

webMethods EntireX

EntireX z/VSE CICS® RPC Server

Version 9.6

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Specifications contained herein are subject to change and these changes will be reported in subsequent release notes or new editions.

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EntireX z/VSE CICS® RPC Server

The EntireX z/VSE CICS® RPC Server allows standard RPC clients to communicate with RPC servers on the operating system z/VSE under CICS. It supports the programming language COBOL. It works together with the *COBOL Wrapper* and *IDL Extractor for COBOL*.

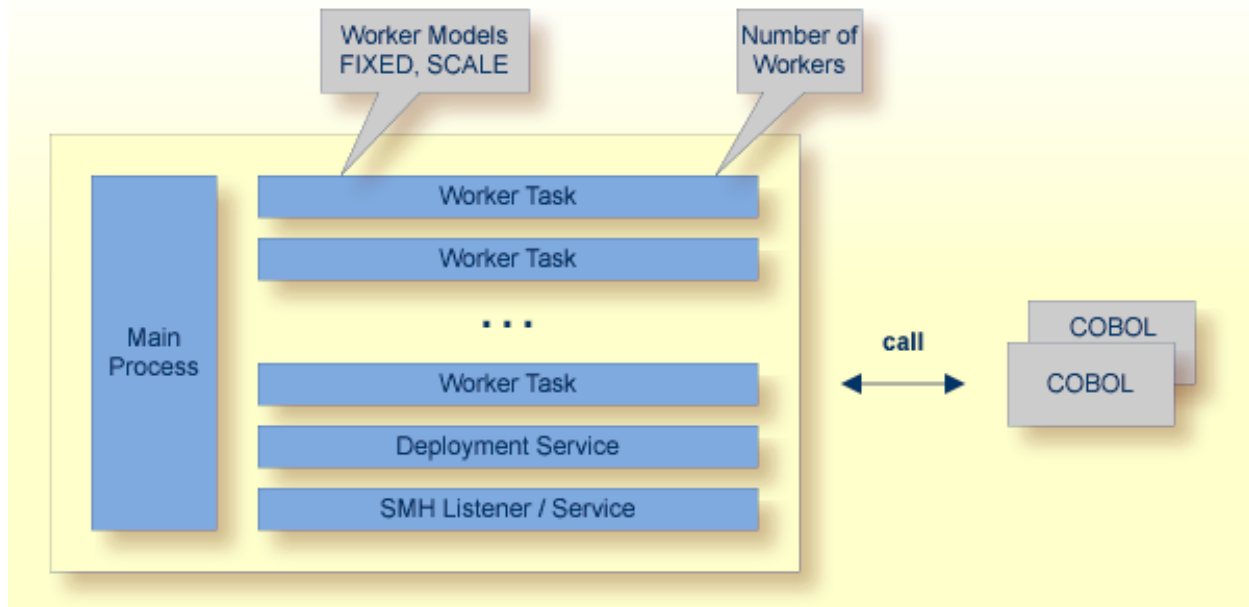
Supported compilers are listed under *z/VSE Prerequisites* in the *Release Notes*.

1 Introduction to the CICS RPC Server

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The EntireX z/VSE CICS® RPC Server allows standard RPC clients to communicate with RPC servers on the operating system z/VSE under CICS. It supports the programming language COBOL.

Worker Models



RPC requests are worked off inside the RPC server in worker tasks, which are controlled by a main task. Every RPC request occupies during its processing a worker task. If you are using RPC conversations, each RPC conversation requires its own task during the lifetime of the conversation. The CICS RPC Server provides two worker models:

■ FIXED

The *fixed* model creates a fixed number of worker tasks. The number of worker tasks (defined with `ERXMAIN macro` parameter `MINW`) does not increase or decrease during the lifetime of an RPC server instance. It is configured by setting the `ERXMAIN macro` parameter `ENDW` to value "NEVER". Example:

```
ENDW=NEVER, MINW=4
```

■ SCALE

The *scale* model creates worker tasks depending on the incoming load of RPC requests.

A maximum number (`ERXMAIN macro` parameter `MAXW`) of the worker tasks created can be set to restrict the system load. The minimum number (`ERXMAIN macro` parameter `MINW`), allows you to define a certain number of tasks - not used by the currently executing RPC request - to wait for new RPC client requests to process. In this way the RPC server is ready to handle many RPC

client requests arriving at the same time. It is configured by setting the [ERXMAIN macro](#) parameter [ENDW](#) to value "TIMEOUT" or "IMMEDIATE".

- With value `IMMEDIATE`, worker tasks shrink fast, that is, worker tasks not used are stopped immediately as soon as it has finished its conversation, except for the number of workers specified as minimum being active.
- With value `TIMEOUT`, worker tasks shrink slowly, that is, all worker tasks not used are stopped in the time specified by the [ERXMAIN macro](#) parameter `TOUT`, except for the number of workers specified as minimum being active.

Example:

```
ENDW=IMMEDIATE , MINW=2 ,MAXW=6
```

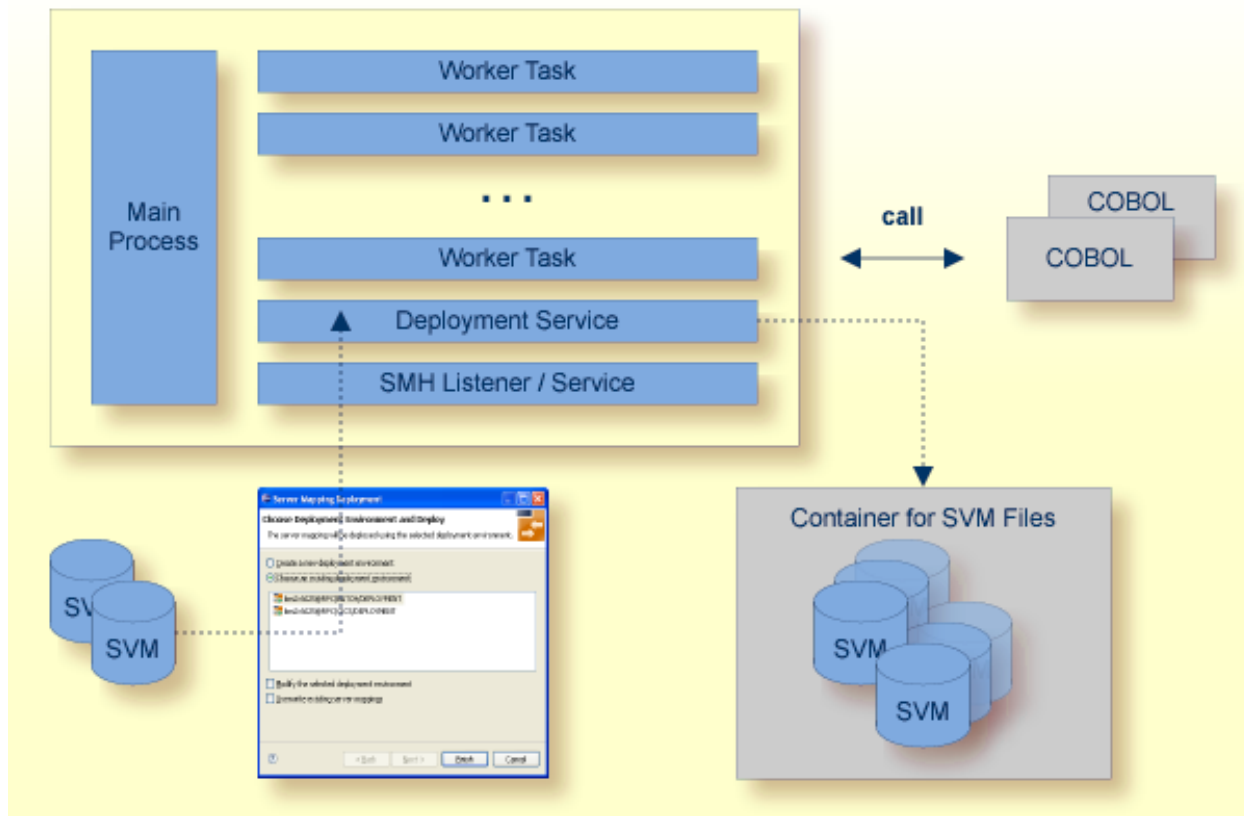
Inbuilt Services

CICS RPC Server provides several services for ease-of-use:

- [Deployment Service](#)
- [SMH Listener Service](#)

