

TDC 375

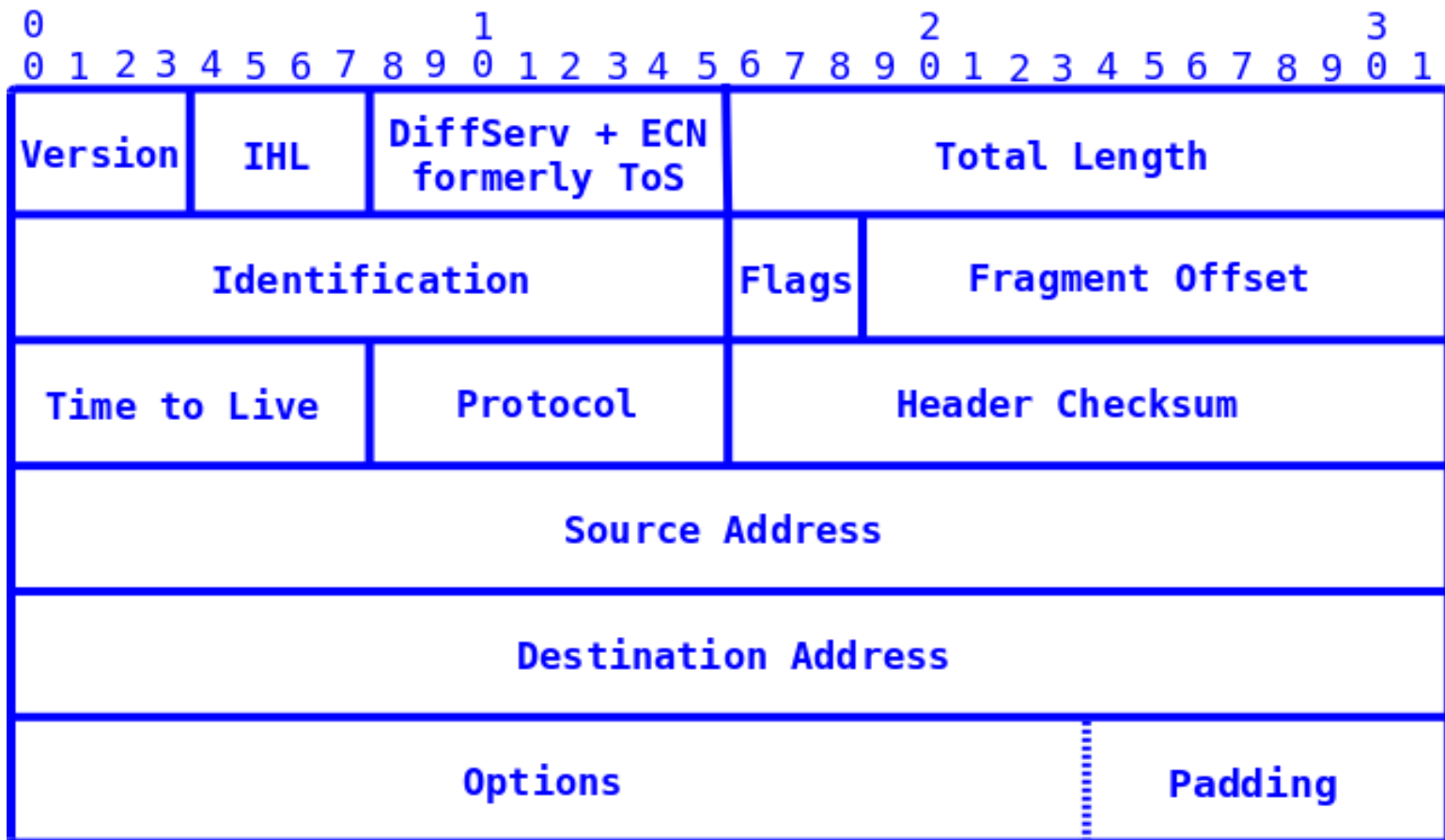
Network Protocols

TCP/IP Suite Overview

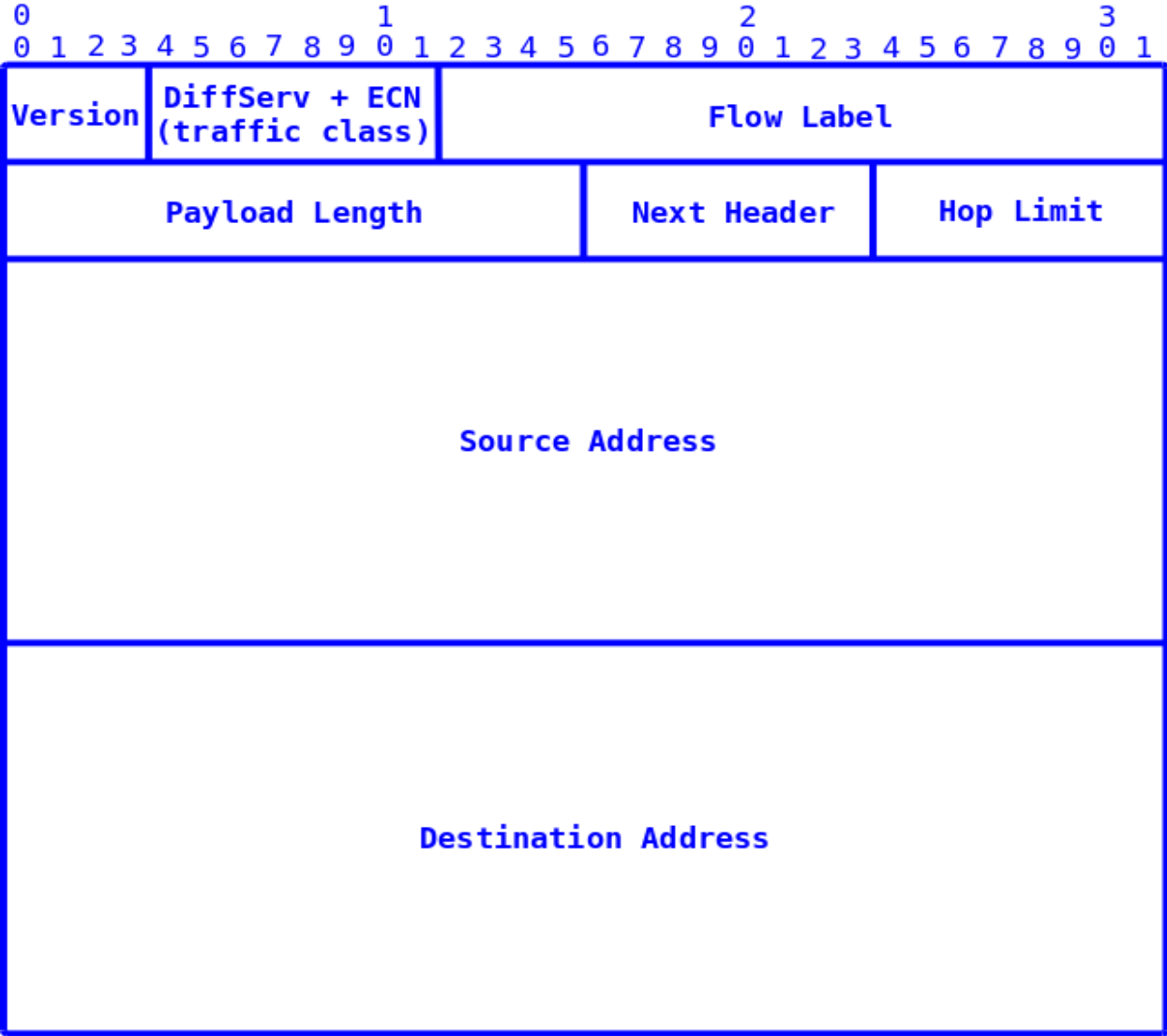
Internet Standards Publications

- Internet-Drafts
- RFCs
 - Proposed, Draft or Internet Standard
 - Informational
 - Historical
 - Experimental
 - Best Common Practice (BCP)
 - For Your Information (FYI)

