

Ethernet Switch

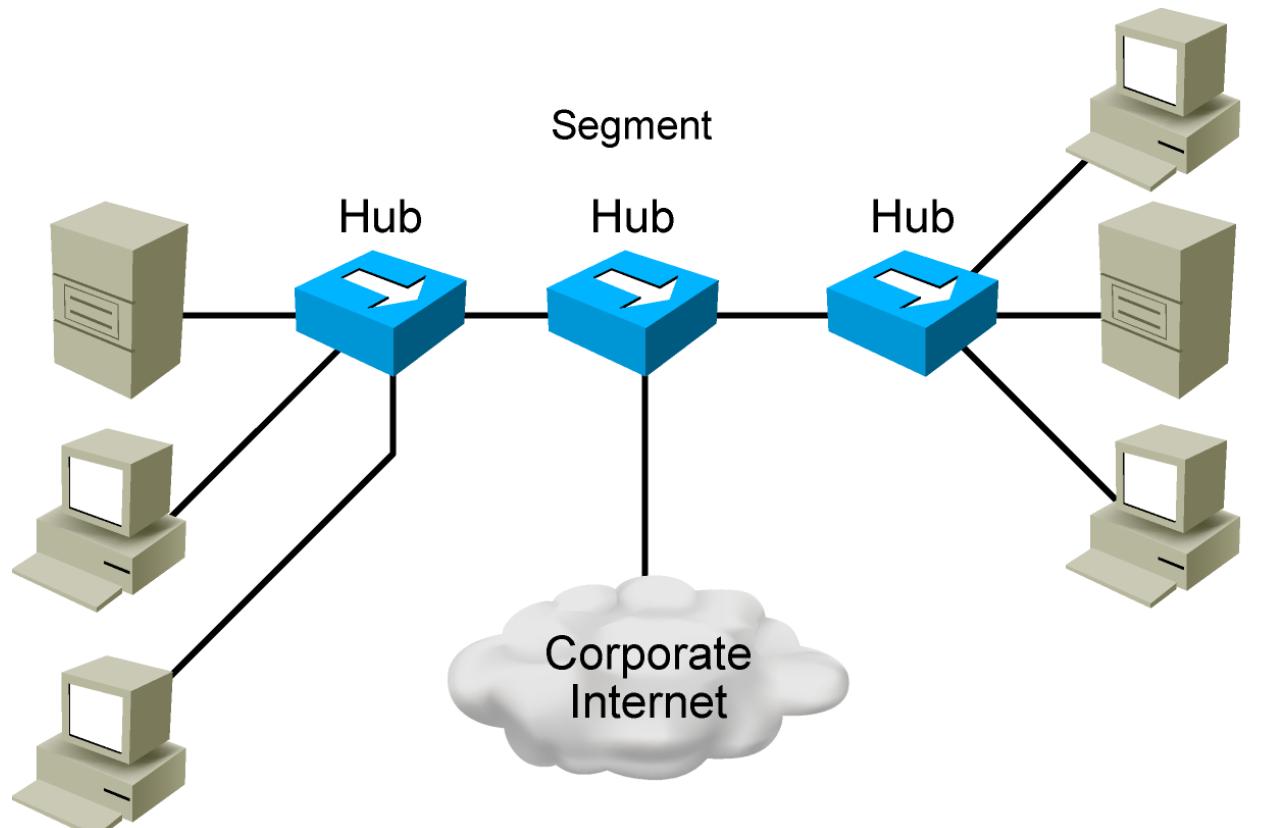


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Triết lý giáo dục: <https://ut.edu.vn/articles/triet-ly-giao-duc-119.html>

Network Congestion



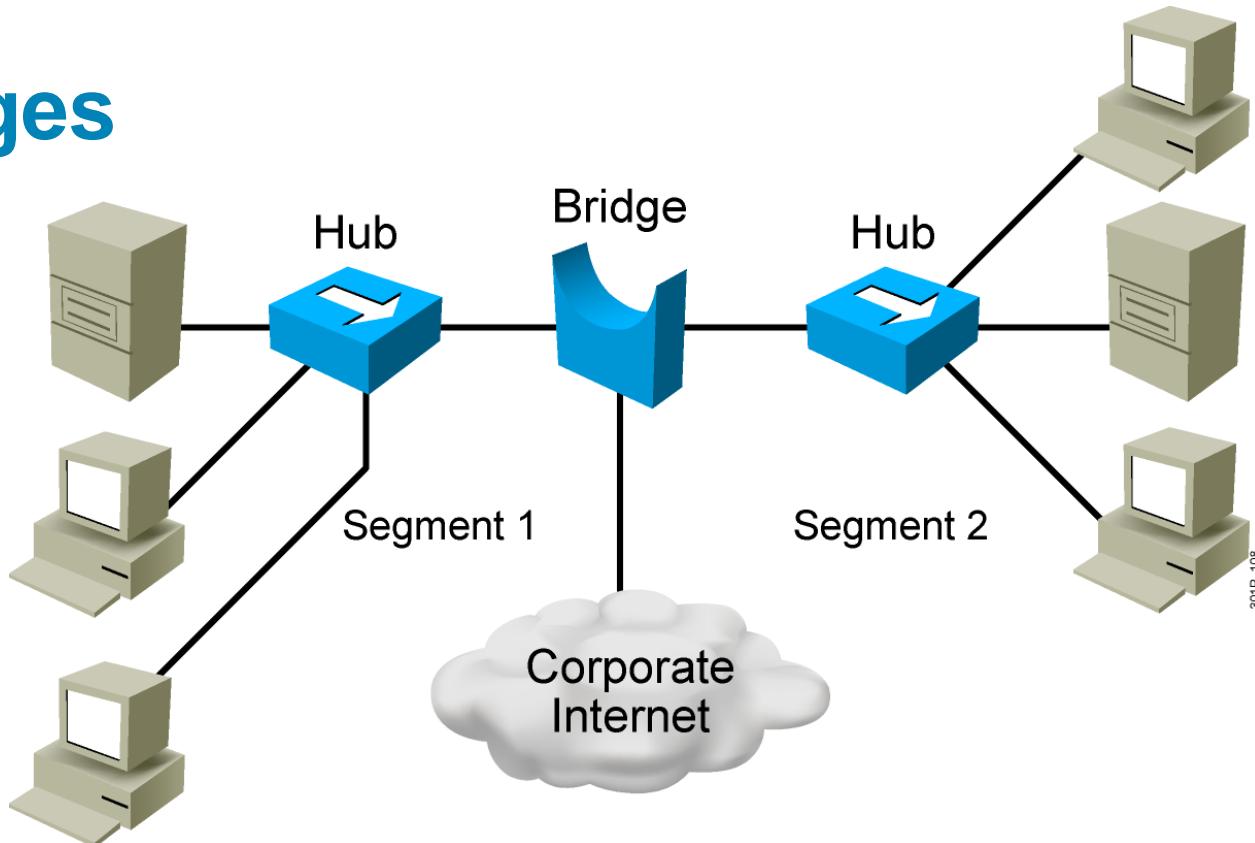
- High-performance PCs
- More networked data
- Bandwidth-intensive applications

