Bus topology essay

Design, Fashion

Bus topology refers to a single cable that connects all the workstations, servers, printers and other devices on the network. The cable runs from device to device by using tee connectors that plug into the network adapter cards. Each end device has a terminator on one end of the tee and a cable going out to the next device on the other end, while all devices in the middle have one cable coming in and one going out.

The terminators on each end device simply stop the network signal from reflecting back into the cable and colliding with other transmissions. The most common type of network cable used for a bus topology is RG-58 thin net. The network speed is limited to 10 megabits per second, making it a suitable media for only 10 BASE 2 Ethernet. There are also network size limitations. You may have a maximum of twenty network devices on a segment, and the segment cannot exceed 185 meters in total length. By using a device called a repeater that boosts the signal, you can have up to five segments on a network. However, only three of these segments can have devices attached to them. The other two segments are used to link the three populated segments, giving you a maximum number of sixty devices with a total network length of 925 meters.

This topology works equally well for either peer to peer or client server. Ring Topology Ring topologies are used on token ring networks. Each device processes and retransmits the signal, so it is capable of supporting many devices in a somewhat slow but very orderly fashion. A token, or small data packet, is continuously passed around the network. When a device needs to transmit, it reserves the token for the next trip around, then attaches its data packet to it. The receiving device sends back the packet with an

acknowledgment of receipt, then the sending device puts the token back out on the network. Most token ring networks have the physical cabling of a star topology and the logical function of a ring through use of multi access units (MAU). In a ring topology, the network signal is passed through each network card of each device and passed on to the next device.

All devices have a cable home unned back to the MAU. The MAU makes a logical ring connection between the devices internally. When each device signs on or off, it sends an electrical signal which trips mechanical switches inside the MAU to either connect the device to the ring or drop it off the ring. The most common type of cabling used for token ring networks is twisted pair, although there are nine different types that can be used.

With IBM Type 1 Shielded cable, you can have up to 33 network segments with 260 devices on each. Transmission rates are at either 4 or 16 megabits per second. Advantages Very orderly network where every device has access to the token and the opportunity to transmit * Performs better than a star topology under heavy network load * Can create much larger network using Token Ring Disadvantages * One malfunctioning workstation or bad port in the MAU can create problems for the entire network * Moves, adds and changes of devices can affect the network * Network adapter cards and MAU’s are much more expensive than Ethernet cards and hubs * Much slower than an Ethernet network under normal load Tree Topology Tree topologies integrate multiple star topologies together onto a bus. In its simplest form, only hub devices connect directly to the tree bus, and each hub functions as the “ root” of a tree of devices. This bus/star hybrid

approach supports future expandability of the network much better than a bus (limited in the number of devices due to the broadcast traffic it generates) or a star (limited by the number of hub connection points) alone.

Advantages of a Tree Topology * Point-to-point wiring for individual segments. * Supported by several hardware and software venders. Disadvantages of a Tree Topology * Overall length of each segment is limited by the type of cabling used.

If the backbone line breaks, the entire segment goes down. * More difficult to configure and wire than other topologies. Mesh Topology Mesh topologies involve the concept of routes. Unlike each of the previous topologies, messages sent on a mesh network can take any of several possible paths from source to destination. (Recall that even in a ring, although two cable paths exist, messages can only travel in one direction.) Some WANs, most notably the Internet, employ mesh routing. A mesh network in which every device connects to every other is called a full mesh. As shown in the illustration below, partial mesh networks also exist in which some devices connect only indirectly to others.

Advantages of Mesh Topology * There are dedicated links used in the topology, which guarantees, that each connection is able to carry its data load, thereby eliminating traffic problems, which are common, when links are shared by multiple devices. * It is a robust topology. When one link in the topology becomes unstable, it does not cause the entire system to halt. * If the network is to be expanded, it can be done without causing any disruption to current users of the network. It is possible to transmit data, from one node

to a number of other nodes simultaneously * Troubleshooting, in case of a problem, is easy as compared to other network topologies. * This topology ensures data privacy and security, as every message travels along a dedicated link. Disadvantages of Mesh Topology * The first disadvantage of this topology is that, it requires a lot more hardware (cables, etc.) as compared to other Local Area Network (LAN) topologies.

* The implementation (installation and configuration) of this topology is very complicated and can get very messy. A large number of Input / Outout (I/O) ports are required. * It is an impractical solution, when large number of devices are to be connected to each other in a network. * The cost of installation and maintenance is high, which is a major deterrent. Star Topology In a star topology, each network device has a home run of cabling back to a network hub, giving each device a separate connection to the network. If there is a problem with a cable, it will generally not affect the rest of the network. The most common cable media in use for star topologies is unshielded twisted pair copper cabling.

Category 3 is still found frequently in older installations. It is capable of 10 megabits per second data transfer rate, making it suitable for only 10 BASE T Ethernet. Most new installations use Category 5 cabling. It is capable of data transfer rates of 100 megabits per second, enabling it to employ 100 BASE T Ethernet, also known as Fast Ethernet. More importantly, the brand new 1000 BASE T Ethernet standard will be able to run over most existing Category 5.

