



Networking Devices



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Table of Contents



- ▶ Common Network Connectivity Devices
- ▶ Other Specialized Devices

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1

Common Network Connectivity Devices

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► Common Network Connectivity Devices ►

Network Interface Controller (NIC)

- A hardware that connects computers to a network
- Every NIC has a unique MAC address



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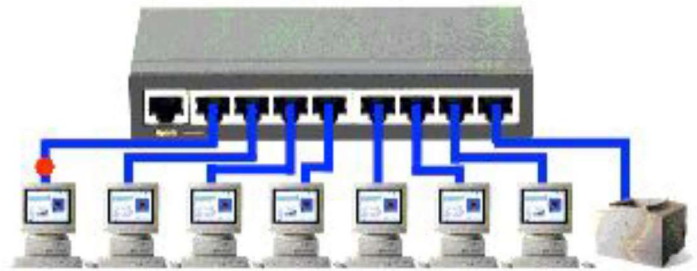
► Common Network Connectivity Devices ►

Hub

- Broadcasts data to every computer connected to it
- Suitable for small LANs
- Not secure because all traffic can be captured
- No routing capability
- Creates a collision domain
- Half-duplex



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5

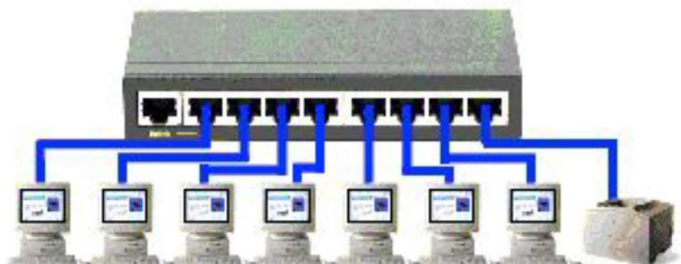
► Common Network Connectivity Devices ►

Switch

- Connects multiple hosts together (*like Hub*)
- Works on Data Link Layer (Layer 2) (*unlike Hub*)
- Can inspect received traffic and forwards only to recipient(s) (*unlike Hub*)
- Each port on a Switch is a separate collision
- Full-duplex (*unlike Hub*)



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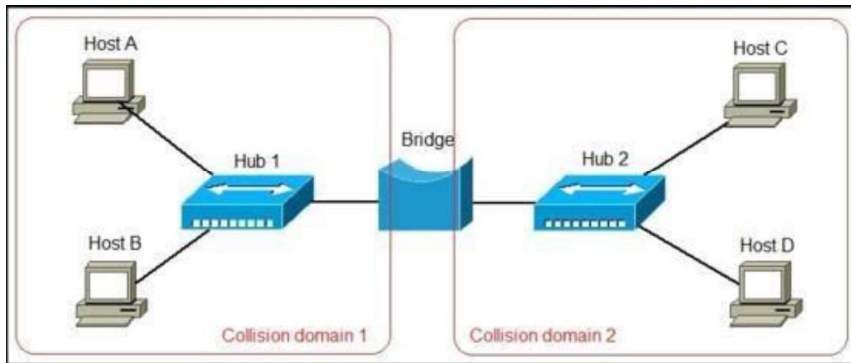


6

► Common Network Connectivity Devices ►

Bridge

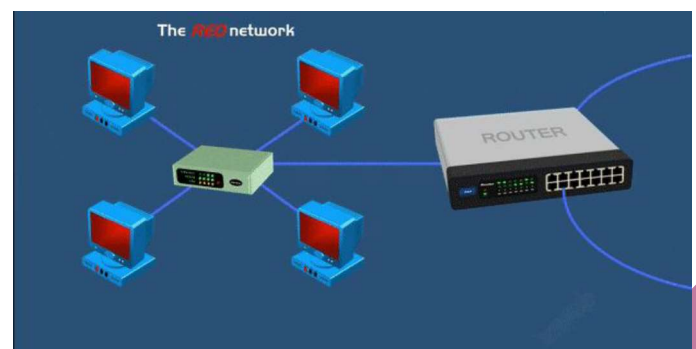
- Divides a network into segments
- Works at Data Link Layer (Layer 2)
- Forwards or filters the Ethernet frames



► Common Network Connectivity Devices ►

Router

- Connects multiple segments together
- Uses IP addresses to make decisions about the best way to get the data to its destination
- Works on Network Layer (Layer 3)
- Combination of hardware and software



Common Network Connectivity Devices

Firewall

- Prevents unauthorized access to or from a private network
- Protects a network's data and resources from outside access and threats
- Usually placed at the end point of a network
- Either a hardware (black box) or a software



