

Installing the EntireX RPC Servers under z/OS

This chapter covers the following topics:

- Installing EntireX RPC Servers under CICS
- Installing EntireX RPC Servers under Batch
- Installing EntireX RPC Servers under IMS
- Extract the EntireX RPC Examples from their Container Data Set

For Natural RPC servers, see *Setting Up a Natural RPC Environment* in your Natural documentation.

Installing EntireX RPC Servers under CICS

The EntireX z/OS CICS® RPC Server allows standard RPC clients to communicate with RPC servers on the operating system z/OS under CICS. It supports the programming languages COBOL and PL/I.

This section covers the following topics:

- Update the CICS Tables
- Modify the CICS Startup JCL
- Build the ERXMAIN Control Block
- TCP/IP-enable the CICS Region (Optional)
- Install the Server-side Mapping Container for a CICS RPC Server (Optional)
- Starting the EntireX RPC Server Automatically on CICS Startup (Optional)
- Stopping the EntireX RPC Server Automatically on CICS Shutdown (Optional)
- Installing Multiple EntireX RPC Servers in the same CICS (Optional)
- Using SSL or TLS Connections with the CICS RPC Server (Optional)

Prerequisites for all EntireX components are described centrally. See *z/OS Prerequisites*.

Update the CICS Tables

EntireX RPC requires a number of enhancements to the CICS tables. These changes are usually performed by a CICS system programmer using standard system jobs.

- Execute "Step 3: Install CICS CSD defs for EntireX RPC Server" of job EXPINSTA located in the EXX970.JOBS data set. This will add the group ERX with all its relevant entries.

- Tracing: TD queue entries for RPC server trace output may optionally be updated by uncommenting the DFHTRACE exec line. See also *ERXMAIN Macro* parameter *TRC1*.

Note:

If you have not extended your DCT (that is, you are using the default values), you must specify the option DCT= in the CICS SYSIN file.

Modify the CICS Startup JCL

The startup JCL for CICS must be modified to include the EXP970.LD00 and EXX970.LOAD data sets in the DFHRPL data set concatenation. This is to enable CICS to find the various programs that have been defined in the PPT.

You may also include a DD statement for ERXOUT extra partition data set. Once the startup JCL has been modified, restart your CICS system.

Build the ERXMAIN Control Block

Adapt the RPC server configuration in the Assembler program EMAINGEN (in EXP970.SRCE) to the customer environment. See *ERXMAIN Macro*.

Execute "Step 2: Build the ERXMAIN Control Block" of job EXPINSTA located in the EXX970.JOBS data set.

The name of the main control block in earlier versions was fixed as ERXMAIN. As of version 5.1.1, any meaningful name can be chosen. Using this name as input parameter *memory* for the *RPC Online Maintenance Facility* means that multiple CICS RPC Servers can be started and monitored in parallel. A fully linked control block named ERXMAIN is delivered in the load library EXP970.LOAD.

See also *Verify the Installation of the EntireX RPC Server*.

TCP/IP-enable the CICS Region (Optional)

If you are using transport method TCP/IP, your CICS region must be enabled for TCP/IP. Refer to your CICS documentation for details.

Install the Server-side Mapping Container for a CICS RPC Server (Optional)

If you are using or plan to use server-side mapping files, you need to set up a server-side mapping container. A server-side mapping file is an EntireX Workbench file with extension .svm. See *Server Mapping Files for COBOL*. If this step is omitted, the RPC server will start without the server-side mapping container. This means that server programs cannot make use of special COBOL syntax and features. See *When is a Server Mapping File Required?* in the EntireX Workbench documentation.

Execute "Step 7: Allocate and (CSD) define SVM file" of the EXPINSTA job located in the EXX970.JOBS data set. After updating the SVMFILE variable to a suitable name, the following steps are performed:

- allocation of the required VSAM cluster

- initialization of the cluster with the first server mapping (VSAM record) that matches the CICS advanced channel container example DFHCON and the advanced CICS large buffer example DFHLBUF of the EXP970.DVCO data set. See *Client and Server Examples for z/OS CICS*.
- CICS CSD definition with the given name in the SVMFILE variable

See also *Server-side Mapping Files* and *Job Replacement Parameters*.

