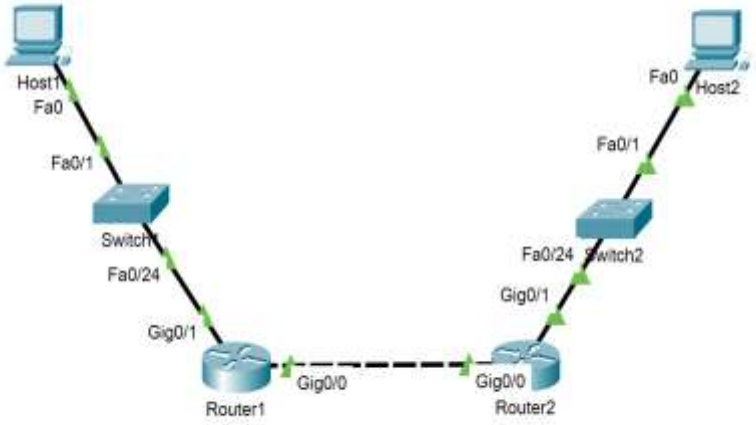

Addressing:

Host 1 NIC
192.168.1.1
C001.C001.C001

Router1
G0/1: A0A0.A0A0.0001
G0/0: A0A0.A0A0.0000

Router2
G0/1: B0B0.B0B0.0001
G0/0: B0B0.B0B0.0000

Host 2 NIC
192.168.1.129
C002.C002.C002

Path from Host A to Host B

1. Host1 sends out the Frame from its NIC:
a. The ARP process constructs a request for the target IP address
b. The device encapsulates the PDU into an Ethernet frame
c. SOURCE MAC: C0001.C0001.C0001
SOURCE IP: 192.168.1.1
DEST MAC: FFFF.FFFF.FFFF
DEST IP: 192.168.1.129

2. Switch1 (FastEthernet0/1) receives the frame:
a. The frame source MAC address does not exist in the MAC table of Switch1
b. Switch1 adds a new MAC entry to its table
c. The frame destination MAC address is broadcast (FFFF.FFFF.FFFF)
d. The Switch processes the frame and decapsulates the PDU from the Ethernet frame
f. This is a broadcast frame so the Switch sends out the frame to all ports except the receiving port
g Frame remains the same:
SOURCE MAC: C0001.C0001.C0001
SOURCE IP: 192.168.1.1
DEST MAC: FFFF.FFFF.FFFF ← Broadcast MAC Address
DEST IP: 192.168.1.129
h. Switch1 (FastEthernet0/24) sends out the frame

3. Router1 (GigabitEthernet0/1) receives the frame
a. The ARP process will run and provide information to all devices
b. Host1 will now have information for its default gateway

THE FIRST PACKET DROPS

NOW (AFTER DISCOVERING ARP AND GATEWAY) LET'S SEE THE FULL PATH

4. Host1 again sends out the Frame:

a. The destination IP address 192.168.1.129 is not in the same subnet so gateway needed

b. HOST1 sets next-hop to default gateway (MAC A0A0.A0A0.0001) in order to leave network

a. The device encapsulates the PDU into an Ethernet frame

SOURCE IP:	192.168.1.1	← Host1
DEST IP:	192.168.1.129	← Host2
SOURCE MAC:	C0001.C0001.C0001	← Host1 NIC's MAC Address
DEST MAC:	A0A0.A0A0.0001	← G0/1 on Router1's MAC Address

5. Switch1 (FastEthernet0/1) receives the new frame with new information from Host1

a. The frame source MAC address is now in MAC table of Switch1

b. Switch looks in its MAC table for the destination MAC address (This is a unicast frame to A0A0.A0A0.0001)

c. Switch1 sends the frame out that port (FastEthernet0/24 sends out the frame)

6. Router1 (GigabitEthernet0/1) receives new frame

a. The frame's destination MAC address matches the receiving port on Router1

b. The device decapsulates the PDU from the Ethernet frame

c. The device looks up the destination IP address in the routing table

d. The routing table finds a routing entry to the destination IP address

e. The next hop is connected on GigabitEthernet0/0 (Router2)

f. The next-hop IP address is in the ARP table

g.

SOURCE IP:	192.168.1.1	← Host1 IP Address
DEST IP:	192.168.1.129	← Host2 IP Address
SOURCE MAC:	A0A0.A0A0.0000	← Router1 (G0/0) MAC Address
DEST MAC:	B0B0.B0B0.0000	← Router2 (G0/0) MAC Address

h. The device encapsulates the PDU into an Ethernet frame (GigabitEthernet0/0) sends out the frame

7. Router2 (GigabitEthernet0/0) receives the frame

a. The frame's destination MAC address matches the receiving port on Router2 (B0B0.B0B0.0000)

b. The device decapsulates the PDU from the Ethernet frame

c. The device looks up the destination IP address in the routing table

d. The routing table finds a routing entry to the destination IP address

e. The destination network is directly connected and the device sets destination as the next-hop

f. The next-hop IP address is in the ARP table

g.

SOURCE IP:	192.168.1.1	← Host1 IP Address
DEST IP:	192.168.1.129	← Host2 IP Address
SOURCE MAC:	B0B0.B0B0.0001	← Router2 (G0/1) MAC Address
DEST MAC:	C002.C002.C002	← Host2 NIC's MAC Address

h. Router2 encapsulates the PDU into an Ethernet frame and GigabitEthernet0/1 sends out the frame

8. Switch2 (FastEthernet0/24) receives the frame

a. The frame source MAC address was found in the MAC table of Switch2

b. Switch2 looks in its MAC table for the destination MAC address

c. Switch2 sends the frame out the correct port (FastEthernet0/24)

9. Host2 receives the Frame on its NIC

a. The frame's destination MAC address matches the receiving port's MAC address (C002.C002.C002)

b. The device decapsulates the PDU from the Ethernet frame

c. The packet's destination IP address matches the device's IP address

d. Host2 sends acknowledgment or reply to its Default-Gateway (Router2-B0B0.B0B0.0000)

e.

SOURCE IP:	192.168.1.129	← Host2 IP Address
DEST IP:	192.168.1.1	← Host1 IP Address
SOURCE MAC:	C002.C002.C002	← Host1 NIC's MAC Address
DEST MAC:	B0B0.B0B0.0000	← Router2 (G0/1) MAC Address