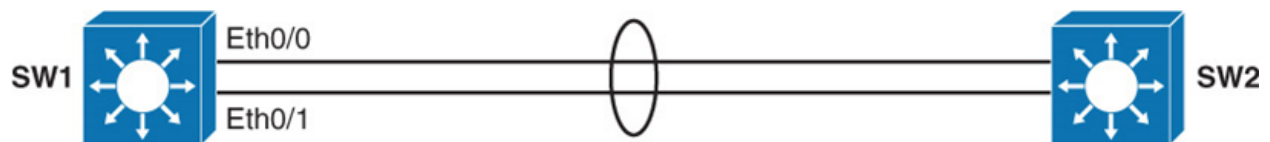
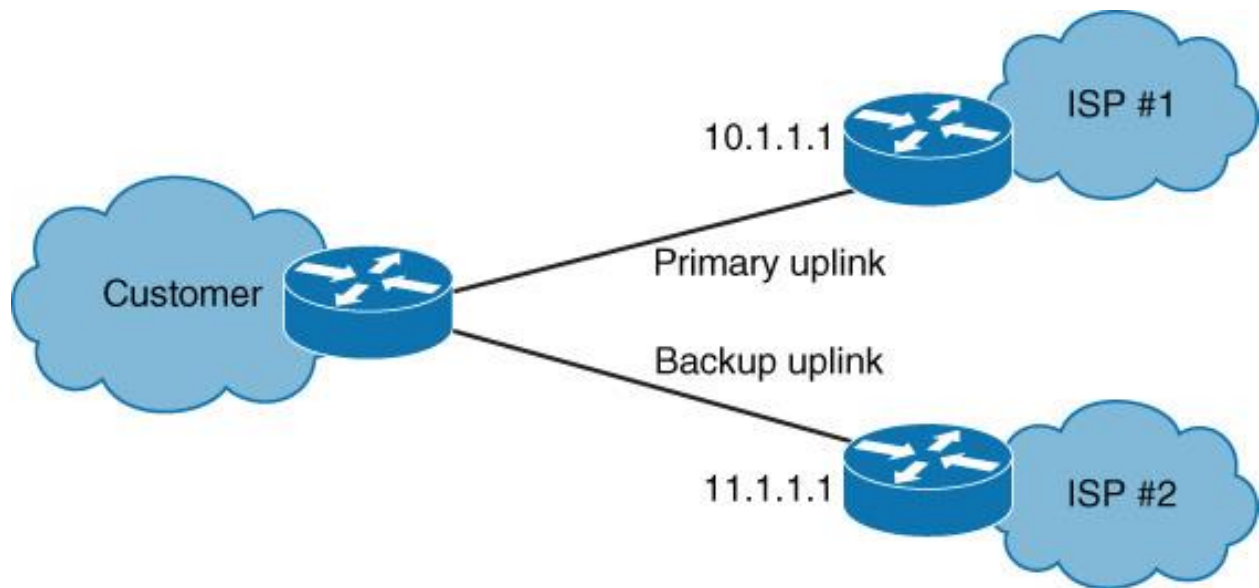


Redundancy:

- o **Redundancy, Failover, High Availability, Clustering, RAID and Fault-tolerance.**
- o A good network design provides the redundancy in devices and network links.
- o Redundancy is basically extra hardware or software that can be used as backup.
- o If the main hardware or software fails or link fail or unavailable in case of emergency.
- o It is method for ensuring network availability in case of network device or path failure.
- o It is method for ensuring network availability in case of network device unavailability.
- o Network redundancy is process through which additional or alternate instances of network devices, equipment & communication mediums are installed within network infrastructure.
- o Redundancy can be achieved via failover, load balancing & high availability in automatically.
- o High availability is a feature which provides redundancy and fault tolerance automatically.
- o High Availability is a number of connected devices processing and providing a services.
- o The goal is to ensure this service is always available even in the event of a failure or down.
- o Clustering is similar to redundant servers & provides fault tolerance in case of emergency.
- o A group of servers are logically combined into a cluster and seen as one device to work.
- o If a device fails within cluster services continue because other devices continue services.
- o One link processing traffic & second link would only become active if primary link fails.
- o Set up to allow company to connect their device to more than one Internet connection.
- o If one connection goes down, all traffic would failover to the other Internet connection.
- o This would eliminate single point of failure and would re-assure availability and reliability.
- o RAID is a fault tolerance solution for hard drives usually implemented in the servers.
- o Redundant Array of Independent Disks providing redundancy and fault tolerance.
- o Automatic failover is process of moving active services from primary device to backup.
- o Usually backup device continues these services until primary device has come back up.
- o When a device fails another device takes over this process which is referred to as a failover.
- o Services failover to backup device which will continue from where primary device left off.
- o Failover feature allows for hardware firewalls to have some redundancy and backup.
- o Have two or more hardware device configured if primary fails, the backup take over.
- o It is implemented on the high-end hardware devices for networks require redundancy.
- o HSRP is a Cisco proprietary protocol for establishing a fault-tolerant default gateway.
- o Redundancy, Fault-tolerance, & High-availability, all refer to some sort of failover of backup.





First-Hop Redundancy Protocols:

- o FHRP is a term which stands for First Hop Redundancy Protocol.
- o FHRP provide redundancy & load balancing of default gateway (First Hop).
- o FHRP connecting multiple physical router & treat as one or more logical router.
- o FHRP connecting multiple physical switch, which work as gateway for LAN devices.
- o FHRP allow for transparent fail-over at the first-hop Cisco IP Router or Cisco Switch.
- o FHRP protocols protect against a single point of failure for the default gateway.
- o FHRP provide load balancing if multiple uplinks are available at first-hop routers.
- o FHRP two or more routers sharing a single MAC and IP (Internet Protocol) address.
- o There are three types of FHRP protocol which are Cisco HSRP, VRRP and Cisco GLBP.

FHRP Working:

- o Creating group of Physical gateway using Layer 3 device Router or Switches.
- o Agree to assign one virtual IP address, which same to all first hop devices.
- o Virtual IP (Internet Protocol) going to use as gateway address to all LAN device.
- o The FHRP creating one or more Virtual MAC (Media Access Control) address.
- o One first hop is respond Address Resolution Protocol request (Active/AVG/Master).
- o It is using the keepalives messages in order to get Virtual gateway status.
- o LAN devices use Virtual IP & MAC (Media Access Control) address as default gateway.

