

Exposing Remote Function Call (RFCs) as Web Service in CAF and Developing Web Dynpro Application



Applies to:

SAP Net Weaver CE 7.1.1 EHP1 (SP0, SP1, SP2 sand SP3). For more information, visit the [Web Dynpro Java homepage](#).

Summary

This article explains exposing Remote Function Call (RFCs) as Web Service in CAF and developing Web Dynpro Application using Adaptive Web Service Model.

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Prerequisite

- SAP Web Application Server Java 7.1 and authorization to configure service group.
- SAP NetWeaver Developer Studio 7.1
- You have access to a remote SAP back-end system (R/3).

To test this example application successfully, you must also make sure that this SAP system contains the function module BAPI_FLIGHT_GETLIST and the appropriate data from the flight data model. To access functions within an SAP system, a user must provide this system with valid credentials by means of the logon process. Since you are using the Web Dynpro Adaptive RFC Layer, the user ID defined in the Web Dynpro Content Administrator of your J2EE Engine will take care of the connection automatically.

Introduction

External Services

You can use external services to communicate with external systems and applications independent of implementation language, technology, or platform. This ensures that the pre-existing functions of these systems and applications can be reused in CAF.

In CAF, you call back-end functions with the following external services:

- Remote function calls (RFCs)
- Web services

You cannot modify external services. You only define dependencies from the application to the external service, and then expose or consume the external service from your application service. External services are always stateless, meaning a session opens and closes within the call.

Web Services

You can use Web services to enable systems to exchange data and start actions of any type. The WSDL (Web Service Description Language) files are imported and retrieved from a directory or UDDI server. You can find a Web service definition either by specifying the URL of its WSDL file, or by browsing the Services Registry.

Remote Function Calls

You can use the RFCs to communicate with ABAP-based SAP systems. RFCs are interfaces that enable external communication with the function modules of SAP systems.

You can import the metadata (including methods and input and output parameters) of RFCs into CAF and subsequently make them available to other CAF services.

Web Dynpro Adaptive Web Service Model

If you plan to reuse a Web Service which is either locally available or from a UDDI then the Adaptive Web Service Model is the interface you would use for your Java Web Dynpro application.

Modeling External Services

Creating Composite Application Development Component

Prerequisites

1. Launch the SAP NetWeaver Developer Studio.
2. Configure Application Server (AS) Java: Windows -> Preference -> SAP AS JAVA.
3. Choose Window -> Open Perspective -> Other.
4. Select Composite Application from the list.
5. Choose OK.

Procedure

1. Choose File -> New ->Project...
2. Select Development Infrastructure -> Development Component and choose Next.
3. Select Composite Application and click next
4. Select the software component for the new DC to be created in and Click next.

The default software component is Local Development -> My Components.

5. Fill the required data as follows:

Vendor : demo.sap.com

Name : Enter the name of the DC.

Caption : Enter a single line caption.

Language : Choose the language. (**Default value:** American English)

Domain : Choose the domain. (**Default value** : Basis)

Support Component : BC

6. Choose Next, then choose Finish. The application you have created is added to the Composite Application Explorer.

Importing RFC Modules

You can use the RFCs to communicate with ABAP-based SAP systems. RFCs are interfaces that enable external communication with the function modules of SAP systems.

You can import the metadata (including methods and input and output parameters) of RFCs into CAF and subsequently make them available to other CAF services.

Procedure

1. In the Composite Applications Explorer, choose the development component (DC) in which you want to import RFC module.
2. Click the external package with the secondary mouse button and choose Import RFC.

The Import RFC wizard appears.

Note: You may import external services only in the external package.

3. Enter the relevant server logon information:

Single Server Connection Mode

Field	Description
Host Name	Address of the target system host
System Number	System service ID number
SAP Router	Address of the SAP router (optional)

4. Enter relevant user logon information:

Field	Description
Client	When you log on to an SAP system, you log on to a particular client of this system. Any activities you carry out in the system are always carried out in one client.

Logon Name	User name
Password	User password
Language	Preferred language (default value: EN)

5. Choose Next and wait until the connection is established.

A wizard for importing RFCs appears.

