



VYSOKÉ UČENÍ FAKULTA  
TECHNICKÉ INFORMAČNÍCH  
V BRNĚ TECHNOLOGIÍ

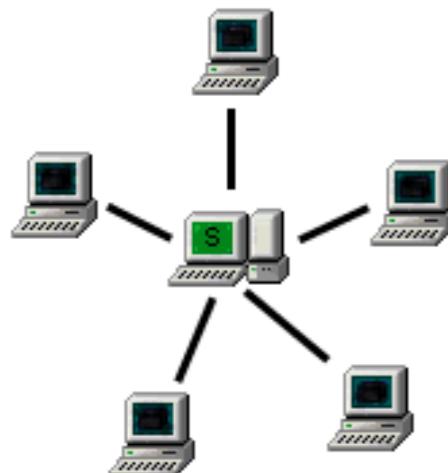


# Závěrečný přehled

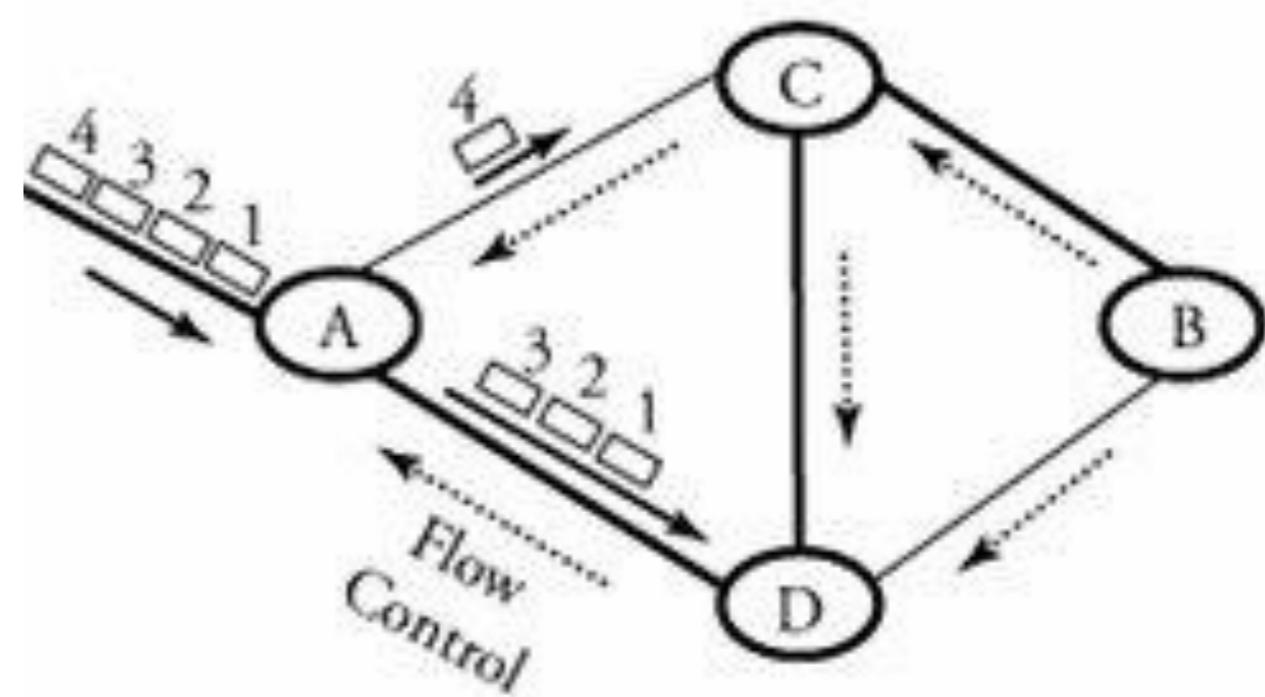
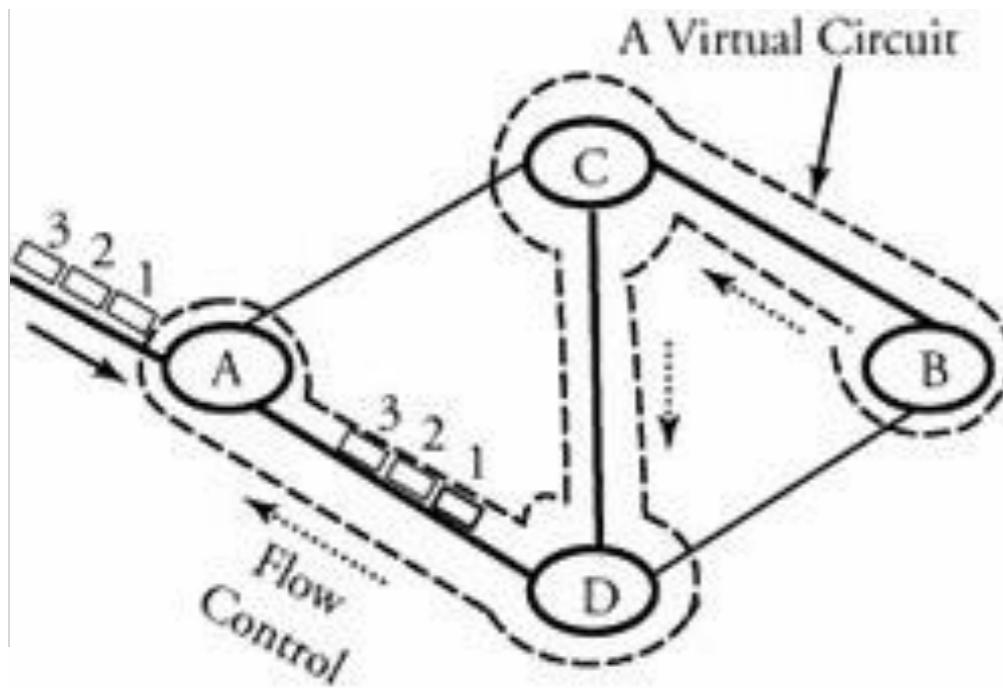
