Glossary

Common Gateway Interface: A standard for interfacing external applications with information servers, such as HTTP or Web servers.

Complex Type: A data type that is composed of other types, simple or complex. Also known as composite type.

Endpoint Reference: In WS-Addressing terminology, an endpoint reference is the address of a particular WS-Resource.

Enterprise Archive File: An Enterprise Archive file represents a J2EE application that can be deployed in a WebSphere application server. EAR files are standard Java archive files and have the file extension .ear. The modules that make up the EAR file are themselves packaged in archive files specific to their types—for example, a Web module contains Web archive files and an EJB module contains Java archive files. EAR files also contain a deployment descriptor (an XML file) that describes the contents of the application and contains instructions for the entire application, such as security settings to be used in the run-time environment.

Extensibility Element: XML element used to specify a concrete protocol or message format. Typically used within a WSDL binding to associate technology specific information — also known as binding information — with an

abstract definition. Extensibility elements must use an XML namespace different from that of WSDL, implying that such elements 'extend' the WSDL by introducing new namespaces.(Christensen, Curbera, Meredith, & Weerawarana, 2001).

Global Element Definition (GED): XML element declarations specify the structure, type, occurrence, and value constraints for an XML element. Global element declarations appear as children of the xsd:schema element. They can be reused by referencing them in other parts of the schema or from other schema documents.

Global Grid Forum (GGF): Global Grid Forum (http://www.globalGrid forum.org/).

Grid Web Services Definition Language (GWSDL): Grid Web Services Definition Language, build upon WSDL.

IBM Cloudscape: A pure, open source-based Java relational database management system that can be embedded in Java programs and used for online transaction processing (OLTP).

Java Server Pages: JavaServer Pages (JSP) technology enables Web developers and designers to rapidly develop and easily maintain, information-rich, dynamic Web pages that leverage existing business systems. As part of the Java technology family, JSP technology enables rapid development of Web-based applications that are platform independent. JSP technology separates the user interface from content generation, enabling designers to change the overall page layout without altering the underlying dynamic content.

Jini: Java middleware based on a service directory providing leased service registration and discovery. Service providers register a service object reference, which may a remote proxy. Service consumers perform lookup operations to find a service that implements the desired interface and may download the reference to any matches they find.

Kerberos: A network authentication protocol. It is designed to provide strong authentication for client/server applications by using secret-key cryptography.

Lightweight Directory Access Protocol: An open industry standard that defines a standard method for accessing and updating information in a directory.

Local Element Definition: XML element declarations specify the structure, type, occurrence, and value constraints for an XML element. Local element declarations are declarations that appear within complex types or model groups and are not references to global elements.

Multipurpose Internet Mail Extensions: An official Internet standard that specifies how messages must be formatted so that they can be exchanged between different e-mail systems. MIME is a very flexible format, permitting one to include virtually any type of file or document in an email message. Specifically, MIME messages can contain text, images, audio, video, or other application-specific data. The fomat has been described in RFC 1521.

Namespace: A namespace is a set of names with some form of identification so that a system using the namespace can use names within the space by qualifying each name with the appropriate namespace identifier. XML namespaces are a collection of element and attribute names where the namespace is identified by a URI. (Bray, Hollander, & Layman, 1999). This allows XML documents to use different elements and attributes that have the same name as long as they come from different namespaces.

Notification Transmission Primitive: Pattern of message passing characterized by a single message being sent by the endpoint. The message trigger must be defined by the application. No reply from the client is expected. This pattern could be used to implement timed events initiated by the service or a listener pattern whereby a client has asked to be informed by the service when a particular event occurs.

One-Way Transmission Primitive: Pattern of message passing characterized by a single message received by the endpoint with no expected return

message. This pattern could be used to implement sensor networks, where each client is a sensor that relays current readings to a service responsible for collating the results.

Port Type: A service interface — the interface implemented by a Grid service. Usually written as portType.

Primitive: In computing terms, a primitive is a low-level operation or object from which higher-level objects or operations can be constructed. A programmer would compose primitives together to create more complex (read: composite) operations or objects.

QName: A QName is an XML qualified name (Biron & Malhotra, 2001). An XML qualified name uniquely references an XML element by specifying the namespace name and local part name for the given element. For example, consider the following QName: xsd:complexType. The format of a QName is namespace_prefix:local_part. The namespace_prefix must be associated with a namespace URI reference in a namespace declaration such as what you might see in a definitions element: xmlns:xsd="http://www.w3.org/2001/XMLSchema". The local_part must be the unique name of an element defined in the namespace referred to by the namespace_prefix. For our example, this means there must be an element named "complexType" found at the namespace referenced by the URI "http://www.w3.org/2001/XMLSchema".

