

Lecture (00)

Preface

Dr. Ahmed M. ElShafee

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Agenda

- Network & data communication.
- Perspectives on Networking
- Eight simple steps to develop a computer network
- Perspectives on Internet

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Network & Data Communication

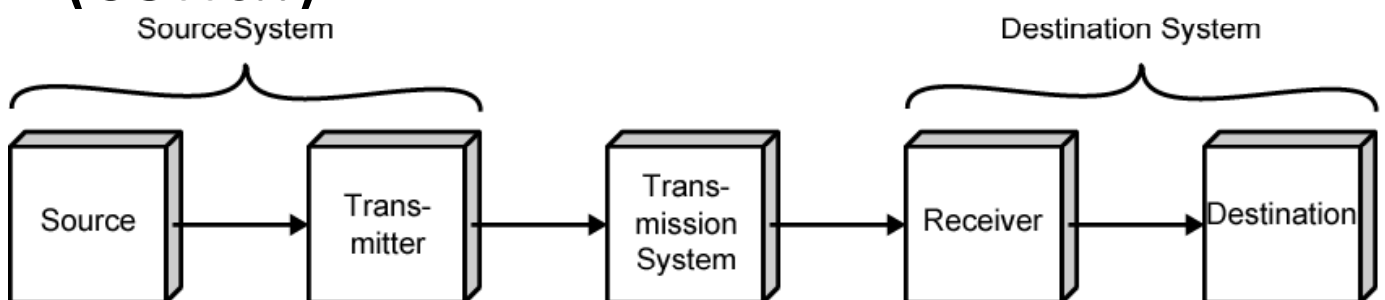
Data communication

- Deals with data or information transfer between a source and a receiver.
- Data Communication is interested in the transfer of data, the method of transfer and the preservation of the data during the transfer process.
- Data communication focuses on the following topics:
 - data encoding and decoding
 - Modulation
 - Error correcting codes
 - Data Encryption and decryption

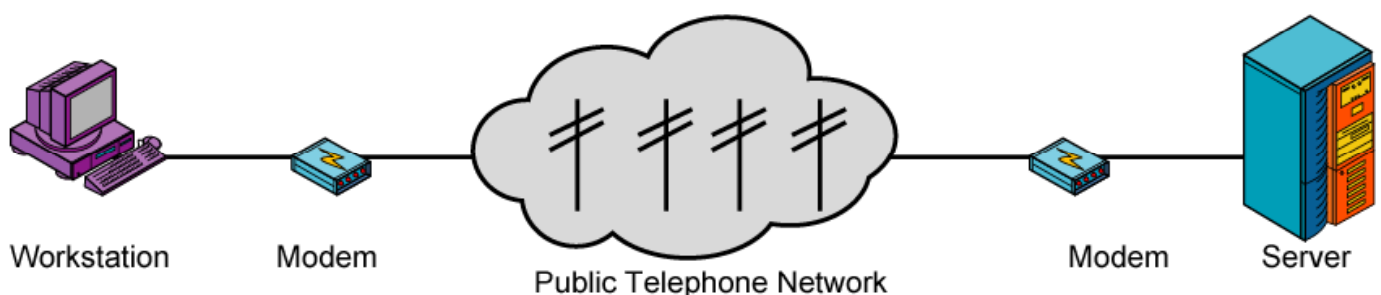
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Network & Data Communication (cont..)



(a) General block diagram



(b) Example

Network & Data Communication (cont,..)

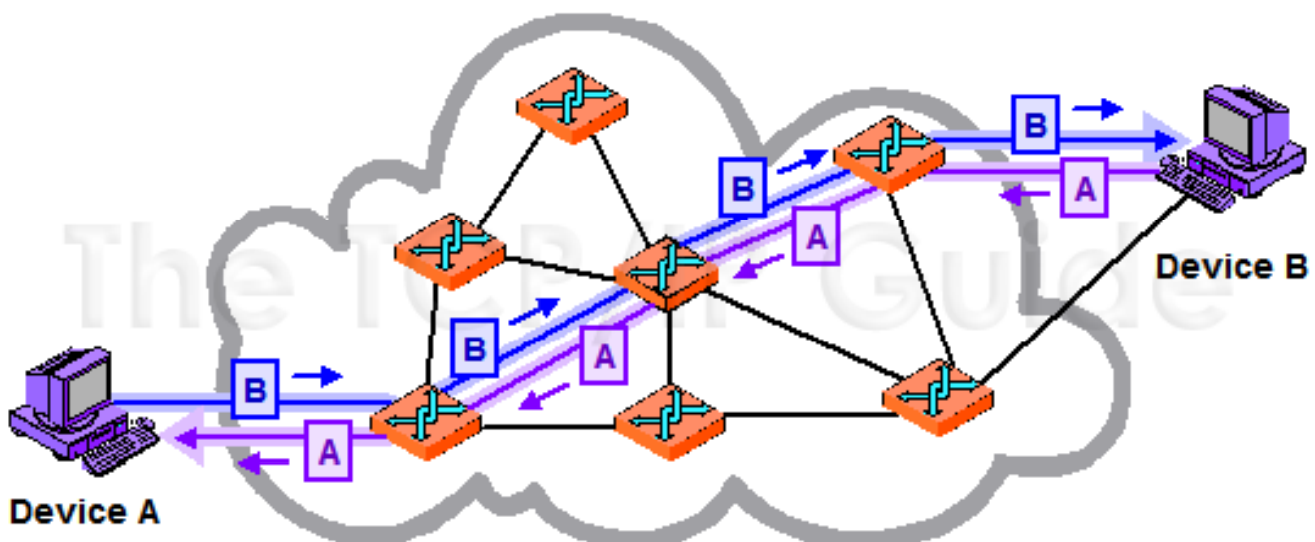
Networking

- Is interested in "connectivity", connecting computers together to share resources.
- provide the rules and regulations that allow computers with different disk operating systems, languages, cabling and locations to share resources.
- The rules and regulations are called protocols and standards in network

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Network & Data Communication (cont,..)