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Bridges



- Operate at Layer 2 of the OSI model
- Forward, filter, or flood frames
- Have few ports
- Are slow

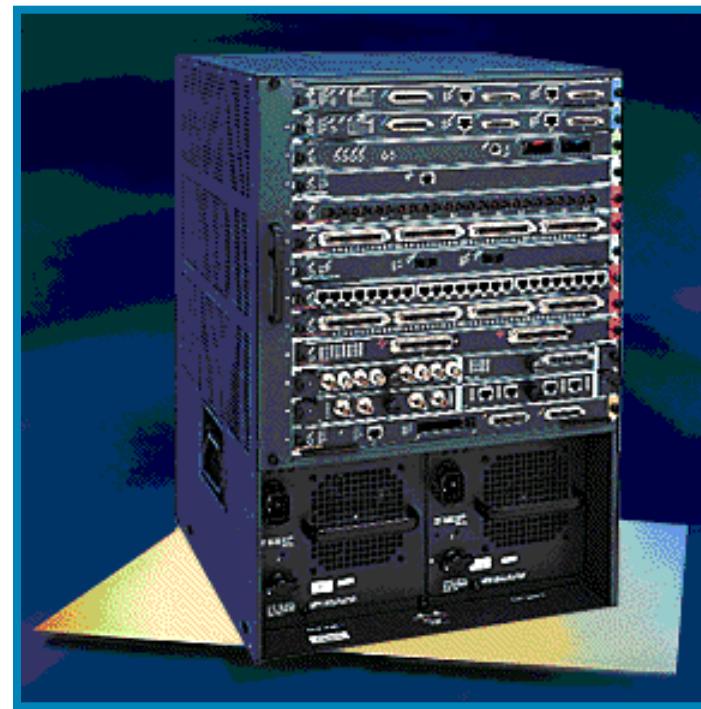
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LAN Switch

- High port density
- Large frame buffers
- Mixture of port speeds
- Fast internal switching
- Switching modes:
 - Cut-through
 - Store-and-forward
 - Fragment-free

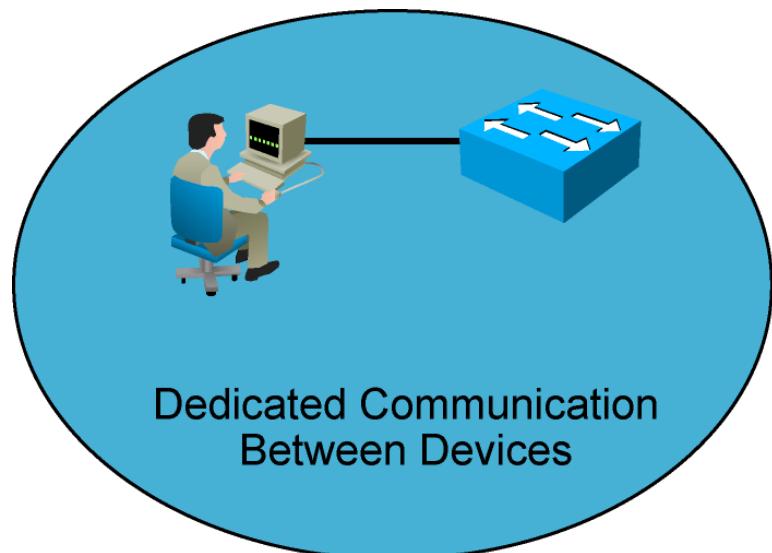


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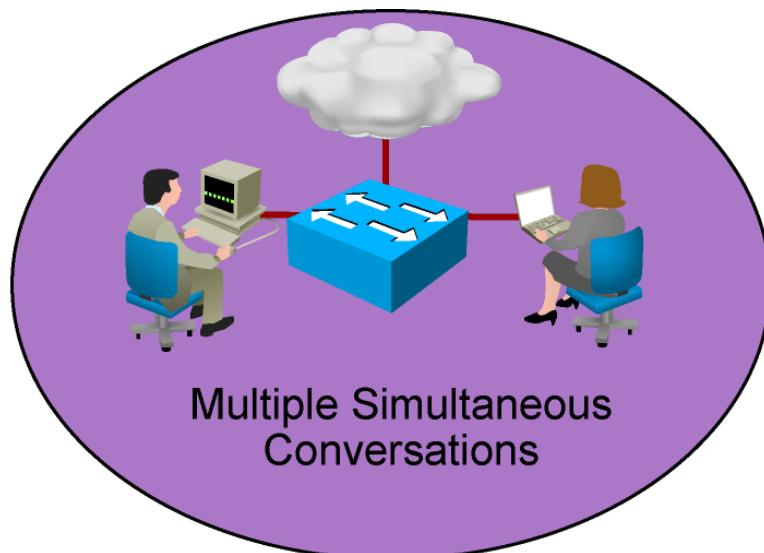
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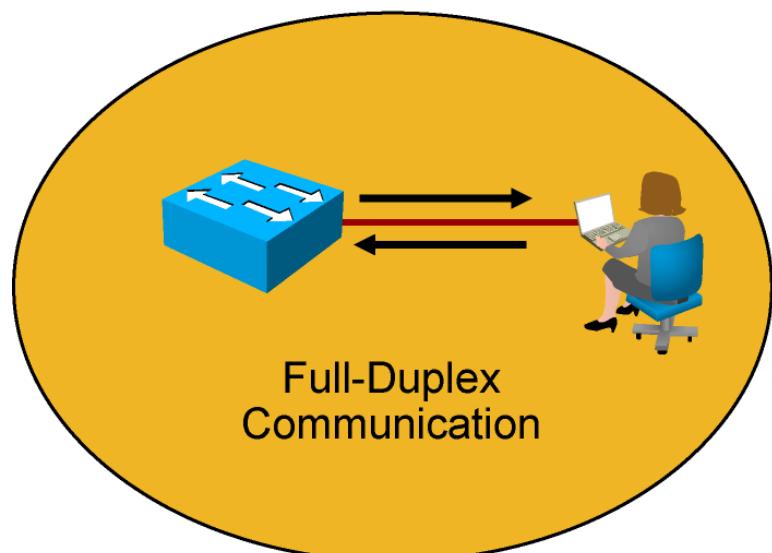
LAN Switch Features



