NANO-GUIDE TCP/IP et tcpdump

Fichier PDF

Acronymes

Acronyms

AH	Authentication Header (RFC 2402)	ISAKMP	Internet Security Association & Key Management Protocol (RFC 2408)
ARP	Address Resolution Protocol (RFC 826)		
BGP	Border Gateway Protocol (RFC 1771)	L2TP	Layer 2 Tunneling Protocol (RFC 2661)
CWR	Congestion Window Reduced (RFC 2481)	NNTP	Network News Transfer Protocol (RFC 977)
DF	Don't Fragment bit (IP)	OSPF	Open Shortest Path First (RFC 1583)
DHCP	Dynamic Host Configuration Protocol (RFC 2131)	POP3	Post Office Protocol v3 (RFC 1460)
DNS	Domain Name System (RFC 1035)	RFC	Request for Comments
ECN	Explicit Congestion Notification (RFC 3168)	RIP	Routing Information Protocol (RFC 2453)
EIGRP	Extended IGRP (Cisco)	LDAP	Lightweight Directory Access Protocol (RFC 2251)
ESP	Encapsulating Security Payload (RFC 2406)	SKIP	Simple Key-Management for Internet Protocols
FTP	File Transfer Protocol (RFC 959)	SMTP	Simple Mail Transfer Protocol (RFC 821)
GRE	Generic Routing Encapsulation (RFC 2784)	SNMP	Simple Network Management Protocol (RFC 1157)
HTTP	Hypertext Transfer Protocol (RFC 1945)	SSH	Secure Shell
ICMP	Internet Control Message Protocol (RFC 792)	SSL	Secure Sockets Layer (Netscape)
IGMP	Internet Group Management Protocol (RFC 2236)	TCP	Transmission Control Protocol (RFC 793)
IGRP	Interior Gateway Routing Protocol (Cisco)	TFTP	Trivial File Transfer Protocol (RFC 1350)
IMAP	Internet Message Access Protocol (RFC 2060)	TOS	Type of Service field (IP)
IP	Internet Protocol (RFC 791)	UDP	User Datagram Protocol (RFC 768)

All RFCs can be found at http://www.rfc-editor.org

tcpdump

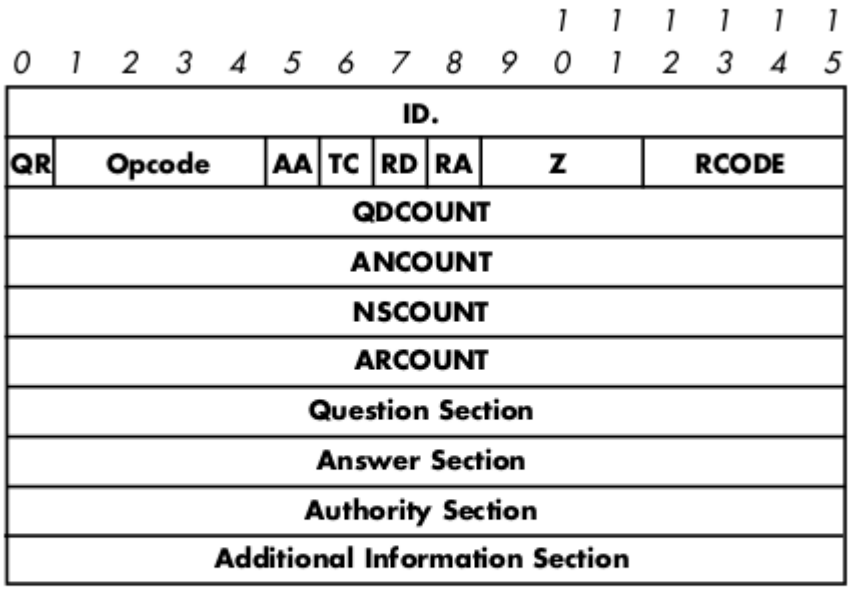
tcpdump Usage

```
tcpdump  [-aenStvx]  [-F file]
[-i int]  [-r file]  [-s snaplen]
[-w file]  ['filter_expression']

-e  Display data link header.
-F  Filter expression in file.
-i  Listen on int interface.
-n  Don't resolve IP addresses.
-r  Read packets from file.
-s  Get snaplen bytes from each packet.
-S  Use absolute TCP sequence numbers.
-t  Don't print timestamp.
-v  Verbose mode.
-w  Write packets to file.
-x  Display in hex.
-X  Display in hex and ASCII.
```

