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第一章 SAP 创建 WS

1.1 概要技术说明

Web Service 简介：构建互联网分布式系统的基本部件。**Web Services** 正成为企业应用集成（**Enterprise Application Integration**）的有效平台。你可以使用互联网中提供的 **Web Service** 构建应用程序，而不必考虑这些 **Web Service** 是怎样运行的。

Web Service 通过标准通信协议，在互联网上发布程序模块（以服务的方式），目前大部分是用 **SOAP** 来做通信协议。

本文档为一个 **SAP ECC**（以下简称 **ECC**）系统如何生成 **Web Service**（以下简称 **WS**）供外部系统调用的示例。**ECC** 系统生成 **WS** 的大致流程为：首先在 **SAP** 中创建一个属性为 **RFC** 的函数，然后对该函数进行封装，最后通过事务代码——**SOAMANAGER** 进行配置，即可得到供外部系统进行调用 **WS** 的 **URL**。详细技术说明见 1.2—1.4。

系统环境：**SAP ECC 6.0**， **BASIS 700 SP15**；

WS 通讯协议：**SOAP 1.1**（此 **ECC** 的版本暂不支持 **SOAP1.2**）。

1.2 创建 RFC 函数

使用 **TCODE**：**se37** 或 **SE80**，首先在函数组(函数组自行创建)中创建一个函数,在弹出的界面输入相关参数，将 **Processing Type** 选为 **RFC** 类型即可。具体如下：

SAP Function Builder: Display ZXTPTDXP_TEST

Function module: ZXTPTDXP_TEST Active

Attributes Import Export Changing Tables Exceptions Source code

Classification

Function Group	ZXTPTDXP	与DXP平台交互函数组
Short Text	DXP平台测试	

Processing Type

☐ Normal Function Module
☒ Remote-Enabled Module
☐ Update Module

☒ Start immed.
☐ Immediate Start, No Restart
☐ Start Delayed
☐ Coll.run

General Data

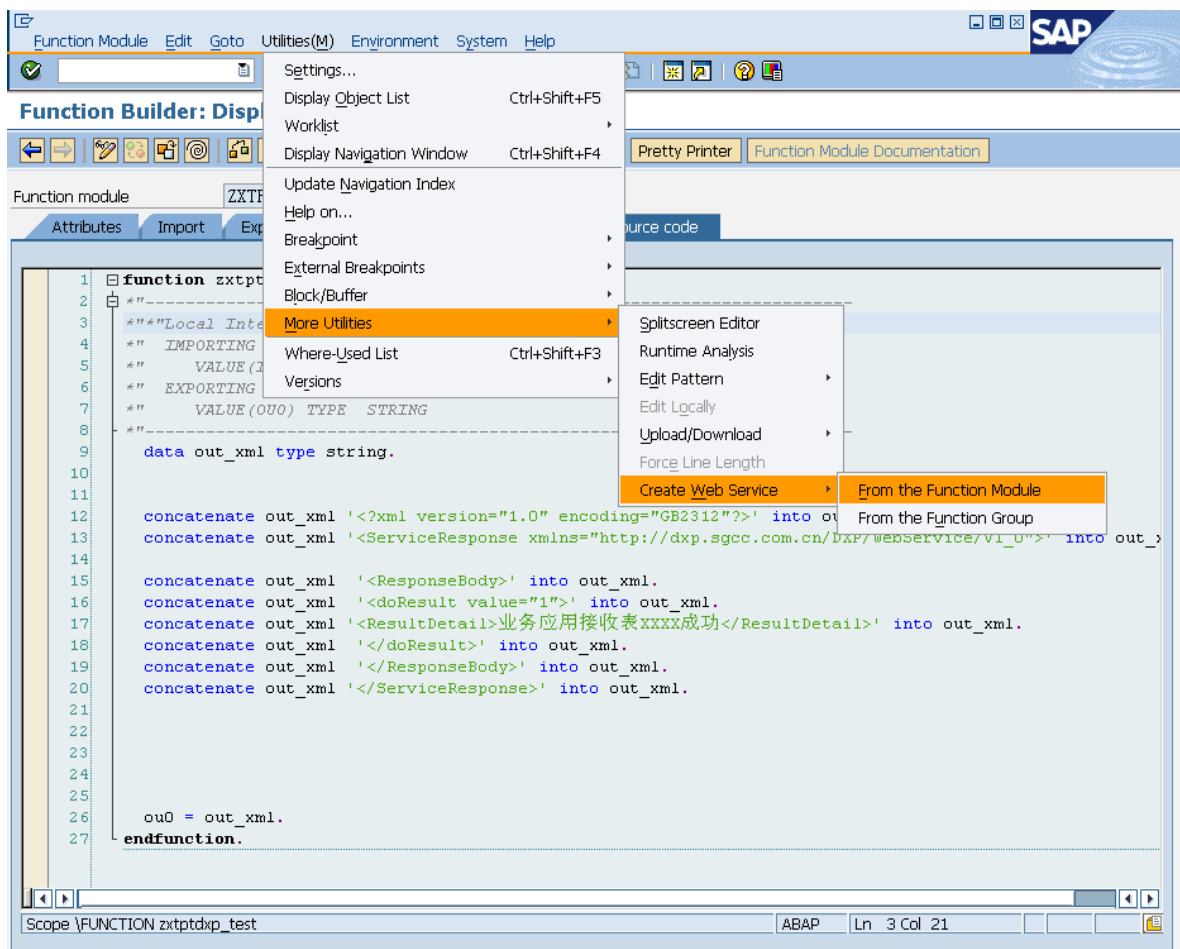
Person Responsible	DEV05
Last Changed By	WUJC
Changed on	06. 03. 2010
Package	ZXTPT00
Program Name	SAPLZXTPTDXP
INCLUDE Name	LZXTPTDXPU02
Original Language	EN
Not released	
<input type="checkbox"/> Edit Lock	
<input type="checkbox"/> Global	

DS1 (1) 100 ZXZXS INS

该函数的输入、输入参数均为 String 类型。

1.3 创建 WS

创建 WS 有两种途径，一种是通过 SE80，另一种是通过 SE37，前一种提供了多种选择类型(WS、Proxy Object 等)，后者只能创建 WS。本文档使用后一种方法，通过如下路径：Utilities->More Utilities->Create Web Service->Form the Function Module。



系统弹出 Web Service 创建向导，输入服务名称、描述：

Provide Service Definition details

Enter a name and a short description for the Web Service and choose an end-point type.

To change the Web Service, use the ABAP Workbench (transaction SE80).

Object Type

- Choose Endpoint
- Choose Operations
- Configure Service
- Enter Package/Request
- Complete

Service Definition: ZXTPTDXP

Kurzbeschreibung: DXP WS TEST

Endpoint Type: Function Module

Back Continue Cancel

Name Mapping 和 XML 文件中生成的函数名对应的变量命名有关，一般不选。

Choose Endpoint

Enter the name of the function module that is to be offered as a Web Service.

If you select the checkbox <ZKName Mapping, the existing descriptions of the end point elements are copied. Initial letters are capitalized and underscores removed.