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Perspectives on Networking

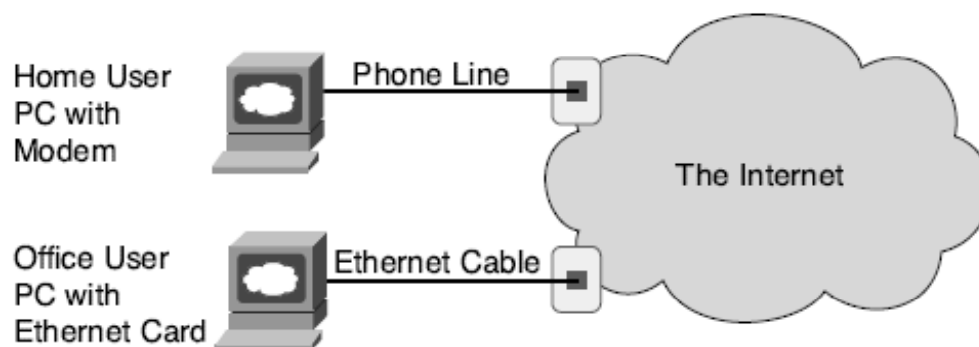
End-User Perspective on Networks

The user plugs in the phone line from the wall into a modem in a PC.

The user plugs PC network card to ADSL modem.

Uses his laptop to connect ADSL modem through wireless LAN.

So user is directly connected the internet.



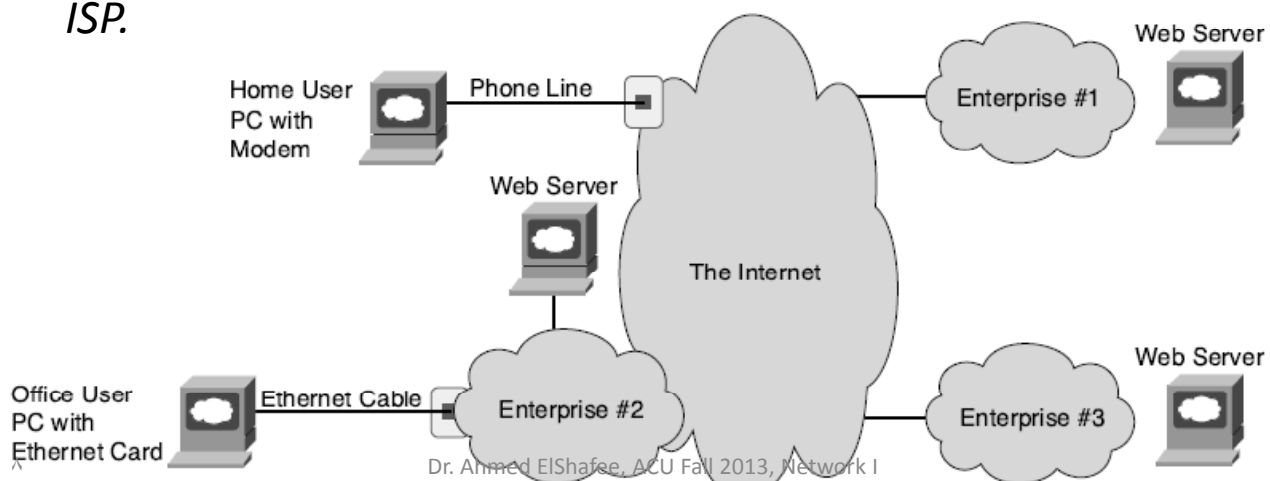
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Perspectives on Networking (2)

Enterprises Perspective on Networks and the Internet

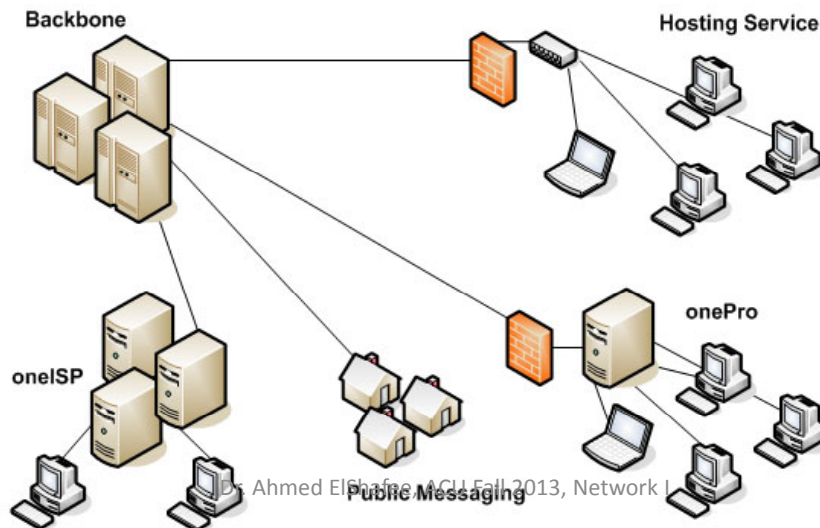
When you go to your collage or your job and connect to “the network,” you are most likely connecting to the private network, or enterprise network, for that school or company. That network, in turn, is connected to the Internet through an ISP.



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Perspectives on Networking (3)

The Internet itself is really a collection of ISPs that, in turn, connect to each other. By having the various enterprise networks / users connect to the Internet, most computer users around the world can use applications to communicate with each other—worldwide.



