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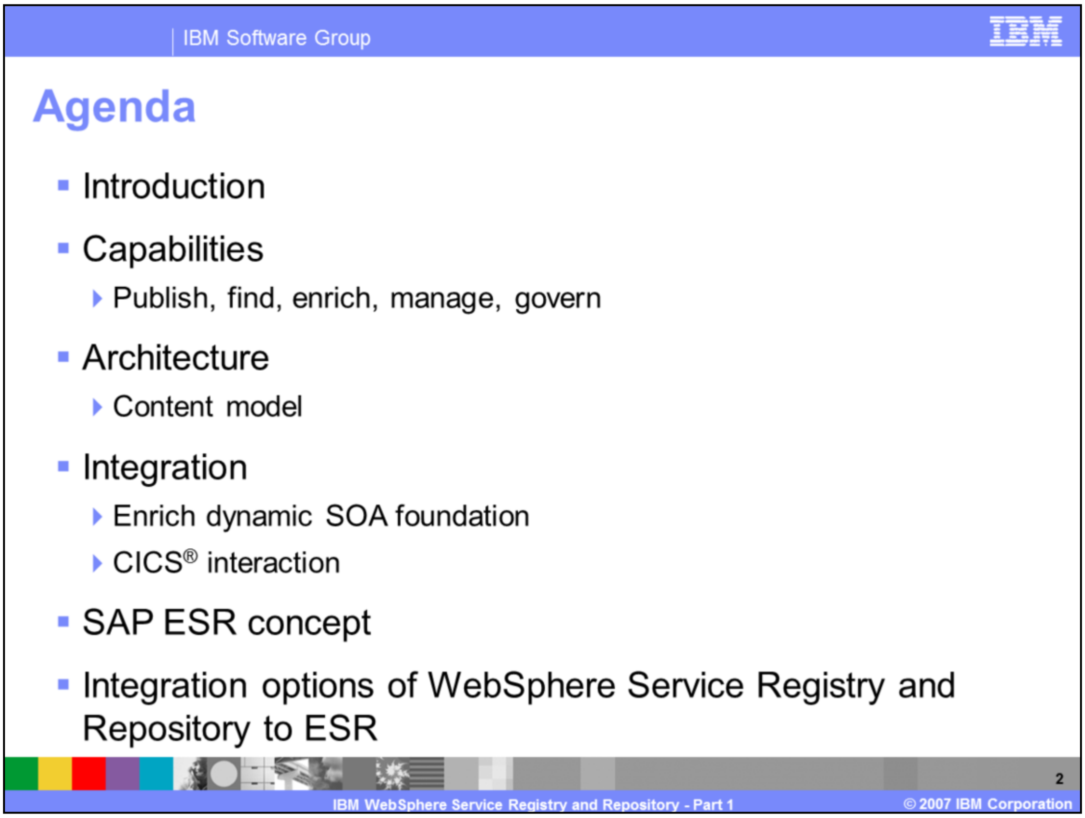
SAP integration workshop

IBM WebSphere Service Registry and Repository – Part 1

business on demand.

Converted to video June 20, 2014

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

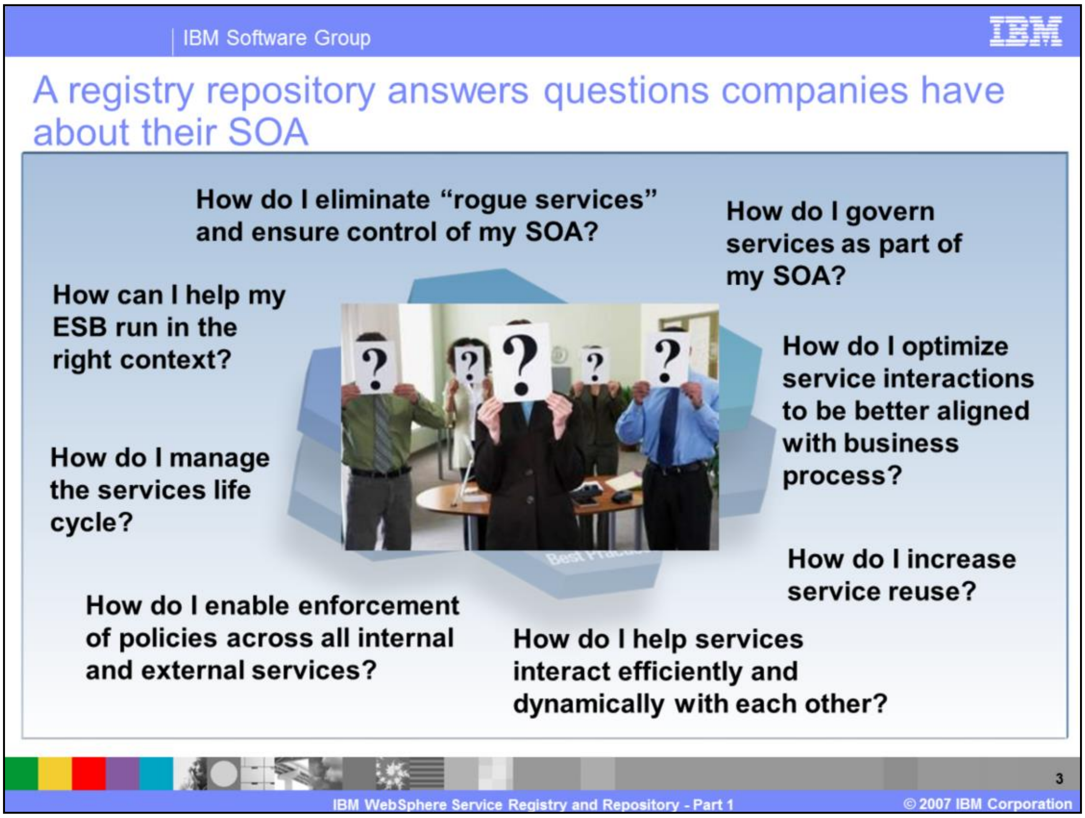


Agenda

- Introduction
- Capabilities
  - Publish, find, enrich, manage, govern
- Architecture
  - Content model
- Integration
  - Enrich dynamic SOA foundation
  - CICS® interaction
- SAP ESR concept
- Integration options of WebSphere Service Registry and Repository to ESR

An introduction of the WebSphere Service Registry and Repository is presented before taking a deeper look into the different capabilities and the architecture.

The agenda continues with the general discussion of integration options which leads to the SAP ESR and the direct integration options for this product.



A registry repository answers questions companies have about their SOA

How do I eliminate “rogue services” and ensure control of my SOA?

How do I govern services as part of my SOA?

How can I help my ESB run in the right context?

How do I optimize service interactions to be better aligned with business process?

How do I manage the services life cycle?

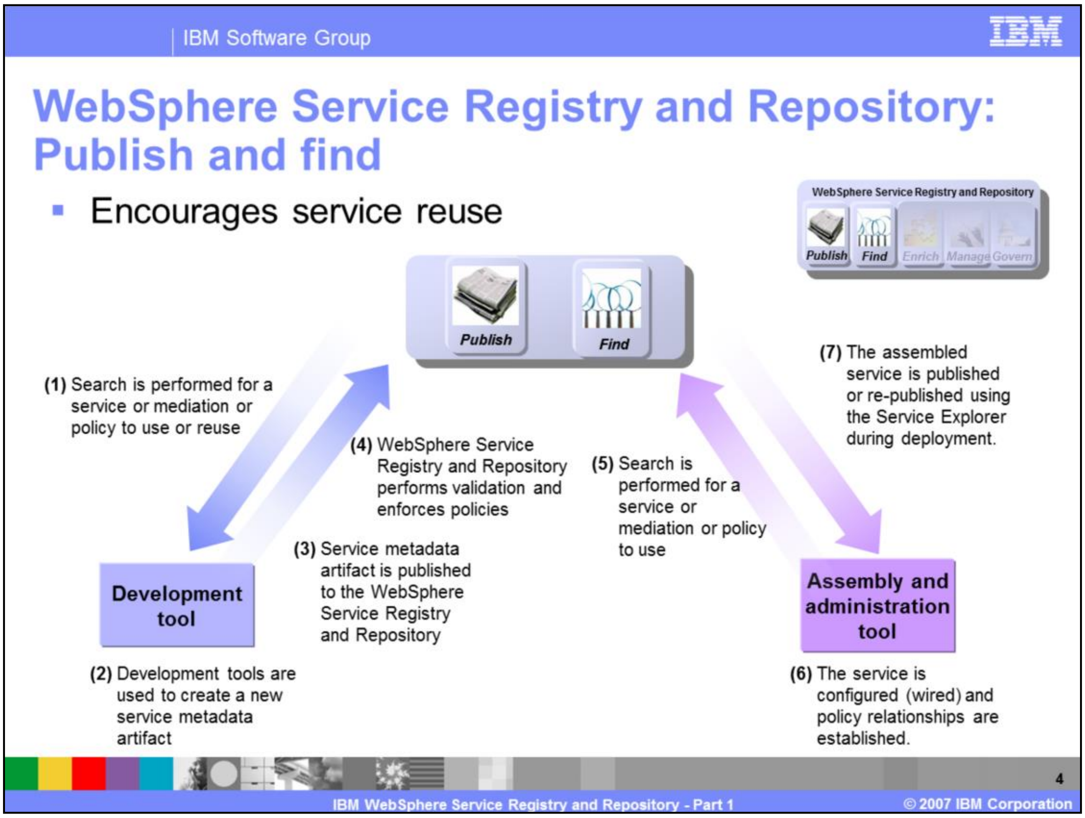
How do I increase service reuse?

How do I enable enforcement of policies across all internal and external services?

How do I help services interact efficiently and dynamically with each other?

The WebSphere Service Registry and Repository was built as an answer for a lot of the questions you see in this slide.

