

Common TCP/IP Protocols

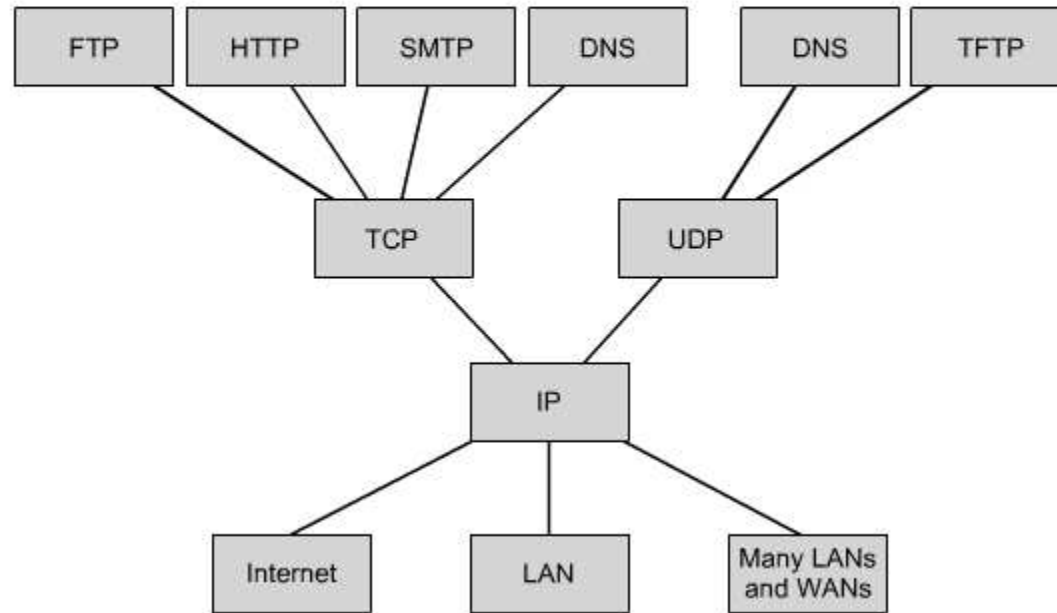
FIGURES

1

2

3

4



Network Layer Fields

FIGURE

1

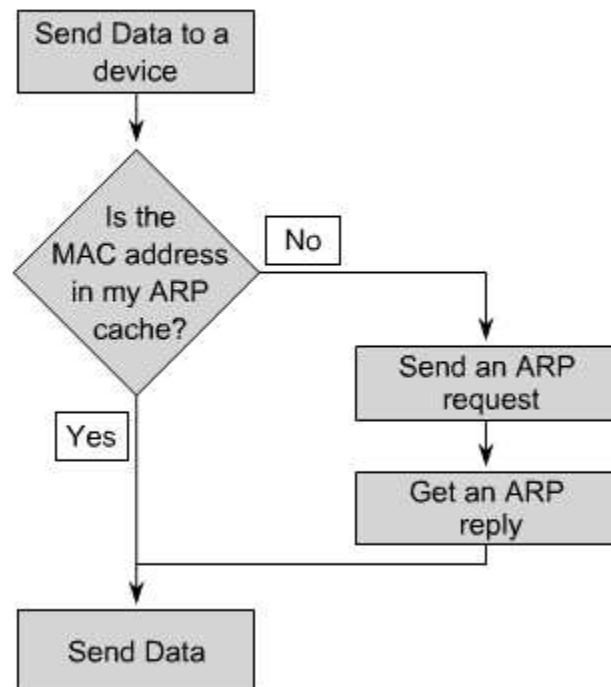
0	4	8	16	19	24	31
VERS		HLEN		Service Type		Total Length
Identification				Flags		Fragment Offset
Time to Live			Protocol		Header Checksum	
Source IP Address						
Destination IP Address						
IP Options (if any)					Padding	
Data						
...						

These are the header fields in an IP packet header. All field lengths are fixed except for IP options and the padding fields.