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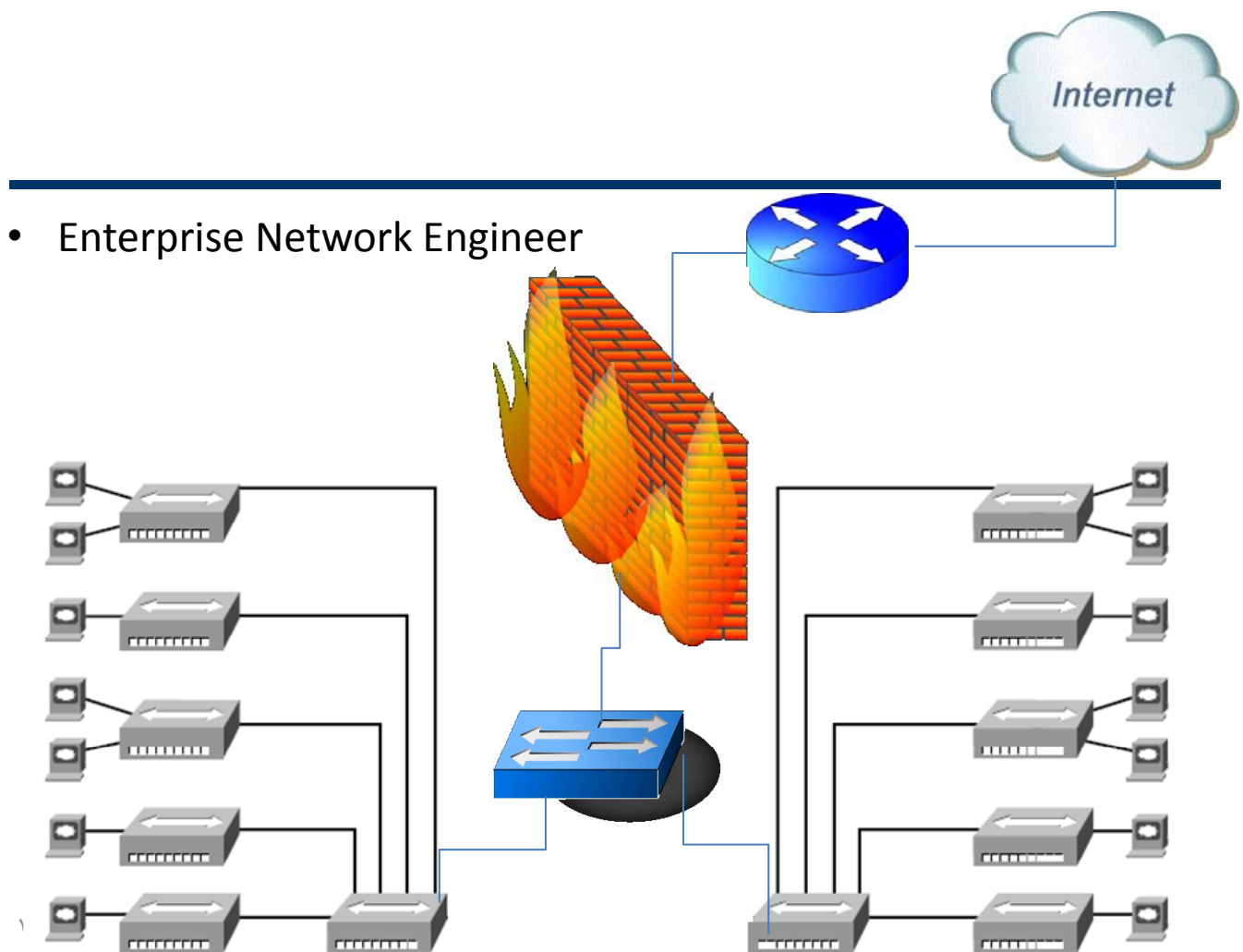
Perspectives on Networking (4)

Network engineer Perspective on Networks

1.

A network engineer, who works for an enterprise, is responsible of the following:

- operating and maintaining enterprise network (servers and workstations) and its internet connectivity in appropriate way and with acceptable quality.
- Network operation, includes providing support of applications (DBs, web applications, mail exchanges) and OS (windows server, workstations) that run on enterprise servers and workstations.



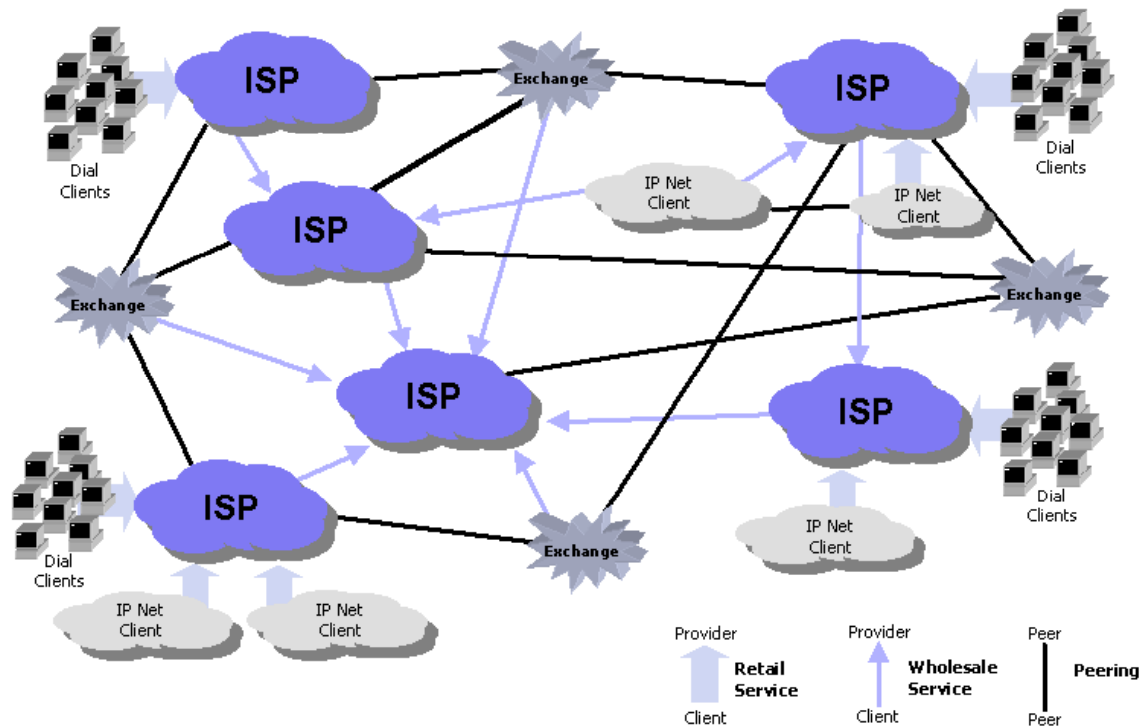
Perspectives on Networking (5)

2.

A network engineer, who works for network service providers, is responsible of one of the following

- Establishing, configuring and high level maintenance of clients network (enterprises or individuals users).
- Providing connectivity between enterprises premises (leased lines or VPNs), or connectivity of enterprises to internet (ISP).

- ISP network engineer



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Perspectives on Networking (6)

A much larger number of people work on enterprise networks than ISP networks.

Eight simple steps to develop a computer network

Mission statement

1. Everyone to be able to exchange files without having to get up from their desks.
2. Everybody is able to simply type in the name of a file and the name of the person, the file appears on the his computer.
3. workers to be able to take their PCs with them and just have to plug the computer into a wall socket so that they can send and receive files from the new office they moved to.
4. This network thing to be like the electrical power thing a plug in the wall near every desk, and if you plug in, you're on the network!