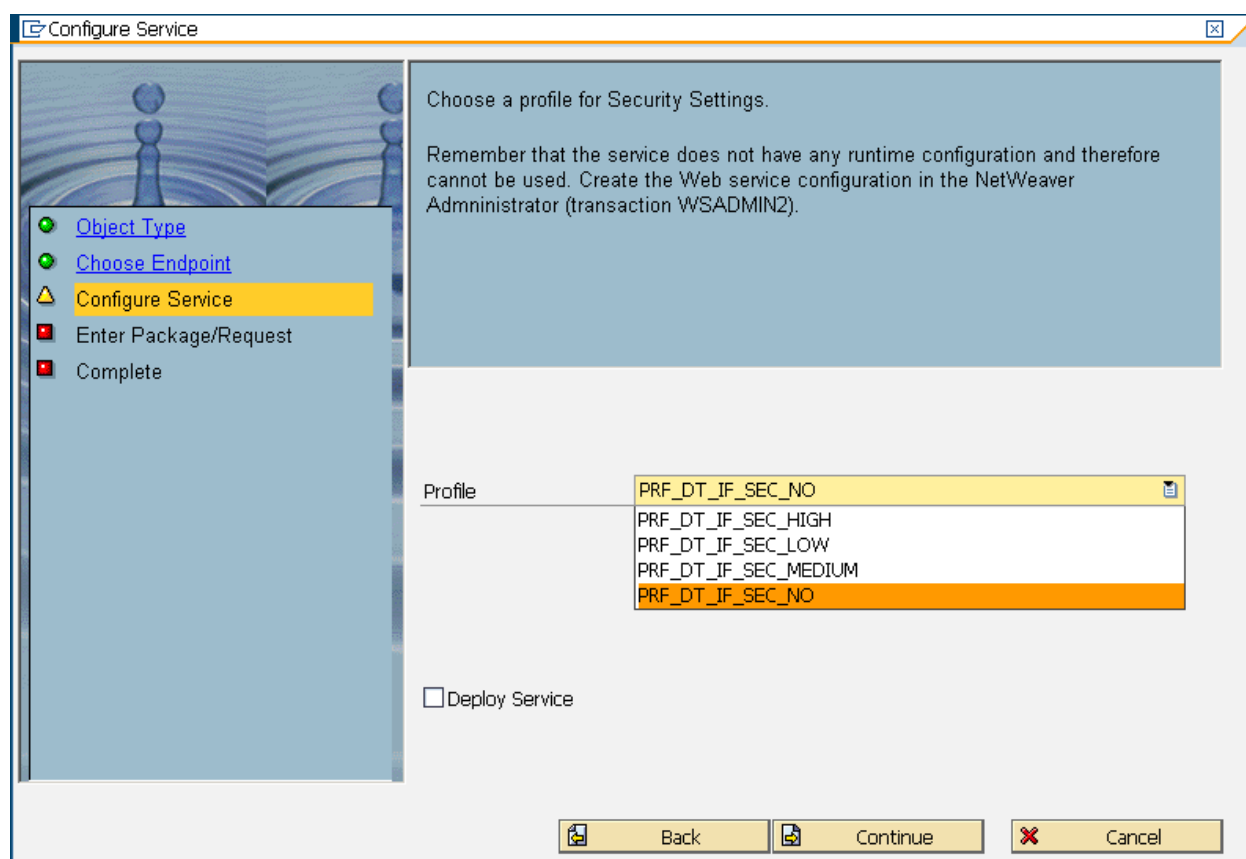
Function Module: ZXTPTDXP_TEST

☐ Name Mapping

Back Continue Cancel

Profile 为安全文件设置，即外部系统访问该服务时 ECC 系统设置的安全级别。Deploy Service 可

不选。



The 'Configure Service' dialog box is shown. On the left, a vertical list of steps includes 'Object Type', 'Choose Endpoint', 'Configure Service' (highlighted with a yellow background and a yellow triangle icon), 'Enter Package/Request', and 'Complete'. The main area has a light blue header with the text 'Choose a profile for Security Settings.' and a reminder: 'Remember that the service does not have any runtime configuration and therefore cannot be used. Create the Web service configuration in the NetWeaver Administrator (transaction WSADMIN2).' Below this, a 'Profile' list box contains five options: 'PRF_DT_IF_SEC_NO' (highlighted in yellow), 'PRF_DT_IF_SEC_HIGH', 'PRF_DT_IF_SEC_LOW', 'PRF_DT_IF_SEC_MEDIUM', and 'PRF_DT_IF_SEC_NO' (highlighted in orange). At the bottom left, there is an unchecked checkbox labeled 'Deploy Service'. At the bottom right, there are three buttons: 'Back', 'Continue', and 'Cancel'.

Configure Service

Choose a profile for Security Settings.

Remember that the service does not have any runtime configuration and therefore cannot be used. Create the Web service configuration in the NetWeaver Administrator (transaction WSADMIN2).

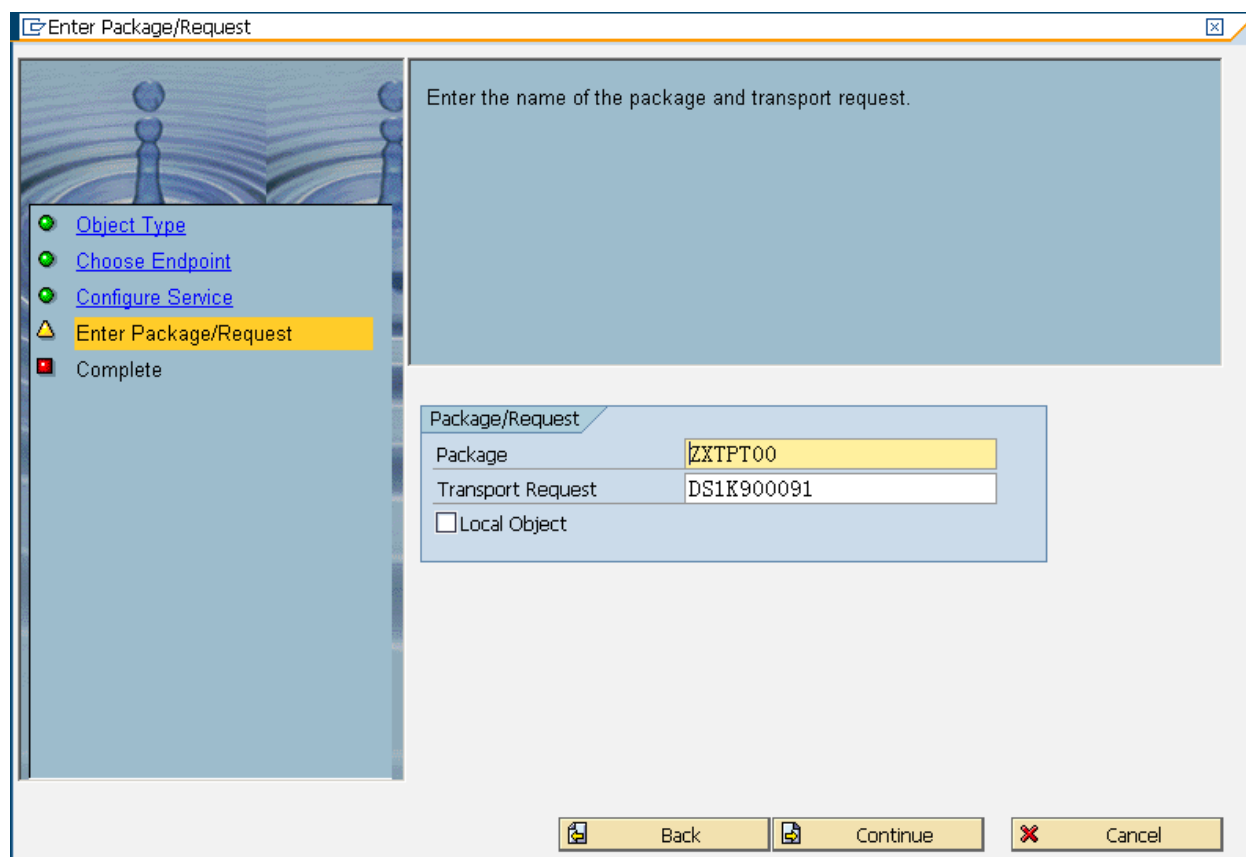
Profile

- PRF_DT_IF_SEC_NO
- PRF_DT_IF_SEC_HIGH
- PRF_DT_IF_SEC_LOW
- PRF_DT_IF_SEC_MEDIUM
- PRF_DT_IF_SEC_NO

☐ Deploy Service

Back Continue Cancel

输入开发包和传输请求:



The 'Enter Package/Request' dialog box is shown. On the left, a vertical list of steps includes 'Object Type', 'Choose Endpoint', 'Configure Service', 'Enter Package/Request' (highlighted with a yellow background and a yellow triangle icon), and 'Complete'. The main area has a light blue header with the text 'Enter the name of the package and transport request.' Below this, a 'Package/Request' section contains two input fields: 'Package' with the value 'ZXTPT00' and 'Transport Request' with the value 'DS1K900091'. There is also an unchecked checkbox labeled 'Local Object'. At the bottom right, there are three buttons: 'Back', 'Continue', and 'Cancel'.

Enter Package/Request

Enter the name of the package and transport request.