Increased use of services in companies has created new possibilities of reusable components in a business environment, but also has lead to new problems with how to handle, provide and govern these services.



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WebSphere Service Registry and Repository: Publish and find

- Encourages service reuse

WebSphere Service Registry and Repository
Publish
Find
Enrich
Manage
Govern
Publish
Find
Development tool
Assembly and administration tool

(1) Search is performed for a service or mediation or policy to use or reuse

(2) Development tools are used to create a new service metadata artifact

(3) Service metadata artifact is published to the WebSphere Service Registry and Repository

(4) WebSphere Service Registry and Repository performs validation and enforces policies

(5) Search is performed for a service or mediation or policy to use

(6) The service is configured (wired) and policy relationships are established.

(7) The assembled service is published or re-published using the Service Explorer during deployment.

4

IBM WebSphere Service Registry and Repository - Part 1

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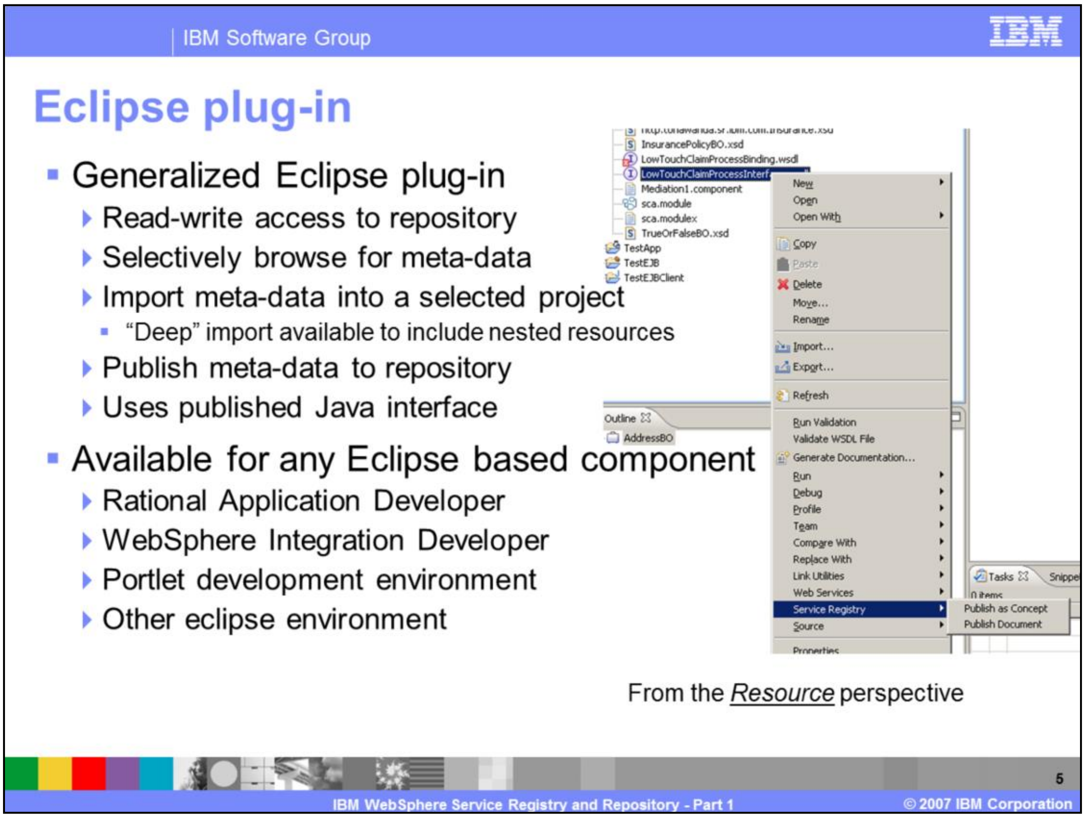
WebSphere Service Registry and Repository governs services by promoting visibility, consistency, and reducing redundancy in a SOA.

WebSphere Registry and Repository maintains service integrity and authorized changes to deployed services. It fosters a rich interaction with all stages of an SOA life cycle.

The repository also provides rich service metadata capabilities and exposes key access points through standardized APIs.

SOA focused service life cycle include such phases as service inception, service reuse, service version handling, and service retirement.



Eclipse plug-in

- Generalized Eclipse plug-in
  - Read-write access to repository
  - Selectively browse for meta-data
  - Import meta-data into a selected project
    - "Deep" import available to include nested resources
  - Publish meta-data to repository
  - Uses published Java interface
- Available for any Eclipse based component
  - Rational Application Developer
  - WebSphere Integration Developer
  - Portlet development environment
  - Other eclipse environment

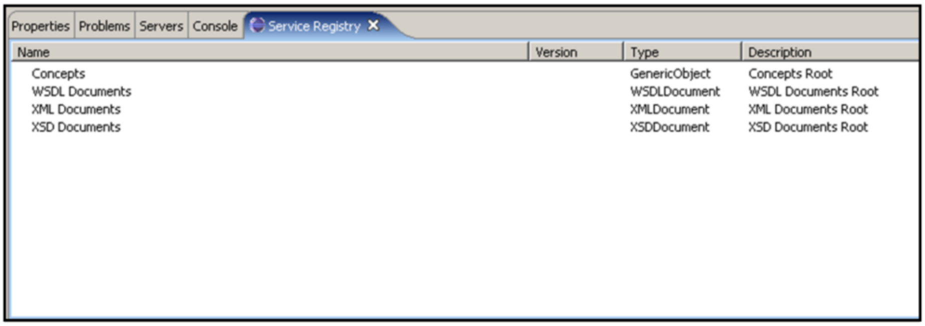
From the *Resource* perspective

The IBM tools support a tight WebSphere Service Registry and Repository interoperation.

There is an Eclipse plug-in to directly publish and consume documents from a repository when creating a service.

This plug-in uses a published Java interface and is compatible with nearly all Eclipse environments.

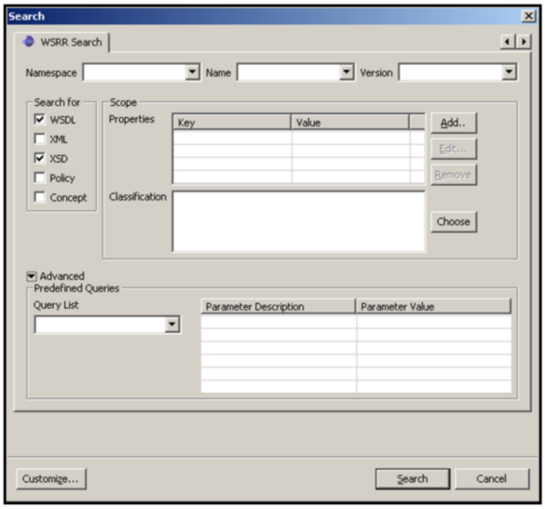
Repository Eclipse plug-in: Retrieve and import



Name	Version	Type	Description
Concepts		GenericObject	Concepts Root
WSDL Documents		WSDLDocument	WSDL Documents Root
XML Documents		XMLDocument	XML Documents Root
XSD Documents		XSDDocument	XSD Documents Root

These are the steps used in this Eclipse plug-in.

Repository Eclipse plug-in: Retrieve and import



Search for
☑ WSDL
□ XML
☑ XSD
□ Policy
□ Concept

First, open a WebSphere Service Registry and Repository search wizard.

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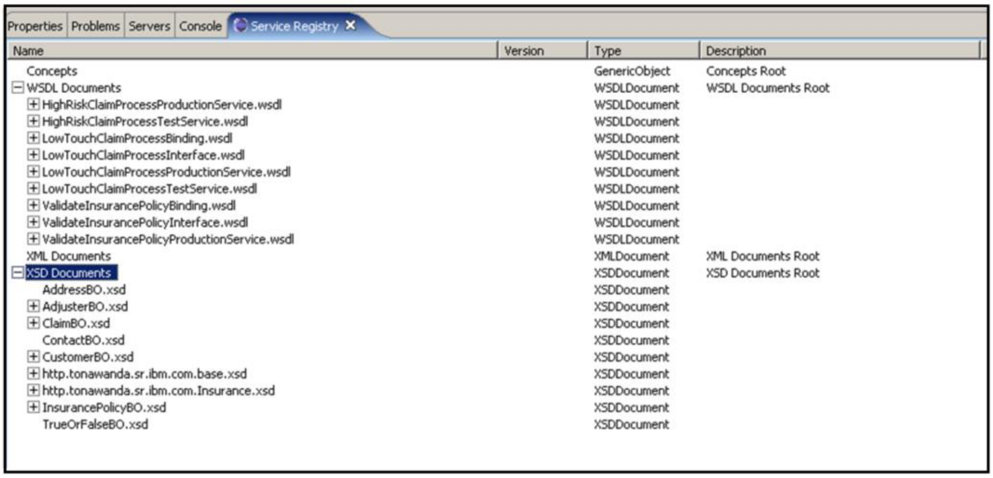
Repository Eclipse plug-in: Retrieve and import



Name	Version	Type	Description
Concepts		GenericObject	Concepts Root
⊟ WSDL Documents		WSDLDocument	WSDL Documents Root
⊞ HighRiskClaimProcessProductionService.wsdl		WSDLDocument	
⊞ HighRiskClaimProcessTestService.wsdl		WSDLDocument	
⊞ LowTouchClaimProcessBinding.wsdl		WSDLDocument	
⊞ LowTouchClaimProcessInterface.wsdl		WSDLDocument	
⊞ LowTouchClaimProcessProductionService.wsdl		WSDLDocument	
⊞ LowTouchClaimProcessTestService.wsdl		WSDLDocument	
⊞ ValidateInsurancePolicyBinding.wsdl		WSDLDocument	
⊞ ValidateInsurancePolicyInterface.wsdl		WSDLDocument	
⊞ ValidateInsurancePolicyProductionService.wsdl		WSDLDocument	
XML Documents		XMLDocument	XML Documents Root
⊟ XSD Documents		XSDDocument	XSD Documents Root
AddressBO.xsd		XSDDocument	
⊞ AdjusterBO.xsd		XSDDocument	
⊞ ClaimBO.xsd		XSDDocument	
ContactBO.xsd		XSDDocument	
⊞ CustomerBO.xsd		XSDDocument	
⊞ http.tonawanda.sr.ibm.com.base.xsd		XSDDocument	
⊞ http.tonawanda.sr.ibm.com.Insurance.xsd		XSDDocument	
⊞ InsurancePolicyBO.xsd		XSDDocument	
TrueOrFalseBO.xsd		XSDDocument	

