

# Client and Server Examples for BS2000/OSD

This chapter describes the examples provided for the COBOL Wrapper for BS2000/OSD. It covers the following topics:

- Overview of Client and Server Examples for BS2000/OSD
  - Creating the Sample COBOL Client Programs
  - Creating the Sample COBOL Server Programs
  - Running the Sample COBOL Client Programs
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## Overview of Client and Server Examples for BS2000/OSD

The following examples are delivered for BS2000/OSD:

- CALC Example
- SQUARE Example
- SENDMAIL Reliable RPC Example
- Notes

All examples here can be found in the EntireX directory *examples/RPC* under UNIX and Windows. If EntireX is installed under BS2000/OSD, the examples are also available on this platform.

### CALC Example

#### Client

Element	Type	LMS Library	Comment	Notes
CREATE-CALC-CLIENT	J	EXP811.COBC	S-procedure to generate the CALC COBOL sample client application. It makes use of RUN-COBOL-COMPILER and BIND-CALC-CLIENT .	2
BIND-CALC-CLIENT	J	EXP811.COBC	S-procedure to bind the CALC COBOL sample client application.	
RUN-COBOL-COMPILER	J	EXP811.COBC	S-procedure to run the COBOL2000 / COBOL85 compiler.	2
RUN-CALC-CLIENT	J	EXP811.COBC	S-procedure to run the CALC COBOL sample client application.	
CALCCLT.COB	S	EXP811.COBC	Main program source of the CALC COBOL example.	1
CALC.COB	S	EXP811.COBC	COBOL RPC client interface object.	1
CALC	S	EXP811.COBC	COBOL RPC interface copybook.	1
COBSRVI.COB	S	EXP811.COBC	Generic RPC service.	1
ERXCOMM	S	EXP811.COBC	Layout of the RPC communication area. See <i>The RPC Communication Area (Reference)</i> .	1
CLIENT-ADAPARM	S	EXP811.COBC	Adabas ADALNK IDTNAME parameter required when using the NET transport method. It is shared by all clients.	
CLIENT-INPARAM-CALC	S	EXP811.COBC	CALC client input parameters.	

### Server

Element	Type	LMS Library	Comment	Notes
CREATE-CALC-SERVER	J	EXP811.COBS	S-procedure to generate the CALC COBOL example server. It makes use of RUN-COBOL-COMPILER.	2
RUN-COBOL-COMPILER	J	EXP811.COBS	S-procedure to run the COBOL2000 / COBOL85 compiler.	2
CALC.COB	S	EXP811.COBS	Server program source of CALC COBOL example.	1

### SQUARE Example

#### Client

Element	Type	LMS Library	Comment	Notes
CREATE-SQUARE-CLIENT	J	EXP811.COBC	S-procedure to generate the SQUARE COBOL sample client application. It uses RUN-COBOL-COMPILER and BIND-SQUARE-CLIENT.	2
BIND-SQUARE-CLIENT	J	EXP811.COBC	S-procedure to bind the SQUARE COBOL sample client application.	
RUN-COBOL-COMPILER	J	EXP811.COBC	S-procedure to run the COBOL2000 / COBOL85 compiler.	2
RUN-SQUARE-CLIENT	J	EXP811.COBC	S-procedure to run the SQUARE COBOL sample client application.	
SQRECLT.COB	S	EXP811.COBC	Main program source of SQUARE COBOL example.	1
SQUARE.COB	S	EXP811.COBC	COBOL RPC client interface object.	1
SQUARE	S	EXP811.COBC	COBOL RPC interface copybook.	1
COBSRVI.COB	S	EXP811.COBC	Generic RPC service.	1
ERXCOMM	S	EXP811.COBC	Layout of the RPC communication area. See <i>The RPC Communication Area (Reference)</i> .	1
CLIENT-ADAPARM	S	EXP811.COBC	Adabas ADALNK IDTNAME parameter required when using the NET transport method. It is shared by all clients	
CLIENT-INPARAM-SQUARE	S	EXP811.COBC	SQUARE client input parameters.	