Starting the EntireX RPC Server Automatically on CICS Startup (Optional)

➤ To start the RPC server automatically on CICS startup

1. Insert a new PLT entry DFHPLT TYPE=ENTRY , PROGRAM=ERXSTART.
2. Rebuild the PLT for CICS startup.

Note:

The EXP970.LD00 CICS load library contains a precompiled ERXSTART module with the default settings of the COBOL source member ERXSTART in EXP970.SRCE

Stopping the EntireX RPC Server Automatically on CICS Shutdown (Optional)

➤ To stop the RPC server automatically on CICS shutdown

1. Insert a new PLT entry DFHPLT TYPE=ENTRY , PROGRAM=ERXSTOP into your CICS shutdown table.
2. Rebuild the PLT for CICS shutdown.

Note:

The EXP970.LD00 CICS load library contains a precompiled ERXSTOP module with the default settings of the COBOL source member ERXSTOP in EXP970.SRCE

Installing Multiple EntireX RPC Servers in the same CICS (Optional)

➤ To install a second RPC server in the same CICS

1. Copy the default CICS RPC Server transaction definition ESRV and give it a unique name, e.g. ESR2.

```
CEDA COPY TRANSACTION(ESRV) GROUP(ERX) TO(ERX2) AS(ESR2)
```

2. Copy the default CICS RPC Server *ERXMAIN Control Block* and give it a unique name, e.g. ERXMAIN2.

```
CEDA COPY PROGRAM(ERXMAIN) GROUP(ERX) TO(ERX2) AS(ERXMAIN2)
```

3. Add the new group ERX2 to the CICS autoinstall list.

```
CEDA ADD GROUP(ERX2) LIST(listname) AFTER(groupname)
```

4. Build a new *ERXMAIN Control Block* and give it the name created above, e.g. ERXMAIN2.

As a minimum, set the *ERXMAIN Macro* parameter *REPL* in the ERXMAIN Control Block to the new RPC server transaction ID created above, e.g. REPL=ESR2.

The second CICS RPC server can now be started manually (see *Starting the RPC Server* under *RPC Online Maintenance Facility*), or automatically on CICS startup.

To start a second RPC server automatically on CICS startup

1. Copy the default CICS RPC Server autostart definition ERXSTART and give it a unique name, e.g. ERXSTR2.

```
CEDA COPY PROGRAM(ERXSTART) GROUP(ERX) TO(ERX2) AS(ERXSTR2)
```

2. "CEDA Install" the new autostart definition.
3. Modify the CICS RPC Server PLT startup routine ERXSTART from data set EXP970.SRCE.
 - Update RPC-TRANSID with ESR2.
 - Update RPC-INPUT with MEM=ERXMAIN2.
4. Compile and link the modified source and give it the name defined above, e.g. ERXSTR2.
5. Insert a new PLT entry DFHPLT TYPE=ENTRY , PROGRAM=ERXSTR2.
6. Rebuild the PLT for CICS startup.

To stop a second RPC server automatically on CICS shutdown

1. Copy the default CICS RPC server autostop definition ERXSTOP and give it a unique name, e.g. ERXSTOP2.

```
CEDA COPY PROGRAM(ERXSTOP) GROUP(ERX) TO(ERX2) AS(ERXSTOP2)
```

2. "CEDA Install" the new autostop definition.
3. Modify the CICS RPC Server PLT routine ERXSTOP from data set EXP970.SRCE.
 - Update RPC-TRANSID with ESR2.
 - Update RPC-INPUT with MEM=ERXMAIN2.
4. Compile and link the modified source and give it the name defined above, e.g. ERXSTOP2.
5. Insert a new PLT entry DFHPLT TYPE=ENTRY , PROGRAM=ERXSTOP2 into your CICS shutdown table.
6. Rebuild the PLT for CICS shutdown.

