

AP Networking | Unit 3

3.1 Planning From Requirements

Solutions

Reference scenario

Plan an installation before choosing equipment.

Staff today: 18

Staff growth: 8

Printers: 2

Gateway interface: 1

Guests: separate wireless network

3.1.1

A group has 40 endpoints and expects 25% growth. How many endpoint addresses should the plan reserve before adding infrastructure addresses?

Reserve $40 + 0.25 * 40 = 50$ endpoint addresses. Gateway and other infrastructure addresses must be added separately.

3.1.2

List three non-device-count requirements for a classroom network.

Examples include required application access, guest isolation, coverage in occupied areas, expected traffic capacity, recovery expectations, power availability, and maintainable documentation. State measurable requirements where possible.

AP Networking | Unit 3

3.2 Topology: Physical and Logical

Solutions

Reference scenario

Compare a cable drawing with logical groups on the same switch.

Physical: one switch, two classrooms

Room A ports: staff VLAN

Room B ports: student VLAN

Printer: staff VLAN

3.2.1

Two devices are in different rooms but use the same VLAN and subnet. Must their traffic cross an IP router solely because of the room boundary?

No. Room location alone does not create an IP boundary. Their logical configuration, link connectivity, and switching path determine whether direct local communication is possible.

3.2.2

A switch failure disconnects both staff and students despite VLAN separation. What does this reveal about logical isolation and physical resilience?

Logical isolation can separate traffic without providing independent hardware. Both groups still share the switch as a physical failure point; resilience requires an appropriate additional physical path or device.

AP Networking | Unit 3

3.3 Subnetting an Address Space

Solutions

Reference scenario

Allocate a conventional IPv4 LAN subnet for 26 endpoints and one gateway. Show the address range.

Candidate: 10.4.8.0/27

Mask: 255.255.255.224

Addresses in block: 32

3.3.1

For 10.4.8.64/26, identify the network address, broadcast address, and conventional usable host range.

The block contains 64 addresses: network 10.4.8.64, broadcast 10.4.8.127, and usable hosts 10.4.8.65 through 10.4.8.126, for 62 usable addresses.

3.3.2

Choose the smallest conventional LAN subnet that can hold 50 endpoints plus one gateway: /27, /26, or /25. Explain.

/26 is the smallest listed choice that works: it provides 62 usable host addresses. /27 provides only 30; /25 works but is larger than necessary for the stated 51 hosts.

AP Networking | Unit 3

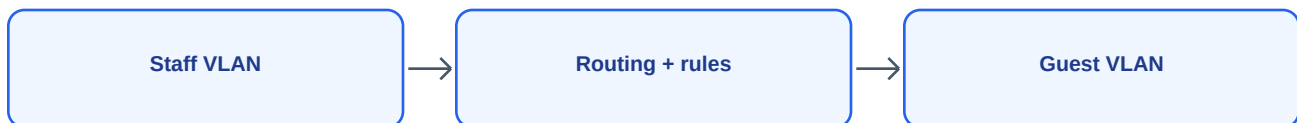
3.4 Segmentation With VLANs

Solutions

Reference scenario

Separate a shared switch into staff and guest networks while keeping approved internet access.

VLAN 10: staff, 10.0.10.0/24
VLAN 20: guests, 10.0.20.0/24
Guests need: internet only



3.4.1

After assigning two devices to different VLANs, their required cross-VLAN application stops working. What functions must be checked?

Check the inter-VLAN routing path, each device gateway, the allowed service policy, and the return path. Separation deliberately removes automatic local reach; required crossings need configuration.

3.4.2

Why is a VLAN label by itself insufficient evidence that guests cannot reach a staff server?

Routing and access rules may still permit guest-to-staff traffic. Inspect the actual policy and test the relevant source, destination, and service.

AP Networking | Unit 3

3.5 Crossing Boundaries: Gateways and Rules

Solutions

Reference scenario

Apply the first matching firewall rule to a student request.

```
1 ALLOW staff -> grade-server TCP 443
2 DENY student -> grade-server ANY
3 ALLOW student -> internet TCP 443
4 DENY any -> any ANY
```

3.5.1

What happens to a staff HTTPS request to the grade server and a staff SSH request to it?

HTTPS matches rule 1 and is allowed. SSH is not covered by rule 1, and the later student rules do not match staff, so it falls to rule 4 and is denied.

3.5.2

An ALLOW any -> any rule is inserted first. Explain its effect on later deny rules.

Under first-match processing, every connection matches the new first rule. Later deny rules become unreachable for that traffic, defeating the intended restrictions.

AP Networking | Unit 3

3.6 Documenting What You Built

Solutions

Reference scenario

Assess whether a change record is sufficient for the next technician.

Change: moved printer

Recorded address: 10.0.10.45

Missing: VLAN, port, reason, tests, rollback

3.6.1

Write a short verification note after moving a printer from a guest segment to a staff segment.

Record that an authorized staff workstation printed a test page, a guest device could no longer open the printer service, and the printer retained its approved address after reconnecting. Include the time and change identifier.

3.6.2

Why should a network diagram and address inventory be updated in the same change process?

Otherwise each may describe a different network state, causing incorrect diagnosis or unsafe later changes. Link both updates to the same approved change and verification record.