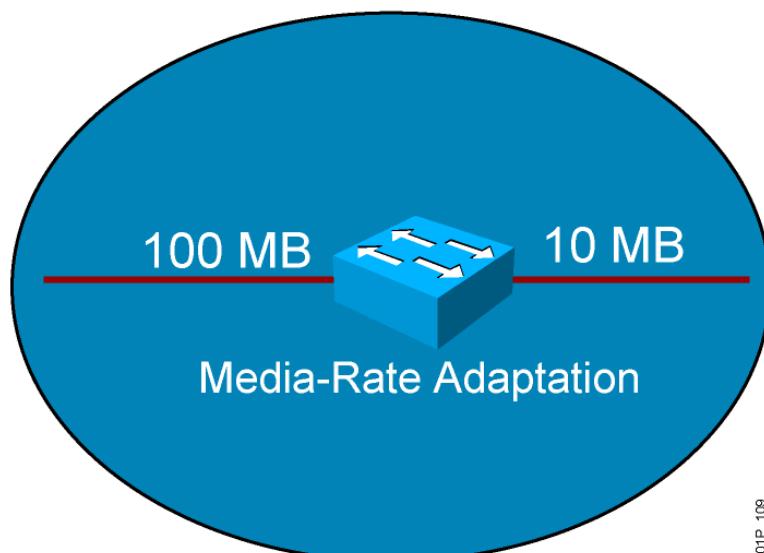
Dedicated Communication
Between Devices



Multiple Simultaneous
Conversations

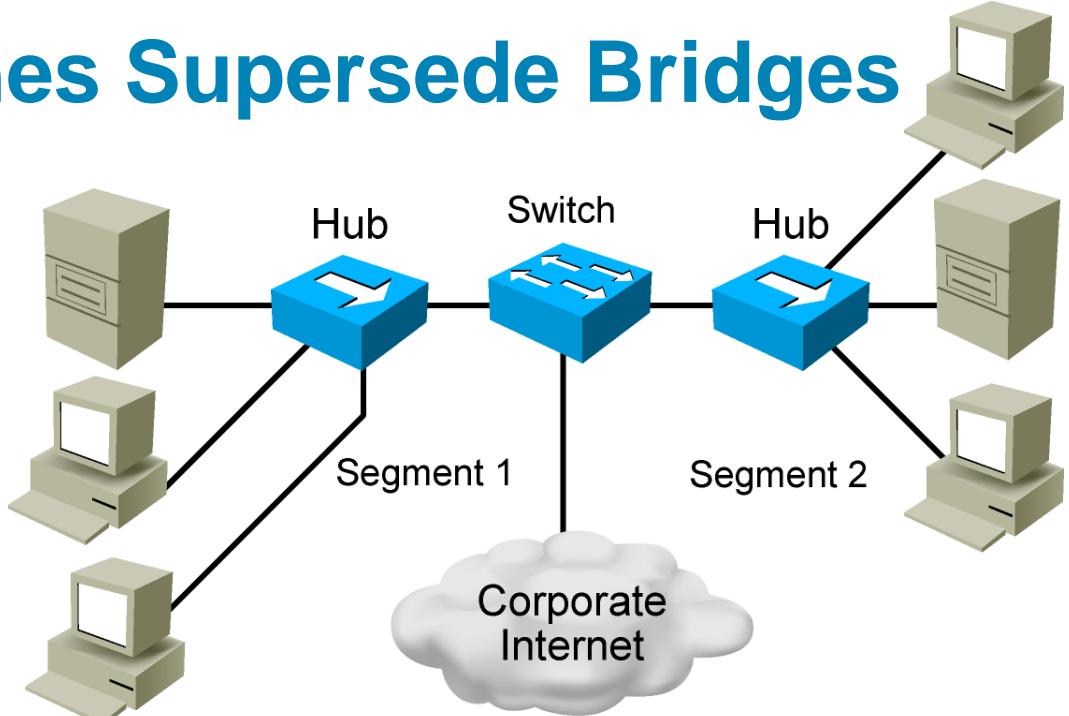


Full-Duplex
Communication



Media-Rate Adaptation

Switches Supersede Bridges



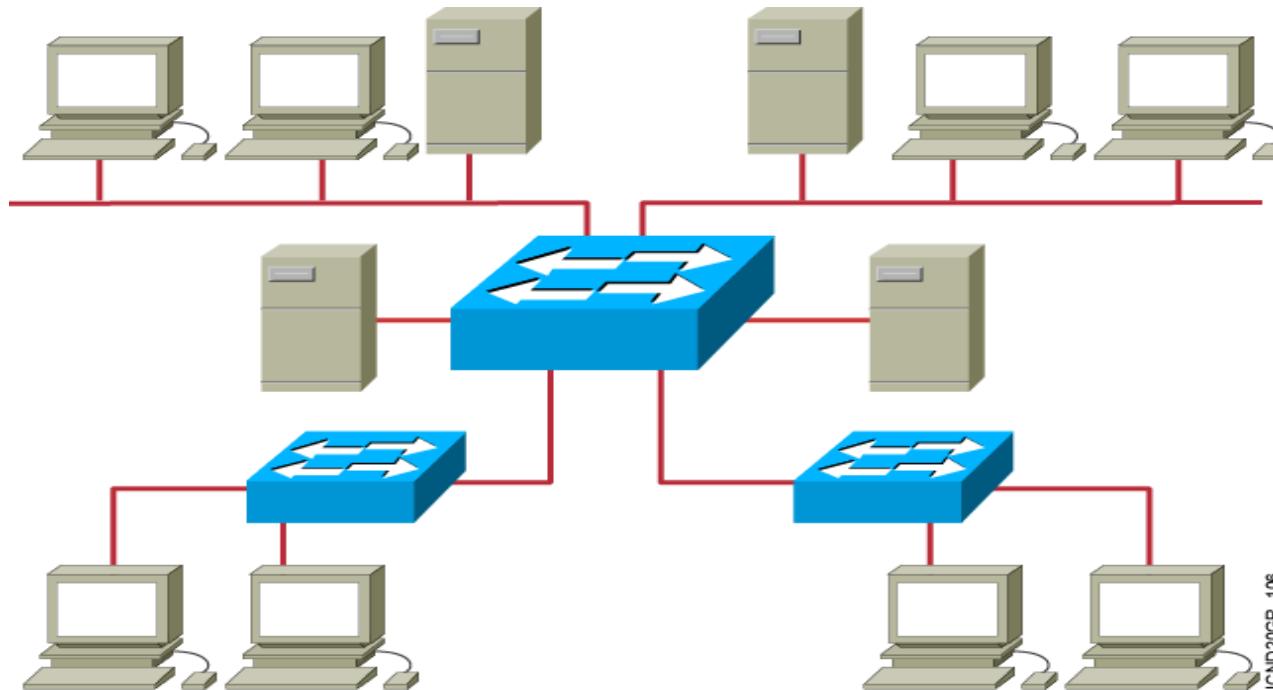
- Operate at Layer 2 of the OSI model
- Forward, filter, or flood frames
- Have many ports
- Are fast

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Ethernet Switches and Bridges



- Address learning