8

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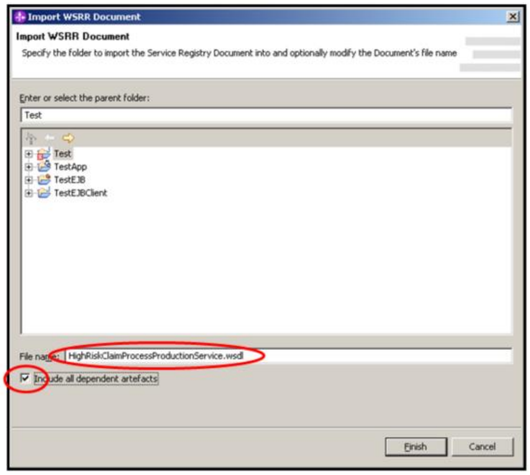
Then you can browse the documents in the registry.

Repository Eclipse plug-in: Retrieve and import



Import WSRR Document

Import WSRR Document

Specify the folder to import the Service Registry Document into and optionally modify the Document's file name

Enter or select the parent folder: Test

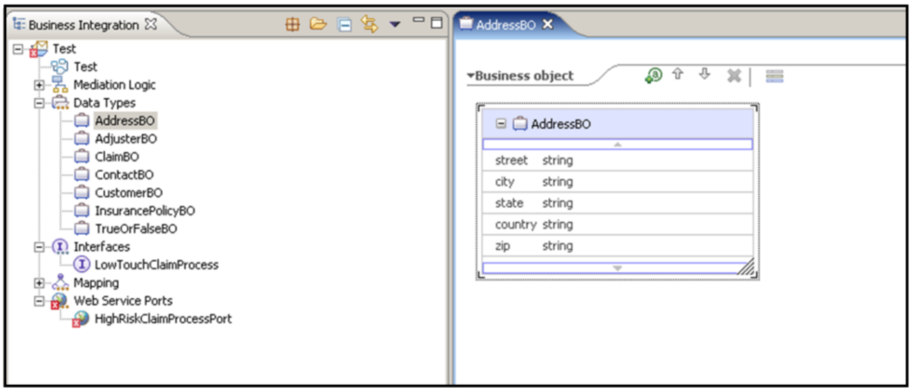
- Test
- TestApp
- TestEJB
- TestEJBClient

File name: HighRiskClaimProcessProductionService.wsdl

☑ Include all dependent artefacts

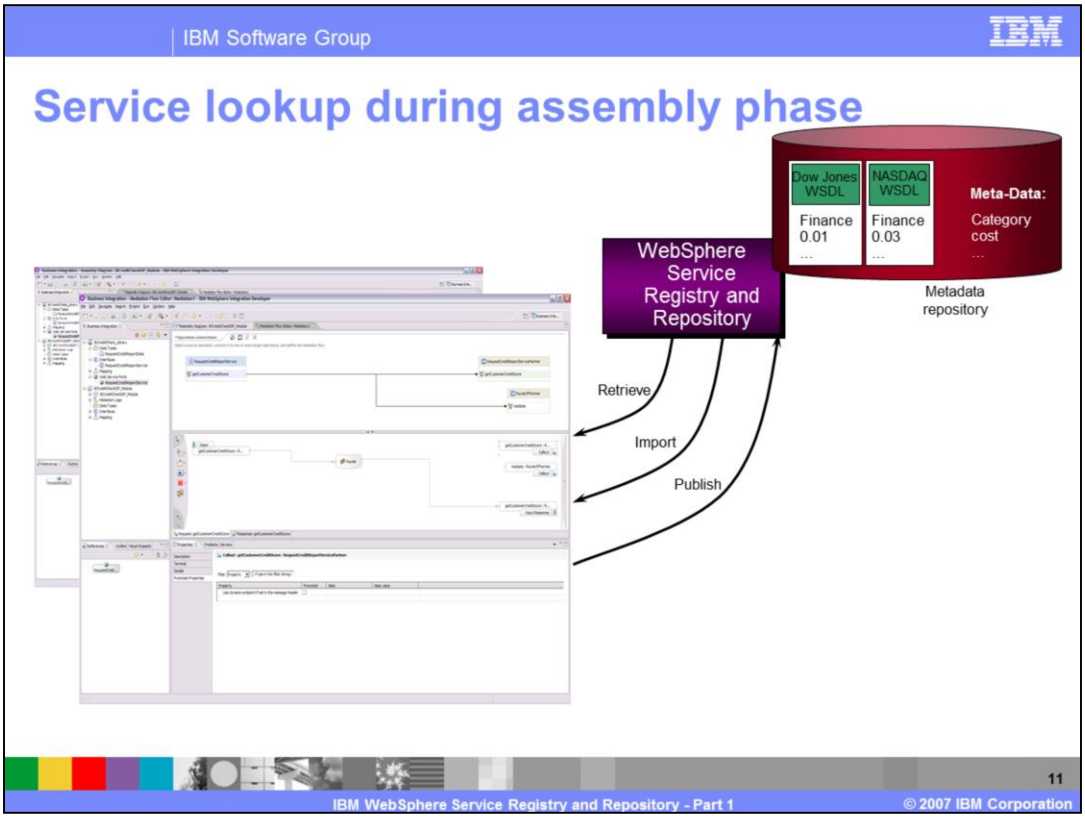
Finally you define the project to import into.

Repository Eclipse plug-in: Retrieve and import



street	string
city	string
state	string
country	string
zip	string

This will import all necessary WSDL and XSD to your project.



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Service lookup during assembly phase

Dow Jones WSDL

Finance 0.01 ...

NASDAQ WSDL

Finance 0.03 ...

Meta-Data:

Category
cost
...

Metadata repository

WebSphere Service Registry and Repository

Retrieve

Import

Publish

11

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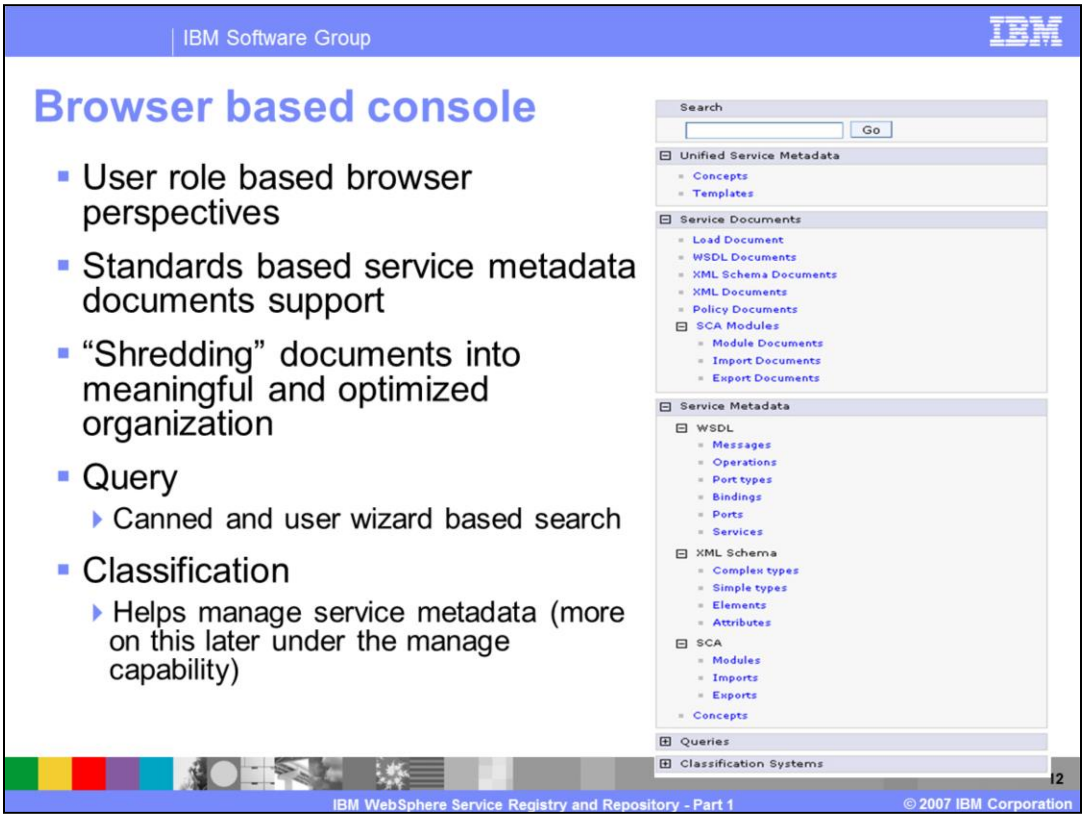
Also the built-in mapping view in WebSphere Integration Developer allows you to start a service lookup during the assembly phase to find the right service to use.

This combines the mapping and endpoint selection into one step.



