OGSA™ WSRF Basic Profile 1.0

Status of This Memo

5 This memo provides a recommendation to the Grid community on how to write normative OGSA services. The intention of this profile is to describe precisely the requirements placed on implementations of such services to ensure interoperability. Distribution is unlimited.

Trademarks

OGSA is a trademark of the Global Grid Forum.

Abstract

The growing number of Web services specifications makes it important to understand and define
15 the interaction and use of these specifications to ensure interoperability. Within the context of basic Web services, it has proved useful to define normative profiles that provide guidance on issues of interoperability. One such profile is the WS-I Basic Profile 1.1 [**WS-I BP 1.1**]. Guided by the principle of interoperation through conformance specification and operating in the wider technical domain of distributed system management and grid computing, we define here the
20 OGSA WSRF Basic Profile 1.0, the first of a set of normative profiles addressing issues relating to distributed resource management and grid computing.

The OGSA WSRF Basic Profile 1.0 described in this document is an *OGSA Recommended Profile as Proposed Recommendation* as defined in the OGSA Profile Definition [**OGSA Profile Definition**]. The OGSA WSRF Basic Profile 1.0 describes uses of widely accepted specifications
25 that have been found to enable interoperability. The specifications considered in this profile are specifically those associated with the addressing, modeling, and management of state: WS-Addressing [**WS-Addressing**], WS-ResourceProperties [**WS-ResourceProperties**], WS-ResourceLifetime [**WS-ResourceLifetime**], WS-BaseNotification [**WS-BaseNotification**], and WS-BaseFaults [**WS-BaseFaults**].

30

Contents

75

75 **1   Introduction**

This document defines the OGSA WSRF Basic Profile 1.0 (hereafter, "the Profile"), consisting of a set of de facto, institutional or evolving institutional Web services specifications, along with clarifications, refinements, interpretations and amplifications of those specifications that promote interoperability among implementations of those specifications.

80 Section 1 introduces the Profile, and explains its relationships to other profiles.

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

Each subsequent section addresses a component of the Profile, and consists of two parts: an overview detailing the component specifications and their extensibility points, followed by subsections that address individual parts of the component specifications. Note that there is no
85 relationship between the section numbers in this document and those in the referenced specifications.

1.1   Profile Overview

The Profile is intended for use when implementing services that are concerned with distributed resource management, grid computing, or other purposes that involve the modeling and
90 management of stateful entities. These services frequently can benefit from the use of interfaces and behaviors defined in the WS-Addressing, WS-Resource Framework, and WS-Notification families of specifications. A service implementation that uses those specifications in a manner conformant with the Profile may be said to be an "implementation of the OGSA WSRF Basic Profile 1.0" or, informally, to be an "OGSA service." (See section 2.3, "OGSA Branding", of the
95 OGSA Roadmap document **[OGSA Roadmap]**.)

The primary issues addressed in the profile are as follows:

- *Addressing.* The Profile mandates the use of WS-Addressing endpoint references and places some constraints on their structure, thus enabling interoperable addressing.

- *Resource Properties.* The Profile mandates that a resource support certain resource
100 properties, thus facilitating introspection, and also mandates support for certain operations that are optional in the WS-ResourceProperties specification. Both sets of requirements facilitate interoperability by allowing a client to make more assumptions about a service's interfaces.

- *Resource Lifetime.* The Profile mandates the use of the ImmediateResourceTermination
105 and ScheduledResourceTermination portTypes and their associated operations and properties for immediate and scheduled termination of resources.

- *Base Notification.* The Profile mandates the use of the NotificationProducer portType and its associated operations and properties to provide notification using a publish/subscribe pattern.

110 - *Base Faults.* The Profile mandates the use of the fault structure specified in WS-BaseFaults and, where applicable, extends the fault structure.

This is not a complete list; see the sections that follow for details.

1.2   Relationships to Other Profiles

This Profile extends the WS-I Basic Profile 1.1 [**WS-I BP 1.1**]. All requirements except for section
115 5 "Service Publication and Discovery" specified in WS-I BP 1.1 pertain to this Profile. There may be additional profiles in the future that will include discovery functions. This Profile mandates composition with an OGSA Basic Security profile as described in Section 8.

1.3   Notational Conventions

120   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 [**RFC2119**].

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

125   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 OGSA WSRF Basic Profile 1.0

Prefix	Namespace
ogsa-bp	http://www.ggf.org/namespaces/OGSABasicProfile-1.0.xsd
soap	http://schemas.xmlsoap.org/soap/envelope
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/2005/03/addressing
wsi	http://ws-i.org/schemas/conformanceClaim
wsrf-rp	http://docs.oasis-open.org/wsrf/rp-1
wsrf-rpw	http://docs.oasis-open.org/wsrf/rpw-1
wsrf-rl	http://docs.oasis-open.org/wsrf/rl-1
wsrf-rlw	http://docs.oasis-open.org/wsrf/rlw-1
wsrf-bf	http://docs.oasis-open.org/wsrf/bf-1
wsnt	http://docs.oasis-open.org/wsn/b-1
wsntw	http://docs.oasis-open.org/wsn/bw-1

130

This Profile uses a number of special terms to refer to referenced specifications.

