Open Grid Services Architecture
Glossary of Terms

Status of This Memo

This memo provides information to the Grid community regarding the concepts and terms used by the Open Grid Services Architecture and related documents. It does not define any standards or technical recommendations. Distribution is unlimited.

Abstract

The Open Grid Services Architecture (OGSA) document summarizes current understanding of the functionality required to implement a Grid infrastructure, and the rendering of this functionality into service definitions. In doing so, it uses many terms whose meanings may need clarification. Some of these terms are introduced and explained in the OGSA document, while others are defined in other related documents.

The purpose of this Glossary is to provide an unambiguous definition of such terms as they are used in the context of an OGSA Grid. It is intended to be read in conjunction with the OGSA document, and does not by itself provide background information about Grids, nor attempt to justify the definitions or the context in which they may be used. The reader is referred to external documents for further explanation where necessary.

Contents

1. Introduction

The Open Grid Services Architecture (OGSA) document summarizes current understanding of the functionality required to implement a Grid infrastructure, and the rendering of this functionality into service definitions. In doing so, it uses many terms whose meanings may need clarification. Some of these terms are introduced and explained in the OGSA document, while others are defined in other related documents.

In this document we attempt to provide unambiguous definitions of such terms as they are used in the context of an OGSA Grid. Many of the definitions were arrived at after considerable debate within the OGSA working group, and some continue to be debated, both within the GGF membership and in the Grid and Web services community as a whole. In presenting these definitions we do not attempt to justify them, nor present the arguments that surround them, but we encourage the reader to read the appropriate section of the OGSA document, and to follow any supplied references for a more detailed discussion.

2. Terms

Note: In the following table, words or phrases in *italics* are themselves defined in the table.

Term	Definition	Ref's
A		
AAA	Authentication, authorization and accounting.	[7]
Abstract name	See *name*.	
ACID	Four properties that must generally apply to stateful *resources* used within the context of a transactional unit of work within a traditional, two-phase-commit-enabled transaction system. Briefly: • **Atomicity:** Updates must be made in an all-or-nothing fashion. • **Consistency:** Resources must be left in a consistent state, even in the event of failure. • **Isolation:** Partial updates must not be visible outside of the transaction until the end of the transactional unit of work. • **Durability:** The permanence of updates made under the transactional unit of work. Source: http://en.wikipedia.org/wiki/ACID.	
Address	See *name*.	
Agreement	An agreement defines a dynamically-established and dynamically-managed relationship between parties. The object of the relationship is the delivery of a service by one of the parties within the context of the agreement. The management of this delivery is achieved by agreeing on the respective roles, rights and obligations of the parties. The agreement may specify not only functional properties for identification or creation of the service, but also non-functional properties of the service such as performance or availability. Entities can dynamically establish and manage agreements via *Web service interfaces*. See https://forge.gridforum.org/projects/graap-wg for information about work being carried out by the GGF's Grid Resource Allocation Agreement Protocol (GRAAP) working group.	
Allocated	See *allocation*.	

Term	Definition	Ref's
Allocation	The process of assigning a set of *resources* for use by a *job*.	
B		
BLAST	Basic Local Alignment Search Tool—a commonly-used biotechnology tool for searching sequence databases. See http://www.ncbi.nlm.nih.gov/BLAST/ for more information.	
C		
Candidate set generator	In *EMS*, a *service* that determines the set of *container resources* on which a service or *job* may execute.	[1]
Capability	In *OGSA*, a set of one or more *services* that together provide a function that is useful in a *Grid* context. OGSA's *Execution Management Services* are an example of an OGSA capability.	[1]
Chargeback	Within an organization, the practice of charging individual departments for the IT *resources* they consume.	
Choreography, orchestration and workflow	The following concepts are closely related: • Choreography describes required patterns of interaction among *services* and templates for sequences (or more structures) of interactions. • Orchestration describes the ways in which business processes are constructed from *Web services* and other business processes, and how these processes interact. • Workflow is a pattern of business process interaction, not necessarily corresponding to a fixed set of business processes. All such interactions may be between services residing within a single data center or across a range of different platforms and implementations anywhere.	[4]
CIM	Common Information Model: An object-oriented model for *resource management*, published by the Distributed Management Task Force (DMTF). See http://www.dmtf.org/standards/cim/ for more information. Also see *WBEM*.	
CMM	*GGF's* Common Management Model working group (CMM-WG). See https://forge.gridforum.org/projects/cmm-wg/ for more information.	
Component	A modular part of a system that encapsulates its contents and whose manifestation is replaceable within its environment. A component defines its behavior in terms of provided and required interfaces.	[9]
Container	See *hosting environment.*	
Context	The conditions and circumstances under which an operation takes place. For example: • In programming languages a calling context is a set of bindings of values to variables. • A *VO* is a possible context for a request to a *service*. • A security context is a set of credentials under which execution can occur.	

