

CCNA RS 2 – Routing and Switching Essentials

# LESSON#4

# SWITCHED NETWORKS

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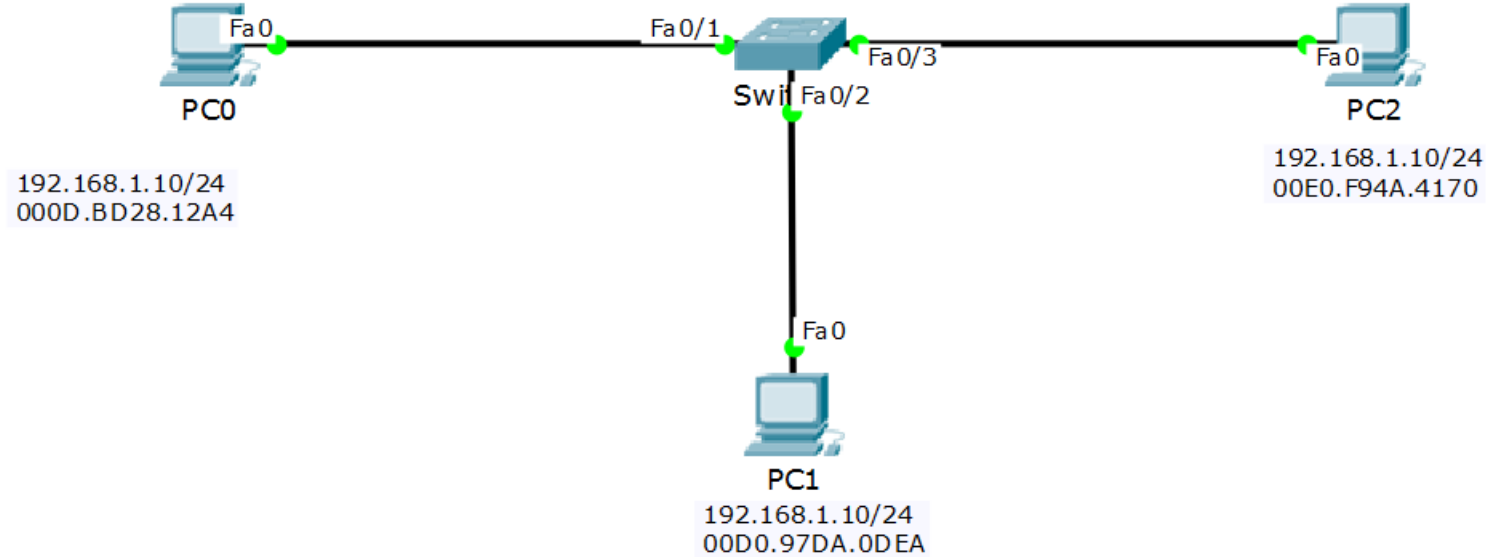


# SWITCHING IN ACTION



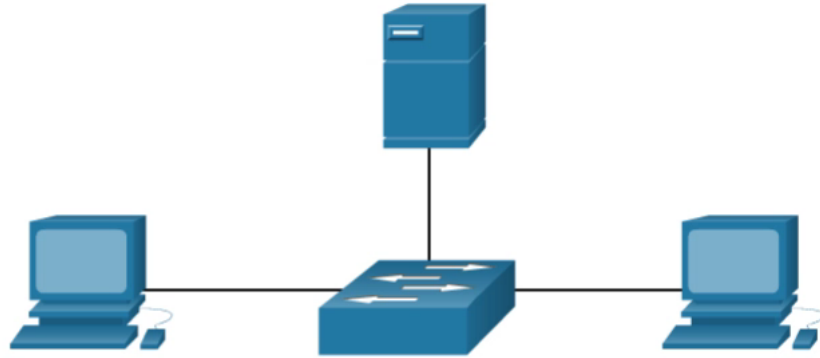
Port Table	
Destination Addresses	Port
EE	1
AA	2
BA	3
EA	4
AC	5
AB	6

