

Re: Switch, Hub and Router

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"Jim" wrote in message

news:1A9942AB-7C84-4954-9EBF-D381DB7F78C6@microsoft.com...

: What is the different between Switch, Hub and Router?

You mean what is the difference between a switching hub, shared hub and router?!

Shared Hub:

Multiport repeater that forwards a packet to all ports, also called flooding. With shared hubs, there is a 5-4-3 rule; 5 segments, 4 repeaters, only 3 segments can contain users. Ethernet uses CSMA/CD (Carrier Sense Multi Access with Collision Detection) It senses the line to transmit and detects if there are collisions, two packets colliding. I believe AppleTalk uses CSMA/CA (Carrier Sense Multi Access with Collision Avoidance) where a RTS (Request To Send) is sent to the target and it waits for a CTS (Clear To Send) signal and there is a random timing involved also.

Bridge:

We also need to cover bridges. A bridge connect two segments. If a computer on Segment A needs to talk to a computer on Segment B, the bridge will forward the packet. It keeps track of who is on which segment. If a computer on Segment A needs to talk to another computer on Segment A, the bridge will filter the packet instead of forwarding it to Segment B. Shared hubs operate in Half Duplex mode where one sends while one receives similar to a walkie talkie or CB radio.

Switching Hub:

A layer-2 switching hub is a multi-port bridge. There are also layer-3 and layer-4 switches, network and transport layers respectively. Generally today, switches can operate in 3 modes. They are cut-thru, fragment free, and store and forward. Cut thru forwards the packet when the destination address is known. Fragment free forwards the packet after the header and part of the data has been read which offer better reliability but increases latency. Store and forward reads the whole packet before forwarding the packet onto its destination address. It is the most reliable and also the slowest performer.

Switches can operate in Full Duplex mode where both devices send/receive at the same time so CSMA/CD is no longer required.

Switches allow for multiple connections at the same time, as long as they are not to the same target. Computer A can be printing, while Computer B talks to Server C and Computer D surfs the net. A switch has taken the linear bus design and moved it inside the box. As a bridge, it keeps track of which address/es is/are connected to each port. It's self-learning. If a destination address is unknown, the switch will flood all ports, as a shared hub does.

Layer-3 switches allow switches to be grouped in VLANs. These switches have trunk ports that allows switches on the same VLAN to talk to each other. However, this can cause a problem since packet could get put into an endless loop. The spanning tree algorithm keeps this from happening. Spanning tree causes a latency for logons in a Windows network where the first attempt will result in error because the timeout at the OS is shorter than the one on the wire. Therefore, layer-3 switches can be set with portfast enabled. This eliminates the timeout on the wire allowing the workstation access to the domain without error. With VLANs users ports can be moved electronically, as they move physically to different offices.

Layer-4 switches actually allow filtering at the transport layer so decisions can be made by identifying which application protocol is being used, i.e. HTTP, SMTP, FTP. This would allow in-house application traffic to get higher priorities than regular Internet traffic, resulting in better performance.

Routers:

Routers connect networks. Routers are slower than hubs, bridges and switches because they store and forward each packet. They also have to determine the path to forward the packet based upon the destination. Routers only know their neighbors. A router will look at static/dynamic routes in its routing table and if the destination network is not known, it will choose a default path, called the default gateway. For networks connected to the Internet, the default gateway is generally the Internet, where most unknowns are. Routers only forward packets transmitted over routed protocols. Protocols that do not support routing are dropped, like NetBIOS, NetBEUI, LAT, SNA, etc. There are hybrid routers called brouters or Bridging Routers. They can forward packets that are not transported over routed protocols but as a bridge to connect segments.

HTH...

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Roland Hall

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How-to: Windows 2000 DNS:

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FAQ W2K/2K3 DNS:

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