Term	Definition	Ref's
D		
Data resource	An *entity* that can act as a source or sink of data together with its associated framework.	
Deployment	The process of installing components and related contents (e.g. programs and data) on a set of *resources* to meet the requirements of the *job* to which they have been allocated.	
	Deployment may be followed by *resource configuration*.	
Denial-of-service (DoS) attack	A form of attack on a computer system that results in some part of the system being prevented from providing its normal level of service to its users.	
DoS	See *denial of service attack*.	
E		
EMS	See *Execution Management Services*.	
Endpoint	A *Web service* endpoint to which a client may bind in order to consume a *service*.	[3]
Endpoint reference (EPR)	A WS-Addressing construct that identifies a message destination. In *WSRF* an EPR conveys the information needed to identify or reference a stateful *resource*.	
	See http://www.w3.org/2002/ws/addr/ for information about WS-Addressing.	
Entity	Any nameable thing. For example, in *OGSA* an entity might be a *resource* or a *service*.	
EPR	See *endpoint reference*.	
Event	Anything that occurs in or to an IT system that is potentially interesting to a person, to some other part of the same system, or to an external system, may be considered to be an event.	
	Information about an event may be expressed as a *log record* and stored in a *log service*. It may also be communicated to other interested *services* through a *notification message*.	
Event consumer	A *service* that receives an *event*.	
Event producer	A *service* that emits an *event*.	
Execution Management Services (OGSA-EMS)	An OGSA *capability* that is concerned with the problems of instantiating and managing, to completion, *units of work*.	[1]
F		
Failure	A state in which a service or other entity is not correctly meeting its specified behavior.	
Failure recovery	Restoration of a *service* or other *entity* to its specified behavior.	
	Recovery might be effected either by correcting the failure condition or by routing subsequent requests to an alternate *entity* that is capable of providing the same service.	

Term	Definition	Ref's
File path	A string in some directory system that can be bound to some file (or pseudo-file)—for example, /home/mydir/data. Usually a file path on one machine is invalid or resolves to a different file on other machines (in the absence of some sort of distributed file system).	
G		
Global Grid Forum (GGF)	A community forum that promotes and supports the development, deployment, and implementation of *Grid* technologies. See http://www.ggf.org for more information.	
GGF	See *Global Grid Forum*.	
Grid	A system that is concerned with the integration, *virtualization*, and *management* of *services* and *resources* in a distributed, heterogeneous environment that supports collections of users and resources (*virtual organizations*) across traditional administrative and organizational domains (*real organizations*).	
Grid fabric	The core set of *service interfaces* that must be implemented in order to realize an *OGSA Grid*. Also known as the OGSA infrastructure services.	
Grid service	1. (deprecated) In *OGSI*, a Grid service is a *service* that implements the GridService portType. This use of the term is considered to be deprecated. 2. (informal) In its more general use, a Grid service is a *Web service* that is designed to operate in a *Grid* environment, and meets the requirements of the Grid(s) in which it participates.	[8]
Grid service handle (GSH)	An *abstract name* for an *OGSI*-based *Grid service*. The term has no meaning in a *Grid* based on *WSRF*.	[8]
Grid service reference (GSR)	A GSR contains sufficient information to communicate with an *OGSI Grid service*—i.e. it is an *address*. The term has no meaning in a *Grid* based on *WSRF*.	[8]
GSH	See *Grid Service Handle*.	
GSR	See *Grid Service Reference*.	
H		
Hosting environment	Any environment in which a *task* can execute—for example a *Web services* execution environment, an operating system, etc. Also referred to as a *service container*, or simply *container*.	
HTTP	Hypertext Transfer Protocol—a text-based protocol that is commonly used for transferring information across the Internet. See http://www.w3c.org/Protocols for more information.	
HTTPS	Hypertext Transfer Protocol (Secure)—*HTTP* encrypted using *SSL*.	
Human-oriented name	See *name*.	
I		
Identity	An attribute, such as a *name*, that allows one *entity* to be distinguished from all others.	

