version 5 (Program Number 5655-W32)
- Enterprise COBOL for z/OS Version 6 Release 1 (Program number 5655-EC6)
- High Level Assembler for MVS & VM & VSE Version 1 Release 4, Version 1 Release 5, Version 1 Release 6 (Program Number 5696-234)
- OS PL/I Version 2 Release 1, Version 2 Release 2, Version 2 Release 3 (Program Numbers 5668-909, 5668-910) - with limitations
- PL/I for MVS & VM Version 1 Release 1 (Program Number 5688-235)
- VisualAge® PL/I for OS/390 Version 2 Release 2 (Program Number 5655-B22)
- Enterprise PL/I for z/OS and OS/390 Version 3 (Program Number 5655-H31)
- Enterprise PL/I for z/OS Version 4 (Program Number 5655-W67)
- Enterprise PL/I for z/OS Version 5 Release 1 (Program Number 5655-PL5)

This edition also applies to all subsequent releases and modifications until otherwise indicated in new editions or technical newsletters.

You can access publications online at www.ibm.com/e-business/linkweb/publications/servlet/pbi.wss

You can find out more about IBM z/OS Debugger by visiting IBM Web site for IBM Debug for z Systems at https://www.ibm.com/us-en/marketplace/debug-for-z-systems and the IBM Web site for IBM Developer for z Systems at https://www.ibm.com/us-en/marketplace/developer-for-z-systems

Contents

About this document

This document describes how to use an application programming interface (API) to create, delete, and modify DTCN or IMS transaction isolation profiles.

Who might use this document

This document is intended for programmers that are developing applications that need access to the DTCN or IMS transaction isolation profiles stored on a z/OS® system. Programmers must be familiar with using APIs that use the HTTP protocol and the Representational State Transfer (REST) access method. Programmers must also be familiar with DTCN or IMS transaction isolation profiles.

In addition, you can also find a description of the tags used in the debug profile data sets.

Accessing z/OS licensed documents on the Internet

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1. Sign in to Resource Link using your Resource Link user ID and password.
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How this document is organized

This document is divided into areas of similar information for easy retrieval of appropriate information. The following list describes how the information is grouped:
- The DTCN API is described in part one:
  - Chapter 1 describes, in general terms, the two parts of the API: the resources it identifies and the actions you can do on those resources.

- Chapter 2 describes, in more detail, the actions that you can do on resources, and the codes used by the z/OS system to indicate whether the actions were completed successfully.
- Chapter 3 describes the security measures you must consider when you access DTCN profiles, how to identify which version of the API you are using, and how compatability is determined between different versions of the API.
- Chapter 4 describes the changes you have to make to the z/OS system where the DTCN profiles are stored so that the API can access them.
- Chapter 5 describes the XML tags used for the DTCN API.
- Chapter 6 displays a sample HTTP request body and a sample HTTP response body.
- The IMS translation isolation API is described in part two:
  - Chapter 7 is an overview of the IMS transaction isolation API. You can find the information about the communication protocol and message definition in this chapter.
  - Chapter 8 describes the request and response messages to the IMS Transaction Isolation Facility.
  - Chapter 9 describes the XML tags used for the IMS Transaction Isolation Facility.
- Appendix A provides a list of the tags that are used in debug profiles and a description of the tags.
- Appendix B describes the resources that are available to help you solve any problems you might encounter with z/OS Debugger.
- Appendix C describes the features and tools available to people with physical disabilities that help them use z/OS Debugger and z/OS Debugger documents.

The last several topics list notices, bibliography, and glossary of terms.

How to send your comments

Your feedback is important in helping us to provide accurate, high-quality information. If you have comments about this document or any other z/OS Debugger documentation, contact us in one of these ways:

- Use the Online Readers' Comment Form at www.ibm.com/software/awdtools/rcf/. Be sure to include the name of the document, the publication number of the document, the version of z/OS Debugger, and, if applicable, the specific location (for example, page number) of the text that you are commenting on.
- Send your comments by email to comments@us.ibm.com. Be sure to include the name of the book, the part number of the book, the version of z/OS Debugger, and, if applicable, the specific location of the text you are commenting on (for example, a page number or table number).

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Summary of changes

Changes introduced for remote debugging with IBM Developer for z Systems™ 14.0.0.5

- MVS™ Batch Application debug configurations are enhanced to allow setting debug options directly without using Property Group.
- Remote CICS® Application, Remote DB2® Application, Remote IMS™ Application, Remote IMS Application with Isolation and MVS Batch Application debug configurations now have an improved remote profile status area and includes a new delete remote profile action.

For more information, see What's new in IBM Developer for z systems.

Changes introduced with IBM z/OS Debugger Version 14.0 APAR PI79208

- Support is added for CICS Transaction Server for z/OS V5.4.
- CICS DTCN transaction now supports session types DTC and DIR.
- LIST capability is added to IMS Transaction Isolation Facility batch interface.
- DFSMSCE0 exit sharing is implemented for IMS Transaction Isolation Facility.
- A new EQAOPTS command, DISABLERLIM, is added to control whether z/OS Debugger disables Omegamon RLIM resource limiting during a debug session.
- EQAOPTS command STARTSTOPMSG is enhanced to allow storing STARTSTOP messages in STARTSTOPMSGDSN in the CICS environment.

Changes introduced for remote debugging with IBM Developer for z Systems 14.0.0.4

- Visual Debugging now supports a filter to only show the current execution path.
- IBM Debug for z Systems now includes the debug configuration of Remote CICS Application that was only available in IBM Developer for z Systems or IBM Developer for z Systems Enterprise Edition.

For more information, see What's new in IBM Developer for z systems.

Changes introduced with IBM z/OS Debugger Version 14.0 APAR PI72873

- z/OS Debugger now supports moved source for Enterprise PL/I for z/OS 5.1 64-bit standard mode debugging through the EQADEBUG DD NAME.
- The discussion of compiler options for standard mode was improved.
- A new appendix is added to *IBM z/OS Debugger User's Guide* to discuss debugging applications that were processed by the Automatic Binary Optimizer for z/OS.

Changes introduced for remote debugging with IBM Developer for z Systems 14.0.0.3

- The IBM z/OS Debugger preference page is updated with new options for Debug Tool compatibility mode and default naming patterns for remote debug profiles.
- The following debug configurations are now included in the IBM Debug for z Systems install:
  - MVS Batch Application

- – Remote DB2 Application
- – Remote IMS Application
- – z/OS UNIX Application
- The JCL Generation preference page is added to provide defaults for MVS Batch Application debug configuration when using IBM Debug for z Systems.
- A new DTSP migration wizard is added to help users migrate to the new debug configurations.
- MVS Batch Application debug configurations now include delay debug support.
- Remote IMS Application with Isolation debug configuration has been added to IBM Developer for z Systems Enterprise Edition.

For more information, see What's new in IBM Developer for z systems.

Changes introduced with IBM z/OS Debugger Version 14.0 APAR PI71891

- z/OS Debugger host support is added for the new Remote IMS Application with Isolation launch configuration in Developer for z Systems Enterprise Edition V14.0.0.3.
- Support is added for Automatic Binary Optimizer V1.2.

  Notices:
  - – The PTF for APAR PI65051 for PD Tools Common Component is required for this support.
  - – If you use IPVLANGO to process an ABO SYSPRINT + Enterprise COBOL SYSDEBUG to create an IPVLANGX for z/OS Debugger, the variable values cannot be listed in a z/OS Debugger session.
- The EQAJCL ISPF Edit macro is enhanced to support DBMDT.
- z/OS Debugger Code Coverage is enhanced to treat the DBMDT TEST runtime parameter the same as the TCPIP runtime parameter.

Changes introduced with IBM z/OS Debugger Version 14.0

- Starting form Version 14.0, IBM Debug Tool for z/OS and Rational® Developer for z Systems Integrated Debugger are merged into a single debugger, IBM z/OS Debugger.
- IBM z/OS Debugger is a component of the following three products:
  - – IBM Developer for z Systems Enterprise Edition
  - – IBM Developer for z Systems
  - – IBM Debug for z Systems

  For more information about these products, see "IBM z/OS Debugger as a component" on page xi.
- Remote debugging support now offers two debugging modes:
  - – Standard mode is the default mode. This mode supports new remote debugging features, including visual debugging and setting paragraph breakpoints from COBOL source files. You can select this mode by using DIRECT or DBM as a TEST runtime parameter.
  - – Debug Tool compatibility mode supports remote debugging features that were previously available with IBM Debug Tool for z/OS. The remote debugging features include the ability to use Debug Tool commands from the Debug Console, debugging of non-Language Environment programs, EQAOPTS commands, and other features of Debug Tool. You can select this mode by using TCPIP or DBMDT as a TEST runtime parameter.

