Synchronization of Services between the IBM WebSphere Services Registry & Repository and SAP’s Services Registry

Applies to:
This document describes how to use the WebSphere Services Registry & Repository and SAP’s Services Registry to build collaborative governance scenarios in environments where both SAP and IBM software platforms are used.

The involved products are the SAP NetWeaver Process Integration 7.1 (which includes the Services Registry (SR) and the Enterprise Services Repository (ES Repository) and the IBM WebSphere Service Registry and Repository 6.2.0.2.

Summary
Please enter a brief summary of your paper here. This abbreviated abstract outlines your essential points and helps the reader understand the purpose of your article, tutorial, case study, or whitepaper. The summary should be about three sentences long, or about fifty words.

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1 Preface

1.1 Preface & Scope

This document describes how to use the WebSphere Services Registry & Repository and the SAP NetWeaver SR to build collaborative governance scenarios in environments where both SAP and IBM software platforms are used.

This guide is intended for SAP and IBM technical personnel, as well as, technical and architectural-focused customers.

The documentation can be used as a working draft to figure out how an organization can enhance its existing infrastructure and how to implement future functionalities using the two Registry/Repository products.

Existing experience with/knowledge about the SOA concept, UDDI registry and basics in application servers, especially the SAP WebAS and the IBM WebSphere Application Server is beneficial.

1.2 Constraints

The texts, references, and graphics contained in this manual have been compiled with utmost care; nevertheless, it is impossible to guarantee that they are fully without error.

IBM cannot assume any responsibility for the correctness or completeness of the following documentation; the user alone is responsible for verifying the information contained herein.

IBM will only assume liability for damage arising from the use of this documentation – irrespective of the pertinent legal basis – in the case of intentional or active negligence; under no other circumstances will a warranty be made.
2 Introduction

This paper describes the synchronization of Web Services and Classification systems between the IBM WebSphere Services Registry & Repository (WSRR) and the SAP Services Registry (SR) which is based on UDDI v3. WSRR itself does not follow the UDDI standard yet it offers a synchronization module that allows for bidirectional synchronization with third party UDDI based registries. The described scenarios are:

- Services Meta-Data synchronization between WSRR and SR (bidirectional synchronization)
- Classifications system Meta-Data synchronization (unidirectional synchronization from SAP SR to IBM WSRR)

2.1 System Landscape

The involved products are the SAP NetWeaver Process Integration 7.1 (which includes the Service Registry (SR) and the Enterprise Services Repository (ESR)) and the IBM WebSphere Service Registry and Repository 6.2.0.2.

![System landscape diagram](image)

Figure 1: System landscape

Architecturally the Services Registry (SR) and the Enterprise Services Repository (ESR) from SAP are two separate components which interact whereas the IBM WebSphere Services Registry & Repository (WSRR) is ONE component. The synchronization or federation will always be done between the IBM WSRR and the SAP SR via SOAP (HTTP/HTTPS) and it is being governed by the synchronization module which is an integral part of the WebSphere product.

Service federation works in both directions, so that Service artefacts (WSDLs, XSDs and WS-Policies) can be synchronised bidirectionally between WSRR and SR.

Classification systems in SAP can now be automatically imported to WSRR. OWL documents are automatically created for them with a matching mapping file to map between the UDDI classifications and the OWL representations. That means when classifications are attached to entities in either registry the classifications are then mapped to the other registry.

Note that there is no automation to copy OWL classification systems into SAP - although this can be setup manually by creating a matching classification system in SAP and a mapping file if desired.
3 Basic Setup

Obviously it is necessary that the involved machines know each others IP address. It is not necessary though that the hostnames are being resolved (working with the IP addresses would be sufficient) yet it is more elegant. So enabling the machines to resolve their hostnames is the desired way of operation.

If any internet-located service is synchronized, both systems have to reach the publish point of the services so consequently both must have access to the internet.

3.1 SAP NetWeaver Process Integration

The SAP system used for this document is a standard installation of SAP Process Integration 7.1 (64 bit). It is running on a Windows Server 2003 Enterprise x64 Edition. This installation involves the SAP WebAS (Java Application Server) as well as a basic database.