Browser based console

- User role based browser perspectives
- Standards based service metadata documents support
- "Shredding" documents into meaningful and optimized organization
- Query
  - Canned and user wizard based search
- Classification
  - Helps manage service metadata (more on this later under the manage capability)

Search

Go

⊟ Unified Service Metadata
- Concepts
- Templates

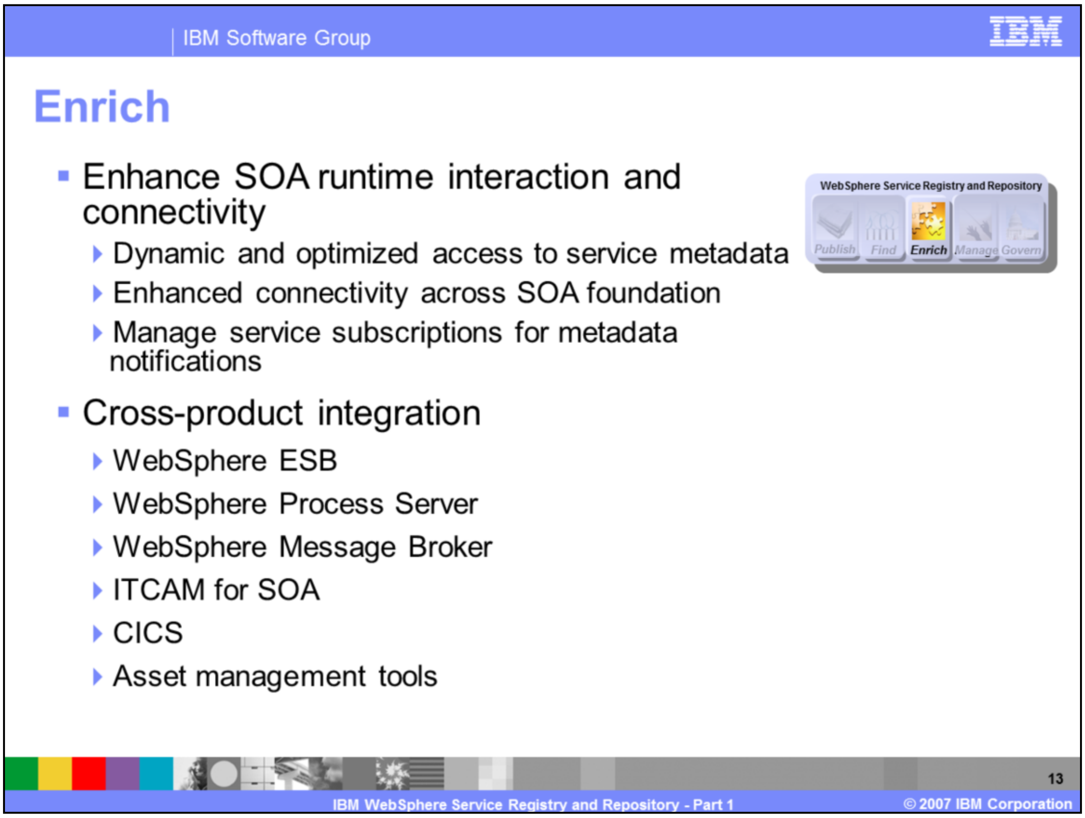
⊟ Service Documents
- Load Document
- WSDL Documents
- XML Schema Documents
- XML Documents
- Policy Documents
- ⊟ SCA Modules
  - Module Documents
  - Import Documents
  - Export Documents

⊟ Service Metadata
- ⊟ WSDL
  - Messages
  - Operations
  - Port types
  - Bindings
  - Ports
  - Services
- ⊟ XML Schema
  - Complex types
  - Simple types
  - Elements
  - Attributes
- ⊟ SCA
  - Modules
  - Imports
  - Exports
- Concepts

⊞ Queries

⊞ Classification Systems

The WebSphere Service Registry and Repository also offers a Web browser based console. This console is role based and offers different views and details to the created user roles. It also allows searching for service documents.



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Enrich

- Enhance SOA runtime interaction and connectivity
  - Dynamic and optimized access to service metadata
  - Enhanced connectivity across SOA foundation
  - Manage service subscriptions for metadata notifications
- Cross-product integration
  - WebSphere ESB
  - WebSphere Process Server
  - WebSphere Message Broker
  - ITCAM for SOA
  - CICS
  - Asset management tools

13

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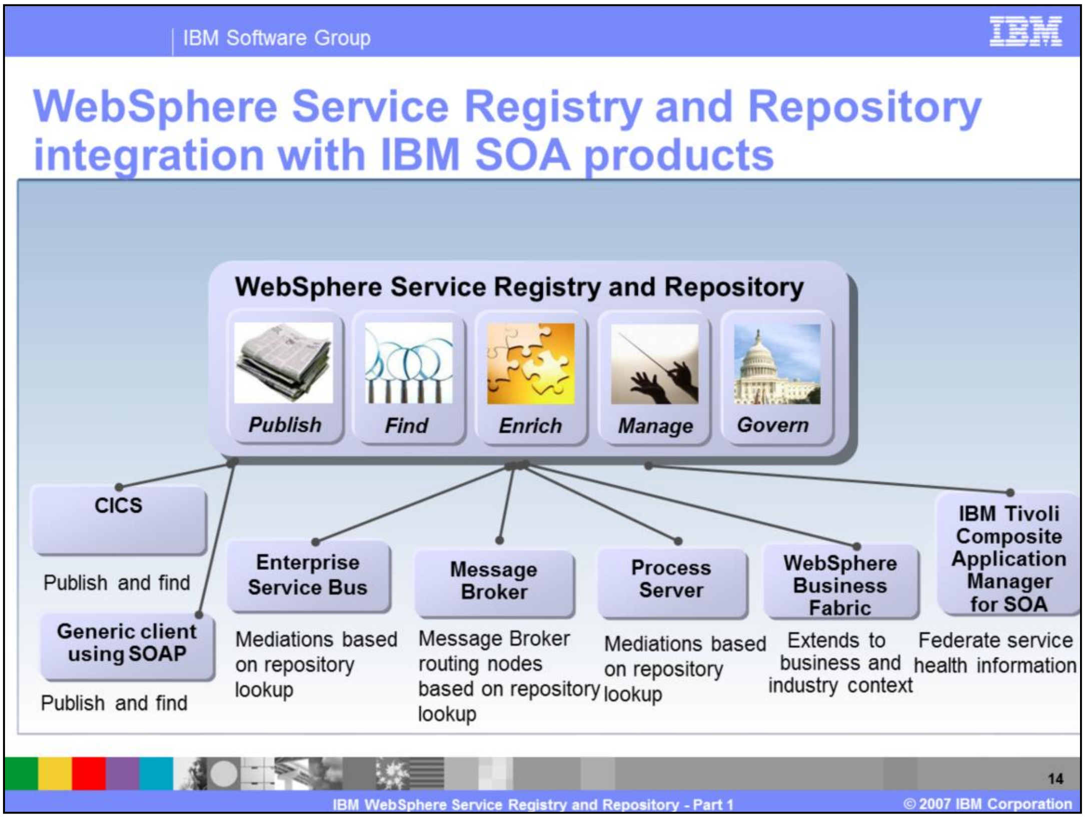
The WebSphere Service Registry and Repository enriches the WebSphere SOA landscape. It offers dynamic and optimized access to services and service metadata. Also it manages subscriptions to services and notifies on each change of metadata.

But the most important benefit is the direct cross-product integration of different products. Because every product is connected to the WebSphere Service Registry and Repository and uses it as service registry, all products can use the same services.



WebSphere Service Registry and Repository integration with IBM SOA products

WebSphere Service Registry and Repository

Publish · Find · Enrich · Manage · Govern

CICS

Publish and find

Generic client using SOAP

Publish and find

Enterprise Service Bus

Mediations based on repository lookup

Message Broker

Message Broker routing nodes based on repository lookup

Process Server

Mediations based on repository lookup

WebSphere Business Fabric

Extends to business and industry context

IBM Tivoli Composite Application Manager for SOA

Federate service health information

Here you see the different integration aspects to the IBM SOA products. CICS and a SOAP client can publish and find services.

The WebSphere Enterprise Service Bus and WebSphere Process Server can create mediations based on WebSphere Service Registry and Repository lookups.

The Message Broker can create routing nodes based on a WebSphere Service Registry and Repository lookup.

The WebSphere Business Fabric extends the services with a business or industry context.

The IBM Tivoli Composite Application Manager for SOA federates service health information.

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Section

WebSphere Service Registry and Repository interaction with WebSphere Enterprise Service Bus

15

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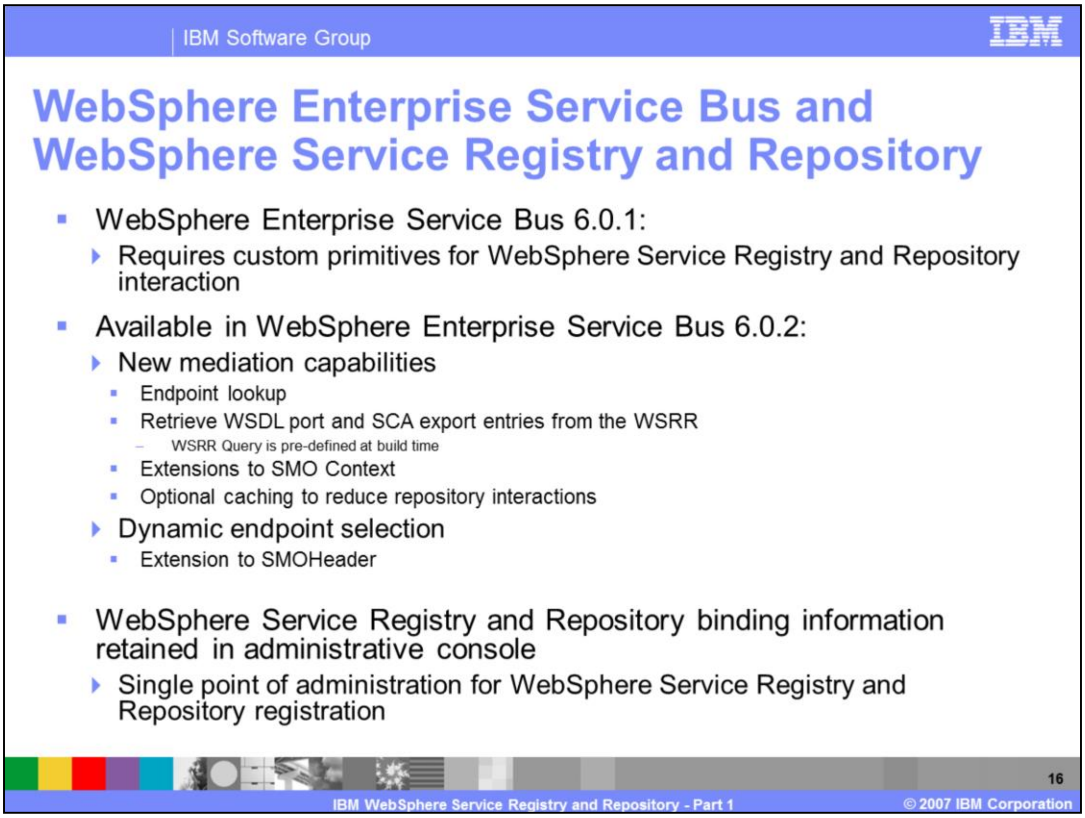
This section takes a deeper look into the interaction from WebSphere Service Registry and Repository and WebSphere Enterprise Service Bus.