Deployment Service

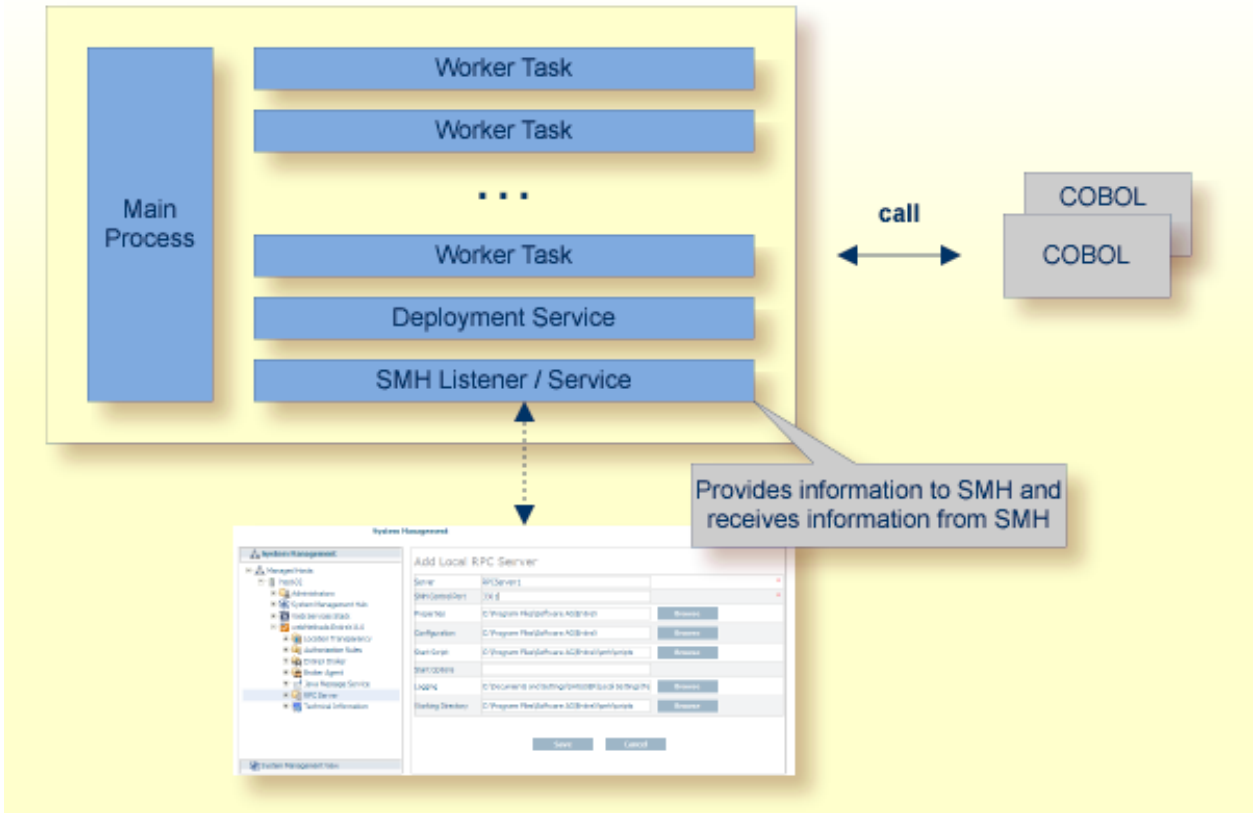
The Deployment Service allows you to deploy server mapping files (SVM files) interactively using the Deployment Wizard (see *Server Mapping Deployment*). On the RPC server side, the SVM files are stored in a VSAM file as the container. See [Deployment Service](#) for configuration information.



SMH Listener Service

With the SMH Listener Service you use the System Management Hub to monitor the RPC server. See *Administering the EntireX RPC Servers using System Management Hub* in the UNIX and Windows administration documentation.

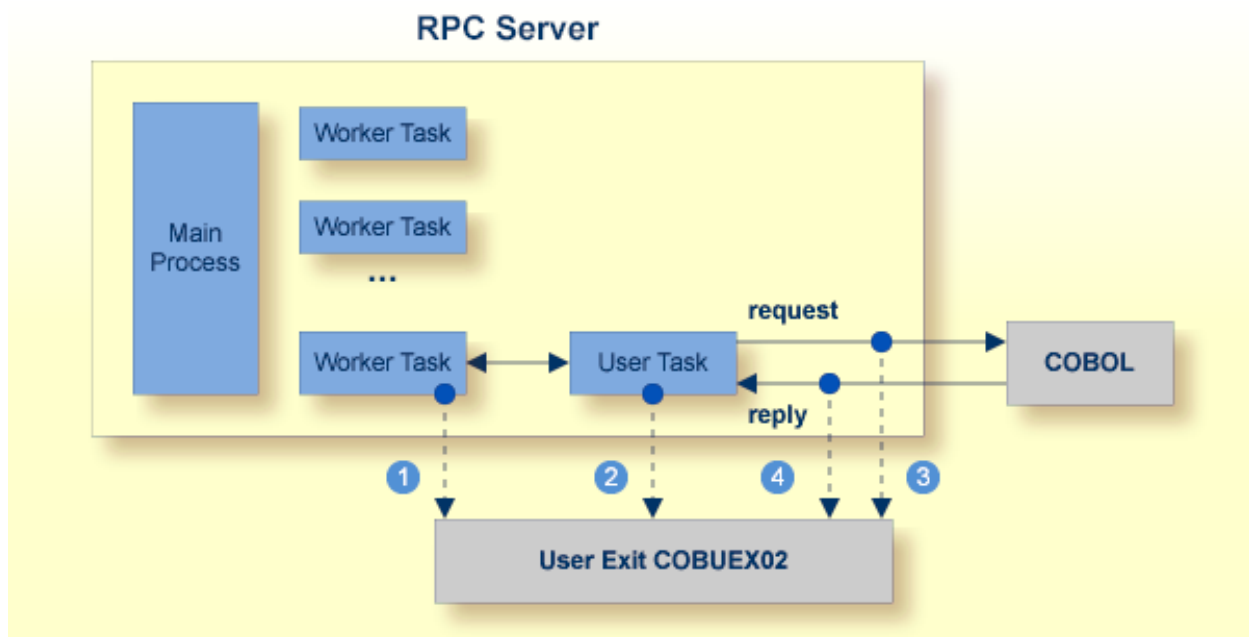
The SMH Listener Service is switched on if the SMH port number is set. See the [ERXMAIN macro](#) parameter [SMH](#) under *Configuring the RPC Server*.



User Exit COBUEX02

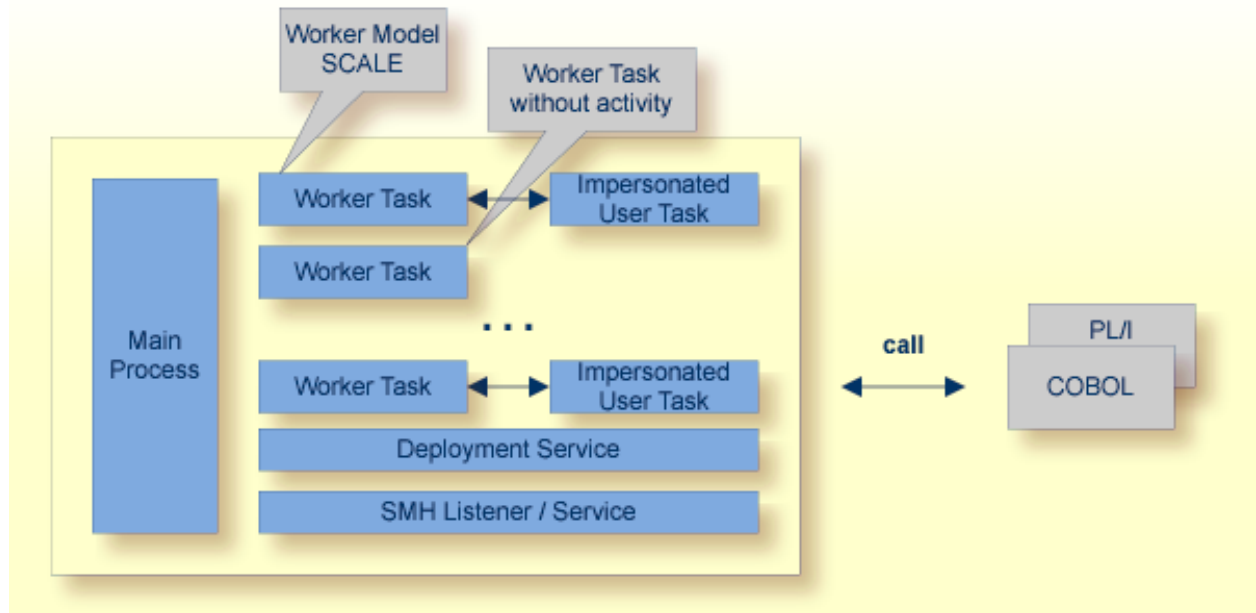
The CICS RPC Server provides a user exit `COBUEX02` to influence/control the RPC logic. The exit is called on the events `START-WORKER`, `START-USER`, `CALL-START` and `CALL-END`. The following tasks can be performed:

- 1 `START-WORKER` event before a CICS worker task is started. This allows you to programmatically set the CICS transaction ID.
- 2 `START-USER` event. Apply CICS transaction ID and user ID to impersonated worker tasks. See [Impersonation](#).
- 3 `CALL-START` event. Inspect, modify or terminate the RPC request (payload) from the RPC client.
- 4 `CALL-END` event. Inspect or modify the RPC reply (payload) or give an error to the RPC client.