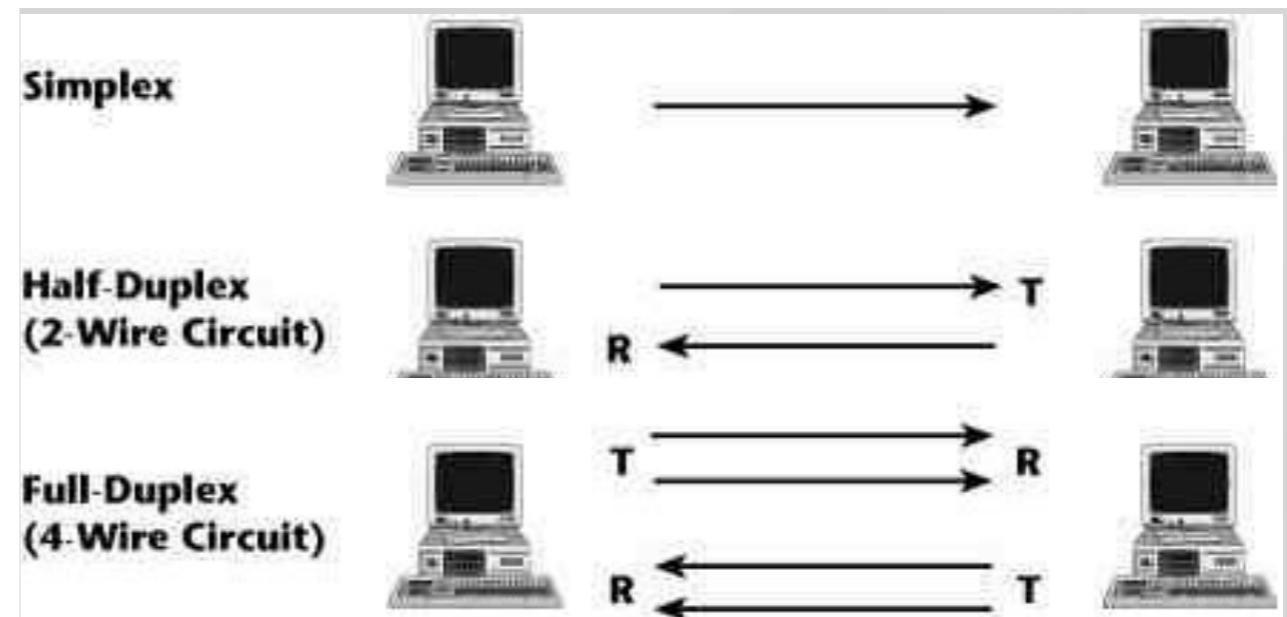
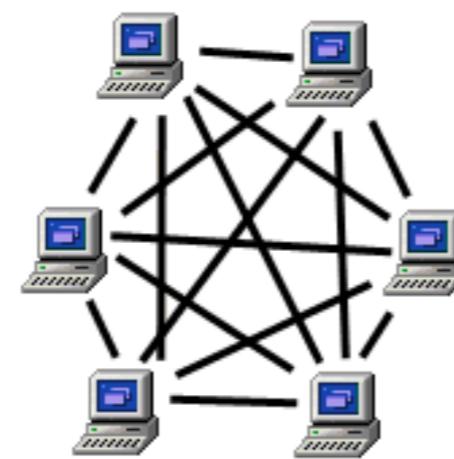
IPK2018L

