Survey on NMS Supporting Network Elements implementing Heterogeneous Protocols

Sheik Nousheen Taj[1], Dr. Sagar B M[2]

[1] M tech 4th Sem, Software Engineering, Department of ISE, RVCE Bangalore, India.

[2] Associate Professor, Department of ISE, RVCE Bangalore, India.

Abstract: *In the telecommunication, mediation is the process in which network elements and element managers will get integrated with Operations Support system. Mediation involves conversion of protocol, model of mapping information. Mediation is an essential process in today's heterogeneous telecommunication domain. Network Elements such as routers, servers and switches communicate through a wide range of protocols (SNMP) and information models (CORBA). The information models and protocols used by Network Element depend on the manufactures choice and the type of Network Element. The diversity which is found in Network Element is also found in Operation Support Systems to support NEs. OSS's are used by service providers to monitor the NEs that comprise a network. OSS is a platform that has been designed to manage a set of NEs using a specific protocol type and information model. As network size increases, the probability of a network remaining homogeneous with respect to the protocol used by its NEs and OSS decreases. For large and diverse networks, it will be difficult to maintain one OSS for each protocol. In this article A network management system with protocol converter is used in order to reconcile the differences between the chosen OSS protocol and the Network Elements it manages.*

Keywords: Network Management System, CORBA, SNMP, setRequest, getRequest, IDL, ORB, IIOP, OSS

1. Introduction

CORBA

CORBA stands for Common Object Request Broker Architecture and is the standard for distributed object computing. Regardless of the object location CORBA is mechanism that handles communication between objects [2]. Distributed objects which are on the two different sides of the world can communicate transparently as if they were located in the same process. The object developer need not know the details regarding the intercommunication. The knowledge of the object interface is the only thing required to communicate with a CORBA object which is defined in the neutral Interface Definition Language (IDL) [2].

CORBA as a distributed computing software simplifies the management of Network Elements instead of highly specialized and complex legacy protocols. Many NEs will be using legacy protocols will continue to use for years to come. CORBA based operations support systems should have a mediation application to communicate with legacy systems [4].

SNMP

SNMP stands for Simple Network Management Protocol. It is an application layer protocol [3]. SNMP is the most widely used protocol for configuring and monitoring network devices. SNMP comprised of three key components Managed devices, agents, Network Management system (NMS). The functions provided by SNMP agent are getRequest, setRequest and trap [3]. GetRequest is manager to agent request to get the value of the object. SetRequest is a manger to agent request to set the value of a variable. SNMP trap is a notification from agent to management system in case of any event.

2. SNMP-CORBA Protocol Converter

In order to simplify the development of Mediation for SNMP network elements and CORBA based management system, SNMP-CORBA protocol converter can be implemented. The converter will act as a gateway between CORBA based management system and SNMP network elements. An Interface Definition Language (IDL) interface will be used to communicate between management system and network agents [4].

This communication include performing operations like GET, SET and receiving asynchronous traps. The protocol is accessed through a set of IDL interfaces. These IDL's provide a generic way in providing management services and network alarm identification. This protocol can be used by any number of management applications and it can manage any number of SNMP agents [4]. This converter can be integrated into an existing management application. Figure 1 illustrates the architecture of the SNMP-CORBA Protocol Converter.

The protocol converter translates incoming SNMP agent responses and events into respective IDL operations and forwards to management system. In the other way the protocol converts CORBA requests from management system to SNMP agents [4].

This SNMP-CORBA converter maintains manager identity list and Agent targets list. Manager Identity include the address at which the CORBA manager is listening in the converter. Agent target represent the an SNMP agent on the network, which includes its network address and configuration parameters. SNMP agent can send management events like traps by specifying an address of the manager [4].
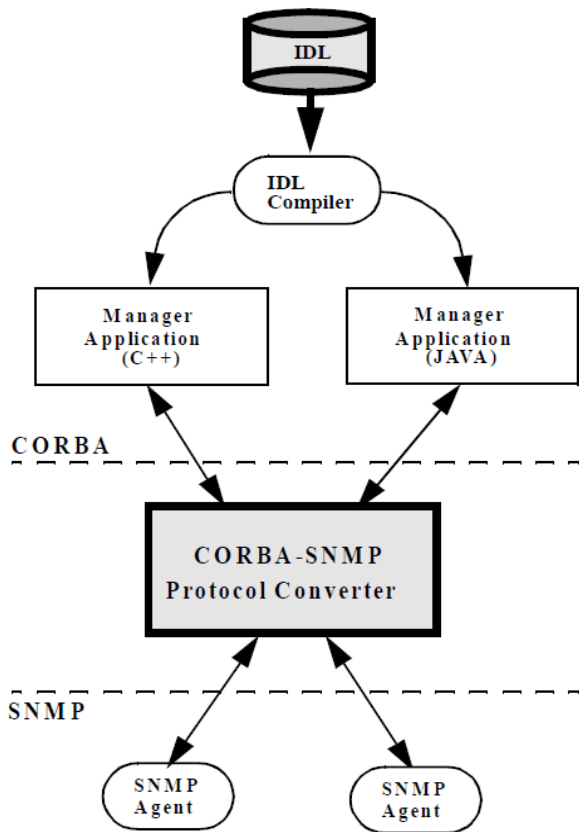
Figure 1: CORBA-SNMP Protocol Converter architectur