See also [User Exit COBUEX02](#) under *Administering the EntireX RPC Server*.

Impersonation



The CICS RPC Server can be configured to execute the RPC request impersonated under the RPC client user ID. For this, worker tasks start additional impersonated user tasks. This can be useful, for example for accounting. Impersonation is controlled by the **ERXMAIN macro** parameter **IMPS**.

- For **IMPS** value **AUTO**, the CICS RPC Server does not validate RPC passwords, so you have to take care the RPC client is correctly authenticated, either by using a secure EntireX Broker (validation must be against the correct mainframe security repository where CICS user IDs are defined) or with your own security implementation.
- For **IMPS** value **YES**, the CICS RPC Server uses the RPC user ID and password supplied by the RPC client for authentication and impersonation of the client. This means that the RPC server validates the password.

The picture above shows the configuration **IMPS=YES**.

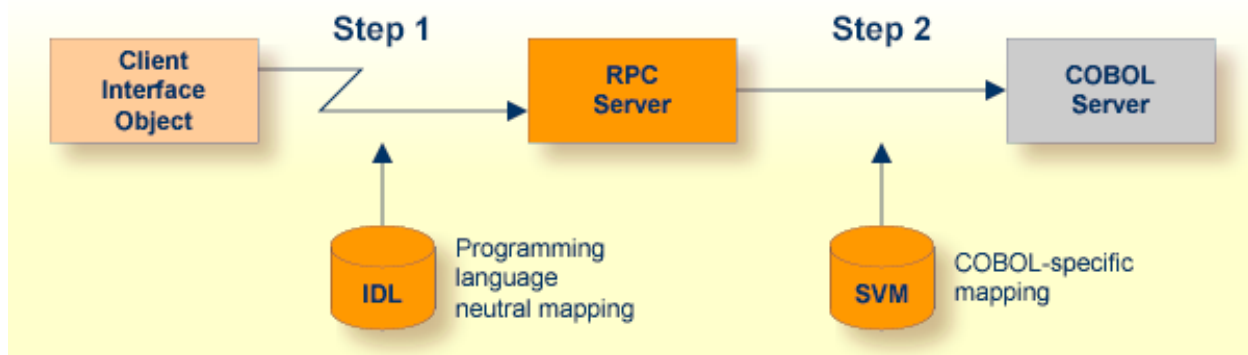
The lifetime of an impersonated user task starts when an open request for an RPC conversation or a non-conversational RPC request is received. It ends when the RPC conversation stops (after a commit operation or timeout) or when the non-conversational RPC request has been performed.

For worker tasks, the slow-shrinking worker model **SCALE** is used - value **TIMEOUT** is forced internally - any value given in the **ERXMAIN macro** parameter **ENDW** is ignored. The lifetime of worker tasks can be controlled with **ERXMAIN macro** parameter **TOUT** as well as the number of workers with macro parameters **MINW** and **MAXW**.

Usage of SVM Files

There are many situations where the CICS RPC Server requires a server mapping file to correctly support special COBOL syntax such as `JUSTIFIED`, `SYNCHRONIZE` and `OCCURS DEPENDING ON` clauses, `LEVEL-88` fields, etc. the .

SVM files contain COBOL-specific mapping information that is not included in the IDL file and therefore *not* sent by an EntireX RPC client to the RPC server. See also [When is an SVM File Required?](#) under [SVM Files](#).



The RPC server marshalls the data in a two-step process: the RPC request coming from the RPC client (Step 1) is completed with COBOL-specific mapping information taken from the SVM file (Step 2). In this way the COBOL server can be called as expected.

The SVM files are retrieved as a result of the *IDL Extractor for COBOL* extraction process and the *COBOL Wrapper* if a COBOL server is generated.

You can customize the usage of the SVM file using the `ERXMAIN` macro parameter `SVM`. See [Configuring the RPC Server](#).



Note: SVM files are used for COBOL only.

Supported Interface Types

The following interface types are supported by the CICS RPC Server:

- *CICS with DFHCOMMAREA Calling Convention* (COBOL Wrapper | Extractor)
- *CICS with DFHCOMMAREA Large Buffer Interface* (COBOL Wrapper | Extractor)

See also [*Locating and Calling the Target Server*](#).

2 Administering the EntireX RPC Server

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The EntireX z/VSE CICS® RPC Server allows standard RPC clients to communicate with RPC servers on the operating system z/VSE under CICS. It supports the programming language COBOL.

Customizing the RPC Server

The following elements are used for setting up the CICS RPC Server:

- ERXMAIN Control Block
- ERXMAIN Macro
- RPC Online Maintenance Facility

ERXMAIN Control Block

- defines a setup of the CICS RPC Server that is persistent over CICS restarts
- is defined with parameters of the *ERXMAIN Macro*; see column 1 in the table under *Configuring the RPC Server*
- contains the following important settings:
 - connection information such as broker ID, see *BKRN*, server address, see *CLZN*, *SRVN* and *SVCN*
 - location and usage of server mapping files, see *SVM*
 - scalability parameters such as *endworker*, *minworker* and *maxworker*, see *ENDW*, *MINW* and *MAXW*
 - etc.

ERXMAIN Macro

- creates an *ERXMAIN Control Block*, a persistent setup of the CICS RPC Server
- needs to be assembled to define a setup
- is defined in Assembler program *EMAINGEN* (in sublibrary *EXP960*) - use this for assembling; see *Build the ERXMAIN Control Block* under *Installing EntireX RPC Servers under CICS*

RPC Online Maintenance Facility

- provides commands (see column 2 in the table below) to vary most of the permanently defined parameters in the *ERXMAIN Control Block* currently in use. All modifications are lost if CICS is restarted. Use *ERXMAIN Macro* for permanent modifications
- allows you to try out new setups of the CICS RPC Server easily without the need to reassemble the *ERXMAIN Control Block*.
- supports
 - starting
 - stopping

- pinging
- monitoring
- activating trace

of the CICS RPC Server. See [RPC Online Maintenance Facility](#).

Configuring the RPC Server

The following rules apply for the *ERXMAIN Macro* syntax (column 1 in table below):

- keywords are given in uppercase
- there are no abbreviations for keywords

The following rules apply for the RPC Online Maintenance Facility commands (column 2 in table below):

- Underscored letters in a command indicate the minimum number of letters that can be used for abbreviation.

For example, in `brokerid=localhost`, `brok` is the minimum number of letters that can be used as an abbreviation, i.e. the commands `brokerid=localhost` and `brok=localhost` are equivalents.

ERXMAIN Macro Syntax	RPC Online Maintenance Facility Commands	Default	Values	Req/Opt
BKRN	<u>brokerid</u>	ETB001	Broker ID used by the server. See <i>Using the Broker ID in Applications</i> in the RPC Programming documentation. Example: BKRN=myhost.com:1971	R
CLZN	<u>class</u>	RPC	Server class part of the server address used by the server. The server address must be defined as a service in the broker attribute file (see <i>Service-specific Attributes (DEFAULTS=SERVICE)</i> under <i>Broker Attributes</i> in the platform-independent administration documentation). Case-sensitive, up to 32 characters. Corresponds to CLASS attribute of the broker attribute file. Example: CLZN=MyRPC	R
SRVN	<u>servername</u>	SRV1	Server name part of the server address used by the server. The server address must be defined as a service in the broker attribute file. See <i>Service-specific Attributes (DEFAULTS=SERVICE)</i> under <i>Broker Attributes</i> in the	R

ERXMAIN Macro Syntax	RPC Online Maintenance Facility Commands	Default	Values	Req/ Opt
			<p>platform-independent administration documentation. Case-sensitive, up to 32 characters. Corresponds to <code>SERVER</code> of the broker attribute file.</p> <p>Example: SRVN=mySrv</p>	
SVCN	<u>service</u>	CALLNAT	<p>Service part of the server address used by the server. The server address must be defined as a service in the broker attribute file. See <i>Service-specific Attributes</i> (<code>DEFAULTS=SERVICE</code>) under <i>Broker Attributes</i> in the platform-independent administration documentation. Case-sensitive, up to 32 characters. Corresponds to <code>SERVICE</code> attribute of the broker attribute file.</p> <p>Example: SVCN=MYSERVICE</p>	R
CODE	<u>codepage</u>	no codepage transferred	<p>Depending on the internationalization approach, the codepage (locale string) where incoming data is provided to the COBOL server. Conversely, the COBOL server must provide outgoing data in the given codepage, otherwise unpredictable results occur. See <i>What is the Best Internationalization Approach to use?</i> under <i>Internationalization with EntireX</i> for information on which internationalization approach requires a codepage (locale string).</p> <p>By default, no codepage is transferred to the broker. For the most popular internationalization approach, <i>ICU Conversion</i> under <i>Introduction to Internationalization</i>, the correct codepage (locale string) must be provided. This means it must:</p> <ul style="list-style-type: none"> ■ follow the rules described under <i>Locale String Mapping</i> in the internationalization documentation ■ be a codepage supported by the broker ■ be the codepage used in your environment for file and terminal IO, otherwise unpredictable results may occur. <p>Example: CODE=ibm-273</p>	O

