

Fundamentals of Networks

Assignment 1

Q1: State the classification of networks.

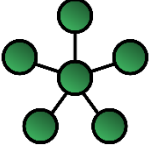
Ans:

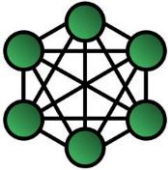
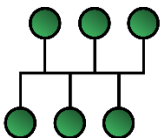
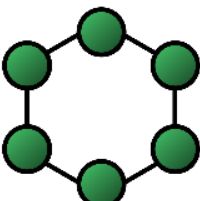
There are four major classification of networks :

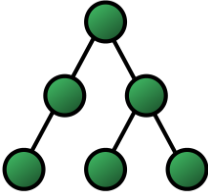
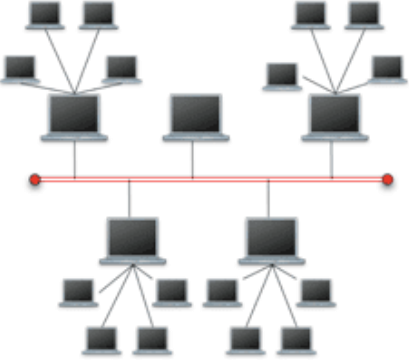
1. **LAN:**
LAN or Local Area Network connects network devices in such a way that personal computer and workstations can share data, tools and programs. The group of computers and devices are connected together by a switch, or stack of switches, using a private addressing scheme as defined by the TCP/IP protocol. Private addresses are unique in relation to other computers on the local network.
2. **MAN:**
MAN or Metropolitan area Network covers a larger area than that of a LAN and smaller area as compared to WAN. It connects two or more computers that are apart but resides in the same or different cities.
3. **WAN:**
WAN or Wide Area Network is a computer network that extends over a large geographical area, although it might be confined within the bounds of a state or country.
4. **PAN:**
PAN It is used in a home, small office or one building and contains few devices and is controlled by one person

Q2: Explain and compare between the different networks topologies?

Ans:

Topologies	Advantages	Disadvantages
<p style="text-align: center;">Star</p> 	<ol style="list-style-type: none">1. It is very reliable – if one cable or device fails then all the others will still work2. It is high-performing as no data collisions can occur3. Easier to put in4. Robust in nature	<ol style="list-style-type: none">1. Requires more cable than a linear bus2. Extra hardware is required (hubs or switches) which adds to cost3. More expensive than linear bus topology due to the value of the

		connecting devices
<p>Mesh</p> 	<ol style="list-style-type: none"> 1. Failure during a single device won't break the network. 2. There is no traffic problem as there is a dedicated point to point links for every computer. 3. Fault identification is straightforward. 4. This topology provides multiple paths to succeed in the destination and tons of redundancy. 5. It provides high privacy and security. 	<ol style="list-style-type: none"> 1. It's costly as compared to the opposite network topologies i.e. star, bus, point to point topology. 2. Installation is extremely difficult in the mesh. 3. Power requirement is higher as all the nodes will need to remain active all the time and share the load. 4. Complex process. 5. The cost to implement mesh is above other selections.
<p>Bus</p> 	<ol style="list-style-type: none"> 1. It is the easiest network topology for connecting peripherals or computers in a linear fashion. 2. It works very efficient well when there is a small network. 3. Length of cable required is less than a star topology. 4. It is easy to connect or remove devices in this network without affecting any other device. 	<ol style="list-style-type: none"> 1. Bus topology is not great for large networks. 2. Identification of problem becomes difficult if whole network goes down. 3. Troubleshooting of individual device issues is very hard. 4. Need of terminators are required at both ends of main cable. 5. Additional devices slow network down.
<p>Ring</p> 	<ol style="list-style-type: none"> 1. It is cheap to install and expand. 2. Minimum collision. 3. Speed to transfer the data is very high in this type of topology. 4. Due to the presence of token passing the performance of ring topology becomes better than bus topology under heavy traffic. 5. Easy to manage. 	<ol style="list-style-type: none"> 1. It is Expensive. 2. Addition and removal of any node during a network is difficult and may cause issue in network activity. 3. Difficult to troubleshoot the ring. 4. In order for all the computer to communicate with each other, all computer must be turned on. 5. Total dependence in on one cable. 6. They were not Scalable.

<p style="text-align: center;">Tree</p> 	<ol style="list-style-type: none"> 1. The other nodes in a network are not affected, if one of their nodes get damaged or not working. 2. Tree topology provides easy maintenance and easy fault identification can be done. 3. A callable topology. Leaf nodes can hold more nodes. 4. Supported by several hardware and software vendors. 5. Point-to-point wiring for individual segments. 	<ol style="list-style-type: none"> 1. Requires large number of cables compared to star and ring topology. 2. As the data needs to travel from the central cable this creates dense network traffic. 3. The Backbone appears as the failure point of the entire segment of the network. 4. Treatment of the topology is pretty complex. 5. The establishment cost increases as well. 6. If the bulk of nodes are added in this network, then the maintenance will become complicated.
<p style="text-align: center;">Mixture</p> 	<ol style="list-style-type: none"> 1. It is very reliable. 2. It is easily scalable as Hybrid networks are built in a fashion which enables for easy integration of new hardware components. 3. Error detecting and trouble shooting is easy. 4. Handles large volume of traffic. 5. It is used for create large network. 	<ol style="list-style-type: none"> 1. There is change hardware in order to connect topology with another topology. 2. Usually hybrid architectures are usually larger in scales so they requires a lot of cables in installation process. 3. Hubs which are used to connect two distinct networks, are very costly. And hubs are different from usual hubs as they need to be intelligent enough to work with different architectures. 4. Installation is a difficult process.

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