

Task 7

Redundancy has become one of the vital elements in networking. When implementing a network, you should always consider single point failure, and availability, which can be accomplished using redundancy. However, redundancy on its own can have a drawback in any network; it opens a door for hackers or outsiders to congest network traffic easily, but with redundancy protocols you can also manage any spams that can waste routers', and switches' resources. In this bank network redundancy protocols is implemented. For switches I implemented STP (Spanning Tree Protocol), and HSRP(Hot Standby Redundancy Protocol) for DSR1, and DSR2 in data centre area.

Switches redundancy:

“Spanning tree protocol (STP) (IEEE 802.1D) is predominantly used to prevent layer 2 loops and broadcast storms and is also used for network redundancy. It was developed around the time where recovery from an outage that took upwards of a minute or more was acceptable. Throughout the years, as technology improved and critical applications relied on stable connections, businesses moved away from these long recovery times and looked for faster solutions.”[1]

I implemented switch redundancy for the 4 switches in data centre network using PVST(Per Vlan spanning Tree). Every switch sends its BPDU advertising itself to be root bridge; the one with the least BID(Bridge ID) value, which is a combination of priority value, and switch's mac address, is elected as root bridge. The root bridge is the reference switch for all switches in the spanning-tree, then every port is elected to be root, or designated, or blocked port, they are elected according to the cost path. The path with the least cost to the root port, its port is elected to be root port for this switch, while the next port with the least path will be designated port, and other ports will be blocked. If one switch is down, it picks the best path after the down switch ports, and if the root switch is down, another switch is re-elected. Every switch should have a root bridge, and designated port, while the rest ports are blocked. I am using pvst, while I can use rapid-pvst, which takes less time to calculate paths, and switches ports.

Router redundancy:

HSRP protocol is implemented on routers DSR1, DSR2. This protocol creates a virtual HSRP group, and include local routers configured to be in this group; it creates a virtual router that acts as a default gateway to local routers in the HSRP group. The router with the highest priority is elected as active router, and the other router is elected as standby. The virtual router uses active router physically to forward packets; the standby router sends hello messages to active router to make sure it is up and working fine, with a holding time. If the active router fails to send back the hello message within specific time to the standby router, the standby takes over to be active router, and an election is made to choose the new standby router. This HSRP group share one ip that is from the original subnet network, and mac addresses.[2] When I ping server 2 to DSGW it picks the one with the highest priority 150,DSR2 router, as it is the active router in this group.DSR1 is sending DSR2 hello messages making sure DSR2 is up, and working. However, If DSR2 fails, DSR1 takes over to be the active router.

Redundancy is actually one think to keep an eye on, as it is very vital in a network, but also make sure to implement it righteously, otherwise your network redundancy will be harmful, because this redundancy will congest your network traffic instead of providing high availability.

References:

[1]

[https://documentation.meraki.com/@api/deki/pages/1037/pdf/Spanning%2bTree%2bProtocol%2b\(STP\)%2bOverview.pdf?stylesheet=default](https://documentation.meraki.com/@api/deki/pages/1037/pdf/Spanning%2bTree%2bProtocol%2b(STP)%2bOverview.pdf?stylesheet=default) "Spanning Tree Protocol (STP) Overview"

[2] <https://www.cisco.com/c/en/us/support/docs/ip/hot-standby-router-protocol-hsrp/9234-hsrpguidetoc.html> "Hot Standby Router Protocol Features and Functionality"