The ARP Process

FIGURES

- 1
- 2
- 3
- 4
- 5
- 6



ARP Table Functions

FIGURES

1

Toolbar: Maximize

2

FE:ED:31:A2:22:11
176.10.16.1

FE:ED:31:A3:47:14
176.10.16.2

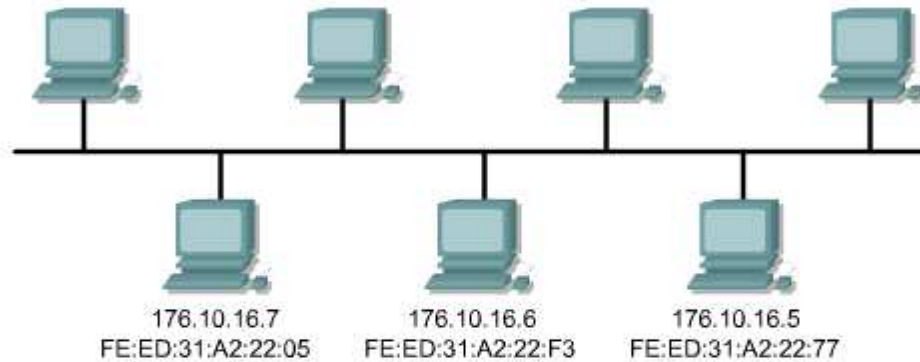
FE:ED:31:22:AA:09
176.10.16.3

FE:ED:31:AF:49:67
176.10.16.4

4

5

6



ARP Table

IP Address	MAC Address

Default Gateway

FIGURES

1

Toolbar: Maximize

2

FE:ED:31:A2:22:11

FE:ED:31:A3:47:14

FE:ED:31:22:AA:09

FE:ED:31:AF:49:67

3

176.10.16.1

176.10.16.2

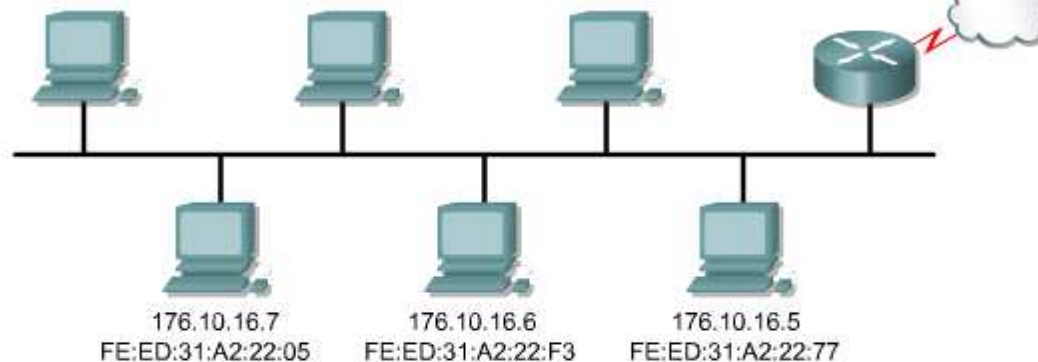
176.10.16.3

176.10.16.4

4

5

6



ARP Table

IP Address	MAC Address
176.10.16.3	FE:ED:31:22:AA:09
176.10.16.6	FE:ED:31:A2:22:F3
176.10.16.5	FE:ED:31:A2:22:77
176.10.16.2	FE:ED:31:A3:47:14

