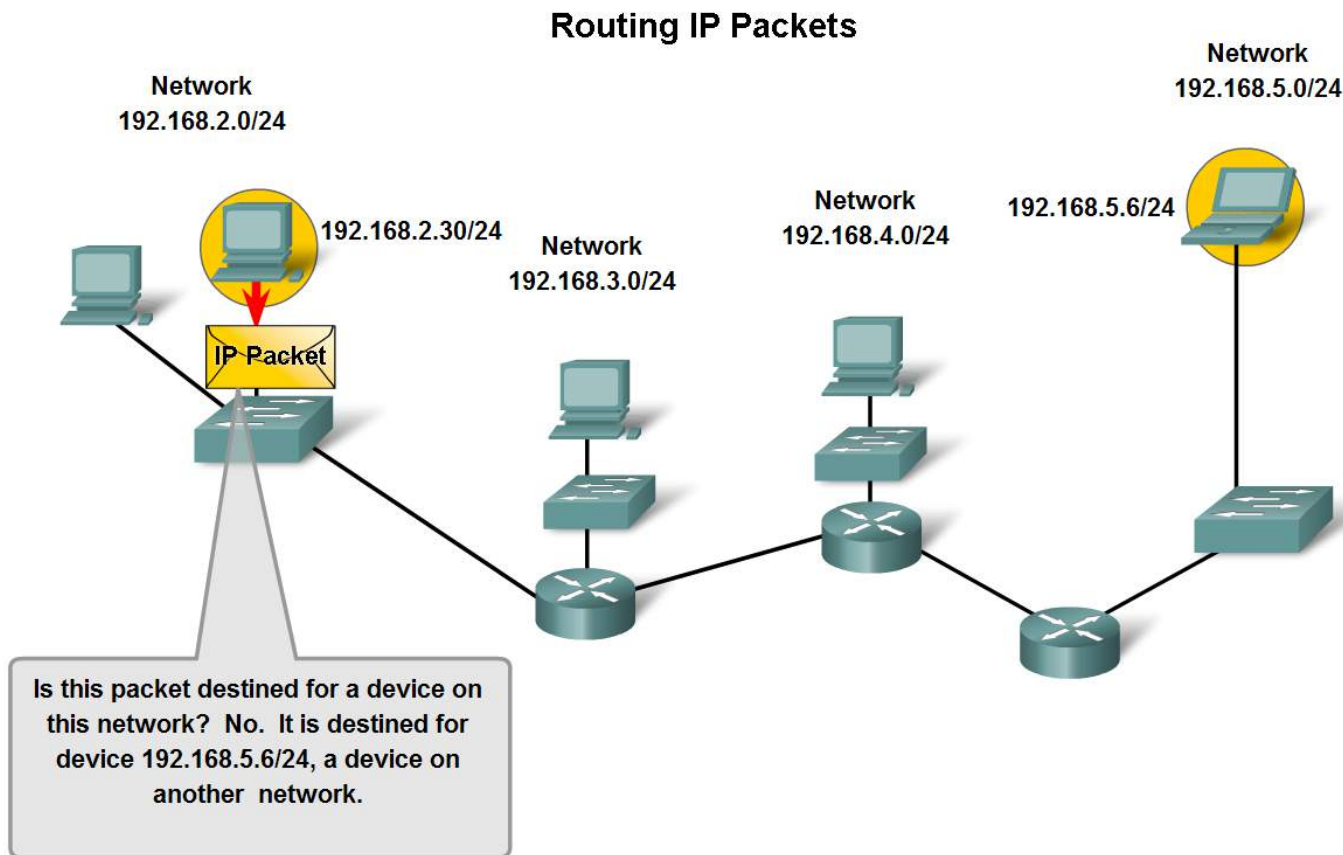


Fundamentals of Routes, Next Hop Addresses and Packet Forwarding

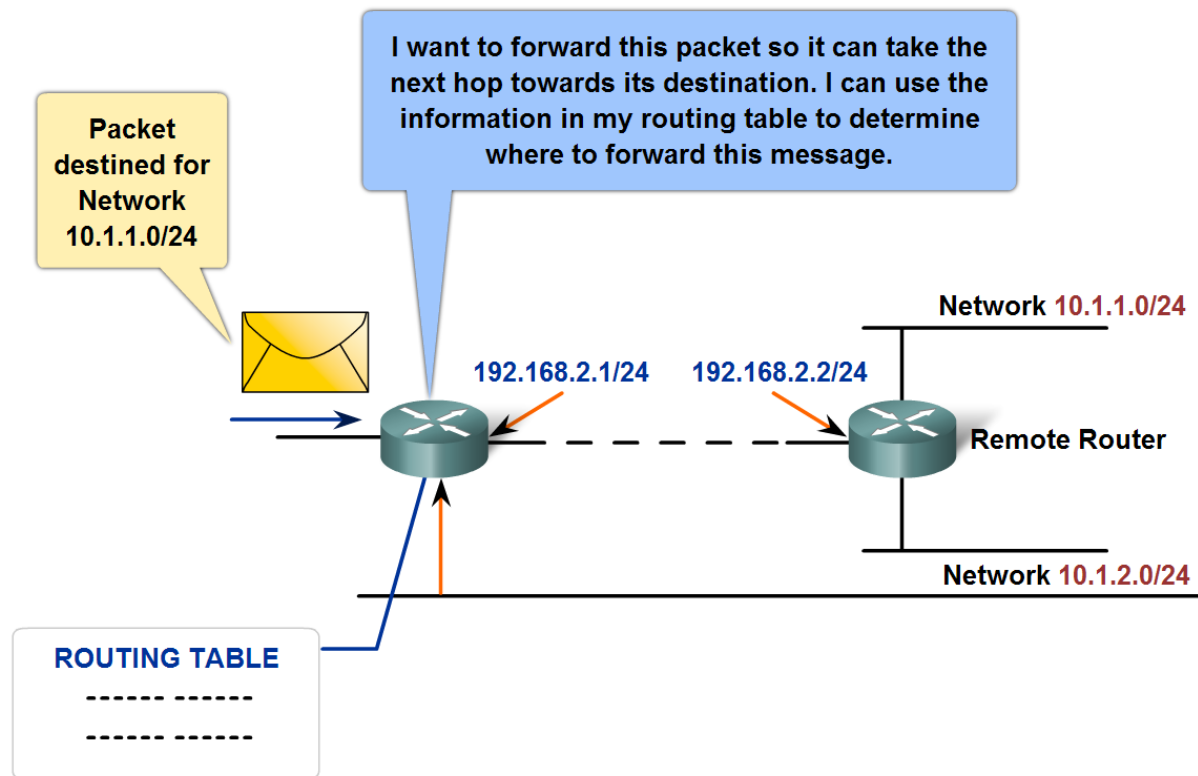
- Trace the steps of an IP packet as it traverses unchanged via routers from sub network to sub-network



Fundamentals of Routes, Next Hop Addresses and Packet Forwarding

- Describe the role of a gateway and the use of a simple route table in directing packets toward their ultimate destinations

