



IBM Software Group

SAP integration workshop

IBM WebSphere Service Registry and Repository – Part 2



@business on demand.

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This IBM WebSphere Service Registry and Repository presentation is part of the SAP Integration Workshop. This presentation will give you a introduction to the WebSphere Service Registry and Repository. Also it will highlight the SAP ESR and the possible interoperation of both repositories.

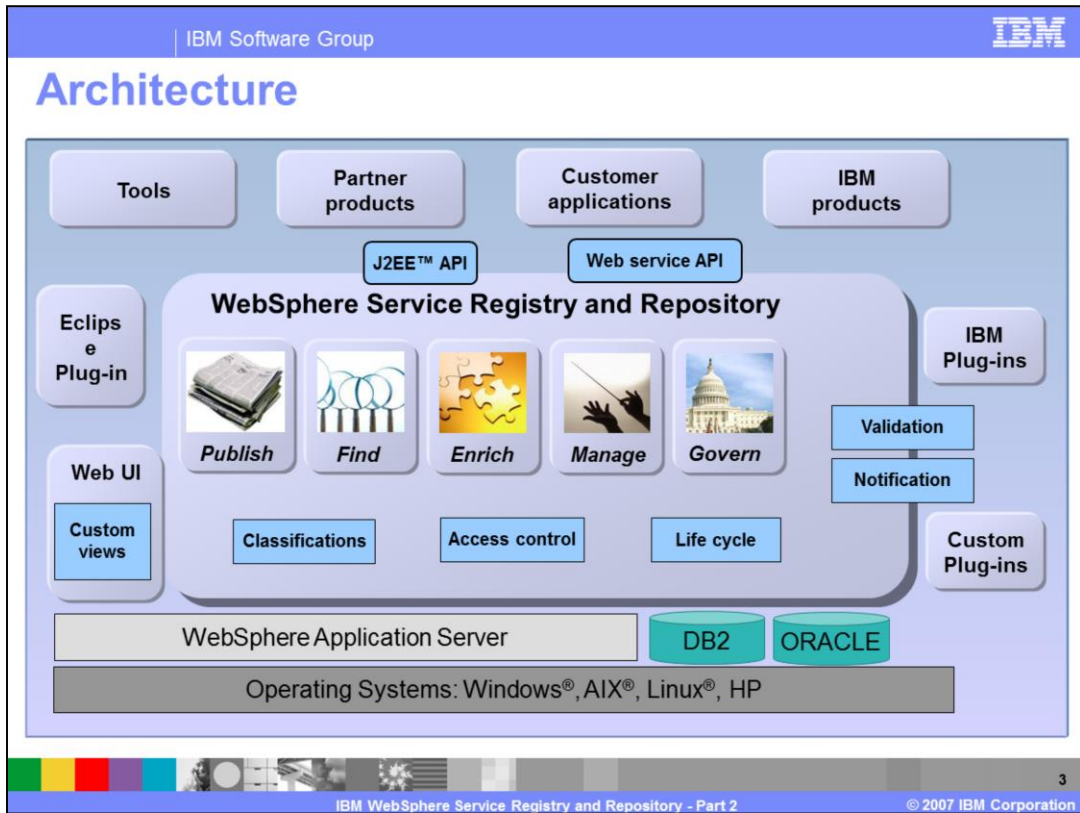
Agenda

- Architecture enabling SOA needs
 - ▶ Service life cycle
 - ▶ Federation with SAP

This presentation will take a deeper look in two SOA requirements.

The service life cycle needs to be governed in a SOA environment.

Also the federation of different service repositories is a huge topic because in a big company architecture there will be likely more than one repository.



This slide shows the overall architecture of the WebSphere Service Registry and Repository.

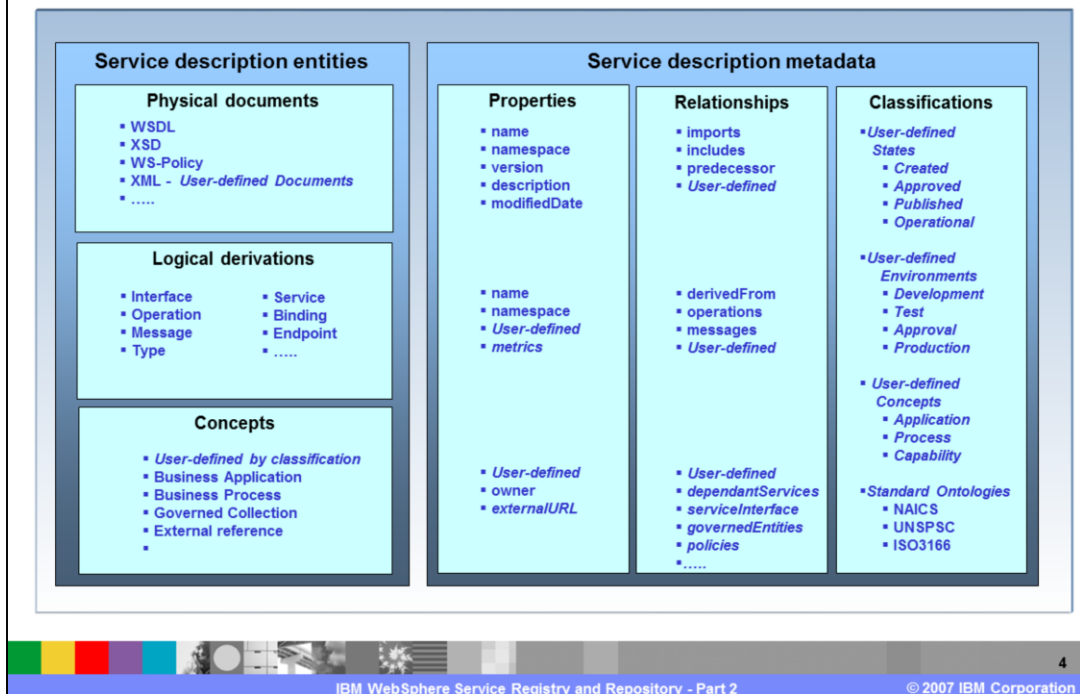
The WebSphere Service Registry and Repository is a J2EE application represented by stateless session beans that installs on top of a WebSphere Application Server. Persistence is provided by a metadata management technology called XMeta which interacts with a relational database configured through the application server.

Both Java and SOAP APIs are provided to interact with the WebSphere Service Registry and Repository. When the SOAP API is used, content is communicated using XML data structures; when the Java API is used, content is communicated using SDO data graphs.

A servlet-based Web user interface is the main way for users representing different roles to interact with the repository, supporting lookup and publish scenarios, metadata management and analysis scenarios, and functions that support SOA governance.