Default Gateway

176.10.16.4	FE:ED:31:AF:49:67

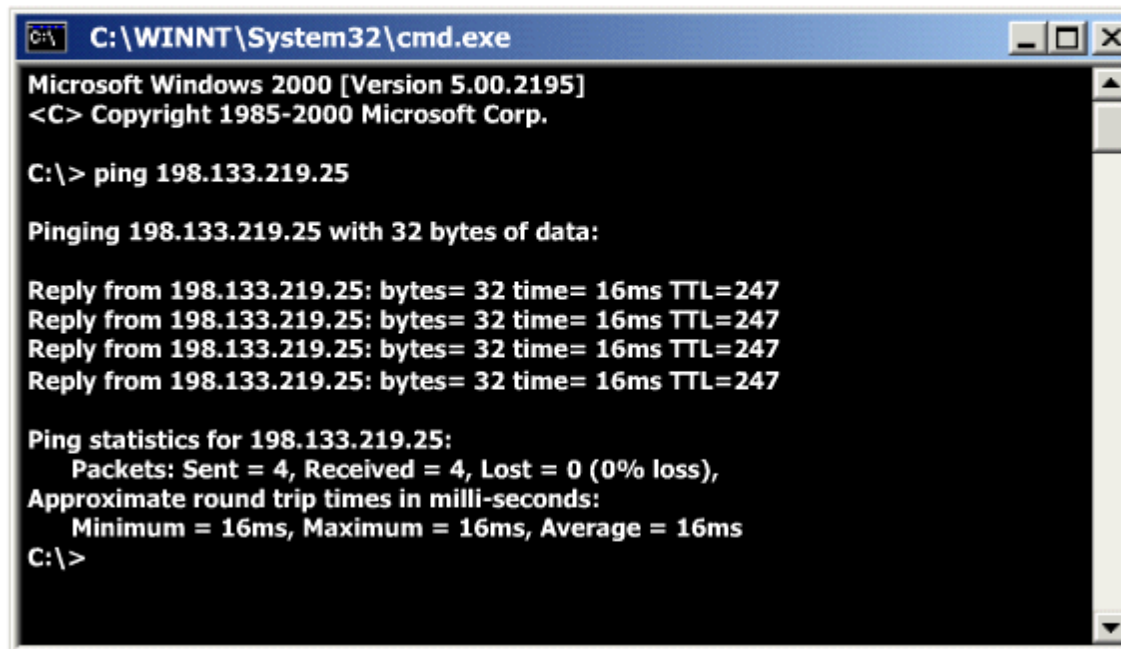
ping Command

FIGURES

1

2

3



```
C:\WINNT\System32\cmd.exe
Microsoft Windows 2000 [Version 5.00.2195]
<C> Copyright 1985-2000 Microsoft Corp.

C:\> ping 198.133.219.25

Pinging 198.133.219.25 with 32 bytes of data:

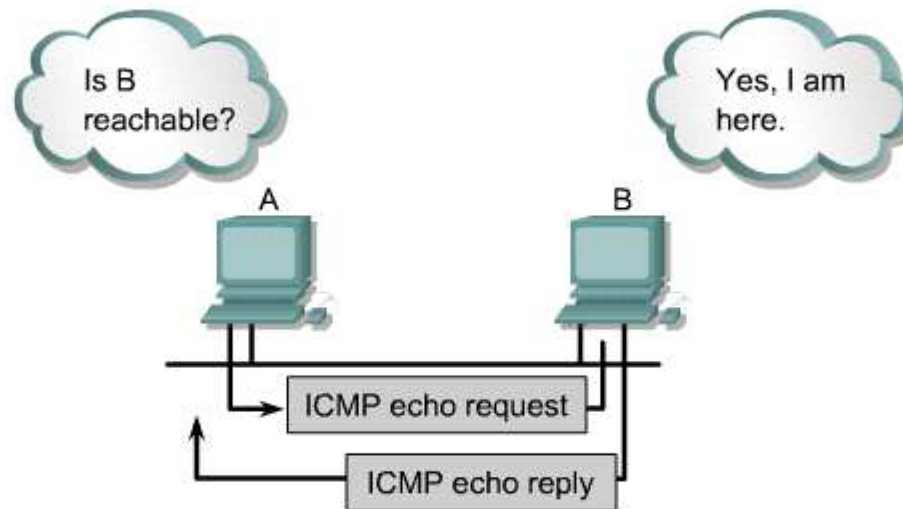
Reply from 198.133.219.25: bytes= 32 time= 16ms TTL=247
Reply from 198.133.219.25: bytes= 32 time= 16ms TTL=247
Reply from 198.133.219.25: bytes= 32 time= 16ms TTL=247
Reply from 198.133.219.25: bytes= 32 time= 16ms TTL=247

Ping statistics for 198.133.219.25:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 16ms, Maximum = 16ms, Average = 16ms
C:\>
```

Echo Reply

FIGURES

- 1
- 2
- 3



Traffic generated by the `ping` command

ICMP Message Types

FIGURES

1

2

ICMP Message Types	
0	Echo Reply
3	Destination Unreachable
4	Source Quench
5	Redirect/ Change Request
8	Echo Request
9	Router Advertisement
10	Router Selection
11	Time Exceeded
12	Parameter Problem
13	Timestamp Request
14	Timestamp Reply
15	Information Request
16	Information Reply
17	Address Mask Request
18	Address Mask Reply