- Forward/filter decision
- Loop avoidance

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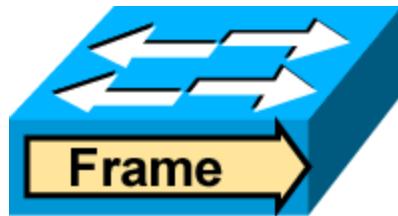
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Transmitting Frames

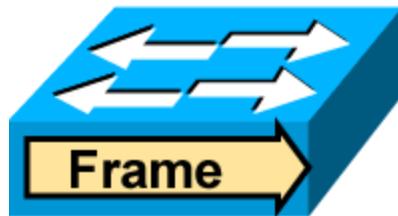
Cut-Through

- Switch checks destination address and immediately begins forwarding frame.



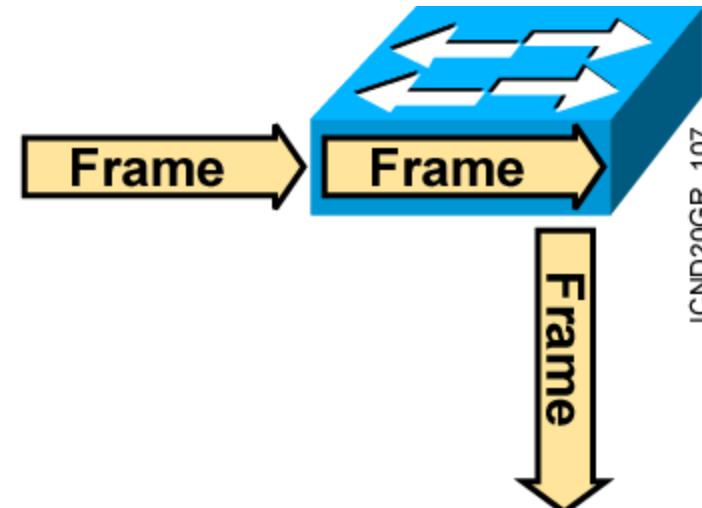
Fragment-Free

- Switch checks the first 64 bytes, then immediately begins forwarding frame.