- Support is added for using Debug Manager with remote debugging in Debug Tool compatibility mode. This allows a user logged on to the Remote Systems Explorer from IBM Explorer for z/OS and using IBM Developer for z Systems to perform remote debugging without having to supply an IP address and port. You can select Debug Manager by using DBM or DBMDT as a TEST runtime parameter (versus DIRECT or TCPIP). For more about Debug Manager, see Chapter 7 "Debug Manager" in *IBM z/OS Debugger Customization Guide*.
- The following deprecated Debug Tool client plug-ins continue to be available for use with z/OS Debugger:
  - Debug Tool Code Coverage
  - JCL Instrumentation
  - DTCN Profile Manager
  - DTSP Profile Manager
  - Load Module Analyzer

  While these plug-ins continue to be provided, no enhancements are planned, and they might not be included in a future release.

  The functions provided by these plug-ins will be provided and enhanced by their IBM Developer for z Systems equivalents, which currently are:
  - Compiled Code Coverage, and the Code Coverage Results view
  - Eclipse Debug launches
    - MVS Batch Application
    - Remote DB2 Application
    - Remote CICS Application
- Support is added for Enterprise COBOL Version 6.1, Enterprise PL/I Version 5.1, and 64-bit programs compiled with Enterprise PL/I Version 5.1 (only supported in standard mode).
- Support is added for CICS TS Version 5.3, DB/2 Version 11, and IMS Version 14.1.
- Support is added for Automated Binary Optimizer Version 1.1.
- The IMS transaction isolation API is added for accessing the IMS transaction isolation facility in the IMS environment. This API provides methods to register or de-register a transaction for debugging and start or stop a user private region for debugging transactions.
- The environment specific Language Environment® user exits EQADBCXT, EQADDCXT, and EQADICXT were removed in IBM z/OS Debugger V14.0. Users should move to the consolidated environment specific Language Environment user exit EQAD3CXT.

IBM z/OS Debugger as a component

IBM z/OS Debugger is the next iteration of IBM debug technology on z Systems and consolidates the IBM Integrated Debugger and IBM Debug Tool engines into one unified technology.

IBM z/OS Debugger is a component of the following products:

IBM Developer for z Systems Enterprise Edition
> This product is included in IBM Application Delivery Foundation for z Systems. IBM Developer for z Systems Enterprise Edition provides all the debug features.

IBM Developer for z Systems
> IBM Developer for z Systems is a subset of IBM Developer for z Systems Enterprise Edition. IBM Developer for z Systems, previously known as IBM Rational Developer for z Systems, is an Eclipse-based integrated development environment for creating and maintaining z/OS applications efficiently.
>
> IBM Developer for z Systems includes all enhancements in IBM Developer for z Systems Enterprise Edition except for the debug features noted in Table 1.

IBM Debug for z Systems
> IBM Debug for z Systems is a subset of Developer for z Systems Enterprise Edition. IBM Debug for z Systems focuses on debugging solutions for z/OS application developers. See Table 1 for the debug features supported.
>
> IBM Debug for z Systems does not provide advanced developer features that are available in IBM Developer for z Systems Enterprise Edition.
>
> For information about how to install the IBM Debug for z Systems client, see Installation of IBM Developer for z Systems and IBM Debug for z System(https://developer.ibm.com/mainframe/2016/12/02/installation-of-ibm-developer-for-z-systems-and-ibm-debug-for-z-systems/).

Table 1 maps out the debug features in the products. In this table, the letter X indicates the features that each product supports.

Table 1. Debug feature comparison

Feature	IBM Debug for z Systems	IBM Developer for z Systems	IBM Developer for z Systems Enterprise Edition
z/OS Debugger remote debug and compiled code coverage GUI interface	X [1]	X [2]	X
Headless Code Coverage		X	X
Java™ Code Coverage		X	X

Table 1. Debug feature comparison (continued)

Feature	IBM Debug for z Systems	IBM Developer for z Systems	IBM Developer for z Systems Enterprise Edition
Compiled Code Coverage Workbench Viewer (HTML, PDF, compare) [3]		X	X
Debug Tool Code Coverage (3270 and remote interfaces) [4]	X		X
z/OS Debugger 3270 interface, including z/OS Debugger Utilities	X		X
Load Module Analyzer (3270 and remote interfaces)	X		X
Debug Tool Plugins	X	X [5]	X
IMS Isolation GUI interface			X
Visual Debug		X	X
Integration with Language Editors (Cobol Editor, PLI Editor, Remote C/C++ Editor, System z® LPEX Editor)		X	X
Integration with CICS Explorer® views		X	X
Integration with Property groups		X	X
Source Entry Breakpoints		X	X
Team Debug support		X	X

Notes:

1. IBM Debug for z Systems includes z/OS Debugger remote debug and compiled code coverage GUI interface, but does not include Headless Code Coverage, Java Code Coverage, and Compiled Code Coverage Workbench Viewer (HTML, PDF, and compare).

2. IBM Developer for z Systems includes z/OS Debugger remote debug and compiled code coverage GUI interface, but does not include Debug Tool Code Coverage.

3. Debug Tool Code Coverage can only be enabled in the 3270 interface.

4. Compiled Code Coverage is the preferred method for code coverage, and is fully compatible with IBM Application Delivery Intelligence.

5. IBM Developer for z Systems includes Debug Tool plugins, but does not include Load Module Analyzer and Debug Tool Code Coverage.

Part 1. DTCN API

The DTCN API is a set of programming interfaces for accessing the DTCN profile manager in the CICS environment. The API provides methods to create, read, update, and delete debug profiles.

Chapter 1. Introduction to the API resources and actions

z/OS Debugger provides an API that communicates with the DTCN profile manager so that you can create, retrieve, update, or delete profiles in the DTCN profile repository. This API uses the HTTP protocol and provides a RESTful (Representational State Transfer) access method. The API describes (abstracts) resources and actions you can do on the resources.

Resource description

The resources are a DTCN profile and a DTCN profile repository. The following list describes how z/OS Debugger abstracts a DTCN profile and a DTCN profile repository as a Uniform Resource Identifier (URI):

DTCN profile
> `http://`*ip*`/dtcn/`*profileID*

DTCN profile repository
> `http://`*ip*`/dtcn`

The following table describes each symbol in the URI:

Table 2. Description of each symbol in the URI

Symbol	Description
ip	The IP address and port number of the CICS HTTP server.
dtcn	Name of the profile collection, which must be **dtcn**.
profileID	A key which identifies a specific profile. This is the TSO user ID of the owner of the DTCN profile.

You can use a query string to provide additional information, the client version, and a profile record number to the DTCN profile manager. You specify a query string by adding a delimiter (the question mark, ?) after the resource name. The following table describes the symbols you can use in the query string:

Table 3. Description of each symbol in the query string

Symbol	Description
clientversion=nnnn	A four digit decimal number that identifies the version of the API that you are using in your application. To learn how to identify version numbers and determine compatibility, see "Compatibility of different versions" on page 9.
s=number	A decimal number that identifies a profile in the profile repository. The DTCN profile manager numbers profile records in the repository in sequence beginning with 1.

The following examples describe how you might write an URI with a query string:

http://yourhost.yourcompany.com:30000/dtcn/userjoe?clientversion=0102
> Identifies a DTCN profile stored in the host `yourhost` and owned by user `userjoe`.

http://anotherhost.yourcompany.com:30000/dtcn?clientversion=0102&s=1
> Use this URI with the GET method to retrieve up to the first 10 profiles starting with profile record 1 in the DTCN profile repository on the host `anotherhost`.

Action descriptions

The following table describes the actions you can do on a resource:

Table 4. HTTP methods and their corresponding actions

HTTP method	Corresponding action
GET	READ (retrieve a specific profile)
GET	LIST (retrieve a collection of profiles)
POST	UPDATE
PUT	CREATE
DELETE	DELETE

For each action, you provide any data needed to do an action in the HTTP request body. The host returns any data in the HTTP response body and the response status code and reason phrase in the HTTP response header. The HTTP request and response bodies are XML documents. To learn about the tags in the XML document, see Chapter 5, "Definition of XML tags," on page 13. You can see an example of an XML document in Chapter 6, "Examples: HTTP request body and HTTP response body," on page 21. To learn more about the specific information you must provide for each action, and the information you receive from the host after it completes an action, see Chapter 2, "HTTP methods, response status codes, and reason phrases," on page 5.

Chapter 2. HTTP methods, response status codes, and reason phrases

This topic describes the HTTP methods (the actions you can do on a resource), response status codes, and reason phrases. The response status codes and reason phrases are stored in the HTTP response body and HTTP request body.

HTTP methods

The following list describes the HTTP methods you can use on an URI.

GET method (READ)
Retrieve a specific DTCN profile from the DTCN profile repository. You must provide the repository name, the profile ID, and the client version in the URI. The HTTP request body must not contain any data. In the HTTP response body, the DTCN profile manager returns an XML document that contains control information (for example, a message and the server version) and the contents of the specified profile.

GET method (LIST)
Retrieve a list of the DTCN profiles from the DTCN profile repository, up to ten at a time. In the URI, you must provide the repository name, a number that identifies a profile in the profile repository, and the client version. The HTTP request body must not contain any data. In the HTTP response body, the DTCN profile manager returns an XML document that contains control information (for example, a message and the server version) and a set of ten or fewer profiles.

