

OPEN GRID SERVICES ARCHITECTURE

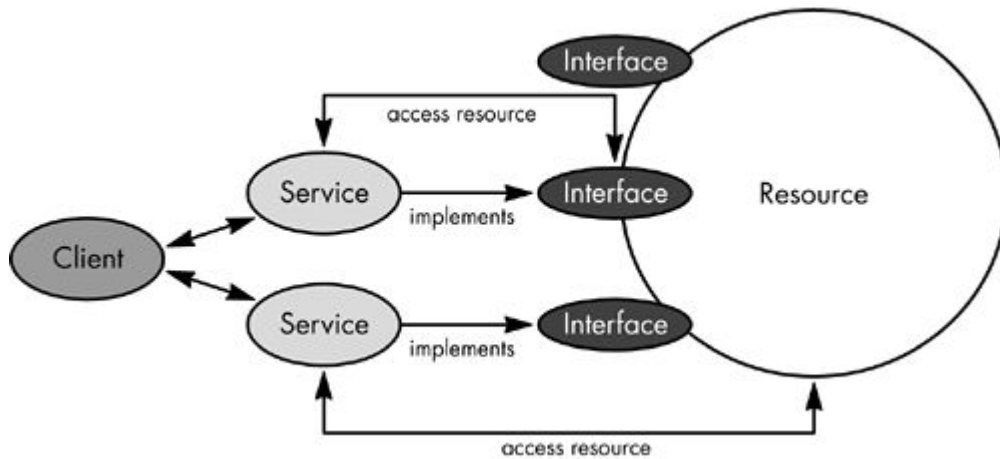
The grid infrastructure is mainly concerned with the creation, management, and the application of dynamic coordinated resources and services. These dynamic and coordinated resources and services are complex. They may be individual or a collection of entities with a short or long lifespan. These resources may be constituted from single or from multiple institutions so as to provide a homogeneous or heterogeneous set of functionalities. Even though the complexity and difference in resources and services may vary within every virtual organization, they are all agreed to deliver a set of QoS features including common security semantics, workflow, resource management, problem determination, failover, and service-level management. These QoS features require a well-defined architecture to achieve the desired level of service quality. This prompted for the introduction of Open Grid Service Architecture (OGSA) to support the creation, maintenance, and application of ensembles of services maintained by virtual organizations (VO) (Foster, Kesselman, & Tuecke).

Clarification of the Usage of Resource and Service

In most of the technology papers and specifications, the definition of the term "resource" and "service" are used interchangeably to represent anything that is sharable and/or can be used by an external user. Even though this may look conceptually correct for the specific scenarios they may be representing, for our discussion we would like to further clarify the resource and service concepts.

A resource is something sharable or a representation of a logical or physical entity (e.g., software application, hardware, operating system, cluster, etc.) and has a number of interfaces or application provider interfaces (API) to manage, access, and monitor the resource. A service is a realization of one of the interfaces with the necessary binding and message exchange pattern information for the use of the client. This is represented in Figure 4.5.

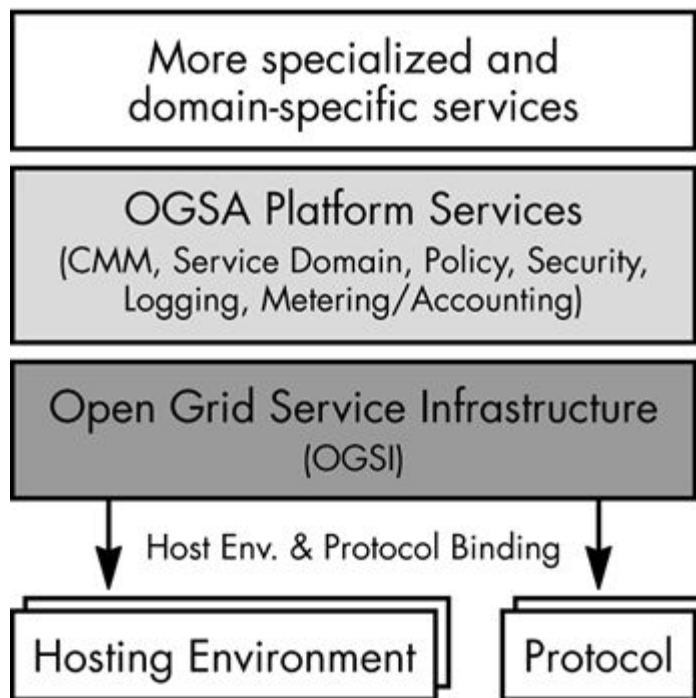
Figure 4.5. Relationship between resource and service.



OGSA Architecture and Goal

OGSA architecture is a layered architecture, as shown in Figure, with clear separation of the functionalities at each layer. As you can see from the figure, the core architecture layers are OGSI, which provides the base infrastructure, and OGSA core platform services, which are a set of standard services including policy, logging, service-level management, and so on. The high-level applications and services use these lower layer core platform components and OGSI that become part of a resource-sharing grid.

Figure 4.6. OGSA platform architecture.



The major OGSA goals are:

Identify the use cases that can drive the OGSA platform components

Identify and define the core OGSA platform components

Define hosting and platform-specific bindings

Define resource models and resource profiles with interoperable solutions

As of today there have been a lot of activities in the GGF to define the use cases and core platform services. We are going to concentrate most of our discussion on these two areas. As you can see, there is not much activity going on in the platform binding and resource models/profile areas. We are assuming that these areas will become more active when people start implementing more OGSA-based grid solutions in their environments and more sharable resources become exposed to the grid community.

In addition to the broad goals defined above, OGSA defines more specific goals, including:

Facilitating distributed resource management across heterogeneous platforms

Providing seamless quality of service delivery

Building a common base for autonomic management solutions

Providing common infrastructure building blocks to avoid "stovepipe solution towers "

Open and published interfaces and messages

Industry-standard integration solutions including Web services

Facilities to accomplish seamless integration with existing IT resources where resources become on-demand services/resources

Providing more knowledge-centric and semantic orientation of services

We start with some use cases that drive the architecture behind OGSA. We then explore core services that are developed as part of the platform solutions for the requirements gathered during the "use case" phase. In the chapter "Introduction to OGSI Specification," we cover the details of the OGSI specification through examples.

Some Sample Use Cases That Drive the OGSA

The OGSA architecture working group defines a number of use cases from a wide variety of application scenarios including those related to e-science and e-business applications.

The main purposes of these use cases are:

To identify and define core OGSA platform functionalities

To define core platform components based on the functionality requirements

To define the high-level requirements on these core components and identify their interrelationship

These use cases are defined as part of the OGSA-WG charter definition specified by GGF, which says, "To produce and document the use cases that drive the definition and prioritization of OGSA platform components, as well as document the rationale for our choices."

As we can see, some of these use cases defined below from the e-business and e-science world helps identify the general OGSA platform features, components, and their interrelationships. This will pave the way for the detailed discussion on the OGSA architecture platform components.

Here are the representational use cases from the OGSA Architecture working group, [1] which we will use in our discussion:

Commercial Data Center (Commercial Grid)

National Fusion Collaboratory (Science Grid)

Online Media and Entertainment (Commercial Grid)

We will discuss the core aspects, scenarios, and the requirements drawn from these use cases.

This will form the basis for our discussion on the OGSA core platform component.

Source : <http://elearningatria.files.wordpress.com/2013/10/ise-viii-grid-computing-06is845-notes.pdf>