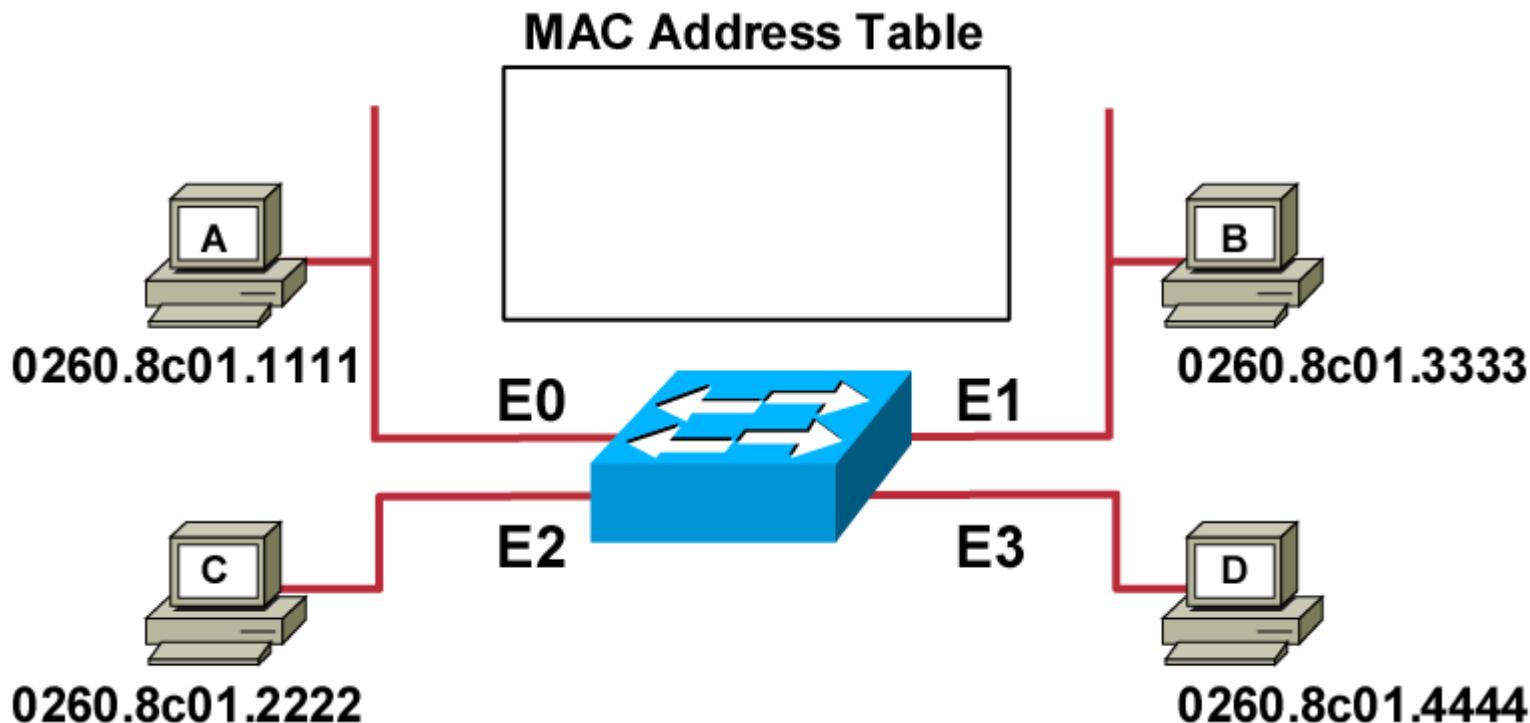


Store and Forward

Complete frame is received and checked before forwarding.



MAC Address Table



ICND20GR_108

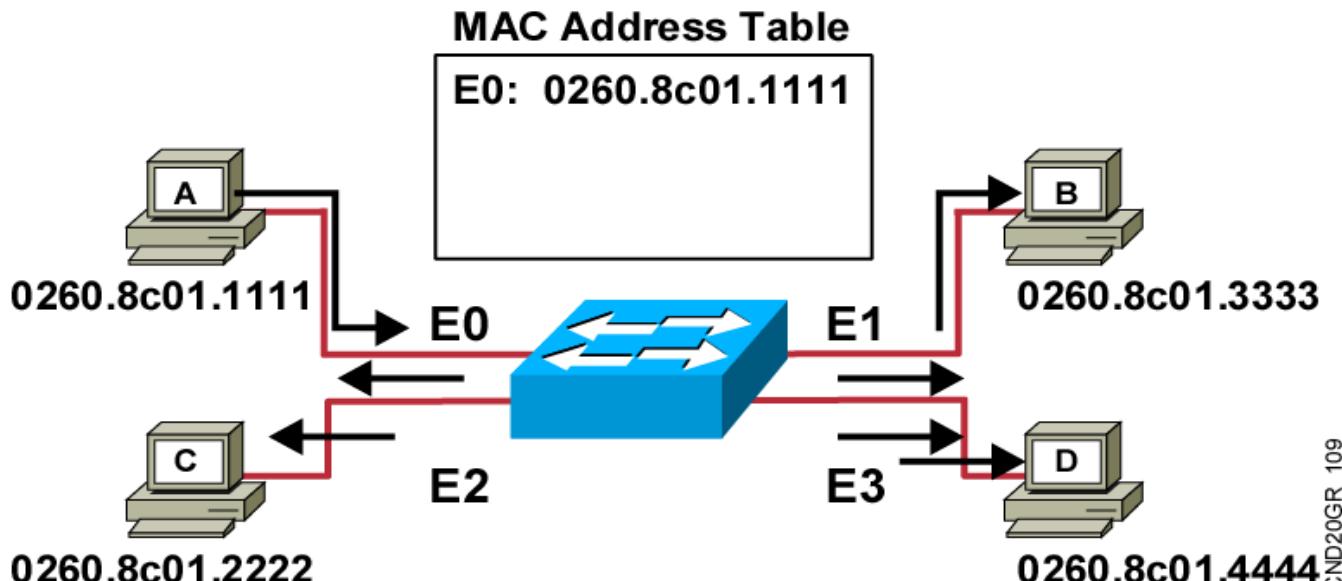
- Initial MAC address table is empty.

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Learning Addresses



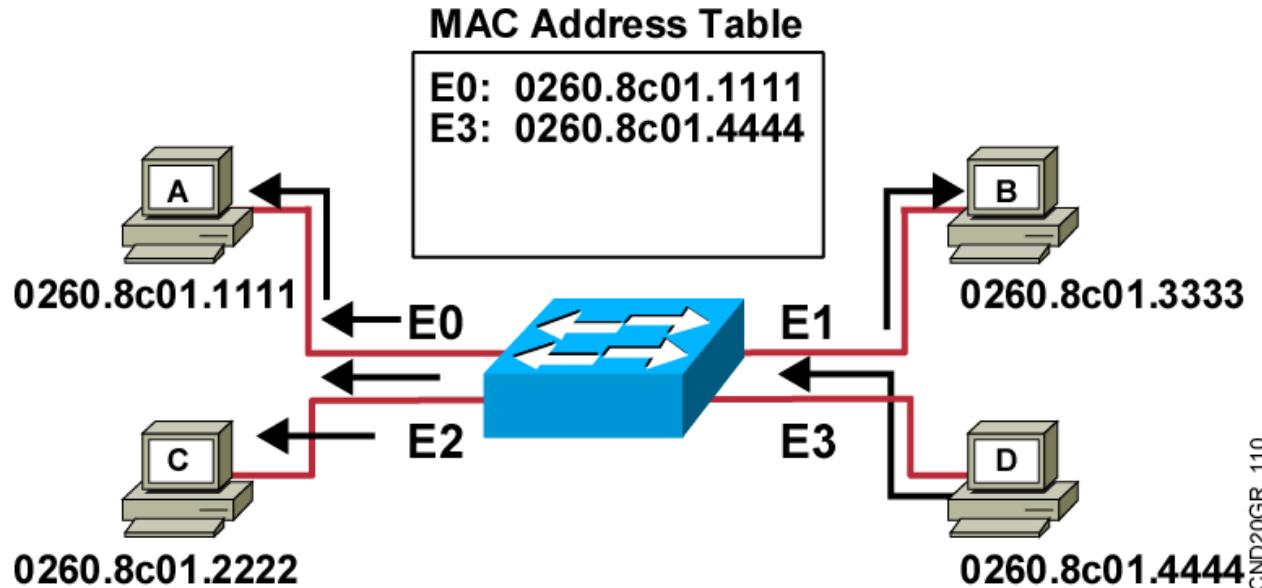
- Station A sends a frame to station C.
- Switch caches the MAC address of station A to port E0 by **learning the source address of data frames**.
- The frame from station A to station C is flooded out to all ports except port E0 (unknown unicasts are flooded).