# Typ komunikace

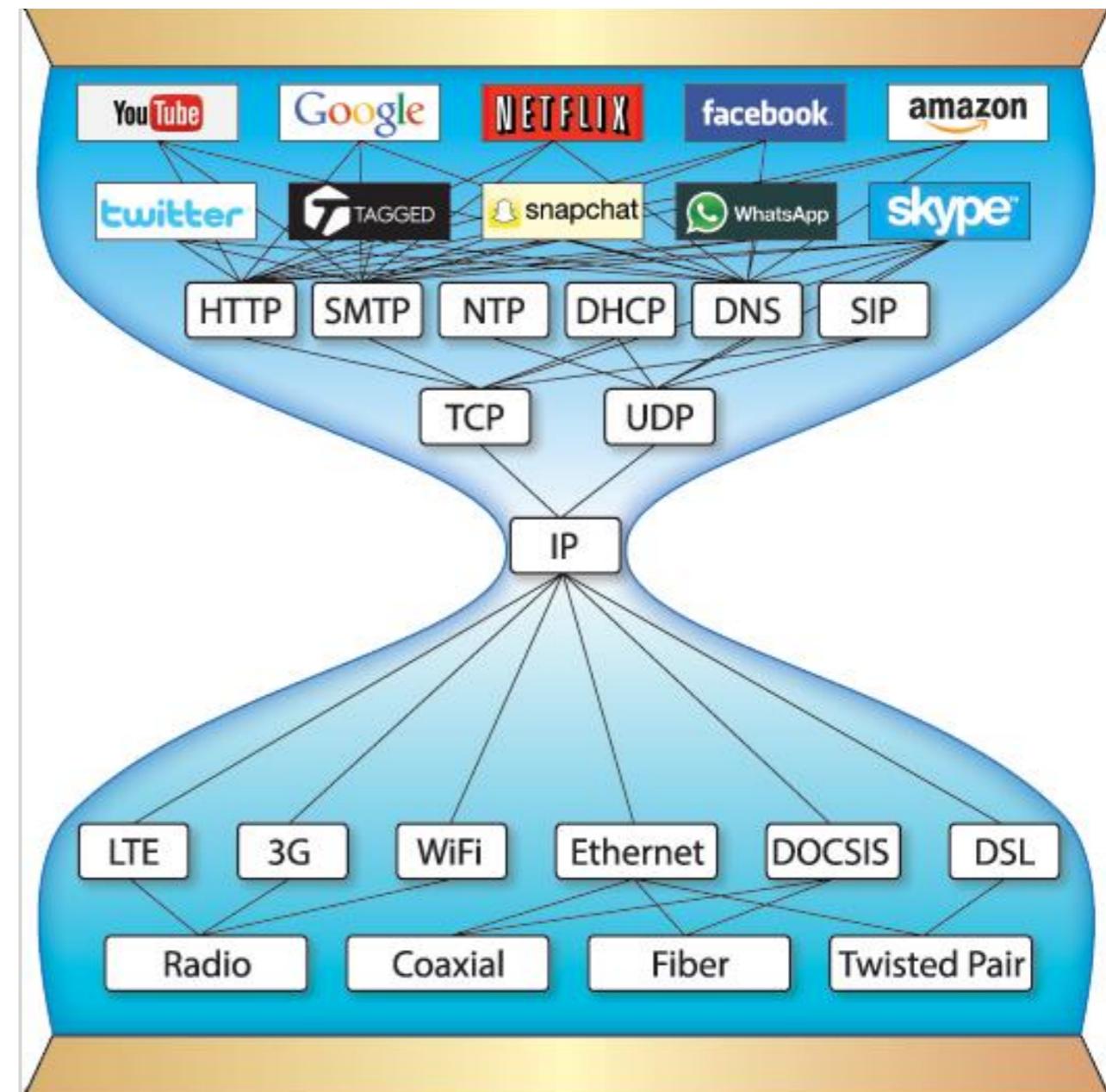
Server Based Network



