

## HSRP (Hot Standby Router Protocol)

Imagine you're running a business, and your internet suddenly goes down because your router dies. That's a disaster, right? So, we used HSRP to prevent that. It lets us have two routers working together: one is **active**, doing all the work, and the other is on **standby**, just waiting in case the active one fails. If that happens, the standby router jumps in, and the network keeps running smoothly.

In this setup, Router 1 is the main router because it has a higher priority (200), and Router 0 is the backup. This way, if anything goes wrong, we're covered.

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## VLANs

Think of your network like an office building with different departments—IT, Finance, and HR. You wouldn't want all their data flowing into the same area because it gets messy and could slow things down. So, we use VLANs to separate them. VLAN 10 is for IT, VLAN 20 for Finance, and VLAN 30 for HR. This keeps things organized, makes it easier to manage traffic, and adds a layer of security since each department stays in its own lane.

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## Router-on-a-Stick

Routers can be expensive, and buying one for every department (or VLAN) isn't practical. That's where Router-on-a-Stick comes in. Instead of having a separate router for each VLAN, we just use one router with sub-interfaces. Each sub-interface handles traffic for a different VLAN, allowing them to communicate with each other. This way, the router becomes the middleman for all the VLANs without needing extra hardware.

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## EtherChannel

Imagine you're connecting two switches together with just one cable. If that cable breaks, your connection is down. To prevent this, we used EtherChannel, which combines multiple cables into one logical link. This gives us more bandwidth and redundancy. So, even if one cable fails, the connection between the switches stays up and running.

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## RIP Version 2

You don't want to manually tell each router where every other network is. That's a headache, right? So, we use RIP v2, a dynamic routing protocol. It allows the routers to automatically share info about what networks they know. In this setup, Router 0 and Router 1 use RIP to learn about all the VLANs and keep the routing tables updated.

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