3. Network Management System Supporting Network Elements implementing Heterogeneous Protocols

System Architecture

Network Management system has to monitor the state of network elements continuously [5]. The Management can communicate with SNMP Network Element as well as CORBA Network Element. If the network element is implementing SNMP protocol, the SNMP-CORBA protocol converter will be used and the corresponding IDL's are created for manager application and it will be notified to the Event server. If the Network element is implementing CORBA protocol, it will get notified directly to the Event server.

The architecture of Network Management system supporting Network Elements implementing Heterogeneous Protocols is as shown in Figure 2

To perform any management operation on SNMP network device with a CORBA management system, management system must have a CORBA object reference which refers to an agent handle. The communication between management system and network element is through this agent handle. There will be one Agent handle for unique SNMP agent. The object reference in management system is the proxy for the agent handle in the SNMP-CORBA protocol converter. The converter will convert the SNMP traps into events which will be notified to the Event notification server [4]. The protocol

converter uses push model which is implemented by using observer pattern.

B. Characteristic Advantage

There is no need to have one management system for one protocol. This feature greatly reduces development time.
By using CORBA management system the communication is secured. SNMP v2 and below do not have secure connection. SNMP v3 supports secured communication. By using secured IIOP connection between network device and CORBA server the communication will be even more secure.
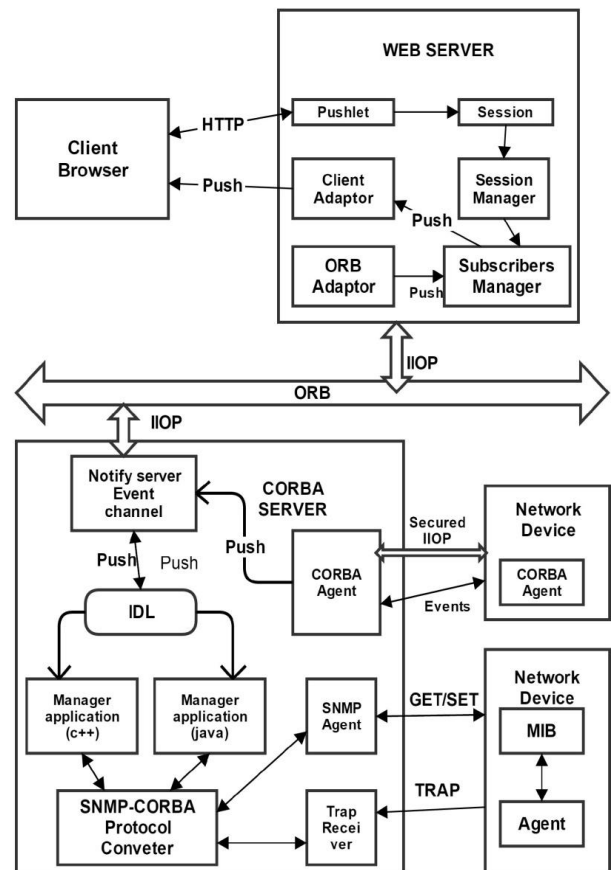

Figure 2: The architecture of network management system

4. Conclusions

This paper presents a Network Management System supporting Network Elements implementing heterogeneous protocols. SNMP-CORBA converter is a module which can be integrated with management system, is included to reduce a large amount of development time. This architecture has good applicability and versatility. This paper also includes secure IIOP connection between network element and management system to have secured communication.

References

[1] Jithesh Sathyan, Fundamentals of EMS, NMS and OSS/BSS, Auerbach Publications © 2010
[2] Alex Chaffee and Bruce Martin, Chapter 2. Introduction to CORBA

Paper ID: SUB154791

2569

[3] IBM, Simple Network Management Protocol (SNMP) Support

[4] Open Networks Engineering Inc.,CORBA-SNMP Protocol Converter, Technical White Paper

[5] Min Huang, Lizhe Zhu, Research for Network Fault Real-time Alarm System Based on Pushlet, IEEE TRANSACTIONS ON COMPUTERS,2012..