USING MOBILE AGENT FOR MONITORING COMPUTER NETWORKS

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Dissertation submitted to the Faculty of Information Technology, University of Moratuwa, Sri Lanka for the partial fulfillment of the requirements of the degree of M.Sc. in Information Technology.

2008

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Abstract

Network monitoring and maintenance have become more crucial when a network comprises of several subnets with heterogeneous hardware and software environments. In order to maintain and deliver high quality of service to end users, network usage and its status must be monitored constantly and potential faults must be dealt with proactively. In this context, the Network Administrators have faced with many challenges including ensuring of network efficiency, uninteresting service and protecting networks from the malicious code. Many researchers have devised network management and monitoring solutions through different technologies. As per the rapid development of the Agent Technology, this project presents the designing and development of the Mobile Agent solution for monitoring of the campus wide local area network in the Sabaragamuwa University of Sri Lanka.

The proposed Mobile Agent System (MobiNET) comprises of three agents; host agent is the one of the agents located in a host while the second is mobile agent, it's movable on the network, third is located in the mobile phone which is connected with the system. This mobile agent has been constructed as two main units. The stationary unit of the mobile agent behaves as the scheduling and controlling unit and performs various tasks including acceptance of requests from the host, investigation of network connection failures on each subnet, continuation of the Network Indicator, scheduling and maintaining work schedule of the mobile unit, updating the system records, and sending SMS and an email to the Administrator when a problem cannot be fixed.

In this case, this unit controls the entire MobiNET. In contrast, the movable unit of the mobile agent is responsible for the repairing and maintenance of the network. This mobile agent reads the work schedule for available works to complete and investigate possibility of migration on a particular subnet, if not any threat for the agent, and then it migrates by itself. At the subnet level, this-unit carries out its assigned duties, such as, monitoring Internet connection failures and fixing the

problems, updating virus guards, scanning virus infections and removing it without any interventions on the subnet as entrusted by the stationary unit. For this purpose, the movable unit of MobiNET has been provided with basic toolkits such as newly updated virus guard, commonly used software, patches etc.

In the event that several problems occur in different subnets, the stationary unit of MobiNET makes a schedule by concerning the matters such as priorities and introduces a mobile unit into different subnets. End of each task, system records are updated by the scheduling and control unit. Third agent lives in the JADE-LEAP platform of the mobile phone which is connected with the system, and it's responsible for monitoring system failures of the MobiNET. If system fails due to any reason, then agent sends the SMS to the Administrator including system failure message. Moreover, scheduling and control unit is monitoring connectivity of mobile phone with the system, when it disconnected due to low power of the battery or any other reason, system issues beep sounds. From the system perspective, the Mobile Agent must be able to carry out several concurrent tasks in response to different external events. In this sense, this Mobile agent carries out a round-robin non-preemptive scheduling among all behaviours. Different approaches for the network monitoring based on Mobile Agent, protecting from the malicious codes were analyzed to design the system. This MobiNET system was developed based on JADE agent development environment and its implementation was carried out by Java. The JADE-LEAP allows the implementation of an agent on the mobile phone with limited resource, while JADE tool provides the main infrastructures to execute all behaviors defined.

MobiNET has been tested on several subnets to investigate the performance and accuracy in real life. During the testing period, we have also made some changes in the certain subnets and inquire system responds by using system log details. According to the test- results, percentage of the system performance was satisfactory. It can also be noted that the development of the Mobile Agent as two units: stationary and movable. They have reported new direction for the architecture of Mobile Agent technology. This approach allows us to develop a simple code of

portable mobile unit separated from a bulky unit that is stationary and located in a host. Furthermore, with this approach, it is easy to maintain and improve MobiNET as two independent units when necessary.

Keywords: Mobile Agent, Computer Networks, Network Monitoring.