Web Services Distributed Management

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Agenda

• History and Members
• Web Services Platform
• WSDM Management Using Web Services
  – Foundations
  – Capabilities
• WSDM Management Of Web Services
• Specification Roadmap
• Relationship to other standards organizations
Membership and History

• WSDM was chartered in Feb 2003
  – Management Protocol TC was chartered in 2002 and then rechartered as WSDM with a broader charter

• CoChairs: Heather Kreger, IBM
  Winston Bumpus, Dell, DMTF President

• Broad representation by member companies
  – Management – Amberpoint, BMC, CA, HP, IBM, …
  – Devices – Cisco, Dell, HP, IBM, SUN, …
  – Application Servers – BEA, IBM, Oracle, SUN...
  – Customers – Mitre, …
Web Services Distributed Management: Missions

• Management USING Web Services (MUWS)
  – Web services to describe and access manageability of resources
  – Management applications use Web services just like other applications use Web services

• Management OF Web Services (MOWS)
  – An application of Management Using Web Services for the Web Service as the IT resource

• Use Web Services as the distributed computing platform to enable interoperability between managers and manageable resources
Web Services Distributed Management

- Defines a set of manageability capabilities which manageable resources can choose to support
- Each capability specifies message exchanges, properties, and events
- Capabilities are described by interfaces using WSDL portTypes, WS-Resource Properties, Metadata, and Policies, etc.
  - Foundational Manageability Capabilities:
    - Operational State, Metrics, .. (WSDM)
  - Resource Specific Manageability Capabilities:
    - Web service (WSDM), Disk, etc ... (DMTF, GGF, etc.)
- Defines common manageability services: Registry, Relationships, Collection, …
- Existing models (CIM, SNMP, OMI, OBD-II, etc.) are a source for properties, operations, and events for the schemas and interfaces
Web Services Architecture and the Manageable Resource
MUWS Concepts

Management Application

Requests, Control, Subscriptions

messages

Information, Events

Manageable Resource (e.g. Printer)
Agentless: Agents or no Agents

Management Application

Manageable Resource

Resource

Management Application

Manageable Resource

Resource

Management Agent
A Manager’s view

- Registry
- Policies and SLAs
- Web Service
- Application Server
- CIM or SNMP Manager
- Agent
- Printer system

DMTF Web Service Manageability (WSDM) Endpoint
Web Services Distributed Management

• Web services architecture replaces or ‘hides’ the traditional Manager/Agent architecture

• Managers always ‘talk’ to the resource while the actual Web Service endpoint may be supported by any number of management agents

• Web Services de-couple manageability capabilities FROM
  – HOW you access the it
  – WHERE you access the it
  – HOW the it is implemented
  – WHEN it was implemented
WHY Add in this new layer?????

- Managers need access to manageability END TO END
  - Across platforms, languages, applications, AND existing management technologies
  - B2B Web services makes this worse! Federated management is required.
  - SLA Monitoring, WorkFlows, Work balancing, Utility computing, pay-per-Quality of Service…
  - Standards are just starting, we’re developing technology to help us solve these up-coming challenges

- Ubiquitous, low entry point infrastructure!
  - HTTP & the Web

- It’s JUST distributed computing, again
  - so leverage Web services infrastructure for scalability, security, etc., don’t re-invent it

- Integration/interoperability between business and IT management domains of the enterprise
  - Management systems gain visibility into business applications and processes
  - Business applications and processes can take advantage of the manageability of resources
Web Services Platform

Management application requires a Web services platform with the following capabilities:

- XML, XML Schema
- WSDL
- SOAP
- WS-Addressing
- WS-Resource Framework
  - Resource Properties
  - More TBD
- WS-Notification
- WS-Security

Manageable resources only implement the specifications that they need
Management Using Web Services (MUWS)

• Management Foundations
  – Meta information
    • Additional descriptive information about interfaces
    • resources, properties, operations, notifications
  – Relationships
    • Association between two IT resources
    • Relationship expression schema and property
  – Management Event Format
    • XML format, carry events from any source
  – Discovery
    • Creating manageable resources from traditional discovery engines
    • Finding resources
    • Introspection of manageability capabilities
Management Using Web Services

• Manageable Resource:
  – Is a Web Service
    • Described by WSDL, WS-Resource Properties, Meta information, Policies,
  – Is a WS-RF WS-Resource
  – MUST support WSDM’s Identity capability with properties (ResourceID, optional Name and Version).
  – Advertises the properties/operations (message exchanges) of the resource to be managed
Management Using Web Services

Capabilities

• Specification of composable semantics to enable a management task

• WSDL, WS-Resource documents, Meta Information, Policies, Notification topics
  – Identity
  – Metrics
  – Operational State
  – Configuration
  – Correlatable Names
  – Relationships
Capabilities – Operational State

