

Introduction to Networks

What is a network ?

- A number of nodes connected together.
- They share information and resources.
- Examples:
Roads, Telephones , Computers

What is a computer network?

- *A computer network* is computers and devices connected together.
- The capabilities of a computer are increased when connected with other devices to form a computer network.

Physical Network



Computer Network Components

Components of a computer network:

- Computer with NIC (PCs, laptops, handhelds)
- routers & switches (IP router, Ethernet switch)
- Links” Transmission media” (wired, wireless)
- protocols (IP,TCP,CSMA/CD,CSMA/CA)
- applications (network services)
i.e. Network Operating System (NOS)
- humans and service agents

Purpose of a Computer Network

- Summarized in a single word: *sharing*.
- Individual computers are isolated.
- Networked computers can share resources.
- Networks also make computer management easier.
- Three types of resources can be shared (Software ,data and hardware)

Share Software and Data

Application and utility software:

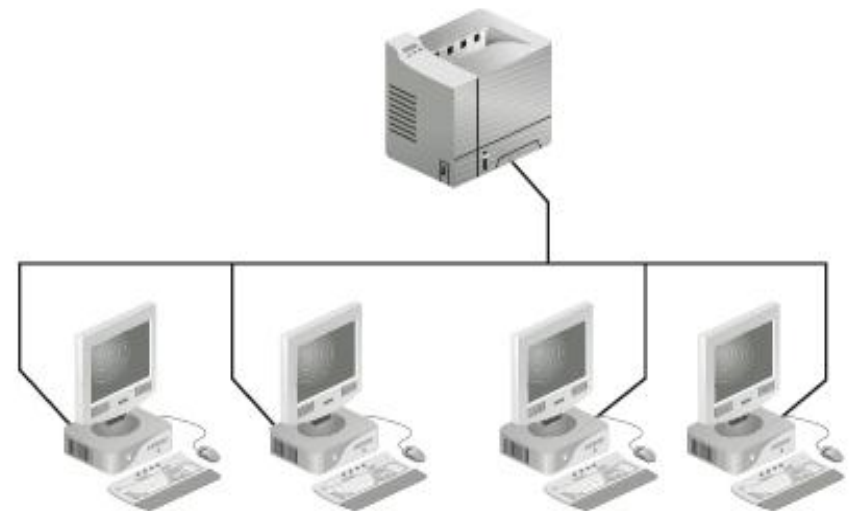
can be shared by all users across the network. This requires only a single software copy to be purchased and maintained.

Data files:

Can also be shared. This makes data more accessible and maintains integrity.

Share Hardware

- Sharing is an essential feature of a computer network.
- This reduces costs and the work of support staff.
- Printers, fax modems, scanners, hard drives, CD-ROMs, and DVDs can all be shared.



Improve Communications

- Communication is essential in today's businesses.
- Computer networks can help in improved communications through groupware.
- E-mail, electronic calendars, and video conferencing are available.