Package/Request

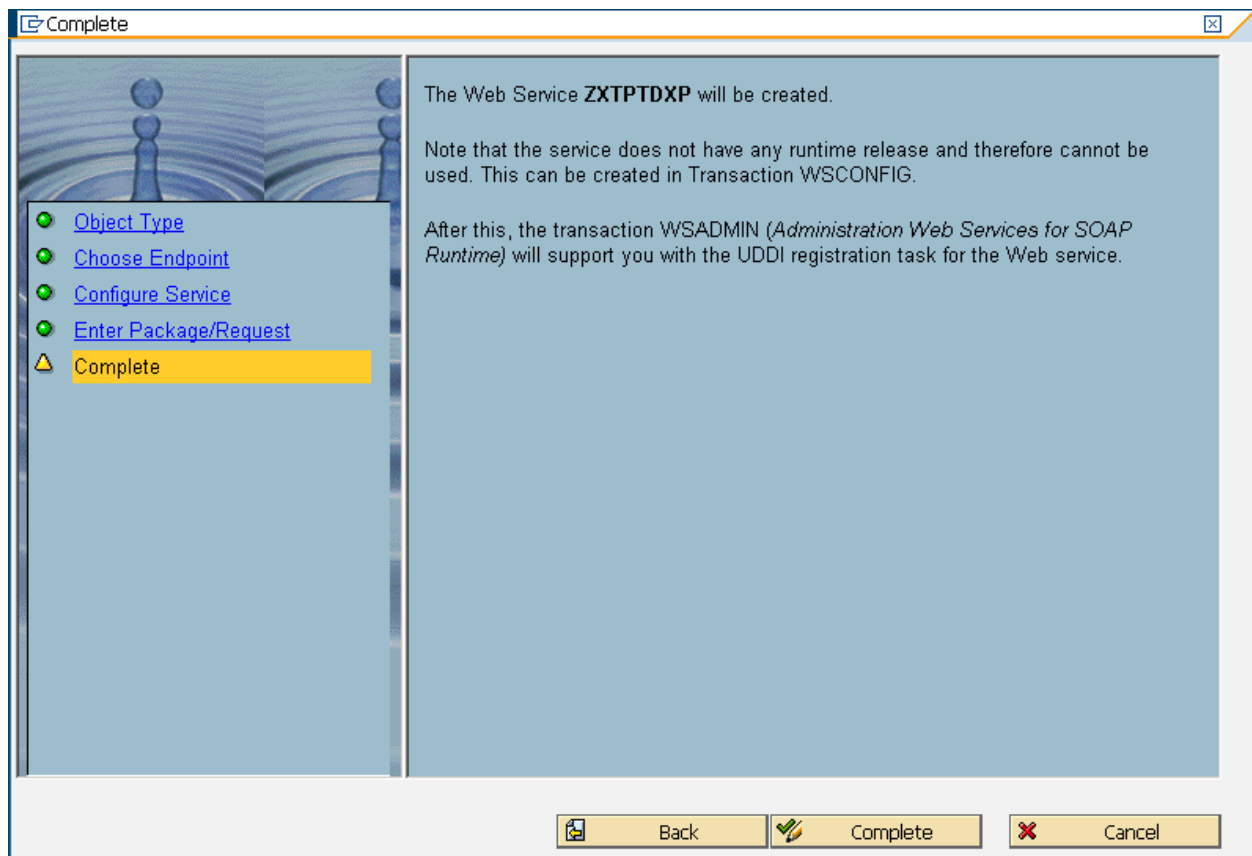
Package ZXTPT00

Transport Request DS1K900091

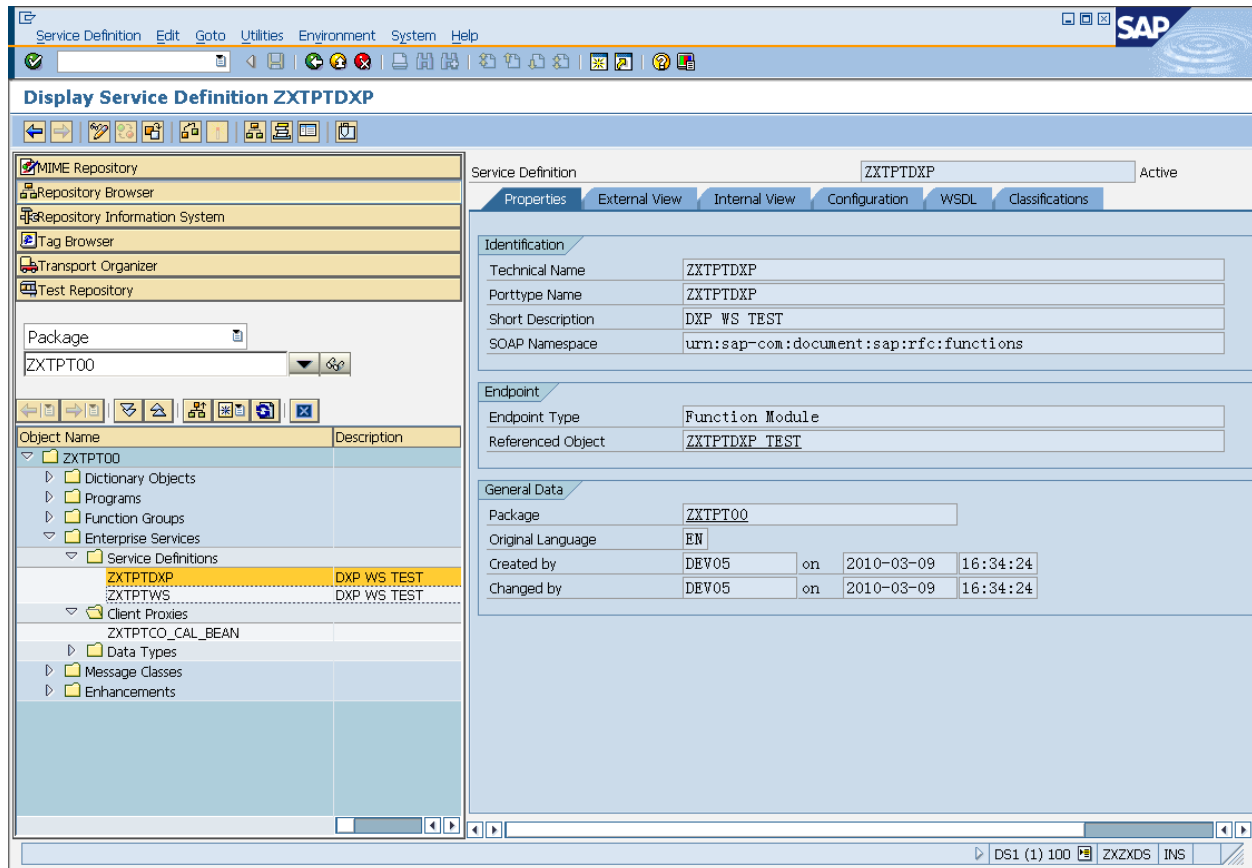
☐ Local Object

Back Continue Cancel

完成:



基本信息如下:



1.4 外部系统访问配置

若是生成的 WS 供 SAP 系统调用，则此步骤可省略，非 SAP 系统访问则必须配置。通过事务代码：SOAMANAGER 对 Web Service (ZXTPT_DXP) 进行配置。配置前需要修改 DNS 解析的 HOST 文件，并添加对应的域名，文件路径：C:\Windows\System32\drivers\etc，以记事本方式修改 hosts 文件，如：

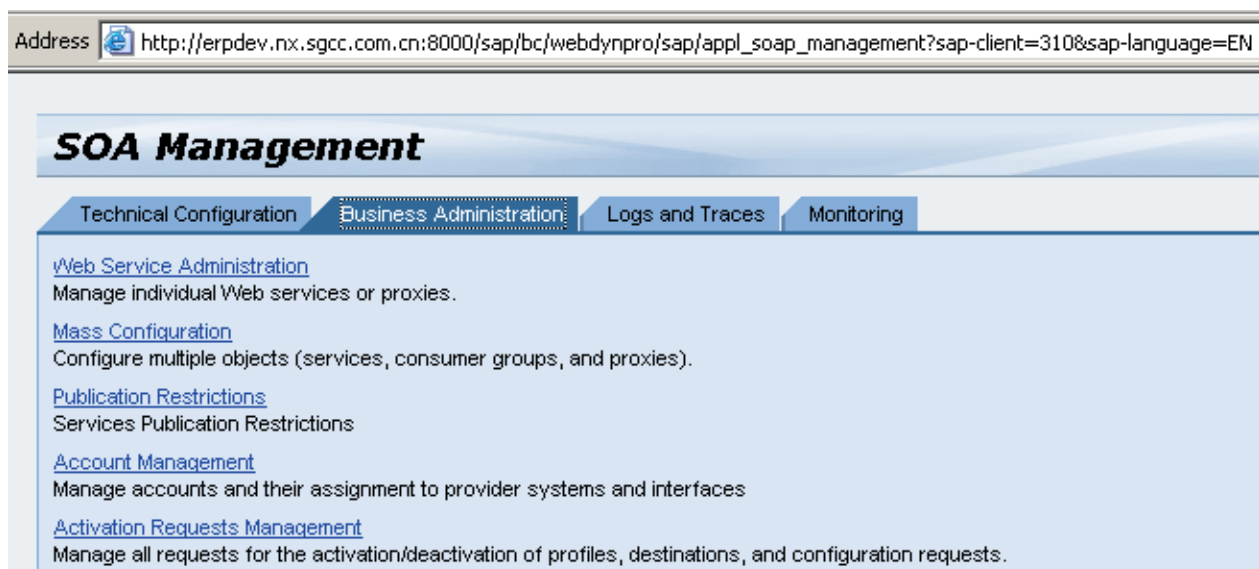
10.85.23.164 pxci.epri.com.cn

10.85.23.74 hecs.epri.com.cn

```
# Additionally, comments (such as these) may
# lines or following the machine name denote
#
# For example:
#
#       102.54.94.97      rhino.acme.com
#       38.25.63.10     x.acme.com
#
127.0.0.1      localhost
10.85.23.161   zxzxd5.epri.com.cn
10.85.23.55    zx55bxdep.epri.com.cn
10.85.23.164   pxci.epri.com.cn
10.85.23.74    hecs.epri.com.cn
10.85.23.81    hzcs.epri.com.cn
```