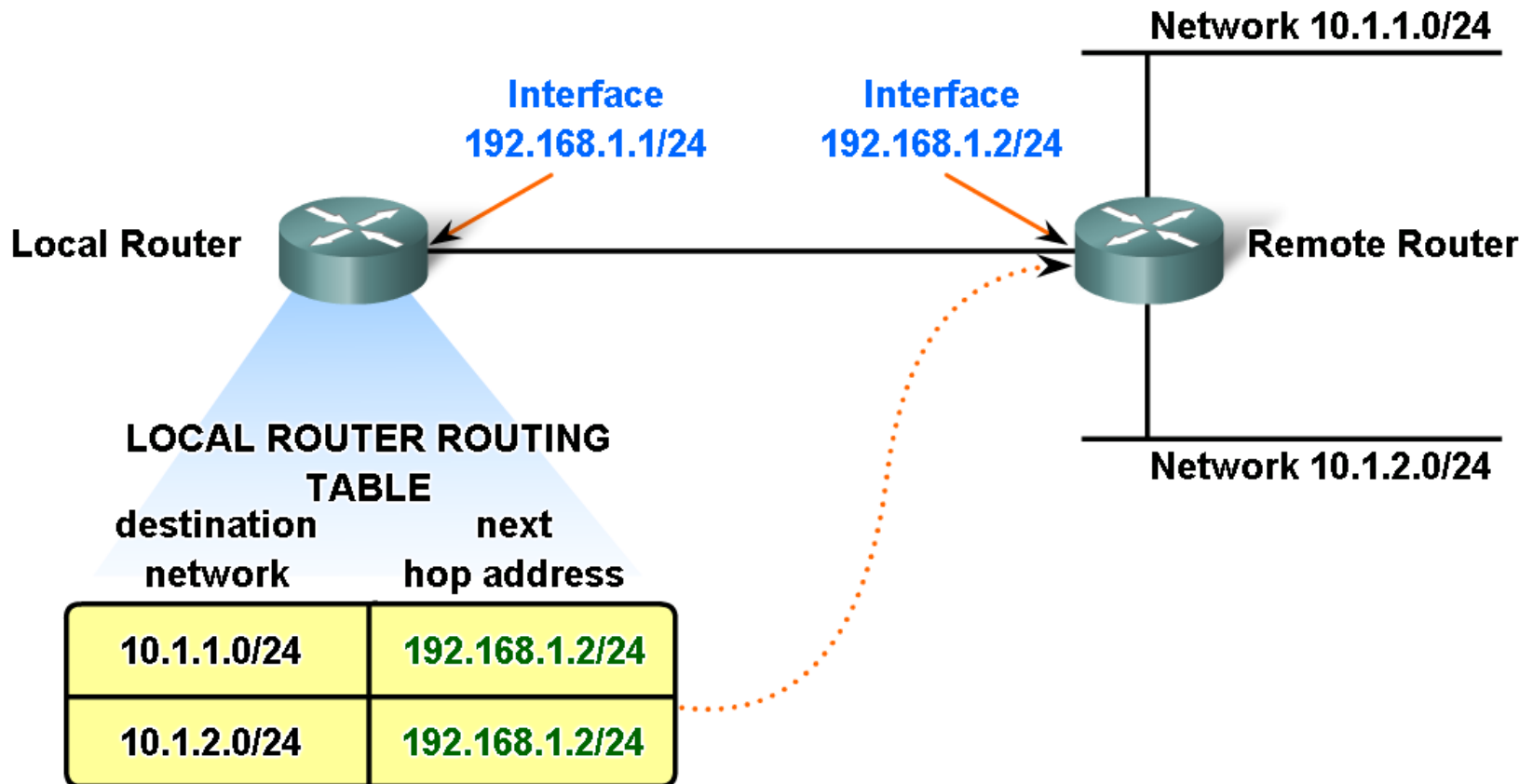
Routing Tables



Fundamentals of Routes, Next Hop Addresses and Packet Forwarding

- Define a route and its three key parts

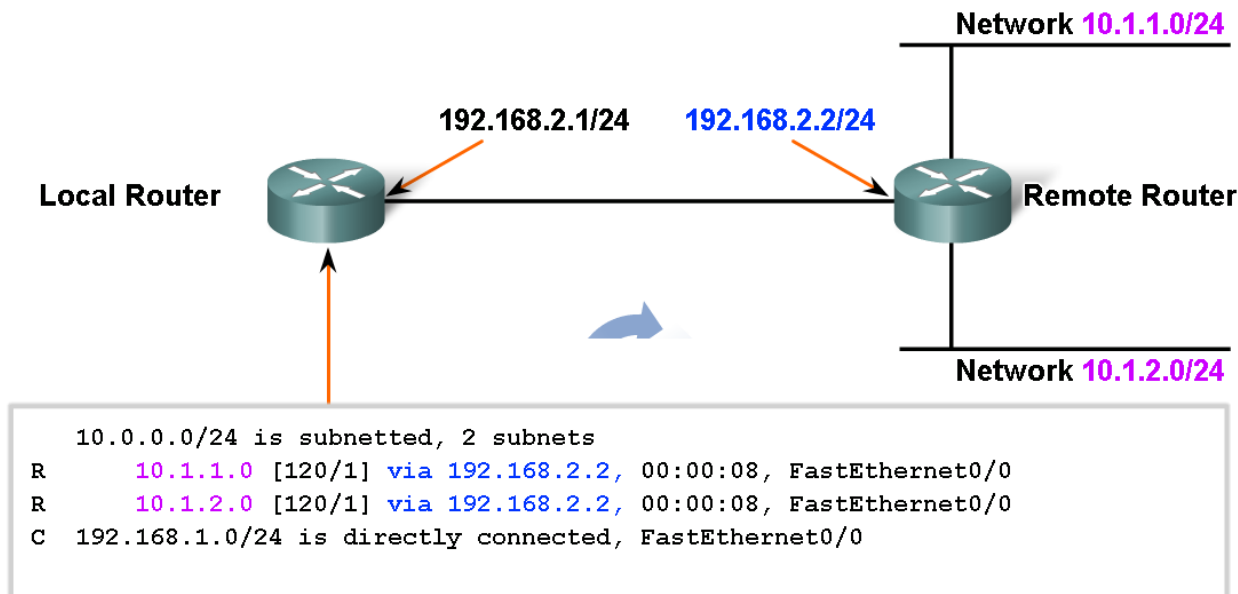
Local Router Routing Table



Fundamentals of Routes, Next Hop Addresses and Packet Forwarding

- Describe the purpose and use of the destination network in a route

Confirming the Gateway and Route



This is the routing table output of Local Router when the **"show ip route"** is issued.