• **WS-Addressing** – Web Services Addressing 1.0 - Core [**WS-Addressing**]

- **WS-ResourceProperties** – Web Services Resource Properties 1.2 [**WS-ResourceProperties**]

135
- **WS-ResourceLifetime** – Web Services Resource Lifetime 1.2 [**WS-ResourceLifetime**]

- **WS-BaseNotification** – Web Services Base Notification 1.3 [**WS-BaseNotification**]

- **WS-BaseFaults** – Web Services Base Faults 1.2 [**WS-BaseFaults**]

- **SchemaCentricCanonicalization** – Schema Centric XML Canonicalization Version 1.0 [**SchemaCentric-XML-C14N**]

140   1.4   Profile Identification and Versioning

Profile identification and versioning uses the style described in WS-I Basic Profile 1.1 and abides by the normative descriptions contained therein. The name of this Profile is "OGSA WSRF Basic Profile" and version number is "1.0. "

2   Profile Conformance

145   Conformance to the Profile is defined normatively in WS-I Basic Profile 1.1. This Profile abides by those definitions.

2.1   Conformance Targets

Since the Profile is an extension of the WS-I Basic Profile 1.1 it may place further restrictions on conformance targets defined in WS-I Basic Profile 1.1. Further, this specification defines an
150   additional conformance target called ENDPOINTREFERENCE.

The following conformance targets are used in the Profile:

- **ENDPOINTREFERENCE** – the serialization of the wsa:EndpointReference element and its content

- **ENVELOPE** – the serialization of the soap:Envelope element and its content (from WS-I
155   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
160   "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
165   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 WS-I Basic Profile 1.1.

The conformance claim URI for this Profile is http://www.ggf.org/namespaces/OGSABasicProfile-
170   1.0.

3   Addressing

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

- Web Services Addressing 1.0 - Core [**WS-Addressing**]
175   Extensibility points:

    o E0301 **– WS-Addressing Extensibility –** WS-Addressing allows extensibility elements for the wsa:EndpointReference element.

    o E0302 **– WS-Addressing Metadata Extensibility –** WS-Addressing allows extensibility elements for metadata as children of the wsa:Metadata element.

180   o E0303 **– WS-Addressing Reference Parameters Extensibility –** WS-Addressing allows extensibility elements for Reference Parameters as children of the wsa:ReferenceParameters element.

3.1   Endpoint Reference

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

185   • Web Services Addressing, Section 2 [**WS-Addressing**]

WS-Addressing defines the endpoint reference structure for referencing services and WS-Resources. The Profile mandates the use of that structure, and places the following constraints on its use:

3.1.1   Endpoint Reference Structure

190   R0311 *An ENDPOINTREFERENCE MUST conform to the structure specified in Web Services Addressing Section 2, "Endpoint References."*

4   Resource Property

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

195   • Web Services Resource Properties 1.2 [**WS-ResourceProperties**]
       Extensibility points:

    o E0401 **– Resource Property Document Extensibility –** Any resource property document MAY include standard XML extensibility through the use of xsd:any.

    o E0402 **– Resource Property Element Extensibility –** Any resource property
200   element MAY include standard XML extensibility through the use of xsd:any.

    o E0403 **– QueryExpression Extensibility –** The Query Expression supported by the QueryResourceProperties message exchange is defined as open content (xsd:any).

4.1   Resource Property Definition

205   WS-ResourceProperties does not define any resource property elements. In contrast, the Profile requires the resource property elements listed below for introspection purposes. The Profile mandates the use of these resource property elements, and places the following constraints on their use.

4.1.1   ResourcePropertyNames Resource Property Element Description

210   Each instance of a WS-Resource is required to provide the ability to retrieve, through the
GetResourceProperty or GetMultipleResourceProperties message exchange pattern, a list of all
resource property element QNames that it contains. (See Appendix C.)

R0411 *A DESCRIPTION MUST contain in the Resource Property Document schema, as*
referred to by the wsrf-rp:ResourceProperties attribute on the portType, a
215   *Resource Property Element ogsa-bp:ResourcePropertyNames as defined in*
the schema http://www.ggf.org/namespaces/OGSABasicProfile-1.0.xsd (see
Appendix D).

R0412 *A RECEIVER MUST respond to a wsrf-rp:GetResourceProperty*
request where the child of the wsrf-rp:GetResourceProperty is the
220   *QName ogsa-bp:ResourcePropertyNames with the complete list of*
the xsd:QNames of all Resource Property Elements contained in
the Resource Property Document at the time of receipt of the
message.

R0413 *A RECEIVER MUST respond to a wsrf-rp:GetMultipleResourceProperties*
225   *request where the child of the wsrf-rp:GetMultipleResourceProperties*
contains the QName ogsa-bp:ResourcePropertyNames with the
complete list of the xsd:QNames of all Resource Property Elements
contained in the Resource Property Document at the time of receipt of
the message.

230   *4.1.2   FinalWSResourceInterface Resource Property Element Description*

Each instance of a WS-Resource is recommended to provide the ability to retrieve, through the
GetResourceProperty or GetMultipleResourceProperties message exchange pattern, the final
portType interface QName. (See Appendix C.)