Term	Definition	Ref's
Interface	In a *service-oriented architecture*, a specification of the operations that a service offers its clients. In *WSDL* 2.0 an interface component describes sequences of messages that a *service* sends and/or receives. In *WSDL* 1.1 an interface is specified in a *portType* element. For more information see http://www.w3.org/TR/wsdl20 and http://www.w3.org/TR/wsdl20-patterns.	
Intermediary	In *OGSA information services*, a *service* that decouples *message* (*event*) *producers* from *message* (*event) consumers*.	
IPC	Inter-process communication via *message*-passing, shared memory (including shared files), or *TCP*.	
IT	Information technology.	
J		
Job	A user-defined *task* that is scheduled to be carried out by an execution subsystem. In *OGSA-EMS*, a job is modeled as a *manageable resource*, has a *resource handle*, and is *managed* by a *job manager*.	[1]
Job manager	In *OGSA-EMS*, a service that manages a set of one or more *job* instances, which may be structured (e.g. a *workflow* or dependence graph) or unstructured (e.g. an array of non-interacting jobs). The job manager encapsulates all aspects of job execution, including interacting with execution planning *services*, the *provisioning* system, *containers*, and monitoring services. It may also deal with *failures* and restarts, it may schedule *jobs* to *resources*, and it may collect *agreements*, *reservations* and job service data.	[1]
Job Submission Description Language (JSDL)	A language for describing job submissions, including details of their required execution environments. See https://forge.gridforum.org/projects/jsdl-wg for more information.	
JSDL	See *Job Submission Description Language*.	
K		
L		
Legacy program	A pre-existing program such as *BLAST*, which must be *Grid*-enabled before it can be executed as a Grid *resource*.	
Legacy file system	An existing file system that is not *Grid*-enabled.	
Log record	An expression of an *event* for the purpose of persisting the event in a *logging service*.	
Log service	See *logging service*.	
Logging service	An *intermediary* that serves as a repository for *log records*.	
M		
Manage	See *management*.	
Manageability	The ability to be *managed*.	
Manageability interface	The *interface* through which a *resource* is *managed*.	

Term	Definition	Ref's
Manageable resource	See *resource*.	
Management	The administrative process of *deploying*, configuring, monitoring, metering, tuning, and/or troubleshooting *resources*.	[11]
Managed	See *management*.	
Manager	Software that *manages manageable resources*. A manager may or may not require a human operator.	
Message	A self-contained unit of data that is transferred between a *message producer* and one or more *message consumers*.	
Message broker	An *intermediary* in a *messaging service*.	
Message consumer	A *service* that receives a *message*.	
Message producer	A *service* that emits a *message*.	
Messaging service	An *intermediary* used for transmitting *messages* from *message producers* to *message consumers*.	
Metadata	Data that describes *OGSA services* or other data. Metadata may include references to schemas, provenance, and information quality.	
MPI	Message Passing Interface: a standard API for implementing message-passing libraries. MPI libraries are generally used to coordinate activity within parallel applications. See http://www.mpi-forum.org for more information.	
N		
Name	An attribute used to identify an *entity*. In *OGSA-naming*, there are three types of names: human-oriented names, abstract names, and addresses. • A **human-oriented name** is based on a naming scheme that is designed to be easily interpreted by humans (e.g. human-readable and human-parsable). • An **abstract name** is a persistent name suitable for machine processing that does not necessarily contain location information. Abstract names are bound to addresses. • An **address** specifies the location of an entity.	[1]
Notification	A *message* communicating the details of an *event* to an interested party.	
Notification message	See *notification*.	
Notify	Send a *notification message*.	
O		
OGSA	Open Grid Services Architecture.	[1]
OGSA-EMS	See *Execution Management Services.*	
OGSA-Naming	An *OGSA* capability used to associate *names* with *entities*.	[1]
OGSA Information Services	An *OGSA* capability that provides access to information about applications, *resources* and *services*.	[1]

Term	Definition	Ref's
OGSA Infrastructure Services	See *Grid fabric*.	
OGSI	Open Grid Services Infrastructure. A GGF specification that defines the common interfaces and behaviors of a *Grid service*. OGSI is deprecated in favor of *WSRF* and *WSN*.	[8]
Orchestration	See *choreography, orchestration and workflow*.	
P		
Policy	Statements, rules or assertions that specify the correct or expected behavior of an *entity*. For example, an authorization policy might specify the correct access control rules for a software *component*.	[10]
portType	In *WSDL* 1.1, a named set of abstract operations and the abstract *messages* involved. In WSDL 2.0, portTypes are renamed as *interfaces*.	
Provisioning	The activity of specifying, *reserving*, *allocating* and *deploying* the set of *resources* required to accomplish a *task*.	
Q		
Quality of service (QoS)	A measure of the level of service attained, such as security, network bandwidth, average response time or service availability.	
QoS	See *Quality of service*.	
R		
Real organization	The computers and *resources* that constitute a traditional administrative and organizational domain.	
Registry	An authoritative, centrally-controlled store of information. *Web services* use registries to advertise their existence and to describe their *interfaces* and other attributes. Prospective clients query registries to locate required *services* and to discover their attributes.	
Release	The action of returning an *allocated resource* to the pool of available resources.	
Reservation	The process of reserving *resources* for future use by a planned *task*.	
Resource[1]	Resources are *entities* that can be *managed*. However not all entities are resources. Resources can be programmatically managed through a *manageability interface*, or through some other mechanism such as a policy file. The term "resource" encompasses not only entities that are pooled (e.g. hosts, software licenses, IP addresses) or that provide a given capacity (e.g. disks, networks, memory), but also processes, print jobs and *virtual organizations*, which do not expose interfaces by themselves but may still be managed by some other means.	
Resource allocation	See *allocation*.	