DNS

DNS



DNS Parameters

Query/Response
0 Query
1 Response

Opcode
0 Standard query (QUERY)
1 Inverse query (IQUERY)
2 Server status request (STATUS)

AA
(1 = Authoritative Answer)

TC
(1 = TrunCation)

RD
(1 = Recursion Desired)

RA
(1 = Recursion Available)

Z
(Reserved; set to 0)

Response code
0 No error
1 Format error
2 Server failure
3 Non-existant domain (NXDOMAIN)
4 Query type not implemented
5 Query refused

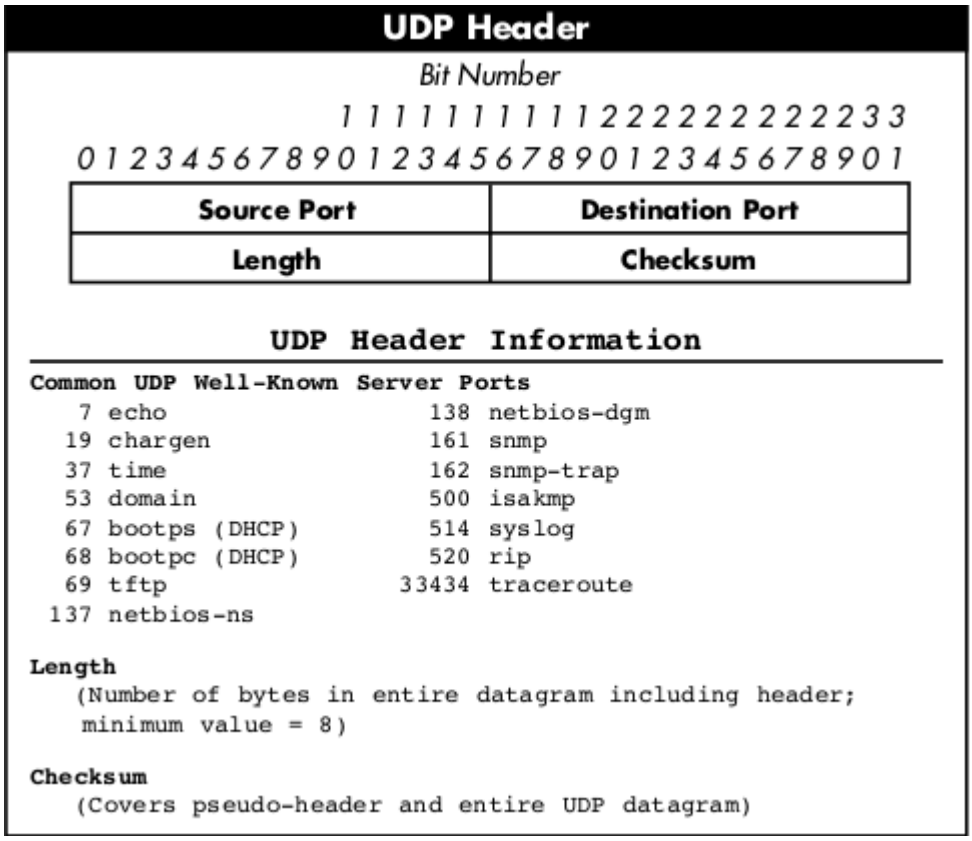
QDCOUNT
(No. of entries in Question section)

ANCOUNT
(No. of resource records in Answer section)

NSCOUNT
(No. of name server resource records in Authority section)

ARCOUNT
(No. of resource records in Additional Information section.

