

NaradaBrokering as Middleware Fabric for Grid-based Remote Visualization Services

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Remote Visualization Services (RVS) have tended to rely on approaches based on the client server paradigm. The simplicity in these approaches is offset by problems such as single-point-of-failures, scaling and availability. Furthermore, as the complexity, scale and scope of the services hosted on this paradigm increase, this approach becomes increasingly unsuitable.

We propose a scheme based on top of a distributed brokering infrastructure, NaradaBrokering, which comprises a distributed network of broker nodes. These broker nodes are organized in a cluster-based architecture that can scale to very large sizes. The broker network is resilient to broker failures and efficiently routes interactions to entities that expressed an interest in them. In our approach to RVS, services advertise their capabilities to the broker network, which manages these service advertisements. Among the services considered within our system are those that perform graphic transformations, mediate access to specialized datasets and finally those that manage the execution of specified tasks. There could be multiple instances of each of these services and the system ensures that load for a given service is distributed efficiently over these service instances. Among the features provided in our approach are efficient discovery of services and asynchronous interactions between services and service requestors (which could themselves be other services). Entities need not be online during the execution of the service request. The system also ensures that entities can be notified about task executions, partial results and failures that might have taken place during service execution. The system also facilitates specification of task overrides, distribution of execution results to alternate devices (which were not used to originally request service execution) and to multiple users. These RVS services could of course be either OGSA (Open Grid Services Architecture) based Grid services or traditional Web services. The brokering infrastructure will manage the service advertisements and the invocation of these services. This scheme ensures that the fundamental Grid computing concept is met – provide computing capabilities of those that are willing to provide it to those that seek the same.

[1] The NaradaBrokering Project: <http://www.naradabrokering.org>