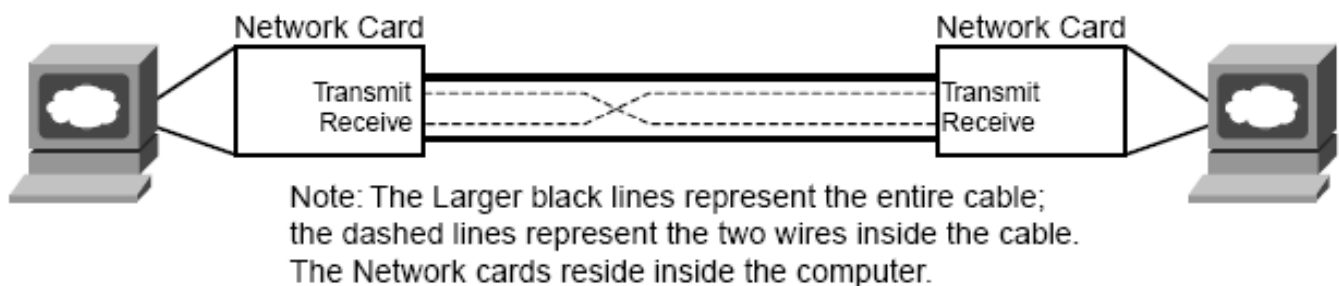
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Eight simple steps to develop a computer network (2)

1st Step: Connecting 2 PCS

Two PCs Transfer Files in the Lab



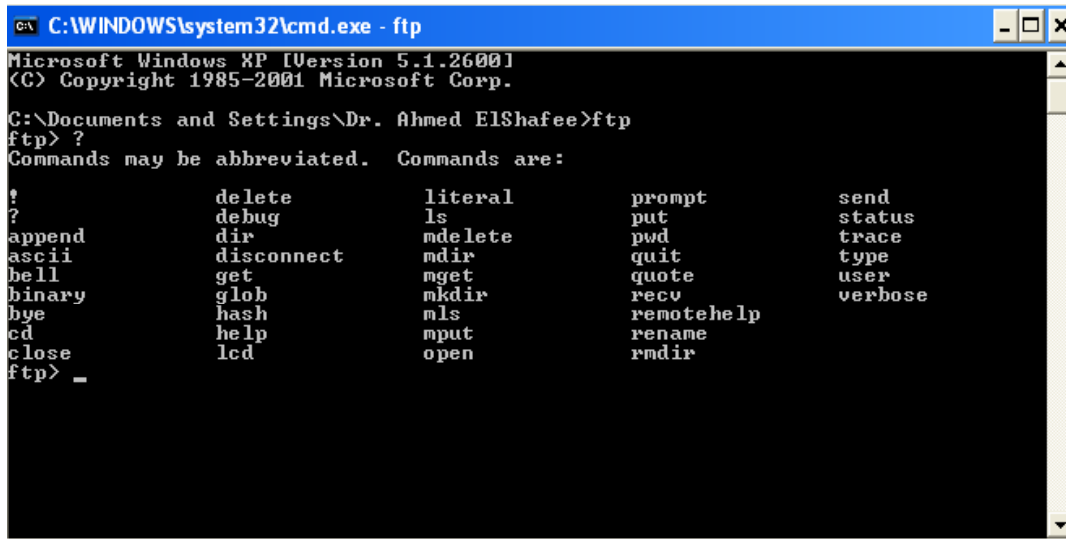
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Eight simple steps to develop a computer network (3)

2nd step, write a software program “GetFile”

GetFile <Owner name> <filename>



```
C:\WINDOWS\system32\cmd.exe - ftp
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

C:\Documents and Settings\Dr. Ahmed ElShafee>ftp
ftp> ?
Commands may be abbreviated.  Commands are:

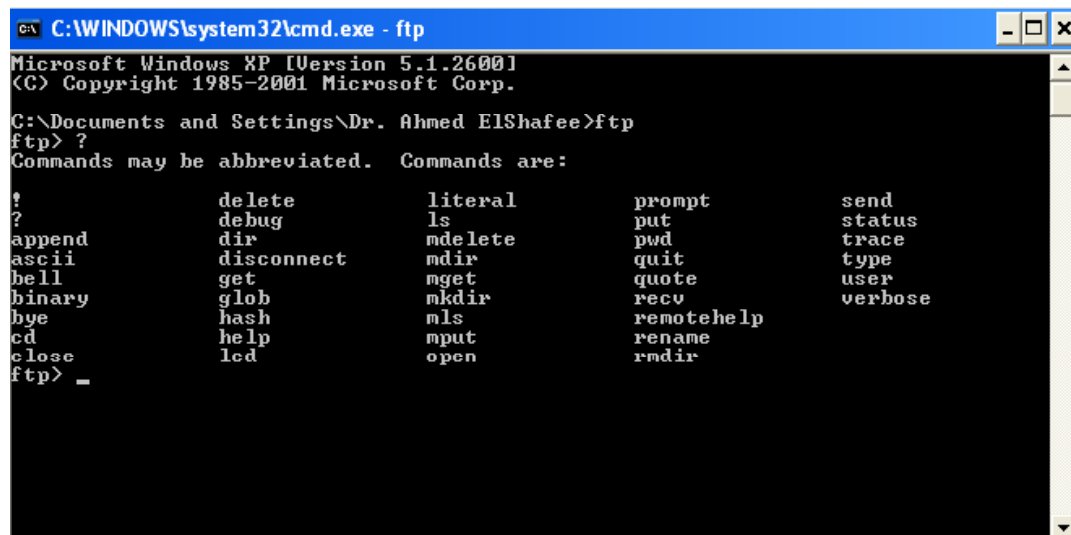
!                delete          literal          prompt          send
?                debug           ls              put             status
append          dir            mdelete        pwd             trace
ascii           disconnect    mdir           quit            type
bell            get           mget           quote           user
binary          glob          mkdir          recu            verbose
bye             hash          mls            remotehelp
cd              help          mput           rename
close          lcd           open           rmdir
ftp> _
```

Eight simple steps to develop a computer network (3.2)

2nd step, write a software program “ExplorFiles”

