

Collision & Broadcast Domain

A collision domain is a section of a network where data packets can collide with one another when being sent on a shared medium or through repeaters, particularly when using early versions of Ethernet. A network collision occurs when more than one device attempts to send a packet on a network segment at the same time.

A broadcast domain is a logical division of a computer network, in which all nodes can reach each other by broadcast at the data link layer.

LAYER 1 - PHYSICAL LAYER

Devices - **Hubs, Repeaters**

Collision Domain: As you might have studied both these devices just forward the data as it is to all the devices that are connected to them after attenuating it (making it stronger so that it travels more distance). All the devices fall in the SAME COLLISION DOMAIN because two or more devices might send the data at the same time even when we have CSMA/CD working. So, the data can collide and nullify each other that way no one gets nothing.

Broadcast Domain: These devices don't use any type of addressing schemes to help them forward the data like MAC or IP addresses. So, if a PC A sends something for PC B and there are also C,D and E PC's connected to the hub then all the devices i.e. B,C,D and E would receive the data (Only PC B accepts it while others drop it). This is what is being in a single BROADCAST DOMAIN.

LAYER 2 - DATA LINK LAYER

Devices: **Bridges, Switches**

Collision Domain: Unlike the layer 1 devices, here, the layer 2 devices break up the collision domain. This means, suppose 4 devices are connected to a 12 port switch. Now, each of these devices is in a separate collision domain. In our case since we have 4 devices or PC's connected to 4 switch ports then we have here 4 collision domains. The switch being a 12 port one, it can provide us with 12 collision domains. Remember, ONE PORT ONE COLLISION DOMAIN, TWO PORT TWO COLLISION DOMAINS and so on.

Broadcast Domain: Like the layer 1 devices, the layer 2 devices fall into the category of being no able to break the broadcast domain. For example - 4 devices connected to a switch make 4 collision domains like we saw above but all these devices are still in one broadcast domain, **BY DEFAULT**. By default means that right out of the box the switch won't divide the broadcast domain, however, you can configure VLAN's in order for the switch to divide the BROADCAST DOMAIN.

All the above applies for bridges as well however, you don't see bridges anymore. Like repeaters were replaced by hubs as the latter was multiport and could support more devices, the same happened with bridges as they were replaced by switches since the latter were multiport.

LAYER 3 - NETWORK LAYER

Devices: **Routers, Layer 3 switches**

Collision Domain: Layer 3 devices are similar to layer 2 ones as they are capable of dividing the collision domain. 2 devices connected to router are in 2 separate collision domains.

Broadcast Domain: Layer 3 devices by default are capable of dividing the broadcast domain. No configuration is required as was the case with switches.

In summary

- A hub and repeater: are one collision domain and one broadcast domain.
- Every port in a switch is a collision domain. And a switch is one big broadcast domain.
- A router separates a broadcast domain.



