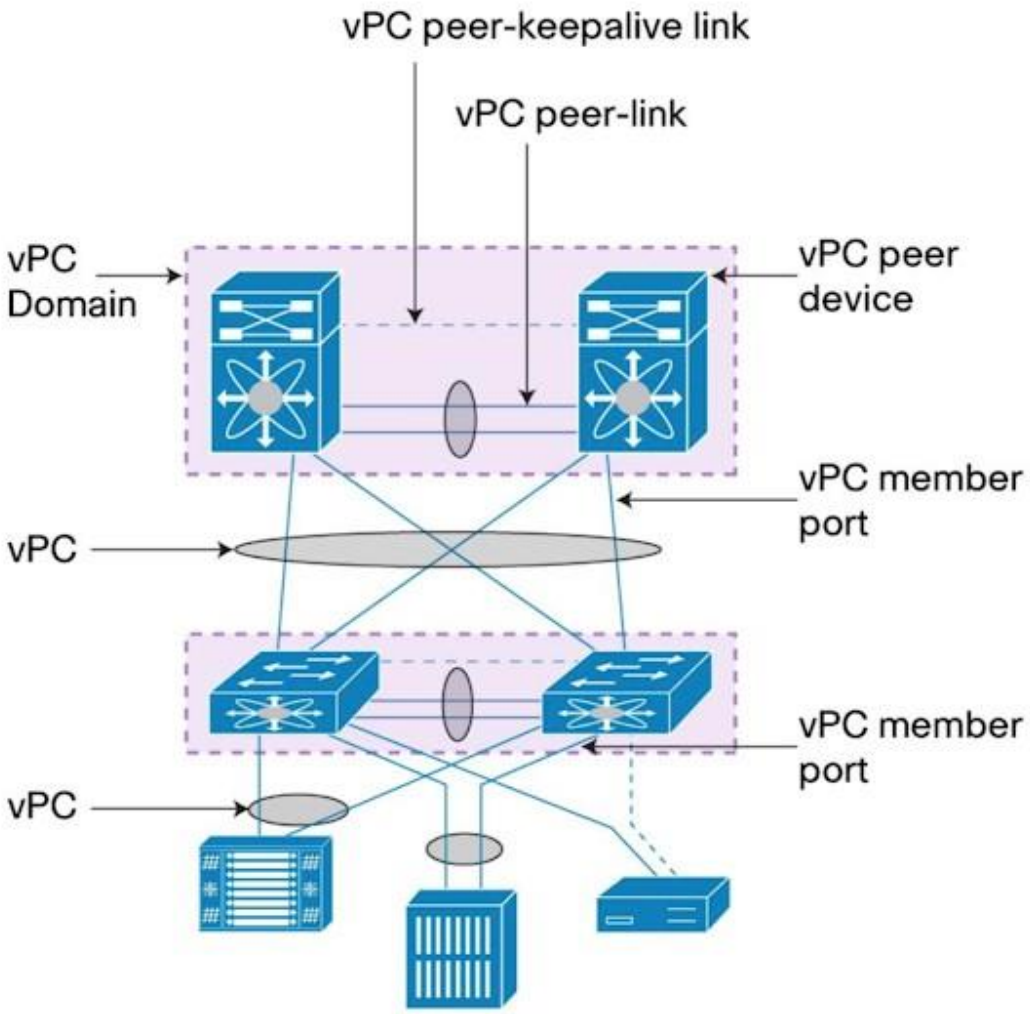
vPC Failure Scenarios:

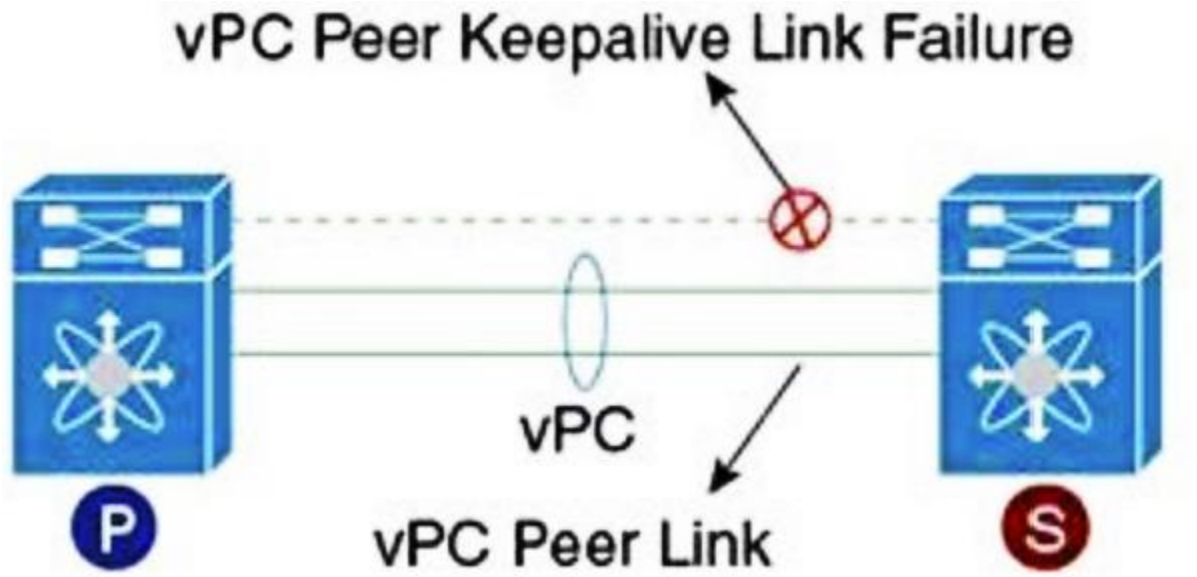
Cisco Virtual Port Channels (vPC) are designed to provide redundancy, high availability, and load balancing in data center networks. However, like any technology, vPC can be vulnerable to various failure scenarios. Here are some common failure scenarios that can impact vPC:



vPC Keep-Alive Link is Down:

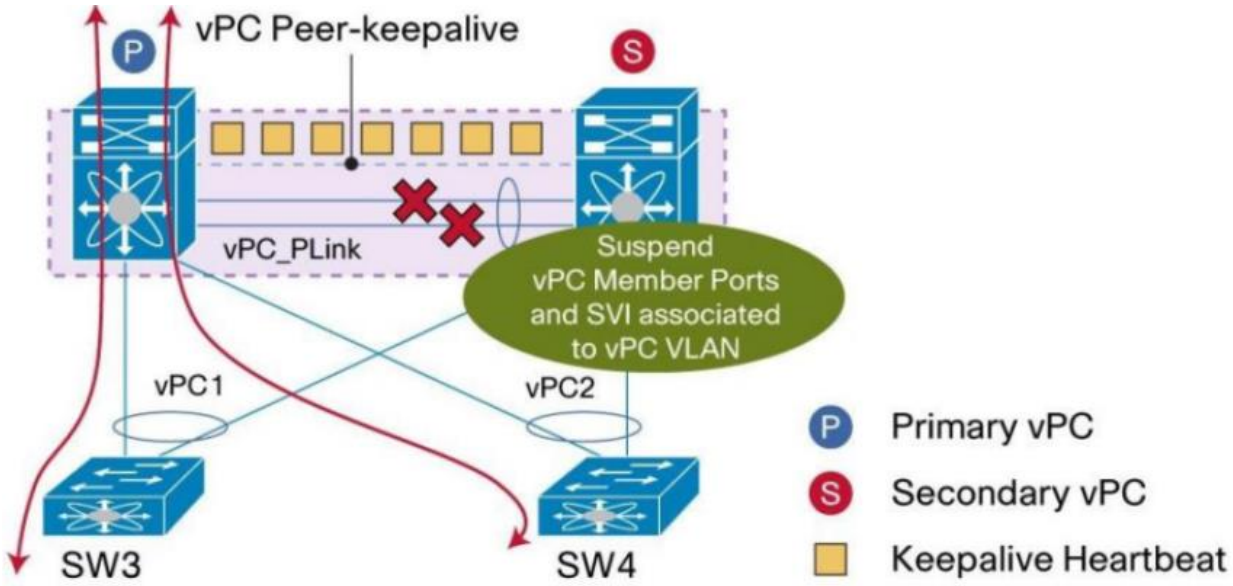
If only Keep-Alive fails, nothing will happen. Only heartbeat between Primary and Secondary node will be lost. No impact on the Data Traffic. Virtual Port-Channel is still in UP state in both vPC Primary/Secondary Members. Interface SVI VLAN's are UP in both vPC Primary & Secondary Members. vPC Primary/Secondary roles will be retained on the vPC members.

