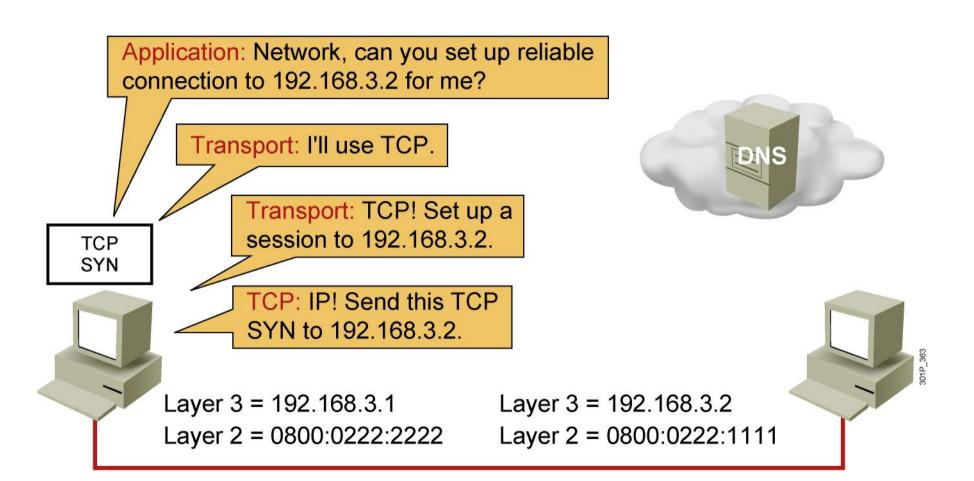
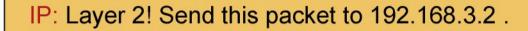
Host-to-Host Packet Delivery (1 of 22)



Host-to-Host Packet Delivery (2 of 22)



SRC IP 192.168.3.1 1

DST IP 192.168.3.2

TCP SYN



Layer 2 = 0800:0222:2222

Layer 3 = 192.168.3.2



Host-to-Host Packet Delivery (3 of 22)

Layer 2: ARP, do you have a mapping for 192.168.3.2?

ARP: Is 192.168.3.2 in my ARP table? No, I guess Layer 2 will have to put the packet in the parking lot until I do an ARP.

SRC IP 192.168.3.1

DST IP 192.168.3.2 TCP SYN



Layer 3 = 192.168.3.1

Layer 2 = 0800:0222:2222

Layer 3 = 192.168.3.2



Host-to-Host Packet Delivery (4 of 22)

ARP: First comes the ARP request. It will say that I am 192.168.3.1 with a MAC of 0800:0222:2222. Are you 192.168.3.2?

Packet

ARP: Layer 2! Send this using our MAC as the SRC MAC and a broadcast as the DST MAC.

