Université Constantine 2
جامعة قسنطينة 2

Network Management

– Course 1 –

Chapter 1 : Introduction to Network Management(1/3)

Introduction

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Concerned Students :

Faculty/Institute	Department	Level	Speciality
NTIC	TLSI	License 3	G.L.

Abstract:

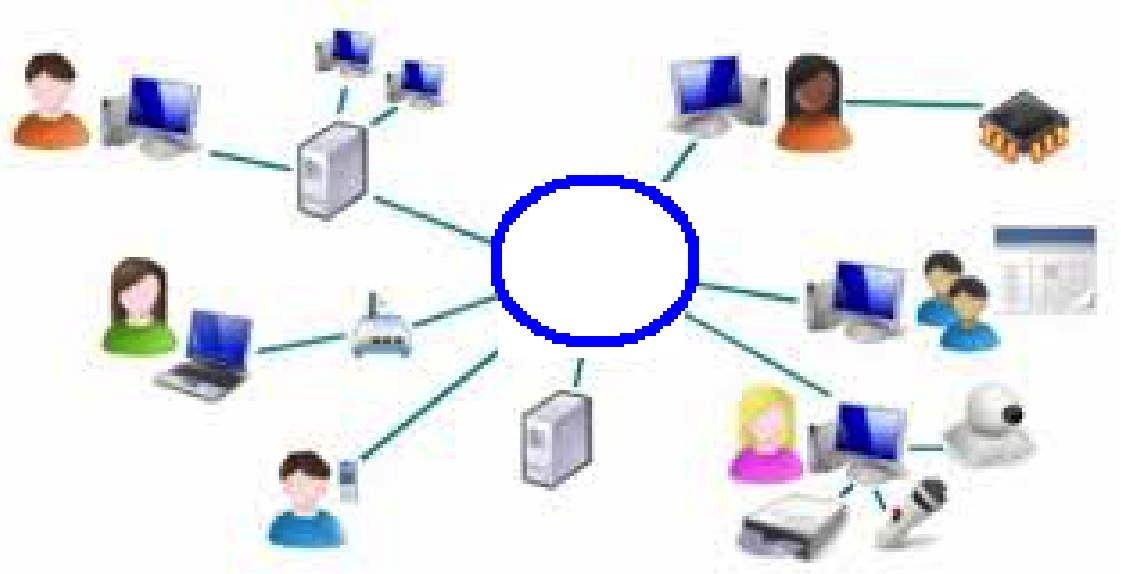
Prerequisite

- Communications Networks,
- Communication Protocols

Course objectives

- Recall the goals behind the installation of a network,
- Introduce the missions of a network administrator,
- Present and detail the missions of designing and implementing a corporate network.

Introduction



Company network

Network Administrator

Introduction

- The **Management** and **supervision** of a network ⇒ **good functioning** of networks.
- Born at the beginning of the **1980s,** period of appearance of micro-computer networks in companies.
- The large **extent**, **number** and **heterogeneity** ⇒ a real problem of management and administration ⇒ need **expert administrators**.
- Use of appropriate tools (hardware or software) to obtain information on the status of the network and its components and their *use*.

The main tasks of a network administrator are:

1. **Design** of the network,
2. **Implementation** of the network,
3. **Administration or Management** of the network.

1. Conception phase

Main *tasks* that a *administrator*, can perform are:

- Create a **network map** and define the network **topology** and architecture.
- Establish an **addressing**, **naming** and **routing** plan.
- Architecture of **services** networks (where are the servers and which services: DHCP, DNS, Mail,...)
- Network security: what **strategies**,**techniques**?
- Administration and Supervision: **who** and **how**?

