Networking

Static Routing

Static Routing

- Guiding Question: How does static routing contribute to network efficiency, and in what scenarios is it the best choice over dynamic routing?

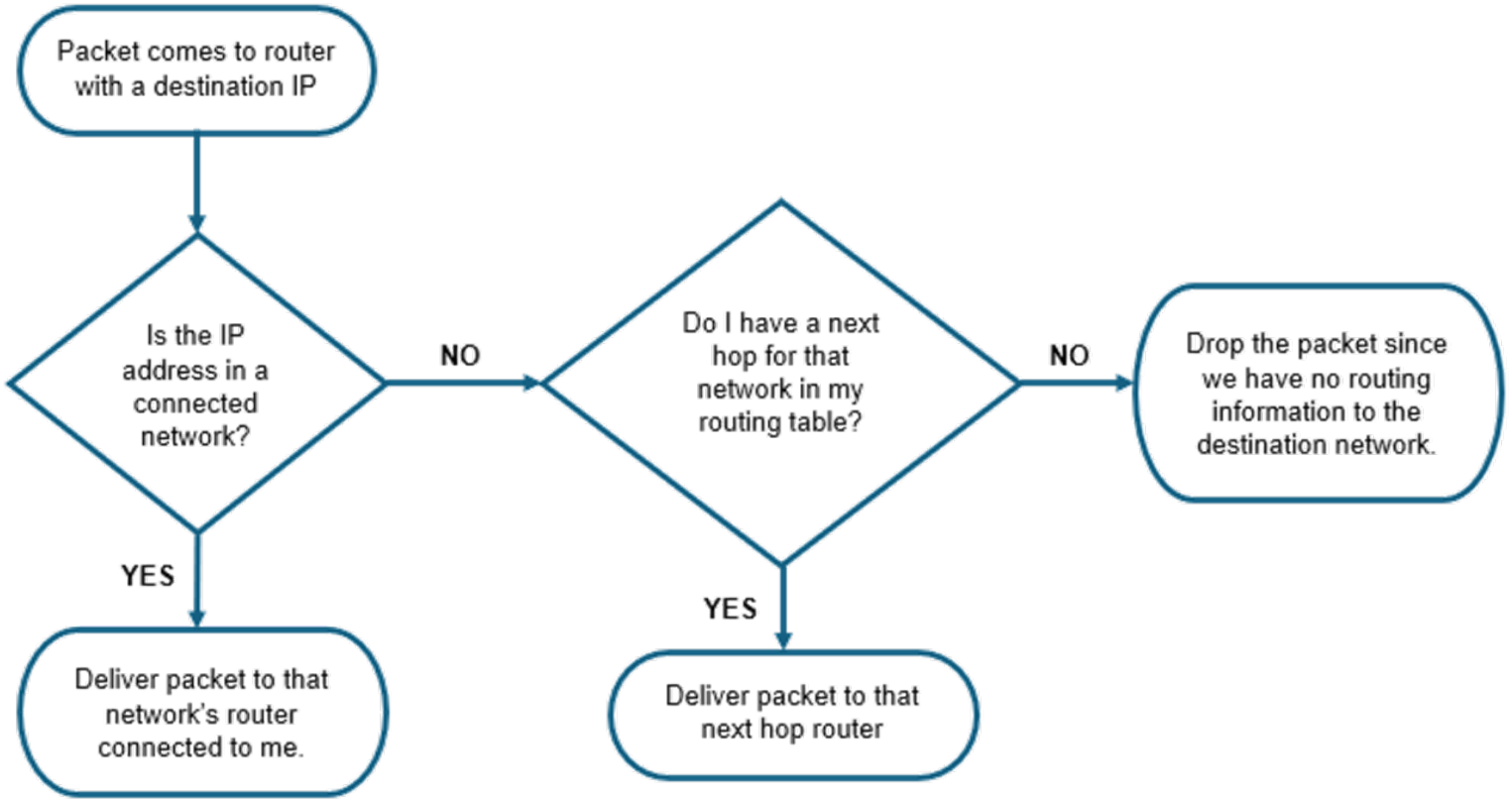
- Students will:
  - Explain the purpose and function of static routing.
  - Compare static and dynamic routing, highlighting their advantages and disadvantages.
  - Identify scenarios where static routing is the preferred choice.