# Dynamically Populating a Switch MAC Address Table



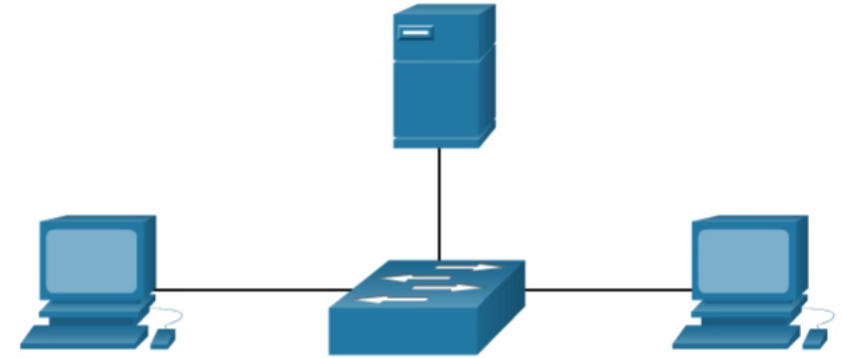
# SWITCH FORWARD METHODS

## Store and Forward



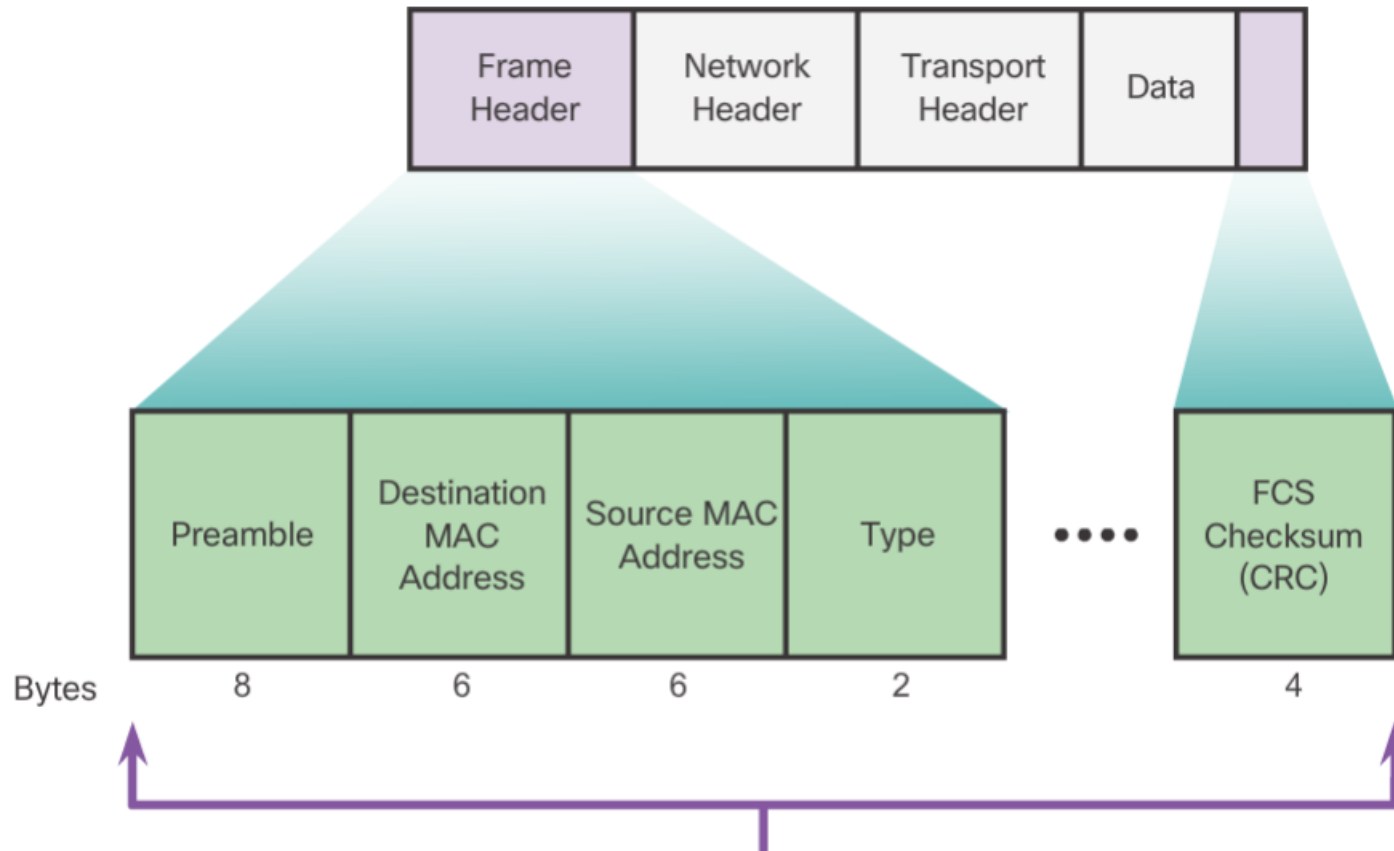
A store-and-forward switch receives the entire frame, and computes the CRC. If the CRC is valid, the switch looks up the destination address, which determines the outgoing interface. The frame is then forwarded out the correct port.

