DIP
Data, Information, and Process Integration with Semantic Web Services
FP6 - 507483

Deliverable

WP 4: Service Usage
D4a.16
Monitoring module prototype

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Oct 31st, 2006
EXECUTIVE SUMMARY

This deliverable focuses on monitoring of Semantic Web Services execution (SWS) and is the prototype for the specification of the monitoring module in DIP (4a.10 – Monitoring Module specification).

It implements the Monitoring Module specification of DIP, which is based on WSDM and adds additional aspects like the ability to use existing Web Services with a proxy approach and logging of data.

This deliverable should be read and used by Web Services component developers, the use-case partners and all others that are interested in monitoring their services.
### Document Information

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**LIST OF KEY WORDS/ABBREVIATIONS**

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<th>Description</th>
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<tr>
<td>MOWS</td>
<td>Management Of Web Services</td>
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<tr>
<td>MUWS</td>
<td>Management Using Web Services</td>
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<tr>
<td>OASIS</td>
<td>Organization for the Advancement of Structured Information Standards</td>
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<tr>
<td>QoS</td>
<td>Quality of Service</td>
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<tr>
<td>SOA</td>
<td>Service Oriented Architecture</td>
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<tr>
<td>SWS</td>
<td>Semantic Web Services</td>
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<td>URL</td>
<td>Unified Resource Loader</td>
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<td>WSDL</td>
<td>Web Service Description Language</td>
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<td>Web Service Distributed Management</td>
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<td>XML</td>
<td>Extensible Markup Language</td>
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<td>GUI</td>
<td>Graphical User Interface</td>
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1 INTRODUCTION

This prototype allows gathering metrics on active Web Services with a Web Services Monitoring Proxy Client. Also, logging is possible. The HTTP request/response header information is always logged. In addition you can enable content logging, which shows you the SOAP body content.

2 TECHNICAL IMPLEMENTATION

The following figure shows the Web Services communication without and with a monitoring component. Monitoring is currently only possible for SOAP over HTTP:

![Diagram showing Web Services communication with and without monitoring](image)

Figure 1: Monitoring prototype as a proxy

2.1 General

On the proxy, the following operations are available:

- **AddManageableService**: This operation adds a Web Service that will be included in the list of monitored Web Services.

- **RemoveManageableService**: This operation removes a Web Service from the list of monitored Web Services.

- **EnableCallContentDump**: This operation is either enabled or not. If it is enabled the content is logged in addition to the always logged HTTP request/response header information. The operation GetCallDump (see below) retrieves the content - see next operation. Since the content can be rather large, logging the content can significantly slow down the performance.

- **GetCallDump**: In addition to the always logged HTTP request/response headers this operation retrieves the content.
• **ResetMetrics**: This operation deletes the metrics of the proxy service operations in a given time interval.

The metrics that will always be logged and pushed to the listening services are:

• **NumberOfRequests**: A counter of the number of request messages that the Web Service endpoint has received and for which a (SOAP) fault was sent in reply. This counter is incremented by 1 whenever a request reaches the received state.

• **NumberOfFailedRequests**: A counter of the number of request messages that the Web Service endpoint has received, and a (SOAP) fault that was sent in reply. This counter is incremented by 1 whenever a request reaches the state Failed.

• **NumberOfSuccessfulRequests**: A counter of the number of request messages that the Web Service endpoint has received and for which anything but a (SOAP) fault was sent in reply. This counter is incremented by 1 whenever a request reaches the state Completed.

• **ServiceTime**: A counter of the total elapsed time (in seconds) that the Web Service endpoint has taken to process all requests (successfully or not).

• **MaxResponseTime**: A gauge indicating the maximum time duration (in seconds) between all requests received and their completion or failure.

• **LastResponseTime**: A gauge indicating the last recorded time duration (in seconds) between the last request received and its completion or failure.

### 2.2 Installation

The monitoring prototype is delivered as a WAR file and could be deployed in each J2EE servlet engine. You find the WAR for installation at

http://demo.inubit.com:8888/monitoringproxy.war

### 3 Graphical Representation

After the deployment in a servlet engine you will find the GUI at the address

http://<host>:<port>/proxy/client

There are different operations, which you can use from the GUI. There is a small help dialog with further explanations, too.