6. Enter the function name as **BAPI_FLIGHT_GETLIST**, then choose Search.

Select the RFC module **BAPI_FLIGHT_GETLIST** and Click Next.

7. Enter **WD_MODELDATA_DEST** for RFC Destination name, Choose Finish.

The imported RFC modules appear under the external package node in the Composite Application Explorer.

You can now create mappings with them.

Mapping Service Operations

Once you have imported an external service in your composite application, you need to map the external service operations to application service operations. This way you use external services without implementing code. When the external service you have imported has a huge number of operations and attributes you can create automatic identical mappings to an application service.

The CAF application uses an application service operation to send an input message. The input message attributes are mapped to the remote service operation input attributes (input mapping). The remote service processes the input attributes and generates output attributes. The output message attributes are mapped to the application service operation output attributes (output mapping).

Creating Automatic Mappings for Application Services

1. Click on the external services you have imported with the secondary mouse button and choose Default mappings.
2. Select all the attributes of the external services to be automatically mapped.
3. Choose the target application service for your mapping. Select the options, *Create methods in new Application Service* and Click OK.

Exposing Application Service as Web Service

To reuse the business logic stored in your application services or business objects, you can expose them as a Web service.

1. In the Composite Application Explorer, click the node of the application service you want to expose with secondary mouse button to choose *Expose Service as Web Service*.
2. In the Select service operation window, choose all the operations to expose.
3. Save, generate, build and deploy your application.

Find the WSDL URL of Exposed Web Service

1. Open Single Service Administration of SAP AS, <http://<servername>:port/nwa/ssadmin>
2. Provide user name and password to login.
3. In Service Definitions tab, enter the application service name in Find field and Click Go.

Note: There might be more than one Service definition listed in the table with the same name. Select the service definition which is relevant to your composite application DC.

4. Click on the WSDLs tab.
5. Copy the WSDL URL link and paste it in a notepad.

Create a Web Dynpro Application consuming web service exposed by RFCs

Creating a Web Dynpro Project

To manage local development objects of an application, you first need an appropriate project in the Developer Studio. Once you have set up the initial project framework, you can create the specific components of the Web application, define them, and implement the necessary source code. There is a wizard which generates an initial structure for your new Web Dynpro project. The Web Dynpro Explorer provides a logical view of the structure of a Web Dynpro project then. With this project view, you can access all Web Dynpro units. In addition, each Web Dynpro project provides access to local dictionaries, with the help of which you can create user-defined dictionary types. Additionally, you can add required projects resources, such as separate Java help classes, to the Web Dynpro project through the resources node.

Procedure

1. Select Development Infrastructure -> Development Component and choose Next.
2. Select Web Dynpro and Click next.
3. Select the software component for the new DC to be created in and Click next.
The default software component is Local Development -> My Components.
4. In the window that appears, enter a name for the project and specify the settings for Project contents and Project language.
5. Finishing the wizard you are asked to open the perspective, based on the type of the project to be created is associated with the Web Dynpro perspective.

Creating the Application Unit

The project structure you have created does not yet include all the elements that enable you to define the specific functions of the whole Web Dynpro application. These additional elements are encapsulated in a Web Dynpro component that can contain any number of windows and views for visual representation and their corresponding controllers. Moreover, you also need an object that can be used to address and display the Web Dynpro component in the Web browser. This is why you create the logical unit application as an additional object. As an independent program unit it connects to an URL that can be accessed from the user via a window within the Web Dynpro component.

Procedure

1. Expand the Web Dynpro node in the structure of the Demo project.
2. To start the relevant wizard, open the context menu of the Applications node, and choose Create

Application.

3. Enter a name for the application unit, such as unit *DemoApp*, and specify the package name (example: *com.sap.demoapp*) in which the generated Java classes will be stored. Choose Next.
4. Assign a Web Dynpro component to which the application is linked. Since a Web Dynpro component has not yet been created, the wizard creates a component at this point. Accept *Create a new component* and choose Next again.
5. In the next screen you specify some general values for the component. Enter the name *DemoComp* for your Web Dynpro component and specify the package name *com.sap.demoapp.comp*. Accept the other suggested settings and choose Finish.