An Eclipse plug-in is also provided to support lookup, retrieval and publishing of service metadata from the development tools.

Content model



There are three views of WebSphere Service Registry and Repository content. These are designed to meet the needs of different user constituencies. There are:

- the view of the physical documents that reside in the WebSphere Service Registry and Repository,
- the logical view of the services in the WebSphere Service Registry and Repository, and
- a conceptual view of services to meet the business user needs.

The physical view is comprised of the physical documents that reside in the Service Registry and Repository. Key documents are WSDL, XSD, Service Component Descriptors, and WS-Policy. These are the 'special' types of document that are decomposed to form the logical model, but you can put other kinds of XML documents into the WebSphere Service Registry and Repository.

Those 'special' types of document are decomposed as they are inserted into the WebSphere Service Registry and Repository. These shredded pieces collectively form the logical model of the service registry and repository. The logical derivations, such as operations, messages, interfaces, and schema types, are first class entities in the WebSphere Service Registry and Repository.

There is one other kind of entity in the SRR, and that is what is called a 'concept' here. This is a generic object that can be used to represent pretty much anything. Concepts are used to represent a reference to content in some other metadata repository such as a portlet catalog or asset repository. For example, it is used to group physical artifacts together for ease of retrieval. It can also represent an application, if a SCDL document is not available to define one.

But there are a lot more Service Description Metadata for these documents.

This is the repository aspect of the WebSphere Service Registry and Repository with special properties, relationships and classifications for the documents.

IBM WebSphere Service Registry and Repository to SAP ESR interoperability methodologies

- Two different methodologies to achieve WebSphere Service Registry and Repository to SAP interoperability are possible
 - ▶ Synchronization of entities
 - ▶ Integration of ESR content to WebSphere Service Registry and Repository

Next, this section focuses on the interoperability of WebSphere Service Registry and Repository and ESR.

There are two methodologies; one is to connect the systems and create a federated environment. The other solution would be to extract the content out of the ESR and store it directly in the WebSphere Service Registry and Repository. Then this extracted information needs to be kept current.

SAP's approach: Enterprise Services Repository

- Registry:
 - ▶ UDDI v3 implementation
 - ▶ References WSDL files
- Proprietary classification service:
 - ▶ Has predefined classification systems
 - ▶ Allows creation of new classification systems
- Repository:
 - ▶ Proprietary
 - ▶ Based on XI Integration Repository
 - ▶ Access with Enterprise Services Builder
 - ▶ Stores service artifacts
 - ▶ Also contains business objects, process definitions, service models

Enterprise Services are defined centrally within the ESR

The Enterprise Services Repository (ESR) is the design-time repository of service objects for Enterprise Services Architecture

These objects include:

- Business Objects
- Service Interfaces (with associated Operations, Message Types, and Data Types)
- Process (ARIS) Models
- Business Scenario and Business Process Objects
- Mapping Objects

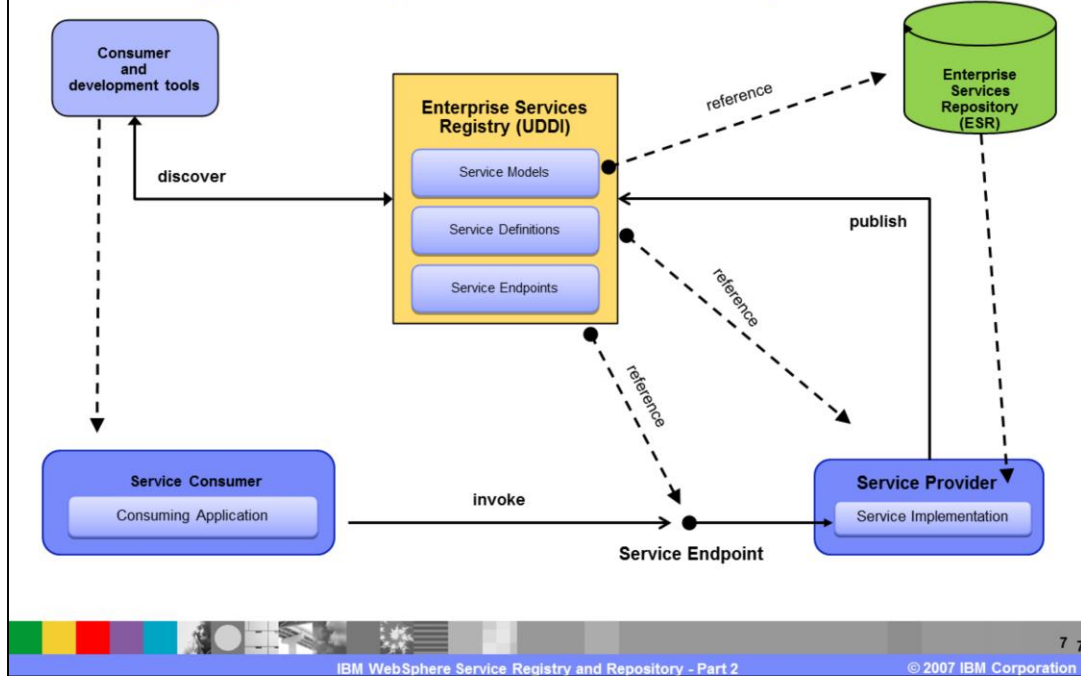


To explain the SAP view of an ESR, the SAP product registry component is a UDDI v3 implementation.