## Cut Through



A cut-through switch forwards the frame before it is entirely received. At a minimum, the destination address of the frame must be read before the frame can be forwarded.

# Store-and-Forward Switching



Store-and-forward switching entails receipt of the entire frame (up to about 9,200 bytes for jumbo frames) before a forwarding decision is made.

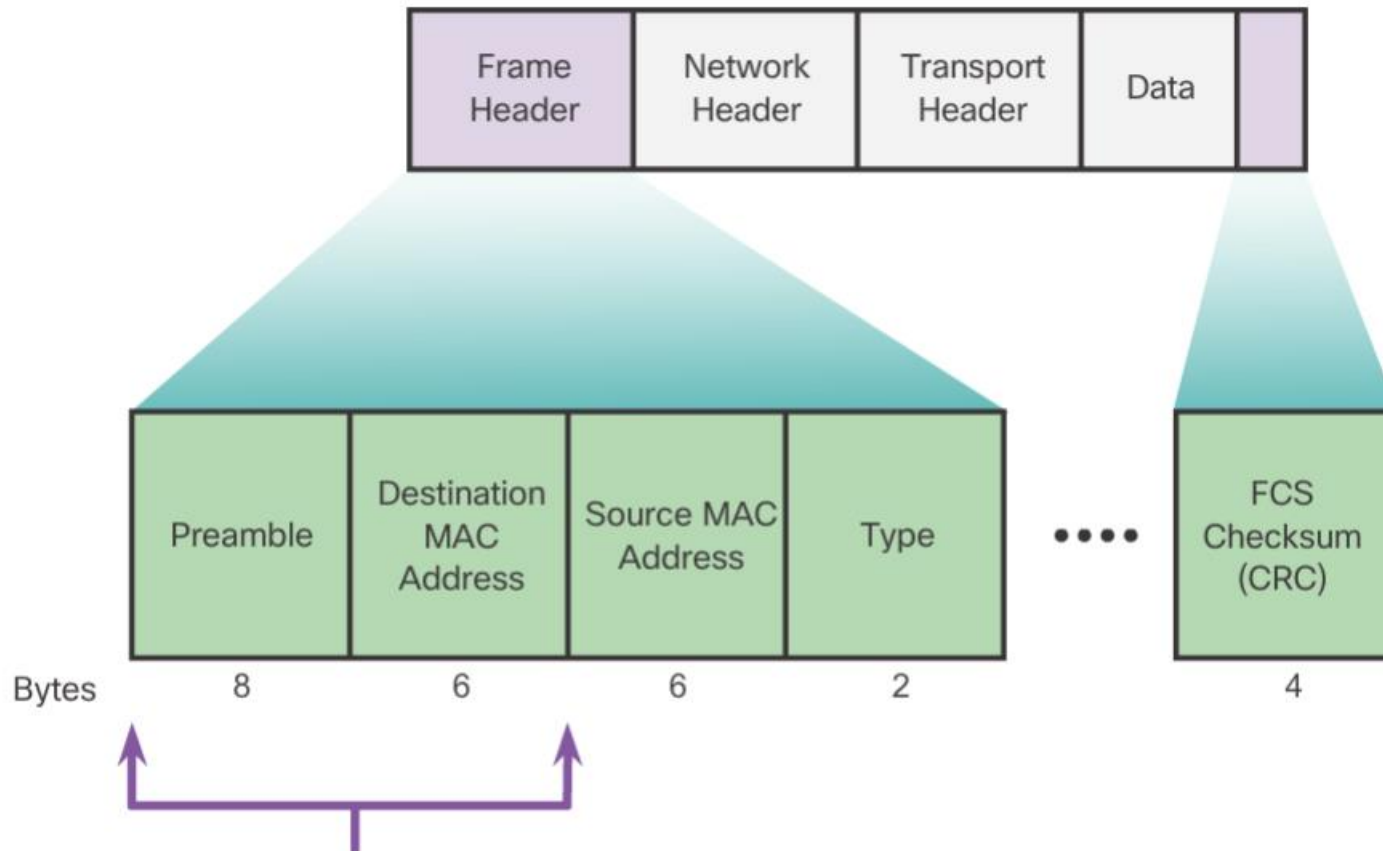
## Error Checking

A switch using store-and-forward switching performs an error check on an incoming frame. After receiving the entire frame on the ingress port, as shown in the figure, the switch compares the frame-check-sequence (FCS) value in the last field of the datagram against its own FCS calculations.

## Automatic Buffering

The ingress port buffering process used by store-and-forward switches provides the flexibility to support any mix of Ethernet speeds. For example, handling an incoming frame traveling into a 100 Mb/s Ethernet port that must be sent out a 1 Gb/s interface would require using the store-and-forward method.

