

webMethods EntireX

Calling COBOL from Integration Server

Version 10.9

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This document applies to webMethods EntireX Version 10.9 and all subsequent releases.

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

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Calling COBOL from Integration Server

1

About this Documentation

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Document Conventions

| Convention | Description |
|----------------|--|
| Bold | Identifies elements on a screen. |
| Monospace font | Identifies service names and locations in the format <i>folder.subfolder.service</i> , APIs, Java classes, methods, properties. |
| <i>Italic</i> | Identifies: Variables for which you must supply values specific to your own situation or environment. New terms the first time they occur in the text. References to other documentation sources. |
| Monospace font | Identifies: Text you must type in. Messages displayed by the system. Program code. |
| { } | Indicates a set of choices from which you must choose one. Type only the information inside the curly braces. Do not type the { } symbols. |
| | Separates two mutually exclusive choices in a syntax line. Type one of these choices. Do not type the symbol. |
| [] | Indicates one or more options. Type only the information inside the square brackets. Do not type the [] symbols. |
| ... | Indicates that you can type multiple options of the same type. Type only the information. Do not type the ellipsis (...). |

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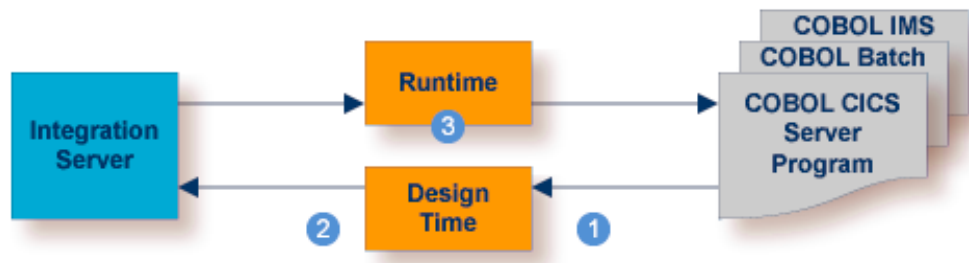
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2 Calling COBOL on z/OS from Integration Server

Under z/OS, a COBOL server can be called in different environments:



- ① Extract the interface of the COBOL server program.
- ② Generate connection and adapter services in Integration Server.
- ③ Execute the call from Integration Server to the COBOL server program.

Continue with the appropriate scenario:

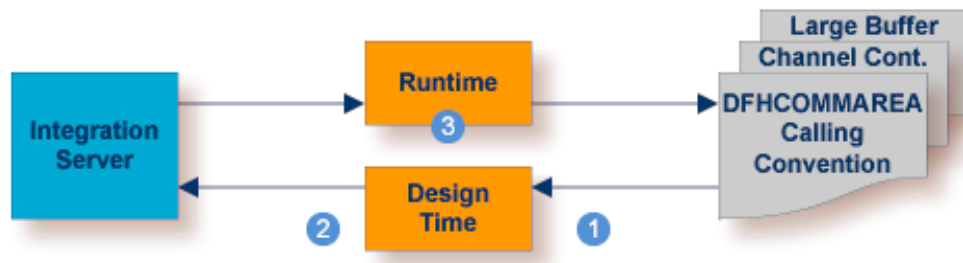
- **CICS** - Choose your CICS calling convention:
 - Channel Container using
 - **CICS IPIC (zero footprint)**
 - **CICS Socket Listener (minimal footprint)**
 - **RPC Server for CICS**
 - DFHCOMMAREA using
 - **CICS IPIC (zero footprint)**
 - **CICS ECI (zero footprint)**
 - **CICS Socket Listener (minimal footprint)**

- **RPC Server for CICS**
- Large Buffer using
 - **CICS Socket Listener (minimal footprint)**
 - **RPC Server for CICS**
- **Batch**
- **IMS** - Choose your IMS environment:
 - **MPP** - online transactions (zero footprint using IMS Connect)
 - **BMP** - batch processing (using RPC Server for IMS)

3

Calling COBOL on z/OS CICS from Integration Server

There are different styles (interface types) for calling a COBOL server.



- 1 Extract the interface of the COBOL server program.
- 2 Generate connection and adapter services in Integration Server.
- 3 Execute the call from Integration Server to the COBOL server program.

» To determine the appropriate scenario

- 1 First it is important to know the interface type of your COBOL server. Analyzing the technique used to access the interface with COBOL and CICS statements is the safest way to determine this. The following interface types are available and are described in the IDL Extractor for COBOL documentation:
 - CICS with DFHCOMMAREA Calling Convention
 - CICS with Channel Container Calling Convention
 - CICS with DFHCOMMAREA Large Buffer Interface

There is no clear and easy indication how to identify the interface type of a CICS COBOL server without COBOL and CICS knowledge. Below are some criteria that might help to determine the interface type. If you are unsure, consult a CICS COBOL specialist.

- The payload size of the CICS COBOL server is greater than 32 KB:
 - In this case it is *not* a DFHCOMMAREA interface, because the DFHCOMMAREA is limited to 32 KB.
 - It could be a large buffer or channel container interface, which are only limited by the storage (memory) available to them.
- The CICS COBOL server is located in a remote CICS region:
 - In this case it is *not* a large buffer interface, because large buffer programs must reside on the same CICS region as the caller, that is, the *RPC Server for CICS*.
 - It could be a DFHCOMMAREA or channel container interface, which can reside in a remote CICS region.



Note: The most used interface type is the DFHCOMMAREA interface. Large buffer and channel container interfaces are used much less frequently.

- 2 Second, for the DFHCOMMAREA interface only, you need to decide for the zero footprint or the RPC Server for CICS approach. Here are some guidelines:

Use the zero footprint approach if:

- you are already using and familiar with ECI or IPIC
- you do not want to install any additional resources in your CICS environment

Use the RPC Server for CICS if:

- you are already using (or planning on using) EntireX Broker for extended messaging

When you are sure which interface type and approach you are using, continue with the appropriate scenario:

CICS - Choose your CICS calling convention:

- Channel Container using
 - **CICS IPIC (zero footprint)**
 - **CICS Socket Listener (minimal footprint)**
 - **RPC Server for CICS**
- DFHCOMMAREA using
 - **CICS IPIC (zero footprint)**

- CICS ECI (zero footprint)
- CICS Socket Listener (minimal footprint)
- RPC Server for CICS
- Large Buffer using
 - CICS Socket Listener (minimal footprint)
 - RPC Server for CICS

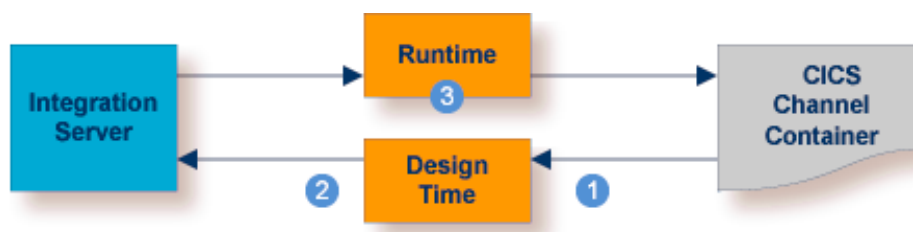
4

Calling COBOL Channel Container (Zero Footprint using CICS IPIC) on z/OS CICS from Integration Server

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This scenario uses the tools IDL Extractor for COBOL and Integration Server Wrapper of the Designer.

Introduction



- ❶ Extract the interface of the COBOL server program.
- ❷ Generate connection and adapter services in Integration Server.
- ❸ Execute the call from Integration Server to the COBOL server program.

This scenario makes the following important assumptions:

For Task 1:

- You have a working COBOL Channel Container server. For illustration and examples on such a server, see *CICS with Channel Container Calling Convention* under *Introduction to the IDL Extractor for COBOL*.
- You have access to the related COBOL sources and copybooks as files on your local machine. The minimum requirement is the `DATA DIVISION` of the interface.



For Tasks 2 and 3:

- To call the COBOL server program at runtime using the *EntireX CICS IPIC* connection method, you need to configure the CICS IPIC TCP/IP service within your CICS region. See *Preparing IBM CICS for IPIC* and *Connection Parameters for CICS IPIC Connections*.



What do I need to Install for this Scenario?

- You have Software AG Designer installed with EntireX plugins and Service Development plugins.
 - For EntireX plugins, see *Designer > EntireX Designer* under *EntireX Installation Packages* in the General Installation documentation.
 - For Service Development plugins, refer to the Integration Server documentation.
- You have an Integration Server with EntireX Adapter installed. See *Adapters > EntireX Adapter* under *EntireX Installation Packages* in the General Installation documentation.

Task 1: Extract the Interface of a COBOL Server

- [Introduction](#)
- [Sample COBOL Server used in the Examples](#)
- [Extracting a COBOL Server - Fast-track Method](#)
- [Extracting a COBOL Server - Modern Method with User-defined Mapping](#)
- [Comparison Chart: Fast-track versus User-defined Mapping](#)
- [Testing the Extraction Results](#)

Introduction

Follow the instructions for extracting COBOL, see *Using the IDL Extractor for COBOL - Overview* and choose *Scenario I: Create New IDL and Server Mapping Files* if this is your first extraction. Learn how to invoke the IDL Extractor for COBOL, create a COBOL Extractor Environment and about the possibilities to select the COBOL source.

The extraction process creates the following EntireX metafiles:

- IDL file. A Software AG IDL file contains definitions of the interface between client and server. See *Software AG IDL File* in the IDL Editor documentation in the IDL Editor documentation.
- Server mapping file (optional). The mapping file is a Designer file with extension `.cvm` that contains COBOL-specific mapping information. See *Server Mapping Files for COBOL* in the Designer documentation.

Sample COBOL Server used in the Examples

The following COBOL server is used to illustrate the features of the IDL Extractor for COBOL. Imagine an existing COBOL server called `EMPLOYEE`. It implements the access logic for a `LIST` and `DETAILS` function to a database view `EMPLOYEE`:

```
IDENTIFICATION DIVISION.
PROGRAM-ID.      EMPLOYEE.
*****
*   Program Name      = EMPLOYEE
*   String Literal    = QUOTE
*****
01 DFHCOMMAREA.
02 OPERATION                                PIC X(1).
    88 OPERATION-LIST                                VALUE 'L'.
    88 OPERATION-DETAILS                            VALUE 'D'.
02 EMPLOYEE-ID                                PIC X(10).
02 EMPLOYEE-DETAILS.
    03 FIRSTNAME                                PIC X(20).
    03 SURNAME                                PIC X(20).
    03 DATE-BIRTH                                PIC X(12).
    03 DETAILS                                PIC X(100).
    03 FILLER REDEFINES DETAILS.
        04 ANNUAL-SALARY PACKED-DECIMAL PIC S9(9).
        04 VACATION                                PIC S9(2).
        04 LANGUAGE                                PIC X(3).
        04 FILLER                                PIC X(90).
02 EMPLOYEES-COUNT                                PIC 9(8) BINARY.
02 EMPLOYEES OCCURS 1 TO 99 DEPENDING ON EMPLOYEES-COUNT.
    03 IDENT                                PIC X(10).
    03 FIRSTNAME                                PIC X(20).
    03 SURNAME                                PIC X(20).
    03 DATE-BIRTH                                PIC X(12).
```

Two approaches for extracting the COBOL server are described below:

- **Fast-track**

Learn how EntireX helps you to connect the COBOL Server with quick results.

- **User-defined Mapping**

The following features are among those available with a user-defined mapping:

- **Shape the interface to your COBOL server**

You can minimize the interface by suppressing COBOL server fields or by providing constant values. Renaming interfaces allows you to specify a readable long name. These two features together - constants and renaming of interfaces - are most powerful when multiple interfaces are implemented in a single COBOL server. Each function of the COBOL server triggered by an operation code or function code can be modelled as a separate IS service.

■ Select alternative mappings

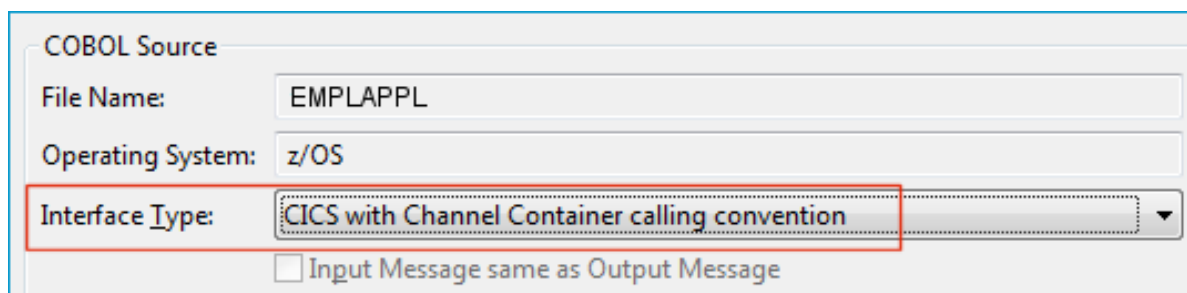
You can select alternative mappings for COBOL data items (REDEFINES, tables etc.) to enable scenarios with COBOL servers where data exchange is not fully described by the LINKAGE SECTION COBOL data items.

These approaches are described under *Fast-track Method* and *Modern Method* below.

Extracting a COBOL Server - Fast-track Method

➤ To extract the COBOL Server

- 1 Switch to the **EntireX** perspective.
- 2 Call the IDL Extractor for COBOL.
- 3 Set the correct interface type as described under *Step 4: Define the Extraction Settings and Start Extraction* under *Scenario I: Create New IDL and Server Mapping Files* in the IDL Extractor for COBOL documentation.



COBOL Source

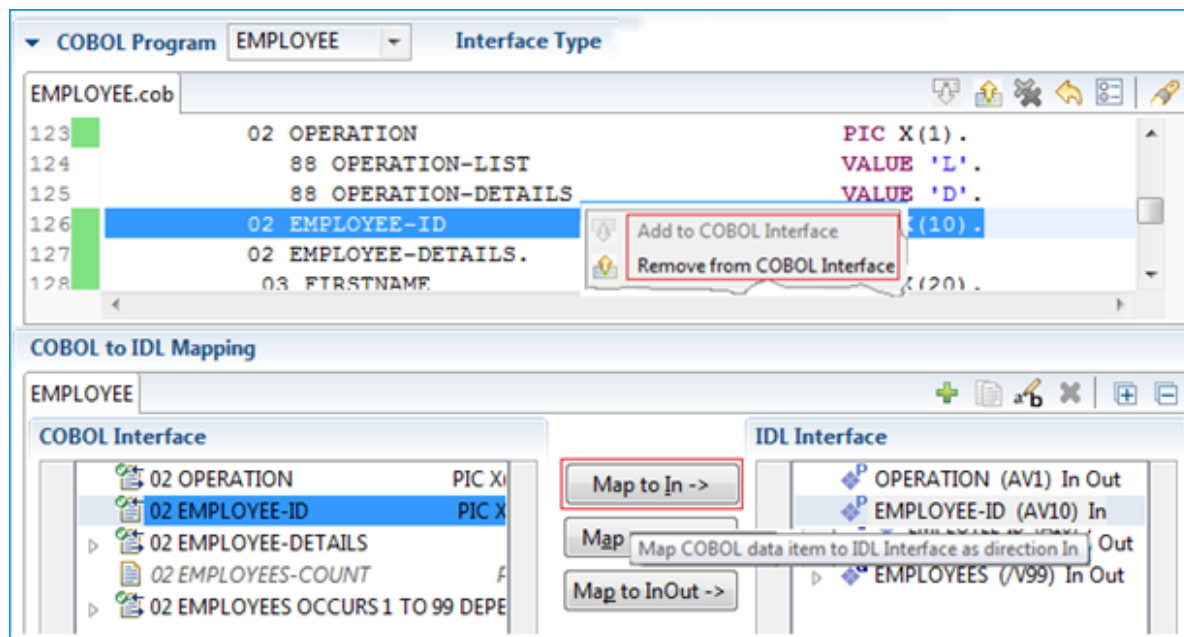
File Name: EMPLAPPL

Operating System: z/OS

Interface Type: CICS with Channel Container calling convention

☐ Input Message same as Output Message

- 4 Press **Next** to enter the COBOL Mapping Editor.



The purpose of the COBOL Mapping Editor is to map COBOL data items to IDL (Interface Definition Language) parameters. It consists of three main areas:

- The upper window pane is the COBOL program source.
- The window pane on the left-hand side is the COBOL interface, consisting of COBOL data items representing the parameters in your COBOL server program.
- The window pane on the right-hand side is the IDL interface consisting of IDL parameters.

For more information see *Mapping Editor User Interface* in the IDL Extractor for COBOL documentation.

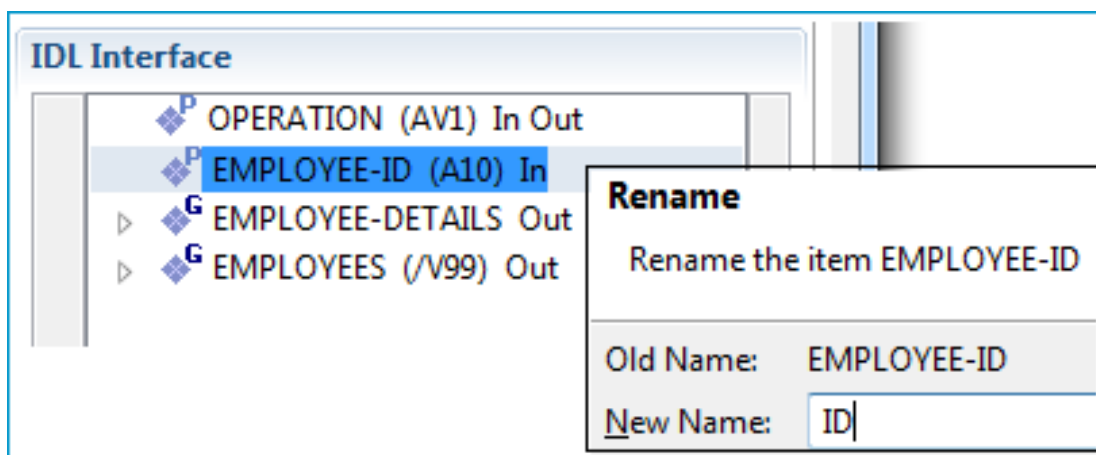
COBOL extraction is a two-step process:

- First, select the COBOL parameters using the **Add to** and **Remove from COBOL Interface** from the context menu on the COBOL data items in the upper window pane (COBOL source); in many situations the COBOL interface is detected by the Mapping Editor directly and you can omit this step.
- Then map the COBOL parameters to IDL directions using the **Map to In/Out/InOut** buttons. COBOL parameters do not have directions, they are always INOUT. This step can be left out for a quick test in non-production scenarios; for real production it is recommended to set IDL directions to reduce data transfer. You also have the option to assign a meaningful name to an IDL parameter if the original COBOL data item is not self-explanatory.

For our example:

- Set **Map to In** for COBOL data item `EMPLOYEE-ID` as IDL direction (see screenshot in previous step). For `EMPLOYEES-DETAILS` and `EMPLOYEES` perform the similar **Map to Out**.

- Use the function **Rename** from the context menu on the IDL parameters in the **IDL Interface** pane to rename COBOL parameter `EMPLOYEE-ID` to IDL parameter `ID`. Do the same for `EMPLOYEE-DETAILS`: Rename to `EMPLOYEE`.



- 5 Press **Finish**. The default extraction settings ensure you get useful results. The outcome is a Software AG IDL file (interface definition language), a Designer file with extension `.idl`:

```
library 'EMPLAPPL' is
program 'EMPLOYEE' is
define data parameter
  1 OPERATION (AV1) In Out
  1 ID (AV10) In /* Original Name:EMPLOYEE-ID
  1 EMPLOYEE Out /* Original Name:EMPLOYEE-DETAILS
    2 FIRSTNAME (AV20)
    2 SURNAME (AV20)
    2 DATE-BIRTH (AV12)
    2 DETAILS (AV100)
  1 EMPLOYEES (/V99) Out
    2 IDENT (AV10)
    2 FIRSTNAME (AV20)
    2 SURNAME (AV20)
    2 DATE-BIRTH (AV12)
end-define
```

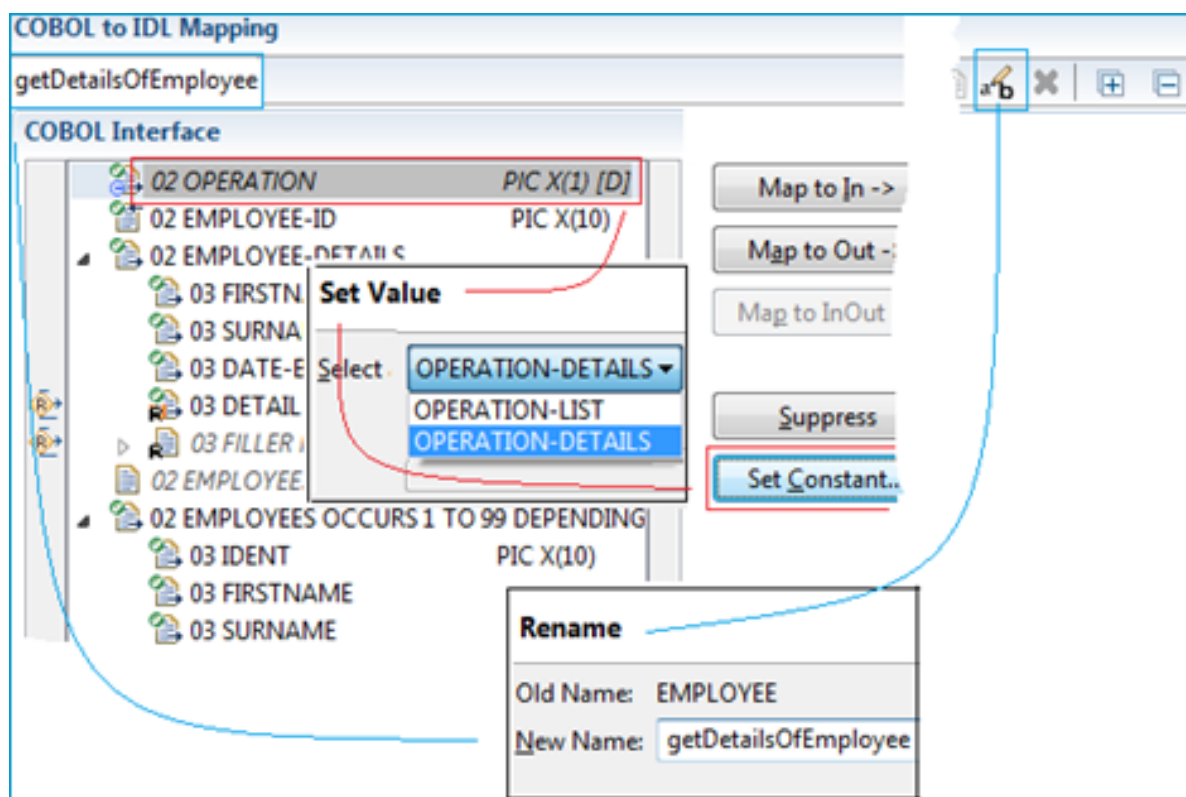
If required, a server mapping file with the same name as the IDL file but the extension `.cvm` may be generated too, for technical reasons. This file must always be stored together with the concomitant IDL file. For more information, see *Server Mapping Files for COBOL* in the Designer documentation. By default, the interface name `EMPLOYEE` is taken from the COBOL server program name.


Extracting a COBOL Server - Modern Method with User-defined Mapping

EntireX allows you to extract all implemented interfaces of the COBOL server separately. Instead of a large `EMPLOYEE` interface, separate interfaces `getListOfEmployees` and `getDetailsOfEmployee` are extracted. Each interface contains required parameters; obsolete parameters for an interface are suppressed, improving its usability.

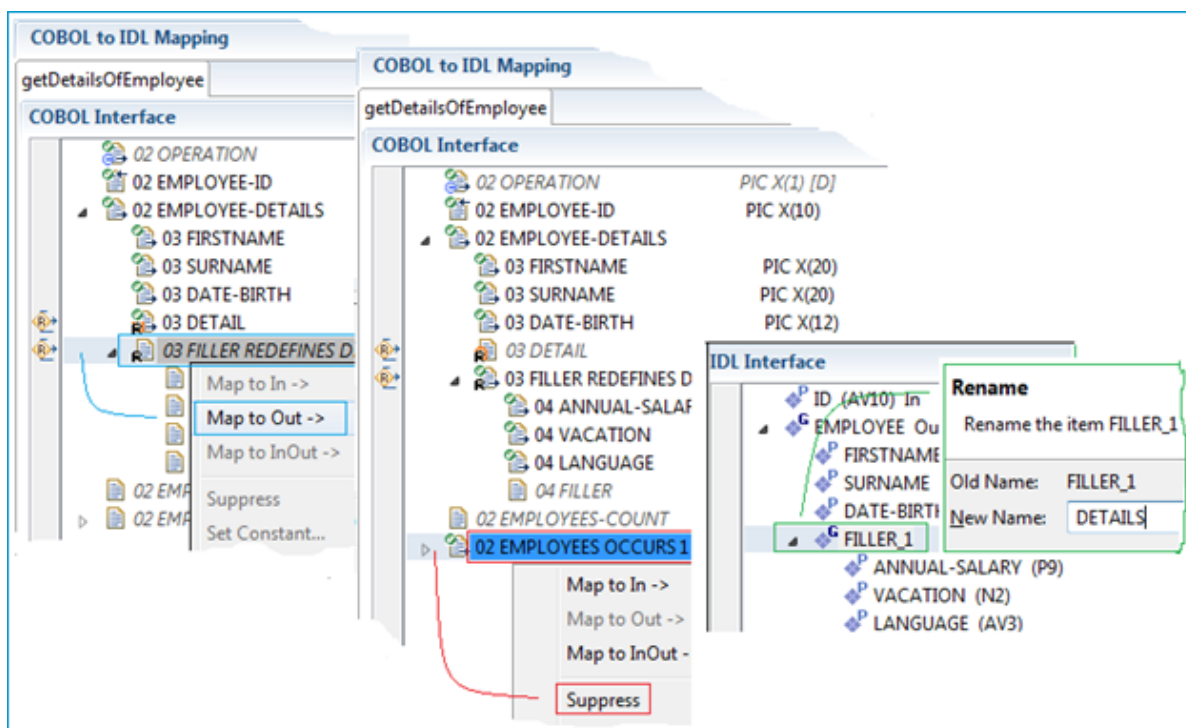
➤ To extract a COBOL server with a user-defined mapping

- 1 Shape `EMPLOYEE` to `getDetailsOfEmployee`:



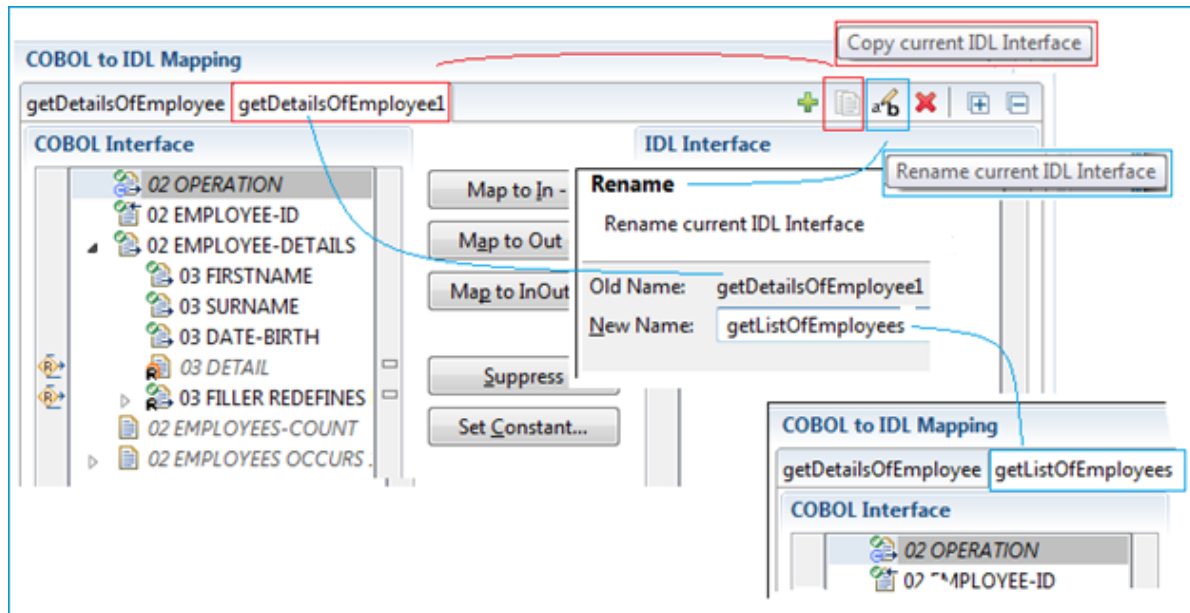
- Mark the `OPERATION` field in the COBOL **Interface** pane and press the **Set Constant** button. In the pop-up window, select `OPERATION-DETAILS` (red markers). The `OPERATION-DETAILS` value originates from COBOL level-88 data item (blue markers). If there is no COBOL level-88 enumeration type in the COBOL program defined, you can enter the function code manually in the pop-up window.
- By default the IDL interface gets the same name as your COBOL server: `EMPLOYEE`. Use the **Rename** button  from the toolbar of the COBOL Mapping Editor and change the IDL interface name to `getDetailsOfEmployee` (blue markers). This name is used as the IS service name later.

- 2 Continue shaping, making `getDetailsOfEmployee` easier to use:




- Use the context menu of the redefinition of the `DETAIL` field in the **COBOL Interface** pane, `FILLER REDEFINES DETAIL` and choose **Map to Out** (blue markers). A redefinition is a secondary layout (field types) of the same memory area. The redefinition contains more specific information (`ANNUAL-SALARY`, `VACATION`, etc.) than character buffer `DETAIL`. This is the reason why it is more useful in your interface.
- Use the context menu of `FILLER_1` in the IDL interface pane and rename `FILLER_1` to `DETAILS` (green markers) for a readable IS service field name later.
- The `DETAILS` function in the COBOL server does not make use of the `EMPLOYEES` field. Therefore you can leave it out of the interface: use the context menu of the `EMPLOYEES` field in the **COBOL Interface** pane and choose **Suppress** (red markers).


3 Shape `EMPLOYEE` to `getListOfEmployees` Function:



The COBOL Mapping Editor allows you to define multiple IDL interfaces to the same COBOL server:

- You create the additional IDL interface using the toolbar button **Copy current IDL interface**

 (red markers). A new tab `getDetailsOfEmployee1` is created. The previously extracted `getDetailsOfEmployee` interface still exists in the first tab. Once you reactivate the first tab, you will see the interface of `getDetailsOfEmployee` again.

- Use the **Rename** button  from the toolbar of the COBOL Mapping Editor and change the IDL interface name to `getListOfEmployees` (blue markers). This name is used as the IS service name later.

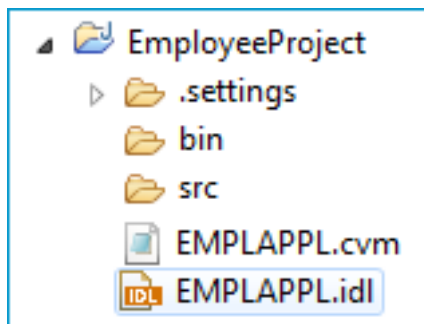
- For the `LIST` function you need the `OPERATION-LIST` value in the `OPERATION` field: Mark the `OPERATION` field in the **COBOL Interface** pane and press the **Set Constant** button. In the pop-up window, select `OPERATION-LIST` (similar to Step 1. above *Shape `EMPLOYEE` to `getDetailsOfEmployee`*; red markers).

- Use the context menu of the `EMPLOYEES` field in the **COBOL Interface** pane, `EMPLOYEES OCCURS 1 TO 99` and choose **Map to Out** (Similar to Step 2. above *Continue shaping, making `getDetailsOfEmployee` easier to use*; blue markers).

- Because the `EMPLOYEE` and `EMPLOYEE-DETAIL` fields are not used in the COBOL server `LIST` function, you leave them out in the IDL interface: use the context menu of `EMPLOYEE-DETAIL` field in the **COBOL Interface** pane and choose **Suppress** (similar to Step 2. above *Continue shaping, making `getDetailsOfEmployee` easier to use*; red markers). Do the same for the `EMPLOYEE-ID` field.

- 4 Press **Finish** to retrieve the extraction result in the form of a Software AG IDL file. At the same time, a server mapping file for COBOL (Designer file with extension `.cvm`) is created.

See *Server Mapping Files for COBOL* in the Designer documentation. The *Software AG IDL File* in the IDL Editor documentation describes the interfaces from the client point of view, while the server mapping file contains the mapping to the real COBOL server. Both of these files must be kept together and in sync, otherwise a call to the COBOL server may fail.



To summarize: We created two IDL interfaces. In the IDL file, these resulted in two IDL programs: `getListOfEmployees` and `getDetailsOfEmployee`. Both IDL programs were given readable names (Steps 1 and 3). Meaningful fields were kept, while superfluous fields were suppressed (Steps 1 and 3). The program `getDetailsOfEmployee` contains the redefined fields of parameter `DETAILS` (see below) mapped during extraction (Step 1).



Note: At runtime, the RPC client generated with the extracted interface will send data for the redesigned interfaces, while your COBOL server still expects `EMPLOYEE` data. The EntireX runtime transforms the incoming data stream from the RPC client, using the server mapping file.

```

program 'getDetailsOfEmployee' is
  define data parameter
    1 ID (AV10) In /* Original Name:EMPLOYEE-ID
    1 EMPLOYEE Out /* Original Name:EMPLOYEE-DETAILS
    2 FIRSTNAME (AV20)
    2 SURNAME (AV20)
    2 DATE-BIRTH (AV12)
    2 DETAILS /* Original Name:FILLER_1
    3 ANNUAL-SALARY (P9)
    3 VACATION (N2)
    3 LANGUAGE (AV3)
  end-define
  program 'getListOfEmployees' is
    1 EMPLOYEES (/V99) Out
    2 IDENT (AV10)
    2 FIRSTNAME (AV20)
    2 SURNAME (AV20)
    2 DATE-BIRTH (AV12)
  end-define
  
```

Comparison Chart: Fast-track versus User-defined Mapping

The following table highlights the differences when shaping an interface with a *user-defined mapping* compared with a *fast-path extraction*.

| | Interface Shaping with User-defined Mapping | Fast-path Extraction |
|----------------------------------|---|---|
| General | User-defined interface with dedicated mapping. For our example, the interfaces are small and tidy and more self-explanatory with long, readable interface names. They are easier to use with the hidden <code>OPERATION</code> field and the suppressed COBOL fields, which are not needed. | Automatic, quick result extraction with COBOL-like interfaces on IS. For our example, the IS interface <code>EMPLOYEE</code> matches exactly 1:1, field by field. |
| IS service(s) | Multiple small and handy IS services; each <code>OPERATION</code> code is mapped to a separate IS service. | One big IS service. |
| IS service name | Readable long name. | Short Subprogram name; up to 8 characters. |
| IS fields | Usage of Suppress and Set Constant reduces the message length. This keeps focus on relevant data items and keeps the client's interface clean. It may also improve performance. | The IS fields and COBOL server parameters match 1:1. As COBOL layout descriptions are sometimes used for many different purposes, irrelevant data items appear and clutter up the IS interface. |
| <code>OPERATION</code> parameter | Suppressed: the <code>OPERATION</code> parameter does not exist in the IS service as an IS field. | The <code>OPERATION</code> parameter exists in the IS service as an IS field and needs to be filled-in by the client endpoint. |
| <code>OPERATION</code> code | The <code>OPERATION</code> code is provided internally by EntireX runtime in the <code>OPERATION</code> field. | The <code>OPERATION</code> code needs to be specified in the IS service in the <code>OPERATION</code> field by the client endpoint. |
| <code>REDEFINE</code> parameters | Either the parameter that is redefined or one of its redefinitions is available as an IS field. | Only the parameter that is redefined is available as an IS field. Redefinitions of the parameter are not available as IS fields. |

A user-defined mapping enables you also to define alternative mappings for COBOL data items (`REDEFINES`, tables etc.). These enable scenarios with COBOL servers where data exchange is not fully described by the `LINKAGE SECTION` COBOL data items. For more information refer to the IDL Extractor for COBOL documentation:

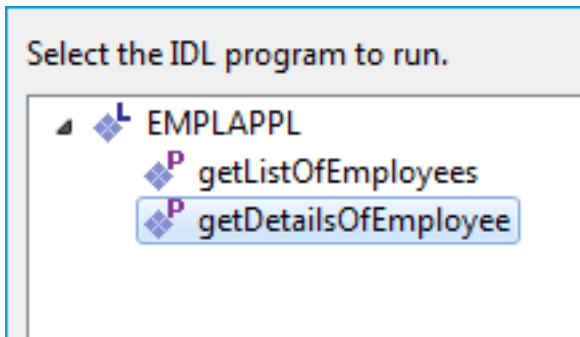
- *Mapping Editor IDL Interface Mapping Functions*
- *User-defined Mapping*

Testing the Extraction Results

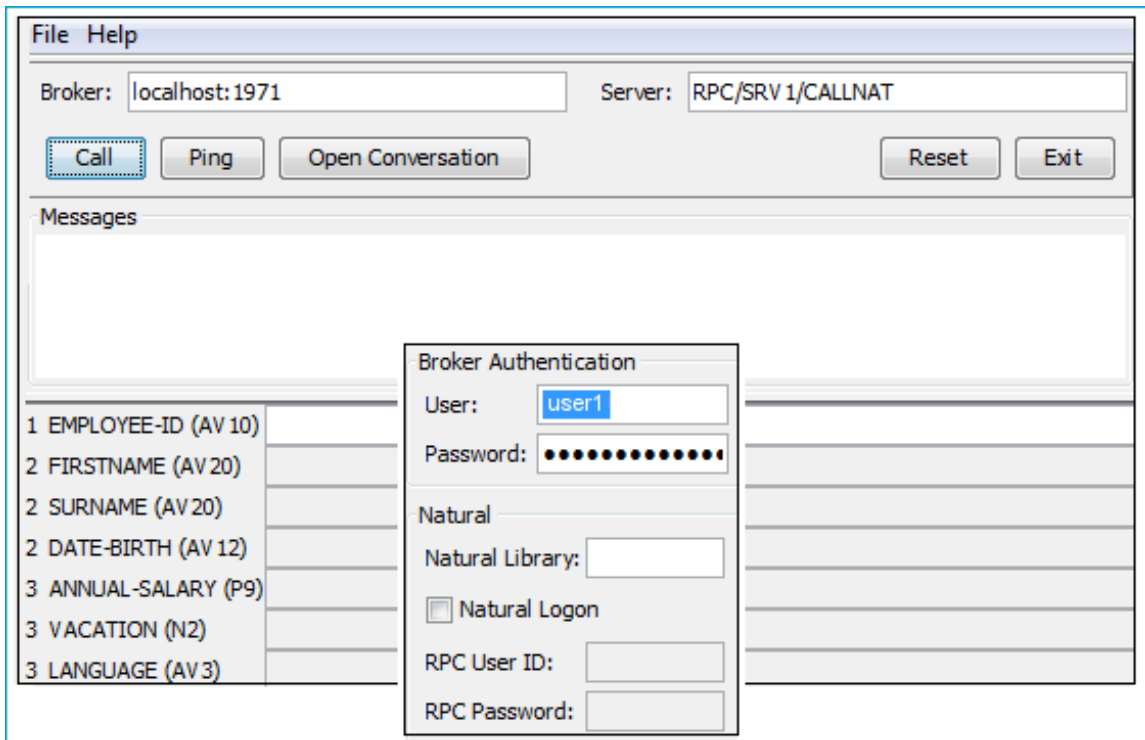
The following pictures use the extraction results described under *Extracting a COBOL Server - Modern Method with User-defined Mapping*.

➤ **To test the extraction results (optional)**

- 1 You can test the results of the extraction operation and the COBOL server back end, using the EntireX IDL Tester. From the context menu of the IDL file in the Designer, choose **Software AG IDL Tester**.



- 2 Select `getDetailsOfEmployee`.



Note that the broker and server parameters contain the explicit route to call the server program, and you can optionally ping the connection from this client. With the **File > Options** dialog, you can set:

- **User** and **Password** for *broker* authentication
- **RPC User ID** and **RPC Password** for *server* authentication

See *EntireX IDL Tester* in the Designer documentation.

- 3 Check the Integration Server log, the EntireX Adapter log or the RPC logs. Applies to all connection methods.

Task 2: Generate the Connection and Adapter Services in Integration Server

This section describes your first steps to create a new Integration Server connection. This is described in more detail under *Using the Integration Server Wrapper*, for example working with existing Integration Server connections. This section covers the following topics:

- [Step 1: Start the Integration Server Wrapper Wizard](#)
- [Step 2: Create a New Integration Server Connection](#)
- [Step 3: Select the Connection Type](#)
- [Step 4: Define Adapter Services for a CICS IPIC Connection](#)

Step 1: Start the Integration Server Wrapper Wizard

➤ To start the Integration Server Wrapper wizard

- 1 In the context menu of a Software AG IDL file, choose **Integration Server > Generate web-Methods IS Connection**.

This starts the wizard with a list of existing Integration Server Wrapper connections.



Note: If the selected IDL file is not valid because of a syntax error, an error dialog comes up and the wizard does not start.

- 2 Continue with *Step 2: Create a New Integration Server Connection*.

Step 2: Create a New Integration Server Connection

Define New Integration Server Connection
Add host:port, user and password for a new Integration Server

Server:

User:

Password:

☐ Use secure connection

➤ To create a new Integration Server connection

- 1 Define the new Integration Server connection on the wizard page.



Notes:

1. The only required field is **Server**. Enter the hostname of the Integration Server including an optional port number. If no port number is specified, port number defaults to "5555". The **Integration Server Authentication** can be passed with the **User** and **Password** fields.
 2. Optional settings are for secure connections. The **Truststore for HTTPS** contains all signed certificates and must be a valid truststore.
 3. The check box **Verify host name** checks that the hostname is entered in the stored certificate.
 4. When the Integration Server has **Client Authentication** enabled, you can specify your **Keystore** file and keystore **Password**.
 5. For managing Integration Server connections, see [Preferences](#).
- 2 Choose **Next** and continue with *Step 3: Select the Connection Type*.

Step 3: Select the Connection Type

☒ Create a new EntireX Adapter connection of type **CICS IPIC Connection**

☐ Update Adapter Services or Listeners to an existing Integration Server connection:

List of Connections

| Connection Name | Package Name | Connection Type | Enabled |
|-------------------------------|--------------|------------------------|---------|
| Employees:EmployeesConnection | Employees | EntireX RPC Connection | Yes |

Total: 1

☒ Map Software AG IDL data types to String

☐ Create or Update REST resource

➤ To create a new connection

- 1 Select a connection type from the drop down list. Connection types are described under *EntireX Adapter Connections* in the EntireX Adapter documentation and *Introduction to the Integration Server Wrapper*.



Note: The list of connection types is filtered: connection types that require a license are only shown if a corresponding license file is available. Reliable RPC connections are only shown if all IDL programs contain only IN parameters. Also, if a server mapping file is available, only those connection types that support the interface type specified in the server mapping file are shown.

- 2 Click **Next** and continue with *Step 4: Define Adapter Services for a CICS IPIC Connection*.

Step 4: Define Adapter Services for a CICS IPIC Connection

Packages on Integration Server localhost:5555

- Calculator
- Default
- Employees
- FLOW_Tutorial

Folder Name: Employee

Connection Name: EmployeeConnection

Connection to CICS IPIC

Hostname: daea.hq.sag

Port: 3852

User ID:

Password:

DataStore ID: IMSCF

➤ To create a connection and related adapter services

- 1 Select a package for the created objects.
- 2 Define a folder name. If the folder does not exist, it will be created.
- 3 Define a connection name.
- 4 Define the parameters of the connection type. For details, see *Connection Parameters for CICS IPIC Connections* in the EntireX Adapter documentation.

As a result, the folder will contain the connection and the adapter services (one for each IDL program). The name of a service is the same as the respective IDL program.

The default settings for the adapter services are:

- the **Default** package; if not available, the first package
- the IDL library name for the **Folder Name**
- the IDL library name with the suffix "Connection" for the **Connection Name**



Note: When creating a connection, a package dependency is added such that the selected package depends on webMethods EntireX (the package `WmEntireX`) with the version currently used.

Task 3: Execute the Call from Integration Server to COBOL

From the **Service Development** perspective, refresh the package where the connection service was written, select the adapter service and use the service test to **Run Service**. This invokes the adapter service through the connector service.

Employees

Employees

getDetailsOfEmployee

getListOfEmployees

EmployeesConnection

Run As

1 Run in Browser

2 Run Service

| Name | Value |
|--------------|-------------|
| outRec | |
| EMPLOYEES | |
| EMPLOYEES[0] | |
| IDENT | 11100102 |
| FIRSTNAME | EDGAR |
| SURNAME | SCHINDLER |
| DATE-BIRTH | Dec 4, 1962 |
| EMPLOYEES[1] | |
| EMPLOYEES[2] | |
| EMPLOYEES[3] | |
| EMPLOYEES[4] | |
| errorCode | 00000000 |
| errorFlag | false |

In case of error or unexpected results:

- Check the Integration Server log, the EntireX Adapter log or the RPC logs.
- Use the IDL Tester as described under [Task 1](#) above.

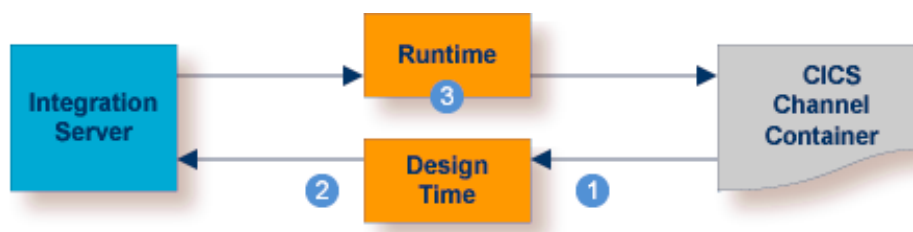
5

Calling COBOL Channel Container (Minimal Footprint using CICS Socket Listener) on z/OS CICS from Integration Server

| | |
|--|----|
| ■ Introduction | 35 |
| ■ What do I need to Install for this Scenario? | 36 |
| ■ Task 1: Extract the Interface of a COBOL Server | 37 |
| ■ Task 2: Generate the Connection and Adapter Services in Integration Server | 49 |
| ■ Task 3: Execute the Call from Integration Server to COBOL | 54 |

This scenario uses the tools IDL Extractor for COBOL and Integration Server Wrapper of the Designer.

Introduction



- ① Extract the interface of the COBOL server program.
- ② Generate connection and adapter services in Integration Server.
- ③ Execute the call from Integration Server to the COBOL server program.

This scenario makes the following important assumptions:

For Task 1:

- You have a working COBOL Channel Container server. For illustration and examples on such a server, see *CICS with Channel Container Calling Convention* under *Introduction to the IDL Extractor for COBOL*.
- You have access to the related COBOL sources and copybooks as files on your local machine. The minimum requirement is the `DATA DIVISION` of the interface.



For Tasks 2 and 3:

- To call the COBOL server program at runtime using the *EntireX CICS Socket Listener* connection method, you need to install the CICS Socket Listener within your CICS region: see *Preparing for CICS Socket Listener*. For configuration, see *Connection Parameters for CICS Socket Listener Connections*.



What do I need to Install for this Scenario?

- You have Software AG Designer installed with EntireX plugins and Service Development plugins.
 - For EntireX plugins, see *Designer > EntireX Designer* under *EntireX Installation Packages* in the General Installation documentation.
 - For Service Development plugins, refer to the Integration Server documentation.
- You have an Integration Server with EntireX Adapter installed. See *Adapters > EntireX Adapter* under *EntireX Installation Packages* in the General Installation documentation.
- The CICS Socket Listener, which is installed
 - together with the RPC Server for CICS, see *Installing the RPC Server for CICS*, or
 - separately, see *EntireX CICS® Socket Listener* in the z/OS Installation documentation

Task 1: Extract the Interface of a COBOL Server

- [Introduction](#)
- [Sample COBOL Server used in the Examples](#)
- [Extracting a COBOL Server - Fast-track Method](#)
- [Extracting a COBOL Server - Modern Method with User-defined Mapping](#)
- [Comparison Chart: Fast-track versus User-defined Mapping](#)
- [Testing the Extraction Results](#)

Introduction

Follow the instructions for extracting COBOL, see *Using the IDL Extractor for COBOL - Overview* and choose *Scenario I: Create New IDL and Server Mapping Files* if this is your first extraction. Learn how to invoke the IDL Extractor for COBOL, create a COBOL Extractor Environment and about the possibilities to select the COBOL source.

The extraction process creates the following EntireX metafiles:

- IDL file. A Software AG IDL file contains definitions of the interface between client and server. See *Software AG IDL File* in the IDL Editor documentation in the IDL Editor documentation.
- Server mapping file (optional). The mapping file is a Designer file with extension .cvm that contains COBOL-specific mapping information. See *Server Mapping Files for COBOL* in the Designer documentation.

Sample COBOL Server used in the Examples

The following COBOL server is used to illustrate the features of the IDL Extractor for COBOL. Imagine an existing COBOL server called `EMPLOYEE`. It implements the access logic for a `LIST` and `DETAILS` function to a database view `EMPLOYEE`:

```
IDENTIFICATION DIVISION.
PROGRAM-ID.    EMPLOYEE.
*****
*   Program Name      = EMPLOYEE
*   String Literal    = QUOTE
*****
01 DFHCOMMAREA.
02 OPERATION                                PIC X(1).
    88 OPERATION-LIST                        VALUE 'L'.
    88 OPERATION-DETAILS                    VALUE 'D'.
02 EMPLOYEE-ID                             PIC X(10).
02 EMPLOYEE-DETAILS.
    03 FIRSTNAME                           PIC X(20).
    03 SURNAME                             PIC X(20).
    03 DATE-BIRTH                          PIC X(12).
    03 DETAILS                             PIC X(100).
    03 FILLER REDEFINES DETAILS.
        04 ANNUAL-SALARY                    PACKED-DECIMAL PIC S9(9).
        04 VACATION                        PIC S9(2).
        04 LANGUAGE                        PIC X(3).
        04 FILLER                          PIC X(90).
02 EMPLOYEES-COUNT                         PIC 9(8) BINARY.
02 EMPLOYEES OCCURS 1 TO 99 DEPENDING ON EMPLOYEES-COUNT.
    03 IDENT                              PIC X(10).
    03 FIRSTNAME                          PIC X(20).
    03 SURNAME                            PIC X(20).
    03 DATE-BIRTH                        PIC X(12).
```

Two approaches for extracting the COBOL server are described below:

- **Fast-track**

Learn how EntireX helps you to connect the COBOL Server with quick results.

- **User-defined Mapping**

The following features are among those available with a user-defined mapping:

- **Shape the interface to your COBOL server**

You can minimize the interface by suppressing COBOL server fields or by providing constant values. Renaming interfaces allows you to specify a readable long name. These two features together - constants and renaming of interfaces - are most powerful when multiple interfaces are implemented in a single COBOL server. Each function of the COBOL server triggered by an operation code or function code can be modelled as a separate IS service.

■ Select alternative mappings

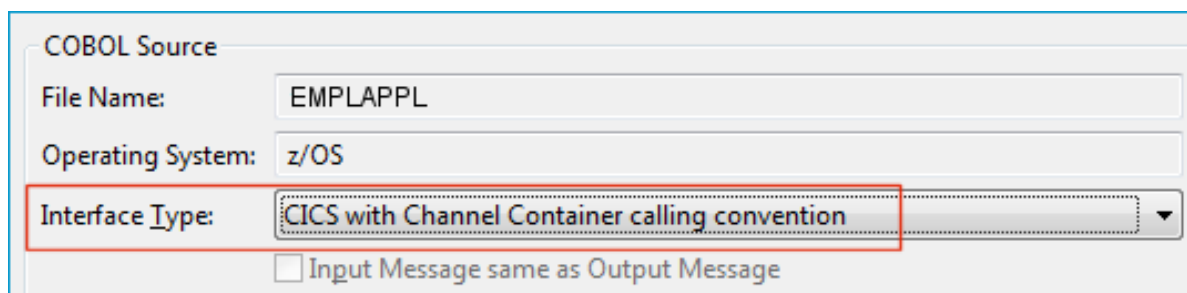
You can select alternative mappings for COBOL data items (REDEFINES, tables etc.) to enable scenarios with COBOL servers where data exchange is not fully described by the LINKAGE SECTION COBOL data items.

These approaches are described under *Fast-track Method* and *Modern Method* below.

Extracting a COBOL Server - Fast-track Method

➤ To extract the COBOL Server

- 1 Switch to the **EntireX** perspective.
- 2 Call the IDL Extractor for COBOL.
- 3 Set the correct interface type as described under *Step 4: Define the Extraction Settings and Start Extraction* under *Scenario I: Create New IDL and Server Mapping Files* in the IDL Extractor for COBOL documentation.



COBOL Source

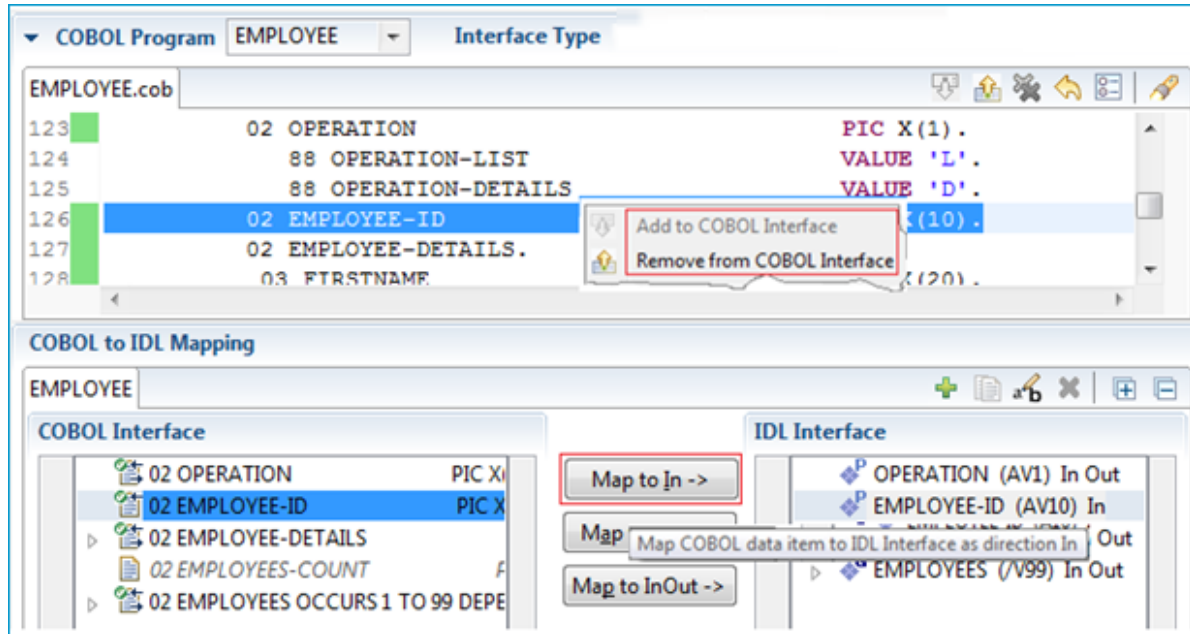
File Name: EMPLAPPL

Operating System: z/OS

Interface Type: CICS with Channel Container calling convention

☐ Input Message same as Output Message

- 4 Press **Next** to enter the COBOL Mapping Editor.



The purpose of the COBOL Mapping Editor is to map COBOL data items to IDL (Interface Definition Language) parameters. It consists of three main areas:

- The upper window pane is the COBOL program source.
- The window pane on the left-hand side is the COBOL interface, consisting of COBOL data items representing the parameters in your COBOL server program.
- The window pane on the right-hand side is the IDL interface consisting of IDL parameters.

For more information see *Mapping Editor User Interface* in the IDL Extractor for COBOL documentation.

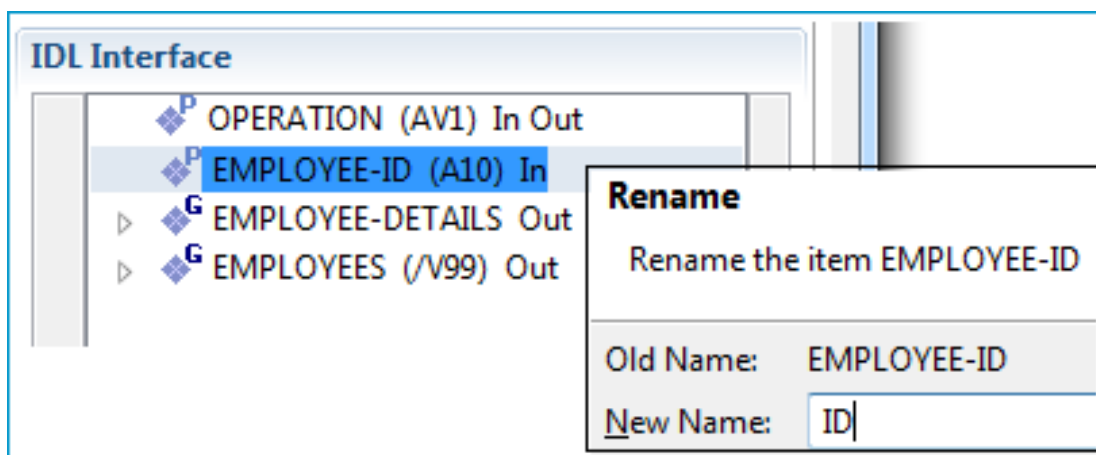
COBOL extraction is a two-step process:

- First, select the COBOL parameters using the **Add to** and **Remove from COBOL Interface** from the context menu on the COBOL data items in the upper window pane (COBOL source); in many situations the COBOL interface is detected by the Mapping Editor directly and you can omit this step.
- Then map the COBOL parameters to IDL directions using the **Map to In/Out/InOut** buttons. COBOL parameters do not have directions, they are always INOUT. This step can be left out for a quick test in non-production scenarios; for real production it is recommended to set IDL directions to reduce data transfer. You also have the option to assign a meaningful name to an IDL parameter if the original COBOL data item is not self-explanatory.

For our example:

- Set **Map to In** for COBOL data item `EMPLOYEE-ID` as IDL direction (see screenshot in previous step). For `EMPLOYEES-DETAILS` and `EMPLOYEES` perform the similar **Map to Out**.

- Use the function **Rename** from the context menu on the IDL parameters in the **IDL Interface** pane to rename COBOL parameter `EMPLOYEE-ID` to IDL parameter `ID`. Do the same for `EMPLOYEE-DETAILS`: Rename to `EMPLOYEE`.



- 5 Press **Finish**. The default extraction settings ensure you get useful results. The outcome is a Software AG IDL file (interface definition language), a Designer file with extension `.idl`:

```
library 'EMPLAPPL' is
program 'EMPLOYEE' is
  define data parameter
    1 OPERATION (AV1) In Out
    1 ID (AV10) In /* Original Name:EMPLOYEE-ID
    1 EMPLOYEE Out /* Original Name:EMPLOYEE-DETAILS
    2 FIRSTNAME (AV20)
    2 SURNAME (AV20)
    2 DATE-BIRTH (AV12)
    2 DETAILS (AV100)
    1 EMPLOYEES (/V99) Out
    2 IDENT (AV10)
    2 FIRSTNAME (AV20)
    2 SURNAME (AV20)
    2 DATE-BIRTH (AV12)
  end-define
```

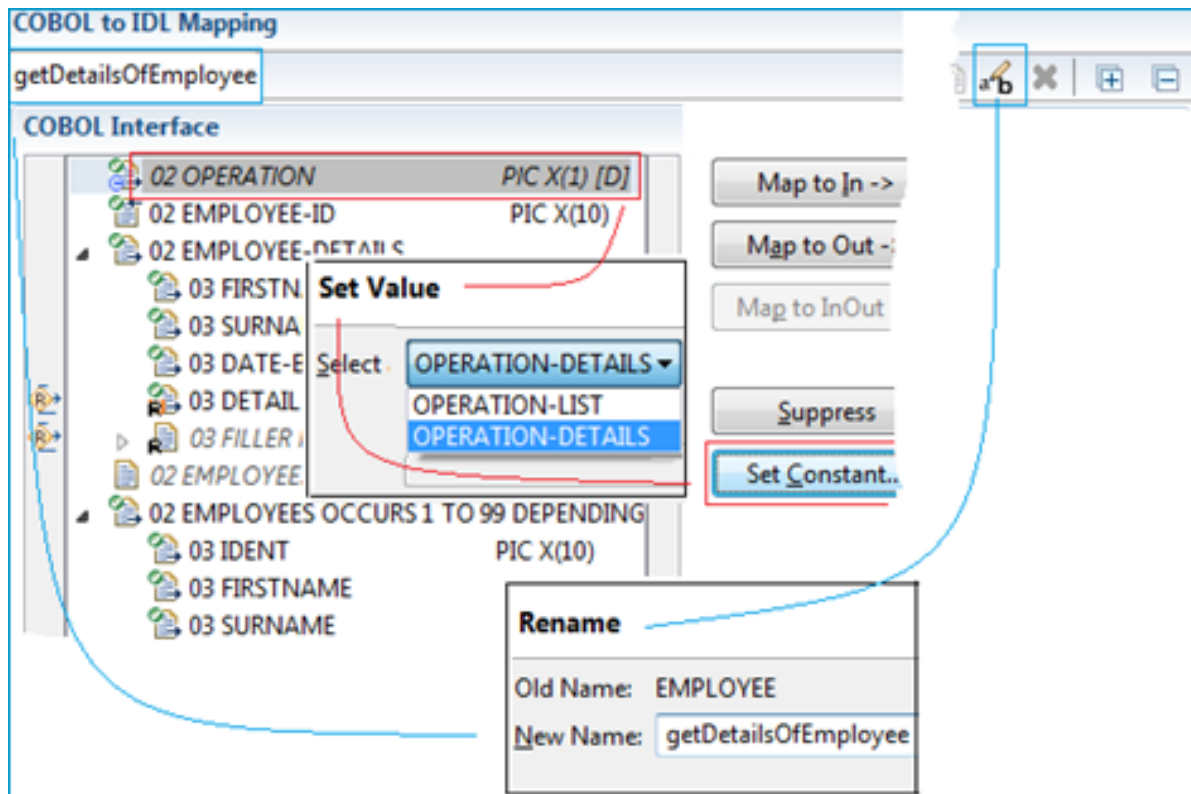
If required, a server mapping file with the same name as the IDL file but the extension `.cvm` may be generated too, for technical reasons. This file must always be stored together with the concomitant IDL file. For more information, see *Server Mapping Files for COBOL* in the Designer documentation. By default, the interface name `EMPLOYEE` is taken from the COBOL server program name.


Extracting a COBOL Server - Modern Method with User-defined Mapping

EntireX allows you to extract all implemented interfaces of the COBOL server separately. Instead of a large `EMPLOYEE` interface, separate interfaces `getListOfEmployees` and `getDetailsOfEmployee` are extracted. Each interface contains required parameters; obsolete parameters for an interface are suppressed, improving its usability.

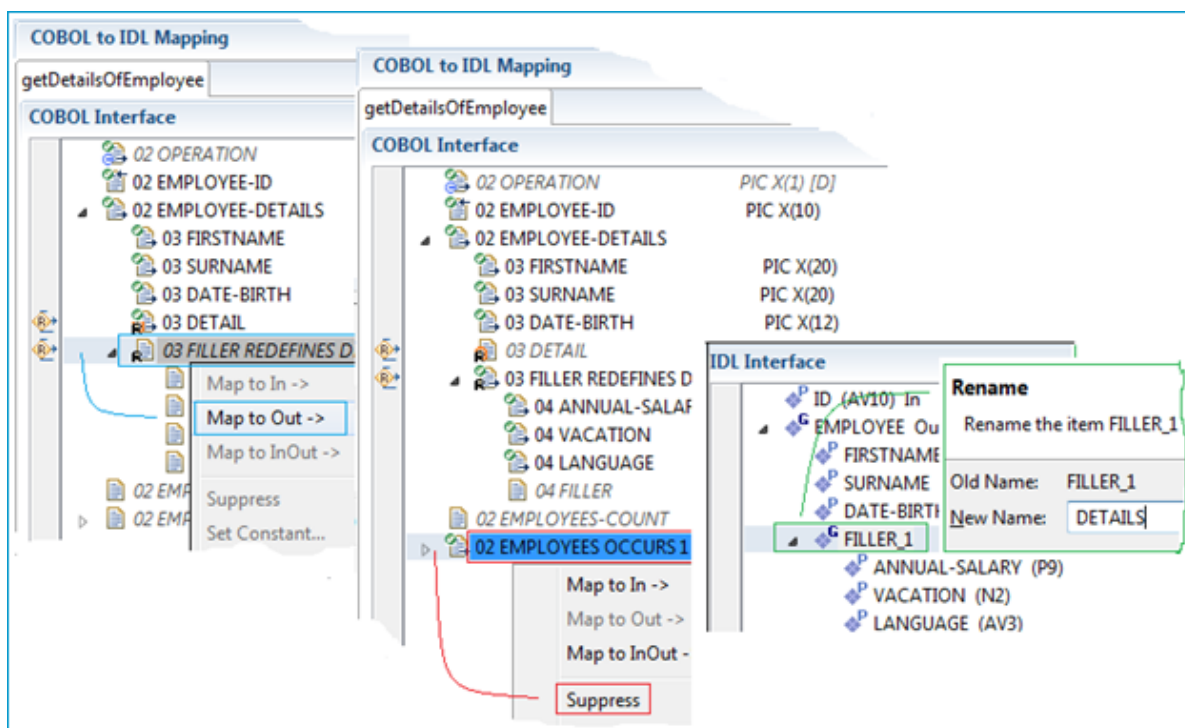
➤ To extract a COBOL server with a user-defined mapping

- 1 Shape `EMPLOYEE` to `getDetailsOfEmployee`:



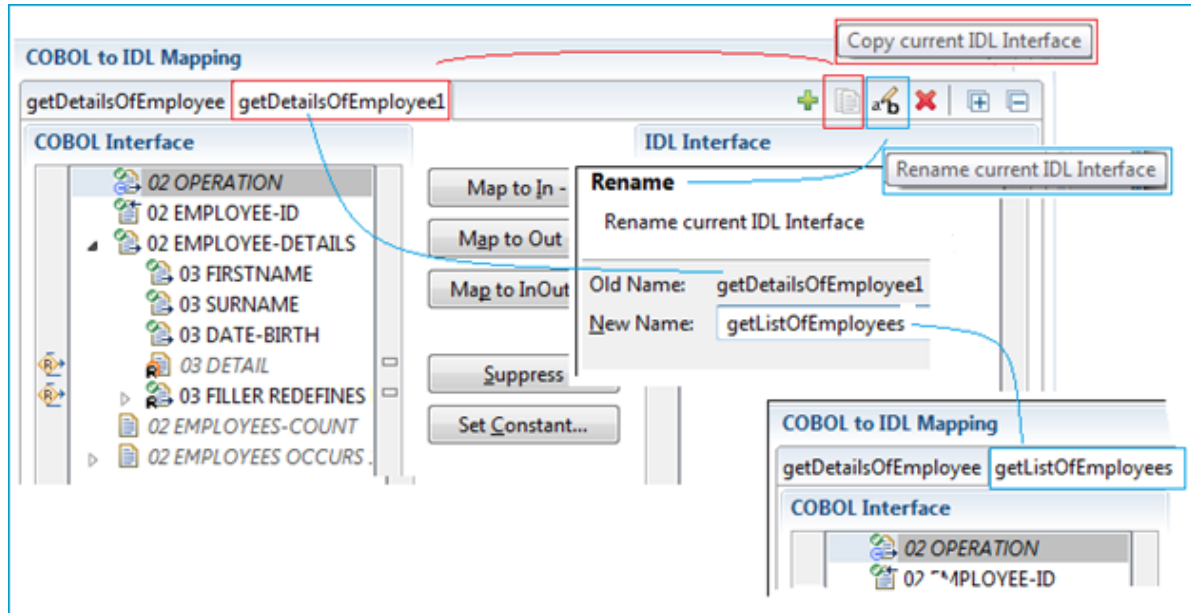
- Mark the `OPERATION` field in the COBOL **Interface** pane and press the **Set Constant** button. In the pop-up window, select `OPERATION-DETAILS` (red markers). The `OPERATION-DETAILS` value originates from COBOL level-88 data item (blue markers). If there is no COBOL level-88 enumeration type in the COBOL program defined, you can enter the function code manually in the pop-up window.
- By default the IDL interface gets the same name as your COBOL server: `EMPLOYEE`. Use the **Rename** button  from the toolbar of the COBOL Mapping Editor and change the IDL interface name to `getDetailsOfEmployee` (blue markers). This name is used as the IS service name later.

- 2 Continue shaping, making `getDetailsOfEmployee` easier to use:




- Use the context menu of the redefinition of the `DETAIL` field in the **COBOL Interface** pane, `FILLER REDEFINES DETAIL` and choose **Map to Out** (blue markers). A redefinition is a secondary layout (field types) of the same memory area. The redefinition contains more specific information (`ANNUAL-SALARY`, `VACATION`, etc.) than character buffer `DETAIL`. This is the reason why it is more useful in your interface.
- Use the context menu of `FILLER_1` in the IDL interface pane and rename `FILLER_1` to `DETAILS` (green markers) for a readable IS service field name later.
- The `DETAILS` function in the COBOL server does not make use of the `EMPLOYEES` field. Therefore you can leave it out of the interface: use the context menu of the `EMPLOYEES` field in the **COBOL Interface** pane and choose **Suppress** (red markers).


3 Shape `EMPLOYEE` to `getListOfEmployees` Function:



The COBOL Mapping Editor allows you to define multiple IDL interfaces to the same COBOL server:

- You create the additional IDL interface using the toolbar button **Copy current IDL interface**

 (red markers). A new tab `getDetailsOfEmployee1` is created. The previously extracted `getDetailsOfEmployee` interface still exists in the first tab. Once you reactivate the first tab, you will see the interface of `getDetailsOfEmployee` again.

- Use the **Rename** button  from the toolbar of the COBOL Mapping Editor and change the IDL interface name to **getListOfEmployees** (blue markers). This name is used as the IS service name later.

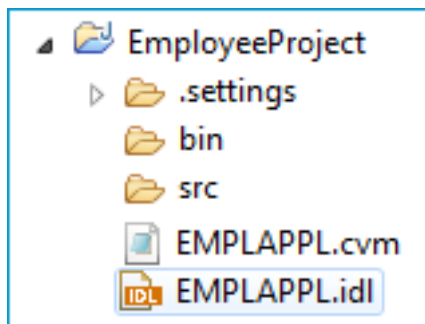
- For the **LIST** function you need the **OPERATION- LIST** value in the **OPERATION** field: Mark the **OPERATION** field in the **COBOL Interface** pane and press the **Set Constant** button. In the pop-up window, select **OPERATION- LIST** (similar to Step 1. above *Shape EMPLOYEE to getDetailsOfEmployee*; red markers).

- Use the context menu of the **EMPLOYEES** field in the **COBOL Interface** pane, **EMPLOYEES OCCURS 1 TO 99** and choose **Map to Out** (Similar to Step 2. above *Continue shaping, making getDetailsOfEmployee easier to use*; blue markers).

- Because the **EMPLOYEE** and **EMPLOYEE-DETAIL** fields are not used in the COBOL server **LIST** function, you leave them out in the IDL interface: use the context menu of **EMPLOYEE-DETAIL** field in the **COBOL Interface** pane and choose **Suppress** (similar to Step 2. above *Continue shaping, making getDetailsOfEmployee easier to use*; red markers). Do the same for the **EMPLOYEE- ID** field.

- 4 Press **Finish** to retrieve the extraction result in the form of a Software AG IDL file. At the same time, a server mapping file for COBOL (Designer file with extension `.cvm`) is created.

See *Server Mapping Files for COBOL* in the Designer documentation. The *Software AG IDL File* in the IDL Editor documentation describes the interfaces from the client point of view, while the server mapping file contains the mapping to the real COBOL server. Both of these files must be kept together and in sync, otherwise a call to the COBOL server may fail.



To summarize: We created two IDL interfaces. In the IDL file, these resulted in two IDL programs: `getListOfEmployees` and `getDetailsOfEmployee`. Both IDL programs were given readable names (Steps 1 and 3). Meaningful fields were kept, while superfluous fields were suppressed (Steps 1 and 3). The program `getDetailsOfEmployee` contains the redefined fields of parameter `DETAILS` (see below) mapped during extraction (Step 1).



Note: At runtime, the RPC client generated with the extracted interface will send data for the redesigned interfaces, while your COBOL server still expects `EMPLOYEE` data. The EntireX runtime transforms the incoming data stream from the RPC client, using the server mapping file.

```

program 'getDetailsOfEmployee' is
  define data parameter
    1 ID (AV10) In /* Original Name:EMPLOYEE-ID
    1 EMPLOYEE Out /* Original Name:EMPLOYEE-DETAILS
    2 FIRSTNAME (AV20)
    2 SURNAME (AV20)
    2 DATE-BIRTH (AV12)
    2 DETAILS /* Original Name:FILLER_1
    3 ANNUAL-SALARY (P9)
    3 VACATION (N2)
    3 LANGUAGE (AV3)
  end-define
  program 'getListOfEmployees' is
    1 EMPLOYEES (/V99) Out
    2 IDENT (AV10)
    2 FIRSTNAME (AV20)
    2 SURNAME (AV20)
    2 DATE-BIRTH (AV12)
  end-define
  
```

Comparison Chart: Fast-track versus User-defined Mapping

The following table highlights the differences when shaping an interface with a *user-defined mapping* compared with a *fast-path extraction*.

| | Interface Shaping with User-defined Mapping | Fast-path Extraction |
|----------------------------------|---|---|
| General | User-defined interface with dedicated mapping. For our example, the interfaces are small and tidy and more self-explanatory with long, readable interface names. They are easier to use with the hidden <code>OPERATION</code> field and the suppressed COBOL fields, which are not needed. | Automatic, quick result extraction with COBOL-like interfaces on IS. For our example, the IS interface <code>EMPLOYEE</code> matches exactly 1:1, field by field. |
| IS service(s) | Multiple small and handy IS services; each <code>OPERATION</code> code is mapped to a separate IS service. | One big IS service. |
| IS service name | Readable long name. | Short Subprogram name; up to 8 characters. |
| IS fields | Usage of Suppress and Set Constant reduces the message length. This keeps focus on relevant data items and keeps the client's interface clean. It may also improve performance. | The IS fields and COBOL server parameters match 1:1. As COBOL layout descriptions are sometimes used for many different purposes, irrelevant data items appear and clutter up the IS interface. |
| <code>OPERATION</code> parameter | Suppressed: the <code>OPERATION</code> parameter does not exist in the IS service as an IS field. | The <code>OPERATION</code> parameter exists in the IS service as an IS field and needs to be filled-in by the client endpoint. |
| <code>OPERATION</code> code | The <code>OPERATION</code> code is provided internally by EntireX runtime in the <code>OPERATION</code> field. | The <code>OPERATION</code> code needs to be specified in the IS service in the <code>OPERATION</code> field by the client endpoint. |
| <code>REDEFINE</code> parameters | Either the parameter that is redefined or one of its redefinitions is available as an IS field. | Only the parameter that is redefined is available as an IS field. Redefinitions of the parameter are not available as IS fields. |

A user-defined mapping enables you also to define alternative mappings for COBOL data items (`REDEFINES`, tables etc.). These enable scenarios with COBOL servers where data exchange is not fully described by the `LINKAGE SECTION` COBOL data items. For more information refer to the IDL Extractor for COBOL documentation:

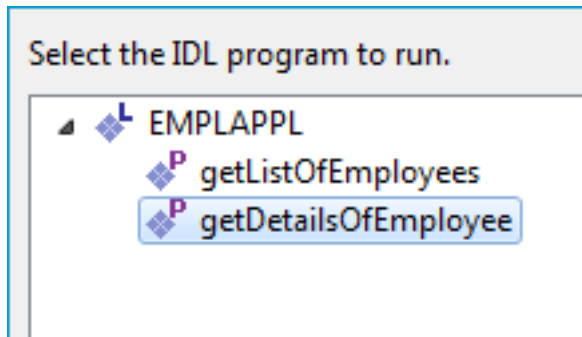
- *Mapping Editor IDL Interface Mapping Functions*
- *User-defined Mapping*

Testing the Extraction Results

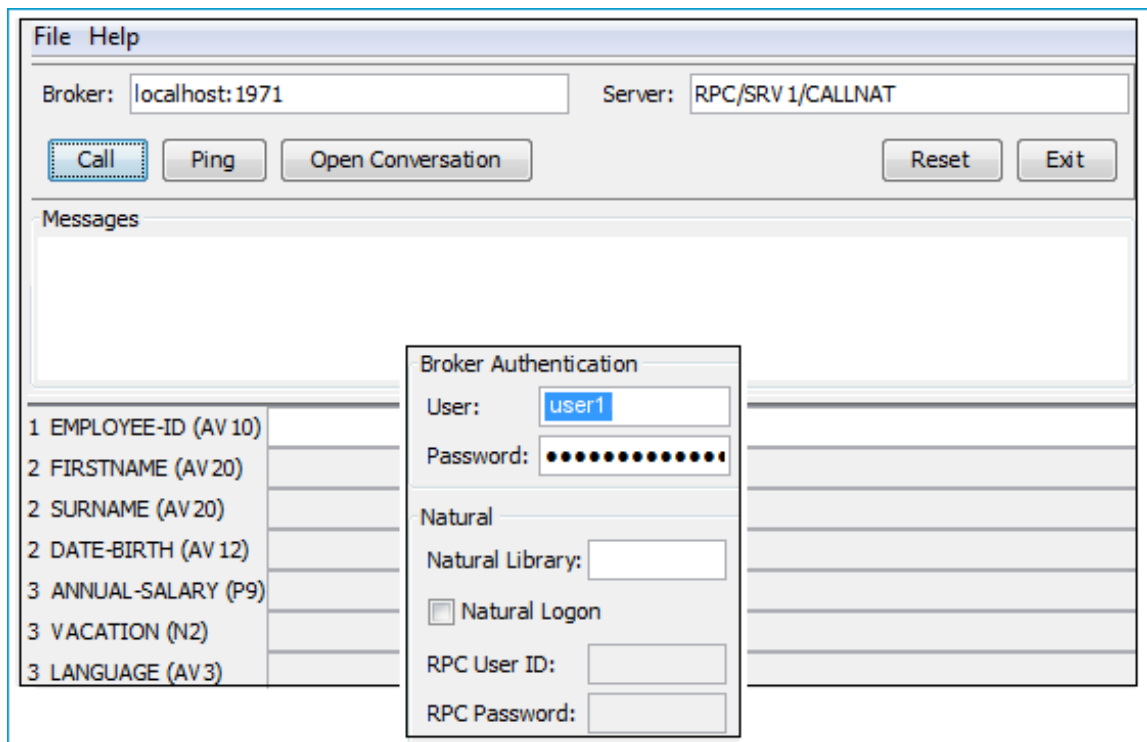
The following pictures use the extraction results described under *Extracting a COBOL Server - Modern Method with User-defined Mapping*.

➤ **To test the extraction results (optional)**

- 1 You can test the results of the extraction operation and the COBOL server back end, using the EntireX IDL Tester. From the context menu of the IDL file in the Designer, choose **Software AG IDL Tester**.



- 2 Select `getDetailsOfEmployee`.



Note that the broker and server parameters contain the explicit route to call the server program, and you can optionally ping the connection from this client. With the **File > Options** dialog, you can set:

- **User** and **Password** for *broker* authentication
- **RPC User ID** and **RPC Password** for *server* authentication

See *EntireX IDL Tester* in the Designer documentation.

- 3 Check the Integration Server log, the EntireX Adapter log or the RPC logs. Applies to all connection methods.

Task 2: Generate the Connection and Adapter Services in Integration Server

This section describes your first steps to create a new Integration Server connection. This is described in more detail under *Using the Integration Server Wrapper*, for example working with existing Integration Server connections. This section covers the following topics:

- [Step 1: Start the Integration Server Wrapper Wizard](#)
- [Step 2: Create a New Integration Server Connection](#)
- [Step 3: Select the Connection Type](#)
- [Step 4: Define Adapter Services for a CICS Socket Listener Connection](#)

Step 1: Start the Integration Server Wrapper Wizard

➤ To start the Integration Server Wrapper wizard

- 1 In the context menu of a Software AG IDL file, choose **Integration Server > Generate web-Methods IS Connection**.

This starts the wizard with a list of existing Integration Server Wrapper connections.



Note: If the selected IDL file is not valid because of a syntax error, an error dialog comes up and the wizard does not start.

- 2 Continue with *Step 2: Create a New Integration Server Connection*.

Step 2: Create a New Integration Server Connection

Define New Integration Server Connection
Add host:port, user and password for a new Integration Server

Server:

User:

Password:

☐ Use secure connection

➤ To create a new Integration Server connection

- 1 Define the new Integration Server connection on the wizard page.



Notes:

1. The only required field is **Server**. Enter the hostname of the Integration Server including an optional port number. If no port number is specified, port number defaults to "5555". The **Integration Server Authentication** can be passed with the **User** and **Password** fields.
 2. Optional settings are for secure connections. The **Truststore for HTTPS** contains all signed certificates and must be a valid truststore.
 3. The check box **Verify host name** checks that the hostname is entered in the stored certificate.
 4. When the Integration Server has **Client Authentication** enabled, you can specify your **Keystore** file and keystore **Password**.
 5. For managing Integration Server connections, see [Preferences](#).
- 2 Choose **Next** and continue with *Step 3: Select the Connection Type*.

Step 3: Select the Connection Type

☒ Create a new EntireX Adapter connection of type **CICS Socket Listener Connection**

☐ Update Adapter Services or Listeners to an existing Integration Server connection:

List of Connections

| Connection Name | Package Name | Connection Type | Enabled |
|-------------------------------|--------------|------------------------|---------|
| Employees:EmployeesConnection | Employees | EntireX RPC Connection | Yes |


Total: 1

☒ Map Software AG IDL data types to String

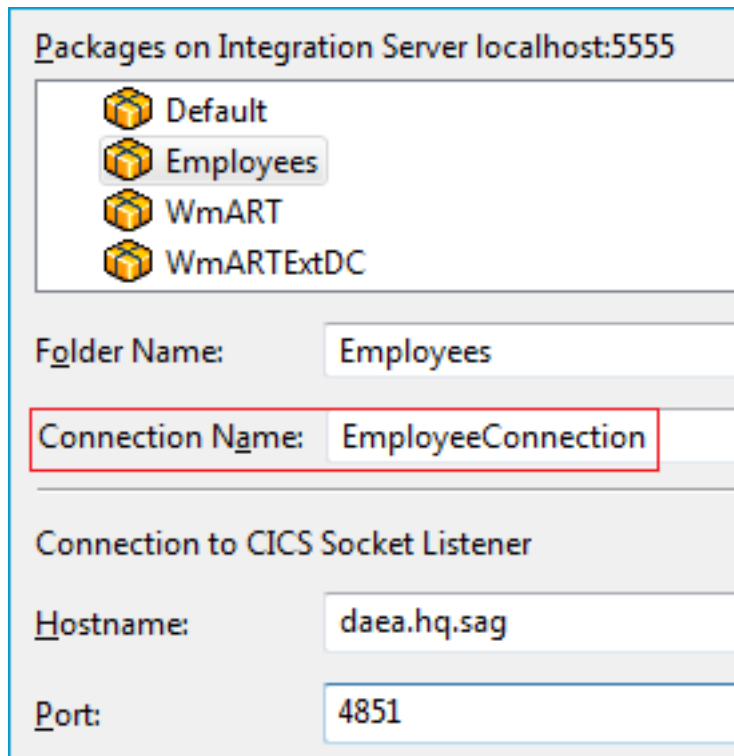
☐ Create or Update REST resource

➤ To create a new connection

- 1 Select a connection type from the drop down list. Connection types are described under *EntireX Adapter Connections* in the EntireX Adapter documentation and *Introduction to the Integration Server Wrapper*.

 **Note:** The list of connection types is filtered: connection types that require a license are only shown if a corresponding license file is available. Reliable RPC connections are only shown if all IDL programs contain only IN parameters. Also, if a server mapping file is available, only those connection types that support the interface type specified in the server mapping file are shown.
- 2 Click **Next** and continue with *Step 4: Define Adapter Services for a CICS Socket Listener Connection*.

Step 4: Define Adapter Services for a CICS Socket Listener Connection



Packages on Integration Server localhost:5555

- Default
- Employees
- WmART
- WmARTEExtDC

Folder Name: Employees

Connection Name: EmployeeConnection

Connection to CICS Socket Listener

Hostname: daea.hq.sag

Port: 4851

➤ To create a connection and related adapter services

- 1 Select a package for the created objects.
- 2 Define a folder name. If the folder does not exist, it will be created.
- 3 Define a connection name.
- 4 Define the parameters of the connection type. For details, see *Connection Parameters for CICS Socket Listener Connections* in the EntireX Adapter documentation.

As a result, the folder will contain the connection and the adapter services (one for each IDL program). The name of a service is the same as the respective IDL program.

The default settings for the adapter services are:

- the **Default** package; if not available, the first package
- the IDL library name for the **Folder Name**
- the IDL library name with the suffix "Connection" for the **Connection Name**



Note: When creating a connection, a package dependency is added such that the selected package depends on webMethods EntireX (the package `WmEntireX`) with the version currently used.

;

Task 3: Execute the Call from Integration Server to COBOL

From the **Service Development** perspective, refresh the package where the connection service was written, select the adapter service and use the service test to **Run Service**. This invokes the adapter service through the connector service.

The screenshot shows the 'Employees' package in the Service Development perspective. The 'getListOfEmployees' service is selected, and the 'Run Service' button is highlighted. Below the package tree, a table displays the results of the service test.

| Name | Value |
|--------------|-------------|
| outRec | |
| EMPLOYEES | |
| EMPLOYEES[0] | |
| IDENT | 11100102 |
| FIRSTNAME | EDGAR |
| SURNAME | SCHINDLER |
| DATE-BIRTH | Dec 4, 1962 |
| EMPLOYEES[1] | |
| EMPLOYEES[2] | |
| EMPLOYEES[3] | |
| EMPLOYEES[4] | |
| errorCode | 00000000 |
| errorFlag | false |

In case of error or unexpected results:

- Check the Integration Server log, the EntireX Adapter log or the RPC logs.
- Use the IDL Tester as described under [Task 1](#) above.

6

Calling COBOL Channel Container on z/OS CICS from Integration Server

| | |
|--|----|
| ■ Introduction | 57 |
| ■ What do I need to Install for this Scenario? | 58 |
| ■ Task 1: Extract the Interface of a COBOL Server | 59 |
| ■ Task 2: Generate the Connection and Adapter Services in Integration Server | 71 |
| ■ Task 3: Execute the Call from Integration Server to COBOL | 75 |

This scenario uses the tools IDL Extractor for COBOL and Integration Server Wrapper of the Designer.

Introduction



- ① Extract the interface of the COBOL server program.
- ② Generate connection and adapter services in Integration Server.
- ③ Execute the call from Integration Server to the COBOL server program.

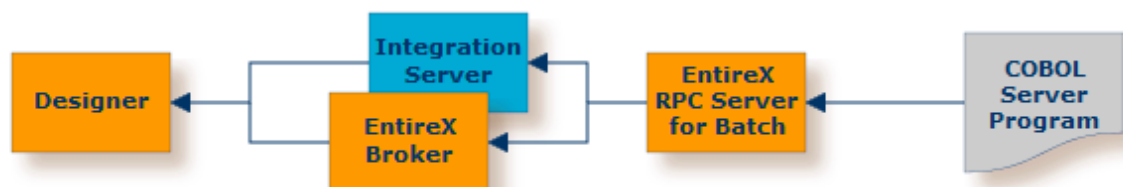
This scenario makes the following important assumptions:

For Task 1:

- You have a working COBOL Channel Container server. For illustration and examples on such a server, see *CICS with Channel Container Calling Convention* under *Introduction to the IDL Extractor for COBOL*.
- You have access to the related COBOL sources and copybooks. The minimum requirement is the `DATA DIVISION` of the interface. The sources and copybooks must be stored either
 - *locally*, that is, on the same machine where the Designer is running



- or *remotely* in a PDS or CA Librarian data set and accessed via the *RPC Server for Batch*, and either EntireX Broker or Integration Server



For Tasks 2 and 3:

- You can call the COBOL server program at runtime using different methods:
 - For the *EntireX RPC* connection method you need
 - EntireX Broker on one of the supported platforms: z/OS | Linux | Windows | BS2000
 - the *RPC Server for CICS*



- For the *EntireX Direct RPC* connection method you need:
 - the *RPC Server for CICS*



See also *Direct RPC* in the EntireX Adapter documentation.

What do I need to Install for this Scenario?

- You have Software AG Designer installed with EntireX plugins and Service Development plugins.
 - For EntireX plugins, see *Designer > EntireX Designer* under *EntireX Installation Packages* in the General Installation documentation.
 - For Service Development plugins, refer to the Integration Server documentation.
- You have an Integration Server with EntireX Adapter installed. See *Adapters > EntireX Adapter* under *EntireX Installation Packages* in the General Installation documentation.
- You have an RPC Server for CICS installed. See *Installing the RPC Server for CICS* in the z/OS Installation documentation.
- Optionally you have an EntireX Broker installed.
 - For Linux and Windows, see *EntireX Broker* under *EntireX Installation Packages* in the General Installation documentation.
 - For z/OS, see *Installing EntireX Broker under z/OS* in the z/OS Installation documentation.
- Optionally, for remote extraction only (Task 1), you have an RPC Server for Batch installed. See *Installing the RPC Server for Batch* in the z/OS Installation documentation.

Task 1: Extract the Interface of a COBOL Server

- [Introduction](#)
- [Sample COBOL Server used in the Examples](#)
- [Extracting a COBOL Server - Fast-track Method](#)
- [Extracting a COBOL Server - Modern Method with User-defined Mapping](#)
- [Comparison Chart: Fast-track versus User-defined Mapping](#)
- [Testing the Extraction Results](#)

Introduction

Follow the instructions for extracting COBOL, see *Using the IDL Extractor for COBOL - Overview* and choose *Scenario I: Create New IDL and Server Mapping Files* if this is your first extraction. Learn how to invoke the IDL Extractor for COBOL, create a COBOL Extractor Environment and about the possibilities to select the COBOL source.

The extraction process creates the following EntireX metafiles:

- IDL file. A Software AG IDL file contains definitions of the interface between client and server. See *Software AG IDL File* in the IDL Editor documentation in the IDL Editor documentation.
- Server mapping file (optional). The mapping file is a Designer file with extension .cvm that contains COBOL-specific mapping information. See *Server Mapping Files for COBOL* in the Designer documentation.

Sample COBOL Server used in the Examples

The following COBOL server is used to illustrate the features of the IDL Extractor for COBOL. Imagine an existing COBOL server called `EMPLOYEE`. It implements the access logic for a `LIST` and `DETAILS` function to a database view `EMPLOYEE`:

```

IDENTIFICATION DIVISION.
    PROGRAM-ID.      EMPLOYEE.
*****
*   Program Name    = EMPLOYEE
*   String Literal  = QUOTE
*****
01 DFHCOMMAREA.
    02 OPERATION                                PIC X(1).
        88 OPERATION-LIST                      VALUE 'L'.
        88 OPERATION-DETAILS                   VALUE 'D'.
    02 EMPLOYEE-ID                              PIC X(10).
    02 EMPLOYEE-DETAILS.
        03 FIRSTNAME                          PIC X(20).
        03 SURNAME                            PIC X(20).
        03 DATE-BIRTH                         PIC X(12).
        03 DETAILS                            PIC X(100).
        03 FILLER REDEFINES DETAILS.
            04 ANNUAL-SALARY                    PACKED-DECIMAL PIC S9(9).
            04 VACATION                          PIC S9(2).
            04 LANGUAGE                          PIC X(3).
            04 FILLER                            PIC X(90).
    02 EMPLOYEES-COUNT                          PIC 9(8) BINARY.
    02 EMPLOYEES OCCURS 1 TO 99 DEPENDING ON EMPLOYEES-COUNT.
        03 IDENT                              PIC X(10).
        03 FIRSTNAME                          PIC X(20).
        03 SURNAME                            PIC X(20).
        03 DATE-BIRTH                         PIC X(12).

```

Two approaches for extracting the COBOL server are described below:

- **Fast-track**

Learn how EntireX helps you to connect the COBOL Server with quick results.

- **User-defined Mapping**

The following features are among those available with a user-defined mapping:

- **Shape the interface to your COBOL server**

You can minimize the interface by suppressing COBOL server fields or by providing constant values. Renaming interfaces allows you to specify a readable long name. These two features together - constants and renaming of interfaces - are most powerful when multiple interfaces are implemented in a single COBOL server. Each function of the COBOL server triggered by an operation code or function code can be modelled as a separate IS service.

■ Select alternative mappings

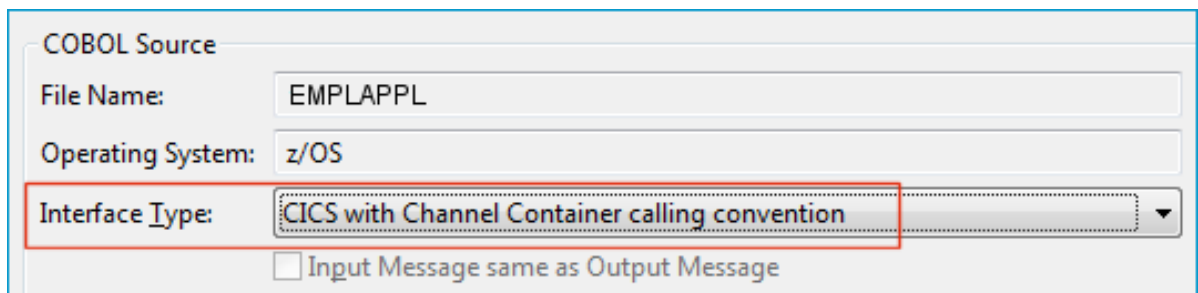
You can select alternative mappings for COBOL data items (REDEFINES, tables etc.) to enable scenarios with COBOL servers where data exchange is not fully described by the LINKAGE SECTION COBOL data items.

