

AP Networking | Unit 2

2.1 What a Small Network Is Made Of

Solutions

Reference scenario

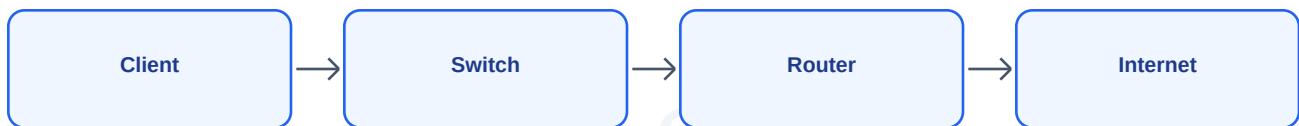
An office printer is reachable locally while all users lose access to outside sites. Distinguish the roles in the network.

Workstations -> switch -> router -> upstream network

Printer -> switch

Local printing: works

External sites: unavailable



2.1.1

Explain which device function forwards traffic between two IP subnets and which connects wired devices within one LAN.

A router or routing-capable gateway forwards between IP subnets. A switch connects local Ethernet devices and forwards frames within the relevant local network.

2.1.2

A home gateway combines routing, switching, and wireless access. Why should an incident record identify the failed function rather than only name the box?

One enclosure can continue switching local traffic while its upstream or wireless function fails. Naming the function directs testing and avoids treating every service provided by that appliance as broken.

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2.2 Addressing: How Devices Are Identified

Solutions

Reference scenario

Decide whether two IPv4 clients share a subnet. Distinguish their IP and interface addresses.

A: 10.8.4.10 / 255.255.255.0

B: 10.8.4.90 / 255.255.255.0

A interface MAC: 02:00:00:00:04:10

2.2.1

Are 10.8.4.250/24 and 10.8.5.5/24 in the same subnet? Give their network addresses.

No. Their network addresses are 10.8.4.0/24 and 10.8.5.0/24, so communication requires routing between those networks.

2.2.2

A laptop moves to another IP subnet. Which address normally changes, and why is a MAC address not a substitute for the gateway setting?

Its assigned IP configuration normally changes to fit the new subnet. A MAC address identifies an interface on a local link; the gateway setting identifies where off-subnet IP traffic should be sent.

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2.3 Automatic Address Assignment

Solutions

Reference scenario

Three new clients cannot obtain normal IPv4 configuration. Investigate the address pool.

DHCP pool: 10.5.2.100 through 10.5.2.119

Active leases: 20

New clients awaiting leases: 3

2.3.1

How many addresses are in a DHCP pool from 10.5.2.50 through 10.5.2.79 inclusive? Can it serve 32 simultaneous clients?

There are $79 - 50 + 1 = 30$ addresses. It cannot supply unique active leases to 32 clients without a larger approved pool or a different allocation plan.

2.3.2

Clients receive valid local addresses but all remote access fails. Which DHCP option should be compared with the network plan first?

Inspect the default gateway option and whether that gateway is reachable. A valid local address can support local traffic even when the advertised gateway is missing or wrong.

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2.4 Wired, Wireless, and the Tradeoff

Solutions

Reference scenario

Choose connectivity for a stationary recording station and tablets that move between rooms.

Recording station: large continuous uploads

Tablets: frequent movement

Cable available at recording desk

2.4.1

A stationary exam computer repeatedly loses wireless service in a crowded room. Name a suitable alternative and one verification measure.

Use an approved wired Ethernet connection if the room permits it. Verify stable access to the exam application and measure loss or response time under the expected workload.

2.4.2

Why might adding wireless bandwidth fail to solve a client problem caused by poor placement behind a concrete wall?

Propagation and obstruction can limit signal quality regardless of advertised throughput. Evaluate access-point placement or an approved additional coverage point and test in the actual location.

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2.5 Testing Whether It Actually Works

Solutions

Reference scenario

Interpret a progression of tests rather than treating every failed reply as the same fault.

Local address: valid

Gateway reachability: succeeds

Approved service by address: succeeds

Name lookup for that service: fails

2.5.1

A host ignores ping but its HTTPS service loads. Is it necessarily unreachable? Explain.

No. It may decline ICMP echo while accepting the application traffic. Test the required service and inspect policy rather than equating one missing echo reply with total unreachability.

2.5.2

Order these checks for one disconnected client: remote application, local link, IP settings, local gateway.

Check the local link, inspect IP settings, test the local gateway, then test the required remote application. Use each result to narrow the next hypothesis.

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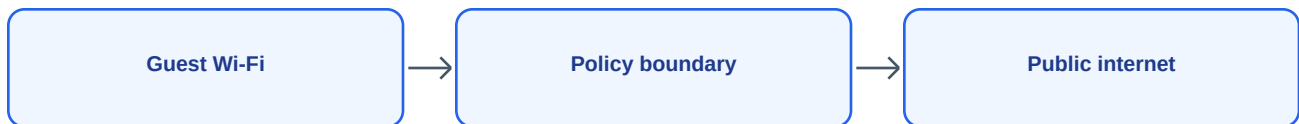
2.6 First Steps in Protecting a Shared Network

Solutions

Reference scenario

A guest wireless network can reach the finance printer and the router administration interface. Recommend boundaries.

Guest -> public internet: required
Guest -> finance printer: not required
Guest -> router administration: not required



2.6.1

Why is changing only the guest Wi-Fi password insufficient when guest devices can still open internal payroll shares?

The password controls entry to the guest network but does not restrict its reach after entry. Segmentation and access policy must limit guest traffic to the resources it actually needs.

2.6.2

Provide one positive and one negative test for the revised guest policy.

Positive: a guest can load an approved public site. Negative: the same guest cannot connect to an internal finance share or management interface. Confirm internal staff access still works.