



NextGRID Basic Profile 1.0

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1 Introduction

This document defines the NextGRID Basic 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.

An introduction to this Profile and its relationship to the other NextGRID profiles are given in this section.

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

Each subsequent section in turn addresses a component of this Profile, and consists of two parts:

- An overview section detailing the component specifications and their extensibility points; followed by
- A number of subsections that address individual parts of the component specifications.

Note that there is no relationship between the section numbers in this document and those in the specifications that it references.

1.1 Profile Overview

This Profile is intended for use when implementing services that are concerned with distributed computing in line with the concepts of the NextGRID project [1]. A service implementation that uses the specifications referenced herein in a manner conformant with this Profile may be said to be an "implementation of the NextGRID Basic Profile 1.0" or, more informally, to be a "NextGRID Service."

The primary issues addressed in the profile are as follows:

- *OGSA WSRF Basic Profile*: this Profile mandates the use of aspects of the OGSA WSRF Basic Profile [2].
- *OGSA Basic Security Profile – Core*: this Profile mandates the use of aspects of the OGSA Basic Security Profile – Core [3].
- *OGSA Basic Security Profile – Secure Channel*: this Profile mandates the use of aspects of the OGSA Basic Security Profile – Secure Channel [4].

1.2 Relationships to Other Profiles

This Profile extends the OGSA WSRF Basic Profile Version 1.0 [2].

This Profile mandates composition with an OGSA Basic Security Profile – Core [3] and OGSA Basic Security Profile – Secure Channel [4], as described in sections 5 and 6.

Note that, while at the time of writing the above security profiles were the current versions of these profiles, it is known that the OGSA Working Group is developing new profiles that will supersede these. The latest information on these new profiles can be found at <http://forge.gridforum.org/sf/projects/ogsa-wg>.

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 [5].

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 [6].

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

This specification 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 Basic Profile 1.0

Prefix	Namespace
ogsa-bp	http://schemas.ggf.org/ogsa/2006/01/wsrf-bp
soap	http://schemas.xmlsoap.org/wsdl/soap
bsp-core	http://schemas.ggf.org/ogsa/2006/01/bsp-core
wsdl	http://schemas.xmlsoap.org/wsdl
xsd	http://www.w3.org/2001/XMLSchema
xsi	http://www.w3.org/2001/XMLSchema-instance
wsa	http://www.w3.org/2005/08/addressing
wsi	http://ws-i.org/schemas/conformanceClaim
wsrf-rp	http://docs.oasis-open.org/wsrf/rp-2
wsrf-rpw	http://docs.oasis-open.org/wsrf/rpw-2
wsrf-rl	http://docs.oasis-open.org/wsrf/rl-2



wsrf-rlw	http://docs.oasis-open.org/wsrf/rlw-2
wsrf-bf	http://docs.oasis-open.org/wsrf/bf-2
wsnt	http://docs.oasis-open.org/wsn/b-2
wsntw	http://docs.oasis-open.org/wsn/bw-2
nextgrid-bp	http://www.nextgrid.org/basicprofile/v-1

1.4 Profile Identification and Versioning

Profile identification and versioning uses the style described in the Profile Identification and Versioning section of WS-I Basic Profile 1.1 [6] and abides by the normative descriptions contained therein. The name of this Profile is “NextGRID Basic Profile” and version number is “1.0.”

2 Profile Conformance

Conformance to the Profile is defined normatively in the Profile Conformance section of WS-I Basic Profile 1.1 [6]. This Profile abides by those definitions.

2.1 Conformance Targets

Since the Profile is an extension of the WS-I Basic Profile 1.1 [6] and the OGSA Basic Profiles [2][3][4], it may place further restrictions on conformance targets defined therein.

The following conformance targets are used in this Profile:

- **ENDPOINTREFERENCE** – the serialization of the `wsa:EndpointReference` element and its content (from OGSA WSRF Basic Profile)
- **ENVELOPE** – the serialization of the `soap:Envelope` element and its content (from WS-I Basic Profile 1.1)
- **DESCRIPTION** – descriptions of types, messages, interfaces and their concrete protocol and data format bindings, and the network access points associated with Web services (e.g., WSDL descriptions) (from WS-I Basic Profile 1.1)
- **INSTANCE** – software that implements a `wsdl:port` (from WS-I Basic Profile 1.1, without “bindingTemplate” from the namespace `urn:uddi-org:api_v2`)
- **CONSUMER** – software that invokes an INSTANCE (from WS-I Basic Profile 1.1)
- **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)

2.2 Claiming Conformance

Claims of conformance to the Profile and the attachments mechanisms are the same as normatively described in the Claiming Conformance section of WS-I Basic Profile 1.1 [6].

The conformance claim URI for this Profile is “<http://www.nextgrid.org/basicprofile/v1>”.