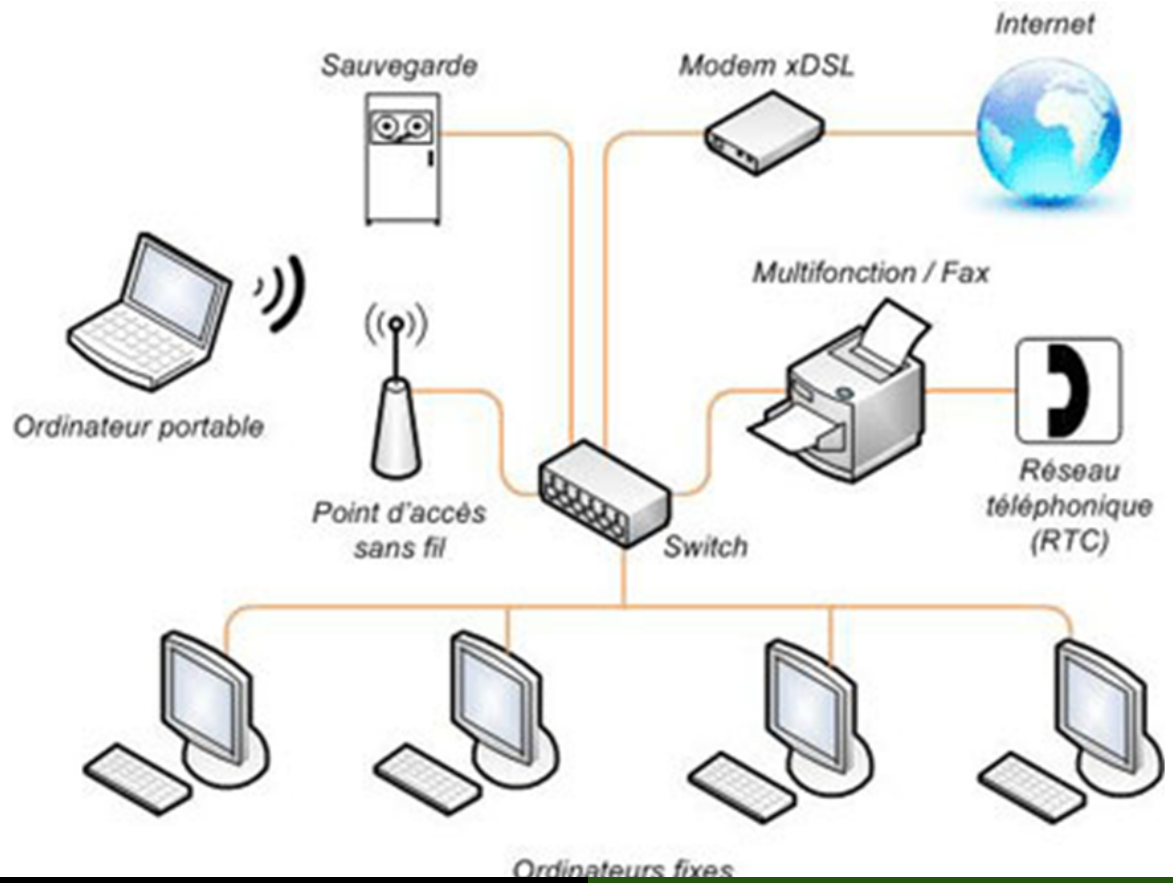
1.1 Network map

Consist of:

- **Develop** a general network map,
- **Identify** user needs,
- **Inventory** available resources,
- **Anticipate** future developments.

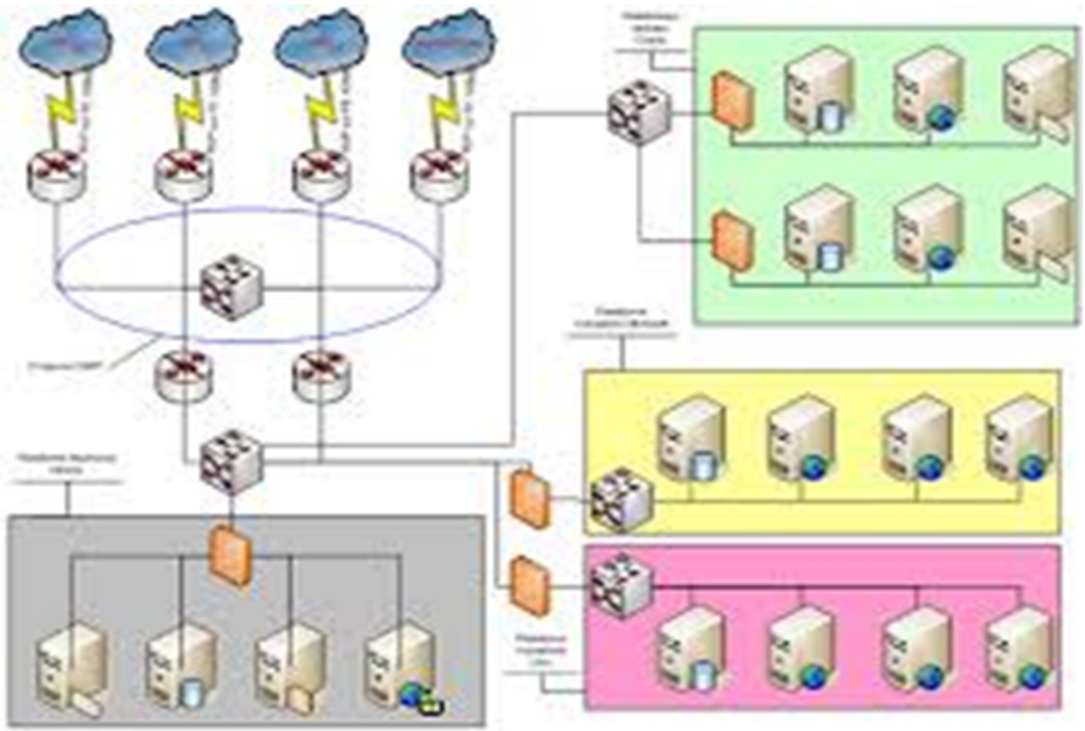
1.2 Topology and Architecture

- **Mono-site**: In the case where the **site** is composed of one or more buildings. The network must be divided into subnets by buildings, by floors... with *hubs*, *switches*, *bridges*.