# Cut-Through Switching



Frames can begin to be forwarded as soon as the Destination MAC is received.

## Rapid Frame Forwarding

As indicated in the figure, a switch using the cut-through method can make a forwarding decision as soon as it has looked up the destination MAC address of the frame in its MAC address table. The switch does not have to wait for the rest of the frame to enter the ingress port before making its forwarding decision.

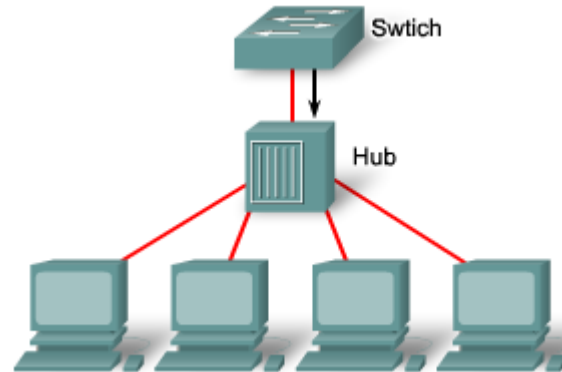
## Fragment Free

Fragment free switching is a modified form of cut-through switching in which the switch waits for the collision window (64 bytes) to pass before forwarding the frame. This means each frame will be checked into the data field to make sure no fragmentation has occurred. Fragment free switching provides better error checking than cut-through, with practically no increase in latency.