ExplorFiles <Remote PC name>

You will get a list of all available files in remote PC



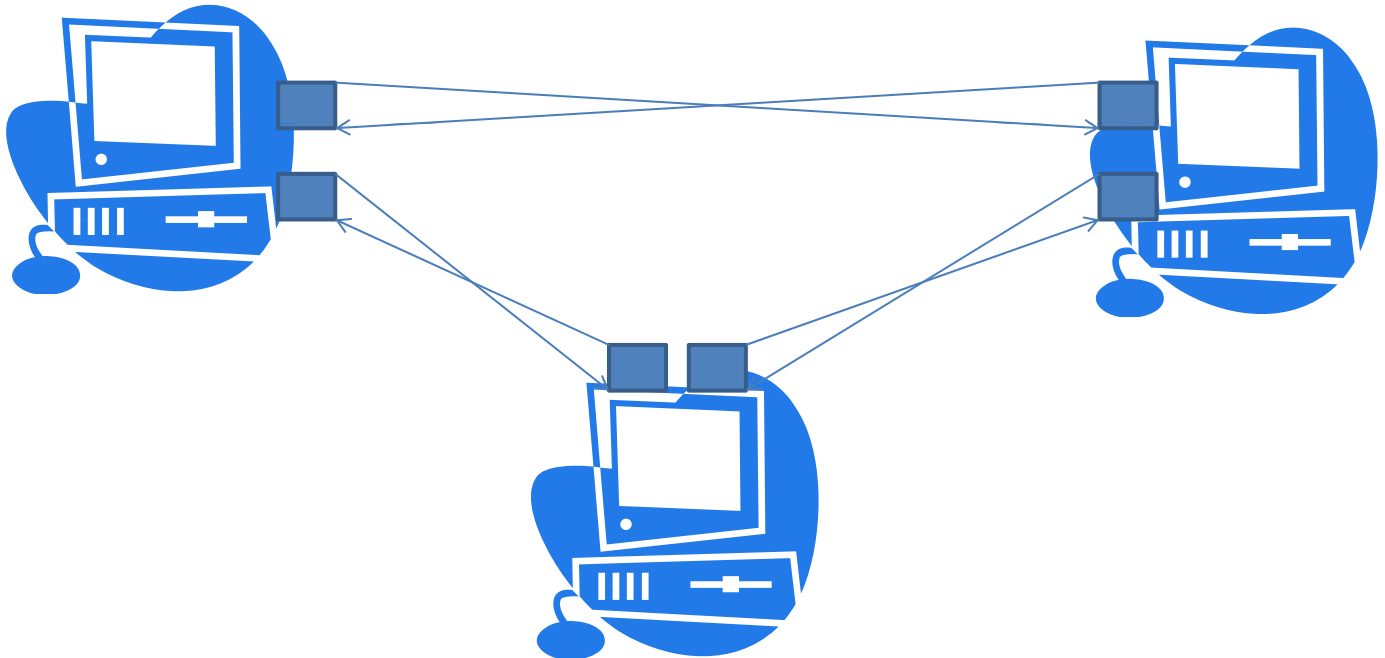
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C:\WINDOWS\system32\cmd.exe - ftp
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Commands may be abbreviated.  Commands are:

!                delete          literal          prompt          send
?                debug           ls              put             status
append          dir            mdelete        pwd             trace
ascii           disconnect    mdir           quit            type
bell            get           mget           quote           user
binary          glob          mkdir          recu            verbose
bye             hash          mls            remotehelp
cd              help          mput           rename
close          lcd           open           rmdir
ftp> _
```

Eight simple steps to develop a computer network (4)

3rd step: connecting 3 PCs

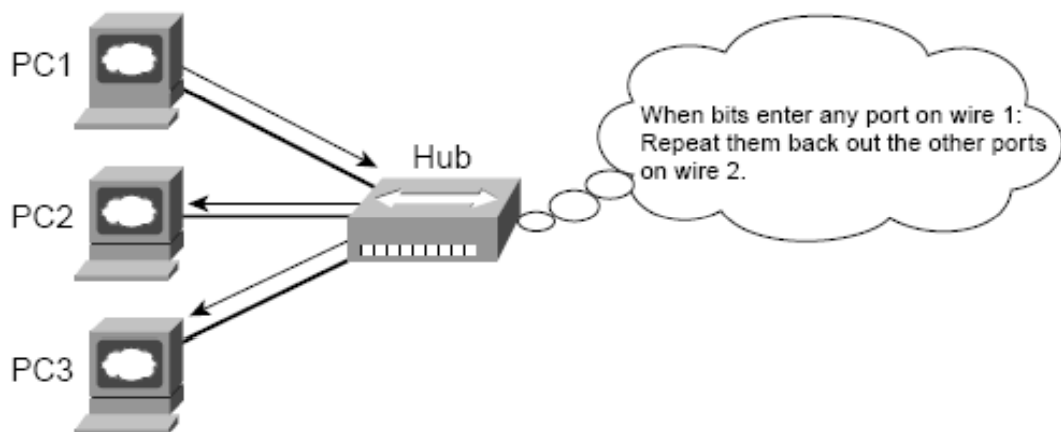


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Eight simple steps to develop a computer network (5)

4th step: connecting 3 PCs again



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Eight simple steps to develop a computer network(6)

5th step: security; software concerns regarding sharing and security

>>ExplorFiles <<Owner name/address> >

>>GetFile <<Owner name/address>> <file name>

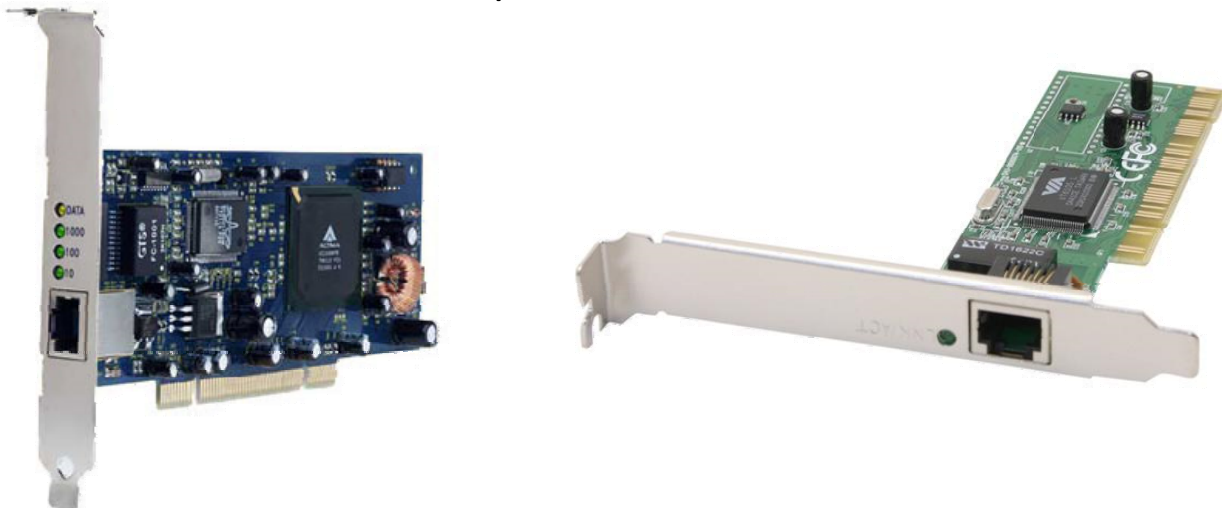


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Eight simple steps to develop a computer network (7)