These approaches are described under *Fast-track Method* and *Modern Method* below.

Extracting a COBOL Server - Fast-track Method

➤ To extract the COBOL Server

- 1 Switch to the **EntireX** perspective.
- 2 Call the IDL Extractor for COBOL.
- 3 Set the correct interface type as described under *Step 4: Define the Extraction Settings and Start Extraction* under *Scenario I: Create New IDL and Server Mapping Files* in the IDL Extractor for COBOL documentation.



COBOL Source

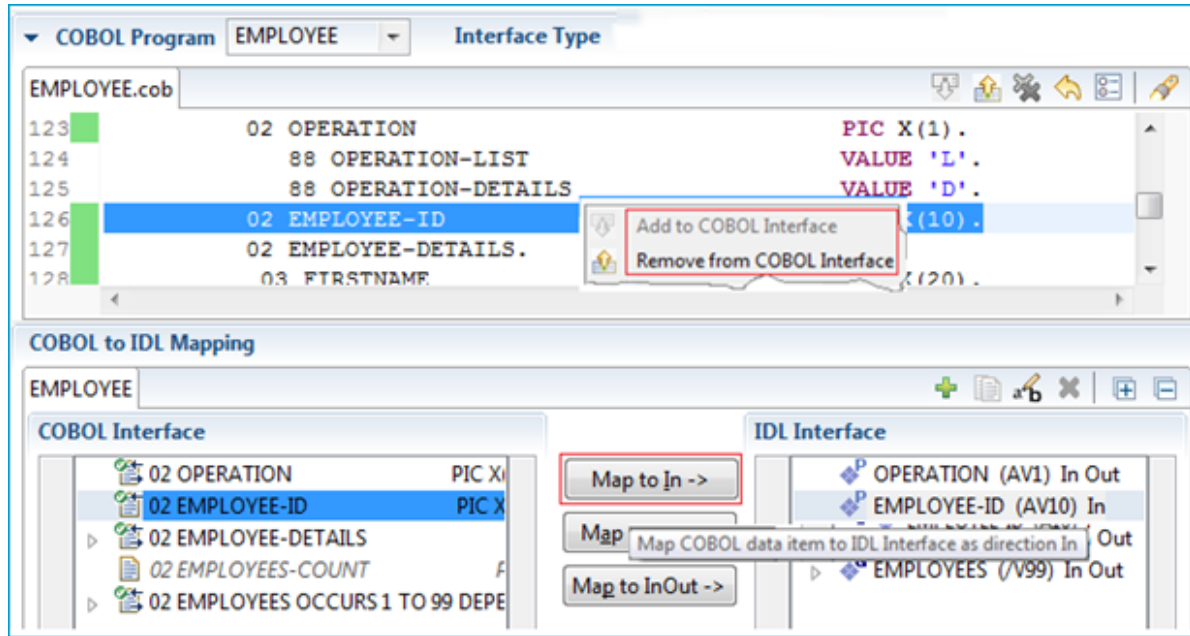
File Name: EMPLAPPL

Operating System: z/OS

Interface Type: CICS with Channel Container calling convention

☐ Input Message same as Output Message

- 4 Press **Next** to enter the COBOL Mapping Editor.



The purpose of the COBOL Mapping Editor is to map COBOL data items to IDL (Interface Definition Language) parameters. It consists of three main areas:

- The upper window pane is the COBOL program source.
- The window pane on the left-hand side is the COBOL interface, consisting of COBOL data items representing the parameters in your COBOL server program.
- The window pane on the right-hand side is the IDL interface consisting of IDL parameters.

For more information see *Mapping Editor User Interface* in the IDL Extractor for COBOL documentation.

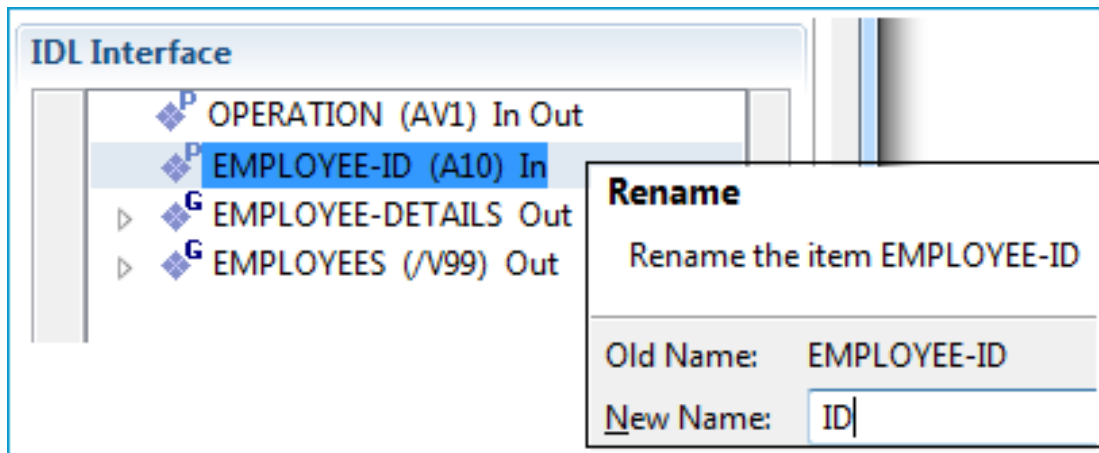
COBOL extraction is a two-step process:

- First, select the COBOL parameters using the **Add to** and **Remove from COBOL Interface** from the context menu on the COBOL data items in the upper window pane (COBOL source); in many situations the COBOL interface is detected by the Mapping Editor directly and you can omit this step.
- Then map the COBOL parameters to IDL directions using the **Map to In/Out/InOut** buttons. COBOL parameters do not have directions, they are always INOUT. This step can be left out for a quick test in non-production scenarios; for real production it is recommended to set IDL directions to reduce data transfer. You also have the option to assign a meaningful name to an IDL parameter if the original COBOL data item is not self-explanatory.

For our example:

- Set **Map to In** for COBOL data item `EMPLOYEE-ID` as IDL direction (see screenshot in previous step). For `EMPLOYEES-DETAILS` and `EMPLOYEES` perform the similar **Map to Out**.

- Use the function **Rename** from the context menu on the IDL parameters in the **IDL Interface** pane to rename COBOL parameter `EMPLOYEES-ID` to IDL parameter `ID`. Do the same for `EMPLOYEE-DETAILS`: Rename to `EMPLOYEE`.



- 5 Press **Finish**. The default extraction settings ensure you get useful results. The outcome is a Software AG IDL file (interface definition language), a Designer file with extension `.idl`:

```
library 'EMPLAPPL' is
program 'EMPLOYEE' is
  define data parameter
    1 OPERATION (AV1) In Out
    1 ID (AV10) In /* Original Name:EMPLOYEE-ID
    1 EMPLOYEE Out /* Original Name:EMPLOYEE-DETAILS
      2 FIRSTNAME (AV20)
      2 SURNAME (AV20)
      2 DATE-BIRTH (AV12)
      2 DETAILS (AV100)
    1 EMPLOYEES (/V99) Out
      2 IDENT (AV10)
      2 FIRSTNAME (AV20)
      2 SURNAME (AV20)
      2 DATE-BIRTH (AV12)
  end-define
```

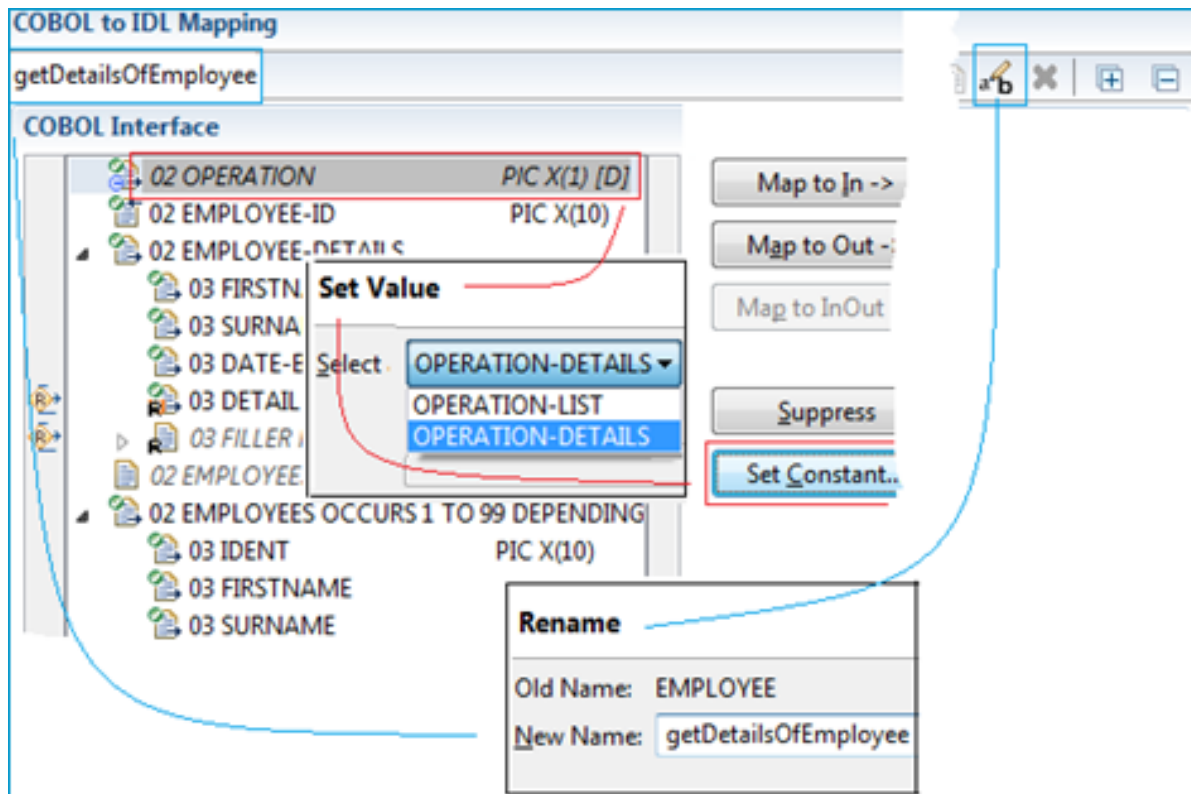
If required, a server mapping file with the same name as the IDL file but the extension `.cvm` may be generated too, for technical reasons. This file must always be stored together with the concomitant IDL file. For more information, see *Server Mapping Files for COBOL* in the Designer documentation. By default, the interface name `EMPLOYEE` is taken from the COBOL server program name.


Extracting a COBOL Server - Modern Method with User-defined Mapping

EntireX allows you to extract all implemented interfaces of the COBOL server separately. Instead of a large `EMPLOYEE` interface, separate interfaces `getListOfEmployees` and `getDetailsOfEmployee` are extracted. Each interface contains required parameters; obsolete parameters for an interface are suppressed, improving its usability.

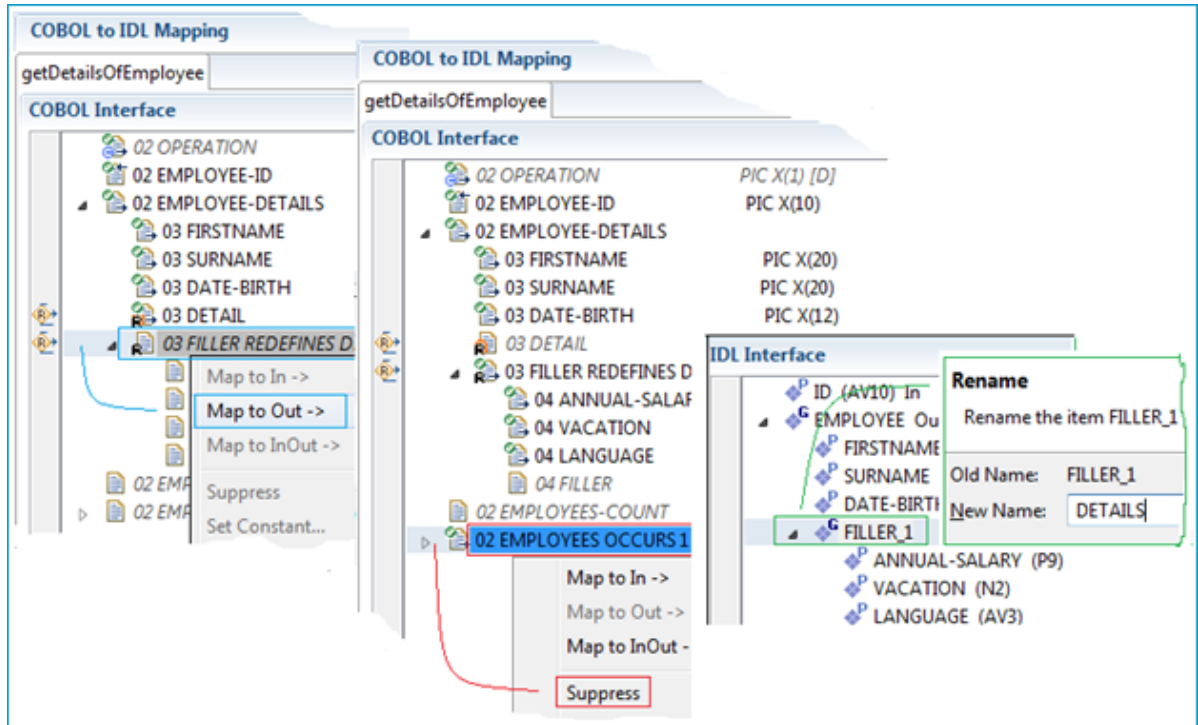
➤ To extract a COBOL server with a user-defined mapping

- 1 Shape `EMPLOYEE` to `getDetailsOfEmployee`:



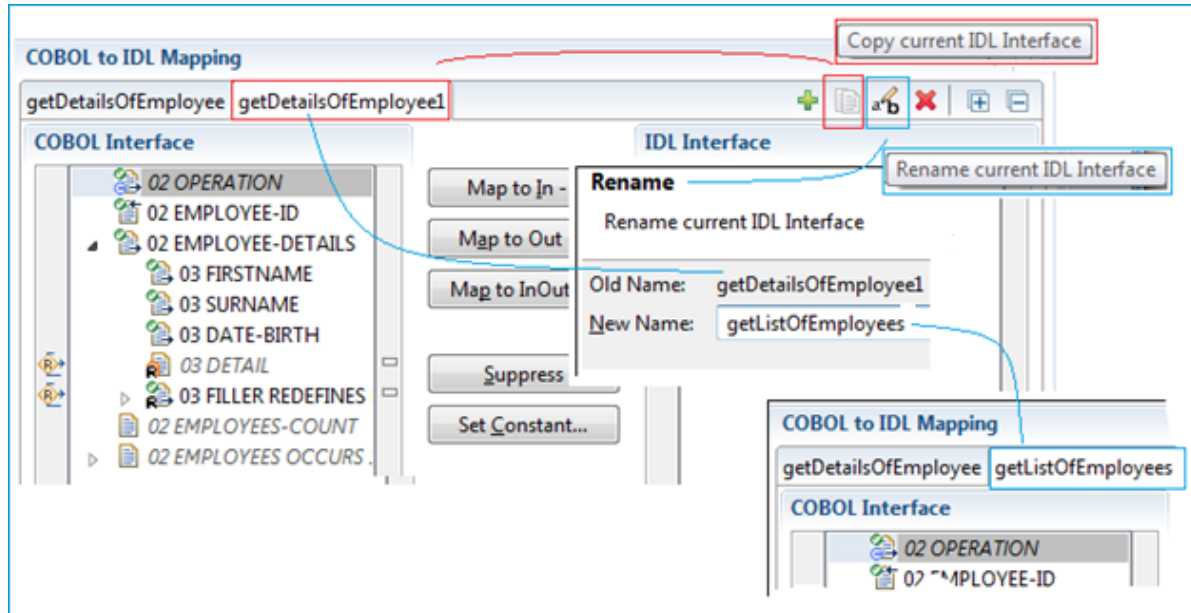
- Mark the `OPERATION` field in the COBOL **Interface** pane and press the **Set Constant** button. In the pop-up window, select `OPERATION-DETAILS` (red markers). The `OPERATION-DETAILS` value originates from COBOL level-88 data item (blue markers). If there is no COBOL level-88 enumeration type in the COBOL program defined, you can enter the function code manually in the pop-up window.
- By default the IDL interface gets the same name as your COBOL server: `EMPLOYEE`. Use the **Rename** button  from the toolbar of the COBOL Mapping Editor and change the IDL interface name to `getDetailsOfEmployee` (blue markers). This name is used as the IS service name later.

- 2 Continue shaping, making `getDetailsOfEmployee` easier to use:




- Use the context menu of the redefinition of the `DETAIL` field in the **COBOL Interface** pane, `FILLER REDEFINES DETAIL` and choose **Map to Out** (blue markers). A redefinition is a secondary layout (field types) of the same memory area. The redefinition contains more specific information (`ANNUAL-SALARY`, `VACATION`, etc.) than character buffer `DETAIL`. This is the reason why it is more useful in your interface.
- Use the context menu of `FILLER_1` in the IDL interface pane and rename `FILLER_1` to `DETAILS` (green markers) for a readable IS service field name later.
- The `DETAILS` function in the COBOL server does not make use of the `EMPLOYEES` field. Therefore you can leave it out of the interface: use the context menu of the `EMPLOYEES` field in the **COBOL Interface** pane and choose **Suppress** (red markers).


3 Shape `EMPLOYEE` to `getListOfEmployees` Function:



The COBOL Mapping Editor allows you to define multiple IDL interfaces to the same COBOL server:

- You create the additional IDL interface using the toolbar button **Copy current IDL interface**

 (red markers). A new tab `getDetailsOfEmployee1` is created. The previously extracted `getDetailsOfEmployee` interface still exists in the first tab. Once you reactivate the first tab, you will see the interface of `getDetailsOfEmployee` again.

- Use the **Rename** button  from the toolbar of the COBOL Mapping Editor and change the IDL interface name to `getListOfEmployees` (blue markers). This name is used as the IS service name later.

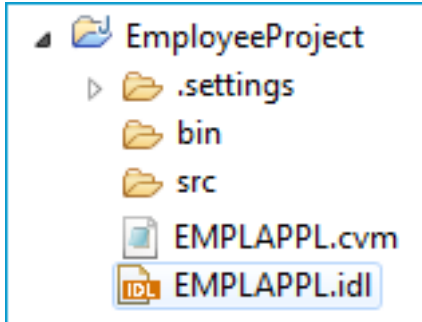
- For the `LIST` function you need the `OPERATION-LIST` value in the `OPERATION` field: Mark the `OPERATION` field in the **COBOL Interface** pane and press the **Set Constant** button. In the pop-up window, select `OPERATION-LIST` (similar to Step 1. above *Shape `EMPLOYEE` to `getDetailsOfEmployee`*; red markers).

- Use the context menu of the `EMPLOYEES` field in the **COBOL Interface** pane, `EMPLOYEES OCCURS 1 TO 99` and choose **Map to Out** (Similar to Step 2. above *Continue shaping, making `getDetailsOfEmployee` easier to use*; blue markers).

- Because the `EMPLOYEE` and `EMPLOYEE-DETAIL` fields are not used in the COBOL server `LIST` function, you leave them out in the IDL interface: use the context menu of `EMPLOYEE-DETAIL` field in the **COBOL Interface** pane and choose **Suppress** (similar to Step 2. above *Continue shaping, making `getDetailsOfEmployee` easier to use*; red markers). Do the same for the `EMPLOYEE-ID` field.

- 4 Press **Finish** to retrieve the extraction result in the form of a Software AG IDL file. At the same time, a server mapping file for COBOL (Designer file with extension `.cvm`) is created.

See *Server Mapping Files for COBOL* in the Designer documentation. The *Software AG IDL File* in the IDL Editor documentation describes the interfaces from the client point of view, while the server mapping file contains the mapping to the real COBOL server. Both of these files must be kept together and in sync, otherwise a call to the COBOL server may fail.



To summarize: We created two IDL interfaces. In the IDL file, these resulted in two IDL programs: `getListOfEmployees` and `getDetailsOfEmployee`. Both IDL programs were given readable names (Steps 1 and 3). Meaningful fields were kept, while superfluous fields were suppressed (Steps 1 and 3). The program `getDetailsOfEmployee` contains the redefined fields of parameter `DETAILS` (see below) mapped during extraction (Step 1).



Note: At runtime, the RPC client generated with the extracted interface will send data for the redesigned interfaces, while your COBOL server still expects `EMPLOYEE` data. The EntireX runtime transforms the incoming data stream from the RPC client, using the server mapping file.

```

program 'getDetailsOfEmployee' is
  define data parameter
    1 ID (AV10) In /* Original Name:EMPLOYEE-ID
    1 EMPLOYEE Out /* Original Name:EMPLOYEE-DETAILS
    2 FIRSTNAME (AV20)
    2 SURNAME (AV20)
    2 DATE-BIRTH (AV12)
    2 DETAILS /* Original Name:FILLER_1
    3 ANNUAL-SALARY (P9)
    3 VACATION (N2)
    3 LANGUAGE (AV3)
  end-define
  program 'getListOfEmployees' is
    1 EMPLOYEES (/V99) Out
    2 IDENT (AV10)
    2 FIRSTNAME (AV20)
    2 SURNAME (AV20)
    2 DATE-BIRTH (AV12)
  end-define

```

Comparison Chart: Fast-track versus User-defined Mapping

The following table highlights the differences when shaping an interface with a *user-defined mapping* compared with a *fast-path extraction*.

| | Interface Shaping with User-defined Mapping | Fast-path Extraction |
|----------------------------------|---|---|
| General | User-defined interface with dedicated mapping. For our example, the interfaces are small and tidy and more self-explanatory with long, readable interface names. They are easier to use with the hidden <code>OPERATION</code> field and the suppressed COBOL fields, which are not needed. | Automatic, quick result extraction with COBOL-like interfaces on IS. For our example, the IS interface <code>EMPLOYEE</code> matches exactly 1:1, field by field. |
| IS service(s) | Multiple small and handy IS services; each <code>OPERATION</code> code is mapped to a separate IS service. | One big IS service. |
| IS service name | Readable long name. | Short Subprogram name; up to 8 characters. |
| IS fields | Usage of Suppress and Set Constant reduces the message length. This keeps focus on relevant data items and keeps the client's interface clean. It may also improve performance. | The IS fields and COBOL server parameters match 1:1. As COBOL layout descriptions are sometimes used for many different purposes, irrelevant data items appear and clutter up the IS interface. |
| <code>OPERATION</code> parameter | Suppressed: the <code>OPERATION</code> parameter does not exist in the IS service as an IS field. | The <code>OPERATION</code> parameter exists in the IS service as an IS field and needs to be filled-in by the client endpoint. |
| <code>OPERATION</code> code | The <code>OPERATION</code> code is provided internally by EntireX runtime in the <code>OPERATION</code> field. | The <code>OPERATION</code> code needs to be specified in the IS service in the <code>OPERATION</code> field by the client endpoint. |
| <code>REDEFINE</code> parameters | Either the parameter that is redefined or one of its redefinitions is available as an IS field. | Only the parameter that is redefined is available as an IS field. Redefinitions of the parameter are not available as IS fields. |

A user-defined mapping enables you also to define alternative mappings for COBOL data items (`REDEFINES`, tables etc.). These enable scenarios with COBOL servers where data exchange is not fully described by the `LINKAGE SECTION` COBOL data items. For more information refer to the IDL Extractor for COBOL documentation:

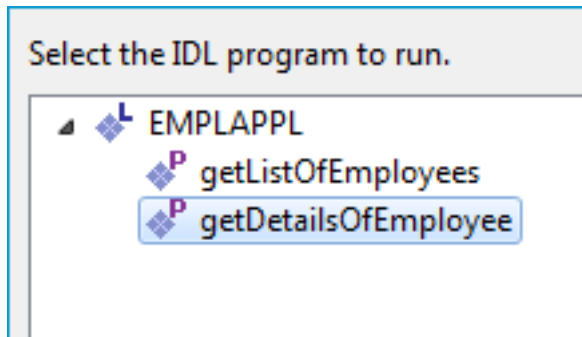
- *Mapping Editor IDL Interface Mapping Functions*
- *User-defined Mapping*

Testing the Extraction Results

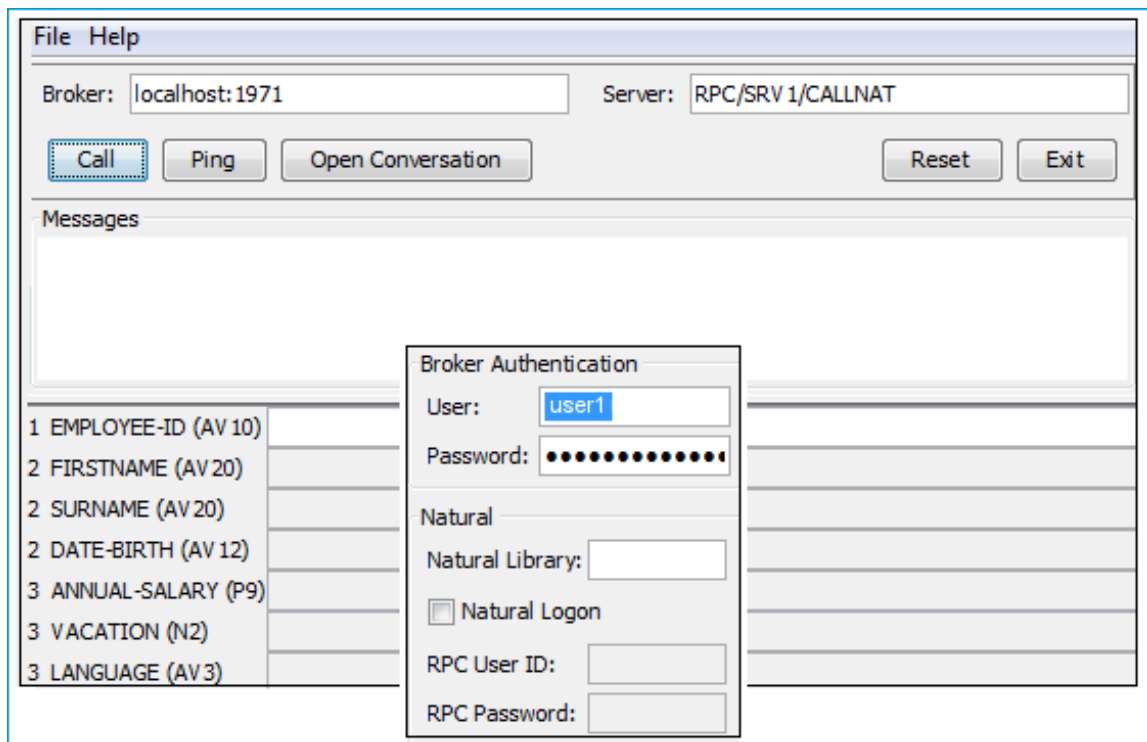
The following pictures use the extraction results described under *Extracting a COBOL Server - Modern Method with User-defined Mapping*.

> To test the extraction results (optional)

- 1 You can test the results of the extraction operation and the COBOL server back end, using the EntireX IDL Tester. From the context menu of the IDL file in the Designer, choose **Software AG IDL Tester**.



- 2 Select `getDetailsOfEmployee`.



Note that the broker and server parameters contain the explicit route to call the server program, and you can optionally ping the connection from this client. With the **File > Options** dialog, you can set:

- **User** and **Password** for *broker* authentication
- **RPC User ID** and **RPC Password** for *server* authentication

See *EntireX IDL Tester* in the Designer documentation.

- 3 Check the Integration Server log, the EntireX Adapter log or the RPC logs. Applies to all connection methods.

Task 2: Generate the Connection and Adapter Services in Integration Server

This section describes your first steps to create a new Integration Server connection. This is described in more detail under *Using the Integration Server Wrapper*, for example working with existing Integration Server connections. This section covers the following topics:

- [Step 1: Start the Integration Server Wrapper Wizard](#)
- [Step 2: Create a New Integration Server Connection](#)
- [Step 3: Select the Connection Type](#)
- [Step 4: Define Adapter Services for an RPC Connection](#)

Step 1: Start the Integration Server Wrapper Wizard

➤ To start the Integration Server Wrapper wizard

- 1 In the context menu of a Software AG IDL file, choose **Integration Server > Generate web-Methods IS Connection**.

This starts the wizard with a list of existing Integration Server Wrapper connections.



Note: If the selected IDL file is not valid because of a syntax error, an error dialog comes up and the wizard does not start.

- 2 Continue with *Step 2: Create a New Integration Server Connection*.

Step 2: Create a New Integration Server Connection

Define New Integration Server Connection

Add host:port, user and password for a new Integration Server

Server:

User:

Password:

☐ Use secure connection

➤ To create a new Integration Server connection

- 1 Define the new Integration Server connection on the wizard page.



Notes:

1. The only required field is **Server**. Enter the hostname of the Integration Server including an optional port number. If no port number is specified, port number defaults to "5555". The **Integration Server Authentication** can be passed with the **User** and **Password** fields.
 2. Optional settings are for secure connections. The **Truststore for HTTPS** contains all signed certificates and must be a valid truststore.
 3. The check box **Verify host name** checks that the hostname is entered in the stored certificate.
 4. When the Integration Server has **Client Authentication** enabled, you can specify your **Keystore** file and keystore **Password**.
 5. For managing Integration Server connections, see [Preferences](#).
- 2 Choose **Next** and continue with *Step 3: Select the Connection Type*.

Step 3: Select the Connection Type

☒ Create a new EntireX Adapter connection of type: EntireX RPC Connection

☐ Update Adapter Services or Listeners to an existing Integration Server connection:

List of Connections

| Connection Name | Package Name | Connection Type | Enabled |
|-------------------------------|--------------|------------------------|---------|
| Employees:EmployeesConnection | Employees | EntireX RPC Connection | Yes |

Total: 1

☒ Map Software AG IDL data types to String

☐ Create or Update REST resource

> To create a new connection

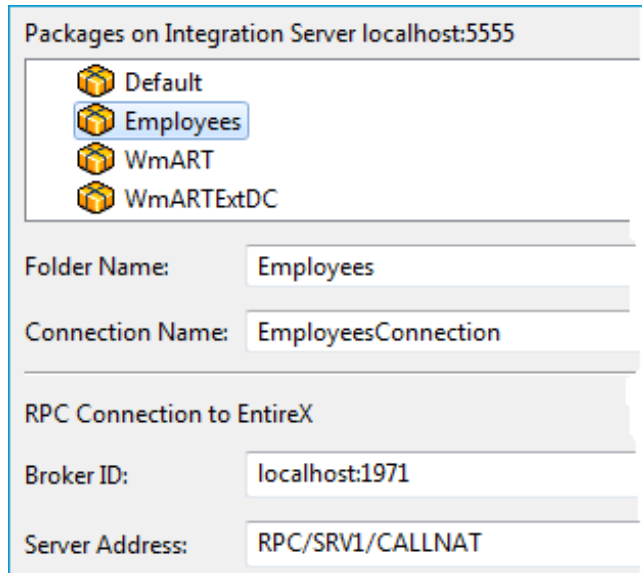
- 1 Select a connection type from the drop down list. Connection types are described under *EntireX Adapter Connections* in the EntireX Adapter documentation and *Introduction to the Integration Server Wrapper*.



Note: The list of connection types is filtered: connection types that require a license are only shown if a corresponding license file is available. Reliable RPC connections are only shown if all IDL programs contain only IN parameters. Also, if a server mapping file is available, only those connection types that support the interface type specified in the server mapping file are shown.

- 2 Click **Next** and continue with *Step 4: Define Adapter Services for an RPC Connection*.

Step 4: Define Adapter Services for an RPC Connection



Packages on Integration Server localhost:5555

- Default
- Employees**
- WmART
- WmARTEExtDC

Folder Name:

Connection Name:

RPC Connection to EntireX

Broker ID:

Server Address:

> To create a connection and related adapter services

- 1 Select an existing package or create a new package for the created objects.
- 2 Define a folder name. If the folder does not exist, it will be created.
- 3 Define a connection name.
- 4 Define the parameters of the connection type. For details, see *Connection Parameters for RPC Connections* in the EntireX Adapter documentation.

As a result, the folder will contain the connection and the adapter services (one for each IDL program). The name of a service is the same as the respective IDL program.

The default settings for the adapter services are:

- the **Default** package; if not available, the first package
- the IDL library name for the **Folder Name**
- the IDL library name with the suffix "Connection" for the **Connection Name**



Note: When creating a connection, a package dependency is added such that the selected package depends on webMethods EntireX (the package `WmEntireX`) with the version currently used.

Task 3: Execute the Call from Integration Server to COBOL

From the **Service Development** perspective, refresh the package where the connection service was written, select the adapter service and use the service test to **Run Service**. This invokes the adapter service through the connector service.

The screenshot shows the 'Employees' package structure in the Service Development perspective. The 'getListOfEmployees' service is selected, and the 'Run Service' button is highlighted. Below the package structure, a table displays the output of the service call.

| Name | Value |
|--------------|-------------|
| outRec | |
| EMPLOYEES | |
| EMPLOYEES[0] | |
| IDENT | 11100102 |
| FIRSTNAME | EDGAR |
| SURNAME | SCHINDLER |
| DATE-BIRTH | Dec 4, 1962 |
| EMPLOYEES[1] | |
| EMPLOYEES[2] | |
| EMPLOYEES[3] | |
| EMPLOYEES[4] | |
| errorCode | 00000000 |
| errorFlag | false |

In case of error or unexpected results:

- Check the Integration Server log, the EntireX Adapter log or the RPC logs.
- Use the IDL Tester as described under [Task 1](#) above.

7

Calling COBOL DFHCOMMAREA (Zero Footprint using CICS ECI) on z/OS CICS from Integration Server

| | |
|--|----|
| ■ Introduction | 78 |
| ■ What do I need to Install for this Scenario? | 79 |
| ■ Task 1: Extract the Interface of a COBOL Server | 80 |
| ■ Task 2: Generate the Connection and Adapter Services in Integration Server | 93 |
| ■ Task 3: Execute the Call from Integration Server to COBOL | 97 |

This scenario uses the tools IDL Extractor for COBOL and Integration Server Wrapper of the Designer.

Introduction



- ① Extract the interface of the COBOL server program.
- ② Generate connection and adapter services in Integration Server.
- ③ Execute the call from Integration Server to the COBOL server program.

This scenario makes the following important assumptions:

For Task 1:

- You have a working COBOL DFHCOMMAREA server. For illustration and examples on such a server, see *CICS with DFHCOMMAREA Calling Convention* under *Introduction to the IDL Extractor for COBOL*.
- You have access to the related COBOL sources and copybooks as files on your local machine. The minimum requirement is the `DATA DIVISION` of the interface.



For Tasks 2 and 3:

- To call the COBOL server program at runtime using the *EntireX CICS ECI* connection method, you need to configure the CICS ECI TCP/IP service within your CICS region. See *Preparing IBM CICS for ECI* and *Connection Parameters for CICS ECI Connections*.



What do I need to Install for this Scenario?

- You have Software AG Designer installed with EntireX plugins and Service Development plugins.
 - For EntireX plugins, see *Designer > EntireX Designer* under *EntireX Installation Packages* in the General Installation documentation.
 - For Service Development plugins, refer to the Integration Server documentation.
- You have an Integration Server with EntireX Adapter installed. See *Adapters > EntireX Adapter* under *EntireX Installation Packages* in the General Installation documentation.

Task 1: Extract the Interface of a COBOL Server

- [Introduction](#)
- [Sample COBOL Server used in the Examples](#)
- [Extracting a COBOL Server - Fast-track Method](#)
- [Extracting a COBOL Server - Modern Method with User-defined Mapping](#)
- [Comparison Chart: Fast-track versus User-defined Mapping](#)
- [Testing the Extraction Results](#)

Introduction

Follow the instructions for extracting COBOL, see *Using the IDL Extractor for COBOL - Overview* and choose *Scenario I: Create New IDL and Server Mapping Files* if this is your first extraction. Learn how to invoke the IDL Extractor for COBOL, create a COBOL Extractor Environment and about the possibilities to select the COBOL source.

The extraction process creates the following EntireX metafiles:

- IDL file. A Software AG IDL file contains definitions of the interface between client and server. See *Software AG IDL File* in the IDL Editor documentation in the IDL Editor documentation.
- Server mapping file (optional). The mapping file is a Designer file with extension .cvm that contains COBOL-specific mapping information. See *Server Mapping Files for COBOL* in the Designer documentation.

Sample COBOL Server used in the Examples

The following COBOL server is used to illustrate the features of the IDL Extractor for COBOL. Imagine an existing COBOL server called `EMPLOYEE`. It implements the access logic for a `LIST` and `DETAILS` function to a database view `EMPLOYEE`:


```

IDENTIFICATION DIVISION.
    PROGRAM-ID.      EMPLOYEE.
*****
*   Program Name    = EMPLOYEE
*   String Literal  = QUOTE
*****
01 DFHCOMMAREA.
    02 OPERATION                                PIC X(1).
        88 OPERATION-LIST                      VALUE 'L'.
        88 OPERATION-DETAILS                  VALUE 'D'.
    02 EMPLOYEE-ID                             PIC X(10).
    02 EMPLOYEE-DETAILS.
        03 FIRSTNAME                          PIC X(20).
        03 SURNAME                           PIC X(20).
        03 DATE-BIRTH                        PIC X(12).
        03 DETAILS                          PIC X(100).
        03 FILLER REDEFINES DETAILS.
            04 ANNUAL-SALARY                   PACKED-DECIMAL PIC S9(9).
            04 VACATION                        PIC S9(2).
            04 LANGUAGE                       PIC X(3).
            04 FILLER                         PIC X(90).
    02 EMPLOYEES-COUNT                         PIC 9(8) BINARY.
    02 EMPLOYEES OCCURS 1 TO 99 DEPENDING ON EMPLOYEES-COUNT.
        03 IDENT                             PIC X(10).
        03 FIRSTNAME                         PIC X(20).
        03 SURNAME                          PIC X(20).
        03 DATE-BIRTH                       PIC X(12).

```

Two approaches for extracting the COBOL server are described below:

- **Fast-track**

Learn how EntireX helps you to connect the COBOL Server with quick results.

- **User-defined Mapping**

The following features are among those available with a user-defined mapping:

- **Shape the interface to your COBOL server**

You can minimize the interface by suppressing COBOL server fields or by providing constant values. Renaming interfaces allows you to specify a readable long name. These two features together - constants and renaming of interfaces - are most powerful when multiple interfaces are implemented in a single COBOL server. Each function of the COBOL server triggered by an operation code or function code can be modelled as a separate IS service.

■ **Select alternative mappings**

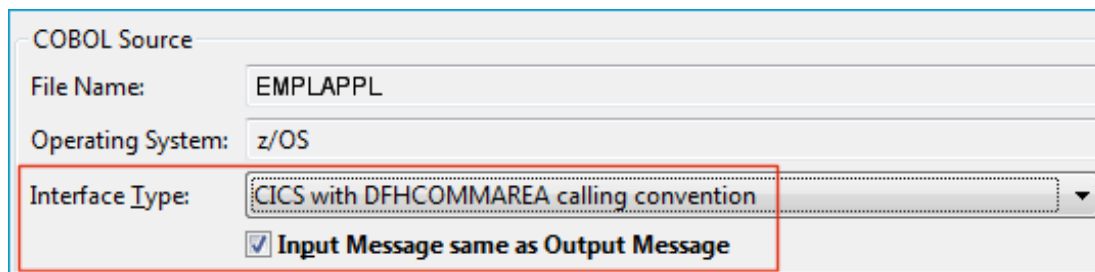
You can select alternative mappings for COBOL data items (REDEFINES, tables etc.) to enable scenarios with COBOL servers where data exchange is not fully described by the LINKAGE SECTION COBOL data items.

These approaches are described under [Fast-track Method](#) and [Modern Method](#) below.

Extracting a COBOL Server - Fast-track Method

➤ **To extract the COBOL Server**

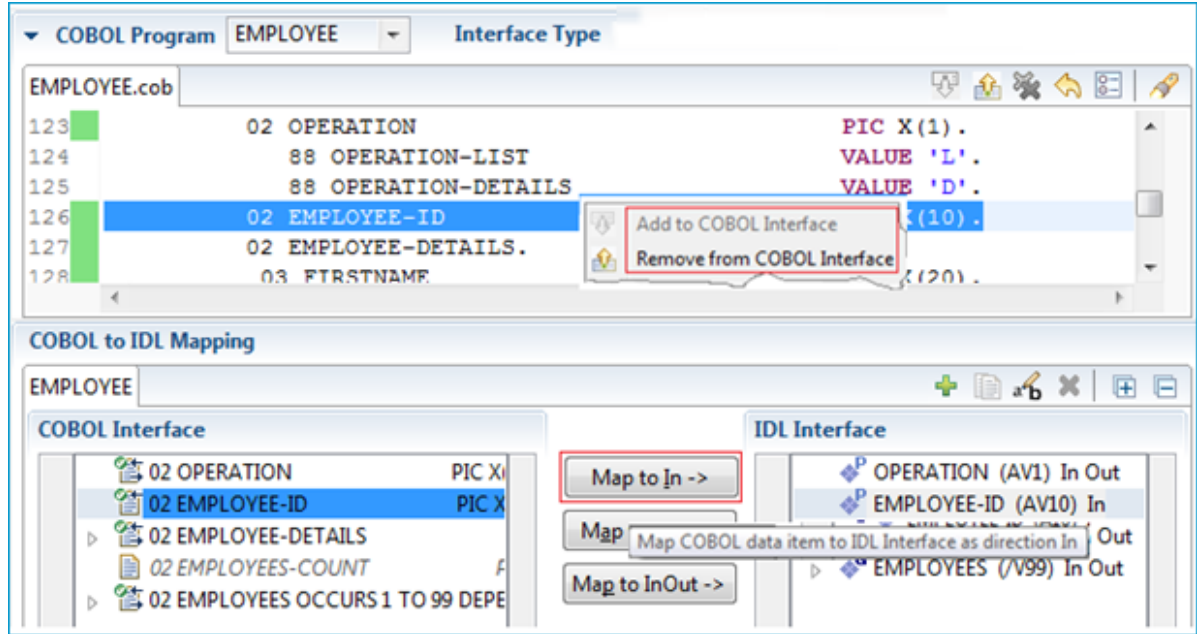
- 1 Switch to the **EntireX** perspective.
- 2 Call the IDL Extractor for COBOL.
- 3 Set the correct interface type as described under *Step 4: Define the Extraction Settings and Start Extraction* under *Scenario I: Create New IDL and Server Mapping Files* in the IDL Extractor for COBOL documentation.



- 4 Set the correct value for checkbox **Input Message same as Output Message**.
 - Check the checkbox if the COBOL data structure of the CICS input message is the same as the structure of the CICS output message, that is, there is one COBOL layout for both directions. See the following COBOL server examples in the IDL Extractor for COBOL documentation:
 - *Example 1: Redefines*
 - *Example 2: Buffer Technique*
 - *Example 3: COBOL SET ADDRESS Statements*
 - Clear the checkbox if the COBOL data structure of the CICS input message is different to the structure of the CICS output message, that is, the output overlays the input, which means there is a second COBOL layout for the reply. See the following COBOL server examples in the IDL Extractor for COBOL documentation:
 - *Example 1: Redefines*
 - *Example 2: Buffer Technique*
 - *Example 3: COBOL SET ADDRESS Statements*

For our example, check the check box, because the COBOL layout for input is the same as the COBOL layout for output.

- 5 Press **Next** to enter the COBOL Mapping Editor.



The purpose of the COBOL Mapping Editor is to map COBOL data items to IDL (Interface Definition Language) parameters. It consists of three main areas:

- The upper window pane is the COBOL program source.
- The window pane on the left-hand side is the COBOL interface, consisting of COBOL data items representing the parameters in your COBOL server program.
- The window pane on the right-hand side is the IDL interface consisting of IDL parameters.

What you select depends on check-box **Input Message same as Output Message**:

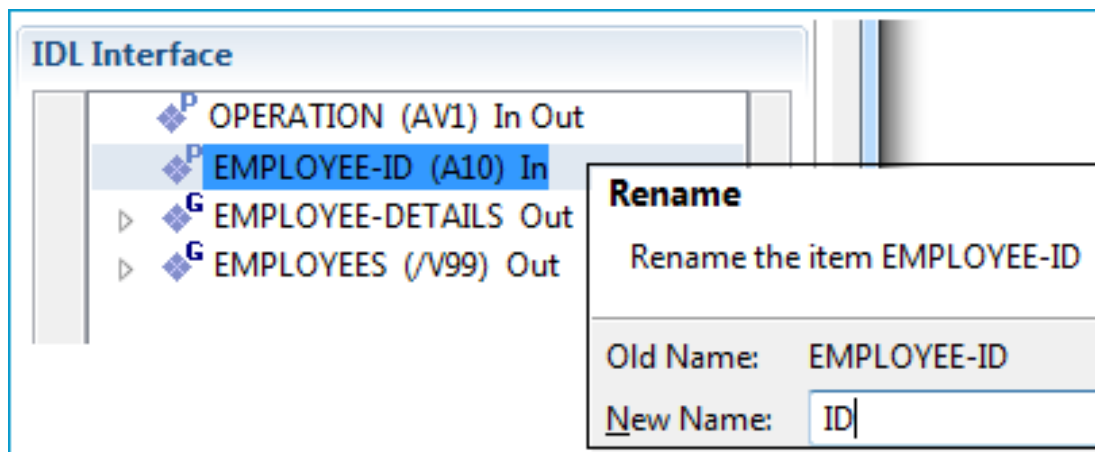
- If there is a single COBOL data structure of the CICS message for input and output - check box **Input Message same as Output Message** is checked - you select a single COBOL data structure in the COBOL Mapping Editor. This structure is used for COBOL input as well as for COBOL output. For more information in this case see *Mapping Editor User Interface* in the IDL Extractor for COBOL documentation.
- If there is a second COBOL data structure for the CICS output message - check box **Input Message same as Output Message** is cleared - you will select two COBOL data structures in the COBOL Mapping Editor. One is used for COBOL input and the other is for COBOL output. For more information in this case see *Mapping Editor User Interface* in the IDL Extractor for COBOL documentation.

COBOL extraction is a two-step process:

- First, select the COBOL parameters using the **Add to** and **Remove from COBOL Interface** from the context menu on the COBOL data items in the upper window pane (COBOL source); in many situations the COBOL interface is detected by the Mapping Editor directly and you can omit this step.
- Then map the COBOL parameters to IDL directions using the **Map to In/Out/InOut** buttons. COBOL parameters do not have directions, they are always INOUT. This step can be left out for a quick test in non-production scenarios; for real production it is recommended to set IDL directions to reduce data transfer. You also have the option to assign a meaningful name to an IDL parameter if the original COBOL data item is not self-explanatory.

For our example:

- Set **Map to In** for COBOL data item `EMPLOYEE-ID` as IDL direction (see screenshot in previous step). For `EMPLOYEES-DETAILS` and `EMPLOYEES` perform the similar **Map to Out**.
- Use the function **Rename** from the context menu on the IDL parameters in the **IDL Interface** pane to rename COBOL parameter `EMPLOYEES-ID` to IDL parameter `ID`. Do the same for `EMPLOYEE-DETAILS`: Rename to `EMPLOYEE`.



- 6 Press **Finish**. The default extraction settings ensure you get useful results. The outcome is a Software AG IDL file (interface definition language), a Designer file with extension `.idl`:

```
library 'EMPLAPPL' is
program 'EMPLOYEE' is
define data parameter
  1 OPERATION (AV1) In Out
  1 ID (AV10) In /* Original Name:EMPLOYEE-ID
  1 EMPLOYEE Out /* Original Name:EMPLOYEE-DETAILS
    2 FIRSTNAME (AV20)
    2 SURNAME (AV20)
    2 DATE-BIRTH (AV12)
    2 DETAILS (AV100)
  1 EMPLOYEES (/V99) Out
    2 IDENT (AV10)
    2 FIRSTNAME (AV20)
    2 SURNAME (AV20)
    2 DATE-BIRTH (AV12)
end-define
```

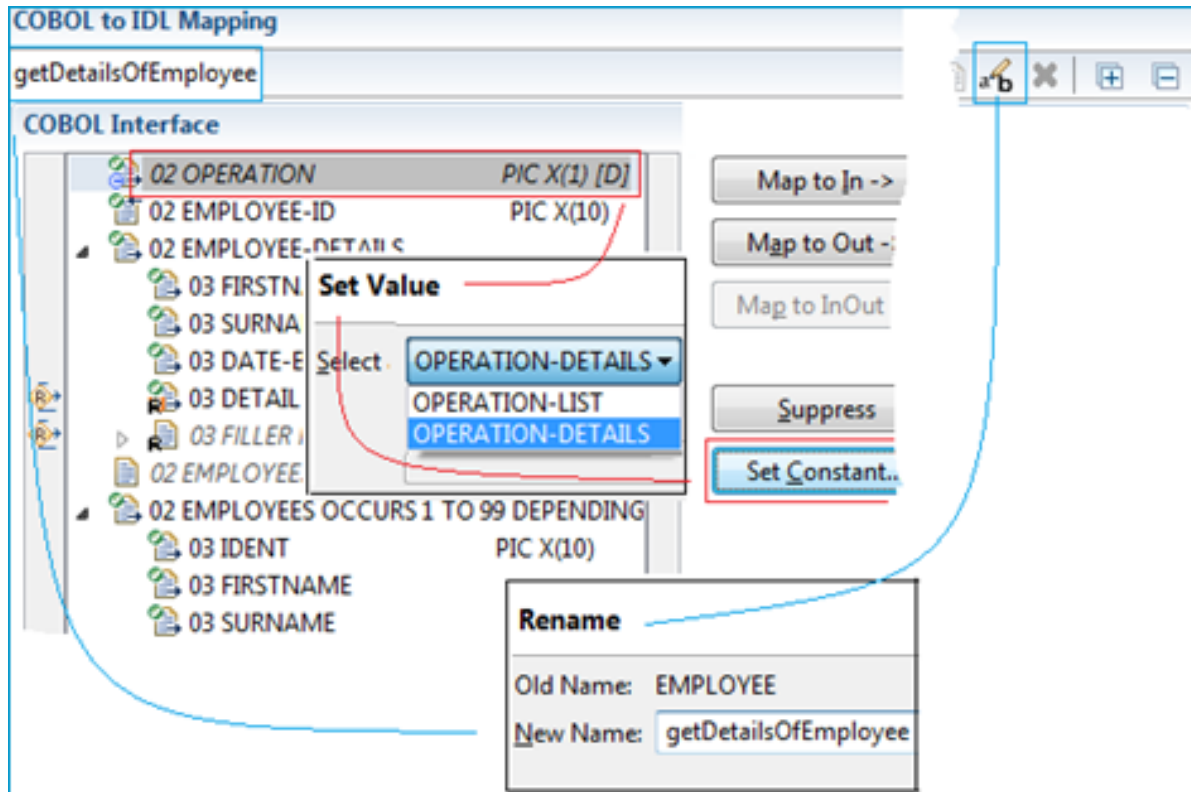
If required, a server mapping file with the same name as the IDL file but the extension .cvm may be generated too, for technical reasons. This file must always be stored together with the concomitant IDL file. For more information, see *Server Mapping Files for COBOL* in the Designer documentation. By default, the interface name `EMPLOYEE` is taken from the COBOL server program name.


Extracting a COBOL Server - Modern Method with User-defined Mapping

EntireX allows you to extract all implemented interfaces of the COBOL server separately. Instead of a large `EMPLOYEE` interface, separate interfaces `getListOfEmployees` and `getDetailsOfEmployee` are extracted. Each interface contains required parameters; obsolete parameters for an interface are suppressed, improving its usability.

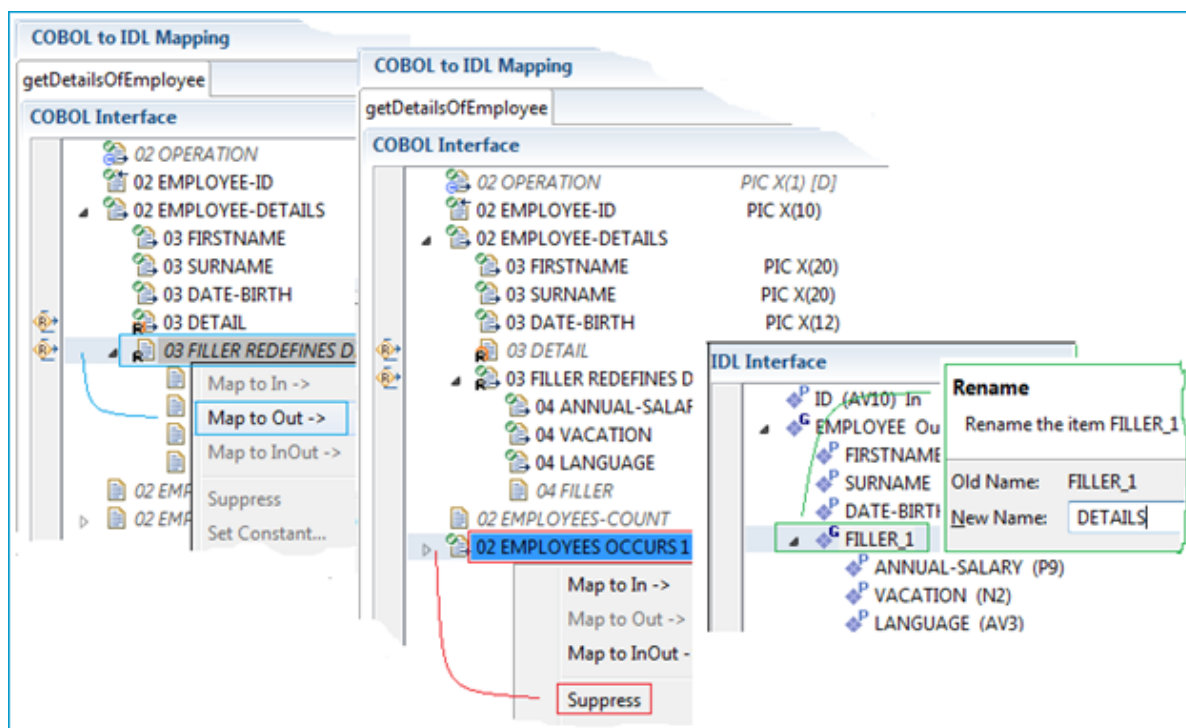
» To extract a COBOL server with a user-defined mapping

- 1 Shape `EMPLOYEE` to `getDetailsOfEmployee`:



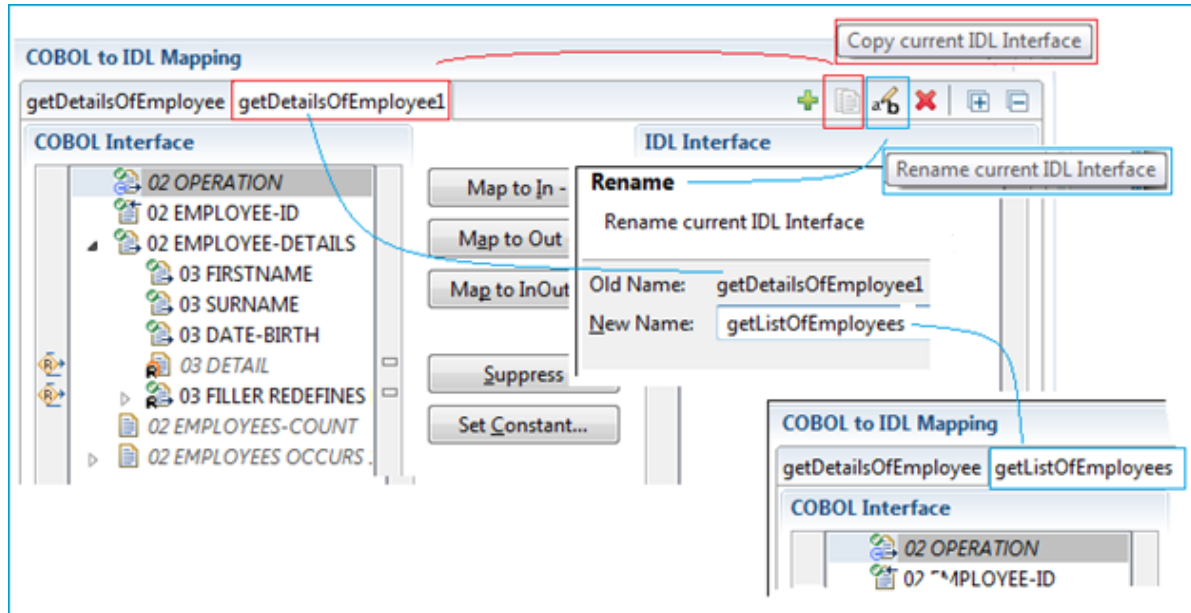
- Mark the `OPERATION` field in the **COBOL Interface** pane and press the **Set Constant** button. In the pop-up window, select `OPERATION-DETAILS` (red markers). The `OPERATION-DETAILS` value originates from COBOL level-88 data item (blue markers). If there is no COBOL level-88 enumeration type in the COBOL program defined, you can enter the function code manually in the pop-up window.
- By default the IDL interface gets the same name as your COBOL server: `EMPLOYEE`. Use the **Rename** button  from the toolbar of the COBOL Mapping Editor and change the IDL interface name to `getDetailsOfEmployee` (blue markers). This name is used as the IS service name later.

2 Continue shaping, making `getDetailsOfEmployee` easier to use:




- Use the context menu of the redefinition of the `DETAIL` field in the **COBOL Interface** pane, `FILLER REDEFINES DETAIL` and choose **Map to Out** (blue markers). A redefinition is a secondary layout (field types) of the same memory area. The redefinition contains more specific information (`ANNUAL-SALARY`, `VACATION`, etc.) than character buffer `DETAIL`. This is the reason why it is more useful in your interface.
- Use the context menu of `FILLER_1` in the IDL interface pane and rename `FILLER_1` to `DETAILS` (green markers) for a readable IS service field name later.
- The `DETAILS` function in the COBOL server does not make use of the `EMPLOYEES` field. Therefore you can leave it out of the interface: use the context menu of the `EMPLOYEES` field in the **COBOL Interface** pane and choose **Suppress** (red markers).


3 Shape `EMPLOYEE` to `getListOfEmployees` Function:



The COBOL Mapping Editor allows you to define multiple IDL interfaces to the same COBOL server:

- You create the additional IDL interface using the toolbar button **Copy current IDL interface**

 (red markers). A new tab `getDetailsOfEmployee1` is created. The previously extracted `getDetailsOfEmployee` interface still exists in the first tab. Once you reactivate the first tab, you will see the interface of `getDetailsOfEmployee` again.

- Use the **Rename** button  from the toolbar of the COBOL Mapping Editor and change the IDL interface name to `getListOfEmployees` (blue markers). This name is used as the IS service name later.

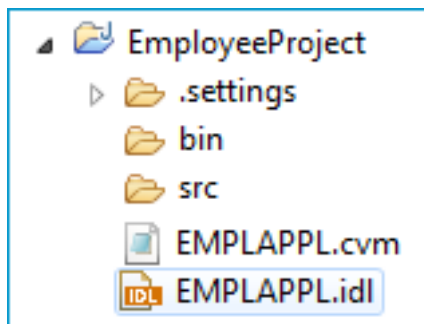
- For the `LIST` function you need the `OPERATION-LIST` value in the `OPERATION` field: Mark the `OPERATION` field in the **COBOL Interface** pane and press the **Set Constant** button. In the pop-up window, select `OPERATION-LIST` (similar to Step 1. above *Shape `EMPLOYEE` to `getDetailsOfEmployee`*; red markers).

- Use the context menu of the `EMPLOYEES` field in the **COBOL Interface** pane, `EMPLOYEES OCCURS 1 TO 99` and choose **Map to Out** (Similar to Step 2. above *Continue shaping, making `getDetailsOfEmployee` easier to use*; blue markers).

- Because the `EMPLOYEE` and `EMPLOYEE-DETAIL` fields are not used in the COBOL server `LIST` function, you leave them out in the IDL interface: use the context menu of `EMPLOYEE-DETAIL` field in the **COBOL Interface** pane and choose **Suppress** (similar to Step 2. above *Continue shaping, making `getDetailsOfEmployee` easier to use*; red markers). Do the same for the `EMPLOYEE-ID` field.

- 4 Press **Finish** to retrieve the extraction result in the form of a Software AG IDL file. At the same time, a server mapping file for COBOL (Designer file with extension `.cvm`) is created.

See *Server Mapping Files for COBOL* in the Designer documentation. The *Software AG IDL File* in the IDL Editor documentation describes the interfaces from the client point of view, while the server mapping file contains the mapping to the real COBOL server. Both of these files must be kept together and in sync, otherwise a call to the COBOL server may fail.



To summarize: We created two IDL interfaces. In the IDL file, these resulted in two IDL programs: `getListOfEmployees` and `getDetailsOfEmployee`. Both IDL programs were given readable names (Steps 1 and 3). Meaningful fields were kept, while superfluous fields were suppressed (Steps 1 and 3). The program `getDetailsOfEmployee` contains the redefined fields of parameter `DETAILS` (see below) mapped during extraction (Step 1).



Note: At runtime, the RPC client generated with the extracted interface will send data for the redesigned interfaces, while your COBOL server still expects `EMPLOYEE` data. The EntireX runtime transforms the incoming data stream from the RPC client, using the server mapping file.

```

program 'getDetailsOfEmployee' is
  define data parameter
    1 ID (AV10) In /* Original Name:EMPLOYEE-ID
    1 EMPLOYEE Out /* Original Name:EMPLOYEE-DETAILS
    2 FIRSTNAME (AV20)
    2 SURNAME (AV20)
    2 DATE-BIRTH (AV12)
    2 DETAILS /* Original Name:FILLER_1
    3 ANNUAL-SALARY (P9)
    3 VACATION (N2)
    3 LANGUAGE (AV3)
  end-define
  program 'getListOfEmployees' is
    1 EMPLOYEES (/V99) Out
    2 IDENT (AV10)
    2 FIRSTNAME (AV20)
    2 SURNAME (AV20)
    2 DATE-BIRTH (AV12)
  end-define
  
```

Comparison Chart: Fast-track versus User-defined Mapping

The following table highlights the differences when shaping an interface with a *user-defined mapping* compared with a *fast-path extraction*.

| | Interface Shaping with User-defined Mapping | Fast-path Extraction |
|----------------------------------|---|---|
| General | User-defined interface with dedicated mapping. For our example, the interfaces are small and tidy and more self-explanatory with long, readable interface names. They are easier to use with the hidden <code>OPERATION</code> field and the suppressed COBOL fields, which are not needed. | Automatic, quick result extraction with COBOL-like interfaces on IS. For our example, the IS interface <code>EMPLOYEE</code> matches exactly 1:1, field by field. |
| IS service(s) | Multiple small and handy IS services; each <code>OPERATION</code> code is mapped to a separate IS service. | One big IS service. |
| IS service name | Readable long name. | Short Subprogram name; up to 8 characters. |
| IS fields | Usage of Suppress and Set Constant reduces the message length. This keeps focus on relevant data items and keeps the client's interface clean. It may also improve performance. | The IS fields and COBOL server parameters match 1:1. As COBOL layout descriptions are sometimes used for many different purposes, irrelevant data items appear and clutter up the IS interface. |
| <code>OPERATION</code> parameter | Suppressed: the <code>OPERATION</code> parameter does not exist in the IS service as an IS field. | The <code>OPERATION</code> parameter exists in the IS service as an IS field and needs to be filled-in by the client endpoint. |
| <code>OPERATION</code> code | The <code>OPERATION</code> code is provided internally by EntireX runtime in the <code>OPERATION</code> field. | The <code>OPERATION</code> code needs to be specified in the IS service in the <code>OPERATION</code> field by the client endpoint. |
| <code>REDEFINE</code> parameters | Either the parameter that is redefined or one of its redefinitions is available as an IS field. | Only the parameter that is redefined is available as an IS field. Redefinitions of the parameter are not available as IS fields. |

A user-defined mapping enables you also to define alternative mappings for COBOL data items (`REDEFINES`, tables etc.). These enable scenarios with COBOL servers where data exchange is not fully described by the `LINKAGE SECTION` COBOL data items. For more information refer to the IDL Extractor for COBOL documentation:

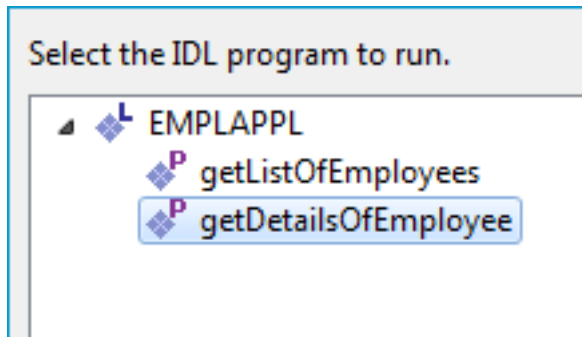
- *Mapping Editor IDL Interface Mapping Functions* if the check-box **Input Message same as Output Message** was checked.
- *Mapping Editor IDL Interface Mapping Functions* if the check-box **Input Message same as Output Message** was cleared.
- *User-defined Mapping*

Testing the Extraction Results

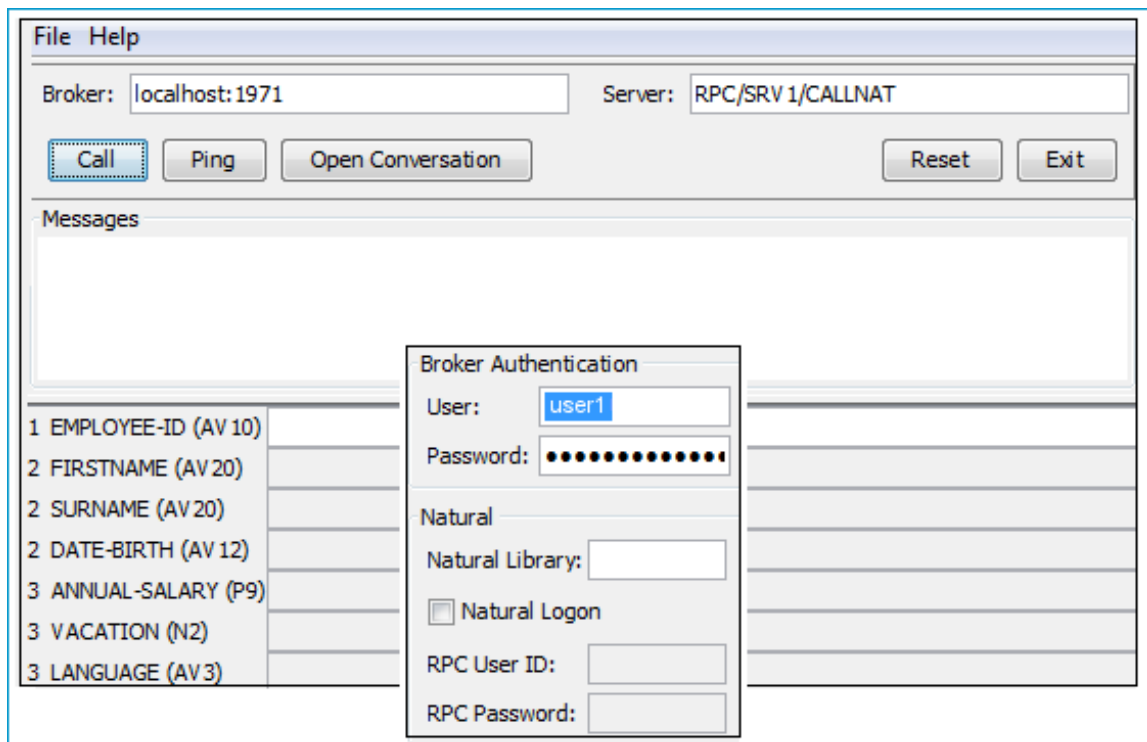
The following pictures use the extraction results described under *Extracting a COBOL Server - Modern Method with User-defined Mapping*.

> To test the extraction results (optional)

- 1 You can test the results of the extraction operation and the COBOL server back end, using the EntireX IDL Tester. From the context menu of the IDL file in the Designer, choose **Software AG IDL Tester**.



- 2 Select `getDetailsOfEmployee`.



Note that the broker and server parameters contain the explicit route to call the server program, and you can optionally ping the connection from this client. With the **File > Options** dialog, you can set:

- **User** and **Password** for *broker* authentication
- **RPC User ID** and **RPC Password** for *server* authentication

See *EntireX IDL Tester* in the Designer documentation.

- 3 Check the Integration Server log, the EntireX Adapter log or the RPC logs. Applies to all connection methods.

Task 2: Generate the Connection and Adapter Services in Integration Server

This section describes your first steps to create a new Integration Server connection. This is described in more detail under *Using the Integration Server Wrapper*, for example working with existing Integration Server connections. This section covers the following topics:

- [Step 1: Start the Integration Server Wrapper Wizard](#)
- [Step 2: Create a New Integration Server Connection](#)
- [Step 3: Select the Connection Type](#)
- [Step 4: Define Adapter Services for a CICS ECI Connection](#)

Step 1: Start the Integration Server Wrapper Wizard

➤ To start the Integration Server Wrapper wizard

- 1 In the context menu of a Software AG IDL file, choose **Integration Server > Generate web-Methods IS Connection**.

This starts the wizard with a list of existing Integration Server Wrapper connections.



Note: If the selected IDL file is not valid because of a syntax error, an error dialog comes up and the wizard does not start.

- 2 Continue with *Step 2: Create a New Integration Server Connection*.

Step 2: Create a New Integration Server Connection

Define New Integration Server Connection
Add host:port, user and password for a new Integration Server

Server:

User:

Password:

☐ Use secure connection

➤ To create a new Integration Server connection

- 1 Define the new Integration Server connection on the wizard page.



Notes:

1. The only required field is **Server**. Enter the hostname of the Integration Server including an optional port number. If no port number is specified, port number defaults to "5555". The **Integration Server Authentication** can be passed with the **User** and **Password** fields.
 2. Optional settings are for secure connections. The **Truststore for HTTPS** contains all signed certificates and must be a valid truststore.
 3. The check box **Verify host name** checks that the hostname is entered in the stored certificate.
 4. When the Integration Server has **Client Authentication** enabled, you can specify your **Keystore** file and keystore **Password**.
 5. For managing Integration Server connections, see [Preferences](#).
- 2 Choose **Next** and continue with *Step 3: Select the Connection Type*.

Step 3: Select the Connection Type

☒ Create a new EntireX Adapter connection of type **CICS ECI Connection**

☐ Update Adapter Services or Listeners to an existing Integration Server connection:

List of Connections

| Connection Name | Package Name | Connection Type | Enabled |
|-------------------------------|--------------|------------------------|---------|
| Employees:EmployeesConnection | Employees | EntireX RPC Connection | Yes |

Total: 1

☒ Map Software AG IDL data types to String

☐ Create or Update REST resource

➤ To create a new connection

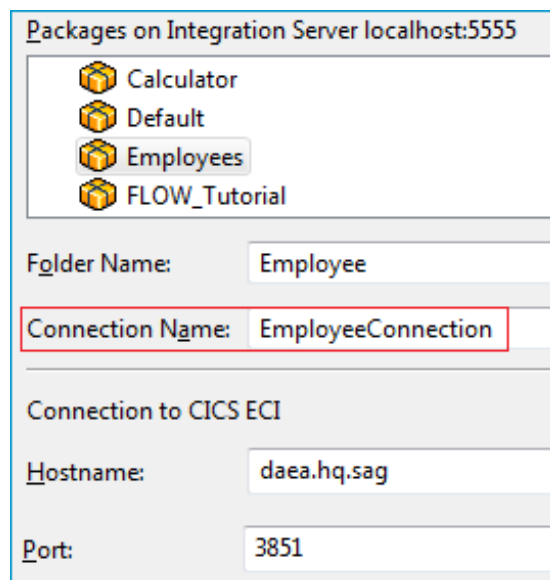
- 1 Select a connection type from the drop down list. Connection types are described under *EntireX Adapter Connections* in the EntireX Adapter documentation and *Introduction to the Integration Server Wrapper*.



Note: The list of connection types is filtered: connection types that require a license are only shown if a corresponding license file is available. Reliable RPC connections are only shown if all IDL programs contain only IN parameters. Also, if a server mapping file is available, only those connection types that support the interface type specified in the server mapping file are shown.

- 2 Click **Next** and continue with *Step 4: Define Adapter Services for a CICS ECI Connection*.

Step 4: Define Adapter Services for a CICS ECI Connection



Packages on Integration Server localhost:5555

- Calculator
- Default
- Employees
- FLOW_Tutorial

Folder Name: Employee

Connection Name: EmployeeConnection

Connection to CICS ECI

Hostname: daea.hq.sag

Port: 3851

➤ To create a connection and related adapter services

- 1 Select a package for the created objects.
- 2 Define a folder name. If the folder does not exist, it will be created.
- 3 Define a connection name.
- 4 Define the parameters of the connection type. For details, see *Connection Parameters for CICS ECI Connections* in the EntireX Adapter documentation.

As a result, the folder will contain the connection and the adapter services (one for each IDL program). The name of a service is the same as the respective IDL program.

The default settings for the adapter services are:

- the **Default** package; if not available, the first package
- the IDL library name for the **Folder Name**
- the IDL library name with the suffix "Connection" for the **Connection Name**



Note: When creating a connection, a package dependency is added such that the selected package depends on webMethods EntireX (the package `WmEntireX`) with the version currently used.

Task 3: Execute the Call from Integration Server to COBOL

From the **Service Development** perspective, refresh the package where the connection service was written, select the adapter service and use the service test to **Run Service**. This invokes the adapter service through the connector service.

The screenshot shows the 'Employees' package in the Service Development perspective. The 'getListOfEmployees' service is selected, and the 'Run Service' button is highlighted. Below the package tree, a table displays the results of the service test.

| Name | Value |
|--------------|-------------|
| outRec | |
| EMPLOYEES | |
| EMPLOYEES[0] | |
| IDENT | 11100102 |
| FIRSTNAME | EDGAR |
| SURNAME | SCHINDLER |
| DATE-BIRTH | Dec 4, 1962 |
| EMPLOYEES[1] | |
| EMPLOYEES[2] | |
| EMPLOYEES[3] | |
| EMPLOYEES[4] | |
| errorCode | 00000000 |
| errorFlag | false |

In case of error or unexpected results:

- Check the Integration Server log or the EntireX Adapter log.

8

Calling COBOL DFHCOMMAREA (Zero Footprint using CICS IPIC) on z/OS CICS from Integration Server

| | |
|--|-----|
| ■ Introduction | 100 |
| ■ What do I need to Install for this Scenario? | 101 |
| ■ Task 1: Extract the Interface of a COBOL Server | 102 |
| ■ Task 2: Generate the Connection and Adapter Services in Integration Server | 115 |
| ■ Task 3: Execute the Call from Integration Server to COBOL | 120 |

This scenario uses the tools IDL Extractor for COBOL and Integration Server Wrapper of the Designer.

Introduction



- ① Extract the interface of the COBOL server program.
- ② Generate connection and adapter services in Integration Server.
- ③ Execute the call from Integration Server to the COBOL server program.

This scenario makes the following important assumptions:

For Task 1:

- You have a working COBOL DFHCOMMAREA server. For illustration and examples on such a server, see *CICS with DFHCOMMAREA Calling Convention* under *Introduction to the IDL Extractor for COBOL*.
- You have access to the related COBOL sources and copybooks as files on your local machine. The minimum requirement is the `DATA DIVISION` of the interface.



For Tasks 2 and 3:

- To call the COBOL server program at runtime using the *EntireX CICS IPIC* connection method, you need to configure the CICS IPIC TCP/IP service within your CICS region. See *Preparing IBM CICS for IPIC* and *Connection Parameters for CICS IPIC Connections*.



What do I need to Install for this Scenario?

- You have Software AG Designer installed with EntireX plugins and Service Development plugins.
 - For EntireX plugins, see *Designer > EntireX Designer* under *EntireX Installation Packages* in the General Installation documentation.
 - For Service Development plugins, refer to the Integration Server documentation.
- You have an Integration Server with EntireX Adapter installed. See *Adapters > EntireX Adapter* under *EntireX Installation Packages* in the General Installation documentation.

Task 1: Extract the Interface of a COBOL Server

- [Introduction](#)
- [Sample COBOL Server used in the Examples](#)
- [Extracting a COBOL Server - Fast-track Method](#)
- [Extracting a COBOL Server - Modern Method with User-defined Mapping](#)
- [Comparison Chart: Fast-track versus User-defined Mapping](#)
- [Testing the Extraction Results](#)

Introduction

Follow the instructions for extracting COBOL, see *Using the IDL Extractor for COBOL - Overview* and choose *Scenario I: Create New IDL and Server Mapping Files* if this is your first extraction. Learn how to invoke the IDL Extractor for COBOL, create a COBOL Extractor Environment and about the possibilities to select the COBOL source.

The extraction process creates the following EntireX metafiles:

- IDL file. A Software AG IDL file contains definitions of the interface between client and server. See *Software AG IDL File* in the IDL Editor documentation in the IDL Editor documentation.
- Server mapping file (optional). The mapping file is a Designer file with extension .cvm that contains COBOL-specific mapping information. See *Server Mapping Files for COBOL* in the Designer documentation.

Sample COBOL Server used in the Examples

The following COBOL server is used to illustrate the features of the IDL Extractor for COBOL. Imagine an existing COBOL server called `EMPLOYEE`. It implements the access logic for a `LIST` and `DETAILS` function to a database view `EMPLOYEE`:

```

IDENTIFICATION DIVISION.
    PROGRAM-ID.      EMPLOYEE.
*****
*   Program Name    = EMPLOYEE
*   String Literal  = QUOTE
*****
01 DFHCOMMAREA.
    02 OPERATION                                           PIC X(1).
        88 OPERATION-LIST                                VALUE 'L'.
        88 OPERATION-DETAILS                             VALUE 'D'.
    02 EMPLOYEE-ID                                         PIC X(10).
    02 EMPLOYEE-DETAILS.
        03 FIRSTNAME                                       PIC X(20).
        03 SURNAME                                         PIC X(20).
        03 DATE-BIRTH                                     PIC X(12).
        03 DETAILS                                         PIC X(100).
        03 FILLER REDEFINES DETAILS.
            04 ANNUAL-SALARY          PACKED-DECIMAL      PIC S9(9).
            04 VACATION                PIC S9(2).
            04 LANGUAGE                PIC X(3).
            04 FILLER                  PIC X(90).
    02 EMPLOYEES-COUNT                                     PIC 9(8) BINARY.
    02 EMPLOYEES OCCURS 1 TO 99 DEPENDING ON EMPLOYEES-COUNT.
        03 IDENT                                           PIC X(10).
        03 FIRSTNAME                                       PIC X(20).
        03 SURNAME                                         PIC X(20).
        03 DATE-BIRTH                                     PIC X(12).

```

Two approaches for extracting the COBOL server are described below:

- **Fast-track**

Learn how EntireX helps you to connect the COBOL Server with quick results.

- **User-defined Mapping**

The following features are among those available with a user-defined mapping:

- **Shape the interface to your COBOL server**

You can minimize the interface by suppressing COBOL server fields or by providing constant values. Renaming interfaces allows you to specify a readable long name. These two features together - constants and renaming of interfaces - are most powerful when multiple interfaces are implemented in a single COBOL server. Each function of the COBOL server triggered by an operation code or function code can be modelled as a separate IS service.

■ **Select alternative mappings**

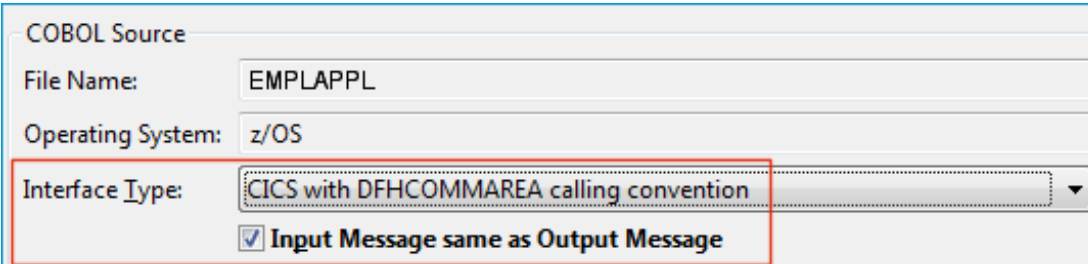
You can select alternative mappings for COBOL data items (REDEFINES, tables etc.) to enable scenarios with COBOL servers where data exchange is not fully described by the LINKAGE SECTION COBOL data items.

These approaches are described under [Fast-track Method](#) and [Modern Method](#) below.

Extracting a COBOL Server - Fast-track Method

➤ **To extract the COBOL Server**

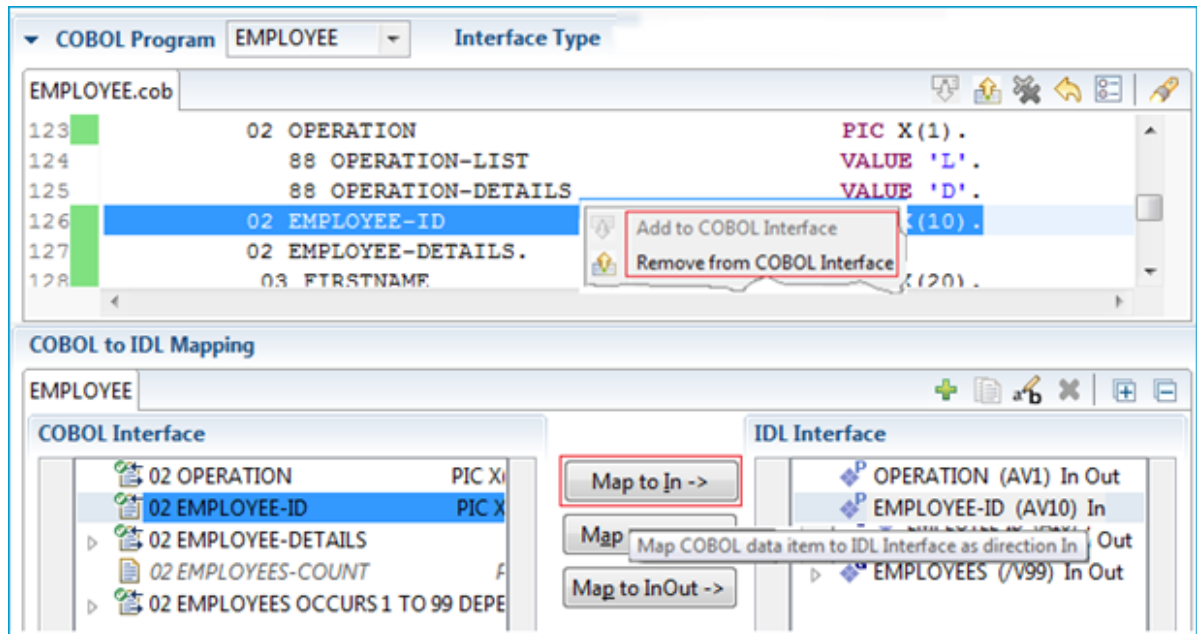
- 1 Switch to the **EntireX** perspective.
- 2 Call the IDL Extractor for COBOL.
- 3 Set the correct interface type as described under *Step 4: Define the Extraction Settings and Start Extraction* under *Scenario I: Create New IDL and Server Mapping Files* in the IDL Extractor for COBOL documentation.



- 4 Set the correct value for checkbox **Input Message same as Output Message**.
 - Check the checkbox if the COBOL data structure of the CICS input message is the same as the structure of the CICS output message, that is, there is one COBOL layout for both directions. See the following COBOL server examples in the IDL Extractor for COBOL documentation:
 - *Example 1: Redefines*
 - *Example 2: Buffer Technique*
 - *Example 3: COBOL SET ADDRESS Statements*
 - Clear the checkbox if the COBOL data structure of the CICS input message is different to the structure of the CICS output message, that is, the output overlays the input, which means there is a second COBOL layout for the reply. See the following COBOL server examples in the IDL Extractor for COBOL documentation:
 - *Example 1: Redefines*
 - *Example 2: Buffer Technique*
 - *Example 3: COBOL SET ADDRESS Statements*

For our example, check the check box, because the COBOL layout for input is the same as the COBOL layout for output.

- 5 Press **Next** to enter the COBOL Mapping Editor.



The purpose of the COBOL Mapping Editor is to map COBOL data items to IDL (Interface Definition Language) parameters. It consists of three main areas:

- The upper window pane is the COBOL program source.
- The window pane on the left-hand side is the COBOL interface, consisting of COBOL data items representing the parameters in your COBOL server program.
- The window pane on the right-hand side is the IDL interface consisting of IDL parameters.

What you select depends on check-box **Input Message same as Output Message**:

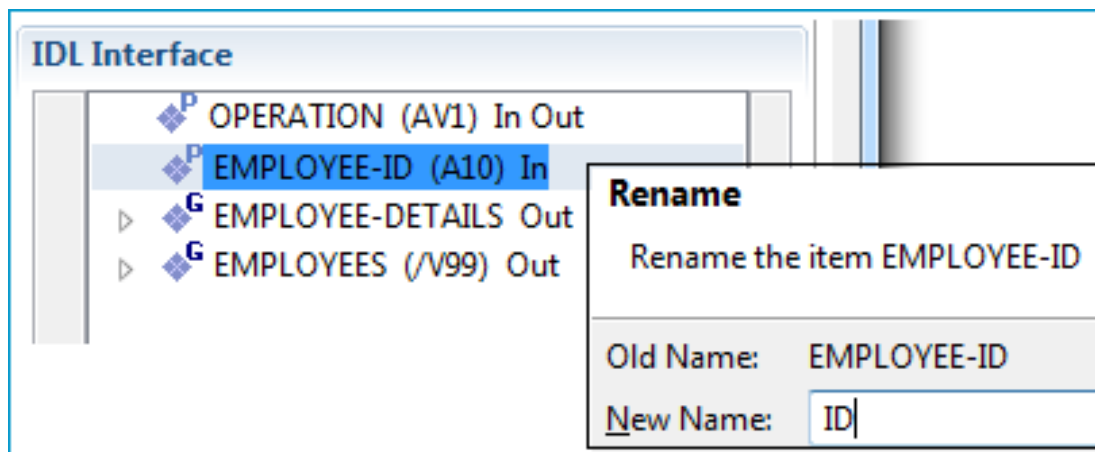
- If there is a single COBOL data structure of the CICS message for input and output - check box **Input Message same as Output Message** is checked - you select a single COBOL data structure in the COBOL Mapping Editor. This structure is used for COBOL input as well as for COBOL output. For more information in this case see *Mapping Editor User Interface* in the IDL Extractor for COBOL documentation.
- If there is a second COBOL data structure for the CICS output message - check box **Input Message same as Output Message** is cleared - you will select two COBOL data structures in the COBOL Mapping Editor. One is used for COBOL input and the other is for COBOL output. For more information in this case see *Mapping Editor User Interface* in the IDL Extractor for COBOL documentation.

COBOL extraction is a two-step process:

- First, select the COBOL parameters using the **Add to** and **Remove from COBOL Interface** from the context menu on the COBOL data items in the upper window pane (COBOL source); in many situations the COBOL interface is detected by the Mapping Editor directly and you can omit this step.
- Then map the COBOL parameters to IDL directions using the **Map to In/Out/InOut** buttons. COBOL parameters do not have directions, they are always INOUT. This step can be left out for a quick test in non-production scenarios; for real production it is recommended to set IDL directions to reduce data transfer. You also have the option to assign a meaningful name to an IDL parameter if the original COBOL data item is not self-explanatory.

For our example:

- Set **Map to In** for COBOL data item `EMPLOYEE-ID` as IDL direction (see screenshot in previous step). For `EMPLOYEES-DETAILS` and `EMPLOYEES` perform the similar **Map to Out**.
- Use the function **Rename** from the context menu on the IDL parameters in the **IDL Interface** pane to rename COBOL parameter `EMPLOYEES-ID` to IDL parameter `ID`. Do the same for `EMPLOYEE-DETAILS`: Rename to `EMPLOYEE`.



- 6 Press **Finish**. The default extraction settings ensure you get useful results. The outcome is a Software AG IDL file (interface definition language), a Designer file with extension .idl:

```
library 'EMPLAPPL' is
program 'EMPLOYEE' is
define data parameter
  1 OPERATION (AV1) In Out
  1 ID (AV10) In /* Original Name:EMPLOYEE-ID
  1 EMPLOYEE Out /* Original Name:EMPLOYEE-DETAILS
    2 FIRSTNAME (AV20)
    2 SURNAME (AV20)
    2 DATE-BIRTH (AV12)
    2 DETAILS (AV100)
  1 EMPLOYEES (/V99) Out
    2 IDENT (AV10)
    2 FIRSTNAME (AV20)
    2 SURNAME (AV20)
    2 DATE-BIRTH (AV12)
end-define
```

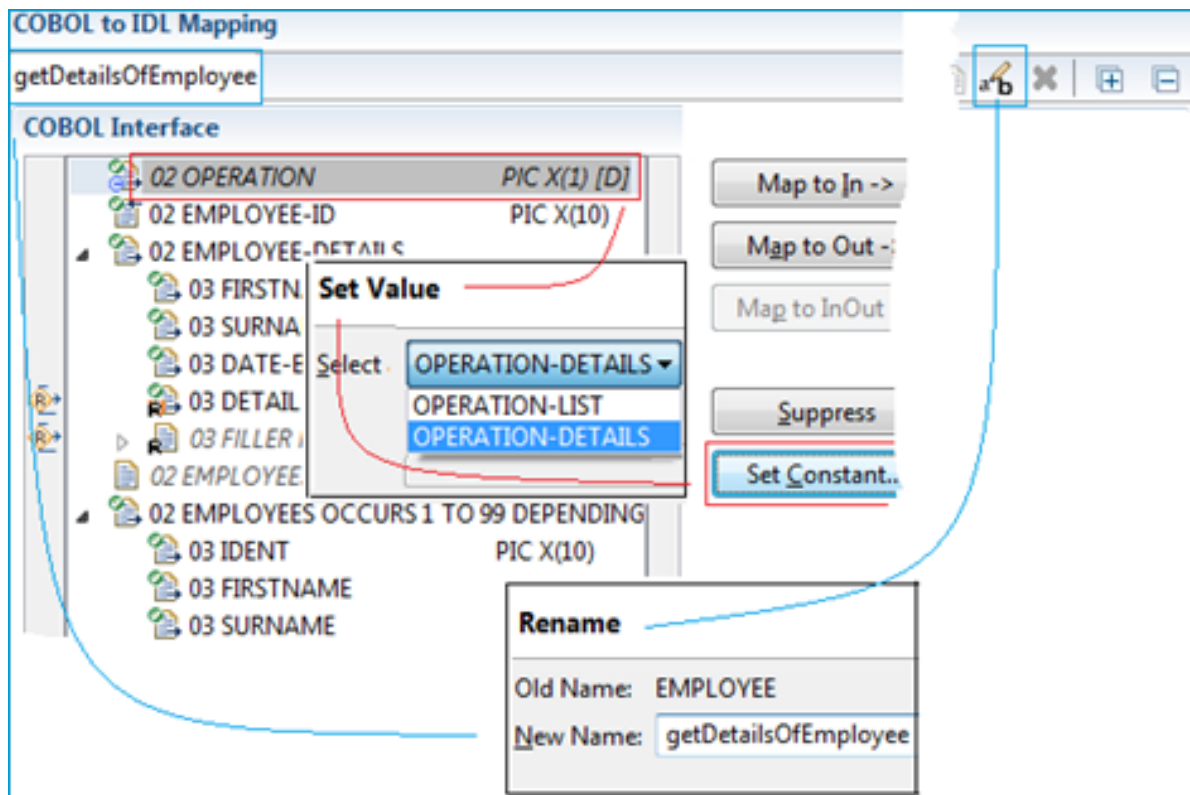
If required, a server mapping file with the same name as the IDL file but the extension .cvm may be generated too, for technical reasons. This file must always be stored together with the concomitant IDL file. For more information, see *Server Mapping Files for COBOL* in the Designer documentation. By default, the interface name `EMPLOYEE` is taken from the COBOL server program name.


Extracting a COBOL Server - Modern Method with User-defined Mapping

EntireX allows you to extract all implemented interfaces of the COBOL server separately. Instead of a large `EMPLOYEE` interface, separate interfaces `getListOfEmployees` and `getDetailsOfEmployee` are extracted. Each interface contains required parameters; obsolete parameters for an interface are suppressed, improving its usability.