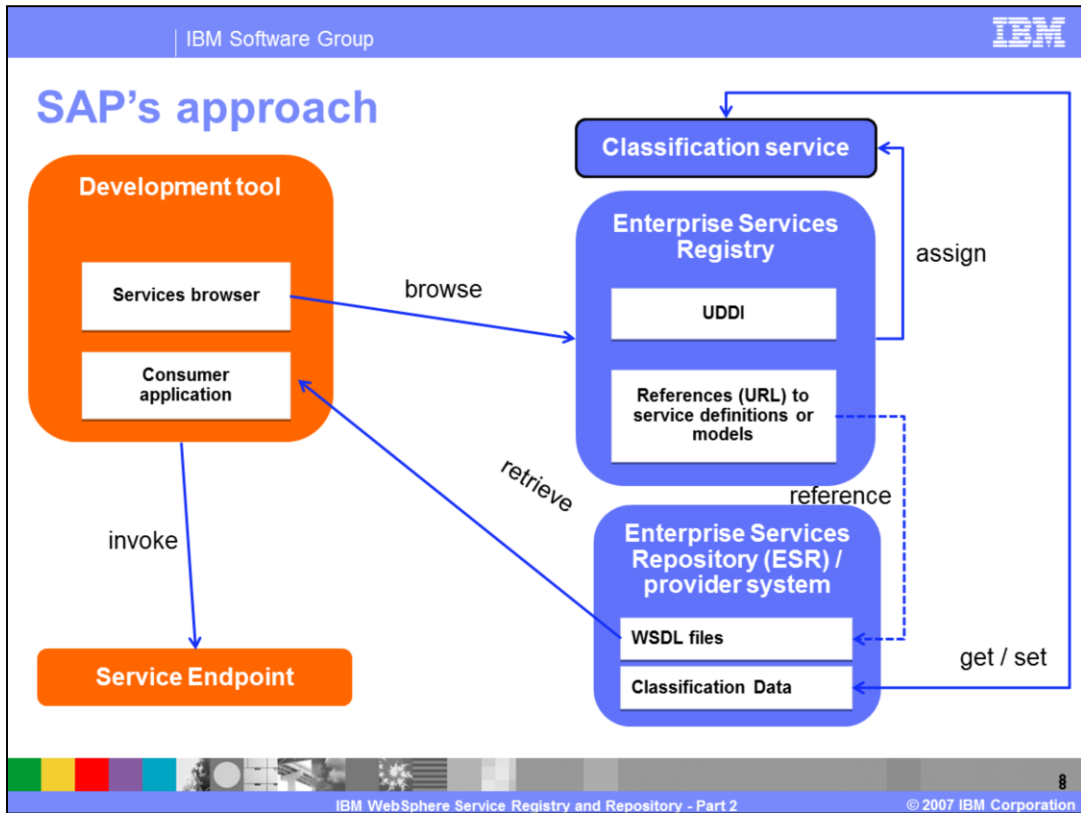
SAP created a proprietary classification service which has predefined classification systems and allows creation of new classification systems.

The repository component is also proprietary and based on the XI integration repository. The access is possible with the enterprise service builder. Service artifacts get stored in the repository with business objects, process definitions and service models.

SAP's approach (ESR architecture)



The architectural view illustrates that the registry component holds references to the ESR or to the services provider itself depending on how the service is exposed. A consumer can use a tool to discover the services and the consumer will later invoke the service.



To get a little bit more specific you see here the components used in development. The service browser is used to find the right service in the UDDI. The consumer stores the selected WSDL file locally and use this file to invoke the service in runtime.

IBM's approach

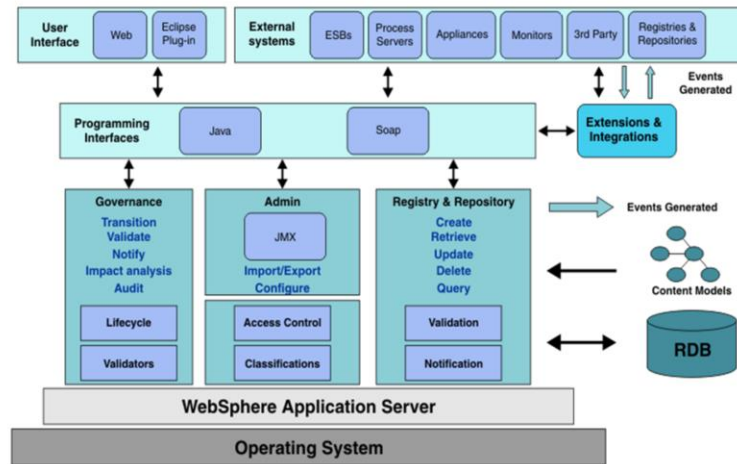
- WebSphere Service Registry and Repository
 - ▶ No UDDI registry
 - ▶ Integrated registry and repository
 - ▶ APIs:
 - SOAP API
 - EJB Java API
 - Web service API
 - ▶ User interfaces:
 - Web user interface
 - Eclipse plug-in



IBM is not using the UDDI standard; it has created its own integrated registry with repository.

The WebSphere Service Registry and Repository offers a SOAP, EJB and Web Service API to connect to it to a broad range of external applications.

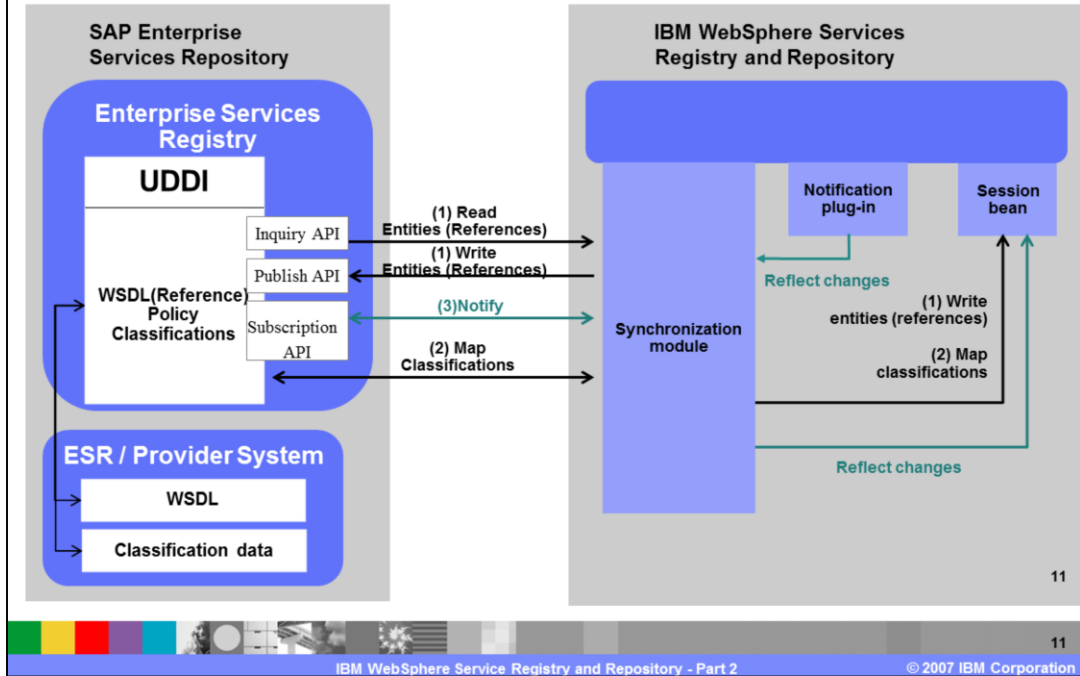
WebSphere Service Registry and Repository architecture



The architectural view shows that all WebSphere Service Registry and Repository capabilities can be accessed through a unified programming interface layer.

All WebSphere Service Registry and Repository components are running on top of the WebSphere Application server.

Synchronization module – WSRR Product Feature



This slide shows the federation capabilities. If you just use the UDDI component of the SAP ESR and the IBM WebSphere Service Registry and Repository, the UDDI API can be used to exchange information.