保存文件。如果 SOAMANAGER 打开浏览器后登录失败，则需要在 SAP 中通过 SICF 来激活相关的服务。若不清楚相关的服务则全部激活。

SOAMANAGER 中的具体配置过程如下：



点击 Web Service Administration 进行配置，进入后选择自己创建的 WS，然后点击 Apply Selection:

SOA Management - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address http://zxz:ds.epri.com.cn:8000/sap/bc/webdynpro/sap/appl_soap_management?sap-client=100&sap-language=EN Go Links

Web Service Administration

Search Design Time object for Web Service Configuration

Search Browse

Search by: Service Search Pattern: z* Field: Internal Name in System: DS1/100 Go [Show Advanced Search](#)

Search Results

Internal Name	External Name	Namespace	Type	Description
ZTESTHCSERVICE2	ztesthcService2	urn:sap-com:document:sap:soap:functions:mc-style	Service	test
ZTESTHCSERVICE3	ztesthcService3	urn:sap-com:document:sap:soap:functions:mc-style	Service	test
ZWEBAA	zwebaa	urn:sap-com:document:sap:soap:functions:mc-style	Service	No short text found
ZXTPTDXP	ZXTPTDXP	urn:sap-com:document:sap:rfc:functions	Service	DXP VWS TEST
ZXTPTWS	ZXTPTWS	urn:sap-com:document:sap:soap:functions:mc-style	Service	DXP VWS TEST

Row 6 of 15

Apply Selection

Details of Service Definition: ZXTPTDXP

Back to search

Overview **Configurations** Classifications Details

Object Status: Services: 1 / Endpoints: 1
Porttype Namespace: urn:sap-com:document:sap:rfc:functions
Porttype Name: ZXTPTDXP
Internal Name: ZXTPTDXP
SOAP Application: URN:SAP-COM:SOAP:RUNTIME:APPLICATION:RFC:710
Package Name: ZXTPT00

[Open porttype WSDL document](#)
[Open WSDL document for selected binding](#)
[Open Web Service navigator for selected binding](#)

ZXTPTDXP::ZXTPTDXP

点击 Configurations，再点击 Edit 按钮，如下：

Configuration of Web Service 'ZXTPTDXP': Endpoint 'ZXTPTDXP'

Provider Security | Web Service Addressing | Messaging | Transport settings | Message Attachments | Operation specific

Transport Guarantee

Transport Guarantee Type

- ☒ No Transport Guarantee
- ☐ HTTPS
- ☐ Signature & Encryption (asymmetric binding)
- ☐ Secure Conversation (Version: February 2005, symmetric binding) bootstrapped with SSL

Properties for Transport Guarantee Type

Transport Protocol: HTTP Protocol

Signature Expected: No Signature Expected

Encryption Expected: No Encryption Expected

Add signature: No Not Add Signature

Encryption: Do Not Encrypt Message

Authentication Settings

Authentication Method

- ☒ No Authentication

HTTP Authentication

- ☐ User ID/Password
- ☐ X.509 SSL Client Certificate (via HTTPS)
- ☐ Logon Ticket

Message Authentication

- ☐ User ID/Password
- ☐ X.509 Certificate
- ☐ SAML 1.1, Sender Vouches Assertion

Collected Authentication Methods

Authentication Method
sapsp:None

Row 1 of 1

ABAP Service User

User Name: *

Password: *

在上图中输入用户名和密码即可，然后点击 **Save** 按钮配置完成。再点击下图中的 **Overview** 按钮，然后打开：**Open WSDL document for selected binding** 标签，即可获得 URL。

SOA Management - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites Refresh Print Mail Stop

Address http://zxzxdx.epri.com.cn:8000/sap/bc/webdynpro/sap/appl_soap_management?sap-client=100&sap-language=EN Go Links

Web Service Administration

Search Design Time object for Web Service Configuration

Search Browse

Search by: Service Search Pattern: z* Field: Internal Name In System: DS1/100 Go [Show Advanced Search](#)

Search Results

Internal Name	External Name	Namespace	Type	Description
ZTESTHCSERVICE2	ztesthcService2	urn:sap-com:document:sap:soap:functions:mc-style	Service	test
ZTESTHCSERVICE3	ztesthcService3	urn:sap-com:document:sap:soap:functions:mc-style	Service	test
ZWEBAA	zwebaa	urn:sap-com:document:sap:soap:functions:mc-style	Service	No short text found
ZXTPTDXP	ZXTPTDXP	urn:sap-com:document:sap:rfc:functions	Service	DXP VWS TEST
ZXTPTWS	ZXTPTWS	urn:sap-com:document:sap:soap:functions:mc-style	Service	DXP VWS TEST

Row 6 of 15

Apply Selection

Details of Service Definition: ZXTPTDXP

[Back to search](#)

Overview Configurations Classifications Details

Object Status: Services: 1 / Endpoints: 1
Porttype Namespace: urn:sap-com:document:sap:rfc:functions
Porttype Name: ZXTPTDXP
Internal Name: ZXTPTDXP
SOAP Application: URN:SAP-COM:SOAP:RUNTIME:APPLICATION:RFC:710
Package Name: ZXTPT00

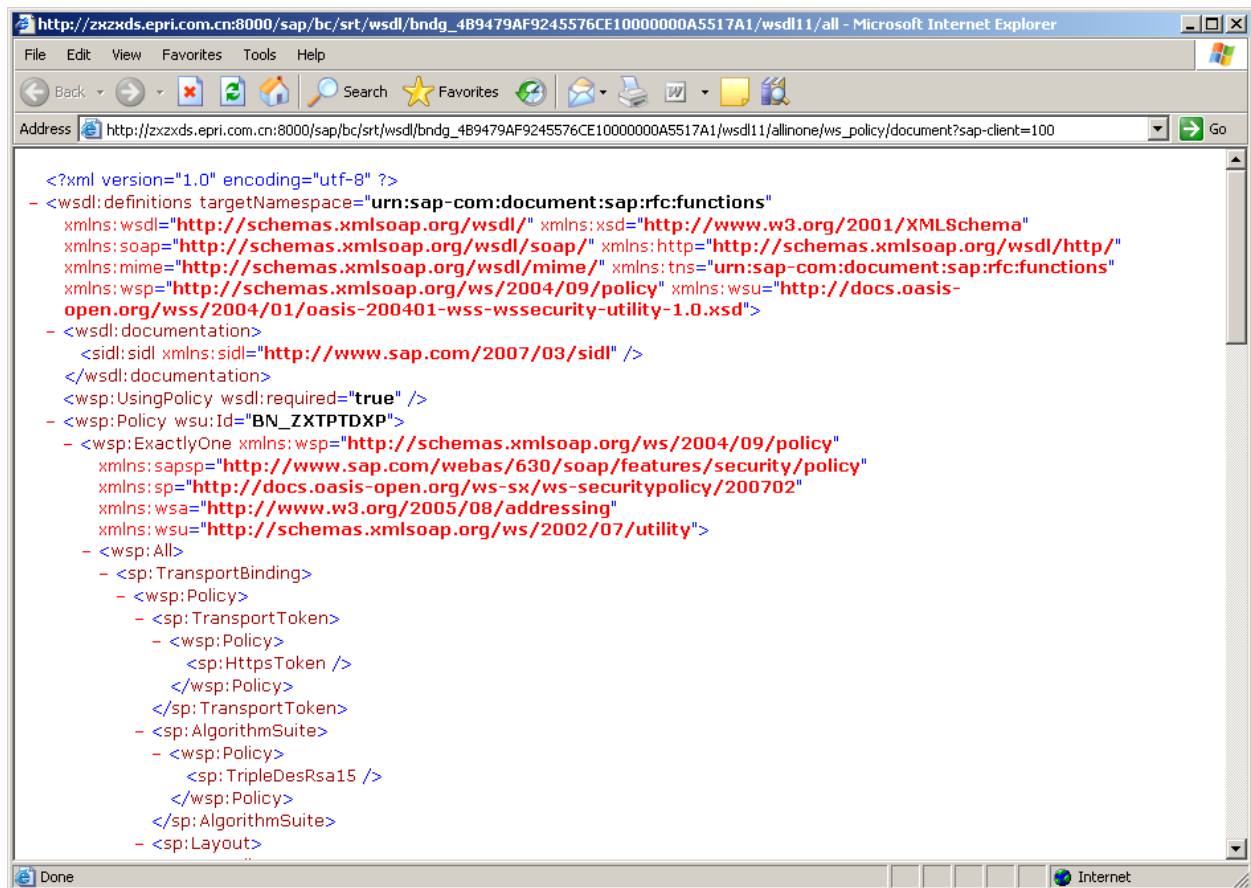
[Open porttype WSDL document](#)
[Open WSDL document for selected binding](#)
[Open Web Service navigator for selected binding](#)