Further information on NetWeaver Process Integration can be found on the SAP Developer Network (SDN):
https://www.sdn.sap.com/irj/sdn

3.2 IBM WebSphere Service Registry and Repository

The IBM system is the WebSphere Service Registry and Repository 6.2.0.2 (please ensure to use at least this this version or higher).

Further information can be found on the following IBM Product Information page:
http://www.ibm.com/support/publications/us/library/ (click on WebSphere Service Registry and Repository link)
3.3 WSRR Proxy-Setup

In order to make WSRR forward the synchronization requests to an external UDDI server the proxy host as well as the proxy port for the HTTP and HTTPS transport protocol have to be defined on the IBM WebSphere Application Server console.

Follow this path: Application server -> <your Server> -> Process Definition -> Java Virtual Machine -> Custom Properties and add the below entries.

Make sure that the entry `http.nonProxyHosts` has the value set to the IP address or the hostname (hostnames need to be resolved then!) of the machine with the SAP system.

Figure 2: IBM WebSphere Proxy Setup

Note: several entries in the value field are separated by the `pipe` symbol (see marked row in above screenshot)
4 Synchronisation configuration

The transport protocol during synchronization can either be HTTP or HTTPS. HTTPS requires SSL encryption. In this chapter the configuration steps for both types of the synchronization process will be described.

**About authentication:** the SAP PI versions 7.10.x and 7.11.x both will **NOT** work when WSRR has been configured to use token based authentication **ONLY**. So configure either basic authentication or a combination of basic authentication and token based authentication. On the SAP side the security configuration will be handled by the SAP WebAS (Web Application Server) and doesn’t need to be configured.

The basics of the SAP WebAS configuration can be looked up here:

[http://help.sap.com/saphelp_nw04/helpdata/en/b0/4d2b418a3edb2be10000000a1550b0/frameset.htm](http://help.sap.com/saphelp_nw04/helpdata/en/b0/4d2b418a3edb2be10000000a1550b0/frameset.htm)

4.1 Configuring HTTP Synchronization

4.1.1 SAP NetWeaver PI in use with HTTP

**Note:** The SAP system does not need to be configured for the transport protocol! The **connection URLs** for HTTP which are the inquiry, publish, security and subscription interfaces of the SAP UDDI server will be utilized automatically when the WSRR configuration addresses them (see WSRR synchronization configuration file in chapter 4.1.2.2).

4.1.2 IBM WebSphere Service Registry and Repository configuration for HTTP

The next step is to configure the IBM WSRR system. In order to do this an xml based UDDI synchronization configuration file needs to be edited.

**Please note that two different ways** of editing the configuration file will be explained below:

- Configuration via the UDDI config tool
- Configuration via the Admin console
4.1.2.1 Configuration Using the UDDI Config Tool

Start the UDDI Configuration Tool by starting the ConfigureUDDI.bat file:
IBM WebSphere Service Registry and Repository -> directory -> admin -> ConfigureUDDI.bat.

Enter the hostname of the machine where the IBM WebSphere IBM WebSphere Service Registry and Repository is installed, use the SOAP port 8880 and press continue (the port number is based on the application server profile in use).

In the next step, the login credentials are required. Enter: User / PW and press OK.

In the next window, make sure that the UDDI synchronization is enabled, use a scheduled interval time for synchronization, e.g. 1 minute (but not smaller than 1!) and choose as the publishing format the value Technical Note 2.0.2. The interval time of 1 minute is a good value when testing the synchronization because of its fast effect. In a production system this value definitely needs to be higher.
Synchronization of Services between the IBM WebSphere Services Registry & Repository and SAP’s Services Registry

Next is the ‘Overview URL’. Select ‘Use WSRR’ and choose HTTP as the protocol and enter hostname and the port of IBM WebSphere Service Registry and Repository System.
Now the UDDI node has to be added. Enter **hostname** and **port** of the system with the SAP System. For HTTP, use port 80.

![Figure 8: Add UDDI Node for Synchronization](image)

On the next screen select the **General Properties** tab to configure the inquiry and publish **connection URLs**.