R0414 *A DESCRIPTION MUST contain in the Resource Property Document schema,*
235   *as referred to by the wsrf-rp:ResourceProperties attribute on the portType,*
a Resource Property Element ogsa-bp:FinalWSResourceInterface as
defined in the schema http://www.ggf.org/namespaces/OGSABasicProfile-
1.0.xsd (see Appendix D).

R0415 *A RECEIVER SHOULD respond to a wsrf-rp:GetResourceProperty*
240   *request where the child of the wsrf-rp:GetResourceProperty is the*
QName ogsa-bp:FinalWSResourceInterface with the xsd:QName of
the wsdl:portType associated with the endpoint to which the
message was addressed.

R0416 *A RECEIVER SHOULD respond to a wsrf-rp:GetMultipleResourceProperties*
245   *request where the child of the wsrf-rp:GetMultipleResourceProperties*
contains the QName ogsa-bp:FinalWSResourceInterface with the
xsd:QName of the wsdl:portType associated with the endpoint to which
the message was addressed.

4.1.3   WSResourceInterfaces Resource Property Element Description

250   Each instance of a WS-Resource is recommended to provide the ability to retrieve, through the
GetResourceProperty or GetMultipleResourceProperties message exchange pattern, a list of all
known portTypes that were composed together to make a new portType for the wsdl:Service/port.
Each portType must be referenced by a QName, where the namespace of the QName is that of
the parent wsdl:definition (See Appendix C.)

255   R0417 *A DESCRIPTION MUST contain in the Resource Property Document*
                schema, as referred to by the wsrf-rp:ResourceProperties attribute on the
                portType, a Resource Property Element ogsa-bp:WSResourceInterfaces
                defined in the schema
                http://www.ggf.org/namespaces/OGSABasicProfile-1.0.xsd (see
260   *Appendix D).*

         R0418 *A RECEIVER SHOULD respond to a wsrf-rp:GetResourceProperty*
                request where the child of the wsrf-rp:GetResourceProperty is the
                QName ogsa-bp:WSResourceInterfaces with the complete list of
                the xsd:QNames of all the wsdl:portTypes that were composed into
265   *the endpoint to which the message was addressed.*

         R0419 *A RECEIVER SHOULD respond to a wsrf-rp:GetMultipleResourceProperties*
                request where the child of the wsrf-rp:GetMultipleResourceProperties
                contains the QName ogsa-bp:WSResourceInterfaces with the complete
                list of the xsd:QNames of all the wsdl:portTypes that were composed into
270   *the endpoint to which the message was addressed.*

      4.1.4   ResourceEndpointReference Resource Property Element Description

      Each instance of a WS-Resource is recommended to provide the ability to retrieve, through the
      GetResourceProperty or GetMultipleResourceProperties message exchange pattern, the
      wsa:EndpointReference(s) for itself. (See Appendix C.)

275   R0420 *A DESCRIPTION MUST contain in the Resource Property Document schema,*
                as referred to by the wsrf-rp:ResourceProperties attribute on the portType,
                a Resource Property Element ogsa-bp:ResourceEndpointReference as
                defined in the schema http://www.ggf.org/namespaces/OGSABasicProfile-
                1.0.xsd (see Appendix D).

280   R0421 *A RECEIVER SHOULD respond to a wsrf-rp:GetResourceProperty*
                request where the child of the wsrf-rp:GetResourceProperty is the
                QName ogsa-bp:ResourceEndpointReference with the
                wsa:EndpointReference(s) of the endpoint to which the message
                was addressed.

285   R0422 *A RECEIVER SHOULD respond to a wsrf-rp:GetMultipleResourceProperties*
                request where the child of the wsrf-rp:GetMultipleResourceProperties
                contains the QName ogsa-bp:ResourceEndpointReference with the
                wsa:EndpointReference(s) of the endpoint to which the message was
                addressed.

290   4.2   Get Multiple Resource Properties

      WS-ResourceProperties defines a portType for retrieval of multiple resource properties. The
      Profile mandates the use of this portType, and places the following constraints on its use.

      4.2.1   wsrf-rpw:GetMultipleResourceProperties Message Exchange

      WS-ResourceProperties only requires that an instance of a WS-Resource implement the
295   GetResourceProperty message exchange pattern. The Profile also requires support for
      GetMultipleResourceProperties message exchange pattern.

         R0423 *A DESCRIPTION MUST include the wsrf-rpw:GetMultipleResourceProperties*
                wsdl:operation as defined in **WS-ResourceProperties** *section 5.3.*

R0424 *An INSTANCE MUST support the wsrf-rpw:GetMultipleResourceProperties*
300 *message exchange to allow for the retrieval of multiple resource*
properties.

4.3   Query Resource Properties

WS-ResourceProperties defines a portType for query and retrieval of resource properties. The Profile recommends the use of this portType, and places the following constraints on its use.

305 *4.3.1   wsrf-rpw:QueryResourceProperties Message Exchange*

WS-ResourceProperties only requires that an instance of a WS-Resource implement the GetResourceProperty message exchange pattern. The Profile also recommends support for the QueryResourceProperties message exchange pattern. Existing implementations of XPath 1.0 are prevalent and as such, the Profile requires support for the XPath 1.0 dialect. Further, without
310 consistent serialization a client's ability to process the response will be hindered. The Profile recommends the use of SchemaCentricCanonicalization for serialization of the response.