Entête UDP



UDP Header

Bit Number

1 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 3 3
0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1

Source Port	Destination Port
Length	Checksum

UDP Header Information

Common UDP Well-Known Server Ports

7	echo	138	netbios-dgm
19	chargen	161	snmp
37	time	162	snmp-trap
53	domain	500	isakmp
67	bootps (DHCP)	514	syslog
68	bootpc (DHCP)	520	rip
69	tftp	33434	traceroute
137	netbios-ns		

Length
(Number of bytes in entire datagram including header; minimum value = 8)

Checksum
(Covers pseudo-header and entire UDP datagram)

Entête TCP

TCP Header

Bit Number

0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1

Source Port			Destination Port
Sequence Number			
Acknowledgment Number			
Offset (Header Length)	Reserved	Flags	Window
Checksum			Urgent Pointer
Options (optional)			

TCP Header Contents

Common TCP Well-Known Server Ports

```
  7 echo                      110 pop3
 19 chargen                   111 sunrpc
 20 ftp-data                  119 nntp
 21 ftp-control               139 netbios-ssn
 22 ssh                       143 imap
 23 telnet                    179 bgp
 25 smtp                      389 ldap
 53 domain                    443 https (ssl)
 79 finger                    445 microsoft-ds
 80 http                     1080 socks
```

Offset
Number of 32-bit words in TCP header; minimum value = 5

Reserved
4 bits; set to 0
ECN bits (used when ECN employed; else 00)
CWR (1 = sender has cut congestion window in half)
ECN-Echo (1 = receiver cuts congestion window in half)

Flags (UAPRSF)
U (1 = Urgent pointer valid)
A (1 = Acknowledgement field value valid)
P (1 = Push data)
R (1 = Reset connection)
S (1 = Synchronize sequence numbers)
F (1 = no more data; Finish connection)

Checksum
Covers pseudoheader and entire TCP segment

Urgent Pointer
Points to the sequence number of the byte following urgent data.

Options

```
0 End of Options list        3 Window scale
1 No operation (pad)         4 Selective ACK ok
2 Maximum segment size       8 Timestamp
```

Entête IP

TCP Header

Bit Number

1 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 3 3
0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1

Source Port			Destination Port
Sequence Number			
Acknowledgment Number			
Offset (Header Length)	Reserved	Flags	Window
Checksum			Urgent Pointer
Options (optional)			

TCP Header Contents

Common TCP Well-Known Server Ports

```
  7 echo                      110 pop3
 19 chargen                   111 sunrpc
 20 ftp-data                  119 nntp
 21 ftp-control               139 netbios-ssn
 22 ssh                       143 imap
 23 telnet                    179 bgp
 25 smtp                      389 ldap
 53 domain                    443 https (ssl)
 79 finger                    445 microsoft-ds
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```

Offset

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Reserved

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P (1 = Push data)
R (1 = Reset connection)
S (1 = Synchronize sequence numbers)
F (1 = no more data; Finish connection)

Checksum

Covers pseudoheader and entire TCP segment

Urgent Pointer

Points to the sequence number of the byte following urgent data.

Options

```
0 End of Options list        3 Window scale
1 No operation (pad)         4 Selective ACK ok
2 Maximum segment size       8 Timestamp
```

ICMP et PING

ICMP

Bit Number

1 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 3 3
0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1

Type	Code	Checksum
Other message-specific information...		

Type Name/Codes (Code=0 unless otherwise specified)

```
 0  Echo Reply
 3  Destination Unreachable
     0 Net Unreachable
     1 Host Unreachable
     2 Protocol Unreachable
     3 Port Unreachable
     4 Fragmentation Needed & DF Set
     5 Source Route Failed
     6 Destination Network Unknown
     7 Destination Host Unknown
     8 Source Host Isolated
     9 Network Administratively Prohibited
    10 Host Administratively Prohibited
    11 Network Unreachable for TOS
    12 Host Unreachable for TOS
    13 Communication Administratively Prohibited
 4  Source Quench
 5  Redirect
    0 Redirect Datagram for the Network
    1 Redirect Datagram for the Host
    2 Redirect Datagram for the TOS & Network
    3 Redirect Datagram for the TOS & Host
 8  Echo
 9  Router Advertisement
10  Router Selection
11  Time Exceeded
    0 Time to Live exceeded in Transit
    1 Fragment Reassembly Time Exceeded
12  Parameter Problem
    0 Pointer indicates the error
    1 Missing a Required Option
    2 Bad Length
13  Timestamp
14  Timestamp Reply
15  Information Request
16  Information Reply
17  Address Mask Request
18  Address Mask Reply
30  Traceroute
```

PING (Echo/Echo Reply)

Bit Number

1 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 3 3
0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1

Type (8 or 0)	Code (0)	Checksum
Identifier		Sequence Number
Data...		

ARP