• State property
• Events on state changes
• Mechanisms to convey the state model
  – Resource model defines the resource specific state models and semantics
• Tying Operations to state changes is being explored
Capabilities - Metrics

• Defining standard metric types/behaviors (collaboration with DMTF Metrics WG)

• Each metric contains its Type, Time scope, LastUpdatedAt, ResetAt
  – IntegerMetric
  – DurationMetric

• Properties: CurrentTime

• Operations: none

Resource specific metrics
Management Of Web Services

• Based on Management Using Web Services
• Reuses work from W3C Web Services Architecture Management Task Force work for
  – Lifecycle, Request Processing, Metrics, Endpoint

• Specifies composeable manageability capabilities for use by Web services architects, designers and implementers
• Manageability for the service side of the IT resources and applications exposed as Web services
• Common base for use by Web services management applications
Management of Web Services

- **Simplification**
  - Use of Web services technologies for management purposes

- **Unification**
  - Manageability capabilities defined and useable just like any other operational capability of a service
  - Composeable with operational capabilities

- **Integration**
  - Management applications gain visibility into business/operational side of applications
  - Business applications and processes can use manageability capabilities to their advantage
Composeability
Composeability in SOAP

<s:Envelope …>
  <s:Header …>
    ...
    <muws:ResourceID>…</muws:ResourceID>
    ...
  </s:Header>
  <s:Body …>
    <wsrp:GetMultipleResourcePropertiesResponse>
      <disk:Size units="gigabyte">200</disk:Size>
      <mows:NumberOfRequests>1237834596</mows:NumberOfRequests>
    </wsrp:GetMultipleResourcePropertiesResponse>
  </s:Body>
</s:Envelope>
MOWS Concepts

Management Application

Requests, Control, Subscriptions

messages

Information, Events

endpoint

Manageable Web service
Agentless: Agents or no Agents
Manageable Web service endpoint resource (WSDM 1.0)

- Identity -> MUWS
- Identification
  - Refers to the Web service endpoint being managed
- Metrics
  - Common set of quantifiable information about the endpoint behavior
- Operational State -> MUWS
- Request Processing State
  - Notifications against requests being processed by the endpoint
- Relationships -> MUWS
Request Processing State Capability Concepts

- Management Application
- Subscription events
- Messages
- Manageable Web service endpoint
- Application
WSDM 1.0 MOWS Use In

- Service Level assessment
- Service Agreement monitoring
- Availability management
- Performance management
- Content-based monitoring
- Application of management and security policies
- Security audit
- Many others…
Key Points to note

• Convergence of management and business/operational semantics in applications
  – Architect manageable Web services applications
  – Use of Web services technologies allows management to be instrumented in the same way as business applications are instrumented
  – Use manageability information in business applications to increase agility, resilience, flexibility, etc.

• Composeability allows the introduction of manageability into applications without disrupting their business purpose
WSDM Specification Roadmap

Initial contributions from:
• HP: Web Services Management Framework (WSMF)
• IBM, CA and TalkingBlocks (now HP): WS-Manageability

WSDM 0.5 – April 2004
  – Identification
  – Metrics
  – Operational State
  – Successful Interoperability testing among vendors and users
WSDM Specification Roadmap

WSDM 1.0 – targeted for November, 2004

- Extend 0.5 capabilities with events and meta information
- Extend Operational State
- Extend Metrics
- Relationships
- Configuration
- Web service endpoint Request Processing State
WSDM Specification Roadmap

WSDM 2.0 – targeted for November, 2005

– Updated for standardized versions of specifications in draft now
– Other candidates:
  • Policy
  • Provisioning
  • TBD
Relationship to Other Standards Work

• W3C
  – WS Description WG
  – WS Arch WG

• DMTF
  – WIP and its WS-CIM subgroup
  – Utility WG
  – State and Behavior WG

• GGF
  – OGSA Common Manageability Model WG

• OASIS
  – Web Services Resource Framework
  – WS-Notification
  – WS-Security
Q & A
Resources and Supporting Material

• WSDM
  – http://www.oasis-open.org/apps/org/workgroup/wsdm/m

• OASIS – http://www.oasis-open.org
• DMTF – http://www.dmtf.org
• GGF – http://www.ggf.org
• W3C – http://www.w3c.org
DMTF

Models real world managed objects. Large existing model

• Interoperability Working Group
  – WS-CIM - Defining a Web Services access to CIM models and CIM/OMs
  – CIM V3 is moving towards XML schema
• State and Behavior WG
  – State model for CIM
• Utility WG
  – Resource Profiles rendered as Web services
• Application Working Group
Global Grid Forum (GGF)

- OGSA (and related WGs) should be able to use WSDM specifications for the base manageable resource
  - CMM joined WSDM
- WSDM technologies fit into the OGSA taxonomy of requirements of a Web services platform