MQSPT-based Open SMS Architecture Design & Materialization

Yong-Hee Lee[1], Jung-Ah Shim[2], Hyun-Jung Kwon[3], and Keun-Heui Kim[4*]

[1,2,3,4*]Department of IT Policy and Management, Soongsil University, Seoul 156-743, Republic of Korea
[1]greenyon@naver.com, [2]rosapoodle@naver.com, [3]musehjkwon@gamil.com, [4*]interbp@hanmail.net

Abstract. The Enterprise Management System is a representative system that supports the important decision-making information on an enterprise's information system control. SMS (System Management System), controlling various states of the system in the information system, collects, processes, and saves varying system information using TCP/IP-communication-based SNMP (Simple Network Management Protocol), and provides the users with the information required to make decisions. SNMP, however, cannot really secure the reliability of data transmission in the event of system circuit failure, delay, or short, which may occur during the process of data collection. Consequently, SMS information has uncertainty issues. Moreover, the data transmission reliability is not guaranteed due to the different system issues appearing in the TCP/IP telecommunication. This study applied SPT technology to guarantee the reliability of TCP/IP communication, and designed an SMS architecture that can effectively deal with issues while collecting the system information. It also proposed the establishment of Open SMS, which can collect and control information regarding every information system connected to the web.

Keywords: MQSPT, SPT, ITSM, EMS, SMS

1 Introduction

Open SMS (System Management System), which enables unrestricted control over information communication systems connected to the web, can be divided into three categories: (1) IL (Instrumentation Level), (2) AL (Agent Level), and (3) IML (Information Manager Level). The problem of the existing SMS is that based on SNMP (Simple Network Management Protocol), the accuracy of each node-collecting information is low. Due to node failure or circuit delay, there may be vulnerability in the collection of information through the data SNMP in IL.

For SNMP to minimize such vulnerability, SPT-based TCP/IP telecommunication, which is proposed herein, can be applied to SMS. It can solve a number of issues occurring in the network. The Open SMS architecture is also proposed herein.

This thesis is organized as follows. Chapter 2 analyzes the understanding and problems of SNMP, presenting a process view of SMS from the architecture perspective. Chapter 3 designs and proposes a system architecture for MQSPT-based

Open SMS to solve the problems of the SNMP of the existing SMS. Lastly, Chapter 4 cites the study's conclusion and discusses the proposed further studies.

2   Related Research

The delivery process of SMS has three steps. Beginning with the IL node, it goes through the information-collecting agent (Agent Level) and IML, where the message information is classified, saved, and processed for decision-making. Finally, SMS Agent completes the transmission through the user terminal. Fig. 1 illustrates the SMS process.
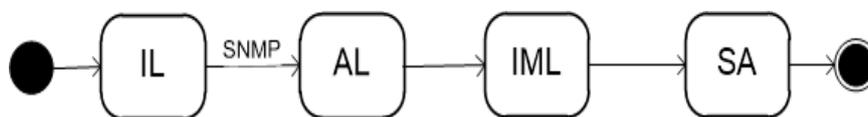

Fig. 1. SMS delivery process

The main objects of this study were the IL and AL sections, which are using SNMP. The information generated on IL is delivered through SNMP, and issues from the devices of IL disturb the collection of accurate information.

SMS plays the most important role among the EMS support systems. It supports the system administrator in making correct decisions. Therefore, the communication protocol vulnerabilities of SNMP must be improved, making sure that the availability and integrity of data communication are supported. This study adopted and applied the SPT (Safe Proper Time [1]) module, which guarantees the reliability of network communication, to SNMP to design the architecture of Open SMS. When SMS is analyzed with a three-step architecture of logic modeling, the network vulnerabilities are easily identified. At the first level of information collection, NMS (Network Management System) uses SNMP to send a "Get Request" message to each node (server, router, etc.), then a "Get Response" message is sent as a reply. Then AL classifies the response information and sends it to IML. The sent information is re-processed to provide resource information in the form of a console, web service, or app service. The administrator evaluates the status of each device and the system based on the provided information to conduct proper follow-up measures.