ZXTPTDXP::ZXTPTDXP

Web Service Configuration of Service Definition: ZXTPTDXP

Done Internet

URL 在 IE 的地址栏中获得。



第二章 SAP 调用 WS

2.1 概要技术说明

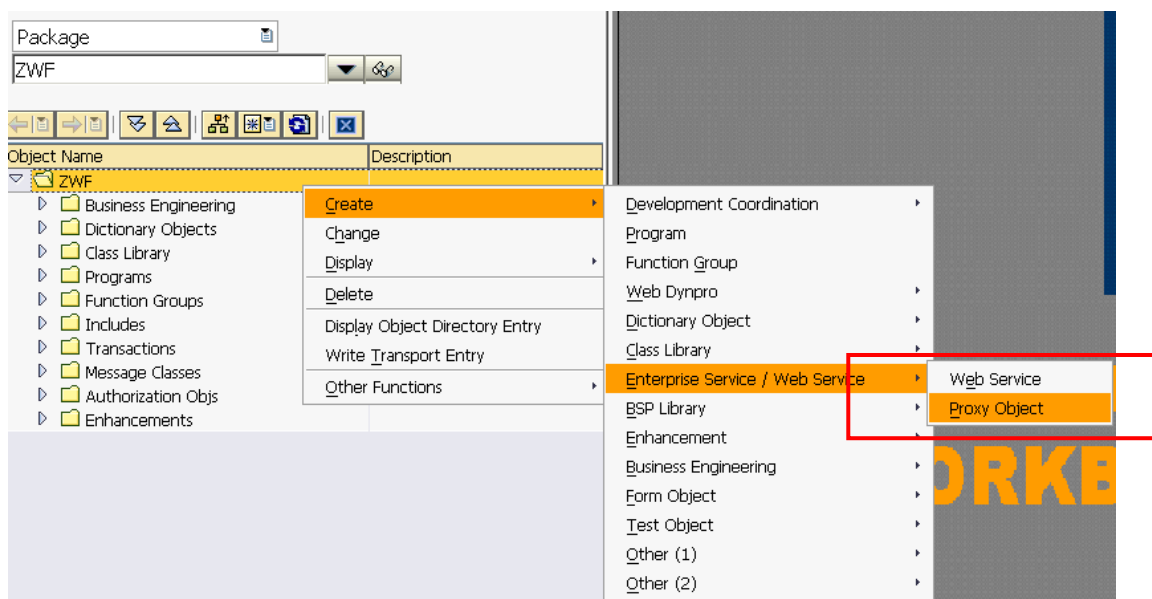
ECC 系统调用外部 WS 是企业信息系统整合集成时经常遇见到的情况，本章为一个 ECC 系统调用外部 WS 来实现和企业门户的数据交换例子。ECC 系统调用外部 WS 的大致流程为：首先在 SAP 中创建一个代理对象，然后为对象创建端口，并将配置端口激活，最后通过事务代码——SOAMANAGER 进行配置，即可在程序中调用 WS 中提供的方法，以实现系统间的数据传输。详细技术说明见 2.2—2.4。

系统环境：SAP ECC 6.0, BASIS 700 SP15;

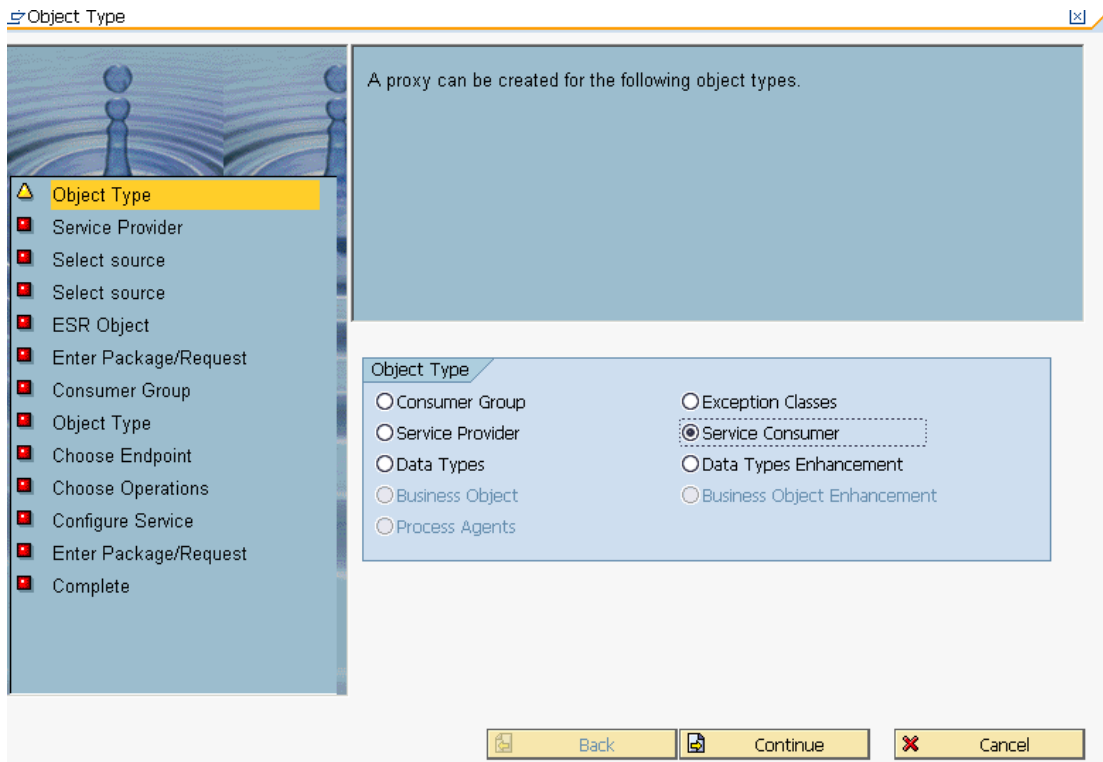
WS 通讯协议：SOAP 1.1（此 ECC 的版本暂不支持 SOAP1.2）。

2.2 创建服务代理对象

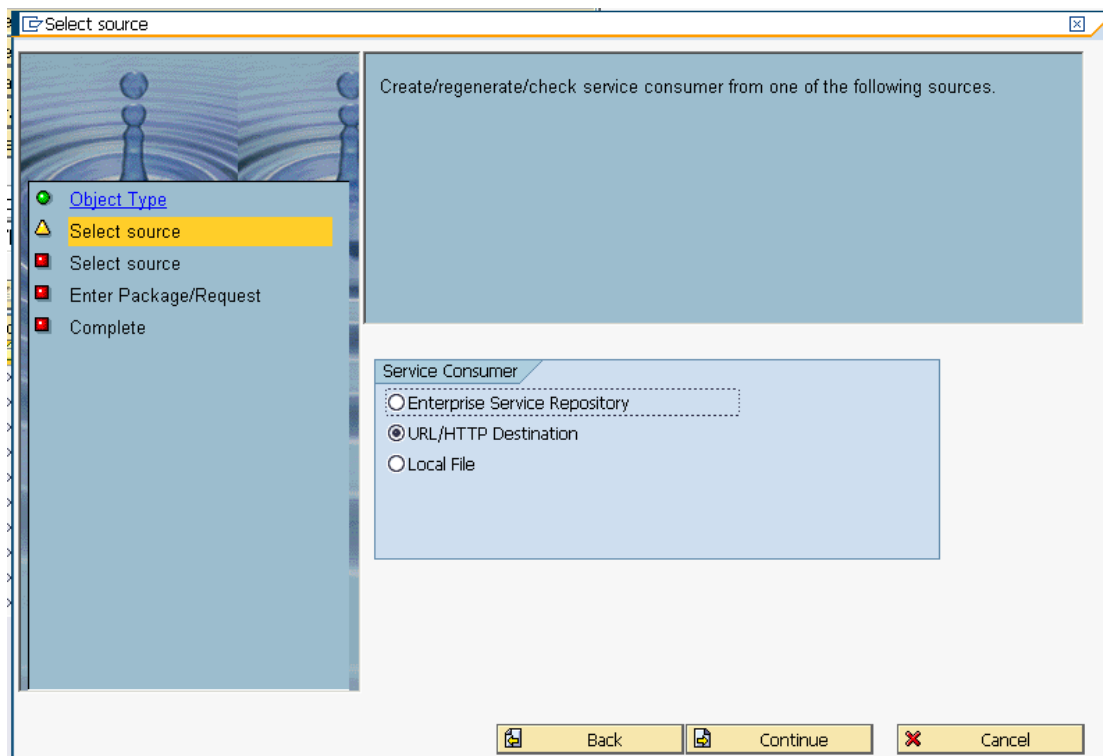
使用 TCODE：se80，选择建立,在弹出的界面输入相关参数即可。具体流程如下：



选择服务消费者：



选择 URL/HTTP 类型:



输入你需调用的 URL:

Select URL

Enter a Web Service URL in the URL field or enter an HTTP destination with a suffix

Object Type
Select source
Select source
Enter Package/Request
Complete

URL/HTTP

☒ URL

☐ HTTP Destination
Path Suffix

Back Continue Cancel

输入开发包、前缀号和请求号：

Enter Package/Request

Enter the package, prefix and transport request for the proxy object.

