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Study of Network Monitoring System Using Java RMI

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Abstract: **- The corporate world looks at IT as that critical function having a say on day-to-day business, the choice of a network monitoring solution is a must factor in the business. In this paper we have discussed such software which are already exists for Network Monitoring. We have also discussed some issues regarding use of Java RMI for Distributed objects i.e. evolution of RMI protocol and Enhancing the speed of RMI protocol. This paper may leads to a future scope for creation of Network Monitoring System using java RMI.**

Keywords: - RMI, SOAP, RPC.

1. Introduction

There are many places like Industries, Universities or Colleges where we have local area networks and lots of people using them as per their own needs. In such scenarios we have to closely monitor the computers. Many a times we need to lock the resources on these computers to restrict the users of making use of them. Sometimes we need to stop the users from using the internet or from changing the setting or accessing the registry editor so as to secure the system from any crash due to misuse of it. And also we need to communicate with the other remote machine via messengers. This is the common task that we do in our day to day life but for this we don't have utility software. With this project idea we are trying to build a software system that can serve us to achieve all this needs.

2. RELATED WORK

We have done the literature survey of other technologies available to cater the same concept. We found some advantages, disadvantages and limitations in these technologies; we are trying to overcome those disadvantages & limitations in our system.

A. Team viewer:-

Team Viewer is one of network monitoring software which is used for establish a connection to any computer via the Internet and control it remotely or simply present your own desktop – all without worrying about firewalls, IP addresses or NAT.[18]smooth operation – even behind firewalls, security, conference facilities[19].

Disadvantages:-

a. Every time while building session new id and password get generated for security purposes but it is hectic to tell password to administer and get authentication for each new session.
b. It will show a little bad in very slow connection.

B. OSMonitor Monitoring Software:-

Monitor Monitoring S/W created by Wangya Computer Co., This software is for Internet usage monitoring/ web filter / screen capture / employee monitoring / block down and games. Ltd. This application let you find out what, when, and long did the employees using the various programs. [20][21]

Disadvantages:-

a. It can't control the applications on the remote client except web resources.
b. It has security issue.

C. OpMANAGER:-

OpManager is a network monitoring software that monitors all the resources on the machines connected in your LAN and WAN. OpManager can monitor 10 of your network devices such as Routers, Servers, switches, Mail-servers, firewalls, printers etc. It provides you with fault management. Load balancers & clustering used for high availability but they need to be monitored continuously so as to identify the good & bad components of network. Using Opmanager lets you know the availability of nodes, response time and resource utilization in the network [32].

Disadvantages:-

1) It is the best network monitoring software but it can't block the resources on client machine.
2) It is very slow in wireless network.

D. Open-NMS Software:-

The Open-NMS Project was started in July of 1999 and registered on Source Forge in March of 2000[22]. Open-NMS describes itself as a "network management application platform"[23]. It has facilities like Event Management and Notifications [24]-[26], Discovery and Provisioning [27], Service Monitoring [28]-[30], Data Collection [31]

Disadvantage:-

It is very slow for wireless network.

3. PROPOSED SYSTEM :-

We can overcome the disadvantages& limitations of the above mentioned systems by using following techniques.

A. USE OF JAVA RMI

RMI (Remote method invocation) system in Java is written with two different components as server

component and a client system. The client system component will be using JNI codes which will be written in any of the native language available and will get used for locking resources such as Drives, Registry Editor and Printers etc. as these resources cannot be locked or manipulated with Java as language[6].

B. EVALUATION OF RMI PROTOCOLS

Although Java provides an interface for programming with sockets, typical applications require a higher-level protocol that can handle encoding and decoding of messages. Java RMI [7] is an API for remote method invocation – the invocation of a method in a remote object by a locally resident object. The polymorphism inherent in method calls makes the Java RMI API a more flexible alternative to RPC-based (Remote Procedure Call) APIs [8].

Communication in distributed software component architectures is based on *Remote Method Invocation* (RMI) protocols that allow one software component to invoke the functionality of another. Examples include Java remote method invocation (Java RMI) [9] and the new *Simple Object Access Protocol* (SOAP) [10]. SOAP has the advantage that many programming languages and component frameworks can support it.