Finally, fiber optic cable can be used to transmit either 10 BASE T or 100 BASE T Ethernet frames. Two variations of the star topology used by most larger Ethernet networks today are the star bus and star tree topologies. Essentially, the star bus topology has multiple data closets interconnected by bus trunk lines of thin net, while the star tree topology links multiple data closets with twisted pair or fiber optic. These types of network topologies allow a network to cover a much larger physical area. There are size limitations to star topologies utilizing Ethernet. The maximum number of network devices is 1, 024 and the maximum number of data closets is four. When using Category 3 or 5 twisted pair cabling, individual cables cannot exceed 100 meters.

In regard to total network length, the maximum when linking data closets with twisted pair is 500 meters between the furthest two devices. If multi-mode fiber optic is used to link closets, then the distance between closets can be up to 2, 000 meters. Advantages of a Star Topology * Easy to install and wire. * No disruptions to the network when connecting or removing devices. * Easy to detect faults and to remove parts. Disadvantages of a Star Topology * Requires more cable length than a linear topology. If the hub, switch, or concentrator fails, nodes attached are disabled. * More expensive than linear bus topologies because of the cost of the hubs, etc.

Point-to-Point nodes topology A point-to-point network is the simplest form of wireless network, composed of two radio and two high gain antennas in direct communication with each other. Point to point links are often used to provide high-performance, dedicated connections or high-speed interconnect

links. These links are quick to deploy individually, but do not easily scale to create a large network. Client used these nodes in a site-to-site configuration. Point to Multipoint nodes topology A point-to multipoint or a Multipoint to point nodes share link between an uplink node with omni directional antenna and repeater nodes or downlink nodes with high gain directional antennas.

This type of network is easier to deploy than Point to point network because adding a new subscriber only requires equipment deployment at the subscriber site, not at the uplink node; however, each remote site must be within range and clear line of sight of the base station. Trees, hills and other line of sight obstruction make point to multipoint nods impractical for residential and home office coverage. A Point to Multipoint network is suited for either backhaul operations or customers that need reliable, high-speed connections, but are not willing to pay for dedicated capacity that may go unused. The nodes performed as a bridge to the uplink network and are generally in wired configuration for the clients. The problem with point to Multipoint node topology is that they are not design to mesh with other nodes due to the directional antenna. Multipoint nodes topology Multipoint to multipoint networks creates a routed mesh topology that mirrors the structure of a wired Internet.

To build a mesh network, indoor or outdoor Internet access is first established with the deployment of an access switch connected to a wired ISP. Additional access routers are then deployed throughout the coverage area until a maximum density is achieved. Each access router not only

provides access for attached users, but also become part of the network infrastructure by routing traffic through the network over multiple hops.

This allows any client to join the network at any point of the mesh, even if the clients are not using a node. Client can access the entire mesh wireless or wired making this the best choice to deploy for areas that require larger coverage MeshA Metropolitan nodes topology Metropolitan node topology uses the two mesh type networks. They are Backhaul and Last Mile.

Backhaul are either a Point-to-Point or Point-to-Multipoint topology. It design is to provide a backbone to the uplink nodes (see MeshAP configuration. The nodes use dual antennas one being directional to the uplink the other providing connection to the last mile. The last mile antenna tends to be omni directional. Backhaul Wiana configuration uses two different realms, channels, and ESSID. Clients do not use the backhaul as an access point.

The prime mission is to bring bandwidth to different part of the last mile. The uplink nodes in backhaul provide multi redundant connections to the wired Internet and have more capacity than 11 MBPS. Depending on the size of the area cover numerous backhaul points maybe required to cover a large city. Last Mile is a Multipoint-to-Multipoint topology is nodes that have single radio cards with omni antennas and are linked to the backhauls omni antenna. The difference between Last Mile and Multipoint-to-Multipoint topology is that Internet connection does not come from a wired router but through the backhaul mesh via a central point. These are just a few examples of the type of topology that a LocustWorld MeshAP can configure.

The complexity increases when adding a second wireless radio card to a node and adding different types of antennas. Mixed node topology. A mixed node network is the complex form of wireless network, composed of two radio and two high gain antennas in direct communication with each other and a third party wireless bridge/repeater. Mixed Nodes are often used to provide high-performance, dedicated connections or high-speed interconnect links. These links are quick to deploy individually, but do not easily scale to create a large network. Client used these bridge/repeater nodes in an indoor environment.

The main benefit is that the indoor unit is a low cost commercial product. Mixed Node Indoor topology. Similar to a mixed node network is the complex form of wireless network, composed of two radio and two high gain antennas in direct communication with each other and a series of third party wireless bridge/repeater. Mixed Nodes are often used to provide high-performance, dedicated connections or high-speed interconnect links. These links are quick to deploy individually, although they do not easily scale to create a large outdoor network they do scale to become a large indoor network. Client used these bridge/repeater nodes in an indoor environment.

The main benefit is that the indoor unit is a low cost commercial product. http://compnetworking. about. com/od/networkdesign/a/topologies. htmhttp://fallsconnect. com/topology. htm