Object Type
Select source
Select source
Enter Package/Request
Complete

Enter Package & Prefix

Package

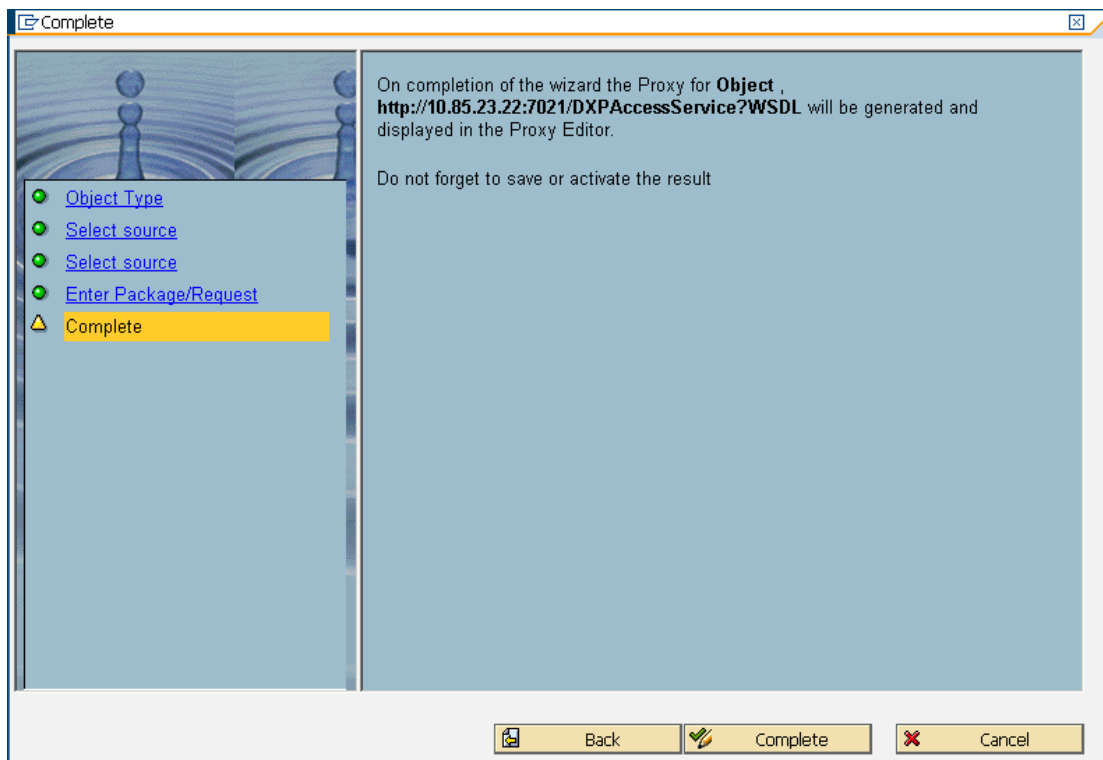
Prefix

Request/Task

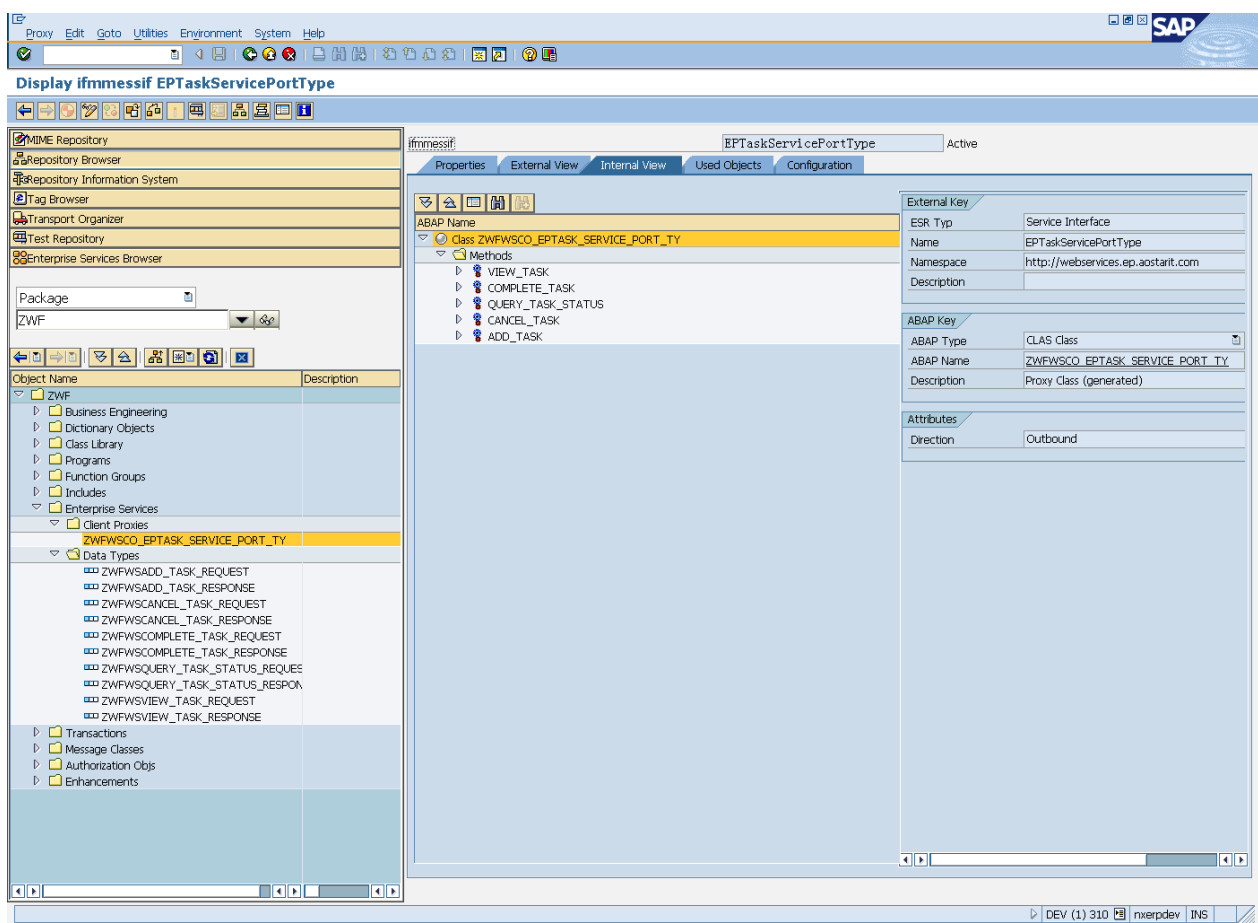
☐ Local Object

Back Continue Cancel

完成：



最后生成了前缀名为 **ZXTPT** 的 Proxy Object，它包含了很多种方法，此处只调用方法 `dxpaccess_service`。

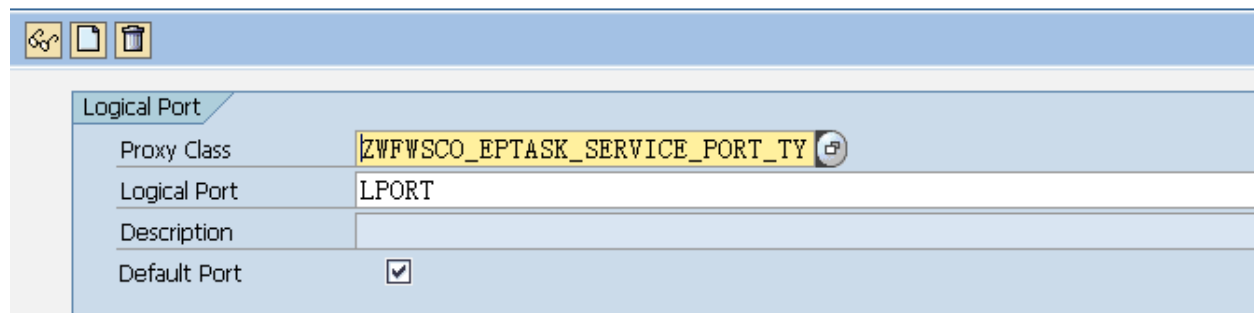


2.3 创建端口

2.3.1 创建默认端口

通过事务代码：LPCONFIG 为 Proxy Object 创建一个默认端口。具体过程如下：
输入类名称和端口名称，若是默认调用的端口，打上对号：

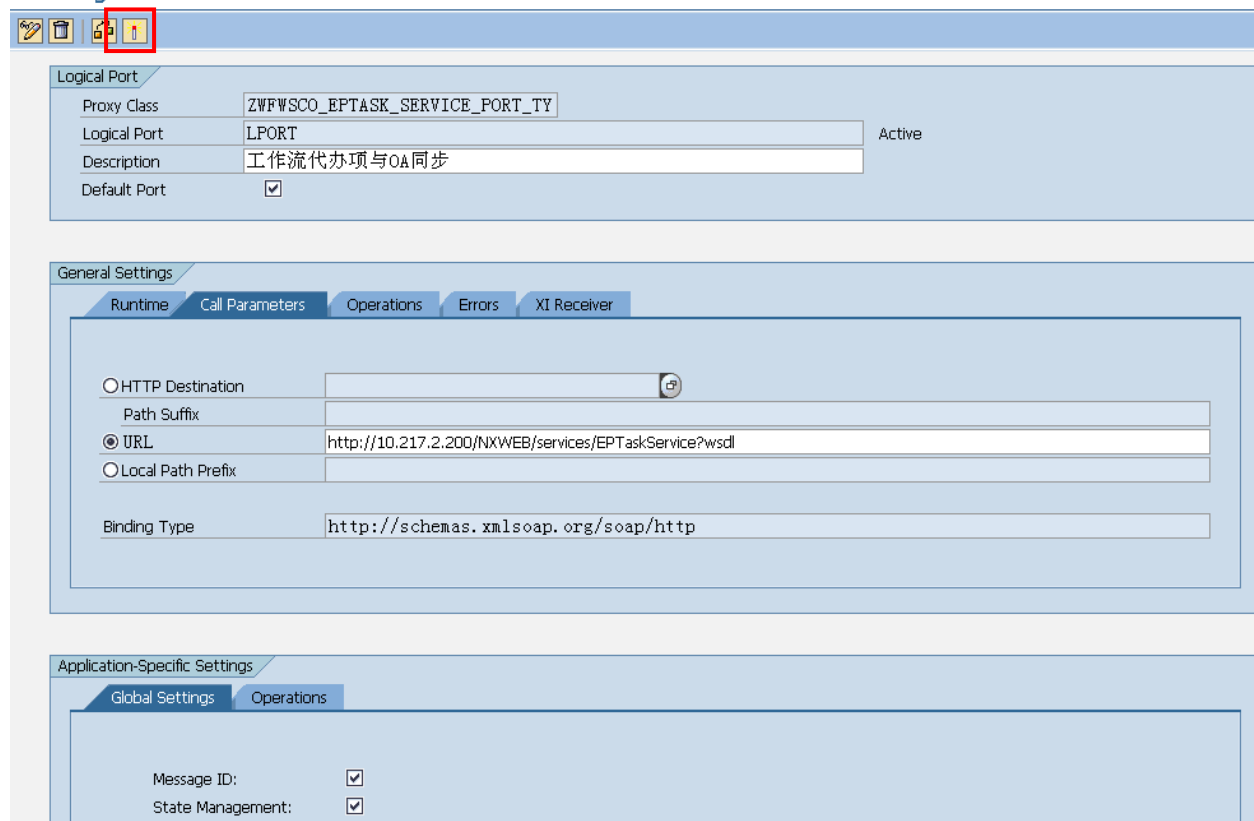
Display/Create Logical Port



Logical Port	
Proxy Class	ZWFWSO_EPTASK_SERVICE_PORT_TY
Logical Port	LPORT
Description	
Default Port	<input checked="" type="checkbox"/>

编辑端口，输入名称、URL 和应用设置等：

Edit Logical Port



Logical Port	
Proxy Class	ZWFWSO_EPTASK_SERVICE_PORT_TY
Logical Port	LPORT
Description	工作流代办项与OA同步
Default Port	<input checked="" type="checkbox"/>

