



NextGRID SLA Provisioning Profile

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1 Introduction

This document defines the NextGRID SLA Provisioning Profile 1.0 (hereafter, "this Profile"). It consists of a set of Web services specifications, along with clarifications, refinements, interpretations and amplifications of those specifications that promote interoperability among implementations of those specifications within the context of the NextGRID architecture.

This Profile forms part of the NextGRID Generalized Specifications, which aims at capturing NextGRID architectural concepts in a set of profiles that may be composed together. These profiles are specified in such a way that they could be implemented in terms of other well known specifications. While overall consistency is achieved at the conceptual level, and captured through the motivating Use Cases accompanying each Generalized Specification, system implementations, which may be based on other specifications, may not be consistent with this profile. Thus, each profile defines a realisation of the underlying concept that can be implemented. However, implementers of the NextGRID architecture may need to support multiple underlying specifications.

Section 1 introduces this Profile and its relationships with other NextGRID Generalized Specifications.

Section 2, "Profile Conformance", explains what it means to be conformant to this Profile.

Each subsequent section addresses a component of this Profile.

1.1 Profile Overview

This Profile is concerned with operations for provisioning of services to resource a Service Level Agreement (SLA), in line with the concepts of the NextGRID project [1]. A component implementation that uses SLA Provisioning operations in a manner conformant with this Profile may be said to be an "implementation of the NextGRID SLA Provisioning Profile 1.0".

The primary issues addressed in this Profile are as follows:

- *SLA Provisioning*. This Profile defines Web service operations for triggering the provisioning of services and resources for an SLA and informing the caller of the set of services and resources that have been provisioned [2].
- *SLA Decommissioning*. This Profile defines Web service operations for triggering decommissioning of an SLA and its associated services and resources [2].

1.2 Relationships to Other Generalised Specifications

This Profile extends the NextGRID Basic Profile [3] to define compliant Web service operations for provisioning and decommissioning of services and resources for an SLA.

1.3 Notational Conventions

The keywords "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in RFC2119 [4].

Normative statements of requirements in this Profile are presented in the manner detailed in the Conformance Requirements section of WS-I Basic Profile 1.1 [5].

Both requirement statements and extensibility statements can be considered namespace-qualified.

This Profile uses a number of namespace prefixes throughout; their associated URIs are listed below. Note that the choice of any namespace prefix is arbitrary and not semantically significant.

Table 1 Namespaces used by NextGRID Accounting and Billing Profile 1.0

Prefix	Namespace
wsdl	http://schemas.xmlsoap.org/wsdl/
xsd	http://www.w3.org/2001/XMLSchema
wsa	http://www.w3.org/2005/08/addressing

1.4 Profile Identification and Versioning

Profile identification and versioning uses the style described in WS-I Basic Profile 1.1 [5] and abides by the normative descriptions contained therein. The name of this Profile is “NextGRID SLA Provisioning Profile” and the version number is “1.0”.

2 Profile Conformance

Conformance to this Profile is defined normatively in WS-I Basic Profile 1.1 [5]. This Profile abides by those definitions.

2.1 Conformance Targets

The following conformance targets are used in this Profile:

- **SLA-PROVISIONING-OPERATIONS** – Web service operations for triggering SLA provisioning.
- **SLA-PROVISIONING-CALLBACKS** – Web service operations that are used to provide the initiator of SLA provisioning with the EndpointReferences of the services and resources that have been provisioned for an SLA or to notify them of faults.
- **SLA-DECOMMISSIONING-OPERATIONS** – Web service operations for triggering SLA decommissioning.
- **INSTANCE** – software that implements a wsdl:port (from WS-I Basic Profile 1.1, without “bindingTemplate” from the namespace urn:uddi-org:api_v2).
- **SENDER** – software that generates a particular message according to the protocol(s) associated with that message (from WS-I Basic Profile 1.1).
- **RECEIVER** – software that consumes a message according to the protocol(s) associated with that message (e.g., SOAP processors) (from WS-I Basic Profile 1.1).
- **ENDPOINTREFERENCE** – the serialization of the wsa:EndpointReference element and its content (from OGSA WSRF Basic Profile)
- **PROVISIONING-INITIATOR** – an instance that triggers SLA Provisioning by calling operations on another service.
- **PROVISIONING-IMPLEMENTOR** – an instance that implements SLA Provisioning in response to triggers from a PROVISIONING-INITIATOR.

2.2 Claiming Conformance

Claims of conformance to this Profile and are the same as normatively described in WS-I Basic Profile 1.1 [5].

The conformance claim URI for this Profile is "<http://www.nextgrid.org/sla-provisioning/v1>".

3 SLA Provisioning and Decommissioning

This Profile defines an interface comprising of SLA-PROVISIONING-OPERATIONS and SLA-DECOMMISSIONING-OPERATIONS that are Web service operations for triggering provisioning and decommissioning of services and resources for an SLA.