# DUPLEX

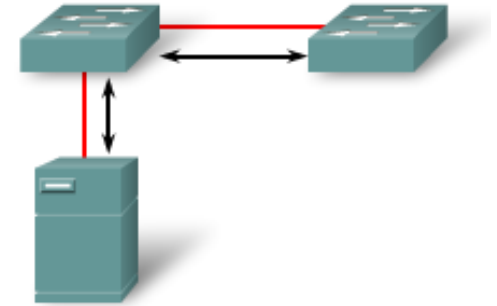
## Half Duplex (CSMA/CD)

- Unidirectional data flow
- Higher potential for collision
- Hub connectivity



## Full Duplex

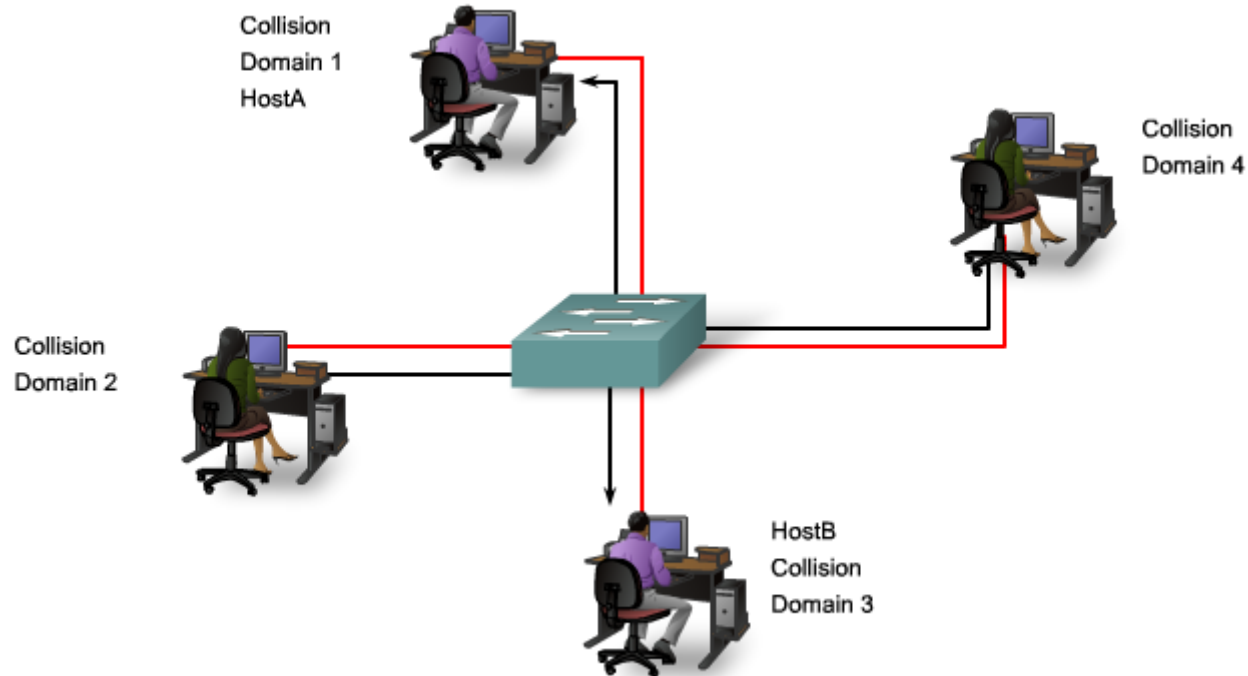
- Point-to-point only
- Attached to dedicated switched port
- Requires full-duplex support on both ends
- Collision-free
- Collision detect circuit disabled



Ports on a Cisco Catalyst 2960 Series switch can be configured with these settings:

- **auto** option allows the two ports to communicate in order to decide the mode.
- **full** option sets full-duplex mode.
- **half** option sets half-duplex mode.