ERXMAIN Macro Syntax	RPC Online Maintenance Facility Commands	Default	Values	Req/ Opt
COMP	<u>compresslevel</u>	N	<p>Enforce compression when data is transferred between broker and server. See <i>Data Compression in EntireX Broker</i> in the general administration documentation.</p> <p><code>compresslevel= 0 1 2 3 4 5 6 7 8 9 Y N</code></p> <p>0-9 0=no compression 9=max. compression</p> <p>N No compression. Y Compression level 6.</p> <p>Example: COMP=6</p>	O
CYCL	<u>restartcycles</u>	15	<p>Number of restart attempts if the broker is not available. This can be used to keep the CICS RPC Server running while the broker is down for a short time. A restart cycle will be repeated at an interval which is calculated as follows:</p> <p><code>timeout + ETB_TIMEOUT + 60 seconds</code></p> <p>where <code>timeout</code> is the RPC server parameter (see this table), and <code>ETB_TIMEOUT</code> is the environment variable (see <i>Environment Variables in EntireX</i> in the general administration documentation)</p> <p>When the number of cycles is reached and a connection to the broker is not possible, the RPC server stops.</p> <p>Example: CYCL=30</p>	O
DPLY	<u>deployment</u>	NO	<p>Activates the deployment service, see Deployment Service. Required to use the deployment wizard. See <i>Server Mapping Deployment Wizard</i> in the COBOL Wrapper documentation.</p> <p>YES Activates the deployment service. The RPC server registers the deployment service in the broker.</p> <p>NO The deployment service is deactivated. The RPC server does not register the deployment service in the broker.</p>	O

ERXMAIN Macro Syntax	RPC Online Maintenance Facility Commands	Default	Values	Req/ Opt
			Example: DPLY=YES	
ENCR	<u>encryptionlevel</u>	0	<p>Enforce encryption when data is transferred between client and server. Requires EntireX Security. See ENCRYPTION-LEVEL under <i>Broker ACI Fields</i>.</p> <p>0 Encryption is enforced.</p> <p>1 Encryption is enforced between server and broker kernel.</p> <p>2 Encryption is enforced between server and broker kernel, and also between client and broker.</p> <p>Example: ENCR=2</p>	O
ENDW	<u>endworker</u>	TIMEOUT	<p>NEVER Defines worker model FIXED with a fixed number of worker threads. The number of active workers is defined with ERXMAIN macro parameter MINW.</p> <p>TIMEOUT Defines slow-shrinking worker model SCALE, where the number of worker threads is adjusted to the current number of client requests. With value TIMEOUT, all worker threads not used are stopped in the time specified by the ERXMAIN macro parameter TOUT, except for the minimum number of active workers specified with ERXMAIN macro parameter MINW. The upper limit of workers parallel active is restricted with ERXMAIN macro parameter MAXW.</p> <p>IMMEDIATE Defines fast-shrinking worker model SCALE, where the number of worker threads is adjusted to the current number of client requests. With value IMMEDIATE, worker threads not used are stopped immediately as soon as they have finished their conversation, except for the minimum number of active workers defined with ERXMAIN macro parameter MINW. The upper limit of workers active in parallel is restricted with ERXMAIN macro parameter MAXW.</p>	O

ERXMAIN Macro Syntax	RPC Online Maintenance Facility Commands	Default	Values	Req/Opt				
			<p>This parameter is forced to value TIMEOUT if impersonation is switched on, see <i>Impersonation</i> and ERXMAIN macro parameter IMPS.</p> <p>Example: ENDW=IMMEDIATE , MINW=2 , MAXW=6</p>					
MINW	<u>minworker</u>	1	<p>Minimum number of workers active in parallel with worker model SCALE or number of workers in worker model FIXED. See also ERXMAIN macro parameter ENDW.</p> <p>Example: MINW=2</p>	O				
MAXW	<u>maxworker</u>	10	<p>Upper limit of workers active in parallel with worker model SCALE. See also ERXMAIN macro parameter ENDW.</p> <p>Example: MAXW=2</p>	O				
ETBL	<u>etblnk</u>	BKIMC	<p>Define the broker stub to be used. See <i>Administration of Broker Stubs under z/VSE</i> for available stubs.</p> <p>Example: ETBL=BKIMC</p>	O				
EXIT	n.a.		<p>At startup, the CICS RPC Server will call the user exit to synchronize its version. If successful, the CICS RPC Server will continue and call the user exit for the implemented events. See <i>User Exit COBUEX02</i>.</p>	O				
IMPS	<u>impersonation</u>	NO	<p>Defines if RPC requests are executed under the user ID of the RPC client. Depending on settings, different levels of checks are done prior to RPC server execution. See also <i>Impersonation</i>.</p> <p>impersonation= NO YES AUTO [, <u>sameuser</u> , <u>anyuser</u>]</p> <table border="1"> <tr> <td>NO</td> <td>The RPC request is executed anonymously, which means the user ID of the RPC client is not used. RPC requests are executed under the user ID of the RPC server.</td> </tr> <tr> <td>YES</td> <td>The RPC request runs impersonated under the supplied RPC client user ID. For execution of the RPC request, the CICS RPC Server starts a separate impersonated user task, that is, the client must be know to CICS and the supplied password is</td> </tr> </table>	NO	The RPC request is executed anonymously, which means the user ID of the RPC client is not used. RPC requests are executed under the user ID of the RPC server.	YES	The RPC request runs impersonated under the supplied RPC client user ID. For execution of the RPC request, the CICS RPC Server starts a separate impersonated user task, that is, the client must be know to CICS and the supplied password is	O
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ERXMAIN Macro Syntax	RPC Online Maintenance Facility Commands	Default	Values		Req/ Opt
				validated against CICS. The worker model <i>SCALE</i> is forced; for details see <i>Impersonation</i> .	
			AUTO	Same as option YES above, except that no password validation is performed, that is, the client is treated as already authenticated. For this setting, make sure the RPC client is correctly authenticated; use either <ul style="list-style-type: none"> ■ a secure broker (validation must be against the correct mainframe security repository where the user IDs are defined) and option <i>sameuser</i> or ■ your own security implementation (option <i>anyuser</i> is supported for compatibility reasons if you need different broker and server user IDs - the customer-written security implementation must validate the RPC client using the <i>RPC client user ID</i>) 	
			<i>sameuser</i>	The CICS RPC Server checks whether the <i>broker client user ID</i> matches the <i>RPC client user ID</i> . This is the default if <i>AUTO</i> is used.	
			<i>anyuser</i>	The <i>RPC client user ID</i> is used for impersonation. The <i>broker client user ID</i> is ignored.	
			<p>Note:</p> <ol style="list-style-type: none"> EntireX supports two user ID/password pairs: a <i>broker client user ID/password</i> pair and an (optional) <i>RPC user ID/password</i> pair sent from RPC clients to the RPC server. With EntireX Security, the <i>broker client user ID/password</i> pair is checked. The <i>RPC user ID/password</i> pair is designed to be checked by the target RPC server. Thus 		

ERXMAIN Macro Syntax	RPC Online Maintenance Facility Commands	Default	Values	Req/ Opt
			<p>it is possible to use different user IDs in the broker and target RPC server.</p> <p>3. RPC clients send the (optional) <i>RPC user ID/password</i> pair in the same way as specifying the Natural user ID/password pair for a Natural RPC Server. See for example <i>Using Natural Security</i> in the respective section of the documentation.</p> <p>4. If the RPC client does not specify the optional <i>RPC user ID/password</i> pair, the <i>broker client user ID</i> is inherited to the <i>RPC user ID</i> and thus used for impersonation by the CICS RPC Server.</p> <p>Example: IMPS=auto</p>	
LOGN	<u>logon</u>	YES	<p>Execute broker functions LOGON/LOGOFF in worker threads. Must match the setting of the broker attribute AUTOLOGON. Reliable RPC requires logon set to YES. See <i>Reliable RPC</i>.</p> <p>NO No logon/logoff functions are executed. <u>YES</u> Logon/logoff functions are executed.</p> <p>Example: LOGN=no</p>	O
n.a.	<u>mapname</u>		Alias for command <i>memory</i> .	O
n.a.	<u>memory</u>		Command to load an <i>ERXMAIN Control Block</i> . See <i>Modifying Parameters of the RPC Server</i> .	O
OPTS	<u>runoption</u>	0	<p>This parameter is for special purposes. It provides the CICS RPC Server with additional information. The runoptions are normally set to meet the platform's requirements. Set this parameter only if a support representative provides you with an option and asks you to do so.</p> <p>Syntax: OPTS=(<i><option-list></i>) <i><option-list></i> = [<i><option-list></i>,] <i><option></i></p> <p>Example: OPTS=(RUNOPT1,RUNOPT2)</p>	O