WebSphere Service Registry and Repository includes a UDDI SyncModule which enables synchronization with standard UDDIs.

But this limits the integration to UDDI information only - all metadata of the SAP ESR is not included.

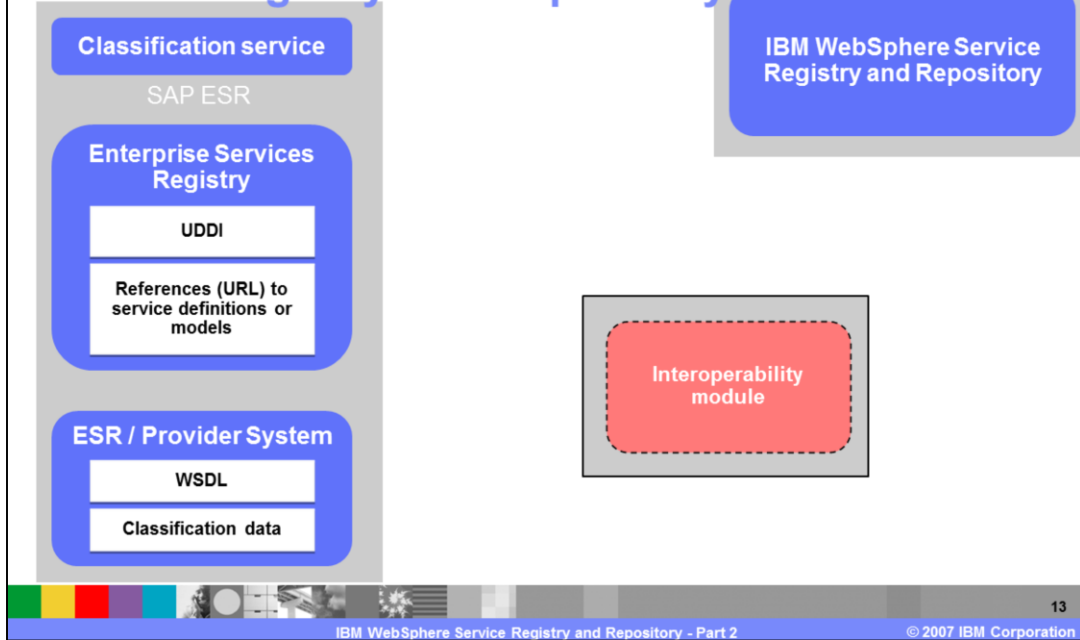
Integration of ESR content to WebSphere Service Registry and Repository

- Loading of physical documents from ESR to WebSphere Service Registry and Repository
 - ▶ WSDLs (including XSDs - that is, business objects)
 - ▶ Business object: address containing attributes like name, street
 - ▶ integration of classifications
 - ▶ mapping of classifications

The integration of content is another method. Here the physical objects are retrieved from ESR and created within WebSphere Service Registry and Repository since the WebSphere Service Registry and Repository has in its structure a counterpart for all objects that might be available in ESR.

This also includes the different classifications, business objects and metadata.

Integration tool - ESR content to WebSphere Service Registry and Repository



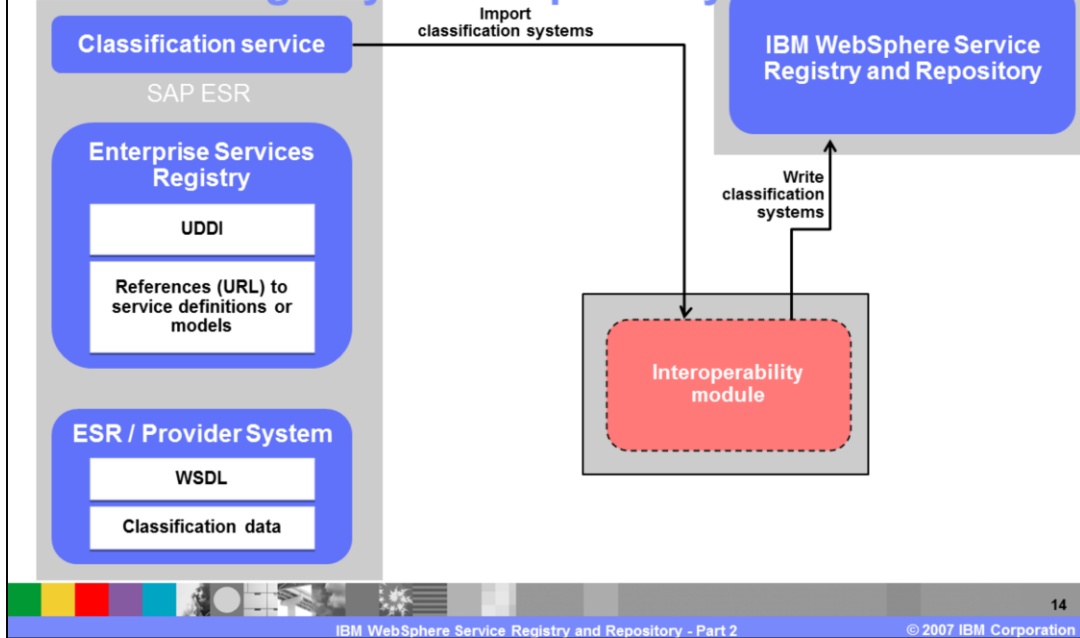
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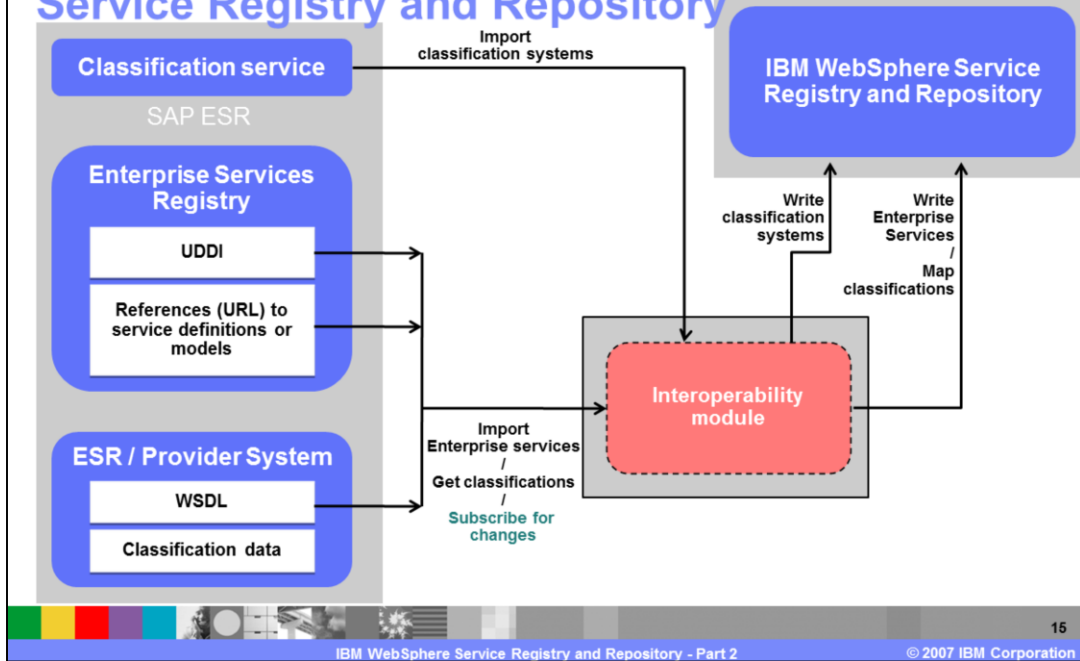
As you will see in this set of slides, the interoperability module creates the bridge between the ESR and the WebSphere Service Registry and Repository. The module leverages also the UDDI notification mechanism to get notified when a service changes. These changes can then be reflected by re-synchronizing the changed artifact.