6th step: security a hardware consern; unique network ID, translate each ID into pc name



* If you changed network card, or pc at all, just update network with your new network ID, and users will reach you by name

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Eight simple steps to develop a computer network (8)

7th step: establishing enterprise network

- Cable cost concern
- Cable length and signal strength concern

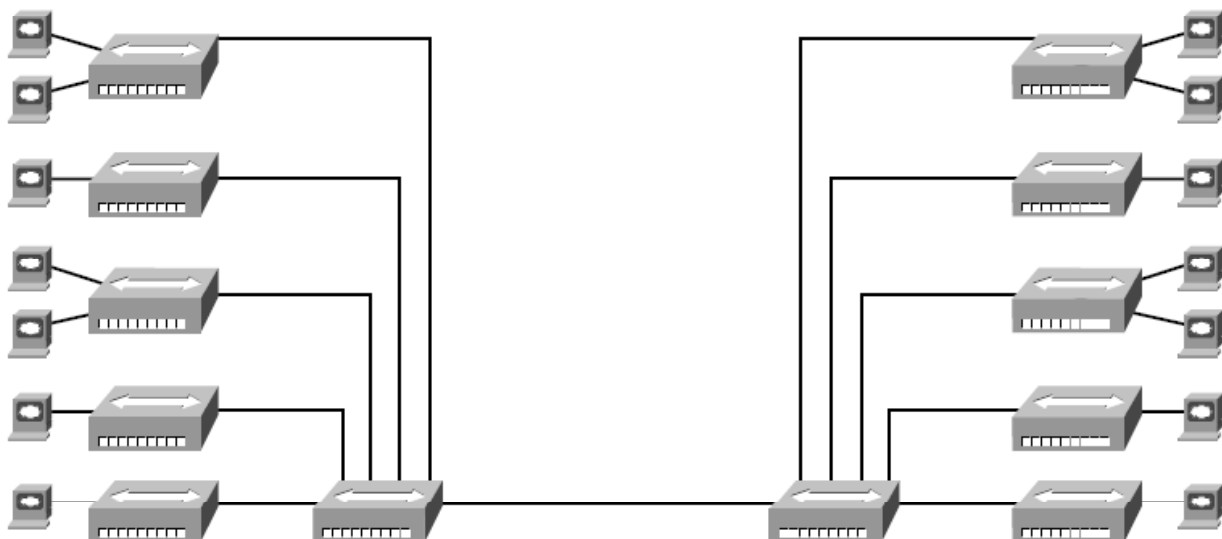


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Eight simple steps to develop a computer network(9)

8th step: re-establishing Enterprise network

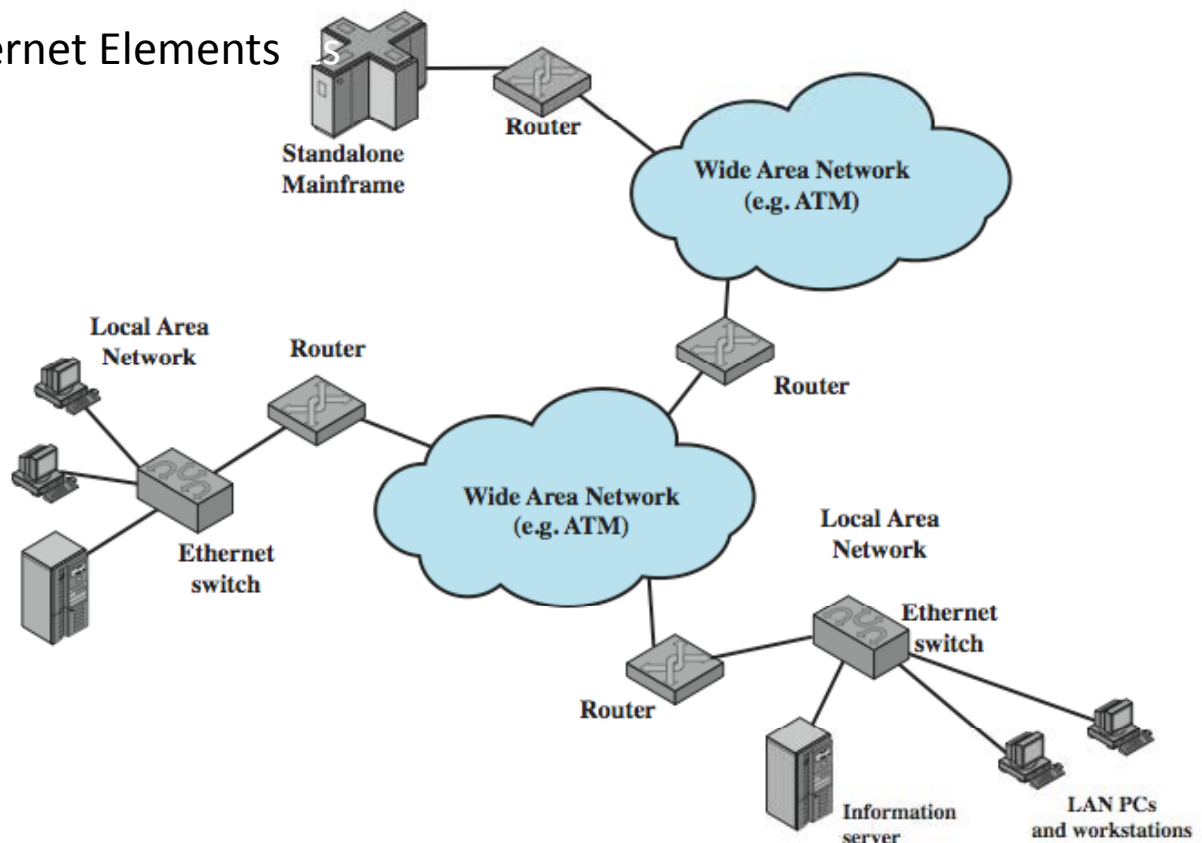


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Perspectives on internet

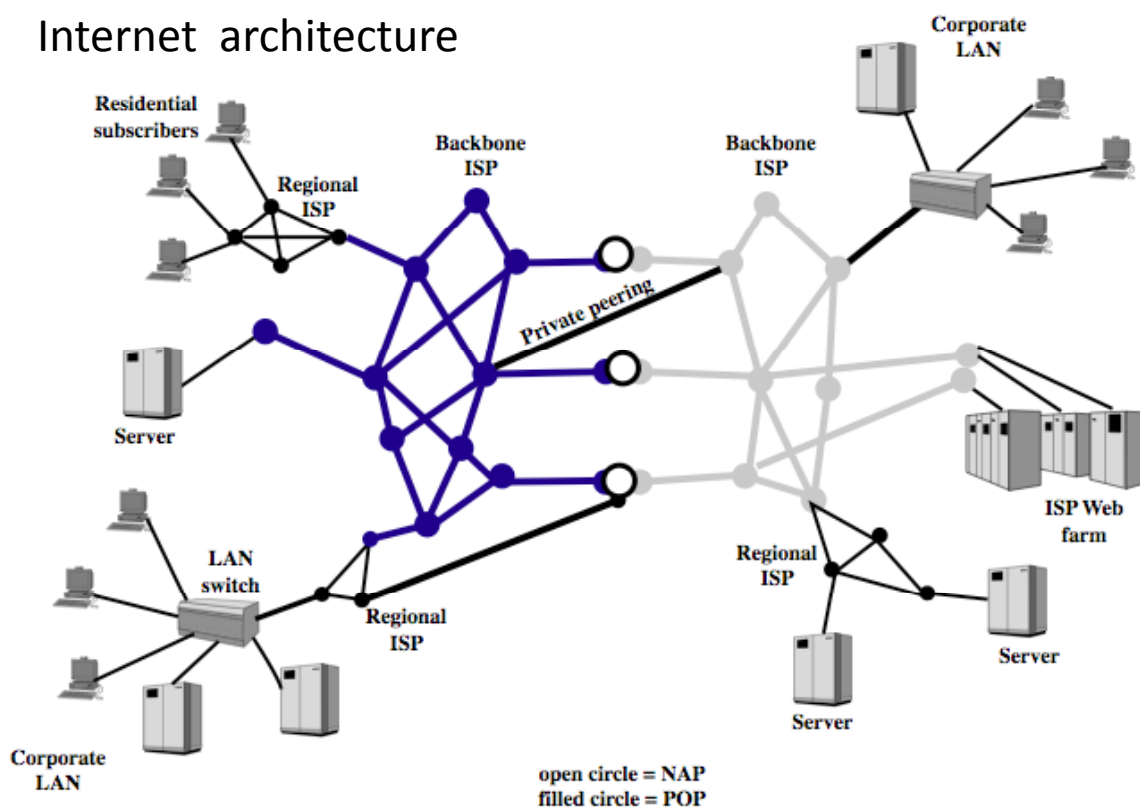
Internet Elements



Internet (2)

POP (point of presence) ,
CPE (customer premises equipment)
CO (Central office)
NAP (Network Access Point)

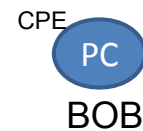
- Internet architecture



Internet (3)

POP (point of presence) ,
CPE (customer premises equipment)
CO (Central office)
NAP (Network Access Point)

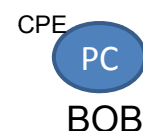