### Server

Element	Type	LMS Library	Comment	Notes
CREATE-SQUARE-SERVER	J	EXP811.COBS	S-procedure to generate the SQUARE COBOL sample server. It uses RUN-COBOL-COMPILER.	2
RUN-COBOL-COMPILER	J	EXP811.COBS	S-procedure to run the COBOL2000 / COBOL85 compiler.	2
SQUARE.COB	S	EXP811.COBS	Server program source of the SQUARE COBOL example.	1

### SENDMAIL Reliable RPC Example

#### Client

Element	Type	LMS Library	Comment	Notes
CREATE-MAIL-CLIENT	J	EXP811.COBC	S-procedure to generate the SENDMAIL reliable RPC COBOL sample client application. It uses RUN-COBOL-COMPILER and BIND-MAIL-CLIENT.	2
BIND-MAIL-CLIENT	J	EXP811.COBC	S-procedure to bind the SENDMAIL reliable RPC COBOL sample client application.	
RUN-COBOL-COMPILER	J	EXP811.COBC	S-procedure to run the COBOL2000 / COBOL85 compiler.	2
RUN-MAIL-CLIENT	J	EXP811.COBC	S-procedure to run the SENDMAIL reliable RPC COBOL sample client application.	
MAILCLT.COB	S	EXP811.COBC	Main program source of the SENDMAIL reliable RPC COBOL example.	1
SENDMAIL.COB	S	EXP811.COBC	COBOL RPC client interface object.	1
SENDMAIL	S	EXP811.COBC	COBOL RPC interface copybook.	1
COBSRVI.COB	S	EXP811.COBC	Generic RPC service.	1
ERXCOMM	S	EXP811.COBC	Layout of the RPC communication area. See <i>The RPC Communication Area (Reference)</i> .	1
CLIENT-ADAPARM	S	EXP811.COBC	Adabas ADALNK IDTNAME parameter required when using the NET transport method. It is shared by all clients.	
CLIENT-INPARAM-MAIL	S	EXP811.COBC	SENDMAIL reliable RPC client input parameters.	

### Server

Element	Type	LMS Library	Comment	Notes
CREATE-MAIL-SERVER	J	EXP811.COBS	S-procedure to generate the SENDMAIL reliable RPC COBOL sample server. It makes use of RUN-COBOL-COMPILER.	2
RUN-COBOL-COMPILER	J	EXP811.COBS	S-procedure to run the COBOL2000 / COBOL85 compiler.	2
SENDMAIL.COB	S	EXP811.COBS	Server program source of the SENDMAIL reliable RPC COBOL example.	1

## Notes

1. When compiling the COBOL client and server sample source programs, the compiler may issue warnings depending on the compiler used. These warnings can be ignored.
2. The default configuration expects a COBOL2000 environment. Depending on your installation it might be necessary to change the COMPILER parameter within the parameter declaration section of the procedures. The delivered procedures support both COBOL2000 and COBOL85 syntax.

## Creating the Sample COBOL Client Programs

To create the CALC, SQUARE and SENDMAIL clients, parametrize S-procedures CREATE-CALC-CLIENT, CREATE-SQUARE-CLIENT and CREATE-MAIL-CLIENT in EXP811.COBC and choose the compiler installed on your system.

For more details, see also see the procedure headers in the delivered job control.

Enter the following commands:

Procedure Parameter	Description	Default
EXP-COB-CLT	COBOL client examples library	EXP811.COBC
COMPILER	The COBOL compiler to be used: COBOL2000 or COBOL85	COBOL2000

For more details, see also see the procedure headers in the delivered job control.

Enter the following commands:

```
/CALL-PROCEDURE *LIB(LIB=EXP811.COBC,ELE=CREATE-CALC-CLIENT)
/CALL-PROCEDURE *LIB(LIB=EXP811.COBC,ELE=CREATE-SQUARE-CLIENT)
/CALL-PROCEDURE *LIB(LIB=EXP811.COBC,ELE=CREATE-MAIL-CLIENT)
```

These procedures call the COBOL compiler and binder to generate corresponding L-elements stored in the EXP-COB-CLT library (the default is EXP811.COBC).

