Developing Management Applications based on SNMP

Jordan Janeiro, Christian Liebing

Abstract – **Following the assumptions that: (i) the SNMP protocol is a widely accepted and used protocol and (ii) many non-SNMP compliant equipments, from different types and sizes, adopt some kind of mechanism that allows their monitoring or even their management in a broader sense, this paper presents some concepts and tools which support the development of SNMP based applications for device management.**

Keywords – **Meta-Management; Network Management; Proxy Agents; AgentX; SNMP Interface Design Patterns.**

I. INTRODUCTION

Since its specification (1989) as an Internet standard, SNMP-based management stations have been acquired by enterprises. After all these years, a lot of investment has been made. We assume that SNMP is a widely accepted and used protocol. But, even 3owadays, many non-SNMP compliant equipments from different types and sizes, adopt some kind of mechanism that allows their monitoring or even their management in a broader sense. Although many of those equipments are not IP-based, the possible advent of convergence to All-IP networks will probably change this scenario and increase the amount of managed devices that are non-SNMP compliant. In order to preserve all the investment done by enterprises, we propose a solution that allows the integration of equipments in an environment that can be completely managed through the SNMP protocol.

II. PROXY AGENT

Proxy agent is a special agent with the ability to intermediate the communication between the management station and the managed device or resource. It provides a protocol conversion function allowing a management station to apply a consistent management framework to all network elements, including devices such as modems, multiplexers, and other devices which support different management frameworks. [1]

III. EXTENSIBLE AGENT

Whenever a new functionality becomes available in a managed device or resource, a collection of components needs to be installed in the managed node. Each component provides instrumentation for the managed objects defined in the new MIB module that should extend the pre-existing MIB modules. However, the SNMP framework does not describe how the set of managed objects supported by a particular agent may be changed dynamically. [2]

In order to dynamically extend the set of managed objects within a node and enable compatibility between different implementations of agents, the Agent Extensibility (AgentX) Framework was adopted. This framework consists of: [2]

- a single processing entity called the master agent, which sends and receives SNMP protocol messages in an agent role (as specified by the SNMP framework documents) but typically has little or no direct access to management information;
- zero or more processing entities called subagents, which are shielded from the SNMP protocol messages processed by the master agent, but which have access to management information;
- an AgentX protocol, which is used for master and subagent communication.

IV. NET-SNMP

Net-SNMP is a suite of applications used to implement SNMP v1, SNMP v2c and SNMP v3 using both IPv4 and IPv6. [4] Among many features, the suite includes command-line applications to retrieve and manipulate information from an SNMP-capable device, convert between numerical and textual forms of MIB OIDs, and display MIB content and structure. This suite also includes an extensible agent for responding to SNMP queries for management information. This agent includes built-in support for a wide range of MIB information modules, and can be extended using dynamically loaded modules, external scripts and commands, and both the SNMP multiplexing (SMUX) and Agent Extensibility (AgentX) protocols. As resource for developing purpose, this suite also includes a library for developing new SNMP applications, with both C and perl APIs. All these features were used to implement and test the platform described in this paper.

V. CONCLUSION

In this paper we provide a brief clarification of some important tools that should be considered for the development of management applications through the SNMP protocol.

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Technische Universität Dresden, Department of Computer Science, Nöthnitzerstrasse 46, 01187, Dresden, Germany. E-Mail: jordan.janeiro@tu-dresden.de