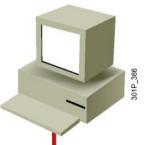
ARP Request

DST MAC Broadcast SRC MAC 0800:0222:2222 ARP Request

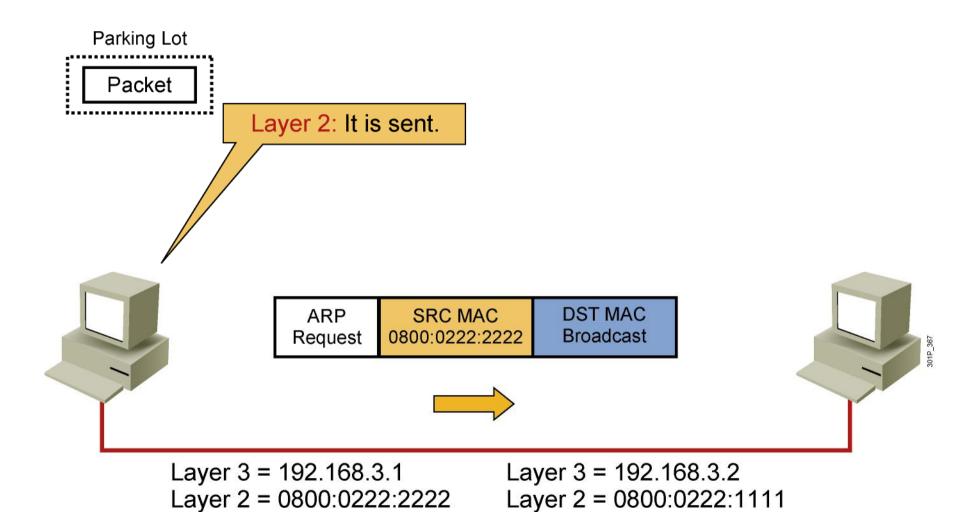
Layer 3 = 192.168.3.1

Layer 2 = 0800:0222:2222

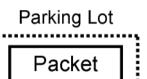
Layer 3 = 192.168.3.2



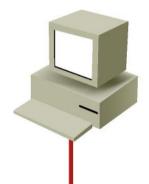
Host-to-Host Packet Delivery (5 of 22)



Host-to-Host Packet Delivery (6 of 22)



Layer 2: I just got a frame with a broadcast MAC so I'll process it. The protocol ID indicates that it belongs to ARP. Let me strip the Layer 2 header and send it to ARP.



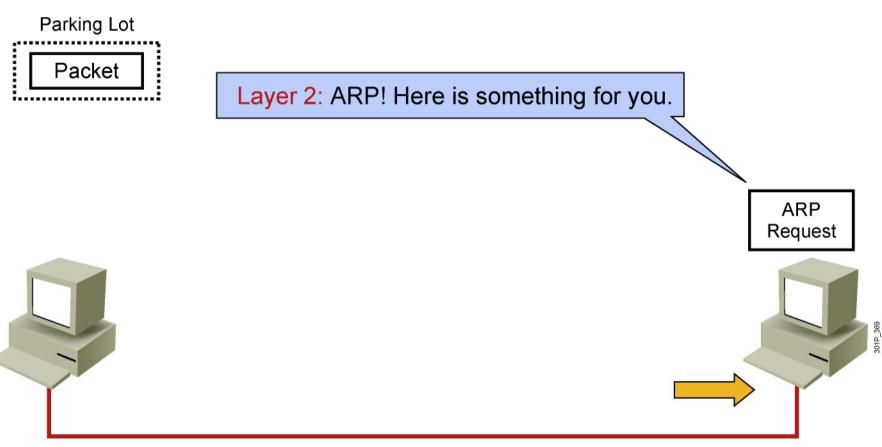
ARP SRC MAC DST MAC Request 0800:0222:2222 Broadcast

Layer 3 = 192.168.3.1

Layer 2 = 0800:0222:2222

Layer 3 = 192.168.3.2

Host-to-Host Packet Delivery (7 of 22)

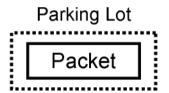


Layer 3 = 192.168.3.1

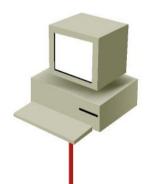
Layer 2 = 0800:0222:2222

Layer 3 = 192.168.3.2

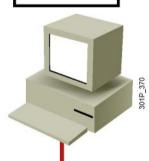
Host-to-Host Packet Delivery (8 of 22)



ARP: I just got an ARP request from 192.168.3.1. Let me add its IP and MAC to my ARP table. Now I can respond.



ARP Request



Layer 3 = 192.168.3.1

Layer 2 = 0800:0222:2222

Layer 3 = 192.168.3.2

Host-to-Host Packet Delivery (9 of 22)

Parking Lot

Packet

ARP: The ARP reply will say that I am 192.168.3.2 with a MAC of 0800:0222:1111.

ARP: Layer 2, send this using our MAC as the SRC MAC and 0800:0222:222 as the DST MAC.