The DTCN profile manager can return up to 10 profiles, starting with the number you specified in the s=*number* symbol of the query string.

You can retrieve the entire repository by repeating the GET request. In the first request, specify "1" as the number in the s=*number* symbol. Repeat the request, each time adding the number of profiles returned from the previous request, until the DTCN profile manager returns no more profiles.

POST method (UPDATE)
Modify a specific profile with the information in the HTTP request body. In the URI, you must provide the profile ID and the client version. In the HTTP request body, you must provide all the profile information in a well-formed XML document. In the HTTP response body, the DTCN profile manager returns an XML document that contains control information (for example, a message and the server version).

PUT method (CREATE)
Create a new profile with the information in the HTTP request body. In the URI, you must provide the profile ID and the client version. In the HTTP request body, you must provide all the profile information in a well-formed XML document. In the HTTP response body, the DTCN profile manager returns an XML document that contains control information (for example, a message and the server version).

DELETE method (DELETE)
Delete the specified profile. In the URI, you must provide the profile ID and the client version. The HTTP request body must be empty. In the HTTP

response body, the DTCN profile manager returns an XML document that contains control information (for example, a message and the server version).

HTTP response status codes and reason phrases

The following table shows the status codes and reason phrases the DTCN profile manager might send to your application:

Table 5. Explanation of reason phrases

Status code	Reason phrase	Explanation
200	OK	The DTCN profile manager completed the method (action) successfully.
200	Profile_Already_Exists_With_Identical_Resources	A PUT request was sent specifying resources that are already used by another profile in the DTCN profile repository. The DTCN profile manager did not create a new profile.
200	Profile_Already_Exists_With_Same_Owner	A PUT request was sent specifying a profile ID that is already used by another profile in the DTCN profile repository. The DTCN profile manager did not create a new profile.
201	Profile_Created_OK	The DTCN profile manager successfully created a new profile.
400	Unsupported_Client_Version	A client version that is 2 or more levels higher or lower than the server version was specified.
400	Invalid_Client_Version	The syntax of the `clientversion` symbol is incorrect. For the correct syntax, see "Compatibility of different versions" on page 9.
400	Invalid_Profile_Record_Number	Starting profile record number is incorrect.
400	No_Resource_Specified	No resources were specified in the HTTP request body.
400	Site_Rules_Require_Terminal_ID_Specified	The HTTP request body does not specify a terminal ID. The DTCN profile manager requires that you specify a terminal ID.[1]
400	Site_Rules_Require_Transaction_ID_Specified	The HTTP request body does not specify a transaction ID. The DTCN profile manager requires that you specify a transaction ID.[1]
400	Site_Rules_Require_At_Least_One_Load_Mod_Name_Specified	The HTTP request body does not specify the name of a load module. The DTCN profile manager requires that you specify the name of at least one load module.[1]
400	Site_Rules_Require_At_Least_One_Program_Name_Specified	The HTTP request body does not specify the name of a compile unit. The DTCN profile manager requires that you specify the name of at least one compile unit.[1]

Table 5. Explanation of reason phrases (continued)

Status code	Reason phrase	Explanation
400	Site_Rules_Require_User_ID_Specified	The HTTP request body does not specify a user ID. The DTCN profile manager requires that you specify a user ID.[1]
400	Site_Rules_Require_NetName_Specified	The HTTP request body does not specify a netname. The DTCN profile manager requires that you specify a netname.[1]
400	Site_Rules_Require_Client_IP_Specified	The HTTP request body does not specify the IP address of the client. The DTCN profile manager requires that you specify the IP address of the client.[1]
400	Invalid_Session_Address	For a PUT or POST request, the HTTP request body is missing the <sessaddr> tag or a value in the <sessaddr> tag, which is required if you specify TCP in the <sessiontype> tag.
400	Invalid_Session_Type	The HTTP request body specifies a value for the <sesstype> tag that is invalid. MFI or TCP are the only valid values for the <sesstype> tag.
400	Invalid_Session_Port	The HTTP request body specifies a value for the <sessport> tag that is not numeric or specifies a port number when the session type is MFI. A port number is used only when the session type is TCP.
400	Invalid_UrmDeb_Flag	The HTTP request body specifies a value for <urmdebug> tag that is invalid. Y or N are the only valid values for the <urmdebug> tag.
400	Invalid_Activation_Flag	The HTTP request body specifies a value for the <activation> tag that is invalid. A or I are the only valid values for the <activation> tag.
400	Invalid_Trigger	The HTTP request body specifies a value for the <trigger> tag that is invalid. TEST or NOTEST are the only valid values for the <trigger> tag.
400	Invalid_Test_Level	The HTTP request body specifies a value for the <level> tag that is invalid. The only valid values for the <level> tag are ALL, ERROR, or NONE.
400	Error_Parsing_XML_Doc	z/OS XML parser failed to parse the HTTP request.
400	Bad Request	The URI is invalid.[2]
401	No_Write_Access_For_Unauthorized_User	The user ID specified in the <userid> tag is not authorized (through RACF®) to update or delete another user's profile.

Table 5. Explanation of reason phrases (continued)

Status code	Reason phrase	Explanation
401	CICS_Default_Userid_Not_Allowed	The CICS default user ID can not be used to access profiles.
401	Create_Not_Allowed_By_Non_Owner	Only the owner of a profile can create a profile with the same user ID.
404	Profile_Not_Found	For the GET, POST, or DELETE request, the DTCN profile manager did not find a profile with the specified profile (user) ID.
500	CICS_Error	There was an error in the CICS region.
500	Dtcn_Manager_Received_Invalid_Function	The DTCN profile manager had internal error.
500	Unknown_Return_Code_Error	The DTCN profile manager had internal error.

Note:

1. When z/OS Debugger was installed, it was customized so that when a user created a DTCN profile, z/OS Debugger verifies that the user specifies a specific resource or resources. If you receive this message, it means that your site requires that you specify the indicated resource when you create a DTCN profile.

2. A DFHWB0723 message appears in the CICS region job output that shows a response code of 8 and one of the following reason codes:

5	Profile collection name is missing
6	Profile collection name is invalid
7	Profile ID is missing
8	Profile ID is too long
9	Profile ID is invalid
10	Query string is missing
11	Client version is invalid
12	Query string is invalid
13	Starting profile record is invalid

   The following example shows how the message appears in the CICS region job output:

```
DFHWB0723 04/29/2009 19:30:10 S07CICP8 CWXN The CICS Web analyzer program
          returned an error response. Program name: EQADCAN0.
          RESPONSE: 8. REASON: rsnCode. Host IP address: 9.26.177.141. Client IP
          address: 9.30.247.101. TCPIPSERVICE: EQAHTTP8
```

Chapter 3. Authentication, access control, and version compatibility

You must authenticate any user that wants to create, delete, or modify DTCN profiles. The DTCN profile manager then determines if the user has the correct access to create, delete, or modify DTCN profiles. The DTCN profile manager also determines if the version of the API running in your application is compatible with the version of the API running on the z/OS system.

How to authenticate a user

Authenticating a user involves the following tasks:

1. You must obtain the user's CICS user ID and password.
2. Encrypt their user ID and password with a base64 encoding scheme and place it in the header area of the HTTP request. For additional protection during transmission, you might want to use the HTTPS protocol with SSL encryption.
3. Transmit your HTTP request. The CICS HTTP server authenticates the user ID and password by using the RACF facility or other equivalent security facility.

How DTCN profile manager determines access to DTCN profiles

After the CICS HTTP server authenticates a user, it determines whether the user is authorized to do the HTTP request.

An authenticated user can read any profile (GET, where corresponding action is READ) or obtain a list of profiles in the repository (GET, where corresponding action is LIST). However, only the profile owner can create (PUT), update (POST), or delete (DELETE) his profile. You can give a user the ability to update or delete a profile owned by any user by adding that user's ID to the EQADTOOL.DTCNCHNGEANY resource profile of the FACILITY class, as described in the topic "Defining who can create, modify, or delete DTCN profiles" in the *IBM z/OS Debugger Customization Guide*.

Compatibility of different versions

When the debugger releases an update to the API, it assigns each release a version number. The following table describes the version numbers:

Table 6. API version number and the corresponding debugger version number

Debugger version number	Corresponding API version number
z/OS Debugger Version 14	0103
Debug Tool for z/OS Version 13	0103
Debug Tool for z/OS Version 10, 11, 12	0102

When you write your application, you identify the version of the API that you are using with the `clientversion` symbol in the URI. When the DTCN profile manager responds, it sends you the version of the API that it is using with the `<serverversion>` XML tag in the HTTP response body.