IPv4



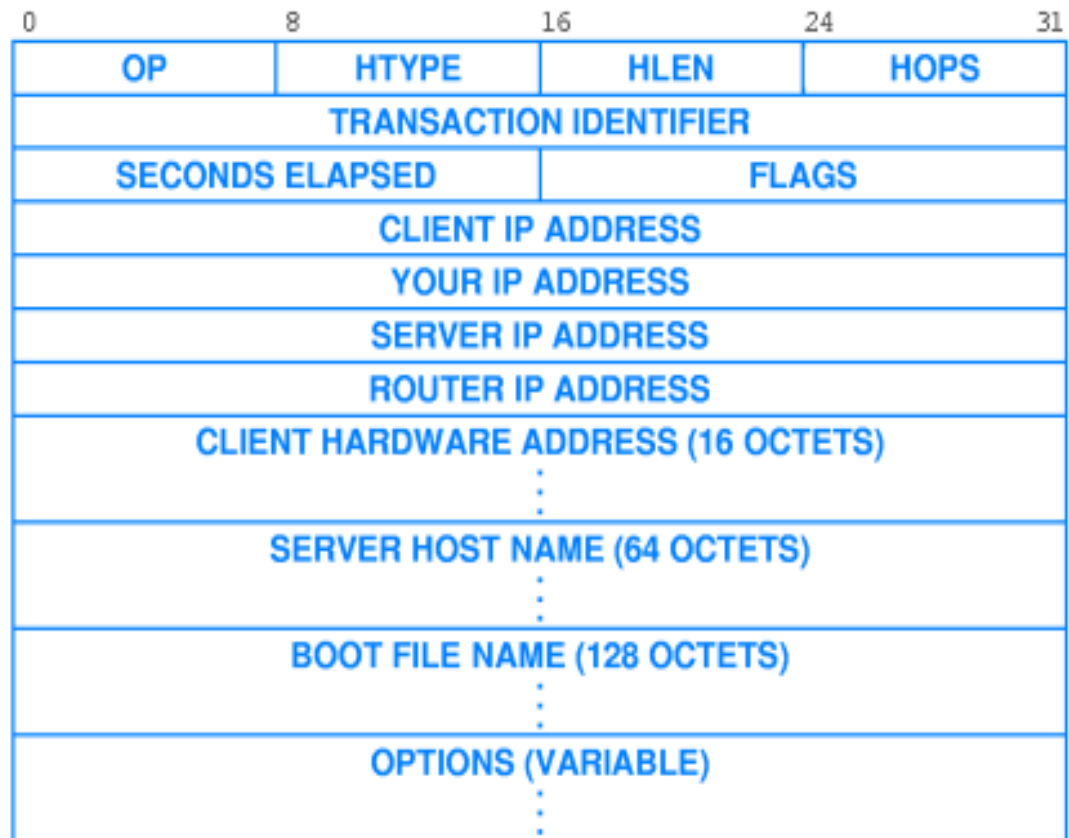
IPv6



ARP

0	8	16	24	31
HARDWARE ADDRESS TYPE		PROTOCOL ADDRESS TYPE		
HADDR LEN	PADDR LEN	OPERATION		
SENDER HADDR (first 4 octets)				
SENDER HADDR (last 2 octets)		SENDER PADDR (first 2 octets)		
SENDER PADDR (last 2 octets)		TARGET HADDR (first 2 octets)		
TARGET HADDR (last 4 octets)				
TARGET PADDR (all 4 octets)				

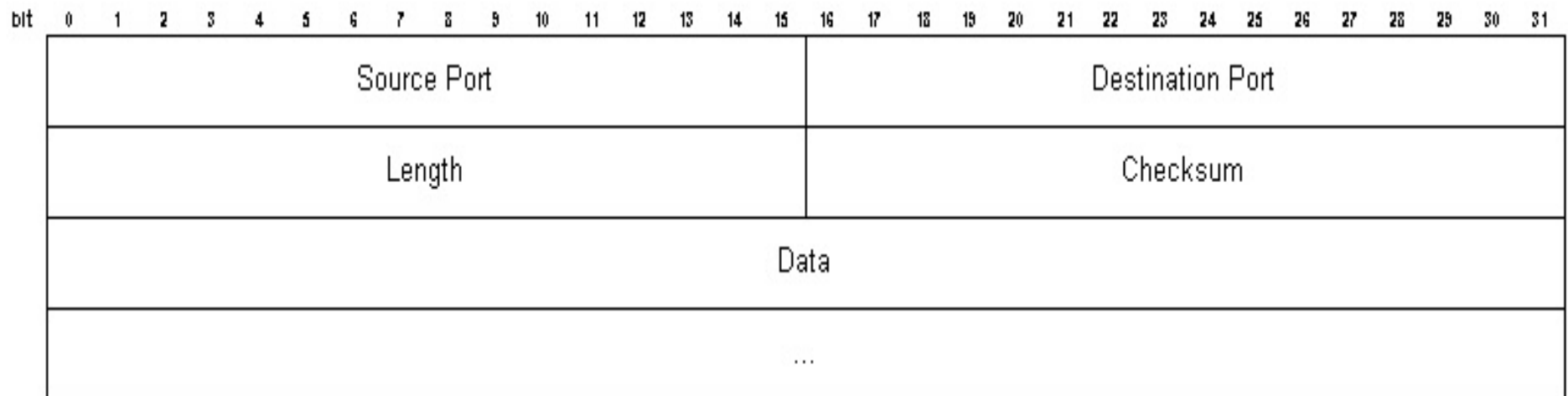
DHCP



ICMP

- Primarily used for error and status messages
- All ICMP messages have 3 common fields:
TYPE, CODE, CHECKSUM
- Otherwise ICMP messages can vary widely
- Common uses
 - ICMP ECHO Request (aka PING)
 - Destination unreachable (e.g. PMTU discovery)

UDP



TCP

0				1				2				3									
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																					
HLEN		rsrvd		C	E	U	A	P	R	S	F	Window Size									
				W	C	R	C	S	S	S	I										
				R	E	G	K	H	T	N	N										
Checksum										Urgent Pointer											
options (if any)										padding (if required)											