Destination Unreachable Message

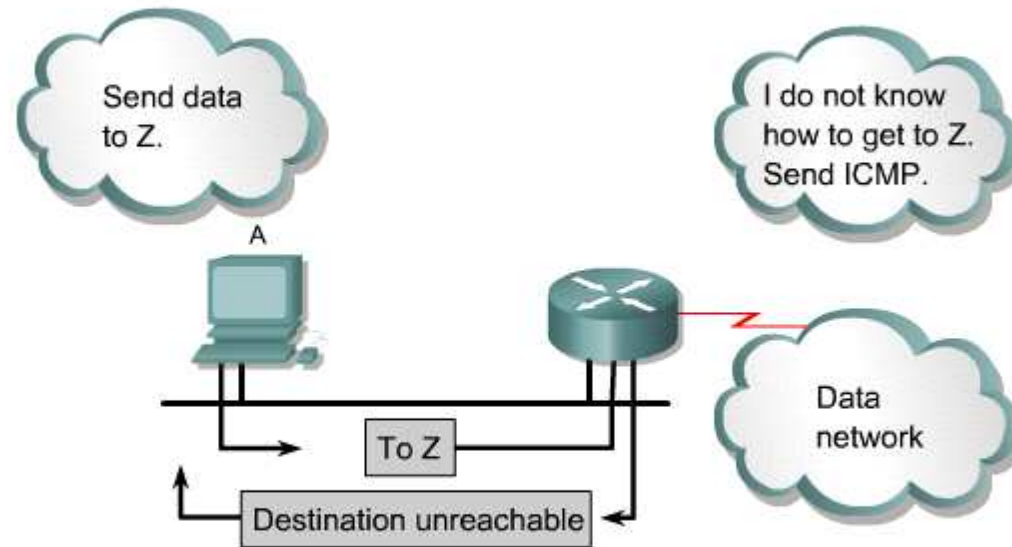
FIGURES

1

2

3

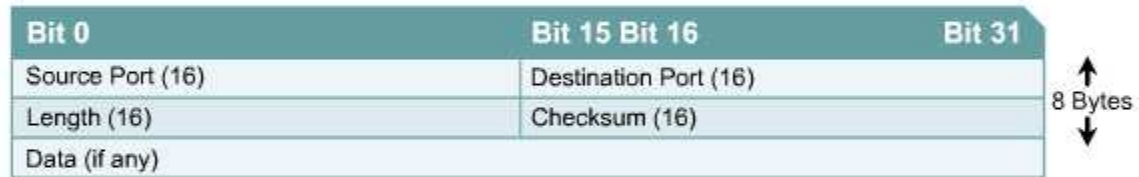
4



UDP Segment Format

FIGURE

1



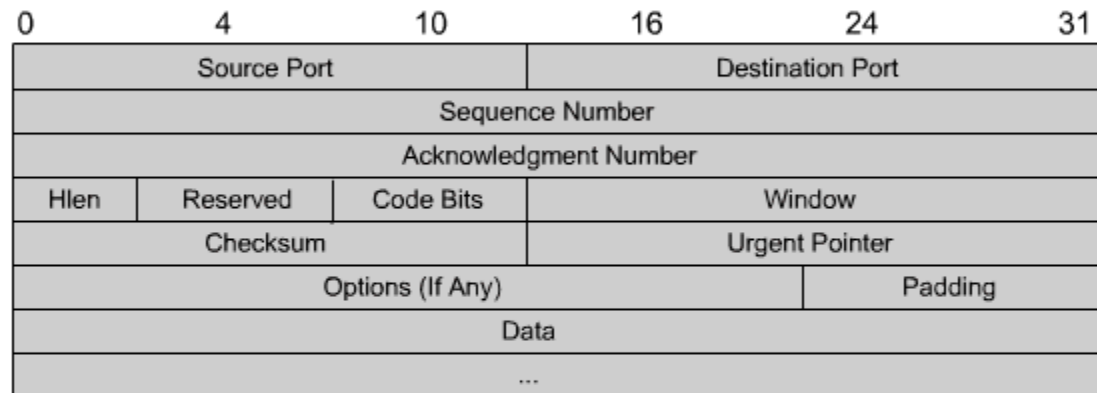
No sequence or acknowledgment fields

TCP Segment Format

FIGURES

1

2

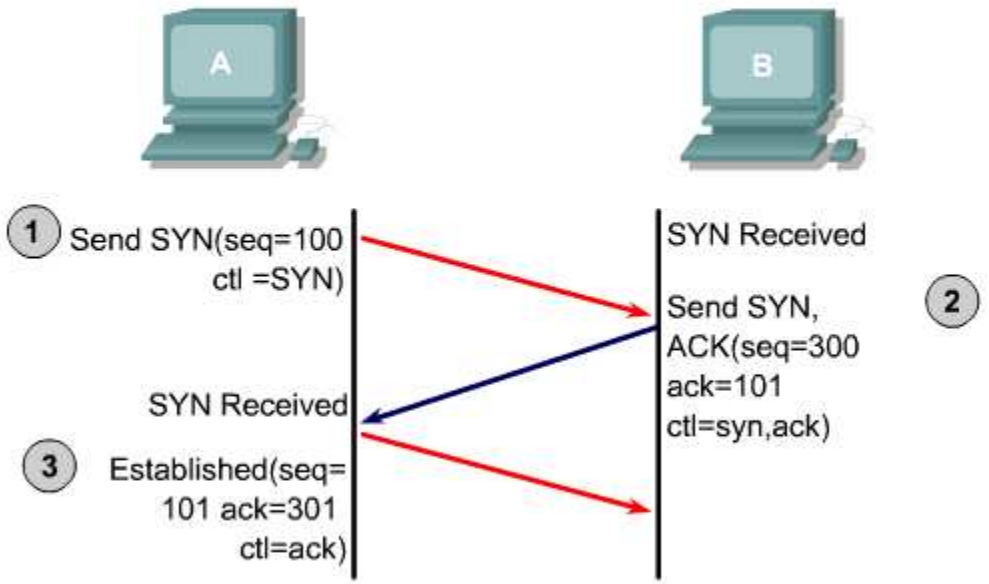