The SMS process view shows the following process. First, at IL, each device provides responses to the requests to SNMP. Second, at AL, the information from each device is classified by message and is converted to appropriate forms for the ILM level. It is mainly classified into software, hardware, or the system information of each device. IML provides proper information to the system administrator in the form of suits for the UI (user interface). It gives direct instructions to each device and controls it directly if necessary.
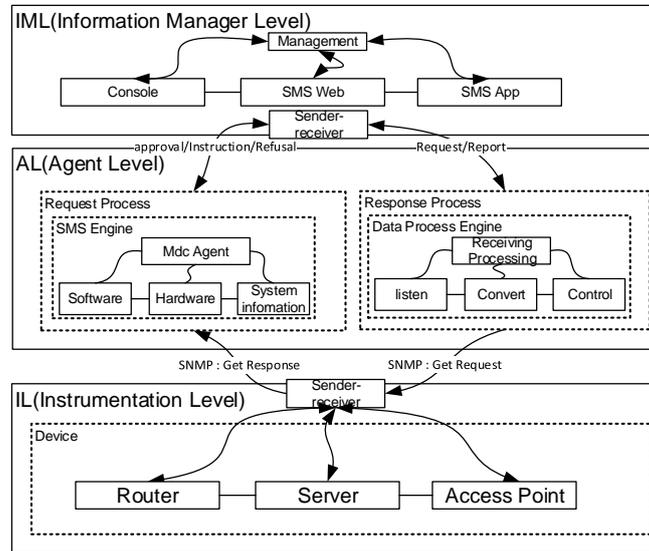
Fig. 2. E-MAIL system process view

3 Open Architecture Proposition & MQSPT Mechanism

The Open SMS architecture is an architecture that a user uses for supporting the management object system's collection, processing, control, and search for information about every system in the world, with Internet connection. The existing intranet-based SMS is difficult to control from the external Internet network. Moreover, it costs much to import the system. In this study, to solve such problem, the MQSPT architecture was imported to Open SMS to guarantee the reliability and stability of the mass data, designing it in such a way as to enable it to collect and control various system information via the Internet. The following figure shows the MQSPT architecture.
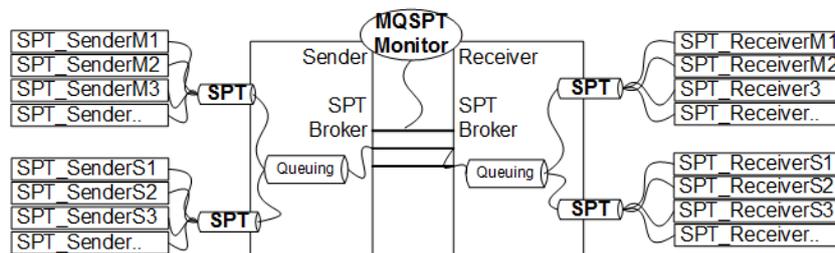

Fig. 3. Composition of the MQSPT architecture

The architecture in the above image applies MQSPT data processing to the IL and AL sections to process the bulk data generated from IL's management object system, securing the reliability and stability of the data transmission. In addition, the SPT module was applied to SNMP to address the protocol vulnerability issue.

One of the most important features of the architecture is that SMS can be registered online for free, and any number of users can collect, process, and control the registered system. In addition, the MQSPT architecture can process mass data, meeting the demand for reliability and data processing speed. As the vulnerabilities of the existing SNMP are supplemented by the SPT technology, the status information of the monitored system can be precisely controlled.

4 Conclusion

In this study, a System Management System (SMS) architecture was designed, and the Network Management System (NMS) and Simple Network Management Protocol (SNMP) were analyzed, through reverse engineering. As a result, issues were found, and the optimum architecture was applied to solve the problems. Further studies are planned to be conducted to additionally expand the Open SMS service and to collect, analyze, and process various information in the system connected to the Internet, for the analysis of the status of the use of the system in each country in the world.

References

1. Keun-Heui Kim: 1. Data Transmission Method and Stock Trading System Reflecting the Method. Korea, Registration No. 10-1458436 (2014)
2. Study on Low-Latency overcome of XMDR-DAI based Stock Trading system. Cloud_Journal of the Korea Institute Of Information and Communication Engineering (2014)
3. Keun-Heui Kim, Mi-ran Han and Jong-Bae Kim: Design and Implementation of MQSPT Protocol for Establishing Financial Next-Generation Project PUSH Architecture. ASTL Vol. 86, No. 22 (2015)
4. Czajkowski, K., Fitzgerald, S., Foster, I., Kesselman, C.: Grid Information Services for Distributed Resource Sharing. In: 10th IEEE International Symposium on High Performance Distributed Computing, pp. 181--184. IEEE Press, New York (2001)
5. Boehm, B.W., Brown, J.R.; Lipow. M. Quantitative Evaluation of Software Quality", Proceedings of Second International Conference on Software Engineering, IEEE.(1976)