## Creating the Sample COBOL Server Programs

To create the CALC, SQUARE and SENDMAIL server programs, parametrize S-procedures CREATE-CALC-SERVER, CREATE-SQUARE-SERVER and CREATE-MAIL-SERVER in EXP811.COBS and choose the compiler installed on your system.

Procedure Parameter	Description	Default
EXP-SRV-LIB	COBOL server examples library	EXP811.COBS
COMPILER	The COBOL compiler to be used: COBOL2000 or COBOL85	COBOL2000

For more details, see also see the procedure headers in the delivered job control.

Enter the following commands:

```
/CALL-PROCEDURE *LIB(LIB=EXP811.COBS,ELE=CREATE-CALC-SERVER)
/CALL-PROCEDURE *LIB(LIB=EXP811.COBS,ELE=CREATE-SQUARE-SERVER)
/CALL-PROCEDURE *LIB(LIB=EXP811.COBS,ELE=CREATE-MAIL-SERVER)
```

These procedures call the COBOL Compiler to generate three corresponding object modules stored as R-elements in EXP-SRV-LIB (the default is EXP811.COBS).

There is no need to link the object modules with the BS2000/OSD Common Runtime Environment (CRTE) library. The CRTE is loaded once dynamically in the corresponding worker task of the RPC server where the server program is executed.

## Running the Sample COBOL Client Programs

Running the CALC client is described below. Running the SQUARE and the SENDMAIL clients is similar.

### ➤ To run the CALC client

1. Adapt S-element CLIENT-INPARAM-CALC in EXP811.COB.

```
* * * * *
*           Example CALC Client Input Parameter           *
* * * * *
BROKERID <ipaddr>:<port>:TCP
* BROKERID ETB<nnnnn>::NET
* USERID <userid>
* PASSWORD <password>
CLASS      RPC
SERVER     SRV1
SERVICE   CALLNAT
LOGON
CALC      + 00012345 00067890
CALC      - 00067890 00012345
CALC      * 00001234 00005678
CALC      / 00005678 00001234
CALC      % 00005678 00001234
LOGOFF
END
```

Set up BROKERID in one of two formats, depending on the transport method:

- **TCP Transport Method**  
*<ip>:<port>:TCP*

where *ip* is the address or DNS host name,  
*port* is the port number that EntireX Broker is listening on, and  
 TCP is the protocol name.

- **NET Transport Method**

ETB<*nnnnn*>::NET

where *nnnnn* is the ID under which EntireX Broker is connected to the Adabas ID table  
 and

NET is the protocol name.

## 2. Adapt S-element CLIENT-ADAPARM.

If "NET" is chosen as transport method, specify the name of the ID table to which the broker is connected:

```
ADALNK IDTNAME=ADAxxxxxx
```

where *xxxxx* is any uppercase value.

This parameter is shared between all sample clients.

## 3. Make sure the RPC server runs as COBOL RPC server (refer to the RPC-CONFIG S-element in library EXP811.JOBS) and library EXP811.COBS is included as PROGRAM-LIB in the start up procedure START-RPC-SERVER.

## 4. Enter the following command to run the CALC COBOL example client:

```
/CALL-PROCEDURE *LIB(LIB=EXP811.COBC,ELE=RUN-CALC-CLIENT)
```

```
CALCCLT : START
OPEN IN: ----- : <00>
          : BROKERID : ETB001
          : CLASS    : RPC
          : SERVER   : SRV1
          : SERVICE  : CALLNAT
CALCCLT : BROKER LOGON.
CALC called successfully: 000012345 + 000067890 = 000080235
CALC called successfully: 000067890 - 000012345 = 000055545
CALC called successfully: 000001234 * 000005678 = 007006652
CALC called successfully: 000005678 / 000001234 = 000000004
CALC called successfully: 000005678 % 000001234 = 000000742
CALCCLT : BROKER LOGOFF.
CLOSE IN: ----- : <00>
CALCCLT : LEAVE
```