Result

The application wizard performs several generation routines. Once it has finished, it adds the new application object to the structure. Additionally, it inserts a substructure for the new Web Dynpro component. Furthermore the initial *DemoCompView* is automatically created for you; you find this view under the Views node in your Web Dynpro project.

Furthermore, a window unit with name *<myproject>Window*, in this example with name *DemoWindow*, has been generated; including the needed plug for application starting purposes.

Importing Adaptive Web Service Model

Using the Web Dynpro model import wizard, you address a Web Service definition which is available locally or from a UDDI for your Web Dynpro application.

Procedure

1. To start the relevant wizard, open the context menu of the Models node, and choose *Create Model*.
In the model import wizard, choose the Adaptive Web Service Model option and Click next.
2. Enter a name for the model, such as unit *Demomodel*, and specify the package name (example: *com.sap.demomodel*).
3. From Available WDSL resources select Remote Location / File System, Click Next.
4. Enter the WSDL URL of application service exposed as web service in CAF and click next.
5. Create New Service Group with default values and click next.
6. The importer displays the model classes that will be generated from the WSDL. Any model name clashes will be resolved. One can see the system renamed model classes by selecting the check box "Show Renamed Model Classes". Note this check box is only enabled if system renamed model classes exist.
7. Click Next, Import Log is shown.
8. Click Finish. Model is created and visible in the WD explorer.

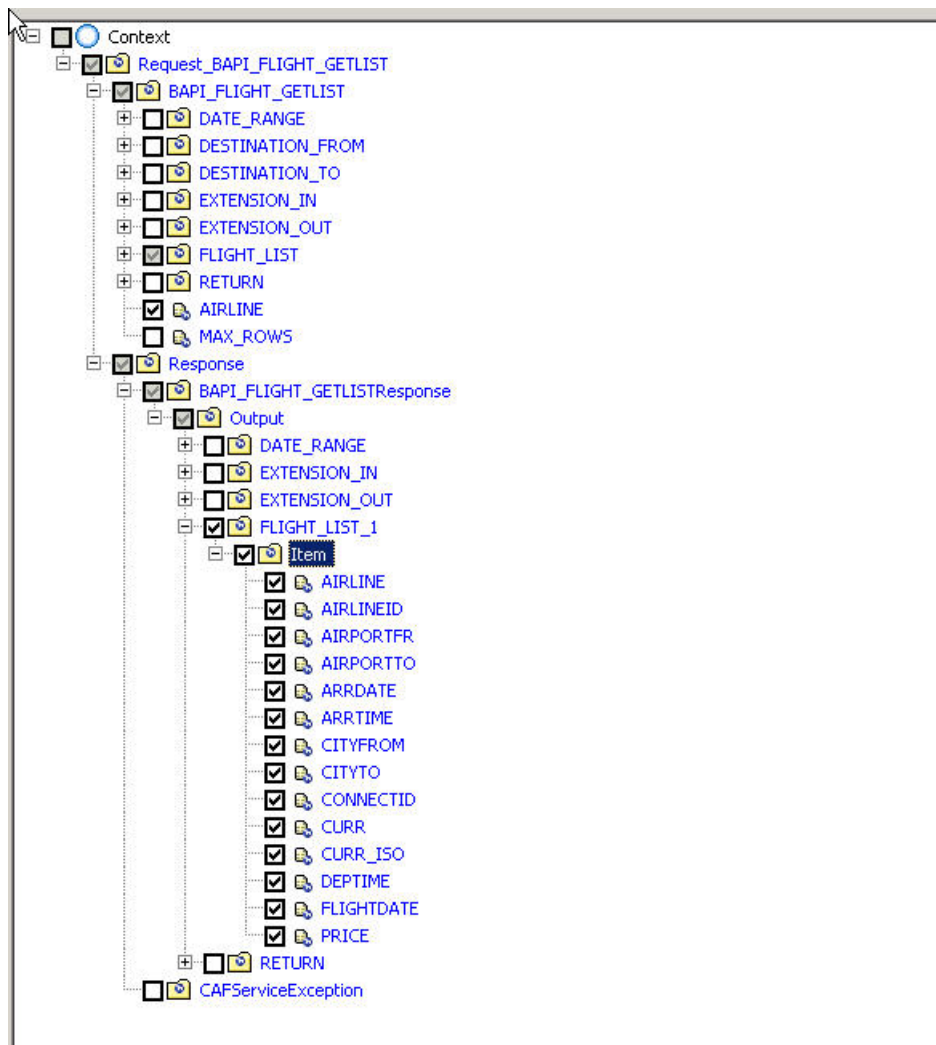
Creating a User Interface to access data from web service

Apply Service Controller Template

Creates a controller that wraps a service. This service is either a Remote Function Call or a Web service. The wizard then creates the required contexts and an optional method for triggering the call.

