Streaming MIB Data Using SNMP

A Patented Network Management Capability

Patent No.: US 10,986,213 B2

Inventors:

Balaji Venkat Venkataswami, Suri Parthasarathy, Chandramouleeswaran Sundaram, Ragavendran Selvaraj, Mohamed Ismail Ibrahim, Chandrasekar Balasubramanian

Network Management Challenges

Management of computer networks such as local area networks involves maintenance and administration of hardware and software resources. There are various established protocols for network management like Simple Network Management Protocol (SNMP) in wired and wireless networks, Common Management Information Protocol (CMIP) in telecommunication networks, Common Management Information Protocol over TCP/IP (CMOT), Web Based Enterprise Model (WBEM), and the like. Inspite of these protocols, there are certain challenges associated with managing wired and wireless networks.

For instance, SNMP is a mechanism using which a manager end-station can monitor multiple devices in a network. The devices include routers, switches, and end-hosts, such as servers, laptops, and even small form factor devices. Conventionally, manager end-stations poll the network devices using commands such as snmp-get, snmp get-next, snmp-get-bulk for read-only information and use the snmp-set procedures to set values on these monitored devices. The monitored network devices include an agent to fetch the management information base (MIB) values using operating system dependent procedure calls and application programming interfaces (APIs), which help report the data to the MIB implementation code. This polling process is very tedious as the manager has to poll each of the monitored devices and fetch the MIB values, and then evaluate and process them.

Further, the distance between the manager end-station and the monitored network devices could lead to latency. For example, the requests, response, and traffic, to and from the device may traverse the entire network if the manager end-station and the monitored devices are located very far from each other on the network. In some instances, the data polled does not change over time, which leads to inefficient use of network and end-point bandwidth, and polling time. Moreover, CPU cycles on manager end-stations could also be wasted depending on whether the polled data changes over time or not. This could lead to inordinate operation of the manager end-station. Additionally, polling intervals might overlap if large numbers of devices are under management.

Various publications have attempted to address some of these challenges associated with network management through monitoring cloud computing environments with data control policies and SNMP, SNMP wireless proxy for efficient network management in wireless environments, using SNMP monitoring agent daemon, etc. However, these do not solve the drawbacks mentioned earlier in SNMP polling.

GAVS' Solution

GAVS has invented a patented asynchronous polling method and system to stream MIB data using SNMP, that overcomes the challenges discussed above. The system includes a manager device and endpoint devices that each run an authentication module, an SNMP agent module and an SNMP proxy module.