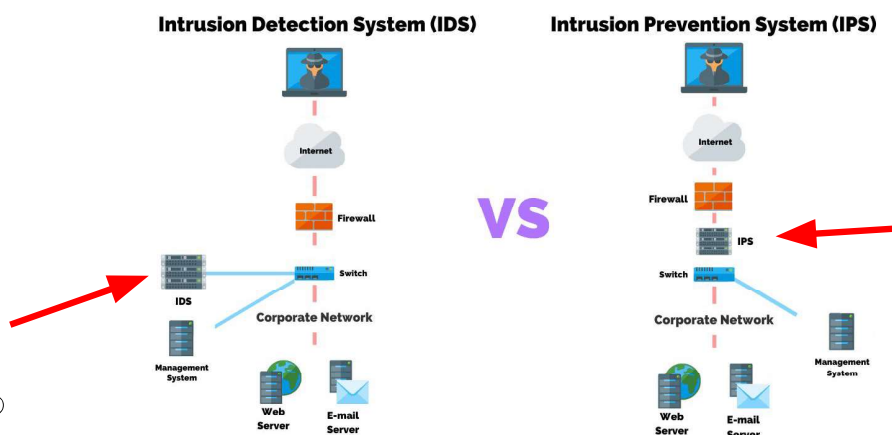
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Common Network Connectivity Devices

IDS/IPS

- Intrusion Detection System (IDS) monitors traffic and report malicious activities
- Intrusion Prevention System (IPS) stops threats in real-time as they occur



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10



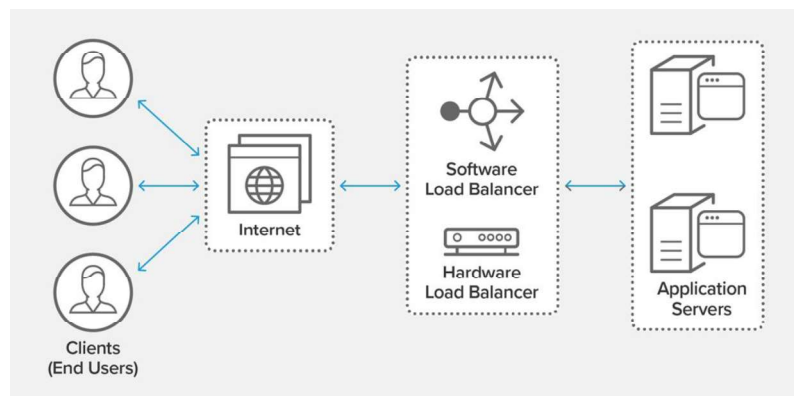
2 Other Specialized Devices

► Other Specialized Devices



Load Balancer

- Distributes client requests or network load efficiently across multiple servers
- Ensures high availability and reliability by sending requests only to servers that are online
- Provides the flexibility to add or subtract servers as demand dictates



► Other Specialized Devices



Domain Name Service (DNS) Server

- Finds the IP addresses of hostnames
- Computers use IP addresses, humans use names
- Easier to remember **www.clarusway.com** than **52.84.116.109**
- There are thousands of DNS servers
- Managed and controlled by *The Internet Assigned Numbers Authority (IANA)*
- IANA is operated by *the Internet Corporation for Assigned Names and Numbers (ICANN)*

► Other Specialized Devices



Domain Name Service (DNS) Server

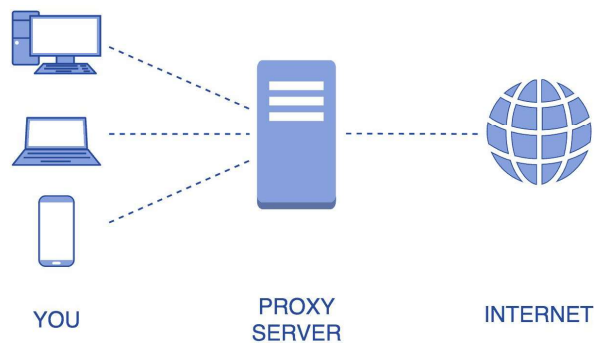
- **.com** A commercial organization
- **.edu** An educational establishment, such as a university
- **.gov** A branch of the U.S. government
- **.int** An international organization, such as NATO or the United Nations
- **.mil** A branch of the U.S. military
- **.net** A network organization
- **.org** A nonprofit organization
- Some DNS names end with country name like:
.jp (Japan) **.ca** (Canada) **.uk** (Great Britain)

► Other Specialized Devices



Proxy Server

- Acts as a gateway between you and the internet
- Acts as a firewall and web filter
- Provides shared network connections
- Caches data to speed up common requests
- Provides privacy



► Other Specialized Devices



Encryption Devices

- Allows you to create secure connections over insecure channels
- Sometimes called *encryption gateway*



► Other Specialized Devices



Packet Shaping (Traffic Shaping)

- Traffic shaping (*or packet shaping*) is a congestion management method that regulates network data transfer by delaying the flow of less important or less desired packets.
- Used to optimize network performance by prioritizing certain traffic flows and ensuring the traffic rate doesn't exceed the bandwidth limit.



► Other Specialized Devices



Packet Shaping (Traffic Shaping)

Common uses of traffic shaping include:

- Time-sensitive data may be given priority over traffic that can be delayed briefly
- In a corporate environment, business-related traffic may be given priority over other traffic
- A large ISP may shape traffic based on customer priority
- An ISP may limit maximum bandwidth consumption for certain applications to reduce costs and create the capacity to take on additional subscribers

► Other Specialized Devices



VPN Concentrator

- Provides secure creation of VPN connections
- A type of router device
- It can:
 - Establish and configure tunnels
 - Authenticate users
 - Assign tunnel/IP addresses to users
 - Encrypt and decrypt data
 - Ensure end-to-end delivery of data



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19



THANKS!

Any questions?

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20