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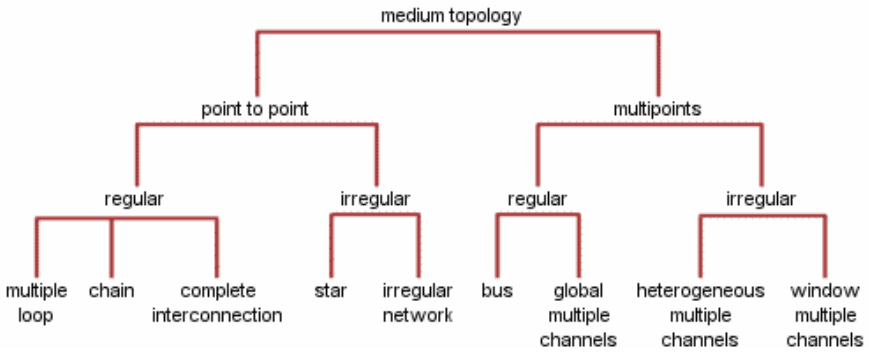
Topology of local networks

Classification of topologies

Local networks are usually ordered in 2 groups (see **classification of networks**):

- **point-to-point (or peer-to-peer) networks**,
- **broadcasting networks**.

From this first classification we can deduce a hierarchy of the different topologies of local networks:



Interconnexions are of two types:

- **regular**: constant connection relations between two different neighbouring modules,
- **irregular**: connection irregularities due to a need of space distribution of the topology for the needs of the application. This system is not flexible.

Finally, the topology we choose for a networks depends on:

- efficiency of the network (bit rate, speed),
- synchronization degree between the distributed tasks,
- reliability and security of transmission,
- cost.

The different topologies

Ring or loop networks

Simple loop

This kind of network is not really efficient and reliable but it is quite cheap. As soon as two lines are cut the network no longer works.

Multiple loop

We can use this topology for security reasons. It is also used for FDDI (optical fibre) local networks.

Networks in star

Network in star

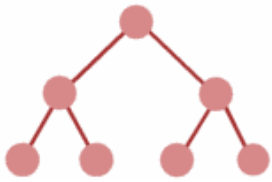
This topology is quite efficient and cheap. Most small local networks is built on this model (mainly for cost reasons), by using a central hub that connects computers together. Private phone networks (PABX) are also based on this topology. The weakness of this structure is the central node that must never be broken.

Complete networks or with regular meshing

Complete network

This topology is reliable but it is also the most expensive one. Each node is connected to every other node. It is never used in practice.

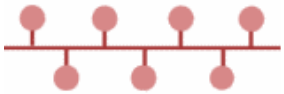
Hierarchical structure



Hierarchical structure

It is sometimes used to copy a given hierarchical organization. In practice, it is not efficient because intermediate nodes can be congestion points.

Buses



Bus

The main characteristic of this topology is that it is a passive structure: is a node is down, the network is not affected. The signal go through the bus and disappears once it has reached an end (terminations on coaxial Ethernet networks).

Undefined network or irregular meshing

Undefined network

Unfortunately it is the most frequent topology. Communication is seldom direct, messages need to go through intermediate nodes. It is not the most efficient and reliable configuration (intermediate nodes can play an important role). This structure is the consequence of interconnection of several local subnetworks.

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 **socioeconomic aspects** **classification** 

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