IBM WebSphere
Service Registry and Repository

Technical Overview

SOA on your terms and our expertise

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Agenda

- Introduction
- Capabilities
  - Publish and Find
  - Enrich
  - Manage
  - Govern
  - Extend
- Development process and Roadmap
Service Oriented Architecture Lifecycle

**Assemble**
Assemble existing and new assets to execute and manage business processes

**Model**
Capture, simulate, analyze, and optimize business models to reduce risk and increase flexibility

**Governance & Processes**
Alignment of strategy and operations across business and IT in support of business objectives

**Deploy**
Deployment of models, policies and assemblies to realize business intent

**Manage**
Real-time visibility and analysis of business information for timely and coordinated action
What is SOA Governance?

There are different aspects of Governance, based on the process(es) that are going to be governed.

**SOA Governance** is an extension of **IT Governance**.

**SOA Governance**: examples of candidate governed processes
- Service funding
- Service ownership
- Service creation
- Service reuse
- Composite application design

**IT Governance**: examples of candidate governed processes
- Requirements management
- Portfolio management
- Change management
- Data design
- Architectural design
- Release management
SOA needs a registry and repository to enable governance

Define the Governance Approach

Deploy the Governance Model Incrementally

SOA Governance Enable challenges
- Eliminate and prevent unnecessary service proliferation
- Change management for shared services
  - Security & authentication
  - Decision rights & process

A registry AND repository is needed to enable governance
- Infrastructure to help organize and discover services assets, govern access and monitor service vitality
- Policies for publishing, using and retiring services
- Change management

Establish the Governance Need

Monitor and Manage the Governance Processes
What is a registry … a repository?

**Registry?**
Contains Service Metadata

**Repository?**
Stores Service Artifacts

An integrated Registry / Repository Solution is needed. Govern and manage SOA for maximum value.

- Business process vitality
- New value through reuse of assets
- Improved connectivity
- Closer alignment of IT to business
- Business Flexibility
WebSphere Service Registry & Repository

Crossing multiple SOA Entry Points

WebSphere Service Registry & Repository delivers...

- Integrated service metadata registry and repository to govern services and manage service lifecycle promoting visibility, consistency and reducing redundancy in your SOA
- Seamless publish and find capabilities across all phases of SOA fostering reuse of services, enriching connectivity with dynamic and efficient interactions between services at runtime

**New feature highlights**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Key benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Publish and find services and related metadata through all stages of SOA</td>
<td>Promote reuse and eliminate redundancies</td>
</tr>
<tr>
<td>Integration and federation with other standard registries and repositories</td>
<td>Enrich SOA runtime interaction</td>
</tr>
<tr>
<td>Enable optimized access to service metadata</td>
<td>Better control of SOA with governance</td>
</tr>
<tr>
<td>Manage service interactions and policies</td>
<td></td>
</tr>
<tr>
<td>Facilitate service lifecycle with guards for state transitions</td>
<td></td>
</tr>
<tr>
<td>Analyze impacts of service introduction, deletion or alteration by maintaining relationships</td>
<td></td>
</tr>
<tr>
<td>Manage role based access to services, changes, versioning and service retirement</td>
<td></td>
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</tbody>
</table>
The WebSphere Service Registry and Repository provides value throughout the SOA lifecycle.

**Encourage Reuse**
Find and reuse services for building blocks for new composite applications.

**Enhance Connectivity**
Enable dynamic and efficient interactions between services at runtime.

**Enable Governance**
Govern services throughout the service lifecycle.

**Help optimize service performance**
Enable enforcement of policies. Impact analysis.
IBM WebSphere Service Registry and Repository Capabilities

**Encourage Greater Reuse**
Find and reuse services for building blocks for new composite applications.

**Publish and find…**
- Services descriptions and capabilities
- Service interactions, dependencies and redundancies
- Service lifecycle stage
- Policies for service usage
## WebSphere Service Registry & Repository Content

### Service Description Entities

#### Physical Documents
- WSDL
- XSD
- SCDL
- WS-Policy
- XML – User-defined Documents
- .....  

#### Logical derivations
- Interface
- Operation
- Message
- Type
- Service
- Binding
- Endpoint
- .....  

#### Concepts
- User-defined by classification
- Business Application
- Business Process
- Governed Collection
- External reference