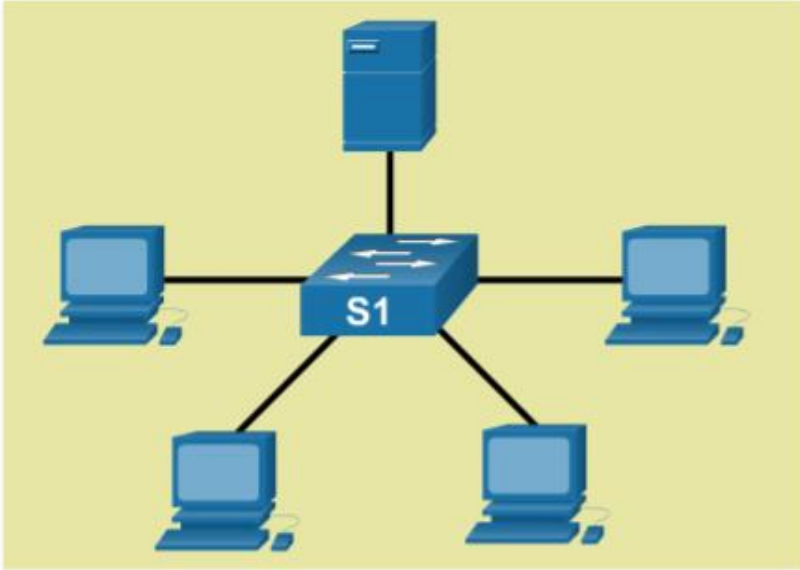
# COLLISION DOMAIN



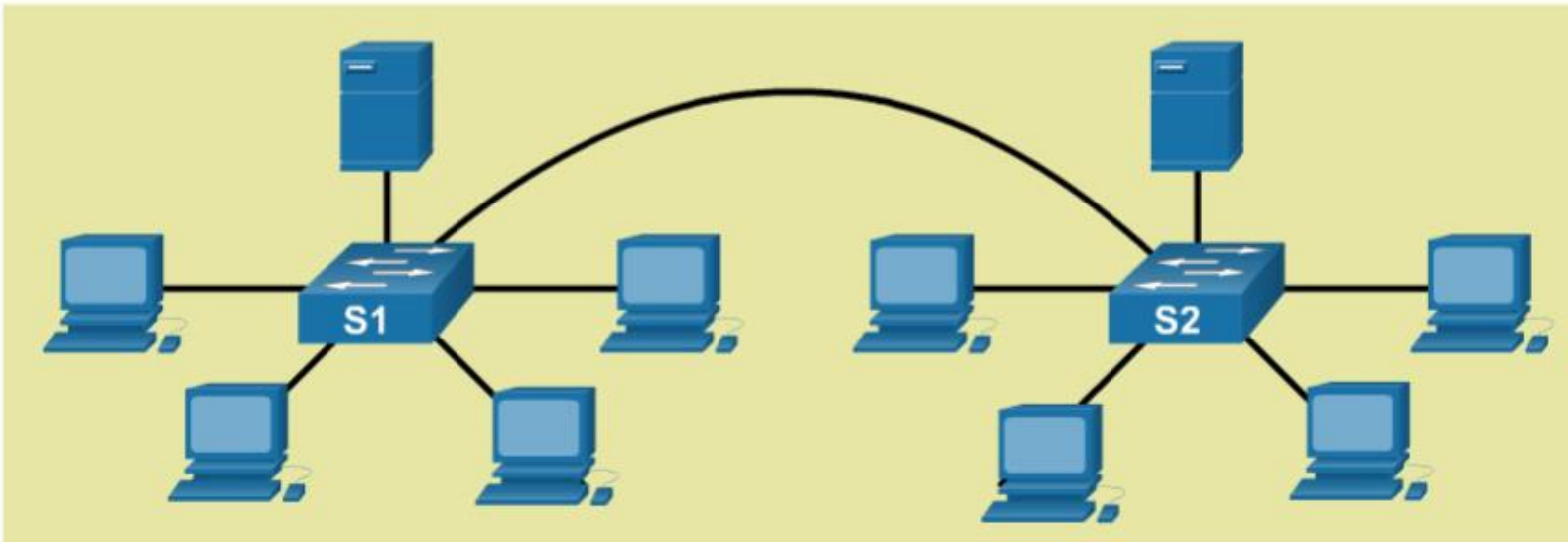
In Ethernet, the network area within which frames that have collided are propagated. Repeaters and hubs propagate collisions. LAN Switches, bridges and routers do not.