Integration tool - ESR content to WebSphere Service Registry and Repository



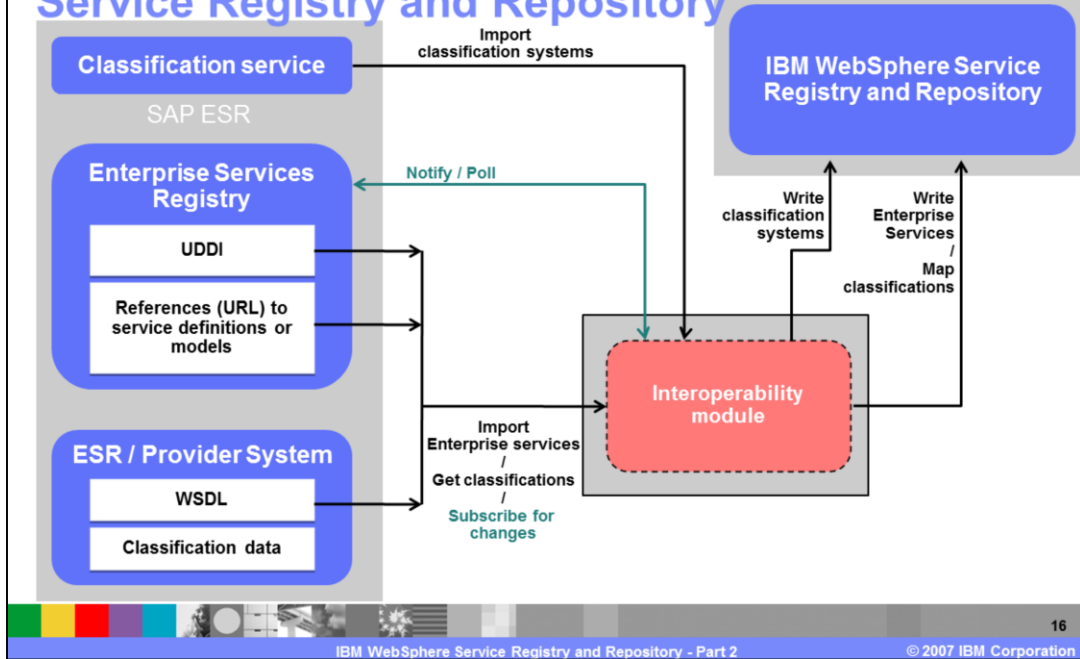
First the classification systems get imported.

Integration tool - ESR content to WebSphere Service Registry and Repository



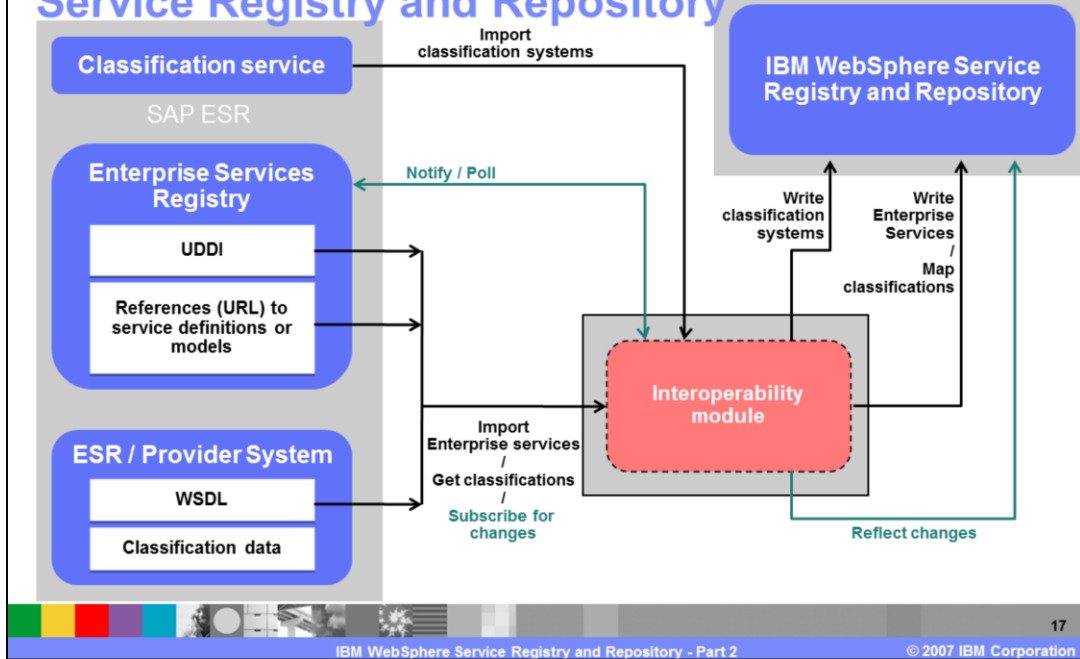
Then the registry data and meta-information get included as well.

Integration tool - ESR content to WebSphere Service Registry and Repository



A notification mechanism checks for updates...

Integration tool - ESR content to WebSphere Service Registry and Repository



...to reflect changes in the repository.

Comparison of interoperability methodologies

Synchronization module	Integration tool
<ul style="list-style-type: none"> ▪ Synchronization <ul style="list-style-type: none"> ▶ REGISTRY level ▶ WebSphere Service Registry and Repository and ESR both in operation ▶ Synchronization of entities (references) ▶ mapping of classifications ▶ not vendor specific ▪ two way: WebSphere Service Registry and Repository <-> ESR 	<ul style="list-style-type: none"> ▪ Integration <ul style="list-style-type: none"> ▶ REPOSITORY level ▶ WebSphere Service Registry and Repository replaces ESR ▶ Transfer physical documents from ESR to WebSphere Service Registry and Repository ▶ integration of classifications ▶ SAP specific ▪ one way only: ESR content to WebSphere Service Registry and Repository

This table includes a small comparison of both interoperability possibilities.