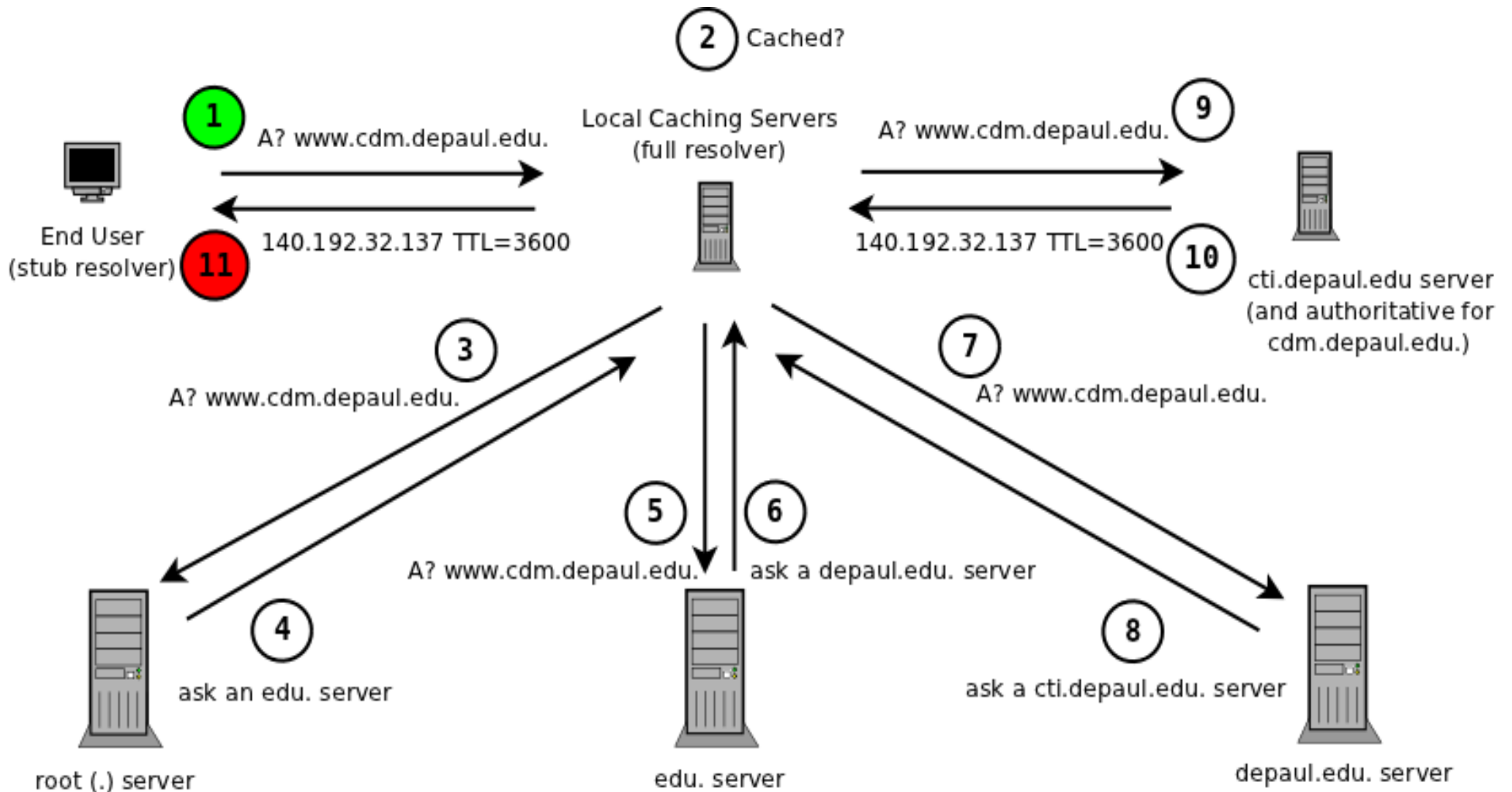
Routing Protocols

- RIP
- OSPF
- IS-IS
- IGRP/EIGRP
- BGP

IP Multicast

- Senders address packets to a group address
 - i.e. 224.0.0.0/4 in IPv4
- Never a source from a multicast address
- IGMP to manage group membership in IPv4
 - MLD, subset of ICMPv6 in IPv6
- Routers forward to where there are group members
- IP multicast routers maintain significant “state”

DNS



Applications, Management and Security

- SMTP, POP, IMAP
- TELNET, SSH
- TFTP, FTP, SCP, SFTP
- HTTP, HTTPS
- SSL/TLS
- syslog, SNMP, NetFlow, NETCONF
- NTP
- RADIUS / TACACS

...and many more

- For a sample, see:
 - Internet protocols (IP) /etc/protocols
 - Network applications (TCP/UDP) /etc/services