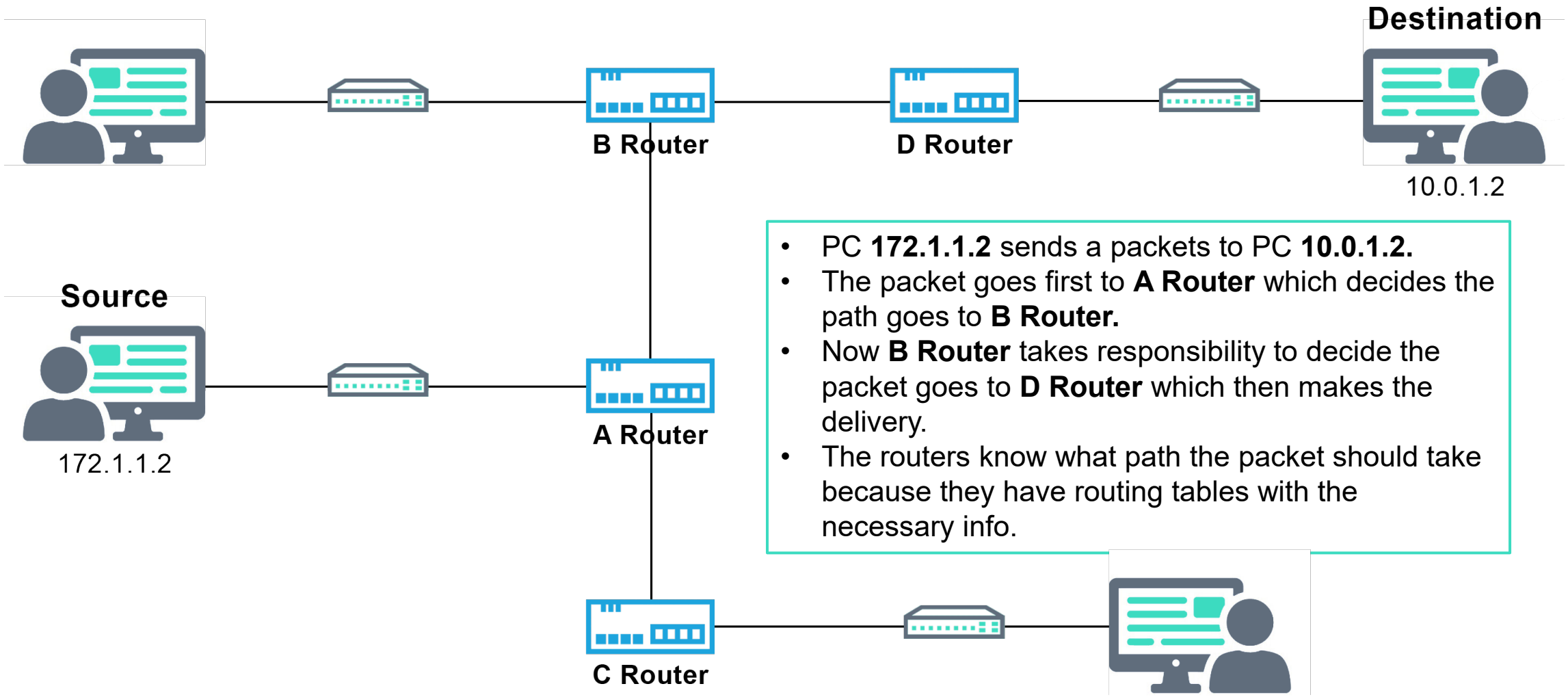
How Routing Works

- Router checks if the destination is on a directly connected network (aka a local network).
- If not, it looks in the routing table for the next-hop IP or interface.
- If there's no route listed, the router drops the data.
- For static routing, admins must manually add routes to reach non-local networks.

How Routing Works (cont'd)

- A router's essential task is to look at an IP address and figure out what network door it should be sent to.
- To do this it asks some basic questions:





- PC **172.1.1.2** sends a packets to PC **10.0.1.2.**
- The packet goes first to **A Router** which decides the path goes to **B Router.**
- Now **B Router** takes responsibility to decide the packet goes to **D Router** which then makes the delivery.
- The routers know what path the packet should take because they have routing tables with the necessary info.

What Is Static Routing?

- Routing helps data find its way from one network to another.
- In static routing, a network admin sets each route by hand by entering the needed information into a routing table.
- The admin must configure a different routing table on each network router.
- Routes don’t change unless the admin changes them.

Why Use Static Routing?

Routers can be configured statically by an administrator, or it can be dynamically configured with software/protocols.

Advantages of Static Routing:

- Predictable: Routes stay the same unless changed manually.
- Efficient: No need for routers to talk to each other constantly.
- Secure: Routes aren’t shared, which limits outside access.
- Simple: Great for networks that don’t change much.

Downsides of Static Routing

- Routes must be updated manually if anything changes. This creates a significant maintenance workload.
- Easy to make mistakes—bad routes can cause network issues or even crash a network.
- Not a good fit for large or growing networks.

When To Use Static Routing?

- Small networks with few routers or changes.
- Stub networks—only one path out to the internet or other networks.
- Backup routes for when dynamic routing fails.
- When you need more control and don’t want to share routes.