The following table describes how the DTCN profile manager and your application respond when the version numbers differ:

Table 7. How the DTCN profile manager and your application respond to differences in version numbers

Version difference	What the DTCN profile manager does	What your application does
`<clientversion>` = `<serverversion>`	The DTCN profile manager processes the request and responds with results from the request.	Your application accepts the DTCN profile manager's response and continues running.
`<clientversion>` > `<serverversion>`	If `<clientversion>` is more than two levels higher than the `<serverversion>`, the DTCN profile manager responds with the HTTP response status code of 400, and the reason phrase "Unsupported_Client_Version". Otherwise, the DTCN profile manager processes the request and sends an HTTP response body that uses the XML tags for the version of the API that the DTCN profile manager is using.	If your application can use the information provided at the `<serverversion>` and `<profileversion>` level, continue running. Otherwise, display a message that says the DTCN profile manager is running a version of the API that is too old.
`<clientversion>` < `<serverversion>`	If the `<clientversion>` is more than two levels lower than the `<serverversion>`, the DTCN profile manager responds with the HTTP response status code of 400 and the reason phrase "Unsupported_Client_Version". Otherwise, the DTCN profile manager processes the request and sends an HTTP response body that uses the XML tags for the version of the API that your application is using.	If the DTCN profile manager responds with a `<profileversion>` level that your application can use, continue running. Otherwise, display a message that say the DTCN profile manager is running a version of the API that is too recent.

Chapter 4. Customizing your z/OS system to give the API access to DTCN profiles

Before you begin using the API, you must do the following tasks:

- Verify that the application you are developing provides the proper authentication and security measures, as described in Chapter 3, "Authentication, access control, and version compatibility," on page 9.

- Enable TCP/IP communication between your application and the z/OS system, as described in the topic "Defining the CICS TCPIPSERVICE resource" in the *IBM z/OS Debugger Customization Guide*.

- If you want users other than the profile owners to modify or delete DTCN profiles, see the topic "Defining who can create, modify, or delete DTCN profiles" in the *IBM z/OS Debugger Customization Guide*.

Chapter 5. Definition of XML tags

This topic describes the XML tags used to create the XML document that contains the data required in HTTP request and response bodies.

`<ACTIVATION>`
A flag to activate or deactivate the profile or indicate the status of a profile.

Maximum length	1 byte
Valid values	A, I
Usage	Optional
Default	I

`<CICSREGIONNAME>`
The name of a CICS region that end user wants to access.

Maximum length	8 bytes
Sample value	S07CICPH
Usage	Output only
Default	Not applicable

`<CLIENTIP>`
The IP name or address that starts the CICS application that the end user wants to debug.

Maximum length	60 bytes
Sample value	9.30.60.1.1
Usage	Optional
Default	Null

`<CLIENTVERSION>`
The version of the API you are using in your application. For a description of the version numbers, see "Compatibility of different versions" on page 9.

Maximum length	4 bytes
Sample value	0102
Usage	Output only
Default	Not applicable

`<COMMANDFILE>`
The name of a file that contains a set of z/OS Debugger commands to control the debug session.

Maximum length	80 bytes
Sample value	ELIN.TEST.COMMANDS
Usage	Optional
Default	*

<COMMAREADATA>

A data pattern, in character string or hexadecimal format, compared against a commarea passed to the program the end user wants to debug when that program is invoked. If the data pattern in the commarea and other specified resources match, that program is debugged.

Maximum length	60 bytes
Sample value	X'C1C2C3'
Usage	Optional
Default	Null

<COMMAREAOFFSET>

A numeric, in character string or hexadecimal format, that represents an offset of data in a commarea passed to the program the end user wants to debug when that program is invoked.

Maximum length	8 bytes
Sample value	X'AC'
Usage	Optional
Default	Null

<CONTAINERDATA>

A data pattern, in character string or hexadecimal format, compared to a container within the current channel passed to the program the end user wants to debug when that program is invoked. If the data pattern in the container and other specified resources match, that program is debugged.

Maximum length	60 bytes
Sample value	X'C1C2C3'
Usage	Optional
Default	Null

<CONTAINERNAME>

Name of the container within the current channel passed to the program the end user wants to debug when that program is invoked.

Maximum length	16 bytes
Sample value	INPUTCNT
Usage	Optional
Default	Null

<CONTAINEROFFSET>

A numeric, in character string or hexadecimal format, that represents an offset of data in the named container within the current channel passed to the program the end user wants to debug when that program is invoked.

Maximum length	8 bytes
Sample value	X'12C'
Usage	Optional
Default	Null

\<EQAOPTSFILE\>
　　Name of a file containing a set of EQAOPTS commands to set the initial
　　environment for the debug session.

Maximum length	54 bytes
Sample value	USER1.EQAOPTS.DATA
Usage	Optional
Default	(blank)

\<LEVEL\>
　　Conditions required for z/OS Debugger to gain control.

Maximum length	8 bytes
Valid values	ALL, ERROR, NONE
Usage	Optional
Default	ALL

\<LOADNAME\>
　　The name of the load module that the user wants to debug, which is part of a
　　program specification. Use this tag with the \<PGMNAME\> tag to identify a
　　specific compile unit.

Maximum length	8 bytes
Sample value	APP1LMD1
Usage	Optional
Default	Null

\<MESSAGE\>
　　An informational or error message returned by the server.

Maximum length	60 bytes
Sample value	Invalid_Client_Version
Usage	Output only
Default	Not applicable

\<NETNAME\>
　　The name of a logical unit in the VTAM® network.

Maximum length	8 bytes
Sample value	CICSNET1
Usage	Optional
Default	Null

\<OTHEROPTS\>
　　Additional Language Environment run time options needed to run the
　　application that the end user wants to debug.

Maximum length	80 bytes
Sample value	STORAGE(00,00,00)

Usage	Optional
Default	Null

\<PGMNAME>

The name of the compile unit the user wants to debug, which is part of a program specification. Use with the <LOADNAME> tag to identify a specific compile unit.

Maximum length	8 bytes
Sample value	APP1PGM1
Usage	Optional
Default	Null

\<PREFERENCEFILE>

Name of a file containing a set of z/OS Debugger commands to control the debug session.

Maximum length	80 bytes
Sample value	ELIN.TEST.PREFFILE
Usage	Optional
Default	*

\<PROFILE>

Tag that encapsulates all information.

\<PROFILECOUNT>

Number of profiles to send to your application. The maximum value number of profiles that can be sent to your application is 10.

Maximum length	2 bytes
Sample value	5
Usage	Output only
Default	Not applicable

\<PROFILEID>

ID for a profile whose data is in the HTTP response body.

Maximum length	8 bytes
Sample value	ELIN
Usage	Output only
Default	Not applicable

\<PROFILERECORD>

Tag that encapsulates all the tags needed for a profile.

\<PROFILEVERSION>

Version and release of the profile.

Maximum length	4 bytes
Sample value	0102

Usage	Output only
Default	Not applicable

\<PROGRAM\>
> Tag that encapsulates a pair of \<LOADNAME\> and \<PGMNAME\> tags. A profile can have up to eight \<PROGRAM\> tags.

\<PROMPTLEVEL\>
> A prompt level that indicates whether z/OS Debugger is invoked at Language Environment initialization. It can also contain commands.

Maximum length	80 bytes
Sample value	PROMPT
Usage	Optional
Default	PROMPT

\<SERVERVERSION\>
> Version of the API that the DTCN profile manager is running. For a description of the version numbers, see "Compatibility of different versions" on page 9.

Maximum length	4 bytes
Sample value	0102
Usage	Output only
Default	Not applicable

\<SERVICEID\>
> ID of the Service Oriented Architecture (SOA) service.

Maximum length	8 bytes
Sample value	DBGTSRV1
Usage	Output only
Default	Not applicable

\<SESSADDR\>
> The terminal ID or IP address of the device running your application.

Maximum length	60 bytes
Sample value	9.30.60.200
Usage	Required if the value of the \<SESSTYPE\> tag is TCP.
Default	Not applicable

\<SESSPORT\>
> Number of the TCP/IP port of the device running your application.

Maximum length	8 bytes
Sample value	8005
Usage	Optional
Default	8001

<SESSTYPE>
>   The method the end user wants to use to interact with z/OS Debugger.

Maximum length	4 bytes
Valid values	TCP, MFI
Usage	Optional
Default	TCP

<STARTPROFILERECORD>
>   The number you specified in the s symbol of the URI.

Maximum length	4 bytes
Sample value	5
Usage	Output only
Default	Not applicable

<TERMINALID>
>   The ID of the CICS terminal running the application that the end user wants to debug.

Maximum length	4 bytes
Sample value	TRM1
Usage	Optional
Default	Null

<TRANSACTIONID>
>   ID of the CICS transactions that starts the application that the end user wants to debug.

Maximum length	4 bytes
Sample value	TRN1
Usage	Optional
Default	Null

<TRIGGER>
>   Indicates whether to start z/OS Debugger when the application that the end user wants to debug is initialized.

Maximum length	8 bytes
Valid values	TEST, NOTEST
Usage	Optional
Default	TEST

<URMDEB>
>   A flag to indicate whether the end user wants to debug URMs during his debugging session.