3 WS-Naming Profile

This section of the Profile incorporates the following specification by reference, and defines extensibility points within it:

- WS-Naming Profile 1.0 [8]
Extensibility points:
 - Although the WS-Naming profile has extensibility points identified, they do not apply to the sections of the WS-Naming Profile 1.0 referenced here.

3.1 Addressing

3.1.1 Unambiguous Web Service Endpoint

This section of the Profile incorporates the following specification (or sections thereof) by reference:

- WS-Naming Profile 1.0, section 3 [8]

The WS-Naming Profile (section 3) mandates the use of the WS-Naming “Unambiguous Web Service Endpoint Profile”. This Profile mandates compliance with this requirement:

R0312 *INSTANCES conforming to the NextGRID Basic Profile MUST conform to the Unambiguous Web Service Endpoint Profile detailed in the WS-Naming Profile, Section 3, “Unambiguous Web Service Endpoint Profile”.*

This mandatory profile defines restrictions on the creation and use of a WS-Addressing Endpoint Reference (EPR), which are necessary to ensure unique delivery of messages within a prescribed context. By adhering to this profile, the EPR-minter guarantees to the consumer that the EPR will always either refer to the same endpoint, or fail.

In particular, Section 3 of the WS-Naming Profile states:

“INSTANCES conforming to the Unambiguous Web Service Endpoint Profile MUST include sufficient information within all ENDPOINTREFERENCES, minted to refer to the INSTANCE, to guarantee that all messages sent using that ENDPOINTREFERENCE are routed to a unique endpoint within the context of the implementation.”

“INSTANCES conforming to the Unambiguous Web Service Endpoint Profile MUST guarantee that all messages sent to the INSTANCE are received by a unique endpoint within the context of the implementation or the message is rejected and a fault returned.”

3.1.2 Web Service Endpoint Address Identifier

This section of the Profile incorporates the following specification (or sections thereof) by reference:

- WS-Naming Profile 1.0, section 4.3 [8]

The WS-Naming Profile (section 4.3) recommends the use of the WS-Naming “Web Service Endpoint Address Identifier Profile”. This Profile recommends compliance with this requirement:

R0313 *INSTANCES conforming to the NextGRID Basic Profile SHOULD conform to the Web Service Endpoint Address Identifier Profile detailed in the WS-Naming Profile, section 4.3, “Web Service Endpoint Address Identifier Profile”.*

The “Web Service Endpoint Address Identifier Profile” restricts the “Unambiguous Web Service Endpoint Profile” further, and defines the requirements placed on an EPR `wsa:Address` field (IRI) to ensure that it is unique in space and time, and that it by itself uniquely identifies the endpoint/resource.

In particular, section 4.3 of the WS-Naming Profile states:

“INSTANCES conforming to the Web Service Endpoint Address Identifier Profile MUST conform to the Unambiguous Web Service Endpoint Profile.”

“All information necessary to adhere to the Web Service Endpoint Address Identifier Profile MUST be present in the `wsa:Address` field of the ENDPOINTREFERENCE.”

“The `wsa:Address` field of the ENDPOINTREFERENCE MUST be unique in space and time.”

4 OGSA WSRF Basic Profile

This section of the Profile incorporates the following specification by reference, and defines extensibility points within it:

- OGSA WSRF Basic Profile 1.0 [2]
Extensibility points:
 - There are no directly stated extensibility points in OGSA WSRF Basic Profile 1.0. However, there are extensibility points in specifications, which are referenced by the OGSA WSRF Basic Profile 1.0. Implementers of this Profile should take note of these inherited extensibility points.

4.1 Addressing

4.1.1 Endpoint References

OGSA WSRF Basic Profile 1.0 highlights three extensibility points within Web Services Addressing 1.0 – Core [7]. Implementations of this Profile should take these into account.

The following specification (or sections thereof) is referred to in this section:

- OGSA WSRF Basic Profile 1.0, section 3 [2]

OGSA WSRF Basic Profile 1.0 mandates the use of WS-Addressing EndPointReferences for addressing service instances. This Profile mandates compliance with this requirement:

R0311 *An ENDPOINTREFERENCE MUST conform to the OGSA WSRF Basic Profile 1.0, section 3.1.1, “Endpoint Reference Structure”.*

4.2 Resource Properties

OGSA WSRF Basic Profile 1.0 highlights three extensibility points within Web Services Resource Properties 1.2 [9]. Implementations of this Profile should take these into account.