ARP Reply

DST MAC 0800:0222:2222 SRC MAC 0800:0222:1111 ARP Reply

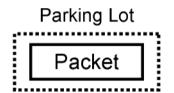


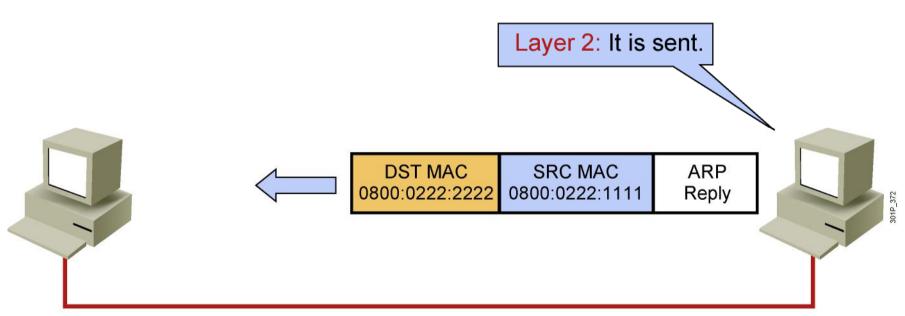
Layer 3 = 192.168.3.1

Layer 2 = 0800:0222:2222

Layer 3 = 192.168.3.2

Host-to-Host Packet Delivery (10 of 22)





Layer 3 = 192.168.3.1

Layer 2 = 0800:0222:2222

Layer 3 = 192.168.3.2

Host-to-Host Packet Delivery (11 of 22)

Parking Lot

Packet

Layer 2: I just got a frame with my MAC so I'll process it. The protocol ID indicates that it belongs to ARP. Let me strip the Layer 2 header and send it to ARP.



DST MAC SR0 0800:0222:2222 0800:0

SRC MAC 0800:0222:1111 ARP Reply



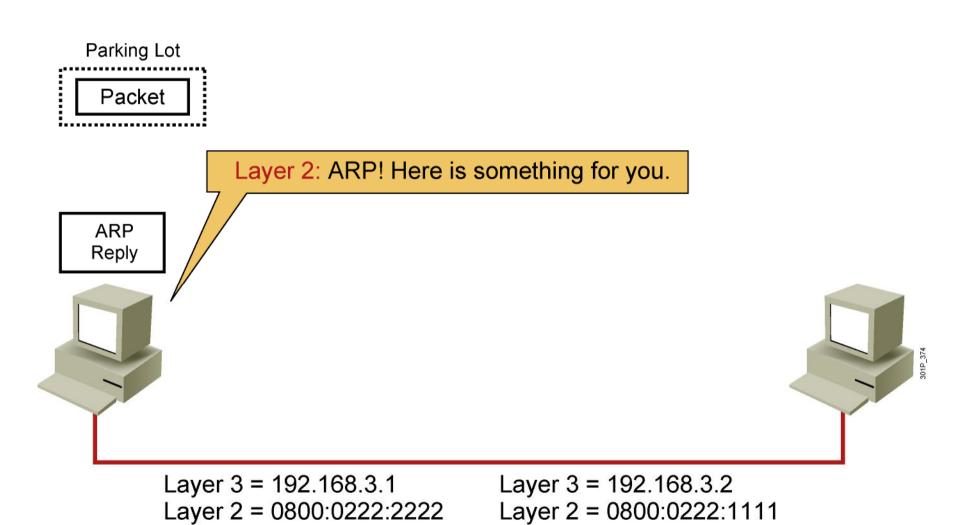
Layer 3 = 192.168.3.1

Layer 2 = 0800:0222:2222

Layer 3 = 192.168.3.2

Process

Host-to-Host Packet Delivery (12 of 22)



Host-to-Host Packet Delivery (13 of 22)

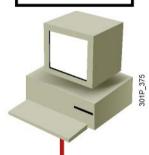


Packet

ARP: I just got an ARP reply from 192.168.3.2. Let me add its IP and MAC to my ARP table.

ARP: Layer 2! I have 192.168.3.2 mapped to 0800:0222:1111.