The synchronization is only at the registry level, while the integration is on the repository level.

In the synchronization case, both products are in operation. In the integration approach the ESR is replaced in run time, but still there for the SAP systems that may be depending on it.

Also the synchronization is based on the UDDI standard and is not vendor specific. The integration of the content is very specific to the SAP product.

Screen captures

- Example screen captures
- How would it look like



This integration is quite theoretical, but the next few slides show how this might look.

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**SAP:
Browsing Enterprise Services
within NetWeaver
Developer Studio**

Import
Services Registry
First choose a service definition and then one of its endpoints.

Namespace	Name	Description	Physical System
http://sap.com/EA-APPL/SE/Global	CustomerReturnsDeliveryWithRefer...	Customer Returns Delivery with Ref...	HJ2
http://sap.com/EA-APPL/SE/Global	CustomerSimpleByNameAndAddress...	Find customer by name and address...	HJ2
http://sap.com/EA-APPL/SE/Global	DefaultEmployeeLeaveRequestByC...	Default Employee Leave Request : R...	HJ2
http://sap.com/EA-APPL/SE/Global	DocumentBulkCreateRequestConfr...	Web Service for Bulk Document crea...	HJ2
http://sap.com/EA-APPL/SE/Global	DocumentBulkUpdateRequestConfr...	Web service for ECC_DOCUMENTBU...	HJ2
http://sap.com/EA-APPL/SE/Global	DocumentByQueryResponse_In	To Search a Document By ID...	HJ2
http://sap.com/EA-APPL/SE/Global	DocumentCreateRequestConfirmat...	Web Service for single Document cre...	HJ2
http://sap.com/EA-APPL/SE/Global	DocumentReleaseRequestConfirmat...	To Release a Document...	HJ2
http://sap.com/EA-APPL/SE/Global	DocumentSimpleElementQueryRe...	Web service for ECC_DOCUMENTSE...	HJ2
http://sap.com/EA-APPL/SE/Global	DocumentSimplePropertyValuat...	WebService SimpleProperty...	HJ2
http://sap.com/EA-APPL/SE/Global	DocumentUpdateRequestConfirmat...	Web service for ECC_DOCUMENTUP...	HJ2
http://sap.com/EA-APPL/SE/Global	DocumentVersionCreateRequestCon...	Web service for ECC_DOCUMENTV...	HJ2
http://sap.com/EA-APPL/SE/Global	DuplicateCreateRequestConfr...	propose payment for payables...	HJ2
http://sap.com/EA-APPL/SE/Global	ECC_LIAP_CHA_BYPDRQ	Real Credit Management Account D...	HJ2
http://sap.com/EA-APPL/SE/Global	EmployeeAddressByEmployeeQuer...	Employee Address : Result by Empl...	HJ2
http://sap.com/EA-APPL/SE/Global	EmployeeBasicDataByEmployeeQuer...	Employee Basic Data : Query By Em...	HJ2
http://sap.com/EA-APPL/SE/Global	EmployeeBenefitParticipationCred...	Employee Benefits Participation Cred...	HJ2
http://sap.com/EA-APPL/SE/Global	EmployeeBenefitParticipationFlexi...	Employee Benefits Participation Flexi...	HJ2
http://sap.com/EA-APPL/SE/Global	EmployeeBenefitParticipationFlexi...	Employee Benefits Participation Flexi...	HJ2
http://sap.com/EA-APPL/SE/Global	EmployeeBenefitParticipationFlexi...	Employee Benefits Participation Flexi...	HJ2
http://sap.com/EA-APPL/SE/Global	EmployeeBenefitParticipationFlexi...	Employee Benefits Participation Flexi...	HJ2
http://sap.com/EA-APPL/SE/Global	EmployeeBenefitParticipationFlexi...	Employee Benefits Participation Flexi...	HJ2
http://sap.com/EA-APPL/SE/Global	EmployeeBenefitParticipationFlexi...	Employee Benefits Participation Flexi...	HJ2
http://sap.com/EA-APPL/SE/Global	EmployeeBenefitParticipationFlexi...	Employee Benefits Participation Flexi...	HJ2
http://sap.com/EA-APPL/SE/Global	EmployeeBenefitParticipationFlexi...	Employee Benefits Participation Flexi...	HJ2
http://sap.com/EA-APPL/SE/Global	EmployeeBenefitParticipationFlexi...	Employee Benefits Participation Flexi...	HJ2
http://sap.com/EA-APPL/SE/Global	EmployeeBenefitParticipationFlexi...	Employee Benefits Participation Flexi...	HJ2
http://sap.com/EA-APPL/SE/Global	EmployeeBenefitParticipationFlexi...	Employee Benefits Participation Flexi...	HJ2
http://sap.com/EA-APPL/SE/Global	EmployeeBenefitParticipationFlexi...	Employee Benefits Participation Flexi...	HJ2
http://sap.com/EA-APPL/SE/Global	EmployeeBenefitParticipationFlexi...	Employee Benefits Participation Flexi...	HJ2
http://sap.com/EA-APPL/SE/Global	EmployeeBenefitParticipationFlexi...	Employee Benefits Participation Flexi...	HJ2

Name	Target Address	Binding WSDL
EmployeeBenefitParticipationFlexibleSpend...	http://erp.esvworkplace.sap.com:80/sap/bc/inf/isp/sap/ecc...	http://erp.esvworkplace.sap.com:80/sap/bc/inf/isp/sap/ecc_e...

< Back Next > End Cancel

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The SAP NetWeaver Developer Studio has an Enterprise Service browser. With these tools you can see all services available in the connected SAP ESR component.

As you see in the figure there are a lot of predefined SAP services deployed.

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WSDL Documents
This is the collection of WSDL documents present in the registry.

