Lecture 1#

Contents:-

Introduction to System and Network Administration

The Goal of System and Network Administration

Introduction

- **What is System and Network Administration**
- Network and system administration is a branch of *engineering* that concerns the operational management of human–computer systems. It is unusual as an engineering discipline in that it addresses both the technology of computer systems and the users of the technology on an equal basis.
- A system administrator works for users, so that they can use the system to produce work. Once a computer is attached to the Internet, we have to consider the consequences of being directly connected to all the other computers in the world.

- The terms *network administration* and *system administration* exist separately and are used both variously and inconsistently by industry and by academics.
- System administration is the term used traditionally by mainframe and UNIX engineers to describe the management of computers whether they are coupled by a network or not.
- **Network administration** means the management of network infrastructure devices (routers and switches). Network administration is the management of PCs in a network

What is a system

- A system could be a mechanical device, a computer, an office of workers, a network of humans and machines, a series of forms and procedures (a bureaucracy) etc.
- Systems involve themes, such as collaboration and communication between different actors, the use of structure to represent information or to promote efficiency, and the laws of cause and effect
- A computer system is usually understood to mean a system composed primarily of computers, using computers or supporting computers.
- A human–computer system includes the role of humans, such as in a business enterprise where computers are widely used.

What is administration

- In human–computer system administration, the definition is broadened to include all of the organizational aspects and also engineering issues, such as system fault diagnosis. In this regard, it is like the medical profession, which combines checking, management and repair of bodily functions. The main issues are the following:
  - System design and rationalization
  - Resource management
  - Fault .handing

  In order to achieve these goals, it requires
    - Procedure
    - Team work
    - Ethical practices
    - Appreciation of security.

- Administration comprises two aspects: technical solutions and arbitrary policies
- A technical solution is required to achieve goals and sub-goals, so that a problem can be broken down into manageable pieces.
- Policy is required to make the system, as far as possible, predictable: it pre-decides the answers to questions on issues that cannot be derived from within the system itself. Policy is therefore an arbitrary choice, perhaps guided by a goal or a principle
- The arbitrary aspect of policy cannot be disregarded from the administration of a system, since it sets the boundary conditions under which the system will operate, and supplies answers to questions that cannot be determined purely on the grounds of efficiency

Studying systems

- There are many issues to be studied in system administration. Some issues are of a technical nature, while others are of a human nature. Eg.
- System design (e.g. how to get humans and machines to do a particular job as efficiently as possible. What works? What does not work? How does one know?)
- Reliability studies (e.g. failure rate of hardware/software, evaluation of policies and strategies)
- Determining and evaluating methods for ensuring system integrity (e.g. automation, cooperation between humans, formalization of policy, contingency planning etc.)
- Observations that reveal aspects of system behaviors that are difficult to predict (e.g. Strange phenomena, periodic cycles)
- Issues of strategy and planning.

The human role in systems

- For humans, the task of system administration is a balancing act. It requires patience, understanding, knowledge and experience. Administrators need to be the doctor, the psychologist, and – when instruments fail – the mechanic.
- We need to work with the limited resources we have, be inventive in a crisis, and know a lot of general facts and figures about the way computers work.
- We need to recognize that the answers are not always written down for us to copy, that machines do not always behave the way we think they should.
- We need to remain calm and attentive, and learn a dozen new things a year.
- Computing systems require the very best of organizational skills and the most professional of attitudes.