ARP Request



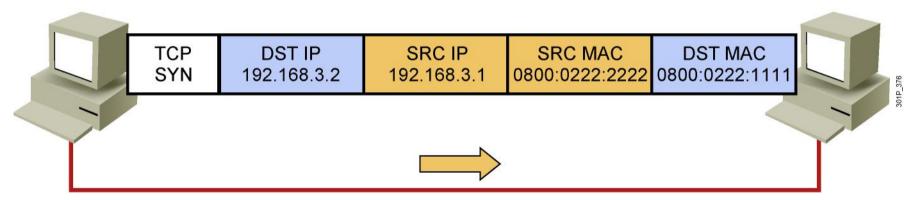
Layer 3 = 192.168.3.1

Layer 2 = 0800:0222:2222

Layer 3 = 192.168.3.2

Host-to-Host Packet Delivery (14 of 22)



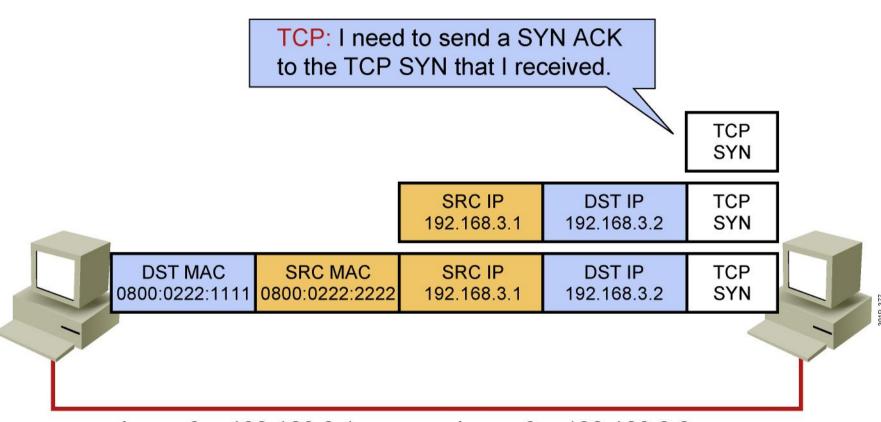


Layer 3 = 192.168.3.1

Layer 2 = 0800:0222:2222

Layer 3 = 192.168.3.2

Host-to-Host Packet Delivery (15 of 22)

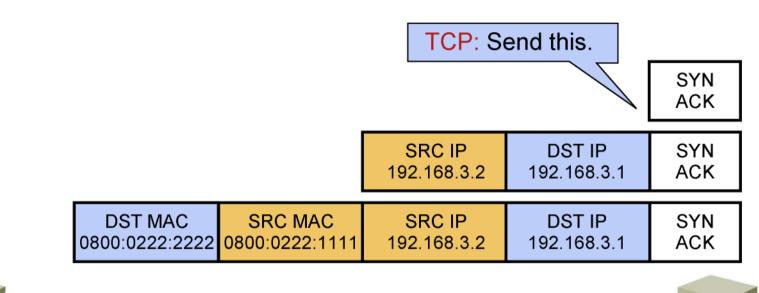


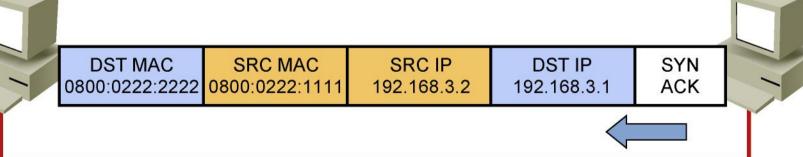
Layer 3 = 192.168.3.1

Layer 2 = 0800:0222:2222

Layer 3 = 192.168.3.2

Host-to-Host Packet Delivery (16 of 22)





Layer 3 = 192.168.3.1

Layer 2 = 0800:0222:2222

Layer 3 = 192.168.3.2

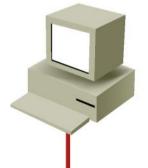
Host-to-Host Packet Delivery (17 of 22)

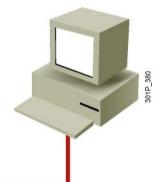
TCP: Got the ACK.