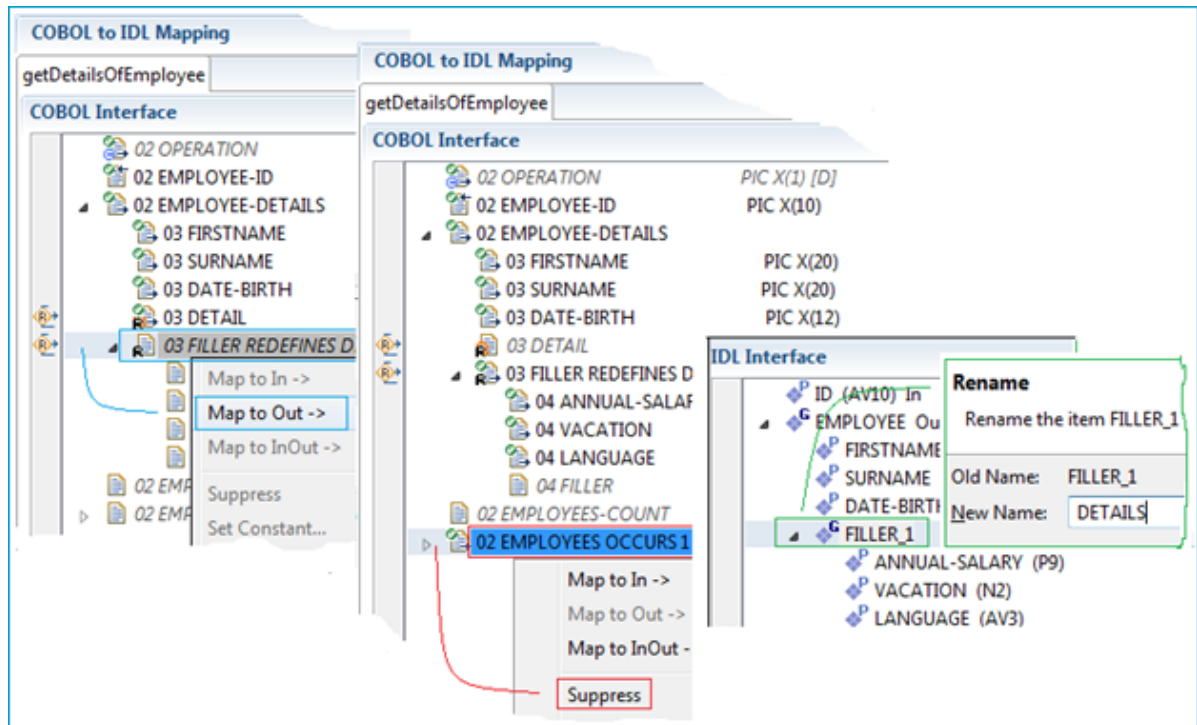
» To extract a COBOL server with a user-defined mapping

- 1 Shape `EMPLOYEE` to `getDetailsOfEmployee`:



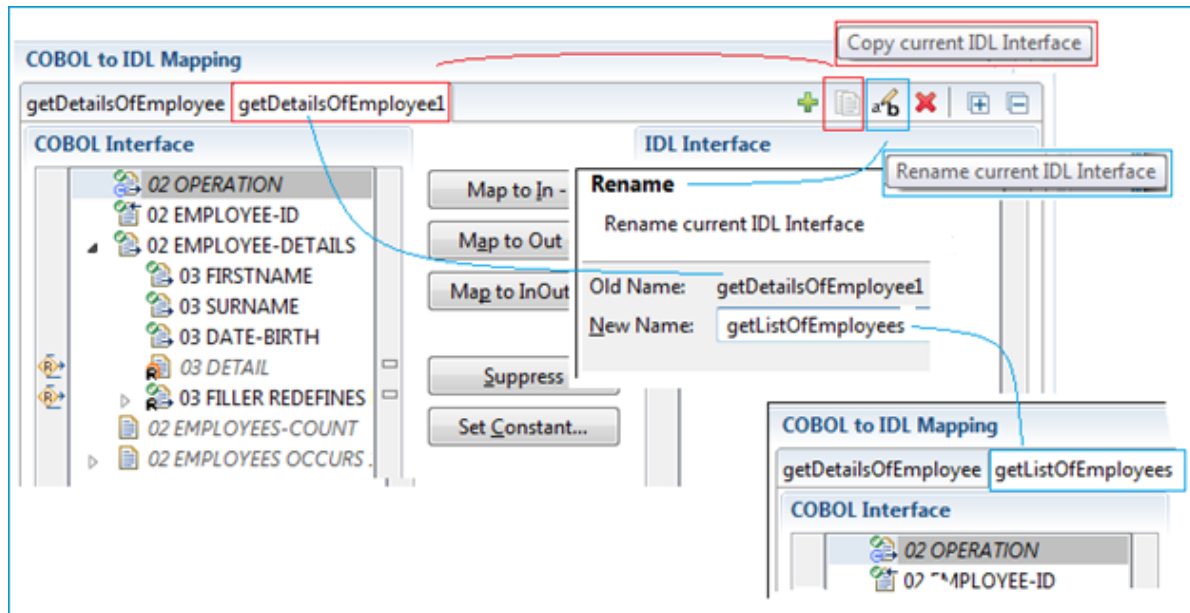
- Mark the `OPERATION` field in the **COBOL Interface** pane and press the **Set Constant** button. In the pop-up window, select `OPERATION-DETAILS` (red markers). The `OPERATION-DETAILS` value originates from COBOL level-88 data item (blue markers). If there is no COBOL level-88 enumeration type in the COBOL program defined, you can enter the function code manually in the pop-up window.
- By default the IDL interface gets the same name as your COBOL server: `EMPLOYEE`. Use the **Rename** button  from the toolbar of the COBOL Mapping Editor and change the IDL interface name to `getDetailsOfEmployee` (blue markers). This name is used as the IS service name later.

2 Continue shaping, making `getDetailsOfEmployee` easier to use:




- Use the context menu of the redefinition of the `DETAIL` field in the **COBOL Interface** pane, `FILLER REDEFINES DETAIL` and choose **Map to Out** (blue markers). A redefinition is a secondary layout (field types) of the same memory area. The redefinition contains more specific information (`ANNUAL-SALARY`, `VACATION`, etc.) than character buffer `DETAIL`. This is the reason why it is more useful in your interface.
- Use the context menu of `FILLER_1` in the IDL interface pane and rename `FILLER_1` to `DETAILS` (green markers) for a readable IS service field name later.
- The `DETAILS` function in the COBOL server does not make use of the `EMPLOYEES` field. Therefore you can leave it out of the interface: use the context menu of the `EMPLOYEES` field in the **COBOL Interface** pane and choose **Suppress** (red markers).


3 Shape `EMPLOYEE` to `getListOfEmployees` Function:



The COBOL Mapping Editor allows you to define multiple IDL interfaces to the same COBOL server:

- You create the additional IDL interface using the toolbar button **Copy current IDL interface**

 (red markers). A new tab `getDetailsOfEmployee1` is created. The previously extracted `getDetailsOfEmployee` interface still exists in the first tab. Once you reactivate the first tab, you will see the interface of `getDetailsOfEmployee` again.

- Use the **Rename** button  from the toolbar of the COBOL Mapping Editor and change the IDL interface name to `getListOfEmployees` (blue markers). This name is used as the IS service name later.

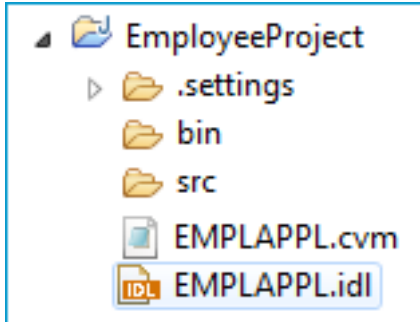
- For the `LIST` function you need the `OPERATION-LIST` value in the `OPERATION` field: Mark the `OPERATION` field in the **COBOL Interface** pane and press the **Set Constant** button. In the pop-up window, select `OPERATION-LIST` (similar to Step 1. above *Shape `EMPLOYEE` to `getDetailsOfEmployee`*; red markers).

- Use the context menu of the `EMPLOYEES` field in the **COBOL Interface** pane, `EMPLOYEES OCCURS 1 TO 99` and choose **Map to Out** (Similar to Step 2. above *Continue shaping, making `getDetailsOfEmployee` easier to use*; blue markers).

- Because the `EMPLOYEE` and `EMPLOYEE-DETAIL` fields are not used in the COBOL server `LIST` function, you leave them out in the IDL interface: use the context menu of `EMPLOYEE-DETAIL` field in the **COBOL Interface** pane and choose **Suppress** (similar to Step 2. above *Continue shaping, making `getDetailsOfEmployee` easier to use*; red markers). Do the same for the `EMPLOYEE-ID` field.

- 4 Press **Finish** to retrieve the extraction result in the form of a Software AG IDL file. At the same time, a server mapping file for COBOL (Designer file with extension `.cvm`) is created.

See *Server Mapping Files for COBOL* in the Designer documentation. The *Software AG IDL File* in the IDL Editor documentation describes the interfaces from the client point of view, while the server mapping file contains the mapping to the real COBOL server. Both of these files must be kept together and in sync, otherwise a call to the COBOL server may fail.



To summarize: We created two IDL interfaces. In the IDL file, these resulted in two IDL programs: `getListOfEmployees` and `getDetailsOfEmployee`. Both IDL programs were given readable names (Steps 1 and 3). Meaningful fields were kept, while superfluous fields were suppressed (Steps 1 and 3). The program `getDetailsOfEmployee` contains the redefined fields of parameter `DETAILS` (see below) mapped during extraction (Step 1).



Note: At runtime, the RPC client generated with the extracted interface will send data for the redesigned interfaces, while your COBOL server still expects `EMPLOYEE` data. The EntireX runtime transforms the incoming data stream from the RPC client, using the server mapping file.

```

program 'getDetailsOfEmployee' is
  define data parameter
    1 ID (AV10) In /* Original Name:EMPLOYEE-ID
    1 EMPLOYEE Out /* Original Name:EMPLOYEE-DETAILS
    2 FIRSTNAME (AV20)
    2 SURNAME (AV20)
    2 DATE-BIRTH (AV12)
    2 DETAILS /* Original Name:FILLER_1
    3 ANNUAL-SALARY (P9)
    3 VACATION (N2)
    3 LANGUAGE (AV3)
  end-define
  program 'getListOfEmployees' is
    1 EMPLOYEES (/V99) Out
    2 IDENT (AV10)
    2 FIRSTNAME (AV20)
    2 SURNAME (AV20)
    2 DATE-BIRTH (AV12)
  end-define
  
```


Comparison Chart: Fast-track versus User-defined Mapping

The following table highlights the differences when shaping an interface with a *user-defined mapping* compared with a *fast-path extraction*.

| | Interface Shaping with User-defined Mapping | Fast-path Extraction |
|----------------------------------|---|---|
| General | User-defined interface with dedicated mapping. For our example, the interfaces are small and tidy and more self-explanatory with long, readable interface names. They are easier to use with the hidden <code>OPERATION</code> field and the suppressed COBOL fields, which are not needed. | Automatic, quick result extraction with COBOL-like interfaces on IS. For our example, the IS interface <code>EMPLOYEE</code> matches exactly 1:1, field by field. |
| IS service(s) | Multiple small and handy IS services; each <code>OPERATION</code> code is mapped to a separate IS service. | One big IS service. |
| IS service name | Readable long name. | Short Subprogram name; up to 8 characters. |
| IS fields | Usage of Suppress and Set Constant reduces the message length. This keeps focus on relevant data items and keeps the client's interface clean. It may also improve performance. | The IS fields and COBOL server parameters match 1:1. As COBOL layout descriptions are sometimes used for many different purposes, irrelevant data items appear and clutter up the IS interface. |
| <code>OPERATION</code> parameter | Suppressed: the <code>OPERATION</code> parameter does not exist in the IS service as an IS field. | The <code>OPERATION</code> parameter exists in the IS service as an IS field and needs to be filled-in by the client endpoint. |
| <code>OPERATION</code> code | The <code>OPERATION</code> code is provided internally by EntireX runtime in the <code>OPERATION</code> field. | The <code>OPERATION</code> code needs to be specified in the IS service in the <code>OPERATION</code> field by the client endpoint. |
| <code>REDEFINE</code> parameters | Either the parameter that is redefined or one of its redefinitions is available as an IS field. | Only the parameter that is redefined is available as an IS field. Redefinitions of the parameter are not available as IS fields. |

A user-defined mapping enables you also to define alternative mappings for COBOL data items (`REDEFINES`, tables etc.). These enable scenarios with COBOL servers where data exchange is not fully described by the `LINKAGE SECTION` COBOL data items. For more information refer to the IDL Extractor for COBOL documentation:

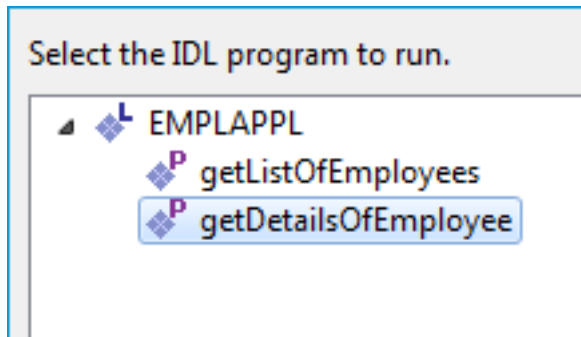
- *Mapping Editor IDL Interface Mapping Functions* if the check-box **Input Message same as Output Message** was checked.
- *Mapping Editor IDL Interface Mapping Functions* if the check-box **Input Message same as Output Message** was cleared.
- *User-defined Mapping*

Testing the Extraction Results

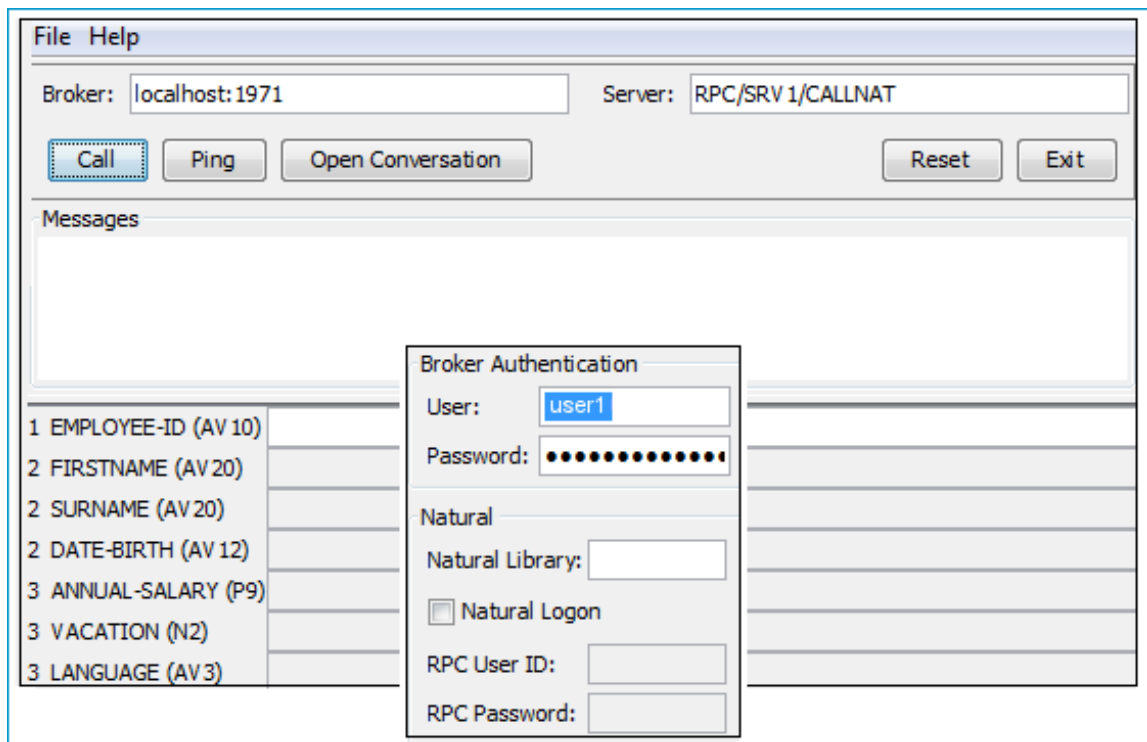
The following pictures use the extraction results described under *Extracting a COBOL Server - Modern Method with User-defined Mapping*.

> To test the extraction results (optional)

- 1 You can test the results of the extraction operation and the COBOL server back end, using the EntireX IDL Tester. From the context menu of the IDL file in the Designer, choose **Software AG IDL Tester**.



- 2 Select `getDetailsOfEmployee`.



Note that the broker and server parameters contain the explicit route to call the server program, and you can optionally ping the connection from this client. With the **File > Options** dialog, you can set:

- **User** and **Password** for *broker* authentication
- **RPC User ID** and **RPC Password** for *server* authentication

See *EntireX IDL Tester* in the Designer documentation.

- 3 Check the Integration Server log, the EntireX Adapter log or the RPC logs. Applies to all connection methods.

Task 2: Generate the Connection and Adapter Services in Integration Server

This section describes your first steps to create a new Integration Server connection. This is described in more detail under *Using the Integration Server Wrapper*, for example working with existing Integration Server connections. This section covers the following topics:

- [Step 1: Start the Integration Server Wrapper Wizard](#)
- [Step 2: Create a New Integration Server Connection](#)
- [Step 3: Select the Connection Type](#)
- [Step 4: Define Adapter Services for a CICS IPIC Connection](#)

Step 1: Start the Integration Server Wrapper Wizard

➤ To start the Integration Server Wrapper wizard

- 1 In the context menu of a Software AG IDL file, choose **Integration Server > Generate web-Methods IS Connection**.

This starts the wizard with a list of existing Integration Server Wrapper connections.



Note: If the selected IDL file is not valid because of a syntax error, an error dialog comes up and the wizard does not start.

- 2 Continue with *Step 2: Create a New Integration Server Connection*.

Step 2: Create a New Integration Server Connection

Define New Integration Server Connection
Add host:port, user and password for a new Integration Server

Server:

User:

Password:

☐ Use secure connection

➤ To create a new Integration Server connection

- 1 Define the new Integration Server connection on the wizard page.



Notes:

1. The only required field is **Server**. Enter the hostname of the Integration Server including an optional port number. If no port number is specified, port number defaults to "5555". The **Integration Server Authentication** can be passed with the **User** and **Password** fields.
 2. Optional settings are for secure connections. The **Truststore for HTTPS** contains all signed certificates and must be a valid truststore.
 3. The check box **Verify host name** checks that the hostname is entered in the stored certificate.
 4. When the Integration Server has **Client Authentication** enabled, you can specify your **Keystore** file and keystore **Password**.
 5. For managing Integration Server connections, see [Preferences](#).
- 2 Choose **Next** and continue with *Step 3: Select the Connection Type*.

Step 3: Select the Connection Type

Create a new EntireX Adapter connection of type **CICS IPIC Connection**

☐ Update Adapter Services or Listeners to an existing Integration Server connection:

List of Connections

| Connection Name | Package Name | Connection Type | Enabled |
|-------------------------------|--------------|------------------------|---------|
| Employees:EmployeesConnection | Employees | EntireX RPC Connection | Yes |

Total: 1

☒ Map Software AG IDL data types to String

☐ Create or Update REST resource

➤ To create a new connection

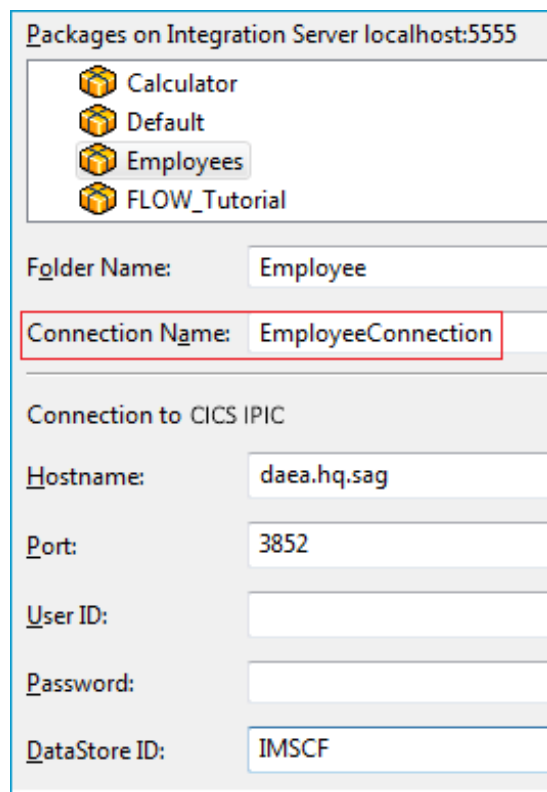
- 1 Select a connection type from the drop down list. Connection types are described under *EntireX Adapter Connections* in the EntireX Adapter documentation and *Introduction to the Integration Server Wrapper*.



Note: The list of connection types is filtered: connection types that require a license are only shown if a corresponding license file is available. Reliable RPC connections are only shown if all IDL programs contain only IN parameters. Also, if a server mapping file is available, only those connection types that support the interface type specified in the server mapping file are shown.

- 2 Click **Next** and continue with *Step 4: Define Adapter Services for a CICS IPIC Connection*.

Step 4: Define Adapter Services for a CICS IPIC Connection



Packages on Integration Server localhost:5555

- Calculator
- Default
- Employees
- FLOW_Tutorial

Folder Name: Employee

Connection Name: EmployeeConnection

Connection to CICS IPIC

Hostname: daea.hq.sag

Port: 3852

User ID:

Password:

DataStore ID: IMSCF

➤ To create a connection and related adapter services

- 1 Select a package for the created objects.
- 2 Define a folder name. If the folder does not exist, it will be created.
- 3 Define a connection name.
- 4 Define the parameters of the connection type. For details, see *Connection Parameters for CICS IPIC Connections* in the EntireX Adapter documentation.

As a result, the folder will contain the connection and the adapter services (one for each IDL program). The name of a service is the same as the respective IDL program.

The default settings for the adapter services are:

- the **Default** package; if not available, the first package
- the IDL library name for the **Folder Name**
- the IDL library name with the suffix "Connection" for the **Connection Name**



Note: When creating a connection, a package dependency is added such that the selected package depends on webMethods EntireX (the package `WmEntireX`) with the version currently used.

Task 3: Execute the Call from Integration Server to COBOL

From the **Service Development** perspective, refresh the package where the connection service was written, select the adapter service and use the service test to **Run Service**. This invokes the adapter service through the connector service.

Employees

Employees

getDetailsOfEmployee

getListOfEmployees

EmployeesConnection

Run As

1 Run in Browser

2 Run Service

| Name | Value |
|--------------|-------------|
| outRec | |
| EMPLOYEES | |
| EMPLOYEES[0] | |
| IDENT | 11100102 |
| FIRSTNAME | EDGAR |
| SURNAME | SCHINDLER |
| DATE-BIRTH | Dec 4, 1962 |
| EMPLOYEES[1] | |
| EMPLOYEES[2] | |
| EMPLOYEES[3] | |
| EMPLOYEES[4] | |
| errorCode | 00000000 |
| errorFlag | false |

In case of error or unexpected results:

- Check the Integration Server log or the EntireX Adapter log.

9

Calling COBOL DFHCOMMAREA (Minimal Footprint using CICS Socket Listener) from Integration Server

| | |
|--|-----|
| ■ Introduction | 122 |
| ■ What do I need to Install for this Scenario? | 123 |
| ■ Task 1: Extract the Interface of a COBOL Server | 124 |
| ■ Task 2: Generate the Connection and Adapter Services in Integration Server | 137 |
| ■ Task 3: Execute the Call from Integration Server to COBOL | 142 |

This scenario uses the tools IDL Extractor for COBOL and Integration Server Wrapper of the Designer.

Introduction



- ❶ Extract the interface of the COBOL server program.
- ❷ Generate connection and adapter services in Integration Server.
- ❸ Execute the call from Integration Server to the COBOL server program.

This scenario makes the following important assumptions:

For Task 1:

- You have a working COBOL DFHCOMMAREA server. For illustration and examples on such a server, see *CICS with DFHCOMMAREA Calling Convention* under *Introduction to the IDL Extractor for COBOL*.
- You have access to the related COBOL sources and copybooks as files on your local machine. The minimum requirement is the `DATA DIVISION` of the interface.



For Tasks 2 and 3:

- To call the COBOL server program at runtime using the *EntireX CICS Socket Listener* connection method, you need to install the CICS Socket Listener within your CICS region: see *Preparing for CICS Socket Listener*. For configuration, see *Connection Parameters for CICS Socket Listener Connections*.



What do I need to Install for this Scenario?

- You have Software AG Designer installed with EntireX plugins and Service Development plugins.
 - For EntireX plugins, see *Designer > EntireX Designer* under *EntireX Installation Packages* in the General Installation documentation.
 - For Service Development plugins, refer to the Integration Server documentation.
- You have an Integration Server with EntireX Adapter installed. See *Adapters > EntireX Adapter* under *EntireX Installation Packages* in the General Installation documentation.
- The CICS Socket Listener, which is installed
 - together with the RPC Server for CICS, see *Installing the RPC Server for CICS*, or
 - separately, see *EntireX CICS® Socket Listener* in the z/OS Installation documentation

Task 1: Extract the Interface of a COBOL Server

- [Introduction](#)
- [Sample COBOL Server used in the Examples](#)
- [Extracting a COBOL Server - Fast-track Method](#)
- [Extracting a COBOL Server - Modern Method with User-defined Mapping](#)
- [Comparison Chart: Fast-track versus User-defined Mapping](#)
- [Testing the Extraction Results](#)

Introduction

Follow the instructions for extracting COBOL, see *Using the IDL Extractor for COBOL - Overview* and choose *Scenario I: Create New IDL and Server Mapping Files* if this is your first extraction. Learn how to invoke the IDL Extractor for COBOL, create a COBOL Extractor Environment and about the possibilities to select the COBOL source.

The extraction process creates the following EntireX metafiles:

- IDL file. A Software AG IDL file contains definitions of the interface between client and server. See *Software AG IDL File* in the IDL Editor documentation in the IDL Editor documentation.
- Server mapping file (optional). The mapping file is a Designer file with extension `.cvm` that contains COBOL-specific mapping information. See *Server Mapping Files for COBOL* in the Designer documentation.

Sample COBOL Server used in the Examples

The following COBOL server is used to illustrate the features of the IDL Extractor for COBOL. Imagine an existing COBOL server called `EMPLOYEE`. It implements the access logic for a `LIST` and `DETAILS` function to a database view `EMPLOYEE`:

```

IDENTIFICATION DIVISION.
    PROGRAM-ID.      EMPLOYEE.
*****
*   Program Name    = EMPLOYEE
*   String Literal  = QUOTE
*****
01 DFHCOMMAREA.
    02 OPERATION                                           PIC X(1).
        88 OPERATION-LIST                                VALUE 'L'.
        88 OPERATION-DETAILS                             VALUE 'D'.
    02 EMPLOYEE-ID                                         PIC X(10).
    02 EMPLOYEE-DETAILS.
        03 FIRSTNAME                                       PIC X(20).
        03 SURNAME                                         PIC X(20).
        03 DATE-BIRTH                                      PIC X(12).
        03 DETAILS                                         PIC X(100).
        03 FILLER REDEFINES DETAILS.
            04 ANNUAL-SALARY          PACKED-DECIMAL      PIC S9(9).
            04 VACATION                PIC S9(2).
            04 LANGUAGE                PIC X(3).
            04 FILLER                  PIC X(90).
    02 EMPLOYEES-COUNT                                     PIC 9(8) BINARY.
    02 EMPLOYEES OCCURS 1 TO 99 DEPENDING ON EMPLOYEES-COUNT.
        03 IDENT                                           PIC X(10).
        03 FIRSTNAME                                       PIC X(20).
        03 SURNAME                                         PIC X(20).
        03 DATE-BIRTH                                      PIC X(12).

```

Two approaches for extracting the COBOL server are described below:

- **Fast-track**

Learn how EntireX helps you to connect the COBOL Server with quick results.

- **User-defined Mapping**

The following features are among those available with a user-defined mapping:

- **Shape the interface to your COBOL server**

You can minimize the interface by suppressing COBOL server fields or by providing constant values. Renaming interfaces allows you to specify a readable long name. These two features together - constants and renaming of interfaces - are most powerful when multiple interfaces are implemented in a single COBOL server. Each function of the COBOL server triggered by an operation code or function code can be modelled as a separate IS service.

■ **Select alternative mappings**

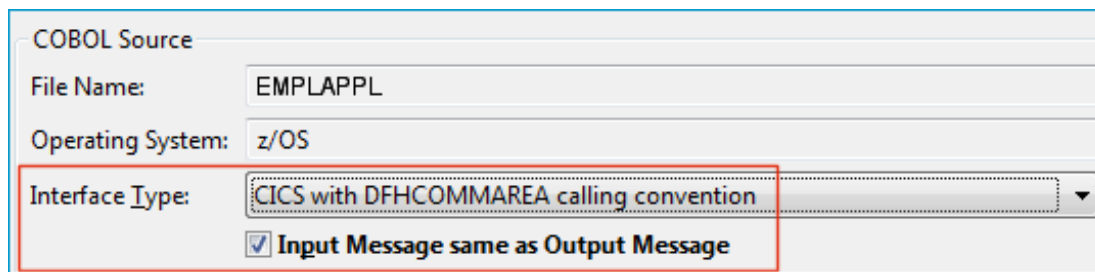
You can select alternative mappings for COBOL data items (REDEFINES, tables etc.) to enable scenarios with COBOL servers where data exchange is not fully described by the LINKAGE SECTION COBOL data items.

These approaches are described under [Fast-track Method](#) and [Modern Method](#) below.

Extracting a COBOL Server - Fast-track Method

➤ **To extract the COBOL Server**

- 1 Switch to the **EntireX** perspective.
- 2 Call the IDL Extractor for COBOL.
- 3 Set the correct interface type as described under *Step 4: Define the Extraction Settings and Start Extraction* under *Scenario I: Create New IDL and Server Mapping Files* in the IDL Extractor for COBOL documentation.



COBOL Source

File Name: EMPLAPPL

Operating System: z/OS

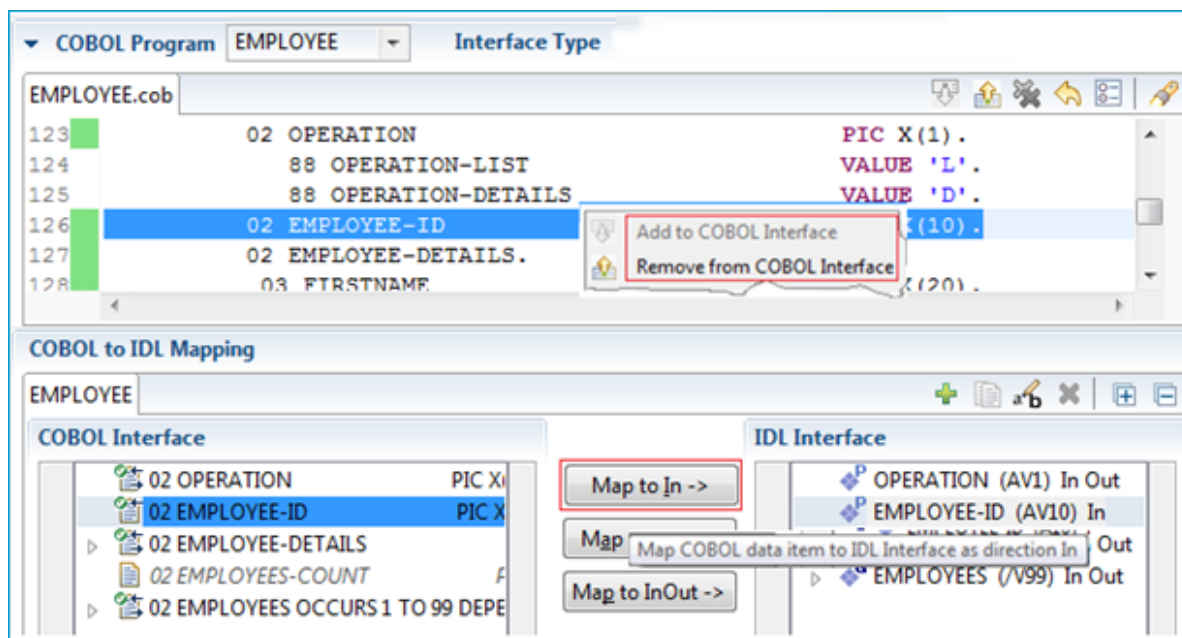
Interface Type: CICS with DFHCOMMAREA calling convention

☒ Input Message same as Output Message

- 4 Set the correct value for checkbox **Input Message same as Output Message**.
 - Check the checkbox if the COBOL data structure of the CICS input message is the same as the structure of the CICS output message, that is, there is one COBOL layout for both directions. See the following COBOL server examples in the IDL Extractor for COBOL documentation:
 - Example 1: Redefines
 - Example 2: Buffer Technique
 - Example 3: COBOL SET ADDRESS Statements
 - Clear the checkbox if the COBOL data structure of the CICS input message is different to the structure of the CICS output message, that is, the output overlays the input, which means there is a second COBOL layout for the reply. See the following COBOL server examples in the IDL Extractor for COBOL documentation:
 - Example 1: Redefines
 - Example 2: Buffer Technique
 - Example 3: COBOL SET ADDRESS Statements

For our example, check the check box, because the COBOL layout for input is the same as the COBOL layout for output.

- 5 Press **Next** to enter the COBOL Mapping Editor.



The purpose of the COBOL Mapping Editor is to map COBOL data items to IDL (Interface Definition Language) parameters. It consists of three main areas:

- The upper window pane is the COBOL program source.
- The window pane on the left-hand side is the COBOL interface, consisting of COBOL data items representing the parameters in your COBOL server program.
- The window pane on the right-hand side is the IDL interface consisting of IDL parameters.

What you select depends on check-box **Input Message same as Output Message**:

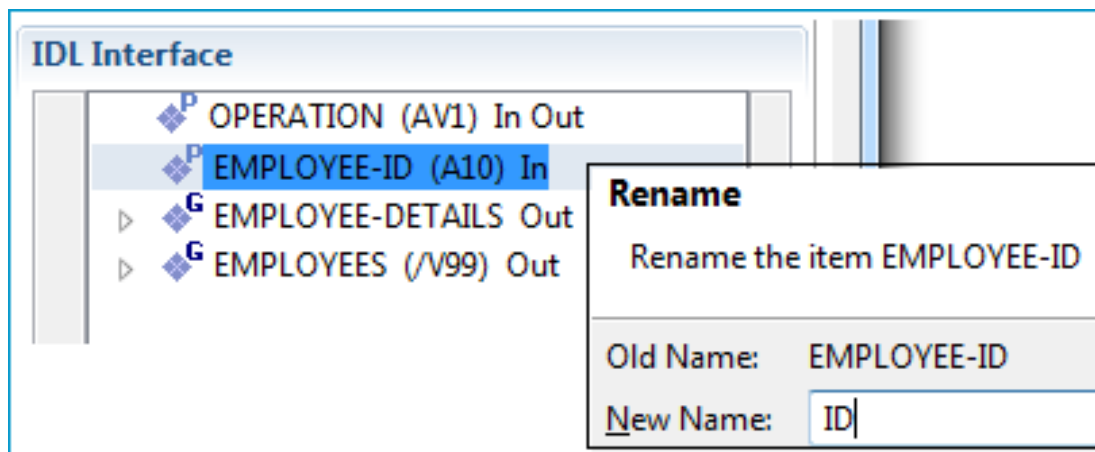
- If there is a single COBOL data structure of the CICS message for input and output - check box **Input Message same as Output Message** is checked - you select a single COBOL data structure in the COBOL Mapping Editor. This structure is used for COBOL input as well as for COBOL output. For more information in this case see *Mapping Editor User Interface* in the IDL Extractor for COBOL documentation.
- If there is a second COBOL data structure for the CICS output message - check box **Input Message same as Output Message** is cleared - you will select two COBOL data structures in the COBOL Mapping Editor. One is used for COBOL input and the other is for COBOL output. For more information in this case see *Mapping Editor User Interface* in the IDL Extractor for COBOL documentation.

COBOL extraction is a two-step process:

- First, select the COBOL parameters using the **Add to** and **Remove from COBOL Interface** from the context menu on the COBOL data items in the upper window pane (COBOL source); in many situations the COBOL interface is detected by the Mapping Editor directly and you can omit this step.
- Then map the COBOL parameters to IDL directions using the **Map to In/Out/InOut** buttons. COBOL parameters do not have directions, they are always INOUT. This step can be left out for a quick test in non-production scenarios; for real production it is recommended to set IDL directions to reduce data transfer. You also have the option to assign a meaningful name to an IDL parameter if the original COBOL data item is not self-explanatory.

For our example:

- Set **Map to In** for COBOL data item `EMPLOYEE-ID` as IDL direction (see screenshot in previous step). For `EMPLOYEES-DETAILS` and `EMPLOYEES` perform the similar **Map to Out**.
- Use the function **Rename** from the context menu on the IDL parameters in the **IDL Interface** pane to rename COBOL parameter `EMPLOYEES-ID` to IDL parameter `ID`. Do the same for `EMPLOYEE-DETAILS`: Rename to `EMPLOYEE`.



- 6 Press **Finish**. The default extraction settings ensure you get useful results. The outcome is a Software AG IDL file (interface definition language), a Designer file with extension .idl:


```
library 'EMPLAPPL' is
program 'EMPLOYEE' is
  define data parameter
    1 OPERATION (AV1) In Out
    1 ID (AV10) In /* Original Name:EMPLOYEE-ID
    1 EMPLOYEE Out /* Original Name:EMPLOYEE-DETAILS
      2 FIRSTNAME (AV20)
      2 SURNAME (AV20)
      2 DATE-BIRTH (AV12)
      2 DETAILS (AV100)
    1 EMPLOYEES (/V99) Out
      2 IDENT (AV10)
      2 FIRSTNAME (AV20)
      2 SURNAME (AV20)
      2 DATE-BIRTH (AV12)
  end-define
```

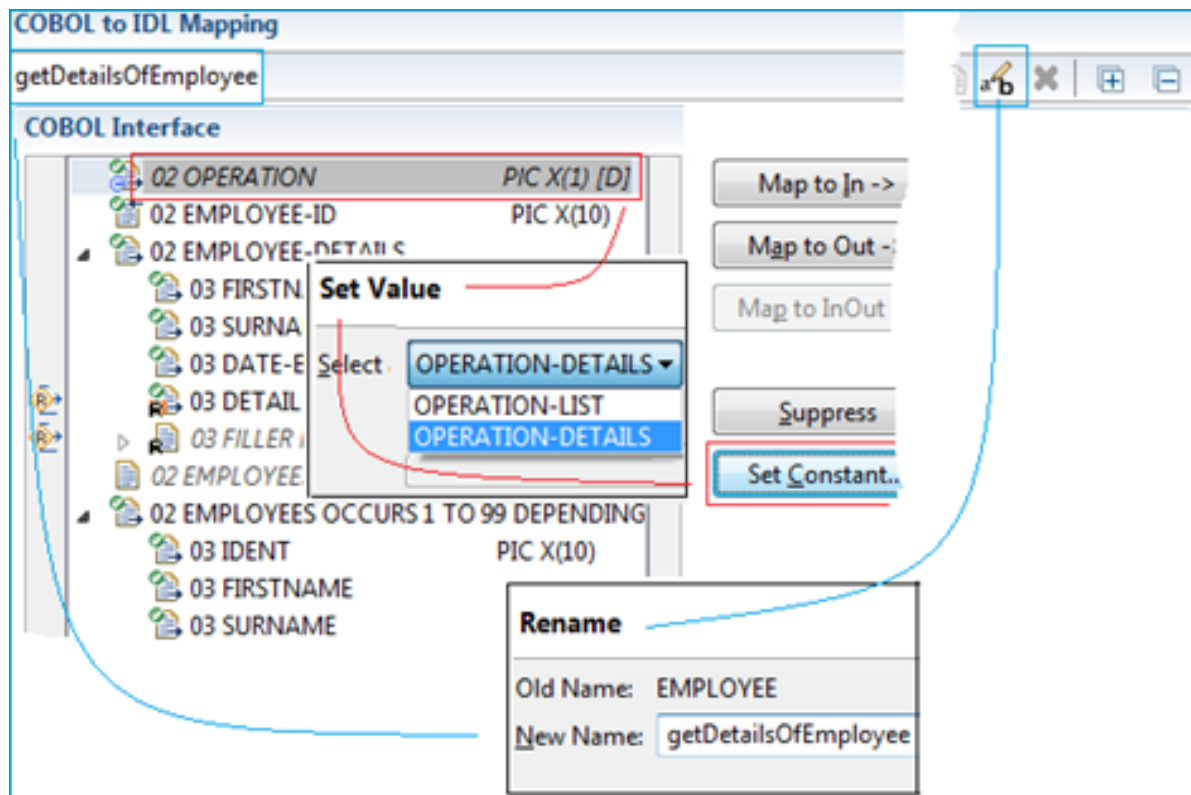
If required, a server mapping file with the same name as the IDL file but the extension .cvm may be generated too, for technical reasons. This file must always be stored together with the concomitant IDL file. For more information, see *Server Mapping Files for COBOL* in the Designer documentation. By default, the interface name `EMPLOYEE` is taken from the COBOL server program name.


Extracting a COBOL Server - Modern Method with User-defined Mapping

EntireX allows you to extract all implemented interfaces of the COBOL server separately. Instead of a large `EMPLOYEE` interface, separate interfaces `getListOfEmployees` and `getDetailsOfEmployee` are extracted. Each interface contains required parameters; obsolete parameters for an interface are suppressed, improving its usability.

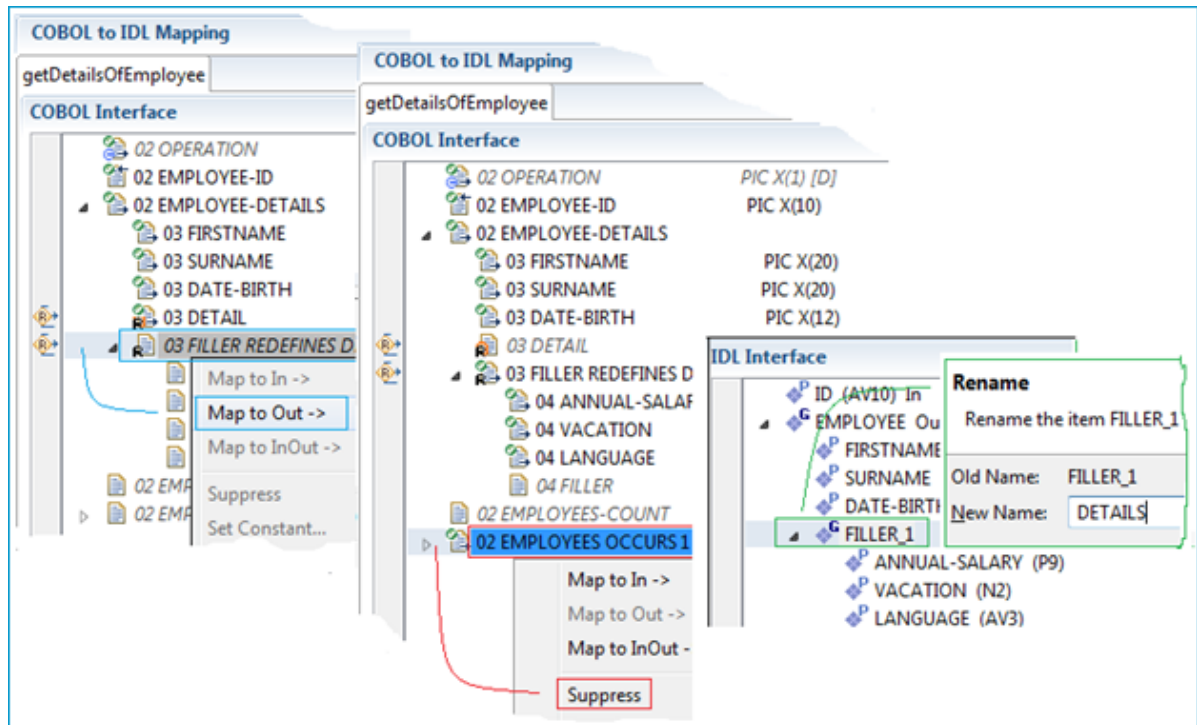
➤ To extract a COBOL server with a user-defined mapping

- 1 Shape `EMPLOYEE` to `getDetailsOfEmployee`:



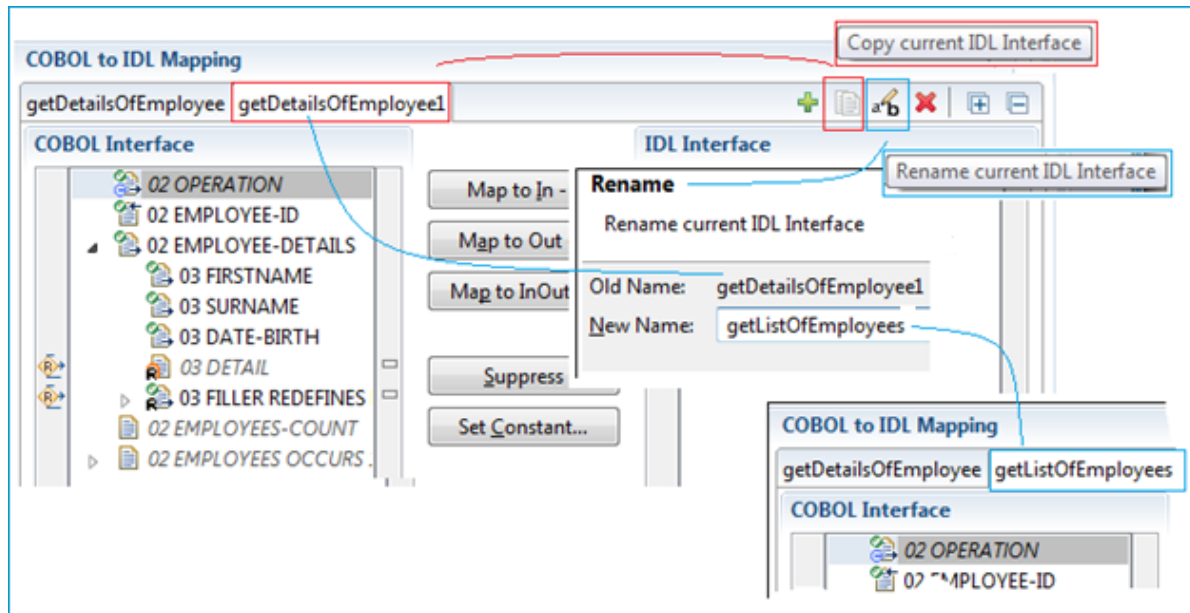
- Mark the `OPERATION` field in the **COBOL Interface** pane and press the **Set Constant** button. In the pop-up window, select `OPERATION-DETAILS` (red markers). The `OPERATION-DETAILS` value originates from COBOL level-88 data item (blue markers). If there is no COBOL level-88 enumeration type in the COBOL program defined, you can enter the function code manually in the pop-up window.
- By default the IDL interface gets the same name as your COBOL server: `EMPLOYEE`. Use the **Rename** button  from the toolbar of the COBOL Mapping Editor and change the IDL interface name to `getDetailsOfEmployee` (blue markers). This name is used as the IS service name later.



2 Continue shaping, making `getDetailsOfEmployee` easier to use:



- Use the context menu of the redefinition of the `DETAIL` field in the **COBOL Interface** pane, `FILLER REDEFINES DETAIL` and choose **Map to Out** (blue markers). A redefinition is a secondary layout (field types) of the same memory area. The redefinition contains more specific information (`ANNUAL-SALARY`, `VACATION`, etc.) than character buffer `DETAIL`. This is the reason why it is more useful in your interface.
- Use the context menu of `FILLER_1` in the IDL interface pane and rename `FILLER_1` to `DETAILS` (green markers) for a readable IS service field name later.
- The `DETAILS` function in the COBOL server does not make use of the `EMPLOYEES` field. Therefore you can leave it out of the interface: use the context menu of the `EMPLOYEES` field in the **COBOL Interface** pane and choose **Suppress** (red markers).

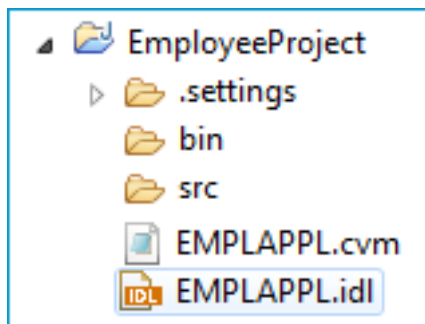
3 Shape `EMPLOYEE` to `getListOfEmployees` Function:



- You create the additional IDL interface using the toolbar button **Copy current IDL interface** . (red markers). A new tab `getDetailsOfEmployee1` is created. The previously extracted `getDetailsOfEmployee` interface still exists in the first tab. Once you reactivate the first tab, you will see the interface of `getDetailsOfEmployee` again.
- Use the **Rename** button  from the toolbar of the COBOL Mapping Editor and change the IDL interface name to **`getListOfEmployees`** (blue markers). This name is used as the IS service name later.
- For the `LIST` function you need the `OPERATION-LIST` value in the `OPERATION` field: Mark the `OPERATION` field in the **COBOL Interface** pane and press the **Set Constant** button. In the pop-up window, select `OPERATION-LIST` (similar to Step 1. above *Shape EMPLOYEE to getDetailsOfEmployee*; red markers).
- Use the context menu of the `EMPLOYEES` field in the **COBOL Interface** pane, `EMPLOYEES OCCURS 1 TO 99` and choose **Map to Out** (Similar to Step 2. above *Continue shaping, making getDetailsOfEmployee easier to use*; blue markers).
- Because the `EMPLOYEE` and `EMPLOYEE-DETAIL` fields are not used in the COBOL server `LIST` function, you leave them out in the IDL interface: use the context menu of `EMPLOYEE-DETAIL` field in the **COBOL Interface** pane and choose **Suppress** (similar to Step 2. above *Continue shaping, making getDetailsOfEmployee easier to use*; red markers). Do the same for the `EMPLOYEE-ID` field.

- 4 Press **Finish** to retrieve the extraction result in the form of a Software AG IDL file. At the same time, a server mapping file for COBOL (Designer file with extension .cvm) is created.

See *Server Mapping Files for COBOL* in the Designer documentation. The *Software AG IDL File* in the IDL Editor documentation describes the interfaces from the client point of view, while the server mapping file contains the mapping to the real COBOL server. Both of these files must be kept together and in sync, otherwise a call to the COBOL server may fail.



To summarize: We created two IDL interfaces. In the IDL file, these resulted in two IDL programs: `getListOfEmployees` and `getDetailsOfEmployee`. Both IDL programs were given readable names (Steps 1 and 3). Meaningful fields were kept, while superfluous fields were suppressed (Steps 1 and 3). The program `getDetailsOfEmployee` contains the redefined fields of parameter `DETAILS` (see below) mapped during extraction (Step 1).



Note: At runtime, the RPC client generated with the extracted interface will send data for the redesigned interfaces, while your COBOL server still expects `EMPLOYEE` data. The EntireX runtime transforms the incoming data stream from the RPC client, using the server mapping file.

```

program 'getDetailsOfEmployee' is
  define data parameter
    1 ID (AV10) In /* Original Name:EMPLOYEE-ID
    1 EMPLOYEE Out /* Original Name:EMPLOYEE-DETAILS
    2 FIRSTNAME (AV20)
    2 SURNAME (AV20)
    2 DATE-BIRTH (AV12)
    2 DETAILS /* Original Name:FILLER_1
    3 ANNUAL-SALARY (P9)
    3 VACATION (N2)
    3 LANGUAGE (AV3)
  end-define
  program 'getListOfEmployees' is
    1 EMPLOYEES (/V99) Out
    2 IDENT (AV10)
    2 FIRSTNAME (AV20)
    2 SURNAME (AV20)
    2 DATE-BIRTH (AV12)
  end-define

```

Comparison Chart: Fast-track versus User-defined Mapping

The following table highlights the differences when shaping an interface with a *user-defined mapping* compared with a *fast-path extraction*.

| | Interface Shaping with User-defined Mapping | Fast-path Extraction |
|----------------------------------|---|---|
| General | User-defined interface with dedicated mapping. For our example, the interfaces are small and tidy and more self-explanatory with long, readable interface names. They are easier to use with the hidden <code>OPERATION</code> field and the suppressed COBOL fields, which are not needed. | Automatic, quick result extraction with COBOL-like interfaces on IS. For our example, the IS interface <code>EMPLOYEE</code> matches exactly 1:1, field by field. |
| IS service(s) | Multiple small and handy IS services; each <code>OPERATION</code> code is mapped to a separate IS service. | One big IS service. |
| IS service name | Readable long name. | Short Subprogram name; up to 8 characters. |
| IS fields | Usage of Suppress and Set Constant reduces the message length. This keeps focus on relevant data items and keeps the client's interface clean. It may also improve performance. | The IS fields and COBOL server parameters match 1:1. As COBOL layout descriptions are sometimes used for many different purposes, irrelevant data items appear and clutter up the IS interface. |
| <code>OPERATION</code> parameter | Suppressed: the <code>OPERATION</code> parameter does not exist in the IS service as an IS field. | The <code>OPERATION</code> parameter exists in the IS service as an IS field and needs to be filled-in by the client endpoint. |
| <code>OPERATION</code> code | The <code>OPERATION</code> code is provided internally by EntireX runtime in the <code>OPERATION</code> field. | The <code>OPERATION</code> code needs to be specified in the IS service in the <code>OPERATION</code> field by the client endpoint. |
| <code>REDEFINE</code> parameters | Either the parameter that is redefined or one of its redefinitions is available as an IS field. | Only the parameter that is redefined is available as an IS field. Redefinitions of the parameter are not available as IS fields. |

A user-defined mapping enables you also to define alternative mappings for COBOL data items (`REDEFINES`, tables etc.). These enable scenarios with COBOL servers where data exchange is not fully described by the `LINKAGE SECTION` COBOL data items. For more information refer to the IDL Extractor for COBOL documentation:

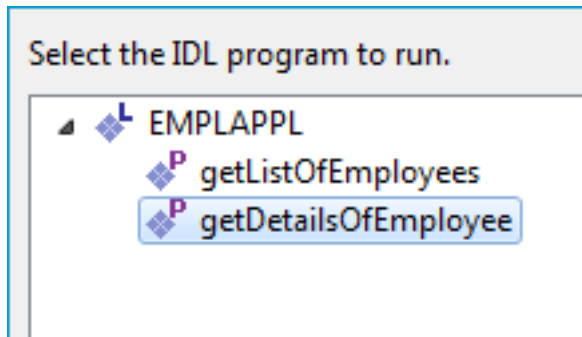
- *Mapping Editor IDL Interface Mapping Functions* if the check-box **Input Message same as Output Message** was checked.
- *Mapping Editor IDL Interface Mapping Functions* if the check-box **Input Message same as Output Message** was cleared.
- *User-defined Mapping*

Testing the Extraction Results

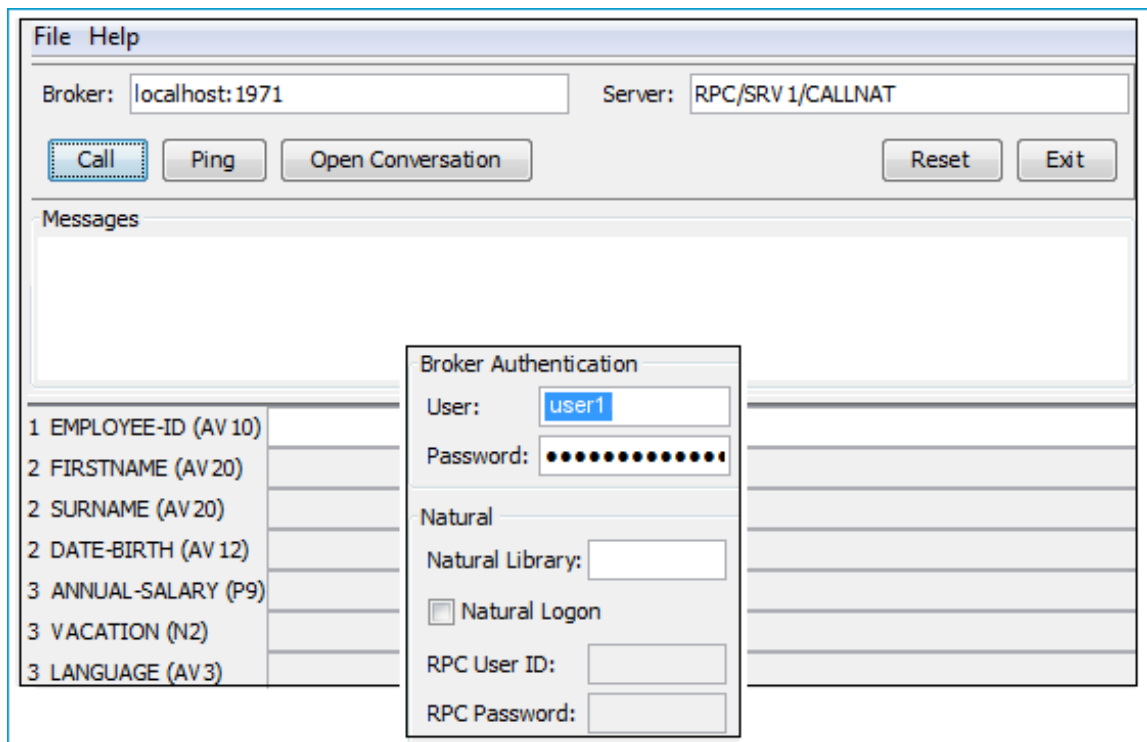
The following pictures use the extraction results described under *Extracting a COBOL Server - Modern Method with User-defined Mapping*.

> To test the extraction results (optional)

- 1 You can test the results of the extraction operation and the COBOL server back end, using the EntireX IDL Tester. From the context menu of the IDL file in the Designer, choose **Software AG IDL Tester**.



- 2 Select `getDetailsOfEmployee`.



Note that the broker and server parameters contain the explicit route to call the server program, and you can optionally ping the connection from this client. With the **File > Options** dialog, you can set:

- **User** and **Password** for *broker* authentication
- **RPC User ID** and **RPC Password** for *server* authentication

See *EntireX IDL Tester* in the Designer documentation.

- 3 Check the Integration Server log, the EntireX Adapter log or the RPC logs. Applies to all connection methods.

Task 2: Generate the Connection and Adapter Services in Integration Server

This section describes your first steps to create a new Integration Server connection. This is described in more detail under *Using the Integration Server Wrapper*, for example working with existing Integration Server connections. This section covers the following topics:

- [Step 1: Start the Integration Server Wrapper Wizard](#)
- [Step 2: Create a New Integration Server Connection](#)
- [Step 3: Select the Connection Type](#)
- [Step 4: Define Adapter Services for a CICS Socket Listener Connection](#)

Step 1: Start the Integration Server Wrapper Wizard

➤ To start the Integration Server Wrapper wizard

- 1 In the context menu of a Software AG IDL file, choose **Integration Server > Generate web-Methods IS Connection**.

This starts the wizard with a list of existing Integration Server Wrapper connections.



Note: If the selected IDL file is not valid because of a syntax error, an error dialog comes up and the wizard does not start.

- 2 Continue with *Step 2: Create a New Integration Server Connection*.

Step 2: Create a New Integration Server Connection

Define New Integration Server Connection
Add host:port, user and password for a new Integration Server

Server:

User:

Password:

☐ Use secure connection

➤ To create a new Integration Server connection

- 1 Define the new Integration Server connection on the wizard page.



Notes:

1. The only required field is **Server**. Enter the hostname of the Integration Server including an optional port number. If no port number is specified, port number defaults to "5555". The **Integration Server Authentication** can be passed with the **User** and **Password** fields.
 2. Optional settings are for secure connections. The **Truststore for HTTPS** contains all signed certificates and must be a valid truststore.
 3. The check box **Verify host name** checks that the hostname is entered in the stored certificate.
 4. When the Integration Server has **Client Authentication** enabled, you can specify your **Keystore** file and keystore **Password**.
 5. For managing Integration Server connections, see [Preferences](#).
- 2 Choose **Next** and continue with *Step 3: Select the Connection Type*.

Step 3: Select the Connection Type

☒ Create a new EntireX Adapter connection of type **CICS Socket Listener Connection**

☐ Update Adapter Services or Listeners to an existing Integration Server connection:

List of Connections

| Connection Name | Package Name | Connection Type | Enabled |
|-------------------------------|--------------|------------------------|---------|
| Employees:EmployeesConnection | Employees | EntireX RPC Connection | Yes |


Total: 1

☒ Map Software AG IDL data types to String

☐ Create or Update REST resource

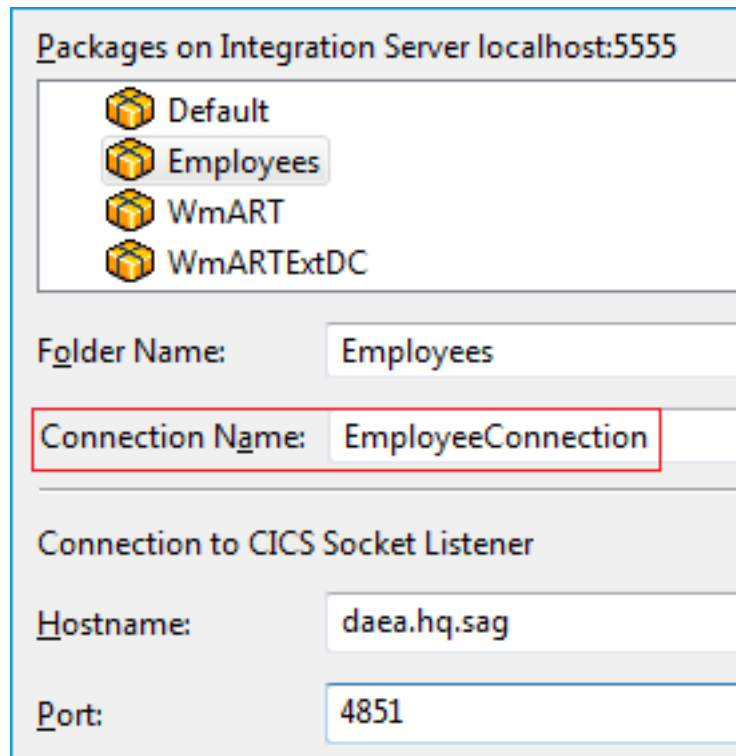
➤ To create a new connection

- 1 Select a connection type from the drop down list. Connection types are described under *EntireX Adapter Connections* in the EntireX Adapter documentation and *Introduction to the Integration Server Wrapper*.



Note: The list of connection types is filtered: connection types that require a license are only shown if a corresponding license file is available. Reliable RPC connections are only shown if all IDL programs contain only IN parameters. Also, if a server mapping file is available, only those connection types that support the interface type specified in the server mapping file are shown.
- 2 Click **Next** and continue with *Step 4: Define Adapter Services for a CICS Socket Listener Connection*.

Step 4: Define Adapter Services for a CICS Socket Listener Connection



Packages on Integration Server localhost:5555

- Default
- Employees
- WmART
- WmARTEExtDC

Folder Name: Employees

Connection Name: EmployeeConnection

Connection to CICS Socket Listener

Hostname: daea.hq.sag

Port: 4851

➤ To create a connection and related adapter services

- 1 Select a package for the created objects.
- 2 Define a folder name. If the folder does not exist, it will be created.
- 3 Define a connection name.
- 4 Define the parameters of the connection type. For details, see *Connection Parameters for CICS Socket Listener Connections* in the EntireX Adapter documentation.

As a result, the folder will contain the connection and the adapter services (one for each IDL program). The name of a service is the same as the respective IDL program.

The default settings for the adapter services are:

- the **Default** package; if not available, the first package
- the IDL library name for the **Folder Name**
- the IDL library name with the suffix "Connection" for the **Connection Name**



Note: When creating a connection, a package dependency is added such that the selected package depends on webMethods EntireX (the package `WmEntireX`) with the version currently used.

;

Task 3: Execute the Call from Integration Server to COBOL

From the **Service Development** perspective, refresh the package where the connection service was written, select the adapter service and use the service test to **Run Service**. This invokes the adapter service through the connector service.

Employees

Employees

getDetailsOfEmployee

getListOfEmployees

EmployeesConnection

Run As

1 Run in Browser

2 Run Service

| Name | Value |
|--------------|-------------|
| outRec | |
| EMPLOYEES | |
| EMPLOYEES[0] | |
| IDENT | 11100102 |
| FIRSTNAME | EDGAR |
| SURNAME | SCHINDLER |
| DATE-BIRTH | Dec 4, 1962 |
| EMPLOYEES[1] | |
| EMPLOYEES[2] | |
| EMPLOYEES[3] | |
| EMPLOYEES[4] | |
| errorCode | 00000000 |
| errorFlag | false |

In case of error or unexpected results:

- Check the Integration Server log or the EntireX Adapter log.

10

Calling COBOL DFHCOMMAREA on z/OS CICS from Integration Server

| | |
|--|-----|
| ■ Introduction | 144 |
| ■ What do I need to Install for this Scenario? | 145 |
| ■ Task 1: Extract the Interface of a COBOL Server | 147 |
| ■ Task 2: Generate the Connection and Adapter Services in Integration Server | 160 |
| ■ Task 3: Execute the Call from Integration Server to COBOL | 164 |

This scenario uses the tools IDL Extractor for COBOL and Integration Server Wrapper of the Designer.

Introduction



- ① Extract the interface of the COBOL server program.
- ② Generate connection and adapter services in Integration Server.
- ③ Execute the call from Integration Server to the COBOL server program.

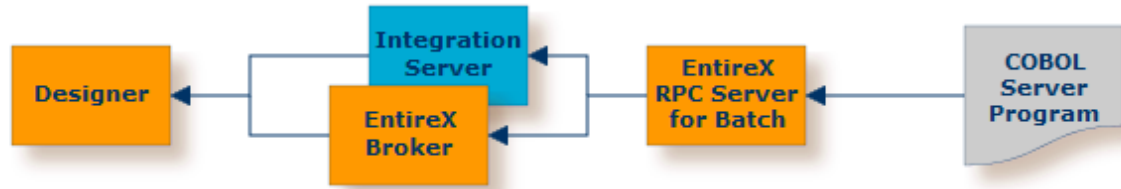
This scenario makes the following important assumptions:

For Task 1:

- You have a working COBOL DFHCOMMAREA server. For illustration and examples on such a server, see *CICS with DFHCOMMAREA Calling Convention* under *Introduction to the IDL Extractor for COBOL*.
- You have access to the related COBOL sources and copybooks. The minimum requirement is the `DATA DIVISION` of the interface. The sources and copybooks must be stored either
 - *locally*, that is, on the same machine where the Designer is running



- or *remotely* in a PDS or CA Librarian data set and accessed via the *RPC Server for Batch*, and either EntireX Broker or Integration Server



For Tasks 2 and 3:

- You can call the COBOL server program at runtime using different methods:
 - For the *EntireX RPC* connection method you need
 - EntireX Broker on one of the supported platforms: z/OS | Linux | Windows | BS2000
 - the *RPC Server for CICS*



- For the *EntireX Direct RPC* connection method you need:
 - the *RPC Server for CICS*



See also *Direct RPC* in the EntireX Adapter documentation.

What do I need to Install for this Scenario?

- You have Software AG Designer installed with EntireX plugins and Service Development plugins.
 - For EntireX plugins, see *Designer > EntireX Designer* under *EntireX Installation Packages* in the General Installation documentation.
 - For Service Development plugins, refer to the Integration Server documentation.
- You have an Integration Server with EntireX Adapter installed. See *Adapters > EntireX Adapter* under *EntireX Installation Packages* in the General Installation documentation.
- You have an RPC Server for CICS installed. See *Installing the RPC Server for CICS* in the z/OS Installation documentation.

- Optionally you have an EntireX Broker installed.
 - For Linux and Windows, see *EntireX Broker* under *EntireX Installation Packages* in the General Installation documentation.
 - For z/OS, see *Installing EntireX Broker under z/OS* in the z/OS Installation documentation.
- Optionally, for remote extraction only (Task 1), you have an RPC Server for Batch installed. See *Installing the RPC Server for Batch* in the z/OS Installation documentation.

Task 1: Extract the Interface of a COBOL Server

- [Introduction](#)
- [Sample COBOL Server used in the Examples](#)
- [Extracting a COBOL Server - Fast-track Method](#)
- [Extracting a COBOL Server - Modern Method with User-defined Mapping](#)
- [Comparison Chart: Fast-track versus User-defined Mapping](#)
- [Testing the Extraction Results](#)

Introduction

Follow the instructions for extracting COBOL, see *Using the IDL Extractor for COBOL - Overview* and choose *Scenario I: Create New IDL and Server Mapping Files* if this is your first extraction. Learn how to invoke the IDL Extractor for COBOL, create a COBOL Extractor Environment and about the possibilities to select the COBOL source.

The extraction process creates the following EntireX metafiles:

- IDL file. A Software AG IDL file contains definitions of the interface between client and server. See *Software AG IDL File* in the IDL Editor documentation in the IDL Editor documentation.
- Server mapping file (optional). The mapping file is a Designer file with extension .cvm that contains COBOL-specific mapping information. See *Server Mapping Files for COBOL* in the Designer documentation.

Sample COBOL Server used in the Examples

The following COBOL server is used to illustrate the features of the IDL Extractor for COBOL. Imagine an existing COBOL server called `EMPLOYEE`. It implements the access logic for a `LIST` and `DETAILS` function to a database view `EMPLOYEE`:

```

IDENTIFICATION DIVISION.
    PROGRAM-ID.      EMPLOYEE.
*****
*   Program Name    = EMPLOYEE
*   String Literal  = QUOTE
*****
01 DFHCOMMAREA.
    02 OPERATION                                PIC X(1).
        88 OPERATION-LIST                      VALUE 'L'.
        88 OPERATION-DETAILS                   VALUE 'D'.
    02 EMPLOYEE-ID                                PIC X(10).
    02 EMPLOYEE-DETAILS.
        03 FIRSTNAME                            PIC X(20).
        03 SURNAME                              PIC X(20).
        03 DATE-BIRTH                          PIC X(12).
        03 DETAILS                             PIC X(100).
        03 FILLER REDEFINES DETAILS.
            04 ANNUAL-SALARY          PACKED-DECIMAL PIC S9(9).
            04 VACATION                PIC S9(2).
            04 LANGUAGE                PIC X(3).
            04 FILLER                  PIC X(90).
    02 EMPLOYEES-COUNT                          PIC 9(8) BINARY.
    02 EMPLOYEES OCCURS 1 TO 99 DEPENDING ON EMPLOYEES-COUNT.
        03 IDENT                          PIC X(10).
        03 FIRSTNAME                      PIC X(20).
        03 SURNAME                        PIC X(20).
        03 DATE-BIRTH                    PIC X(12).

```

Two approaches for extracting the COBOL server are described below:

- **Fast-track**

Learn how EntireX helps you to connect the COBOL Server with quick results.

- **User-defined Mapping**

The following features are among those available with a user-defined mapping:

- **Shape the interface to your COBOL server**

You can minimize the interface by suppressing COBOL server fields or by providing constant values. Renaming interfaces allows you to specify a readable long name. These two features together - constants and renaming of interfaces - are most powerful when multiple interfaces are implemented in a single COBOL server. Each function of the COBOL server triggered by an operation code or function code can be modelled as a separate IS service.

■ Select alternative mappings

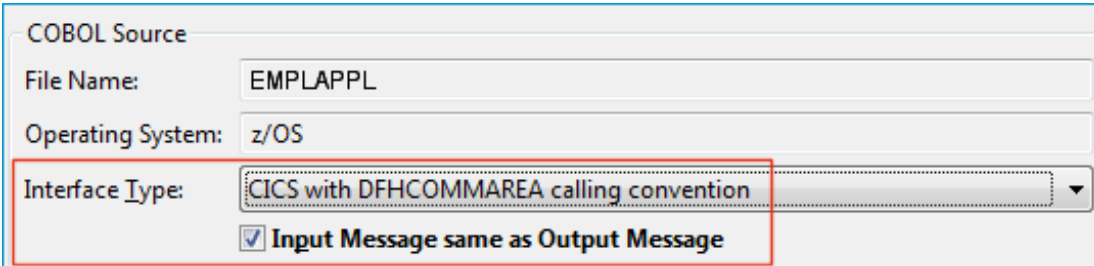
You can select alternative mappings for COBOL data items (REDEFINES, tables etc.) to enable scenarios with COBOL servers where data exchange is not fully described by the LINKAGE SECTION COBOL data items.

These approaches are described under [Fast-track Method](#) and [Modern Method](#) below.

Extracting a COBOL Server - Fast-track Method

➤ To extract the COBOL Server

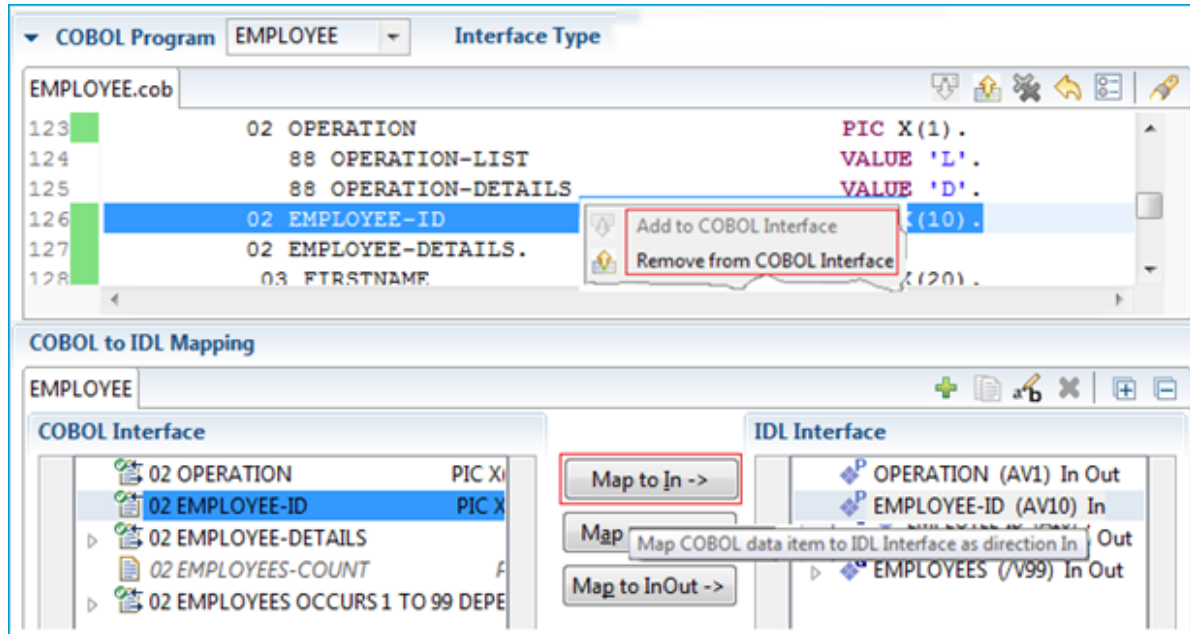
- 1 Switch to the **EntireX** perspective.
- 2 Call the IDL Extractor for COBOL.
- 3 Set the correct interface type as described under *Step 4: Define the Extraction Settings and Start Extraction* under *Scenario I: Create New IDL and Server Mapping Files* in the IDL Extractor for COBOL documentation.



- 4 Set the correct value for checkbox **Input Message same as Output Message**.
 - Check the checkbox if the COBOL data structure of the CICS input message is the same as the structure of the CICS output message, that is, there is one COBOL layout for both directions. See the following COBOL server examples in the IDL Extractor for COBOL documentation:
 - *Example 1: Redefines*
 - *Example 2: Buffer Technique*
 - *Example 3: COBOL SET ADDRESS Statements*
 - Clear the checkbox if the COBOL data structure of the CICS input message is different to the structure of the CICS output message, that is, the output overlays the input, which means there is a second COBOL layout for the reply. See the following COBOL server examples in the IDL Extractor for COBOL documentation:
 - *Example 1: Redefines*
 - *Example 2: Buffer Technique*
 - *Example 3: COBOL SET ADDRESS Statements*

For our example, check the check box, because the COBOL layout for input is the same as the COBOL layout for output.

- 5 Press **Next** to enter the COBOL Mapping Editor.



The purpose of the COBOL Mapping Editor is to map COBOL data items to IDL (Interface Definition Language) parameters. It consists of three main areas:

- The upper window pane is the COBOL program source.
- The window pane on the left-hand side is the COBOL interface, consisting of COBOL data items representing the parameters in your COBOL server program.
- The window pane on the right-hand side is the IDL interface consisting of IDL parameters.

What you select depends on check-box **Input Message same as Output Message**:

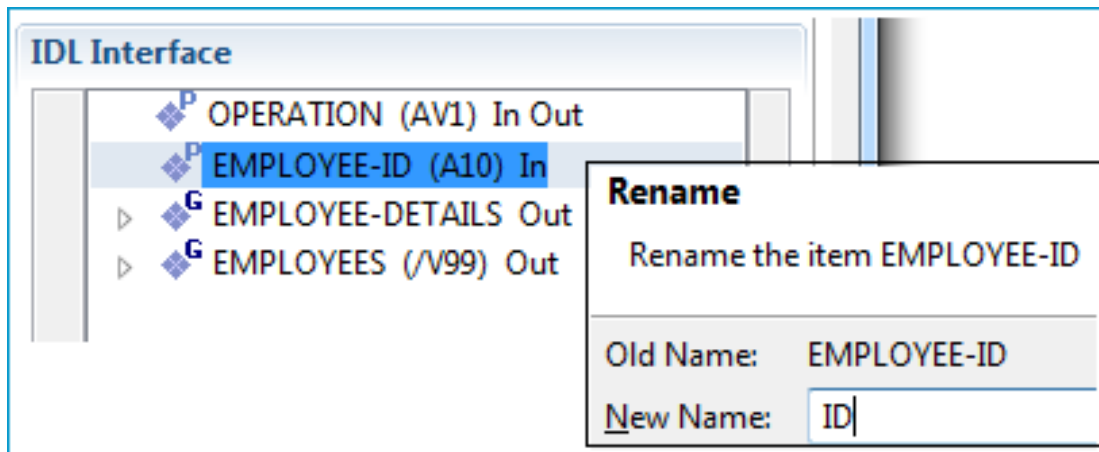
- If there is a single COBOL data structure of the CICS message for input and output - check box **Input Message same as Output Message** is checked - you select a single COBOL data structure in the COBOL Mapping Editor. This structure is used for COBOL input as well as for COBOL output. For more information in this case see *Mapping Editor User Interface* in the IDL Extractor for COBOL documentation.
- If there is a second COBOL data structure for the CICS output message - check box **Input Message same as Output Message** is cleared - you will select two COBOL data structures in the COBOL Mapping Editor. One is used for COBOL input and the other is for COBOL output. For more information in this case see *Mapping Editor User Interface* in the IDL Extractor for COBOL documentation.

COBOL extraction is a two-step process:

- First, select the COBOL parameters using the **Add to** and **Remove from COBOL Interface** from the context menu on the COBOL data items in the upper window pane (COBOL source); in many situations the COBOL interface is detected by the Mapping Editor directly and you can omit this step.
- Then map the COBOL parameters to IDL directions using the **Map to In/Out/InOut** buttons. COBOL parameters do not have directions, they are always INOUT. This step can be left out for a quick test in non-production scenarios; for real production it is recommended to set IDL directions to reduce data transfer. You also have the option to assign a meaningful name to an IDL parameter if the original COBOL data item is not self-explanatory.

For our example:

- Set **Map to In** for COBOL data item `EMPLOYEE-ID` as IDL direction (see screenshot in previous step). For `EMPLOYEES-DETAILS` and `EMPLOYEES` perform the similar **Map to Out**.
- Use the function **Rename** from the context menu on the IDL parameters in the **IDL Interface** pane to rename COBOL parameter `EMPLOYEES-ID` to IDL parameter `ID`. Do the same for `EMPLOYEE-DETAILS`: Rename to `EMPLOYEE`.



- 6 Press **Finish**. The default extraction settings ensure you get useful results. The outcome is a Software AG IDL file (interface definition language), a Designer file with extension `.idl`:

```

library 'EMPLAPPL' is
program 'EMPLOYEE' is
define data parameter
  1 OPERATION (AV1) In Out
  1 ID (AV10) In /* Original Name:EMPLOYEE-ID
  1 EMPLOYEE Out /* Original Name:EMPLOYEE-DETAILS
    2 FIRSTNAME (AV20)
    2 SURNAME (AV20)
    2 DATE-BIRTH (AV12)
    2 DETAILS (AV100)
  1 EMPLOYEES (/V99) Out
    2 IDENT (AV10)
    2 FIRSTNAME (AV20)
    2 SURNAME (AV20)
    2 DATE-BIRTH (AV12)
end-define

```

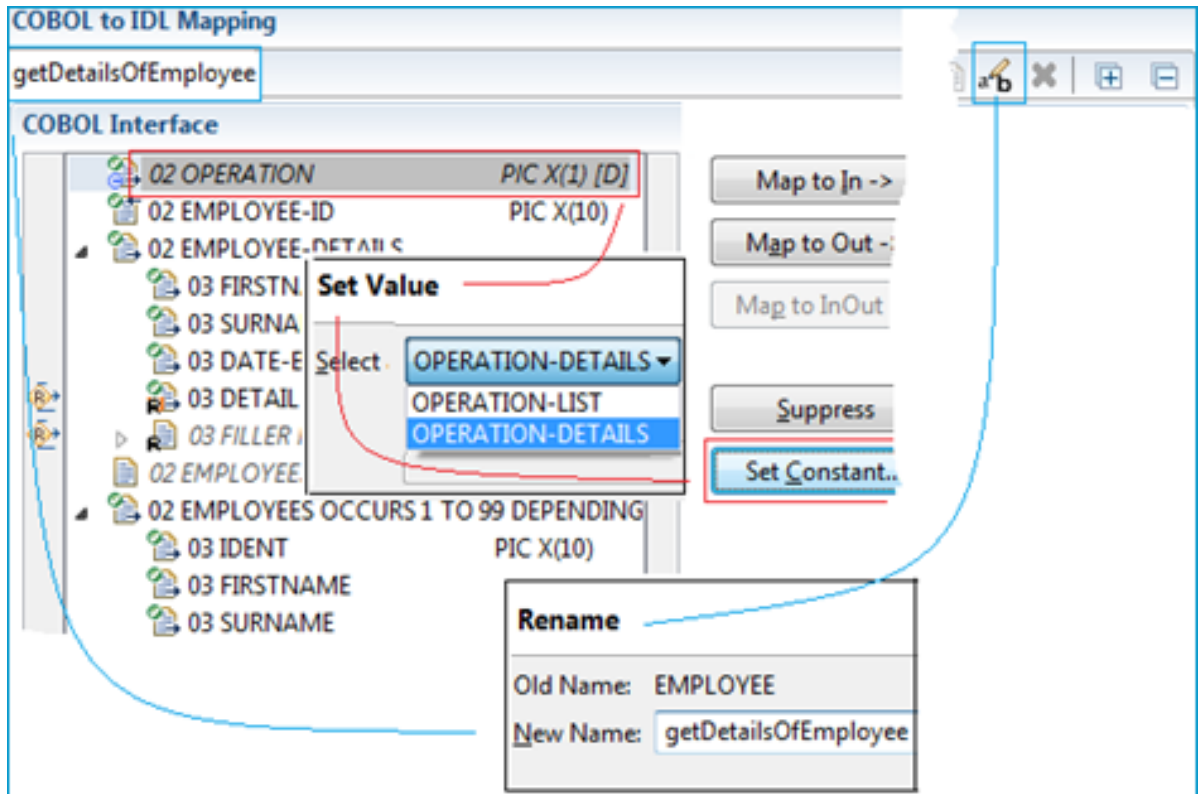
If required, a server mapping file with the same name as the IDL file but the extension .cvm may be generated too, for technical reasons. This file must always be stored together with the concomitant IDL file. For more information, see *Server Mapping Files for COBOL* in the Designer documentation. By default, the interface name `EMPLOYEE` is taken from the COBOL server program name.


Extracting a COBOL Server - Modern Method with User-defined Mapping

EntireX allows you to extract all implemented interfaces of the COBOL server separately. Instead of a large `EMPLOYEE` interface, separate interfaces `getListOfEmployees` and `getDetailsOfEmployee` are extracted. Each interface contains required parameters; obsolete parameters for an interface are suppressed, improving its usability.

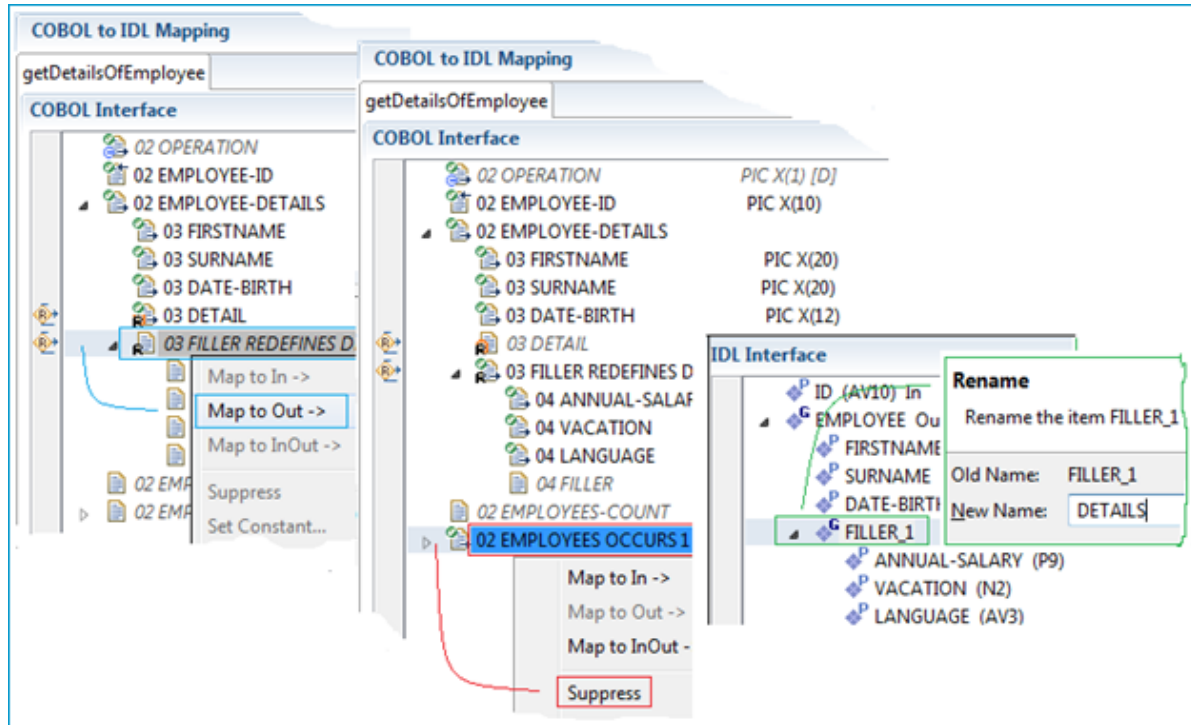
➤ To extract a COBOL server with a user-defined mapping

- 1 Shape `EMPLOYEE` to `getDetailsOfEmployee`:



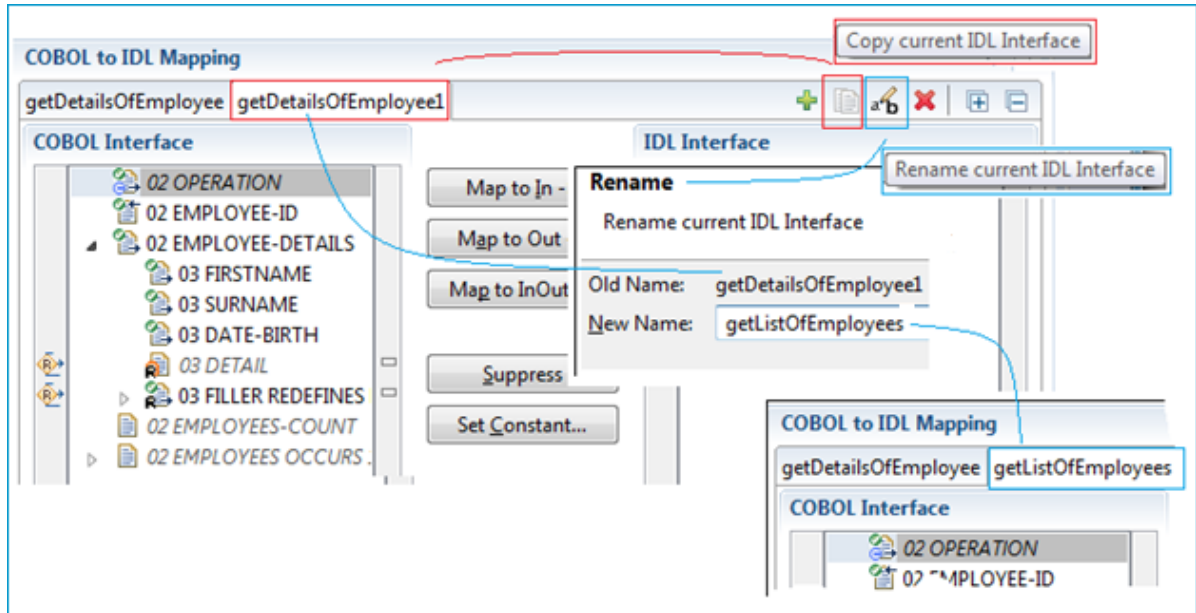
- Mark the `OPERATION` field in the **COBOL Interface** pane and press the **Set Constant** button. In the pop-up window, select `OPERATION-DETAILS` (red markers). The `OPERATION-DETAILS` value originates from COBOL level-88 data item (blue markers). If there is no COBOL level-88 enumeration type in the COBOL program defined, you can enter the function code manually in the pop-up window.
- By default the IDL interface gets the same name as your COBOL server: `EMPLOYEE`. Use the **Rename** button  from the toolbar of the COBOL Mapping Editor and change the IDL interface name to `getDetailsOfEmployee` (blue markers). This name is used as the IS service name later.

2 Continue shaping, making `getDetailsOfEmployee` easier to use:





- Use the context menu of the redefinition of the `DETAIL` field in the **COBOL Interface** pane, `FILLER REDEFINES DETAIL` and choose **Map to Out** (blue markers). A redefinition is a secondary layout (field types) of the same memory area. The redefinition contains more specific information (`ANNUAL-SALARY`, `VACATION`, etc.) than character buffer `DETAIL`. This is the reason why it is more useful in your interface.
- Use the context menu of `FILLER_1` in the IDL interface pane and rename `FILLER_1` to `DETAILS` (green markers) for a readable IS service field name later.
- The `DETAILS` function in the COBOL server does not make use of the `EMPLOYEES` field. Therefore you can leave it out of the interface: use the context menu of the `EMPLOYEES` field in the **COBOL Interface** pane and choose **Suppress** (red markers).

3 Shape `EMPLOYEE` to `getListOfEmployees` Function:

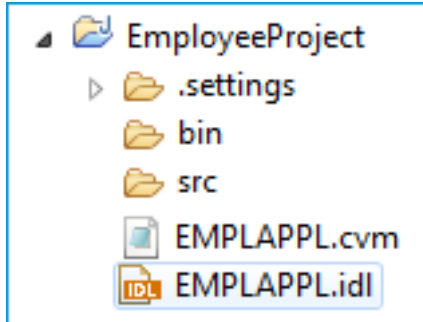


The COBOL Mapping Editor allows you to define multiple IDL interfaces to the same COBOL server:

- You create the additional IDL interface using the toolbar button **Copy current IDL interface**  (red markers). A new tab `getDetailsOfEmployee1` is created. The previously extracted `getDetailsOfEmployee` interface still exists in the first tab. Once you reactivate the first tab, you will see the interface of `getDetailsOfEmployee` again.
- Use the **Rename** button  from the toolbar of the COBOL Mapping Editor and change the IDL interface name to `getListOfEmployees` (blue markers). This name is used as the IS service name later.
- For the `LIST` function you need the `OPERATION-LIST` value in the `OPERATION` field: Mark the `OPERATION` field in the **COBOL Interface** pane and press the **Set Constant** button. In the pop-up window, select `OPERATION-LIST` (similar to Step 1. above *Shape `EMPLOYEE` to `getDetailsOfEmployee`*; red markers).
- Use the context menu of the `EMPLOYEES` field in the **COBOL Interface** pane, `EMPLOYEES OCCURS 1 TO 99` and choose **Map to Out** (Similar to Step 2. above *Continue shaping, making `getDetailsOfEmployee` easier to use*; blue markers).
- Because the `EMPLOYEE` and `EMPLOYEE-DETAIL` fields are not used in the COBOL server `LIST` function, you leave them out in the IDL interface: use the context menu of `EMPLOYEE-DETAIL` field in the **COBOL Interface** pane and choose **Suppress** (similar to Step 2. above *Continue shaping, making `getDetailsOfEmployee` easier to use*; red markers). Do the same for the `EMPLOYEE-ID` field.

- 4 Press **Finish** to retrieve the extraction result in the form of a Software AG IDL file. At the same time, a server mapping file for COBOL (Designer file with extension `.cvm`) is created.

See *Server Mapping Files for COBOL* in the Designer documentation. The *Software AG IDL File* in the IDL Editor documentation describes the interfaces from the client point of view, while the server mapping file contains the mapping to the real COBOL server. Both of these files must be kept together and in sync, otherwise a call to the COBOL server may fail.



To summarize: We created two IDL interfaces. In the IDL file, these resulted in two IDL programs: `getListOfEmployees` and `getDetailsOfEmployee`. Both IDL programs were given readable names (Steps 1 and 3). Meaningful fields were kept, while superfluous fields were suppressed (Steps 1 and 3). The program `getDetailsOfEmployee` contains the redefined fields of parameter `DETAILS` (see below) mapped during extraction (Step 1).