Procedure

1. Add the created model to the list of Used Models node under Component with the secondary mouse button, choose the created model and click Ok.
2. Select the Component Controller in Web dynpro explorer with the secondary mouse button, choose Template -> Apply
3. Select Service Controller and Click Next.
4. Select "Request_BAPI_FLIGHT_GETLIST" Model Class and Click next.
5. Select the nodes, attributes shown in figure below and Click next.
6. Enable Generate method for model execution and Click on Finish.



View - Context Mapping

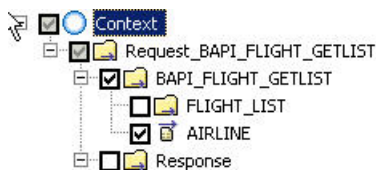
1. Double click on the view in Web Dynpro explorer.
2. Go to Context tab, Select Context and with the secondary mouse button, Choose New > Node > Mapping.
3. Click Next, Choose Component Controller in popup Required Controllers and Click OK.
4. Select “Request_BAPI_FLIGHT_GETLIST” and click Next.
5. Select all the nodes, attributes under “Request_BAPI_FLIGHT_GETLIST” and Click Finish.

Apply Form Template

You can use the form template wizard to create a form layout for a view, based on the view context. For designing and implementing this form layout, you can use controller context data or access the data of a declared Web Dynpro model directly.

Procedure

1. Select the View in Web dynpro explorer with the secondary mouse button, choose Template -> Apply
2. Choose the option Form. Enter a name for the layout template or use the default.
3. Choose Next. You see a window in which you can choose the context attributes you require for the form.
4. Select the AIRLINE attribute shown in figure and click Finish.



Apply Action Button Template

The wizard for the Action Button template allows you to easily create a button, an action, an event handler, and the code for calling a method and triggering an event.

Procedure

1. Select the View in Web dynpro explorer with the secondary mouse button, choose Template -> Apply
2. Choose the option *Action Button*. Enter a name for the template or use the default.
3. Choose *Next*. In the next window, you use the default for action, and event. For the label, Enter *Get Flight List*.
4. Choose *Next* to proceed to the wizard window for defining the methods and plugs.
5. Select the check box Call Method and for controller drop down field select the View Controller.
Corresponding method is also filled in Method drop down field.
6. Close the wizard by choosing *Finish* and save your changes.

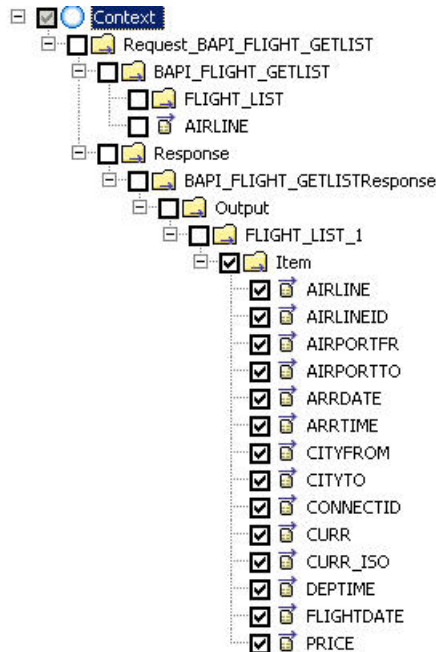
Apply Table Template

When you define this table layout, you can access the controller context data directly.

Procedure

1. Select the View in Web dynpro explorer with the secondary mouse button, choose Template -> Apply
2. Choose the option Form. Enter a name for the layout template or use the default.