Maximum length	1 byte
Valid values	Y, N

Usage	Optional
Default	N

<USERID>

The ID of the user that runs the transaction the end user wants to debug.

Maximum length	8 bytes
Sample value	ELIN1
Usage	Optional
Default	Null

Chapter 6. Examples: HTTP request body and HTTP response body

The following sample XML document displays the HTTP request body of a PUT (CREATE) or POST (UPDATE) request.

```
<?xml version="1.0"?>
<profile>
 <profilerecord>
  <activation>A</activation>
  <program>
   <loadname>APP1LMD1</loadname>
   <pgmname>APP1PGM1</pgmname>
  </program>
  <program>
   <loadname>APP1LMD2</loadname>
   <pgmname>APP1PGM2</pgmname>
  </program>
  <transactionid>TRN1</transactionid>
  <terminalid>TRM1</terminalid>
  <userid>ELIN</userid>
  <netname>CICSNET1</netname>
  <clientip>9.30.60.200</clientip>
  <commareaoffset>12</commareaoffset>
  <commareadata>ABC</commareadata>
  <containername>APP1CONT</containername>
  <containeroffset>100</containeroffset>
  <containerdata>DEF</containerdata>
  <urmdeb>N</urmdeb>
  <trigger>TEST</trigger>
  <level>ALL</level>
  <sesstype>TCP</sesstype>
  <sessaddr>9.30.60.100</sessaddr>
  <sessport>8005</sessport>
  <commandfile>ELIN.TEST.COMMANDS</commandfile>
  <preferencefile>ELIN.TEST.PREFFILE</preferencefile>
  <promptlevel>PROMPT</promptlevel>
  <otheropts>STORAGE(00,00,00)</otheropts>
 </profilerecord>
</profile>
```

The following sample XML document displays the HTTP return body after the DTCN profile manager completes the GET request of the profile created or updated in the previous example.

```
<?xml version="1.0"?>
<profile>
 <profileversion>0102</profileversion>
 <serviceid>DBGTPROF</serviceid>
 <clientversion>0102</clientversion>
 <serverversion>0102</serverversion>
 <profilerecord>
  <profileid>ELIN</profileid>
  <activation>A</activation>
  <program>
   <loadname>APP1LMD1</loadname>
   <pgmname>APP1PGM1</pgmname>
  </program>
  <program>
   <loadname>APP1LMD2</loadname>
   <pgmname>APP1PGM2</pgmname>
  </program>
```

```
                      <transactionid>TRN1</transactionid>
                      <terminalid>TRM1</terminalid>
                      <userid>ELIN1</userid>
                      <netname>CICSNET1</netname>
                      <clientip>9.30.60.200</clientip>
                      <commareaoffset>12</commareaoffset>
                      <commareadata>ABC</commareadata>
                      <containername>APP1CONT</containername>
                      <containeroffset>100</containeroffset>
                      <containerdata>DEF</containerdata>
                      <urmdeb>N</urmdeb>
                      <trigger>TEST</trigger>
                      <level>ALL</level>
                      <sesstype>TCP</sesstype>
                      <sessaddr>9.30.60.100</sessaddr>
                      <sessport>8005</sessport>
                      <commandfile>ELIN.TEST.COMMANDS</commandfile>
                      <preferencefile>ELIN.TEST.PREFFILE</preferencefile>
                      <promptlevel>PROMPT</promptlevel>
                      <otheropts>STORAGE(00,00,00)</otheropts>
                   </profilerecord>
                 </profile>
```

Part 2. IMS transaction isolation API

The IMS transaction isolation API is a set of programming interfaces for accessing the IMS transaction isolation facility in the IMS environment. The API provides methods to register or de-register a transaction for debugging and start or stop a user private region for debugging transactions.

Chapter 7. Overview

z/OS Debugger provides an API to access the IMS Transaction Isolation Facility. You can use the facility to select a transaction to debug and start or stop a private region.

Communication protocol

The communication protocol is a synchronous request and response message exchange between the requester and the responder.

Message definition

The message has a message header and message body.

Message header

The 12-byte message header consists of the following fields:

Length field
  Length of message (header and body) in binary. The length field is 4 bytes.

Type field
  Message type in binary. The type field is 4 bytes.

  Request messages:
  - 114 - get IMS system IDs
  - 117 - get transaction information
  - 118 - register a transaction
  - 119 - de-register a transaction
  - 120 - start a private region
  - 121 - stop a private region
  - 122 - update pattern match data

  Response messages:
  - 1 — success
  - 2 — failure

Version field
  Version is 2 in binary. The version field is 4 bytes.

Message body

The message body contains details of request or response.

Chapter 8. Host API

The host API consists of request and response messages to the IMS Transaction Isolation Facility.

A request is either requesting information about the IMS system or requesting an action to be run. The response contains the status of request processed and information returned.

Getting IMS system IDs

This request gets a list of valid IMS system IDs. IMS system ID is needed as input of other requests.

Request message

Type: 114

Body: null

Response message

type: 1 - success

body:
```
<IMSISOLATION>
  <IMSSIDINFO>
    <IMSSID>...</IMSSID>
    <IMSSID>...</IMSSID>
        .
        .
  </IMSSIDINFO>
</IMSISOLATION>
```

type: 2 - failure

body:
```
<IMSISOLATION>
  <MSG>...</MSG>
</IMSISOLATION>
```

Getting transaction information

This request gets a list of transactions in an IMS system.

Request message

type: 117

body:
```
<IMSISOLATION>
  <CLIENTID>...</CLIENTID>
  <IMSSID>...</IMSSID>
</IMSISOLATION>
```

Response message

type: 1 - success

body:
```
<IMSISOLATION>
  <IMSSID>...</IMSSID>
  <IMSDBGPRFDSN>...</IMSDBGPRFDSN>
  <IMSTRANINFO>
    <IMSTRANTUPLE>
      <IMSTRANNAME>...</IMSTRANNAME>
      <IMSPSBNAME>...</IMSPSBNAME>
      <IMSUID>...</IMSUID>
      <IMSRGNNAME>...</IMSRGNNAME>
      <IMSRGNCLASS>...</IMSRGNCLASS>
      <IMSRGNSTATUS>...</IMSRGNSTATUS>
      <IMSPMUID>...</IMSPMUID>
      <IMSPMMSG>...</IMSPMMSG>
      <IMSPMCASE>...</IMSPMCASE>
      <IMSPMHEX>...</IMSPMHEX>
    </IMSTRANTUPLE>
    <IMSTRANTUPLE>
      <IMSTRANNAME>...</IMSTRANNAME>
      <IMSPSBNAME>...</IMSPSBNAME>
      <IMSUID>...</IMSUID>
      <IMSRGNNAME>...</IMSRGNNAME>
      <IMSRGNCLASS>...</IMSRGNCLASS>
      <IMSRGNSTATUS>...</IMSRGNSTATUS>
      <IMSPMUID>...</IMSPMUID>
      <IMSPMMSG>...</IMSPMMSG>
      <IMSPMCASE>...</IMSPMCASE>
      <IMSPMHEX>...</IMSPMHEX>
    </IMSTRANTUPLE>
        .
        .
        .
  </IMSTRANINFO>
</IMSISOLATION>
```

type: 2 - failure

body:
```
<IMSISOLATION>
  <MSG>...</MSG>
</IMSISOLATION>
```

Registering a transaction

This request registers a transaction for debugging.

Request message

type: 118

body:
```
<IMSISOLATION>
  <CLIENTID>...</CLIENTID>
  <IMSSID>...</IMSSID>
  <IMSTRANTUPLE>
    <IMSTRANNAME>...</IMSTRANNAME>
    <IMSPSBNAME>...</IMSPSBNAME>
    <IMSUID>...</IMSUID>
    <IMSRGNNAME>...</IMSRGNNAME>
```

```
        <IMSRGNCLASS>...</IMSRGNCLASS>
        <IMSRGNSTATUS>...</IMSRGNSTATUS>
        <IMSPMUID>...</IMSPMUID>
        <IMSPMMSG>...</IMSPMMSG>
        <IMSPMCASE>...</IMSPMCASE>
        <IMSPMHEX>...</IMSPMHEX>
      </IMSTRANTUPLE>
    </IMSISOLATION>
```

Response message

type: `1 - success`

body: `null`

Note: The requester should refresh transaction information by issuing request 117 to get changes related to the request and other changes in the IMS system.

type: `2 — failure`

body:
```
    <IMSISOLATION>
      <MSG>...</MSG>
    </IMSISOLATION>
```

De-registering a transaction

This request de-registers a transaction for debugging.