Active

General Settings

Runtime | Call Parameters | Operations | Errors | XI Receiver

☐ HTTP Destination

Path Suffix

☒ URL: http://10.217.2.200/NXWEB/services/EPTaskService?wsdl

☐ Local Path Prefix

Binding Type: http://schemas.xmlsoap.org/soap/http

Application-Specific Settings

Global Settings | Operations

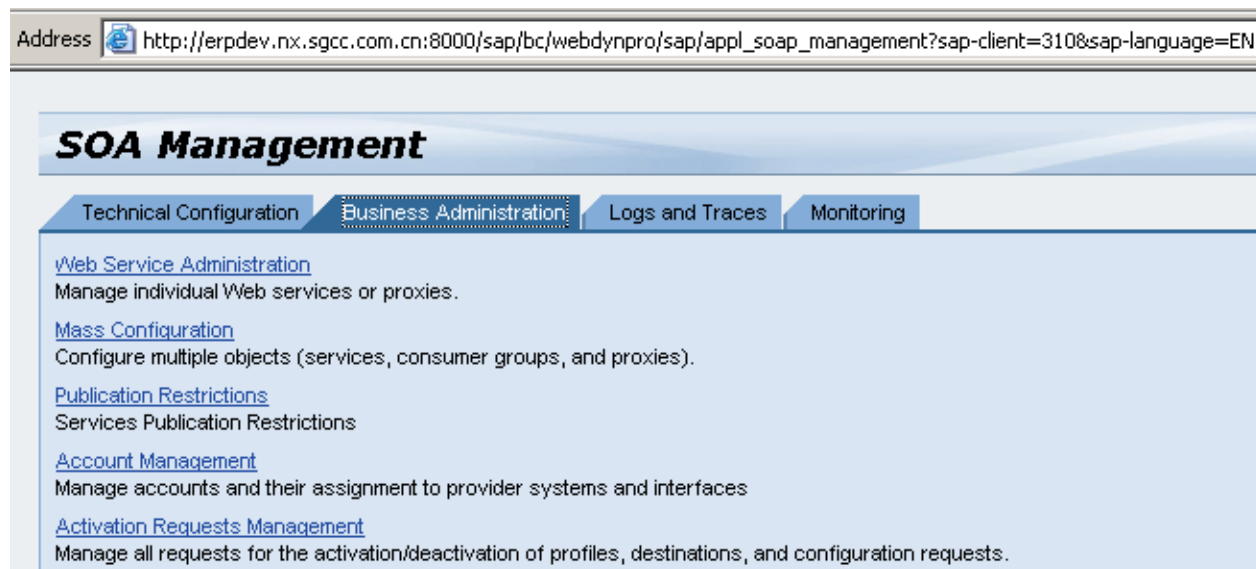
Message ID: ☒

State Management: ☒

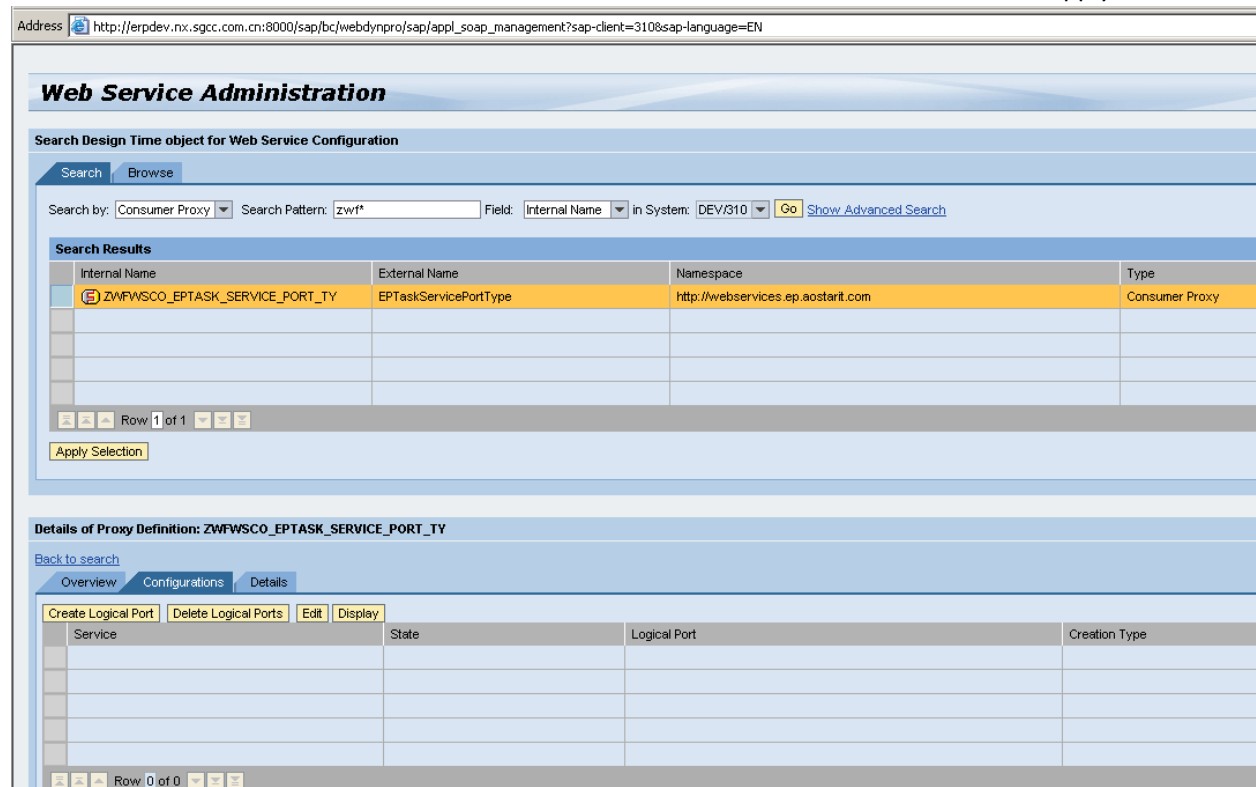
检查无误后，点击激活按钮激活此端口即可。

2.3.2 配置默认端口

通过事务代码：SOAMANAGER 对 Proxy Object 进行配置。具体过程如下：



点击 Web Service Administration 进行配置，进入后选择自己创建的代理类，然后点击 Apply Selection:



点击 Create Logical Prot 会弹出如下窗口，分别输入相关参数即可：

SOA Management

General Configuration Settings

New Service Name: * ZWFWSOA

Logical Port Name: * LPORT Logical Port is Default: ☐

Configuration Type ☒ WSDL Based Configuration ☐ Manual Configuration

WSDL Access Settings

WSDL Base ☒ Via HTTP Access ☐ Via File

WSDL Location

URL for WSDL Access: * http://10.217.2.200/NXWEB/services/EPTaskService?wsdl

WSDL Access User: * wf-admin

WSDL Access User Password: *

Show/Hide Proxy Settings

Apply Settings Cancel

最后点击 Apply Setting，然后点击 Save 按钮即可激活此配置。

SOA Management - Microsoft Internet Explorer

Address http://erpdev.nx.sgcc.com.cn:8000/sap/bc/webdynpro/sap/appl_soap_management?sap-client=310&sap-language=EN

Service	Port Type	URL	Proxy
ZWFWSCO_EPTASK_SERVICE_PORT_TY	EPTaskServicePortType	http://webServices.ep.aostart.com	Consumer Proxy

Row 1 of 1

Apply Selection

Details of Proxy Definition: ZWFWSCO_EPTASK_SERVICE_PORT_TY

Back to search

Overview Configurations Details

Service	State	Logical Port	Creation Type
ZWFWSCO	Active	LPORT	Manually Created

Row 1 of 1

Web Service Configuration of Proxy Definition: ZWFWSCO_EPTASK_SERVICE_PORT_TY

Back to Design Time Details

Edit Save Cancel

Configuration of Web Service 'ZWFWSCO': Endpoint 'EPTaskServiceHttpBinding'

Consumer Security Web Service Addressing Messaging Transport settings Message Attachments Operation specific

Configuration of Consumer Settings additional to WSDL Document Information LP-LPORT

User ID/Password

User Name: wf-admin

Password:

Properties from WSDL Document

Authentication

Authentication Method: saps:HTTPBasic

Transport Security

Signature Expected:	false
Encryption Expected:	false
Add signature:	false

完成上述两个步骤后，即可在程序中调用此代理类。

2.4 程序实现调用

2.4.1 代码实现

关键代码如下：

```
data : lo_proxy type ref to zxtptco_report_parser,
      lo_input type zxtptdxdpaccess_service,
      lo_output type zxtptdxdpaccess_service_respons,
      lo_sys_exception type ref to cx_ai_system_fault.

try.

* create an instance of proxy class

create object lo_proxy
exporting
    logical_port_name = 'LP01'.

* call the corresponding method

call method lo_proxy->dxdpaccess_service
exporting
    input = lo_input
importing
    output = lo_output.

catch cx_ai_system_fault into lo_sys_exception.

* error handling.
write : lo_sys_exception->errortext.

endtry.
```

第三章 数据交换格式

3.1 数据交换格式

在 ECC 系统和外部系统交换数据时，采用的是将 XML 格式的数据封装到字符串中的方式来实现数据的交互。财务集约化之协同抵消项目中，ECC 和 CE 7.1 系统之间采用的是将数据按照 XML 的方式封装到单个输入和单个输出字符串中，然后再进行解析。SAP 中将 XML 格式的数据解析到内表中的函数如下：

```
function zxtpt_xml2table.
* "-----
* "Local interface:
* " IMPORTING
* " REFERENCE (INPUT) TYPE STRING
* " EXPORTING
* " REFERENCE (RETCODE) TYPE I
* " TABLES
* " I_TABLE STRUCTURE ZXTPT_CDIF
* "-----
* I_TABLE 最后返回元素,元素值或者属性,属性值的列表.

type-pools: ixml.

types: begin of t_xml_line ,
       data(256) type x,
       end of t_xml_line.

data: l_ixml          type ref to if_ixml,
      l_streamfactory type ref to if_ixml_stream_factory,
