Rough Set Based Grid Computing Service in Wireless Network

M.Ravi[1] & A.S.Syed Navaz[2]

[12]Assistant Professor, Department of Computer Applications,
Muthayammal College of Arts & Science, Namakkal, Tamilnadu, India.

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Abstract - The computational grid is rapidly evolving into a service-oriented computing infrastructure that facilitates resource sharing and large-scale problem solving over the Internet. Service discovery becomes an issue of vital importance in utilizing grid facilities. In this paper presents ROSSE, a Rough sets-based search engine for grid service discovery. Building on the Rough sets theory, ROSSE is novel in its capability to deal with the uncertainty of properties when matching services. In this way, ROSSE can discover the services that are most relevant to a service query from a functional point of view. Since functionally matched services may have distinct nonfunctional properties related to the quality of service (QoS), ROSSE introduces a QoS model to further filter matched services with their QoS values to maximize user satisfaction in service discovery.

ROSSE is evaluated from the aspects of accuracy and efficiency in discovery of computing services. This paper Rough Sets based service matchmaking algorithm is used for service discovery that can deal with uncertainty of service properties. Experiment results show that the algorithm is more effective for service matchmaking than UDDI and OWL-S mechanisms.

Key Words: Wireless Network, Rough Set, QoS, UDDI, RTCP, Grid Computing

1.INTRODUCTION

In this mobile communication era, mobile phones are common and are mandatory for human survival. They are used for voice communication, messages, multimedia messages, browsing internet on move etc.

Even mobile service providers provide many value added service other than basic services such as weather forecasting, news, score updates etc. The goal of this paper is to improve real-time video transport over 3G wireless networks . By real-time video transport, we mean a piece of video content being delivered from a server in a wired network to a mobile client via a last-hop wireless link, to be decoded and viewed by the client before the entire content has been downloaded. This video streaming service must be compliant with the 3GPP packet streaming service (3GPP-PSS) [1], where the server uses RTP [2] for media transport and each client sends only RTCP reports as feedback to its server.

One common objective of media adaptation is congestion control whereby video sources reduce their transmission rates in reaction to deduced network congestion [3]. For paths involving wired and wireless links, that end-to-end feedback information alone is ineffective for congestion control purposes since it is not possible to identify where losses occur. Specifically, if losses occur in the wireless link due to poor wireless condition, it is not helpful for the sources to reduce their transmission rate. On the other hand, if losses occur in the wired network due to congestion, the sources should reduce their transmission rate.

One effective mechanism to provide additional information that allow sources to take appropriate actions is the RTP monitoring agent [4]—a network agent located at the junction of the wired and wireless network that sends *statistical feedbacks* (RTCP reports in particular) back to the sender to help the sender determine the proper action. However, the limited information contained in such statistical feedbacks is often insufficient for fine-grained application-level streaming optimization schemes [5]–[7].

Another limitation of using only end-to-end feedbacks is the long time for the feedbacks to arrive. In today's 3G wireless network, typical one-way delay of radio links is quite large—on the order of 100 ms—without link layer retransmissions. Thus, the actual end-to-end delay in practice can be quite large, especially with wireless link-level retransmissions implemented. Such long delay can severely impede the effectiveness of feedback information for the purpose of congestion control and beyond.

Both problems above can be solved simultaneously using a special agent called a streaming agent (SA) [8], located at the junction of the wired network and wireless link. Unlike the RTP monitoring agent [4], which provides only statistical feedbacks such as average roundtrip time (RTT) and packet loss rate, SA sends *timely feedbacks*, such as acknowledgment packets (ACKs), that tell the sender whether each packet has arrived at SA correctly and on time. We call such information provided by SA the *wired application state*, in contrast with information provided by RTP monitoring agent, which we term *wired network state*. Obviously, using fine-grained timely feedbacks one can derive wired network state as well as wired application state. Since most of the delay is in the wireless link, SA can provide much faster response about the condition of the wired network so that congestion control can react faster to alleviate network congestion. Furthermore, by providing the wired application state rather than just the wired network state, SA allows senders to have much more flexibility in media adaptation than it is possible with wired network state alone. Armed with SA's extra feedbacks, we next design application-level streaming systems that can take advantage of these feedbacks.. It is a complexity-scalable automatic retransmission scheme that capitalizes on SA feedbacks in estimating the success delivery probability of transmitted packets.

2. PROBLEM DESCRIPTION

2.1 EXISTING SYSTEM

Most systems include some job schedulers, but as grids span wider areas, there will be a need for more meta-schedulers that can manage variously configured collections of clusters and smaller grids. These schedulers will evolve to better schedule jobs, considering multiple resources rather than just CPU utilization. They will also extend their reach to implement better quality of service, using reservations, redundancy, and history profiles of jobs and grid performance.

2.2 PROPOSED SYSTEM

The users of the grid can be organized dynamically into a number of virtual organizations, each with different requirements. These virtual organizations can share their resources collectively as a larger grid. Sharing starts with data in the form of files or data. A "grid" can expand data capabilities in several ways. First, files or data can seamlessly span many systems and thus have required capacities than on any system. Such spanning can improve data transfer rates through the use of striping techniques.
Data can be duplicated throughout the grid to serve as a backup and can be hosted on the machines most likely to need the data, in conjunction with advanced scheduling techniques. Sharing is not limited to files, but also includes many other resources, such as equipment, software, services, licenses, and others. These resources are "virtualized" to give them a more uniform interoperability among heterogeneous grid participants. The participants and users of the grid can be members of several real and virtual organizations.