Select both ‘Write XML declaration’ and ‘WSRR can write to UDDI’.

![Figure 9: UDDI Node General Properties](image)
Now choose the Security tab. Select ‘Auth Token’ and supply the API security URL of the SAP system

In the ‘Authentication’ section mark both ‘Inquiry API secured’ and ‘Publish API secured’.

The next step is to add the UDDI user credentials, which are send to the SAP UDDI Server for logon. Enter the user/PW information and and then click ‘Add’.
If there are several user accounts, one has to be selected as the primary user for publishing and logon to the SAP UDDI server. Select an existing SAP user.

![Image of UDDI Node publishing User](image1.jpg)

Figure 12: UDDI Node publishing User

After the complete entry of the required data, it’s necessary to test the connection between the IBM WebSphere Service Registry and Repository and SAP’s Services Registry, the UDDI node. Check all the entries and then click the ‘Test UDDI Connection’ button on left bottom of the UDDI Node Properties window.

![Image of Test UDDI Connection](image2.jpg)

Figure 13: Connection Test

When the connection test is successful press ‘Apply this Configuration to WSRR’ and check the response.

![Image of Applying Configuration to IBM WebSphere Service Registry and Repository](image3.jpg)

Figure 14: Applying Configuration to IBM WebSphere Service Registry and Repository
A successful configuration of the WSRR UDDI synchronization module is indicated by the WSRR Update Confirmation.

![WSRR Update Confirmation](image_url)

**Figure 15: Configuration update**

### 4.1.2.2 Configure the WSRR Synchronization Module via the Admin Console

Start the IBM WebSphere Service Registry and Repository Console by navigating to http://<<localhost>>:<<port>>/ServiceRegistry.

On the IBM WebSphere Service Registry and Repository Admin Console – note that there are two different administrative consoles on the system, one for IBM WebSphere Service Registry and Repository and one for the IBM WebSphere Application Server – navigate to UDDI synchronization configuration.

The configuration file can be accessed by changing to the configuration perspective (1.) and going down the following path: Active Configuration Profile -> Plug-ins -> UDDI and here choose UDDI Synchronization Configuration.

![IBM WebSphere Service Registry and Repository Configuration via WebInterface](image_url)

**Figure 16: IBM WebSphere Service Registry and Repository Configuration via WebInterface**
Synchronization of Services between the IBM WebSphere Services Registry & Repository and SAP’s Services Registry

Now a text editor is opened and the xml configuration file can be edited manually. For better visualization, the configuration file in this document has to be viewed using a web browser, which highlights the xml syntax and distinguishes the configuration data from the meta data.

```xml
<?xml version="1.0" encoding="UTF-8" ?>
<WSRR_UDDI_CONFIGURATION>
  <SERVICELOCATION>weburl</SERVICELOCATION>
  <UDDIREGISTRIES>
    <UDDIREGISTRY Alias="UDDI_UO">
      <INQUIRY_URL>http://afrika1:80/uddi/api/inquiry</INQUIRY_URL>
      <INQUIRY_SERVER_AUTH>BasicAuth</INQUIRY_SERVER_AUTH>
      <INQUIRY_UDDI_AUTH_TOKEN>Required</INQUIRY_UDDI_AUTH_TOKEN>
      <PUBLISH_URL>http://afrika1:80/uddi/api/publish</PUBLISH_URL>
      <PUBLISH_SERVER_AUTH>BasicAuth</PUBLISH_SERVER_AUTH>
      <PUBLISH_UDDI_AUTH_TOKEN>Required</PUBLISH_UDDI_AUTH_TOKEN>
      <SECURITY_URL>http://afrika1:80/uddi/api/security</SECURITY_URL>
      <SECURITY_SERVER_AUTH>BasicAuth</SECURITY_SERVER_AUTH>
      <APSR_END_POINT>http://afrika1:80/ServicesRegistrySiService/ServicesRegistrySiPort</APSR_END_POINT>
      <WRITE_XML_DECLARATION>true</WRITE_XML_DECLARATION>
      <READONLY>no</READONLY>
      <DEFAULT_USER>J2EE_Admin</DEFAULT_USER>
    </UDDIREGISTRY>
    <USERS>
      <USER>
        <USER_ID>J2EE_Admin</USER_ID>
        <PASSWORD>**********</PASSWORD>
      </USER>
    </USERS>
    <UseOwnerforURLResolution>false</UseOwnerforURLResolution>
  </UDDIREGISTRIES>
</WSRR_UDDI_CONFIGURATION>
```