Note: At runtime, the RPC client generated with the extracted interface will send data for the redesigned interfaces, while your COBOL server still expects `EMPLOYEE` data. The EntireX runtime transforms the incoming data stream from the RPC client, using the server mapping file.

```

program 'getDetailsOfEmployee' is
  define data parameter
    1 ID (AV10) In /* Original Name:EMPLOYEE-ID
    1 EMPLOYEE Out /* Original Name:EMPLOYEE-DETAILS
    2 FIRSTNAME (AV20)
    2 SURNAME (AV20)
    2 DATE-BIRTH (AV12)
    2 DETAILS /* Original Name:FILLER_1
    3 ANNUAL-SALARY (P9)
    3 VACATION (N2)
    3 LANGUAGE (AV3)
  end-define
  program 'getListOfEmployees' is
    1 EMPLOYEES (/V99) Out
    2 IDENT (AV10)
    2 FIRSTNAME (AV20)
    2 SURNAME (AV20)
    2 DATE-BIRTH (AV12)
  end-define
    
```

Comparison Chart: Fast-track versus User-defined Mapping

The following table highlights the differences when shaping an interface with a *user-defined mapping* compared with a *fast-path extraction*.

| | Interface Shaping with User-defined Mapping | Fast-path Extraction |
|----------------------------------|---|---|
| General | User-defined interface with dedicated mapping. For our example, the interfaces are small and tidy and more self-explanatory with long, readable interface names. They are easier to use with the hidden <code>OPERATION</code> field and the suppressed COBOL fields, which are not needed. | Automatic, quick result extraction with COBOL-like interfaces on IS. For our example, the IS interface <code>EMPLOYEE</code> matches exactly 1:1, field by field. |
| IS service(s) | Multiple small and handy IS services; each <code>OPERATION</code> code is mapped to a separate IS service. | One big IS service. |
| IS service name | Readable long name. | Short Subprogram name; up to 8 characters. |
| IS fields | Usage of Suppress and Set Constant reduces the message length. This keeps focus on relevant data items and keeps the client's interface clean. It may also improve performance. | The IS fields and COBOL server parameters match 1:1. As COBOL layout descriptions are sometimes used for many different purposes, irrelevant data items appear and clutter up the IS interface. |
| <code>OPERATION</code> parameter | Suppressed: the <code>OPERATION</code> parameter does not exist in the IS service as an IS field. | The <code>OPERATION</code> parameter exists in the IS service as an IS field and needs to be filled-in by the client endpoint. |
| <code>OPERATION</code> code | The <code>OPERATION</code> code is provided internally by EntireX runtime in the <code>OPERATION</code> field. | The <code>OPERATION</code> code needs to be specified in the IS service in the <code>OPERATION</code> field by the client endpoint. |
| <code>REDEFINE</code> parameters | Either the parameter that is redefined or one of its redefinitions is available as an IS field. | Only the parameter that is redefined is available as an IS field. Redefinitions of the parameter are not available as IS fields. |

A user-defined mapping enables you also to define alternative mappings for COBOL data items (`REDEFINES`, tables etc.). These enable scenarios with COBOL servers where data exchange is not fully described by the `LINKAGE SECTION` COBOL data items. For more information refer to the IDL Extractor for COBOL documentation:

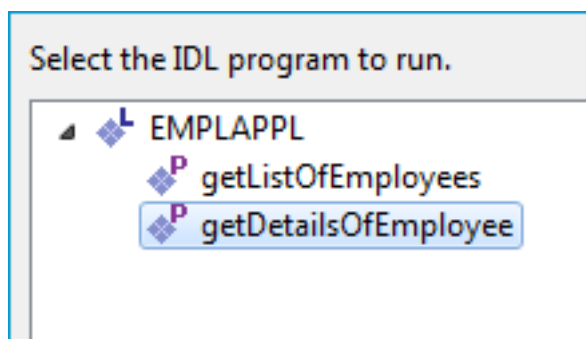
- *Mapping Editor IDL Interface Mapping Functions* if the check-box **Input Message same as Output Message** was checked.
- *Mapping Editor IDL Interface Mapping Functions* if the check-box **Input Message same as Output Message** was cleared.
- *User-defined Mapping*

Testing the Extraction Results

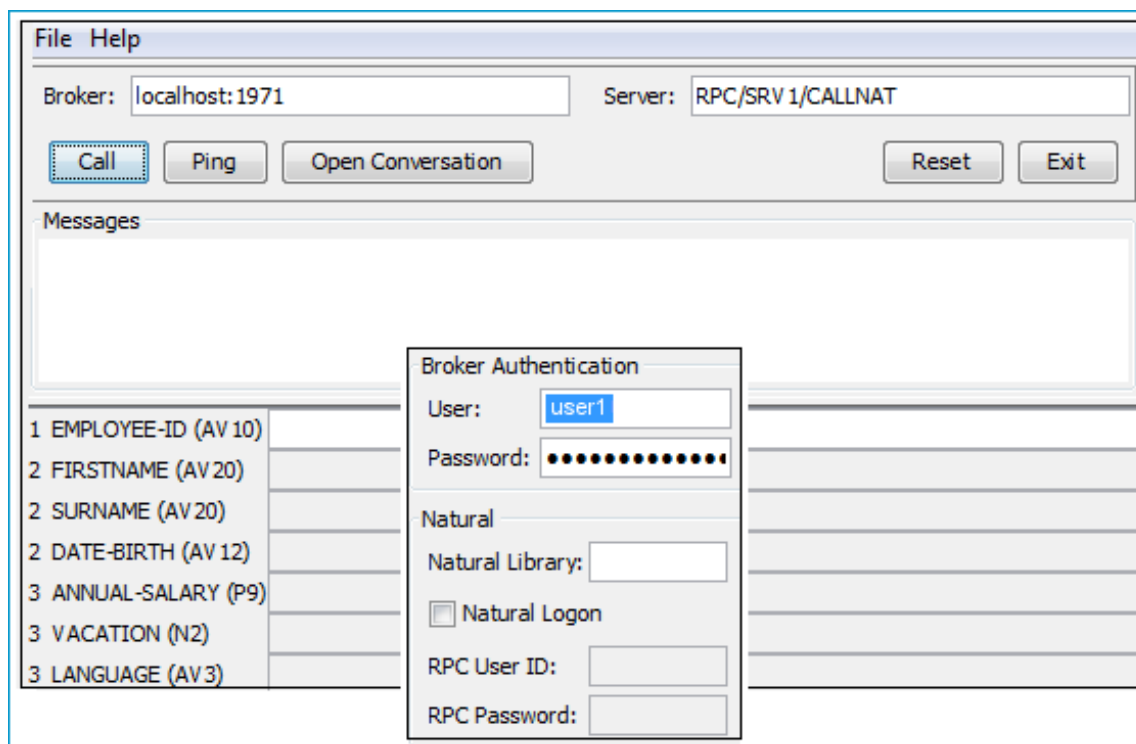
The following pictures use the extraction results described under *Extracting a COBOL Server - Modern Method with User-defined Mapping*.

> To test the extraction results (optional)

- 1 You can test the results of the extraction operation and the COBOL server back end, using the EntireX IDL Tester. From the context menu of the IDL file in the Designer, choose **Software AG IDL Tester**.



- 2 Select `getDetailsOfEmployee`.



Note that the broker and server parameters contain the explicit route to call the server program, and you can optionally ping the connection from this client. With the **File > Options** dialog, you can set:

- **User** and **Password** for *broker* authentication
- **RPC User ID** and **RPC Password** for *server* authentication

See *EntireX IDL Tester* in the Designer documentation.

- 3 Check the Integration Server log, the EntireX Adapter log or the RPC logs. Applies to all connection methods.

Task 2: Generate the Connection and Adapter Services in Integration Server

This section describes your first steps to create a new Integration Server connection. This is described in more detail under *Using the Integration Server Wrapper*, for example working with existing Integration Server connections. This section covers the following topics:

- [Step 1: Start the Integration Server Wrapper Wizard](#)
- [Step 2: Create a New Integration Server Connection](#)
- [Step 3: Select the Connection Type](#)
- [Step 4: Define Adapter Services for an RPC Connection](#)

Step 1: Start the Integration Server Wrapper Wizard

➤ To start the Integration Server Wrapper wizard

- 1 In the context menu of a Software AG IDL file, choose **Integration Server > Generate web-Methods IS Connection**.

This starts the wizard with a list of existing Integration Server Wrapper connections.



Note: If the selected IDL file is not valid because of a syntax error, an error dialog comes up and the wizard does not start.

- 2 Continue with *Step 2: Create a New Integration Server Connection*.

Step 2: Create a New Integration Server Connection

Define New Integration Server Connection

Add host:port, user and password for a new Integration Server

Server:

User:

Password:

☐ Use secure connection

➤ **To create a new Integration Server connection**

- 1 Define the new Integration Server connection on the wizard page.

**Notes:**

1. The only required field is **Server**. Enter the hostname of the Integration Server including an optional port number. If no port number is specified, port number defaults to "5555". The **Integration Server Authentication** can be passed with the **User** and **Password** fields.
 2. Optional settings are for secure connections. The **Truststore for HTTPS** contains all signed certificates and must be a valid truststore.
 3. The check box **Verify host name** checks that the hostname is entered in the stored certificate.
 4. When the Integration Server has **Client Authentication** enabled, you can specify your **Keystore** file and keystore **Password**.
 5. For managing Integration Server connections, see [Preferences](#).
- 2 Choose **Next** and continue with *Step 3: Select the Connection Type*.

Step 3: Select the Connection Type

☒ Create a new EntireX Adapter connection of type: **EntireX RPC Connection**

☐ Update Adapter Services or Listeners to an existing Integration Server connection:

List of Connections

| Connection Name | Package Name | Connection Type | Enabled |
|-------------------------------|--------------|------------------------|---------|
| Employees:EmployeesConnection | Employees | EntireX RPC Connection | Yes |

Total: 1

☒ Map Software AG IDL data types to String

☐ Create or Update REST resource

> To create a new connection

- 1 Select a connection type from the drop down list. Connection types are described under *EntireX Adapter Connections* in the EntireX Adapter documentation and *Introduction to the Integration Server Wrapper*.



Note: The list of connection types is filtered: connection types that require a license are only shown if a corresponding license file is available. Reliable RPC connections are only shown if all IDL programs contain only IN parameters. Also, if a server mapping file is available, only those connection types that support the interface type specified in the server mapping file are shown.

- 2 Click **Next** and continue with *Step 4: Define Adapter Services for an RPC Connection*.

Step 4: Define Adapter Services for an RPC Connection

Packages on Integration Server localhost:5555

- Default
- Employees**
- WmART
- WmARTEExtDC

Folder Name:

Connection Name:

RPC Connection to EntireX

Broker ID:

Server Address:

> To create a connection and related adapter services

- 1 Select an existing package or create a new package for the created objects.
- 2 Define a folder name. If the folder does not exist, it will be created.
- 3 Define a connection name.
- 4 Define the parameters of the connection type. For details, see *Connection Parameters for RPC Connections* in the EntireX Adapter documentation.

As a result, the folder will contain the connection and the adapter services (one for each IDL program). The name of a service is the same as the respective IDL program.

The default settings for the adapter services are:

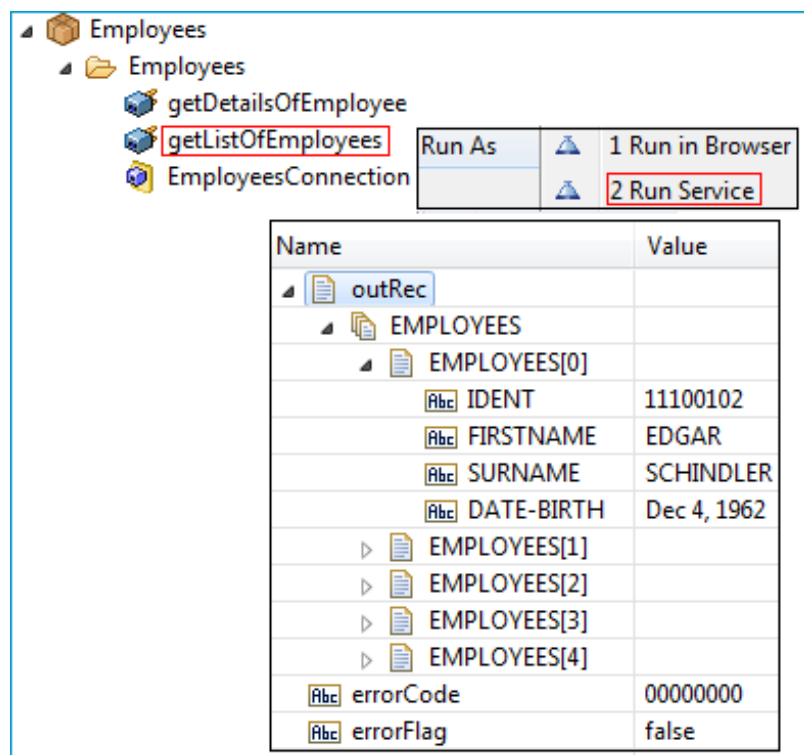
- the **Default** package; if not available, the first package
- the IDL library name for the **Folder Name**
- the IDL library name with the suffix "Connection" for the **Connection Name**



Note: When creating a connection, a package dependency is added such that the selected package depends on webMethods EntireX (the package `WmEntireX`) with the version currently used.

Task 3: Execute the Call from Integration Server to COBOL

From the **Service Development** perspective, refresh the package where the connection service was written, select the adapter service and use the service test to **Run Service**. This invokes the adapter service through the connector service.



The screenshot shows the 'Employees' package in the Service Development perspective. The 'getListOfEmployees' service is selected, and the 'Run Service' button is highlighted. Below, a table displays the response data.

| Name | Value |
|--------------|-------------|
| outRec | |
| EMPLOYEES | |
| EMPLOYEES[0] | |
| IDENT | 11100102 |
| FIRSTNAME | EDGAR |
| SURNAME | SCHINDLER |
| DATE-BIRTH | Dec 4, 1962 |
| EMPLOYEES[1] | |
| EMPLOYEES[2] | |
| EMPLOYEES[3] | |
| EMPLOYEES[4] | |
| errorCode | 00000000 |
| errorFlag | false |

In case of error or unexpected results:

- Check the Integration Server log, the EntireX Adapter log or the RPC logs.
- Use the IDL Tester as described under [Task 1](#) above.

11

Calling COBOL Large Buffer (Minimal Footprint using CICS Socket Listener) on z/OS CICS from Integration Server

| | |
|--|-----|
| ■ Introduction | 167 |
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| ■ Task 1: Extract the Interface of a COBOL Server | 169 |
| ■ Task 2: Generate the Connection and Adapter Services in Integration Server | 182 |
| ■ Task 3: Execute the Call from Integration Server to COBOL | 187 |

This scenario uses the tools IDL Extractor for COBOL and Integration Server Wrapper of the Designer.

Introduction



- ❶ Extract the interface of the COBOL server program.
- ❷ Generate connection and adapter services in Integration Server.
- ❸ Execute the call from Integration Server to the COBOL server program.

This scenario makes the following important assumptions:

For Task 1:

- You have a working COBOL Large Buffer server. For illustration and examples on such a server, see *CICS with DFHCOMMAREA Large Buffer Interface* under *Introduction to the IDL Extractor for COBOL*.
- You have access to the related COBOL sources and copybooks as files on your local machine. The minimum requirement is the `DATA DIVISION` of the interface.



For Tasks 2 and 3:

- To call the COBOL server program at runtime using the *EntireX CICS Socket Listener* connection method, you need to install the CICS Socket Listener within your CICS region: see *Preparing for CICS Socket Listener*. For configuration, see *Connection Parameters for CICS Socket Listener Connections*.



What do I need to Install for this Scenario?

- You have Software AG Designer installed with EntireX plugins and Service Development plugins.
 - For EntireX plugins, see *Designer > EntireX Designer* under *EntireX Installation Packages* in the General Installation documentation.
 - For Service Development plugins, refer to the Integration Server documentation.
- You have an Integration Server with EntireX Adapter installed. See *Adapters > EntireX Adapter* under *EntireX Installation Packages* in the General Installation documentation.
- The CICS Socket Listener, which is installed
 - together with the RPC Server for CICS, see *Installing the RPC Server for CICS*, or
 - separately, see *EntireX CICS® Socket Listener* in the z/OS Installation documentation

Task 1: Extract the Interface of a COBOL Server

- [Introduction](#)
- [Sample COBOL Server used in the Examples](#)
- [Extracting a COBOL Server - Fast-track Method](#)
- [Extracting a COBOL Server - Modern Method with User-defined Mapping](#)
- [Comparison Chart: Fast-track versus User-defined Mapping](#)
- [Testing the Extraction Results](#)

Introduction

Follow the instructions for extracting COBOL, see *Using the IDL Extractor for COBOL - Overview* and choose *Scenario I: Create New IDL and Server Mapping Files* if this is your first extraction. Learn how to invoke the IDL Extractor for COBOL, create a COBOL Extractor Environment and about the possibilities to select the COBOL source.

The extraction process creates the following EntireX metafiles:

- IDL file. A Software AG IDL file contains definitions of the interface between client and server. See *Software AG IDL File* in the IDL Editor documentation in the IDL Editor documentation.
- Server mapping file (optional). The mapping file is a Designer file with extension .cvm that contains COBOL-specific mapping information. See *Server Mapping Files for COBOL* in the Designer documentation.

Sample COBOL Server used in the Examples

The following COBOL server is used to illustrate the features of the IDL Extractor for COBOL. Imagine an existing COBOL server called `EMPLOYEE`. It implements the access logic for a `LIST` and `DETAILS` function to a database view `EMPLOYEE`:

```
IDENTIFICATION DIVISION.
PROGRAM-ID.    EMPLOYEE.
*****
*   Program Name      = EMPLOYEE
*   String Literal    = QUOTE
*****
01 DFHCOMMAREA.
02 OPERATION                                PIC X(1).
    88 OPERATION-LIST                        VALUE 'L'.
    88 OPERATION-DETAILS                    VALUE 'D'.
02 EMPLOYEE-ID                             PIC X(10).
02 EMPLOYEE-DETAILS.
    03 FIRSTNAME                           PIC X(20).
    03 SURNAME                             PIC X(20).
    03 DATE-BIRTH                          PIC X(12).
    03 DETAILS                             PIC X(100).
    03 FILLER REDEFINES DETAILS.
        04 ANNUAL-SALARY                    PACKED-DECIMAL PIC S9(9).
        04 VACATION                         PIC S9(2).
        04 LANGUAGE                         PIC X(3).
        04 FILLER                           PIC X(90).
02 EMPLOYEES-COUNT                         PIC 9(8) BINARY.
02 EMPLOYEES OCCURS 1 TO 99 DEPENDING ON EMPLOYEES-COUNT.
    03 IDENT                               PIC X(10).
    03 FIRSTNAME                           PIC X(20).
    03 SURNAME                             PIC X(20).
    03 DATE-BIRTH                          PIC X(12).
```

Two approaches for extracting the COBOL server are described below:

- **Fast-track**

Learn how EntireX helps you to connect the COBOL Server with quick results.

- **User-defined Mapping**

The following features are among those available with a user-defined mapping:

- **Shape the interface to your COBOL server**

You can minimize the interface by suppressing COBOL server fields or by providing constant values. Renaming interfaces allows you to specify a readable long name. These two features together - constants and renaming of interfaces - are most powerful when multiple interfaces are implemented in a single COBOL server. Each function of the COBOL server triggered by an operation code or function code can be modelled as a separate IS service.

■ Select alternative mappings

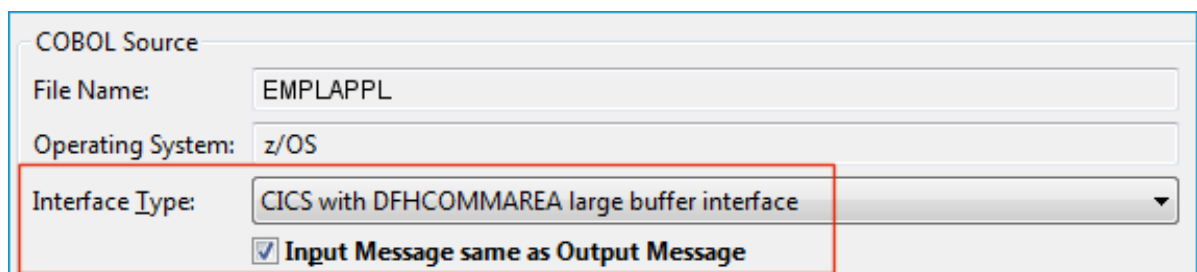
You can select alternative mappings for COBOL data items (REDEFINES, tables etc.) to enable scenarios with COBOL servers where data exchange is not fully described by the LINKAGE SECTION COBOL data items.

These approaches are described under [Fast-track Method](#) and [Modern Method](#) below.

Extracting a COBOL Server - Fast-track Method

➤ To extract the COBOL Server

- 1 Switch to the **EntireX** perspective.
- 2 Call the IDL Extractor for COBOL.
- 3 Set the correct interface type as described under *Step 4: Define the Extraction Settings and Start Extraction* under *Scenario I: Create New IDL and Server Mapping Files* in the IDL Extractor for COBOL documentation.



COBOL Source

File Name: EMPLAPPL

Operating System: z/OS

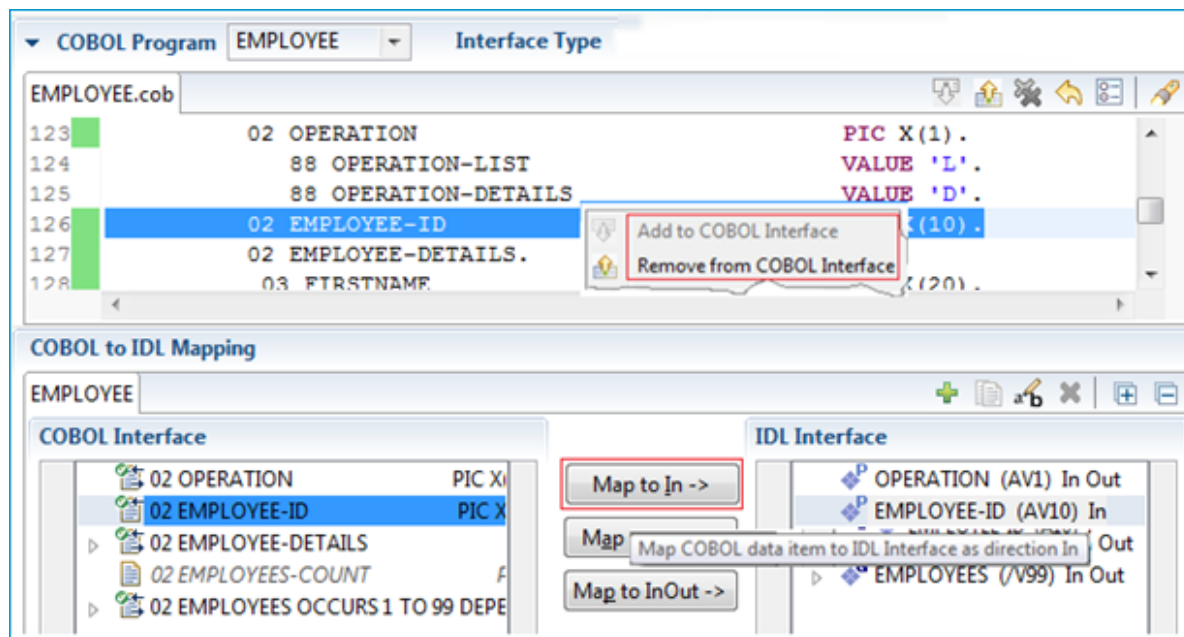
Interface Type: CICS with DFHCOMMAREA large buffer interface

☒ Input Message same as Output Message

- 4 Set the correct value for checkbox **Input Message same as Output Message**.
 - Check the checkbox if the COBOL data structure of the CICS input message is the same as the structure of the CICS output message, that is, there is one COBOL layout for both directions.
 - Clear the checkbox if the COBOL data structure of the CICS input message is different to the structure of the CICS output message, that is, the output overlays the input, which means there is a second COBOL layout for the reply.

For our example, check the check box, because the COBOL layout for input is the same as the COBOL layout for output.

- 5 Press **Next** to enter the COBOL Mapping Editor.



The purpose of the COBOL Mapping Editor is to map COBOL data items to IDL (Interface Definition Language) parameters. It consists of three main areas:

- The upper window pane is the COBOL program source.
- The window pane on the left-hand side is the COBOL interface, consisting of COBOL data items representing the parameters in your COBOL server program.
- The window pane on the right-hand side is the IDL interface consisting of IDL parameters.

What you select depends on check-box **Input Message same as Output Message**:

- If there is a single COBOL data structure of the CICS message for input and output - check box **Input Message same as Output Message** is checked - you select a single COBOL data structure in the COBOL Mapping Editor. This structure is used for COBOL input as well as for COBOL output. For more information in this case see *Mapping Editor User Interface* in the IDL Extractor for COBOL documentation.
- If there is a second COBOL data structure for the CICS output message - check box **Input Message same as Output Message** is cleared - you will select two COBOL data structures in the COBOL Mapping Editor. One is used for COBOL input and the other is for COBOL output. For more information in this case see *Mapping Editor User Interface* in the IDL Extractor for COBOL documentation.

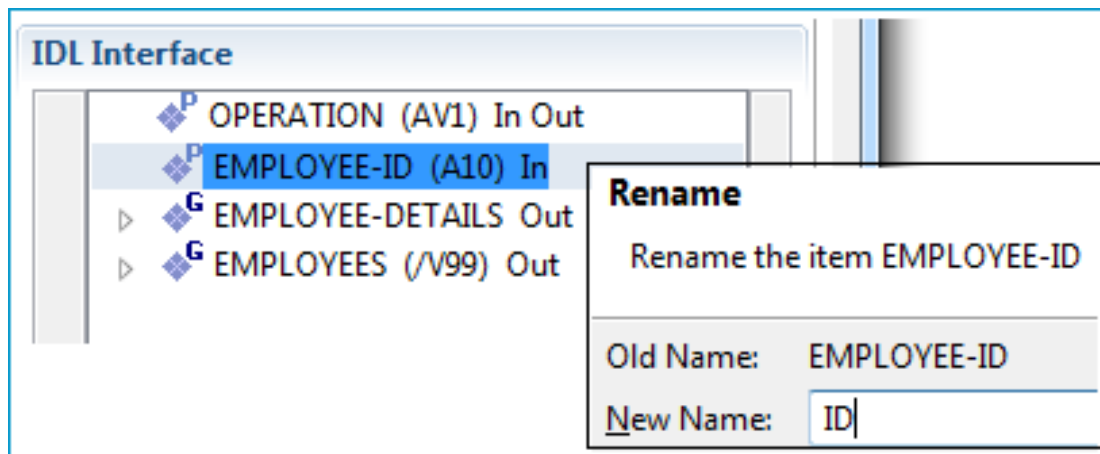
COBOL extraction is a two-step process:

- First, select the COBOL parameters using the **Add to** and **Remove from COBOL Interface** from the context menu on the COBOL data items in the upper window pane (COBOL source); in many situations the COBOL interface is detected by the Mapping Editor directly and you can omit this step.

- Then map the COBOL parameters to IDL directions using the **Map to In/Out/InOut** buttons. COBOL parameters do not have directions, they are always INOUT. This step can be left out for a quick test in non-production scenarios; for real production it is recommended to set IDL directions to reduce data transfer. You also have the option to assign a meaningful name to an IDL parameter if the original COBOL data item is not self-explanatory.

For our example:

- Set **Map to In** for COBOL data item `EMPLOYEE-ID` as IDL direction (see screenshot in previous step). For `EMPLOYEES-DETAILS` and `EMPLOYEES` perform the similar **Map to Out**.
- Use the function **Rename** from the context menu on the IDL parameters in the **IDL Interface** pane to rename COBOL parameter `EMPLOYEES-ID` to IDL parameter `ID`. Do the same for `EMPLOYEE-DETAILS`: Rename to `EMPLOYEE`.



- 6 Press **Finish**. The default extraction settings ensure you get useful results. The outcome is a Software AG IDL file (interface definition language), a Designer file with extension .idl:

```
library 'EMPLAPPL' is
program 'EMPLOYEE' is
  define data parameter
    1 OPERATION (AV1) In Out
    1 ID (AV10) In /* Original Name:EMPLOYEE-ID
    1 EMPLOYEE Out /* Original Name:EMPLOYEE-DETAILS
      2 FIRSTNAME (AV20)
      2 SURNAME (AV20)
      2 DATE-BIRTH (AV12)
      2 DETAILS (AV100)
    1 EMPLOYEES (/V99) Out
      2 IDENT (AV10)
      2 FIRSTNAME (AV20)
      2 SURNAME (AV20)
      2 DATE-BIRTH (AV12)
  end-define
```

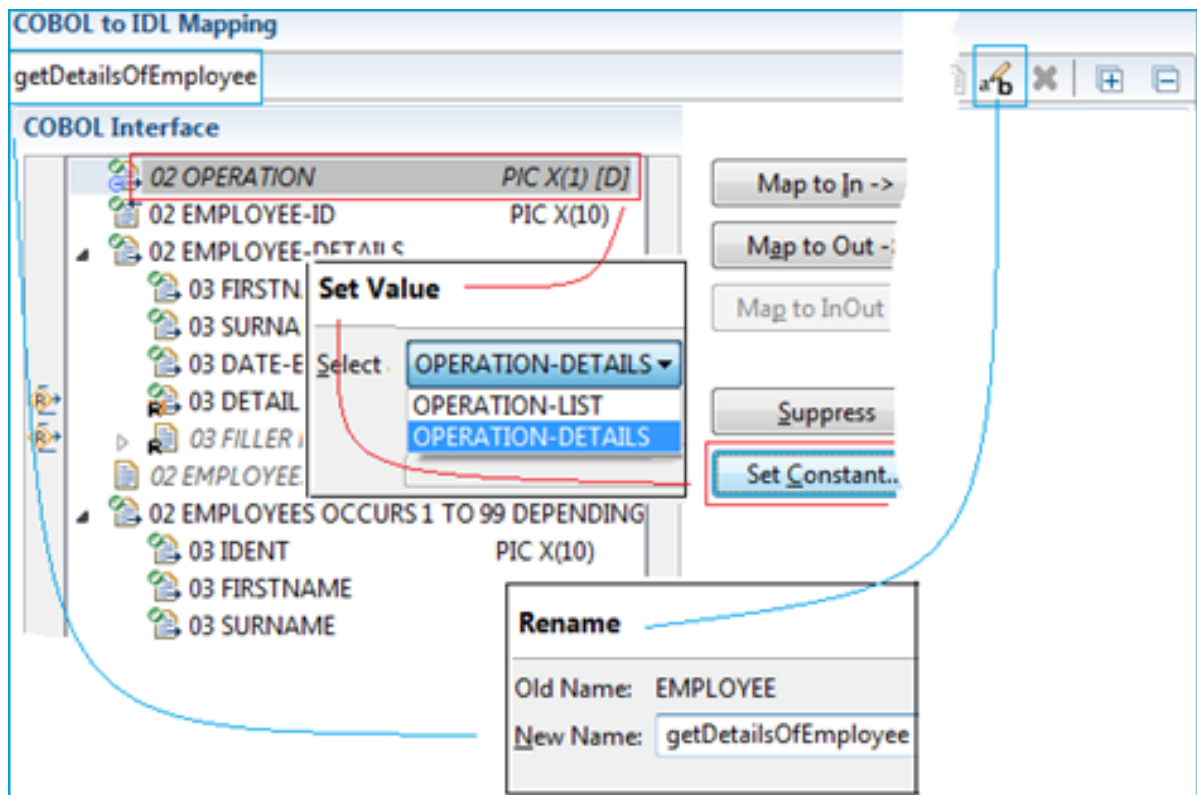
If required, a server mapping file with the same name as the IDL file but the extension .cvm may be generated too, for technical reasons. This file must always be stored together with the concomitant IDL file. For more information, see *Server Mapping Files for COBOL* in the Designer documentation. By default, the interface name `EMPLOYEE` is taken from the COBOL server program name.


Extracting a COBOL Server - Modern Method with User-defined Mapping

EntireX allows you to extract all implemented interfaces of the COBOL server separately. Instead of a large `EMPLOYEE` interface, separate interfaces `getListOfEmployees` and `getDetailsOfEmployee` are extracted. Each interface contains required parameters; obsolete parameters for an interface are suppressed, improving its usability.

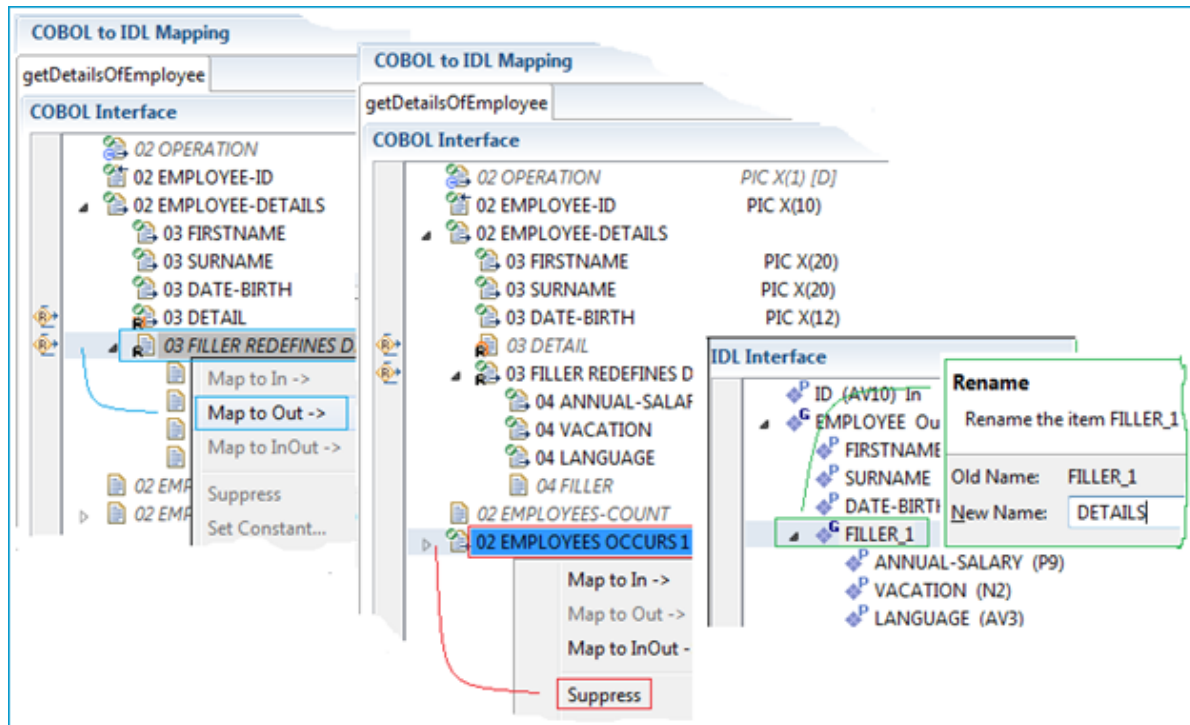
» To extract a COBOL server with a user-defined mapping

- 1 Shape `EMPLOYEE` to `getDetailsOfEmployee`:



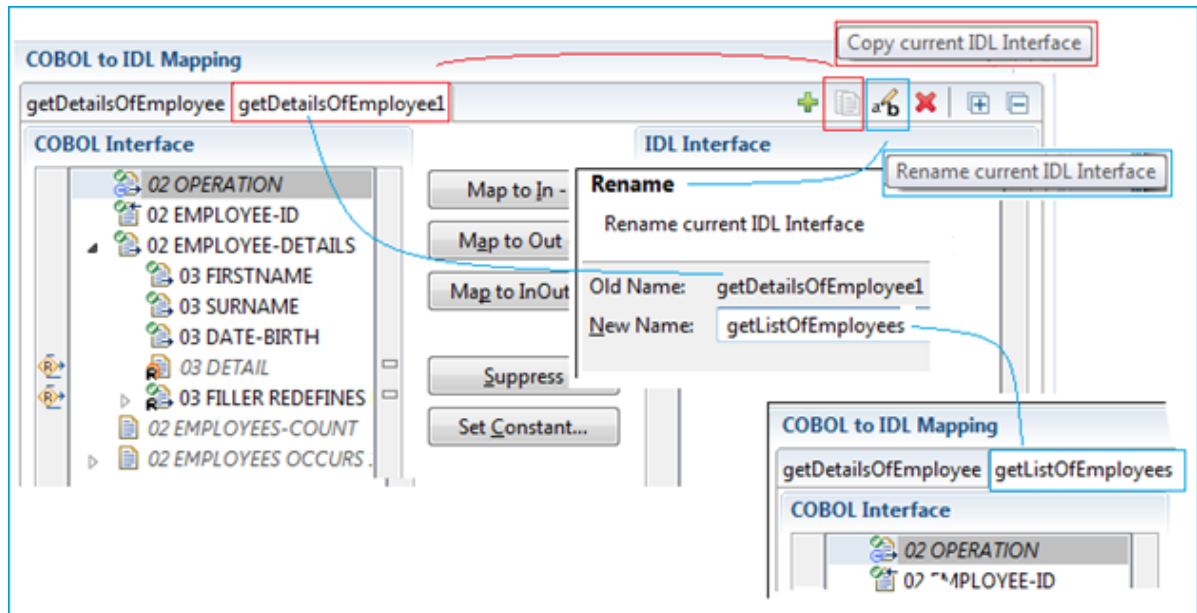
- Mark the `OPERATION` field in the **COBOL Interface** pane and press the **Set Constant** button. In the pop-up window, select `OPERATION-DETAILS` (red markers). The `OPERATION-DETAILS` value originates from COBOL level-88 data item (blue markers). If there is no COBOL level-88 enumeration type in the COBOL program defined, you can enter the function code manually in the pop-up window.
- By default the IDL interface gets the same name as your COBOL server: `EMPLOYEE`. Use the **Rename** button  from the toolbar of the COBOL Mapping Editor and change the IDL interface name to `getDetailsOfEmployee` (blue markers). This name is used as the IS service name later.

2 Continue shaping, making `getDetailsOfEmployee` easier to use:




- Use the context menu of the redefinition of the `DETAIL` field in the **COBOL Interface** pane, `FILLER REDEFINES DETAIL` and choose **Map to Out** (blue markers). A redefinition is a secondary layout (field types) of the same memory area. The redefinition contains more specific information (`ANNUAL-SALARY`, `VACATION`, etc.) than character buffer `DETAIL`. This is the reason why it is more useful in your interface.
- Use the context menu of `FILLER_1` in the IDL interface pane and rename `FILLER_1` to `DETAILS` (green markers) for a readable IS service field name later.
- The `DETAILS` function in the COBOL server does not make use of the `EMPLOYEES` field. Therefore you can leave it out of the interface: use the context menu of the `EMPLOYEES` field in the **COBOL Interface** pane and choose **Suppress** (red markers).


3 Shape `EMPLOYEE` to `getListOfEmployees` Function:



The COBOL Mapping Editor allows you to define multiple IDL interfaces to the same COBOL server:

- You create the additional IDL interface using the toolbar button **Copy current IDL interface**

 . (red markers). A new tab `getDetailsOfEmployee1` is created. The previously extracted `getDetailsOfEmployee` interface still exists in the first tab. Once you reactivate the first tab, you will see the interface of `getDetailsOfEmployee` again.

- Use the **Rename** button  from the toolbar of the COBOL Mapping Editor and change the IDL interface name to **getListOfEmployees** (blue markers). This name is used as the IS service name later.

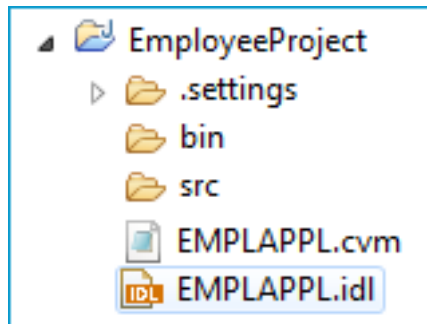
- **For the LIST function you need the OPERATION-LIST value in the OPERATION field:** Mark the OPERATION field in the **COBOL Interface** pane and press the **Set Constant** button. In the pop-up window, select OPERATION-LIST (similar to Step 1. above *Shape EMPLOYEE to getDetailsOfEmployee*; red markers).

- Use the context menu of the `EMPLOYEES` field in the **COBOL Interface** pane, `EMPLOYEES OCCURS 1 TO 99` and choose **Map to Out** (Similar to Step 2. above *Continue shaping, making `getDetailsOfEmployee` easier to use*; blue markers).

- Because the `EMPLOYEE` and `EMPLOYEE-DETAIL` fields are not used in the COBOL server `LIST` function, you leave them out in the IDL interface: use the context menu of `EMPLOYEE-DETAIL` field in the **COBOL Interface** pane and choose **Suppress** (similar to Step 2. above *Continue shaping, making `getDetailsOfEmployee` easier to use*; red markers). Do the same for the `EMPLOYEE-ID` field.

- 4 Press **Finish** to retrieve the extraction result in the form of a Software AG IDL file. At the same time, a server mapping file for COBOL (Designer file with extension .cvm) is created.

See *Server Mapping Files for COBOL* in the Designer documentation. The *Software AG IDL File* in the IDL Editor documentation describes the interfaces from the client point of view, while the server mapping file contains the mapping to the real COBOL server. Both of these files must be kept together and in sync, otherwise a call to the COBOL server may fail.



To summarize: We created two IDL interfaces. In the IDL file, these resulted in two IDL programs: `getListOfEmployees` and `getDetailsOfEmployee`. Both IDL programs were given readable names (Steps 1 and 3). Meaningful fields were kept, while superfluous fields were suppressed (Steps 1 and 3). The program `getDetailsOfEmployee` contains the redefined fields of parameter `DETAILS` (see below) mapped during extraction (Step 1).



Note: At runtime, the RPC client generated with the extracted interface will send data for the redesigned interfaces, while your COBOL server still expects `EMPLOYEE` data. The EntireX runtime transforms the incoming data stream from the RPC client, using the server mapping file.

```
program 'getDetailsOfEmployee' is
  define data parameter
    1 ID (AV10) In /* Original Name:EMPLOYEE-ID
    1 EMPLOYEE Out /* Original Name:EMPLOYEE-DETAILS
    2 FIRSTNAME (AV20)
    2 SURNAME (AV20)
    2 DATE-BIRTH (AV12)
    2 DETAILS /* Original Name:FILLER_1
    3 ANNUAL-SALARY (P9)
    3 VACATION (N2)
    3 LANGUAGE (AV3)
  end-define
  program 'getListOfEmployees' is
    1 EMPLOYEES (/V99) Out
    2 IDENT (AV10)
    2 FIRSTNAME (AV20)
    2 SURNAME (AV20)
    2 DATE-BIRTH (AV12)
  end-define
```

Comparison Chart: Fast-track versus User-defined Mapping

The following table highlights the differences when shaping an interface with a *user-defined mapping* compared with a *fast-path extraction*.

| | Interface Shaping with User-defined Mapping | Fast-path Extraction |
|----------------------------------|---|---|
| General | User-defined interface with dedicated mapping. For our example, the interfaces are small and tidy and more self-explanatory with long, readable interface names. They are easier to use with the hidden <code>OPERATION</code> field and the suppressed COBOL fields, which are not needed. | Automatic, quick result extraction with COBOL-like interfaces on IS. For our example, the IS interface <code>EMPLOYEE</code> matches exactly 1:1, field by field. |
| IS service(s) | Multiple small and handy IS services; each <code>OPERATION</code> code is mapped to a separate IS service. | One big IS service. |
| IS service name | Readable long name. | Short Subprogram name; up to 8 characters. |
| IS fields | Usage of Suppress and Set Constant reduces the message length. This keeps focus on relevant data items and keeps the client's interface clean. It may also improve performance. | The IS fields and COBOL server parameters match 1:1. As COBOL layout descriptions are sometimes used for many different purposes, irrelevant data items appear and clutter up the IS interface. |
| <code>OPERATION</code> parameter | Suppressed: the <code>OPERATION</code> parameter does not exist in the IS service as an IS field. | The <code>OPERATION</code> parameter exists in the IS service as an IS field and needs to be filled-in by the client endpoint. |
| <code>OPERATION</code> code | The <code>OPERATION</code> code is provided internally by EntireX runtime in the <code>OPERATION</code> field. | The <code>OPERATION</code> code needs to be specified in the IS service in the <code>OPERATION</code> field by the client endpoint. |
| <code>REDEFINE</code> parameters | Either the parameter that is redefined or one of its redefinitions is available as an IS field. | Only the parameter that is redefined is available as an IS field. Redefinitions of the parameter are not available as IS fields. |

A user-defined mapping enables you also to define alternative mappings for COBOL data items (`REDEFINES`, tables etc.). These enable scenarios with COBOL servers where data exchange is not fully described by the `LINKAGE SECTION` COBOL data items. For more information refer to the IDL Extractor for COBOL documentation:

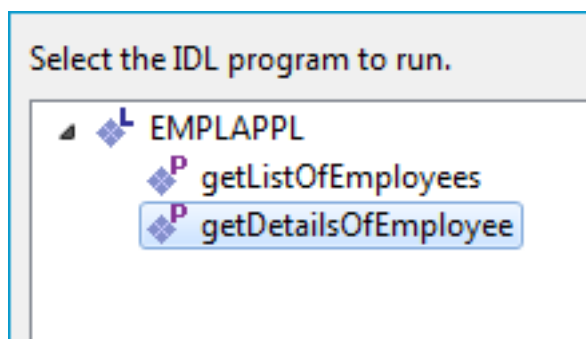
- *Mapping Editor IDL Interface Mapping Functions* if check-box **Input Message same as Output Message** was checked.
- *Mapping Editor IDL Interface Mapping Functions* if check-box **Input Message same as Output Message** was cleared.
- *User-defined Mapping*

Testing the Extraction Results

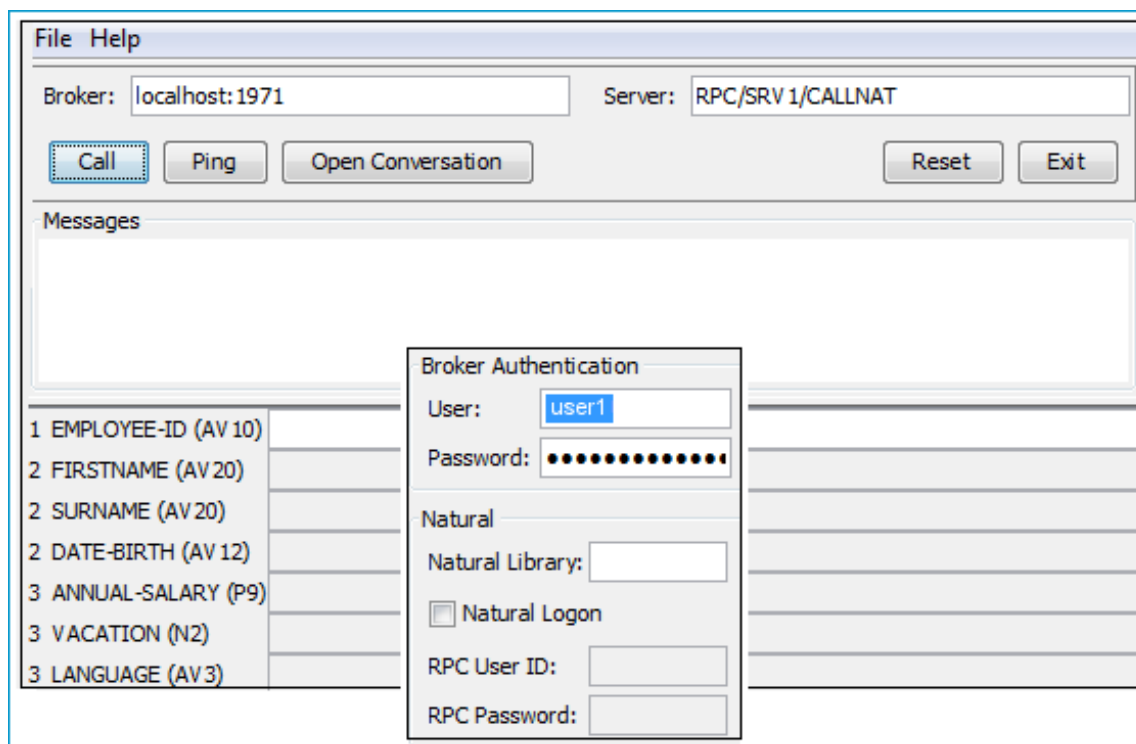
The following pictures use the extraction results described under [Extracting a COBOL Server - Modern Method with User-defined Mapping](#).

> To test the extraction results (optional)

- 1 You can test the results of the extraction operation and the COBOL server back end, using the EntireX IDL Tester. From the context menu of the IDL file in the Designer, choose **Software AG IDL Tester**.



- 2 Select `getDetailsOfEmployee`.



Note that the broker and server parameters contain the explicit route to call the server program, and you can optionally ping the connection from this client. With the **File > Options** dialog, you can set:

- **User** and **Password** for *broker* authentication
- **RPC User ID** and **RPC Password** for *server* authentication

See *EntireX IDL Tester* in the Designer documentation.

- 3 Check the Integration Server log, the EntireX Adapter log or the RPC logs. Applies to all connection methods.

Task 2: Generate the Connection and Adapter Services in Integration Server

This section describes your first steps to create a new Integration Server connection. This is described in more detail under *Using the Integration Server Wrapper*, for example working with existing Integration Server connections. This section covers the following topics:

- [Step 1: Start the Integration Server Wrapper Wizard](#)
- [Step 2: Create a New Integration Server Connection](#)
- [Step 3: Select the Connection Type](#)
- [Step 4: Define Adapter Services for a CICS Socket Listener Connection](#)

Step 1: Start the Integration Server Wrapper Wizard

➤ To start the Integration Server Wrapper wizard

- 1 In the context menu of a Software AG IDL file, choose **Integration Server > Generate web-Methods IS Connection**.

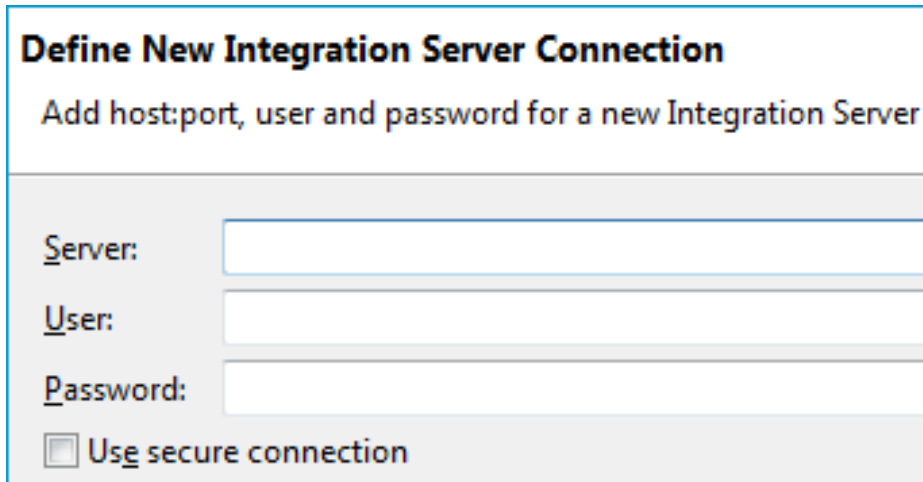
This starts the wizard with a list of existing Integration Server Wrapper connections.



Note: If the selected IDL file is not valid because of a syntax error, an error dialog comes up and the wizard does not start.

- 2 Continue with *Step 2: Create a New Integration Server Connection*.

Step 2: Create a New Integration Server Connection



The screenshot shows a web-based wizard titled "Define New Integration Server Connection". Below the title is a subtitle: "Add host:port, user and password for a new Integration Server". The form contains three input fields: "Server:", "User:", and "Password:". Below these fields is a checkbox labeled "Use secure connection".

➤ To create a new Integration Server connection

- 1 Define the new Integration Server connection on the wizard page.



Notes:

1. The only required field is **Server**. Enter the hostname of the Integration Server including an optional port number. If no port number is specified, port number defaults to "5555". The **Integration Server Authentication** can be passed with the **User** and **Password** fields.
 2. Optional settings are for secure connections. The **Truststore for HTTPS** contains all signed certificates and must be a valid truststore.
 3. The check box **Verify host name** checks that the hostname is entered in the stored certificate.
 4. When the Integration Server has **Client Authentication** enabled, you can specify your **Keystore** file and keystore **Password**.
 5. For managing Integration Server connections, see [Preferences](#).
- 2 Choose **Next** and continue with *Step 3: Select the Connection Type*.

Step 3: Select the Connection Type

☒ Create a new EntireX Adapter connection of type **CICS Socket Listener Connection**

☐ Update Adapter Services or Listeners to an existing Integration Server connection:

List of Connections

| Connection Name | Package Name | Connection Type | Enabled |
|-------------------------------|--------------|------------------------|---------|
| Employees:EmployeesConnection | Employees | EntireX RPC Connection | Yes |

Total: 1

☒ Map Software AG IDL data types to String

☐ Create or Update REST resource

➤ To create a new connection

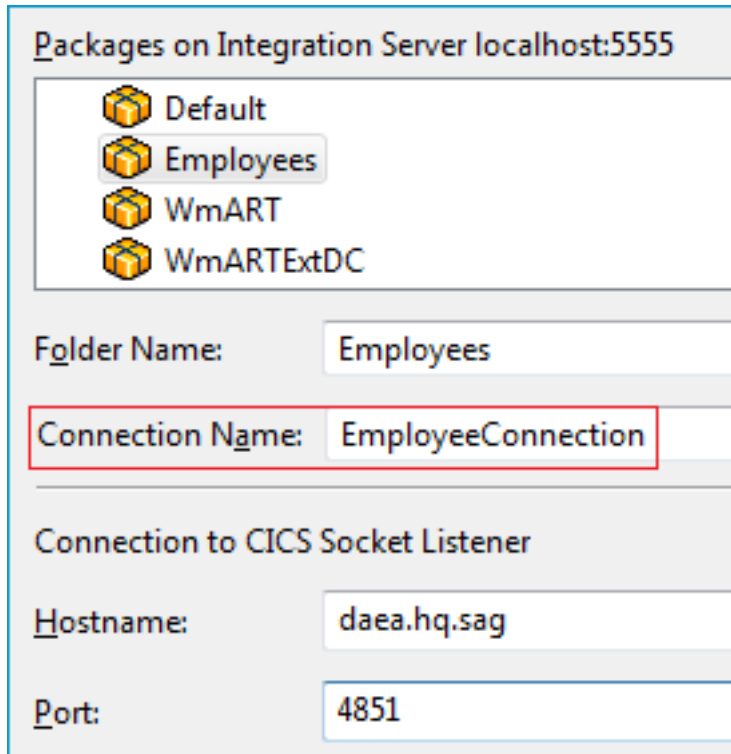
- 1 Select a connection type from the drop down list. Connection types are described under *EntireX Adapter Connections* in the EntireX Adapter documentation and *Introduction to the Integration Server Wrapper*.



Note: The list of connection types is filtered: connection types that require a license are only shown if a corresponding license file is available. Reliable RPC connections are only shown if all IDL programs contain only IN parameters. Also, if a server mapping file is available, only those connection types that support the interface type specified in the server mapping file are shown.

- 2 Click **Next** and continue with *Step 4: Define Adapter Services for a CICS Socket Listener Connection*.

Step 4: Define Adapter Services for a CICS Socket Listener Connection



Packages on Integration Server localhost:5555

- Default
- Employees
- WmART
- WmARTEExtDC

Folder Name: Employees

Connection Name: EmployeeConnection

Connection to CICS Socket Listener

Hostname: daea.hq.sag

Port: 4851


➤ To create a connection and related adapter services

- 1 Select a package for the created objects.
- 2 Define a folder name. If the folder does not exist, it will be created.
- 3 Define a connection name.
- 4 Define the parameters of the connection type. For details, see *Connection Parameters for CICS Socket Listener Connections* in the EntireX Adapter documentation.

As a result, the folder will contain the connection and the adapter services (one for each IDL program). The name of a service is the same as the respective IDL program.

The default settings for the adapter services are:

- the **Default** package; if not available, the first package
- the IDL library name for the **Folder Name**
- the IDL library name with the suffix "Connection" for the **Connection Name**

 **Note:** When creating a connection, a package dependency is added such that the selected package depends on webMethods EntireX (the package `WmEntireX`) with the version currently used.

;

Task 3: Execute the Call from Integration Server to COBOL

From the **Service Development** perspective, refresh the package where the connection service was written, select the adapter service and use the service test to **Run Service**. This invokes the adapter service through the connector service.

The screenshot shows the Service Development perspective. On the left, a tree view displays the 'Employees' package structure:

- Employees
 - Employees
 - getDetailsOfEmployee
 - getListOfEmployees (highlighted with a red box)
 - EmployeesConnection

To the right of the tree, a 'Run As' dialog box is open, showing two options:

- 1 Run in Browser
- 2 Run Service (highlighted with a red box)

Below the dialog, a table displays the output of the service test:

| Name | Value |
|--------------|-------------|
| outRec | |
| EMPLOYEES | |
| EMPLOYEES[0] | |
| IDENT | 11100102 |
| FIRSTNAME | EDGAR |
| SURNAME | SCHINDLER |
| DATE-BIRTH | Dec 4, 1962 |
| EMPLOYEES[1] | |
| EMPLOYEES[2] | |
| EMPLOYEES[3] | |
| EMPLOYEES[4] | |
| errorCode | 00000000 |
| errorFlag | false |

In case of error or unexpected results:

- Check the Integration Server log, the EntireX Adapter log or the RPC logs.
- Use the IDL Tester as described under [Task 1](#) above.

12

Calling COBOL Large Buffer on z/OS CICS from Integration Server

| | |
|--|-----|
| ■ Introduction | 191 |
| ■ What do I need to Install for this Scenario? | 192 |
| ■ Task 1: Extract the Interface of a COBOL Server | 193 |
| ■ Task 2: Generate the Connection and Adapter Services in Integration Server | 206 |
| ■ Task 3: Execute the Call from Integration Server to COBOL | 210 |

This scenario uses the tools IDL Extractor for COBOL and Integration Server Wrapper of the Designer.

Introduction



- ❶ Extract the interface of the COBOL server program.
- ❷ Generate connection and adapter services in Integration Server.
- ❸ Execute the call from Integration Server to the COBOL server program.

This scenario makes the following important assumptions:

For Task 1:

- You have a working COBOL Large Buffer server. For illustration and examples on such a server, see *CICS with DFHCOMMAREA Large Buffer Interface* under *Introduction to the IDL Extractor for COBOL*.
- You have access to the related COBOL sources and copybooks. The minimum requirement is the `DATA DIVISION` of the interface. The sources and copybooks must be stored either
 - *locally*, that is, on the same machine where the Designer is running



- or *remotely* in a PDS or CA Librarian data set and accessed via the *RPC Server for Batch*, and either EntireX Broker or Integration Server



For Tasks 2 and 3:

- You can call the COBOL server program at runtime using different methods:
 - For the *EntireX RPC* connection method you need
 - EntireX Broker on one of the supported platforms: z/OS | Linux | Windows | BS2000
 - the *RPC Server for CICS*



- For the *EntireX Direct RPC* connection method you need:
 - the *RPC Server for CICS*



See also *Direct RPC* in the EntireX Adapter documentation.

What do I need to Install for this Scenario?

- You have Software AG Designer installed with EntireX plugins and Service Development plugins.
 - For EntireX plugins, see *Designer > EntireX Designer* under *EntireX Installation Packages* in the General Installation documentation.
 - For Service Development plugins, refer to the Integration Server documentation.
- You have an Integration Server with EntireX Adapter installed. See *Adapters > EntireX Adapter* under *EntireX Installation Packages* in the General Installation documentation.
- You have an RPC Server for CICS installed. See *Installing the RPC Server for CICS* in the z/OS Installation documentation.
- Optionally you have an EntireX Broker installed.
 - For Linux and Windows, see *EntireX Broker* under *EntireX Installation Packages* in the General Installation documentation.
 - For z/OS, see *Installing EntireX Broker under z/OS* in the z/OS Installation documentation.
- Optionally, for remote extraction only (Task 1), you have an RPC Server for Batch installed. See *Installing the RPC Server for Batch* in the z/OS Installation documentation.

Task 1: Extract the Interface of a COBOL Server

- [Introduction](#)
- [Sample COBOL Server used in the Examples](#)
- [Extracting a COBOL Server - Fast-track Method](#)
- [Extracting a COBOL Server - Modern Method with User-defined Mapping](#)
- [Comparison Chart: Fast-track versus User-defined Mapping](#)
- [Testing the Extraction Results](#)

Introduction

Follow the instructions for extracting COBOL, see *Using the IDL Extractor for COBOL - Overview* and choose *Scenario I: Create New IDL and Server Mapping Files* if this is your first extraction. Learn how to invoke the IDL Extractor for COBOL, create a COBOL Extractor Environment and about the possibilities to select the COBOL source.

The extraction process creates the following EntireX metafiles:

- IDL file. A Software AG IDL file contains definitions of the interface between client and server. See *Software AG IDL File* in the IDL Editor documentation in the IDL Editor documentation.
- Server mapping file (optional). The mapping file is a Designer file with extension .cvm that contains COBOL-specific mapping information. See *Server Mapping Files for COBOL* in the Designer documentation.

Sample COBOL Server used in the Examples

The following COBOL server is used to illustrate the features of the IDL Extractor for COBOL. Imagine an existing COBOL server called `EMPLOYEE`. It implements the access logic for a `LIST` and `DETAILS` function to a database view `EMPLOYEE`:

```

IDENTIFICATION DIVISION.
    PROGRAM-ID.      EMPLOYEE.
*****
*   Program Name    = EMPLOYEE
*   String Literal  = QUOTE
*****
01 DFHCOMMAREA.
    02 OPERATION                                PIC X(1).
        88 OPERATION-LIST                      VALUE 'L'.
        88 OPERATION-DETAILS                   VALUE 'D'.
    02 EMPLOYEE-ID                              PIC X(10).
    02 EMPLOYEE-DETAILS.
        03 FIRSTNAME                          PIC X(20).
        03 SURNAME                            PIC X(20).
        03 DATE-BIRTH                         PIC X(12).
        03 DETAILS                            PIC X(100).
        03 FILLER REDEFINES DETAILS.
            04 ANNUAL-SALARY                    PACKED-DECIMAL PIC S9(9).
            04 VACATION                          PIC S9(2).
            04 LANGUAGE                          PIC X(3).
            04 FILLER                            PIC X(90).
    02 EMPLOYEES-COUNT                          PIC 9(8) BINARY.
    02 EMPLOYEES OCCURS 1 TO 99 DEPENDING ON EMPLOYEES-COUNT.
        03 IDENT                              PIC X(10).
        03 FIRSTNAME                          PIC X(20).
        03 SURNAME                            PIC X(20).
        03 DATE-BIRTH                         PIC X(12).

```

Two approaches for extracting the COBOL server are described below:

- **Fast-track**

Learn how EntireX helps you to connect the COBOL Server with quick results.

- **User-defined Mapping**

The following features are among those available with a user-defined mapping:

- **Shape the interface to your COBOL server**

You can minimize the interface by suppressing COBOL server fields or by providing constant values. Renaming interfaces allows you to specify a readable long name. These two features together - constants and renaming of interfaces - are most powerful when multiple interfaces are implemented in a single COBOL server. Each function of the COBOL server triggered by an operation code or function code can be modelled as a separate IS service.

■ Select alternative mappings

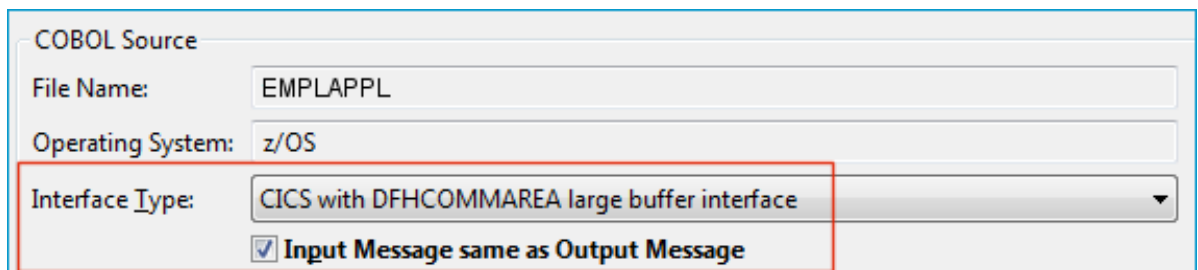
You can select alternative mappings for COBOL data items (REDEFINES, tables etc.) to enable scenarios with COBOL servers where data exchange is not fully described by the LINKAGE SECTION COBOL data items.

These approaches are described under *Fast-track Method* and *Modern Method* below.

Extracting a COBOL Server - Fast-track Method

➤ To extract the COBOL Server

- 1 Switch to the **EntireX** perspective.
- 2 Call the IDL Extractor for COBOL.
- 3 Set the correct interface type as described under *Step 4: Define the Extraction Settings and Start Extraction* under *Scenario I: Create New IDL and Server Mapping Files* in the IDL Extractor for COBOL documentation.



COBOL Source

File Name: EMPLAPPL

Operating System: z/OS

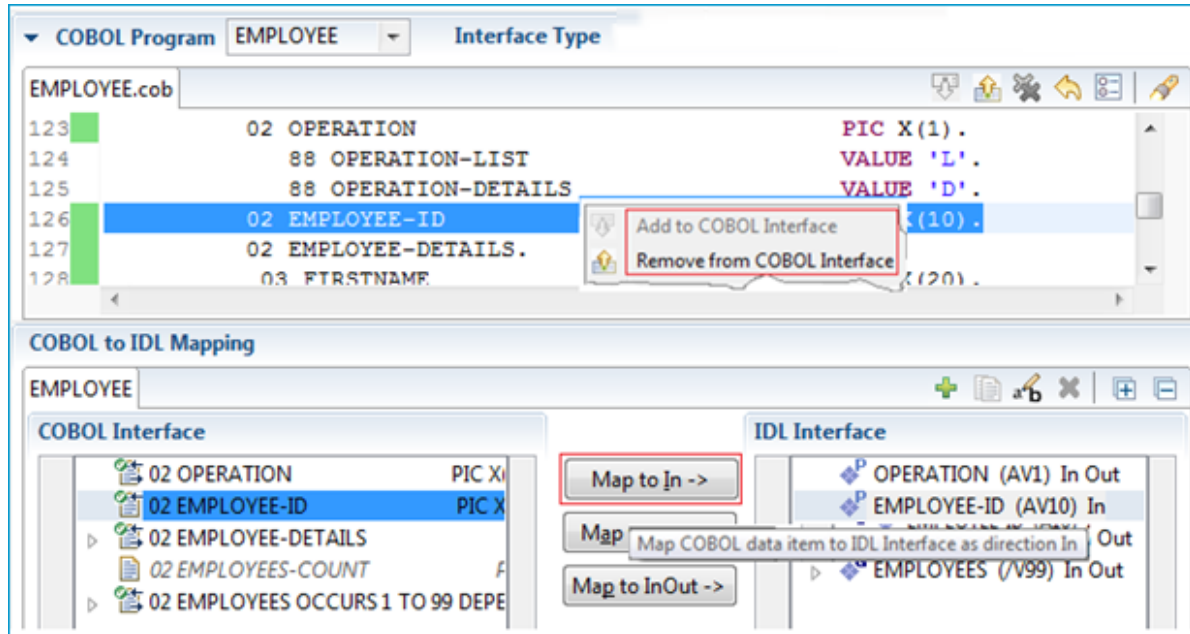
Interface Type: CICS with DFHCOMMAREA large buffer interface

☒ Input Message same as Output Message

- 4 Set the correct value for checkbox **Input Message same as Output Message**.
 - Check the checkbox if the COBOL data structure of the CICS input message is the same as the structure of the CICS output message, that is, there is one COBOL layout for both directions.
 - Clear the checkbox if the COBOL data structure of the CICS input message is different to the structure of the CICS output message, that is, the output overlays the input, which means there is a second COBOL layout for the reply.

For our example, check the check box, because the COBOL layout for input is the same as the COBOL layout for output.

- 5 Press **Next** to enter the COBOL Mapping Editor.



The purpose of the COBOL Mapping Editor is to map COBOL data items to IDL (Interface Definition Language) parameters. It consists of three main areas:

- The upper window pane is the COBOL program source.
- The window pane on the left-hand side is the COBOL interface, consisting of COBOL data items representing the parameters in your COBOL server program.
- The window pane on the right-hand side is the IDL interface consisting of IDL parameters.

What you select depends on check-box **Input Message same as Output Message**:

- If there is a single COBOL data structure of the CICS message for input and output - check box **Input Message same as Output Message** is checked - you select a single COBOL data structure in the COBOL Mapping Editor. This structure is used for COBOL input as well as for COBOL output. For more information in this case see *Mapping Editor User Interface* in the IDL Extractor for COBOL documentation.
- If there is a second COBOL data structure for the CICS output message - check box **Input Message same as Output Message** is cleared - you will select two COBOL data structures in the COBOL Mapping Editor. One is used for COBOL input and the other is for COBOL output. For more information in this case see *Mapping Editor User Interface* in the IDL Extractor for COBOL documentation.

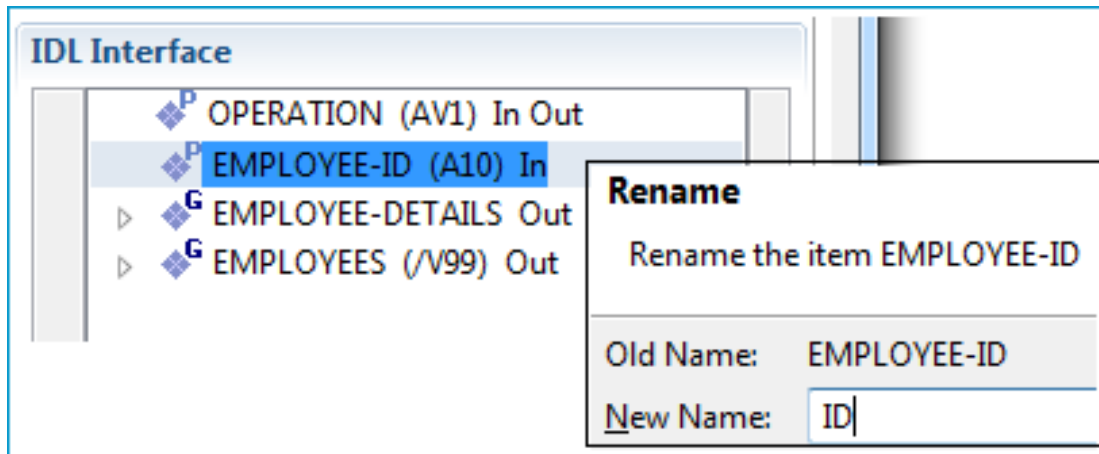
COBOL extraction is a two-step process:

- First, select the COBOL parameters using the **Add to** and **Remove from COBOL Interface** from the context menu on the COBOL data items in the upper window pane (COBOL source); in many situations the COBOL interface is detected by the Mapping Editor directly and you can omit this step.

- Then map the COBOL parameters to IDL directions using the **Map to In/Out/InOut** buttons. COBOL parameters do not have directions, they are always INOUT. This step can be left out for a quick test in non-production scenarios; for real production it is recommended to set IDL directions to reduce data transfer. You also have the option to assign a meaningful name to an IDL parameter if the original COBOL data item is not self-explanatory.

For our example:

- Set **Map to In** for COBOL data item `EMPLOYEE-ID` as IDL direction (see screenshot in previous step). For `EMPLOYEES-DETAILS` and `EMPLOYEES` perform the similar **Map to Out**.
- Use the function **Rename** from the context menu on the IDL parameters in the **IDL Interface** pane to rename COBOL parameter `EMPLOYEES-ID` to IDL parameter `ID`. Do the same for `EMPLOYEE-DETAILS`: Rename to `EMPLOYEE`.



- 6 Press **Finish**. The default extraction settings ensure you get useful results. The outcome is a Software AG IDL file (interface definition language), a Designer file with extension `.idl`:

```
library 'EMPLAPPL' is
program 'EMPLOYEE' is
  define data parameter
    1 OPERATION (AV1) In Out
    1 ID (AV10) In /* Original Name:EMPLOYEE-ID
    1 EMPLOYEE Out /* Original Name:EMPLOYEE-DETAILS
      2 FIRSTNAME (AV20)
      2 SURNAME (AV20)
      2 DATE-BIRTH (AV12)
      2 DETAILS (AV100)
    1 EMPLOYEES (/V99) Out
      2 IDENT (AV10)
      2 FIRSTNAME (AV20)
      2 SURNAME (AV20)
      2 DATE-BIRTH (AV12)
  end-define
```

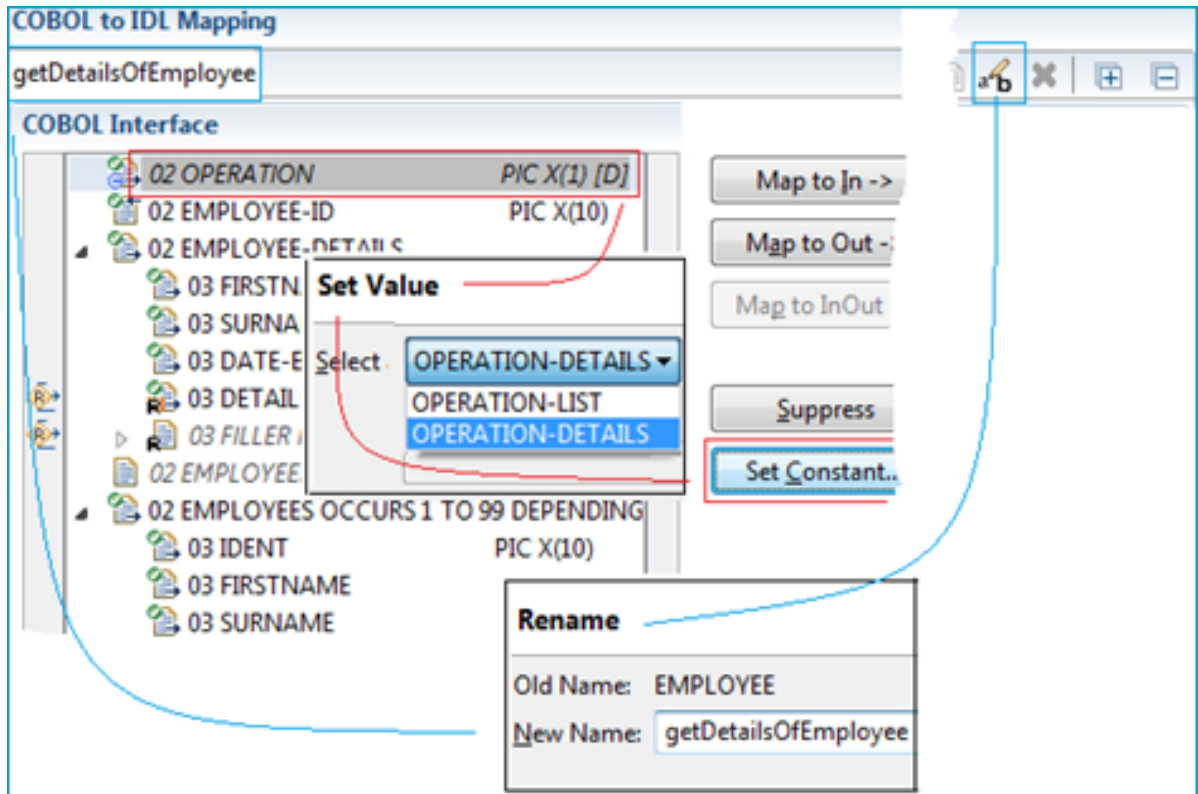
If required, a server mapping file with the same name as the IDL file but the extension .cvm may be generated too, for technical reasons. This file must always be stored together with the concomitant IDL file. For more information, see *Server Mapping Files for COBOL* in the Designer documentation. By default, the interface name `EMPLOYEE` is taken from the COBOL server program name.


Extracting a COBOL Server - Modern Method with User-defined Mapping

EntireX allows you to extract all implemented interfaces of the COBOL server separately. Instead of a large `EMPLOYEE` interface, separate interfaces `getListOfEmployees` and `getDetailsOfEmployee` are extracted. Each interface contains required parameters; obsolete parameters for an interface are suppressed, improving its usability.

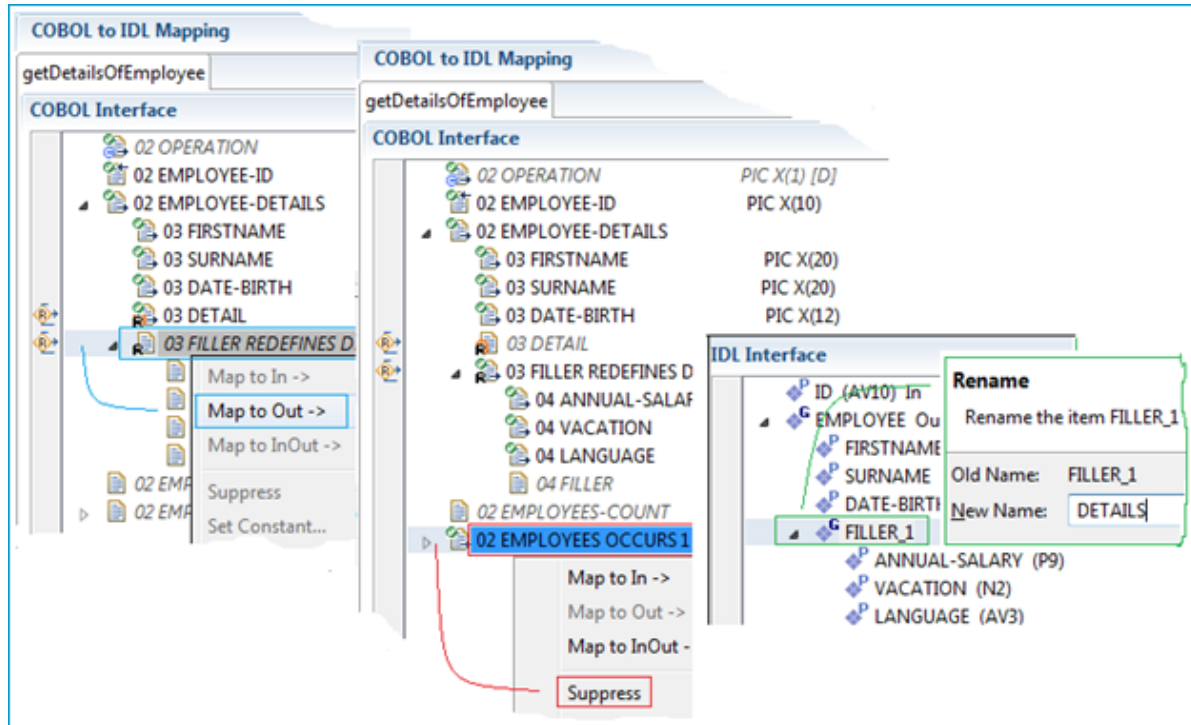
➤ To extract a COBOL server with a user-defined mapping

- 1 Shape `EMPLOYEE` to `getDetailsOfEmployee`:



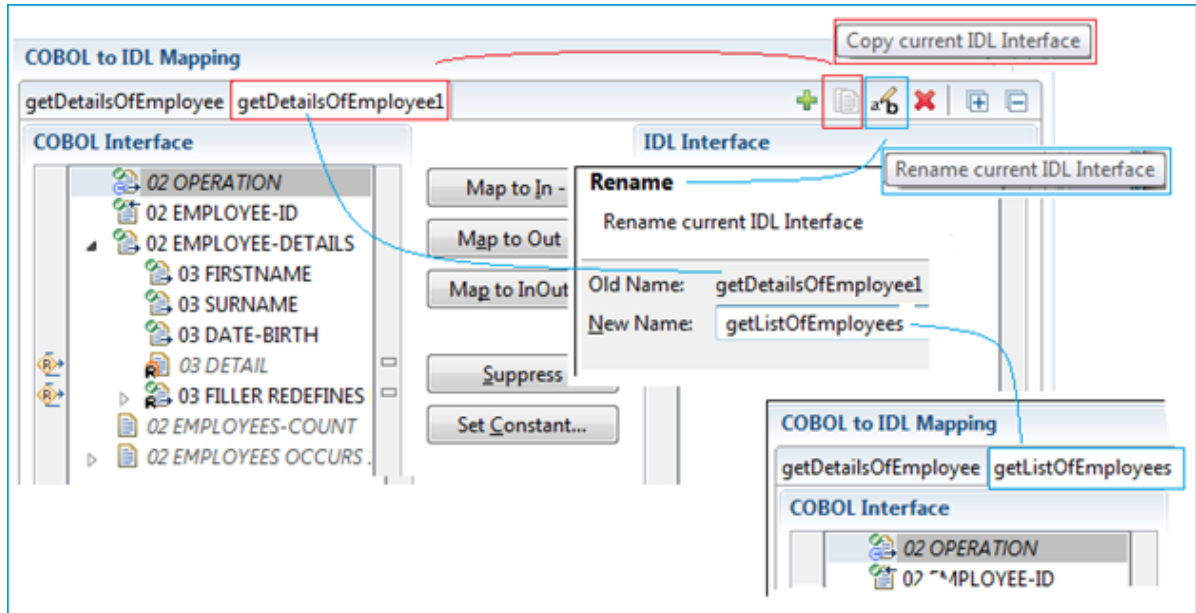
- Mark the `OPERATION` field in the **COBOL Interface** pane and press the **Set Constant** button. In the pop-up window, select `OPERATION-DETAILS` (red markers). The `OPERATION-DETAILS` value originates from COBOL level-88 data item (blue markers). If there is no COBOL level-88 enumeration type in the COBOL program defined, you can enter the function code manually in the pop-up window.
- By default the IDL interface gets the same name as your COBOL server: `EMPLOYEE`. Use the **Rename** button  from the toolbar of the COBOL Mapping Editor and change the IDL interface name to `getDetailsOfEmployee` (blue markers). This name is used as the IS service name later.

2 Continue shaping, making `getDetailsOfEmployee` easier to use:



- Use the context menu of the redefinition of the `DETAIL` field in the **COBOL Interface** pane, `FILLER REDEFINES DETAIL` and choose **Map to Out** (blue markers). A redefinition is a secondary layout (field types) of the same memory area. The redefinition contains more specific information (`ANNUAL-SALARY`, `VACATION`, etc.) than character buffer `DETAIL`. This is the reason why it is more useful in your interface.
- Use the context menu of `FILLER_1` in the IDL interface pane and rename `FILLER_1` to `DETAILS` (green markers) for a readable IS service field name later.
- The `DETAILS` function in the COBOL server does not make use of the `EMPLOYEES` field. Therefore you can leave it out of the interface: use the context menu of the `EMPLOYEES` field in the **COBOL Interface** pane and choose **Suppress** (red markers).

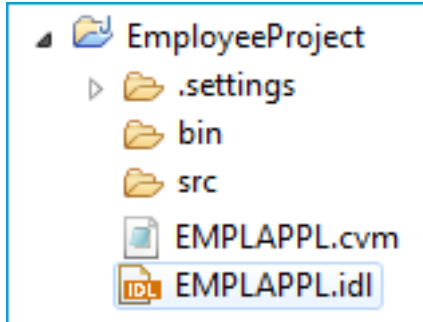
3 Shape `EMPLOYEE` to `getListOfEmployees` Function:



The COBOL Mapping Editor allows you to define multiple IDL interfaces to the same COBOL server:

- You create the additional IDL interface using the toolbar button **Copy current IDL interface** (red markers). A new tab `getDetailsOfEmployee1` is created. The previously extracted `getDetailsOfEmployee` interface still exists in the first tab. Once you reactivate the first tab, you will see the interface of `getDetailsOfEmployee` again.
 - Use the **Rename** button (blue markers) from the toolbar of the COBOL Mapping Editor and change the IDL interface name to `getListOfEmployees` (blue markers). This name is used as the IS service name later.
 - For the `LIST` function you need the `OPERATION-LIST` value in the `OPERATION` field: Mark the `OPERATION` field in the **COBOL Interface** pane and press the **Set Constant** button. In the pop-up window, select `OPERATION-LIST` (similar to Step 1. above *Shape `EMPLOYEE` to `getDetailsOfEmployee`*; red markers).
 - Use the context menu of the `EMPLOYEES` field in the **COBOL Interface** pane, `EMPLOYEES OCCURS 1 TO 99` and choose **Map to Out** (Similar to Step 2. above *Continue shaping, making `getDetailsOfEmployee` easier to use*; blue markers).
 - Because the `EMPLOYEE` and `EMPLOYEE-DETAIL` fields are not used in the COBOL server `LIST` function, you leave them out in the IDL interface: use the context menu of `EMPLOYEE-DETAIL` field in the **COBOL Interface** pane and choose **Suppress** (similar to Step 2. above *Continue shaping, making `getDetailsOfEmployee` easier to use*; red markers). Do the same for the `EMPLOYEE-ID` field.
- 4 Press **Finish** to retrieve the extraction result in the form of a Software AG IDL file. At the same time, a server mapping file for COBOL (Designer file with extension `.cvm`) is created.

See *Server Mapping Files for COBOL* in the Designer documentation. The *Software AG IDL File* in the IDL Editor documentation describes the interfaces from the client point of view, while the server mapping file contains the mapping to the real COBOL server. Both of these files must be kept together and in sync, otherwise a call to the COBOL server may fail.



To summarize: We created two IDL interfaces. In the IDL file, these resulted in two IDL programs: `getListOfEmployees` and `getDetailsOfEmployee`. Both IDL programs were given readable names (Steps 1 and 3). Meaningful fields were kept, while superfluous fields were suppressed (Steps 1 and 3). The program `getDetailsOfEmployee` contains the redefined fields of parameter `DETAILS` (see below) mapped during extraction (Step 1).



Note: At runtime, the RPC client generated with the extracted interface will send data for the redesigned interfaces, while your COBOL server still expects `EMPLOYEE` data. The EntireX runtime transforms the incoming data stream from the RPC client, using the server mapping file.

```

program 'getDetailsOfEmployee' is
  define data parameter
    1 ID (AV10) In /* Original Name:EMPLOYEE-ID
    1 EMPLOYEE Out /* Original Name:EMPLOYEE-DETAILS
    2 FIRSTNAME (AV20)
    2 SURNAME (AV20)
    2 DATE-BIRTH (AV12)
    2 DETAILS /* Original Name:FILLER_1
    3 ANNUAL-SALARY (P9)
    3 VACATION (N2)
    3 LANGUAGE (AV3)
  end-define
  program 'getListOfEmployees' is
    1 EMPLOYEES (/V99) Out
    2 IDENT (AV10)
    2 FIRSTNAME (AV20)
    2 SURNAME (AV20)
    2 DATE-BIRTH (AV12)
  end-define

```

Comparison Chart: Fast-track versus User-defined Mapping

The following table highlights the differences when shaping an interface with a *user-defined mapping* compared with a *fast-path extraction*.

| | Interface Shaping with User-defined Mapping | Fast-path Extraction |
|----------------------------------|---|---|
| General | User-defined interface with dedicated mapping. For our example, the interfaces are small and tidy and more self-explanatory with long, readable interface names. They are easier to use with the hidden <code>OPERATION</code> field and the suppressed COBOL fields, which are not needed. | Automatic, quick result extraction with COBOL-like interfaces on IS. For our example, the IS interface <code>EMPLOYEE</code> matches exactly 1:1, field by field. |
| IS service(s) | Multiple small and handy IS services; each <code>OPERATION</code> code is mapped to a separate IS service. | One big IS service. |
| IS service name | Readable long name. | Short Subprogram name; up to 8 characters. |
| IS fields | Usage of Suppress and Set Constant reduces the message length. This keeps focus on relevant data items and keeps the client's interface clean. It may also improve performance. | The IS fields and COBOL server parameters match 1:1. As COBOL layout descriptions are sometimes used for many different purposes, irrelevant data items appear and clutter up the IS interface. |
| <code>OPERATION</code> parameter | Suppressed: the <code>OPERATION</code> parameter does not exist in the IS service as an IS field. | The <code>OPERATION</code> parameter exists in the IS service as an IS field and needs to be filled-in by the client endpoint. |
| <code>OPERATION</code> code | The <code>OPERATION</code> code is provided internally by EntireX runtime in the <code>OPERATION</code> field. | The <code>OPERATION</code> code needs to be specified in the IS service in the <code>OPERATION</code> field by the client endpoint. |
| <code>REDEFINE</code> parameters | Either the parameter that is redefined or one of its redefinitions is available as an IS field. | Only the parameter that is redefined is available as an IS field. Redefinitions of the parameter are not available as IS fields. |

A user-defined mapping enables you also to define alternative mappings for COBOL data items (`REDEFINES`, tables etc.). These enable scenarios with COBOL servers where data exchange is not fully described by the `LINKAGE SECTION` COBOL data items. For more information refer to the IDL Extractor for COBOL documentation:

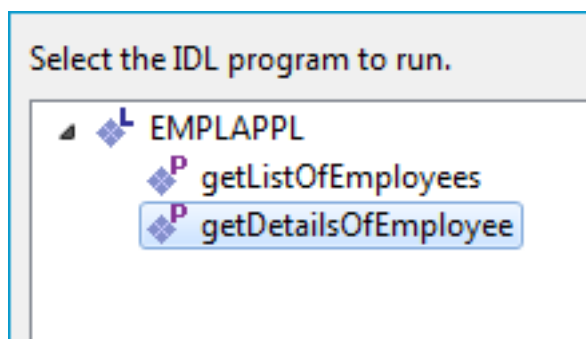
- *Mapping Editor IDL Interface Mapping Functions* if check-box **Input Message same as Output Message** was checked.
- *Mapping Editor IDL Interface Mapping Functions* if check-box **Input Message same as Output Message** was cleared.
- *User-defined Mapping*

Testing the Extraction Results

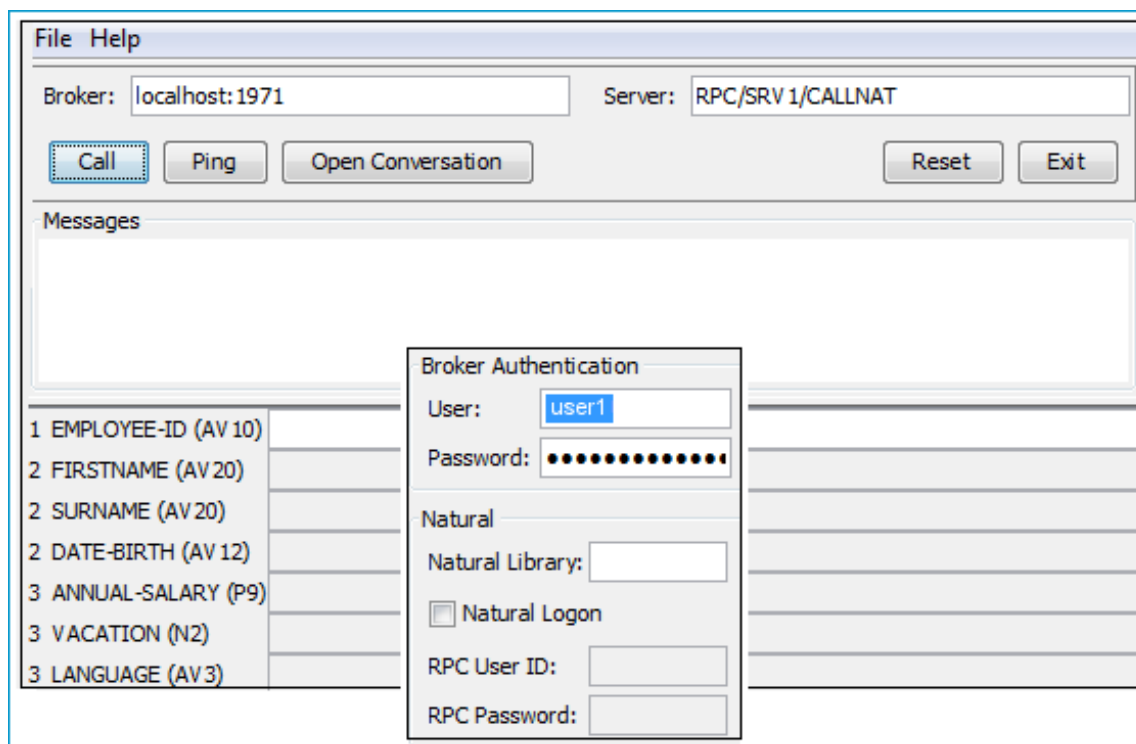
The following pictures use the extraction results described under *Extracting a COBOL Server - Modern Method with User-defined Mapping*.

> To test the extraction results (optional)

- 1 You can test the results of the extraction operation and the COBOL server back end, using the EntireX IDL Tester. From the context menu of the IDL file in the Designer, choose **Software AG IDL Tester**.



- 2 Select `getDetailsOfEmployee`.



Note that the broker and server parameters contain the explicit route to call the server program, and you can optionally ping the connection from this client. With the **File > Options** dialog, you can set:

- **User** and **Password** for *broker* authentication
- **RPC User ID** and **RPC Password** for *server* authentication

See *EntireX IDL Tester* in the Designer documentation.

- 3 Check the Integration Server log, the EntireX Adapter log or the RPC logs. Applies to all connection methods.

Task 2: Generate the Connection and Adapter Services in Integration Server

This section describes your first steps to create a new Integration Server connection. This is described in more detail under *Using the Integration Server Wrapper*, for example working with existing Integration Server connections. This section covers the following topics:

- [Step 1: Start the Integration Server Wrapper Wizard](#)
- [Step 2: Create a New Integration Server Connection](#)
- [Step 3: Select the Connection Type](#)
- [Step 4: Define Adapter Services for an RPC Connection](#)

Step 1: Start the Integration Server Wrapper Wizard

➤ To start the Integration Server Wrapper wizard

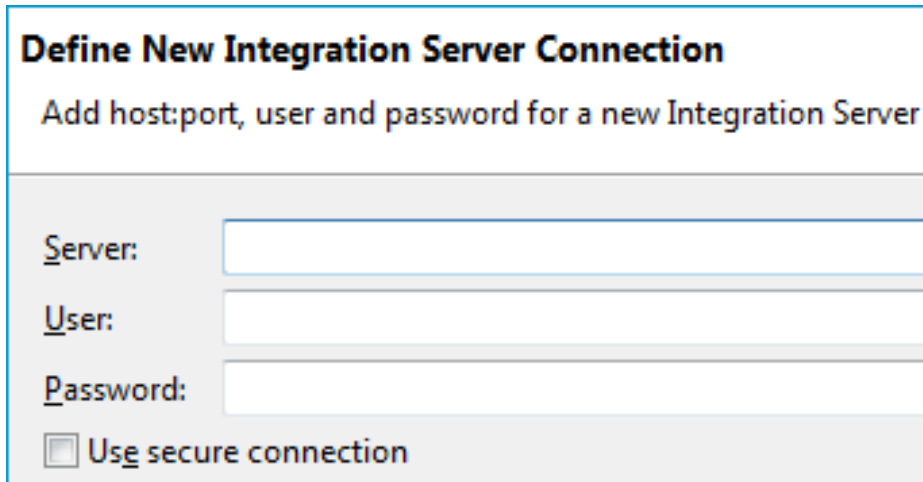
- 1 In the context menu of a Software AG IDL file, choose **Integration Server > Generate web-Methods IS Connection**.

This starts the wizard with a list of existing Integration Server Wrapper connections.



Note: If the selected IDL file is not valid because of a syntax error, an error dialog comes up and the wizard does not start.

- 2 Continue with *Step 2: Create a New Integration Server Connection*.

Step 2: Create a New Integration Server Connection

Define New Integration Server Connection

Add host:port, user and password for a new Integration Server

Server:

User:

Password:

☐ Use secure connection

> To create a new Integration Server connection

- 1 Define the new Integration Server connection on the wizard page.