R0425 *A DESCRIPTION SHOULD include the wsrf-rpw:QueryResourceProperties*
wsdl:operation as defined in **WS-ResourceProperties** *section 5.4.*

R0426 *An INSTANCE SHOULD support the wsrf-rpw:QueryResourceProperties*
315 *message exchange to allow for the query and retrieval of multiple*
resource properties.

R0427 *An INSTANCE MUST support the QueryExpression Dialect URI*
http://www.w3.org/TR/1999/REC-xpath-19991116 on the
wsrf-rpw:QueryResourceProperties message exchange.

320 R0428 *An INSTANCE, when presented with a resource property retrieval for*
the QName wsrf-rp:QueryExpressionDialect response, MUST (at
least) include the URI http://www.w3.org/TR/1999/REC-xpath-
19991116.

R0429 *A MESSAGE response for wsrf-rpw:QueryResourceProperties with the*
325 *Dialect URI http://www.w3.org/TR/1999/REC-xpath-19991116*
SHOULD conform to the structure/serialization as defined in
SchemaCentricCanonicalization.

Note: Without standardized serialization of the XPath evaluation, it is unlikely a client will be able to process the QueryResourceProperties response successfully. The client will be left to deal with
330 the vagaries of the XPath implementation with respect to such things as namespaces (or just their prefixes), comments, processing instructions, boolean values, defaults and a host of other information items. This is not a new problem; serialization of an XPath evaluation is a 'classical' problem introduced by XPath 1.0's lack of normative serialization specification. To address this shortcoming several specifications defining canonicalization/serialization algorithms have been
335 developed: Canonical XML [**XML-C14N**], Exclusive XML Canonicalization [**XML-Exc-C14N**] and SchemaCentricCanonicalization. The first two specifications have well known issues that make them unsuitable for serialization (except in the most limited of use cases). SchemaCentricCanonicalization addresses these issues. For a complete discussion of the limitations of Canonical XML and Exclusive XML Canonicalization see
340 SchemaCentricCanonicalization Section 1.1.

4.4   Resource Property Change Notification

WS-ResourceProperties recommends support for resource property element change notifications for WS-Resources that support the wsntw:NotificationProducer [**WS-BaseNotification**] portType. OGSA services fundamentally rely on the ability to understand changes in other OGSA services.

345   The Profile recommends the use of the wsrf-rp:ResourcePropertyValueChangeNotification
      element and places the following constraints on its use.

4.4.1   Use of wsntw:NotificationProducer

The Profile recommends the use of the NotificationProducer portType and its associated
operations and properties to support the resource property value change notification pattern for
350   insertions, updates and deletions.

> R0430 *A DESCRIPTION SHOULD include the wsntw:NotificationProducer*
>   *wsdl:portType as defined in* **WS-BaseNotification** *section 4.*

> R0431 *An INSTANCE SHOULD support wsnt:Subscribe message exchange to*
>   *allow for creation of wsrf-rpw:ResourcePropertyValueChangeNotification.*

355   **5   Resource Lifetime**

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

- Web Services Resource Lifetime 1.2 [**WS-ResourceLifetime**] Extensibility points:

  - E0501 **– Termination Reason –** The termination reason in the
360   TerminationNotification message type allows for open content (xsd:any).

5.1   Immediate Resource Termination

WS-ResourceLifetime defines a portType for immediate termination of a WS-Resource. The
Profile mandates the use of this portType for explicit destruction of resources created as a result
of a message exchange, and places the following constraints on its use:

365   *5.1.1   wsrf-rlw:Destroy Message Exchange*

WS-ResourceLifetime does not require that an instance of a WS-Resource implement any of the
message exchanges that it defines. In contrast, the Profile mandates immediate destruction
capability for WS-Resource instances that are created as a result of a message exchange.

> R0511 *A DESCRIPTION SHOULD include the wsrf-rlw:Destroy wsdl:operation*
370 >   *as defined in WS-ResourceLifetime section 4 to allow for the*
>   *immediate destruction of a WS-Resource.*

> R0512 *An INSTANCE that is created as a result of a message exchange*
>   *MUST support the wsrf-rlw:Destroy message exchange to allow for*
>   *the immediate destruction of a WS-Resource.*

375   5.2   Scheduled Resource Termination

WS-ResourceLifetime defines a portType for scheduled termination of a WS-Resource. The
Profile mandates the use of this portType to provide time-based destruction of resources created
as a result of a message exchange, and places the following constraints on its use:

5.2.1   wsrf-rlw:SetTerminationTime Message Exchange

380   WS-ResourceLifetime does not require that an instance of a WS-Resource implement any of the
message exchanges that it defines. In contrast, the Profile mandates time-based destruction
capability for WS-Resource instances that are created as a result of a message exchange.