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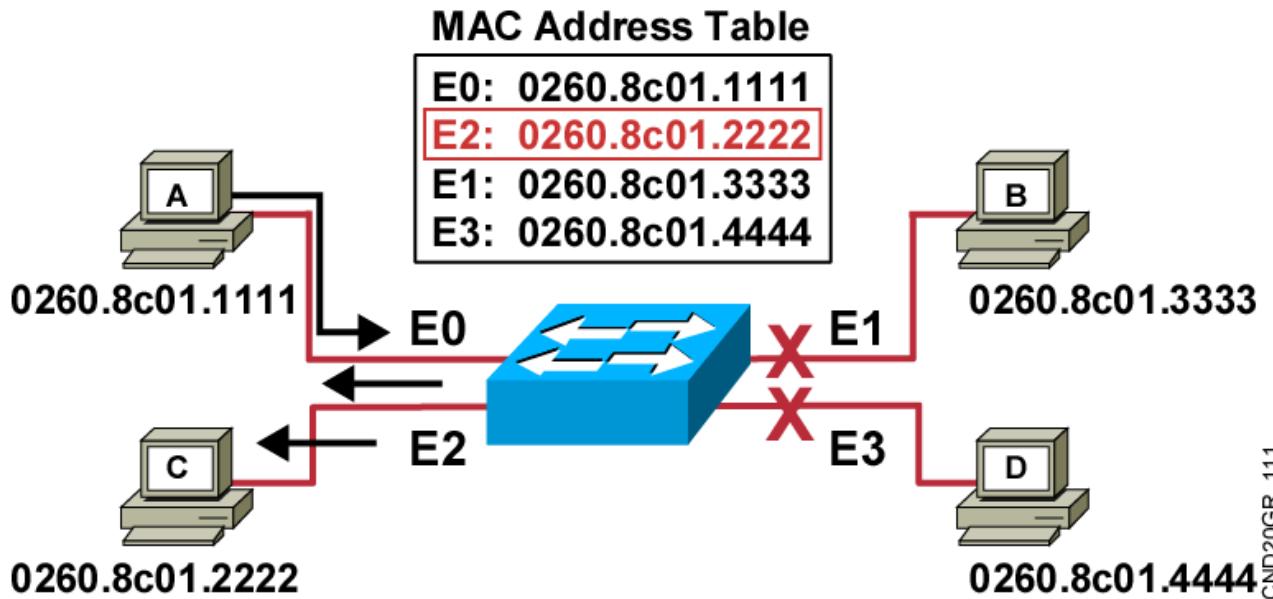
Learning Addresses (Cont.)



ICND200GR_110

- Station D sends a frame to station C.
- Switch caches the MAC address of station D to port E3 by learning the source address of data frames.
- The frame from station D to station C is flooded out to all ports except port E3 (unknown unicasts are flooded).

Forward Frames



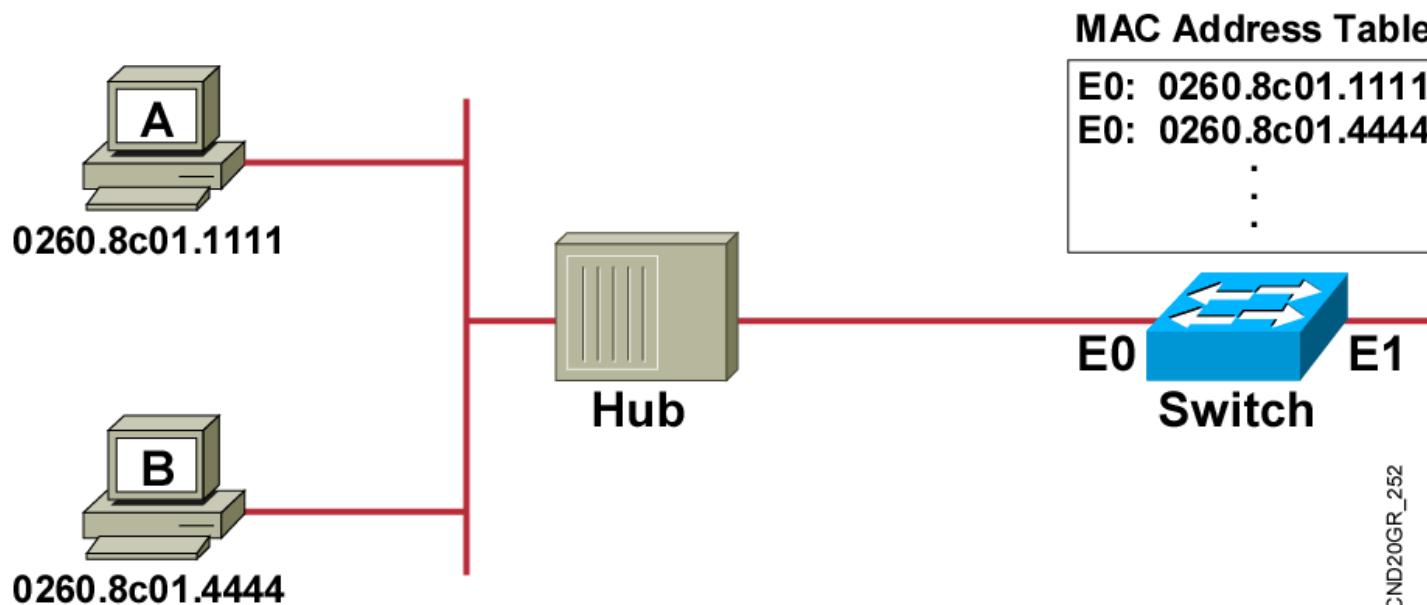
- Station A sends a frame to station C.
- Destination is known; frame is not flooded.

