**Network Management Requirements**

* Fault management
* Configuration management
* Accounting management
* Performance management
* Security management
1. **FAULT MANAGEMENT**
* The facilities that enable the detection, isolation, and correction of abnormal operation of the OSI environment
* What is “a fault”?
	+ an abnormal condition that requires management attention (or action) to repair
	+ indicated by failure to operate correctly or by excessive errors
		- Communication line is cut
		- A crimp in the cable
		- Certain errors may occur occasionally and are not normally considered to be faults
* When a fault occurs
	+ Determine “exactly” where the fault is
	+ Isolate the rest of the network from the failure
	+ Reconfigure or modify the network to minimize the impact of operation
	+ Repair or replace the failed components

**User requirements for Fault Management**

* Fast and reliable problem resolution
	+ Receive notification and correct the problem immediately
	+ Requires rapid and reliable fault detection and diagnostic management
	+ Provides fault tolerance
		- Redundant components and alternate communication routes
		- Fault management capability itself should be redundant
* Keep informed of the network status
	+ Reassurance of correct network operation through mechanisms that use tests or analyze dumps, logs, alerts, or statistics
* Problem tracking and control
	+ Ensure the problem is truly resolved and no new problems are introduced
* Fault management should have minimal effect on network performance
1. **CONFIGURATION MANAGEMENT**
* Configuration management is concerned with
	+ Initializing a network
	+ Gracefully shutting down part or all of the network
	+ Maintaining, adding, and updating the relationships among components and the status of components themselves during network operation

**Requirements for Configuration Management**

* The network manager needs the capability to
	+ Identify initially the components that comprise the network
	+ Define and change the connectivity of components
	+ Define and modify default attributes, and load the predefined sets of attributes into the specified network components
	+ Reconfigure a network for performance evaluation, network upgrade, fault recovery or security checks
		- End users want to inquire about the upcoming status of resources and their attributes before reconfiguration
	+ Generate configuration reports
		- Periodic basis
		- Response for a request
	+ Only authorized end users can manage and control network operation (software distribution and updating)
1. **ACCOUNTING MANAGEMENT**
* The facilities that enable
	+ charges to be established for the use of managed objects
	+ costs to be identified for the use of those managed objects
* Network managers track the use of network resources by end user or end-user class
	+ An end user or group of end users may be abusing its access privileges and burdening the network at the expense of other users
	+ End users may be making inefficient use of the network, and network manager can assist in changing procedures to improve performance
	+ The network manager is easier to plan for network growth if end user activity is known in sufficient detail

**Requirements for Accounting Management**

* The network manager can specify
	+ the kinds of accounting information to be recorded at various nodes
	+ the desired interval between sending the recorded information to higher-level management nodes
	+ the algorithms to be used in calculating the charging
* Generate accounting reports
* Provide the capability to verify end users’ authorization to access and manipulate the information
1. **PERFORMANCE MANAGEMENT**
* The facilities needed to evaluate
	+ the behavior of managed objects
	+ the effectiveness of communication activities
* Functions of performance management
	+ Monitoring
		- Tracks activities on the network
	+ Controlling
		- Enables performance management to make adjustments to improve network performance

**Issues of Performance Management**

* What is the level of capacity utilization?
* Is there excessive traffic?
* Has throughput been reduced to unacceptable levels?
* Are there bottlenecks?
* Is response time increasing?

**To deal the issues of Performance Management**

* The network manager focus on some initial set of resources to be monitored in order to assess performance levels
	+ Appropriate metrics and values with relevant network resources as indicators of different levels of performance
		- The count of retransmission on a transport connection
	+ Monitor many resources to provide information in determining network operating level
	+ Collect and analyze information, and then using the resultant analysis as feedback to the prescribed set of values

**User Requirements for Performance Management**

* End users want to know
	+ the average and worst case response times
	+ the reliability of network services
* Performance statistics can help managers
	+ Plan, manage and maintain large networks
	+ Recognize potential bottlenecks in advance
		- balance or redistribute traffic load by changing routing tables
1. **SECURITY MANAGEMENT**
* The facilities that address those aspects of OSI security essential to
	+ Operate OSI network management correctly
	+ Protect managed objects
		- network resources
		- end user information
* End users want to know
	+ the proper security policies are in force and effective
	+ the management of security facilities is itself secure

**Issues of Security Management**

* Managing information protection, and access control facilities
	+ Generating, distributing and storing encryption keys
	+ Passwords, authorization or access control information must be maintained and distributed
* Monitoring and controlling access to computer networks and to all or part of the network management information
	+ SM involves with the collection, storage, and examination of audit records and security logs
	+ the enabling and disabling of these logging facilities