The field format of a TCP segment contains a TCP header followed by data. Segments are used to establish connections as well as to carry data and acknowledgments.

TCP Three-Way Handshake/Open Connection

FIGURES

- 1
- 2

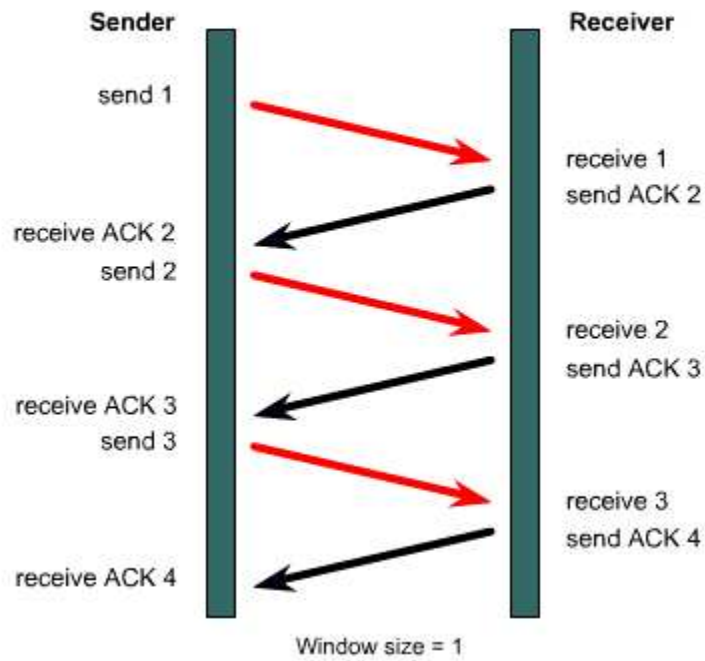


TCP Basic Window

FIGURES

1

2

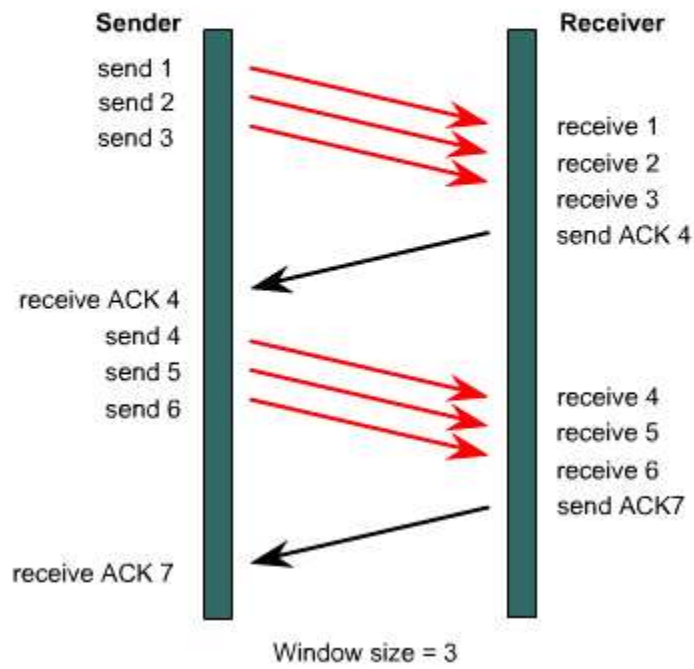


TCP Sliding Window

FIGURES

1

2



TCP Sliding Window

FIGURES

1

2

