Simple Network Management Protocol (SNMP)

Topics covered:

– Introduction to SNMP
– SNMP Architecture
– SNMP Basic Commands
– Introduction to MIB
  • Examples
– SNMP Application
– SNMP Merits and Demerits
Introduction to SNMP

What does it stand for and where does it fit?
SNMP Architecture

Components of SNMP Architecture

- **Network Management Station (NMS)**
- **SNMP Manager**
- **SNMP Application**
- **SNMP Agent**
- **Management Information Base (MIB)**
- **Managed Node**
SNMP Basic Commands

- **Get**: Manager sends a get request to the agent. The agent replies with a response.
- **Get Next**: Manager sends a getNext request to the agent. The agent replies with a response.
- **Set**: Manager sends a set request to the agent. The agent replies with a response.
- **Trap**: Manager sends a trap to the agent.
Introduction to MIB
Examples of an Object Type:

sysLocation OBJECT-TYPE
SYNTAX DisplayString (SIZE (0..255))
MAX-ACCESS read-write
STATUS current
DESCRIPTION "The physical location of this node (e.g., 'telephone closet, 3rd floor'). If the location is unknown, the value is the zero-length string."
 ::= { system 6 }

Example of a Trap-Type:

dpsRTUp8005Set TRAP-TYPE
ENTERPRISE dpsRTU
VARIABLES { sysDescr, sysLocation, dpsRTUDateTime,
dpsRTUAPort, dpsRTUCAAddress, dpsRTUADisplay, dpsRTUAPoint,
dpsRTUAPntDesc, dpsRTUASTate }
DESCRIPTION "Generated when discrete point 5 is set."
 ::= 8005
Sample .mib file

TOASTER-MIB DEFINITIONS ::= BEGIN

IMPORTS
  enterprises
    FROM RFC1155-SMI

OBJECT-TYPE
  FROM RFC-1212

DisplayString
  FROM RFC-1213;

epilogue OBJECT IDENTIFIER ::= \{enterprises 12\}
toaster OBJECT IDENTIFIER ::= \{epilogue 2\}

toasterManufacturer OBJECT-TYPE
  SYNTAX  DisplayString
  ACCESS  read-only
  STATUS  mandatory
  DESCRIPTION

Sample .mib file.....

"The name of the toaster's manufacturer. For instance, Microsoft Toaster."
 ::= {toaster 1}

toasterModelNumber OBJECT-TYPE
   SYNTAX  DisplayString
   ACCESS  read-only
   STATUS  mandatory
   DESCRIPTION
      "The name of the toaster's model. For instance, Radiant Automatic."
 ::= {toaster 2}

toasterControl OBJECT-TYPE
   SYNTAX  INTEGER  {up (1), down (2)}
   ACCESS  read-write
   STATUS  mandatory
   DESCRIPTION
"This variable controls the current state of the toaster. To begin toasting, set it to down (2). To abort toasting (perhaps in the event of an emergency), set it to up (2)."
 ::= {toaster 3}

toasterDoneness OBJECT-TYPE
SYNTAX  INTEGER (1..10)
ACCESS  read-write
STATUS  mandatory
DESCRIPTION
 "This variable controls how well-done is the ensuing toast. It should be on a scale of 1 to 10. Toast made at 10 generally is considered unfit for human consumption; toast made at 1 is warmed lightly."
 ::= {toaster 4}
Sample .mib file.....

toasterToastType OBJECT-TYPE
SYNTAX  INTEGER {
    white-bread (1),
    wheat-bread (2),
    wonder-bread (3),
    frozen-waffle (4),
    frozen-bagel (5),
    hash-brown (6),
    other (7)
}
ACCESS  read-write
STATUS  mandatory
DESCRIPTION
"This variable informs the toaster of the type of material that is being toasted. The toaster uses this information, combined with toasterToastDoneness, to compute for how long the material must be toasted to achieve the required doneness."
::= {toaster 5}
END
Net-SNMP

- **Suite of applications which includes**:
  - Command-line applications
  - A graphical MIB browser
  - A library for developing new SNMP applications, with both C and perl APIs. Etc..

- **Examples of command line tools**:
  
  **Command:**
  
  ```
  snmpwalk -Os -c public zeus system
  ```

  **Output:**
  
  ```
  sysDescr.0 = "SunOS zeus.net.cmu.edu 4.1.3_U1 1 sun4m"
  sysObjectID.0 = OID: enterprises.hp.nm.hpsystem.10.1.1
  sysUpTime.0 = Timeticks: (155274552) 17 days, 23:19:05
  sysContact.0 = ""
  sysName.0 = "zeus.net.cmu.edu"
  sysLocation.0 = ""
  sysServices.0 = 72
  ```
Net-SNMP …. 

- **Command:**
  
  `snmpget -c public zeus system.sysDescr.0`

- **Output:**
  
  `system.sysDescr.0 = "SunOS zeus.net.cmu.edu 4.1.3_U1 1 sun4m"`
SNMP Merits and Demerits

• Merits
  – Simple Design
  – Wide Usage
  – Expandability

• Demerits
  – Security Gaps
References

- http://www.tcpipguide.com
Questions ?