Request message

type: `119`

body:
```
    <IMSISOLATION>
      <CLIENTID>...</CLIENTID>
      <IMSSID>...</IMSSID>
      <IMSTRANTUPLE>
        <IMSTRANNAME>...</IMSTRANNAME>
        <IMSPSBNAME>...</IMSPSBNAME>
        <IMSUID>...</IMSUID>
        <IMSRGNNAME>...</IMSRGNNAME>
        <IMSRGNCLASS>...</IMSRGNCLASS>
        <IMSRGNSTATUS>...</IMSRGNSTATUS>
        <IMSPMUID>...</IMSPMUID>
        <IMSPMMSG>...</IMSPMMSG>
        <IMSPMCASE>...</IMSPMCASE>
        <IMSPMHEX>...</IMSPMHEX>
      </IMSTRANTUPLE>
    </IMSISOLATION>
```

Response message

type: `1 - success`

body: `null`

Note: The requester should refresh transaction information by issuing request 117 to get changes related to the request and other changes in the IMS system.

type: `2 — failure`

body:
```
<IMSISOLATION>
  <MSG>...</MSG>
</IMSISOLATION>
```

Starting a private region

This request starts a private region that registered transaction can be routed to for debugging.

Request message

type: `120`

body:
```
<IMSISOLATION>
  <CLIENTID>...</CLIENTID>
  <IMSSID>...</IMSSID>
  <IMSULIBINFO>
    <IMSULIB>...</IMSULIB>
    <IMSULIB>...</IMSULIB>

        .
        .
  </IMSULIBINFO>
  <IMSTRANTUPLE>
    <IMSTRANNAME>...</IMSTRANNAME>
    <IMSPSBNAME>...</IMSPSBNAME>
    <IMSUID>...</IMSUID>
    <IMSRGNNAME>...</IMSRGNNAME>
    <IMSRGNCLASS>...</IMSRGNCLASS>
    <IMSRGNSTATUS>...</IMSRGNSTATUS>
    <IMSPMUID>...</IMSPMUID>
    <IMSPMMSG>...</IMSPMMSG>
    <IMSPMCASE>...</IMSPMCASE>
    <IMSPMHEX>...</IMSPMHEX>
  </IMSTRANTUPLE>
</IMSISOLATION>
```

Response message

type: `1 - success`

body: `null`

Note: The requester should refresh transaction information by issuing request 117 to get changes related to the request and other changes in the IMS system.

type: `2 — failure`

body:
```
<IMSISOLATION>
  <MSG>...</MSG>
</IMSISOLATION>
```

Stopping a private region

This request stops a private region when the user completes debugging the registered transactions.

Request message

type: 121

body:
```
<IMSISOLATION>
  <CLIENTID>...</CLIENTID>
  <IMSSID>...</IMSSID>
  <IMSTRANTUPLE>
    <IMSTRANNAME>...</IMSTRANNAME>
    <IMSPSBNAME>...</IMSPSBNAME>
    <IMSUID>...</IMSUID>
    <IMSRGNNAME>...</IMSRGNNAME>
    <IMSRGNCLASS>...</IMSRGNCLASS>
    <IMSRGNSTATUS>...</IMSRGNSTATUS>
    <IMSPMUID>...</IMSPMUID>
    <IMSPMMSG>...</IMSPMMSG>
    <IMSPMCASE>...</IMSPMCASE>
    <IMSPMHEX>...</IMSPMHEX>
  </IMSTRANTUPLE>
</IMSISOLATION>
```

Response message

type: 1 - success

body: null

Note: The requester should refresh transaction information by issuing request 117 to get changes related to the request and other changes in the IMS system.

type: 2 – failure

body:
```
<IMSISOLATION>
  <MSG>...</MSG>
</IMSISOLATION>
```

Updating pattern match information

This request updates the pattern match information of a registered transaction. The user can selectively debug a transaction instance when it matches the pattern match information.

Request message

type: 122

body:
```
<IMSISOLATION>
  <CLIENTID>...</CLIENTID>
  <IMSSID>...</IMSSID>
  <IMSTRANTUPLE>
    <IMSTRANNAME>...</IMSTRANNAME>
```

```
                    <IMSPSBNAME>...</IMSPSBNAME>
                    <IMSUID>...</IMSUID>
                    <IMSRGNNAME>...</IMSRGNNAME>
                    <IMSRGNCLASS>...</IMSRGNCLASS>
                    <IMSRGNSTATUS>...</IMSRGNSTATUS>
                    <IMSPMUID>...</IMSPMUID>
                    <IMSPMMSG>...</IMSPMMSG>
                    <IMSPMCASE>...</IMSPMCASE>
                    <IMSPMHEX>...</IMSPMHEX>
                </IMSTRANTUPLE>
            </IMSISOLATION>
```

Response message

type: `1 - success`

body: `null`

Note: The requester should refresh transaction information by issuing request 117 to get changes related to the request and other changes in the IMS system.

type: `2 – failure`

body:
```
        <IMSISOLATION>
          <MSG>...</MSG>
        </IMSISOLATION>
```

Chapter 9. Definition of XML tags

This topic describes the XML tags used in the request and response message bodies.

The XML tag definition is listed in the alphabetical order.

`<CLIENTID>`
> The requester ID.

`<IMSDBGPRFDSN>`
> The debug profile data set naming pattern.

`<IMSISOLATION>`
> The root element tag of the XML document.

`<IMSPMCASE>`
> The case sensitivity of the pattern match message text. The following values are valid:
>
> **Y**   The pattern match message text is case sensitive.
>
> **N**   The pattern match message text is case insensitive.

`<IMSPMHEX>`
> The pattern match message text in hexadecimal. The following values are valid:
>
> **Y**   The pattern match message text is in hexadecimal.
>
> **N**   The pattern match message text is not in hexadecimal.

`<IMSPMMSG>`
> The pattern match message text. The maximum length is 32 bytes.

`<IMSPMUID>`
> The pattern match user ID.

`<IMSPSBNAME>`
> The program specification block name.

`<IMSRGNCLASS>`
> The class assigned to private region.

`<IMSRGNNAME>`
> The private region name.

`<IMSRGNSTATUS>`
> The private region status. The following values are valid:
>
> **P**   The private region was stopped.
>
> **S**   The private region was started.

`<IMSSID>`
> The IMS system ID.

`<IMSSIDINFO>`
> The container tag of IMS system ID tags.

`<IMSTRANINFO>`
> The container tag of IMS transaction tuple tags.

<IMSTRANNAME>
> The transaction name.

<IMSTRANTUPLE>
> The container tag of transaction information tags.

<IMSULIB>
> The user library data set name.

<IMSULIBINFO>
> The container tag of user library tags.

<IMSUID>
> The transaction owner ID.

<MSG>
> The message text.

Part 3. Appendixes

Appendix A. Debug profile tags

The following table lists the tags that are used in debug profiles and a description of the tags.

Table 8. Debug profile tags

Tag name	Debug profile type	Description
<DBC>	Delay	A DB2 client user ID that locates the delay debug profile data set.
<DSC>	Delay	A DB2 stored procedure schema that traps the stored procedure with the matching schema for debugging.
<DSP>	Delay	A DB2 stored procedure external name that traps the stored procedure with the matching external name for debugging.
<EQO>	Regular, delay	An EQAOPTS data set name that provides a list of EQAXOPT commands for the debugger to process during initialization. Use apostrophes (') to specify a fully qualified data set name.
<IID>	Regular, delay	An IMS subsystem ID that traps the IMS transaction running in the IMS subsystem with the matching IMS subsystem ID for debugging.
<ITR>	Regular, delay	An IMS transaction ID that traps the IMS transaction with the matching IMS transaction ID for debugging.
<JBN>	Regular	A batch job name that traps the batch job with the matching job name for debugging.
<NM2>	Regular, delay	A load module name, and a program or C function name that trap the program or C function with the matching load module name, and program or C function name for debugging. Format rules of the names: • Use a comma to separate the load module name and the program or C function name, for example, <NM2>LM1,PM1. • A wildcard of asterisk (*) can be specified as the only character, or the last character of the name to indicate that there is zero or more characters, for example, <NM2>*,* and <NM2>lm3,pm*. • If the name is not enclosed in single or double quotation marks, the debugger uppercases the name before comparing it against the incoming load module name, program name or C function name, for example, <NM2>'lm3','pm3'. If the name is enclosed in single or double quotation marks, the name is compared exactly as coded. • If you want to specify only the program or C function name, use an asterisk (*) as the load module name, for example, <NM2>*,PM1.
<PGL>	Regular, delay	The name of the first load module of the initial enclave for regular debug profiles or the program name for the delay debug profiles. This tag is deprecated. Use the <NM2> tag instead.

Table 8. Debug profile tags (continued)

Tag name	Debug profile type	Description
<PGM>	Regular, delay	The name of the first load module of the initial enclave for regular debug profiles or the program name for the delay debug profiles. This tag is deprecated. Use the <NM2> tag instead.
<RTO>	Regular	Runtime options that are provided to Language Environment.
<STN>	Regular	A batch job step name that traps the job step with the matching job step name for debugging.
<TST>	Regular, delay	TEST runtime options that start the debugger.

Appendix B. Support resources and problem solving information

This section shows you how to quickly locate information to help answer your questions and solve your problems. If you have to call IBM support, this section provides information that you need to provide to the IBM service representative to help diagnose and resolve the problem.