### Service Description Metadata

#### Properties
- name
- namespace
- version
- description
- modifiedDate
- name
- namespace
- User-defined
- metrics

#### Relationships
- imports
- includes
- predecessor
- User-defined
- derivedFrom
- operations
- messages
- User-defined

#### Classifications
- User-defined States
- Created
- Approved
- Published
- Operational
- User-defined Environments
- Development
- Test
- Approval
- Production
- User-defined Concepts
- Application
- Process
- Capability
- User-defined
- Service
- ServiceInterface
- governedEntities
- policies
- .....  

Metadata applies to all entities

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SOA on your terms and our expertise
IBM WebSphere Service Registry and Repository Makes It Easy......To Publish using Web UI

Preparing to load the document

Specify the file to load.

Path to the service document.

Properties

General Properties

Key
MyCustomProperty

Value
My Custom Value

Additional Properties

- Port types
- Bindings
- Services
- Custom properties

Relationships

- Imported schemas
- Included schemas
- Imported WSDLs
- Custom relationships
- Classifications

Apply OK Reset Cancel
IBM WebSphere Service Registry and Repository Makes It Easy......
To Find using Web UI
IBM WebSphere Service Registry and Repository Makes It Easy......To Publish and Find using Eclipse Plug-In
IBM WebSphere Service Registry and Repository Capabilities

**Enhance Connectivity**
Enable dynamic and efficient interactions among services at runtime.

- Manage dynamic and efficient access to services information by runtimes
  - Service endpoint selection
  - Service availability management
  - Policy enforcement
- Identify users of metadata
- Notify users of changes
- Securely transmit service information
IBM WebSphere Service Registry and Repository Makes It Easy……To Enhance Connectivity

- Through pre-defined nodes for
  - WebSphere Message Broker
  - WebSphere Enterprise Service Bus

Message Flow/Mediation

WSRR

Meta-Data:
- DowJones
- NASDAQ

DowJones WSDL
- NASDAQ WSDL
- Finance 0.01
- Finance 0.03

Metadata Repository

Service Requestor

WSRR Lookup

SRRetrieveITService

Local Cache

Soap

Lookup

Filter

Map

Invoke

Invoke

NASDAQ WSDL

DowJones WSDL

NASDAQ

DJ WSDL

Meta-Data:
- Category
- Cost

...
Endpoint Lookup Mediation Primitive

- Endpoint Lookup mediation primitive
  - Can be configured to search for service endpoints using various selection criteria
  - Utilizes the WebSphere Service Registry and Repository as the registry
- Supports of Dynamic Endpoints enhancement
  - Primitive does the lookup, Dynamic Endpoints needed to actually call it
- WESB/WPS runtime provides a cache for registry lookups
  - Intended to boost performance for registry lookups

Benefits:
- Enable registry lookup of service endpoints at runtime
  - Endpoints can be managed using WebSphere Service Registry and Repository
  - Mediation flow can be easily configured to perform registry lookups
  - Capabilities of registry for service selection enable new application scenarios
- More flexibility in managing mediation flows without requiring redeploy
Endpoint Lookup – Properties

- Properties define search criteria for endpoint selection
  - Name
    - Port type name
    - Typically matches the Interface on the Reference for the dynamic callout
  - Namespace
    - Port type namespace
  - Version
    - A freeform string used to represent the version of the port type
    - This is matched with a version field associated with the port type in WSRR
    - There is no equivalent of this in WID
  - Registry Name
    - Identifies the registry against which to do the lookup
    - Registries are administratively defined in the server runtime at the cell level
    - Leaving this blank results in use of the registry designated as the default
  - Match Policy
    - Return one matching endpoint – arbitrarily select one returned endpoint to place in the SMO
    - Return all matching endpoints – place all returned endpoints in the SMO
Dynamic End-point Selection

- Provide enhanced callout nodes to allow for dynamicity
  - Boolean attribute on callout node to indicate if dynamicity of endpoint is allowed
  - SMO header enhanced to allow with a target address element

Benefit:

- Enable selection of service endpoints at runtime
  - Mediation flow has greater influence on dynamic routing
  - Endpoint address can by constructed and/or looked up by the mediation flow
  - Target endpoint does not have to be predefined in the mediation flow
- More flexibility in managing mediation flows without requiring redeploy
- Enables integration with WebSphere Service Registry and Repository
Tooling Support – Dynamic Endpoint

**Callout Node**

```
doTest : ServicePartner
    Callout:
```

**Callout Node Properties**

- Reference name: ServicePartner
- Operation name: doTest

- Use dynamic endpoint if set in the message header

**Assembly Diagram**

**Default Endpoint**

**SMOHeader**

```
headers : HeadersType
    SMOHeader : SMOHeaderType
        MessageUID : string
        Version : VersionType
    MessageType : messageType
        Operation : string
        Action : string
    Target : TargetAddressType
        address : anyURI
```
Usage Scenario – Routing Insurance Claims

Assembly Diagram

Mediation Flow

Database Lookup Properties

Provider name used as key to DB lookup
Provider name obtained from body of SMO
Endpoint address set into SMOHeader target address
IBM WebSphere Service Registry and Repository

Help optimize service usage and performance

- Manage service interactions, dependencies, relationships and redundancies
- Classify services into meaningful groupings based on business objectives
- Manage policies for service usage and governance
- Manage change and versioning of services
- Analyze services usage, history and business impact
- Promote and encourage optimal services usage
IBM WebSphere Service Registry and Repository Makes It Easy......
To Manage relationships

- Through automatic discovery of relationships

## Built-in Relationships

<table>
<thead>
<tr>
<th>Derived entity reference to its source document</th>
</tr>
</thead>
<tbody>
<tr>
<td>WSDL or XSD document to imported XSD document</td>
</tr>
<tr>
<td>WSDL or XSD document to included XSD document</td>
</tr>
<tr>
<td>WSDL or XSD document to redefined XSD document</td>
</tr>
<tr>
<td>WSDL document to imported WSDL document</td>
</tr>
<tr>
<td>Entity reference to classification</td>
</tr>
<tr>
<td>Entity relationship to predecessor</td>
</tr>
<tr>
<td>Non-derived entity reference to its template</td>
</tr>
<tr>
<td>WSDL service to WSDL port</td>
</tr>
<tr>
<td>WSDL port to WSDL binding</td>
</tr>
<tr>
<td>WSDL port to SOAP address</td>
</tr>
<tr>
<td>WSDL binding to SOAP binding</td>
</tr>
<tr>
<td>WSDL binding to WSDL port type</td>
</tr>
<tr>
<td>WSDL port type to WSDL operation</td>
</tr>
<tr>
<td>WSDL operation to fault WSDL message</td>
</tr>
<tr>
<td>WSDL operation to input WSDL message</td>
</tr>
<tr>
<td>WSDL operation to output WSDL message</td>
</tr>
<tr>
<td>WSDL message to WSDL part</td>
</tr>
<tr>
<td>WSDL part to XSD type</td>
</tr>
<tr>
<td>WSDL part to XSD element declaration</td>
</tr>
<tr>
<td>SCA module entity reference to SCA import document</td>
</tr>
<tr>
<td>SCA module entity reference to SCA export document</td>
</tr>
<tr>
<td>SCA module entity reference to XML schema definition document</td>
</tr>
<tr>
<td>SCA module entity reference to WSDL document</td>
</tr>
<tr>
<td>SCA module entity reference to SCA module document</td>
</tr>
<tr>
<td>SCA module to SCA import entity</td>
</tr>
<tr>
<td>SCA module to SCA export entity</td>
</tr>
<tr>
<td>SCA import or export entity reference to SCA interface</td>
</tr>
<tr>
<td>SCA import entity to SCA import binding</td>
</tr>
<tr>
<td>SCA export entity to SCA export binding</td>
</tr>
<tr>
<td>SCA import binding entity reference to SCA export binding entity</td>
</tr>
<tr>
<td>SCA web service import binding to WSDL port</td>
</tr>
<tr>
<td>SCA WSDL port type reference to WSDL port type</td>
</tr>
<tr>
<td>XSD complex type reference to a local attribute</td>
</tr>
</tbody>
</table>
IBM WebSphere Service Registry and Repository Makes It Easy......To Manage relationships...