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Filtering Frames



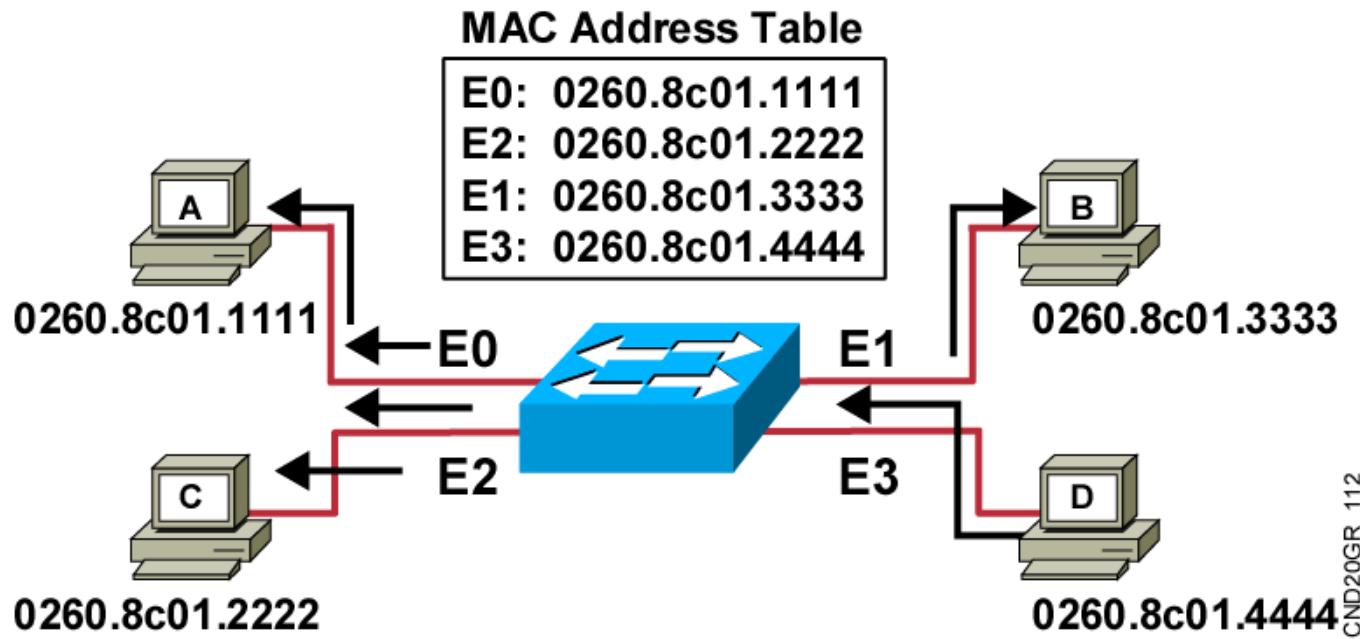
- Station A sends a frame to station B.
- The switch has the address for station B in the MAC address table.

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Broadcast and Multicast Frames



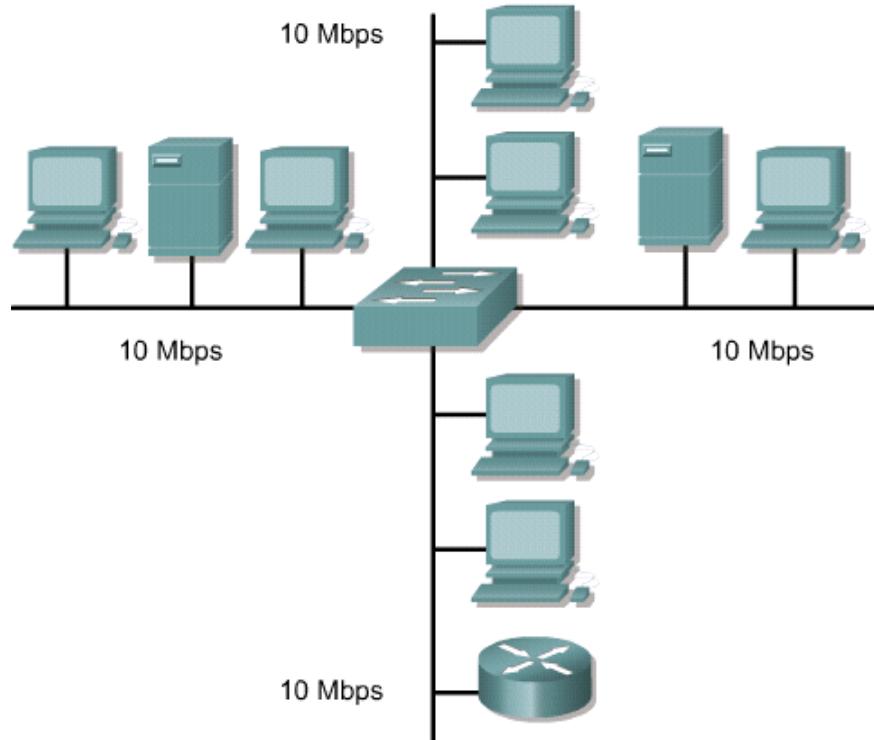
- Station D sends a broadcast or multicast frame.
- Broadcast and multicast frames are flooded to all ports other than the originating port.

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Symmetric switching



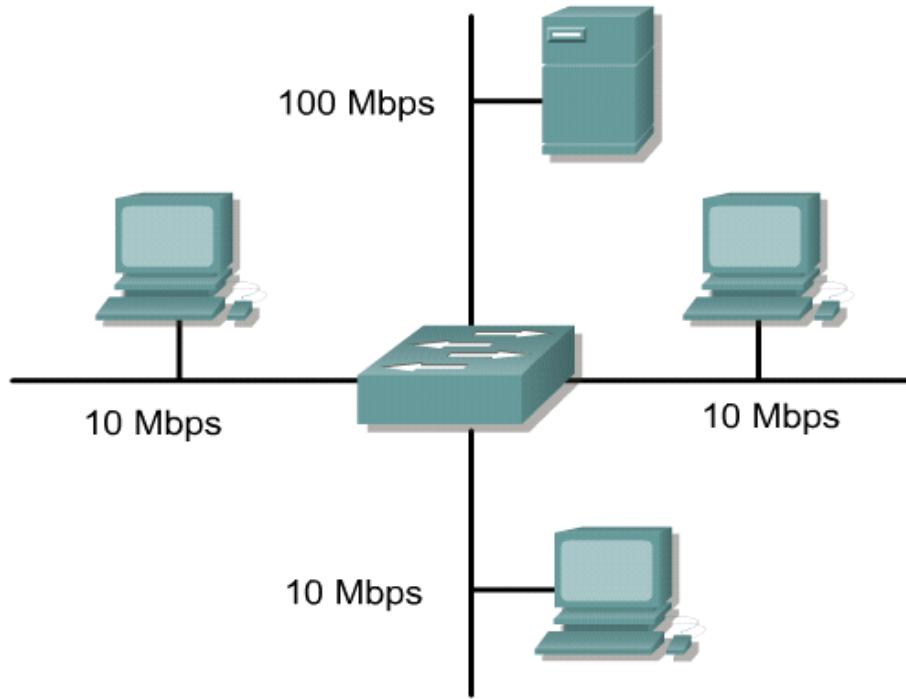
A symmetric switch provides switched connections between ports with the same bandwidth.

