

Computer Networks

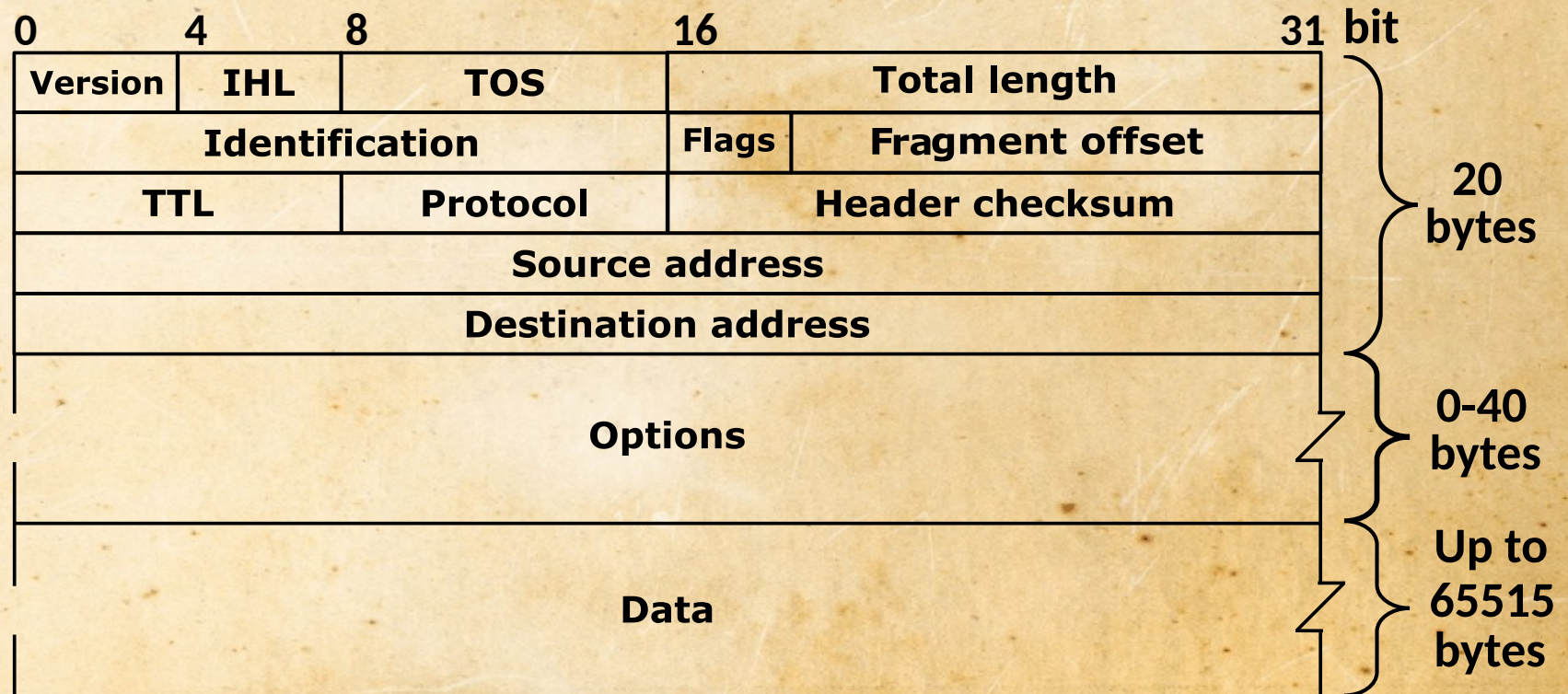
Internet Protocol Version 4 (IPv4) Address

Lecture Contents

- IPv4
 - Classful Network
 - Classless Inter-Domain Routing (CIDR)
- IPv6

Internet Protocol version 4 (IPv4) Header

- Header given in *IEN 54* (and *RFC 760*)

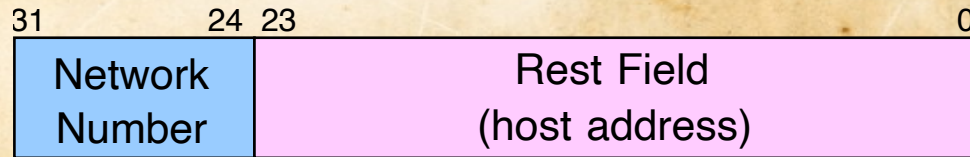


Internet Protocol version 4 (IPv4) Address

- 32 bits (4 bytes)
 - Convention is to write as 4 decimal numbers ($2^8 = 256$) so 0..255
 - 0.0.0.0 to 255.255.255.255

IPv4 Original Allocation

- Original address allocation
 - 8 bits for network number (ARPANet address 10)
 - Remainder to identify host within the network ($2^{24} = 16,777,216$)



- Very early an obvious limitation to scalability

IPv4 Classful Allocation

- Defined in RFC 791
 - Less than $2^6 = 64$ networks had been allocated, so upper bits taken for class bits

	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0					
Class A	0	$2^7 = 128$							$2^{24} = 16,777,216$																												
Class B	1	0	$2^{14} = 16,384$														$2^{16} = 65,536$																				
Class C	1	1	0	$2^{21} = 2,097,152$																			$2^8 = 256$														
Class D	1	1	1	0	<i>Multicast</i>																																
Class E	1	1	1	1	<i>Reserved</i>																																

Network Number

Rest Field

IPv4 Classless Inter-Domain Routing (CIDR)

- Introduced 1993
- Slow growth of routing tables
- Slow exhaustion of IPv4 addresses
- Based on *variable-length subnet masking* (VLSM)

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