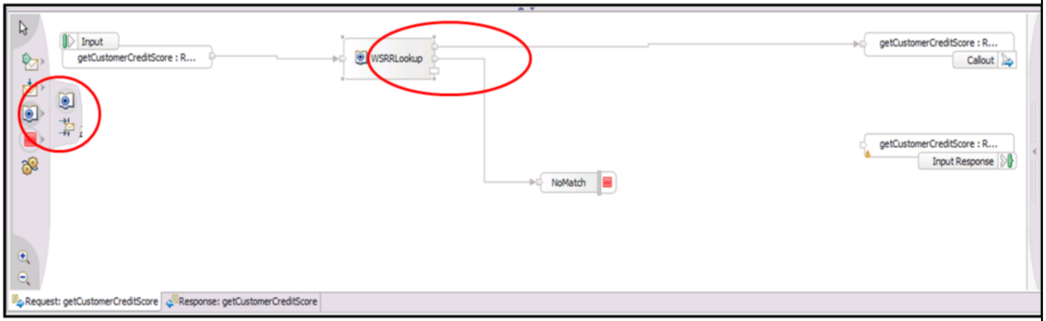
WebSphere Enterprise Service Bus and WebSphere Service Registry and Repository

- WebSphere Enterprise Service Bus 6.0.1:
  - Requires custom primitives for WebSphere Service Registry and Repository interaction
- Available in WebSphere Enterprise Service Bus 6.0.2:
  - New mediation capabilities
    - Endpoint lookup
    - Retrieve WSDL port and SCA export entries from the WSRR
      - WSRR Query is pre-defined at build time
    - Extensions to SMO Context
    - Optional caching to reduce repository interactions
  - Dynamic endpoint selection
    - Extension to SMOHeader
- WebSphere Service Registry and Repository binding information retained in administrative console
  - Single point of administration for WebSphere Service Registry and Repository registration

In an interaction with WebSphere Enterprise Service Bus 6.0.1, a custom primitive was needed. In 6.0.2, new mediation capabilities were introduced to enhance the endpoint lookup and retrieving WSDL files from the repository. The SMO context was also extended.

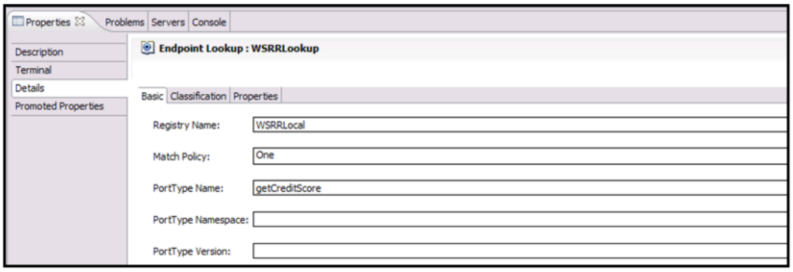
The complete WebSphere Service Registry and Repository binding information is configured in the administrative console, so there is a single point of administration.

Endpoint lookup


Input
getCustomerCreditScore : R...
WSRRLookup
getCustomerCreditScore : R...
Callout
getCustomerCreditScore : R...
Input Response
NoMatch
Request: getCustomerCreditScore
Response: getCustomerCreditScore

The combination of WebSphere Enterprise Service Bus and WebSphere Service Registry and Repository allows an endpoint lookup. This can be easily added in the flow editor.

Endpoint lookup



Endpoint Lookup : WSRRLookup

Registry Name: WSRRLocal

Match Policy: One

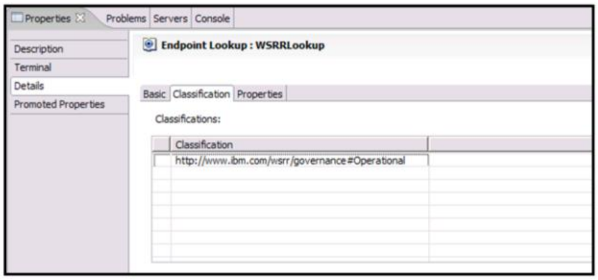
PortType Name: getCreditScore

PortType Namespace:

PortType Version:

After that it gets configured to hit the right WebSphere Service Registry and Repository system.

Endpoint lookup



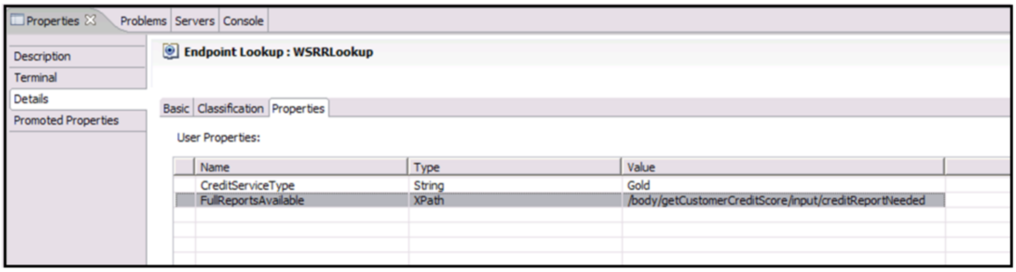
Endpoint Lookup : WSRRLookup

Classifications:

Classification
http://www.ibm.com/wsrr/governance#Operational

Then additional selection criteria can be added…

Endpoint lookup

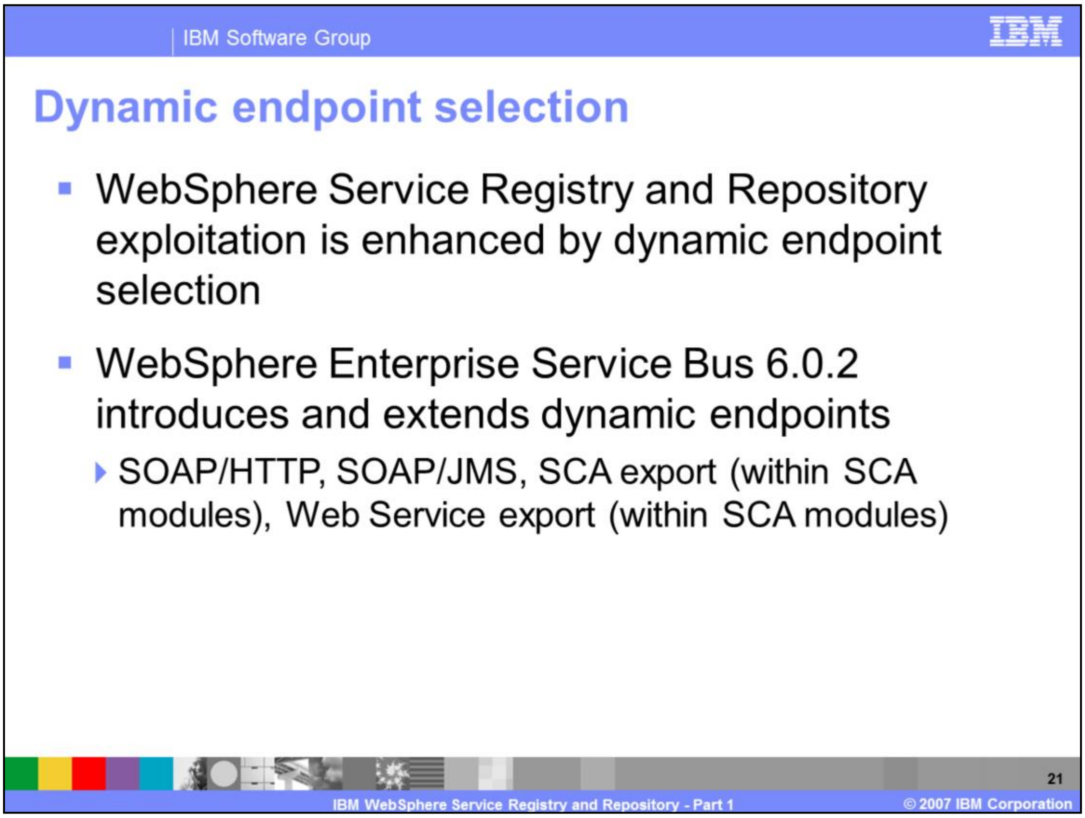


Endpoint Lookup : WSRRLookup

User Properties:

Name	Type	Value
CreditServiceType	String	Gold
FullReportsAvailable	XPath	/body/getCustomerCreditScore/input/creditReportNeeded