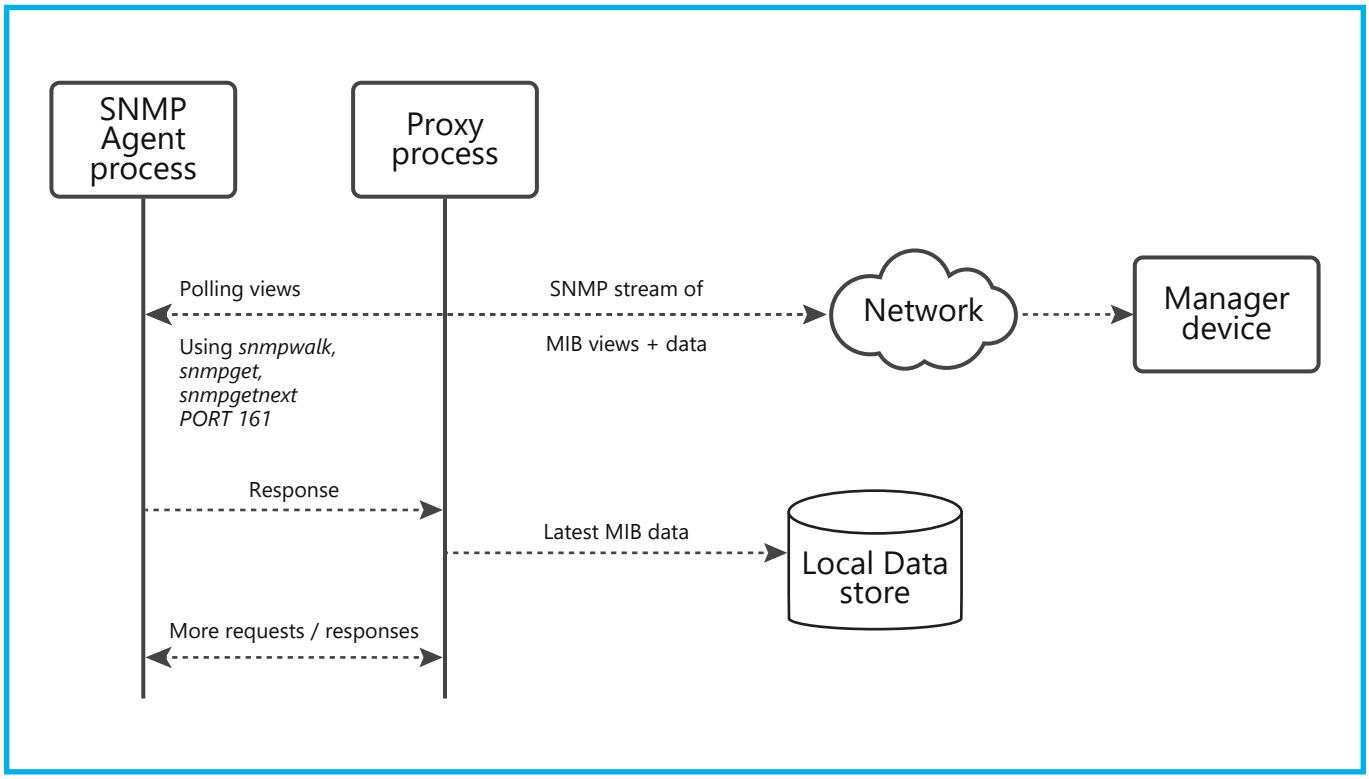
Authentication

The authentication module is configured to send an authentication response to the manager device on receipt of an authentication request from the manager device, where the authentication response indicates an approval for communication.

MIB Data Retrieval

The SNMP proxy module receives the request for the MIB views from the manager device, the request including one or more MIB variables of interest. The SNMP proxy retrieves MIB data from the SNMP agent associated with the endpoint device, where the MIB data comprises of a full MIB sub-tree and differential MIB sub-trees. The full MIB sub-tree comprises of all MIB data associated with the endpoint device, and the differential MIB sub-trees comprise of differences from the full MIB sub-tree over different time periods. The SNMP proxy module is configured to determine a differential MIB sub-tree by differentiating the full MIB-sub-tree obtained at t_n from the full MIB sub-tree obtained at t_{n-1}.

MIB views comprising of MIB variables of interest associated with the full MIB sub-tree and differential MIB sub-trees are created based on a predetermined configuration. Prior to creating MIB views, the endpoint device receives the predetermined configuration from the manager device.



MIB Data Storage & Streaming

The SNMP proxy stores the MIB views and corresponding MIB data on a local data store in the endpoint device. The MIB views along with the corresponding MIB data associated with the full MIB sub-tree and differential MIB sub-trees are compressed into files. The SNMP proxy module is configured to stream files of the MIB views in a predetermined sequence provided by the manager device. The compressed & encrypted files of the MIB views with MIB data associated with the full MIB sub-tree are sent by the proxy module to the manager device in an initial stream - in response to an SNMP trap. The transport mechanism used in the streaming is either UDP or TCP.

Further, the endpoint device streams compressed & encrypted files of the MIB views with MIB data associated with the differential MIB sub-trees to the manager device, on receiving subsequent requests for updated MIB views from the manager device. The requests for MIB views comprise of one or more MIB variables of interest.

The manager device includes a management module configured to generate charts and graphs associated with the MIB data in the MIB views received from the endpoint devices. These provide deep insights to enable effective management of the network.

ZIF

ZIF (**Zero Incident Framework™**), is an award-winning AIOps platform for IT Operations. ZIF delivers business outcomes by leveraging unsupervised pattern-based machine learning algorithms. Infrastructure and application telemetry data are aggregated, correlated, and potential failures are predicted. To enable faster resolution and better user experience, ZIF deploys intelligent bots for proactive remediation. Developed by GAVS Technologies (www.gavstech.com), ZIF is available as an on-premise and SAAS solution.

To find out how ZIF can help your organization, please visit **www.zif.ai** or write to **inquiry@zif.ai**