

An Introduction to Aggregation Grid

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Abstract

Aggregation grid enables all grid nodes connected with a hierarchical architecture into a world-wide grid which can provide all services to all grid nodes for anyone who visits any grid node in the aggregation grid. Once users submit service requests anywhere, the aggregation grid would find the service regardless of where the service is, and will provide the service to users' desktop. Service discovery is fast through lookup service snapshot, aggregation path table and aggregation route table, can find the best service provider through man-made response latency, and is safe through agent aggregation node's symmetrical password. The grid channel, which is very safeguarded by authentication of the display, the borrower node's public key for encryption, the lender node's public key for encryption, the grid channel's symmetrical password, directly connects users and services in order to cut down transfer time.

1. Introduction

Grid computing [1] is regarded as one of the technology trends in future decades, and there are many kinds of grid such as knowledge grid [2, 3, 4], computing grid and data grid. Although a grid node can be very great, effective and capable, the node is impossible to satisfy everyone's demand. It is necessary for users to request a service from different grid nodes, but it is not convenient for a user to visit a grid node when he needs the service in another grid node. Aggregate grid solves the problem using a hierarchical architecture and enable users to use all services in all nodes in the aggregate grid through any node in the grid.

Aggregate grid is transparent, in which users can login from any node in the grid to use all services in all grid nodes. Login twice is not necessary. When users service in another grid node which is not the one the users login in, the two grids will consult with each other for cooperation and fee arrangement.

2. Aggregation Grid Architecture

Aggregation grid architecture is divided into three layers: client layer, node layer, and aggregation layer, as is shown in figure 1.

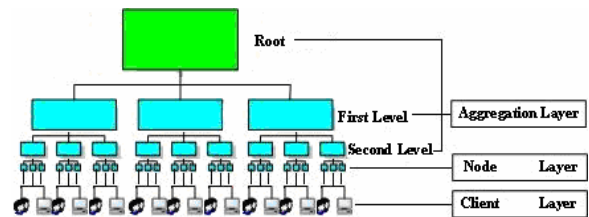


Figure 1. Aggregation Grid Architecture

The aggregation layer is based on the client layer and the node layer. Aggregation is preformed by aggregation nodes.

How to aggregate? All grid nodes are classified into different classes, and all grid nodes in the same class are connected to bottom aggregation grids; then every bottom aggregation grid is assigned into functionally different classes, and then the bottom aggregation grids of same class are connected to a father aggregation grid; and so on; until root aggregation grid is formed.

3. Aggregation Grid Service

The process of service discovery is shown in figure2, in which every node in the service discovery path contains a white blank.

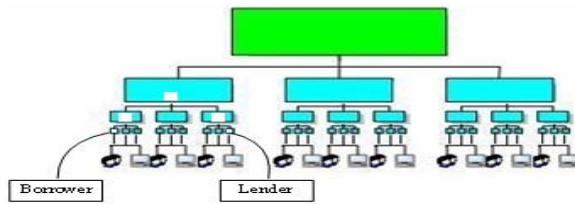


Figure 2. Aggregation Grid Service Discovery

4. Experiments and Evaluations

Aggregation grid has been evaluated with an experimental test bed in a simulator.

4.1 Experimental Test bed

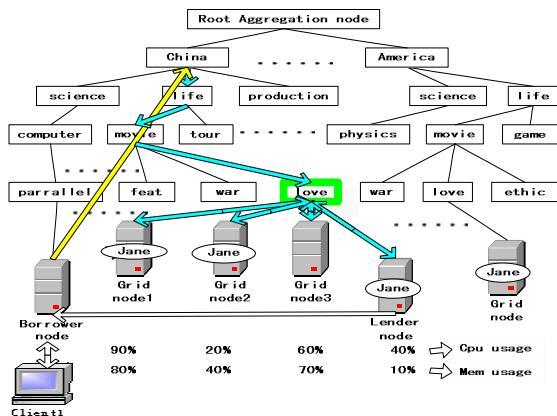


Figure 6. Test bed Topology

The topology of the test bed is shown in figure 6.

4.2 Evaluations

As is shown in figure 6, there are eight steps from the borrower node beginning to discovery service to the lender node setting up a channel with the borrower node in the experiment. And every step costs a discovery latency in searching memory data about 1ms and transfer latency inside china about 2ms. In addition, there is 1.1 ms used for scheduling.

5. Related Works

A number of service discovery in grids have been developed.

Information grid, service grid and knowledge grid can also share and manage globally distributed resources. [2,3,4].

Universal Description, Discovery and Integration (UDDI) is a key component of service publication and service discovery of web services. [5].

The fundamental difference between the technology and our aggregation grid is that aggregation grid aggregates services from small domain to large domain in the aggregation grid

architecture. Aggregation grid can discover the services which are nearest to users and are run in a comparatively free node. At the same time we address the challenges brought by constructing the aggregate architecture for business factor.

6. Summary

Aggregation grid can provide service to users safely, transparently and quickly; can increase, decrease and change services, members and structure dynamically.

Aggregation grid is not only powerful, but also easy to put in practice.

Reference

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