3. Choose Next. You see a window in which you can choose the context attributes you require for the form.
4. Select the nodes and attributes displayed in the image below.



5. Close the wizard by choosing Finish and then choose Save All to save your changes.

Build and Deploy DCs

Build

1. On the web dynpro project with the secondary mouse button choose Development Component > Build.
2. Select all the DCs and Click OK. Make sure that Fore Build Check box is active.

Deploy

1. On the web dynpro project with the secondary mouse button choose Deploy.
2. Enter the J2ee Engine Username and password and click OK.
3. Click OK on Deploy wizard once deployment is successful.

Create Destination in SAP Net Weaver Administrator.

Applications or services can establish connections to other services. When using such connections, you need to specify the remote service's address and the user authentication information to use for the connection. Many applications use the Destination service for this purpose.

1. Open NetWeaver Administrator page <http://<server name>:<port>/nwa/destinations>
2. Search for the destination WD_MODELDATA_DEST, if found remove the destination, if not no problem.
3. Create a New Destination, Click on Create Button
4. Enter the details:

General Data:

Hosting System: leave default value.

Destination Name: WD_MODELDATA_DEST

Destination Type: RFC

Click Next

Connection and Transport Security Settings

Choose **No** option for load balancing, you must specify the following information:

Target host: The name of a server host of the target system that you want to use as a port to the system.

System number: Enter the system number of target host

System ID: ID of SAP system

Logon Data:

Authentication: Technical user

- *Language:* System language to be used
- *Client:* Client code
- *User:* User name to be used for remote logon, if different from current user name
- *Password:* User password

Configure Service Group in SAP NetWeaver Administrator.**Create Communication Profile**

1. Open NetWeaver Administrator page <http://<server name>:<port>/nwa>
2. Click on SOA management.
3. Click on System Connections under Technical configuration tab.
4. Click on Communication Profiles tab. Click on New Button. Give some Profile Name (ex: demoprofile), Click Next, Next and Finish (maintain all default settings).

Create Provider System

1. Go to Provider Systems tab.
2. Click New,

Select System type: Java

Enter System Name: The SID of your system

Host: Host address of your system .

3. Click Next, Next, select the Profile Name (ex: demoprofile) from dropdown menu.
4. Click Next, select Mode as Single Service and for WSDL URL, Enter the WSDL URL of application service exposed as web service in CAF. Click Finish.

Configuring Application communication on J2EE engine

1. Open SOA Management tab
2. Select Application and Scenario Communication -> Application Communication.

3. Select your deployed WD project

The Service Group should appear automatically in a table.

4. Select the Service Group & Click the Edit Button -> Click the “Assign Provider System” button -> Click on Go button and select the Provider System -> Click on save button.

Run Application

To deploy the logical Application unit which is also displayed in the Web Dynpro Explorer view, you select Deploy new Archive and Run. As you can see, you would also trigger the execution process for the WD application.

Output

AIRLINE_Label:

[Get Flight List](#)

CURR_JSO	AIRLINEID	AIRPORTTO	AIRPORTFR	CITYFROM	FLIGHTDATE	PRICE	AIRLINE	CONNECTID	ARRTIME	CURR	CITYTO	DEPTIME	ARRDATE
EUR	LH	JFK	FRA	FRANKFURT	10/7/2006	666	Lufthansa	0400	11:34:00 AM	EUR	NEW YORK	10:10:00 AM	10/7/2006
EUR	LH	JFK	FRA	FRANKFURT	11/4/2006	666	Lufthansa	0400	11:34:00 AM	EUR	NEW YORK	10:10:00 AM	11/4/2006
EUR	LH	JFK	FRA	FRANKFURT	12/2/2006	666	Lufthansa	0400	11:34:00 AM	EUR	NEW YORK	10:10:00 AM	12/2/2006
EUR	LH	JFK	FRA	FRANKFURT	12/30/2006	666	Lufthansa	0400	11:34:00 AM	EUR	NEW YORK	10:10:00 AM	12/30/2006
EUR	LH	JFK	FRA	FRANKFURT	1/27/2007	666	Lufthansa	0400	11:34:00 AM	EUR	NEW YORK	10:10:00 AM	1/27/2007

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