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Grid and web services: Dependent approaches

Sangeet Kumar

Assistant Professor, PG Dept. of Computer Science DAV College, Jalandhar, Punjab, India

***Abstract*-This paper is related to the dependable approaches of Grid and Web Services. Paper explains web service and Grid service and related architecture of Grid and web service. This paper explains extension of Grid computing with web service composed of Grid Service. In this paper I have explained architecture of Cloud and Grid computing with its different services.**

***Keywords*-Grid service, Web service, Cloud computing**

I. INTRODUCTION

The term `Grid Computing' is a buzzword for any new technology to do with computing, especially computer networking. Grid Computing, or Network Computing, is intended to provide computational power that is accessible in the same way that electricity is available from the electricity grid - you simply plug into it and do not need to worry about where the power is coming from or how it got there. The Grid provides the protocols, services and software development kits needed to enable flexible, controlled resource sharing on a large scale. A software system built to support communication between two processing elements that are interconnected through a network is called web service. A Grid service is basically a Web service with some additions. Grid services have different goals from pure Web services. Every Grid service "is a" Web services, but not every Web service "is a" Grid service. The difference lies between grid services and web services in the scale, scope, ubiquity and easy of utilization of these services. Both typically deal with wide-area distributed computing.

II. TERMINOLOGY

What is grid: There are so many definitions of grid but we have improved definition of grid that as a layered of networked devices which allow different users to access distributed collection of data and application resources.

What is service: A service is a set of actions that form a coherent whole from the point of view of service providers and service requesters.

Web Service: Web services are typically application programming interfaces (API) or web APIs that can be accessed over a network, such as the Internet, and executed on a remote system hosting the requested services. A standardized way of integrating web-based applications which share business logic, data and processes through a programmatic interface across a network. Web service as a software system designed to support interoperable machine-to-machine interaction over a network. Web services are small units of code. Web services are designed to handle a limited set of tasks. Web services use XML based communicating protocols. Web services are independent of operating systems. Web services are independent of programming languages. Web services connect people, systems and devices. A Web service is considered non-transient as it does not have the concept of service creation and destruction, and hence managing its lifecycle.

Grid Service

It is a cluster-based, modern hosting service powered by hundreds of servers working in tandem to power your websites, applications and email with unrivaled power and bur stability. Grid Services, which are basically web services with improved characteristics and services, is a cluster-based, modern hosting service powered by hundreds of servers working in tandem to power your websites, applications and email with unrivaled power. Grid service is a perfect choice for those webmasters who are launching new websites and are uncertain about their traffic flow. In addition, it is also a good choice for those websites that are subject to a period of heavy traffic followed by a period of low traffic. Such websites face trouble with shared hosting service, because the shared server may not have the enough capacity to match the increased needs during a period. On the other hand, opting for dedicated hosting service is not a practical solution because it would be simply wastage of resources during the low traffic period.

III. EXTENSION OF WEB SERVICES

Grid service extended to web service**:**

Grid Service conceived to share computing power and resources like disk storage databases and software applications

"Grid service = Grid computing + Web services**"**

Grid services extend Web services by:

- Stateful services: This is regard to web service. An instance of a service is stateless if it cannot remember prior events and an instance of service is stateful if it can remember about prior actions. Stateless means that web services can't remember what you've done from one invocation to another. If we wanted to perform a chain of operations, we would have to get the result of one operation and

send it as a parameter to the next operation. A web service is usually stateless, a grid service is stateful.

- Lifetime management: It is related to the issues of resource reclamation associated with services in the event of failures (e.g. loss of network connectivity) or lack of interest by any relevant clients (e.g. service no longer ref. by any active process).in web services cycle controlled by web server. It dynamically allocated when a request arrives and deallocated when that request/session ends, whereas grid service set a time when a service will self-destruct unless kept alive by subsequent increases in its termination time.
- Notifications: A grid service can be configured to be a notification source, and certain clients to be notification sinks (or subscribers). This means that if a change occurs in the grid service, that change is notified to all the subscribers
- Service discovery: Web Service allow introspection and discovery of static information such as service interfaces and associated policy and grid service need support for transient service instances that are created or destroyed dynamically grid service uses an own index service which locate service based upon user criteria also service discovery is based on Service Data Elements (SDEs) that is a structured collection of information associated with a grid service that allow a user to choose a service that satisfies its needs, e.g. functionality speed, cost.

IV. ARCHITECTURE

Web services Architecture (WSA) is intended to provide a common definition of a Web service, and define its place within a larger Web services framework to guide the community. The WSA provides a conceptual model and a context for understanding Web services and the relationships between the components of this model. The Web services architecture is interoperability architecture: it identifies those global elements of the global Web services network that are required in order to ensure interoperability between Web services. The Web services architecture is based upon the interactions between three primary roles: service provider, service registry, and service requestor. These roles interact using publish, find, and bind operations. The service provider is the business that provides access to the Web service and publishes the service description in a service registry. The service requestor finds the service description in a service registry and uses the information in the description to bind to a service. A logical view of the Web services architecture is shown in Figure 1. The simplest form of service discovery is to request a copy of the service description from the service provider. After receiving the request, the service provider can simply e-mail the service description as an attachment or provide it to the service requestor on a transferable media, such as a diskette.