Informally (in Java-like syntax), the set of operations in the interface are given below:

```
void ProvisionService(URI slaReference, Policy[] policySet) throws
    SLAAlreadyProvisionedFault

void DecommissionService(URI slaReference) throws
    SLANotProvisionedFault
```

A PROVISIONING-INITIATOR calls the ProvisionService operation on a PROVISIONING-IMPLEMENTOR in order to request that services and resources are provisioned for an SLA. The SLA is identified by slaReference, and a set of management policies, policySet, are sent in this message also. The management policies are provided so that the PROVISIONING-IMPLEMENTOR can deploy the policies to the management infrastructure, ready to implement the SLA. A SLAAlreadyProvisionedFault MUST be thrown by the PROVISIONING-IMPLEMENTOR if the SLA has been provisioned prior to the call.

A PROVISIONING-INITIATOR calls the DecommissionService operation to request that the PROVISIONING-IMPLEMENTOR decommission the services and resources associated with an SLA. The SLA is identified by slaReference. The PROVISIONING-IMPLEMENTOR must throw a SLANotProvisionedFault if the SLA has not been provisioned previously.

3.1 Full WSDL

The WSDL for SLA-PROVISIONING-OPERATIONS and SLA-DECOMMISSIONING-OPERATIONS is given below.

```
<?xml version="1.0" encoding="UTF-8"?>
<wsdl:definitions
  targetNamespace="http://www.nextgrid.org/omf/servicesupervisor/2006/11"
  xmlns:apachesoap="http://xml.apache.org/xml-soap"
  xmlns:impl="http://www.nextgrid.org/omf/servicesupervisor/2006/11"
  xmlns:intf="http://www.nextgrid.org/omf/servicesupervisor/2006/11"
  xmlns:wSDL="http://schemas.xmlsoap.org/wSDL/"
  xmlns:wSDLsoap="http://schemas.xmlsoap.org/wSDL/soap/"
  xmlns:xsd="http://www.w3.org/2001/XMLSchema">
  <wsdl:types>
    <schema

  targetNamespace="http://www.nextgrid.org/omf/servicesupervisor/2006/11"
  xmlns="http://www.w3.org/2001/XMLSchema">
```

```

    <complexType name="ProvisionServiceRequestType">
      <sequence>
        <element name="SLAReference" type="xsd:anyURI" />
        <element maxOccurs="unbounded" minOccurs="0"
          name="PolicySet" nillable="true"
          type="xsd:string" />
      </sequence>
    </complexType>
  <element name="ProvisionServiceRequest"
    type="impl:ProvisionServiceRequestType" />
  <complexType name="ProvisionServiceResponseType">
    <sequence />
  </complexType>
  <element name="ProvisionServiceResponse"
    type="impl:ProvisionServiceResponseType" />
  <complexType name="SLAAlreadyProvisionedFault">
    <sequence>
      <element name="SLAReference" type="xsd:anyURI" />
    </sequence>
  </complexType>
  <element name="SLAAlreadyProvisionedFault"
    type="impl:SLAAlreadyProvisionedFault" />
  <complexType name="DecommissionServiceRequestType">
    <sequence>
      <element name="SLAReference" type="xsd:anyURI" />
    </sequence>
  </complexType>
  <element name="DecommissionServiceRequest"
    type="impl:DecommissionServiceRequestType" />

  <complexType name="DecommissionServiceResponseType">
    <sequence />
  </complexType>
  <element name="DecommissionServiceResponse"
    type="impl:DecommissionServiceResponseType" />
  <complexType name="SLANotProvisionedFault">
    <sequence>
      <element name="SLAReference" type="xsd:anyURI" />
    </sequence>
  </complexType>

  <element name="SLANotProvisionedFault"
    type="impl:SLANotProvisionedFault" />
</schema>
</wsdl:types>

<wsdl:message name="SLANotProvisionedFault">
  <wsdl:part element="impl:SLANotProvisionedFault"
    name="SLANotProvisionedFault" />
</wsdl:message>

<wsdl:message name="ProvisionServiceResponse">
  <wsdl:part element="impl:ProvisionServiceResponse"
    name="ProvisionServiceResponse" />
</wsdl:message>