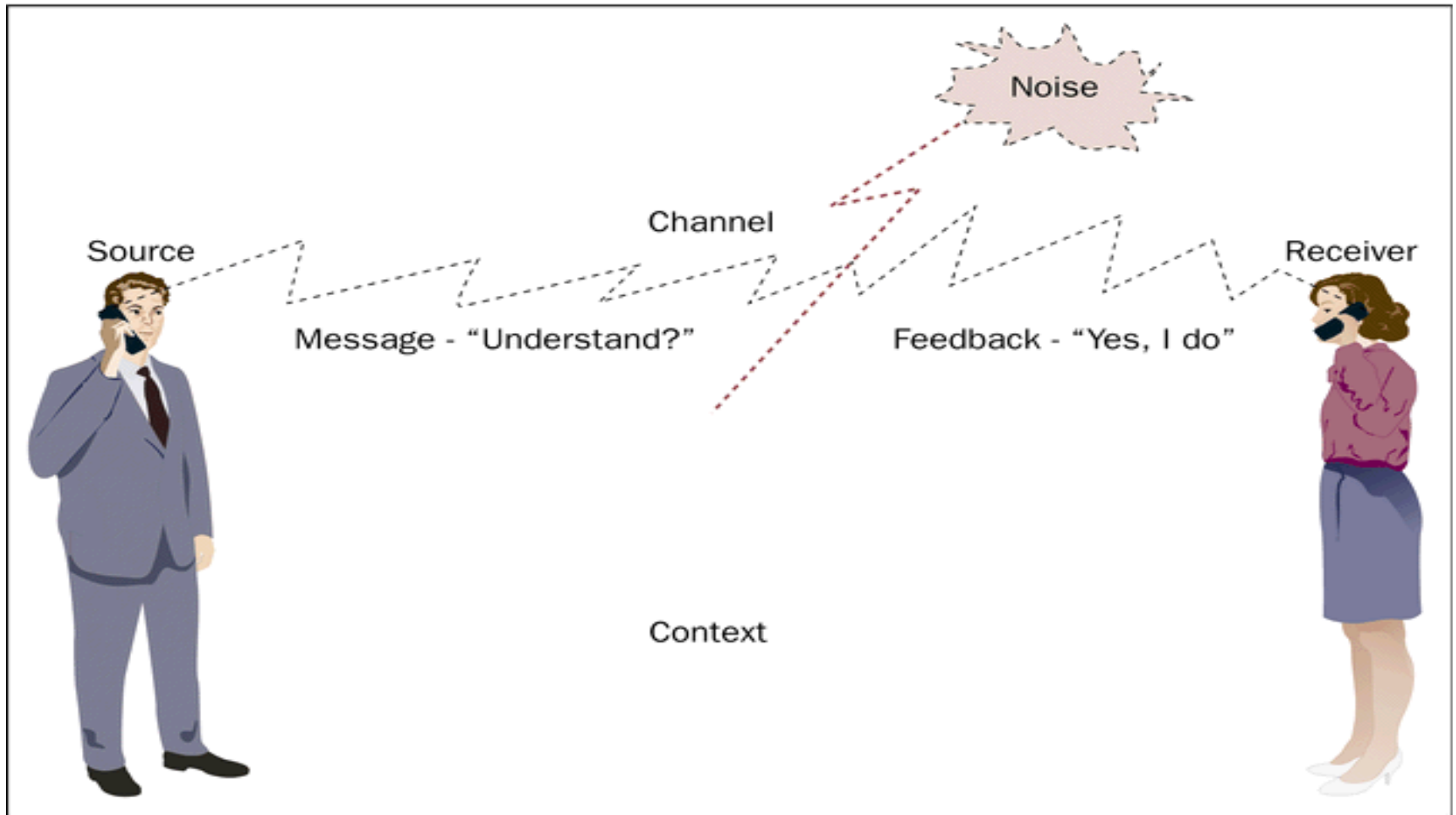
Centralize Management

- Computer networks allow computers to be managed from one central location.
- Software updates can be “pushed” to users’ computers.
- Problems can be diagnosed over the network.
- Training can be done over the network.

