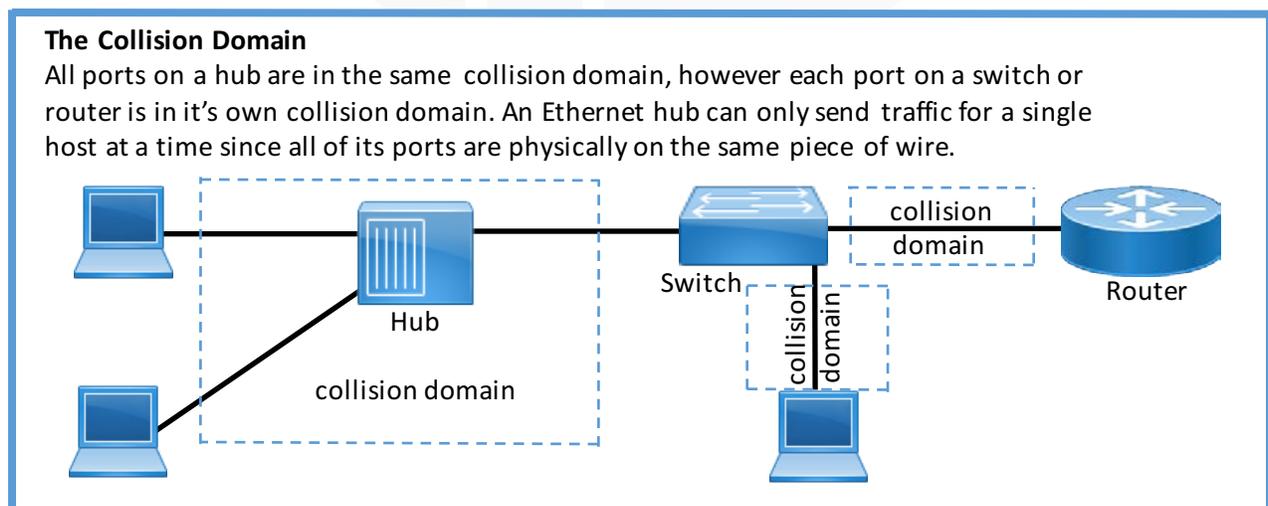


## Tech Lesson: Collision & Broadcast Domains

Collision domains and broadcast domains are very different from each other even though these two concepts are often mentioned together. Let's begin with a simple understanding of collision domains and then we will move on to broadcast domains. A collision domain is basically a reference to a "shared piece of wire" where the connected devices need to use that same "shared piece of wire" or shared media. In terms of Ethernet, CSMA/CD (carrier sense multiple access with collision detection) is used to check if there are any devices currently transmitting on the wire, and if there are the data would not be sent in order to avoid a "collision". The concept is similar to stopping your car to check to see if another car is coming before using the road. We may find it amusing that collisions can occur in data networking and indeed they can. This is one reason it is important to understand what a collision domain is. It is further important to understand how to configure a network so that collision domains do not become a problem.

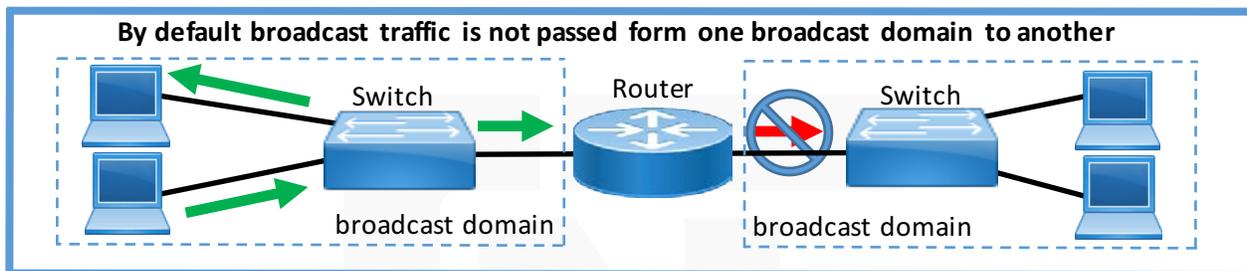
Thinking in terms of network hardware most of us are familiar with a hub, switch and router, and we need to understand how collision domains are separated by the ports of these devices. Let's take a hub for starters. A hub strengthens the signal it receives and then puts that signal back onto the wire. Regarding the ports of a hub it is really like extending the same piece of wire into multiple connection points. In this way, everything that attaches to a hub is in the same collision domain. This means every connected host must access a shared piece of wire and check if there is already traffic on that wire before sending. You may see how adding more and more hosts to a hub would continuously make the network slower and slower as more hosts need to access that same piece of shared wire. This is a large reason why it is best to just leave hubs out of your network completely. In terms of a switch or a router all the ports are on their own collision domain. Switches resolve the problems introduced with having multiple hosts on a single collision domain.