```

```

<wsdl:message name="DecommissionServiceRequest">
  <wsdl:part element="impl:DecommissionServiceRequest"
    name="DecommissionServiceRequest" />
</wsdl:message>

<wsdl:message name="ProvisionServiceRequest">
  <wsdl:part element="impl:ProvisionServiceRequest"
    name="ProvisionServiceRequest" />
</wsdl:message>

<wsdl:message name="DecommissionServiceResponse">
  <wsdl:part element="impl:DecommissionServiceResponse"
    name="DecommissionServiceResponse" />
</wsdl:message>

<wsdl:message name="SLAAlreadyProvisionedFault">
  <wsdl:part element="impl:SLAAlreadyProvisionedFault"
    name="SLAAlreadyProvisionedFault" />
</wsdl:message>

<wsdl:portType name="ServiceSupervisor">
  <wsdl:operation name="ProvisionService"
    parameterOrder="ProvisionServiceRequest">
    <wsdl:input message="impl:ProvisionServiceRequest"
      name="ProvisionServiceRequest" />
    <wsdl:output message="impl:ProvisionServiceResponse"
      name="ProvisionServiceResponse" />
    <wsdl:fault message="impl:SLAAlreadyProvisionedFault"
      name="SLAAlreadyProvisionedFault" />
  </wsdl:operation>

  <wsdl:operation name="DecommissionService"
    parameterOrder="DecommissionServiceRequest">
    <wsdl:input message="impl:DecommissionServiceRequest"
      name="DecommissionServiceRequest" />
    <wsdl:output message="impl:DecommissionServiceResponse"
      name="DecommissionServiceResponse" />
    <wsdl:fault message="impl:SLANotProvisionedFault"
      name="SLANotProvisionedFault" />
  </wsdl:operation>
</wsdl:portType>

<wsdl:binding name="ServiceSupervisorSOAPSsoapBinding"
  type="impl:ServiceSupervisor">

  <wsdlsoap:binding style="document"
    transport="http://schemas.xmlsoap.org/soap/http" />

  <wsdl:operation name="ProvisionService">
    <wsdlsoap:operation
      soapAction="http://www.nextgrid.org/omf/servicesupervisor/2006/11/ProvisionService" />
    <wsdl:input name="ProvisionServiceRequest">
      <wsdlsoap:body use="literal" />
    </wsdl:input>
  </wsdl:operation>

```

```

        <wsdl:output name="ProvisionServiceResponse">
            <wsdlsoap:body use="literal" />
        </wsdl:output>

        <wsdl:fault name="SLAAlreadyProvisionedFault">
            <wsdlsoap:fault name="SLAAlreadyProvisionedFault"
                use="literal" />
        </wsdl:fault>
    </wsdl:operation>

    <wsdl:operation name="DecommissionService">
        <wsdlsoap:operation
            soapAction="http://www.nextgrid.org/omf/servicesupervisor/2006/11/DecommissionService" />
        <wsdl:input name="DecommissionServiceRequest">
            <wsdlsoap:body use="literal" />
        </wsdl:input>

        <wsdl:output name="DecommissionServiceResponse">
            <wsdlsoap:body use="literal" />
        </wsdl:output>

        <wsdl:fault name="SLANotProvisionedFault">
            <wsdlsoap:fault name="SLANotProvisionedFault"
                use="literal" />
        </wsdl:fault>
    </wsdl:operation>
</wsdl:binding>
</wsdl:definitions>

```

4 SLA Provisioning Callbacks

After a PROVISIONING-INITIATOR has requested that an SLA is provisioned, the PROVISIONING-IMPLEMENTOR may provision the SLA, and if successful inform the PROVISIONING-INITIATOR of the set of services and resources that were provisioned for the SLA. Since SLA Provisioning may take a significant amount of time, this message is sent asynchronously with regard to the original SLA Provisioning request message.

This Profile defines call back operations to allow the PROVISIONING-INITIATOR to be informed of the services and resources that were provisioned under the SLA, or to be notified of faults that occurred during SLA provisioning.

Informally (in Java-like syntax), the call back operations are:

```

void slaProvisioned(EPR[] availableServicesAndResources)

void slaNotProvisioned(String reason)

```

The PROVISIONING-IMPLEMENTOR calls the slaProvisioned operation on the PROVISIONING-INITIATOR after successful provisioning. The set of available services and resources are passed in the message as an array of EndpointReferences.

If it was not possible to provision the SLA, the PROVISIONING-IMPLEMENTOR informs the PROVISIONING-INITIATOR and provides the reason for the fault. This is achieved by calling the slaNotProvisioned operation on the PROVISIONING-INITIATOR.