ERXMAIN Macro Syntax	RPC Online Maintenance Facility Commands	Default	Values	Req/Opt
PSWD	<u>password</u>		<p>Password for broker logon. Case-sensitive, up to 32 characters. For more information see broker ACI control block field <code>PASSWORD</code>.</p> <p>Example: PSWD=MyPwd</p>	O
PRELOAD	<u>preload</u>	YES	<p>Enable to call CICS RPC Server with <code>AMODE=24</code></p> <p>YES Enable to call RPC server with <code>AMODE 24</code> or <code>31</code>. Internally the CICS RPC Server preloads the called RPC server before execution to check the <code>AMODE</code> and releases the RPC server after this. The disadvantage of this approach is the CICS <code>USECOUNT</code> of the called RPC server program is increased by 2 for every executed RPC call.</p> <p>NO The CICS RPC Server does not preload the called RPC server to check its <code>AMODE</code>. All RPC servers are called as running in <code>AMODE 31</code>. This option is useful for customers who require the CICS <code>USECOUNT</code> in their accounting (increased by 1 for every executed RPC call) but prevents usage of calling RPC Server with <code>AMODE 24</code>.</p>	O
REPL	<u>replicatename</u>	ESRV	<p>CICS transaction ID (uppercase, up to 4 characters) assigned to worker tasks and as default for user tasks if <i>Impersonation</i> is set. In the <code>START-USER</code> event of the user exit (see <i>User Exit COBUEX02</i>) the CICS transaction ID for user tasks can be overridden. See also <i>Introduction to the CICS RPC Server</i>.</p>	O
SMH	<u>smhport</u>	0	<p>The port where the server listens for commands from the System Management Hub (SMH). If this port is 0 (default), no port is used and management by the SMH is disabled.</p> <p>See <i>SMH Listener Service</i> for more information.</p> <p>Example: SMH=3001</p>	O
SVM	<u>svmfile</u>		<p>Usage and location of SVM files. If no SVM parameter is given, the RPC server tries to open the SVM container using CICS file with name <code>ERXSVM</code>. If this CICS file is not available, no server mappings are used. For more information see <i>Usage of SVM Files</i>.</p> <p>Syntax: SVM=NO <i>cicsname</i></p>	O

ERXMAIN Macro Syntax	RPC Online Maintenance Facility Commands	Default	Values	Req/ Opt
			<p><i>cicsname</i> The RPC server tries to open the SVM container using the CICS file with name <i>cicsname</i>.</p> <p>no No server mappings are used.</p> <p>Example: SVM=MYSVM</p> <p>The server mapping file VSAM (container) must be installed and configured. See <i>Step 1: Define an RPC Server Mapping File - VSAMDEF.J (Optional)</i> under <i>Installing the z/VSE EntireX RPC Servers</i>.</p>	
TOUT	<u>timeout</u>	600	<p>Timeout in seconds, used by the server to wait for broker requests. See broker ACI control block field <code>WAIT</code> for more information. Also influences <code>restartcycles</code>.</p> <p>See worker model <code>SCALE</code> to define the lifetime of worker threads in slow-shrinking worker model <code>SCALE</code>.</p> <p>Example: TOUT=300</p>	O
TRC1	<u>tracedestination</u>	CSSL	<p>Name of the destination for trace output. A valid CICS transient data queue.</p>	O
TRLV	<u>tracelevel</u>	0	<p>Trace level for the server. See also Activating Tracing for the RPC Server.</p> <p>Syntax: TRLV= <u>None</u> Standard Advanced Support</p> <p>None No trace output.</p> <p>Standard For minimal trace output.</p> <p>Advanced For detailed trace output.</p> <p>Support This trace level is for support diagnostics and should only be switched on when requested by Software AG support.</p> <p>Example: TRLV=standard</p>	O

ERXMAIN Macro Syntax	RPC Online Maintenance Facility Commands	Default	Values	Req/Opt
USER	<code>userid</code>	ERXSRV1	Used to identify the server to the broker. See broker ACI control block field USER-ID. Case-sensitive, up to 32 characters. Example: USER=MyUid	R

Locating and Calling the Target Server

The IDL library and IDL program names that come from RPC client are used to locate the RPC server. See `library-definition` and `program-definition` under *Software AG IDL Grammar* in the *IDL Editor* documentation. This two-level concept (library and program) has to be mapped to the CICS RPC Server environment.

The approach used to derive the CICS program name for the RPC server depends on whether so-called server mapping files are used or not. See [Usage of SVM Files](#) for an introduction.

- If SVM files are used, the IDL library and IDL program names are used to form a key to locate the SVM entry in the SVM container. If an SVM entry is found, the CICS program name of the RPC server is derived from the SVM entry. In this case the IDL program name can be different to the CICS program name if it is renamed during wrapping process (see *Customize Automatically Generated Server Names*) or during the extraction process in the COBOL Mapping Editor (see *The Software AG IDL Tree Pane*).
- If no SVM files are used at all, the IDL program name is used as the CICS program name of the RPC server (the IDL library name is ignored).

▶ To use the CICS RPC Server with COBOL

- 1 Make sure that all CICS programs called as RPC servers
 - use an interface type supported by the CICS RPC Server for target language COBOL; see [Supported Interface Types](#).
 - can be called with an `EXEC CICS LINK PROGRAM`
 - are accessible through the CICS RPL chain
- 2 Configure the `ERXMAIN macro` parameter `SVM` depending on whether SVM files are used or not.

See also [Scenario I: Calling an Existing COBOL Server](#) or [Scenario II: Writing a New COBOL Server](#).

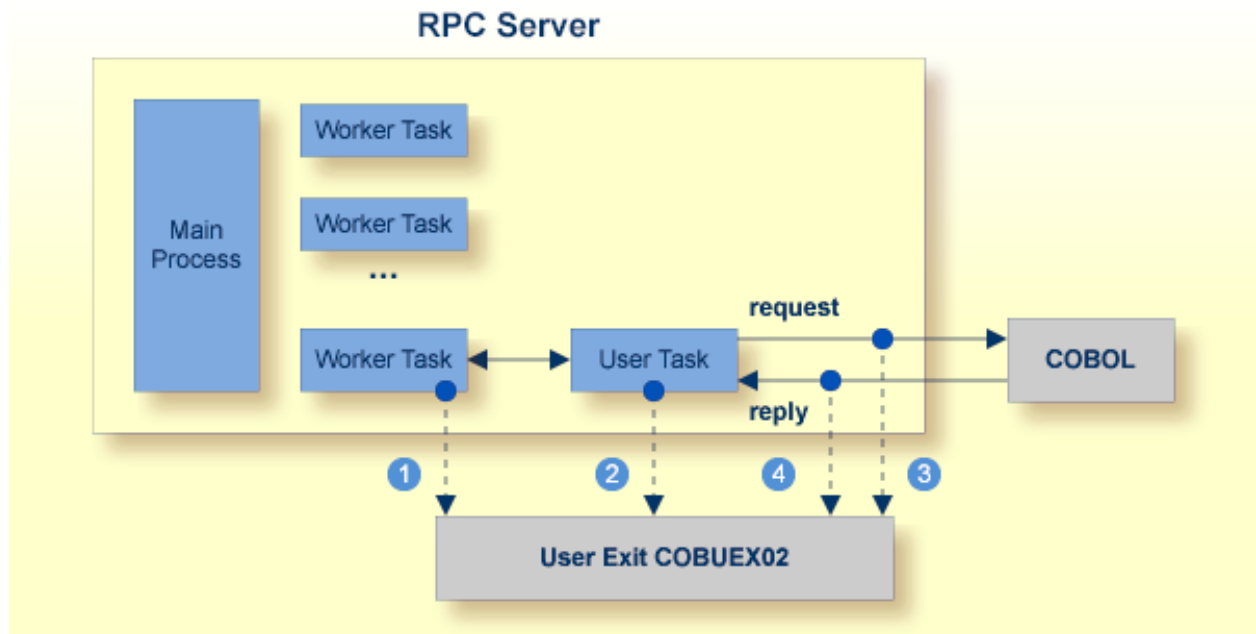
User Exit COBUEX02

The CICS RPC Server provides a user exit COBUEX02 to influence/control the RPC logic.

- User Exit Events
- Writing the User Exit
- Configuring the User Exit

User Exit Events

The user exit is called on the following events:



- 1 START-WORKER event before a CICS worker task is started. This allows you to programatically set the CICS transaction ID. You can terminate an RPC request by specifying an *ERROR-CODE* and optional *ERROR-TEXT*.
- 2 START-USER event. Before an impersonated CICS transaction (worker task) is started, the user exit may change the user ID and CICS transaction ID of the new impersonated worker. See *Impersonation*. You can terminate an RPC request by specifying an *ERROR-CODE* and optional *ERROR-TEXT*.
- 3 CALL-START event. The RPC request (payload data from the RPC client to the RPC server) may be inspected and modified. You can terminate an RPC request by specifying *ERROR-CODE* and optional *ERROR-TEXT*.

- 4 **CALL-END** event. The RPC reply (payload data from the RPC server to the RPC client) may be inspected and modified. If an *ERROR-CODE* and optional *ERROR-TEXT* is given in the API, this error is returned to the RPC client instead of the payload.

Writing the User Exit

The sublibrary EXP960 of the EntireX CICS installation provides the user exit skeleton `COBUEX02.C` for COBOL. Copy this skeleton so you have your own user exit source for modifications.