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[1] The definition of "resource" will be reconsidered for the next version of this document, and may be revised to reflect work being carried out by the OGSA design teams.

Term	Definition	Ref's
Resource configuration	The process of adjusting the configurations of a set of *resources* to meet the requirements of the *task* to which they have been *allocated*. For example, configuration may involve setting appropriate parameters and storing policies for middleware, O/S, firmware and hardware. Resource configuration may be preceded by *resource deployment*.	
Resource deployment	See *deployment*.	
Resource handle	An *abstract name* for a *resource* and its associated state (if any).	
Resource lifecycle management	The process of *managing* resources allocated to a *task*, from the time of *allocation* until the time of *release*.	
Resource management	A generic term for several forms of *management* that may be applied to *resources*. These include (but are not limited to) typical *IT* systems management activities.	
Resource manager	A *manager* that implements one or more *resource management* functions.	
Resource model	An abstract representation of *manageable resources* that defines their schema (conceptual hierarchy and inter-relationships) and characteristics (attributes, *management* operations, etc.).	
Resource provisioning	See *provisioning*.	
Resource release	See *release*.	
Resource reservation	See *reservation*.	
Resource virtualization	See *virtualization*.	
S		
Schedule	A mapping (relation) between *services* and *resources*, possibly with time constraints. A schedule can be extended with a list of alternative *schedule deltas*.	
Schedule deltas	A set of transformations that may be produced for use if some part of the current *schedule* becomes invalid. For example, if a *resource* becomes unavailable, it may be possible to use a schedule delta rather than reschedule the *job* from scratch.	[1]
Scheduling	The process of reserving *resources* for future use by a planned *task*.	
Self-management	A *capability* by which system *components*—including hardware components, such as computers, networks and storage devices, and software components such as operating systems and business applications—are self-configuring, self-healing and self-optimizing. A self-managing IT infrastructure is less complex and more cost-effective to operate, and can react more quickly to component failures and to changing business needs than can a traditionally-managed environment.	
Service	A software *component* participating in a *service-oriented architecture* that provides functionality and/or participates in realizing one or more *capabilities*.	
Service composition	Aggregation of multiple small *services* into larger services. See http://www.serviceoriented.org for more information.	

Term	Definition	Ref's
Service container	See *hosting environment.*	
Service endpoint	See *endpoint*.	
Service level agreement (SLA)	A contract between a provider and a user that specifies the level of service that is expected during the term of the contract. SLAs are used by vendors and customers, as well as internally by IT shops and their end users. They might specify availability requirements, response times for routine and *ad hoc* queries, and response time for problem resolution (network down, machine failure, etc.). Source: http://www.hostchart.com/webhostingterms.asp.	[10]
Service level attainment	The act of meeting a pre-established *service level objective*.	
Service level manager (SLM)	A service level *manager* ensures that the *service level objectives* for a set of resources are met. Service level management typically entails monitoring availability and performance, analyzing the results of the monitoring activity and projecting future requirements, determining what adjustments, if any, are needed to meet the objectives, and acting accordingly.	
Service level objective (SLO)	A target level of service for a *resource* or a set of resources. A service level objective might be expressed in units such as average response time for a representative set of transaction types, or in terms of the monthly availability of a given *service*.	[10]
Service-oriented architecture (SOA)	This term is increasingly used to refer to an architectural style of building reliable distributed systems that deliver functionality as *services*, with the additional emphasis on loose coupling between interacting services. [2] Note: An SOA can be based on *Web services* (which provide basic interoperability), but it may use other technologies instead.	[5] [6]
SLA	See *service level agreement*.	
SLM	See *service level manager.*	
SLO	See *service level objective*.	
SOA	See *service-oriented architecture*.	
SOAP	An XML-based protocol for exchanging structured information in a decentralized, distributed environment. [3] See http://www.w3.org/2000/xp/Group and http://www.w3.org/TR/soap12-part1/ for more information.	
SSL	Secure Sockets Layer: a communication protocol whose primary goal is to provide private and reliable communication between two applications.	
T		
Task	A task is a definable *unit of work*.	