Figure 17: UDDI Configuration file

In this configuration file there are mandatory and optional entries which are well described in the official IBM documentation at:


4.2 SSL based Synchronization

To make use of the HTTPS transport protocol you need to configure both systems for the use of SSL which is being detailed in the following sections.

4.2.1 Setup of the SAP Cryptographic Library in the SAP system

To install the SAP Cryptographic Library for SSL follow the guide referenced here:


This guide also includes a simple test to check whether the SSL configuration works.

4.2.2 Handle the security certificates of the involved Systems

After setting up the cryptographic library, the next step is to exchange certificates between the systems. This is relevant for the synchronization only when encryption is being used.
4.2.3 Import SSL Certificate at SAP NetWeaver

For the import of security certificates into SAP NetWeaver open the administration console at http://localhost/nwa. Follow the path on belows screenshot: Configuration Management -> Security -> Certificates and Keys.

![SAP NetWeaver Certificate import](image1.png)

Now change into the editable perspective and adjust the key stores trustedCAs and WebServiceSecurity.

![SAP NetWeaver Certificate Keystore revision](image2.png)
Import a new entry into each of the key stores trustedCAs and WebServiceSecurity. As the entry type select x.509 certificate and enter the path to the certificate of the IBM WebSphere Service Registry and Repository which can be loaded from the WSRR console (see below screenshot).

Figure 20: Apply Certificate for SAP NetWeaver

4.2.3.1 How to get the security certificate from the WSRR machine

Open the IBM WebSphere Application Server Console via a Webbrowser. The Security Alert window opens and then choose 'View Certificate'. Go to the 'Details' tab on the now opening Certificate window.

Click ‘Copy To File...’ and mark the Base-64 encoded x.509 certificate format. After entering a file name specify a location to copy the security certificate to. This file together with its path is what you need to enter into the SAP 'Entry Import' mask.

Figure 21: How to get the security certificate
Synchronization of Services between the IBM WebSphere Services Registry & Repository and SAP’s Services Registry

Figure 22: Copy to file

Figure 23: Select file format
4.3.2.3 Import an SSL Certificate to the IBM WebSphere Registry & Repository

For entering the SAP NetWeaver SSL certificate at IBM WebSphere Service Registry and Repository open the IBM WebSphere Application Server Administration Console and go to Security -> SSL certificate and key management -> Key stores and certificates -> NodeDefaultTrustStore -> Signer certificates and choose Retrieve from port.

This will open the ‘Configuration’ window for the system from which the certificate will be requested - in this case the SAP system. Enter the requested data (Hostname, https Portnumber, Alias) and pick ‘NodeDefaultSSLSettings’ as the SSL configuration for outbound connection.

Click ‘Retrieve signer information’ which will make the IBM WebSphere Application Server Interface automatically load the required certificate from the SAP system. Press ‘apply’ and then go to the configuration of the synchronization module.
4.3 Configuring HTTPS Synchronization

4.3.1 SAP NetWeaver PI in use with HTTPS

It is vital that all previous steps on setting up the SSL encryption were successful which will enable WSRR to make use of the SAP HTTPS interfaces in its synchronization configuration file.

Note: The SAP system does not need to be configured for the transport protocol! The connection URLs (see screenshot below) for HTTPS which are the inquiry, publish, security and subscription interfaces of the SAP UDDI server will be utilized automatically when the WSRR configuration addresses them (see WSRR synchronization configuration file next chapter).