Accordingly, a COBOL copybook `COBUEX02.CPY` is provided in EXP960.

Hint: The copybook extension `CPY` might not be understood by the z/VSE COBOL compiler. In this case, copy `COBUEX02.CPY` into your copybook library and rename it to `COBUEX02.C`. Add this library to your COBOL compiler `LIBDEF` chain.

The most important API parameters of the user exit are described below. Other parameters are informational and are described in the source code. The user exit program must comply with the `EXEC CICS LINK PROGRAM COMMAREA` conventions.

Parameter	Description
VERSION	Required for future changes. Do not change the skeleton code.
ERROR-CODE	You can terminate the current request: Any number between 1 and 9999 will cause the CICS RPC Server to stop execution of the current RPC request and pass back the given error code with message class 1022 to the RPC client. See <i>Message Class 1022 - CICS RPC Server User Exit Messages</i> under <i>Error Messages and Codes</i> . With error code 0000, the CICS RPC Server continues as normal.
ERROR-TEXT	If the error code is not zero, an error text of up to 256 characters may be applied. This is passed to the RPC client.
CICS-TRANSID	Can be applied in the event <code>START-USER</code> , otherwise it is informational. Apply the <code>TRANSID</code> that your business logic requires.
CICS-TERMID	Can be applied in the event <code>START-USER</code> , otherwise it is informational. In some (rare) cases, RPC server routines require a terminal ID. Apply the <code>TERMID</code> that your business logic requires.
USERID	Can be applied in the event <code>START-USER</code> otherwise it is informational. Under some circumstances, it might be necessary to change the original <code>RPC-USERID</code> from the calling RPC client.
DATA-POINTER	This pointer refers to the payload data for the events <code>CALL-START</code> and <code>CALL-END</code> . The payload to which this pointer is pointing may be inspected as well as modified. The pointer itself must not be changed.

Configuring the User Exit

Apply the name of your exit routine to the EntireX RPC server `ERXMAIN` macro parameter `EXIT`. See *Configuring the RPC Server*.

At startup, the CICS RPC Server will call the named user exit to synchronize its version. If successful, the *RPC Online Maintenance Facility* will display the user exit as map field "parameter opts". See *To display the Server parameters* (PF06) under *RPC Online Maintenance Facility*. The CICS RPC Server will continue and call the user exit for the implemented events.

Multiple RPC Servers in the same CICS

If you need to install multiple instances in the same CICS region, see *Installing Multiple EntireX RPC Servers in the same CICS (Optional)* under *Installing EntireX RPC Servers under CICS* under *Installing EntireX RPC Servers under CICS* in the z/VSE installation documentation.

3

RPC Online Maintenance Facility

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- Activating Tracing for the RPC Server 32
- Console Commands for the RPC Server 32

Monitoring the RPC Server

The parameters in the following screens are described under *Configuring the RPC Server*.

▶ **To call the RPC Online Maintenance Facility and display the RPC Broker Parameters**

- Start the CICS transaction

```
ERXM [MEM=erxmain-control-block]
```

where *erxmain-control-block* is the name of the ERXMAIN control block. See **ERXMAIN Control Block** under *Customizing the RPC Server*.

The RPC Broker Parameter map is displayed:

```
11:56:56          --- ERX CICS Online utility  V960.0 ---          06/02/2014
                    RPC Broker Parameter

Broker parameter
Broker name      = ETB001:SVC045:NET
Class name       = RPC
Server name      = SRV1
Service name     = CALLNAT
User ID          = ERXSRV1
Code page        =

Logon            = No
Server timeout   = 600
Encryptionlevel = 0
Compression lvl  = N

ETBLNK          = BKIMC

COMMAND ==>

-----
PF01=Help  03=Exit  04=Control  05=Broker parms  06=Server parms
           08=Start server  09=Ping server  10=Stop server
```

Press **PF05** from any map to return to the RPC Broker Parameter map.

▶ **To display the RPC Server Parameters**

- Press **PF06** from any map and the RPC Server Parameters will be displayed:

```

12:03:05          --- ERX CICS Online utility  V960.0 ---          06/02/2014
                    RPC Server Parameter

Server parameter
# Min. Workers =      2              Trace Level      = 0
# Max. Workers =      2              Trace Dest.(TD)= CSSL
Ending Workers = Never
Impersonation  = No
Deployment     = Yes
Restart Cycles =      3
SMH Port      =

Server options = SVM      AutoSYNC
Marshal options=

CICS parameter                Mapping file = ERXSVM   (Prefered)
Memory name   = ERXMAIN   (V900)   Dsn(ENTIREX.SVMDEV.KSDS)
Transaction ID = ESRV              Opn Add Rea Upd Del

COMMAND ===>
-----
PF01=Help   03=Exit   04=Control   05=Broker parms   06=Server parms
              08=Start server  09=Ping server   10=Stop server

```

▶ To display the RPC Server Control map

■ Press **PF04**.

```

12:07:18          --- ERX CICS Online utility  V960.0 ---          06/02/2014
                    RPC Server Control

MAIN Task
Status      Running

WORKER Tasks
Registered      2
Busy            0
Maximum busy    2

USER Tasks
Active          0
Max. active     0

BrokerId in use:  ETB001:SVC045:NET
Class in use:     RPC
Server Name in use: SRV1
Service in use:   CALLNAT

COMMAND ===>

```

PF01=Help	03=Exit	04=Control	05=Broker parms	06=Server parms
		08=Start server	09=Ping server	10=Stop server

▶ **To display help for the RPC Online Maintenance Facility**

- Enter `Help` or press **PF01**.

▶ **To stop the RPC Online Maintenance Facility**

- Enter `Exit` or press **PF03**.

Starting the RPC Server

▶ **To start the CICS RPC Server using the RPC Online Maintenance Facility**

- 1 Start the CICS transaction `ERXM` to call the RPC Online Maintenance Facility. See also [Monitoring the RPC Server](#).
- 2 Start the server with the **PF08** key or with the command `start`. The status of the `MAIN` task (see RPC server control panel) changes to “is running”. The defined number (see `ERXMAIN` macro parameter `MINW`) of worker tasks that are registered is displayed.

If an error occurred and the CICS RPC Server is not correctly registered in the broker, but the number of currently active worker tasks is not zero:

- Check with CICS command `CEMT INQUIRE TASK` whether server instances are already running. If yes, stop them using native CICS commands.
- Verify the server parameters matching your system requirements. See column 2 of table under [Configuring the RPC Server](#).
- Then issue command `start` or use **PF08**.

Alternatively, you can use the `start` command from the console. See [Console Commands for the RPC Server](#).

Pinging the RPC Server

▶ **To ping the CICS RPC Server using the RPC Online Maintenance Facility**

- 1 Start the CICS transaction `ERXM` to call the EntireX RPC Online Maintenance Facility. See [Monitoring the RPC Server](#).
- 2 Issue the command `ping` or use **PF09**.

Alternative Method

- Use the `ping` command from the console. See [Console Commands for the RPC Server](#).

Stopping the RPC Server

▶ **To stop the CICS RPC Server using the RPC Online Maintenance Facility**

- 1 Start the CICS transaction `ERXM` to call the RPC Online Maintenance Facility. See [Monitoring the RPC Server](#).
- 2 Issue the `stop` command or use **PF10**. This ensures correct deregistration from broker and all worker tasks are shut down.

Alternatively, you can use the `stop` command from the console. See [Console Commands for the RPC Server](#).

Modifying Parameters of the RPC Server

With RPC Online Maintenance Facility commands, CICS RPC Server parameters can be temporarily modified. Modifications are lost if CICS is restarted. The purpose of the commands is to try out easily new configurations. For persistent modifications (setup) of the CICS RPC Server, reassemble the `ERXMAIN Control Block` using the `ERXMAIN Macro`.

▶ **To modify the CICS RPC Server parameters using the RPC Online Maintenance Facility**

- 1 Start the CICS transaction `ERXM` to call the EntireX RPC Online Maintenance Facility. See [Monitoring the RPC Server](#).
- 2 Use the appropriate RPC Online Maintenance Facility command to modify the parameters. See the column 2 of table under [Configuring the RPC Server](#).

Activating Tracing for the RPC Server

▶ To switch on tracing for the CICS RPC Server using the RPC Online Maintenance Facility

A prerequisite to switch on tracing is a valid defined trace destination. We recommend defining it permanently, see [ERXMAIN macro](#) parameter [TRC1](#).

- 1 Start the CICS transaction ERXM to call the EntireX RPC Online Maintenance Facility. See [Monitoring the RPC Server](#).
- 2 Use the command `tracellevel=tracellevel`, where `tracellevel` is one of None, Standard, Advanced or Support. See [ERXMAIN macro](#) parameter [TRLV](#).

Example: `tracellevel=Standard`

To evaluate CICS RPC Server return codes, see *EntireX RPC Server Return Codes* under *Error Messages and Codes*.