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Asymmetric switching



An asymmetric LAN switch provides switched connections between ports of unlike bandwidth, such as a combination of 10 Mbps and 100 Mbps ports.

Asymmetric switching enables more bandwidth to be dedicated to the server switch port in order to prevent a bottleneck.

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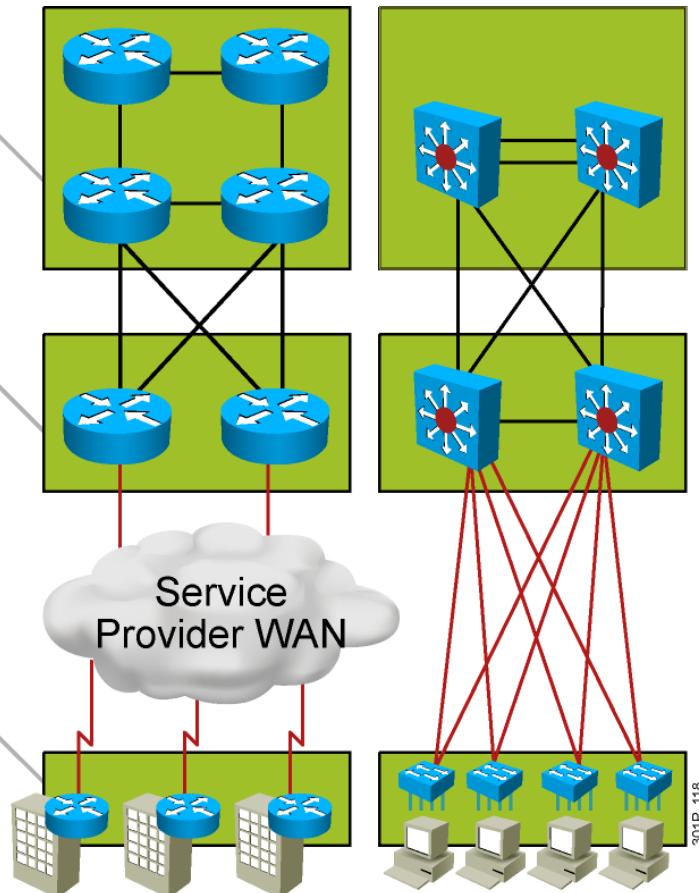
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The Hierarchy of Connectivity

Core layer: Provides optimal transport between core routers and distribution sites

Distribution layer: Provides policy-based connectivity, ? peer reduction, and aggregation

Access layer: Provides common group access to the internetworking environment

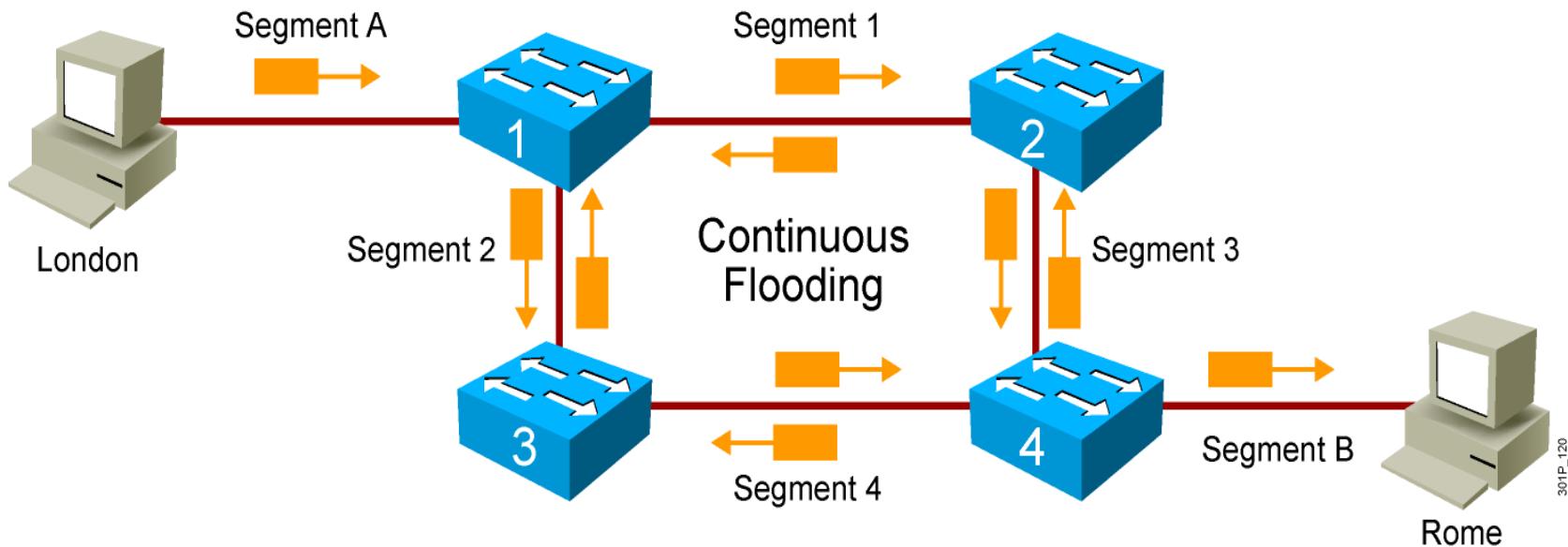


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Loops



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Spanning Tree Protocol

One switch is elected the root based on lowest bridge ID (priority and MAC address concatenated).