2.3 MODULES

2.3.1 AUTHENTICATION

While doing the inventory of several servers we realized that it was cumbersome to have to logon to and access the default System Information utility. At that time some of work should be confidential and important thing that should not done by all. So we done this module with two different users in that one has full privileges and another one has less.

2.3.2 REMOTE CONFIGURATION RETRIEVAL

This module is a wrapper for some basic interfaces that provide detailed information about a system. The class allows the use of the current security context or a specified name and path to access either a remote or a local machine. Once connected the class is then populated with the values from the machine. This gives us an easy way of accessing the information without having worry about the calls to each of the interfaces and stores all the information.

2.3.3 DATA

The administrators are used to prepare hardware to set up a configuration that will meet the needed performance, availability, and data integrity needs of applications and users. Hardware and Software ranges from low-cost minimum configurations that include only the components required for operation, to high-end configurations that include speed, storage, application and location. Regardless of configuration, the use of required-quality hardware is recommended, as hardware malfunction is the primary cause of system down time. Although all configurations provide availability, some configurations protect against every single point of failure. In addition, all configurations provide data integrity, but some configurations protect data under every failure condition. Therefore, administrators must fully understand the needs of their computing environment and also the availability and data integrity features of different hardware configurations in order to choose the system that will meet the proper requirements. So here we made a pre preparation method that is to design a application that it get all the require data from the administrator and stores under a profile name for future ret rival purpose.

2.3.4 DATA MATCHING

In this module we use rough set match making algorithm to find out the required configuration and is the one of important portion of this paper. By select the profile and system id the matching will occur.

- **The rough set**

The composed of the lower and upper approximation is called a rough set; thus, a rough set is composed of two crisp sets, one representing a lower boundary of the target set X and the other representing an upper boundary of the target set X.

The accuracy of the rough-set representation of the set X is given by the following:

That is, the accuracy of the rough set representation of X, $\alpha_P(X)$, , is the ratio of the number of objects which can positively be placed in X to the number of objects that can possibly be placed in X – this provides a measure of how closely the rough set is approximating the target set. Clearly, when the upper and lower approximations are equal (i.e., boundary region empty), then $\alpha_P(X) = 1$, and the approximation is perfect; at the other extreme, whenever the lower approximation is empty, the accuracy is zero (regardless of the size of the upper approximation).

- **Boundary region**

The boundary region, given by set difference, consists of those objects that can neither be ruled in nor ruled out as members of the target set X.

In summary, the lower approximation of a target set is a conservative approximation consisting of only those objects which can positively be identified as members of the set. (These objects have no indiscernible "clones" which are excluded by the target set.) The upper approximation is a liberal approximation which includes all objects that might be members of target set. (Some objects in the upper approximation may not be members of the target set.) From the perspective of, the lower approximation contains objects that are members of the target set with certainty (probability = 1), while the upper approximation contains objects that are members of the target set with non-zero probability (probability >0).

2.3.5 DATA ANALYSIS

A system analysis is for researching, planning, coordinating and recommending software and system choices to meet an organization's business requirements. It plays a vital role in the systems development process. The system analysis is used to manage various programming languages, operating systems, and computer hardware platforms, resources. Here in our paper the systems analyst that is administrator may act as liaisons between vendors and the organization they represent. They may be responsible for developing cost analyses, design considerations, and implementation time-lines. They may also be responsible for feasibility studies of a computer system before making recommendations to senior management.

Basically a systems analyst performs the following tasks:

- Interact with the customers to know their requirements
- Interact with designers to convey the possible interface of the software

3. CONCLUSION

In this paper, we have presented ROSSE, a search engine for discovery of grid services. ROSSE builds on the Rough sets theory to dynamically reduce uncertain properties when matching services. In this way, ROSSE increases the accuracy of service discovery. The evaluation results have shown that ROSSE significantly improves the precision and recall compared with UDDI keyword matching and OWL-S matching, respectively. We have also introduced a QoS model to filter functionally matched services with their QoS-related nonfunctional performance. To maximize user satisfaction in service discovery, ROSSE dynamically determines the set of services that will be presented to users based on the lower and upper approximations of relevant services.

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AUTHOR'S BIOGRAPHY

M.Ravi received B.Sc Mathematics from Thiruvalluvar Govt. Arts College. Madras University 2005, M.Sc Computer Science from Muthayammal College of Arts & Science, Periyar University 2008, M.Phil in Computer Science from Prist University, Thanjavur 2010 and B.Ed from Tamilnadu Teaching Education 2012. Currently he is working as an Asst.Professor in the Department of Computer Applications, Muthayammal College of Arts & Science, Namakkal. His areas of interests are Computer Networks and Mobile Communications.

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A.S.SYED NAVAZ received M.Sc in Information Technology from K.S.Rangasamy College of Technology, Anna University Coimbatore, M.Phil in Computer Science from Prist University, Thanjavur, M.C.A from Periyar University, Salem, PGDCA in Erode and Pursuing Ph.D in the area of Wireless Sensor Networks. Currently he is working as an Assistant Professor in the Department of Computer Applications at Muthayammal College of Arts & Science, Namakkal, India. His Research areas are Networking & Image Processing.