> R0513 *A DESCRIPTION SHOULD contain in the Resource Property Document*
>   *schema, as referred to by the wsrf-rp:ResourceProperties attribute on*

385   *the portType, a Resource Property Element wsrf-rl:CurrentTime as*
        defined in the schema http://docs.oasis-open.org/wsrf/rl-1.

        R0514 *A DESCRIPTION SHOULD include the wsrf-rlw:SetTerminationTime*
        wsdl:operation as defined in WS-ResourceLifetime section 5 to
        allow for the scheduled destruction of a WS-Resource.

390   R0515 *An INSTANCE that is created as a result of a message exchange*
        MUST support the wsrf-rlw:SetTerminationTime message
        exchange to allow for the scheduled destruction of a WS-Resource.

6   Base Notification

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

- Web Services Base Notification 1.3 [**WS-BaseNotification**] Extensibility points:

  - E0601 **– Subscribe Topic Expression –** The topic expression in the
    wsnt:Subscribe is open content (xsd:any).

6.1   Notification Producer

400   The Profile mandates the use of this portType for client-controlled notifications of events from
resources, and places the following constraints on its use:

6.1.1   *wsntw:Subscribe Message Exchange*

The wsntw:Subscribe message exchange allows for notification messages to be sent over
protocols other than Web services-based protocols. This flexibility impedes the interoperability of
405   services that conform to the Profile. The Profile allows the use of this message exchange but
places the following constraints on it:

        R0611 *A CONSUMER MUST NOT include the wsnt:SubscriptionPolicy/wsnt:UseRaw*
        element in the wsntw:Subscribe request.

        R0612 *An INSTANCE MUST support the TopicExpression Dialect URI*
410   *http://docs.oasis-open.org/wsn/2004/06/TopicExpression/Simple for*
        wsnt:Subscribe/wsnt:Filter/wsnt:TopicExpression@Dialect in the
        wsntw:Subscribe message exchange.

        R0613 *An INSTANCE, when presented with a resource property retrieval for*
        the QName wsnt:TopicExpressionDialect MUST include in the
415   *response (at a minimum) the URI http://docs.oasis-*
        open.org/wsn/2004/06/TopicExpression/Simple.

        R0614 *An INSTANCE that accepts the wsnt:Filter/wsnt:ProducerProperties*
        element in the wsntw:Subscribe message exchange MUST support
        the Dialect from the namespace http://www.w3.org/TR/1999/REC-
420   *xpath-19991116 as the content for the*
        wsnt:Filter/wsnt:ProducerProperties element.

        R0615 *An INSTANCE that accepts the wsnt:Filter/wsnt:MessageContent*
        element in the wsntw:Subscribe message exchange MUST support
        the Dialect from the namespace http://www.w3.org/TR/1999/REC-
425   *xpath-19991116 as the content for the*
        wsnt:Filter/wsnt:MessageContent element.

6.1.2   Notification Message Exchange

Although WS-BaseNotification allows the use of raw notification, the Profile mandates the Notify message by R0611 and disallows raw notification. Therefore:

430   R0616 *An INSTANCE MUST send the wsntw:Notify message to the*
             NotificationConsumer in order to deliver one or more
             NotificationMessage(s).

7   Base Faults

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

- Web Services Base Faults 1.2 [**WS-BaseFaults**] Extensibility points:

   o E0701 **– Base Fault Type –** The Base Fault Type includes open content
      (xsd:any) as the last child element in sequence.

7.1   Base Faults

440   WS-BaseFaults defines the fault structure that WS-Resources use for faults that are generated by
       the WS-Resource. The Profile mandates the use of that structure, and places the following
       constraints on its use:

7.1.1   BaseFault Structure

       R0711 *A MESSAGE for a fault from a WS-Resource MUST conform to the*
445   *structure specified in Web Services Base Faults Section 2, "Base*
              Fault Type."

7.1.2   BaseFault Extension

WS-BaseFaults use extension as the mechanism for 'subtyping' faults. Unfortunately, if an
extension of the base introduces a new element the extension then violates the Unique Particle
450   Attribution constraint (see http://www.w3.org/TR/xmlschema-1/#cos-nonambig) [**XML-Schema**].
       This means that the schema component will not validate because the sequence is non-
       deterministic. The Profile places the following constraints on extension:

       R0712 *A DESCRIPTION for an extension of a wsrf-bf:BaseFaultType MUST*
             NOT introduce any child elements to the sequence.

455   **8   Security**

The Profile does not address security requirements directly; Grid infrastructure and environmental
security requirements must be profiled in separate documents. The Profile mandates the
composition with an OGSA Basic Security profile that exposes an OGSA Basic Security
conformance claim along with the OGSA Security conformance claim. For instance, an OGSA
460   anonymous channel would expose two claims, one for OGSA Basic Security conformance and
       one for the anonymous channel conformance.