Network Communications

- Source
- Message
- Channel
- Receiver
- Noise
- Feedback
- Context

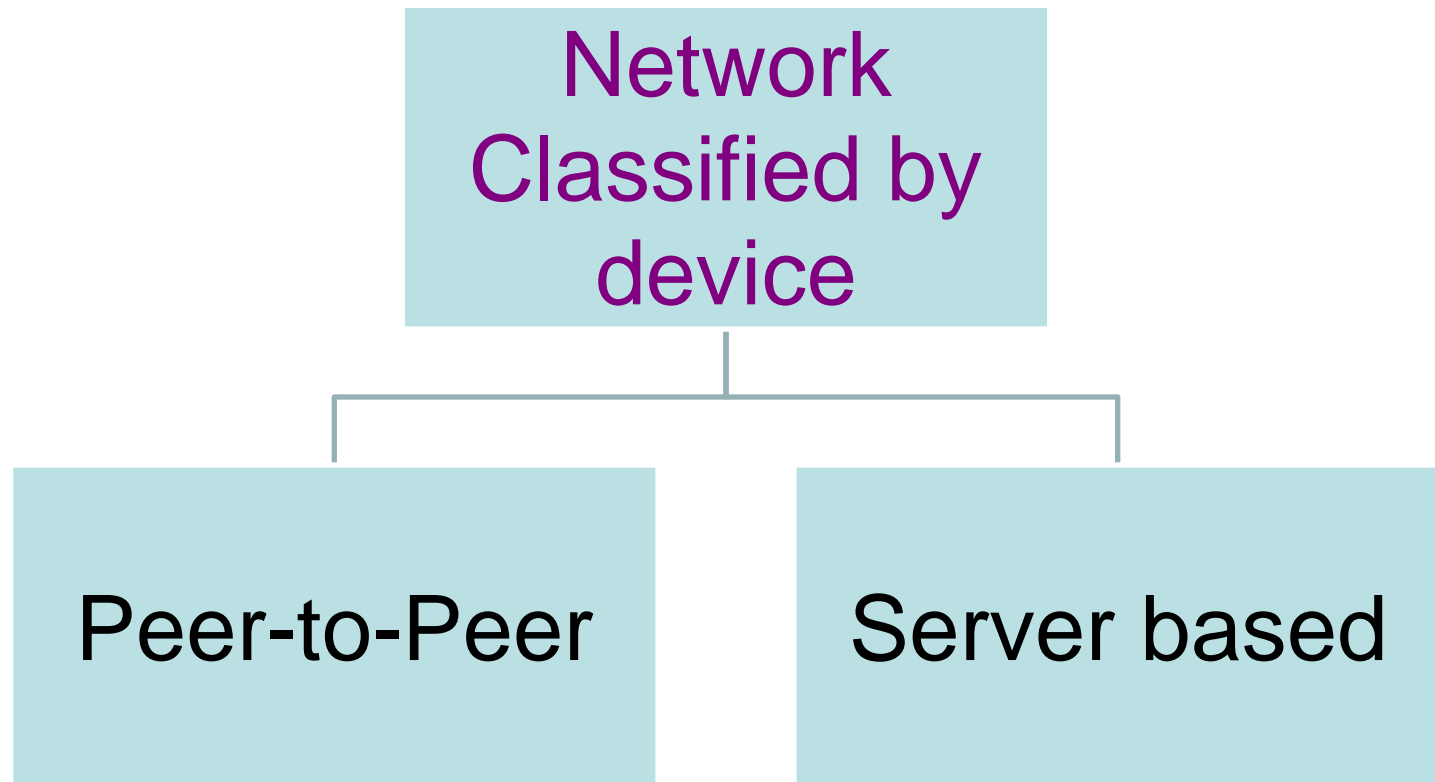
Network Communications



Types of Networks

Two types of network classifications:

- Classified by device that controls network
- Classified by distance between devices



I. Peer-to-Peer Network

- No single computer controls the network.
- Each computer is the same (a peer) to all others.
- It is suitable for small offices.
- Called “work group”.
- Each user controls the access to his own computer (read only, hide files).

Its suitable when :

- 10 or less computers.
- All computers in the same place.
- Security is not an issue.
- No network upgrading plans.