SOAP can be used to build a reliable, multi-protocol RMI system that can access desktop component technology like Microsoft COM and other non-Java software components. However, when additional performance is
needed a multi-protocol approach allows a faster, more specialized protocol to be dynamically inserted to move data. Several efforts have been started to extend SOAP to have security and higher performance [11], [12] but at the cost of reducing its simplicity and universality.

SOAP is an object-oriented, Internet-based protocol for exchanging information between applications in a distributed environment. Box [13] provides a good basic introduction to SOAP with some examples. SOAP is independent of the programming language, platform or transport mechanism used for the exchange. SOAP's interoperability arises from a simple syntax based on XML (Extensible Markup Language [14]). Although HTTP (Hypertext Transfer Protocol) is the most widely used transport layer for SOAP packets, which are XML documents, other protocols like SMTP or FTP can also be used. The SOAP message exchange
model consists of one-way transmissions from sender to receiver which can be combined to be used as a request/response pattern. SOAP messages rely on XML Namespaces [15] and the XML Schema definition language [16].

C. TO ENHANCE THE SPEED OF WIRELESS NETWORK

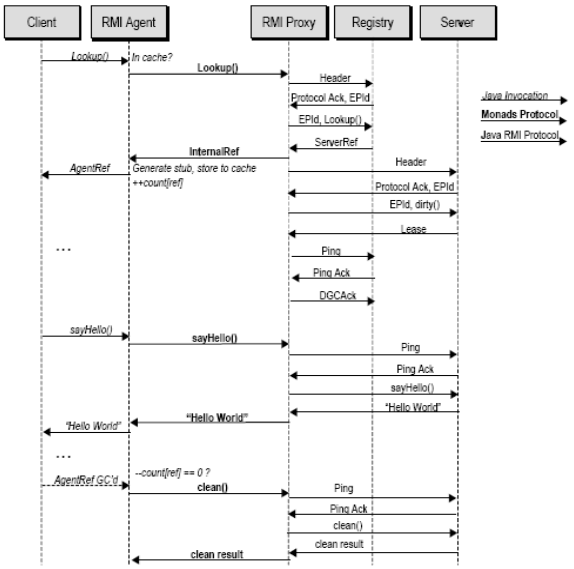

Fig 1.Using mediators to optimize the remote invocation

Java RMI is poorly suited for communication over slow wireless links because of its high overhead in data traffic & in round trips. However, its performance can be enhanced without breaking compatibility with Java RMI specification, and with minimal changes to existing software and network hosts by using mediator technology [17].if we analyze the performance characteristics of Java RMI over GSM Data Service and High Speed Data Service [1] the performance of JAVA RMI is not encouraging, Java RMI works poorly in slow wireless environments. This is due to the poor performance of TCP in a wireless environment but also due to the Java RMI protocol itself. We can overcome this problem by using mediator based solution. Mediators are widely used to improve TCP/IP performance on communication paths including a slow wireless link.
They are known as performance enhancing proxies in IETF [2]. Mediators are also used to improve application level protocols like HTTP [3], [4]. In addition, the WAP architecture [5] is also based on mediators.

The role of the RMI mediators is shown in Fig.1[17]. The RMI Agent captures the invocation made by the client. A lookup request is first checked in the local cache, and only if the remote reference is unknown is the request forwarded to the server [17].

Java RMI is poorly suited for communication over slow wireless links because of its high overhead in data traffic & in round trips. \ However, it can be optimized without breaking compatibility with Java RMI specification, and with minimal changes to existing software. New software is necessary only at the mobile terminal and at its access point to the fixed network. This is possible by utilizing mediator technology, which is widely exploited in wireless communications [17].

CONCLUSION:-

Considering all above specifications and techniques we conclude that we have future scope to develop a system by which server can monitor and control the client machines over internet connected through wired LAN or Wireless LAN using JAVA RMI with better performance and good results. And also will overcome disadvantages and limitations of other existing systems as some of them discussed above.

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