1.2 Topology and Architecture

- **Multi-sites**: If the dispersion of sites is greater than 500 m, each site is seen as an isolated site ⇒ **interconnection** of sites (*local network* + *routers* + *Internet*).



1.3. Security

Plan the means and tools that will have to preserve the *security* of the network.

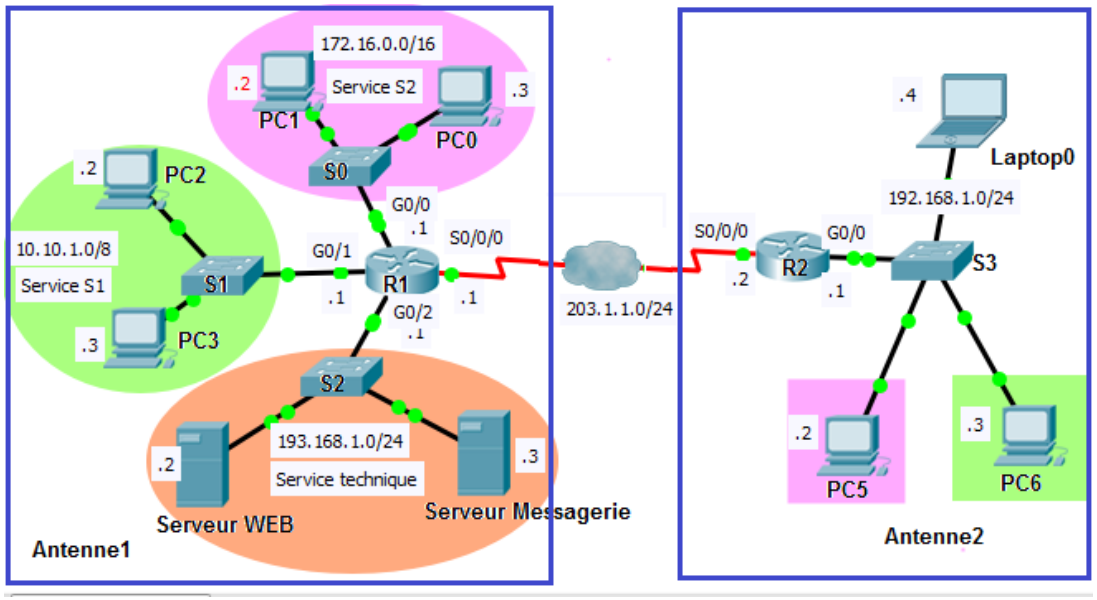
Security can be assured through the use of:

- Secure System,
- Appropriate hardware (media type, interconnection equipment...),
- Software tools (firewall, antivirus...).

1.4. Address Plan

Make an addressing plan:

- **Choose** the right IP address according to the size of the network and its possible extensions,
- **Cut** the networks into subnets (choice of mask),
- **Provide** subnets by groups, entities, ... etc.



1.5. Naming Plan

- Choose a **domain name**, for a site or group of sites,

  Example : **univ-constantine2.dz**,

- Prioritize the naming in case of the presence of distinct entities.

  Example: **rectorat.univ-constantine2.dz**

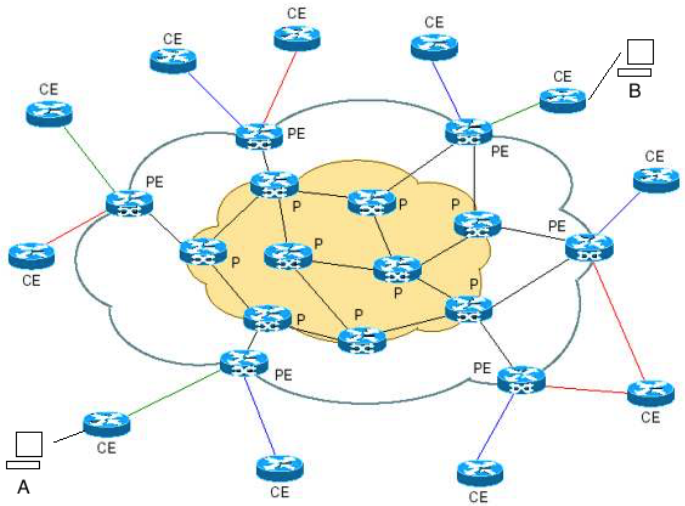
  or

  bibliotheque-centrale.univ-constantine2.dz

1.6. Routing Plan

Whose objectives are:

- **Choice of** addressing protocol (IP, IPX, AppleTalk protocol...)
- **Static** Routing or
- **Dynamic** routing (choice of a routing algorithm such as RIP, OSFP, IGRP, EGP...)



