Proposing Web Service to Web Service Management Standards

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Categories of Standards (related to web service management)

A. Standards for describing functionality of web services.
B. Standards for describing non-functional attributes of web services.
C. Standards for manageability of web services.
D. Standards for execution of transactions across web services.
E. Standards for web service to web service management
Standards for describing functionality of web services

**What?** standards for describing web services, their operations, flows, relationships to other web services, how they can be contacted, and protocols they support

**Why?** they tell a web service management system about the managed objects (services, transactions, composition, etc.)

**Examples:** WSDL, WSFL
Standards for describing non-functional properties of web services

**What?** standards for describing performance, reliability, security, availability, and other quality guarantees of a web service (either absolute guarantees or guarantees as they relate to one customer or a class of customers).

**Why?** they set the goals for a web service management system. The job of the management system is to meet the constraints specified in them.

**Examples:** WSEL (Absolute QoS for web services), SLAs between web services.
Standards for manageability of web services

**What?** standards for obtaining measurements and other data from web services; standards for uniform control of web services; standards for instrumenting web services.

**Why?** they will help easy integration with management systems despite the heterogeneity in web services; they will also enable new forms of management that are otherwise not possible.

**Examples:** ARM, XARM, JMX, CIM, SNMP for web services.
Standards for execution of transactions across web services

**What?** standards for format of messages exchanged between web services; standards for transaction and conversation execution.

**Why?** they will enable a management system to intercept messages flowing between web services and to understand the state of transaction/ conversation.

**Examples:** SOAP.
Standards for web service to web service management

**What?** Management interfaces that will enable web service to web service management.

**Why?** Visibility and control. That will enable cross-enterprise management of web services – SLAs, transactions, etc; they will also help in better dynamic selection and automatic negotiation of web services.
Web Service to Web Service Management

Consumer’s manageability interface

S1

Interactions

S2

Provider’s manageability interface
Need for such standards

- Discovery or pre-composition phase
  - negotiation and selection based on new set of attributes (as opposed to static attributes in UDDI)
    - Quality of service-performance, availability, reliability
    - Service-level guarantees
- Execution or post-composition phase
  - Visibility and control
  - Monitoring and controlling of users, tasks, compliance
  - Dynamic business interaction for re-engineering business process
## Elements of server-side manageability interface

<table>
<thead>
<tr>
<th>Service-level Visibility</th>
<th>Interaction-level Visibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nature of visibility and control supported</td>
<td>Expected time an interaction will take to execute prior to submission</td>
</tr>
<tr>
<td>Quality levels-performance, availability, reliability</td>
<td>Expected time an interaction in progress will take to complete. Track an interaction in progress.</td>
</tr>
<tr>
<td>Quality levels currently being guaranteed to the consumer</td>
<td>Amount of time a completed interaction took</td>
</tr>
<tr>
<td>History of quality levels with all consumers</td>
<td>Quality level being guaranteed on certain types of interactions</td>
</tr>
<tr>
<td>Generic service metrics no of current consumers, avg turn-around time</td>
<td></td>
</tr>
<tr>
<td>Service specific metrics-books sold per second for a book selling service</td>
<td></td>
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## Elements of server-side manageability interface

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<th>Service-level control</th>
<th>Interaction-level control</th>
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<tr>
<td>Change current quality levels being guaranteed to the customer. For e.g., change the consumer from bronze to gold customer</td>
<td>Abort an interaction, suspend an interaction, resume a suspended interaction</td>
</tr>
<tr>
<td>Report a consumer-perceived service level violation to the provider. Ask for an explanation. May result in compensation according to the contract</td>
<td>Change the desired quality level for an interaction</td>
</tr>
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Elements of consumer-side manageability interface

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<th>Service-level Visibility</th>
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</thead>
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<tr>
<td>Nature of visibility and control supported</td>
<td>quality levels for a particular interaction or a class of interactions as perceived on the consumer side</td>
</tr>
<tr>
<td>Quality levels currently being guaranteed to the consumer</td>
<td></td>
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## Elements of consumer side manageability interface

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<td>Slow down the request rate, fail over to a different service</td>
<td>Re-issue or restart an interaction. Suspend an interaction</td>
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</table>
Realizing the vision

- Standards for transporting management and context related information in the headers of other messages

- Management interfaces explicitly defined to enable management conversations
Realizing the vision

• Define set of standard terms
  • Terms such as QoS, contracts, transactions
  • Define standard conversations
  • Need to adhere to standards for being certified manageable

• Standardize extensions to protocols like SOAP as to include manageability information.
  • Headers of request documents capturing quality level expected and conversation context
  • Headers of response documents containing quality level delivered, response time information, and conversation context
Conclusion

- Need for web service to web service management
- Standardization need of the hour


• Sahai A, Machiraju V, Wurster K. Monitoring and Controlling Internet based Services. The Second IEEE Workshop on Internet Applications (WIAPP'01), San Jose, CA July, 2001 (also HPL-2000-120)


• Web Services Flow Language (WSFL),  
  http://www.ibm.com/software/solutions/webservices

• Web Services Description Language (WSDL), http://www.w3.org/TR/wsdl.

• Universal Description, Discovery, and Integration (UDDI),  
  http://www.uddi.org