4.3.2 IBM WebSphere Service Registry and Repository configuration for HTTPS

The ways how to edit the WSRR config file have been described before so it is just shown that we use the https protocol and the respective port 443 (see screenshot below).

```xml
<?xml version="1.0" encoding="UTF-8"?>
<WSRR_UDDI_CONFIGURATION>
  <WSDL_MAPPING>technicalnote202</WSDL_MAPPING>
  <SERVICELOCATION>webru</SERVICELOCATION>
  <UDDIREGISTRIES>
    <UDDIREGISTRY Alias="UDDI.UDO">
      <INQUIRY_URL>https://afkink1:443/uddi/api/inquiry</INQUIRY_URL>
      <INQUIRY_SERVER_AUTH>BasicAuth</INQUIRY_SERVER_AUTH>
      <INQUIRY_UDDI_AUTH_TOKEN>Required</INQUIRY_UDDI_AUTH_TOKEN>
      <PUBLISH_URL>https://afkink1:443/uddi/api/publish</PUBLISH_URL>
      <PUBLISH_SERVER_AUTH>BasicAuth</PUBLISH_SERVER_AUTH>
      <PUBLISH_UDDI_AUTH_TOKEN>Required</PUBLISH_UDDI_AUTH_TOKEN>
      <SECURITY_SERVER_AUTH>BasicAuth</SECURITY_SERVER_AUTH>
      <SAPSR_ENDPOINT>http://afkink1:80/servicesRegistryService/ServicesRegistryServicePort</SAPSR_ENDPOINT>
      <WRITE_XML_DECLARATION>true</WRITE_XML_DECLARATION>
      <READONLY>no</READONLY>
      <DEFAULT_USER>J2EE_Admin</DEFAULT_USER>
      <USERS>
        <USER>
          <USER_ID>J2EE_Admin</USER_ID>
          <PASSWORD>password</PASSWORD>
        </USER>
        <USERS>
      </USERS>
    </UDDIREGISTRY>
  </UDDIREGISTRIES>
  <WSRR_MAPPING_CONTROL />
</WSRR_UDDI_CONFIGURATION>
```

Figure 27: IBM WebSphere Service Registry and Repository UDDI Configuration

4.3.3 Configuration of WSRR for Services requiring additional Authentication

It may be the case that a publish point or a registry with which WSRR needs to be synchronized is secured by additional authentication. In this case the WSRR configuration file needs to be extended as shown below.

The following synchronization configuration file shows the relevant and additive tags for configuring the additional user credentials for authentication both for logon to the UDDI server as well as providing the authentication for the especially secured publish points to which the UDDI server actually links.
The ‘OwnerforURLResolution’ pattern shown below is necessary to assign the right credentials to both the UDDI server and the machine where the service really is. The first user credentials are not used here (UseOwnerforURLResolution=false) yet are produced in the overall setup process (primary UDDI user) and remains in the configuration file. For further information on using the additive authentication settings see the IBM documentation at the official help center which can be found at:


```xml
<WSRR_UDDI_CONFIGURATION>
  <WSDLMAPPING>/technicalnote202</WSDLMAPPING>
  <SERVICELOCATION>weburl</SERVICELOCATION>
  <UDDIREGISTRIES>
    <UDDIREGISTRY Alias="UDDI_Id">
      <INQUIRY_SERVER_AUTH>BasicAuth</INQUIRY_SERVER_AUTH>
      <INQUIRY_UDDI_AUTH_TOKEN>Required</INQUIRY_UDDI_AUTH_TOKEN>
      <PUBLISH_URL>https://afrika1:443/uddi/api/publish</PUBLISH_URL>
      <PUBLISH_SERVER_AUTH>BasicAuth</PUBLISH_SERVER_AUTH>
      <PUBLISH_UDDI_AUTH_TOKEN>Required</PUBLISH_UDDI_AUTH_TOKEN>
      <SECURITY_SERVER_AUTH>BasicAuth</SECURITY_SERVER_AUTH>
      <SAPSR_ENDPOINT>http://afrika1:80/ServicesRegistrySiService/ServicesRegistrySiPort</SAPSR_ENDPOINT>
      <WRITE_XML_DECLARATION>true</WRITE_XML_DECLARATION>
      <READONLY>10</READONLY>
      <DEFAULT_USER>J2EE_Admin</DEFAULT_USER>
      <USERS>
        <USER>
          <USER_ID>J2EE_Admin</USER_ID>
          <PASSWORD>********</PASSWORD>
        </USER>
        <USERS>
          <UseOwnerforURLResolution>false</UseOwnerforURLResolution>
        </USERS>
        <OverviewURLResolution>
          <USER>
            <USER_ID>J2EE_Admin</USER_ID>
            <PASSWORD>********</PASSWORD>
            <URL_PATTERN>http://afrika1.de.ibm.com</URL_PATTERN>
          </USER>
          <USERS>
            <USER>
              <USER_ID>********</USER_ID>
              <PASSWORD>********</PASSWORD>
              <URL_PATTERN>http://smr.ewsworkplace.sap.com</URL_PATTERN>
            </USER>
          </USERS>
        </OverviewURLResolution>
      </USERS>
    </UDDIREGISTRY>
  </UDDIREGISTRIES>
</WSRR_UDDI_CONFIGURATION>
```