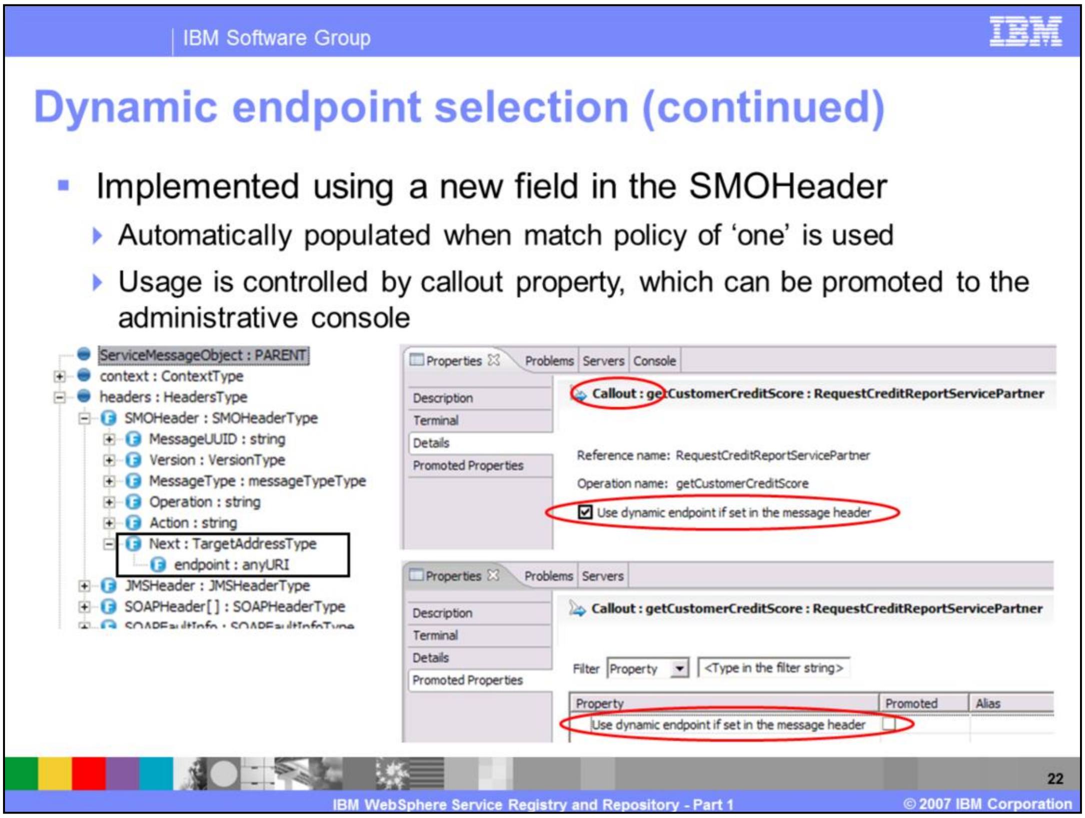
And special user properties or XPath can be leveraged to retrieve special services. The tools completely support these configurations.



Dynamic endpoint selection

- WebSphere Service Registry and Repository exploitation is enhanced by dynamic endpoint selection
- WebSphere Enterprise Service Bus 6.0.2 introduces and extends dynamic endpoints
  - SOAP/HTTP, SOAP/JMS, SCA export (within SCA modules), Web Service export (within SCA modules)

Another feature of the WebSphere Service Registry and Repository is the dynamic endpoint selection.



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Dynamic endpoint selection (continued)

- Implemented using a new field in the SMOHeader
  - Automatically populated when match policy of ‘one’ is used
  - Usage is controlled by callout property, which can be promoted to the administrative console

```
ServiceMessageObject : PARENT
context : ContextType
headers : HeadersType
  SMOHeader : SMOHeaderType
    MessageUUID : string
    Version : VersionType
    MessageType : messageTypeType
    Operation : string
    Action : string
    Next : TargetAddressType
      endpoint : anyURI
  JMSHeader : JMSHeaderType
  SOAPHeader[] : SOAPHeaderType
```

Callout : getCustomerCreditScore : RequestCreditReportServicePartner

Reference name: RequestCreditReportServicePartner

Operation name: getCustomerCreditScore

☑ Use dynamic endpoint if set in the message header

Callout : getCustomerCreditScore : RequestCreditReportServicePartner

Filter Property <Type in the filter string>

Property	Promoted	Alias
Use dynamic endpoint if set in the message header	□	

22

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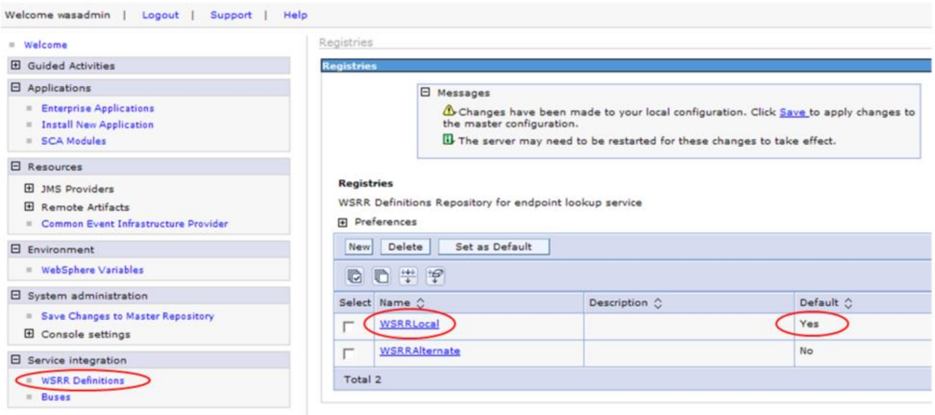
So the endpoint gets selected during run time by using different selection parameters.

In this way the application can for example configure additional parameters like “Gold service”, but the real endpoints are configured and administered in the WebSphere Service Registry and Repository.

If the endpoints change, the application does not need to be changed and redeployed.

Registry definitions

- Single point of definition for WebSphere Service Registry and Repository references



Registries

Messages

⚠ Changes have been made to your local configuration. Click Save to apply changes to the master configuration.

The server may need to be restarted for these changes to take effect.

Registries

WSRR Definitions Repository for endpoint lookup service

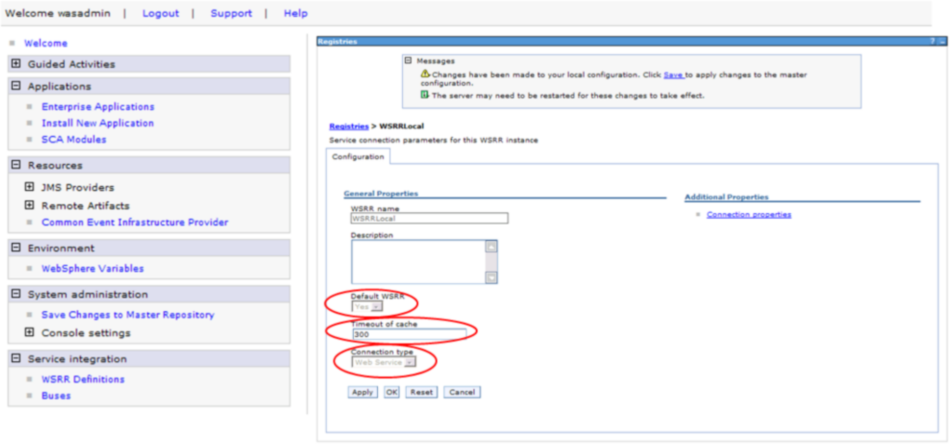
Preferences

Select	Name	Description	Default
□	WSRRLocal		Yes
□	WSRRAlternate		No
Total 2			

The configuration of the WebSphere Service Registry and Repository reference is done in the administrative console.

Registry definitions

- Single point of definition for WebSphere Service Registry and Repository references



Messages

Changes have been made to your local configuration. Click Save to apply changes to the master configuration.

The server may need to be restarted for these changes to take effect.

Registries > WSRRLocal

Service connection parameters for this WSRR instance

General Properties

WSRR name: WSRRLocal

Description:

Default WSRR: Yes

Timeout of cache: 300

Connection type: Web Service

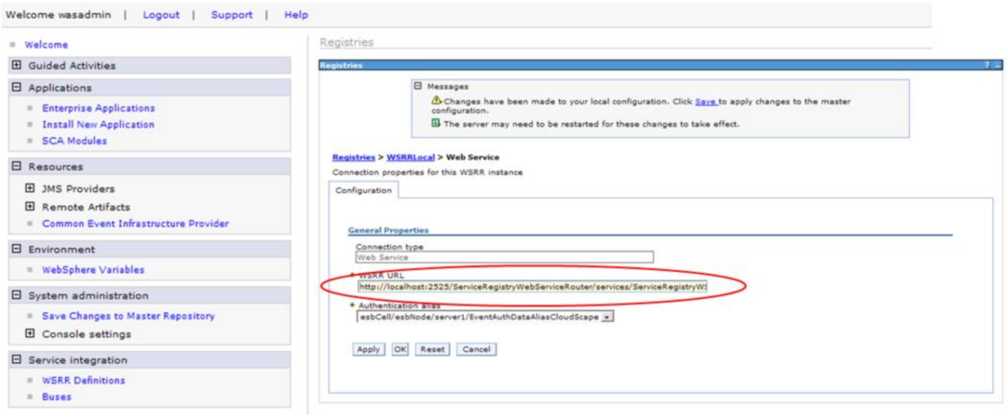
Additional Properties

- Connection properties

The standard options for default,timeout or connection type configuration are used.