Console Commands for the RPC Server

The RPC Online Maintenance Facility ERXM can be used directly from a z/VSE console using the syntax below:

- `task_id` is the name of the CICS task ID
- `erxmain-control-block` is the name of the [ERXMAIN Control Block](#). It can be omitted if the default name ERXMAIN is used.
- No blanks are allowed in the string provided to ERXM, for example
`MEM=erxmain-control-block,CMD=...`

▶ To start the CICS RPC Server from a z/VSE console

- Use the following z/VSE command:

```
task_id ERXM [MEM=erxmain-control-block,]CMD=START
```

▶ To ping the CICS RPC Server from a z/VSE console

- Use the following z/VSE command:

```
task_id ERXM [MEM=erxmain-control-block,]CMD=PING
```

▶ **To stop the CICS RPC Server from a z/VSE console**

- Use the following z/VSE command:

```
task_id ERXM [MEM=erxmain-control-block,]CMD=STOP
```

▶ **To switch on tracing for the CICS RPC Server from a z/VSE console**

- Use the following z/VSE command:

```
task_id ERXM [MEM=erxmain-control-block,]CMD=TRACELEVEL=tracelevel
```

For *tracelevel*, see [Activating Tracing for the RPC Server](#).

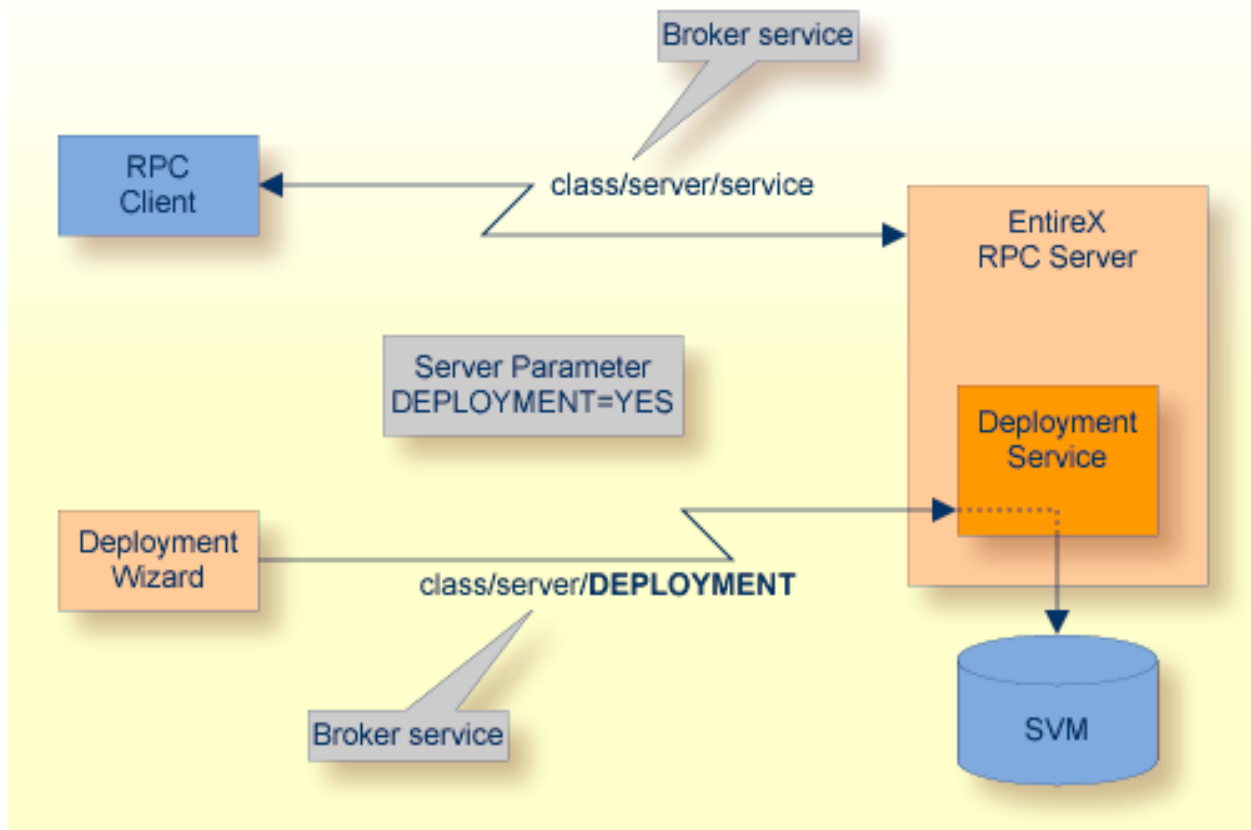
4 Deployment Service

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- Disabling the Deployment Service 38

Introduction

The deployment service

- is the (server-side) counterpart to the deployment wizard; see *Server Mapping Deployment Wizard*.
- is a built-in service of the EntireX RPC server, which can be enabled/disabled by EntireX RPC server configuration settings
- usage can be restricted to certain users or group of users, using EntireX Security; see *Authorization of Client and Server* under *Overview of EntireX Security* in the EntireX Security documentation.



Scope

The deployment service is used for the

- IDL Extractor for COBOL to deploy SVM files with the deployment wizard;
- COBOL Wrapper for server generation to deploy SVM files with the deployment wizard.

See *Server Mapping Deployment Wizard*.

The deployment service uses the same class and server names as defined for the EntireX RPC server, and DEPLOYMENT as the service name, resulting in `class/server/DEPLOYMENT` as the broker service. Please note DEPLOYMENT is a service name reserved by Software AG. See broker attribute SERVICE.

Enabling the Deployment Service

▶ To enable the deployment service

- 1 For a CICS RPC Server, the server mapping file VSAM (container) must be installed and configured. See *Step 1: Define an RPC Server Mapping File - VSAMDEF.J (Optional)* under *Installing the z/VSE EntireX RPC Servers*.
- 2 Set *ERXMAIN Macro* parameter DPLY=YES. See DPLY under *Configuring the RPC Server*.
- 3 Define in the broker attribute file, under the RPC service, an additional broker service with DEPLOYMENT as the service name and values for class and server identical to those used for the RPC service. For example, if your RPC service is named

```
CLASS = RPC    SERVER = SRV1    SERVICE = CALLNAT
```

the deployment service requires the following additional service definition in the broker attribute file:

```
CLASS = RPC    SERVER = SRV1    SERVICE = DEPLOYMENT
```

- 4 Optional. If you need to restrict the use of the deployment service to a selected group of users, use EntireX Security and define security rules for the `class/server/DEPLOYMENT` broker service. The service name DEPLOYMENT is a constant.
 - For a z/OS broker, see *Resource Profiles in EntireX Security* in the EntireX Security documentation.

- For a UNIX or Windows broker, see *Administering Authorization Rules using System Management Hub* in the UNIX and Windows administration documentation.
- Not applicable to a BS2000/OSD or z/VSE broker.

Disabling the Deployment Service

▶ To disable the deployment service

- Set *ERXMAIN Macro* parameter `DPLY=NO`. See *ERXMAIN macro* parameter `DPLY`.
The CICS RPC Server will not register the deployment service in the broker.

5 Handling SVM Files

- SVM Files in the EntireX Workbench 40
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A server mapping file (SVM) enables the RPC server to correctly support special COBOL syntax such as `REDEFINES`, `JUSTIFIED`, `SYNCHRONIZE` and `OCCURS DEPENDING ON` clauses, `LEVEL-88` fields, etc. If one of these elements is used, the EntireX Workbench automatically extracts an SVM file in addition to the IDL (interface definition language), or an SVM file is generated by the COBOL Wrapper for a server skeleton. The SVM file is used at runtime to marshal and unmarshal the RPC data stream.

SVM Files in the EntireX Workbench

In the *EntireX Workbench*, an SVM file has to relate to an appropriate IDL file. Therefore, you always have to keep the IDL file and the SVM file together in the same folder.

If there is an SVM file and a corresponding IDL file,

- at least one of the IDL programs in the corresponding IDL file requires server-mapping information to correctly call the target server. For those IDL programs, there is an SVM entry (line) in the Workbench SVM file.
- deployment of the SVM file to the RPC server is mandatory, see *Server Mapping Deployment*.

If there is an IDL file but no corresponding SVM file,

- there is no IDL program that requires server mapping information.

SVM Files in the RPC Server

Under *z/VSE*, SVM entries of the EntireX Workbench SVM files are stored as records within one VSAM file (containing all SVM entries from all Workbench SVM files). The unique key of the VSAM file consists of the first 255 bytes of the record: for the type (1 byte), for the IDL library (127 bytes) and for the IDL program (127 bytes). The CICS, Batch and IMS RPC servers use a VSAM file as the container.

If *one* server requires an SVM file, you need to provide this to the RPC server:

- Development environments: to allow the deployment of new SVM files, enable the deployment service. See *Enabling the Deployment Service*.
- Production environments: provide SVM files to the RPC server. See `ERXMAIN` macro parameter `SVM`.

If *no* server requires an SVM file, you can execute the RPC server without SVM files:

- Development environments: you can disable the deployment service. See *Disabling the Deployment Service*.