Preferences

Load Documents Delete Add Property Add Relationship Add Classifications Export Subscribe Add to Favorites

Select	Name	Description
<input type="checkbox"/>	EmployeeBenefitsParticipationFlexibleSpendingAccountClaimByEmployeeQueryResponse_1o	Employee Benefits Participation Flexible Spending Account Claim : Result By Employee
<input type="checkbox"/>	EmployeeBenefitsParticipationHealthPlanByEmployeeQueryResponse_1o	Employee Benefits Participation Health Plan : Result By Employee
<input type="checkbox"/>	EmployeeBenefitsParticipationInsurancePlanByEmployeeQueryResponse_1o	Employee Benefits Participation Insurance Plan : Result By Employee
<input type="checkbox"/>	EmployeeBenefitsParticipationMiscellaneousPlanByEmployeeQueryResponse_1o	Employee Benefits Participation Miscellaneous Plan : Result By Employee
<input type="checkbox"/>	EmployeeBenefitsParticipationSavingsPlanByEmployeeQueryResponse_1o	Employee Benefits Participation Savings Plan : Result By Employee
<input type="checkbox"/>	EmployeeBenefitsParticipationStockPurchasePlanByEmployeeQueryResponse_1o	Employee Benefits Participation Stock Purchase Plan : Result By Employee
<input type="checkbox"/>	EmployeeCommunicationDataByEmployeeQueryResponse_1o	Employee Communication Data : Result By Employee
<input type="checkbox"/>	EmployeeCompensationAgreementCompensationStructureGradeAssignmentByEmployeeQueryResponse_1o	Employee Pay Grade data
<input type="checkbox"/>	EmployeeCompensationAgreementEstimatedAnnualSalaryByEmployeeQueryResponse_1o	Employee Compensation Agreement - Estimated Annual Salary : Result By Employee
<input type="checkbox"/>	EmployeeCompensationAgreementLongTermIncentivePlanByEmployeeQueryResponse_1o	Employee Compensation Agreement - Long Term Incentive Plan : Result By Employee
<input type="checkbox"/>	EmployeeDependentByEmployeeQueryResponse_1o	Employee dependent Query By Employee
<input type="checkbox"/>	EmployeeLeaveRequestAllowedApproverByIdentifyingElementsQueryResponse_1o	Employee Leave Request Allowed Approver : Identifying Elements Query
<input type="checkbox"/>	EmployeeLeaveRequestApproveCheckQueryResponse_1o	Employee Leave Request Approve Check Query
<input type="checkbox"/>	EmployeeLeaveRequestApproveRequestConfirmation_1o	Employee Leave Request : Approve Request
<input type="checkbox"/>	EmployeeLeaveRequestByIDQueryResponse_1o	Employee Leave Request : Result by ID
<input type="checkbox"/>	EmployeeLeaveRequestByParticipantQueryResponse_1o	Employee Leave Request : Result By Participant
<input type="checkbox"/>	EmployeeLeaveRequestCancelCheckQueryResponse_1o	Employee Leave Request Cancel Check
<input type="checkbox"/>	EmployeeLeaveRequestCancelRequestConfirmation_1o	Employee Leave Request Cancel Request Confirmation
<input type="checkbox"/>	EmployeeLeaveRequestConfigurationByEmployeeQueryResponse_1o	Emp LeaveReqConfig: By Emp
<input type="checkbox"/>	EmployeeLeaveRequestCreateCheckQueryResponse_1o	Employee Leave Request Create Check

Page: 6 of 21 Total: 411

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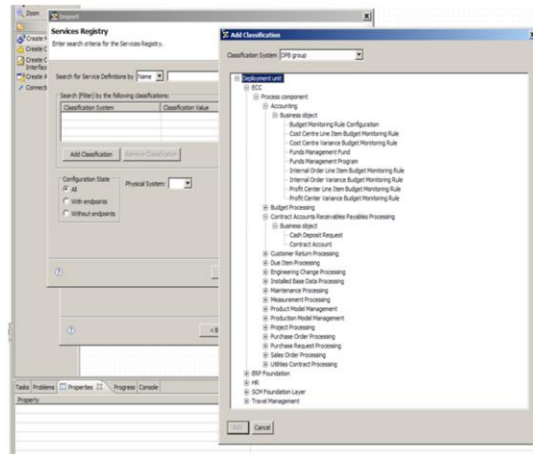
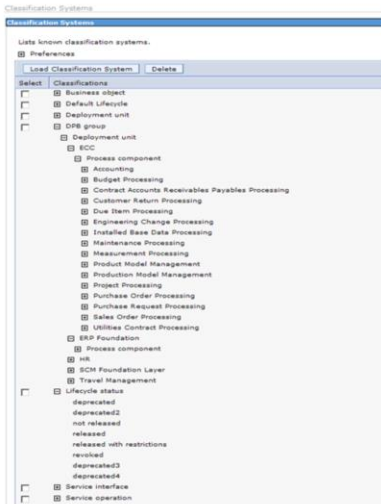
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IBM:
Imported enterprise services
in WebSphere Service
Registry and Repository

When these services with all meta data like the description get transferred in the WebSphere Service Registry and Repository this would look like this figure.

You see the WebSphere Service Registry and Repository administrative console with all present WSDL files.

**SAP classification systems
within NetWeaver Developer
Studio
(DPB group)**



**SAP classification systems
imported into WebSphere Service
Registry and Repository**

It is similar for the classification systems. They will look the same in WebSphere Service Registry and Repository and in ESR.

Classifications

Classifications

WSDL Documents > EmployeeCommunicationDataByEmployeeQueryResponse_In > Classification Systems

Navigate the tree on the left to select classifications to be added to the WSDL document: EmployeeCommunicationDataByEmployeeQueryResponse_In. Click the Add button to add the selected classifications to the list.

Preferences

Classification tree

Select: Classifications

- Business object
- Default Lifecycle
- Deployment unit
- DPB group
- Lifecycle status
- Service interface
- Service operation
 - Software Component Version
 - SPB group
- WSRR Core Ontology

Add >>>

Remove

Classification list

- Employee
- Find Employee Communication Data by Employee Query Employee In

Details for the selected classification. To see the details for an item, select the classification from the list.

System	Name	URI
Service operation	Find Employee Communication Data by Employee	uddi:uddi.sap.com: categorization: service-operation: Find%20Employee%20Communication%20Data%20by%20Employee

Apply OK Reset Cancel

Found and mapped classifications for SAP Enterprise Service

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Here you see how the classification systems would look like in the IBM WebSphere Service Registry and Repository in more detail.

Classifications

WSDL Documents > EmployeeCommunicationDataByEmployeeQueryResponse_In > Classification Systems

Navigate the tree on the left to select classifications to be added to the WSDL document: EmployeeCommunicationDataByEmployeeQueryResponse_In. Click the Add button to add the selected classifications to the list.

Preferences

Classification tree

Select:

- Classifications
 - Business object
 - Default Lifecycle
 - Deployment unit
 - DPB group
 - Lifecycle status
 - depreciated
 - depreciated2
 - not released
 - released
 - released with restrictions
 - revoked
 - depreciated3
 - depreciated4
 - Service interface
 - Service operation
 - Software Component Version
 - SPB group
 - WSRR Core Ontology

Classification list

Employee
Find Employee Communication Data by Employee Query Employee In
released

Add >>>
Remove

Details for the selected classification. To see the details for an item, select the classification from the list.

