Simple Network Management Protocol developments in XUNET

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1 Motivation

Provide XUNET the capability to:

- Visualize network problems,
- Monitor individual entities,
- Remotely control and reconfigure,
- Measure and verify protocol tuning with a common tool.

2 Simple Network Management Protocol (SNMP) Model

- Managed nodes - each with *agent*,
- Network Management Station (NMS),
- Network Management Protocol,
  - -- allows NMS and agents to exchange information
- Managed Information.

Managed Nodes

- network capability
- management impact must be **minimal**

Network Management Station is a host running

- network management protocol
- one or more network management applications

Network Management Protocol

- remote debugging paradigm
- read/write variables
- traverse information
- trap - report extraordinary events

Management Information

- managed objects
- Management Information Base (MIB) - collection of managed objects
- access policy

3 SNMP development in XUNET

SNMPv1 router agents exist (Andy Schmidt, SGI, CMU - ported to SGI)

- Schmidt's agent talks only to XUNET router.
- SGI and CMU don't talk to router and can't read router MIB.
- SGI preferred over CMU for performance.

SNMPv1 and SNMPv2 applications exist (CMU).

- Can get, set and walk through SNMP variables.
- Graphical interface via tcl to show real time statistics.
- SNMP-based remote node query tool.

SNMP agent for XUNET switch. Proxy? SNMPv1 or v2?

SNMPv2 offers performance enhancements.

- Extended typing and control of managed information.
- get-bulk operator allows lower overhead in retrieving information and custom responses.
- Several access control policies available (SNMPv1 to authentication).

4 Experimenter's Measurement Platform

Measure at every managed node along resource path

1. Usual method - measure at only end systems with custom instrumentation.
2. Worked well if all systems in same Administrative Domain (AD).
3. Experiments in WANs tend to leave AD's.
4. In WANs, unable to control or instrument all network nodes in path.
5. SNMP allows measurement on remote nodes without custom instrumentation.

Experiment scenario:

- Custom instrument nodes within AD, and
- use SNMP to instrument nodes not in AD.
- Able to gather more information.

5 Continuing and Future Endeavors

1. Extensible SNMPv1
2. Increase monitoring capability of XUNET MIB
   - HIPPI - HXA (Pointer)
   - lessons from ATM MIB
   - configure XUNET via SNMP
3. SNMPv2
4. SNMP over XTP
5. XTP MIB in SNMP
6. Experimentation with XTP management packets