Use the diagram below to better understand how collision domains apply to hubs, switches, routers, and computers.

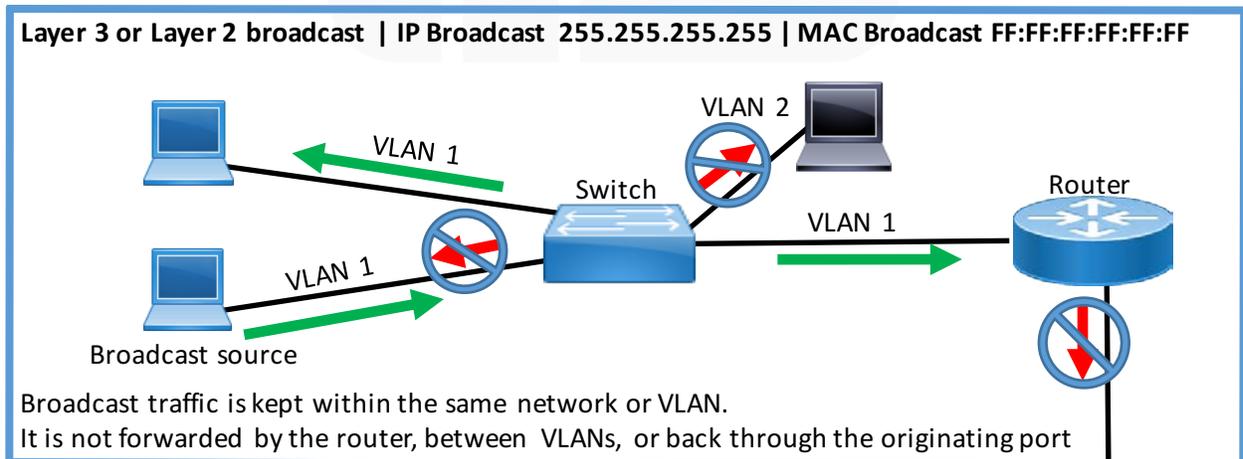


## Tech Lesson: Collision & Broadcast Domains

Broadcast domains deal with more of the logical world than the physical, but are still not too difficult a concept to comprehend. A broadcast domain is a division of a network in which all nodes can reach each other by broadcasting at the Data Link Layer (OSI layer 2). A layer 2 broadcast can also be triggered by a broadcast at the Network Layer (OSI layer 3). Many are probably already familiar with the term “IP broadcast” and if so you can continue to think in those terms as the function is the same whether talking about layer 2 or layer 3 broadcasts. The most important thing to understand is that by default a Router will not pass broadcasts on to other networks. If routers did pass broadcasts then the entire internet would be in a giant broadcast storm and would not function.