The next hop for networks 10.1.1.0/24 and 10.1.2.0/24 from Local Router is 192.168.2.2.

Fundamentals of Routes, Next Hop Addresses and Packet Forwarding

- Describe the purpose and use of the next hop in a route

Routing Table Output with Next Hops

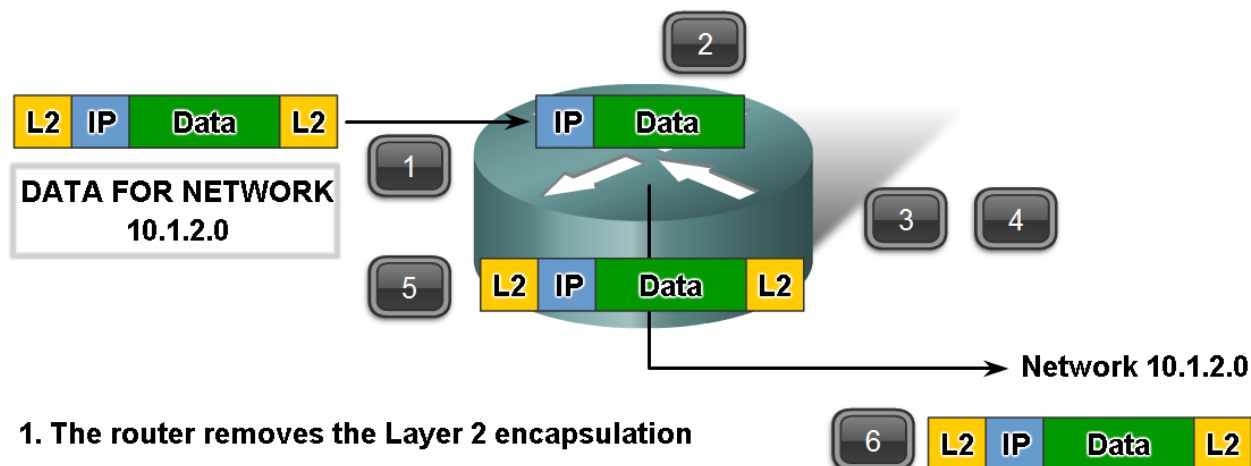
```

10.0.0.0/24 is subnetted, 2 subnets
R   10.1.1.0 [120/1] via 192.168.2.2, 00:00:08, FastEthernet0/0
R   10.1.2.0 [120/1] via 192.168.2.2, 00:00:08, FastEthernet0/0
C 192.168.1.0/24 is directly connected, FastEthernet0/0
  
```

Fundamentals of Routes, Next Hop Addresses and Packet Forwarding

- Trace the steps of several IP packets as they are routed through several gateways from devices on one sub network to devices on other sub networks

Route Entry Exists

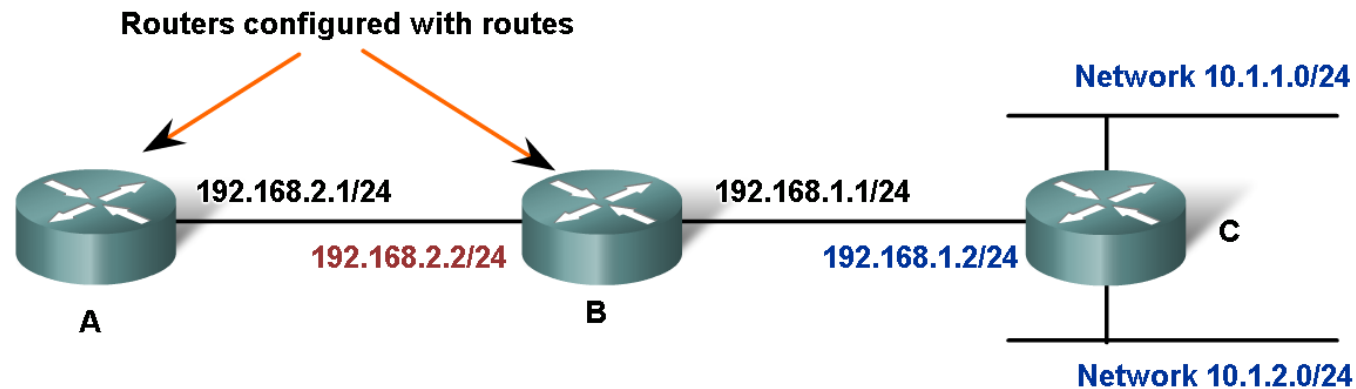


1. The router removes the Layer 2 encapsulation
2. Router extracts the destination IP address
3. Router checks the routing table for a match
4. Network 10.1.2.0 is found in the routing table
5. Router re-encapsulates the packet
6. Packet is sent to Network 10.1.2.0