Using SSL or TLS Connections with the CICS RPC Server (Optional)

See *Using SSL or TLS with the RPC Server*.

Installing EntireX RPC Servers under Batch

The EntireX z/OS Batch RPC Server allows standard RPC clients to communicate with RPC servers on the operating system z/OS running in batch mode. It supports the programming languages COBOL, PL/I and C. This section covers the following topics:

- Prepare Your Startup JCL
- Customize Your Server Configuration
- Using z/OS Privileged Services
- Install the Server-side Mapping Container for a Batch RPC Server (Optional)
- Using SSL or TLS Connections with the Batch RPC Server (Optional)

Prerequisites for all EntireX components are described centrally. See *z/OS Prerequisites*.

Prepare Your Startup JCL

The Batch RPC Server can run as a started task. The installation medium contains the following sample JCL:

- EXPSRVB

To prepare your startup JCL

1. Modify the example started task EXPSRVB of the EXX970.JOBS data set to suit your installation.
2. Modify the CONFIG DD statement to point to your server configuration file.
3. Concatenate your server application data set to the RPC server STEPLIB.
4. Add the EntireX RPC server JCL to your TASKLIB data set.

Customize Your Server Configuration

Modify the sample parameter member CONFIG from EXP970.SRCE. The Batch RPC Server is optimized for use in COBOL environments. Nevertheless, as a minimum the following parameters must be set according to your system environment:

- BrokerId
- Class
- ServerName

- Service

For more information see *Configuring the RPC Server*.

Using z/OS Privileged Services

Some of the RPC server features such as impersonation require privileged z/OS access. Therefore, the RPC server should be started (initially) from an APF-authorized library. Consequently, all other load data sets concatenated to STEPLIB DD have to be APF-authorized as well, including customer's server data sets.

To cope with non-APF-authorized data sets, a server invocation module EXXAUTH\$ is provided. The module can be invoked (APF-authorized) from an APF data set (other than STEPLIB), which installs the authorized PC routines necessary before it invokes (unauthorized) the RPC server.

➤ To install the server invocation module

1. Copy load module EXXAUTH\$ from EntireX load library *EXP970.LB00* to an APF-authorized load library that is linked to the system LNKST concatenation and rename the copy to EXXAUTH.

Note:

A different name is essential if the *EXP970.LB00* is part of the STEPLIB concatenation, because under z/OS search for the module is first done in the STEPLIB libraries prior to LNKST libraries. Thus not changing the name would result in invoking the module from STEPLIB instead of invoking the module from LNKST and the module could not work properly.

2. Change the RPC server startup JCL:

```
//BATRPCS EXEC PGM=EXXAUTH, PARM='RPCSRVB CFG=DD:CONFIG'
```

Note:

EXXAUTH expects the first parameter to be the name of the RPC server to be started. Subsequent parameters will be passed to the RPC server directly.

Install the Server-side Mapping Container for a Batch RPC Server (Optional)

If you are using or plan to use server-side mapping files, you need to set up a server-side mapping container. A server-side mapping file is an EntireX Workbench file with extension .svm. See *Server Mapping Files for COBOL*. If this step is omitted, the RPC server will start without the server-side mapping container. This means that server programs cannot make use of special COBOL syntax and features. See *When is a Server Mapping File Required?* in the EntireX Workbench documentation.

Execute the EXPSVMAL job located in the EXX970.JOBS data set. After updating the SVMFILE variable to a suitable name, the following steps are performed:

- allocation of the required VSAM cluster
- initialization of the cluster with a dummy server mapping (VSAM record)

Insert the new server-side mapping container (VSAM file) into your Batch RPC server's JCL under the DD name of ERXSVM. If this cluster is to be shared between more than one RPC server it should be defined with the RLS=NR1 attribute:

```
//ERXSVM DD DISP=SHR,DSN=< batch.svm.cluster >
```

See also *Server-side Mapping Files* and *Job Replacement Parameters*.