- Through manual definition:

  - RepairAddressService
  - RepairLocalAddressService
  - RepairGlobalAddressService
IBM WebSphere Service Registry and Repository Makes It Easy......To Manage Impact Analysis

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>ObjectType</th>
<th>Version</th>
<th>ImpactRelationship</th>
<th>RelationshipName</th>
<th>OriginatingObject</th>
</tr>
</thead>
<tbody>
<tr>
<td>Repair Local Address Service</td>
<td>Update the customer local address</td>
<td>concept</td>
<td>3.0</td>
<td>Depends on</td>
<td>serviceDependencies</td>
<td>Repair Address</td>
</tr>
<tr>
<td>Repair global Address Service</td>
<td>Update the customer global address</td>
<td>concept</td>
<td>3.0</td>
<td>Depends on</td>
<td>serviceDependencies</td>
<td>Repair Address</td>
</tr>
<tr>
<td>Businessnames.xml</td>
<td>JK Enterprise business objects</td>
<td>XML schema definition document</td>
<td>3.0</td>
<td>Depends on</td>
<td>serviceDependencies</td>
<td>Repair Address</td>
</tr>
</tbody>
</table>

**Totals:** 3

- Entity reference to classification
- Entity relationship to preferences
- Non-derived entity reference to its template
- WSDL service to WSDL port
- WSDL port to WSDL binding
- WSDL port to SOAP address
- WSDL binding to SOAP binding

- serviceDependencies
- providedInterface
- availableEndpoints
- serviceDependencies
- endpointReference
- definingWSDL
- serviceDependencies
IBM WebSphere Service Registry and Repository Makes It Easy......To Manage Classifications
IBM WebSphere Service Registry and Repository Makes It Easy……To Manage Notification

- Through Subscription and Notification
  - Email based and JMS based notification

- Extensible notification framework

- Granularity
  - Per entity
  - By classification
  - By operation … create, update, delete
  - By transition
IBM WebSphere Service Registry and Repository Makes It Easy…… To Manage

- Through integration with ITCAM for SOA
Enable Governance
Govern services throughout the service lifecycle

- Infrastructure to help organize and discover services assets, govern access and monitor service vitality
- Classification of services by lifecycle phase
- Policies for publishing, using and retiring services
- Roles based access
IBM WebSphere Service Registry and Repository Makes It Easy......To Govern
IBM WebSphere Service Registry and Repository Makes It Easy……To Extend

- Through user-defined roles and resource based permissions
  - User bill can access services of type finance
  - User bill can access XSD files named FinanceBO*
- Through user-defined classifications
- Through user-defined service lifecycle
- Through user-defined validators and notifiers
WebSphere Service Registry & Repository Runtime Integration

WebSphere Service Registry and Repository

Publish
Find
Enrich
Manage
Govern

Business Services Fabric
Enterprise Service Bus
Message Broker
Process Server
CICS
Generic Client (.Net or other)

ITCAM for SOA

Mediations based on WSRR Lookup
MB Routing Nodes based on WSRR lookup
Mediations based on WSRR Lookup
Any CICS Web services provider program publish and read capability
Web services client can publish and search
The Approach:
- Incremental development process
  - Field-based development model and Iterative code availability
  - Very effective in releasing ready for prime time product with 8 iterations for Release 1 (Version 6.0)
- Linkage across SWG for key components and integration
  - First class consumption and exploitation across the SOA Foundation
- **Early Access Program continues**
  - Effective and customer focused requirements
Features Summary of WebSphere Service Registry and Repository

- User role based browser perspectives
- Standards based service metadata documents support
- “Shredding” documents into meaningful and optimized organization
- Query
  - Keyword and wizard based search
- Classification
  - OWL based ontologies
  - Customization enabling governance capabilities, state transitions, lifecycle actions
- Eclipse based toolset integrating into Eclipse 3.0.x based IDEs
- Java and Web services API
- Command line utilities
- Subscription and Notification support
- Impact Analysis
  - Service Relationships
Thank you!