

→ Simple Network Management Protocol basic components

works by sending Protocol Data Units (PDUs) between a managed system. 3 components:

- **Managed devices**: network node that contains an SNMP agent, stores management info and make it available using SNMP. Can be routers, access servers, bridges, switches, hubs,
- **Agents**: Network-management software module that resides in a managed device.
- **Network-management systems (NMSs)**: executes apps that monitor and control managed devices. Provide bulk of the processing and memory resources required for network management. (One or more must exist).

Managed devices are monitored and controlled using four basic SNMP commands:

- **read**: used by NMS to monitor managed devices (examines different variables).
- **write**: used by NMS to control managed devices. (changes variables).
- **trap**: used by managed devices to asynchronously report events to NMS (sends a trap). Info only generated when required but more resources required and can be useless in many events at same time.
- **traversal operations**: used by NMS to determine which variables a managed device supports and gather info in variable tables (e.g. routing table)

↳ **SNMP Polling**: manager periodically asks the agent for new info. Manager completely controls the equipment and knows all network details but there is delay between event and entry and unnecessary communication overhead.

↳ **SNMPv1: security and authentication**

- Based on notion of "SNMP community string"
- The 'words of community' identify the permissions of the machine accessing the agent: read-only or read-write.
- By default, all systems are configured with the community strings: **public (read-only)**, **private (read-write)**.
- Words are case sensitive.

↳ **SNMPv2 extensions**

Structure of management information

Manager: manager capacity

New protocol operations

↳ **SNMPv3 extensions**

New message format and security.

Access control, depends on the user.

Authentication: pre-shared key.

Packet data encrypted, protection against replays.

↳ SNMP MIBs

Managed information Base (MIB): set of managed objects, used to define information from equipments and created by manufacturer.

Organizes and represents info gathered by agent.

Uses Object Identifiers (OIDs) to identify and access specific nodes in the MIB.