The following specification (or sections thereof) is referred to in this section of the Profile:

- OGSA WSRF Basic Profile 1.0, section 4 [2]

OGSA WSRF Basic Profile 1.0 mandates the inclusion of named Resource Properties. This Profile mandates compliance with these requirements:

R0314 *An INSTANCE’S DESCRIPTION and RECEIVER MUST conform to the OGSA WSRF Basic Profile 1.0, section 4.1.1, “ResourcePropertyNames Resource Property Element Description”.*

R0315 *An INSTANCE’S DESCRIPTION and RECEIVER MUST conform to the OGSA WSRF Basic Profile 1.0, section 4.1.2, “FinalWSResourceInterface Resource Property Element Description”.*

R0316 *An INSTANCE’S DESCRIPTION and RECEIVER MUST conform to the OGSA WSRF Basic Profile 1.0, section 4.1.3, “WSResourceInterfaces Resource Property Element Description”.*

R0317 *An INSTANCE'S DESCRIPTION and RECEIVER MUST conform to the OGSA WSRF Basic Profile 1.0, section 4.1.4, "ResourceEndpointReference Resource Property Element Description".*

Furthermore this profile mandates that INSTANCES MUST publish their Service WSDL description as a Resource Property. The service MAY also make their Service WSDL description available through other means.

The Resource Property QName of this property is:

```
{http://nextgrid.org/2007/basicprofile}ServiceWSDL
```

The type of this resource property is a WSDL Document as defined by <http://schemas.xmlsoap.org/wsdl>.

OGSA WSRF Basic Profile 1.0 mandates or recommends the inclusion of several operations in the description and implementation of services claiming compliance to that profile. This Profile mandates compliance with these requirements:

R0318 *An INSTANCE MUST publish and implement the Get Multiple Resource Properties message exchange pattern as defined in OGSA WSRF Basic Profile 1.0, section 4.2 "Get Multiple Resource Properties".*

R0319 *An INSTANCE SHOULD publish and implement the Query Resource Properties message exchange pattern as defined in OGSA WSRF Basic Profile 1.0, section 4.3 "Query Resource Properties".*

OGSA WSRF Basic Profile 1.0 recommends support for notifications through Resource Property Change Notification in services claiming compliance to that profile. This Profile mandates compliance with these recommendations:

R0320 *An INSTANCE supporting the notification pattern MUST comply with OGSA WSRF Basic Profile 1.0, section 4.4 "Resource Property Change Notification".*

Furthermore, in order to integrate the property and notification data models, this profile mandates that services implementing notification must use the Resource Property Change Notification pattern exclusively:

R0321 *An INSTANCE supporting the notification pattern MUST use the Resource Property Change Notification pattern, as described in WS-BaseNotifications [10], exclusively, for all notification actions.*

4.3 Resource Lifetime

OGSA WSRF Basic Profile 1.0 Profiles the WSRF Resource Lifetime Specification. This profile makes no changes or restrictions to this specification.

4.4 Basic Notification

OGSA WSRF Basic Profile 1.0 Profiles the WSN Basic Notification Specification. This profile makes no changes or restrictions to this specification.

5 Basic Security

OGSA Basic Security Profile 1.0 – Core [3] highlights three extensibility points in Web Services Addressing 1.0 – Core [7]. Implementations of this Profile should take these into account.

The following specification (or sections thereof) is referred to in this section of the Profile:

- OGSA Basic Security Profile 1.0 – Core, section 3 [3]

OGSA Basic Security Profile 1.0 – Core mandates the inclusion of security key information in End Point References for any instance compliant to that Profile. This Profile mandates compliance with these requirements:

R0411 *An ENDPOINTREFERENCE MUST conform to the OGSA Basic Security Profile 1.0 - Core, section 3.1.1, “Key Information Binding to Endpoint Reference” by providing the EndPointKeyInfo element in the EPR.*

6 Secure Channel

The following specification (or sections thereof) is referred to in this section of the Profile:

- OGSA Basic Security Profile 1.0 – Secure Channel, section 3 [4]

OGSA Basic Security Profile 1.0 – Secure Channel defines a set of conformance statements for the use of Transport Layer Security (TLS) as a means of securing communication. This Profile mandates compliance with these requirements:

R0511 *INSTANCES and CONSUMERS MUST conform to the OGSA Basic Security Profile 1.0 – Secure Channel, section 3.1.1, “Using Transport Layer Security as a mean of Secure Communication”.*

R0512 *SENDERS and RECIEVERS MUST conform to the OGSA Basic Security Profile 1.0 – Secure Channel, section 3.2.1, “SSL and TLS”.*



R0513 *INSTANCES and CONSUMERS MUST conform to the OGSA Basic Security Profile 1.0 – Secure Channel, section 3.3.1, “Authentication”.*

7 Alternative Renderings

This profile builds of the extensions to basic WS profiled by the WSRF suite of specifications. The reader should note that there are a number of other specification sets that could be used to address this same set of requirements. At the time of writing the WSRF suite was the most complete and stable and therefore used in this profile. The earliest suite of specifications that addressed this collection of requirements was the Open Grid Services Infrastructure (OGSI) 1.0 [11]. Another suite of specifications that also addresses this area is the WS-Management suite, including WS-Transfer, WS-Eventing, and WS-Enumeration [12]. In many ways this suite overlaps with the WSRF suite and there is an effort starting to reconcile these two suites called WS ResourceTransfer [13]. While not a complete suite at this time, it is an indication of possible unification in this area.

8 References

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