There is only one issue that happens only when the vPC primary/Secondary also goes down after the Keep-Alive link stopped working. The vPC Primary/Secondary member cannot establish vPC once they come back online if Keep-Alive Link is Down.



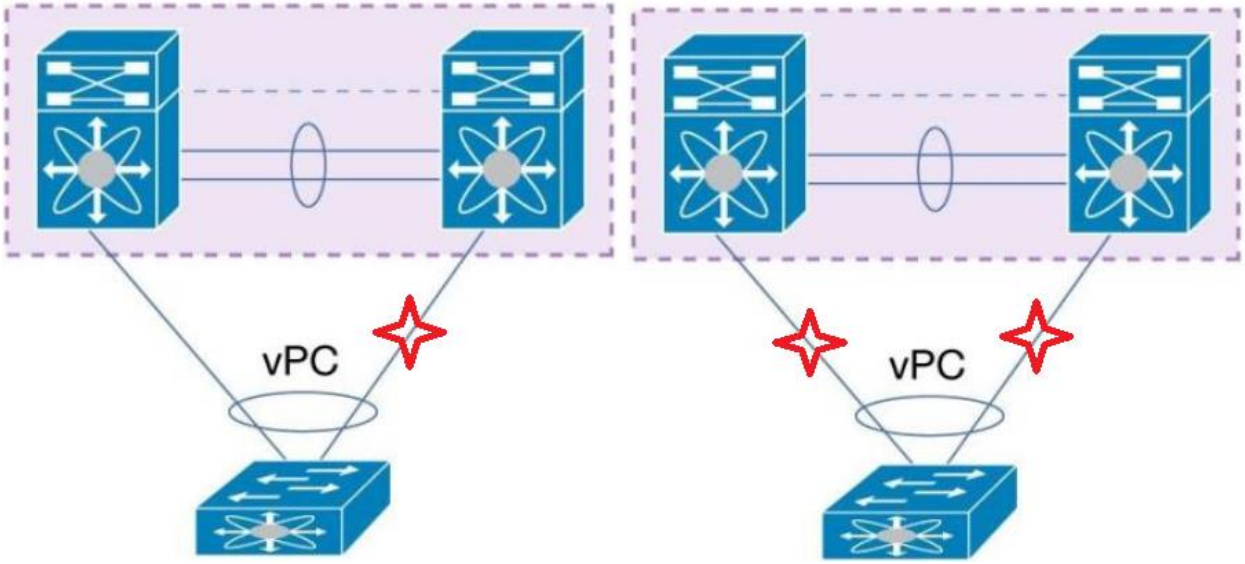
vPC Peer Link is Down:

If the peer-link fails, all of the vPC Member ports of the Secondary vPC Member will be shut down if the Keep-Alive Link is up. Impact on the Data Traffic. Virtual Port-Channel is in UP state. vPC Primary only would be to continue to forward the traffic from member ports. Interface SVI VLAN's are UP only in vPC Primary and Down in vPC Secondary. Single attached devices connected to vPC Secondary member going to lose network connectivity as all the SVI's related to vPC VLAN will be shutdown. Single attached devices connected to vPC Primary member not going to lose network connectivity as all the SVI's related to vPC VLAN are in UP State.



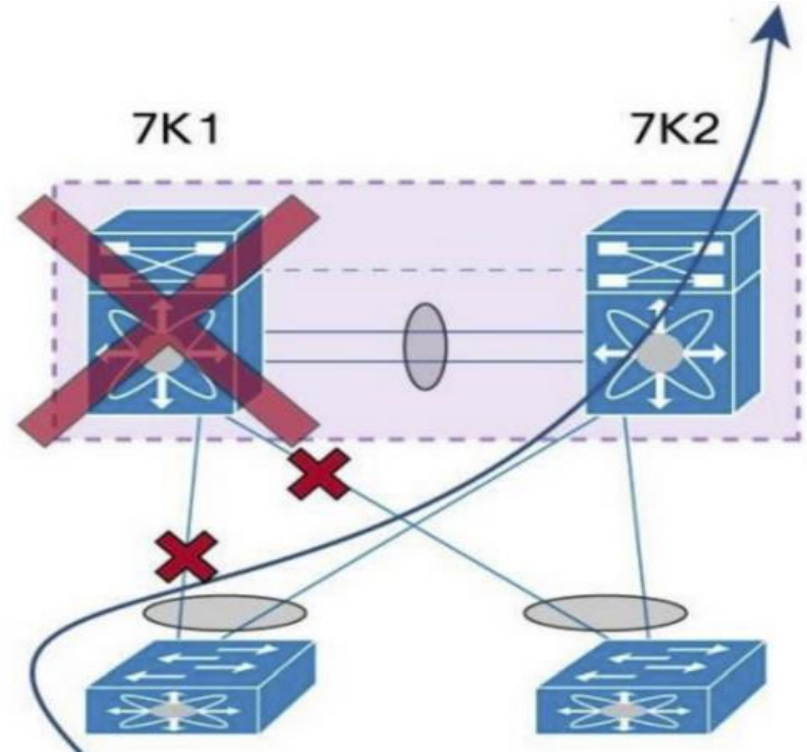
Member Port Failure:

If the member port fails for a particular end host, that host only will be affected. All other members will still be operational. In case of one link fails, then traffic will be through another interface. If both fails, then full outage for that end host.



vPC Peer Switch Failure:

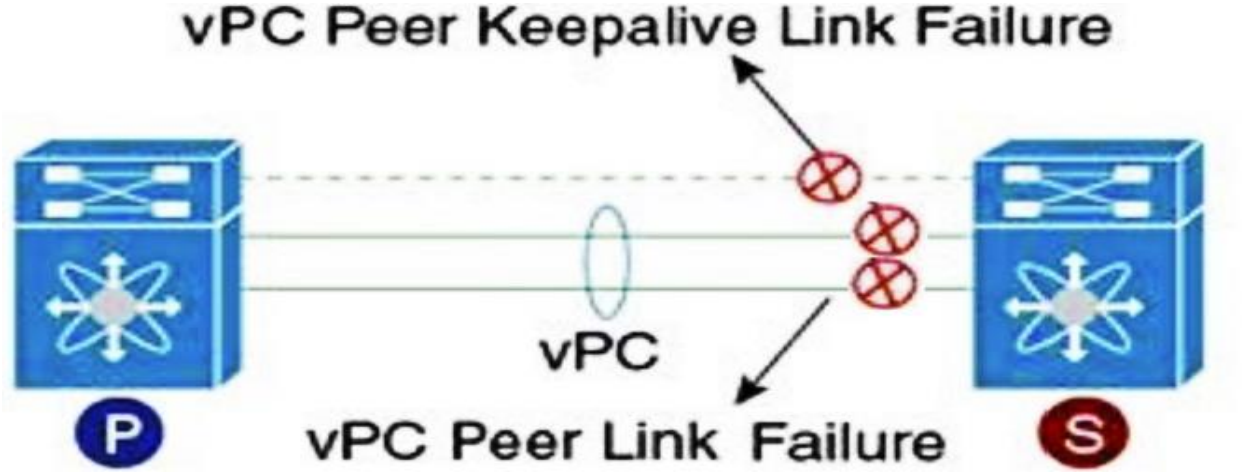
In case of Primary switch failure in vPC, secondary switch will be promoted as operational primary and forward all the traffic. If secondary switch fails, primary will keep forwarding traffic like earlier.



Peer-link Failure, followed by Keep-Alive Link:

Here, the member port will be suspended first due to peer-link down, but the heartbeat is there through keep-alive link. Traffic will flow through the primary peer switch. Now, if keep-alive fails, the suspended ports will remain suspended and all the traffic keeps flowing through primary node.

If the vPC Peer Link is down and after some time Keep-Alive Link also goes down. vPC Member Ports/Interface VLAN's on the Secondary goes into shutdown state after Peer Link is Down. vPC Secondary goes into the suspend state if the Keep-Alive Link goes down and does not go into up state unless the Keep-Alive Link comes up then the Peer Link also comes up.



Keep-Alive Link failure, followed by Peer-Link:

This failure is most critical. If Keep-Alive link fail first, nothing will happen due to vPC peer roles are already decided. However, if Peer-Link dies after the Keep-Alive, secondary vPC node will start thinking that, the primary node is completely down because of no heartbeat from Primary node. So, secondary node will become operational primary. In this case, both vPC nodes will forward the traffic. This type of scenario called split brain scenario in vPC.