For a comprehensive multimedia overview of IBM software support resources, see the IBM Education Assistant presentation "IBM Software Support Resources for System z Enterprise Development Tools and Compilers products" at http://publib.boulder.ibm.com/infocenter/ieduasst/stgv1r0/index.jsp?topic=/com.ibm.iea.debugt/debugt/6.1z/TrainingEducation/SupportInfoADTools/player.html.

- "Searching knowledge bases"
- "Getting fixes" on page 41
- "Subscribing to support updates" on page 41
- "Contacting IBM Support" on page 42

Searching knowledge bases

You can search the available knowledge bases to determine whether your problem was already encountered and is already documented.

- Searching the information center
- Searching product support documents

Searching the information center

You can find this publication and documentation for many other products in the IBM System z Enterprise Development Tools & Compilers information center at http://publib.boulder.ibm.com/infocenter/pdthelp/v1r1/index.jsp. Using the information center, you can search product documentation in a variety of ways. You can search across the documentation for multiple products, search across a subset of the product documentation that you specify, or search a specific set of topics that you specify within a document. Search terms can include exact words or phrases, wild cards, and Boolean operators.

To learn more about how to use the search facility provided in the IBM System z Enterprise Development Tools & Compilers information center, you can view the multimedia presentation at http://publib.boulder.ibm.com/infocenter/pdthelp/v1r1/index.jsp?topic=/com.ibm.help.doc/InfoCenterTour800600.htm.

Searching product support documents

If you need to look beyond the information center to answer your question or resolve your problem, you can use one or more of the following approaches:

- Find the content that you need by using the IBM Support Portal at www.ibm.com/software/support or directly at www.ibm.com/support/entry/portal.

  The IBM Support Portal is a unified, centralized view of all technical support tools and information for all IBM systems, software, and services. The IBM

Support Portal lets you access the IBM electronic support portfolio from one place. You can tailor the pages to focus on the information and resources that you need for problem prevention and faster problem resolution.

Familiarize yourself with the IBM Support Portal by viewing the demo videos at https://www.ibm.com/blogs/SPNA/entry/ the_ibm_support_portal_videos?lang=en_us about this tool. These videos introduce you to the IBM Support Portal, explore troubleshooting and other resources, and demonstrate how you can tailor the page by moving, adding, and deleting portlets.

Access a specific IBM Software Support site:

– Application Performance Analyzer for z/OS Support
– z/OS Debugger support
– Enterprise COBOL for z/OS Support
– Enterprise PL/I for z/OS Support
– Fault Analyzer for z/OS Support
– File Export for z/OS Support
– File Manager for z/OS Support
– WebSphere® Studio Asset Analyzer for Multiplatforms Support
– Workload Simulator for z/OS and OS/390® Support

- Search for content by using the IBM masthead search. You can use the IBM masthead search by typing your search string into the Search field at the top of any ibm.com® page.

- Search for content by using any external search engine, such as Google, Yahoo, or Bing. If you use an external search engine, your results are more likely to include information that is outside the ibm.com domain. However, sometimes you can find useful problem-solving information about IBM products in newsgroups, forums, and blogs that are not on ibm.com. Include "IBM" and the name of the product in your search if you are looking for information about an IBM product.

- The IBM Support Assistant (also referred to as ISA) is a free local software serviceability workbench that helps you resolve questions and problems with IBM software products. It provides quick access to support-related information. You can use the IBM Support Assistant to help you in the following ways:

– Search through IBM and non-IBM knowledge and information sources across multiple IBM products to answer a question or solve a problem.

– Find additional information through product and support pages, customer news groups and forums, skills and training resources and information about troubleshooting and commonly asked questions.

In addition, you can use the built in Updater facility in IBM Support Assistant to obtain IBM Support Assistant upgrades and new features to add support for additional software products and capabilities as they become available.

For more information, and to download and start using the IBM Support Assistant for IBM System z Enterprise Development Tools & Compilers products, please visit http://www.ibm.com/support/docview.wss?rs=2300 &context=SSFMHB&dc=D600&uid=swg21242707&loc=en_US&cs=UTF-8 &lang=en.

General information about the IBM Support Assistant can be found on the IBM Support Assistant home page at http://www.ibm.com/software/support/isa.

Getting fixes

A product fix might be available to resolve your problem. To determine what fixes and other updates are available, select a link from the following list:

- Latest PTFs for Application Performance Analyzer for z/OS
- Latest PTFs for Debug Tool for z/OS
- Latest PTFs for Fault Analyzer for z/OS
- Latest PTFs for File Manager for z/OS
- Latest PTFs for IBM z/OS Debugger
- Latest PTFs for IBM Developer for z System
- Latest PTFs for Problem Determination Tools for z/OS Common Component
- Latest PTFs for Workload Simulator for z/OS and OS/390

When you find a fix that you are interested in, click the name of the fix to read its description and to optionally download the fix.

Subscribe to receive e-mail notifications about fixes and other IBM Support information as described in Subscribing to Support updates..

Subscribing to support updates

To stay informed of important information about the IBM products that you use, you can subscribe to updates. By subscribing to receive updates, you can receive important technical information and updates for specific Support tools and resources. You can subscribe to updates by using the following:

- RSS feeds and social media subscriptions
- My Notifications

RSS feeds and social media subscriptions

For general information about RSS, including steps for getting started and a list of RSS-enabled IBM web pages, visit the IBM Software Support RSS feeds site at http://www.ibm.com/software/support/rss/other/index.html. For information about the RSS feed for the IBM System z Enterprise Development Tools & Compilers information center, refer to the Subscribe to information center updates topic in the information center at http://publib.boulder.ibm.com/infocenter/pdthelp/v1r1/topic/com.ibm.help.doc/subscribe_info.html.

My Notifications

With My Notifications, you can subscribe to Support updates for any IBM product. You can specify that you want to receive daily or weekly email announcements. You can specify what type of information you want to receive (such as publications, hints and tips, product flashes (also known as alerts), downloads, and drivers). My Notifications enables you to customize and categorize the products about which you want to be informed and the delivery methods that best suit your needs.

To subscribe to Support updates, follow the steps below.

1. Click My notifications to get started. Click **Subscribe now!** on the page.
2. Sign in My notifications with your IBM ID. If you do not have an IBM ID, create one ID by following the instructions.

3. After you sign in My notifications, enter the name of the product that you want to subscribe in the **Product lookup** field. The look-ahead feature lists products matching what you typed. If the product does not appear, use the **Browse for a product** link.

4. Next to the product, click the **Subscribe** link. A green check mark is shown to indicate the subscription is created. The subscription is listed under Product subscriptions.

5. To indicate the type of notices for which you want to receive notifications, click the **Edit** link. To save your changes, click the **Submit** at the bottom of the page.

6. To indicate the frequency and format of the email message you receive, click **Delivery preferences**. Then, click **Submit**.

7. Optionally, you can click the RSS/Atom feed by clicking **Links**. Then, copy and paste the link into your feeder.

8. To see any notifications that were sent to you, click **View**.

Contacting IBM Support

IBM Support provides assistance with product defects, answering FAQs, and performing rediscovery.

After trying to find your answer or solution by using other self-help options such as technotes, you can contact IBM Support. Before contacting IBM Support, your company must have an active IBM maintenance contract, and you must be authorized to submit problems to IBM. For information about the types of available support, see the information below or refer to the Support portfolio topic in the Software Support Handbook at http://www14.software.ibm.com/webapp/set2/sas/f/handbook/offerings.html.

- For IBM distributed software products (including, but not limited to, Tivoli®, Lotus®, and Rational products, as well as DB2 and WebSphere products that run on Windows, or UNIX operating systems), enroll in Passport Advantage® in one of the following ways:

    Online
    Go to the Passport Advantage Web site at http://www.lotus.com/ services/passport.nsf/ WebDocs/Passport_Advantage_Home and click **How to Enroll**.

    By phone
    For the phone number to call in your country, go to the Contacts page of the *IBM Software Support Handbook* on the Web at http:// www14.software.ibm.com/webapp/set2/sas/f/handbook/contacts.html and click the name of your geographic region.

- For customers with Subscription and Support (S & S) contracts, go to the Software Service Request Web site at http://www.ibm.com/support/ servicerequest.

- For customers with IBMLink, CATIA, Linux, S/390®, iSeries, pSeries, zSeries, and other support agreements, go to the IBM Support Line Web site at http://www.ibm.com/services/us/index.wss/so/its/a1000030/dt006.

- For IBM eServer™ software products (including, but not limited to, DB2 and WebSphere products that run in zSeries, pSeries, and iSeries environments), you can purchase a software maintenance agreement by working directly with an IBM sales representative or an IBM Business Partner. For more information about support for eServer software products, go to the IBM Technical Support Advantage Web site at http://www.ibm.com/servers/eserver/techsupport.html.

If you are not sure what type of software maintenance contract you need, call 1-800-IBMSERV (1-800-426-7378) in the United States. From other countries, go to the Contacts page of the *IBM Software Support Handbook* on the Web at http://www14.software.ibm.com/webapp/set2/sas/f/handbook/contacts.html and click the name of your geographic region for phone numbers of people who provide support for your location.