Request-Response Transmission Primitive: Pattern of message passing characterized by the endpoint receiving a message and sending a correlated return message. This is the standard pattern for most service invocations where the client initiates an operation with a message containing required parameters; the service conducts some form of processing and returns the result in a new message.

Remote Procedure Call: RFC 1050 defines client-server protocol for passing parameters and evoking remote procedure using messages.

Resource Property: An individual component of a WS-Resource's state, represented by an XML element within a WS-Resource Property Document.

RSA Cryptographic Algorithm: The RSA algorithm invented by Ronald L. Rivest, Adi Shamir, and Leonard Adleman in 1977.

Service Oriented Architecture (SOA): Service Oriented Architecture refers to a collection of services that have some means of communicating with each other in a request-response pattern of message passing (Barry). Services within this architecture should be loosely coupled with respect to location, protocol and time (Hanson, 2002).

Simple Data Type: A simple type is a data type whose instances are composed of only one item of data. Also known as atomic or primitive types.

Simple Object Access Protocol: A communication protocol for communication between applications via Internet. It is platform and language independent, and based on XML. It allows the message to pass through firewalls because it is carried by HTML traffic.

Solicit-Response Transmission Primitive: Pattern of message passing characterized by the endpoint sending a message and receiving a correlated message from some client. This pattern could be used to implement leasing where a service maintains a list of clients that have a lease with the service. Periodically the service solicits a response from the client to see if they are active and still wish to maintain their lease.

Stateful Resource: A structured data entity that stores state data that is associated with and can be manipulated by a Grid Web service. A stateful resource must be expressible as an XML document and have a well-defined lifecycle. An instance of a stateful resource may be created via a Web service referred to as a stateful resource factory.

Stateful Resource Factory: A Web service that can instantiate stateful resources.

Stateful Resource Identifier: A reference to a Grid Web service stateful resource, use by WS-Addressing in GT4.

Struts: An open source framework for building Java Web applications.

Transmission Primitive: A pattern of message passing. With reference to Web Services this refers to one of the four patterns supported by WSDL: one-way, request-response, solicit-response and notification transmission primitives.

Uniform Resource Identifiers (URI): (Berners-Lee, Fielding, Irvine, & Masinter, 1998), the generic term for all types of names and addresses that identify abstract or physical resources. A URL is one kind of URI, but it is a mistake to think that URI's can be looked up on the Web.

Universal Description, Discovery and Integration: A Web-based distributed directory that enables businesses to list themselves on the Internet and discover each other, similar to a traditional phone book's yellow and white pages.

Universal Plug 'N' Play: Platform and language independent middleware designed for robust connectivity among stand-alone devices and PCs .

Universal Resource Locator: Global address system for documents and other resources on the Word Wide Web. General format is protocol:// server:port/path. A unique name of a Web page. URL belongs to a broader group of URI — Universal Resource Identifiers, which identify resources in the Web: documents, images, downloadable files, services, electronic mailboxes, and other.

Web Archive File: File format similar to Java Archive File, used for packaging Web applications. The structure of WAR file:

- The static HTML files and JSPs are stored in the top level directory.
- The Servlet and related Java technology class files must be stored in the WEB-INF/classes directory.
- Any auxiliary library JAR files must be stored in the WEB-INF/lib directory.

- The deployment descriptor is stored as a file named web.xml in the WEB-INF directory

Web Service Description Language: An XML format for describing network services as a set of endpoints operating on messages containing either document-oriented or procedure-oriented information. The operations and messages are described abstractly, and then bound to a concrete network protocol and message format to define an endpoint. Related concrete endpoints are combined into abstract endpoints (services).

Web Services: A set of standards that define programmatic interfaces for application-to-application communication over a network (2004). Standards use XML languages such as UDDI, WSDL, and SOAP.

Web Services for Remote Portlets: Portlet provided to the requestor over Web, with interface description that is defined in a public directory service.

Web Services Resource Framework (WSRF): http://www.globus.org/wsrf

World Wide Web (WWW): A collection of Internet servers that deliver specially formatted documents to clients across the Internet.

WS-ResourceProperties: Specification for creation and use of WS-Resource Properties Document.

WS-Resource Properties Document: A XML Global Element Declaration (GED) in a given namespace that defines the type of a stateful resource, a.k.a. resource property document.

WS-Resource: A composition formed by a Web service description being associated with a stateful resource.