System	Name	URI
Lifecycle status	released	uddi:uddi.sap.com: categorization: life-cycle-status: released

Apply OK Reset Cancel

Setting additional classifications (life cycle status) for Enterprise Service

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And it would be possible to set new classifications in the IBM environment.

Classifications

WSDL Documents > EmployeeCommunicationDataByEmployeeQueryResponse_In > Classification Systems

Navigate the tree on the left to select classifications to be added to the WSDL document: EmployeeCommunicationDataByEmployeeQueryResponse_In. Click the Add button to add the selected classifications to the list.

Preferences

Classification tree

Select Classifications

- Business object
 - Default Lifecycle
 - Deployment unit
 - DPB group
 - Deployment unit
 - ECC
 - Process component
 - Accounting
 - Business object
 - Budget Monitoring Rule Configuration
 - Cost Centre Line Item Budget Monitoring Rule
 - Cost Centre Variance Budget Monitoring Rule
 - Funds Management Fund
 - Funds Management Program
 - Internal Order Line Item Budget Monitoring Rule
 - Internal Order Variance Budget Monitoring Rule
 - Profit Center Line Item Budget Monitoring Rule
 - Profit Center Variance Budget Monitoring Rule
 - Budget Processing
 - Contract Accounts Receivables Payables Processing
 - Business object
 - Cash Deposit Request
 - Contract Account
 - Customer Return Processing
 - Due Item Processing
 - Engineering Change Processing
 - Installed Base Data Processing
 - Maintenance Processing
 - Measurement Processing

Classification list

Employee
Find Employee Communication Data by Employee
Query Employee In
released

Add >>>
Remove

Setting additional classifications (DPB group) for Enterprise Service

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These classifications also get stored and can be leveraged by external clients.

Classification systems

SAP Services Registry: Browsing services, Managing classifications

Main Classifications

Group: DRB_group
Physical System: (All) Show Details

DRB group

- ECC
- ERP Foundation
- HR
- SCM Foundation Layer
- Travel Management

B Service Definitions found:

Name	State	Namespace	Description	Physical System No.
EmployeeBenefitsParticipationCreditPlanByEmployeeQ...	With Endpoints	http://sap.com/xi/EA-HR/SE/Global	Employee Benefits Participation Credit Plan - Result By ...	HU2
EmployeeBenefitsParticipationFlexibleSpendingAccoun...	With Endpoints	http://sap.com/xi/EA-HR/SE/Global	Employee Benefits Participation Flexible Spending Acc...	HU2
EmployeeBenefitsParticipationFlexibleSpendingAccoun...	With Endpoints	http://sap.com/xi/EA-HR/SE/Global	Employee Benefits Participation Flexible Spending Acc...	HU2
EmployeeBenefitsParticipationHealthPlanByEmployeeQ...	With Endpoints	http://sap.com/xi/EA-HR/SE/Global	Employee Benefits Participation Health Plan - Result By ...	HU2
EmployeeBenefitsParticipationInsurancePlanByEmploy...	With Endpoints	http://sap.com/xi/EA-HR/SE/Global	Employee Benefits Participation Insurance Plan - Result...	HU2

Details for service definition: EmployeeBenefitsParticipationCreditPlanByEmployeeQueryResponse_In

Details Endpoints Classifications

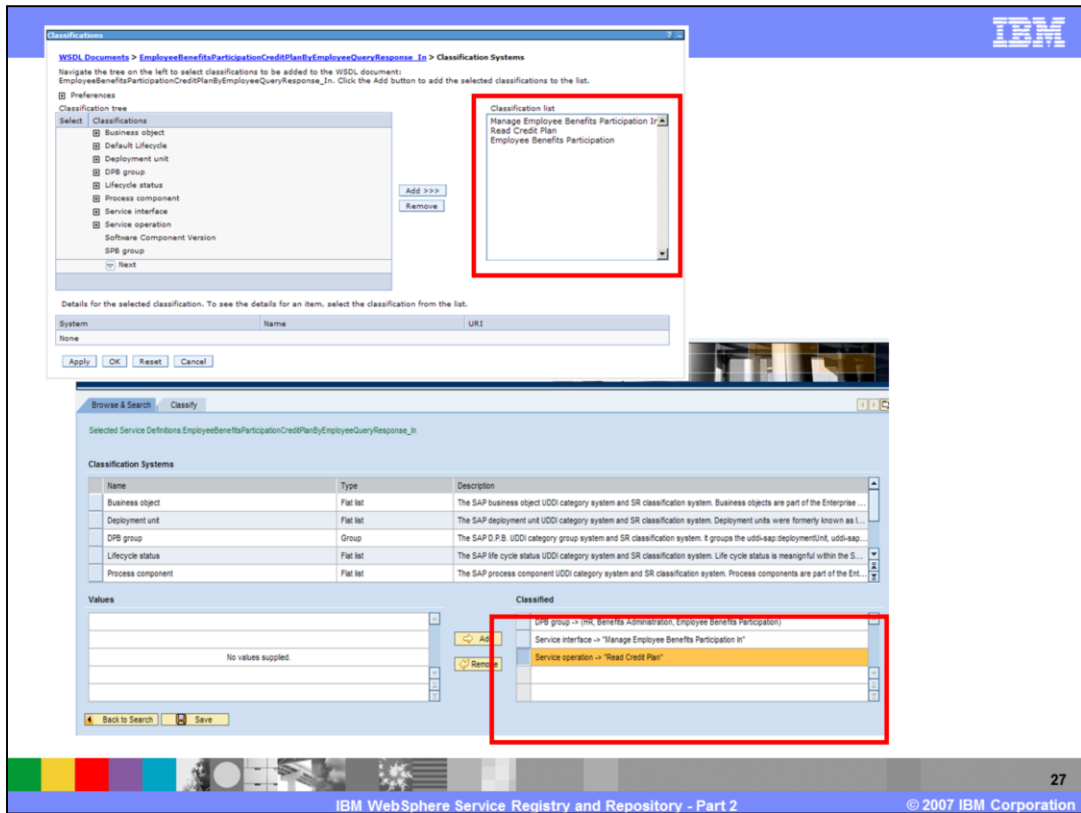
Manage Classifications

Classification Group	Classification System	Value
The SAP D.P.B. UDDI category group system and SR classification syste...	Service interface	Manage Employee Benefits Participation In
	Service operation	Read Credit Plan
	Deployment unit	HR
	Process component	Benefits Administration
	Business object	Employee Benefits Participation

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Again you can see that the SAP view on the ESR data is exactly the same



And the classification is one to one the same in both products. No matter if it is SAP or the WebSphere Service Registry and Repository.

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