### 3.1 Monitoring Service

In the first tab you find the **Monitoring Service**. It shows the endpoint of the monitoring web service, the available operations and the WSDL.
3.2 Monitoring Services

In the second tab - **Manageable Services** - you can add a web service to the monitoring proxy:

**Figure 3: Add Manageable Services**

After **Add** was clicked, the service is added as a managed service and you will find the web service endpoint of the proxy:
Web Services Monitoring Proxy Client

Manageable Services

Add manageable service to proxy

WSDL URL: 
Description: 

Add Reset

CountryInfoService [wsdl] [remove]
country infos
Monitoring endpoint: http://localhost:8000/proxy/services/CountryInfoService
Original endpoint: http://www.oorsprong.org/websamples.countryinfo/CountryInfoService.wsdl
Operations:
- CurrencyName
- LanguageName
- CountryCurrency
- CountryInfoPhoneCode
- ListOfContinentsByName
- CountryISOCode
- FullCountryInfo
- ListOfCurrenciesByCode
- LanguageISOCode
- ListOfCountryNamesByCode
- CountryName
- ListOfLanguagesByNames
- FullCountryInfoAllCountries
- CountriesUsingCurrency
- ListOfCurrenciesByName
- ListOfContinentsByCode
- ListOfCountryNamesByCode
- ListOfCountryNamesGroupedByContinent
- ListOfLanguagesByCodes
- CapitalCity
- CountryFlag

Figure 4: List of Manageable Services

3.3 MOWS Capabilities

In the tab MOWS Capabilities you can show the metrics of all added services in the given time frame:
Web Services Monitoring Proxy Client

MOWS Capabilities

<table>
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<th>CountryInfoService</th>
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<td>Start datetime</td>
<td>2005-11-03T11:03:36</td>
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<tr>
<td>End datetime</td>
<td>2007-11-03T11:03:36</td>
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Number of requests: 2
Number of failed requests: 0
Number of successful requests: 2
Service time: PT0.2665
Max response time: PT0.1335
Last response time: PT0.1335

Figure 5: MOWS Capabilities

3.4 Call dump

In the Call dump tab you can show the dump of the last request/response:
Proxy process ID: 53c9dbd4:10ead30abfa:-7f93

Request [2006-11-03 11:08:51.924]:
content-length 297
host localhost:8000
user-agent Jakarta Commons-HttpClient/3.0
content-type text/xml;charset=UTF-8
soapaction ""

Content:

```xml
<soapenv:Envelope
    xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
    xmlns:web="http://www.oorsprong.org/websamples.countryinfo">
  <soapenv:Body>
    <web:CountryName>
      web:sCountryISOCode>DE</web:sCountryISOCode>
    </web:CountryName>
  </soapenv:Body>
</soapenv:Envelope>
```

Figure 6: Request call dump
4 EVENTING

The GUI is only one way to work with the monitoring component. If you want to be informed by events about the metrics you could subscribe to the monitoring component.

Example subscription of an end point by web service call:

```xml
<?xml version="1.0" encoding="UTF-8"?>
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:urn="urn:WebServicesMonitoringProxy">
  <soapenv:Body>
    <urn:Subscribe>
      <ServiceName>CountryInfoService</ServiceName>
    </urn:Subscribe>
  </soapenv:Body>
</soapenv:Envelope>
```

After having subscribed your end point you get events each time the web service is called:

Example of such an event:

```xml
<?xml version="1.0" encoding="UTF-8"?>
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:urn="urn:WebServicesMonitoringProxy">
  <soapenv:Body>
    <urn:Notify>
      <m:CountryNameResponse>
        <m:CountryNameResult>Germany</m:CountryNameResult>
      </m:CountryNameResponse>
    </urn:Notify>
  </soapenv:Body>
</soapenv:Envelope>
```
<soapenv:Header/>
<soapenv:Body>
<muws-p1-xs:EventId>237dce8a:10ea417cf99:-7f99</muws-p1-xs:EventId>
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</muws-p1-xs:ManagementEvent>
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</soapenv:Envelope>

5 CONCLUSION
This deliverable represented the prototype of the monitoring component for execution monitoring of the technical Web Services behind the services and goals of the Semantic Web Services. The deliverable presents metrics about the executions of such services with a front end about a time period and with Web Service events as defined in WSDM.

REFERENCES