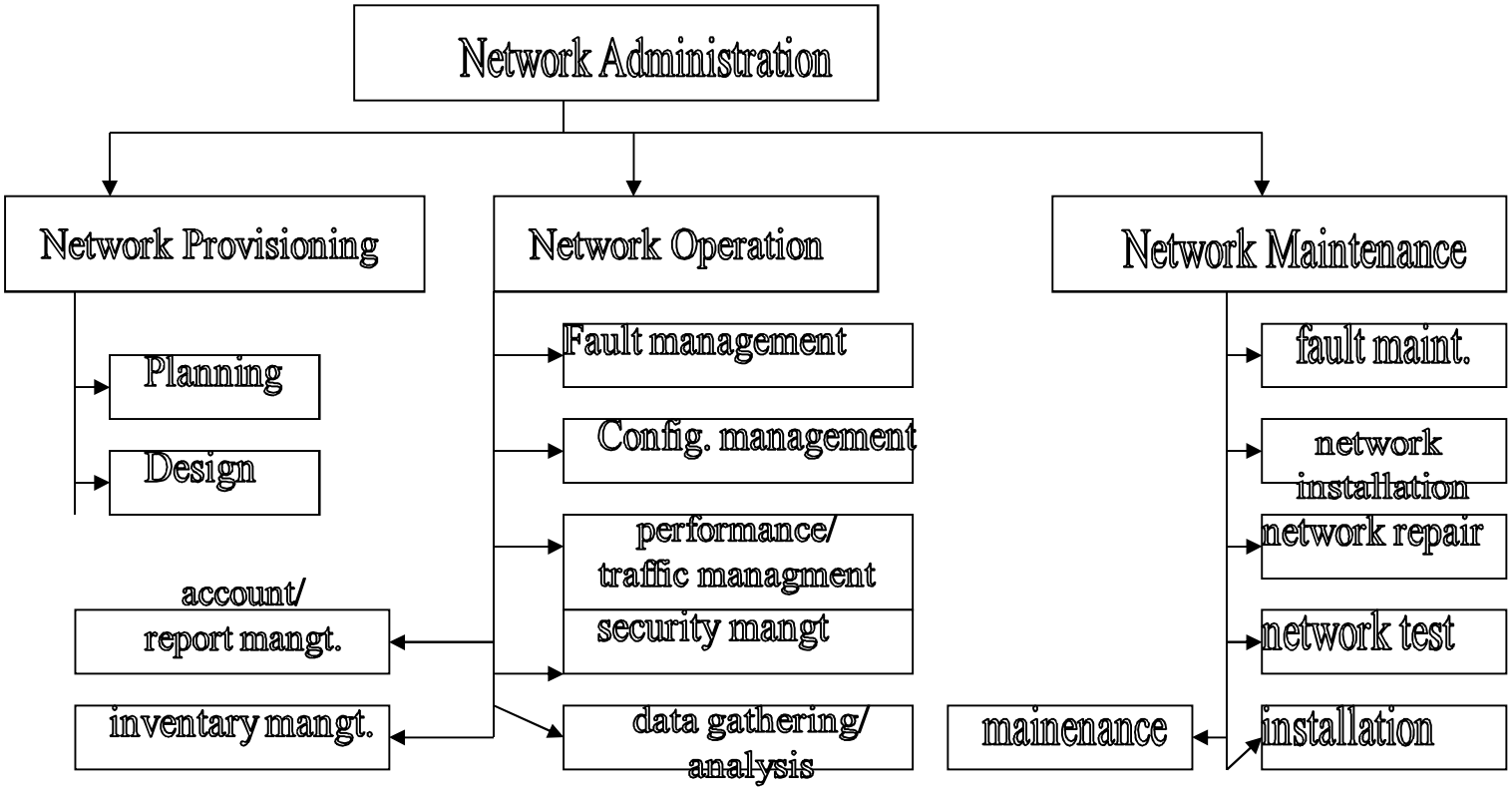
The challenges of system administration

- System administration is not just about installing operating systems. It is about planning and designing an efficient *community* of computers so that real *users* will be able to get their jobs done. That means:
- Designing a network which is logical and efficient.
- Deploying large numbers of machines which can be easily upgraded later.
- Deciding what services are needed.
- Planning and implementing adequate security.
- Providing a comfortable environment for users.
- Developing ways of fixing errors and problems which occur.
- Keeping track of and understanding how to use the enormous amount of knowledge which increases every year.

Goal of network administration:-

- The goal of network administration is to ensures that the users of networks receive the information and technically serves with quality of services they except.
- Network administration means the management of network infrastructures devices (such as router and switches)
- Network administration compromises of 3 majors groups:
- Network provisioning
- Network operations
- Network maintenance

- **Network provisioning:-** is the primary responsibility of engineering groups and its consists of planning and design of network which is done by engineer.
- **Network operations:** - it consists of fault, configurations, traffic, all type of management and it is done by plant facilities group. Its is nerve center of network management operations.
- **Network maintenance:-** its consists of all type of installations and maintenance work.


Network Administration
Network Provisioning
Network Operation
Network Maintenance
Planning
Design
account/
report mangt.
inventary mangt.
Fault management
Config. management
performance/
traffic managment
security mangt
data gathering/
analysis
fault maint.
network
installation
network repair
network test
installation
mainenance

Responsibilities of Network Administration:-

- It is to provide a reliable consistent and scalable network infrastructure that meets or exceeds levels and optimize enterprises assets.
- To build hardware configuration
- To configure software configuration
- Designing of network which is logical and official
- Displaying large nos of machines which can be easily upgraded later
- Deciding which/ what services are needed.
- Planning and implementing environments for users.
- Developing a ways of fixing errors and problems when occurs.

- To make user life very easy and to empower them in production of real work.
  - So to meets above goal a management should establish policy either formally or informally contract service levels agreements with users.
  - From a business administration point of view, network administration involves strategic and tactical planning of engineering, operations and maintenance of network and network service for current and future needs at minimum overall costs
  - Well established communications and interactions among various groups are necessary to perform these functions

Goal of System administration

- The primary tasks of system administration is to ensures that the following things happens
- The top management is assured of efficiency in utilizations of the system resources
- The general user's community gets the services which they are seeking.
- Various tasks performed by system administrators are
- Systems starts up and shutdowns
- Opening and closing of users accounts
- Helping users to set up there working environments
- Maintaining users services

- Allocating disks spaces and relocating quotas when the needs grows
- Installing and maintaining the software
- Installing new devices and upgrading the configurations
- Ensuring security of systems
- Maintaining the systems logs files and profile of users
- System accounting
- Reconfiguration the kernel when required.