4.1 Full WSDL

The WSDL for SLA-PROVISIONING-CALLBACKS is given below.

```
<?xml version="1.0" encoding="UTF-8"?>
<wsdl:definitions
  targetNamespace="http://www.it-innovation.soton.ac.uk/2006/nextgrid/slaresource"
  xmlns:impl="http://www.it-innovation.soton.ac.uk/2006/nextgrid/slaresource"
  xmlns:wsa="http://www.w3.org/2005/08/addressing"
  xmlns:wsc="http://schemas.xmlsoap.org/wsdl/"
  xmlns:wscsoap="http://schemas.xmlsoap.org/wsdl/soap/"
  xmlns:xsd="http://www.w3.org/2001/XMLSchema">

  <wsdl:types>
    <schema elementFormDefault="qualified"
      targetNamespace="http://www.it-
innovation.soton.ac.uk/2006/nextgrid/slaresource"
      xmlns="http://www.w3.org/2001/XMLSchema">
      <import namespace="http://www.w3.org/2005/08/addressing" />
      <element name="slaProvisioned">
        <complexType>
          <sequence>
            <element maxOccurs="unbounded"
              name="serviceEPRs"
              type="wsa:EndpointReferenceType" />
          </sequence>
        </complexType>
      </element>
      <element name="slaProvisionedResponse">
        <complexType />
      </element>
      <element name="slaNotProvisioned">
        <complexType>
          <sequence>
            <element name="reason" type="xsd:string" />
          </sequence>
        </complexType>
      </element>
      <element name="slaNotProvisionedResponse">
        <complexType />
      </element>
    </schema>
  </wsdl:types>

  <wsdl:message name="slaProvisionedResponse">
    <wsdl:part element="impl:slaProvisionedResponse" name="parameters" />
  </wsdl:message>

  <wsdl:message name="slaProvisionedRequest">
    <wsdl:part element="impl:slaProvisioned" name="parameters" />
  </wsdl:message>
</wsdl:definitions>
```

```

</wsdl:message>

<wsdl:message name="slaNotProvisionedResponse">
  <wsdl:part element="impl:slaNotProvisionedResponse" name="parameters" />
</wsdl:message>

<wsdl:message name="slaNotProvisionedRequest">
  <wsdl:part element="impl:slaNotProvisioned" name="parameters" />
</wsdl:message>

<wsdl:portType name="SlaResource">
  <wsdl:operation name="slaProvisioned">
    <wsdl:input message="impl:slaProvisionedRequest"
      name="slaProvisionedRequest" />
    <wsdl:output message="impl:slaProvisionedResponse"
      name="slaProvisionedResponse" />
  </wsdl:operation>
  <wsdl:operation name="slaNotProvisioned">
    <wsdl:input message="impl:slaNotProvisionedRequest"
      name="slaNotProvisionedRequest" />
    <wsdl:output message="impl:slaNotProvisionedResponse"
      name="slaNotProvisionedResponse" />
  </wsdl:operation>
</wsdl:portType>

<wsdl:binding name="SlaResourceSoapBinding"
  type="impl:SlaResource">
  <wsdlsoap:binding style="document"
    transport="http://schemas.xmlsoap.org/soap/http" />
  <wsdl:operation name="slaProvisioned">
    <wsdlsoap:operation
      soapAction="http://www.it-
innovation.soton.ac.uk/2006/nextgrid/slaresource/slaProvisioned" />
    <wsdl:input name="slaProvisionedRequest">
      <wsdlsoap:body use="literal" />
    </wsdl:input>
    <wsdl:output name="slaProvisionedResponse">
      <wsdlsoap:body use="literal" />
    </wsdl:output>
  </wsdl:operation>
  <wsdl:operation name="slaNotProvisioned">
    <wsdlsoap:operation
      soapAction="http://www.it-
innovation.soton.ac.uk/2006/nextgrid/slaresource/slaNotProvisioned" />
    <wsdl:input name="slaNotProvisionedRequest">
      <wsdlsoap:body use="literal" />
    </wsdl:input>
    <wsdl:output name="slaNotProvisionedResponse">
      <wsdlsoap:body use="literal" />
    </wsdl:output>
  </wsdl:operation>
</wsdl:binding>
</wsdl:definitions>

```

5 References

- [1] D. Snelling and M. Fisher and A. Basermann and F. Wray and P. Wieder and M. Surridge (eds.), NextGRID White Paper V5, NextGRID Project, July 25, 2005, http://www.nextgrid.org/download/publications/NextGRID_Architecture_White_Paper.pdf
- [2] J.Ferris (ed.), NextGRID SLA Provisioning Use Cases, V1.0, NextGRID Project, February 2008, http://www.nextgrid.org/GS/management_systems/operational_management/NextGRID_SLA_provisioning_usecases.pdf
- [3] V. Li and D. Snelling (eds.), NextGRID Basic Profile, V1.0, NextGRID Project, September 2006, http://www.nextgrid.org/GS/management_systems/basic/NextGRID_basic_profile.pdf
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- [5] K. Ballinger, D. Ehnebuske, C. Ferris, M. Gudgin, C.K. Liu, M. Nottingham, and P. Yendluri (ed.): Basic Profile Version 1.1, Web Services Interoperability Organization Final Material, 24 August 2004. <http://www.wsi.org/Profiles/BasicProfile-1.1.html>