Figure 28: Configuration of the ‘OwnerforURLResolution’ pattern
5 Synchronization

After the successful configuration of both systems the actual synchronization is the next step. This chapter covers the synchronization between the systems and distinguishes the two fundamental approaches of bidirectional synchronization:

- IBM WebSphere Service Registry and Repository synchronizes data **from** SAP’s Services Registry
- IBM WebSphere Service Registry and Repository synchronizes data **to** SAP’s Services Registry

**Note:** In both cases the IBM system is the acting and the SAP system the reacting one.

5.1 Publishing services into SAP’s Services Registry and synchronizing them into the IBM WebSphere Services Registry & Repository

Obviously data has to be in the SAP SR for WSRR to be able to synchronize. If the SAP system is still empty then services need to get published to it which is shown in the following section.

To publish services to the SAP system navigate to `http://<host>/sr` and choose the tab ‘Publish’ on the Service Registry page and add the URL of an existing and reachable Web Service, e.g. a publicly available service of Amazon.

The publish process of SAP Web Services themselves is of course exactly the same process yet it has to be noted that many SAP service definition files do not have a `.wsdl` extension such that they appear differently in WSRR (see Figure 5.1-2). This itself is not a problem, but when accessing WSRR from WID they will not be detected properly as a WSDL files but seen as plain text documents in WID.

![Publishing Services in SAP's Services Registry](image)

Figure 29: Publishing Services in SAP's Services Registry

To check whether the synchronization has been successful open the WSRR Administrative console and make sure you choose the Administrative perspective. Here go to Service Documents -> WSDL Documents. If the synchronization was successful you will see the the services that are in SAP SR now also in WSRR.

![Existing Services in IBM WebSphere Service Registry and Repository](image)

Figure 30: Existing Services in IBM WebSphere Service Registry and Repository
5.2 Publishing services into the IBM WebSphere Services Registry & Repository and synchronizing them into SAP’s Services Registry

To publish a WSDL into WSRR open the WSRR Administrative console and select the Administrative perspective. Here go to Service Documents -> WSDL Documents. Upload the WSDL by choosing ‘Load Documents’, select the located file and enter a description as well as a version of document optionally.

![Figure 31: Upload a service into the IBM WebSphere Service Registry and Repository](image)

Click OK and then finish uploading WSDL into IBM WebSphere Registry and Repository. Check in the SAP system by opening the UDDI Service Registry at `http://localhost/sr` and check the existing services. When the service definition file that has been uploaded to the WSRR is available synchronization was successful.

![Figure 32: Existing services in SAP’s Services Registry](image)

5.3 Synchronization behaviour when deleting services

In the following section we discuss the consequences of deleting service definitions. It is a big difference if we delete services in the registries were they were originally published to or if we delete services in the registries where they were synchronized to.

5.3.1 Deleting a service in SAP’s Services Registry

To delete one of the services in SAP’s Services Registry navigate to `http://<hostname>/wsnavigator` and follow the following screenshots to remove a service.
Click in the SAP WebSphere WebService Navigator the ‘**Service ServicesRegistrySIPort**’ as shown below which will lead to the next page.