Registry definitions

- Single point of definition for WebSphere Service Registry and Repository references



Welcome wasadmin | Logout | Support | Help

- Welcome
- ⊞ Guided Activities
- ⊟ Applications
  - Enterprise Applications
  - Install New Application
  - SCA Modules
- ⊟ Resources
  - ⊞ JMS Providers
  - ⊞ Remote Artifacts
  - Common Event Infrastructure Provider
- ⊟ Environment
  - WebSphere Variables
- ⊟ System administration
  - Save Changes to Master Repository
  - ⊞ Console settings
- ⊟ Service integration
  - WSRR Definitions
  - Buses

Registries

Registries

⊟ Messages

⚠ Changes have been made to your local configuration. Click Save to apply changes to the master configuration.

The server may need to be restarted for these changes to take effect.

Registries > WSRRLocal > Web Service

Connection properties for this WSRR instance

Configuration

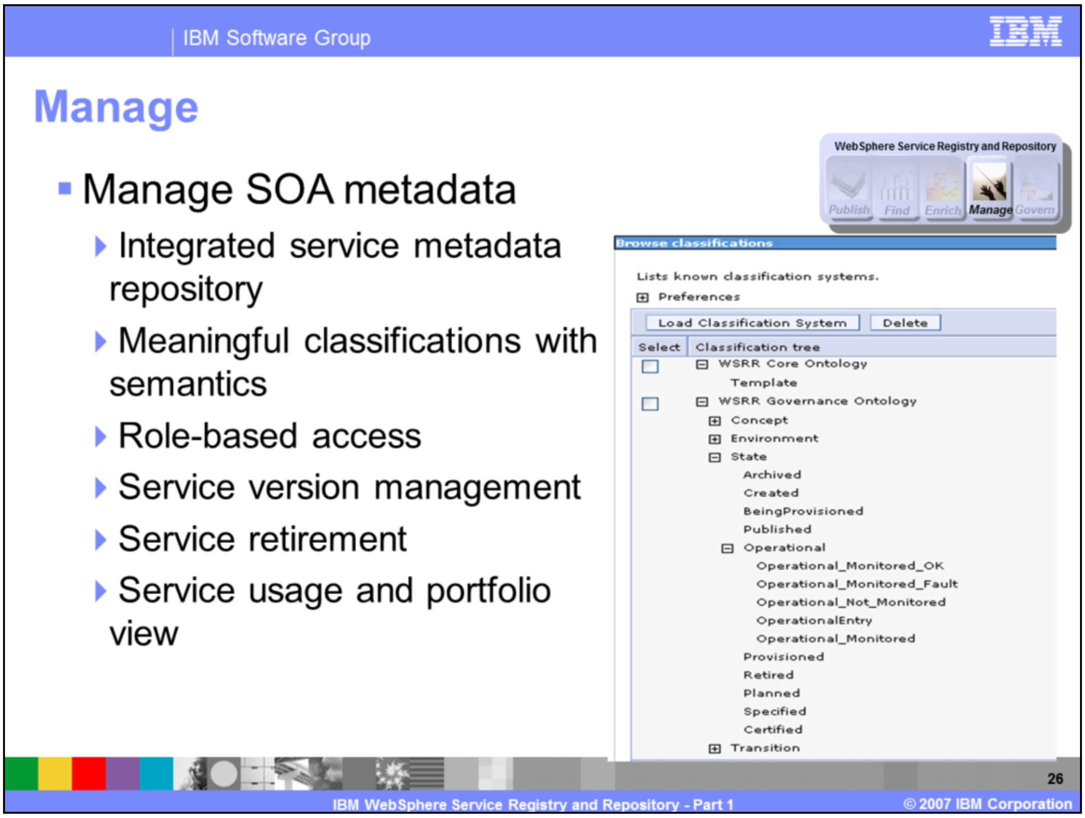
General Properties

Connection type: Web Service

* WSRR URL: http://localhost:2525/ServiceRegistryWebServiceRouter/services/ServiceRegistryWS

* Authentication alias: esbCell/esbNode/server1/EventAuthDataAliasCloudScape

The connection type needs a WebSphere Service Registry and Repository URL.



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Manage

- Manage SOA metadata
  - Integrated service metadata repository
  - Meaningful classifications with semantics
  - Role-based access
  - Service version management
  - Service retirement
  - Service usage and portfolio view

Browse classifications

Lists known classification systems.

⊞ Preferences

Load Classification System | Delete

```
Select  Classification tree
☐       ⊟ WSRR Core Ontology
              Template
☐       ⊟ WSRR Governance Ontology
            ⊞ Concept
            ⊞ Environment
            ⊟ State
                  Archived
                  Created
                  BeingProvisioned
                  Published
                ⊟ Operational
                      Operational_Monitored_OK
                      Operational_Monitored_Fault
                      Operational_Not_Monitored
                      OperationalEntry
                      Operational_Monitored
                  Provisioned
                  Retired
                  Planned
                  Specified
                  Certified
            ⊞ Transition
```

26

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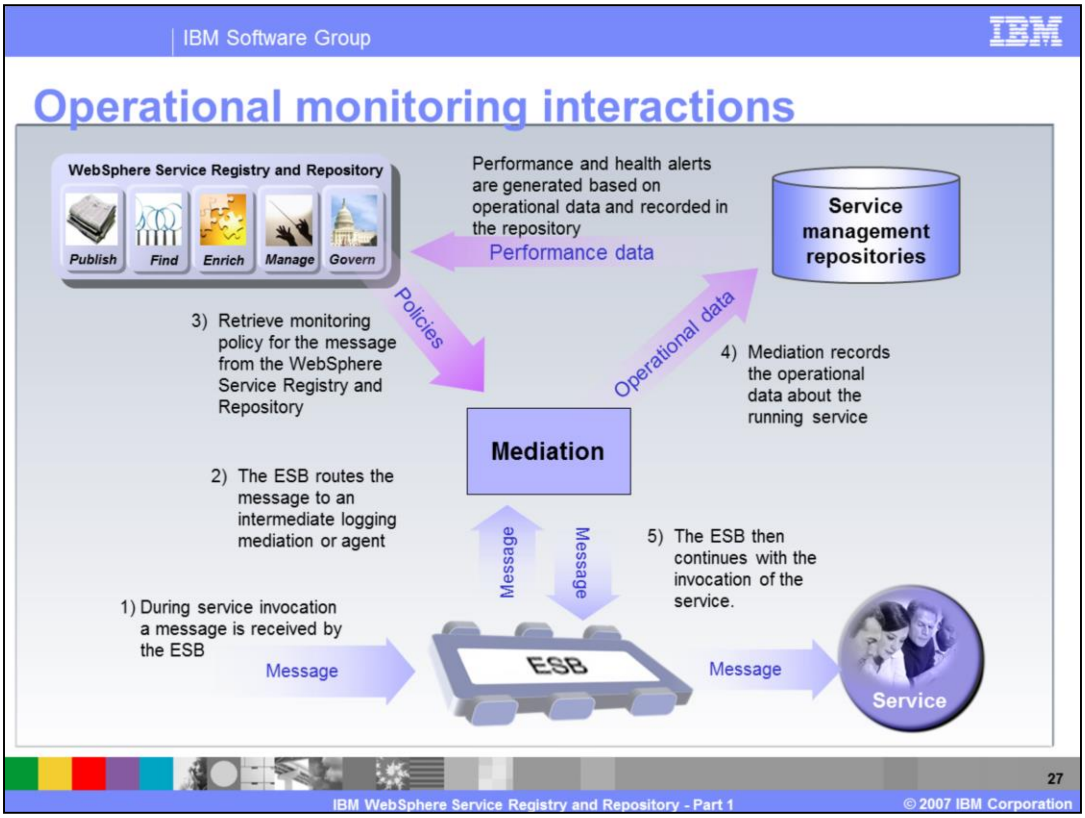
The WebSphere Service Registry and Repository has an integrated service metadata repository to store meaningful classifications with semantics.

This makes it much easier to manually find a special service or tools supported.

The WebSphere Service Registry and Repository supports a role-based access so that the accessible services can be configured rights can be edited on the services.

A complete service version management, retirement and usage view is included in the WebSphere Service Registry and Repository also.



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Operational monitoring interactions

Performance and health alerts are generated based on operational data and recorded in the repository

3) Retrieve monitoring policy for the message from the WebSphere Service Registry and Repository

4) Mediation records the operational data about the running service

2) The ESB routes the message to an intermediate logging mediation or agent

5) The ESB then continues with the invocation of the service.