8.1.1   OGSA Basic Security Profile Conformance Claim

One of the primary aspects of the OGSA security architecture is the ability for a service requester
to discover the security capabilities of the service. In order to accomplish this, the Profile
465   introduces a requirement for exposure of a well known conformance claim for all OGSA Basic
       Security profiles. The Profile places the following constraints on the conformance claim:

R0811 *A DESCRIPTION MUST have attached to the wsdl:portType a wsi:claim with the URI "http://www.ggf.org/namespaces/OGSABasicSecurity-1.0".*

470

Author Information

Ian Foster
Math & Computer Science Division
Argonne National Laboratory
475   Argonne, IL 60439
Email: <foster@mcs.anl.gov>

Tom Maguire
IBM
2455 South Road
480   Poughkeepsie, NY 10509
Email: <tmaguire@us.ibm.com>

Dr. David Snelling
Fujitsu Laboratories of Europe
Hayes Park Central
485   Hayes End Road
Hayes, Middlesex UB4 8FE
Email: <d.snelling@fle.fujitsu.com>

Contributors

Acknowledgements

Intellectual Property Statement

Full Copyright Notice

510   This document and translations of it may be copied and furnished to others, and derivative works that comment on or otherwise explain it or assist in its implementation may be prepared, copied, published and distributed, in whole or in part, without restriction of any kind, provided that the above copyright notice and this paragraph are included on all such copies and derivative works. However, this document itself may not be modified in any way, such as by removing the copyright

515   notice or references to the GGF or other organizations, except as needed for the purpose of developing Grid Recommendations in which case the procedures for copyrights defined in the GGF Document process must be followed, or as required to translate it into languages other than English.

The limited permissions granted above are perpetual and will not be revoked by the GGF or its

520   successors or assigns.

This document and the information contained herein is provided on an "AS IS" basis and THE GLOBAL GRID FORUM DISCLAIMS ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY WARRANTY THAT THE USE OF THE INFORMATION HEREIN WILL NOT INFRINGE ANY RIGHTS OR ANY IMPLIED WARRANTIES OF MERCHANTABILITY

525   OR FITNESS FOR A PARTICULAR PURPOSE."

Normative References

- **[SchemaCentric-XML-C14N]** B. Atkinson, S. Aissi, M. Hondo (ed.), Schema Centric XML Canonicalization, OASIS Committee Specification, 10 July 2002. http://www.uddi.org/pubs/SchemaCentricCanonicalization-20020710.htm

530   - **[RFC2119]** S. Bradner (ed.) Key words for use in RFCs to Indicate Requirement Levels, The Internet Engineering Task Force Best Current Practice, March 1997. http://www.ietf.org/rfc/rfc2119

- **[WS-Addressing]** D. Box and F. Curbera (ed.) Web Services Addressing 1.0 – Core (WS-Addressing), W3C Last Call, 31 March 2005. http://www.w3.org/TR/2005/WD-ws-
535   addr-core-20050331

- **[WS-BaseFaults]** S. Tuecke, L. Liu and S. Meder (ed.) Web Services Base Faults 1.2 (WS-BaseFaults), OASIS Public Review Draft 01. 13 June 2005. http://docs.oasis-open.org/wsrf/wsrf-ws_base_faults-1.2-spec-pr-01.pdf

- **[WS-BaseNotification]** S. Graham, D. Hull and B. Murray (ed.) Web Services Base
540   Notification 1.3 (WS-BaseNotification), OASIS Public Review Draft 01, 07 July 2005. http://docs.oasis-open.org/wsn/wsn-ws_base_notification-1.3-spec-pr-01.pdf

- **[WS-ResourceLifetime]** L. Srinivasan and T. Banks (ed.) Web Services Resource Lifetime 1.2 (WS-ResourceLifetime), OASIS Public Review Draft 01, 13 June 2005. http://docs.oasis-open.org/wsrf/wsrf-ws_resource_lifetime-1.2-spec-pr-01.pdf

545   - **[WS-ResourceProperties]** S. Graham and J. Treadwell (ed.) Web Services Resource Properties 1.2 (WS-ResourceProperties), OASIS Public Review Draft 01, 10 June 2005. http://docs.oasis-open.org/wsrf/wsrf-ws_resource_properties-1.2-spec-pr-01.pdf

- **[WS-I BP 1.1]** 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
550   Organization Final Material, 24 August 2004. http://www.ws-i.org/Profiles/BasicProfile-1.1.html

- **[XML-Schema]** H. Thompson, D. Beech, M. Maloney, and N. Mendelsohn XML Schema Part 1: Structures Second Edition, W3C Recommendation 28 October 2004. http://www.w3.org/TR/xmlschema-1/

555   **Non-Normative References**

- **[OGSA Profile Definition]** T. Maguire and D. Snelling OGSA Profile Definition Version 1.0, Global Grid Forum OGSA-WG, GWD-I (submitted), 27 June 2005. http://forge.gridforum.org/projects/ogsa-wg/document/draft-ggf-ogsa-profile-definition/en/15

560
- **[OGSA Roadmap]** H. Kishimoto and J. Treadwell (eds.) Defining the Grid: A Roadmap (version 1.0) for the Open Grid Services Architecture, Global Grid Forum OGSA-WG, GWD-I (submitted), 24 June 2005. http://forge.gridforum.org/projects/ogsa-wg/document/draft-ggf-ogsa-roadmap/en/15