I. Peer-to-Peer Network

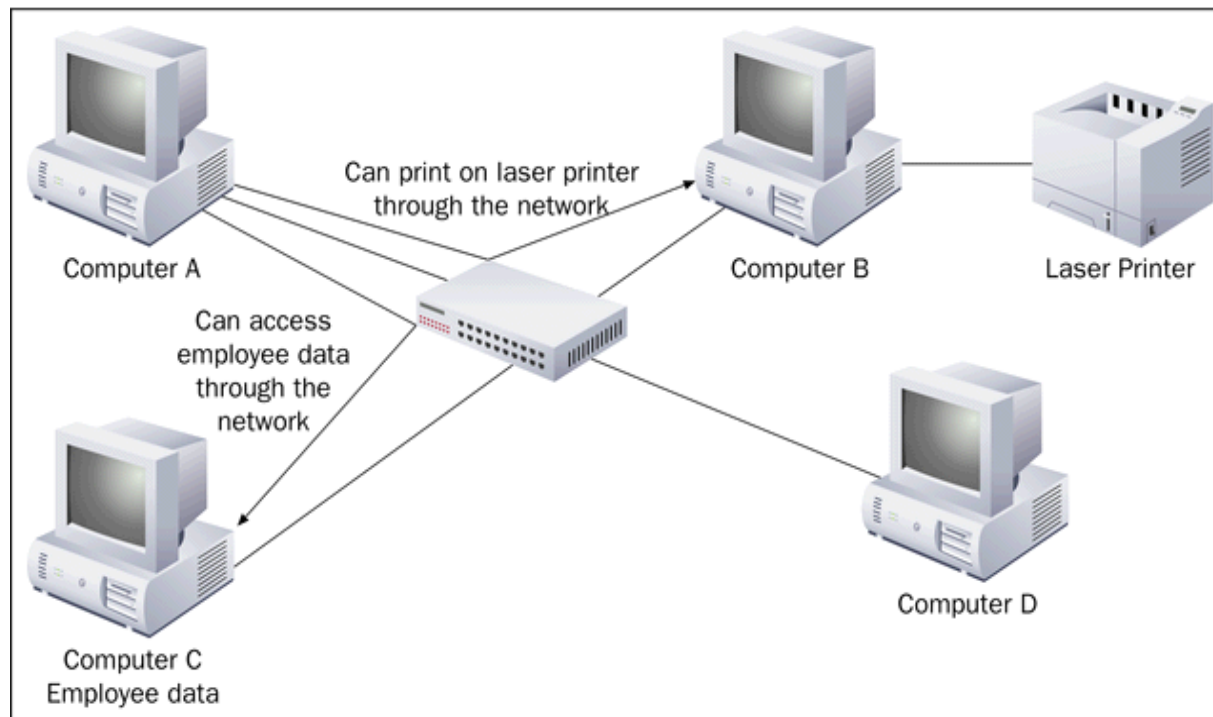
Advantages :

- Limited cost.
- No software needed.
- No powerful computers needed.
- Easy to install and setup.

Disadvantages:

Not suitable for large networks

I. Peer-to-Peer Network



II. Server-Based Network

- The network is controlled by a special high-powered server.
- The server is dedicated to running the network.
- The server never work as a client.
- If the number of computers connected together is large , another server is used.

Types:

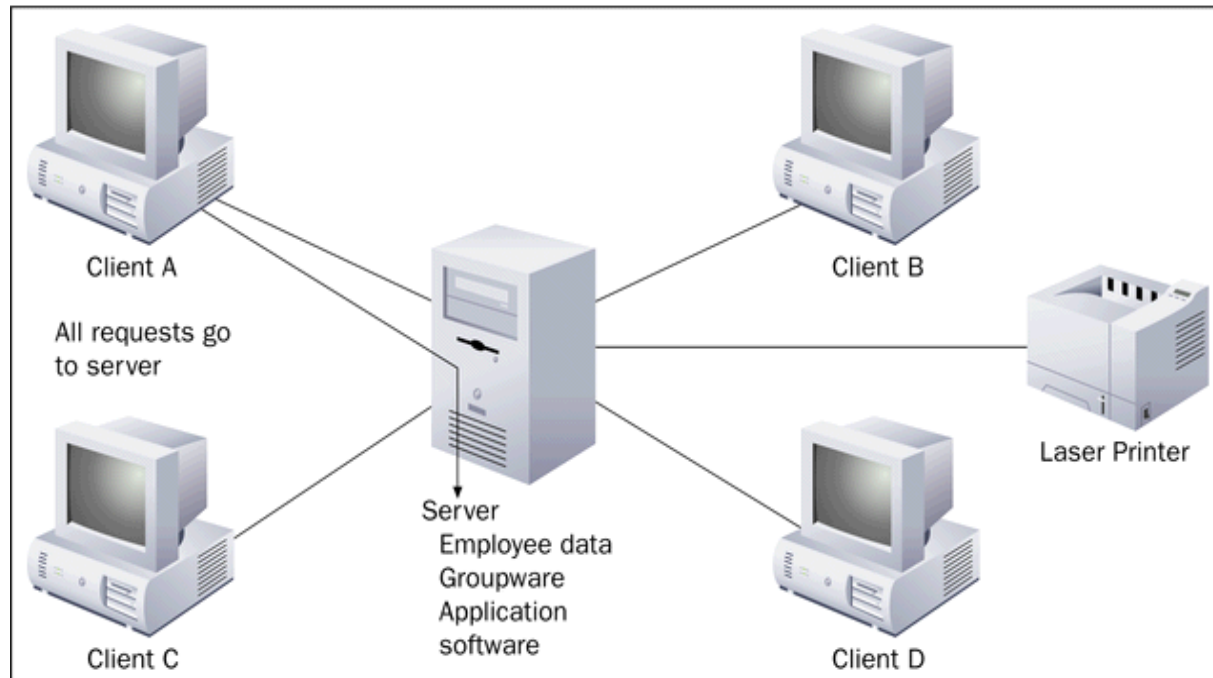
- ☐ Print and file servers
- ☐ Application servers
- ☐ Communication servers
- ☐ Directory service servers

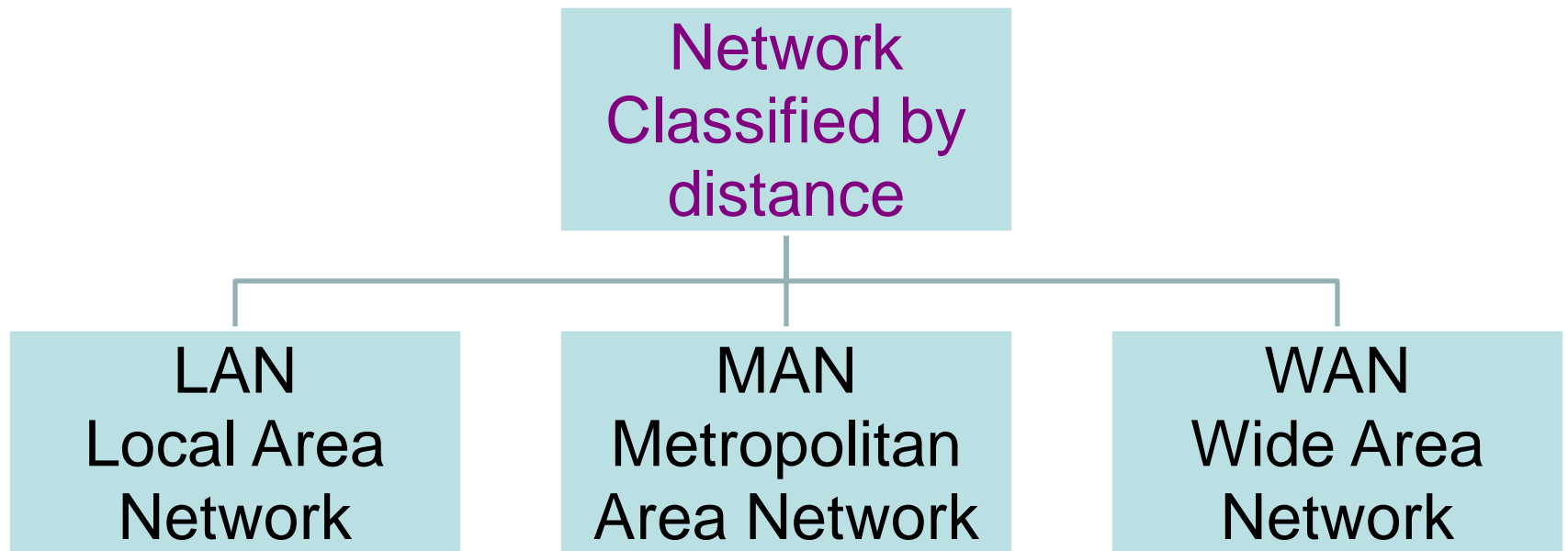
II. Server-Based Network

Advantages:

- Scheduled Backup
- Data is safe
- Thousands of users
- Any type of computers can be connected.
- Easy to access and manage data.
- Security (to have an administrator)

II. Server-Based Network

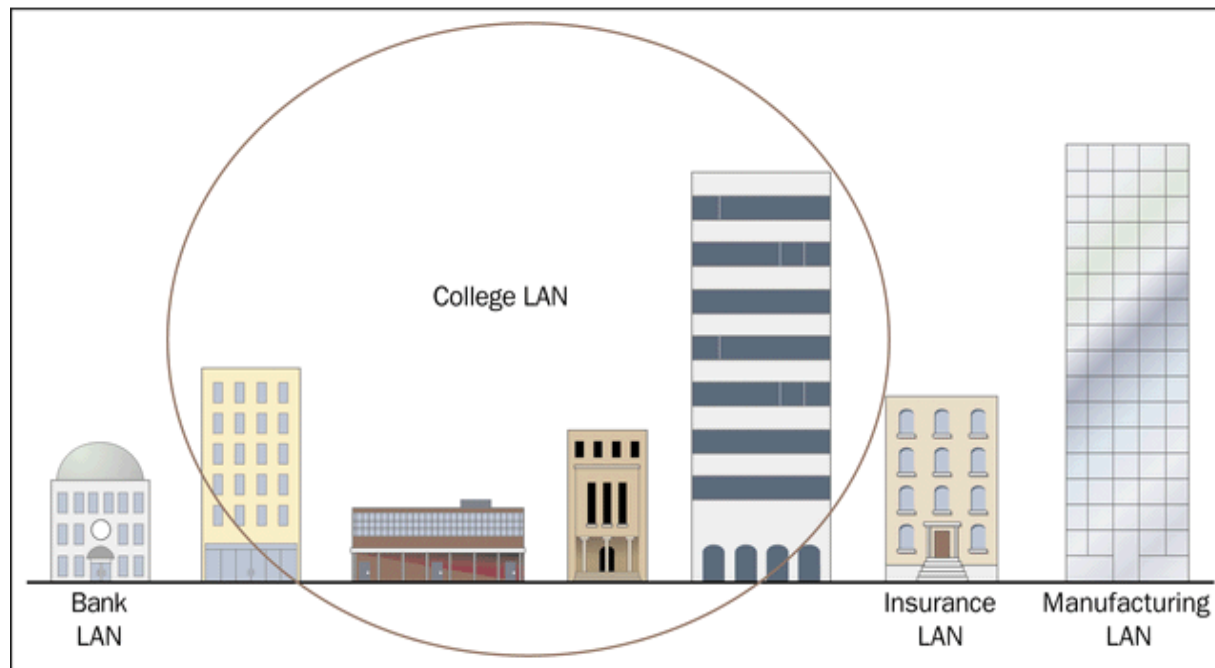




I. Local Area Network

- Network computers are located relatively close to each other.
- They are generally limited to buildings owned by one organization.
- They operate at high speeds (10-1000 mbps)
- They are low-cost networks.

I. Local Area Network



II. Metropolitan Area Network

- A very fast LAN.
- Uses fiber optics as a media.
- Covers an area from 20 to 100 meters.

III. Wide Area Network

- Network computers are spread out over a larger area.
- They are often managed by public carriers.
- They operate at lower speeds.
- They are a higher-cost network.

III. Wide Area Network