1) During service invocation a message is received by the ESB

27

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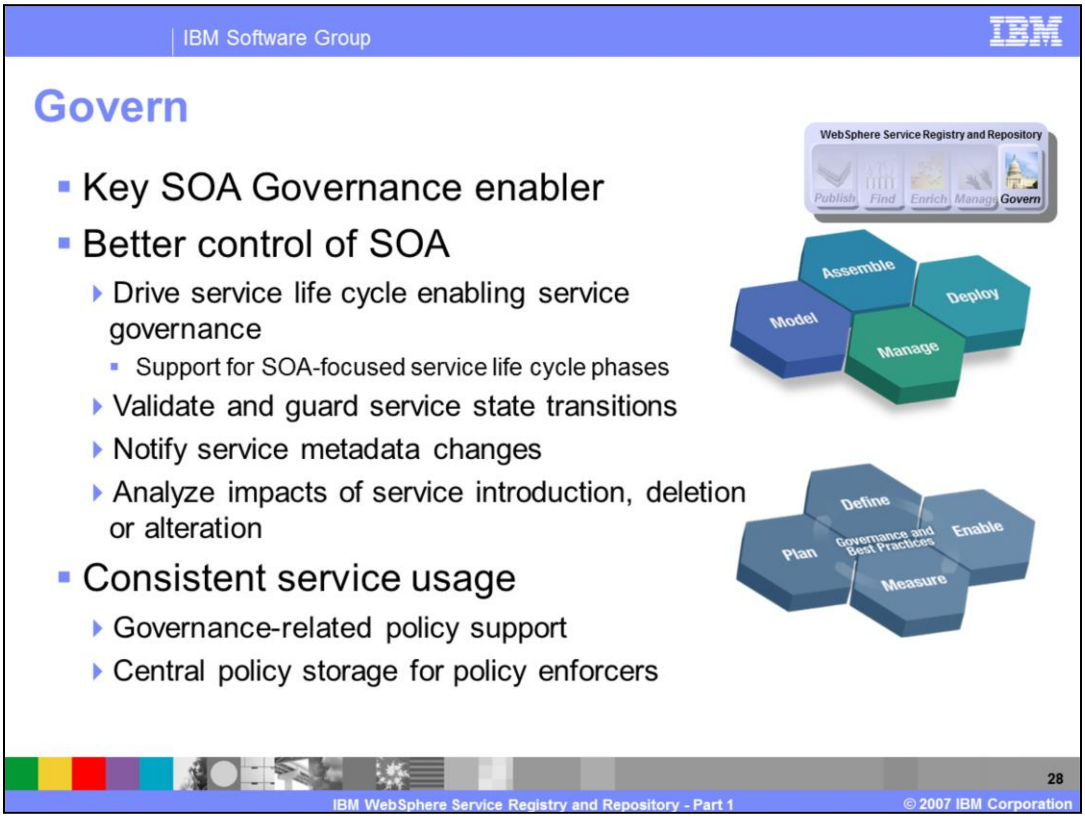
The service registry is accessed by monitoring mediations to determine which services are to be monitored and to acquire any monitoring requirements such as filters to apply. An example of such a filter is to monitor submitOrder requests that originate only from certain partners. This allows different services, say from a new external partner, to be monitored differently from those of more established partners. During runtime, mediations can act on the collected data to affect filtering and routing decisions.

Service management tools capture and assess the performance of services against business and operational performance objectives. This information will be linked to service descriptions in the WebSphere Service Registry and Repository and accessed by mediations at runtime to affect dynamic routing, filtering and other kinds of decisions, providing operational flexibility.



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Govern

- Key SOA Governance enabler
- Better control of SOA
  - Drive service life cycle enabling service governance
    - Support for SOA-focused service life cycle phases
  - Validate and guard service state transitions
  - Notify service metadata changes
  - Analyze impacts of service introduction, deletion or alteration
- Consistent service usage
  - Governance-related policy support
  - Central policy storage for policy enforcers

28

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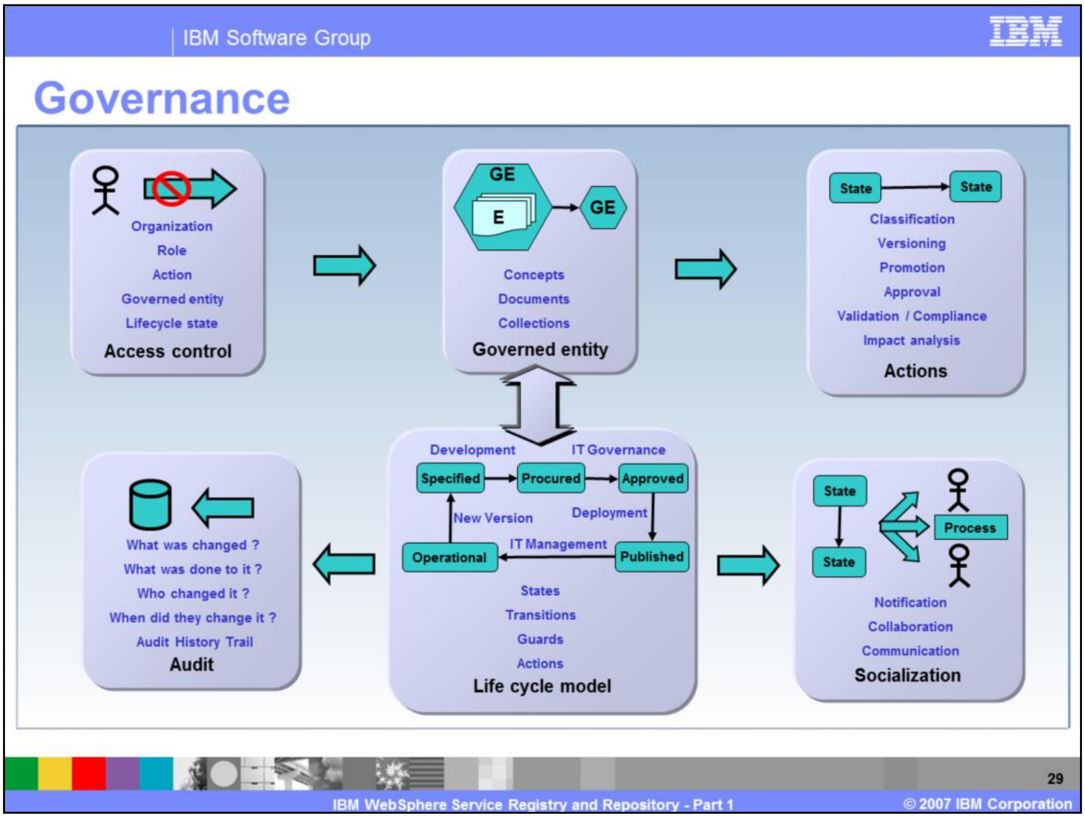
It is not enough to create services and store the connection data; the whole lifecycle of a service need to be monitored.

A service can get introduced, measured, used and sunset without losing the overview.

This governance is a key enabler of SOA.

The defined SOA focused service life cycle include phases such as service inception, service reuse, service version handling, service retirement, service promotion, service availability, service funded, and so on.



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Governance

Organization
Role
Action
Governed entity
Lifecycle state
Access control

GE
E
GE
Concepts
Documents
Collections
Governed entity

State
State
Classification
Versioning
Promotion
Approval
Validation / Compliance
Impact analysis
Actions

What was changed ?
What was done to it ?
Who changed it ?
When did they change it ?
Audit History Trail
Audit

Development
IT Governance
Specified
Procured
Approved
New Version
Deployment
IT Management
Operational
Published
States
Transitions
Guards
Actions
Life cycle model

State
State
Process
Notification
Collaboration
Communication
Socialization

29

IBM WebSphere Service Registry and Repository - Part 1

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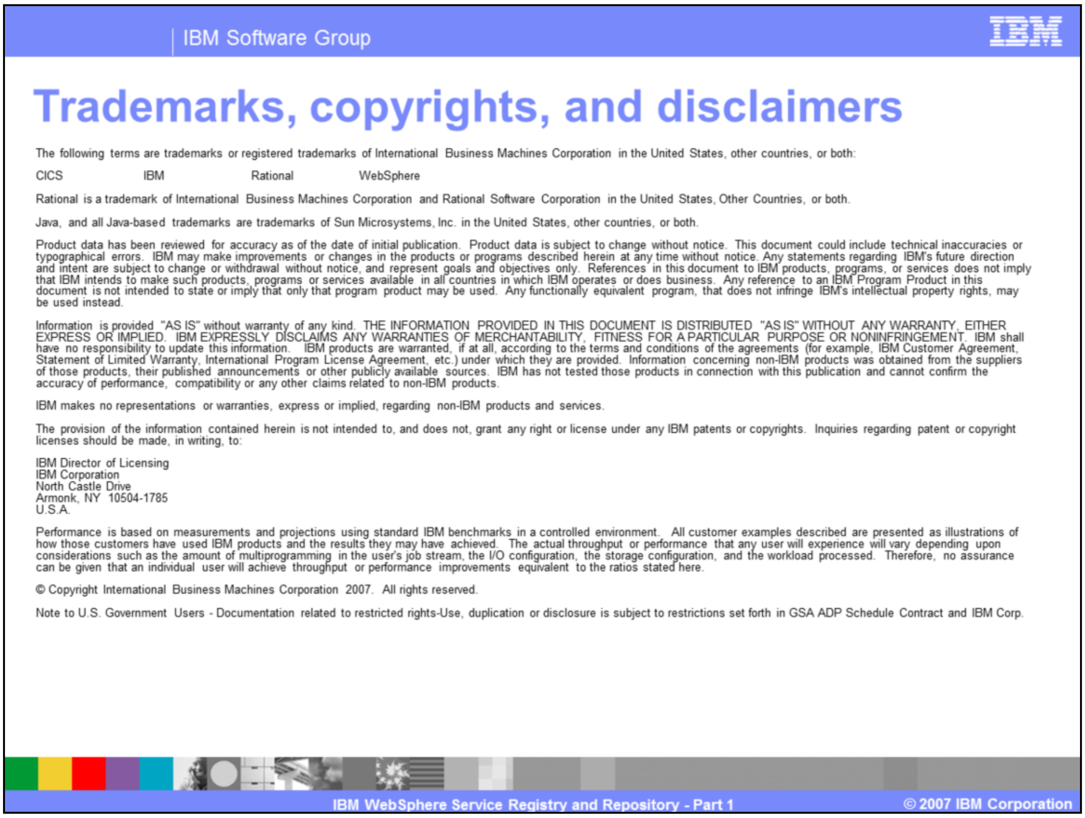
This slide shows a high level view of governance as it applies to the service registry and repository.

The WebSphere Service Registry and Repository governance module provides a simple configurable life cycle model that can be used to manage governed entities (services and other assets) through an SOA life cycle. This is represented as a state machine with the states indicating the position of the service or asset in its life cycle. Transitions are used to validate changes to the governed entities and apply access control before performing the action represented by the transition. Following a successful transition the governed entity then adopts a new state.

During governance processes, users will perform actions on the governed entities (like services and assets) in the WebSphere Service Registry and Repository subject to access control. These actions are constrained by the life cycle model thus ensuring governance and changes in state are socialized to other users or systems where needed, and audited for assurance of the governance processes.



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IBM WebSphere Service Registry and Repository - Part 1

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