- Production environments: there is no need to provide SVM files to the RPC server. See `ERXMAIN` macro parameter `SVM`.

Source Control of SVM Files

Because SVM entries within an SVM file contain text data only, a Workbench SVM file is text-based (although it is not intended for human consumption). Therefore, you can include it in your source control management together with the IDL file and the COBOL source(s) as a triplet that should always be kept in sync.

Change Management of SVM Files

Under z/VSE, change management for a VSAM file (SVM container) is similar to change management for a database. The complete VSAM file can be backed up at any time, for example by using IDCAMS. All updates to the VSAM file done after a backup must be kept.

All Workbench SVM files added since the last backup should be available.

Compare SVM Files

For SVM files in the *EntireX Workbench* format, you can use a third party file/text compare tool to check if two files are identical.

The SVM entries (corresponding to lines in a Workbench SVM file) contain a creation timestamp at offset 276 (decimal) in the format `YYYYMMDDHHIISST`. The precision is 1/10 of a second.

List Deployed SVM Files

Use IDCAMS:

```
* $$ JOB JNM=VSAMPRNT,CLASS=0,DISP=D
* $$ LST CLASS=A,DISP=K
/* ----- */
/* PRINT CONTENT OF AN SVM VSAM CLUSTER */
/* ----- */
// JOB VSAMPRNT
// DLBL ERXSVM,'ENTIREX.SVMDEV.KSDS',0,VSAM,CAT=VSESPUC
// EXEC IDCAMS,SIZE=AUTO
// PRINT INFILE(ERXSVM) CHAR
```

```
/*
/ &
* $$ EOJ
```

Check if an SVM File Revision has been Deployed

SVM entries (corresponding to lines in Workbench SVM files) contain a creation timestamp at offset 276 (decimal) in the format *YYYYMMDDHHIISST*. Precision is 1/10 of a second. The creation timestamp can be checked.

The timestamp can be found on the same offset in the records in the VSAM file (SVM container).

Access Control: Secure SVM File Deployment

For deployment with the *Server Mapping Deployment Wizard*, use EntireX Security if the broker is running on platforms z/OS, UNIX, Windows or z/VSE. See [Enabling the Deployment Service](#).

For IBM deployment tool IDCAMS, use RACF to secure deployment.

Ensure that Deployed SVM Files are not Overwritten

For IDCAMS, use the `NOREPLACE` option to disallow overwriting of duplicate SVM records in the VSAM file (container). See *Server Mapping Deployment using FTP and IDCAMS*.

When is an SVM File Required?

For the IDL Extractor for COBOL

Interface Type	COBOL Syntax	COBOL Mapping Editor	SVM Required	More Information
CICS with DFHCOMMAREA Calling Convention and IN different to OUT	all		yes	<i>CICS with DFHCOMMAREA Calling Convention under Introduction to the IDL Extractor for COBOL CICS DFHCOMMAREA under COBOL Parameter Selection</i>
CICS Channel Container Calling Convention	all		yes	<i>CICS with Channel Container Calling Convention</i>

Interface Type	COBOL Syntax	COBOL Mapping Editor	SVM Required	More Information
CICS with DFHCOMMAREA Large Buffer Interface	all		yes	<i>CICS with DFHCOMMAREA Large Buffer Interface</i>
IMS MPP Message Interface (IMS Connect)	all		yes	<i>IMS MPP Message Interface (IMS Connect)</i>
IMS BMP with Standard Linkage Calling Convention	all		yes	<i>IMS BMP with Standard Linkage Calling Convention</i>
Micro Focus with Standard Linkage Calling Convention	BINARY clause		yes	<i>Micro Focus with Standard Linkage Calling Convention</i>
all	OCCURS DEPENDING ON clause		yes	<i>Tables with Variable Size - DEPENDING ON Clause under COBOL to IDL Mapping in the IDL Extractor for COBOL documentation</i>
all	REDEFINES clause		yes	<i>REDEFINE Clause</i>
all	TRAILING [SEPARATE] clause		yes	<i>SIGN LEADING and TRAILING SEPARATE Clause</i>
all	LEADING [SEPARATE] clause		yes	<i>SIGN LEADING and TRAILING SEPARATE Clause</i>
all	ALIGNED RIGHT attribute		yes	
all	all	Rename of program	yes	<i>The Software AG IDL Tree Pane under Mapping Editor User Interface in the IDL Extractor for COBOL documentation</i>
all	all	Map to operation	yes	<i>Context Menu under The COBOL Parameters Pane</i>
all	all	Map to constant	yes	<i>Context Menu</i>
all	all	Suppress	yes	<i>Context Menu</i>
other combinations			no	

For the COBOL Wrapper

This depends on the interface type chosen and the IDL type:

Interface Type	IDL Type	COBOL Wrapper	SVM Required	More Information
CICS with DFHCOMMAREA Large Buffer Interface	all		yes	<i>CICS with DFHCOMMAREA Large Buffer Interface under COBOL Server Interface Types</i>
CICS with Channel Container Calling Convention	all		yes	<i>CICS with Channel Container Calling Convention</i>
IMS BMP with Standard Linkage Calling Convention	all		yes	<i>IMS BMP with Standard Linkage Calling Convention</i>
Micro Focus	I2 or I4		yes	<i>Micro Focus with Standard Linkage Calling Convention IDL Data Types under Software AG IDL File in the IDL Editor documentation</i>
all	IDL unbounded array		yes	<i>array-definition under Software AG IDL Grammar in the IDL Editor documentation</i>
all	IDL unbounded group		yes	<i>group-parameter-definition under Software AG IDL Grammar in the IDL Editor documentation</i>
all	all	IDL program name is not a valid COBOL name and is therefore adapted, or the COBOL program name is customized	yes	<i>Customize Automatically Generated Server Names</i>
other combinations			no	

Is There a Way to Smoothly Introduce SVM Files?

All EntireX RPC servers can be executed without SVM files. There is no need to install the SVM container (see [SVM Files in the RPC Server](#)) as long as you do not use features that require SVM files (see [When is an SVM File Required?](#)). You can also call COBOL servers generated or extracted with previous versions of EntireX mixed with a COBOL server that requires SVM files. All EntireX RPC servers are backward compatible.

6 Scenarios and Programmer Information

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- Automatic Syncpoint Handling 47

COBOL Scenarios

- [Scenario I: Calling an Existing COBOL Server](#)
- [Scenario II: Writing a New COBOL Server](#)

Scenario I: Calling an Existing COBOL Server

▶ To call an existing COBOL server

- 1 Use the *IDL Extractor for COBOL* to extract the Software AG IDL and, depending on the complexity of the extraction, also an SVM file.
- 2 Build an EntireX RPC client using any EntireX wrapper. See *EntireX Wrappers*. For a quick test you can:
 - use the IDL Tester; see *EntireX IDL Tester* in the EntireX Workbench documentation
 - generate an XML mapping file (XMM) and use the XML Tester for verification; see *EntireX XML Tester*

See *Client and Server Examples for z/VSE CICS* for COBOL RPC Server examples.

Scenario II: Writing a New COBOL Server

▶ To write a new COBOL server

- 1 Use the *COBOL Wrapper* to generate a COBOL server skeleton and, depending on the complexity of the extraction, also an SVM file. Write your COBOL server and proceed as described under *Using the COBOL Wrapper for the Server Side*.
- 2 Build an EntireX RPC client using any EntireX wrapper. See *EntireX Wrappers*. For a quick test you can:
 - use the IDL Tester; see *EntireX IDL Tester* in the EntireX Workbench documentation
 - generate an XML mapping file (XMM) and use the XML Tester for verification; see *EntireX XML Tester*

See *Client and Server Examples for z/VSE CICS* for COBOL RPC Server examples.

Aborting RPC Server Customer Code and Returning Error to RPC Client

Using EXEC CICS ABEND ABCODE

This approach applies to all CICS scenarios (all programming languages and all interface types); see [Supported Interface Types](#).

The CICS feature `EXEC CICS ABEND ABCODE(myabend)` may be used to indicate application error codes. According to IBM CICS standards, ABEND codes starting with the letter A are reserved for CICS itself and should not be used in your RPC server.

The CICS RPC Server follows these IBM CICS standards and sends back the RPC protocol message

1. 10010018 Abnormal termination during program execution. This is returned when an ABEND code starting with the letter "A" is received from CICS, which is a CICS ABEND.
2. 10010045 CICS ABEND *myabend* was issued. This is returned when an ABEND code starting with a letter other than "A" is received from CICS, which is an application error situation forced by your RPC server.

Automatic Syncpoint Handling

The CICS RPC Server issues a `SYNCPPOINT` command under the following circumstances:

- After a successful non-conversational request or an end-of-conversation, the server issues a `SYNCPPOINT COMMIT` command. If you are running under CICS with impersonation, this `SYNCPPOINT` command is not executed by the server, but by CICS when the user task is terminated. See [Impersonation](#).
- After abnormal termination of a non-conversational request or a conversation due to an error, the server performs a `SYNCPPOINT ROLLBACK` command to back out any pending database modifications.