**Notes:**

1. The only required field is **Server**. Enter the hostname of the Integration Server including an optional port number. If no port number is specified, port number defaults to "5555". The **Integration Server Authentication** can be passed with the **User** and **Password** fields.
 2. Optional settings are for secure connections. The **Truststore for HTTPS** contains all signed certificates and must be a valid truststore.
 3. The check box **Verify host name** checks that the hostname is entered in the stored certificate.
 4. When the Integration Server has **Client Authentication** enabled, you can specify your **Keystore** file and keystore **Password**.
 5. For managing Integration Server connections, see [Preferences](#).
- 2 Choose **Next** and continue with *Step 3: Select the Connection Type*.

Step 3: Select the Connection Type

☒ Create a new EntireX Adapter connection of type: **EntireX RPC Connection**

☐ Update Adapter Services or Listeners to an existing Integration Server connection:

List of Connections

| Connection Name | Package Name | Connection Type | Enabled |
|-------------------------------|--------------|------------------------|---------|
| Employees:EmployeesConnection | Employees | EntireX RPC Connection | Yes |

Total: 1

☒ Map Software AG IDL data types to String

☐ Create or Update REST resource

> To create a new connection

- 1 Select a connection type from the drop down list. Connection types are described under *EntireX Adapter Connections* in the EntireX Adapter documentation and *Introduction to the Integration Server Wrapper*.



Note: The list of connection types is filtered: connection types that require a license are only shown if a corresponding license file is available. Reliable RPC connections are only shown if all IDL programs contain only IN parameters. Also, if a server mapping file is available, only those connection types that support the interface type specified in the server mapping file are shown.

- 2 Click **Next** and continue with *Step 4: Define Adapter Services for an RPC Connection*.

Step 4: Define Adapter Services for an RPC Connection

Packages on Integration Server localhost:5555

- Default
- Employees**
- WmART
- WmARTEstDC

Folder Name:

Connection Name:

RPC Connection to EntireX

Broker ID:

Server Address:

> To create a connection and related adapter services

- 1 Select an existing package or create a new package for the created objects.
- 2 Define a folder name. If the folder does not exist, it will be created.
- 3 Define a connection name.
- 4 Define the parameters of the connection type. For details, see *Connection Parameters for RPC Connections* in the EntireX Adapter documentation.

As a result, the folder will contain the connection and the adapter services (one for each IDL program). The name of a service is the same as the respective IDL program.

The default settings for the adapter services are:

- the **Default** package; if not available, the first package
- the IDL library name for the **Folder Name**
- the IDL library name with the suffix "Connection" for the **Connection Name**



Note: When creating a connection, a package dependency is added such that the selected package depends on webMethods EntireX (the package `WmEntireX`) with the version currently used.

Task 3: Execute the Call from Integration Server to COBOL

From the **Service Development** perspective, refresh the package where the connection service was written, select the adapter service and use the service test to **Run Service**. This invokes the adapter service through the connector service.

The screenshot shows the 'Employees' package in the Service Development perspective. The 'getListOfEmployees' service is selected, and the 'Run As' dropdown is set to '2 Run Service'. Below the service list, the 'outRec' table displays the results of the service call.

| Name | Value |
|--------------|-------------|
| outRec | |
| EMPLOYEES | |
| EMPLOYEES[0] | |
| IDENT | 11100102 |
| FIRSTNAME | EDGAR |
| SURNAME | SCHINDLER |
| DATE-BIRTH | Dec 4, 1962 |
| EMPLOYEES[1] | |
| EMPLOYEES[2] | |
| EMPLOYEES[3] | |
| EMPLOYEES[4] | |
| errorCode | 00000000 |
| errorFlag | false |

In case of error or unexpected results:

- Check the Integration Server log, the EntireX Adapter log or the RPC logs.
- Use the IDL Tester as described under [Task 1](#) above.

13

Calling COBOL on z/OS Batch from Integration Server

| | |
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This scenario uses the tools IDL Extractor for COBOL and Integration Server Wrapper of the Designer.

Introduction



- ❶ Extract the interface of the COBOL server program.
- ❷ Generate connection and adapter services in Integration Server.
- ❸ Execute the call from Integration Server to the COBOL server program.

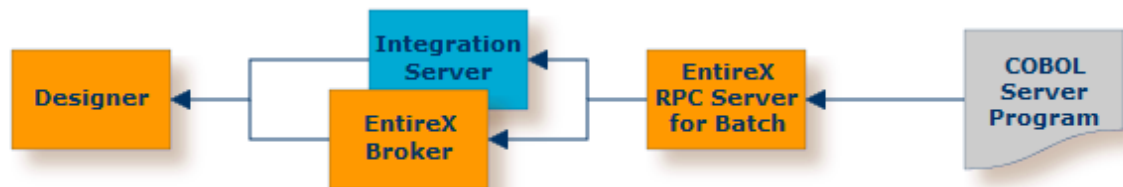
This scenario makes the following important assumptions:

For Task 1:

- You have a working COBOL batch server. For illustration and examples on such a server, see *Batch with Standard Linkage Calling Convention* under *Introduction to the IDL Extractor for COBOL*.
- You have access to the related COBOL sources and copybooks. The minimum requirement is the `DATA DIVISION` of the interface. The sources and copybooks must be stored either
 - *locally*, that is, on the same machine where the Designer is running



- or *remotely* in a PDS or CA Librarian data set and accessed via the *RPC Server for Batch*, and either EntireX Broker or Integration Server



For Tasks 2 and 3:

- You can call the COBOL server program at runtime using different methods:
 - For the *EntireX RPC* connection method you need
 - EntireX Broker on one of the supported platforms: z/OS | Linux | Windows | BS2000
 - The *RPC Server for Batch*



- For the *EntireX Direct RPC* connection method you need:
 - the *RPC Server for Batch*



See also *Direct RPC* in the EntireX Adapter documentation.

What do I need to Install for this Scenario?

- You have Software AG Designer installed with EntireX plugins and Service Development plugins.
 - For EntireX plugins, see *Designer > EntireX Designer* under *EntireX Installation Packages* in the General Installation documentation.
 - For Service Development plugins, refer to the Integration Server documentation.
- You have an Integration Server with EntireX Adapter installed. See *Adapters > EntireX Adapter* under *EntireX Installation Packages* in the General Installation documentation.
- You have an RPC Server for Batch installed. See *Installing the RPC Server for Batch* in the z/OS Installation documentation.
- Optionally, for remote extraction (Task 1) or RPC Connection method (Task 2 and 3), you have an EntireX Broker installed.
 - For Linux and Windows, see *EntireX Broker* under *EntireX Installation Packages* in the General Installation documentation.
 - For z/OS, see *Installing EntireX Broker under z/OS* in the z/OS Installation documentation.

Task 1: Extract the Interface of a COBOL Server

- [Introduction](#)
- [Sample COBOL Server used in the Examples](#)
- [Extracting a COBOL Server - Fast-track Method](#)
- [Extracting a COBOL Server - Modern Method with User-defined Mapping](#)
- [Comparison Chart: Fast-track versus User-defined Mapping](#)
- [Testing the Extraction Results](#)

Introduction

Follow the instructions for extracting COBOL, see *Using the IDL Extractor for COBOL - Overview* and choose *Scenario I: Create New IDL and Server Mapping Files* if this is your first extraction. Learn how to invoke the IDL Extractor for COBOL, create a COBOL Extractor Environment and about the possibilities to select the COBOL source.

The extraction process creates the following EntireX metafiles:

- IDL file. A Software AG IDL file contains definitions of the interface between client and server. See *Software AG IDL File* in the IDL Editor documentation in the IDL Editor documentation.
- Server mapping file (optional). The mapping file is a Designer file with extension .cvm that contains COBOL-specific mapping information. See *Server Mapping Files for COBOL* in the Designer documentation.

Sample COBOL Server used in the Examples

The following COBOL server is used to illustrate the features of the IDL Extractor for COBOL. Imagine an existing COBOL server called `EMPLOYEE`. It implements the access logic for a `LIST` and `DETAILS` function to a database view `EMPLOYEE`:

```

IDENTIFICATION DIVISION.
    PROGRAM-ID.      EMPLOYEE.
*****
*   Program Name    = EMPLOYEE
*   String Literal  = QUOTE
*****
01 DFHCOMMAREA.
    02 OPERATION                                PIC X(1).
        88 OPERATION-LIST                      VALUE 'L'.
        88 OPERATION-DETAILS                  VALUE 'D'.
    02 EMPLOYEE-ID                              PIC X(10).
    02 EMPLOYEE-DETAILS.
        03 FIRSTNAME                          PIC X(20).
        03 SURNAME                          PIC X(20).
        03 DATE-BIRTH                        PIC X(12).
        03 DETAILS                          PIC X(100).
        03 FILLER REDEFINES DETAILS.
            04 ANNUAL-SALARY                PACKED-DECIMAL PIC S9(9).
            04 VACATION                      PIC S9(2).
            04 LANGUAGE                      PIC X(3).
            04 FILLER                      PIC X(90).
    02 EMPLOYEES-COUNT                          PIC 9(8) BINARY.
    02 EMPLOYEES OCCURS 1 TO 99 DEPENDING ON EMPLOYEES-COUNT.
        03 IDENT                            PIC X(10).
        03 FIRSTNAME                        PIC X(20).
        03 SURNAME                          PIC X(20).
        03 DATE-BIRTH                      PIC X(12).

```

Two approaches for extracting the COBOL server are described below:

- **Fast-track**

Learn how EntireX helps you to connect the COBOL Server with quick results.

- **User-defined Mapping**

The following features are among those available with a user-defined mapping:

- **Shape the interface to your COBOL server**

You can minimize the interface by suppressing COBOL server fields or by providing constant values. Renaming interfaces allows you to specify a readable long name. These two features together - constants and renaming of interfaces - are most powerful when multiple interfaces are implemented in a single COBOL server. Each function of the COBOL server triggered by an operation code or function code can be modelled as a separate IS service.

■ Select alternative mappings

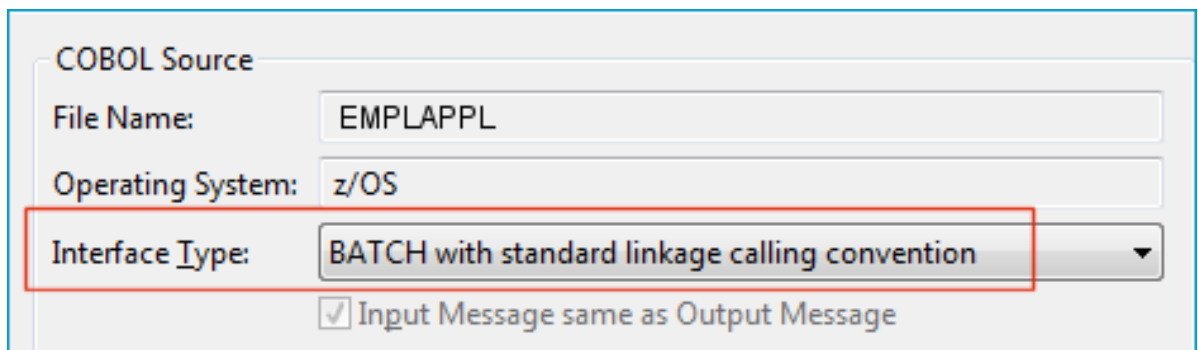
You can select alternative mappings for COBOL data items (REDEFINES, tables etc.) to enable scenarios with COBOL servers where data exchange is not fully described by the LINKAGE SECTION COBOL data items.

These approaches are described under *Fast-track Method* and *Modern Method* below.

Extracting a COBOL Server - Fast-track Method

➤ To extract the COBOL Server

- 1 Switch to the **EntireX** perspective.
- 2 Call the IDL Extractor for COBOL.
- 3 Set the correct interface type as described under *Step 4: Define the Extraction Settings and Start Extraction* under *Scenario I: Create New IDL and Server Mapping Files* in the IDL Extractor for COBOL documentation.



COBOL Source

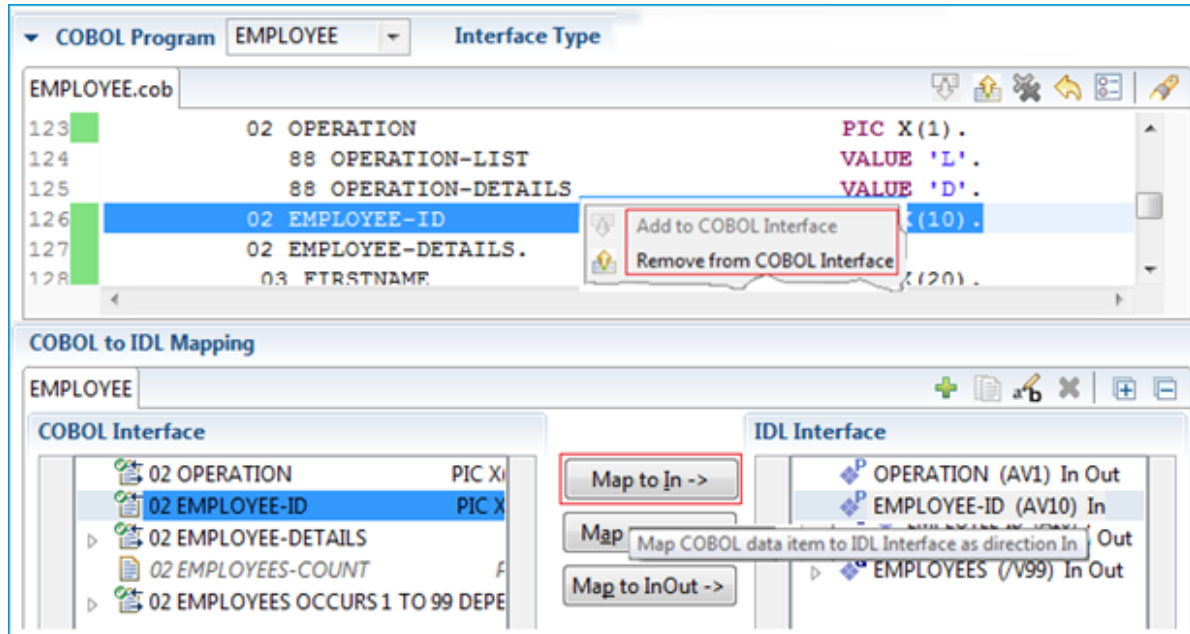
File Name: EMPLAPPL

Operating System: z/OS

Interface Type: BATCH with standard linkage calling convention ▼

☒ Input Message same as Output Message

- 4 Press **Next** to enter the COBOL Mapping Editor.



The purpose of the COBOL Mapping Editor is to map COBOL data items to IDL (Interface Definition Language) parameters. It consists of three main areas:

- The upper window pane is the COBOL program source.
- The window pane on the left-hand side is the COBOL interface, consisting of COBOL data items representing the parameters in your COBOL server program.
- The window pane on the right-hand side is the IDL interface consisting of IDL parameters.

For more information see *Mapping Editor User Interface* in the IDL Extractor for COBOL documentation.

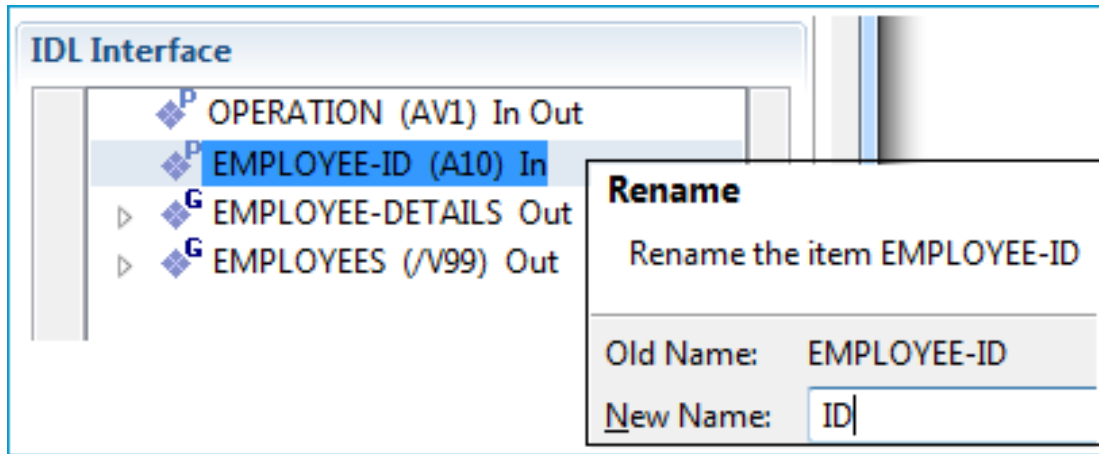
COBOL extraction is a two-step process:

- First, select the COBOL parameters using the **Add to** and **Remove from COBOL Interface** from the context menu on the COBOL data items in the upper window pane (COBOL source); in many situations the COBOL interface is detected by the Mapping Editor directly and you can omit this step.
- Then map the COBOL parameters to IDL directions using the **Map to In/Out/InOut** buttons. COBOL parameters do not have directions, they are always INOUT. This step can be left out for a quick test in non-production scenarios; for real production it is recommended to set IDL directions to reduce data transfer. You also have the option to assign a meaningful name to an IDL parameter if the original COBOL data item is not self-explanatory.

For our example:

- Set **Map to In** for COBOL data item `EMPLOYEE-ID` as IDL direction (see screenshot in previous step). For `EMPLOYEES-DETAILS` and `EMPLOYEES` perform the similar **Map to Out**.

- Use the function **Rename** from the context menu on the IDL parameters in the **IDL Interface** pane to rename COBOL parameter `EMPLOYEE-ID` to IDL parameter `ID`. Do the same for `EMPLOYEE-DETAILS`: Rename to `EMPLOYEE`.



- 5 Press **Finish**. The default extraction settings ensure you get useful results. The outcome is a Software AG IDL file (interface definition language), a Designer file with extension `.idl`:

```
library 'EMPLAPPL' is
program 'EMPLOYEE' is
  define data parameter
    1 OPERATION (AV1) In Out
    1 ID (AV10) In /* Original Name:EMPLOYEE-ID
    1 EMPLOYEE Out /* Original Name:EMPLOYEE-DETAILS
      2 FIRSTNAME (AV20)
      2 SURNAME (AV20)
      2 DATE-BIRTH (AV12)
      2 DETAILS (AV100)
    1 EMPLOYEES (/V99) Out
      2 IDENT (AV10)
      2 FIRSTNAME (AV20)
      2 SURNAME (AV20)
      2 DATE-BIRTH (AV12)
  end-define
```

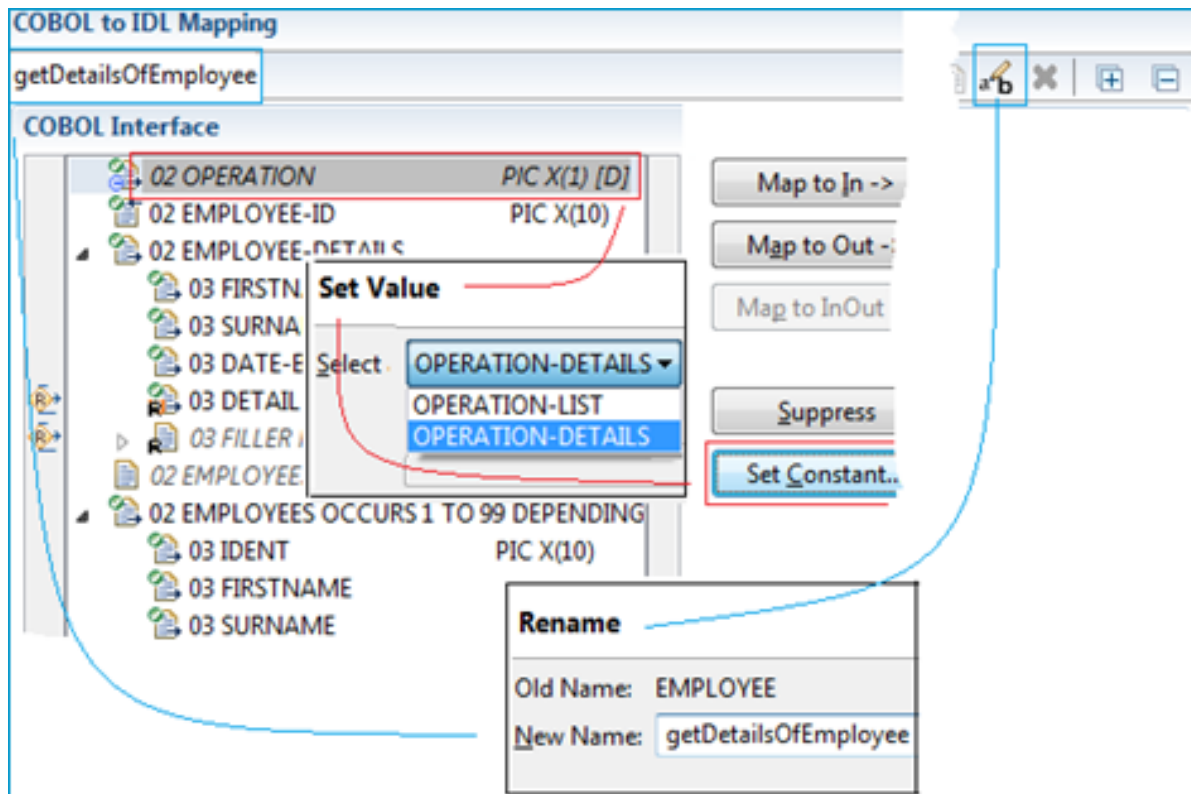
If required, a server mapping file with the same name as the IDL file but the extension `.cvm` may be generated too, for technical reasons. This file must always be stored together with the concomitant IDL file. For more information, see *Server Mapping Files for COBOL* in the Designer documentation. By default, the interface name `EMPLOYEE` is taken from the COBOL server program name.


Extracting a COBOL Server - Modern Method with User-defined Mapping

EntireX allows you to extract all implemented interfaces of the COBOL server separately. Instead of a large `EMPLOYEE` interface, separate interfaces `getListOfEmployees` and `getDetailsOfEmployee` are extracted. Each interface contains required parameters; obsolete parameters for an interface are suppressed, improving its usability.

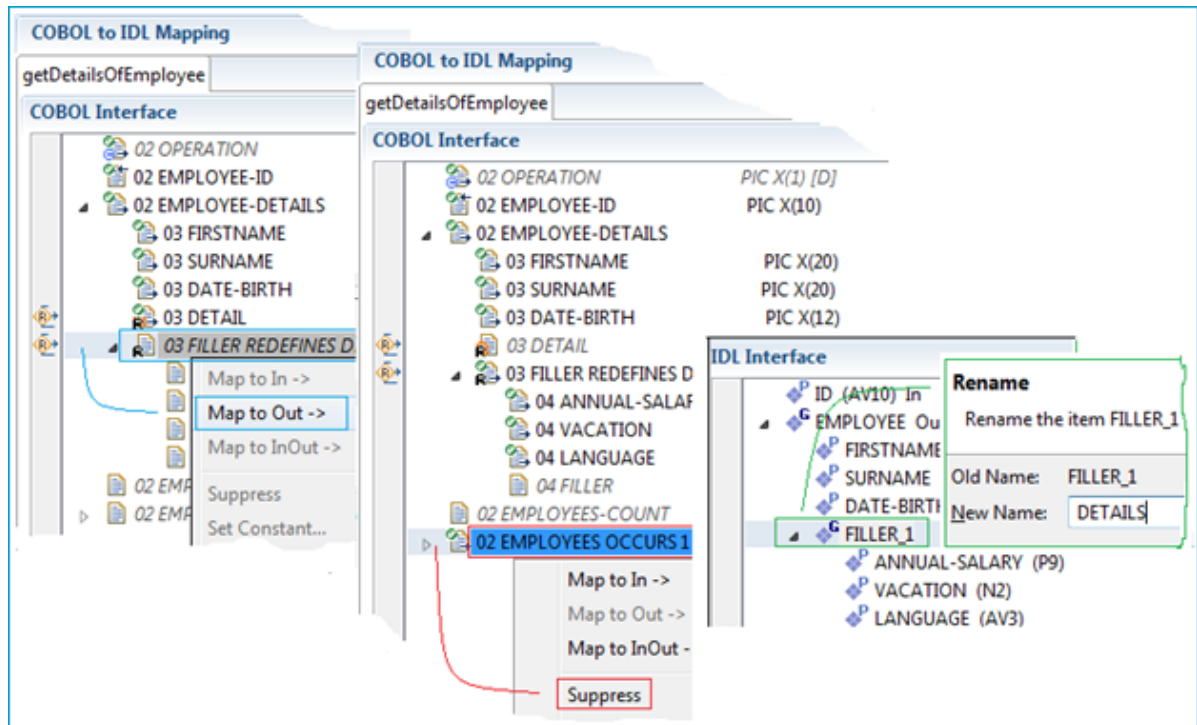
➤ To extract a COBOL server with a user-defined mapping

- 1 Shape `EMPLOYEE` to `getDetailsOfEmployee`:



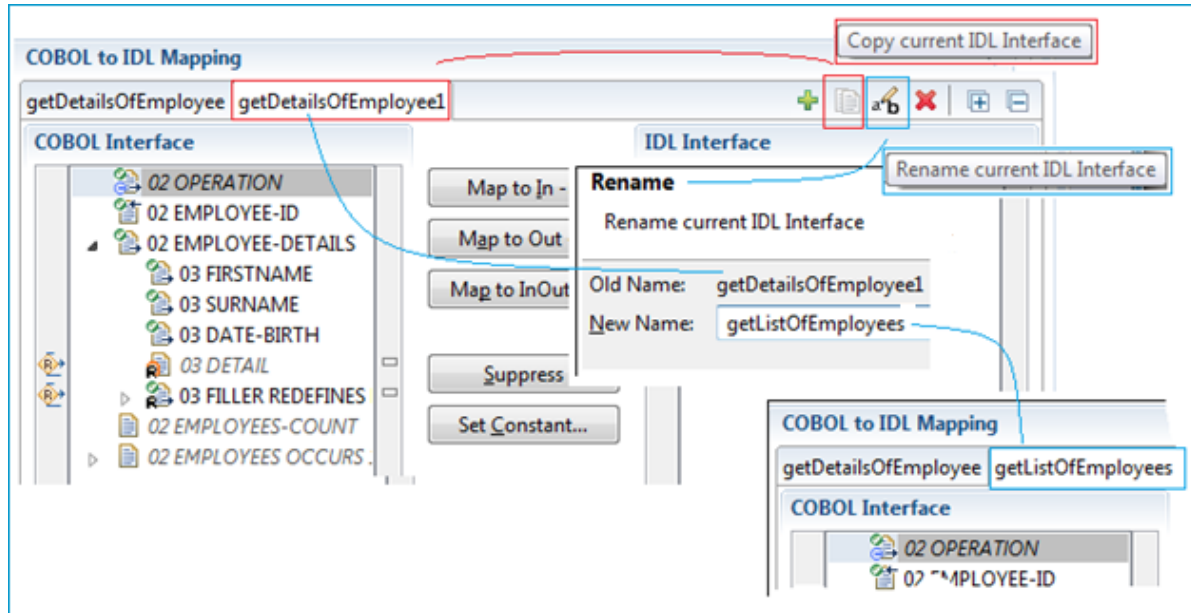
- Mark the `OPERATION` field in the COBOL **Interface** pane and press the **Set Constant** button. In the pop-up window, select `OPERATION-DETAILS` (red markers). The `OPERATION-DETAILS` value originates from COBOL level-88 data item (blue markers). If there is no COBOL level-88 enumeration type in the COBOL program defined, you can enter the function code manually in the pop-up window.
- By default the IDL interface gets the same name as your COBOL server: `EMPLOYEE`. Use the **Rename** button  from the toolbar of the COBOL Mapping Editor and change the IDL interface name to `getDetailsOfEmployee` (blue markers). This name is used as the IS service name later.

- 2 Continue shaping, making `getDetailsOfEmployee` easier to use:




- Use the context menu of the redefinition of the `DETAIL` field in the **COBOL Interface** pane, `FILLER REDEFINES DETAIL` and choose **Map to Out** (blue markers). A redefinition is a secondary layout (field types) of the same memory area. The redefinition contains more specific information (`ANNUAL-SALARY`, `VACATION`, etc.) than character buffer `DETAIL`. This is the reason why it is more useful in your interface.
- Use the context menu of `FILLER_1` in the IDL interface pane and rename `FILLER_1` to `DETAILS` (green markers) for a readable IS service field name later.
- The `DETAILS` function in the COBOL server does not make use of the `EMPLOYEES` field. Therefore you can leave it out of the interface: use the context menu of the `EMPLOYEES` field in the **COBOL Interface** pane and choose **Suppress** (red markers).


3 Shape `EMPLOYEE` to `getListOfEmployees` Function:



The COBOL Mapping Editor allows you to define multiple IDL interfaces to the same COBOL server:

- You create the additional IDL interface using the toolbar button **Copy current IDL interface**

 (red markers). A new tab `getDetailsOfEmployee1` is created. The previously extracted `getDetailsOfEmployee` interface still exists in the first tab. Once you reactivate the first tab, you will see the interface of `getDetailsOfEmployee` again.

- Use the **Rename** button  from the toolbar of the COBOL Mapping Editor and change the IDL interface name to **getListOfEmployees** (blue markers). This name is used as the IS service name later.

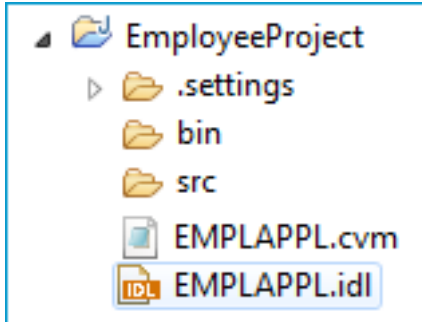
- For the **LIST** function you need the **OPERATION- LIST** value in the **OPERATION** field: Mark the **OPERATION** field in the **COBOL Interface** pane and press the **Set Constant** button. In the pop-up window, select **OPERATION- LIST** (similar to Step 1. above *Shape EMPLOYEE to getDetailsOfEmployee*; red markers).

- Use the context menu of the **EMPLOYEES** field in the **COBOL Interface** pane, **EMPLOYEES OCCURS 1 TO 99** and choose **Map to Out** (Similar to Step 2. above *Continue shaping, making getDetailsOfEmployee easier to use*; blue markers).

- Because the **EMPLOYEE** and **EMPLOYEE-DETAIL** fields are not used in the COBOL server **LIST** function, you leave them out in the IDL interface: use the context menu of **EMPLOYEE-DETAIL** field in the **COBOL Interface** pane and choose **Suppress** (similar to Step 2. above *Continue shaping, making getDetailsOfEmployee easier to use*; red markers). Do the same for the **EMPLOYEE- ID** field.

- 4 Press **Finish** to retrieve the extraction result in the form of a Software AG IDL file. At the same time, a server mapping file for COBOL (Designer file with extension `.cvm`) is created.

See *Server Mapping Files for COBOL* in the Designer documentation. The *Software AG IDL File* in the IDL Editor documentation describes the interfaces from the client point of view, while the server mapping file contains the mapping to the real COBOL server. Both of these files must be kept together and in sync, otherwise a call to the COBOL server may fail.



To summarize: We created two IDL interfaces. In the IDL file, these resulted in two IDL programs: `getListOfEmployees` and `getDetailsOfEmployee`. Both IDL programs were given readable names (Steps 1 and 3). Meaningful fields were kept, while superfluous fields were suppressed (Steps 1 and 3). The program `getDetailsOfEmployee` contains the redefined fields of parameter `DETAILS` (see below) mapped during extraction (Step 1).



Note: At runtime, the RPC client generated with the extracted interface will send data for the redesigned interfaces, while your COBOL server still expects `EMPLOYEE` data. The EntireX runtime transforms the incoming data stream from the RPC client, using the server mapping file.

```

program 'getDetailsOfEmployee' is
  define data parameter
    1 ID (AV10) In /* Original Name:EMPLOYEE-ID
    1 EMPLOYEE Out /* Original Name:EMPLOYEE-DETAILS
    2 FIRSTNAME (AV20)
    2 SURNAME (AV20)
    2 DATE-BIRTH (AV12)
    2 DETAILS /* Original Name:FILLER_1
    3 ANNUAL-SALARY (P9)
    3 VACATION (N2)
    3 LANGUAGE (AV3)
  end-define
  program 'getListOfEmployees' is
    1 EMPLOYEES (/V99) Out
    2 IDENT (AV10)
    2 FIRSTNAME (AV20)
    2 SURNAME (AV20)
    2 DATE-BIRTH (AV12)
  end-define

```


Comparison Chart: Fast-track versus User-defined Mapping

The following table highlights the differences when shaping an interface with a *user-defined mapping* compared with a *fast-path extraction*.

| | Interface Shaping with User-defined Mapping | Fast-path Extraction |
|----------------------------------|---|---|
| General | User-defined interface with dedicated mapping. For our example, the interfaces are small and tidy and more self-explanatory with long, readable interface names. They are easier to use with the hidden <code>OPERATION</code> field and the suppressed COBOL fields, which are not needed. | Automatic, quick result extraction with COBOL-like interfaces on IS. For our example, the IS interface <code>EMPLOYEE</code> matches exactly 1:1, field by field. |
| IS service(s) | Multiple small and handy IS services; each <code>OPERATION</code> code is mapped to a separate IS service. | One big IS service. |
| IS service name | Readable long name. | Short Subprogram name; up to 8 characters. |
| IS fields | Usage of Suppress and Set Constant reduces the message length. This keeps focus on relevant data items and keeps the client's interface clean. It may also improve performance. | The IS fields and COBOL server parameters match 1:1. As COBOL layout descriptions are sometimes used for many different purposes, irrelevant data items appear and clutter up the IS interface. |
| <code>OPERATION</code> parameter | Suppressed: the <code>OPERATION</code> parameter does not exist in the IS service as an IS field. | The <code>OPERATION</code> parameter exists in the IS service as an IS field and needs to be filled-in by the client endpoint. |
| <code>OPERATION</code> code | The <code>OPERATION</code> code is provided internally by EntireX runtime in the <code>OPERATION</code> field. | The <code>OPERATION</code> code needs to be specified in the IS service in the <code>OPERATION</code> field by the client endpoint. |
| <code>REDEFINE</code> parameters | Either the parameter that is redefined or one of its redefinitions is available as an IS field. | Only the parameter that is redefined is available as an IS field. Redefinitions of the parameter are not available as IS fields. |

A user-defined mapping enables you also to define alternative mappings for COBOL data items (`REDEFINES`, tables etc.). These enable scenarios with COBOL servers where data exchange is not fully described by the `LINKAGE SECTION` COBOL data items. For more information refer to the IDL Extractor for COBOL documentation:

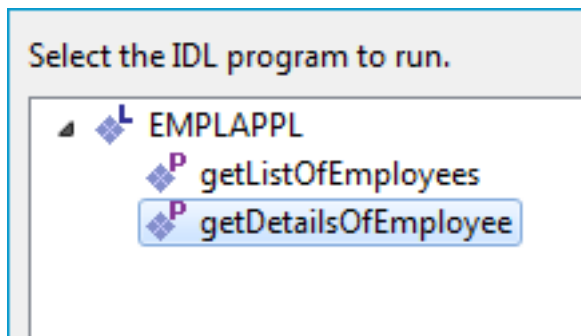
- *Mapping Editor IDL Interface Mapping Functions*
- *User-defined Mapping*

Testing the Extraction Results

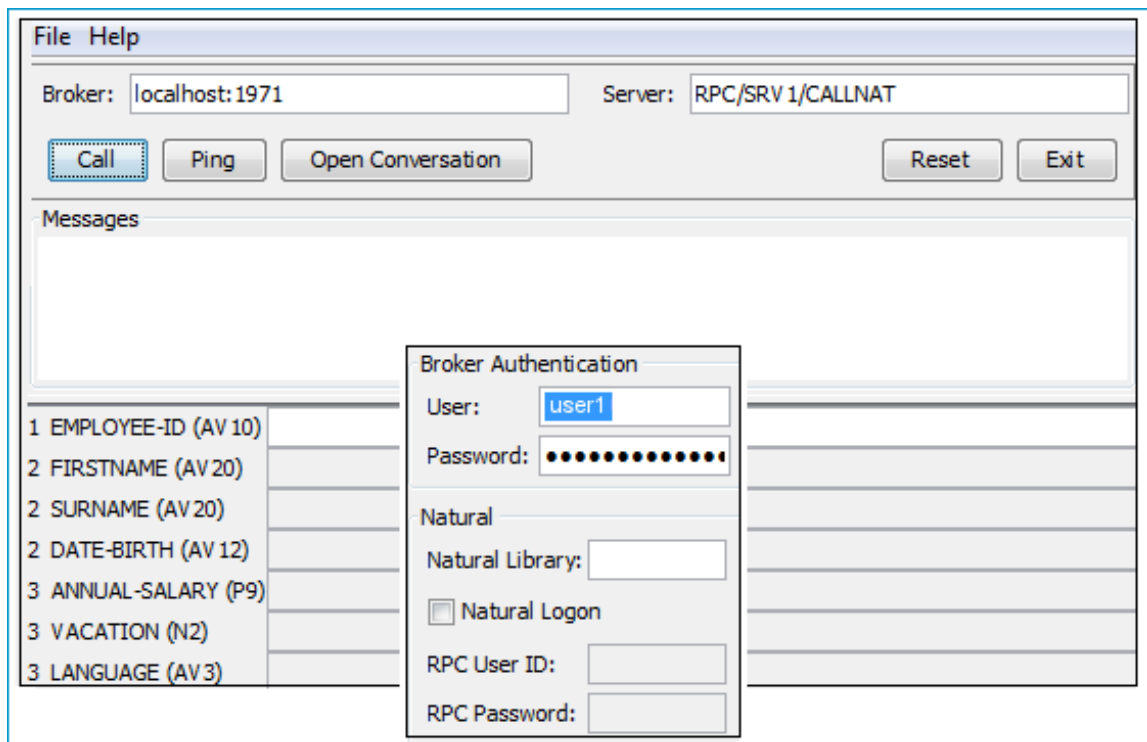
The following pictures use the extraction results described under *Extracting a COBOL Server - Modern Method with User-defined Mapping*.

> To test the extraction results (optional)

- 1 You can test the results of the extraction operation and the COBOL server back end, using the EntireX IDL Tester. From the context menu of the IDL file in the Designer, choose **Software AG IDL Tester**.



- 2 Select `getDetailsOfEmployee`.



Note that the broker and server parameters contain the explicit route to call the server program, and you can optionally ping the connection from this client. With the **File > Options** dialog, you can set:

- **User** and **Password** for *broker* authentication
- **RPC User ID** and **RPC Password** for *server* authentication

See *EntireX IDL Tester* in the Designer documentation.

- 3 Check the Integration Server log, the EntireX Adapter log or the RPC logs. Applies to all connection methods.

Task 2: Generate the Connection and Adapter Services in Integration Server

This section describes your first steps to create a new Integration Server connection. This is described in more detail under *Using the Integration Server Wrapper*, for example working with existing Integration Server connections. This section covers the following topics:

- [Step 1: Start the Integration Server Wrapper Wizard](#)
- [Step 2: Create a New Integration Server Connection](#)
- [Step 3: Select the Connection Type](#)
- [Step 4: Define Adapter Services for an RPC Connection](#)

Step 1: Start the Integration Server Wrapper Wizard

➤ To start the Integration Server Wrapper wizard

- 1 In the context menu of a Software AG IDL file, choose **Integration Server > Generate web-Methods IS Connection**.

This starts the wizard with a list of existing Integration Server Wrapper connections.



Note: If the selected IDL file is not valid because of a syntax error, an error dialog comes up and the wizard does not start.

- 2 Continue with *Step 2: Create a New Integration Server Connection*.

Step 2: Create a New Integration Server Connection

Define New Integration Server Connection

Add host:port, user and password for a new Integration Server

Server:

User:

Password:

☐
Use secure connection

➤ To create a new Integration Server connection

- 1 Define the new Integration Server connection on the wizard page.



Notes:


1. The only required field is **Server**. Enter the hostname of the Integration Server including an optional port number. If no port number is specified, port number defaults to "5555". The **Integration Server Authentication** can be passed with the **User** and **Password** fields.
 2. Optional settings are for secure connections. The **Truststore for HTTPS** contains all signed certificates and must be a valid truststore.
 3. The check box **Verify host name** checks that the hostname is entered in the stored certificate.
 4. When the Integration Server has **Client Authentication** enabled, you can specify your **Keystore** file and keystore **Password**.
 5. For managing Integration Server connections, see [Preferences](#).
- 2 Choose **Next** and continue with *Step 3: Select the Connection Type*.

Step 3: Select the Connection Type

☒ Create a new EntireX Adapter connection of type: EntireX RPC Connection

☐ Update Adapter Services or Listeners to an existing Integration Server connection:

List of Connections

| Connection Name | Package Name | Connection Type | Enabled |
|---|--------------|------------------------|---------|
|  Employees:EmployeesConnection | Employees | EntireX RPC Connection | Yes |

Total: 1

☒ Map Software AG IDL data types to String

☐ Create or Update REST resource

➤ **To create a new connection**

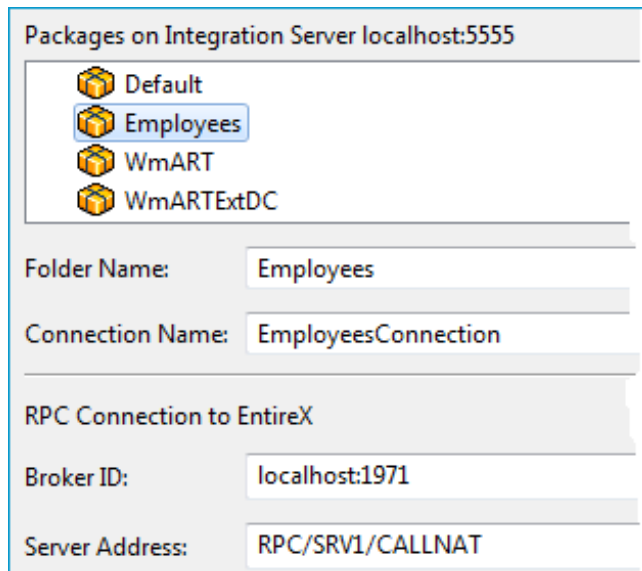
- 1 Select a connection type from the drop down list. Connection types are described under *EntireX Adapter Connections* in the EntireX Adapter documentation and *Introduction to the Integration Server Wrapper*.



Note: The list of connection types is filtered: connection types that require a license are only shown if a corresponding license file is available. Reliable RPC connections are only shown if all IDL programs contain only IN parameters. Also, if a server mapping file is available, only those connection types that support the interface type specified in the server mapping file are shown.

- 2 Click **Next** and continue with *Step 4: Define Adapter Services for an RPC Connection*.

Step 4: Define Adapter Services for an RPC Connection



Packages on Integration Server localhost:5555

- Default
- Employees**
- WmART
- WmARTEExtDC

Folder Name:

Connection Name:

RPC Connection to EntireX

Broker ID:

Server Address:

> To create a connection and related adapter services

- 1 Select an existing package or create a new package for the created objects.
- 2 Define a folder name. If the folder does not exist, it will be created.
- 3 Define a connection name.
- 4 Define the parameters of the connection type. For details, see *Connection Parameters for RPC Connections* in the EntireX Adapter documentation.

As a result, the folder will contain the connection and the adapter services (one for each IDL program). The name of a service is the same as the respective IDL program.

The default settings for the adapter services are:

- the **Default** package; if not available, the first package
- the IDL library name for the **Folder Name**
- the IDL library name with the suffix "Connection" for the **Connection Name**



Note: When creating a connection, a package dependency is added such that the selected package depends on webMethods EntireX (the package `WmEntireX`) with the version currently used.

Task 3: Execute the Call from Integration Server to COBOL

From the **Service Development** perspective, refresh the package where the connection service was written, select the adapter service and use the service test to **Run Service**. This invokes the adapter service through the connector service.

The screenshot shows the 'Employees' package structure in the Service Development perspective. The 'getListOfEmployees' service is selected, and the 'Run Service' button is highlighted. Below the package structure, a table displays the output of the service call.

| Name | Value |
|--------------|-------------|
| outRec | |
| EMPLOYEES | |
| EMPLOYEES[0] | |
| IDENT | 11100102 |
| FIRSTNAME | EDGAR |
| SURNAME | SCHINDLER |
| DATE-BIRTH | Dec 4, 1962 |
| EMPLOYEES[1] | |
| EMPLOYEES[2] | |
| EMPLOYEES[3] | |
| EMPLOYEES[4] | |
| errorCode | 00000000 |
| errorFlag | false |

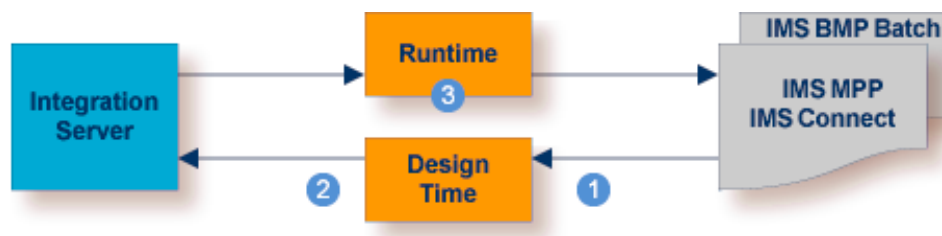
In case of error or unexpected results:

- Check the Integration Server log, the EntireX Adapter log or the RPC logs.
- Use the IDL Tester as described under [Task 1](#) above.

14

Calling COBOL on z/OS IMS from Integration Server

In IMS there are two styles of programs: message processing programs (MPP) and batch message processing programs (BMP). MPP programs can be called via IMS Connect.



- ❶ Extract the interface of the COBOL server program.
- ❷ Generate connection and adapter services in Integration Server.
- ❸ Execute the call from Integration Server to the COBOL server program.

It is important to know whether your COBOL server runs in MPP (online transaction) mode or BMP (batch processing) mode. If you are unsure, consult a COBOL IMS specialist or see description of interface type in the IDL Extractor for COBOL documentation for details and examples: *IMS MPP | IMS BMP*.

When you are sure which programming style you are using, continue with the appropriate scenario:

- **MPP** - online transactions (zero footprint using IMS Connect)
- **BMP** - batch processing (using RPC Server for IMS)

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Calling COBOL on z/OS IMS MPP (Zero Footprint using IMS Connect) from Integration Server

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This scenario uses the tools IDL Extractor for COBOL and Integration Server Wrapper of the Designer.

Introduction



- ❶ Extract the interface of the COBOL server program.
- ❷ Generate connection and adapter services in Integration Server.
- ❸ Execute the call from Integration Server to the COBOL server program.

This scenario makes the following important assumptions:

For Task 1:

- You have a working COBOL IMS MPP server. For illustration and examples on such a server, see *IMS MPP Message Interface (IMS Connect)* under *Introduction to the IDL Extractor for COBOL*.
- You have access to the related COBOL sources and copybooks as files on your local machine. The minimum requirement is the `DATA DIVISION` of the interface.



For Tasks 2 and 3:

- To call the COBOL server program at runtime using the EntireX IMS Connect method, you need an IMS Connect address space running. See *Preparing for IMS Connect* and *Connection Parameters for Connections to IMS Connect*.



What do I need to Install for this Scenario?

- You have Software AG Designer installed with EntireX plugins and Service Development plugins.
 - For EntireX plugins, see *Designer > EntireX Designer* under *EntireX Installation Packages* in the General Installation documentation.
 - For Service Development plugins, refer to the Integration Server documentation.
- You have an Integration Server with EntireX Adapter installed. See *Adapters > EntireX Adapter* under *EntireX Installation Packages* in the General Installation documentation.

Task 1: Extract the Interface of a COBOL Server

- [Introduction](#)
- [Sample COBOL Server used in the Examples](#)
- [Extracting a COBOL Server - Fast-track Method](#)
- [Extracting a COBOL Server - Modern Method with User-defined Mapping](#)
- [Comparison Chart: Fast-track versus User-defined Mapping](#)
- [Testing the Extraction Results](#)

Introduction

Follow the instructions for extracting COBOL, see *Using the IDL Extractor for COBOL - Overview* and choose *Scenario I: Create New IDL and Server Mapping Files* if this is your first extraction. Learn how to invoke the IDL Extractor for COBOL, create a COBOL Extractor Environment and about the possibilities to select the COBOL source.

The extraction process creates the following EntireX metafiles:

- IDL file. A Software AG IDL file contains definitions of the interface between client and server. See *Software AG IDL File* in the IDL Editor documentation in the IDL Editor documentation.
- Server mapping file (optional). The mapping file is a Designer file with extension .cvm that contains COBOL-specific mapping information. See *Server Mapping Files for COBOL* in the Designer documentation.

Sample COBOL Server used in the Examples

The following COBOL server is used to illustrate the features of the IDL Extractor for COBOL. Imagine an existing COBOL server called `EMPLOYEE`. It implements the access logic for a `LIST` and `DETAILS` function to a database view `EMPLOYEE`:

```
IDENTIFICATION DIVISION.
  PROGRAM-ID.      EMPLOYEE.
*****
*   Program Name    = EMPLOYEE
*   String Literal  = QUOTE
*****
01 DFHCOMMAREA.
  02 OPERATION                                PIC X(1).
    88 OPERATION-LIST                          VALUE 'L'.
    88 OPERATION-DETAILS                      VALUE 'D'.
  02 EMPLOYEE-ID                                PIC X(10).
  02 EMPLOYEE-DETAILS.
    03 FIRSTNAME                                PIC X(20).
    03 SURNAME                                PIC X(20).
    03 DATE-BIRTH                              PIC X(12).
    03 DETAILS                                PIC X(100).
    03 FILLER REDEFINES DETAILS.
      04 ANNUAL-SALARY          PACKED-DECIMAL PIC S9(9).
      04 VACATION                PIC S9(2).
      04 LANGUAGE                PIC X(3).
      04 FILLER                  PIC X(90).
  02 EMPLOYEES-COUNT                        PIC 9(8) BINARY.
  02 EMPLOYEES OCCURS 1 TO 99 DEPENDING ON EMPLOYEES-COUNT.
    03 IDENT                        PIC X(10).
    03 FIRSTNAME                    PIC X(20).
    03 SURNAME                      PIC X(20).
    03 DATE-BIRTH                    PIC X(12).
```

Two approaches for extracting the COBOL server are described below:

- **Fast-track**

Learn how EntireX helps you to connect the COBOL Server with quick results.

- **User-defined Mapping**

The following features are among those available with a user-defined mapping:

- **Shape the interface to your COBOL server**

You can minimize the interface by suppressing COBOL server fields or by providing constant values. Renaming interfaces allows you to specify a readable long name. These two features together - constants and renaming of interfaces - are most powerful when multiple interfaces are implemented in a single COBOL server. Each function of the COBOL server triggered by an operation code or function code can be modelled as a separate IS service.

■ **Select alternative mappings**

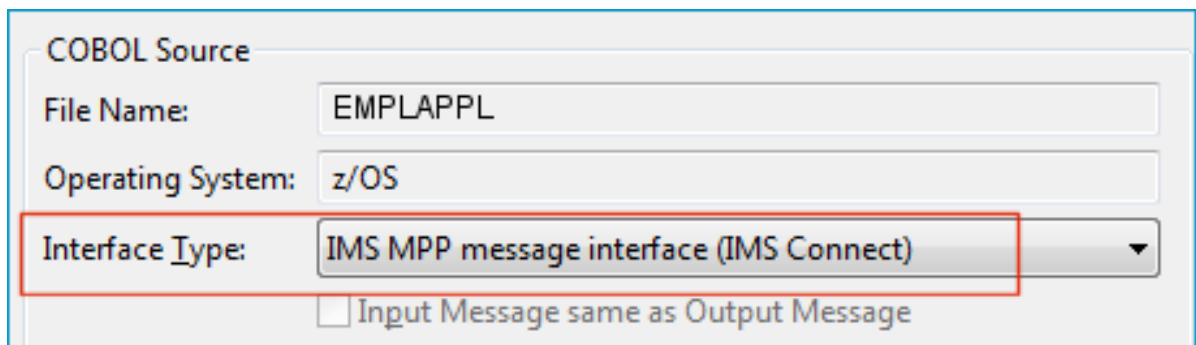
You can select alternative mappings for COBOL data items (REDEFINES, tables etc.) to enable scenarios with COBOL servers where data exchange is not fully described by the LINKAGE SECTION COBOL data items.

These approaches are described under *Fast-track Method* and *Modern Method* below.

Extracting a COBOL Server - Fast-track Method

➤ **To extract the COBOL Server**

- 1 Switch to the **EntireX** perspective.
- 2 Call the IDL Extractor for COBOL.
- 3 Set the correct interface type as described under *Step 4: Define the Extraction Settings and Start Extraction* under *Scenario I: Create New IDL and Server Mapping Files* in the IDL Extractor for COBOL documentation.



COBOL Source

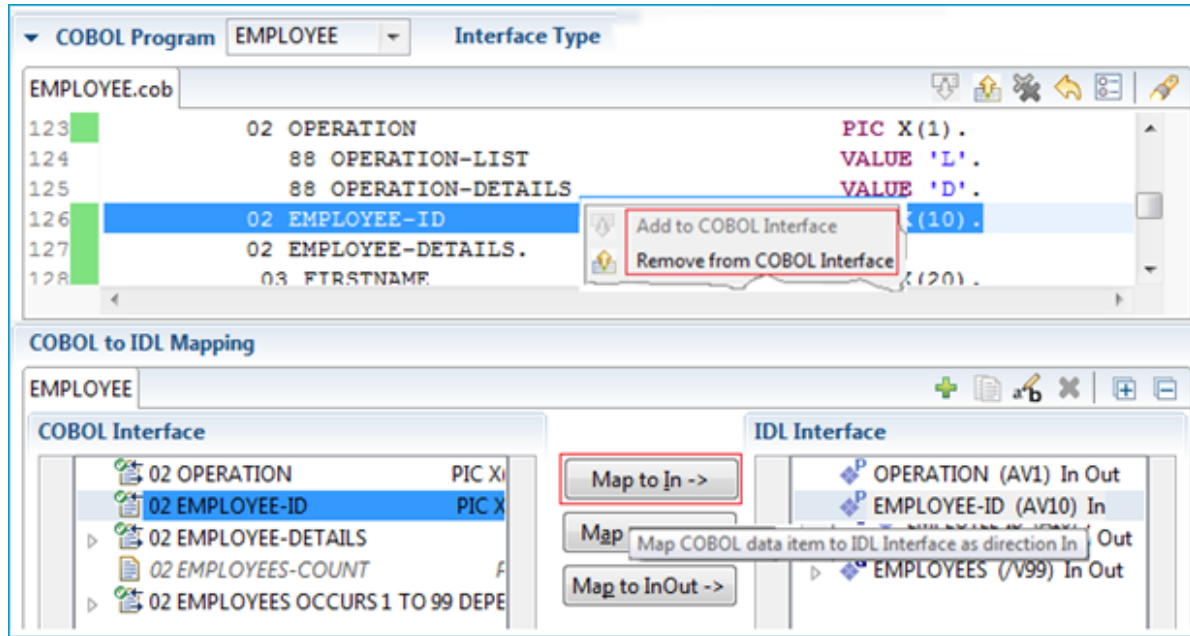
File Name: EMPLAPPL

Operating System: z/OS

Interface Type: IMS MPP message interface (IMS Connect) ▼

☐ Input Message same as Output Message

- 4 Press **Next** to enter the COBOL Mapping Editor.



The purpose of the COBOL Mapping Editor is to map COBOL data items to IDL (Interface Definition Language) parameters. It consists of three main areas:

- The upper window pane is the COBOL program source.
- The window pane on the left-hand side is the COBOL interface, consisting of COBOL data items representing the parameters in your COBOL server program.
- The window pane on the right-hand side is the IDL interface consisting of IDL parameters.

For more information see *Mapping Editor User Interface* in the IDL Extractor for COBOL documentation.

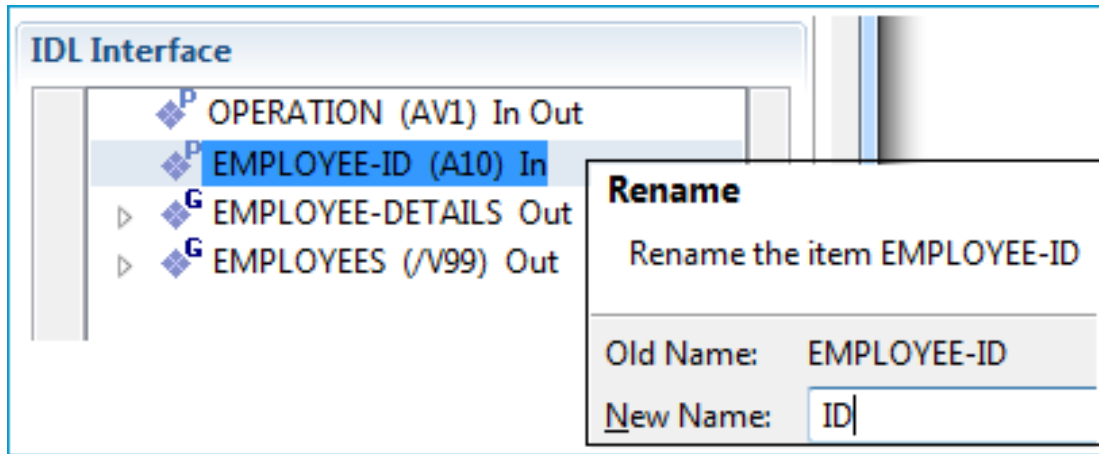
COBOL extraction is a two-step process:

- First, select the COBOL parameters using the **Add to** and **Remove from COBOL Interface** from the context menu on the COBOL data items in the upper window pane (COBOL source); in many situations the COBOL interface is detected by the Mapping Editor directly and you can omit this step.
- Then map the COBOL parameters to IDL directions using the **Map to In/Out/InOut** buttons. COBOL parameters do not have directions, they are always INOUT. This step can be left out for a quick test in non-production scenarios; for real production it is recommended to set IDL directions to reduce data transfer. You also have the option to assign a meaningful name to an IDL parameter if the original COBOL data item is not self-explanatory.

For our example:

- Set **Map to In** for COBOL data item `EMPLOYEE-ID` as IDL direction (see screenshot in previous step). For `EMPLOYEES-DETAILS` and `EMPLOYEES` perform the similar **Map to Out**.

- Use the function **Rename** from the context menu on the IDL parameters in the **IDL Interface** pane to rename COBOL parameter `EMPLOYEE-ID` to IDL parameter `ID`. Do the same for `EMPLOYEE-DETAILS`: Rename to `EMPLOYEE`.



- 5 Press **Finish**. The default extraction settings ensure you get useful results. The outcome is a Software AG IDL file (interface definition language), a Designer file with extension `.idl`:

```
library 'EMPLAPPL' is
program 'EMPLOYEE' is
  define data parameter
    1 OPERATION (AV1) In Out
    1 ID (AV10) In /* Original Name:EMPLOYEE-ID
    1 EMPLOYEE Out /* Original Name:EMPLOYEE-DETAILS
      2 FIRSTNAME (AV20)
      2 SURNAME (AV20)
      2 DATE-BIRTH (AV12)
      2 DETAILS (AV100)
    1 EMPLOYEES (/V99) Out
      2 IDENT (AV10)
      2 FIRSTNAME (AV20)
      2 SURNAME (AV20)
      2 DATE-BIRTH (AV12)
  end-define
```

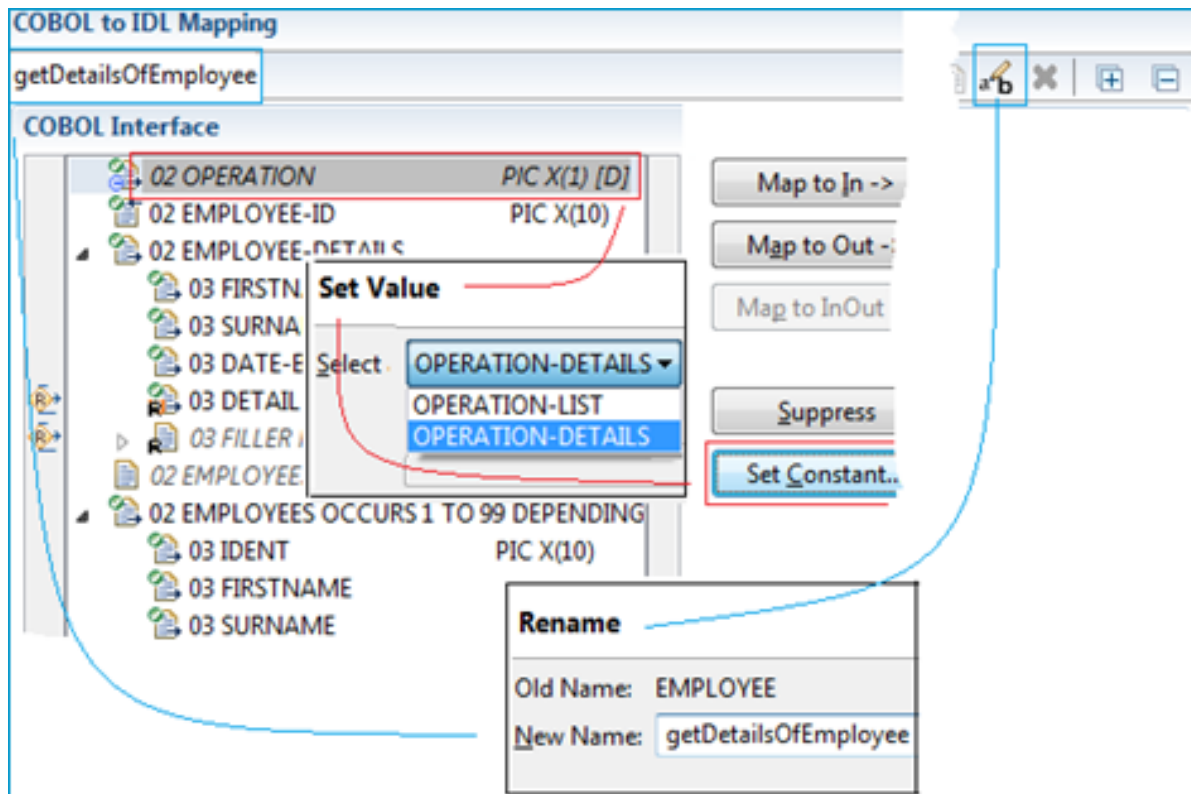
If required, a server mapping file with the same name as the IDL file but the extension `.cvm` may be generated too, for technical reasons. This file must always be stored together with the concomitant IDL file. For more information, see *Server Mapping Files for COBOL* in the Designer documentation. By default, the interface name `EMPLOYEE` is taken from the COBOL server program name.


Extracting a COBOL Server - Modern Method with User-defined Mapping

EntireX allows you to extract all implemented interfaces of the COBOL server separately. Instead of a large `EMPLOYEE` interface, separate interfaces `getListOfEmployees` and `getDetailsOfEmployee` are extracted. Each interface contains required parameters; obsolete parameters for an interface are suppressed, improving its usability.

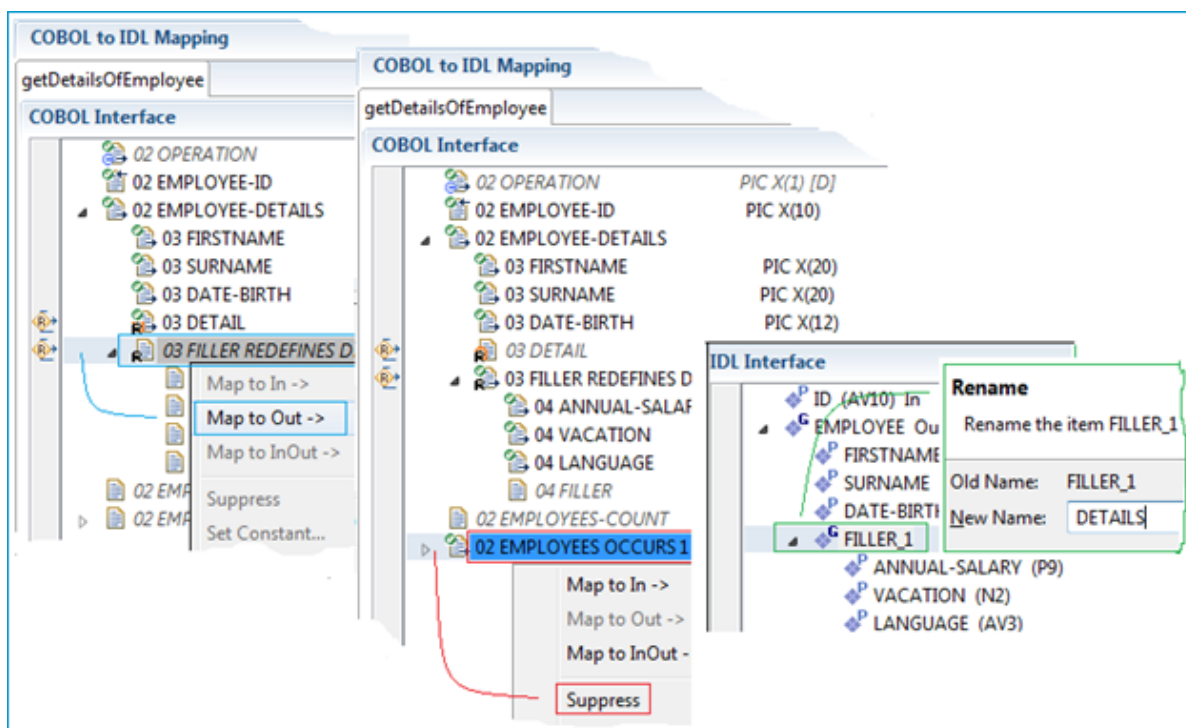
➤ To extract a COBOL server with a user-defined mapping

- 1 Shape `EMPLOYEE` to `getDetailsOfEmployee`:



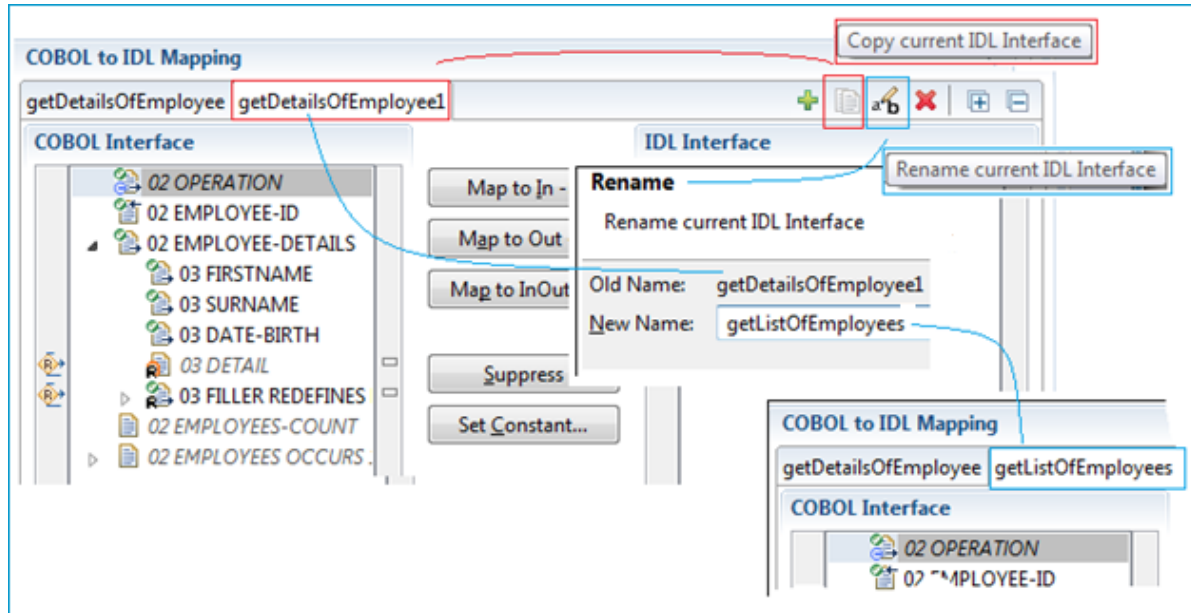
- Mark the `OPERATION` field in the COBOL **Interface** pane and press the **Set Constant** button. In the pop-up window, select `OPERATION-DETAILS` (red markers). The `OPERATION-DETAILS` value originates from COBOL level-88 data item (blue markers). If there is no COBOL level-88 enumeration type in the COBOL program defined, you can enter the function code manually in the pop-up window.
- By default the IDL interface gets the same name as your COBOL server: `EMPLOYEE`. Use the **Rename** button  from the toolbar of the COBOL Mapping Editor and change the IDL interface name to `getDetailsOfEmployee` (blue markers). This name is used as the IS service name later.

- 2 Continue shaping, making `getDetailsOfEmployee` easier to use:




- Use the context menu of the redefinition of the `DETAIL` field in the **COBOL Interface** pane, `FILLER REDEFINES DETAIL` and choose **Map to Out** (blue markers). A redefinition is a secondary layout (field types) of the same memory area. The redefinition contains more specific information (`ANNUAL-SALARY`, `VACATION`, etc.) than character buffer `DETAIL`. This is the reason why it is more useful in your interface.
- Use the context menu of `FILLER_1` in the IDL interface pane and rename `FILLER_1` to `DETAILS` (green markers) for a readable IS service field name later.
- The `DETAILS` function in the COBOL server does not make use of the `EMPLOYEES` field. Therefore you can leave it out of the interface: use the context menu of the `EMPLOYEES` field in the **COBOL Interface** pane and choose **Suppress** (red markers).


3 Shape `EMPLOYEE` to `getListOfEmployees` Function:



The COBOL Mapping Editor allows you to define multiple IDL interfaces to the same COBOL server:

- You create the additional IDL interface using the toolbar button **Copy current IDL interface**

 (red markers). A new tab `getDetailsOfEmployee1` is created. The previously extracted `getDetailsOfEmployee` interface still exists in the first tab. Once you reactivate the first tab, you will see the interface of `getDetailsOfEmployee` again.

- Use the **Rename** button  from the toolbar of the COBOL Mapping Editor and change the IDL interface name to `getListOfEmployees` (blue markers). This name is used as the IS service name later.

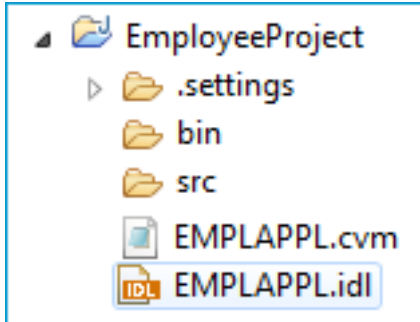
- For the `LIST` function you need the `OPERATION-LIST` value in the `OPERATION` field: Mark the `OPERATION` field in the **COBOL Interface** pane and press the **Set Constant** button. In the pop-up window, select `OPERATION-LIST` (similar to Step 1. above *Shape `EMPLOYEE` to `getDetailsOfEmployee`*; red markers).

- Use the context menu of the `EMPLOYEES` field in the **COBOL Interface** pane, `EMPLOYEES OCCURS 1 TO 99` and choose **Map to Out** (Similar to Step 2. above *Continue shaping, making `getDetailsOfEmployee` easier to use*; blue markers).

- Because the `EMPLOYEE` and `EMPLOYEE-DETAIL` fields are not used in the COBOL server `LIST` function, you leave them out in the IDL interface: use the context menu of `EMPLOYEE-DETAIL` field in the **COBOL Interface** pane and choose **Suppress** (similar to Step 2. above *Continue shaping, making `getDetailsOfEmployee` easier to use*; red markers). Do the same for the `EMPLOYEE-ID` field.

- 4 Press **Finish** to retrieve the extraction result in the form of a Software AG IDL file. At the same time, a server mapping file for COBOL (Designer file with extension `.cvm`) is created.

See *Server Mapping Files for COBOL* in the Designer documentation. The *Software AG IDL File* in the IDL Editor documentation describes the interfaces from the client point of view, while the server mapping file contains the mapping to the real COBOL server. Both of these files must be kept together and in sync, otherwise a call to the COBOL server may fail.



To summarize: We created two IDL interfaces. In the IDL file, these resulted in two IDL programs: `getListOfEmployees` and `getDetailsOfEmployee`. Both IDL programs were given readable names (Steps 1 and 3). Meaningful fields were kept, while superfluous fields were suppressed (Steps 1 and 3). The program `getDetailsOfEmployee` contains the redefined fields of parameter `DETAILS` (see below) mapped during extraction (Step 1).



Note: At runtime, the RPC client generated with the extracted interface will send data for the redesigned interfaces, while your COBOL server still expects `EMPLOYEE` data. The EntireX runtime transforms the incoming data stream from the RPC client, using the server mapping file.

```

program 'getDetailsOfEmployee' is
  define data parameter
    1 ID (AV10) In /* Original Name:EMPLOYEE-ID
    1 EMPLOYEE Out /* Original Name:EMPLOYEE-DETAILS
    2 FIRSTNAME (AV20)
    2 SURNAME (AV20)
    2 DATE-BIRTH (AV12)
    2 DETAILS /* Original Name:FILLER_1
    3 ANNUAL-SALARY (P9)
    3 VACATION (N2)
    3 LANGUAGE (AV3)
  end-define
  program 'getListOfEmployees' is
    1 EMPLOYEES (/V99) Out
    2 IDENT (AV10)
    2 FIRSTNAME (AV20)
    2 SURNAME (AV20)
    2 DATE-BIRTH (AV12)
  end-define
  
```

Comparison Chart: Fast-track versus User-defined Mapping

The following table highlights the differences when shaping an interface with a *user-defined mapping* compared with a *fast-path extraction*.

| | Interface Shaping with User-defined Mapping | Fast-path Extraction |
|----------------------------------|---|---|
| General | User-defined interface with dedicated mapping. For our example, the interfaces are small and tidy and more self-explanatory with long, readable interface names. They are easier to use with the hidden <code>OPERATION</code> field and the suppressed COBOL fields, which are not needed. | Automatic, quick result extraction with COBOL-like interfaces on IS. For our example, the IS interface <code>EMPLOYEE</code> matches exactly 1:1, field by field. |
| IS service(s) | Multiple small and handy IS services; each <code>OPERATION</code> code is mapped to a separate IS service. | One big IS service. |
| IS service name | Readable long name. | Short Subprogram name; up to 8 characters. |
| IS fields | Usage of Suppress and Set Constant reduces the message length. This keeps focus on relevant data items and keeps the client's interface clean. It may also improve performance. | The IS fields and COBOL server parameters match 1:1. As COBOL layout descriptions are sometimes used for many different purposes, irrelevant data items appear and clutter up the IS interface. |
| <code>OPERATION</code> parameter | Suppressed: the <code>OPERATION</code> parameter does not exist in the IS service as an IS field. | The <code>OPERATION</code> parameter exists in the IS service as an IS field and needs to be filled-in by the client endpoint. |
| <code>OPERATION</code> code | The <code>OPERATION</code> code is provided internally by EntireX runtime in the <code>OPERATION</code> field. | The <code>OPERATION</code> code needs to be specified in the IS service in the <code>OPERATION</code> field by the client endpoint. |
| <code>REDEFINE</code> parameters | Either the parameter that is redefined or one of its redefinitions is available as an IS field. | Only the parameter that is redefined is available as an IS field. Redefinitions of the parameter are not available as IS fields. |

A user-defined mapping enables you also to define alternative mappings for COBOL data items (`REDEFINES`, tables etc.). These enable scenarios with COBOL servers where data exchange is not fully described by the `LINKAGE SECTION` COBOL data items. For more information refer to the IDL Extractor for COBOL documentation:

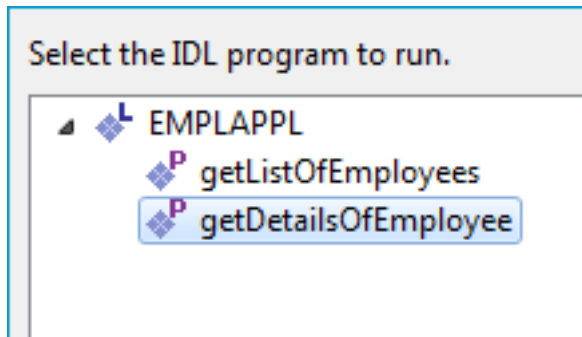
- *Mapping Editor IDL Interface Mapping Functions*
- *User-defined Mapping*

Testing the Extraction Results

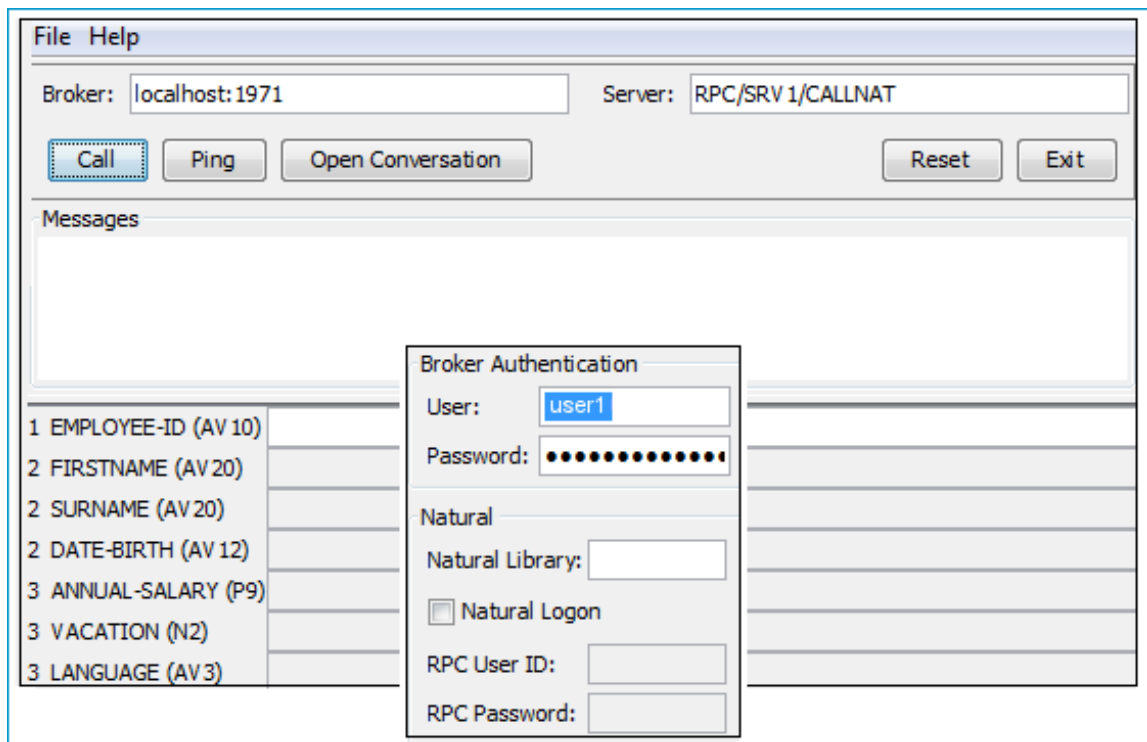
The following pictures use the extraction results described under *Extracting a COBOL Server - Modern Method with User-defined Mapping*.

> To test the extraction results (optional)

- 1 You can test the results of the extraction operation and the COBOL server back end, using the EntireX IDL Tester. From the context menu of the IDL file in the Designer, choose **Software AG IDL Tester**.



- 2 Select `getDetailsOfEmployee`.



Note that the broker and server parameters contain the explicit route to call the server program, and you can optionally ping the connection from this client. With the **File > Options** dialog, you can set:

- **User** and **Password** for *broker* authentication
- **RPC User ID** and **RPC Password** for *server* authentication

See *EntireX IDL Tester* in the Designer documentation.

- 3 Check the Integration Server log, the EntireX Adapter log or the RPC logs. Applies to all connection methods.

Task 2: Generate the Connection and Adapter Services in Integration Server

This section describes your first steps to create a new Integration Server connection. This is described in more detail under *Using the Integration Server Wrapper*, for example working with existing Integration Server connections. This section covers the following topics:

- [Step 1: Start the Integration Server Wrapper Wizard](#)
- [Step 2: Create a New Integration Server Connection](#)
- [Step 3: Select the Connection Type](#)
- [Step 4: Define Adapter Services for an IMS Connect Connection](#)

Step 1: Start the Integration Server Wrapper Wizard

➤ To start the Integration Server Wrapper wizard

- 1 In the context menu of a Software AG IDL file, choose **Integration Server > Generate web-Methods IS Connection**.

This starts the wizard with a list of existing Integration Server Wrapper connections.



Note: If the selected IDL file is not valid because of a syntax error, an error dialog comes up and the wizard does not start.

- 2 Continue with *Step 2: Create a New Integration Server Connection*.

Step 2: Create a New Integration Server Connection

Define New Integration Server Connection
Add host:port, user and password for a new Integration Server

Server:

User:

Password:

☐ Use secure connection

➤ To create a new Integration Server connection

- 1 Define the new Integration Server connection on the wizard page.



Notes:

1. The only required field is **Server**. Enter the hostname of the Integration Server including an optional port number. If no port number is specified, port number defaults to "5555". The **Integration Server Authentication** can be passed with the **User** and **Password** fields.
 2. Optional settings are for secure connections. The **Truststore for HTTPS** contains all signed certificates and must be a valid truststore.
 3. The check box **Verify host name** checks that the hostname is entered in the stored certificate.
 4. When the Integration Server has **Client Authentication** enabled, you can specify your **Keystore** file and keystore **Password**.
 5. For managing Integration Server connections, see [Preferences](#).
- 2 Choose **Next** and continue with *Step 3: Select the Connection Type*.

Step 3: Select the Connection Type

☒ Create a new EntireX Adapter connection of type **IMS Connect Connection**

☐ Update Adapter Services or Listeners to an existing Integration Server connection:

List of Connections

| Connection Name | Package Name | Connection Type | Enabled |
|-------------------------------|--------------|------------------------|---------|
| Employees:EmployeesConnection | Employees | EntireX RPC Connection | Yes |

Total: 1

☒ Map Software AG IDL data types to String

☐ Create or Update REST resource

➤ To create a new connection

- 1 Select a connection type from the drop down list. Connection types are described under *EntireX Adapter Connections* in the EntireX Adapter documentation and *Introduction to the Integration Server Wrapper*.

Note: The list of connection types is filtered: connection types that require a license are only shown if a corresponding license file is available. Reliable RPC connections are only shown if all IDL programs contain only IN parameters. Also, if a server mapping file is available, only those connection types that support the interface type specified in the server mapping file are shown.
- 2 Click **Next** and continue with *Step 4: Define Adapter Services for an IMS Connect Connection*.

Step 4: Define Adapter Services for an IMS Connect Connection

The screenshot shows a configuration window titled "Packages on Integration Server localhost:5555". It contains a list of packages: Calculator, Default, Employees, and FLOW_Tutorial. Below the list, there are input fields for "Folder Name" (set to "Employee") and "Connection Name" (set to "EmployeeConnection", which is highlighted with a red rectangle). Under the "Connection to IMS Connect" section, there are fields for "Hostname" (daea.hq.sag), "Port" (3852), "User ID" (empty), "Password" (empty), and "DataStore ID" (IMSCF).

➤ To create a connection and related adapter services

- 1 Select a package for the created objects.
- 2 Define a folder name. If the folder does not exist, it will be created.
- 3 Define a connection name.
- 4 Define the parameters of the connection type. For details, see *Connection Parameters for Connections to IMS Connect* in the EntireX Adapter documentation.

As a result, the folder will contain the connection and the adapter services (one for each IDL program). The name of a service is the same as the respective IDL program.

The default settings for the adapter services are:

- the **Default** package; if not available, the first package
- the IDL library name for the **Folder Name**
- the IDL library name with the suffix "Connection" for the **Connection Name**



Note: When creating a connection, a package dependency is added such that the selected package depends on webMethods EntireX (the package `WmEntireX`) with the version currently used.

Task 3: Execute the Call from Integration Server to COBOL

From the **Service Development** perspective, refresh the package where the connection service was written, select the adapter service and use the service test to **Run Service**. This invokes the adapter service through the connector service.

Employees

Employees

getDetailsOfEmployee

getListOfEmployees

EmployeesConnection

Run As

1 Run in Browser

2 Run Service

| Name | Value |
|--------------|-------------|
| outRec | |
| EMPLOYEES | |
| EMPLOYEES[0] | |
| IDENT | 11100102 |
| FIRSTNAME | EDGAR |
| SURNAME | SCHINDLER |
| DATE-BIRTH | Dec 4, 1962 |
| EMPLOYEES[1] | |
| EMPLOYEES[2] | |
| EMPLOYEES[3] | |
| EMPLOYEES[4] | |
| errorCode | 00000000 |
| errorFlag | false |

In case of error or unexpected results:

- Check the Integration Server log or the EntireX Adapter log.

16

Calling COBOL on z/OS IMS BMP (Batch) from Integration Server

| | |
|--|-----|
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| ■ What do I need to Install for this Scenario? | 260 |
| ■ Task 1: Extract the Interface of a COBOL Server | 261 |
| ■ Task 2: Generate the Connection and Adapter Services in Integration Server | 273 |
| ■ Task 3: Execute the Call from Integration Server to COBOL | 277 |

This scenario uses the tools IDL Extractor for COBOL and Integration Server Wrapper of the Designer.

Introduction



- ❶ Extract the interface of the COBOL server program.
- ❷ Generate connection and adapter services in Integration Server.
- ❸ Execute the call from Integration Server to the COBOL server program.

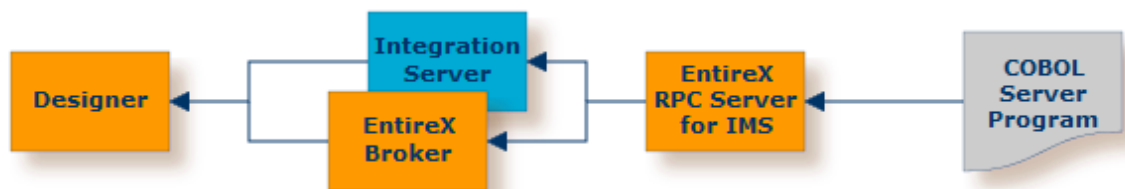
This scenario makes the following important assumptions:

For Task 1:

- You have a working COBOL IMS BMP server. For illustration and examples on such a server, see *IMS BMP with Standard Linkage Calling Convention* under *Introduction to the IDL Extractor for COBOL*.
- You have access to the related COBOL sources and copybooks. The minimum requirement is the `DATA DIVISION` of the interface. The sources and copybooks must be stored either
 - *locally*, that is, on the same machine where the Designer is running



- or *remotely* in a PDS or CA Librarian data set and accessed via the RPC Server for IMS, and either EntireX Broker or Integration Server



For Tasks 2 and 3:

- You can call the COBOL server program at runtime using different methods:
 - For the *EntireX RPC* connection method you need
 - EntireX Broker on one of the supported platforms: z/OS | Linux | Windows | BS2000
 - The *RPC Server for IMS*



- For the *EntireX Direct RPC* connection method you need:
 - the *RPC Server for IMS*



See also *Direct RPC* in the EntireX Adapter documentation.

What do I need to Install for this Scenario?

- You have Software AG Designer installed with EntireX plugins and Service Development plugins.
 - For EntireX plugins, see *Designer > EntireX Designer* under *EntireX Installation Packages* in the General Installation documentation.
 - For Service Development plugins, refer to the Integration Server documentation.
- You have an Integration Server with EntireX Adapter installed. See *Adapters > EntireX Adapter* under *EntireX Installation Packages* in the General Installation documentation.
- You have an RPC Server for IMS installed. See *Installing the RPC Server for IMS* in the z/OS Installation documentation.
- Optionally you have an EntireX Broker installed.
 - For Linux and Windows, see *EntireX Broker* under *EntireX Installation Packages* in the General Installation documentation.
 - For z/OS, see *Installing EntireX Broker under z/OS* in the z/OS Installation documentation.

Task 1: Extract the Interface of a COBOL Server

- [Introduction](#)
- [Sample COBOL Server used in the Examples](#)
- [Extracting a COBOL Server - Fast-track Method](#)
- [Extracting a COBOL Server - Modern Method with User-defined Mapping](#)
- [Comparison Chart: Fast-track versus User-defined Mapping](#)
- [Testing the Extraction Results](#)

Introduction

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The extraction process creates the following EntireX metafiles:

- IDL file. A Software AG IDL file contains definitions of the interface between client and server. See *Software AG IDL File* in the IDL Editor documentation in the IDL Editor documentation.
- Server mapping file (optional). The mapping file is a Designer file with extension .cvm that contains COBOL-specific mapping information. See *Server Mapping Files for COBOL* in the Designer documentation.

Sample COBOL Server used in the Examples

The following COBOL server is used to illustrate the features of the IDL Extractor for COBOL. Imagine an existing COBOL server called `EMPLOYEE`. It implements the access logic for a `LIST` and `DETAILS` function to a database view `EMPLOYEE`:

```

IDENTIFICATION DIVISION.
    PROGRAM-ID.      EMPLOYEE.
*****
*   Program Name    = EMPLOYEE
*   String Literal  = QUOTE
*****
01 DFHCOMMAREA.
    02 OPERATION                                PIC X(1).
        88 OPERATION-LIST                      VALUE 'L'.
        88 OPERATION-DETAILS                   VALUE 'D'.
    02 EMPLOYEE-ID                             PIC X(10).
    02 EMPLOYEE-DETAILS.
        03 FIRSTNAME                          PIC X(20).
        03 SURNAME                           PIC X(20).
        03 DATE-BIRTH                         PIC X(12).
        03 DETAILS                           PIC X(100).
        03 FILLER REDEFINES DETAILS.
            04 ANNUAL-SALARY                   PACKED-DECIMAL PIC S9(9).
            04 VACATION                        PIC S9(2).
            04 LANGUAGE                        PIC X(3).
            04 FILLER                          PIC X(90).
    02 EMPLOYEES-COUNT                         PIC 9(8) BINARY.
    02 EMPLOYEES OCCURS 1 TO 99 DEPENDING ON EMPLOYEES-COUNT.
        03 IDENT                             PIC X(10).
        03 FIRSTNAME                         PIC X(20).
        03 SURNAME                          PIC X(20).
        03 DATE-BIRTH                       PIC X(12).

```

Two approaches for extracting the COBOL server are described below:

- **Fast-track**

Learn how EntireX helps you to connect the COBOL Server with quick results.

- **User-defined Mapping**

The following features are among those available with a user-defined mapping:

- **Shape the interface to your COBOL server**

You can minimize the interface by suppressing COBOL server fields or by providing constant values. Renaming interfaces allows you to specify a readable long name. These two features together - constants and renaming of interfaces - are most powerful when multiple interfaces are implemented in a single COBOL server. Each function of the COBOL server triggered by an operation code or function code can be modelled as a separate IS service.

■ Select alternative mappings

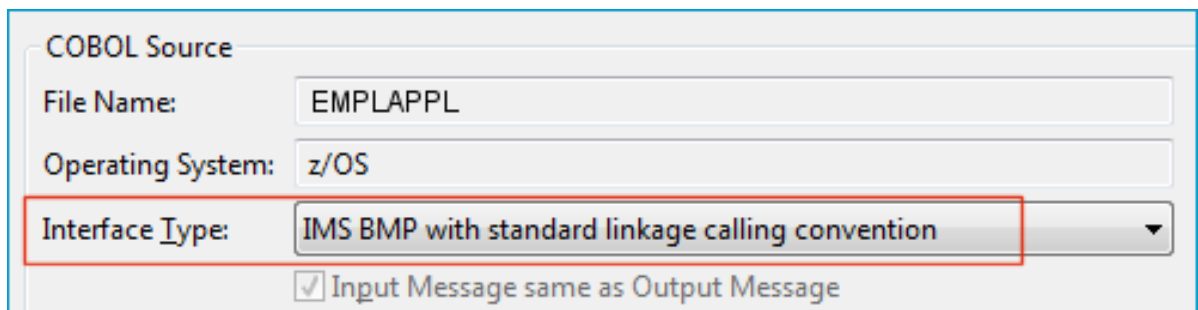
You can select alternative mappings for COBOL data items (REDEFINES, tables etc.) to enable scenarios with COBOL servers where data exchange is not fully described by the LINKAGE SECTION COBOL data items.

These approaches are described under *Fast-track Method* and *Modern Method* below.

Extracting a COBOL Server - Fast-track Method

➤ To extract the COBOL Server

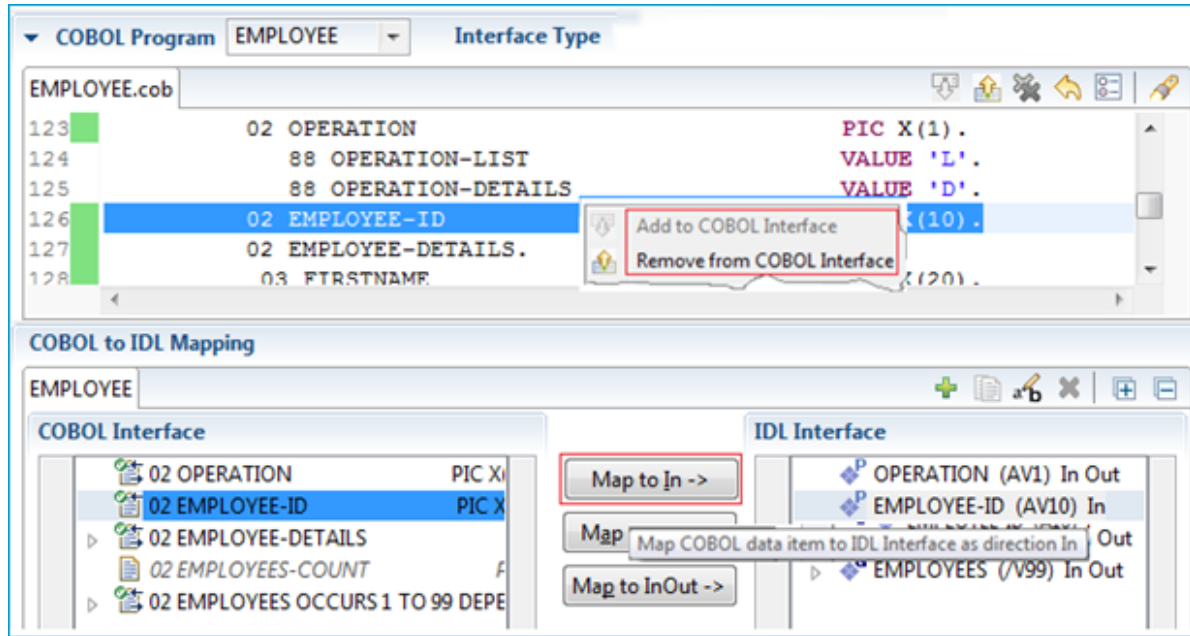
- 1 Switch to the **EntireX** perspective.
- 2 Call the IDL Extractor for COBOL.
- 3 Set the correct interface type as described under *Step 4: Define the Extraction Settings and Start Extraction under Scenario I: Create New IDL and Server Mapping Files* in the IDL Extractor for COBOL documentation.