SYN ACK

SRC IP DST IP SYN 192.168.3.1 ACK

DST MAC	SRC MAC	SRC IP	DST IP	SYN
0800:0222:2222	0800:0222:1111	192.168.3.2	192.168.3.1	ACK





Layer 3 = 192.168.3.1

Layer 2 = 0800:0222:2222

Layer 3 = 192.168.3.2

Host-to-Host Packet Delivery (18 of 22)

TCP: I need to let the other end know I got the SYN ACK to complete the session establishment.

TCP ACK

SRC IP DST IP TCP 192.168.3.1 ACK

DST MAC | SRC MAC | SRC IP | DST IP | TCP | 192.168.3.1 | 192.168.3.2 | ACK

TCP DST IP SRC IP SRC MAC 0800:0222:2222 0800:0222:1111

Layer 3 = 192.168.3.1

Layer 2 = 0800:0222:2222

Layer 3 = 192.168.3.2

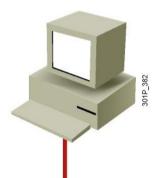
Layer 2 = 0800:0222:1111

01P_381

Host-to-Host Packet Delivery (19 of 22)

Layer 4: OK, Application, I have your session set up.

Application: OK, I'll send you some data.

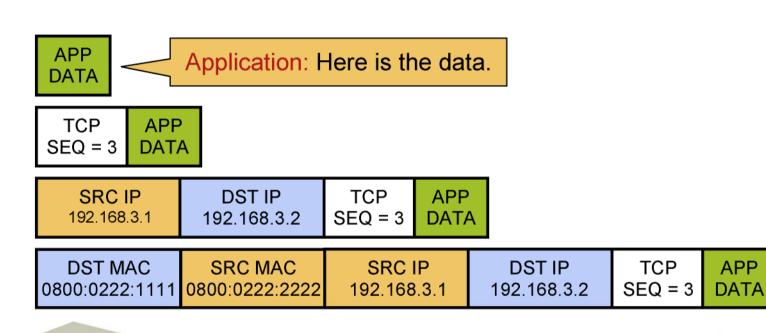


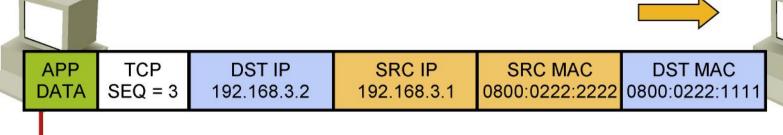
Layer 3 = 192.168.3.1

Layer 2 = 0800:0222:2222

Layer 3 = 192.168.3.2

Host-to-Host Packet Delivery (20 of 22)





Layer 3 = 192.168.3.1

Layer 2 = 0800:0222:2222

Layer 3 = 192.168.3.2

Host-to-Host Packet Delivery (21 of 22)

TCP: Application! Here is some data.

APP **DATA**

TCP SEQ = 3

APP DATA

SRC IP **DST IP TCP APP** 192.168.3.1 192.168.3.2 SEQ = 3DATA

DST MAC

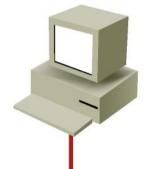
SRC MAC 0800:0222:1111 0800:0222:2222

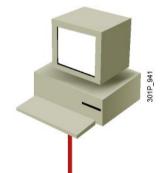
SRC IP 192.168.3.1

DST IP 192.168.3.2

TCP SEQ = 3

APP DATA





Layer 2 = 0800:0222:2222

Layer 3 = 192.168.3.1

Layer 2 = 0800:0222:1111

Layer 3 = 192.168.3.2

Host-to-Host Packet Delivery (22 of 22)

I need to send an ACK to the data that I received.

ACK = 4SEQ = 3

SRC IP **DST IP** ACK = 4192.168.3.2 SEQ = 3192.168.3.1

DST MAC SRC MAC SRC IP DST IP ACK = 40800:0222:2222 0800:0222:1111 SEQ = 3192.168.3.2 192,168,3,1

DST MAC 0800:0222:2222 0800:0222:1111

SRC MAC

SRC IP 192.168.3.2

DST IP 192.168.3.1 ACK = 4SEQ = 3

Layer 3 = 192.168.3.1

Layer 2 = 0800:0222:2222

Layer 3 = 192.168.3.2