![Figure 33: Removing SAP NetWeaver Service Definition 1](image)

Now click the ‘**findServiceDefinitions**’ method shown below.

![Figure 34: Removing SAP NetWeaver Service Definition 2](image)

This method provides the functionality to find existent and published service definitions in SAP NetWeaver Service Registries. The search mask is shown in the next screenshot. It is possible to search with a wildcard (*), for complete names, for place holders and also for other service attributes.

![Figure 35: Removing SAP NetWeaver Service Definition 3](image)
In the now displayed xml file mark and copy the UDDI key from the service you want to delete. At the top of the WS Navigator page select 'Select Operation' and look for the method ‘hideServiceDefinition’ to start it by clicking it.

Then enter the UDDIkey to delete the service from SAP’s Services Registry and press the ‘Execute’. Whether the deletion was successful can be verified by checking whether the deleted service has disappeared from the list of published services (see start of chapter 5 on how to do that).

5.3.2 Deleting a service in the IBM WebSphere Service Registry and Repository

Open the IBM WebSphere Service Registry and Repository Administration console and select the Administrators perspective. Open Service Documents -> WSDL Documents and select a synchronized file that you want to delete.

The above message indicates that the deletion process was successful.

5.3.3 Conclusion

If a deleted service in WSRR was a service that has originally been published to WSRR and then has been synchronized to SAP SR will disappear from the SAP SR after a synchronization run of WSRR.

If a deleted service in WSRR was a service that has been synchronized to WSRR from SAP SR the service will still be available in SAP SR after a synchronization run of WSRR.
The same is true for the other direction.

If a deleted service in SAP SR was a service that has originally been published to SAP SR and then has been synchronized to WSRR it will disappear from WSRR after a synchronization run.

If a deleted service in SAP SR was a service that has been synchronized to WSRR from SAP SR the service will disappear in WSRR after a synchronization run.

5.4 Synchronising classifications meta-data between the two registries

SAP classifications meta-data can automatically be imported to the IBM WebSphere Service Registry and Repository. To do so the endpoint for the SAP classification system of SAP’s Services Registry - ‘ServicesRegistrySiPort’ - has to be properly configured in the WSRR configuration file. As an example in one of the above WSRR configuration file samples look for for the tag <SAPSR_Endpoint>. Enter an equivalent URL which matches your environment into your WSRR systems’ configuration file.

This automatic process does not work in the other direction though it can be set up manually by creating a matching classification system and a mapping file.

5.4.1 Add a classification to SAP’s Services Registry

Building a custom classification in SAP’s Services Registry can be done by starting the Service Registry at http://localhost/sr. Choose the tab ‘Manage’ and push ‘New’.

Figure 39: Add a new classification to SAP’s Services Registry
Now a menu is shown which allows the configuration of the new classification. Enter a name, a namespace as well as a short description so that the new classification is well identifiable in the IBM WebSphere System.

![Figure 40: Define Classification at SAP's Services Registry](image)

After having defined a new classification you can add values (e.g. ‘Automotive’, ‘Healthcare’, ‘Banking’ etc.) to it by pressing ‘Add Value’ in the screen above. Add the values by entering the information for each new value as requested (shown below).

![Figure 41: Add Value to a new classification in SAP’s Services Registry](image)

Once the new classification was saved it will be in the IBM WebSphere Registry and Repository after the next synchronization run.

### 5.4.2 Check availability of synchronized SAP classification in the IBM WebSphere Service Registry

Check the IBM WebSphere Service Registry, to see whether the classification system has been synchronized. Navigate to the Service Registry Administration console at `http://<<localhost>>:<<port>>/ServiceRegistry` and follow the path below to open the required menu.
Open the ‘Configuration’ perspective (1) and the ‘Active Configuration Profile’ (2) menu in that order. Use the link to ‘Classification systems’ (3) and find listed all existent classifications.

Figure 42: Classification systems overview in the IBM WebSphere Service Registry and Repository

Click onto the name of the new classification system (here: ‘TestingClassification’) and the following properties window appears.

Figure 43: View synchronized classification in the IBM WebSphere Service Registry and Repository
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