The screenshot shows a dialog box titled "COBOL Source". It contains the following fields and options:

- File Name:** EMPLAPPL
- Operating System:** z/OS
- Interface Type:** A dropdown menu with the selected option "IMS BMP with standard linkage calling convention". This dropdown is highlighted with a red rectangle.
- ☒ Input Message same as Output Message

- 4 Press **Next** to enter the COBOL Mapping Editor.



The purpose of the COBOL Mapping Editor is to map COBOL data items to IDL (Interface Definition Language) parameters. It consists of three main areas:

- The upper window pane is the COBOL program source.
- The window pane on the left-hand side is the COBOL interface, consisting of COBOL data items representing the parameters in your COBOL server program.
- The window pane on the right-hand side is the IDL interface consisting of IDL parameters.

For more information see *Mapping Editor User Interface* in the IDL Extractor for COBOL documentation.

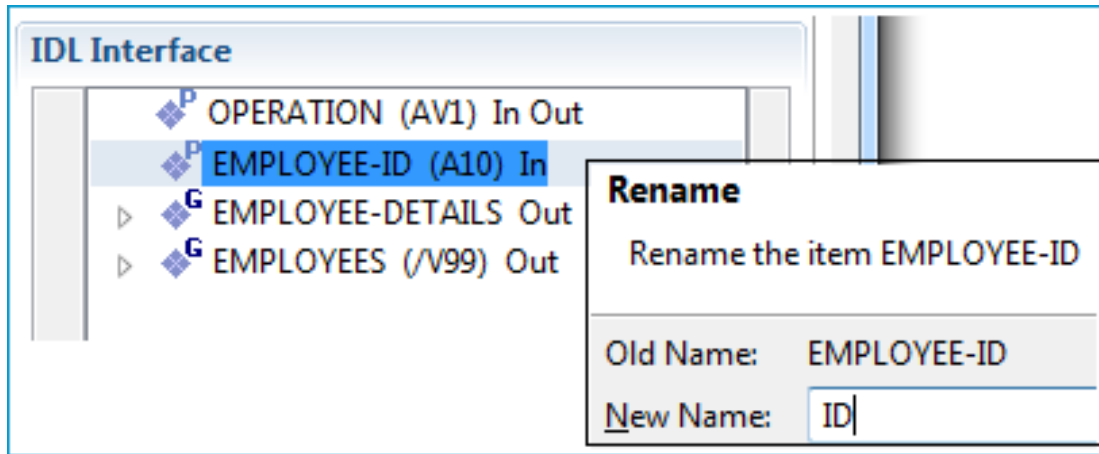
COBOL extraction is a two-step process:

- First, select the COBOL parameters using the **Add to** and **Remove from COBOL Interface** from the context menu on the COBOL data items in the upper window pane (COBOL source); in many situations the COBOL interface is detected by the Mapping Editor directly and you can omit this step.
- Then map the COBOL parameters to IDL directions using the **Map to In/Out/InOut** buttons. COBOL parameters do not have directions, they are always INOUT. This step can be left out for a quick test in non-production scenarios; for real production it is recommended to set IDL directions to reduce data transfer. You also have the option to assign a meaningful name to an IDL parameter if the original COBOL data item is not self-explanatory.

For our example:

- Set **Map to In** for COBOL data item `EMPLOYEE-ID` as IDL direction (see screenshot in previous step). For `EMPLOYEES-DETAILS` and `EMPLOYEES` perform the similar **Map to Out**.

- Use the function **Rename** from the context menu on the IDL parameters in the **IDL Interface** pane to rename COBOL parameter `EMPLOYEE-ID` to IDL parameter `ID`. Do the same for `EMPLOYEE-DETAILS`: Rename to `EMPLOYEE`.



- 5 Press **Finish**. The default extraction settings ensure you get useful results. The outcome is a Software AG IDL file (interface definition language), a Designer file with extension `.idl`:

```
library 'EMPLAPPL' is
program 'EMPLOYEE' is
  define data parameter
    1 OPERATION (AV1) In Out
    1 ID (AV10) In /* Original Name:EMPLOYEE-ID
    1 EMPLOYEE Out /* Original Name:EMPLOYEE-DETAILS
      2 FIRSTNAME (AV20)
      2 SURNAME (AV20)
      2 DATE-BIRTH (AV12)
      2 DETAILS (AV100)
    1 EMPLOYEES (/V99) Out
      2 IDENT (AV10)
      2 FIRSTNAME (AV20)
      2 SURNAME (AV20)
      2 DATE-BIRTH (AV12)
  end-define
```

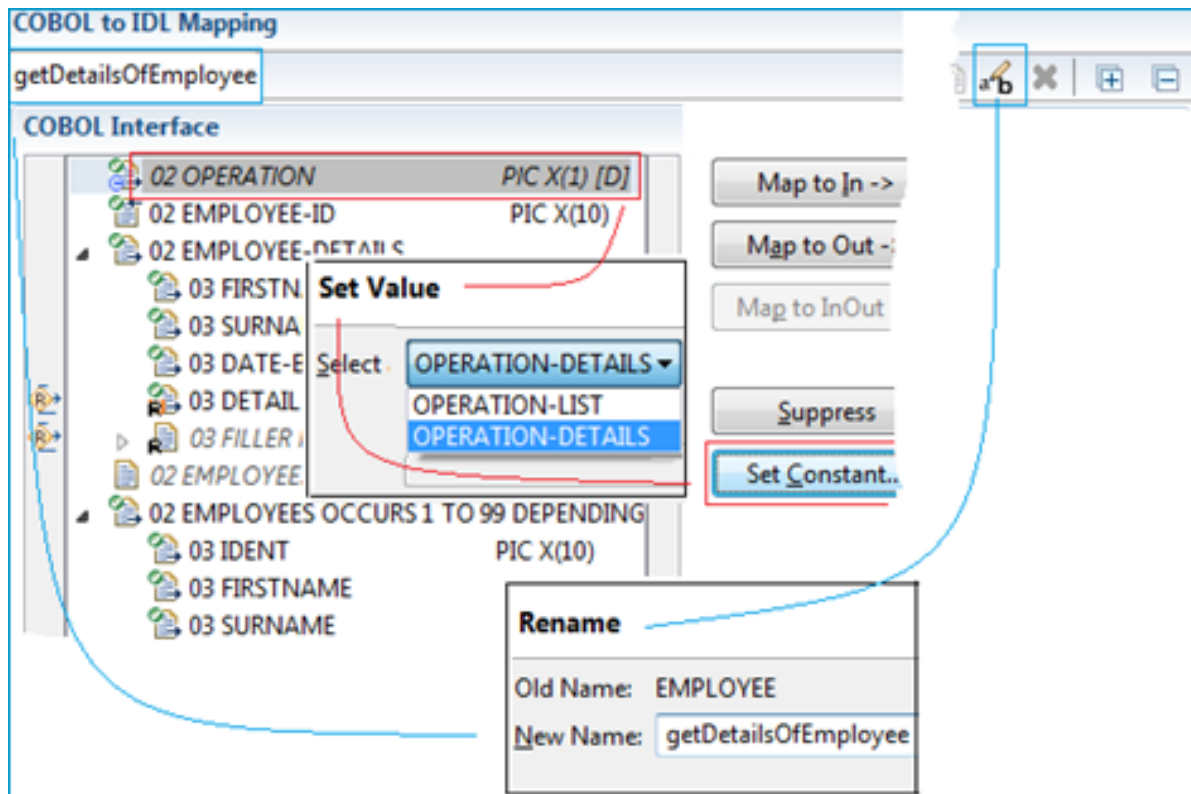
If required, a server mapping file with the same name as the IDL file but the extension `.cvm` may be generated too, for technical reasons. This file must always be stored together with the concomitant IDL file. For more information, see *Server Mapping Files for COBOL* in the Designer documentation. By default, the interface name `EMPLOYEE` is taken from the COBOL server program name.


Extracting a COBOL Server - Modern Method with User-defined Mapping

EntireX allows you to extract all implemented interfaces of the COBOL server separately. Instead of a large `EMPLOYEE` interface, separate interfaces `getListOfEmployees` and `getDetailsOfEmployee` are extracted. Each interface contains required parameters; obsolete parameters for an interface are suppressed, improving its usability.

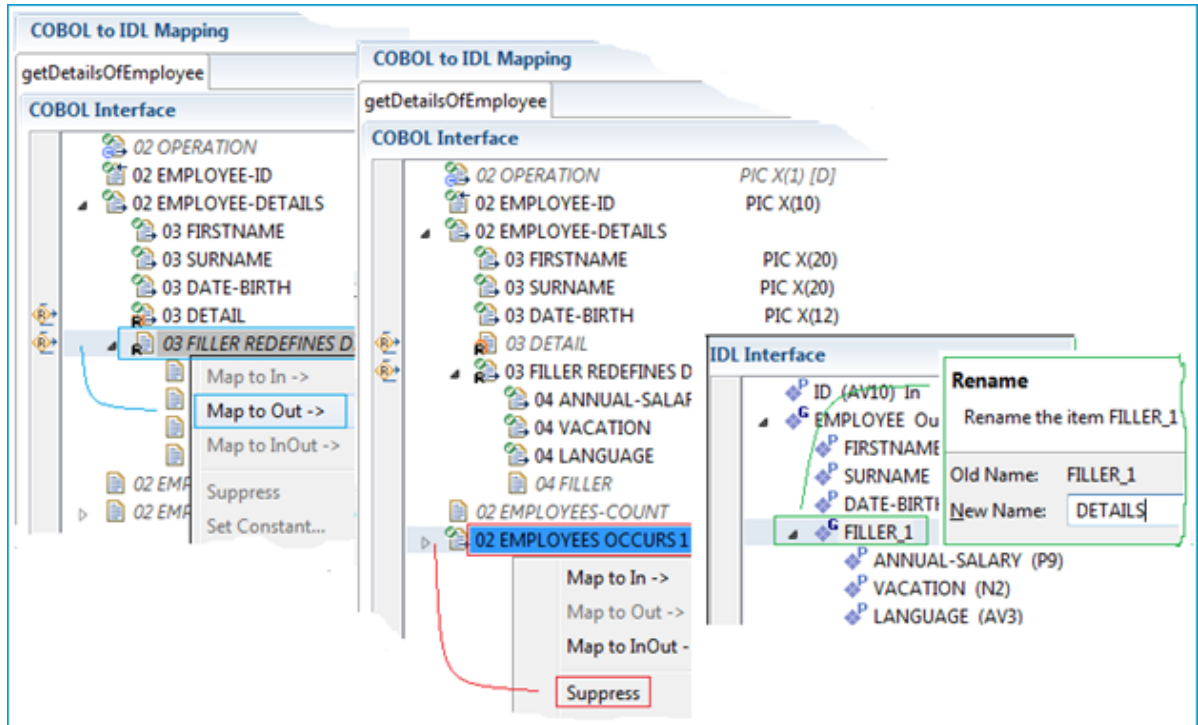
> To extract a COBOL server with a user-defined mapping

- 1 Shape `EMPLOYEE` to `getDetailsOfEmployee`:



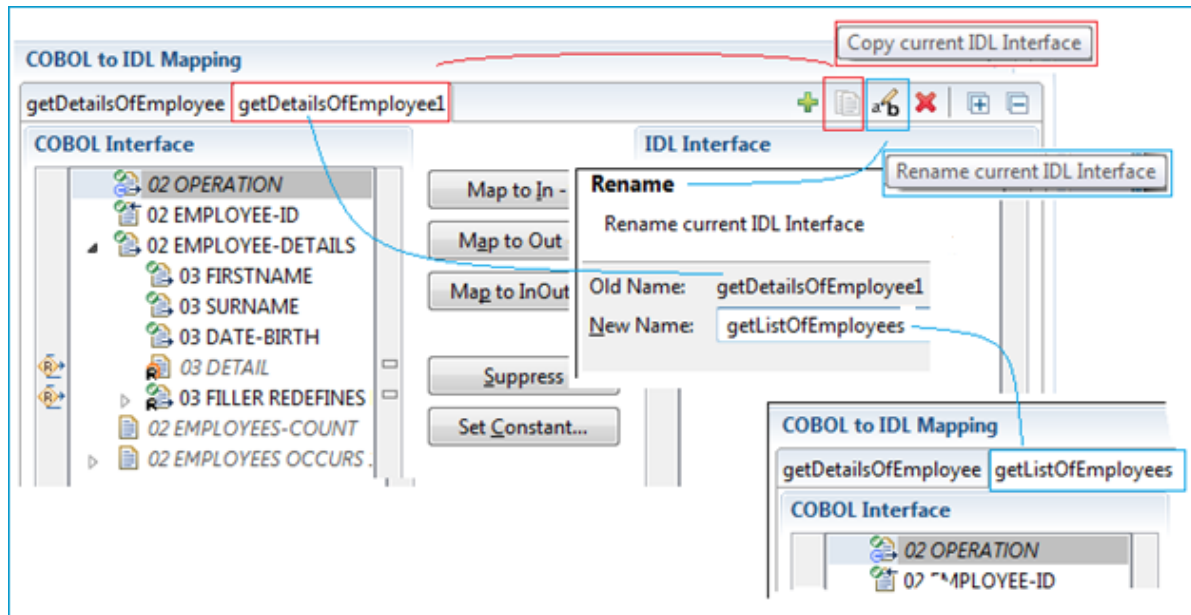
- Mark the `OPERATION` field in the COBOL **Interface** pane and press the **Set Constant** button. In the pop-up window, select `OPERATION-DETAILS` (red markers). The `OPERATION-DETAILS` value originates from COBOL level-88 data item (blue markers). If there is no COBOL level-88 enumeration type in the COBOL program defined, you can enter the function code manually in the pop-up window.
- By default the IDL interface gets the same name as your COBOL server: `EMPLOYEE`. Use the **Rename** button  from the toolbar of the COBOL Mapping Editor and change the IDL interface name to `getDetailsOfEmployee` (blue markers). This name is used as the IS service name later.

- 2 Continue shaping, making `getDetailsOfEmployee` easier to use:




- Use the context menu of the redefinition of the `DETAIL` field in the **COBOL Interface** pane, `FILLER REDEFINES DETAIL` and choose **Map to Out** (blue markers). A redefinition is a secondary layout (field types) of the same memory area. The redefinition contains more specific information (`ANNUAL-SALARY`, `VACATION`, etc.) than character buffer `DETAIL`. This is the reason why it is more useful in your interface.
- Use the context menu of `FILLER_1` in the IDL interface pane and rename `FILLER_1` to `DETAILS` (green markers) for a readable IS service field name later.
- The `DETAILS` function in the COBOL server does not make use of the `EMPLOYEES` field. Therefore you can leave it out of the interface: use the context menu of the `EMPLOYEES` field in the **COBOL Interface** pane and choose **Suppress** (red markers).


3 Shape `EMPLOYEE` to `getListOfEmployees` Function:



The COBOL Mapping Editor allows you to define multiple IDL interfaces to the same COBOL server:

- You create the additional IDL interface using the toolbar button **Copy current IDL interface**

 (red markers). A new tab `getDetailsOfEmployee1` is created. The previously extracted `getDetailsOfEmployee` interface still exists in the first tab. Once you reactivate the first tab, you will see the interface of `getDetailsOfEmployee` again.

- Use the **Rename** button  from the toolbar of the COBOL Mapping Editor and change the IDL interface name to `getListOfEmployees` (blue markers). This name is used as the IS service name later.

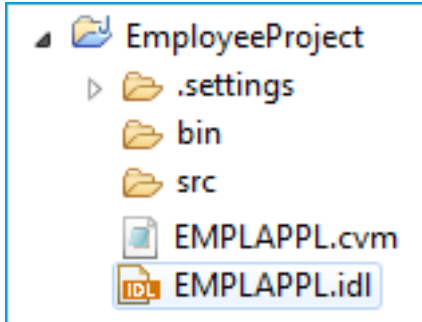
- For the `LIST` function you need the `OPERATION-LIST` value in the `OPERATION` field: Mark the `OPERATION` field in the **COBOL Interface** pane and press the **Set Constant** button. In the pop-up window, select `OPERATION-LIST` (similar to Step 1. above *Shape `EMPLOYEE` to `getDetailsOfEmployee`*; red markers).

- Use the context menu of the `EMPLOYEES` field in the **COBOL Interface** pane, `EMPLOYEES OCCURS 1 TO 99` and choose **Map to Out** (Similar to Step 2. above *Continue shaping, making `getDetailsOfEmployee` easier to use*; blue markers).

- Because the `EMPLOYEE` and `EMPLOYEE-DETAIL` fields are not used in the COBOL server `LIST` function, you leave them out in the IDL interface: use the context menu of `EMPLOYEE-DETAIL` field in the **COBOL Interface** pane and choose **Suppress** (similar to Step 2. above *Continue shaping, making `getDetailsOfEmployee` easier to use*; red markers). Do the same for the `EMPLOYEE-ID` field.

- 4 Press **Finish** to retrieve the extraction result in the form of a Software AG IDL file. At the same time, a server mapping file for COBOL (Designer file with extension `.cvm`) is created.

See *Server Mapping Files for COBOL* in the Designer documentation. The *Software AG IDL File* in the IDL Editor documentation describes the interfaces from the client point of view, while the server mapping file contains the mapping to the real COBOL server. Both of these files must be kept together and in sync, otherwise a call to the COBOL server may fail.



To summarize: We created two IDL interfaces. In the IDL file, these resulted in two IDL programs: `getListOfEmployees` and `getDetailsOfEmployee`. Both IDL programs were given readable names (Steps 1 and 3). Meaningful fields were kept, while superfluous fields were suppressed (Steps 1 and 3). The program `getDetailsOfEmployee` contains the redefined fields of parameter `DETAILS` (see below) mapped during extraction (Step 1).



Note: At runtime, the RPC client generated with the extracted interface will send data for the redesigned interfaces, while your COBOL server still expects `EMPLOYEE` data. The EntireX runtime transforms the incoming data stream from the RPC client, using the server mapping file.

```

program 'getDetailsOfEmployee' is
  define data parameter
    1 ID (AV10) In /* Original Name:EMPLOYEE-ID
    1 EMPLOYEE Out /* Original Name:EMPLOYEE-DETAILS
    2 FIRSTNAME (AV20)
    2 SURNAME (AV20)
    2 DATE-BIRTH (AV12)
    2 DETAILS /* Original Name:FILLER_1
    3 ANNUAL-SALARY (P9)
    3 VACATION (N2)
    3 LANGUAGE (AV3)
  end-define
  program 'getListOfEmployees' is
    1 EMPLOYEES (/V99) Out
    2 IDENT (AV10)
    2 FIRSTNAME (AV20)
    2 SURNAME (AV20)
    2 DATE-BIRTH (AV12)
  end-define

```

Comparison Chart: Fast-track versus User-defined Mapping

The following table highlights the differences when shaping an interface with a *user-defined mapping* compared with a *fast-path extraction*.

| | Interface Shaping with User-defined Mapping | Fast-path Extraction |
|----------------------------------|---|---|
| General | User-defined interface with dedicated mapping. For our example, the interfaces are small and tidy and more self-explanatory with long, readable interface names. They are easier to use with the hidden <code>OPERATION</code> field and the suppressed COBOL fields, which are not needed. | Automatic, quick result extraction with COBOL-like interfaces on IS. For our example, the IS interface <code>EMPLOYEE</code> matches exactly 1:1, field by field. |
| IS service(s) | Multiple small and handy IS services; each <code>OPERATION</code> code is mapped to a separate IS service. | One big IS service. |
| IS service name | Readable long name. | Short Subprogram name; up to 8 characters. |
| IS fields | Usage of Suppress and Set Constant reduces the message length. This keeps focus on relevant data items and keeps the client's interface clean. It may also improve performance. | The IS fields and COBOL server parameters match 1:1. As COBOL layout descriptions are sometimes used for many different purposes, irrelevant data items appear and clutter up the IS interface. |
| <code>OPERATION</code> parameter | Suppressed: the <code>OPERATION</code> parameter does not exist in the IS service as an IS field. | The <code>OPERATION</code> parameter exists in the IS service as an IS field and needs to be filled-in by the client endpoint. |
| <code>OPERATION</code> code | The <code>OPERATION</code> code is provided internally by EntireX runtime in the <code>OPERATION</code> field. | The <code>OPERATION</code> code needs to be specified in the IS service in the <code>OPERATION</code> field by the client endpoint. |
| <code>REDEFINE</code> parameters | Either the parameter that is redefined or one of its redefinitions is available as an IS field. | Only the parameter that is redefined is available as an IS field. Redefinitions of the parameter are not available as IS fields. |

A user-defined mapping enables you also to define alternative mappings for COBOL data items (`REDEFINES`, tables etc.). These enable scenarios with COBOL servers where data exchange is not fully described by the `LINKAGE SECTION` COBOL data items. For more information refer to the IDL Extractor for COBOL documentation:

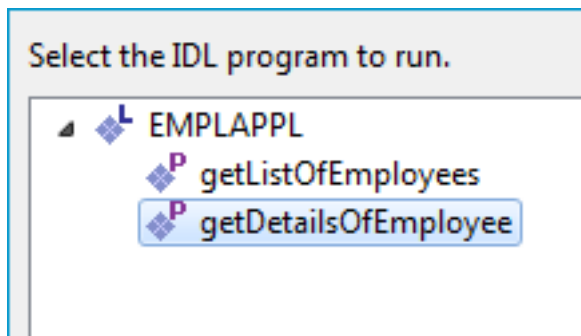
- *Mapping Editor IDL Interface Mapping Functions*
- *User-defined Mapping*

Testing the Extraction Results

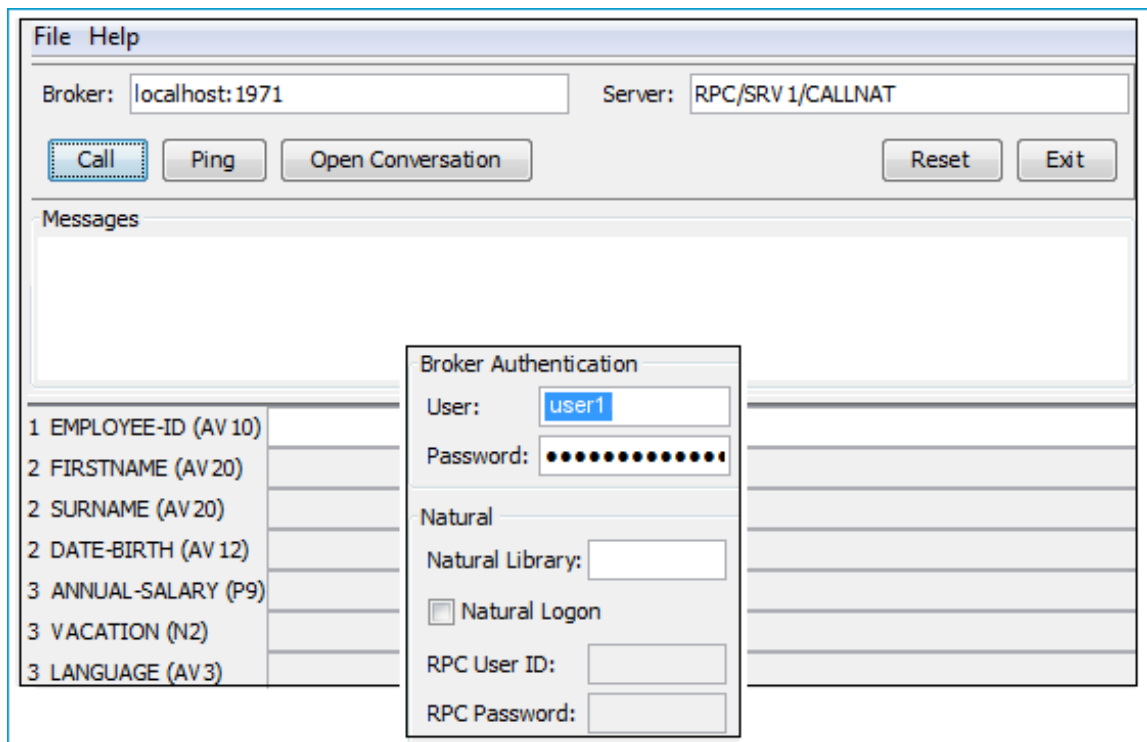
The following pictures use the extraction results described under *Extracting a COBOL Server - Modern Method with User-defined Mapping*.

> To test the extraction results (optional)

- 1 You can test the results of the extraction operation and the COBOL server back end, using the EntireX IDL Tester. From the context menu of the IDL file in the Designer, choose **Software AG IDL Tester**.



- 2 Select `getDetailsOfEmployee`.



Note that the broker and server parameters contain the explicit route to call the server program, and you can optionally ping the connection from this client. With the **File > Options** dialog, you can set:

- **User** and **Password** for *broker* authentication
- **RPC User ID** and **RPC Password** for *server* authentication

See *EntireX IDL Tester* in the Designer documentation.

- 3 Check the Integration Server log, the EntireX Adapter log or the RPC logs. Applies to all connection methods.

Task 2: Generate the Connection and Adapter Services in Integration Server

This section describes your first steps to create a new Integration Server connection. This is described in more detail under *Using the Integration Server Wrapper*, for example working with existing Integration Server connections. This section covers the following topics:

- [Step 1: Start the Integration Server Wrapper Wizard](#)
- [Step 2: Create a New Integration Server Connection](#)
- [Step 3: Select the Connection Type](#)
- [Step 4: Define Adapter Services for an RPC Connection](#)

Step 1: Start the Integration Server Wrapper Wizard

➤ To start the Integration Server Wrapper wizard

- 1 In the context menu of a Software AG IDL file, choose **Integration Server > Generate web-Methods IS Connection**.

This starts the wizard with a list of existing Integration Server Wrapper connections.



Note: If the selected IDL file is not valid because of a syntax error, an error dialog comes up and the wizard does not start.

- 2 Continue with *Step 2: Create a New Integration Server Connection*.

Step 2: Create a New Integration Server Connection

Define New Integration Server Connection

Add host:port, user and password for a new Integration Server

Server:

User:

Password:

☐
Use secure connection

➤ To create a new Integration Server connection

- 1 Define the new Integration Server connection on the wizard page.



Notes:

1. The only required field is **Server**. Enter the hostname of the Integration Server including an optional port number. If no port number is specified, port number defaults to "5555". The **Integration Server Authentication** can be passed with the **User** and **Password** fields.
 2. Optional settings are for secure connections. The **Truststore for HTTPS** contains all signed certificates and must be a valid truststore.
 3. The check box **Verify host name** checks that the hostname is entered in the stored certificate.
 4. When the Integration Server has **Client Authentication** enabled, you can specify your **Keystore** file and keystore **Password**.
 5. For managing Integration Server connections, see [Preferences](#).
- 2 Choose **Next** and continue with *Step 3: Select the Connection Type*.

Step 3: Select the Connection Type

☒ Create a new EntireX Adapter connection of type: **EntireX RPC Connection**

☐ Update Adapter Services or Listeners to an existing Integration Server connection:

List of Connections

| Connection Name | Package Name | Connection Type | Enabled |
|-------------------------------|--------------|------------------------|---------|
| Employees:EmployeesConnection | Employees | EntireX RPC Connection | Yes |

Total: 1

☒ Map Software AG IDL data types to String

☐ Create or Update REST resource

> To create a new connection

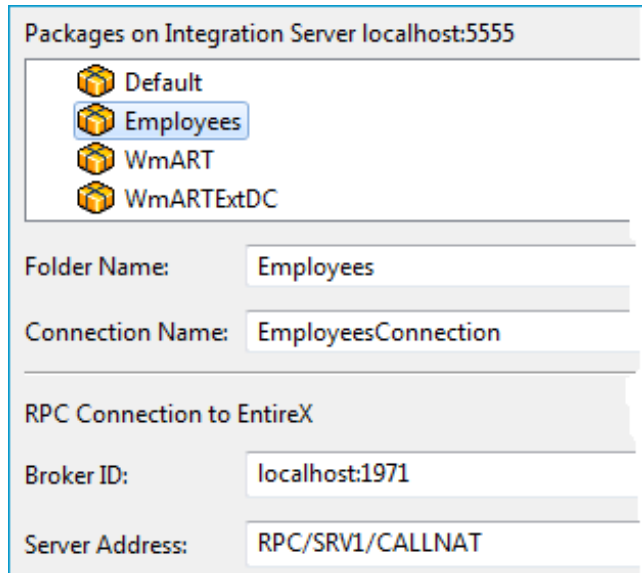
- 1 Select a connection type from the drop down list. Connection types are described under *EntireX Adapter Connections* in the EntireX Adapter documentation and *Introduction to the Integration Server Wrapper*.



Note: The list of connection types is filtered: connection types that require a license are only shown if a corresponding license file is available. Reliable RPC connections are only shown if all IDL programs contain only IN parameters. Also, if a server mapping file is available, only those connection types that support the interface type specified in the server mapping file are shown.

- 2 Click **Next** and continue with *Step 4: Define Adapter Services for an RPC Connection*.

Step 4: Define Adapter Services for an RPC Connection



Packages on Integration Server localhost:5555

- Default
- Employees**
- WmART
- WmARTEExtDC

Folder Name: Employees

Connection Name: EmployeesConnection

RPC Connection to EntireX

Broker ID: localhost:1971

Server Address: RPC/SRV1/CALLNAT

> To create a connection and related adapter services

- 1 Select an existing package or create a new package for the created objects.
- 2 Define a folder name. If the folder does not exist, it will be created.
- 3 Define a connection name.
- 4 Define the parameters of the connection type. For details, see *Connection Parameters for RPC Connections* in the EntireX Adapter documentation.

As a result, the folder will contain the connection and the adapter services (one for each IDL program). The name of a service is the same as the respective IDL program.

The default settings for the adapter services are:

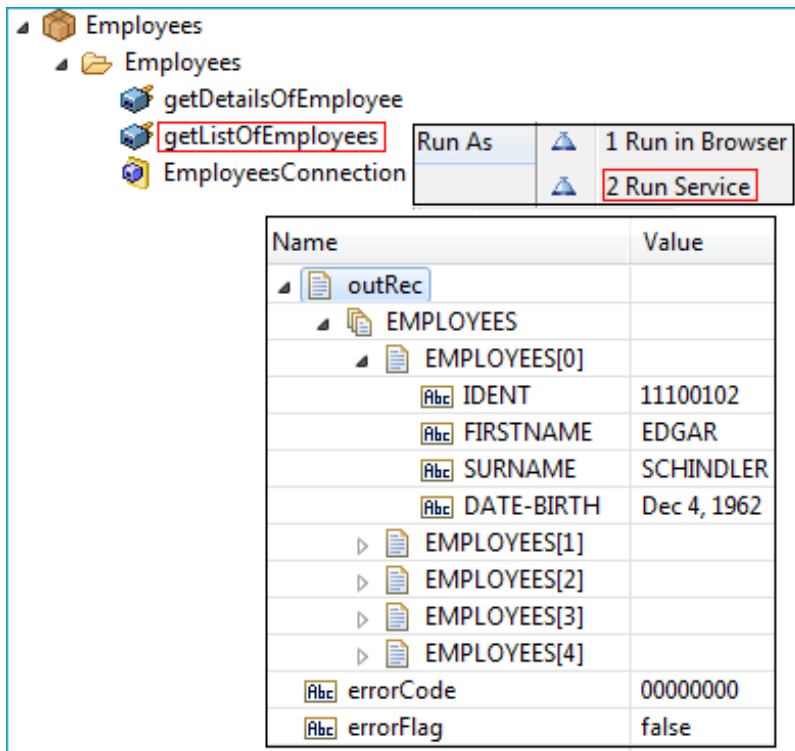
- the **Default** package; if not available, the first package
- the IDL library name for the **Folder Name**
- the IDL library name with the suffix "Connection" for the **Connection Name**



Note: When creating a connection, a package dependency is added such that the selected package depends on webMethods EntireX (the package `WmEntireX`) with the version currently used.

Task 3: Execute the Call from Integration Server to COBOL

From the **Service Development** perspective, refresh the package where the connection service was written, select the adapter service and use the service test to **Run Service**. This invokes the adapter service through the connector service.



The screenshot shows the 'Employees' package in the Service Development perspective. The 'getListOfEmployees' service is selected, and the 'Run As' dropdown is set to '2 Run Service'. Below, the 'outRec' table shows the results of the service call.

| Name | Value |
|--------------|-------------|
| outRec | |
| EMPLOYEES | |
| EMPLOYEES[0] | |
| IDENT | 11100102 |
| FIRSTNAME | EDGAR |
| SURNAME | SCHINDLER |
| DATE-BIRTH | Dec 4, 1962 |
| EMPLOYEES[1] | |
| EMPLOYEES[2] | |
| EMPLOYEES[3] | |
| EMPLOYEES[4] | |
| errorCode | 00000000 |
| errorFlag | false |

In case of error or unexpected results:

- Check the Integration Server log, the EntireX Adapter log or the RPC logs.
- Use the IDL Tester as described under [Task 1](#) above.

17

Calling COBOL on BS2000 from Integration Server

| | |
|--|-----|
| ■ Introduction | 281 |
| ■ What do I need to Install for this Scenario? | 282 |
| ■ Task 1: Extract the Interface of a COBOL Server | 283 |
| ■ Task 2: Generate the Connection and Adapter Services in Integration Server | 295 |
| ■ Task 3: Execute the Call from Integration Server to COBOL | 299 |

This scenario uses the tools IDL Extractor for COBOL and Integration Server Wrapper of the Designer.

Introduction



- ❶ Extract the interface of the COBOL server program.
- ❷ Generate connection and adapter services in Integration Server.
- ❸ Execute the call from Integration Server to the COBOL server program.

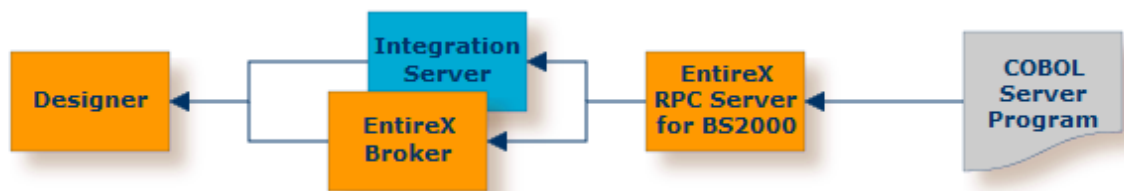
This scenario makes the following important assumptions:

For Task 1:

- You have a working COBOL batch server. For illustration and examples on such a server, see *Batch with Standard Linkage Calling Convention* under *Introduction to the IDL Extractor for COBOL*.
- You have access to the related COBOL sources and copybooks. The minimum requirement is the `DATA DIVISION` of the interface. The sources and copybooks must be stored either
 - *locally*, that is, on the same machine where the Designer is running



- or *remotely* in LMS libraries and accessed via the *RPC Server for BS2000* and either EntireX Broker or Integration Server



For Tasks 2 and 3:

- You can call the COBOL server program at runtime using different methods:
 - For the *EntireX RPC Connection* method you need
 - EntireX Broker on one of the supported platforms: z/OS | Linux | Windows | BS2000
 - the *RPC Server for BS2000*



- For the *EntireX Direct RPC* connection method you need:
 - the *RPC Server for BS2000*



See also *Direct RPC* in the EntireX Adapter documentation.

What do I need to Install for this Scenario?

- You have Software AG Designer installed with EntireX plugins and Service Development plugins.
 - For EntireX plugins, see *Designer > EntireX Designer* under *EntireX Installation Packages* in the General Installation documentation.
 - For Service Development plugins, refer to the Integration Server documentation.
- You have an Integration Server with EntireX Adapter installed. See *Adapters > EntireX Adapter* under *EntireX Installation Packages* in the General Installation documentation.
- You have an RPC Server for BS2000 installed. See *Installing the RPC Server for BS2000* in the BS2000 Installation documentation.
- Optionally, for RPC Connection method (Task 3), you have an EntireX Broker installed.
 - For Linux and Windows, see *EntireX Broker* under *EntireX Installation Packages* in the General Installation documentation.

Task 1: Extract the Interface of a COBOL Server

- [Introduction](#)
- [Sample COBOL Server used in the Examples](#)
- [Extracting a COBOL Server - Fast-track Method](#)
- [Extracting a COBOL Server - Modern Method with User-defined Mapping](#)
- [Comparison Chart: Fast-track versus User-defined Mapping](#)
- [Testing the Extraction Results](#)

Introduction

Follow the instructions for extracting COBOL, see *Using the IDL Extractor for COBOL - Overview* and choose *Scenario I: Create New IDL and Server Mapping Files* if this is your first extraction. Learn how to invoke the IDL Extractor for COBOL, create a COBOL Extractor Environment and about the possibilities to select the COBOL source.

The extraction process creates the following EntireX metafiles:

- IDL file. A Software AG IDL file contains definitions of the interface between client and server. See *Software AG IDL File* in the IDL Editor documentation in the IDL Editor documentation.
- Server mapping file (optional). The mapping file is a Designer file with extension .cvm that contains COBOL-specific mapping information. See *Server Mapping Files for COBOL* in the Designer documentation.

Sample COBOL Server used in the Examples

The following COBOL server is used to illustrate the features of the IDL Extractor for COBOL. Imagine an existing COBOL server called `EMPLOYEE`. It implements the access logic for a `LIST` and `DETAILS` function to a database view `EMPLOYEE`:

```

IDENTIFICATION DIVISION.
    PROGRAM-ID.      EMPLOYEE.
*****
*   Program Name    = EMPLOYEE
*   String Literal  = QUOTE
*****
01 DFHCOMMAREA.
    02 OPERATION                                PIC X(1).
        88 OPERATION-LIST                      VALUE 'L'.
        88 OPERATION-DETAILS                  VALUE 'D'.
    02 EMPLOYEE-ID                              PIC X(10).
    02 EMPLOYEE-DETAILS.
        03 FIRSTNAME                          PIC X(20).
        03 SURNAME                            PIC X(20).
        03 DATE-BIRTH                        PIC X(12).
        03 DETAILS                          PIC X(100).
        03 FILLER REDEFINES DETAILS.
            04 ANNUAL-SALARY          PACKED-DECIMAL PIC S9(9).
            04 VACATION                PIC S9(2).
            04 LANGUAGE                PIC X(3).
            04 FILLER                  PIC X(90).
    02 EMPLOYEES-COUNT                          PIC 9(8) BINARY.
    02 EMPLOYEES OCCURS 1 TO 99 DEPENDING ON EMPLOYEES-COUNT.
        03 IDENT                          PIC X(10).
        03 FIRSTNAME                      PIC X(20).
        03 SURNAME                        PIC X(20).
        03 DATE-BIRTH                    PIC X(12).

```

Two approaches for extracting the COBOL server are described below:

- **Fast-track**

Learn how EntireX helps you to connect the COBOL Server with quick results.

- **User-defined Mapping**

The following features are among those available with a user-defined mapping:

- **Shape the interface to your COBOL server**

You can minimize the interface by suppressing COBOL server fields or by providing constant values. Renaming interfaces allows you to specify a readable long name. These two features together - constants and renaming of interfaces - are most powerful when multiple interfaces are implemented in a single COBOL server. Each function of the COBOL server triggered by an operation code or function code can be modelled as a separate IS service.

■ Select alternative mappings

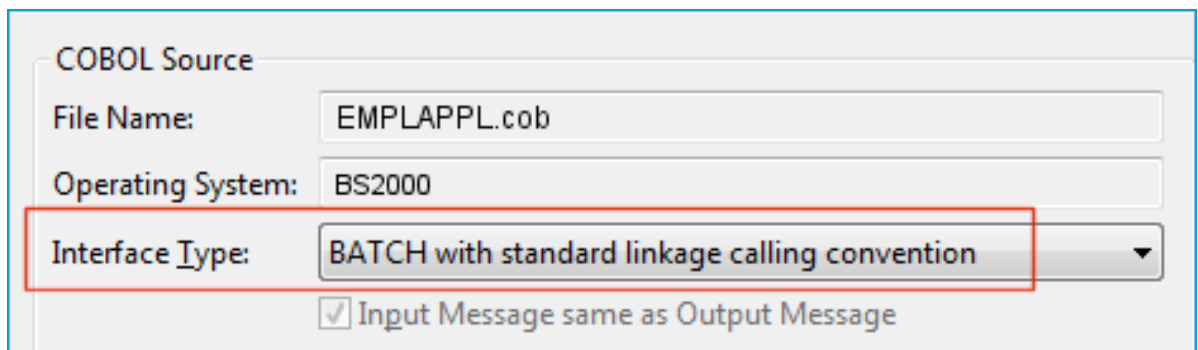
You can select alternative mappings for COBOL data items (REDEFINES, tables etc.) to enable scenarios with COBOL servers where data exchange is not fully described by the LINKAGE SECTION COBOL data items.

These approaches are described under *Fast-track Method* and *Modern Method* below.

Extracting a COBOL Server - Fast-track Method

➤ To extract the COBOL Server

- 1 Switch to the **EntireX** perspective.
- 2 Call the IDL Extractor for COBOL.
- 3 Set the correct interface type as described under *Step 4: Define the Extraction Settings and Start Extraction* under *Scenario I: Create New IDL and Server Mapping Files* in the IDL Extractor for COBOL documentation.



COBOL Source

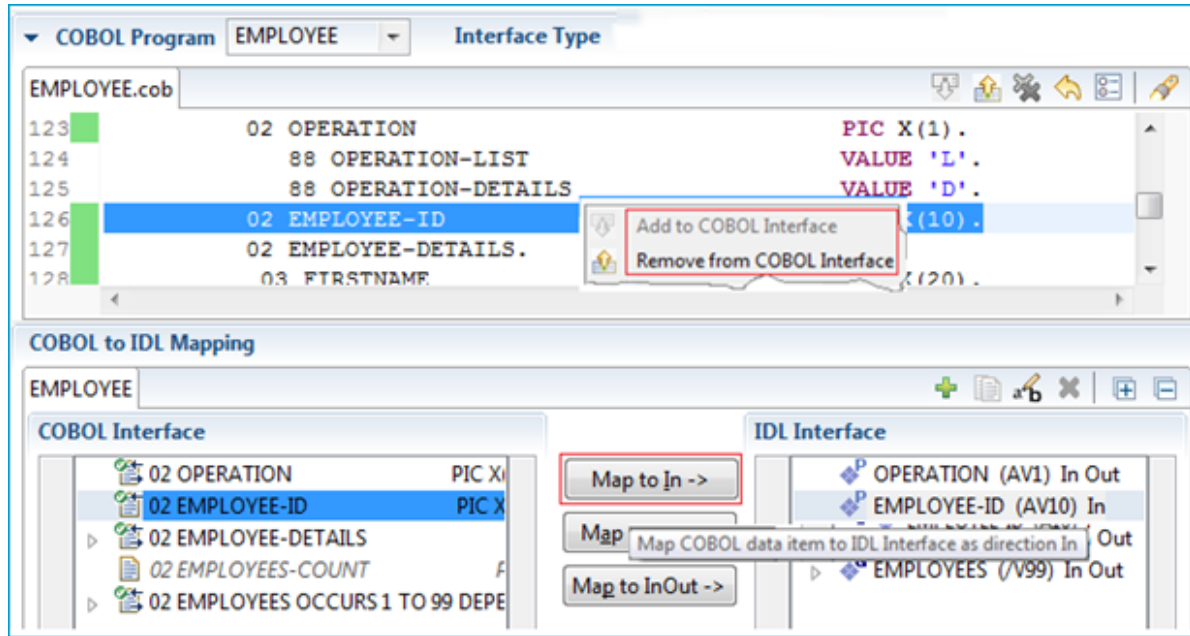
File Name: EMPLAPPL.cob

Operating System: BS2000

Interface Type: BATCH with standard linkage calling convention ▼

☒ Input Message same as Output Message

- 4 Press **Next** to enter the COBOL Mapping Editor.



The purpose of the COBOL Mapping Editor is to map COBOL data items to IDL (Interface Definition Language) parameters. It consists of three main areas:

- The upper window pane is the COBOL program source.
- The window pane on the left-hand side is the COBOL interface, consisting of COBOL data items representing the parameters in your COBOL server program.
- The window pane on the right-hand side is the IDL interface consisting of IDL parameters.

For more information see *Mapping Editor User Interface* in the IDL Extractor for COBOL documentation.

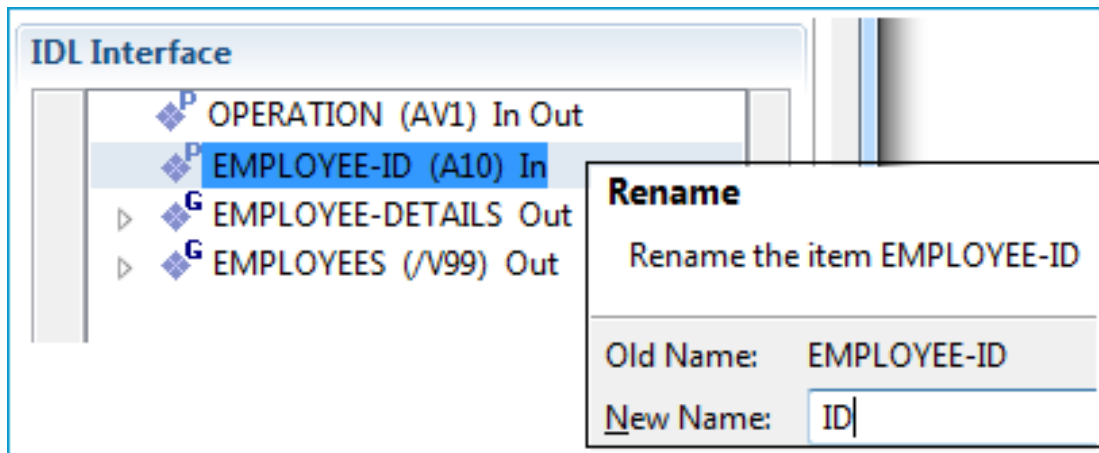
COBOL extraction is a two-step process:

- First, select the COBOL parameters using the **Add to** and **Remove from COBOL Interface** from the context menu on the COBOL data items in the upper window pane (COBOL source); in many situations the COBOL interface is detected by the Mapping Editor directly and you can omit this step.
- Then map the COBOL parameters to IDL directions using the **Map to In/Out/InOut** buttons. COBOL parameters do not have directions, they are always INOUT. This step can be left out for a quick test in non-production scenarios; for real production it is recommended to set IDL directions to reduce data transfer. You also have the option to assign a meaningful name to an IDL parameter if the original COBOL data item is not self-explanatory.

For our example:

- Set **Map to In** for COBOL data item `EMPLOYEE-ID` as IDL direction (see screenshot in previous step). For `EMPLOYEES-DETAILS` and `EMPLOYEES` perform the similar **Map to Out**.

- Use the function **Rename** from the context menu on the IDL parameters in the **IDL Interface** pane to rename COBOL parameter `EMPLOYEE-ID` to IDL parameter `ID`. Do the same for `EMPLOYEE-DETAILS`: Rename to `EMPLOYEE`.



- 5 Press **Finish**. The default extraction settings ensure you get useful results. The outcome is a Software AG IDL file (interface definition language), a Designer file with extension `.idl`:

```
library 'EMPLAPPL' is
program 'EMPLOYEE' is
define data parameter
  1 OPERATION (AV1) In Out
  1 ID (AV10) In /* Original Name:EMPLOYEE-ID
  1 EMPLOYEE Out /* Original Name:EMPLOYEE-DETAILS
    2 FIRSTNAME (AV20)
    2 SURNAME (AV20)
    2 DATE-BIRTH (AV12)
    2 DETAILS (AV100)
  1 EMPLOYEES (/V99) Out
    2 IDENT (AV10)
    2 FIRSTNAME (AV20)
    2 SURNAME (AV20)
    2 DATE-BIRTH (AV12)
end-define
```

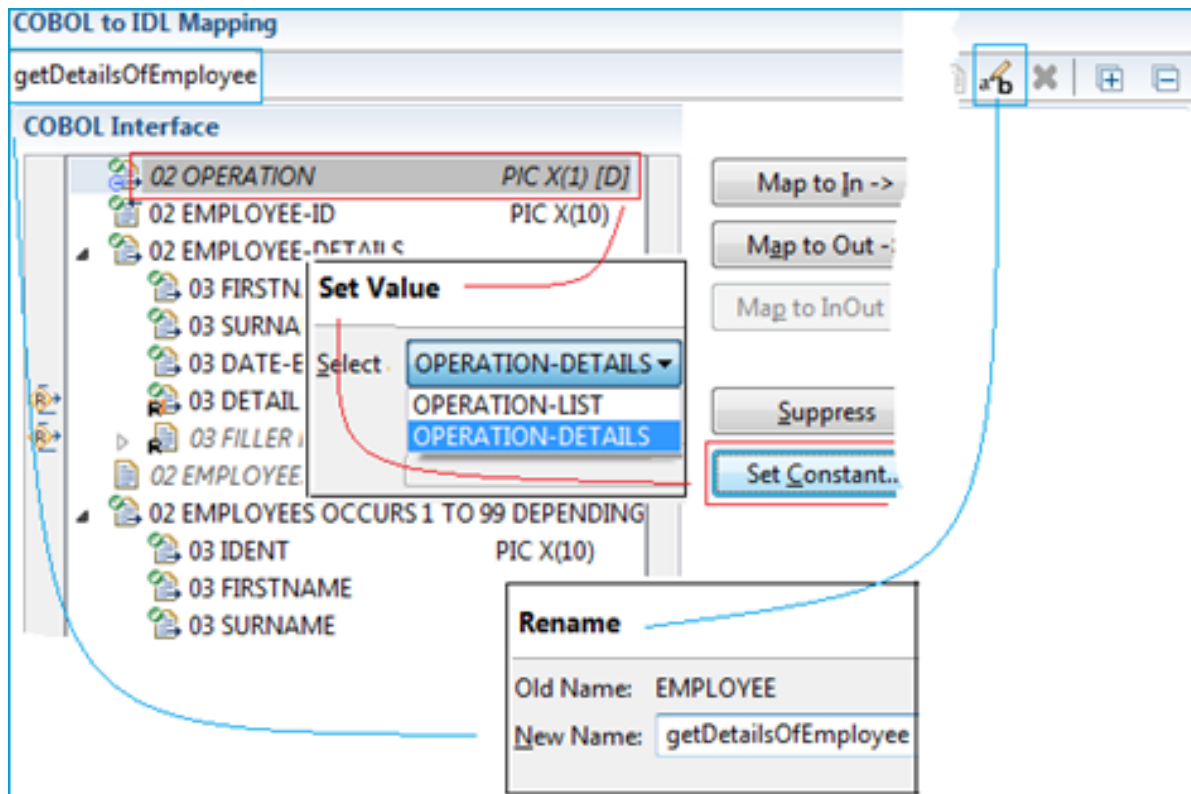
If required, a server mapping file with the same name as the IDL file but the extension `.cvm` may be generated too, for technical reasons. This file must always be stored together with the concomitant IDL file. For more information, see *Server Mapping Files for COBOL* in the Designer documentation. By default, the interface name `EMPLOYEE` is taken from the COBOL server program name.


Extracting a COBOL Server - Modern Method with User-defined Mapping

EntireX allows you to extract all implemented interfaces of the COBOL server separately. Instead of a large `EMPLOYEE` interface, separate interfaces `getListOfEmployees` and `getDetailsOfEmployee` are extracted. Each interface contains required parameters; obsolete parameters for an interface are suppressed, improving its usability.

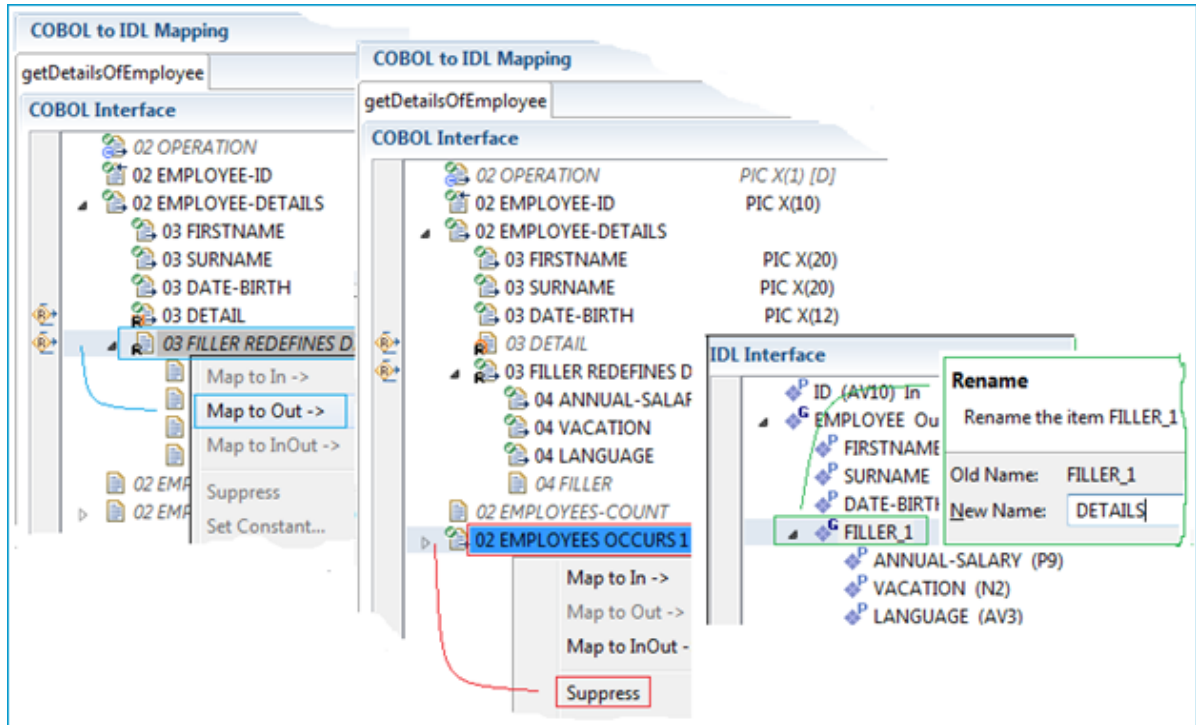
> To extract a COBOL server with a user-defined mapping

- 1 Shape `EMPLOYEE` to `getDetailsOfEmployee`:



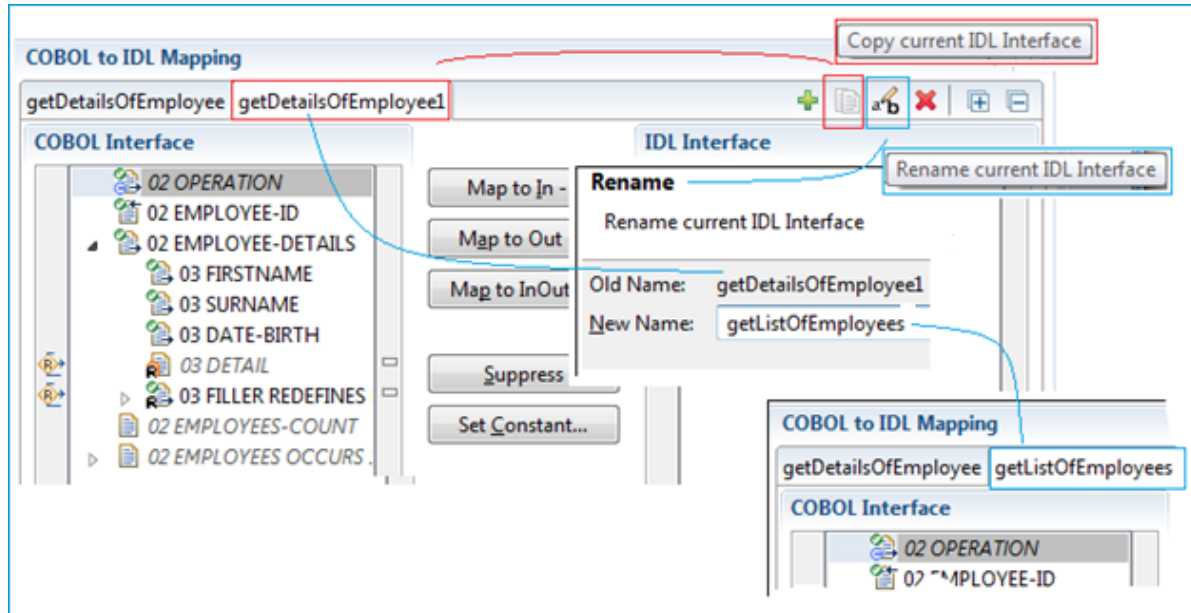
- Mark the `OPERATION` field in the COBOL **Interface** pane and press the **Set Constant** button. In the pop-up window, select `OPERATION-DETAILS` (red markers). The `OPERATION-DETAILS` value originates from COBOL level-88 data item (blue markers). If there is no COBOL level-88 enumeration type in the COBOL program defined, you can enter the function code manually in the pop-up window.
- By default the IDL interface gets the same name as your COBOL server: `EMPLOYEE`. Use the **Rename** button  from the toolbar of the COBOL Mapping Editor and change the IDL interface name to `getDetailsOfEmployee` (blue markers). This name is used as the IS service name later.

- 2 Continue shaping, making `getDetailsOfEmployee` easier to use:




- Use the context menu of the redefinition of the `DETAIL` field in the **COBOL Interface** pane, `FILLER REDEFINES DETAIL` and choose **Map to Out** (blue markers). A redefinition is a secondary layout (field types) of the same memory area. The redefinition contains more specific information (`ANNUAL-SALARY`, `VACATION`, etc.) than character buffer `DETAIL`. This is the reason why it is more useful in your interface.
- Use the context menu of `FILLER_1` in the IDL interface pane and rename `FILLER_1` to `DETAILS` (green markers) for a readable IS service field name later.
- The `DETAILS` function in the COBOL server does not make use of the `EMPLOYEES` field. Therefore you can leave it out of the interface: use the context menu of the `EMPLOYEES` field in the **COBOL Interface** pane and choose **Suppress** (red markers).


3 Shape `EMPLOYEE` to `getListOfEmployees` Function:



The COBOL Mapping Editor allows you to define multiple IDL interfaces to the same COBOL server:

- You create the additional IDL interface using the toolbar button **Copy current IDL interface**

 (red markers). A new tab `getDetailsOfEmployee1` is created. The previously extracted `getDetailsOfEmployee` interface still exists in the first tab. Once you reactivate the first tab, you will see the interface of `getDetailsOfEmployee` again.

- Use the **Rename** button  from the toolbar of the COBOL Mapping Editor and change the IDL interface name to **getListOfEmployees** (blue markers). This name is used as the IS service name later.

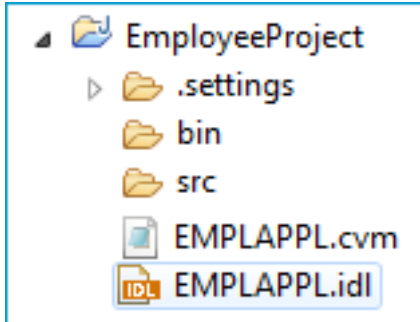
- For the **LIST** function you need the **OPERATION- LIST** value in the **OPERATION** field: Mark the **OPERATION** field in the **COBOL Interface** pane and press the **Set Constant** button. In the pop-up window, select **OPERATION- LIST** (similar to Step 1. above *Shape EMPLOYEE to getDetailsOfEmployee*; red markers).

- Use the context menu of the **EMPLOYEES** field in the **COBOL Interface** pane, **EMPLOYEES OCCURS 1 TO 99** and choose **Map to Out** (Similar to Step 2. above *Continue shaping, making getDetailsOfEmployee easier to use*; blue markers).

- Because the **EMPLOYEE** and **EMPLOYEE-DETAIL** fields are not used in the COBOL server **LIST** function, you leave them out in the IDL interface: use the context menu of **EMPLOYEE-DETAIL** field in the **COBOL Interface** pane and choose **Suppress** (similar to Step 2. above *Continue shaping, making getDetailsOfEmployee easier to use*; red markers). Do the same for the **EMPLOYEE- ID** field.

- 4 Press **Finish** to retrieve the extraction result in the form of a Software AG IDL file. At the same time, a server mapping file for COBOL (Designer file with extension `.cvm`) is created.

See *Server Mapping Files for COBOL* in the Designer documentation. The *Software AG IDL File* in the IDL Editor documentation describes the interfaces from the client point of view, while the server mapping file contains the mapping to the real COBOL server. Both of these files must be kept together and in sync, otherwise a call to the COBOL server may fail.



To summarize: We created two IDL interfaces. In the IDL file, these resulted in two IDL programs: `getListOfEmployees` and `getDetailsOfEmployee`. Both IDL programs were given readable names (Steps 1 and 3). Meaningful fields were kept, while superfluous fields were suppressed (Steps 1 and 3). The program `getDetailsOfEmployee` contains the redefined fields of parameter `DETAILS` (see below) mapped during extraction (Step 1).



Note: At runtime, the RPC client generated with the extracted interface will send data for the redesigned interfaces, while your COBOL server still expects `EMPLOYEE` data. The EntireX runtime transforms the incoming data stream from the RPC client, using the server mapping file.

```

program 'getDetailsOfEmployee' is
  define data parameter
    1 ID (AV10) In /* Original Name:EMPLOYEE-ID
    1 EMPLOYEE Out /* Original Name:EMPLOYEE-DETAILS
    2 FIRSTNAME (AV20)
    2 SURNAME (AV20)
    2 DATE-BIRTH (AV12)
    2 DETAILS /* Original Name:FILLER_1
    3 ANNUAL-SALARY (P9)
    3 VACATION (N2)
    3 LANGUAGE (AV3)
  end-define
  program 'getListOfEmployees' is
    1 EMPLOYEES (/V99) Out
    2 IDENT (AV10)
    2 FIRSTNAME (AV20)
    2 SURNAME (AV20)
    2 DATE-BIRTH (AV12)
  end-define

```

Comparison Chart: Fast-track versus User-defined Mapping

The following table highlights the differences when shaping an interface with a *user-defined mapping* compared with a *fast-path extraction*.

| | Interface Shaping with User-defined Mapping | Fast-path Extraction |
|----------------------------------|---|---|
| General | User-defined interface with dedicated mapping. For our example, the interfaces are small and tidy and more self-explanatory with long, readable interface names. They are easier to use with the hidden <code>OPERATION</code> field and the suppressed COBOL fields, which are not needed. | Automatic, quick result extraction with COBOL-like interfaces on IS. For our example, the IS interface <code>EMPLOYEE</code> matches exactly 1:1, field by field. |
| IS service(s) | Multiple small and handy IS services; each <code>OPERATION</code> code is mapped to a separate IS service. | One big IS service. |
| IS service name | Readable long name. | Short Subprogram name; up to 8 characters. |
| IS fields | Usage of Suppress and Set Constant reduces the message length. This keeps focus on relevant data items and keeps the client's interface clean. It may also improve performance. | The IS fields and COBOL server parameters match 1:1. As COBOL layout descriptions are sometimes used for many different purposes, irrelevant data items appear and clutter up the IS interface. |
| <code>OPERATION</code> parameter | Suppressed: the <code>OPERATION</code> parameter does not exist in the IS service as an IS field. | The <code>OPERATION</code> parameter exists in the IS service as an IS field and needs to be filled-in by the client endpoint. |
| <code>OPERATION</code> code | The <code>OPERATION</code> code is provided internally by EntireX runtime in the <code>OPERATION</code> field. | The <code>OPERATION</code> code needs to be specified in the IS service in the <code>OPERATION</code> field by the client endpoint. |
| <code>REDEFINE</code> parameters | Either the parameter that is redefined or one of its redefinitions is available as an IS field. | Only the parameter that is redefined is available as an IS field. Redefinitions of the parameter are not available as IS fields. |

A user-defined mapping enables you also to define alternative mappings for COBOL data items (`REDEFINES`, tables etc.). These enable scenarios with COBOL servers where data exchange is not fully described by the `LINKAGE SECTION` COBOL data items. For more information refer to the IDL Extractor for COBOL documentation:

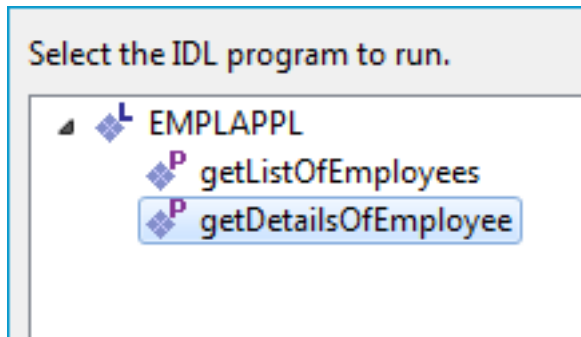
■ Mapping Editor IDL Interface Mapping Functions

Testing the Extraction Results

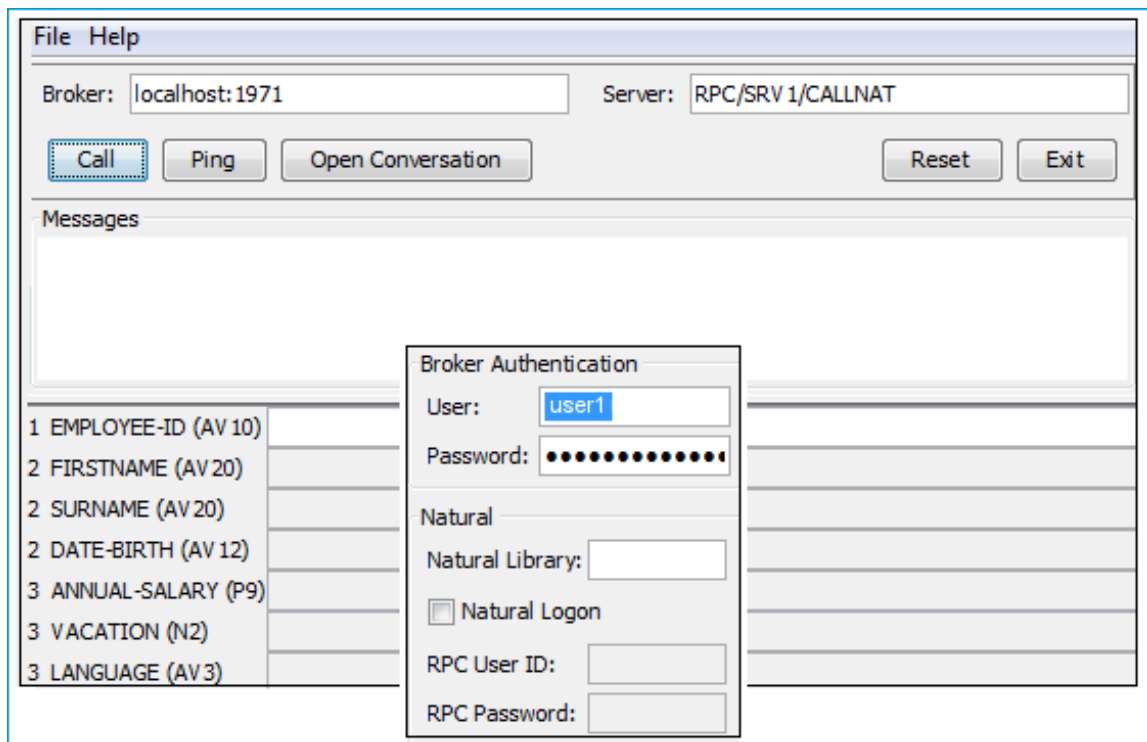
The following pictures use the extraction results described under *Extracting a COBOL Server - Modern Method with User-defined Mapping*.

> To test the extraction results (optional)

- 1 You can test the results of the extraction operation and the COBOL server back end, using the EntireX IDL Tester. From the context menu of the IDL file in the Designer, choose **Software AG IDL Tester**.



- 2 Select `getDetailsOfEmployee`.



Note that the broker and server parameters contain the explicit route to call the server program, and you can optionally ping the connection from this client. With the **File > Options** dialog, you can set:

- **User** and **Password** for *broker* authentication
- **RPC User ID** and **RPC Password** for *server* authentication

See *EntireX IDL Tester* in the Designer documentation.

- 3 Check the Integration Server log, the EntireX Adapter log or the RPC logs. Applies to all connection methods.

Task 2: Generate the Connection and Adapter Services in Integration Server

This section describes your first steps to create a new Integration Server connection. This is described in more detail under *Using the Integration Server Wrapper*, for example working with existing Integration Server connections. This section covers the following topics:

- [Step 1: Start the Integration Server Wrapper Wizard](#)
- [Step 2: Create a New Integration Server Connection](#)
- [Step 3: Select the Connection Type](#)
- [Step 4: Define Adapter Services for an RPC Connection](#)

Step 1: Start the Integration Server Wrapper Wizard

➤ To start the Integration Server Wrapper wizard

- 1 In the context menu of a Software AG IDL file, choose **Integration Server > Generate web-Methods IS Connection**.

This starts the wizard with a list of existing Integration Server Wrapper connections.



Note: If the selected IDL file is not valid because of a syntax error, an error dialog comes up and the wizard does not start.

- 2 Continue with *Step 2: Create a New Integration Server Connection*.

Step 2: Create a New Integration Server Connection

Define New Integration Server Connection

Add host:port, user and password for a new Integration Server

Server:

User:

Password:

☐
Use secure connection

➤ To create a new Integration Server connection

- 1 Define the new Integration Server connection on the wizard page.



Notes:

1. The only required field is **Server**. Enter the hostname of the Integration Server including an optional port number. If no port number is specified, port number defaults to "5555". The **Integration Server Authentication** can be passed with the **User** and **Password** fields.
 2. Optional settings are for secure connections. The **Truststore for HTTPS** contains all signed certificates and must be a valid truststore.
 3. The check box **Verify host name** checks that the hostname is entered in the stored certificate.
 4. When the Integration Server has **Client Authentication** enabled, you can specify your **Keystore** file and keystore **Password**.
 5. For managing Integration Server connections, see [Preferences](#).
- 2 Choose **Next** and continue with *Step 3: Select the Connection Type*.

Step 3: Select the Connection Type

☒ Create a new EntireX Adapter connection of type: **EntireX RPC Connection**

☐ Update Adapter Services or Listeners to an existing Integration Server connection:

List of Connections

| Connection Name | Package Name | Connection Type | Enabled |
|-------------------------------|--------------|------------------------|---------|
| Employees:EmployeesConnection | Employees | EntireX RPC Connection | Yes |

Total: 1

☒ Map Software AG IDL data types to String

☐ Create or Update REST resource

> To create a new connection

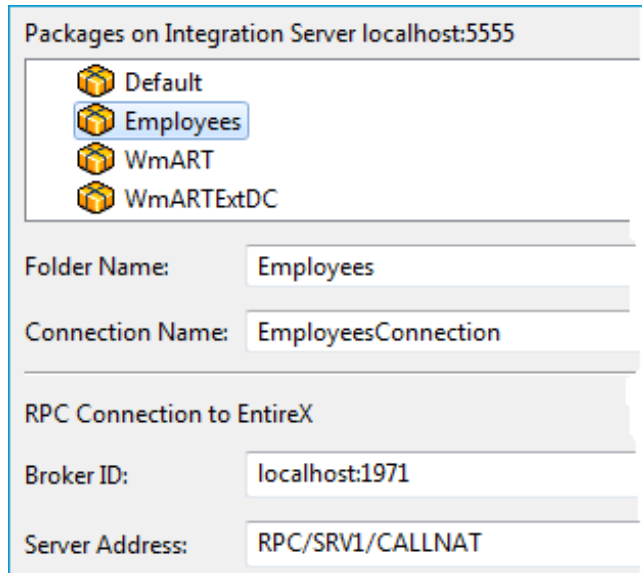
- 1 Select a connection type from the drop down list. Connection types are described under *EntireX Adapter Connections* in the EntireX Adapter documentation and *Introduction to the Integration Server Wrapper*.



Note: The list of connection types is filtered: connection types that require a license are only shown if a corresponding license file is available. Reliable RPC connections are only shown if all IDL programs contain only IN parameters. Also, if a server mapping file is available, only those connection types that support the interface type specified in the server mapping file are shown.

- 2 Click **Next** and continue with *Step 4: Define Adapter Services for an RPC Connection*.

Step 4: Define Adapter Services for an RPC Connection



Packages on Integration Server localhost:5555

- Default
- Employees**
- WmART
- WmARTEExtDC

Folder Name:

Connection Name:

RPC Connection to EntireX

Broker ID:

Server Address:

> To create a connection and related adapter services

- 1 Select an existing package or create a new package for the created objects.
- 2 Define a folder name. If the folder does not exist, it will be created.
- 3 Define a connection name.
- 4 Define the parameters of the connection type. For details, see *Connection Parameters for RPC Connections* in the EntireX Adapter documentation.

As a result, the folder will contain the connection and the adapter services (one for each IDL program). The name of a service is the same as the respective IDL program.

The default settings for the adapter services are:

- the **Default** package; if not available, the first package
- the IDL library name for the **Folder Name**
- the IDL library name with the suffix "Connection" for the **Connection Name**



Note: When creating a connection, a package dependency is added such that the selected package depends on webMethods EntireX (the package `WmEntireX`) with the version currently used.

Task 3: Execute the Call from Integration Server to COBOL

From the **Service Development** perspective, refresh the package where the connection service was written, select the adapter service and use the service test to **Run Service**. This invokes the adapter service through the connector service.

| Name | Value |
|--------------|-------------|
| outRec | |
| EMPLOYEES | |
| EMPLOYEES[0] | |
| IDENT | 11100102 |
| FIRSTNAME | EDGAR |
| SURNAME | SCHINDLER |
| DATE-BIRTH | Dec 4, 1962 |
| EMPLOYEES[1] | |
| EMPLOYEES[2] | |
| EMPLOYEES[3] | |
| EMPLOYEES[4] | |
| errorCode | 00000000 |
| errorFlag | false |

In case of error or unexpected results:

- Check the Integration Server log, the EntireX Adapter log or the RPC logs.
- Use the IDL Tester as described under [Task 1](#) above.

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Calling COBOL on z/VSE from Integration Server

Under z/VSE, a COBOL server can be called in different environments:



- ① Extract the interface of the COBOL server program.
- ② Generate connection and adapter services in Integration Server.
- ③ Execute the call from Integration Server to the COBOL server program.

Continue with the appropriate scenario:

- **CICS** - Choose your CICS calling convention:
 - DFHCOMMAREA using
 - **CICS ECI (zero footprint)**
 - **CICS Socket Listener (minimal footprint)**
 - Channel Container using
 - **CICS Socket Listener (minimal footprint)**
 - Large Buffer using
 - **CICS Socket Listener (minimal footprint)**

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Calling COBOL on z/VSE CICS from Integration Server

There are different styles (interface types) for calling a COBOL server.



It is important to know the interface type of your COBOL server. If you are unsure, consult a COBOL CICS specialist or see description of interface type in the IDL Extractor for COBOL documentation for details and examples: [DFHCOMMAREA Calling Convention](#) | [Channel Container Calling Convention](#) | [DFHCOMMAREA Large Buffer Interface](#).

When you are sure which programming style you are using, continue with the appropriate scenario:

- Channel Container using
 - [CICS Socket Listener \(minimal footprint\)](#)
- DFHCOMMAREA using
 - [CICS ECI \(zero footprint\)](#)
 - [CICS Socket Listener \(minimal footprint\)](#)
- Large Buffer using
 - [CICS Socket Listener \(minimal footprint\)](#)

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Calling COBOL DFHCOMMAREA (Zero Footprint using CICS ECI) on z/VSE CICS from Integration Server

| | |
|--|-----|
| ■ Introduction | 306 |
| ■ What do I need to Install for this Scenario? | 307 |
| ■ Task 1: Extract the Interface of a COBOL Server | 308 |
| ■ Task 2: Generate the Connection and Adapter Services in Integration Server | 321 |
| ■ Task 3: Execute the Call from Integration Server to COBOL | 325 |

This scenario uses the tools IDL Extractor for COBOL and Integration Server Wrapper of the Designer.

Introduction



- ① Extract the interface of the COBOL server program.
- ② Generate connection and adapter services in Integration Server.
- ③ Execute the call from Integration Server to the COBOL server program.

This scenario makes the following important assumptions:

For Step 1

- You have a working COBOL DFHCOMMAREA server. For illustration and examples on such a server, see *CICS with DFHCOMMAREA Calling Convention* under *Introduction to the IDL Extractor for COBOL*.
- You have access to the related COBOL sources and copybooks as files on your local machine. The minimum requirement is the `DATA DIVISION` of the interface.



For Steps 2 and 3

- To call the COBOL server program at runtime using the *EntireX CICS ECI* connection method, you need to configure the CICS ECI TCP/IP service within your CICS region. See *Preparing IBM CICS for ECI* and *Connection Parameters for CICS ECI Connections*.



What do I need to Install for this Scenario?

- You have Software AG Designer installed with EntireX plugins and Service Development plugins.
 - For EntireX plugins, see *Designer > EntireX Designer* under *EntireX Installation Packages* in the General Installation documentation.
 - For Service Development plugins, refer to the Integration Server documentation.
- You have an Integration Server with EntireX Adapter installed. See *Adapters > EntireX Adapter* under *EntireX Installation Packages* in the General Installation documentation.

Task 1: Extract the Interface of a COBOL Server

- [Introduction](#)
- [Sample COBOL Server used in the Examples](#)
- [Extracting a COBOL Server - Fast-track Method](#)
- [Extracting a COBOL Server - Modern Method with User-defined Mapping](#)
- [Comparison Chart: Fast-track versus User-defined Mapping](#)
- [Testing the Extraction Results](#)

Introduction

Follow the instructions for extracting COBOL, see *Using the IDL Extractor for COBOL - Overview* and choose *Scenario I: Create New IDL and Server Mapping Files* if this is your first extraction. Learn how to invoke the IDL Extractor for COBOL, create a COBOL Extractor Environment and about the possibilities to select the COBOL source.

The extraction process creates the following EntireX metafiles:

- IDL file. A Software AG IDL file contains definitions of the interface between client and server. See *Software AG IDL File* in the IDL Editor documentation in the IDL Editor documentation.
- Server mapping file (optional). The mapping file is a Designer file with extension .cvm that contains COBOL-specific mapping information. See *Server Mapping Files for COBOL* in the Designer documentation.

Sample COBOL Server used in the Examples

The following COBOL server is used to illustrate the features of the IDL Extractor for COBOL. Imagine an existing COBOL server called `EMPLOYEE`. It implements the access logic for a `LIST` and `DETAILS` function to a database view `EMPLOYEE`:

```

IDENTIFICATION DIVISION.
    PROGRAM-ID.      EMPLOYEE.
*****
*   Program Name    = EMPLOYEE
*   String Literal  = QUOTE
*****
01 DFHCOMMAREA.
    02 OPERATION                                PIC X(1).
        88 OPERATION-LIST                      VALUE 'L'.
        88 OPERATION-DETAILS                  VALUE 'D'.
    02 EMPLOYEE-ID                             PIC X(10).
    02 EMPLOYEE-DETAILS.
        03 FIRSTNAME                          PIC X(20).
        03 SURNAME                           PIC X(20).
        03 DATE-BIRTH                        PIC X(12).
        03 DETAILS                          PIC X(100).
        03 FILLER REDEFINES DETAILS.
            04 ANNUAL-SALARY          PACKED-DECIMAL PIC S9(9).
            04 VACATION                PIC S9(2).
            04 LANGUAGE                PIC X(3).
            04 FILLER                  PIC X(90).
    02 EMPLOYEES-COUNT                         PIC 9(8) BINARY.
    02 EMPLOYEES OCCURS 1 TO 99 DEPENDING ON EMPLOYEES-COUNT.
        03 IDENT                        PIC X(10).
        03 FIRSTNAME                    PIC X(20).
        03 SURNAME                      PIC X(20).
        03 DATE-BIRTH                  PIC X(12).

```

Two approaches for extracting the COBOL server are described below:

- **Fast-track**

Learn how EntireX helps you to connect the COBOL Server with quick results.

- **User-defined Mapping**

The following features are among those available with a user-defined mapping:

- **Shape the interface to your COBOL server**

You can minimize the interface by suppressing COBOL server fields or by providing constant values. Renaming interfaces allows you to specify a readable long name. These two features together - constants and renaming of interfaces - are most powerful when multiple interfaces are implemented in a single COBOL server. Each function of the COBOL server triggered by an operation code or function code can be modelled as a separate IS service.

■ **Select alternative mappings**

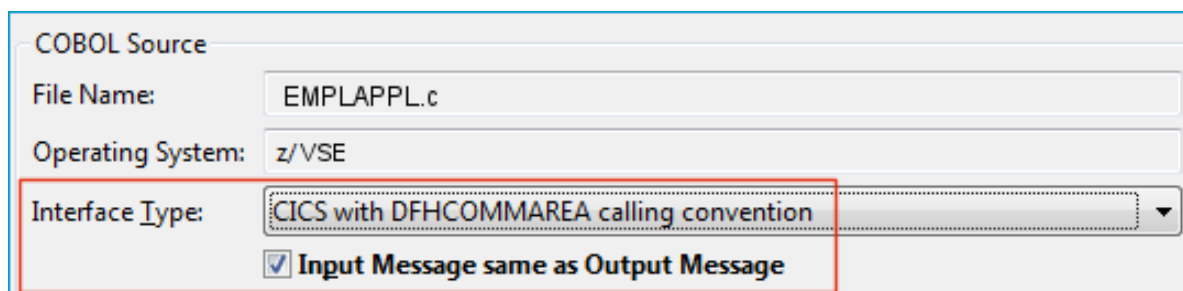
You can select alternative mappings for COBOL data items (REDEFINES, tables etc.) to enable scenarios with COBOL servers where data exchange is not fully described by the LINKAGE SECTION COBOL data items.

These approaches are described under [Fast-track Method](#) and [Modern Method](#) below.

Extracting a COBOL Server - Fast-track Method

➤ **To extract the COBOL Server**

- 1 Switch to the **EntireX** perspective.
- 2 Call the IDL Extractor for COBOL.
- 3 Set the correct interface type as described under *Step 4: Define the Extraction Settings and Start Extraction* under *Scenario I: Create New IDL and Server Mapping Files* in the IDL Extractor for COBOL documentation.

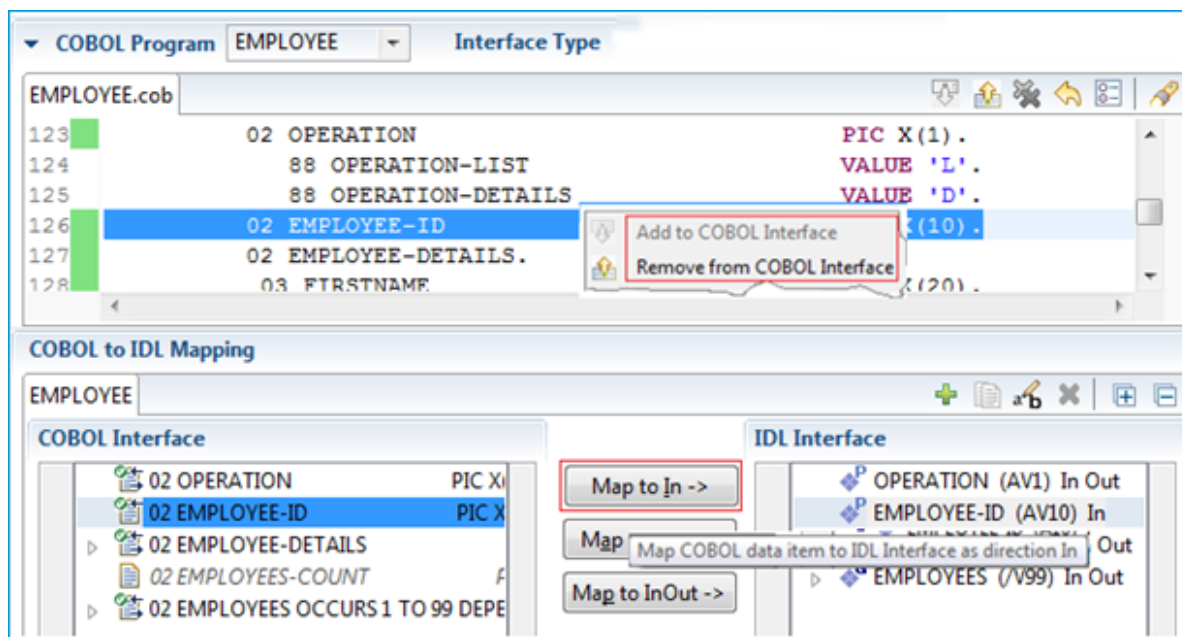


- 4 Set the correct value for checkbox **Input Message same as Output Message**.
 - Check the checkbox if the COBOL data structure of the CICS input message is the same as the structure of the CICS output message, that is, there is one COBOL layout for both directions. See the following COBOL server examples in the IDL Extractor for COBOL documentation:
 - *Example 1: Redefines*
 - *Example 2: Buffer Technique*
 - *Example 3: COBOL SET ADDRESS Statements*
 - Clear the checkbox if the COBOL data structure of the CICS input message is different to the structure of the CICS output message, that is, the output overlays the input, which means there is a second COBOL layout for the reply. See the following COBOL server examples in the IDL Extractor for COBOL documentation:
 - *Example 1: Redefines*
 - *Example 2: Buffer Technique*

■ *Example 3: COBOL SET ADDRESS Statements*

For our example, check the check box, because the COBOL layout for input is the same as the COBOL layout for output.

- 5 Press **Next** to enter the COBOL Mapping Editor.



The purpose of the COBOL Mapping Editor is to map COBOL data items to IDL (Interface Definition Language) parameters. It consists of three main areas:

- The upper window pane is the COBOL program source.
- The window pane on the left-hand side is the COBOL interface, consisting of COBOL data items representing the parameters in your COBOL server program.
- The window pane on the right-hand side is the IDL interface consisting of IDL parameters.

What you select depends on check-box **Input Message same as Output Message**:

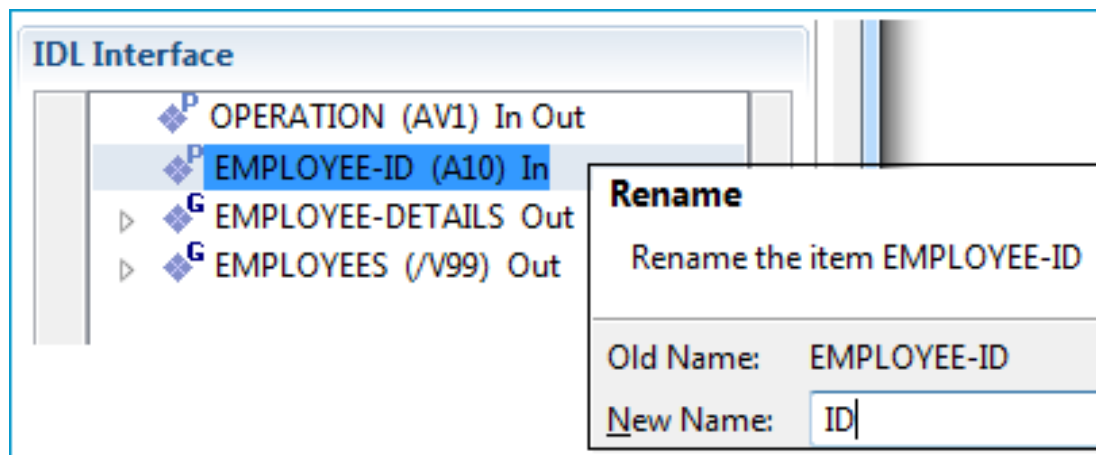
- If there is a single COBOL data structure of the CICS message for input and output - check box **Input Message same as Output Message** is checked - you select a single COBOL data structure in the COBOL Mapping Editor. This structure is used for COBOL input as well as for COBOL output. For more information in this case see *Mapping Editor User Interface* in the IDL Extractor for COBOL documentation.
- If there is a second COBOL data structure for the CICS output message - check box **Input Message same as Output Message** is cleared - you will select two COBOL data structures in the COBOL Mapping Editor. One is used for COBOL input and the other is for COBOL output. For more information in this case see *Mapping Editor User Interface* in the IDL Extractor for COBOL documentation.

COBOL extraction is a two-step process:

- First, select the COBOL parameters using the **Add to** and **Remove from COBOL Interface** from the context menu on the COBOL data items in the upper window pane (COBOL source); in many situations the COBOL interface is detected by the Mapping Editor directly and you can omit this step.
- Then map the COBOL parameters to IDL directions using the **Map to In/Out/InOut** buttons. COBOL parameters do not have directions, they are always INOUT. This step can be left out for a quick test in non-production scenarios; for real production it is recommended to set IDL directions to reduce data transfer. You also have the option to assign a meaningful name to an IDL parameter if the original COBOL data item is not self-explanatory.

For our example:

- Set **Map to In** for COBOL data item `EMPLOYEE-ID` as IDL direction (see screenshot in previous step). For `EMPLOYEES-DETAILS` and `EMPLOYEES` perform the similar **Map to Out**.
- Use the function **Rename** from the context menu on the IDL parameters in the **IDL Interface** pane to rename COBOL parameter `EMPLOYEES-ID` to IDL parameter `ID`. Do the same for `EMPLOYEE-DETAILS`; **Rename** to `EMPLOYEE`.



- 6 Press **Finish**. The default extraction settings ensure you get useful results. The outcome is a Software AG IDL file (interface definition language), a Designer file with extension .idl:


```
library 'EMPLAPPL' is
program 'EMPLOYEE' is
define data parameter
  1 OPERATION (AV1) In Out
  1 ID (AV10) In /* Original Name:EMPLOYEE-ID
  1 EMPLOYEE Out /* Original Name:EMPLOYEE-DETAILS
    2 FIRSTNAME (AV20)
    2 SURNAME (AV20)
    2 DATE-BIRTH (AV12)
    2 DETAILS (AV100)
  1 EMPLOYEES (/V99) Out
    2 IDENT (AV10)
    2 FIRSTNAME (AV20)
    2 SURNAME (AV20)
    2 DATE-BIRTH (AV12)
end-define
```

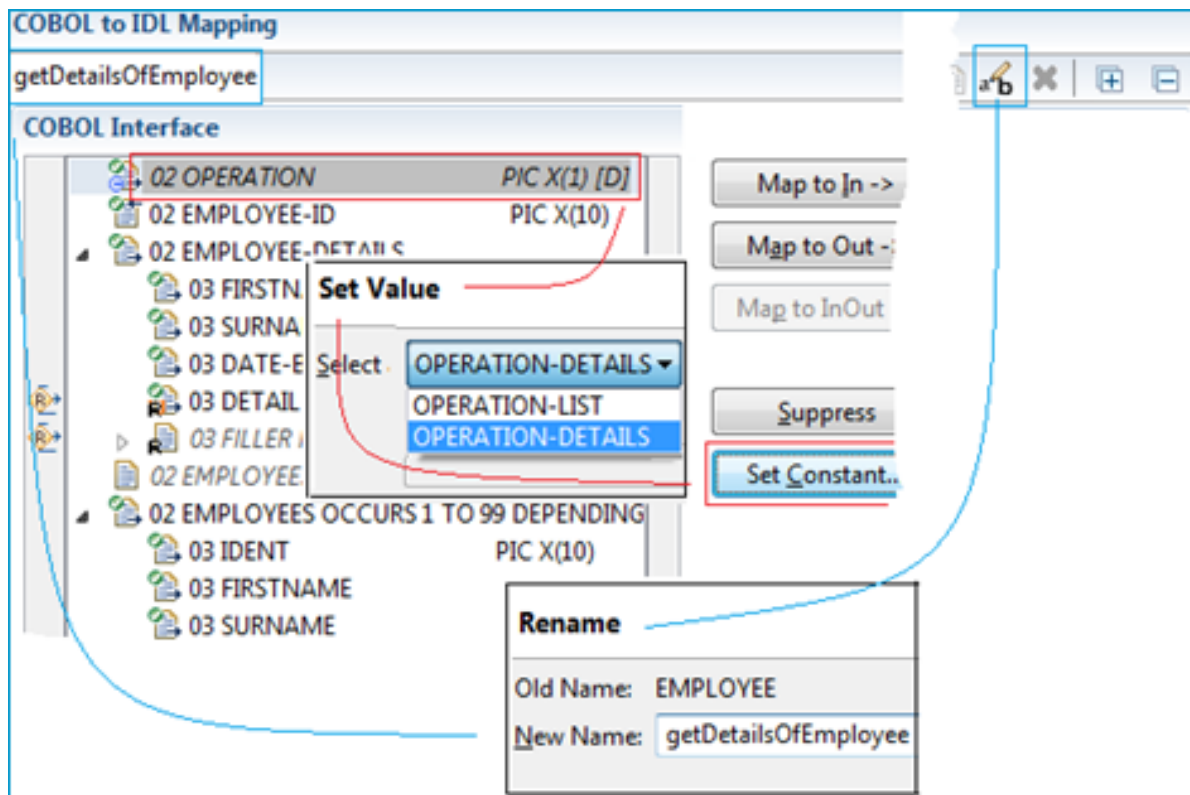
If required, a server mapping file with the same name as the IDL file but the extension .cvm may be generated too, for technical reasons. This file must always be stored together with the concomitant IDL file. For more information, see *Server Mapping Files for COBOL* in the Designer documentation. By default, the interface name `EMPLOYEE` is taken from the COBOL server program name.


Extracting a COBOL Server - Modern Method with User-defined Mapping

EntireX allows you to extract all implemented interfaces of the COBOL server separately. Instead of a large `EMPLOYEE` interface, separate interfaces `getListOfEmployees` and `getDetailsOfEmployee` are extracted. Each interface contains required parameters; obsolete parameters for an interface are suppressed, improving its usability.