- **[XML-C14N]** J. Boyer (ed.) Canonical XML W3C Recommendation, March 2001
565   http://www.w3.org/TR/2001/REC-xml-c14n-20010315

    http://www.ietf.org/rfc/rfc3076.txt

    [XML-Exc-C14N] J. Boyer, D. Eastlake, and J. Reagle (ed.) Exclusive XML Canonicalization W3C Candidate Recommendation, 12 February 2002 http://www.w3.org/TR/2002/CR-xml-exc-c14n-20020212

570

Appendix A. Referenced Specifications

The following specifications' requirements are incorporated into the Profile by reference, except where superseded by the Profile:

- Web Services Addressing 1.0 – Core (WS-Addressing) **[WS-Addressing]**

575
- Web Services Base Faults 1.2 (WS-BaseFaults) [**WS-BaseFaults**]

- Web Services Base Notification 1.3 (WS-BaseNotification) [**WS-BaseNotification**]

- Web Services Resource Lifetime 1.2 (WS-ResourceLifetime) [**WS-ResourceLifetime**]

- Web Services Resource Properties 1.2 (WS-ResourceProperties) [**WS-ResourceProperties**]

580
- Basic Profile 1.1 [**WS-I BP 1.1**]

- Schema Centric XML Canonicalization Version 1.0 [**SchemaCentric-XML-C14N**]

Appendix B. Extensibility Points

This section identifies extensibility points for the Profile's component specifications. These
mechanisms are out of the scope of the Profile; their use may affect interoperability, and may
require private agreement between the parties to a Web service.

In Web Services Addressing [**WS-Addressing**]:

- E0301 **– WS-Addressing Extensibility –** WS-Addressing allows extensibility elements
  for the wsa:EndpointReference.

- E0302 **– WS-Addressing Metadata Extensibility –** WS-Addressing allows extensibility
  elements for metadata as children of the wsa:Metadata element.

- E0303 **– WS-Addressing Reference Parameters Extensibility –** WS-Addressing allows
  extensibility elements for Reference Parameters as children of the
  wsa:ReferenceParameters element.

In Web Services Resource Properties 1.2 [**WS-ResourceProperties**]:

- E0401 **– Resource Property Document Extensibility –** Any resource property
  document MAY include standard XML extensibility through the use of xsd:any.

- E0402 **– Resource Property Element Extensibility –** Any resource property document
  MAY include standard XML extensibility through the use of xsd:any.

- E0403 **– QueryExpression Extensibility –** The Query Expression supported by the
  QueryResourceProperties message exchange is defined as open content (xsd:any).

In Web Services Resource Lifetime 1.2 [**WS-ResourceLifetime**]

- E0501 **– Termination Reason –** The termination reason in the TerminationNotification
  message type allows for open content (xsd:any).

In Web Services Base Notification 1.2 [**WS-BaseNotification**]

- E0601 **– Subscribe Topic Expression –** The topic expression in the wsnt:Subscribe is
  open content (xsd:any).

In Web Services Base Faults 1.2 [**WS-BaseFaults**]

- E0701 **– Base Fault Type –** The Base Fault Type includes open content (xsd:any) as
  the last child element in sequence.

Appendix C. OGSA Resource Properties – Normative

C.1. ResourcePropertyNames Resource Property Element Definition

The general form of a ResourcePropertyNames resource property element is:

615
```
<ogsa-bp:ResourcePropertyNames>
  list of xsd:QNames
</ogsa-bp:ResourcePropertyNames>
```

Furthermore, this reference MUST reflect the minOccurs and maxOccurs properties as follows:

```
<xsd:element ref="ogsa-bp:ResourcePropertyNames"
620            minOccurs="1" maxOccurs="1" />
```

This resource property element is further constrained as follows:

/ogsa-bp:ResourcePropertyNames

> Contains a complete list of xsd:QNames of all Resource Property Elements defined in the Resource Property Document.

625   C.2. FinalWSResourceInterface Resource Property Element Definition

The general form of a FinalWSResourceInterface resource property element is:

```
<ogsa-bp:FinalWSResourceInterface>
  xsd:QName
</ogsa-bp:FinalWSResourceInterface>
```

630   Furthermore, this reference MUST reflect the minOccurs and maxOccurs properties as follows:

```
<xsd:element ref="ogsa-bp:FinalWSResourceInterface"
            minOccurs="0" maxOccurs="1" />
```

This resource property element is further constrained as follows:

/ogsa-bp:FinalWSResourceInterface

635   > Optional element, if present, contains the xsd:QName of the most derived portType interface of the service.

C.3. WS ResourceInterfaces Resource Property Element Definition

The general form of a WSResourceInterfaces resource property element is:

```
<ogsa-bp:WSResourceInterfaces>
640  list of xsd:QNames
</ogsa-bp:WSResourceInterfaces>
```

Furthermore, this reference MUST reflect the minOccurs and maxOccurs properties as follows:

```
<xsd:element ref="ogsa-bp:WSResourceInterfaces"
            minOccurs="0" maxOccurs="1" />
```

645   This resource property element is further constrained as follows:

/ogsa-bp:WSResourceInterfaces

> Optional element, if present, contains a complete list of xsd:QNames of all portType interfaces aggregated into the service.