1.7. Network Services

List the required *services* such as:

- Name server (**DNS**),
- Dynamic Address Configuration Server (**DHCP**),
- Application Server, **Web**, **Mail**, ...

2. Implementation Phase

Consists in the realization of the network **materially** and configure the **network applications**.

Similarly, the *steps* of this phase are the **implementation** of:

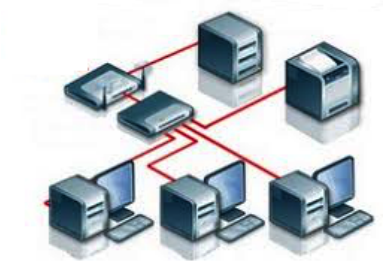
- Topology and Architecture;
- Addressing plan;
- Routing Plan;
- Network Services.

2.1. Topology and Architecture

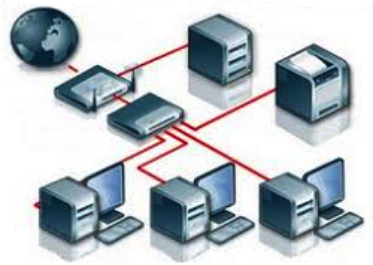
- Write a **specifications**,
- **Call** on subcontractors (a call for tenders for large projects and large budgets),
- **Supervise** the works and their progress,
- **Provide** a set of tests to evaluate the realized network.

2.2. Addressing and Naming Plan

- Private network (just a private address is enough),



- Otherwise, reserve the address with the dedicated organization depending on the location or **ICANN** (worldwide).

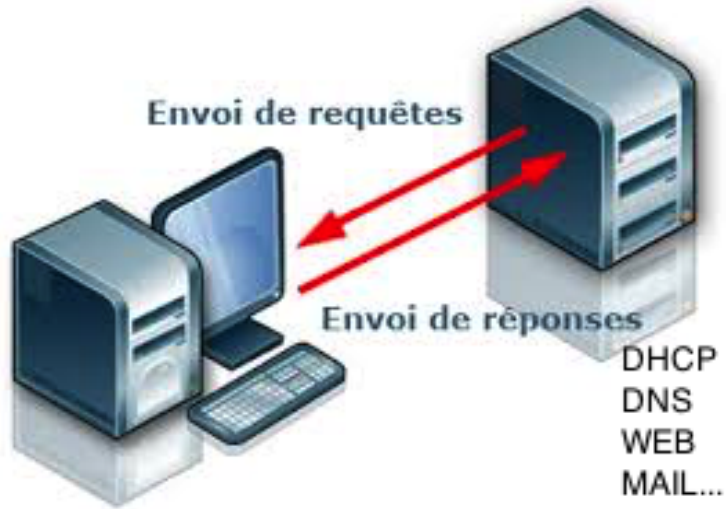


- If necessary reserve a domain name and extension (.com, .org, .dz).

2.3. Network Services

Install the necessary network services such as:

- Name server (DNS),
- Dynamic Configuration Server (DHCP),
- Web Server (HTTP),
- Mail Server(SMTP, POP),
- News Server (NNTP)...



Conclusion

- Network management is a delicate task that can be composed of several missions such as:
- Reflection on the usefulness of a network in a company,
- Drawing up specifications,
- Installation of the network, its test and verification
- and finally its administration and supervision.

- All these missions have a determined duration except the **management** which will last all the time of existence of the network. This mission will be the subject of the next lesson.

Some utile links

Link 1 :

- http://www.net-snmp.org/

Link 2 :

- https://www.nagios.org/

Link 3 :

- www.centreon.com
- A. Guermouche, "Administration Réseaux: Introduction", cours en ligne.

References

- D. C. Verma, "Principles of Computer Systems and Network Management", 2010, Springer Science & Business Media.
- A. S. Tannenbaum, "Computer Networks", Prentice Hall.
- J.F. Bouchaudy, "Linux administration, Tome 1: Les bases de l'administration système", Les guides de formation Tsoft, 2014, Eyrolles.
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