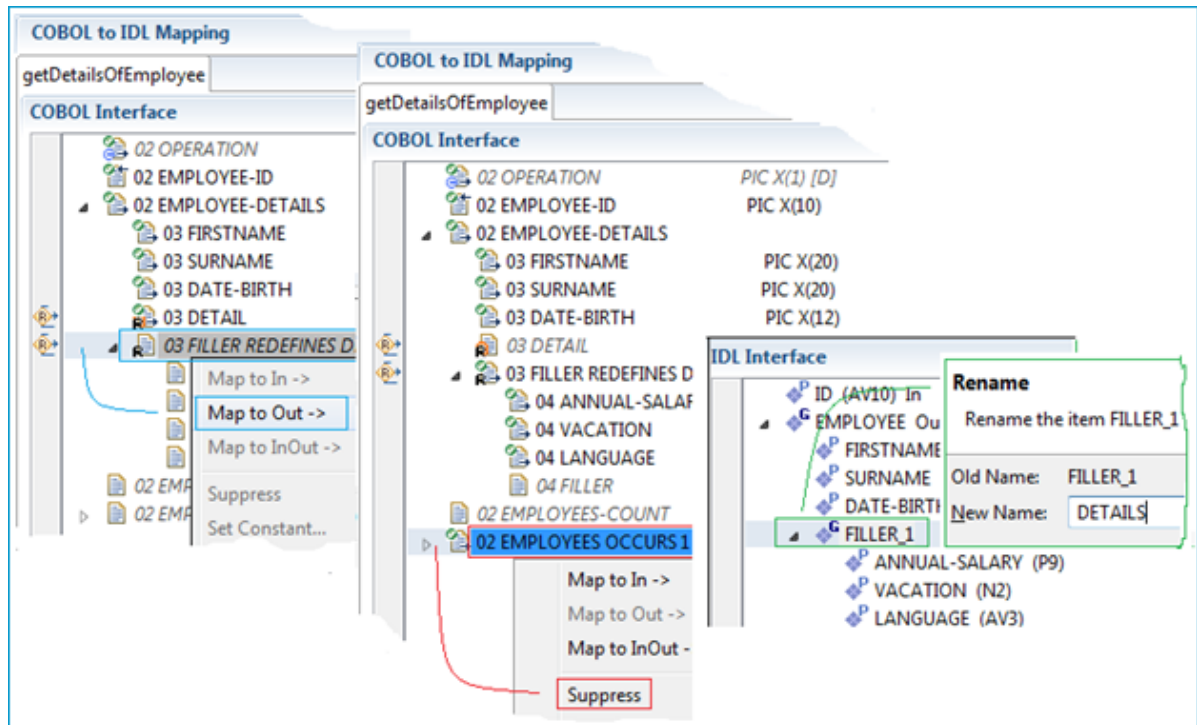
» To extract a COBOL server with a user-defined mapping

- 1 Shape `EMPLOYEE` to `getDetailsOfEmployee`:



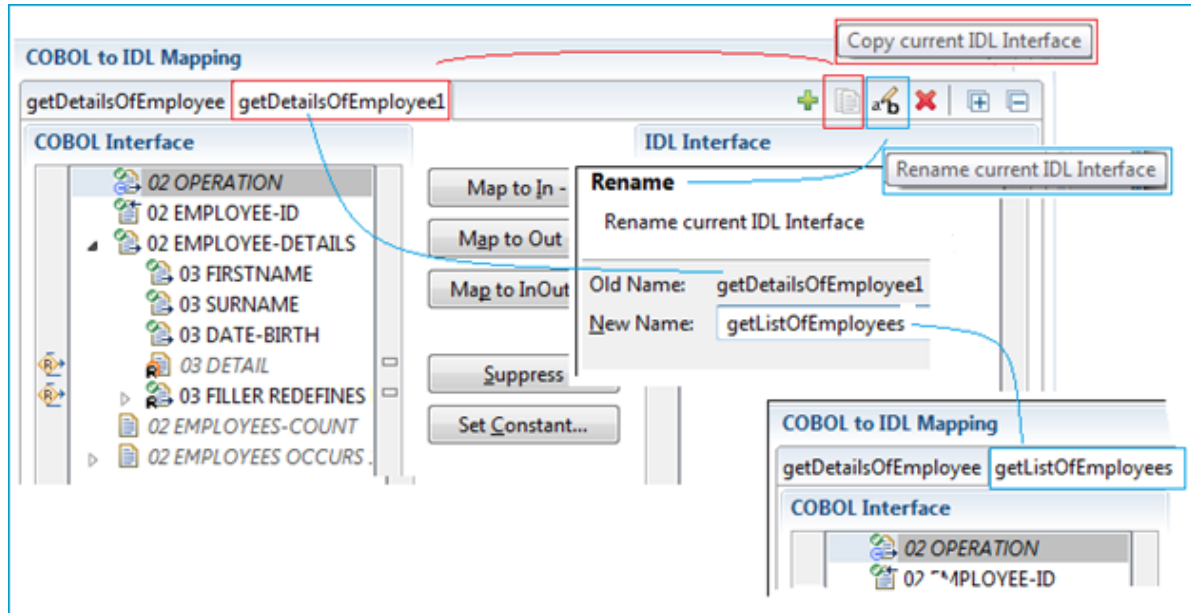
- Mark the `OPERATION` field in the **COBOL Interface** pane and press the **Set Constant** button. In the pop-up window, select `OPERATION-DETAILS` (red markers). The `OPERATION-DETAILS` value originates from COBOL level-88 data item (blue markers). If there is no COBOL level-88 enumeration type in the COBOL program defined, you can enter the function code manually in the pop-up window.
- By default the IDL interface gets the same name as your COBOL server: `EMPLOYEE`. Use the **Rename** button  from the toolbar of the COBOL Mapping Editor and change the IDL interface name to `getDetailsOfEmployee` (blue markers). This name is used as the IS service name later.

2 Continue shaping, making `getDetailsOfEmployee` easier to use:




- Use the context menu of the redefinition of the `DETAIL` field in the **COBOL Interface** pane, `FILLER REDEFINES DETAIL` and choose **Map to Out** (blue markers). A redefinition is a secondary layout (field types) of the same memory area. The redefinition contains more specific information (`ANNUAL-SALARY`, `VACATION`, etc.) than character buffer `DETAIL`. This is the reason why it is more useful in your interface.
- Use the context menu of `FILLER_1` in the IDL interface pane and rename `FILLER_1` to `DETAILS` (green markers) for a readable IS service field name later.
- The `DETAILS` function in the COBOL server does not make use of the `EMPLOYEES` field. Therefore you can leave it out of the interface: use the context menu of the `EMPLOYEES` field in the **COBOL Interface** pane and choose **Suppress** (red markers).


3 Shape `EMPLOYEE` to `getListOfEmployees` Function:



The COBOL Mapping Editor allows you to define multiple IDL interfaces to the same COBOL server:

- You create the additional IDL interface using the toolbar button **Copy current IDL interface**

 (red markers). A new tab `getDetailsOfEmployee1` is created. The previously extracted `getDetailsOfEmployee` interface still exists in the first tab. Once you reactivate the first tab, you will see the interface of `getDetailsOfEmployee` again.

- Use the **Rename** button  from the toolbar of the COBOL Mapping Editor and change the IDL interface name to `getListOfEmployees` (blue markers). This name is used as the IS service name later.

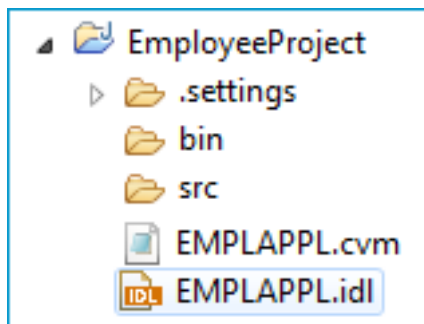
- For the `LIST` function you need the `OPERATION-LIST` value in the `OPERATION` field: Mark the `OPERATION` field in the **COBOL Interface** pane and press the **Set Constant** button. In the pop-up window, select `OPERATION-LIST` (similar to Step 1. above *Shape `EMPLOYEE` to `getDetailsOfEmployee`*; red markers).

- Use the context menu of the `EMPLOYEES` field in the **COBOL Interface** pane, `EMPLOYEES OCCURS 1 TO 99` and choose **Map to Out** (Similar to Step 2. above *Continue shaping, making `getDetailsOfEmployee` easier to use*; blue markers).

- Because the `EMPLOYEE` and `EMPLOYEE-DETAIL` fields are not used in the COBOL server `LIST` function, you leave them out in the IDL interface: use the context menu of `EMPLOYEE-DETAIL` field in the **COBOL Interface** pane and choose **Suppress** (similar to Step 2. above *Continue shaping, making `getDetailsOfEmployee` easier to use*; red markers). Do the same for the `EMPLOYEE-ID` field.

- 4 Press **Finish** to retrieve the extraction result in the form of a Software AG IDL file. At the same time, a server mapping file for COBOL (Designer file with extension `.cvm`) is created.

See *Server Mapping Files for COBOL* in the Designer documentation. The *Software AG IDL File* in the IDL Editor documentation describes the interfaces from the client point of view, while the server mapping file contains the mapping to the real COBOL server. Both of these files must be kept together and in sync, otherwise a call to the COBOL server may fail.



To summarize: We created two IDL interfaces. In the IDL file, these resulted in two IDL programs: `getListOfEmployees` and `getDetailsOfEmployee`. Both IDL programs were given readable names (Steps 1 and 3). Meaningful fields were kept, while superfluous fields were suppressed (Steps 1 and 3). The program `getDetailsOfEmployee` contains the redefined fields of parameter `DETAILS` (see below) mapped during extraction (Step 1).



Note: At runtime, the RPC client generated with the extracted interface will send data for the redesigned interfaces, while your COBOL server still expects `EMPLOYEE` data. The EntireX runtime transforms the incoming data stream from the RPC client, using the server mapping file.

```

program 'getDetailsOfEmployee' is
  define data parameter
    1 ID (AV10) In /* Original Name:EMPLOYEE-ID
    1 EMPLOYEE Out /* Original Name:EMPLOYEE-DETAILS
    2 FIRSTNAME (AV20)
    2 SURNAME (AV20)
    2 DATE-BIRTH (AV12)
    2 DETAILS /* Original Name:FILLER_1
    3 ANNUAL-SALARY (P9)
    3 VACATION (N2)
    3 LANGUAGE (AV3)
  end-define
  program 'getListOfEmployees' is
    1 EMPLOYEES (/V99) Out
    2 IDENT (AV10)
    2 FIRSTNAME (AV20)
    2 SURNAME (AV20)
    2 DATE-BIRTH (AV12)
  end-define
  
```

Comparison Chart: Fast-track versus User-defined Mapping

The following table highlights the differences when shaping an interface with a *user-defined mapping* compared with a *fast-path extraction*.

| | Interface Shaping with User-defined Mapping | Fast-path Extraction |
|----------------------------------|---|---|
| General | User-defined interface with dedicated mapping. For our example, the interfaces are small and tidy and more self-explanatory with long, readable interface names. They are easier to use with the hidden <code>OPERATION</code> field and the suppressed COBOL fields, which are not needed. | Automatic, quick result extraction with COBOL-like interfaces on IS. For our example, the IS interface <code>EMPLOYEE</code> matches exactly 1:1, field by field. |
| IS service(s) | Multiple small and handy IS services; each <code>OPERATION</code> code is mapped to a separate IS service. | One big IS service. |
| IS service name | Readable long name. | Short Subprogram name; up to 8 characters. |
| IS fields | Usage of Suppress and Set Constant reduces the message length. This keeps focus on relevant data items and keeps the client's interface clean. It may also improve performance. | The IS fields and COBOL server parameters match 1:1. As COBOL layout descriptions are sometimes used for many different purposes, irrelevant data items appear and clutter up the IS interface. |
| <code>OPERATION</code> parameter | Suppressed: the <code>OPERATION</code> parameter does not exist in the IS service as an IS field. | The <code>OPERATION</code> parameter exists in the IS service as an IS field and needs to be filled-in by the client endpoint. |
| <code>OPERATION</code> code | The <code>OPERATION</code> code is provided internally by EntireX runtime in the <code>OPERATION</code> field. | The <code>OPERATION</code> code needs to be specified in the IS service in the <code>OPERATION</code> field by the client endpoint. |
| <code>REDEFINE</code> parameters | Either the parameter that is redefined or one of its redefinitions is available as an IS field. | Only the parameter that is redefined is available as an IS field. Redefinitions of the parameter are not available as IS fields. |

A user-defined mapping enables you also to define alternative mappings for COBOL data items (`REDEFINES`, tables etc.). These enable scenarios with COBOL servers where data exchange is not fully described by the `LINKAGE SECTION` COBOL data items. For more information refer to the IDL Extractor for COBOL documentation:

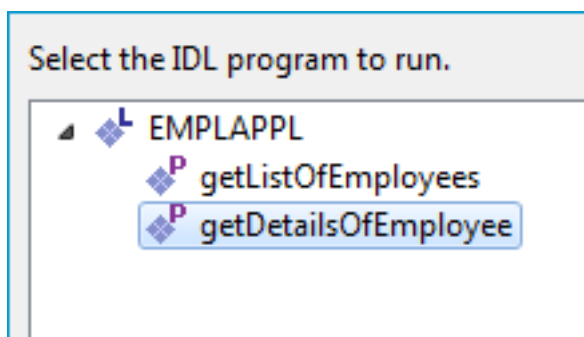
- *Mapping Editor IDL Interface Mapping Functions* if the check-box **Input Message same as Output Message** was checked.
- *Mapping Editor IDL Interface Mapping Functions* if the check-box **Input Message same as Output Message** was cleared.
- *User-defined Mapping*

Testing the Extraction Results

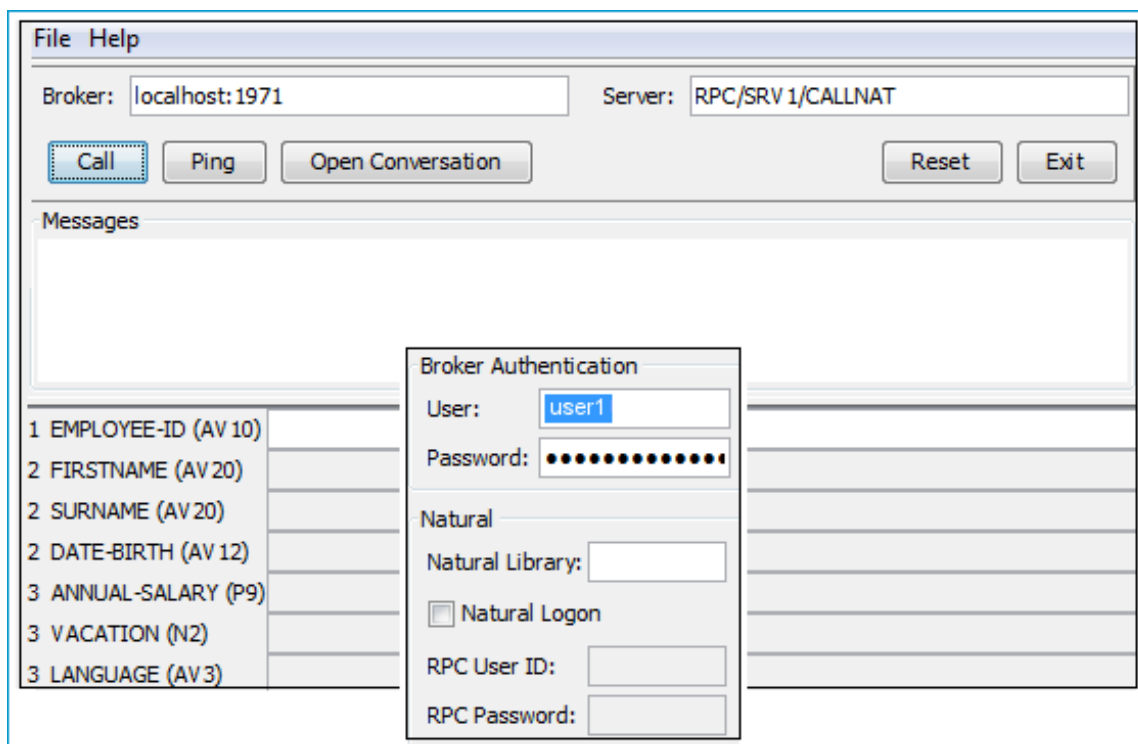
The following pictures use the extraction results described under *Extracting a COBOL Server - Modern Method with User-defined Mapping*.

> To test the extraction results (optional)

- 1 You can test the results of the extraction operation and the COBOL server back end, using the EntireX IDL Tester. From the context menu of the IDL file in the Designer, choose **Software AG IDL Tester**.



- 2 Select `getDetailsOfEmployee`.



Note that the broker and server parameters contain the explicit route to call the server program, and you can optionally ping the connection from this client. With the **File > Options** dialog, you can set:

- **User** and **Password** for *broker* authentication
- **RPC User ID** and **RPC Password** for *server* authentication

See *EntireX IDL Tester* in the Designer documentation.

- 3 Check the Integration Server log, the EntireX Adapter log or the RPC logs. Applies to all connection methods.

Task 2: Generate the Connection and Adapter Services in Integration Server

This section describes your first steps to create a new Integration Server connection. This is described in more detail under *Using the Integration Server Wrapper*, for example working with existing Integration Server connections. This section covers the following topics:

- [Step 1: Start the Integration Server Wrapper Wizard](#)
- [Step 2: Create a New Integration Server Connection](#)
- [Step 3: Select the Connection Type](#)
- [Step 4: Define Adapter Services for a CICS ECI Connection](#)

Step 1: Start the Integration Server Wrapper Wizard

➤ To start the Integration Server Wrapper wizard

- 1 In the context menu of a Software AG IDL file, choose **Integration Server > Generate web-Methods IS Connection**.

This starts the wizard with a list of existing Integration Server Wrapper connections.



Note: If the selected IDL file is not valid because of a syntax error, an error dialog comes up and the wizard does not start.

- 2 Continue with *Step 2: Create a New Integration Server Connection*.

Step 2: Create a New Integration Server Connection

Define New Integration Server Connection
Add host:port, user and password for a new Integration Server

Server:

User:

Password:

☐ Use secure connection

➤ To create a new Integration Server connection

- 1 Define the new Integration Server connection on the wizard page.



Notes:

1. The only required field is **Server**. Enter the hostname of the Integration Server including an optional port number. If no port number is specified, port number defaults to "5555". The **Integration Server Authentication** can be passed with the **User** and **Password** fields.
 2. Optional settings are for secure connections. The **Truststore for HTTPS** contains all signed certificates and must be a valid truststore.
 3. The check box **Verify host name** checks that the hostname is entered in the stored certificate.
 4. When the Integration Server has **Client Authentication** enabled, you can specify your **Keystore** file and keystore **Password**.
 5. For managing Integration Server connections, see [Preferences](#).
- 2 Choose **Next** and continue with *Step 3: Select the Connection Type*.

Step 3: Select the Connection Type

☒ Create a new EntireX Adapter connection of type **CICS ECI Connection**

☐ Update Adapter Services or Listeners to an existing Integration Server connection:

List of Connections

| Connection Name | Package Name | Connection Type | Enabled |
|-------------------------------|--------------|------------------------|---------|
| Employees:EmployeesConnection | Employees | EntireX RPC Connection | Yes |

Total: 1

☒ Map Software AG IDL data types to String

☐ Create or Update REST resource

➤ To create a new connection

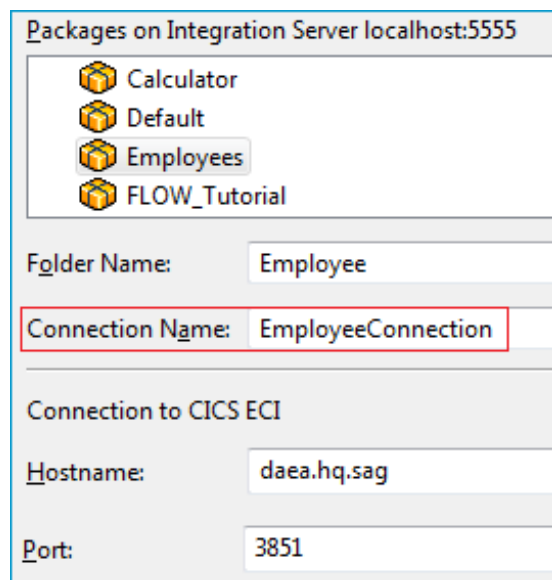
- 1 Select a connection type from the drop down list. Connection types are described under *EntireX Adapter Connections* in the EntireX Adapter documentation and *Introduction to the Integration Server Wrapper*.



Note: The list of connection types is filtered: connection types that require a license are only shown if a corresponding license file is available. Reliable RPC connections are only shown if all IDL programs contain only IN parameters. Also, if a server mapping file is available, only those connection types that support the interface type specified in the server mapping file are shown.

- 2 Click **Next** and continue with *Step 4: Define Adapter Services for a CICS ECI Connection*.

Step 4: Define Adapter Services for a CICS ECI Connection



Packages on Integration Server localhost:5555

- Calculator
- Default
- Employees
- FLOW_Tutorial

Folder Name: Employee

Connection Name: EmployeeConnection

Connection to CICS ECI

Hostname: daea.hq.sag

Port: 3851

➤ To create a connection and related adapter services

- 1 Select a package for the created objects.
- 2 Define a folder name. If the folder does not exist, it will be created.
- 3 Define a connection name.
- 4 Define the parameters of the connection type. For details, see *Connection Parameters for CICS ECI Connections* in the EntireX Adapter documentation.

As a result, the folder will contain the connection and the adapter services (one for each IDL program). The name of a service is the same as the respective IDL program.

The default settings for the adapter services are:

- the **Default** package; if not available, the first package
- the IDL library name for the **Folder Name**
- the IDL library name with the suffix "Connection" for the **Connection Name**



Note: When creating a connection, a package dependency is added such that the selected package depends on webMethods EntireX (the package `WmEntireX`) with the version currently used.

Task 3: Execute the Call from Integration Server to COBOL

From the **Service Development** perspective, refresh the package where the connection service was written, select the adapter service and use the service test to **Run Service**. This invokes the adapter service through the connector service.

The screenshot shows the 'Employees' package in the Service Development perspective. The 'getListOfEmployees' service is selected, and the 'Run As' dropdown is set to '2 Run Service'. Below the package tree, a table displays the results of the service test.

| Name | Value |
|--------------|-------------|
| outRec | |
| EMPLOYEES | |
| EMPLOYEES[0] | |
| IDENT | 11100102 |
| FIRSTNAME | EDGAR |
| SURNAME | SCHINDLER |
| DATE-BIRTH | Dec 4, 1962 |
| EMPLOYEES[1] | |
| EMPLOYEES[2] | |
| EMPLOYEES[3] | |
| EMPLOYEES[4] | |
| errorCode | 00000000 |
| errorFlag | false |

In case of error or unexpected results:

- Check the Integration Server log or the EntireX Adapter log.

21

Calling COBOL DFHCOMMAREA (Minimal Footprint using CICS Socket Listener) on z/VSE CICS from Integration Server

| | |
|--|-----|
| ■ Introduction | 328 |
| ■ What do I need to Install for this Scenario? | 329 |
| ■ Task 1: Extract the Interface of a COBOL Server | 330 |
| ■ Task 2: Generate the Connection and Adapter Services in Integration Server | 343 |
| ■ Task 3: Execute the Call from Integration Server to COBOL | 348 |

This scenario uses the tools IDL Extractor for COBOL and Integration Server Wrapper of the Designer.

Introduction



- ❶ Extract the interface of the COBOL server program.
- ❷ Generate connection and adapter services in Integration Server.
- ❸ Execute the call from Integration Server to the COBOL server program.

This scenario makes the following important assumptions:

For Task 1:

- You have a working COBOL DFHCOMMAREA server. For illustration and examples on such a server, see *CICS with DFHCOMMAREA Calling Convention* under *Introduction to the IDL Extractor for COBOL*.
- You have access to the related COBOL sources and copybooks as files on your local machine. The minimum requirement is the `DATA DIVISION` of the interface.



For Tasks 2 and 3:

- To call the COBOL server program at runtime using the *EntireX CICS Socket Listener* connection method, you need to install the CICS Socket Listener within your CICS region: see *Preparing for CICS Socket Listener*. For configuration, see *Connection Parameters for CICS Socket Listener Connections*.



What do I need to Install for this Scenario?

- You have Software AG Designer installed with EntireX plugins and Service Development plugins.
 - For EntireX plugins, see *Designer > EntireX Designer* under *EntireX Installation Packages* in the General Installation documentation.
 - For Service Development plugins, refer to the Integration Server documentation.
- You have an Integration Server with EntireX Adapter installed. See *Adapters > EntireX Adapter* under *EntireX Installation Packages* in the General Installation documentation.
- You have the CICS Socket Listener installed. See *Installing the CICS Socket Listener* in the z/VSE Installation documentation.

Task 1: Extract the Interface of a COBOL Server

- [Introduction](#)
- [Sample COBOL Server used in the Examples](#)
- [Extracting a COBOL Server - Fast-track Method](#)
- [Extracting a COBOL Server - Modern Method with User-defined Mapping](#)
- [Comparison Chart: Fast-track versus User-defined Mapping](#)
- [Testing the Extraction Results](#)

Introduction

Follow the instructions for extracting COBOL, see *Using the IDL Extractor for COBOL - Overview* and choose *Scenario I: Create New IDL and Server Mapping Files* if this is your first extraction. Learn how to invoke the IDL Extractor for COBOL, create a COBOL Extractor Environment and about the possibilities to select the COBOL source.

The extraction process creates the following EntireX metafiles:

- IDL file. A Software AG IDL file contains definitions of the interface between client and server. See *Software AG IDL File* in the IDL Editor documentation in the IDL Editor documentation.
- Server mapping file (optional). The mapping file is a Designer file with extension `.cvm` that contains COBOL-specific mapping information. See *Server Mapping Files for COBOL* in the Designer documentation.

Sample COBOL Server used in the Examples

The following COBOL server is used to illustrate the features of the IDL Extractor for COBOL. Imagine an existing COBOL server called `EMPLOYEE`. It implements the access logic for a `LIST` and `DETAILS` function to a database view `EMPLOYEE`:

```

IDENTIFICATION DIVISION.
    PROGRAM-ID.      EMPLOYEE.
*****
*   Program Name    = EMPLOYEE
*   String Literal  = QUOTE
*****
01 DFHCOMMAREA.
    02 OPERATION                                PIC X(1).
        88 OPERATION-LIST                      VALUE 'L'.
        88 OPERATION-DETAILS                  VALUE 'D'.
    02 EMPLOYEE-ID                                PIC X(10).
    02 EMPLOYEE-DETAILS.
        03 FIRSTNAME                            PIC X(20).
        03 SURNAME                            PIC X(20).
        03 DATE-BIRTH                          PIC X(12).
        03 DETAILS                            PIC X(100).
        03 FILLER REDEFINES DETAILS.
            04 ANNUAL-SALARY                    PACKED-DECIMAL PIC S9(9).
            04 VACATION                        PIC S9(2).
            04 LANGUAGE                        PIC X(3).
            04 FILLER                          PIC X(90).
    02 EMPLOYEES-COUNT                          PIC 9(8) BINARY.
    02 EMPLOYEES OCCURS 1 TO 99 DEPENDING ON EMPLOYEES-COUNT.
        03 IDENT                              PIC X(10).
        03 FIRSTNAME                          PIC X(20).
        03 SURNAME                            PIC X(20).
        03 DATE-BIRTH                        PIC X(12).

```

Two approaches for extracting the COBOL server are described below:

- **Fast-track**

Learn how EntireX helps you to connect the COBOL Server with quick results.

- **User-defined Mapping**

The following features are among those available with a user-defined mapping:

- **Shape the interface to your COBOL server**

You can minimize the interface by suppressing COBOL server fields or by providing constant values. Renaming interfaces allows you to specify a readable long name. These two features together - constants and renaming of interfaces - are most powerful when multiple interfaces are implemented in a single COBOL server. Each function of the COBOL server triggered by an operation code or function code can be modelled as a separate IS service.

■ **Select alternative mappings**

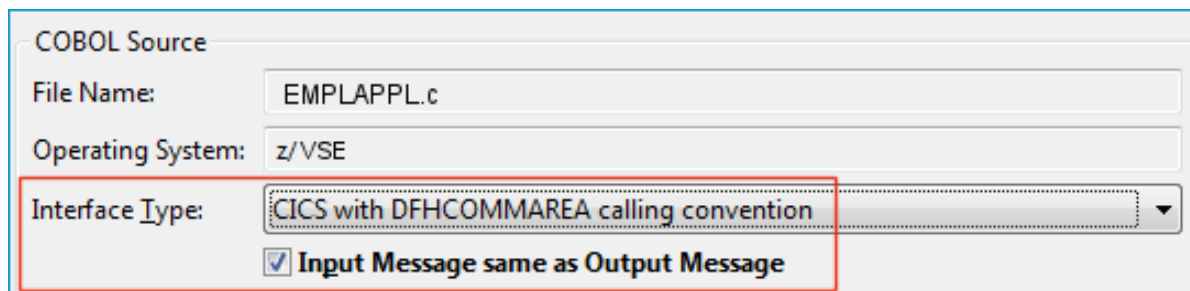
You can select alternative mappings for COBOL data items (REDEFINES, tables etc.) to enable scenarios with COBOL servers where data exchange is not fully described by the LINKAGE SECTION COBOL data items.

These approaches are described under [Fast-track Method](#) and [Modern Method](#) below.

Extracting a COBOL Server - Fast-track Method

➤ **To extract the COBOL Server**

- 1 Switch to the **EntireX** perspective.
- 2 Call the IDL Extractor for COBOL.
- 3 Set the correct interface type as described under *Step 4: Define the Extraction Settings and Start Extraction* under *Scenario I: Create New IDL and Server Mapping Files* in the IDL Extractor for COBOL documentation.

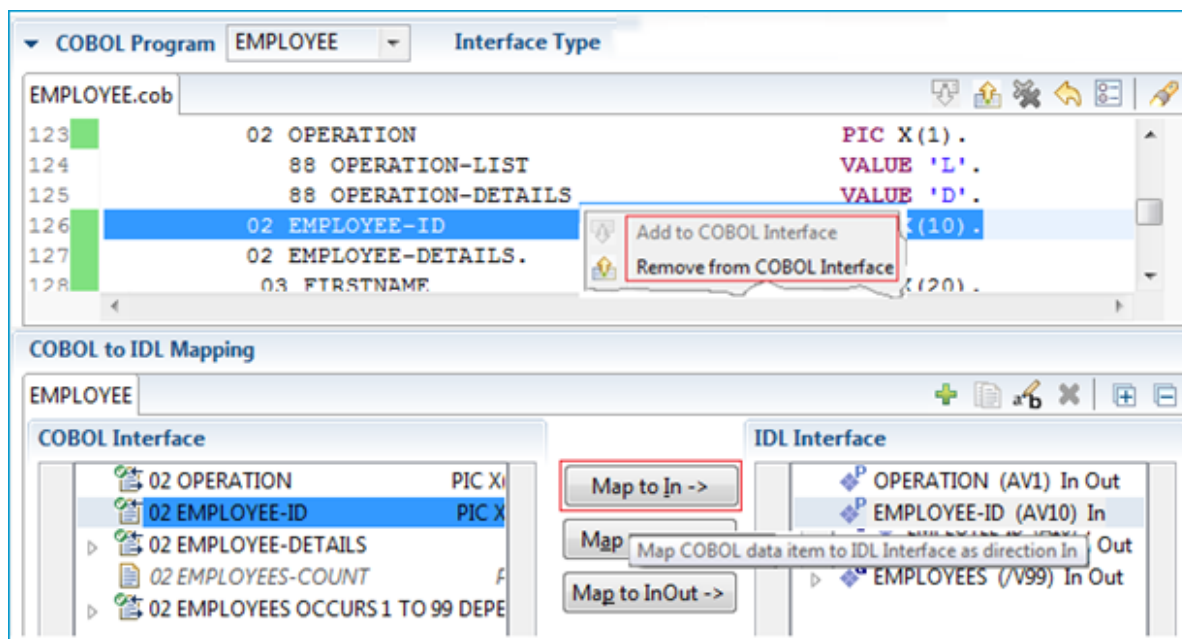


- 4 Set the correct value for checkbox **Input Message same as Output Message**.
 - Check the checkbox if the COBOL data structure of the CICS input message is the same as the structure of the CICS output message, that is, there is one COBOL layout for both directions. See the following COBOL server examples in the IDL Extractor for COBOL documentation:
 - *Example 1: Redefines*
 - *Example 2: Buffer Technique*
 - *Example 3: COBOL SET ADDRESS Statements*
 - Clear the checkbox if the COBOL data structure of the CICS input message is different to the structure of the CICS output message, that is, the output overlays the input, which means there is a second COBOL layout for the reply. See the following COBOL server examples in the IDL Extractor for COBOL documentation:
 - *Example 1: Redefines*
 - *Example 2: Buffer Technique*

■ *Example 3: COBOL SET ADDRESS Statements*

For our example, check the check box, because the COBOL layout for input is the same as the COBOL layout for output.

- 5 Press **Next** to enter the COBOL Mapping Editor.



The purpose of the COBOL Mapping Editor is to map COBOL data items to IDL (Interface Definition Language) parameters. It consists of three main areas:

- The upper window pane is the COBOL program source.
- The window pane on the left-hand side is the COBOL interface, consisting of COBOL data items representing the parameters in your COBOL server program.
- The window pane on the right-hand side is the IDL interface consisting of IDL parameters.

What you select depends on check-box **Input Message same as Output Message**:

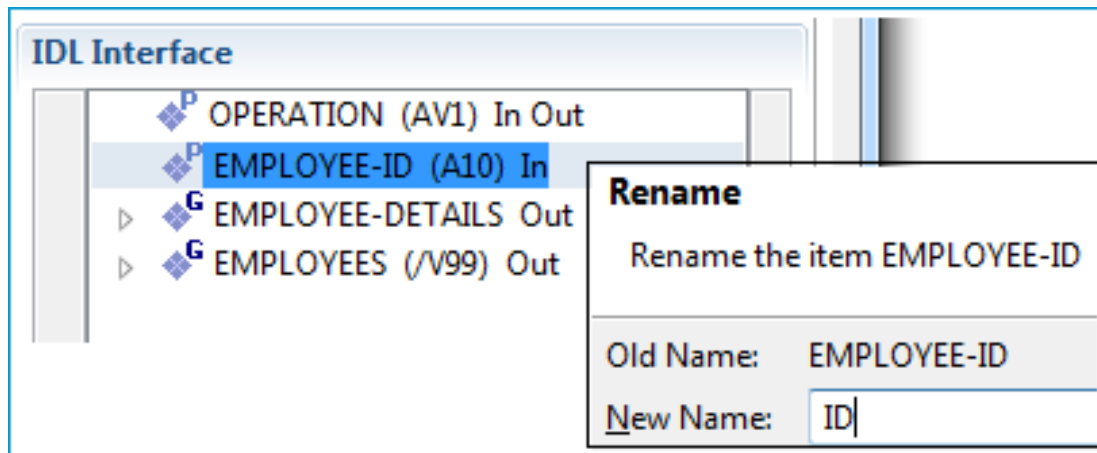
- If there is a single COBOL data structure of the CICS message for input and output - check box **Input Message same as Output Message** is checked - you select a single COBOL data structure in the COBOL Mapping Editor. This structure is used for COBOL input as well as for COBOL output. For more information in this case see *Mapping Editor User Interface* in the IDL Extractor for COBOL documentation.
- If there is a second COBOL data structure for the CICS output message - check box **Input Message same as Output Message** is cleared - you will select two COBOL data structures in the COBOL Mapping Editor. One is used for COBOL input and the other is for COBOL output. For more information in this case see *Mapping Editor User Interface* in the IDL Extractor for COBOL documentation.

COBOL extraction is a two-step process:

- First, select the COBOL parameters using the **Add to** and **Remove from COBOL Interface** from the context menu on the COBOL data items in the upper window pane (COBOL source); in many situations the COBOL interface is detected by the Mapping Editor directly and you can omit this step.
- Then map the COBOL parameters to IDL directions using the **Map to In/Out/InOut** buttons. COBOL parameters do not have directions, they are always INOUT. This step can be left out for a quick test in non-production scenarios; for real production it is recommended to set IDL directions to reduce data transfer. You also have the option to assign a meaningful name to an IDL parameter if the original COBOL data item is not self-explanatory.

For our example:

- Set **Map to In** for COBOL data item `EMPLOYEE-ID` as IDL direction (see screenshot in previous step). For `EMPLOYEES-DETAILS` and `EMPLOYEES` perform the similar **Map to Out**.
- Use the function **Rename** from the context menu on the IDL parameters in the **IDL Interface** pane to rename COBOL parameter `EMPLOYEES-ID` to IDL parameter `ID`. Do the same for `EMPLOYEE-DETAILS`; **Rename** to `EMPLOYEE`.



- 6 Press **Finish**. The default extraction settings ensure you get useful results. The outcome is a Software AG IDL file (interface definition language), a Designer file with extension .idl:

```
library 'EMPLAPPL' is
program 'EMPLOYEE' is
  define data parameter
    1 OPERATION (AV1) In Out
    1 ID (AV10) In /* Original Name:EMPLOYEE-ID
    1 EMPLOYEE Out /* Original Name:EMPLOYEE-DETAILS
      2 FIRSTNAME (AV20)
      2 SURNAME (AV20)
      2 DATE-BIRTH (AV12)
      2 DETAILS (AV100)
    1 EMPLOYEES (/V99) Out
      2 IDENT (AV10)
      2 FIRSTNAME (AV20)
      2 SURNAME (AV20)
      2 DATE-BIRTH (AV12)
  end-define
```

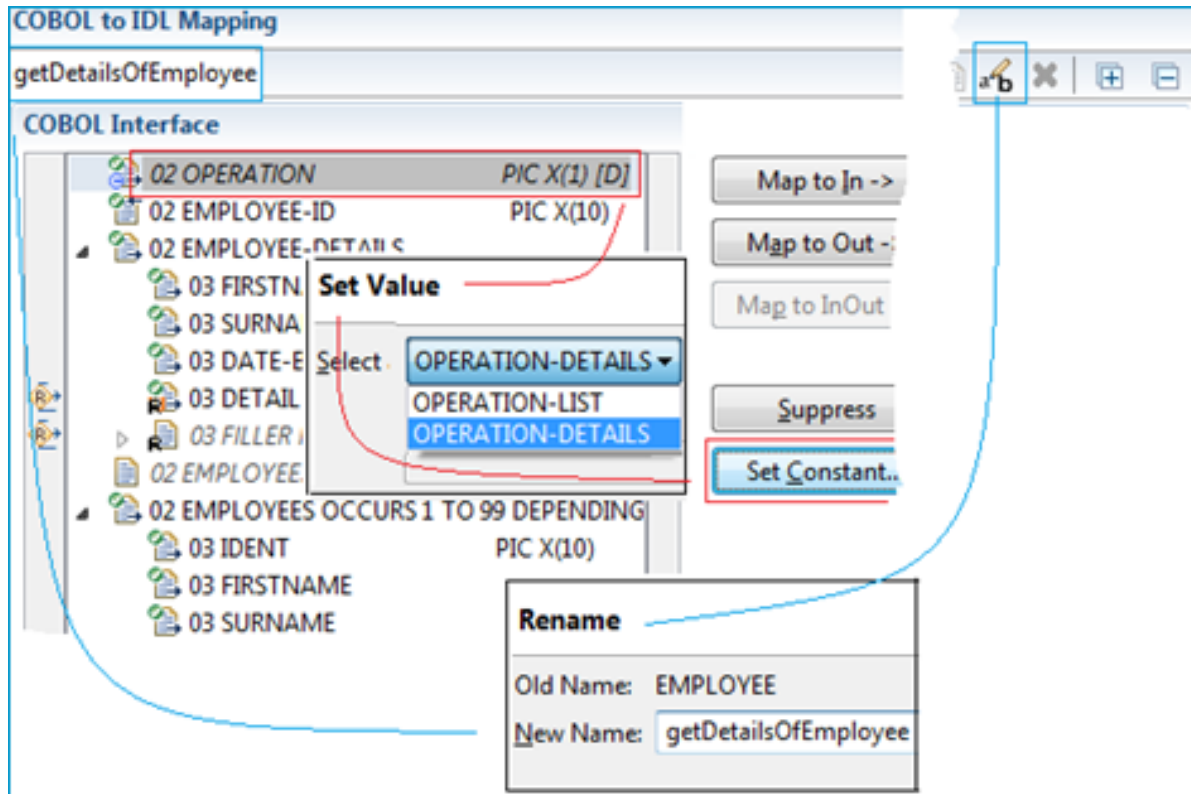
If required, a server mapping file with the same name as the IDL file but the extension .cvm may be generated too, for technical reasons. This file must always be stored together with the concomitant IDL file. For more information, see *Server Mapping Files for COBOL* in the Designer documentation. By default, the interface name `EMPLOYEE` is taken from the COBOL server program name.


Extracting a COBOL Server - Modern Method with User-defined Mapping

EntireX allows you to extract all implemented interfaces of the COBOL server separately. Instead of a large `EMPLOYEE` interface, separate interfaces `getListOfEmployees` and `getDetailsOfEmployee` are extracted. Each interface contains required parameters; obsolete parameters for an interface are suppressed, improving its usability.

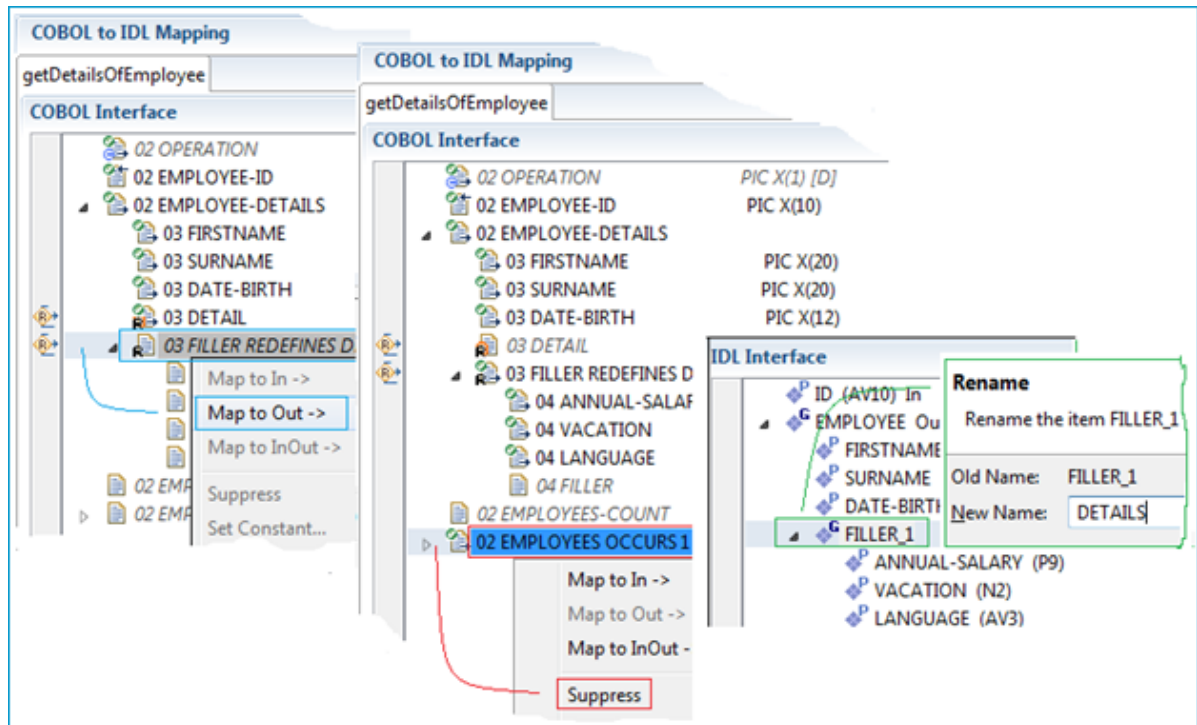
» To extract a COBOL server with a user-defined mapping

- 1 Shape `EMPLOYEE` to `getDetailsOfEmployee`:



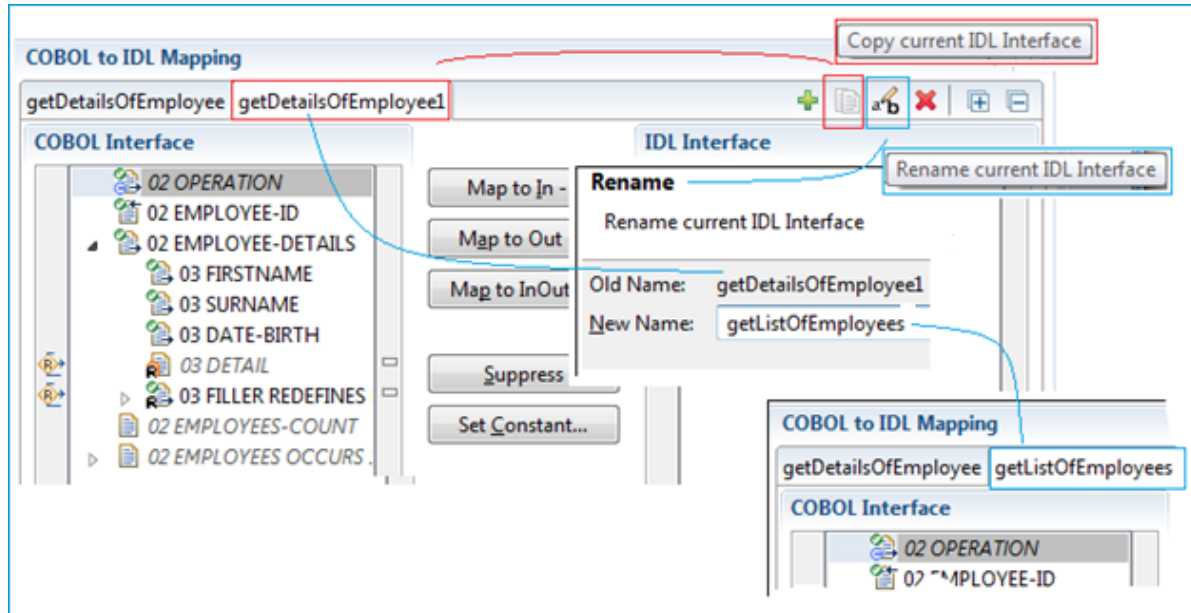
- Mark the `OPERATION` field in the **COBOL Interface** pane and press the **Set Constant** button. In the pop-up window, select `OPERATION-DETAILS` (red markers). The `OPERATION-DETAILS` value originates from COBOL level-88 data item (blue markers). If there is no COBOL level-88 enumeration type in the COBOL program defined, you can enter the function code manually in the pop-up window.
- By default the IDL interface gets the same name as your COBOL server: `EMPLOYEE`. Use the **Rename** button  from the toolbar of the COBOL Mapping Editor and change the IDL interface name to `getDetailsOfEmployee` (blue markers). This name is used as the IS service name later.

2 Continue shaping, making `getDetailsOfEmployee` easier to use:




- Use the context menu of the redefinition of the `DETAIL` field in the **COBOL Interface** pane, `FILLER REDEFINES DETAIL` and choose **Map to Out** (blue markers). A redefinition is a secondary layout (field types) of the same memory area. The redefinition contains more specific information (`ANNUAL-SALARY`, `VACATION`, etc.) than character buffer `DETAIL`. This is the reason why it is more useful in your interface.
- Use the context menu of `FILLER_1` in the IDL interface pane and rename `FILLER_1` to `DETAILS` (green markers) for a readable IS service field name later.
- The `DETAILS` function in the COBOL server does not make use of the `EMPLOYEES` field. Therefore you can leave it out of the interface: use the context menu of the `EMPLOYEES` field in the **COBOL Interface** pane and choose **Suppress** (red markers).


3 Shape `EMPLOYEE` to `getListOfEmployees` Function:



The COBOL Mapping Editor allows you to define multiple IDL interfaces to the same COBOL server:

- You create the additional IDL interface using the toolbar button **Copy current IDL interface**

 (red markers). A new tab `getDetailsOfEmployee1` is created. The previously extracted `getDetailsOfEmployee` interface still exists in the first tab. Once you reactivate the first tab, you will see the interface of `getDetailsOfEmployee` again.

- Use the **Rename** button  from the toolbar of the COBOL Mapping Editor and change the IDL interface name to `getListOfEmployees` (blue markers). This name is used as the IS service name later.

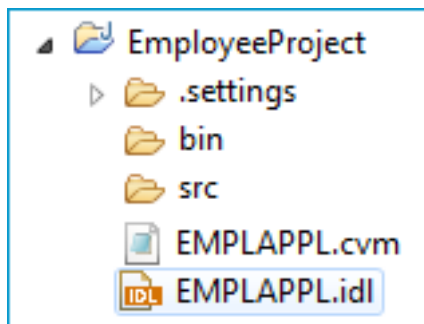
- For the `LIST` function you need the `OPERATION-LIST` value in the `OPERATION` field: Mark the `OPERATION` field in the **COBOL Interface** pane and press the **Set Constant** button. In the pop-up window, select `OPERATION-LIST` (similar to Step 1. above *Shape `EMPLOYEE` to `getDetailsOfEmployee`*; red markers).

- Use the context menu of the `EMPLOYEES` field in the **COBOL Interface** pane, `EMPLOYEES OCCURS 1 TO 99` and choose **Map to Out** (Similar to Step 2. above *Continue shaping, making `getDetailsOfEmployee` easier to use*; blue markers).

- Because the `EMPLOYEE` and `EMPLOYEE-DETAIL` fields are not used in the COBOL server `LIST` function, you leave them out in the IDL interface: use the context menu of `EMPLOYEE-DETAIL` field in the **COBOL Interface** pane and choose **Suppress** (similar to Step 2. above *Continue shaping, making `getDetailsOfEmployee` easier to use*; red markers). Do the same for the `EMPLOYEE-ID` field.

- 4 Press **Finish** to retrieve the extraction result in the form of a Software AG IDL file. At the same time, a server mapping file for COBOL (Designer file with extension `.cvm`) is created.

See *Server Mapping Files for COBOL* in the Designer documentation. The *Software AG IDL File* in the IDL Editor documentation describes the interfaces from the client point of view, while the server mapping file contains the mapping to the real COBOL server. Both of these files must be kept together and in sync, otherwise a call to the COBOL server may fail.



To summarize: We created two IDL interfaces. In the IDL file, these resulted in two IDL programs: `getListOfEmployees` and `getDetailsOfEmployee`. Both IDL programs were given readable names (Steps 1 and 3). Meaningful fields were kept, while superfluous fields were suppressed (Steps 1 and 3). The program `getDetailsOfEmployee` contains the redefined fields of parameter `DETAILS` (see below) mapped during extraction (Step 1).



Note: At runtime, the RPC client generated with the extracted interface will send data for the redesigned interfaces, while your COBOL server still expects `EMPLOYEE` data. The EntireX runtime transforms the incoming data stream from the RPC client, using the server mapping file.

```

program 'getDetailsOfEmployee' is
  define data parameter
    1 ID (AV10) In /* Original Name:EMPLOYEE-ID
    1 EMPLOYEE Out /* Original Name:EMPLOYEE-DETAILS
    2 FIRSTNAME (AV20)
    2 SURNAME (AV20)
    2 DATE-BIRTH (AV12)
    2 DETAILS /* Original Name:FILLER_1
    3 ANNUAL-SALARY (P9)
    3 VACATION (N2)
    3 LANGUAGE (AV3)
  end-define
  program 'getListOfEmployees' is
    1 EMPLOYEES (/V99) Out
    2 IDENT (AV10)
    2 FIRSTNAME (AV20)
    2 SURNAME (AV20)
    2 DATE-BIRTH (AV12)
  end-define
  
```

Comparison Chart: Fast-track versus User-defined Mapping

The following table highlights the differences when shaping an interface with a *user-defined mapping* compared with a *fast-path extraction*.

| | Interface Shaping with User-defined Mapping | Fast-path Extraction |
|----------------------------------|---|---|
| General | User-defined interface with dedicated mapping. For our example, the interfaces are small and tidy and more self-explanatory with long, readable interface names. They are easier to use with the hidden <code>OPERATION</code> field and the suppressed COBOL fields, which are not needed. | Automatic, quick result extraction with COBOL-like interfaces on IS. For our example, the IS interface <code>EMPLOYEE</code> matches exactly 1:1, field by field. |
| IS service(s) | Multiple small and handy IS services; each <code>OPERATION</code> code is mapped to a separate IS service. | One big IS service. |
| IS service name | Readable long name. | Short Subprogram name; up to 8 characters. |
| IS fields | Usage of Suppress and Set Constant reduces the message length. This keeps focus on relevant data items and keeps the client's interface clean. It may also improve performance. | The IS fields and COBOL server parameters match 1:1. As COBOL layout descriptions are sometimes used for many different purposes, irrelevant data items appear and clutter up the IS interface. |
| <code>OPERATION</code> parameter | Suppressed: the <code>OPERATION</code> parameter does not exist in the IS service as an IS field. | The <code>OPERATION</code> parameter exists in the IS service as an IS field and needs to be filled-in by the client endpoint. |
| <code>OPERATION</code> code | The <code>OPERATION</code> code is provided internally by EntireX runtime in the <code>OPERATION</code> field. | The <code>OPERATION</code> code needs to be specified in the IS service in the <code>OPERATION</code> field by the client endpoint. |
| <code>REDEFINE</code> parameters | Either the parameter that is redefined or one of its redefinitions is available as an IS field. | Only the parameter that is redefined is available as an IS field. Redefinitions of the parameter are not available as IS fields. |

A user-defined mapping enables you also to define alternative mappings for COBOL data items (`REDEFINES`, tables etc.). These enable scenarios with COBOL servers where data exchange is not fully described by the `LINKAGE SECTION` COBOL data items. For more information refer to the IDL Extractor for COBOL documentation:

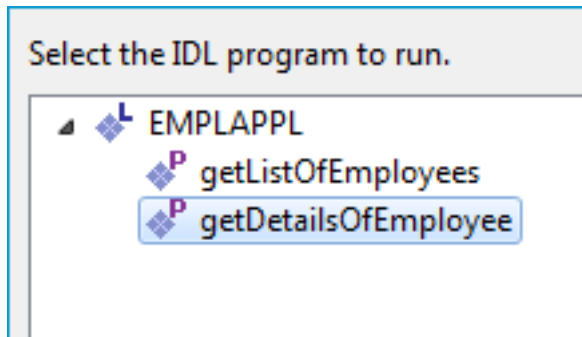
- *Mapping Editor IDL Interface Mapping Functions* if the check-box **Input Message same as Output Message** was checked.
- *Mapping Editor IDL Interface Mapping Functions* if the check-box **Input Message same as Output Message** was cleared.
- *User-defined Mapping*

Testing the Extraction Results

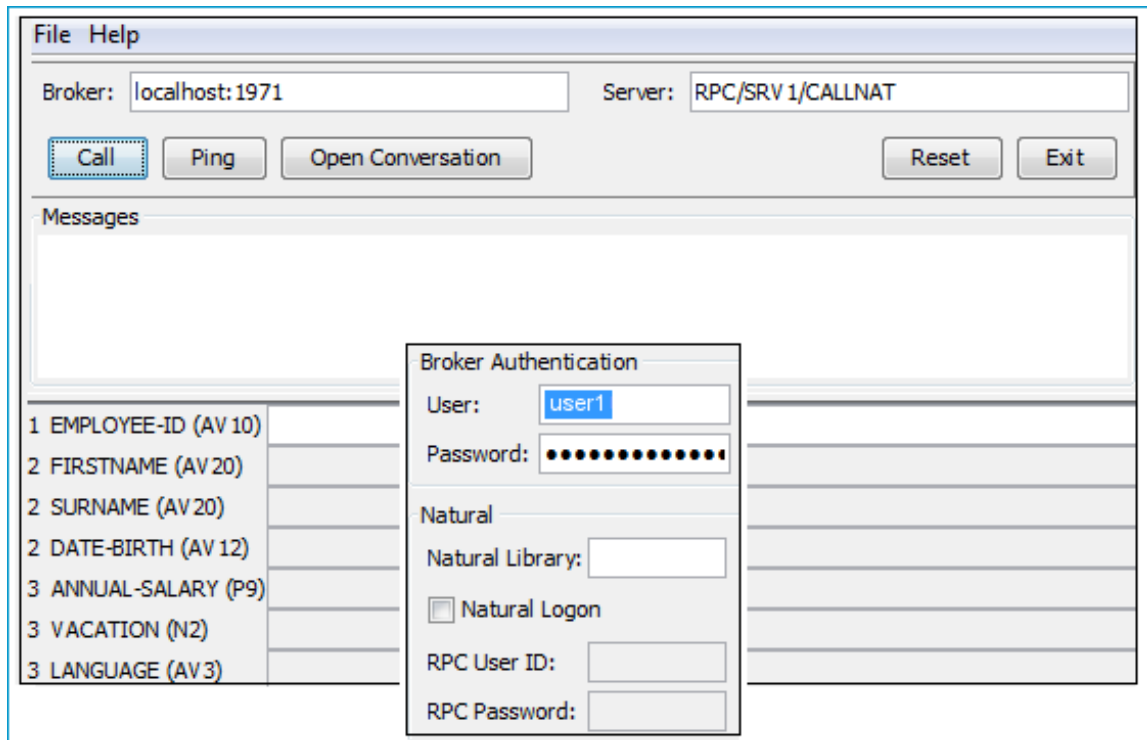
The following pictures use the extraction results described under *Extracting a COBOL Server - Modern Method with User-defined Mapping*.

➤ **To test the extraction results (optional)**

- 1 You can test the results of the extraction operation and the COBOL server back end, using the EntireX IDL Tester. From the context menu of the IDL file in the Designer, choose **Software AG IDL Tester**.



- 2 Select `getDetailsOfEmployee`.



Note that the broker and server parameters contain the explicit route to call the server program, and you can optionally ping the connection from this client. With the **File > Options** dialog, you can set:

- **User** and **Password** for *broker* authentication
- **RPC User ID** and **RPC Password** for *server* authentication

See *EntireX IDL Tester* in the Designer documentation.

- 3 Check the Integration Server log, the EntireX Adapter log or the RPC logs. Applies to all connection methods.

Task 2: Generate the Connection and Adapter Services in Integration Server

This section describes your first steps to create a new Integration Server connection. This is described in more detail under *Using the Integration Server Wrapper*, for example working with existing Integration Server connections. This section covers the following topics:

- [Step 1: Start the Integration Server Wrapper Wizard](#)
- [Step 2: Create a New Integration Server Connection](#)
- [Step 3: Select the Connection Type](#)
- [Step 4: Define Adapter Services for a CICS Socket Listener Connection](#)

Step 1: Start the Integration Server Wrapper Wizard

➤ To start the Integration Server Wrapper wizard

- 1 In the context menu of a Software AG IDL file, choose **Integration Server > Generate web-Methods IS Connection**.

This starts the wizard with a list of existing Integration Server Wrapper connections.



Note: If the selected IDL file is not valid because of a syntax error, an error dialog comes up and the wizard does not start.

- 2 Continue with *Step 2: Create a New Integration Server Connection*.

Step 2: Create a New Integration Server Connection

Define New Integration Server Connection
Add host:port, user and password for a new Integration Server

Server:

User:

Password:

☐ Use secure connection

➤ To create a new Integration Server connection

- 1 Define the new Integration Server connection on the wizard page.



Notes:

1. The only required field is **Server**. Enter the hostname of the Integration Server including an optional port number. If no port number is specified, port number defaults to "5555". The **Integration Server Authentication** can be passed with the **User** and **Password** fields.
 2. Optional settings are for secure connections. The **Truststore for HTTPS** contains all signed certificates and must be a valid truststore.
 3. The check box **Verify host name** checks that the hostname is entered in the stored certificate.
 4. When the Integration Server has **Client Authentication** enabled, you can specify your **Keystore** file and keystore **Password**.
 5. For managing Integration Server connections, see [Preferences](#).
- 2 Choose **Next** and continue with *Step 3: Select the Connection Type*.

Step 3: Select the Connection Type

☒ Create a new EntireX Adapter connection of type **CICS Socket Listener Connection**

☐ Update Adapter Services or Listeners to an existing Integration Server connection:

List of Connections

| Connection Name | Package Name | Connection Type | Enabled |
|-------------------------------|--------------|------------------------|---------|
| Employees:EmployeesConnection | Employees | EntireX RPC Connection | Yes |


Total: 1

☒ Map Software AG IDL data types to String

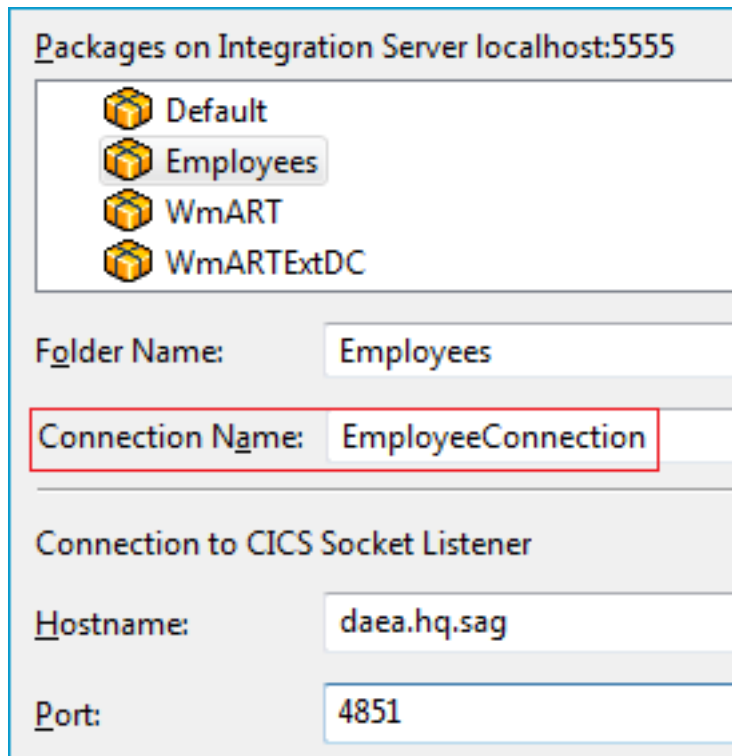
☐ Create or Update REST resource

➤ To create a new connection

- 1 Select a connection type from the drop down list. Connection types are described under *EntireX Adapter Connections* in the EntireX Adapter documentation and *Introduction to the Integration Server Wrapper*.

 **Note:** The list of connection types is filtered: connection types that require a license are only shown if a corresponding license file is available. Reliable RPC connections are only shown if all IDL programs contain only IN parameters. Also, if a server mapping file is available, only those connection types that support the interface type specified in the server mapping file are shown.
- 2 Click **Next** and continue with *Step 4: Define Adapter Services for a CICS Socket Listener Connection*.

Step 4: Define Adapter Services for a CICS Socket Listener Connection



Packages on Integration Server localhost:5555

- Default
- Employees
- WmART
- WmARTEExtDC

Folder Name: Employees

Connection Name: EmployeeConnection

Connection to CICS Socket Listener

Hostname: daea.hq.sag

Port: 4851

➤ To create a connection and related adapter services

- 1 Select a package for the created objects.
- 2 Define a folder name. If the folder does not exist, it will be created.
- 3 Define a connection name.
- 4 Define the parameters of the connection type. For details, see *Connection Parameters for CICS Socket Listener Connections* in the EntireX Adapter documentation.

As a result, the folder will contain the connection and the adapter services (one for each IDL program). The name of a service is the same as the respective IDL program.

The default settings for the adapter services are:

- the **Default** package; if not available, the first package
- the IDL library name for the **Folder Name**
- the IDL library name with the suffix "Connection" for the **Connection Name**



Note: When creating a connection, a package dependency is added such that the selected package depends on webMethods EntireX (the package `WmEntireX`) with the version currently used.

;

Task 3: Execute the Call from Integration Server to COBOL

From the **Service Development** perspective, refresh the package where the connection service was written, select the adapter service and use the service test to **Run Service**. This invokes the adapter service through the connector service.

Employees

Employees

getDetailsOfEmployee

getListOfEmployees

EmployeesConnection

Run As

1 Run in Browser

2 Run Service

| Name | Value |
|--------------|-------------|
| outRec | |
| EMPLOYEES | |
| EMPLOYEES[0] | |
| IDENT | 11100102 |
| FIRSTNAME | EDGAR |
| SURNAME | SCHINDLER |
| DATE-BIRTH | Dec 4, 1962 |
| EMPLOYEES[1] | |
| EMPLOYEES[2] | |
| EMPLOYEES[3] | |
| EMPLOYEES[4] | |
| errorCode | 00000000 |
| errorFlag | false |

In case of error or unexpected results:

- Check the Integration Server log or the EntireX Adapter log.

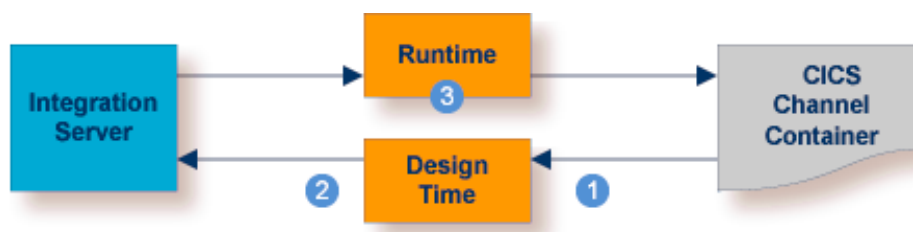
22

Calling COBOL Channel Container (Minimal Footprint using CICS Socket Listener) on z/VSE CICS from Integration Server

| | |
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| ■ Introduction | 351 |
| ■ What do I need to Install for this Scenario? | 352 |
| ■ Task 1: Extract the Interface of a COBOL Server | 353 |
| ■ Task 2: Generate the Connection and Adapter Services in Integration Server | 365 |
| ■ Task 3: Execute the Call from Integration Server to COBOL | 370 |

This scenario uses the tools IDL Extractor for COBOL and Integration Server Wrapper of the Designer.

Introduction



- ① Extract the interface of the COBOL server program.
- ② Generate connection and adapter services in Integration Server.
- ③ Execute the call from Integration Server to the COBOL server program.

This scenario makes the following important assumptions:

For Task 1:

- You have a working COBOL Channel Container server. For illustration and examples on such a server, see *CICS with Channel Container Calling Convention* under *Introduction to the IDL Extractor for COBOL*.
- You have access to the related COBOL sources and copybooks as files on your local machine. The minimum requirement is the `DATA DIVISION` of the interface.



For Tasks 2 and 3:

- To call the COBOL server program at runtime using the *EntireX CICS Socket Listener* connection method, you need to install the CICS Socket Listener within your CICS region: see *Preparing for CICS Socket Listener*. For configuration, see *Connection Parameters for CICS Socket Listener Connections*.



What do I need to Install for this Scenario?

- You have Software AG Designer installed with EntireX plugins and Service Development plugins.
 - For EntireX plugins, see *Designer > EntireX Designer* under *EntireX Installation Packages* in the General Installation documentation.
 - For Service Development plugins, refer to the Integration Server documentation.
- You have an Integration Server with EntireX Adapter installed. See *Adapters > EntireX Adapter* under *EntireX Installation Packages* in the General Installation documentation.
- You have the CICS Socket Listener installed. See *Installing the CICS Socket Listener* in the z/VSE Installation documentation.

Task 1: Extract the Interface of a COBOL Server

- [Introduction](#)
- [Sample COBOL Server used in the Examples](#)
- [Extracting a COBOL Server - Fast-track Method](#)
- [Extracting a COBOL Server - Modern Method with User-defined Mapping](#)
- [Comparison Chart: Fast-track versus User-defined Mapping](#)
- [Testing the Extraction Results](#)

Introduction

Follow the instructions for extracting COBOL, see *Using the IDL Extractor for COBOL - Overview* and choose *Scenario I: Create New IDL and Server Mapping Files* if this is your first extraction. Learn how to invoke the IDL Extractor for COBOL, create a COBOL Extractor Environment and about the possibilities to select the COBOL source.

The extraction process creates the following EntireX metafiles:

- IDL file. A Software AG IDL file contains definitions of the interface between client and server. See *Software AG IDL File* in the IDL Editor documentation in the IDL Editor documentation.
- Server mapping file (optional). The mapping file is a Designer file with extension .cvm that contains COBOL-specific mapping information. See *Server Mapping Files for COBOL* in the Designer documentation.

Sample COBOL Server used in the Examples

The following COBOL server is used to illustrate the features of the IDL Extractor for COBOL. Imagine an existing COBOL server called `EMPLOYEE`. It implements the access logic for a `LIST` and `DETAILS` function to a database view `EMPLOYEE`:

```
IDENTIFICATION DIVISION.
PROGRAM-ID.      EMPLOYEE.
*****
*   Program Name      = EMPLOYEE
*   String Literal    = QUOTE
*****
01 DFHCOMMAREA.
02 OPERATION                                PIC X(1).
    88 OPERATION-LIST                        VALUE 'L'.
    88 OPERATION-DETAILS                    VALUE 'D'.
02 EMPLOYEE-ID                                PIC X(10).
02 EMPLOYEE-DETAILS.
    03 FIRSTNAME                            PIC X(20).
    03 SURNAME                              PIC X(20).
    03 DATE-BIRTH                          PIC X(12).
    03 DETAILS                             PIC X(100).
    03 FILLER REDEFINES DETAILS.
        04 ANNUAL-SALARY                    PACKED-DECIMAL PIC S9(9).
        04 VACATION                        PIC S9(2).
        04 LANGUAGE                        PIC X(3).
        04 FILLER                          PIC X(90).
02 EMPLOYEES-COUNT                          PIC 9(8) BINARY.
02 EMPLOYEES OCCURS 1 TO 99 DEPENDING ON EMPLOYEES-COUNT.
    03 IDENT                                PIC X(10).
    03 FIRSTNAME                            PIC X(20).
    03 SURNAME                              PIC X(20).
    03 DATE-BIRTH                          PIC X(12).
```

Two approaches for extracting the COBOL server are described below:

- **Fast-track**

Learn how EntireX helps you to connect the COBOL Server with quick results.

- **User-defined Mapping**

The following features are among those available with a user-defined mapping:

- **Shape the interface to your COBOL server**

You can minimize the interface by suppressing COBOL server fields or by providing constant values. Renaming interfaces allows you to specify a readable long name. These two features together - constants and renaming of interfaces - are most powerful when multiple interfaces are implemented in a single COBOL server. Each function of the COBOL server triggered by an operation code or function code can be modelled as a separate IS service.

■ Select alternative mappings

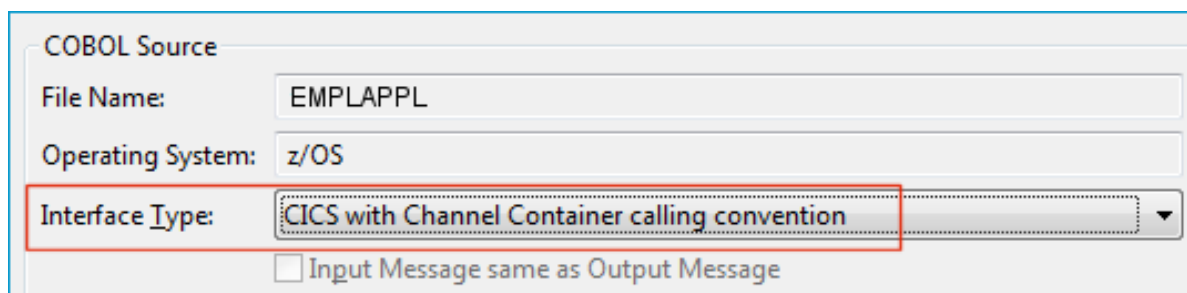
You can select alternative mappings for COBOL data items (REDEFINES, tables etc.) to enable scenarios with COBOL servers where data exchange is not fully described by the LINKAGE SECTION COBOL data items.

These approaches are described under *Fast-track Method* and *Modern Method* below.

Extracting a COBOL Server - Fast-track Method

➤ To extract the COBOL Server

- 1 Switch to the **EntireX** perspective.
- 2 Call the IDL Extractor for COBOL.
- 3 Set the correct interface type as described under *Step 4: Define the Extraction Settings and Start Extraction* under *Scenario I: Create New IDL and Server Mapping Files* in the IDL Extractor for COBOL documentation.



COBOL Source

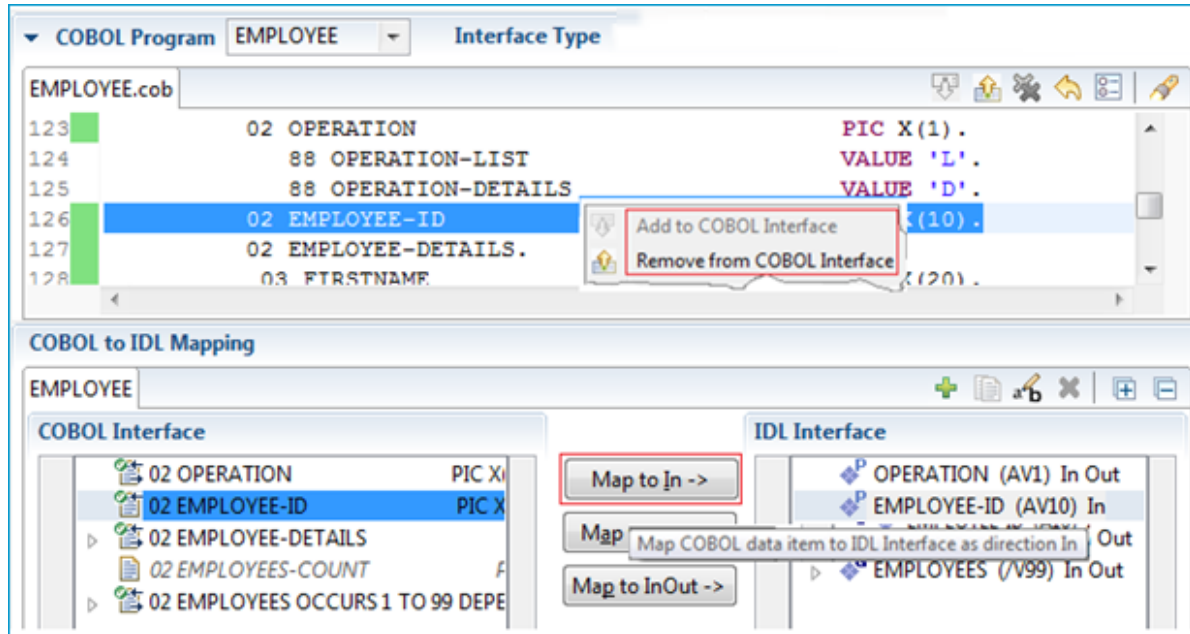
File Name: EMPLAPPL

Operating System: z/OS

Interface Type: CICS with Channel Container calling convention

☐ Input Message same as Output Message

- 4 Press **Next** to enter the COBOL Mapping Editor.



The purpose of the COBOL Mapping Editor is to map COBOL data items to IDL (Interface Definition Language) parameters. It consists of three main areas:

- The upper window pane is the COBOL program source.
- The window pane on the left-hand side is the COBOL interface, consisting of COBOL data items representing the parameters in your COBOL server program.
- The window pane on the right-hand side is the IDL interface consisting of IDL parameters.

For more information see *Mapping Editor User Interface* in the IDL Extractor for COBOL documentation.

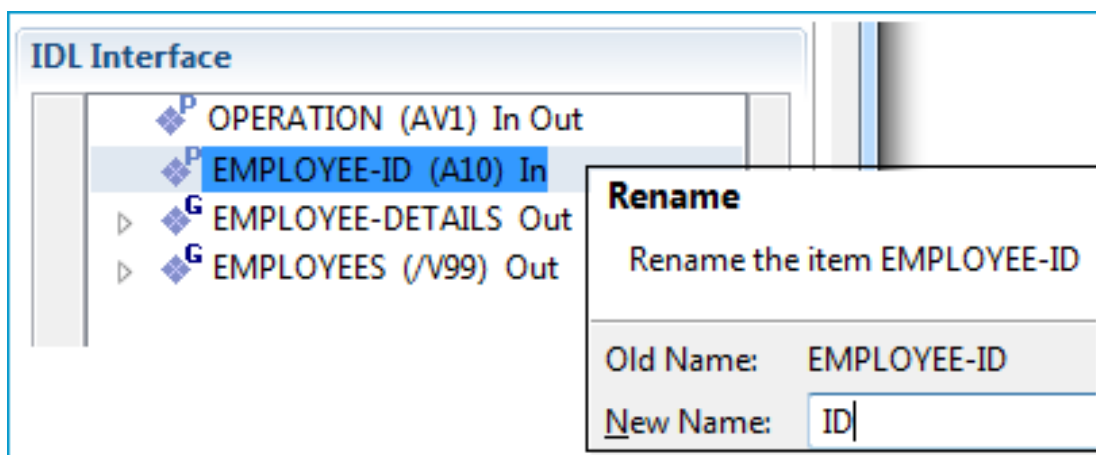
COBOL extraction is a two-step process:

- First, select the COBOL parameters using the **Add to** and **Remove from COBOL Interface** from the context menu on the COBOL data items in the upper window pane (COBOL source); in many situations the COBOL interface is detected by the Mapping Editor directly and you can omit this step.
- Then map the COBOL parameters to IDL directions using the **Map to In/Out/InOut** buttons. COBOL parameters do not have directions, they are always INOUT. This step can be left out for a quick test in non-production scenarios; for real production it is recommended to set IDL directions to reduce data transfer. You also have the option to assign a meaningful name to an IDL parameter if the original COBOL data item is not self-explanatory.

For our example:

- Set **Map to In** for COBOL data item `EMPLOYEE-ID` as IDL direction (see screenshot in previous step). For `EMPLOYEES-DETAILS` and `EMPLOYEES` perform the similar **Map to Out**.

- Use the function **Rename** from the context menu on the IDL parameters in the **IDL Interface** pane to rename COBOL parameter `EMPLOYEE-ID` to IDL parameter `ID`. Do the same for `EMPLOYEE-DETAILS`: Rename to `EMPLOYEE`.



- 5 Press **Finish**. The default extraction settings ensure you get useful results. The outcome is a Software AG IDL file (interface definition language), a Designer file with extension `.idl`:

```
library 'EMPLAPPL' is
program 'EMPLOYEE' is
  define data parameter
    1 OPERATION (AV1) In Out
    1 ID (AV10) In /* Original Name:EMPLOYEE-ID
    1 EMPLOYEE Out /* Original Name:EMPLOYEE-DETAILS
      2 FIRSTNAME (AV20)
      2 SURNAME (AV20)
      2 DATE-BIRTH (AV12)
      2 DETAILS (AV100)
    1 EMPLOYEES (/V99) Out
      2 IDENT (AV10)
      2 FIRSTNAME (AV20)
      2 SURNAME (AV20)
      2 DATE-BIRTH (AV12)
  end-define
```

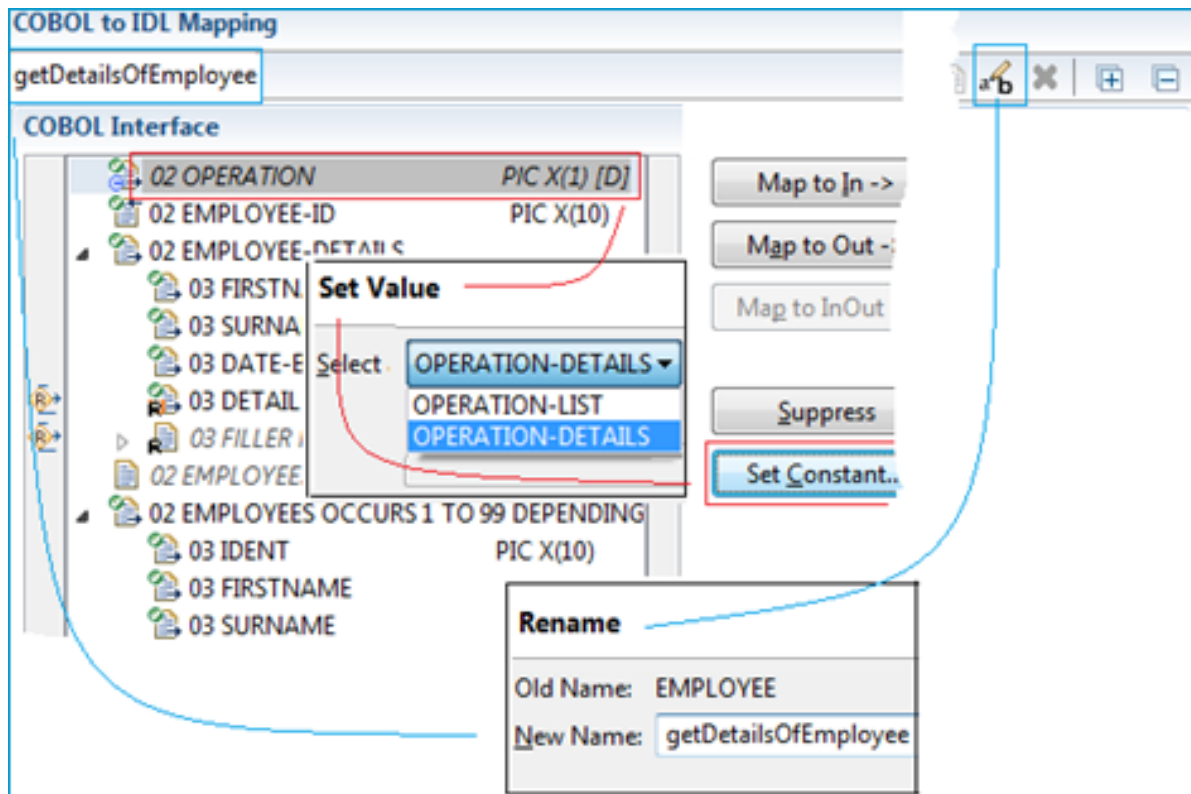
If required, a server mapping file with the same name as the IDL file but the extension `.cvm` may be generated too, for technical reasons. This file must always be stored together with the concomitant IDL file. For more information, see *Server Mapping Files for COBOL* in the Designer documentation. By default, the interface name `EMPLOYEE` is taken from the COBOL server program name.


Extracting a COBOL Server - Modern Method with User-defined Mapping

EntireX allows you to extract all implemented interfaces of the COBOL server separately. Instead of a large `EMPLOYEE` interface, separate interfaces `getListOfEmployees` and `getDetailsOfEmployee` are extracted. Each interface contains required parameters; obsolete parameters for an interface are suppressed, improving its usability.

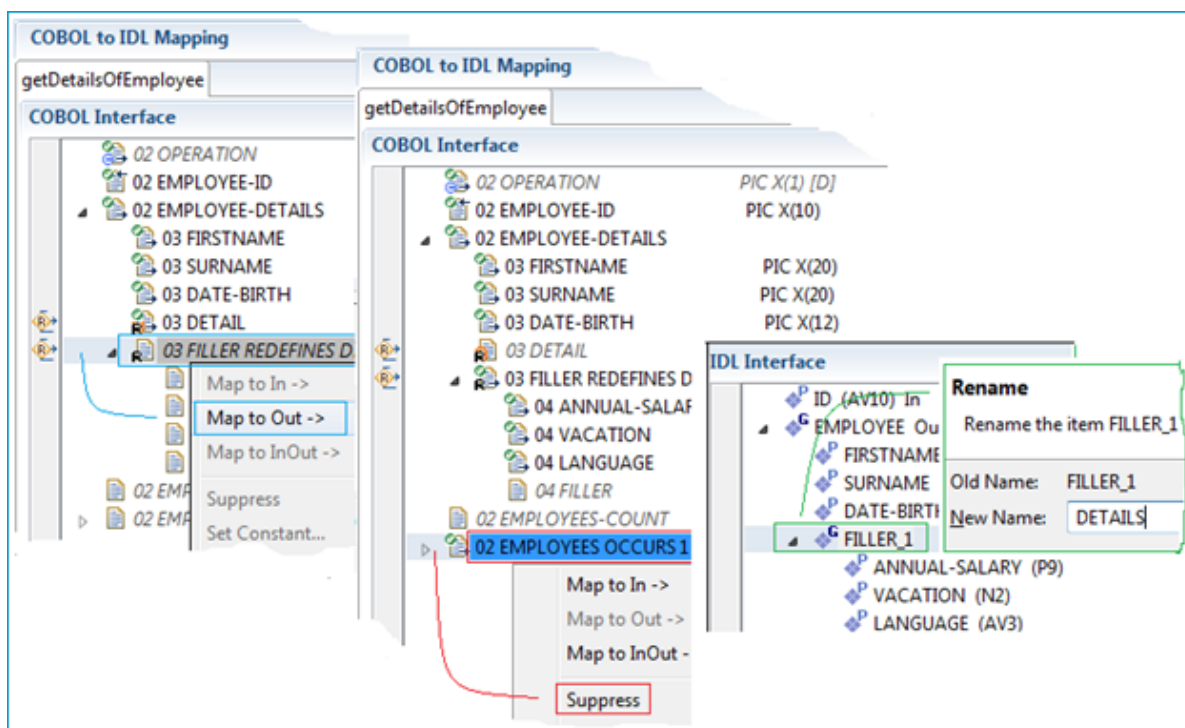
➤ To extract a COBOL server with a user-defined mapping

- 1 Shape `EMPLOYEE` to `getDetailsOfEmployee`:



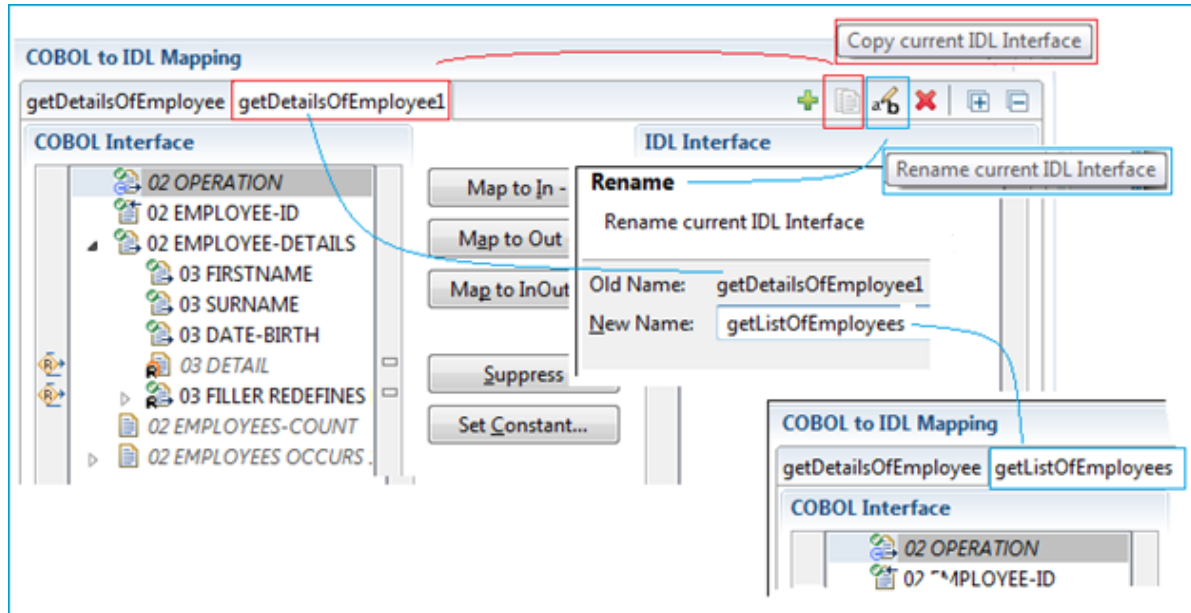
- Mark the `OPERATION` field in the COBOL **Interface** pane and press the **Set Constant** button. In the pop-up window, select `OPERATION-DETAILS` (red markers). The `OPERATION-DETAILS` value originates from COBOL level-88 data item (blue markers). If there is no COBOL level-88 enumeration type in the COBOL program defined, you can enter the function code manually in the pop-up window.
- By default the IDL interface gets the same name as your COBOL server: `EMPLOYEE`. Use the **Rename** button  from the toolbar of the COBOL Mapping Editor and change the IDL interface name to `getDetailsOfEmployee` (blue markers). This name is used as the IS service name later.

- 2 Continue shaping, making `getDetailsOfEmployee` easier to use:




- Use the context menu of the redefinition of the `DETAIL` field in the **COBOL Interface** pane, `FILLER REDEFINES DETAIL` and choose **Map to Out** (blue markers). A redefinition is a secondary layout (field types) of the same memory area. The redefinition contains more specific information (`ANNUAL-SALARY`, `VACATION`, etc.) than character buffer `DETAIL`. This is the reason why it is more useful in your interface.
- Use the context menu of `FILLER_1` in the IDL interface pane and rename `FILLER_1` to `DETAILS` (green markers) for a readable IS service field name later.
- The `DETAILS` function in the COBOL server does not make use of the `EMPLOYEES` field. Therefore you can leave it out of the interface: use the context menu of the `EMPLOYEES` field in the **COBOL Interface** pane and choose **Suppress** (red markers).


3 Shape `EMPLOYEE` to `getListOfEmployees` Function:



The COBOL Mapping Editor allows you to define multiple IDL interfaces to the same COBOL server:

- You create the additional IDL interface using the toolbar button **Copy current IDL interface**

 (red markers). A new tab `getDetailsOfEmployee1` is created. The previously extracted `getDetailsOfEmployee` interface still exists in the first tab. Once you reactivate the first tab, you will see the interface of `getDetailsOfEmployee` again.

- Use the **Rename** button  from the toolbar of the COBOL Mapping Editor and change the IDL interface name to `getListOfEmployees` (blue markers). This name is used as the IS service name later.

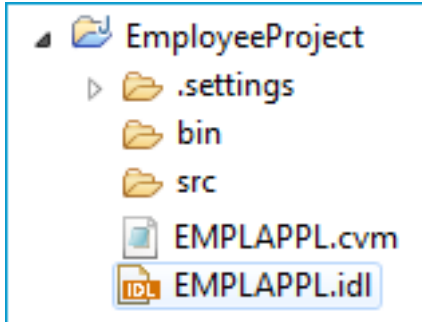
- For the `LIST` function you need the `OPERATION-LIST` value in the `OPERATION` field: Mark the `OPERATION` field in the **COBOL Interface** pane and press the **Set Constant** button. In the pop-up window, select `OPERATION-LIST` (similar to Step 1. above *Shape `EMPLOYEE` to `getDetailsOfEmployee`*; red markers).

- Use the context menu of the `EMPLOYEES` field in the **COBOL Interface** pane, `EMPLOYEES OCCURS 1 TO 99` and choose **Map to Out** (Similar to Step 2. above *Continue shaping, making `getDetailsOfEmployee` easier to use*; blue markers).

- Because the `EMPLOYEE` and `EMPLOYEE-DETAIL` fields are not used in the COBOL server `LIST` function, you leave them out in the IDL interface: use the context menu of `EMPLOYEE-DETAIL` field in the **COBOL Interface** pane and choose **Suppress** (similar to Step 2. above *Continue shaping, making `getDetailsOfEmployee` easier to use*; red markers). Do the same for the `EMPLOYEE-ID` field.

- 4 Press **Finish** to retrieve the extraction result in the form of a Software AG IDL file. At the same time, a server mapping file for COBOL (Designer file with extension `.cvm`) is created.

See *Server Mapping Files for COBOL* in the Designer documentation. The *Software AG IDL File* in the IDL Editor documentation describes the interfaces from the client point of view, while the server mapping file contains the mapping to the real COBOL server. Both of these files must be kept together and in sync, otherwise a call to the COBOL server may fail.



To summarize: We created two IDL interfaces. In the IDL file, these resulted in two IDL programs: `getListOfEmployees` and `getDetailsOfEmployee`. Both IDL programs were given readable names (Steps 1 and 3). Meaningful fields were kept, while superfluous fields were suppressed (Steps 1 and 3). The program `getDetailsOfEmployee` contains the redefined fields of parameter `DETAILS` (see below) mapped during extraction (Step 1).