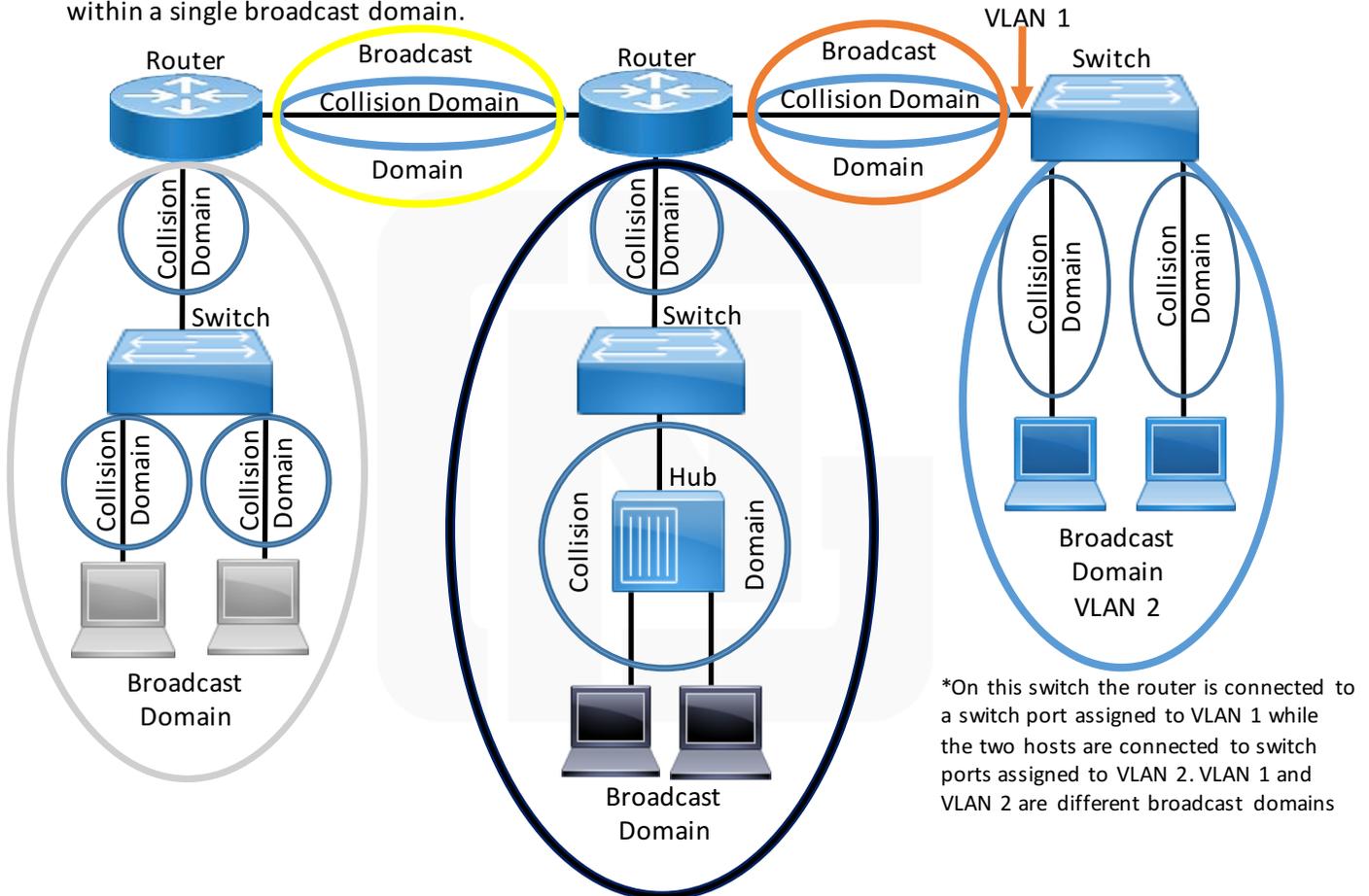


Another good item to discuss is broadcasting in relation to VLANs. Virtual Local Area Networks (VLANs) are a way to logically separate a switch into multiple broadcast domains. This is important because different VLANs act the same as different networks or interfaces on a router. So, we can say that a switch will not forward broadcast traffic to other VLANs just as a router will not forward broadcast traffic to other networks. VLANs and networks are both broadcast domains. To get a better understanding of this please review the diagram below:



## Tech Lesson: Collision & Broadcast Domains

Now, we can have a look at how both collision domains and broadcast domains are viewed within the same diagram. By looking at the diagram below we can see that for every broadcast domain there is at least one collision domain. In this diagram we are looking at different broadcast domains that are implemented between each router and switch. As well as one switch with two of its ports configured in the same Broadcast Domain (VLAN2). In this particular case there will never be more than one broadcast domain per collision domain, but there can be multiple collision domains within a single broadcast domain.



There is also scenario when we may have multiple broadcast domains that traverse a single physical connection and collision domain. Take the following diagram of a VLAN Trunk for example. Here we have multiple VLANs trunked across a single physical link between a router and a switch. In this case there are multiple VLANs/Broadcast Domains (VLAN 1 and VLAN 100) per the single collision domain.



Using what you've learned about both topics thus far review this document again to confirm your understanding.