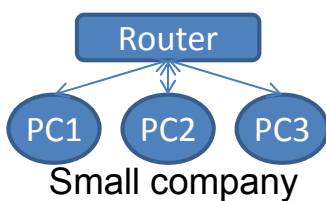
- Example



Internet (3)

POP (point of presence) ,
CPE (customer premises equipment)
CO (Central office)
NAP (Network Access Point)

- Example



Internet (3)

POP (point of presence) ,
CPE (customer premises equipment)
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Internet (3)

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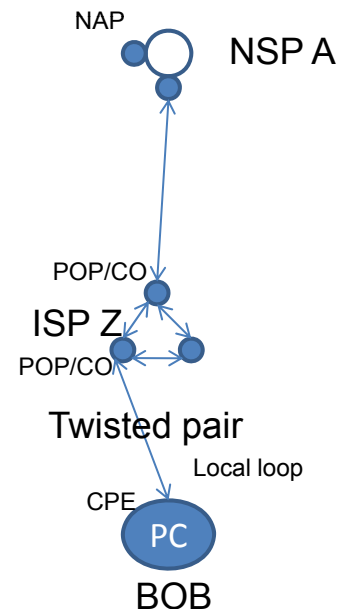
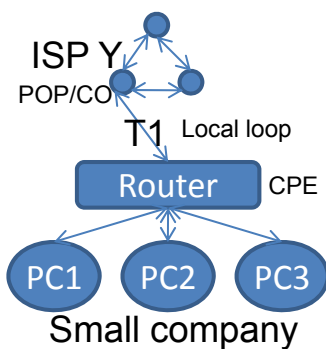
- Example



Internet (3)

POP (point of presence) ,
CPE (customer premises equipment)
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NAP (Network Access Point)

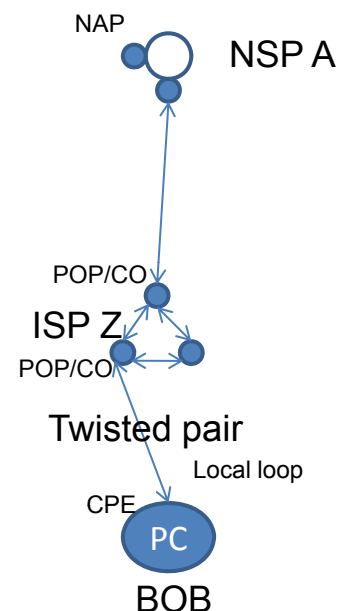
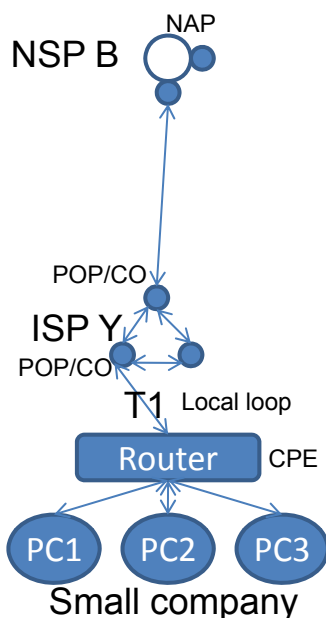
- Example



Internet (3)

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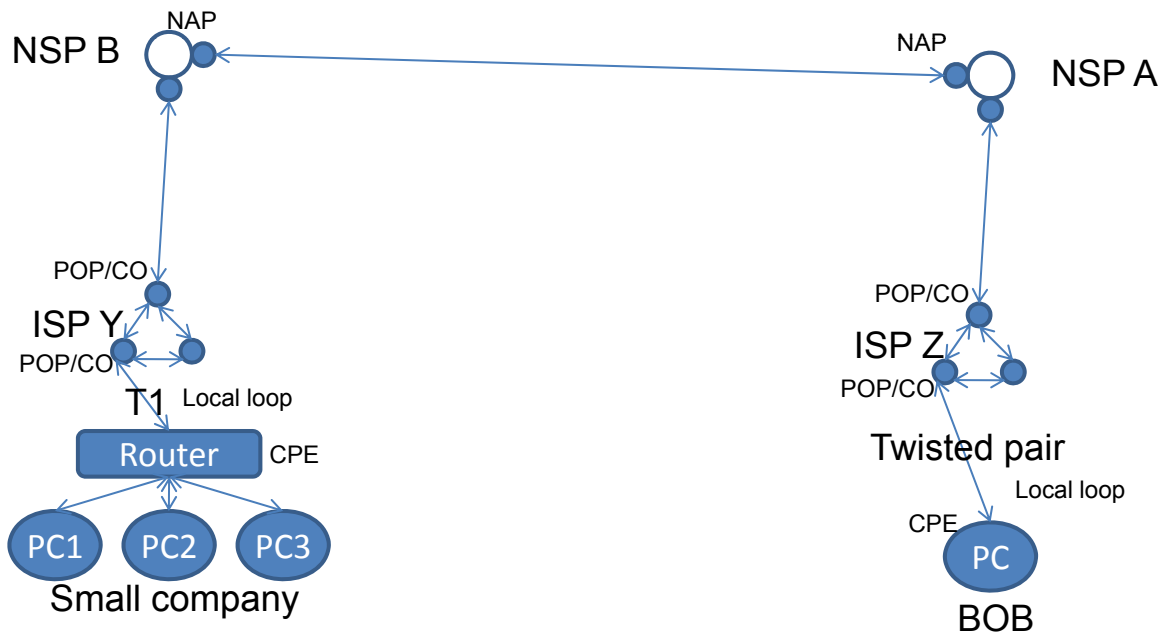
- Example



Internet (3)

POP (point of presence) ,
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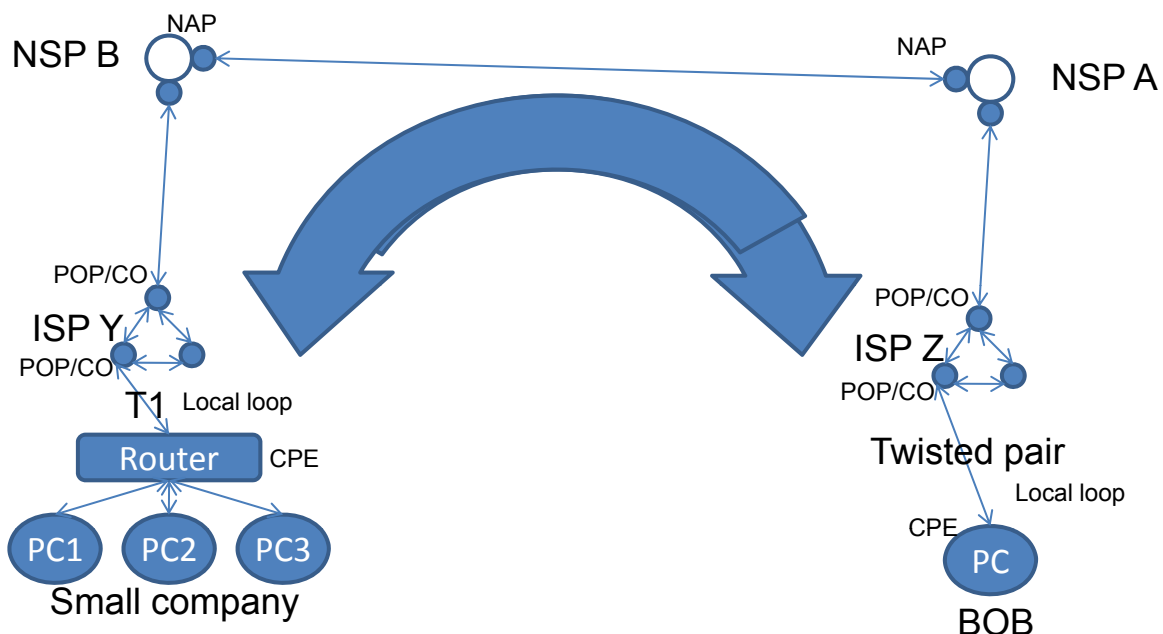
- Example



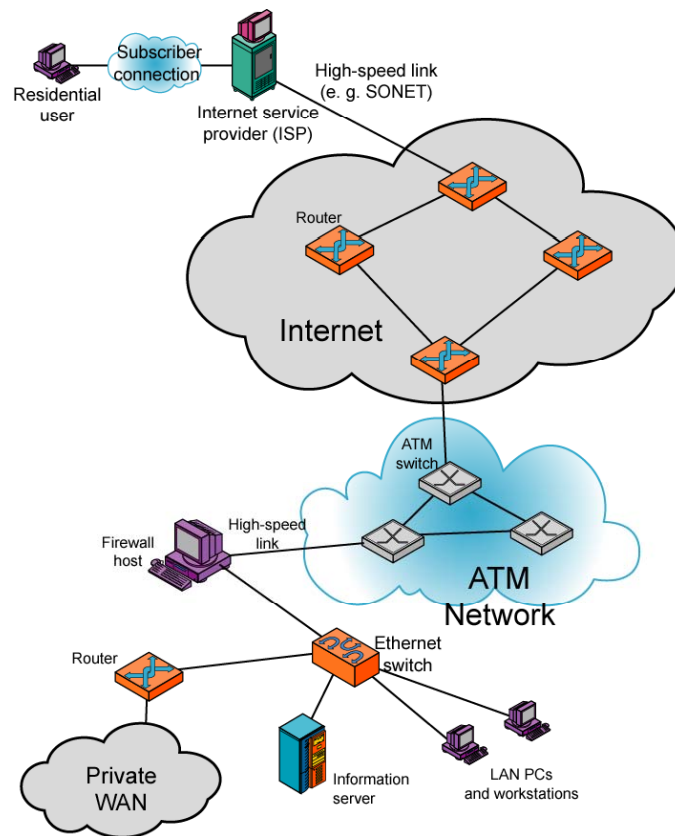
Internet (3)

POP (point of presence) ,
CPE (customer premises equipment)
CO (Central office)
NAP (Network Access Point)

- Example



Example Configuration



Thanks,...
See you next week (ISA),...