Note: At runtime, the RPC client generated with the extracted interface will send data for the redesigned interfaces, while your COBOL server still expects `EMPLOYEE` data. The EntireX runtime transforms the incoming data stream from the RPC client, using the server mapping file.

```

program 'getDetailsOfEmployee' is
  define data parameter
    1 ID (AV10) In /* Original Name:EMPLOYEE-ID
    1 EMPLOYEE Out /* Original Name:EMPLOYEE-DETAILS
    2 FIRSTNAME (AV20)
    2 SURNAME (AV20)
    2 DATE-BIRTH (AV12)
    2 DETAILS /* Original Name:FILLER_1
    3 ANNUAL-SALARY (P9)
    3 VACATION (N2)
    3 LANGUAGE (AV3)
  end-define
  program 'getListOfEmployees' is
    1 EMPLOYEES (/V99) Out
    2 IDENT (AV10)
    2 FIRSTNAME (AV20)
    2 SURNAME (AV20)
    2 DATE-BIRTH (AV12)
  end-define
  
```

Comparison Chart: Fast-track versus User-defined Mapping

The following table highlights the differences when shaping an interface with a *user-defined mapping* compared with a *fast-path extraction*.

| | Interface Shaping with User-defined Mapping | Fast-path Extraction |
|----------------------------------|---|---|
| General | User-defined interface with dedicated mapping. For our example, the interfaces are small and tidy and more self-explanatory with long, readable interface names. They are easier to use with the hidden <code>OPERATION</code> field and the suppressed COBOL fields, which are not needed. | Automatic, quick result extraction with COBOL-like interfaces on IS. For our example, the IS interface <code>EMPLOYEE</code> matches exactly 1:1, field by field. |
| IS service(s) | Multiple small and handy IS services; each <code>OPERATION</code> code is mapped to a separate IS service. | One big IS service. |
| IS service name | Readable long name. | Short Subprogram name; up to 8 characters. |
| IS fields | Usage of Suppress and Set Constant reduces the message length. This keeps focus on relevant data items and keeps the client's interface clean. It may also improve performance. | The IS fields and COBOL server parameters match 1:1. As COBOL layout descriptions are sometimes used for many different purposes, irrelevant data items appear and clutter up the IS interface. |
| <code>OPERATION</code> parameter | Suppressed: the <code>OPERATION</code> parameter does not exist in the IS service as an IS field. | The <code>OPERATION</code> parameter exists in the IS service as an IS field and needs to be filled-in by the client endpoint. |
| <code>OPERATION</code> code | The <code>OPERATION</code> code is provided internally by EntireX runtime in the <code>OPERATION</code> field. | The <code>OPERATION</code> code needs to be specified in the IS service in the <code>OPERATION</code> field by the client endpoint. |
| <code>REDEFINE</code> parameters | Either the parameter that is redefined or one of its redefinitions is available as an IS field. | Only the parameter that is redefined is available as an IS field. Redefinitions of the parameter are not available as IS fields. |

A user-defined mapping enables you also to define alternative mappings for COBOL data items (`REDEFINES`, tables etc.). These enable scenarios with COBOL servers where data exchange is not fully described by the `LINKAGE SECTION` COBOL data items. For more information refer to the IDL Extractor for COBOL documentation:

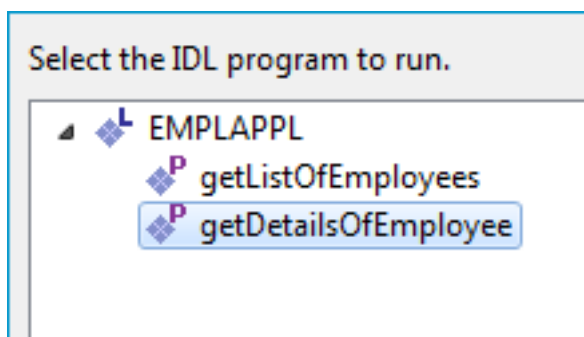
- *Mapping Editor IDL Interface Mapping Functions*
- *User-defined Mapping*

Testing the Extraction Results

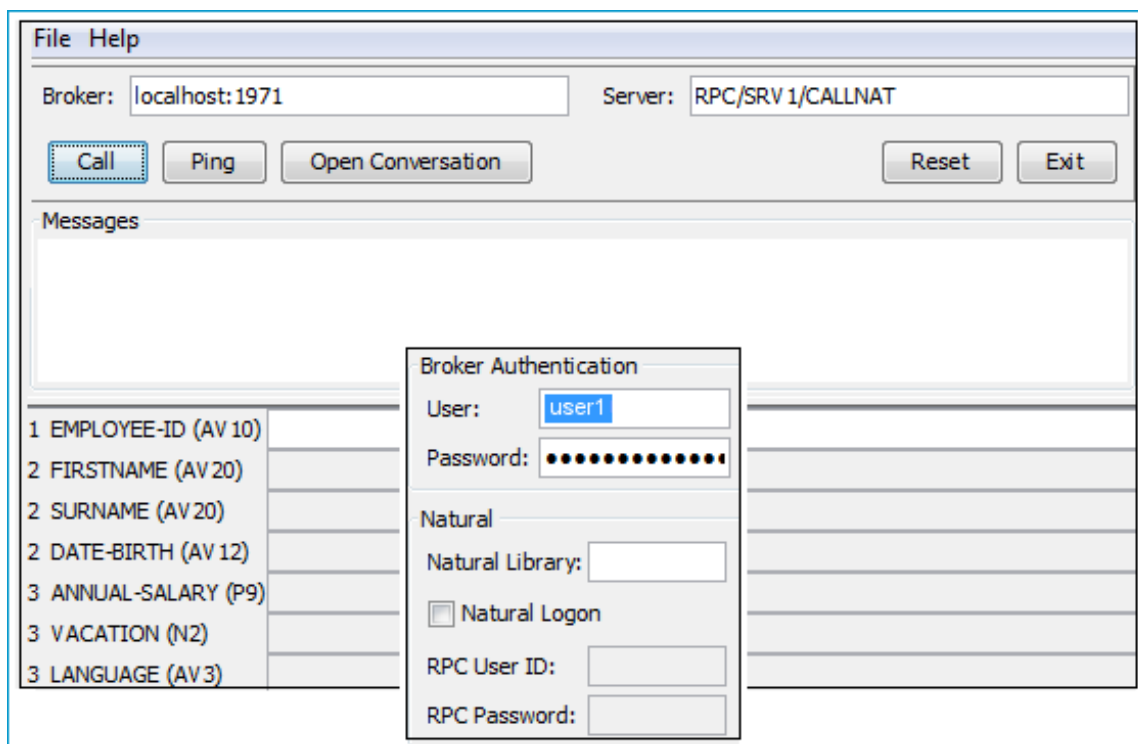
The following pictures use the extraction results described under *Extracting a COBOL Server - Modern Method with User-defined Mapping*.

> To test the extraction results (optional)

- 1 You can test the results of the extraction operation and the COBOL server back end, using the EntireX IDL Tester. From the context menu of the IDL file in the Designer, choose **Software AG IDL Tester**.



- 2 Select `getDetailsOfEmployee`.



Note that the broker and server parameters contain the explicit route to call the server program, and you can optionally ping the connection from this client. With the **File > Options** dialog, you can set:

- **User** and **Password** for *broker* authentication
- **RPC User ID** and **RPC Password** for *server* authentication

See *EntireX IDL Tester* in the Designer documentation.

- 3 Check the Integration Server log, the EntireX Adapter log or the RPC logs. Applies to all connection methods.

Task 2: Generate the Connection and Adapter Services in Integration Server

This section describes your first steps to create a new Integration Server connection. This is described in more detail under *Using the Integration Server Wrapper*, for example working with existing Integration Server connections. This section covers the following topics:

- [Step 1: Start the Integration Server Wrapper Wizard](#)
- [Step 2: Create a New Integration Server Connection](#)
- [Step 3: Select the Connection Type](#)
- [Step 4: Define Adapter Services for a CICS Socket Listener Connection](#)

Step 1: Start the Integration Server Wrapper Wizard

➤ To start the Integration Server Wrapper wizard

- 1 In the context menu of a Software AG IDL file, choose **Integration Server > Generate web-Methods IS Connection**.

This starts the wizard with a list of existing Integration Server Wrapper connections.



Note: If the selected IDL file is not valid because of a syntax error, an error dialog comes up and the wizard does not start.

- 2 Continue with *Step 2: Create a New Integration Server Connection*.

Step 2: Create a New Integration Server Connection

Define New Integration Server Connection
Add host:port, user and password for a new Integration Server

Server:

User:

Password:

☐ Use secure connection

➤ To create a new Integration Server connection

- 1 Define the new Integration Server connection on the wizard page.



Notes:

1. The only required field is **Server**. Enter the hostname of the Integration Server including an optional port number. If no port number is specified, port number defaults to "5555". The **Integration Server Authentication** can be passed with the **User** and **Password** fields.
 2. Optional settings are for secure connections. The **Truststore for HTTPS** contains all signed certificates and must be a valid truststore.
 3. The check box **Verify host name** checks that the hostname is entered in the stored certificate.
 4. When the Integration Server has **Client Authentication** enabled, you can specify your **Keystore** file and keystore **Password**.
 5. For managing Integration Server connections, see [Preferences](#).
- 2 Choose **Next** and continue with *Step 3: Select the Connection Type*.

Step 3: Select the Connection Type

☒ Create a new EntireX Adapter connection of type **CICS Socket Listener Connection**

☐ Update Adapter Services or Listeners to an existing Integration Server connection:

List of Connections

| Connection Name | Package Name | Connection Type | Enabled |
|-------------------------------|--------------|------------------------|---------|
| Employees:EmployeesConnection | Employees | EntireX RPC Connection | Yes |


Total: 1

☒ Map Software AG IDL data types to String

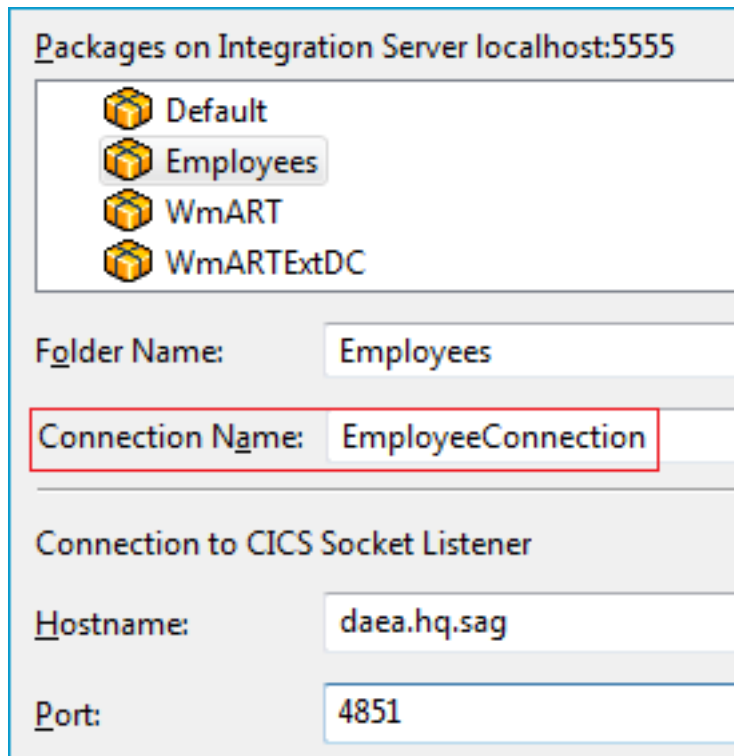
☐ Create or Update REST resource

➤ To create a new connection

- 1 Select a connection type from the drop down list. Connection types are described under *EntireX Adapter Connections* in the EntireX Adapter documentation and *Introduction to the Integration Server Wrapper*.

 **Note:** The list of connection types is filtered: connection types that require a license are only shown if a corresponding license file is available. Reliable RPC connections are only shown if all IDL programs contain only IN parameters. Also, if a server mapping file is available, only those connection types that support the interface type specified in the server mapping file are shown.
- 2 Click **Next** and continue with *Step 4: Define Adapter Services for a CICS Socket Listener Connection*.

Step 4: Define Adapter Services for a CICS Socket Listener Connection



Packages on Integration Server localhost:5555

- Default
- Employees
- WmART
- WmARTextDC

Folder Name: Employees

Connection Name: EmployeeConnection

Connection to CICS Socket Listener

Hostname: daea.hq.sag

Port: 4851

➤ To create a connection and related adapter services

- 1 Select a package for the created objects.
- 2 Define a folder name. If the folder does not exist, it will be created.
- 3 Define a connection name.
- 4 Define the parameters of the connection type. For details, see *Connection Parameters for CICS Socket Listener Connections* in the EntireX Adapter documentation.

As a result, the folder will contain the connection and the adapter services (one for each IDL program). The name of a service is the same as the respective IDL program.

The default settings for the adapter services are:

- the **Default** package; if not available, the first package
- the IDL library name for the **Folder Name**
- the IDL library name with the suffix "Connection" for the **Connection Name**



Note: When creating a connection, a package dependency is added such that the selected package depends on webMethods EntireX (the package `WmEntireX`) with the version currently used.

;

Task 3: Execute the Call from Integration Server to COBOL

From the **Service Development** perspective, refresh the package where the connection service was written, select the adapter service and use the service test to **Run Service**. This invokes the adapter service through the connector service.

The screenshot shows the 'Employees' package in the Service Development perspective. The 'getListOfEmployees' service is selected, and the 'Run Service' button is highlighted. Below the package tree, a table displays the results of the service test.

| Name | Value |
|--------------|-------------|
| outRec | |
| EMPLOYEES | |
| EMPLOYEES[0] | |
| IDENT | 11100102 |
| FIRSTNAME | EDGAR |
| SURNAME | SCHINDLER |
| DATE-BIRTH | Dec 4, 1962 |
| EMPLOYEES[1] | |
| EMPLOYEES[2] | |
| EMPLOYEES[3] | |
| EMPLOYEES[4] | |
| errorCode | 00000000 |
| errorFlag | false |

In case of error or unexpected results:

- Check the Integration Server log, the EntireX Adapter log or the RPC logs.
- Use the IDL Tester as described under [Task 1](#) above.

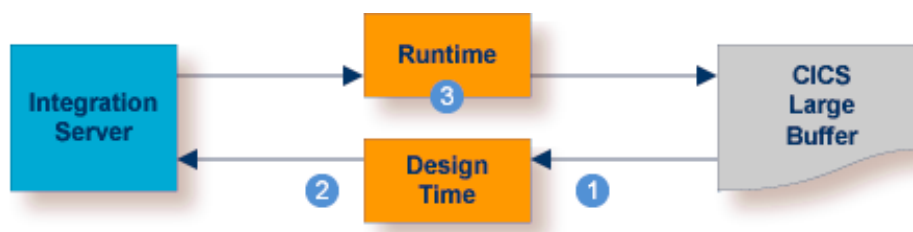
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Calling COBOL Large Buffer (Minimal Footprint using CICS Socket Listener) on z/VSE CICS from Integration Server

| | |
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| ■ Introduction | 373 |
| ■ What do I need to Install for this Scenario? | 374 |
| ■ Task 1: Extract the Interface of a COBOL Server | 375 |
| ■ Task 2: Generate the Connection and Adapter Services in Integration Server | 388 |
| ■ Task 3: Execute the Call from Integration Server to COBOL | 393 |

This scenario uses the tools IDL Extractor for COBOL and Integration Server Wrapper of the Designer.

Introduction



- ❶ Extract the interface of the COBOL server program.
- ❷ Generate connection and adapter services in Integration Server.
- ❸ Execute the call from Integration Server to the COBOL server program.

This scenario makes the following important assumptions:

For Task 1:

- You have a working COBOL Large Buffer server. For illustration and examples on such a server, see *CICS with DFHCOMMAREA Large Buffer Interface* under *Introduction to the IDL Extractor for COBOL*.
- You have access to the related COBOL sources and copybooks as files on your local machine. The minimum requirement is the `DATA DIVISION` of the interface.



For Tasks 2 and 3:

- To call the COBOL server program at runtime using the *EntireX CICS Socket Listener* connection method, you need to install the CICS Socket Listener within your CICS region: see *Preparing for CICS Socket Listener*. For configuration, see *Connection Parameters for CICS Socket Listener Connections*.



What do I need to Install for this Scenario?

- You have Software AG Designer installed with EntireX plugins and Service Development plugins.
 - For EntireX plugins, see *Designer > EntireX Designer* under *EntireX Installation Packages* in the General Installation documentation.
 - For Service Development plugins, refer to the Integration Server documentation.
- You have an Integration Server with EntireX Adapter installed. See *Adapters > EntireX Adapter* under *EntireX Installation Packages* in the General Installation documentation.
- You have the CICS Socket Listener installed. See *Installing the CICS Socket Listener* in the z/VSE Installation documentation.

Task 1: Extract the Interface of a COBOL Server

- [Introduction](#)
- [Sample COBOL Server used in the Examples](#)
- [Extracting a COBOL Server - Fast-track Method](#)
- [Extracting a COBOL Server - Modern Method with User-defined Mapping](#)
- [Comparison Chart: Fast-track versus User-defined Mapping](#)
- [Testing the Extraction Results](#)

Introduction

Follow the instructions for extracting COBOL, see *Using the IDL Extractor for COBOL - Overview* and choose *Scenario I: Create New IDL and Server Mapping Files* if this is your first extraction. Learn how to invoke the IDL Extractor for COBOL, create a COBOL Extractor Environment and about the possibilities to select the COBOL source.

The extraction process creates the following EntireX metafiles:

- IDL file. A Software AG IDL file contains definitions of the interface between client and server. See *Software AG IDL File* in the IDL Editor documentation in the IDL Editor documentation.
- Server mapping file (optional). The mapping file is a Designer file with extension .cvm that contains COBOL-specific mapping information. See *Server Mapping Files for COBOL* in the Designer documentation.

Sample COBOL Server used in the Examples

The following COBOL server is used to illustrate the features of the IDL Extractor for COBOL. Imagine an existing COBOL server called `EMPLOYEE`. It implements the access logic for a `LIST` and `DETAILS` function to a database view `EMPLOYEE`:

```

IDENTIFICATION DIVISION.
    PROGRAM-ID.      EMPLOYEE.
*****
*   Program Name    = EMPLOYEE
*   String Literal  = QUOTE
*****
01 DFHCOMMAREA.
    02 OPERATION                                PIC X(1).
        88 OPERATION-LIST                      VALUE 'L'.
        88 OPERATION-DETAILS                   VALUE 'D'.
    02 EMPLOYEE-ID                             PIC X(10).
    02 EMPLOYEE-DETAILS.
        03 FIRSTNAME                          PIC X(20).
        03 SURNAME                            PIC X(20).
        03 DATE-BIRTH                         PIC X(12).
        03 DETAILS                            PIC X(100).
        03 FILLER REDEFINES DETAILS.
            04 ANNUAL-SALARY                    PACKED-DECIMAL PIC S9(9).
            04 VACATION                          PIC S9(2).
            04 LANGUAGE                          PIC X(3).
            04 FILLER                            PIC X(90).
    02 EMPLOYEES-COUNT                         PIC 9(8) BINARY.
    02 EMPLOYEES OCCURS 1 TO 99 DEPENDING ON EMPLOYEES-COUNT.
        03 IDENT                              PIC X(10).
        03 FIRSTNAME                          PIC X(20).
        03 SURNAME                            PIC X(20).
        03 DATE-BIRTH                         PIC X(12).

```

Two approaches for extracting the COBOL server are described below:

- **Fast-track**

Learn how EntireX helps you to connect the COBOL Server with quick results.

- **User-defined Mapping**

The following features are among those available with a user-defined mapping:

- **Shape the interface to your COBOL server**

You can minimize the interface by suppressing COBOL server fields or by providing constant values. Renaming interfaces allows you to specify a readable long name. These two features together - constants and renaming of interfaces - are most powerful when multiple interfaces are implemented in a single COBOL server. Each function of the COBOL server triggered by an operation code or function code can be modelled as a separate IS service.

■ Select alternative mappings

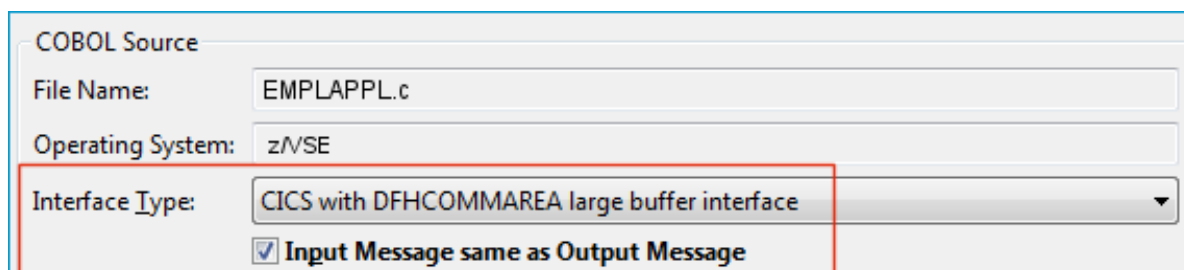
You can select alternative mappings for COBOL data items (REDEFINES, tables etc.) to enable scenarios with COBOL servers where data exchange is not fully described by the LINKAGE SECTION COBOL data items.

These approaches are described under [Fast-track Method](#) and [Modern Method](#) below.

Extracting a COBOL Server - Fast-track Method

➤ To extract the COBOL Server

- 1 Switch to the **EntireX** perspective.
- 2 Call the IDL Extractor for COBOL.
- 3 Set the correct interface type as described under *Step 4: Define the Extraction Settings and Start Extraction* under *Scenario I: Create New IDL and Server Mapping Files* in the IDL Extractor for COBOL documentation.



COBOL Source

File Name: EMPLAPPL.c

Operating System: z/VSE

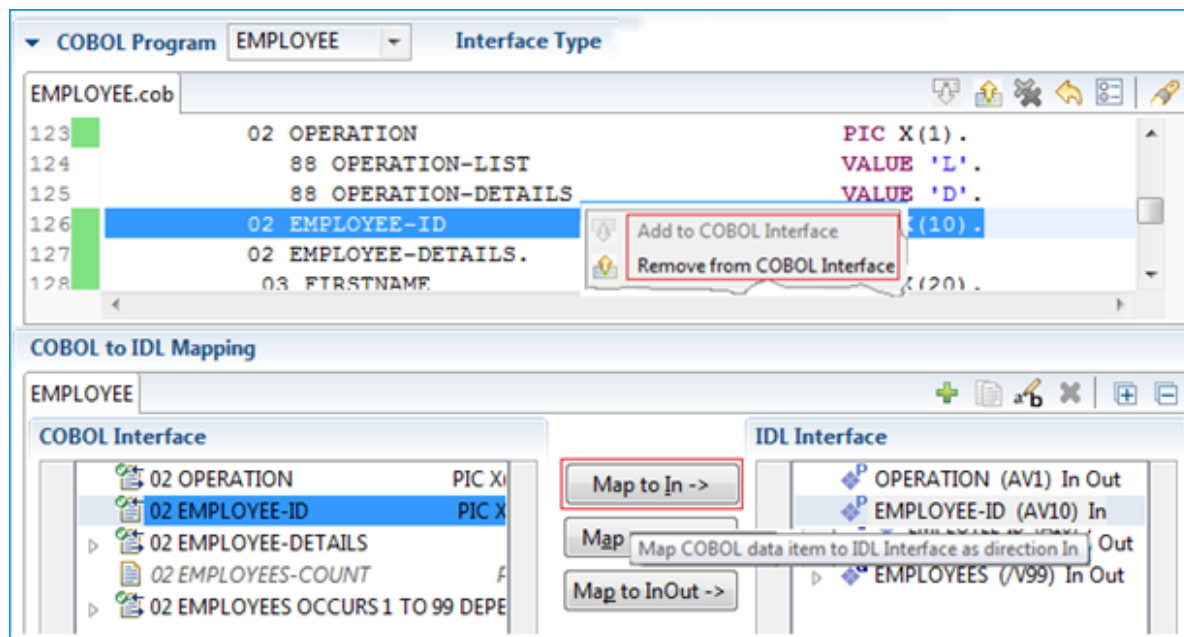
Interface Type: CICS with DFHCOMMAREA large buffer interface

☒ Input Message same as Output Message

- 4 Set the correct value for checkbox **Input Message same as Output Message**.
 - Check the checkbox if the COBOL data structure of the CICS input message is the same as the structure of the CICS output message, that is, there is one COBOL layout for both directions.
 - Clear the checkbox if the COBOL data structure of the CICS input message is different to the structure of the CICS output message, that is, the output overlays the input, which means there is a second COBOL layout for the reply.

For our example, check the check box, because the COBOL layout for input is the same as the COBOL layout for output.

- 5 Press **Next** to enter the COBOL Mapping Editor.



The purpose of the COBOL Mapping Editor is to map COBOL data items to IDL (Interface Definition Language) parameters. It consists of three main areas:

- The upper window pane is the COBOL program source.
- The window pane on the left-hand side is the COBOL interface, consisting of COBOL data items representing the parameters in your COBOL server program.
- The window pane on the right-hand side is the IDL interface consisting of IDL parameters.

What you select depends on check-box **Input Message same as Output Message**:

- If there is a single COBOL data structure of the CICS message for input and output - check box **Input Message same as Output Message** is checked - you select a single COBOL data structure in the COBOL Mapping Editor. This structure is used for COBOL input as well as for COBOL output. For more information in this case see *Mapping Editor User Interface* in the IDL Extractor for COBOL documentation.
- If there is a second COBOL data structure for the CICS output message - check box **Input Message same as Output Message** is cleared - you will select two COBOL data structures in the COBOL Mapping Editor. One is used for COBOL input and the other is for COBOL output. For more information in this case see *Mapping Editor User Interface* in the IDL Extractor for COBOL documentation.

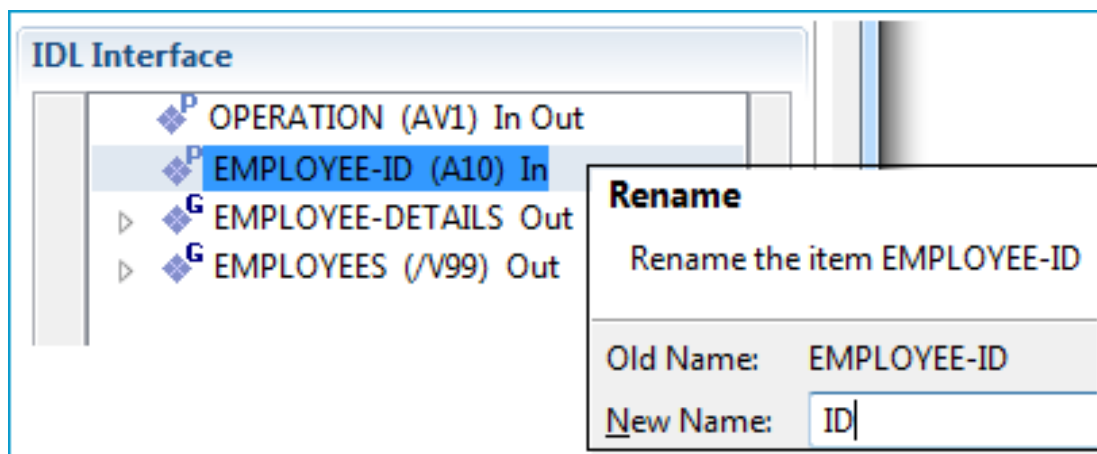
COBOL extraction is a two-step process:

- First, select the COBOL parameters using the **Add to** and **Remove from COBOL Interface** from the context menu on the COBOL data items in the upper window pane (COBOL source); in many situations the COBOL interface is detected by the Mapping Editor directly and you can omit this step.

- Then map the COBOL parameters to IDL directions using the **Map to In/Out/InOut** buttons. COBOL parameters do not have directions, they are always INOUT. This step can be left out for a quick test in non-production scenarios; for real production it is recommended to set IDL directions to reduce data transfer. You also have the option to assign a meaningful name to an IDL parameter if the original COBOL data item is not self-explanatory.

For our example:

- Set **Map to In** for COBOL data item `EMPLOYEE-ID` as IDL direction (see screenshot in previous step). For `EMPLOYEES-DETAILS` and `EMPLOYEES` perform the similar **Map to Out**.
- Use the function **Rename** from the context menu on the IDL parameters in the **IDL Interface** pane to rename COBOL parameter `EMPLOYEES-ID` to IDL parameter `ID`. Do the same for `EMPLOYEE-DETAILS`: Rename to `EMPLOYEE`.



- 6 Press **Finish**. The default extraction settings ensure you get useful results. The outcome is a Software AG IDL file (interface definition language), a Designer file with extension `.idl`:

```
library 'EMPLAPPL' is
program 'EMPLOYEE' is
  define data parameter
    1 OPERATION (AV1) In Out
    1 ID (AV10) In /* Original Name:EMPLOYEE-ID
    1 EMPLOYEE Out /* Original Name:EMPLOYEE-DETAILS
      2 FIRSTNAME (AV20)
      2 SURNAME (AV20)
      2 DATE-BIRTH (AV12)
      2 DETAILS (AV100)
    1 EMPLOYEES (/V99) Out
      2 IDENT (AV10)
      2 FIRSTNAME (AV20)
      2 SURNAME (AV20)
      2 DATE-BIRTH (AV12)
  end-define
```

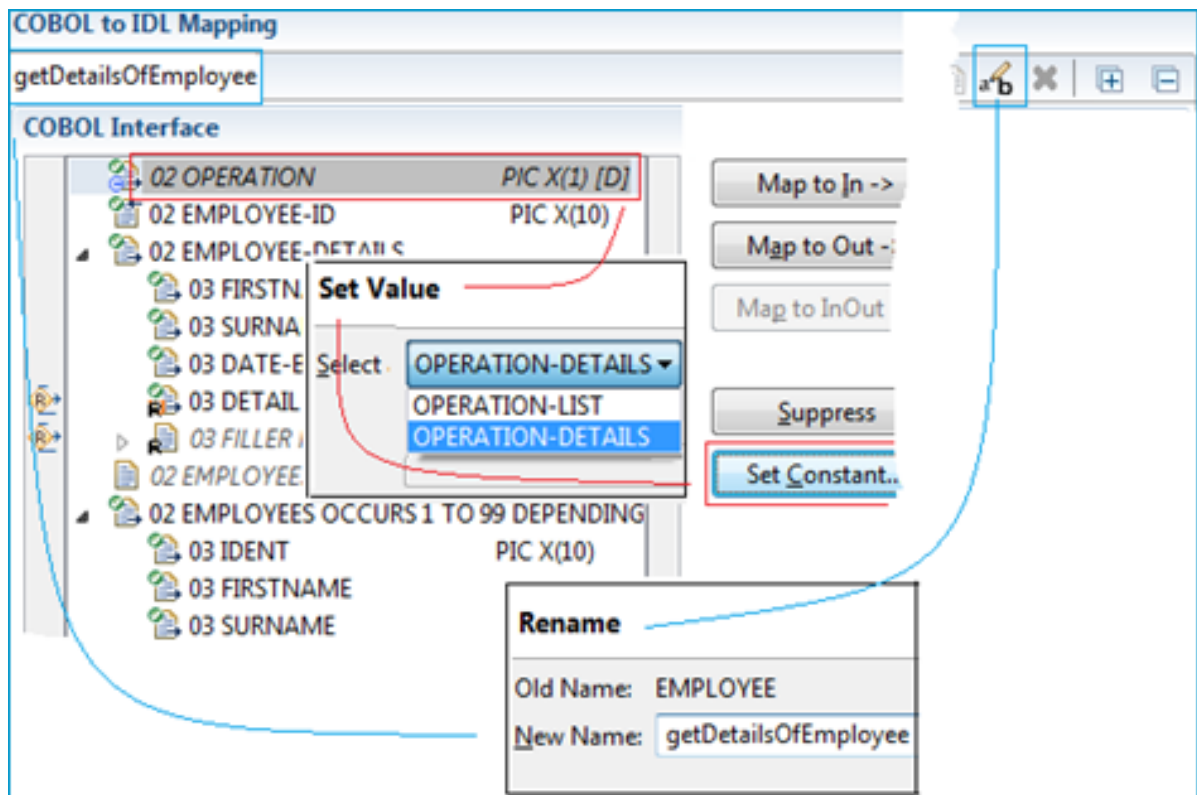
If required, a server mapping file with the same name as the IDL file but the extension .cvm may be generated too, for technical reasons. This file must always be stored together with the concomitant IDL file. For more information, see *Server Mapping Files for COBOL* in the Designer documentation. By default, the interface name `EMPLOYEE` is taken from the COBOL server program name.


Extracting a COBOL Server - Modern Method with User-defined Mapping

EntireX allows you to extract all implemented interfaces of the COBOL server separately. Instead of a large `EMPLOYEE` interface, separate interfaces `getListOfEmployees` and `getDetailsOfEmployee` are extracted. Each interface contains required parameters; obsolete parameters for an interface are suppressed, improving its usability.

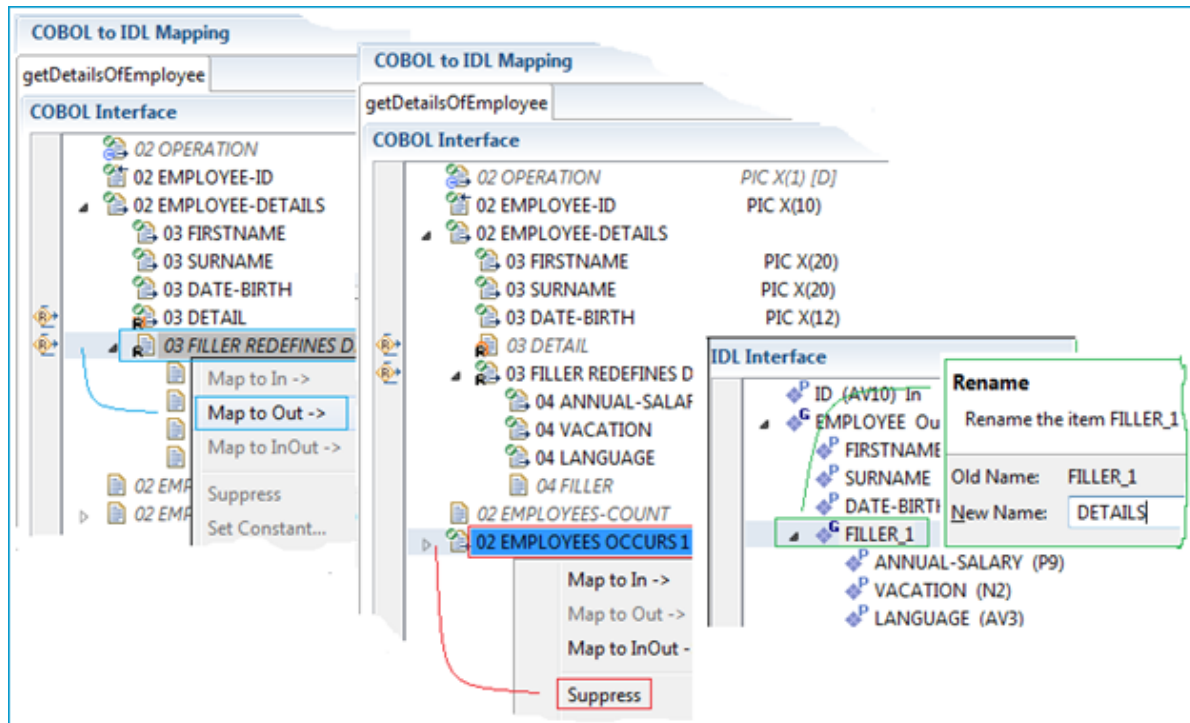
➤ To extract a COBOL server with a user-defined mapping

- 1 Shape `EMPLOYEE` to `getDetailsOfEmployee`:



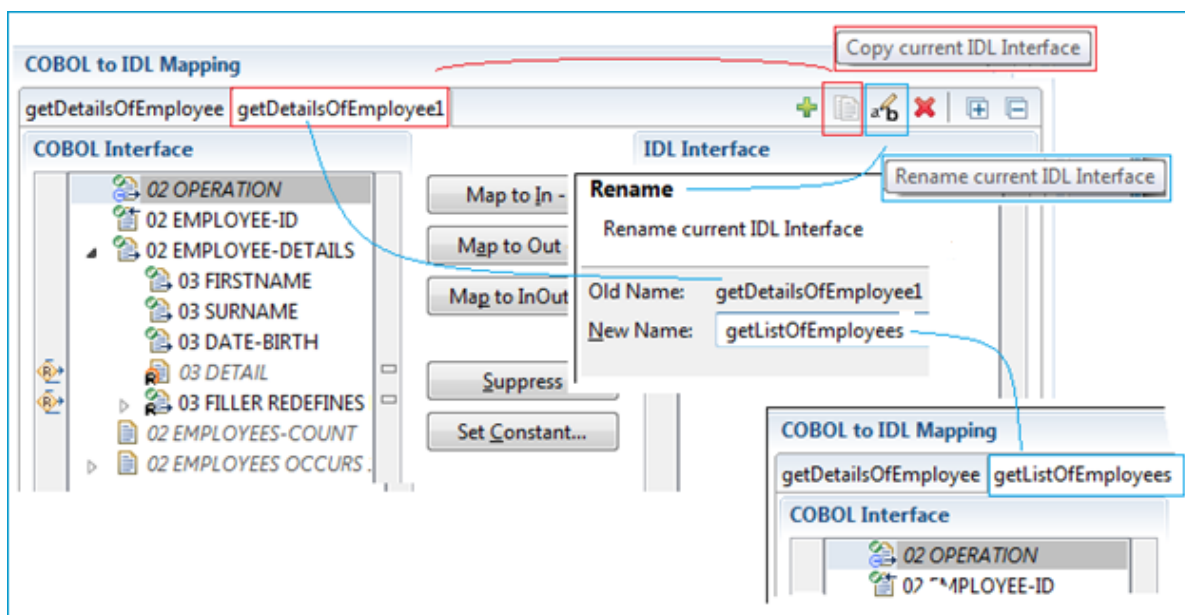
- Mark the `OPERATION` field in the **COBOL Interface** pane and press the **Set Constant** button. In the pop-up window, select `OPERATION-DETAILS` (red markers). The `OPERATION-DETAILS` value originates from COBOL level-88 data item (blue markers). If there is no COBOL level-88 enumeration type in the COBOL program defined, you can enter the function code manually in the pop-up window.
- By default the IDL interface gets the same name as your COBOL server: `EMPLOYEE`. Use the **Rename** button  from the toolbar of the COBOL Mapping Editor and change the IDL interface name to `getDetailsOfEmployee` (blue markers). This name is used as the IS service name later.

2 Continue shaping, making `getDetailsOfEmployee` easier to use:




- Use the context menu of the redefinition of the `DETAIL` field in the **COBOL Interface** pane, `FILLER REDEFINES DETAIL` and choose **Map to Out** (blue markers). A redefinition is a secondary layout (field types) of the same memory area. The redefinition contains more specific information (`ANNUAL-SALARY`, `VACATION`, etc.) than character buffer `DETAIL`. This is the reason why it is more useful in your interface.
- Use the context menu of `FILLER_1` in the IDL interface pane and rename `FILLER_1` to `DETAILS` (green markers) for a readable IS service field name later.
- The `DETAILS` function in the COBOL server does not make use of the `EMPLOYEES` field. Therefore you can leave it out of the interface: use the context menu of the `EMPLOYEES` field in the **COBOL Interface** pane and choose **Suppress** (red markers).


3 Shape `EMPLOYEE` to `getListOfEmployees` Function:



The COBOL Mapping Editor allows you to define multiple IDL interfaces to the same COBOL server:

- You create the additional IDL interface using the toolbar button **Copy current IDL interface**

 (red markers). A new tab `getDetailsOfEmployee1` is created. The previously extracted `getDetailsOfEmployee` interface still exists in the first tab. Once you reactivate the first tab, you will see the interface of `getDetailsOfEmployee` again.

- Use the **Rename** button  from the toolbar of the COBOL Mapping Editor and change the IDL interface name to `getListOfEmployees` (blue markers). This name is used as the IS service name later.

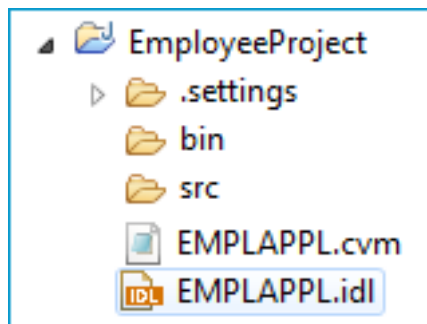
- For the `LIST` function you need the `OPERATION-LIST` value in the `OPERATION` field: Mark the `OPERATION` field in the **COBOL Interface** pane and press the **Set Constant** button. In the pop-up window, select `OPERATION-LIST` (similar to Step 1. above *Shape `EMPLOYEE` to `getDetailsOfEmployee`*; red markers).

- Use the context menu of the `EMPLOYEES` field in the **COBOL Interface** pane, `EMPLOYEES OCCURS 1 TO 99` and choose **Map to Out** (Similar to Step 2. above *Continue shaping, making `getDetailsOfEmployee` easier to use*; blue markers).

- Because the `EMPLOYEE` and `EMPLOYEE-DETAIL` fields are not used in the COBOL server `LIST` function, you leave them out in the IDL interface: use the context menu of `EMPLOYEE-DETAIL` field in the **COBOL Interface** pane and choose **Suppress** (similar to Step 2. above *Continue shaping, making `getDetailsOfEmployee` easier to use*; red markers). Do the same for the `EMPLOYEE-ID` field.

- 4 Press **Finish** to retrieve the extraction result in the form of a Software AG IDL file. At the same time, a server mapping file for COBOL (Designer file with extension `.cvm`) is created.

See *Server Mapping Files for COBOL* in the Designer documentation. The *Software AG IDL File* in the IDL Editor documentation describes the interfaces from the client point of view, while the server mapping file contains the mapping to the real COBOL server. Both of these files must be kept together and in sync, otherwise a call to the COBOL server may fail.



To summarize: We created two IDL interfaces. In the IDL file, these resulted in two IDL programs: `getListOfEmployees` and `getDetailsOfEmployee`. Both IDL programs were given readable names (Steps 1 and 3). Meaningful fields were kept, while superfluous fields were suppressed (Steps 1 and 3). The program `getDetailsOfEmployee` contains the redefined fields of parameter `DETAILS` (see below) mapped during extraction (Step 1).



Note: At runtime, the RPC client generated with the extracted interface will send data for the redesigned interfaces, while your COBOL server still expects `EMPLOYEE` data. The EntireX runtime transforms the incoming data stream from the RPC client, using the server mapping file.

```
program 'getDetailsOfEmployee' is
  define data parameter
    1 ID (AV10) In /* Original Name:EMPLOYEE-ID
    1 EMPLOYEE Out /* Original Name:EMPLOYEE-DETAILS
      2 FIRSTNAME (AV20)
      2 SURNAME (AV20)
      2 DATE-BIRTH (AV12)
      2 DETAILS /* Original Name:FILLER_1
        3 ANNUAL-SALARY (P9)
        3 VACATION (N2)
        3 LANGUAGE (AV3)
  end-define
  program 'getListOfEmployees' is
    1 EMPLOYEES (/V99) Out
      2 IDENT (AV10)
      2 FIRSTNAME (AV20)
      2 SURNAME (AV20)
      2 DATE-BIRTH (AV12)
  end-define
```


Comparison Chart: Fast-track versus User-defined Mapping

The following table highlights the differences when shaping an interface with a *user-defined mapping* compared with a *fast-path extraction*.

| | Interface Shaping with User-defined Mapping | Fast-path Extraction |
|----------------------------------|---|---|
| General | User-defined interface with dedicated mapping. For our example, the interfaces are small and tidy and more self-explanatory with long, readable interface names. They are easier to use with the hidden <code>OPERATION</code> field and the suppressed COBOL fields, which are not needed. | Automatic, quick result extraction with COBOL-like interfaces on IS. For our example, the IS interface <code>EMPLOYEE</code> matches exactly 1:1, field by field. |
| IS service(s) | Multiple small and handy IS services; each <code>OPERATION</code> code is mapped to a separate IS service. | One big IS service. |
| IS service name | Readable long name. | Short Subprogram name; up to 8 characters. |
| IS fields | Usage of Suppress and Set Constant reduces the message length. This keeps focus on relevant data items and keeps the client's interface clean. It may also improve performance. | The IS fields and COBOL server parameters match 1:1. As COBOL layout descriptions are sometimes used for many different purposes, irrelevant data items appear and clutter up the IS interface. |
| <code>OPERATION</code> parameter | Suppressed: the <code>OPERATION</code> parameter does not exist in the IS service as an IS field. | The <code>OPERATION</code> parameter exists in the IS service as an IS field and needs to be filled-in by the client endpoint. |
| <code>OPERATION</code> code | The <code>OPERATION</code> code is provided internally by EntireX runtime in the <code>OPERATION</code> field. | The <code>OPERATION</code> code needs to be specified in the IS service in the <code>OPERATION</code> field by the client endpoint. |
| <code>REDEFINE</code> parameters | Either the parameter that is redefined or one of its redefinitions is available as an IS field. | Only the parameter that is redefined is available as an IS field. Redefinitions of the parameter are not available as IS fields. |

A user-defined mapping enables you also to define alternative mappings for COBOL data items (`REDEFINES`, tables etc.). These enable scenarios with COBOL servers where data exchange is not fully described by the `LINKAGE SECTION` COBOL data items. For more information refer to the IDL Extractor for COBOL documentation:

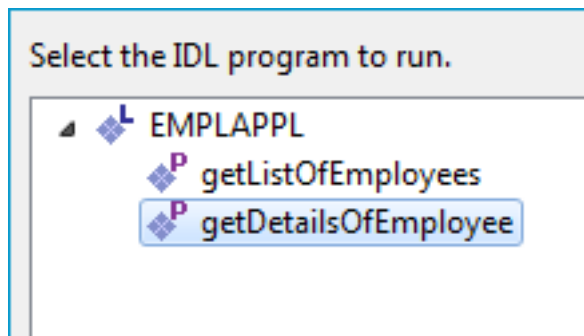
- *Mapping Editor IDL Interface Mapping Functions* if check-box **Input Message same as Output Message** was checked.
- *Mapping Editor IDL Interface Mapping Functions* if check-box **Input Message same as Output Message** was cleared.
- *User-defined Mapping*

Testing the Extraction Results

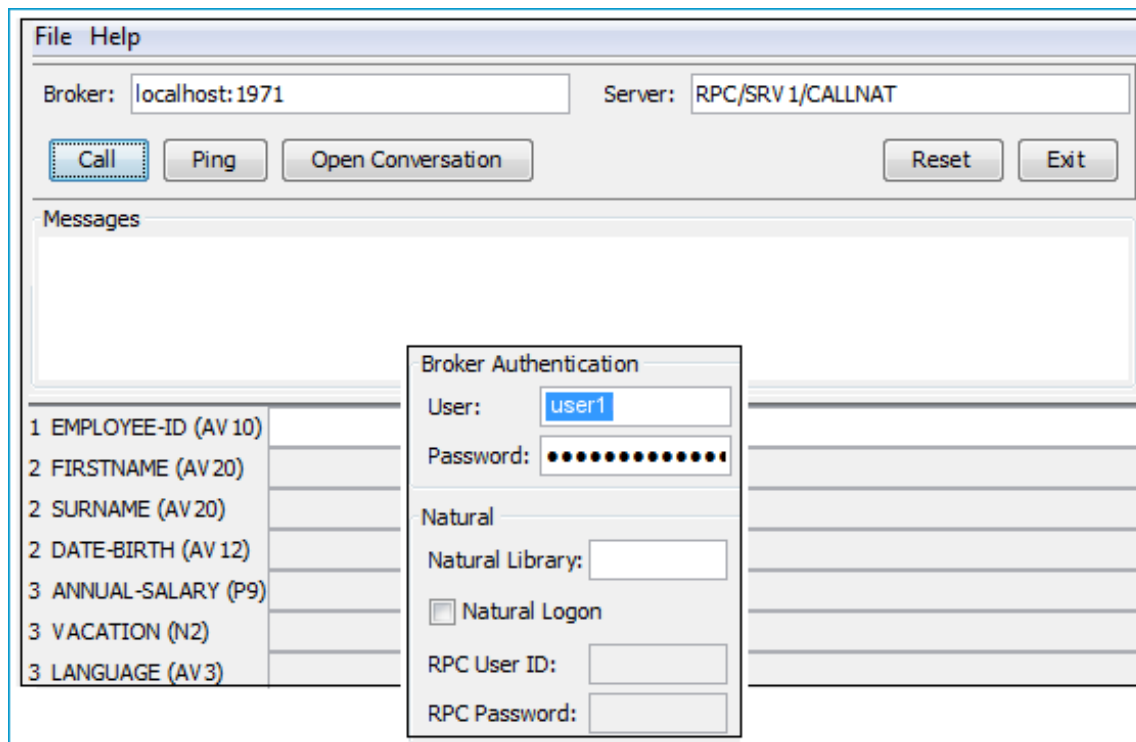
The following pictures use the extraction results described under [Extracting a COBOL Server - Modern Method with User-defined Mapping](#).

➤ To test the extraction results (optional)

- 1 You can test the results of the extraction operation and the COBOL server back end, using the EntireX IDL Tester. From the context menu of the IDL file in the Designer, choose **Software AG IDL Tester**.



- 2 Select `getDetailsOfEmployee`.



Note that the broker and server parameters contain the explicit route to call the server program, and you can optionally ping the connection from this client. With the **File > Options** dialog, you can set:

- **User** and **Password** for *broker* authentication
- **RPC User ID** and **RPC Password** for *server* authentication

See *EntireX IDL Tester* in the Designer documentation.

- 3 Check the Integration Server log, the EntireX Adapter log or the RPC logs. Applies to all connection methods.

Task 2: Generate the Connection and Adapter Services in Integration Server

This section describes your first steps to create a new Integration Server connection. This is described in more detail under *Using the Integration Server Wrapper*, for example working with existing Integration Server connections. This section covers the following topics:

- [Step 1: Start the Integration Server Wrapper Wizard](#)
- [Step 2: Create a New Integration Server Connection](#)
- [Step 3: Select the Connection Type](#)
- [Step 4: Define Adapter Services for a CICS Socket Listener Connection](#)

Step 1: Start the Integration Server Wrapper Wizard

➤ To start the Integration Server Wrapper wizard

- 1 In the context menu of a Software AG IDL file, choose **Integration Server > Generate web-Methods IS Connection**.

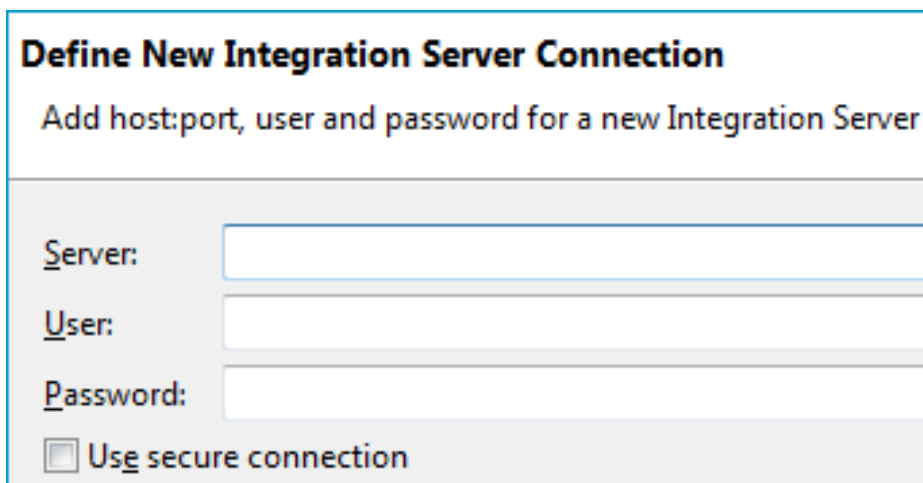
This starts the wizard with a list of existing Integration Server Wrapper connections.



Note: If the selected IDL file is not valid because of a syntax error, an error dialog comes up and the wizard does not start.

- 2 Continue with *Step 2: Create a New Integration Server Connection*.

Step 2: Create a New Integration Server Connection



Define New Integration Server Connection

Add host:port, user and password for a new Integration Server

Server:

User:

Password:

☐ Use secure connection

➤ To create a new Integration Server connection

- 1 Define the new Integration Server connection on the wizard page.



Notes:

1. The only required field is **Server**. Enter the hostname of the Integration Server including an optional port number. If no port number is specified, port number defaults to "5555". The **Integration Server Authentication** can be passed with the **User** and **Password** fields.
 2. Optional settings are for secure connections. The **Truststore for HTTPS** contains all signed certificates and must be a valid truststore.
 3. The check box **Verify host name** checks that the hostname is entered in the stored certificate.
 4. When the Integration Server has **Client Authentication** enabled, you can specify your **Keystore** file and keystore **Password**.
 5. For managing Integration Server connections, see [Preferences](#).
- 2 Choose **Next** and continue with *Step 3: Select the Connection Type*.

Step 3: Select the Connection Type

☒ Create a new EntireX Adapter connection of type **CICS Socket Listener Connection**

☐ Update Adapter Services or Listeners to an existing Integration Server connection:

List of Connections

| Connection Name | Package Name | Connection Type | Enabled |
|-------------------------------|--------------|------------------------|---------|
| Employees:EmployeesConnection | Employees | EntireX RPC Connection | Yes |

Total: 1

☒ Map Software AG IDL data types to String

☐ Create or Update REST resource

➤ To create a new connection

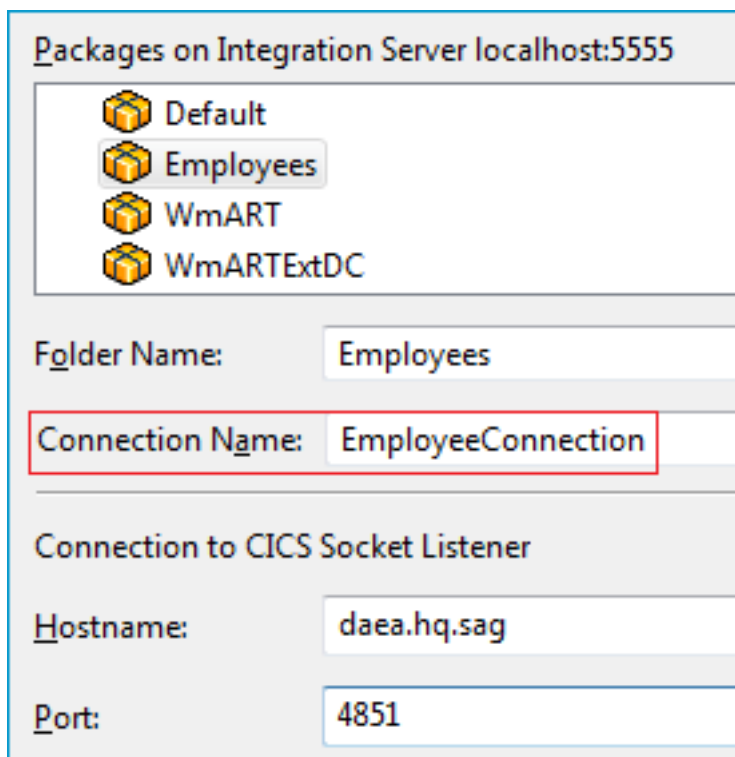
- 1 Select a connection type from the drop down list. Connection types are described under *EntireX Adapter Connections* in the EntireX Adapter documentation and *Introduction to the Integration Server Wrapper*.



Note: The list of connection types is filtered: connection types that require a license are only shown if a corresponding license file is available. Reliable RPC connections are only shown if all IDL programs contain only IN parameters. Also, if a server mapping file is available, only those connection types that support the interface type specified in the server mapping file are shown.

- 2 Click **Next** and continue with *Step 4: Define Adapter Services for a CICS Socket Listener Connection*.

Step 4: Define Adapter Services for a CICS Socket Listener Connection



Packages on Integration Server localhost:5555

- Default
- Employees
- WmART
- WmARTEExtDC

Folder Name: Employees

Connection Name: EmployeeConnection

Connection to CICS Socket Listener

Hostname: daea.hq.sag

Port: 4851

➤ To create a connection and related adapter services

- 1 Select a package for the created objects.
- 2 Define a folder name. If the folder does not exist, it will be created.
- 3 Define a connection name.
- 4 Define the parameters of the connection type. For details, see *Connection Parameters for CICS Socket Listener Connections* in the EntireX Adapter documentation.

As a result, the folder will contain the connection and the adapter services (one for each IDL program). The name of a service is the same as the respective IDL program.

The default settings for the adapter services are:

- the **Default** package; if not available, the first package
- the IDL library name for the **Folder Name**
- the IDL library name with the suffix "Connection" for the **Connection Name**



Note: When creating a connection, a package dependency is added such that the selected package depends on webMethods EntireX (the package `WmEntireX`) with the version currently used.

;

Task 3: Execute the Call from Integration Server to COBOL

From the **Service Development** perspective, refresh the package where the connection service was written, select the adapter service and use the service test to **Run Service**. This invokes the adapter service through the connector service.

The screenshot shows the 'Employees' package in the Service Development perspective. The 'getListOfEmployees' service is selected, and the 'Run As' dropdown is set to '2 Run Service'. Below the package tree, a table displays the output of the service test.

| Name | Value |
|--------------|-------------|
| outRec | |
| EMPLOYEES | |
| EMPLOYEES[0] | |
| IDENT | 11100102 |
| FIRSTNAME | EDGAR |
| SURNAME | SCHINDLER |
| DATE-BIRTH | Dec 4, 1962 |
| EMPLOYEES[1] | |
| EMPLOYEES[2] | |
| EMPLOYEES[3] | |
| EMPLOYEES[4] | |
| errorCode | 00000000 |
| errorFlag | false |

In case of error or unexpected results:

- Check the Integration Server log, the EntireX Adapter log or the RPC logs.
- Use the IDL Tester as described under [Task 1](#) above.

24

Calling COBOL on IBM i from Integration Server

| | |
|--|-----|
| ■ Introduction | 397 |
| ■ What do I need to Install for this Scenario? | 398 |
| ■ Task 1: Extract the Interface of a COBOL Server | 399 |
| ■ Task 2: Generate the Connection and Adapter Services in Integration Server | 411 |
| ■ Task 3: Execute the Call from Integration Server to COBOL | 416 |

This scenario uses the tools IDL Extractor for COBOL and Integration Server Wrapper of the Designer.

Introduction

Under IBM i, a COBOL server with a standard call interface can be called.



- ❶ Extract the interface of the COBOL server program.
- ❷ Generate connection and adapter services in Integration Server.
- ❸ Execute the call from Integration Server to the COBOL server program.

This scenario makes the following important assumptions:

For Task 1:

- You have a working COBOL batch server. For illustration and examples on such a server, see *Batch with Standard Linkage Calling Convention* under *Introduction to the IDL Extractor for COBOL*.
- You have access to the related COBOL sources and copybooks as files on your local machine. The minimum requirement is the `DATA DIVISION` of the interface.



For Tasks 2 and 3:

- You have installed the IBM ToolBox for Java (JTOpen). See *Post-installation Steps for AS/400*.
- With interface type AS/400 connection you can remotely call server programs written in COBOL. See *Connection Parameters for AS/400 Connections* in the EntireX Adapter documentation.



What do I need to Install for this Scenario?

- You have Software AG Designer installed with EntireX plugins and Service Development plugins.
 - For EntireX plugins, see *Designer > EntireX Designer* under *EntireX Installation Packages* in the General Installation documentation.
 - For Service Development plugins, refer to the Integration Server documentation.
- You have an Integration Server with EntireX Adapter installed. See *Adapters > EntireX Adapter* under *EntireX Installation Packages* in the General Installation documentation.

Task 1: Extract the Interface of a COBOL Server

- [Introduction](#)
- [Sample COBOL Server used in the Examples](#)
- [Extracting a COBOL Server - Fast-track Method](#)
- [Extracting a COBOL Server - Modern Method with User-defined Mapping](#)
- [Comparison Chart: Fast-track versus User-defined Mapping](#)
- [Testing the Extraction Results](#)

Introduction

Follow the instructions for extracting COBOL, see *Using the IDL Extractor for COBOL - Overview* and choose *Scenario I: Create New IDL and Server Mapping Files* if this is your first extraction. Learn how to invoke the IDL Extractor for COBOL, create a COBOL Extractor Environment and about the possibilities to select the COBOL source.

The extraction process creates the following EntireX metafiles:

- IDL file. A Software AG IDL file contains definitions of the interface between client and server. See *Software AG IDL File* in the IDL Editor documentation in the IDL Editor documentation.
- Server mapping file (optional). The mapping file is a Designer file with extension .cvm that contains COBOL-specific mapping information. See *Server Mapping Files for COBOL* in the Designer documentation.

Sample COBOL Server used in the Examples

The following COBOL server is used to illustrate the features of the IDL Extractor for COBOL. Imagine an existing COBOL server called `EMPLOYEE`. It implements the access logic for a `LIST` and `DETAILS` function to a database view `EMPLOYEE`:

```

IDENTIFICATION DIVISION.
    PROGRAM-ID.      EMPLOYEE.
*****
*   Program Name    = EMPLOYEE
*   String Literal  = QUOTE
*****
01 DFHCOMMAREA.
    02 OPERATION                                PIC X(1).
        88 OPERATION-LIST                      VALUE 'L'.
        88 OPERATION-DETAILS                  VALUE 'D'.
    02 EMPLOYEE-ID                              PIC X(10).
    02 EMPLOYEE-DETAILS.
        03 FIRSTNAME                          PIC X(20).
        03 SURNAME                            PIC X(20).
        03 DATE-BIRTH                        PIC X(12).
        03 DETAILS                          PIC X(100).
        03 FILLER REDEFINES DETAILS.
            04 ANNUAL-SALARY          PACKED-DECIMAL PIC S9(9).
            04 VACATION                PIC S9(2).
            04 LANGUAGE                PIC X(3).
            04 FILLER                  PIC X(90).
    02 EMPLOYEES-COUNT                          PIC 9(8) BINARY.
    02 EMPLOYEES OCCURS 1 TO 99 DEPENDING ON EMPLOYEES-COUNT.
        03 IDENT                          PIC X(10).
        03 FIRSTNAME                      PIC X(20).
        03 SURNAME                        PIC X(20).
        03 DATE-BIRTH                    PIC X(12).

```

Two approaches for extracting the COBOL server are described below:

- **Fast-track**

Learn how EntireX helps you to connect the COBOL Server with quick results.

- **User-defined Mapping**

The following features are among those available with a user-defined mapping:

- **Shape the interface to your COBOL server**

You can minimize the interface by suppressing COBOL server fields or by providing constant values. Renaming interfaces allows you to specify a readable long name. These two features together - constants and renaming of interfaces - are most powerful when multiple interfaces are implemented in a single COBOL server. Each function of the COBOL server triggered by an operation code or function code can be modelled as a separate IS service.

■ Select alternative mappings

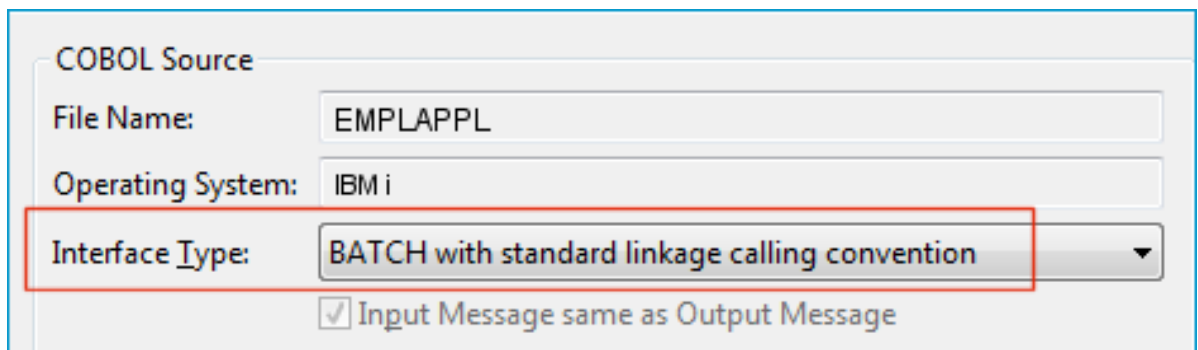
You can select alternative mappings for COBOL data items (REDEFINES, tables etc.) to enable scenarios with COBOL servers where data exchange is not fully described by the LINKAGE SECTION COBOL data items.

These approaches are described under *Fast-track Method* and *Modern Method* below.

Extracting a COBOL Server - Fast-track Method

➤ To extract the COBOL Server

- 1 Switch to the **EntireX** perspective.
- 2 Call the IDL Extractor for COBOL.
- 3 Set the correct interface type as described under *Step 4: Define the Extraction Settings and Start Extraction* under *Scenario I: Create New IDL and Server Mapping Files* in the IDL Extractor for COBOL documentation.



COBOL Source

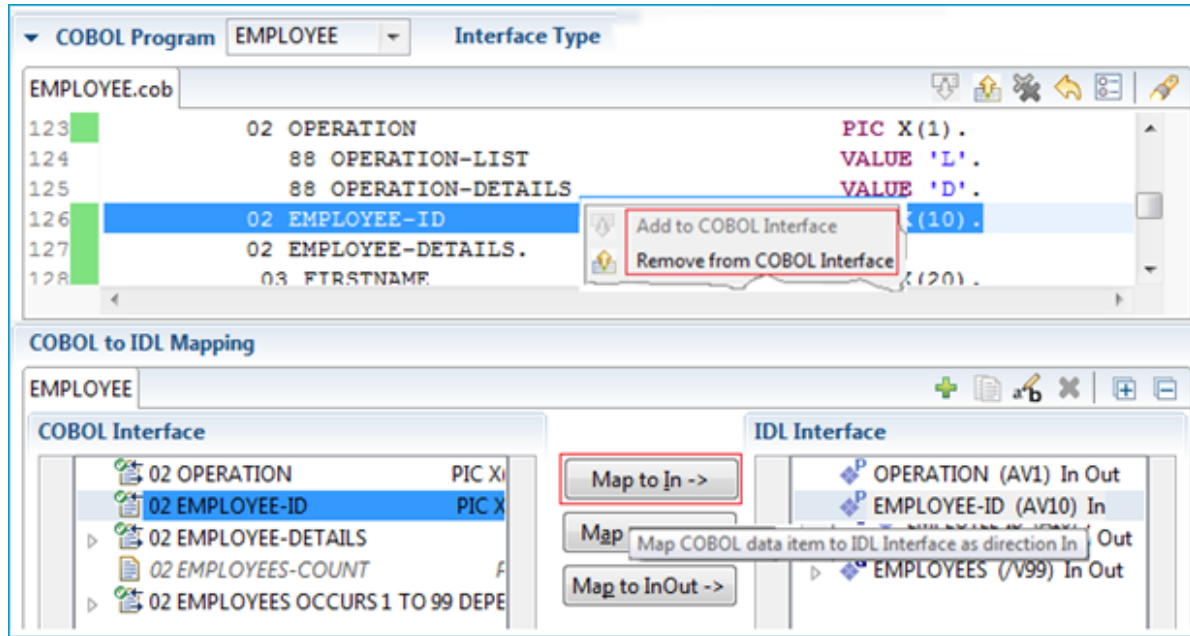
File Name: EMPLAPPL

Operating System: IBM i

Interface Type: BATCH with standard linkage calling convention ▼

☒ Input Message same as Output Message

- 4 Press **Next** to enter the COBOL Mapping Editor.



The purpose of the COBOL Mapping Editor is to map COBOL data items to IDL (Interface Definition Language) parameters. It consists of three main areas:

- The upper window pane is the COBOL program source.
- The window pane on the left-hand side is the COBOL interface, consisting of COBOL data items representing the parameters in your COBOL server program.
- The window pane on the right-hand side is the IDL interface consisting of IDL parameters.

For more information see *Mapping Editor User Interface* in the IDL Extractor for COBOL documentation.

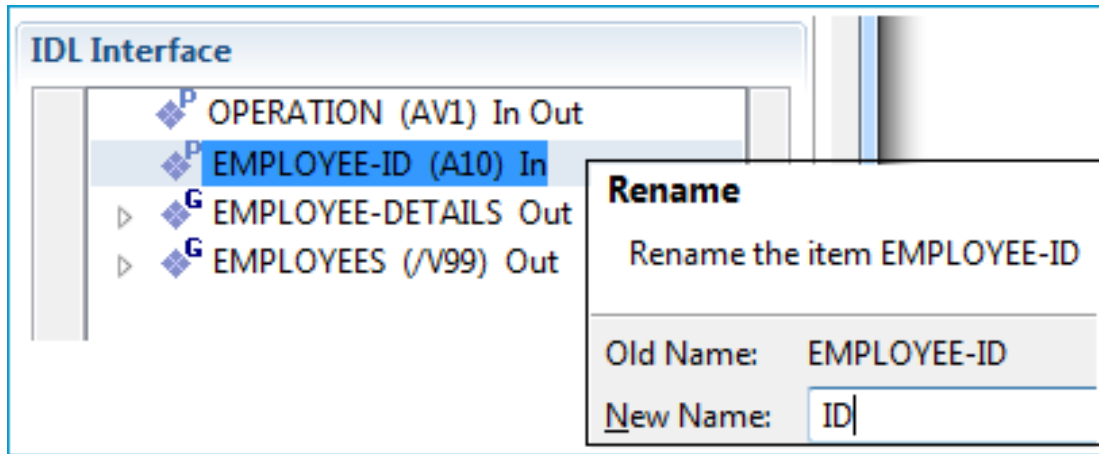
COBOL extraction is a two-step process:

- First, select the COBOL parameters using the **Add to** and **Remove from COBOL Interface** from the context menu on the COBOL data items in the upper window pane (COBOL source); in many situations the COBOL interface is detected by the Mapping Editor directly and you can omit this step.
- Then map the COBOL parameters to IDL directions using the **Map to In/Out/InOut** buttons. COBOL parameters do not have directions, they are always INOUT. This step can be left out for a quick test in non-production scenarios; for real production it is recommended to set IDL directions to reduce data transfer. You also have the option to assign a meaningful name to an IDL parameter if the original COBOL data item is not self-explanatory.

For our example:

- Set **Map to In** for COBOL data item `EMPLOYEE-ID` as IDL direction (see screenshot in previous step). For `EMPLOYEES-DETAILS` and `EMPLOYEES` perform the similar **Map to Out**.

- Use the function **Rename** from the context menu on the IDL parameters in the **IDL Interface** pane to rename COBOL parameter `EMPLOYEE-ID` to IDL parameter `ID`. Do the same for `EMPLOYEE-DETAILS`: Rename to `EMPLOYEE`.



- 5 Press **Finish**. The default extraction settings ensure you get useful results. The outcome is a Software AG IDL file (interface definition language), a Designer file with extension `.idl`:

```
library 'EMPLAPPL' is
program 'EMPLOYEE' is
  define data parameter
    1 OPERATION (AV1) In Out
    1 ID (AV10) In /* Original Name:EMPLOYEE-ID
    1 EMPLOYEE Out /* Original Name:EMPLOYEE-DETAILS
      2 FIRSTNAME (AV20)
      2 SURNAME (AV20)
      2 DATE-BIRTH (AV12)
      2 DETAILS (AV100)
    1 EMPLOYEES (/V99) Out
      2 IDENT (AV10)
      2 FIRSTNAME (AV20)
      2 SURNAME (AV20)
      2 DATE-BIRTH (AV12)
  end-define
```

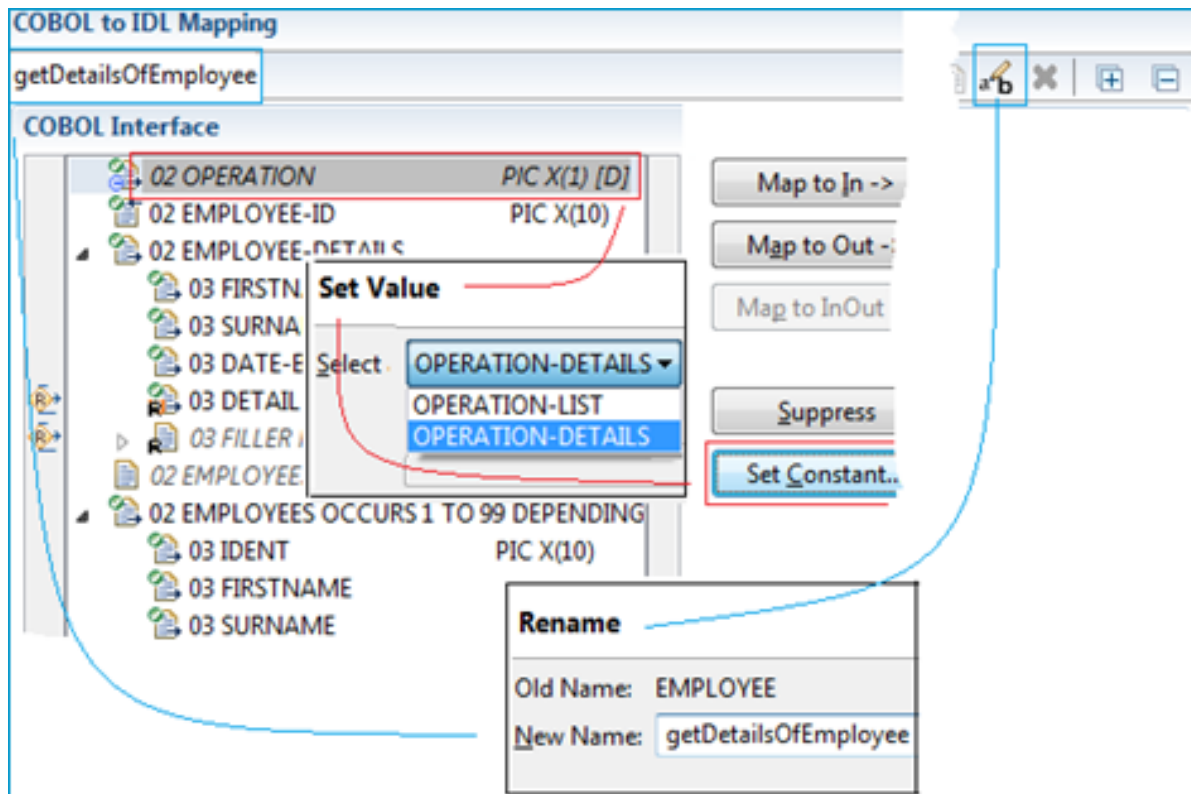
If required, a server mapping file with the same name as the IDL file but the extension `.cvm` may be generated too, for technical reasons. This file must always be stored together with the concomitant IDL file. For more information, see *Server Mapping Files for COBOL* in the Designer documentation. By default, the interface name `EMPLOYEE` is taken from the COBOL server program name.


Extracting a COBOL Server - Modern Method with User-defined Mapping

EntireX allows you to extract all implemented interfaces of the COBOL server separately. Instead of a large `EMPLOYEE` interface, separate interfaces `getListOfEmployees` and `getDetailsOfEmployee` are extracted. Each interface contains required parameters; obsolete parameters for an interface are suppressed, improving its usability.

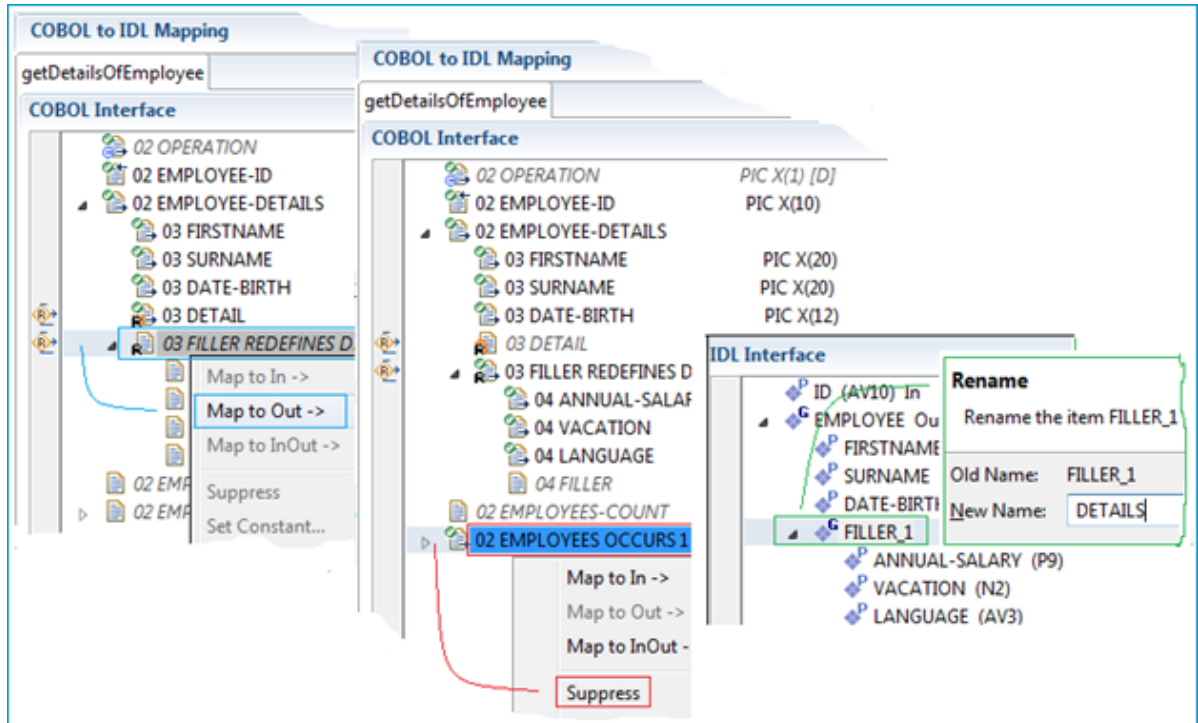
➤ To extract a COBOL server with a user-defined mapping

- 1 Shape `EMPLOYEE` to `getDetailsOfEmployee`:



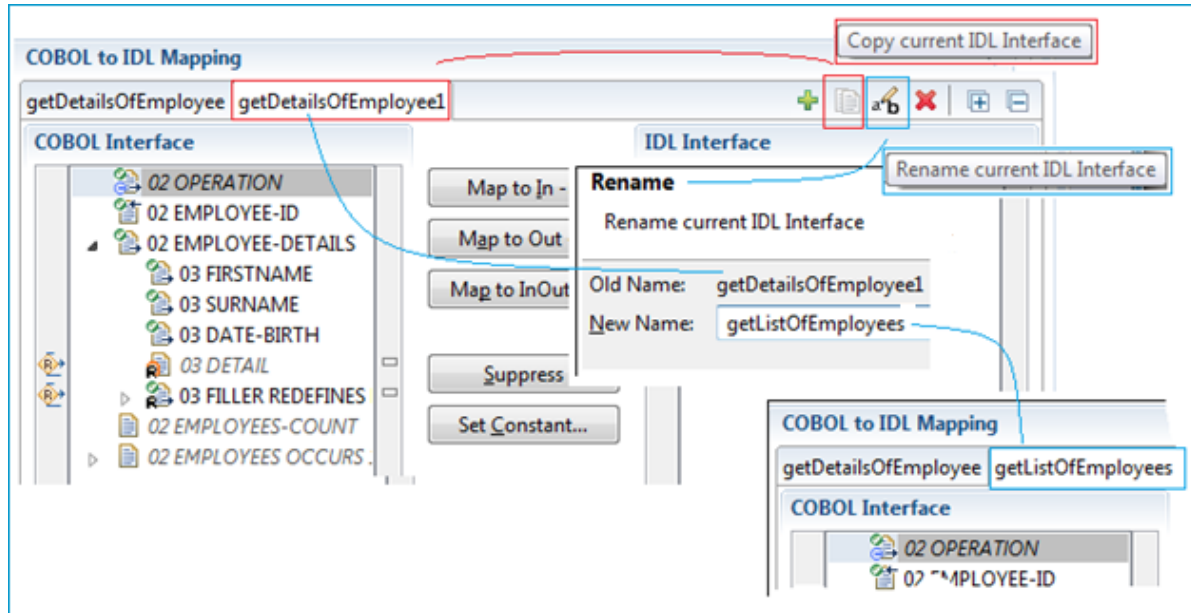
- Mark the `OPERATION` field in the COBOL **Interface** pane and press the **Set Constant** button. In the pop-up window, select `OPERATION-DETAILS` (red markers). The `OPERATION-DETAILS` value originates from COBOL level-88 data item (blue markers). If there is no COBOL level-88 enumeration type in the COBOL program defined, you can enter the function code manually in the pop-up window.
- By default the IDL interface gets the same name as your COBOL server: `EMPLOYEE`. Use the **Rename** button  from the toolbar of the COBOL Mapping Editor and change the IDL interface name to `getDetailsOfEmployee` (blue markers). This name is used as the IS service name later.

- 2 Continue shaping, making `getDetailsOfEmployee` easier to use:




- Use the context menu of the redefinition of the `DETAIL` field in the **COBOL Interface** pane, `FILLER REDEFINES DETAIL` and choose **Map to Out** (blue markers). A redefinition is a secondary layout (field types) of the same memory area. The redefinition contains more specific information (`ANNUAL-SALARY`, `VACATION`, etc.) than character buffer `DETAIL`. This is the reason why it is more useful in your interface.
- Use the context menu of `FILLER_1` in the IDL interface pane and rename `FILLER_1` to `DETAILS` (green markers) for a readable IS service field name later.
- The `DETAILS` function in the COBOL server does not make use of the `EMPLOYEES` field. Therefore you can leave it out of the interface: use the context menu of the `EMPLOYEES` field in the **COBOL Interface** pane and choose **Suppress** (red markers).


3 Shape `EMPLOYEE` to `getListOfEmployees` Function:



The COBOL Mapping Editor allows you to define multiple IDL interfaces to the same COBOL server:

- You create the additional IDL interface using the toolbar button **Copy current IDL interface**

 (red markers). A new tab `getDetailsOfEmployee1` is created. The previously extracted `getDetailsOfEmployee` interface still exists in the first tab. Once you reactivate the first tab, you will see the interface of `getDetailsOfEmployee` again.

- Use the **Rename** button  from the toolbar of the COBOL Mapping Editor and change the IDL interface name to **getListOfEmployees** (blue markers). This name is used as the IS service name later.

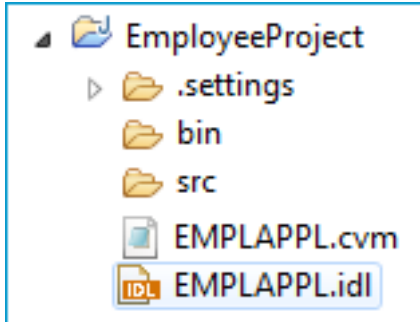
- For the **LIST** function you need the **OPERATION-*LIST*** value in the **OPERATION** field: Mark the **OPERATION** field in the **COBOL Interface** pane and press the **Set Constant** button. In the pop-up window, select **OPERATION-*LIST*** (similar to Step 1. above *Shape EMPLOYEE to getDetailsOfEmployee*; red markers).

- Use the context menu of the **EMPLOYEES** field in the **COBOL Interface** pane, **EMPLOYEES OCCURS 1 TO 99** and choose **Map to Out** (Similar to Step 2. above *Continue shaping, making getDetailsOfEmployee easier to use*; blue markers).

- Because the **EMPLOYEE** and **EMPLOYEE-DETAIL** fields are not used in the COBOL server **LIST** function, you leave them out in the IDL interface: use the context menu of **EMPLOYEE-DETAIL** field in the **COBOL Interface** pane and choose **Suppress** (similar to Step 2. above *Continue shaping, making getDetailsOfEmployee easier to use*; red markers). Do the same for the **EMPLOYEE-ID** field.

- 4 Press **Finish** to retrieve the extraction result in the form of a Software AG IDL file. At the same time, a server mapping file for COBOL (Designer file with extension `.cvm`) is created.

See *Server Mapping Files for COBOL* in the Designer documentation. The *Software AG IDL File* in the IDL Editor documentation describes the interfaces from the client point of view, while the server mapping file contains the mapping to the real COBOL server. Both of these files must be kept together and in sync, otherwise a call to the COBOL server may fail.



To summarize: We created two IDL interfaces. In the IDL file, these resulted in two IDL programs: `getListOfEmployees` and `getDetailsOfEmployee`. Both IDL programs were given readable names (Steps 1 and 3). Meaningful fields were kept, while superfluous fields were suppressed (Steps 1 and 3). The program `getDetailsOfEmployee` contains the redefined fields of parameter `DETAILS` (see below) mapped during extraction (Step 1).



Note: At runtime, the RPC client generated with the extracted interface will send data for the redesigned interfaces, while your COBOL server still expects `EMPLOYEE` data. The EntireX runtime transforms the incoming data stream from the RPC client, using the server mapping file.

```

program 'getDetailsOfEmployee' is
  define data parameter
    1 ID (AV10) In /* Original Name:EMPLOYEE-ID
    1 EMPLOYEE Out /* Original Name:EMPLOYEE-DETAILS
    2 FIRSTNAME (AV20)
    2 SURNAME (AV20)
    2 DATE-BIRTH (AV12)
    2 DETAILS /* Original Name:FILLER_1
    3 ANNUAL-SALARY (P9)
    3 VACATION (N2)
    3 LANGUAGE (AV3)
  end-define
  program 'getListOfEmployees' is
    1 EMPLOYEES (/V99) Out
    2 IDENT (AV10)
    2 FIRSTNAME (AV20)
    2 SURNAME (AV20)
    2 DATE-BIRTH (AV12)
  end-define

```


Comparison Chart: Fast-track versus User-defined Mapping

The following table highlights the differences when shaping an interface with a *user-defined mapping* compared with a *fast-path extraction*.

| | Interface Shaping with User-defined Mapping | Fast-path Extraction |
|----------------------------------|---|---|
| General | User-defined interface with dedicated mapping. For our example, the interfaces are small and tidy and more self-explanatory with long, readable interface names. They are easier to use with the hidden <code>OPERATION</code> field and the suppressed COBOL fields, which are not needed. | Automatic, quick result extraction with COBOL-like interfaces on IS. For our example, the IS interface <code>EMPLOYEE</code> matches exactly 1:1, field by field. |
| IS service(s) | Multiple small and handy IS services; each <code>OPERATION</code> code is mapped to a separate IS service. | One big IS service. |
| IS service name | Readable long name. | Short Subprogram name; up to 8 characters. |
| IS fields | Usage of Suppress and Set Constant reduces the message length. This keeps focus on relevant data items and keeps the client's interface clean. It may also improve performance. | The IS fields and COBOL server parameters match 1:1. As COBOL layout descriptions are sometimes used for many different purposes, irrelevant data items appear and clutter up the IS interface. |
| <code>OPERATION</code> parameter | Suppressed: the <code>OPERATION</code> parameter does not exist in the IS service as an IS field. | The <code>OPERATION</code> parameter exists in the IS service as an IS field and needs to be filled-in by the client endpoint. |
| <code>OPERATION</code> code | The <code>OPERATION</code> code is provided internally by EntireX runtime in the <code>OPERATION</code> field. | The <code>OPERATION</code> code needs to be specified in the IS service in the <code>OPERATION</code> field by the client endpoint. |
| <code>REDEFINE</code> parameters | Either the parameter that is redefined or one of its redefinitions is available as an IS field. | Only the parameter that is redefined is available as an IS field. Redefinitions of the parameter are not available as IS fields. |

A user-defined mapping enables you also to define alternative mappings for COBOL data items (`REDEFINES`, tables etc.). These enable scenarios with COBOL servers where data exchange is not fully described by the `LINKAGE SECTION` COBOL data items. For more information refer to the IDL Extractor for COBOL documentation:

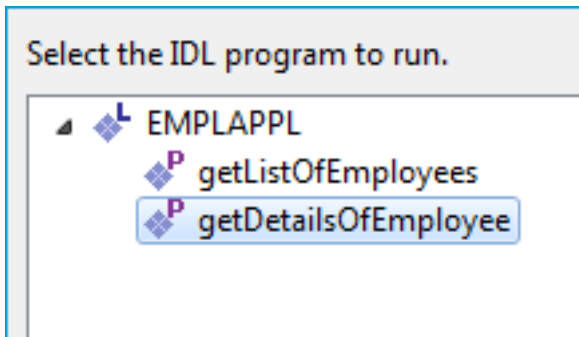
- *Mapping Editor IDL Interface Mapping Functions*
- *User-defined Mapping*

Testing the Extraction Results

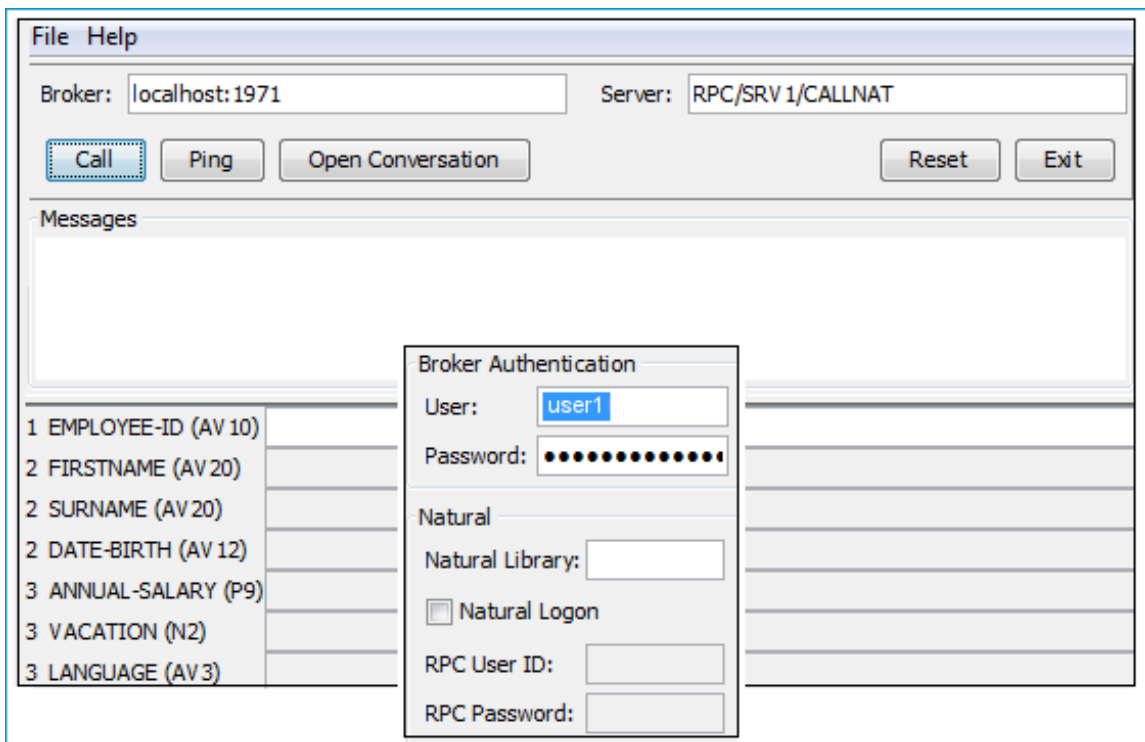
The following pictures use the extraction results described under *Extracting a COBOL Server - Modern Method with User-defined Mapping*.

> To test the extraction results (optional)

- 1 You can test the results of the extraction operation and the COBOL server back end, using the EntireX IDL Tester. From the context menu of the IDL file in the Designer, choose **Software AG IDL Tester**.



- 2 Select `getDetailsOfEmployee`.



Note that the broker and server parameters contain the explicit route to call the server program, and you can optionally ping the connection from this client. With the **File > Options** dialog, you can set:

- **User** and **Password** for *broker* authentication
- **RPC User ID** and **RPC Password** for *server* authentication

See *EntireX IDL Tester* in the Designer documentation.

- 3 Check the Integration Server log, the EntireX Adapter log or the RPC logs. Applies to all connection methods.

Task 2: Generate the Connection and Adapter Services in Integration Server

This section describes your first steps to create a new Integration Server connection. This is described in more detail under *Using the Integration Server Wrapper*, for example working with existing Integration Server connections. This section covers the following topics:

- [Step 1: Start the Integration Server Wrapper Wizard](#)
- [Step 2: Create a New Integration Server Connection](#)
- [Step 3: Select the Connection Type](#)
- [Step 4: Define Adapter Services for an AS/400 Connection](#)

Step 1: Start the Integration Server Wrapper Wizard

➤ To start the Integration Server Wrapper wizard

- 1 In the context menu of a Software AG IDL file, choose **Integration Server > Generate web-Methods IS Connection**.

This starts the wizard with a list of existing Integration Server Wrapper connections.



Note: If the selected IDL file is not valid because of a syntax error, an error dialog comes up and the wizard does not start.

- 2 Continue with *Step 2: Create a New Integration Server Connection*.

Step 2: Create a New Integration Server Connection

Define New Integration Server Connection

Add host:port, user and password for a new Integration Server

Server:

User:

Password:

☐
Use secure connection

➤ To create a new Integration Server connection

- 1 Define the new Integration Server connection on the wizard page.



Notes:

1. The only required field is **Server**. Enter the hostname of the Integration Server including an optional port number. If no port number is specified, port number defaults to "5555". The **Integration Server Authentication** can be passed with the **User** and **Password** fields.
 2. Optional settings are for secure connections. The **Truststore for HTTPS** contains all signed certificates and must be a valid truststore.
 3. The check box **Verify host name** checks that the hostname is entered in the stored certificate.
 4. When the Integration Server has **Client Authentication** enabled, you can specify your **Keystore** file and keystore **Password**.
 5. For managing Integration Server connections, see [Preferences](#).
- 2 Choose **Next** and continue with *Step 3: Select the Connection Type*.

Step 3: Select the Connection Type

☒ Create a new EntireX Adapter connection of type AS/400 Connection
☐ Update Adapter Services or Listeners to an existing Integration Server connection:

List of Connections

| Connection Name | Package Name | Connection Type | Enabled |
|-------------------------------|--------------|------------------------|---------|
| Employees:EmployeesConnection | Employees | EntireX RPC Connection | Yes |

Total: 1

☒ Map Software AG IDL data types to String
☐ Create or Update REST resource

> To create a new connection

- 1 Select a connection type from the drop down list. Connection types are described under *EntireX Adapter Connections* in the EntireX Adapter documentation and *Introduction to the Integration Server Wrapper*.



Note: The list of connection types is filtered: connection types that require a license are only shown if a corresponding license file is available. Reliable RPC connections are only shown if all IDL programs contain only IN parameters. Also, if a server mapping file is available, only those connection types that support the interface type specified in the server mapping file are shown.

- 2 Click **Next** and continue with *Step 4: Define Adapter Services for an AS/400 Connection*.

Step 4: Define Adapter Services for an AS/400 Connection

Packages on Integration Server localhost:5555

- Default
- Employees
- FLOW_Tutorial
- WmART

Folder Name:

Connection Name:

Connection to IBM AS/400

Hostname:

User ID:

Password:

Encoding:

> To create a connection and related adapter services

- 1 Select a package for the created objects.
- 2 Define a folder name. If the folder does not exist, it will be created.
- 3 Define a connection name.
- 4 Define the parameters of the connection type. For details, see *Connection Parameters for AS/400 Connections* in the EntireX Adapter documentation.

As a result, the folder will contain the connection and the adapter services (one for each IDL program). The name of a service is the same as the respective IDL program.

The default settings for the adapter services are:

- the **Default** package; if not available, the first package
- the IDL library name for the **Folder Name**

- the IDL library name with the suffix "Connection" for the **Connection Name**



Note: When creating a connection, a package dependency is added such that the selected package depends on webMethods EntireX (the package `WmEntireX`) with the version currently used.

Task 3: Execute the Call from Integration Server to COBOL

From the **Service Development** perspective, refresh the package where the connection service was written, select the adapter service and use the service test to **Run Service**. This invokes the adapter service through the connector service.

Employees

Employees

getDetailsOfEmployee

getListOfEmployees

EmployeesConnection

Run As

1 Run in Browser

2 Run Service

| Name | Value |
|--------------|-------------|
| outRec | |
| EMPLOYEES | |
| EMPLOYEES[0] | |
| IDENT | 11100102 |
| FIRSTNAME | EDGAR |
| SURNAME | SCHINDLER |
| DATE-BIRTH | Dec 4, 1962 |
| EMPLOYEES[1] | |
| EMPLOYEES[2] | |
| EMPLOYEES[3] | |
| EMPLOYEES[4] | |
| errorCode | 00000000 |
| errorFlag | false |

In case of error or unexpected results:

- Check the Integration Server log, the EntireX Adapter log or the RPC logs.
- Use the IDL Tester as described under [Task 1](#) above.