650   C.4. Resource Endpoint Reference Resource Property Element Definition

The general form of an ogsa-bp:ResourceEndpointReference resource property element is:

```
<ogsa-bp:ResourceEndpointReference>
  wsa:EndpointReferenceType
</ogsa-bp:ResourceEndpointReference>
```

655   Furthermore, this reference MUST reflect the minOccurs and maxOccurs properties as follows:

```
<xsd:element ref="ogsa-bp:ResourceEndpointReference"
             minOccurs="0" maxOccurs="unbounded" />
```

This resource property element is further constrained as follows:

/ogsa-bp:ResourceEndpointReference

660   Optional elements, if present, contain wsa:EndpointReference(s) by which a service is
            addressable.

Appendix D. OGSA WSRF Basic Profile Schema

665 This section contains the normative XML Schema definitions described in this document. The definitions in this section MUST be considered normative.

```
<?xml version="1.0" encoding="UTF-8"?>
<!--
The GGF takes no position regarding the validity or scope of any
intellectual property or other rights that might be claimed to
pertain to the implementation or use of the technology described in
this document or the extent to which any license under such rights
might or might not be available; neither does it represent that it
has made any effort to identify any such rights. Copies of claims of
rights made available for publication and any assurances of licenses
to be made available, or the result of an attempt made to obtain a
general license or permission for the use of such proprietary rights
by implementers or users of this specification can be obtained from
the GGF Secretariat.

The GGF invites any interested party to bring to its attention any
copyrights, patents or patent applications, or other proprietary
rights which may cover technology that may be required to practice
this recommendation. Please address the information to the GGF
Executive Director.

Copyright (C) Global Grid Forum (2005). All Rights Reserved.

This document and translations of it may be copied and furnished to
others, and derivative works that comment on or otherwise explain it
or assist in its implementation may be prepared, copied, published
and distributed, in whole or in part, without restriction of any
kind, provided that the above copyright notice and this paragraph
are included on all such copies and derivative works. However, this
document itself may not be modified in any way, such as by removing
the copyright notice or references to the GGF or other
organizations, except as needed for the purpose of developing Grid
Recommendations in which case the procedures for copyrights defined
in the GGF Document process must be followed, or as required to
translate it into languages other than English.

The limited permissions granted above are perpetual and will not be
revoked by the GGF or its successors or assigns.
This document and the information contained herein is provided on an
"AS IS" basis and THE GLOBAL GRID FORUM DISCLAIMS ALL WARRANTIES,
EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY WARRANTY THAT
THE USE OF THE INFORMATION HEREIN WILL NOT INFRINGE ANY RIGHTS OR
ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A
PARTICULAR PURPOSE."

-->
```

```
<xsd:schema
  xmlns="http://www.w3.org/2001/XMLSchema"
  xmlns:xsd="http://www.w3.org/2001/XMLSchema"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
715  xmlns:wsa="http://www.w3.org/2005/03/addressing"
  xmlns:ogsa-bp="http://www.ggf.org/namespaces/OGSABasicProfile-
1.0.xsd"
  elementFormDefault="qualified"
  attributeFormDefault="unqualified"
720  targetNamespace="http://www.ggf.org/namespaces/OGSABasicProfile-
1.0.xsd" >

  <xsd:import
    namespace="http://www.w3.org/2005/03/addressing"
725    schemaLocation="http://www.w3.org/2005/03/addressing/" />

  <xsd:simpleType name="QNameListType">
    <xsd:list itemType="xsd:QName"/>
  </xsd:simpleType>
730
  <xsd:element name="ResourcePropertyNames"
               type="ogsa-bp:QNameListType" />

  <xsd:element name="FinalWSResourceInterface"
735               type="xsd:QName" />

  <xsd:element name="WSResourceInterfaces"
               type="ogsa-bp:QNameListType" />

740  <xsd:element name="ResourceEndpointReference"
               type="wsa:EndpointReferenceType" />

</xsd:schema>
```

GWD-R (draft-ggf-ogsa-wsrf-basic-profile-043)   Thursday, September 22, 2005

745 **Appendix E. Referenced Specification Status and Adoption Level Classification**

The classification of this Profile's referenced specifications at the time of writing are in Table 2.

Table 2 Status of specifications referenced by OGSA WSRF Basic Profile 1.0

OGSA Referenced Specifications: OGSA WSRF Basic Profile 1.0														
August 31, 2005	Status							Adoption						
Specification/Profile Name	De Facto	Institutional	Evolving Institutional	Draft Institutional	Consortium	Evolving Consortium	Draft	Ubiquitous	Adopted	Community	Interoperable	Implemented	Unimplemented	Note
Specifications														
WS-Addressing 1.0		<	X									<	X	IBM, Apache implementing
WS-ResourceProperties 1.2		<	X									<	X	At public review
WS-ResourceLifetime 1.2		<	X									<	X	At public review
WS-BaseFaults 1.2		<	X									<	X	At public review
WS-BaseNotification 1.3		<	X									<	X	At public review
SchemaCentricCanonicalization			X									X		Committee Specification
Profiles														
WS-I Basic Profile 1.1		X						-	-	-	-	-	-	Final Material

Legend:
X   Specification or profile is currently at this status or adoption level
<   Specification or profile is approaching this status or adoption level
-   Status or adoption level is not applicable