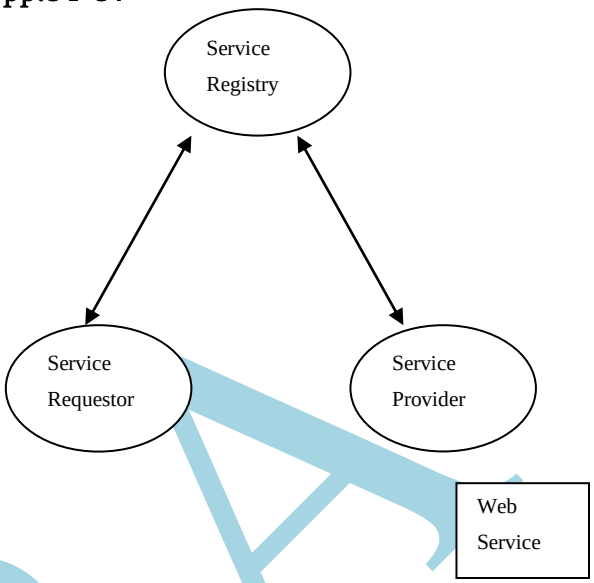

Figure: Web service architecture

Grid services Architecture: Open Grid Services Architecture (OGSA) is a set of standards defining the way in which information is shared among diverse components of large, heterogeneous grid systems. OGSA definitions and criteria apply to hardware, platforms and software in standards-based grid computing. The OGSA is, in effect, an extension and refinement of the service-oriented architecture (SOA). The OGSA addresses ongoing issues and challenges such as authentication, authorization, policy negotiation and enforcement, administration of service-level agreements, management of virtual organizations and customer data integration. The Open Grid Services Architecture (OGSA), developed by The Global Grid Forum, aims to define a common, standard, and open architecture for grid-based applications. The goal of OGSA is to standardize practically all the services one finds in a grid application (job management services, resource management services, security services, etc.) by specifying a set of standard interfaces for these services. However, although the web services architecture was certainly the best option, it still had several shortcomings which made it inadequate for OGSA's needs. OGSA overcame this obstacle by defining an extended type of Web Service called Grid Service (as shown in the diagram: Grid services are defined by OGSA). A Grid Service is simply a Web Service with a lot of extensions that make it adequate for a grid-based application (and, in particular, for OGSA). In the diagram: grid services are an extension of web services. Finally, since grid services are going to be the distributed technology underlying OGSA, it is also correct to say that OGSA is based on Grid Services.

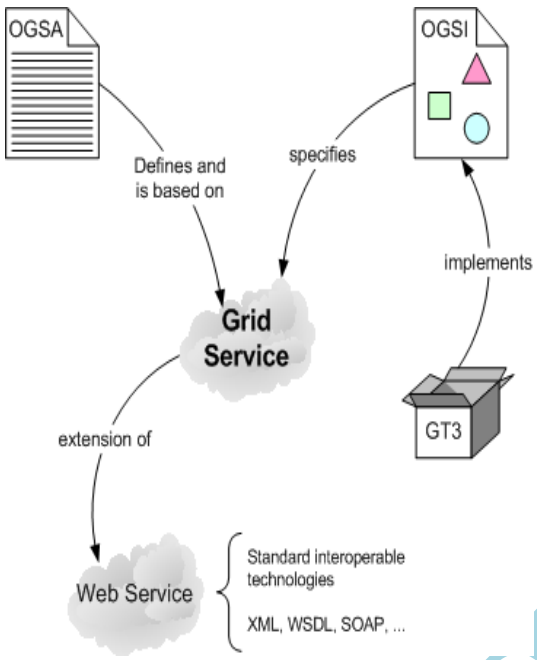

Fig: Grid service architecture

The goal is to optimize communication and interoperability among resources of all types. OGSA is a distributed interaction and computing architecture based around services, assuring interoperability on heterogeneous systems so that different types of resources can communicate and share information. OGSA has been

Although this type of service discovery is simple, it is not very efficient since it requires prior knowledge of the Web service, as well as the contact information for the service provider described as a refinement of the emerging Web Services architecture, specifically designed to support Grid requirements. The Open Grid Services Architecture also defines, in terms of Web Services Description Language (WSDL) interfaces and associated conventions, mechanisms required for creating and composing sophisticated distributed systems, including lifetime management, change management, and notification. Open Grid Services Architecture (OGSA) is a set of standards that extends Web services and service-oriented architecture to the grid computing environment. OGSA definitions and criteria describe how information is shared and distributed among the components of large, heterogeneous grid systems; they apply to hardware, platforms and software. Grid computing has intrigued the IT world for years. The notion of harnessing the processing power of multiple computers whether within an organization, supplied by volunteers or provided as a broadband, metered computing utility is attractive and compelling, but implementing it has proved somewhat difficult. One of the more recent developments advancing this cause, OGSA extends the idea of Web services to the universe of grid computing and thereby extends and refines the concept of service-oriented architecture. To create workable grid services, developers have had to address several important issues: how to establish identity and negotiate authentication, how to express and negotiate policy, how to find out what services are available, how to negotiate and monitor service-level agreements, how to organize and manage collections of services to deliver reliable and scalable services, and how to integrate data resources into computations. OGSA is based primarily on the technologies of Web Service Description Language (WSDL) and Simple Object Access Protocol (SOAP), an XML-based protocol for passing messages between systems over the Internet. It is service- oriented because it works as a series of loosely coupled, interacting services that use industry-accepted Web services standards.

V. CONCLUSION

For a Web service to be considered a grid service, clients must be able to easily discover, update, modify and delete information about the service and its functionality and relevant data; define how the service evolves; and ensure ongoing compatibility with other services. This paper can further extended by comparing differ net services of Grid and Cloud Computing.

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