

Protocols Used & Rationale

HSRP (Hot Standby Router Protocol)

- **Used For:** Gateway redundancy on VLANs 10 and 20
- **Why:** Ensures high availability — clients always have a default gateway

OSPF (Open Shortest Path First)

- **Used For:** Internal dynamic routing between routers
- **Why:** Fast convergence, supports scalable topologies, automatic route updates

BGP (Border Gateway Protocol)

- **Used For:** Simulating WAN peering between Router1 (AS 65001) and Router2 (AS 65002)
- **Why:** Demonstrates ability to configure external routing and inter-domain reachability

VLANs

- **Used For:** Traffic separation — VLAN 10 (wired PCs), VLAN 20 (wireless)
- **Why:** Enhances security, broadcast control, and logical segmentation

DHCP

- **Used For:** Dynamic IP assignment on both VLANs via Router1
- **Why:** Simulates centralized IPAM in real networks; reduces admin overhead

WPA2 WiFi

- **Used For:** Laptop connectivity to VLAN 20 via secure SSID (OfficeWiFi)
- **Why:** Completes the real-world hybrid network scenario with secure wireless access