

COMP476
Networked Computer Systems

SNMP

Network Management

- Network management involves detecting and correcting problems that make communication inefficient.

Network Management Challenges

- When dealing with heterogeneous internets, a variety of different hardware or software may be in use.
 - Inconsistencies or incompatibilities between components can lead to problems in communication.
- Detecting the cause of communication problems can be difficult in large internets where connected computers may be distant.
 - Global internets can span several continents.

Error Detection

- Failures that cause severe problems are often the easiest to diagnose
- Intermittent or Partial failures are often difficult to diagnose.
 - Protocols by nature accommodate packet loss.
 - hardware or software failures of this type can be difficult to detect and isolate.

Problem with Failures

- Network hardware and protocol software automatically detects and retransmits packets as necessary.
- Retransmissions of data take up precious bandwidth that could be used elsewhere.
 - This usually results in lower performance for all computers that share the network.

Network Management Software

- Allows the network manager to find problems and isolate their cause.
- Works on the application layer.

layer	purpose	OSI equivalent	example
1. Application	Provides network services.	Application	Network Management Software
2. Transport	Multiplexes data streams from different applications. May also provide error correction.	Transport	TCP, UDP
3. Internet	Routing.	Network	IP
4. Network Interface	Provides access to the Data Link and lower protocols.	Data Link	Ethernet

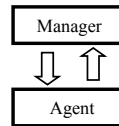
NMS Operation

- Network Management Software works well on the application layer
 - Failures can be easily detected and isolated with machines that continue to function normally.
 - Problems on the network are immediately recognized in the same way (possibly at the same time) as any other program on the network.

SNMP

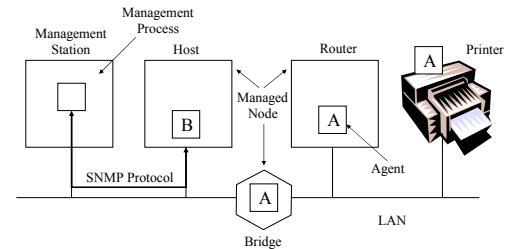
Simple Network Management Protocol

- The standard protocol used to manage an internet.
- Defines the format of requests and replies between network manager and network device agent.



The SNMP Model

- Components of the SNMP management model.



Abstract Syntax Notation 1 (ASN.1)

- ASN.1 is a standard for encoding SNMP messages.

* Basic data types allowed in SNMP

Primitive type	Meaning	Code
INTEGER	Arbitrary length integer	2
BIT STRING	A string of 0 or more bits	3
OCTET STRING	A string of 0 or more unsigned bytes	4
NULL	A place holder	5
OBJECT IDENTIFIER	An officially defined data type	6

Fetch-Store Paradigm

- The SNMP protocol uses the two basic operations of fetch and store as control commands.
 - Fetch is used to obtain a value from a device.
 - Store is used to set a value in a device.

MIB Variables & Object Names

- The collection of objects managed by SNMP is defined in the Management Information Base (MIB).

Group	Description
System	Name, location, & description of equipment
Interfaces	Network interfaces and measured traffic
AT	Address translation (deprecated)
IP	IP packet statistics
ICMP	Statistics about ICMP messages received
TCP	TCP algorithms, parameters, & statistics
UDP	UDP traffic statistics
EGP	Exterior gateway protocol traffic stats
Transmission	Reserved for media-specific MIBs
SNMP	SNMP traffic statistics