      l_parser        type ref to if_ixml_parser,
      l_istream       type ref to if_ixml_istream,
      l_document      type ref to if_ixml_document,
      l_node          type ref to if_ixml_node,
      l_xmldata       type string.

data: l_elem          type ref to if_ixml_element,
      l_root_node     type ref to if_ixml_node,
      l_next_node     type ref to if_ixml_node,
      l_name          type string,
      l_iterator      type ref to if_ixml_node_iterator.

data: l_xml_table     type table of t_xml_line,
```

```

        l_xml_line      type t_xml_line,
        l_xml_table_size type i.

*   Creating the main iXML factory
    l_ixml = cl_ixml=>create( ).

*   Creating a stream factorya
    l_streamfactory = l_ixml->create_stream_factory( ).

    l_istream = l_streamfactory->create_istream_string( string = input ).
*   Creating a document
    l_document = l_ixml->create_document( ).

*   Create a Parser
    l_parser = l_ixml->create_parser( stream_factory = l_streamfactory
                                     istream         = l_istream
                                     document         = l_document ).

*   Parse the stream
    if l_parser->parse( ) ne 0.
        retcode = 0.
        return .
    endif.

*   Process the document
    if l_parser->is_dom_generating( ) eq 'X'.
        perform process_dom tables i_table using l_document .
    endif.

endfunction.

*&-----*
*&      Form  process_dom
*&-----*

form process_dom tables p_i_zxml structure zxtpt_cdif
using  document type ref to if_ixml_document .

data: node      type ref to if_ixml_node,
      iterator  type ref to if_ixml_node_iterator,
      nodemap   type ref to if_ixml_named_node_map,
      node_parent type ref to if_ixml_node,

```

```

    attr      type ref to if_ixml_node,
    name      type string,
    name1     type string,
    prefix    type string,
    value     type string,
    indent    type i,
    count     type i,
    index     type i.

```

```
node ?= document.
```

```
check not node is initial.
```

```

if node is initial.
    exit.
endif.

```

```
*   create a node iterator
```

```
iterator = node->create_iterator( ).
```

```
*   get current node
```

```
node = iterator->get_next( ).
```

```
*   loop over all nodes
```

```
while not node is initial.
```

```
    indent = node->get_height( ) * 2.
```

```
    indent = indent + 20.
```

```
case node->get_type( ).
```

```
    when if_ixml_node=>co_node_element.
```

```
*       element node
```

```
    name      = node->get_name( ).
```

```
    nodemap = node->get_attributes( ).
```

```
    if not nodemap is initial.
```

```
*       attributes
```

```
    count = nodemap->get_length( ).
```

```
    do count times.
```

```
        index = sy-index - 1.
```

```
        attr  = nodemap->get_item( index ).
```

```
        name  = attr->get_name( ).
```

```
        prefix = attr->get_namespace_prefix( ).
```

```
        value  = attr->get_value( ).
```

```
        "记录属性及属性值
```

```
        p_i_zxml-fieldname = name .
```

```
        p_i_zxml-fieldvalue = value .
```

```

        append p_i_zxml .

    enddo.
endif.
when if_ixml_node=>co_node_text or
if_ixml_node=>co_node_cdata_section.
*
    text node
    value = node->get_value( ).
    node_parent = node->get_parent( ).
    name1 = node_parent->get_name( ).
    "记录元素及元素值
    p_i_zxml-fieldname = name1 .
    p_i_zxml-fieldvalue = value .
    append p_i_zxml .

endcase.

node = iterator->get_next( ).
endwhile.
endform.
"process_dom

```