Using SSL or TLS Connections with the Batch RPC Server (Optional)

See *Using SSL or TLS with the RPC Server*.

Installing EntireX RPC Servers under IMS

The EntireX z/OS IMS RPC Server allows standard RPC clients to communicate with RPC servers on the operating system z/OS running with IMS in BMP mode. It supports the programming languages COBOL, PL/I and C and can provide IMS-specific PCB pointers for access to IMS databases if needed. This section covers the following topics:

- Prepare Your Startup JCL
- Customize Your Server Configuration
- Install the Server-side Mapping Container for an IMS RPC Server (Optional)
- Using SSL or TLS Connections with the IMS RPC Server (Optional)

Prerequisites for all EntireX components are described centrally. See *z/OS Prerequisites*.

Prepare Your Startup JCL

The IMS RPC Server can run as a started task. The installation medium contains the following sample JCL:

- EXPSRVI

To prepare your startup JCL

1. Modify the sample started task EXPSRVI of the EXX970.JOBS data set to suit your installation.
2. Modify the CONFIG DD statement to point to your server configuration file.
3. Name a valid PSB in the parameter list for IMSBATCH.
4. Concatenate the necessary EntireX product data sets to the RPC server STEPLIB.
5. Concatenate your server application data set to the RPC server STEPLIB.
6. Insert a valid IMS RESLIB data set high-level qualifier.
7. Add the EntireX RPC server JCL to your TASKLIB data set.

Customize Your Server Configuration

Modify the sample parameter member `CONFIG` from `EXP970.SRCE`. The EntireX RPC server is optimized for use in COBOL environments. Nevertheless, as a minimum the following parameters must be set according to your system environment:

- `BrokerId`
- `Class`
- `ServerName`
- `Service`

For more information see *Configuring the RPC Server*.

Install the Server-side Mapping Container for an IMS RPC Server (Optional)

If you are using or plan to use server-side mapping files, you need to set up a server-side mapping container. A server-side mapping file is an EntireX Workbench file with extension `.svm`. See *Server Mapping Files for COBOL*. If this step is omitted, the RPC server will start without the server-side mapping container. This means that server programs cannot make use of special COBOL syntax and features. See *When is a Server Mapping File Required?* in the EntireX Workbench documentation.

Execute the `EXPSVMAL` job located in the `EXX970.JOBS` data set. After updating the `SVMFILE` variable to a suitable name, the following steps are performed:

- allocation of the required VSAM cluster
- initialization of the cluster with a dummy server mapping (VSAM record)

Insert the new server-side mapping container (VSAM file) into your IMS RPC Server's JCL under the DD name of `ERXSVM`. If this cluster is to be shared between more than one server, it should be defined with the `RLS=NRI` attribute:

```
//ERXSVM DD DISP=SHR,DSN=< ims.svm.cluster >
```

See also *Server-side Mapping Files* and *Job Replacement Parameters*.

Using SSL or TLS Connections with the IMS RPC Server (Optional)

See also *Using SSL or TLS with the RPC Server* and *Job Replacement Parameters*.

Extract the EntireX RPC Examples from their Container Data Set

All example data sets are delivered in the condensed IBM `IEBCOPY` load format and can be found with their last level qualifier as a member name in the `EXP970.EXPL` data set. The CICS and batch examples are unloaded with separate jobs:

➤ **To unload the CICS members to their target data sets**

- Select the desired programming language (COBOL or PL/I) and execute "Step 5: Extract the Examples" of job `EXPINSTA` located in the `EXX970.JOBS` data set.

➤ **To unload the Batch members to their target data sets**

- Select the desired programming language (COBOL or PL/I) and execute job `EXPEXAMP` located in the `EXX970.JOBS` data set.

➤ **To unload the IMS members to their target data sets**

- Execute job `EXPINSTI` located in the `EXX970.JOBS` data set.