Complete the following steps to contact IBM Support with a problem:
1. "Define the problem and determine the severity of the problem"
2. "Gather diagnostic information"
3. "Submit the problem to IBM Support" on page 44

To contact IBM Software support, follow these steps:

Define the problem and determine the severity of the problem

Define the problem and determine severity of the problem When describing a problem to IBM, be as specific as possible. Include all relevant background information so that IBM Support can help you solve the problem efficiently.

IBM Support needs you to supply a severity level. Therefore, you need to understand and assess the business impact of the problem that you are reporting. Use the following criteria:

Severity 1
> The problem has a **critical** business impact. You are unable to use the program, resulting in a critical impact on operations. This condition requires an immediate solution.

Severity 2
> The problem has a **significant** business impact. The program is usable, but it is severely limited.

Severity 3
> The problem has **some** business impact. The program is usable, but less significant features (not critical to operations) are unavailable.

Severity 4
> The problem has **minimal** business impact. The problem causes little impact on operations, or a reasonable circumvention to the problem was implemented.

For more information, see the Getting IBM support topic in the Software Support Handbook at http://www14.software.ibm.com/webapp/set2/sas/f/handbook/getsupport.html.

Gather diagnostic information

To save time, if there is a Mustgather document available for the product, refer to the Mustgather document and gather the information specified. Mustgather documents contain specific instructions for submitting your problem to IBM and gathering information needed by the IBM support team to resolve your problem. To determine if there is a Mustgather document for this product, go to the product support page and search on the term Mustgather. At the time of this publication, the following Mustgather documents are available:

- Mustgather: Read first for problems encountered with Application Performance Analyzer for z/OS: http://www.ibm.com/support/docview.wss?rs=2300 &context=SSFMHB&q1=mustgather&uid=swg21265542&loc=en_US&cs=utf-8 ⟨=en
- Mustgather: Read first for problems encountered with IBM z/OS Debugger: http://www.ibm.com/support/docview.wss?rs=615&context=SSGTSD &q1=mustgather&uid=swg21254711&loc=en_US&cs=utf-8&lang=en
- Mustgather: Read first for problems encountered with Fault Analyzer for z/OS:http://www.ibm.com/support/docview.wss?rs=273&context=SSXJAJ &q1=mustgather&uid=swg21255056&loc=en_US&cs=utf-8&lang=en
- Mustgather: Read first for problems encountered with File Manager for z/OS: http://www.ibm.com/support/docview.wss?rs=274&context=SSXJAV &q1=mustgather&uid=swg21255514&loc=en_US&cs=utf-8&lang=en
- Mustgather: Read first for problems encountered with Enterprise COBOL for z/OS: http://www.ibm.com/support/docview.wss?rs=2231&context=SS6SG3 &q1=mustgather&uid=swg21249990&loc=en_US&cs=utf-8&lang=en
- Mustgather: Read first for problems encountered with Enterprise PL/I for z/OS: http://www.ibm.com/support/docview.wss?rs=619&context=SSY2V3 &q1=mustgather&uid=swg21260496&loc=en_US&cs=utf-8&lang=en

If the product does not have a Mustgather document, please provide answers to the following questions:

- What software versions were you running when the problem occurred?
- Do you have logs, traces, and messages that are related to the problem symptoms? IBM Software Support is likely to ask for this information.
- Can you re-create the problem? If so, what steps were performed to re-create the problem?
- Did you make any changes to the system? For example, did you make changes to the hardware, operating system, networking software, and so on.
- Are you currently using a workaround for the problem? If so, be prepared to explain the workaround when you report the problem.

Submit the problem to IBM Support

You can submit your problem to IBM Support in one of three ways:

Online using the IBM Support Portal
Click **Service request** on the IBM Software Support site at http://www.ibm.com/software/support. On the right side of the Service request page, expand the Product related links section. Click Software support (general) and select ServiceLink/IBMLink to open an Electronic Technical Response (ETR). Enter your information into the appropriate problem submission form.

Online using the Service Request tool
The Service Request tool can be found at http://www.ibm.com/software/ support/servicerequest.

By phone
Call 1-800-IBMSERV (1-800-426-7378) in the United States or, from other countries, go to the Contacts page of the *IBM Software Support Handbook* at http://www14.software.ibm.com/webapp/set2/sas/f/handbook/ contacts.html and click the name of your geographic region.

If the problem you submit is for a software defect or for missing or inaccurate documentation, IBM Support creates an Authorized Program Analysis Report (APAR). The APAR describes the problem in detail. Whenever possible, IBM Support provides a workaround that you can implement until the APAR is resolved and a fix is delivered. IBM publishes resolved APARs on the IBM Support website daily, so that other users who experience the same problem can benefit from the same resolution.

After a Problem Management Record (PMR) is open, you can submit diagnostic MustGather data to IBM using one of the following methods:

- FTP diagnostic data to IBM. For more information, refer to http://www.ibm.com/support/docview.wss?rs=615&uid=swg21154524.
- If FTP is not possible, e-mail diagnostic data to techsupport@mainz.ibm.com. You must add PMR xxxxx bbb ccc in the subject line of your e-mail. xxxxx is your PMR number, bbb is your branch office, and ccc is your IBM country code. Go to http://itcenter.mainz.de.ibm.com/ecurep/mail/subject.html for more details.

Always update your PMR to indicate that data has been sent. You can update your PMR online or by phone as described above.

Appendix C. Accessibility

Accessibility features help a user who has a physical disability, such as restricted mobility or limited vision, to use software products successfully. The accessibility features in z/OS provide accessibility for z/OS Debugger.

The major accessibility features in z/OS enable users to:

- Use assistive technology products such as screen readers and screen magnifier software
- Operate specific or equivalent features by using only the keyboard
- Customize display attributes such as color, contrast, and font size

The *IBM System z Enterprise Development Tools & Compilers* Information Center, and its related publications, are accessibility-enabled. The accessibility features of the information center are described at *http://publib.boulder.ibm.com/infocenter/pdthelp/ v1r1/topic/com.ibm.help.doc/accessibility_info.html*.

Using assistive technologies

Assistive technology products work with the user interfaces that are found in z/OS. For specific guidance information, consult the documentation for the assistive technology product that you use to access z/OS interfaces.

Keyboard navigation of the user interface

Users can access z/OS user interfaces by using TSO/E or ISPF. Refer to *z/OS TSO/E Primer*, *z/OS TSO/E User's Guide*, and *z/OS ISPF User's Guide Volume 1* for information about accessing TSO/E and ISPF interfaces. These guides describe how to use TSO/E and ISPF, including the use of keyboard shortcuts or function keys (PF keys). Each guide includes the default settings for the PF keys and explains how to modify their functions.

Accessibility of this document

Information in the following format of this document is accessible to visually impaired individuals who use a screen reader:

- HTML format when viewed from the *IBM System z Enterprise Development Tools & Compilers* Information Center

Syntax diagrams start with the word Format or the word Fragments. Each diagram is preceded by two images. For the first image, the screen reader will say "Read syntax diagram". The associated link leads to an accessible text diagram. When you return to the document at the second image, the screen reader will say "Skip visual syntax diagram" and has a link to skip around the visible diagram.

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Programming interface information

This book is intended to help you debug application programs. This publication documents intended Programming Interfaces that allow you to write programs to obtain the services of z/OS Debugger.

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IBM z/OS Debugger publications

Using CODE/370 wih VS COBOL II and OS PL/I, SC09-1862

IBM z/OS Debugger

You can access the IBM z/OS Debugger publications by visiting the IBM Developer for z Systems library page at http://www.ibm.com/support/docview.wss?uid=swg27048563.

IBM z/OS Debugger User's Guide, SC27-8932

IBM z/OS Debugger Coverage Utility User's Guide and Messages, SC27-8936

IBM z/OS Debugger Reference and Messages, SC27-8934

IBM z/OS Debugger Reference Summary , SC27-8933

IBM z/OS Debugger API User's Guide and Reference, SC27-8937

IBM z/OS Debugger Customization Guide, SC27-8935

Program Directory for IBM z/OS Debugger, GI13-4540

COBOL and CICS Command Level Conversion Aid for OS/390 & MVS & VM: User's Guide, SC26-9400

Program Directory for IBM COBOL and CICS Command Level Conversion Aid for OS/390 & MVS & VM, GI10-5080

Japanese Program Directory for IBM COBOL and CICS Command Level Conversion Aid for OS/390 & MVS & VM, GI10-6976

Problem Determination Tools Common Component Program Directory, GI10-8969

Problem Determination Tools for z/OS Common Component Customization Guide and User Guide, SC19-4159

Related publications

CICS

Application Programming Guide, SC34-6231

Application Programming Primer, SC34-0674

Application Programming Reference, SC34-6232

z/OS

MVS JCL Reference, SA22-7597

MVS JCL User's Guide, SA22-7598

MVS System commands, SA22-7627

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