

# NETWORK MANAGEMENT - II

## **5.7.1. Elements of Network Management**

Network management has three main components: network management: a managing center, a managed device, and a network management protocol. The managing center consists of the network administrator and his or her facilities. Typically, the managing center comprises a substantial human network. A managed device is the network equipment, including its software, that is controlled by the managing center. Any hub, bridge, router, server, printer, or modem can be a managed device. The network management protocol is a policy between the managing center and the managed devices. The protocol in this context allows the managing center to obtain the status of managed devices. In network management, an agent is a managed device, such as a router, hub, or bridge. A manager is a network administrative device, as a management host. An agent can use the network management protocol to inform the managing center of an unexpected event.

## **5.7.2. Structure of Management Information (SMI)**

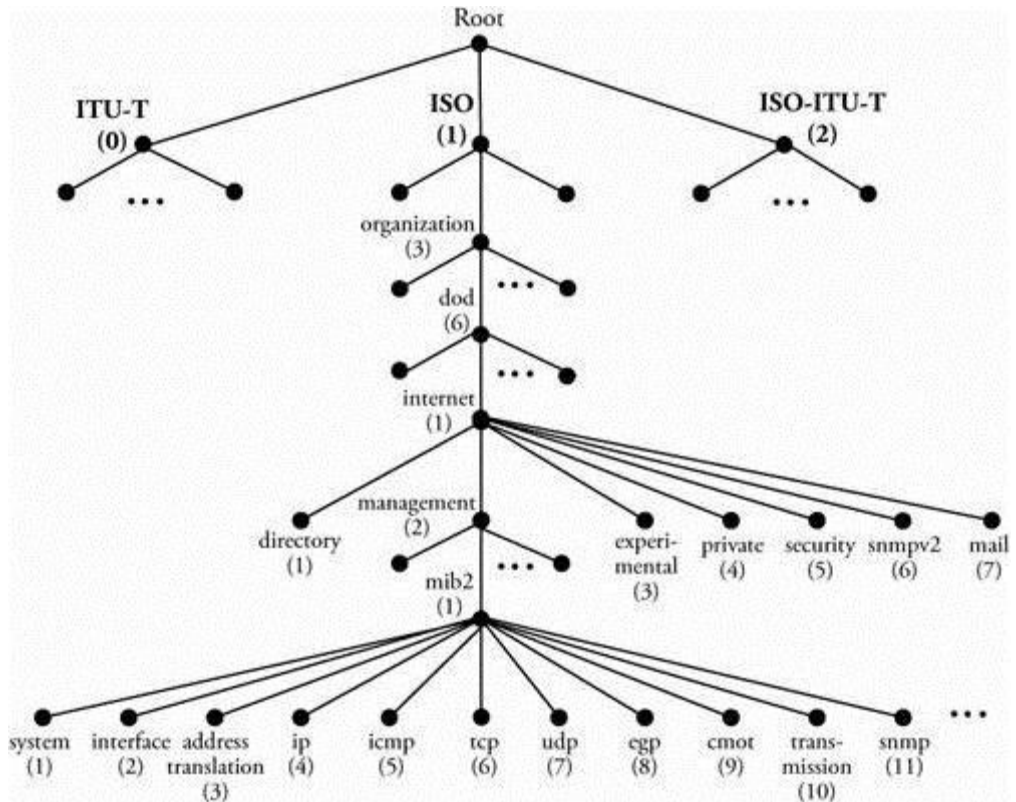
The structure of management information (SMI) language is used to define the rules for naming objects and to encode objects in a managed network center. In other words, SMI is a language by which a specific instance of the data in a managed network center is defined. For example, Integer32 means a 32-bit integer with a value between  $-2^{31}$  and  $-2^{31} - 1$ . The SMI language also provides higher-level language constructs, which typically specify the data type, status, and semantics of managed objects containing the management

data. For example, the STATUS clause specifies whether the object definition is current or obsolete, ipInDelivers defines a 32-bit counter to trace the number of IP datagrams received at a managed device and then received at an upper-layer protocol.

### **5.7.3. Management Information Base (MIB)**

Management information base (MIB) is an information storage medium that contains managed objects reflecting the current status of the network. Because managed objects have associated pieces of information that are stored in a MIB, the MIB forms a collection of named objects, including their relationships to one another in a management center. The information pieces can be obtained by directing the managing center to do so.

Objects are organized in a hierarchical manner and are identified by the abstract syntax notation one (ASN.1) object definition language. The hierarchy of object names, known as ASN.1 object identifier, is an object identifier tree in which each branch has both a name and a number, as shown in [Figure 5.11](#). Network management can then identify an object by a sequence of names or numbers from the root to that object.



**Figure 5.11. ASN.1 object identifier organized hierarchically**

On the root of the object identifier hierarchy are three entries: ISO (International Standardization Organization), ITU-T (International Telecommunication Union-Telecommunication) standardization sector, and ISO-ITU-T, the joint branch of these two organizations. [Figure 5.11](#) shows only part of the hierarchy. Under the ISO entry are other branches. For example, the organization (3) branch is labeled sequentially from the root as 1.3. If we continue to follow the entries on this branch, we see a path over

dod (6), Internet (1), management (2), mib-2(1), and ip (4). This path is identified by (1.3.6.1.2.1.4) to indicate all the labeled numbers from the root to the ip (4) entry. Besides that entry, MIB module represents a number of network interfaces and well-known Internet protocols at the bottom of this tree. This path clearly shows all the standards of "IP" associated with the "MIB-2" computer networking "management."

Source : <http://elearningatria.files.wordpress.com/2013/10/cse-vi-computer-networks-ii-10cs64-notes.pdf>