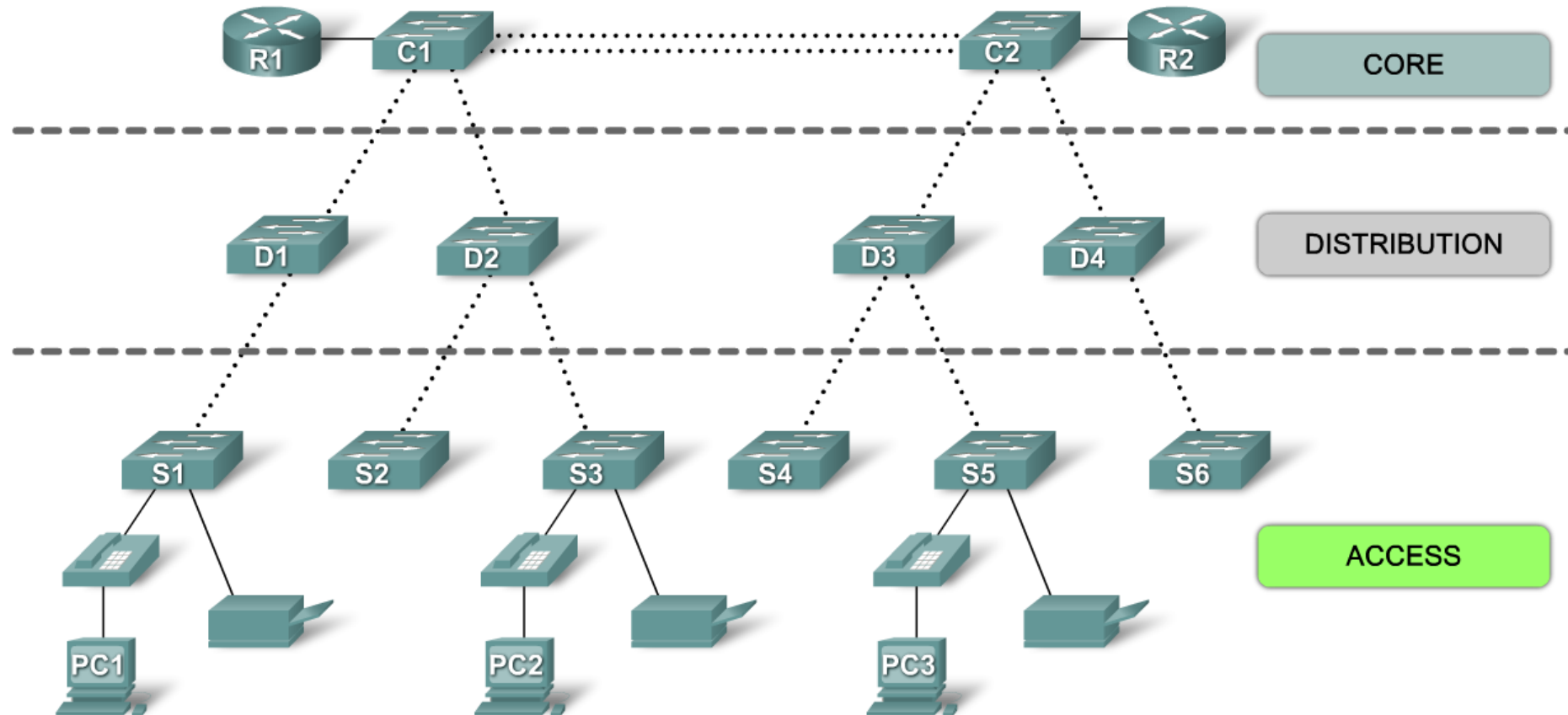
# BROADCAST DOMAIN



A collection of interconnected switches forms a single broadcast domain. Only a network layer device, such as a router, can divide a Layer 2 broadcast domain. Routers are used to segment broadcast domains, but will also segment a collision domain.



# BORDERLESS LAN DESIGN



# Q/A

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