Fundamentals of Routes, Next Hop Addresses and Packet Forwarding

- Describe the purpose of routing protocols and the need for both static and dynamic routes

Static Routing

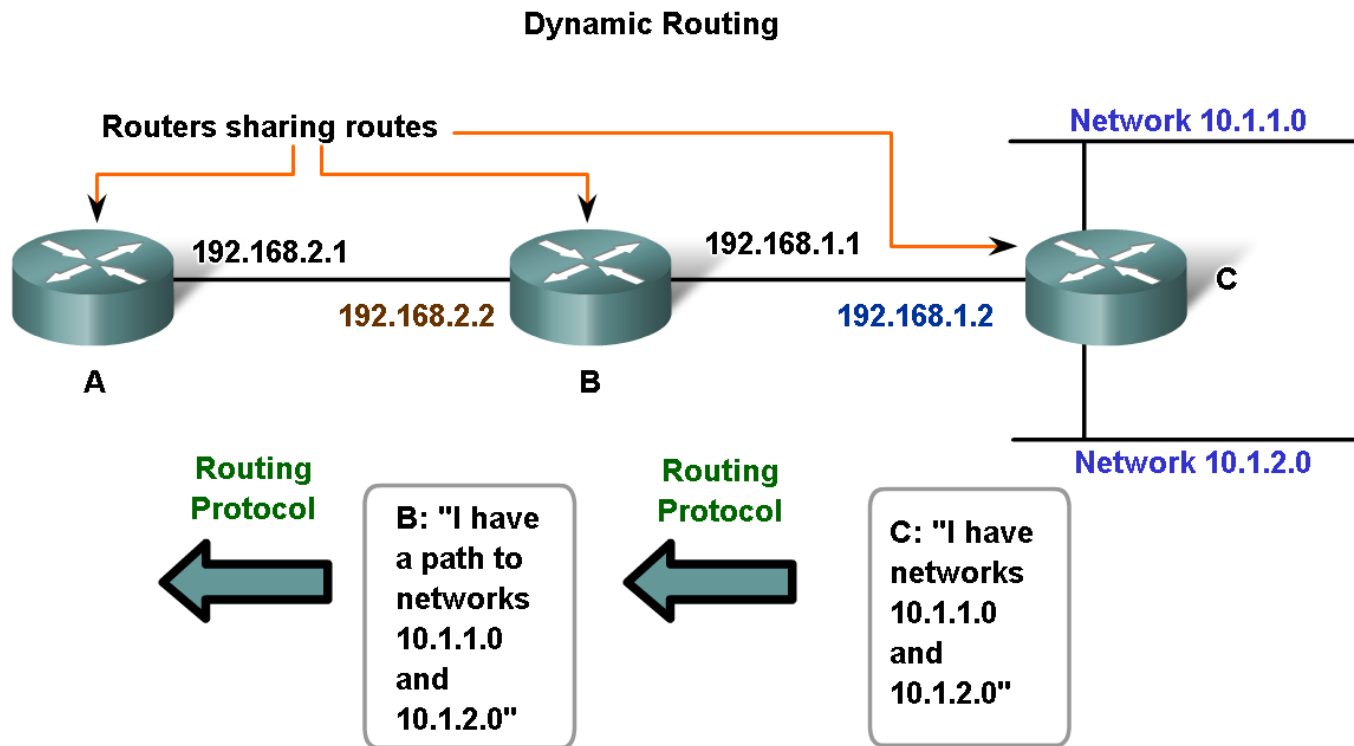


Router A:
192.168.2.2/24
 configured manually as
 next hop for networks
 10.1.1.0/24 and
 10.1.2.0/24

Router B:
192.168.1.2/24
 configured manually
 as next hop for
 networks 10.1.1.0/24
 and 10.1.2.0/24

Fundamentals of Routes, Next Hop Addresses and Packet Forwarding

- Explain how routes are manually configured to build routing table



Router B learns about Router C's networks dynamically.
Router B's next hop to 10.1.1.0 and 10.1.2.0 is 192.168.1.2 (Router C).
Router A learns about Router C's networks dynamically from Router B.
Router A's next hop to 10.1.1.0 and 10.1.2.0 is 192.168.2.2 (Router B).

Fundamentals of Routes, Next Hop Addresses and Packet Forwarding

- Explain the role of routing protocols in building the routing table



Hands-on Lab:
Examining a Route



Thank You