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[2] See https://forge.gridforum.org/projects/ogsa-wg/document/Proposed_SOA_Definition/en/1 for additional considerations of service-oriented architecture.

[3] Originally the acronym *SOAP* stood for "Simple Object Access Protocol", but that name is no longer considered by the W3C to be descriptive of its use, so "SOAP" is now considered to be a name rather than an abbreviation.

Term	Definition	Ref's
TCP	Transmission Control Protocol. A packet-level protocol used to exchange data over the Internet.	
Trust	The willingness to take actions expecting beneficial outcomes, based on assertions by other parties.	[7]
Trust authority	An *entity* that is trusted to make specified assertions.	[7]
Trust management	Trust management defines *trust authorities* and specifies what they should be trusted to do.	[7]
Trust relationships	*Polices* that govern how *entities* in differing domains honor each other's authorizations. An authority may be completely trusted—for example, any statement from the authority will be accepted as a basis for action—or there may be limited trust, in which case only statements in a specific range are accepted.	[7]
U		
UDDI	Universal Description, Discovery and Integration: a specification that defines a way to publish and discover information about *Web services*. See http://www.uddi.org for more information.	
Unit of work	A request, typically user-defined, to execute an *OGSA* application or a *legacy program*. In *OGSA-EMS*, a unit of work has both a ***manageability* aspect**, represented by a *job*, and an **execution aspect**. Its execution aspect, e.g., a running application or *service*, is managed through the associated job.	[1]
UML	Unified Modeling Language. See http://www.uml.org/ for more information.	
URI	Uniform Resource Identifier: A string used for identifying an abstract or physical *resource*.	
URL	Uniform Resource Locator: the *address* of an Internet resource.	
UUID	Universally-unique identifier.	
V		
Virtualize	Make a common set of abstract *interfaces* available for a set of similar *resources*, thereby hiding differences in their properties and operations, and allowing them to be viewed and/or manipulated in a common way.	
Virtual organization	A virtual organization (VO) comprises a set of individuals and/or institutions having direct access to computers, software, data, and other *resources* for collaborative problem-solving or other purposes. VOs are a concept that supplies a *context* for operation of the *Grid* that can be used to associate users, their requests, and a set of resources. The sharing of resources in a VO is necessarily highly controlled, with resource providers and consumers defining clearly and carefully just what is shared, who is allowed to share, and the conditions under which sharing occurs.	[1] [2]
VO	See *virtual organization*.	

Term	Definition	Ref's
W		
WBEM	Web Based Enterprise Management: a set of *management* technologies developed to unify the management of enterprise computing environments. WBEM has three main components: the *CIM* resource model; a representation of CIM classes and instances in XML; and a mapping of CIM operations onto HTTP. A means of accessing CIM through *Web services* is currently under development. See http://www.dmtf.org for more information.	
Web service	A software system designed to support interoperable machine- or application-oriented interaction over a network. A Web service has an *interface* described in a machine-processable format (specifically *WSDL*). Other systems interact with the Web service in a manner prescribed by its description using *SOAP* messages, typically conveyed using *HTTP* with an *XML* serialization in conjunction with other Web-related standards.	[3]
Workflow	See *choreography, orchestration and workflow*.	
WSDL	Web Services Description Language—an *XML* format for describing *Web services*. See http://www.w3.org/TR/wsdl for more information.	
WSDM	Web Services Distributed Management: A Web services architecture for *managing* distributed *resources*. See http://www.oasis-open.org/apps/org/workgroup/wsdm for more information.	
WS-Notification	A set of proposed specifications dealing with *notification*. See http://www.oasis-open.org/apps/org/workgroup/wsn/ for more information.	
WS-Resource Framework	A set of proposed specifications dealing with the association of *Web services* with stateful *resources*. See http://www.oasis-open.org/apps/org/workgroup/wsrf/ for more information.	
WSN, WS-N	See *WS-Notification*.	
WSRF, WS-RF	See *WS-Resource Framework*.	
X		
XML	Extensible Markup Language—a flexible text format that is used for data exchange. See http://www.w3.org/XML for information.	

Term	Definition	Ref's
Y		
Z		

3. Security Considerations

Security considerations are not applicable to this document.

4. Editor Information

Jem Treadwell
Hewlett-Packard
Phone: 732-577-6043
Email: Jem.Treadwell@hp.com

5. Contributors

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