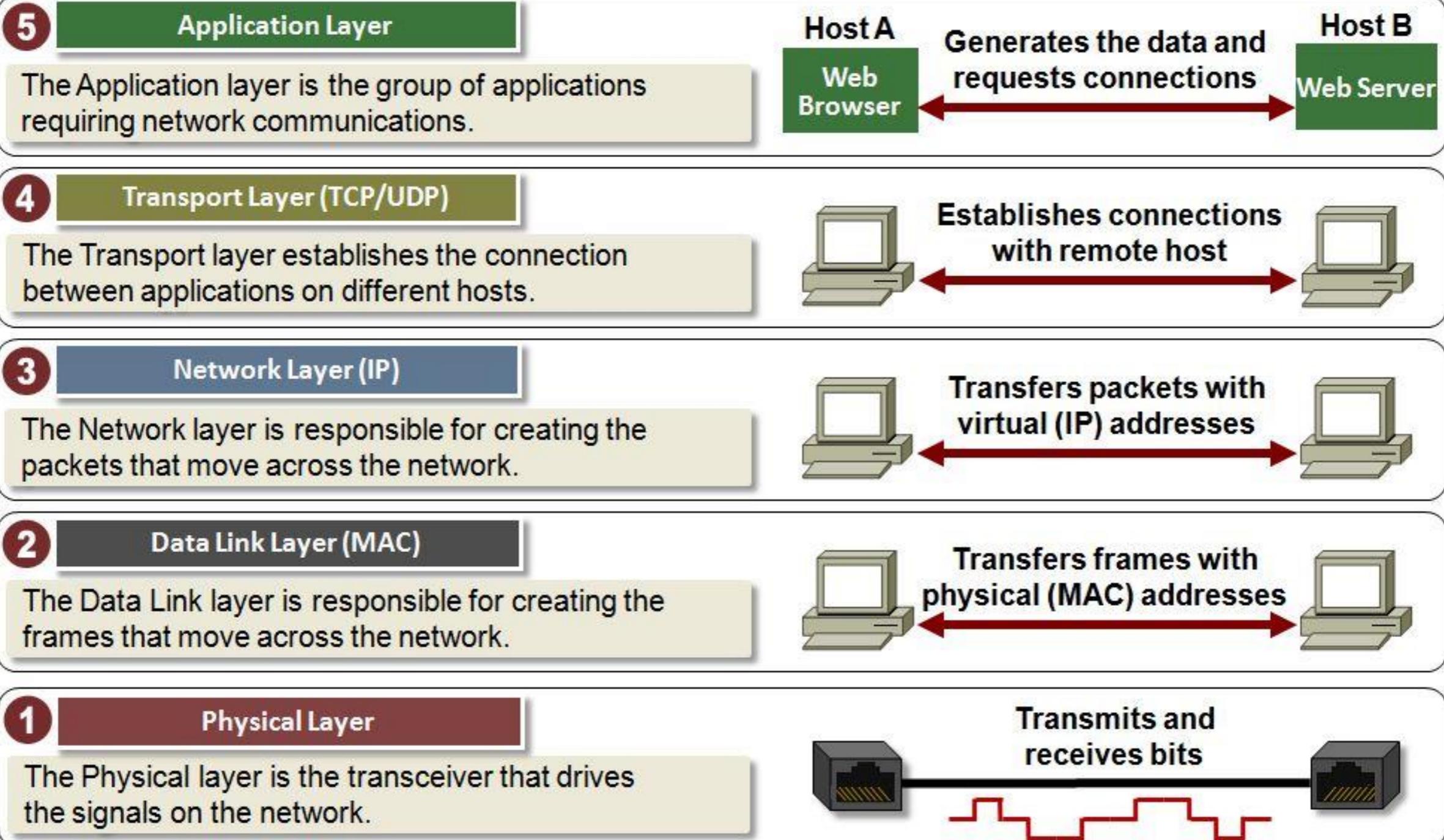
Peer to Peer Network



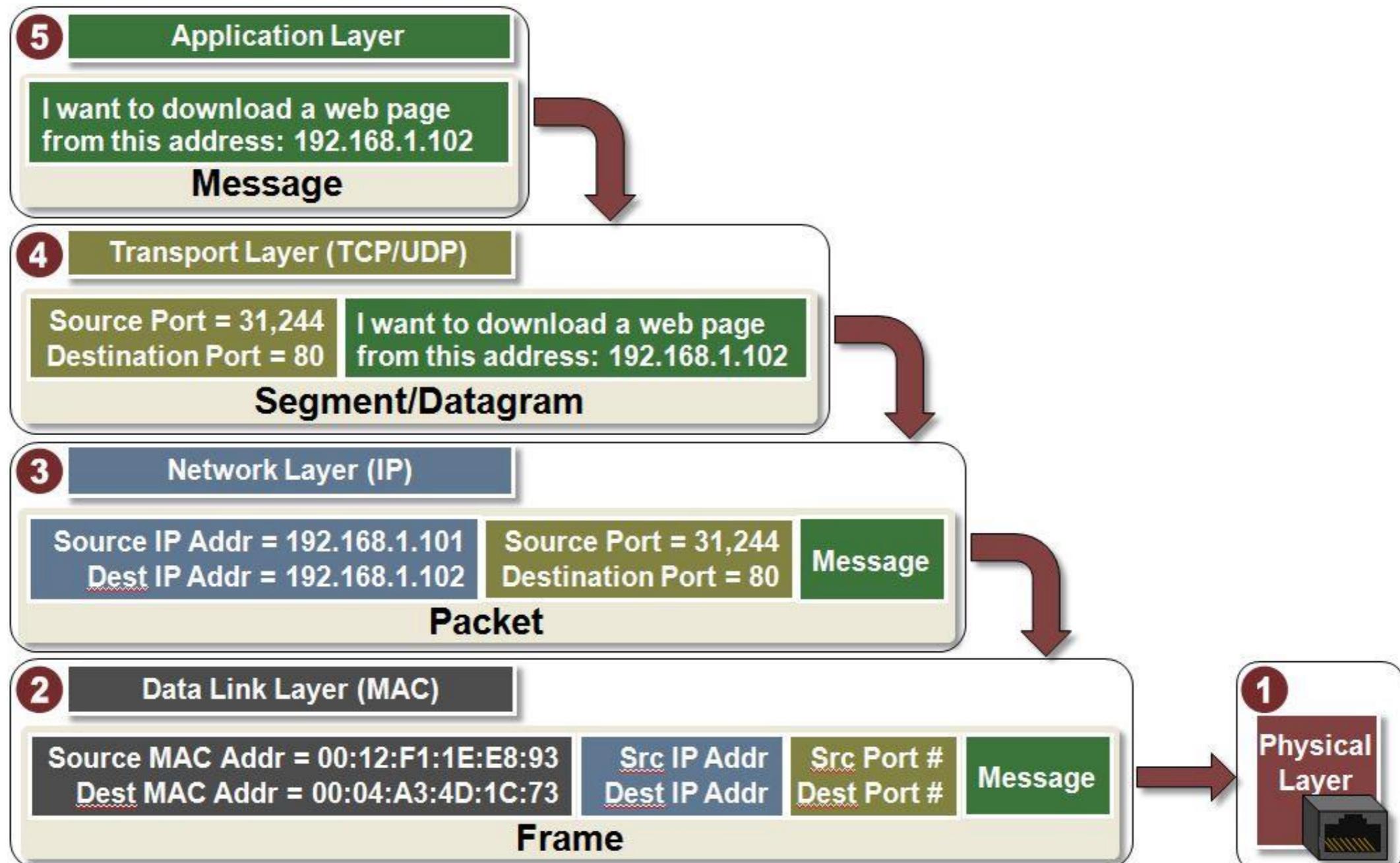
# Protokol



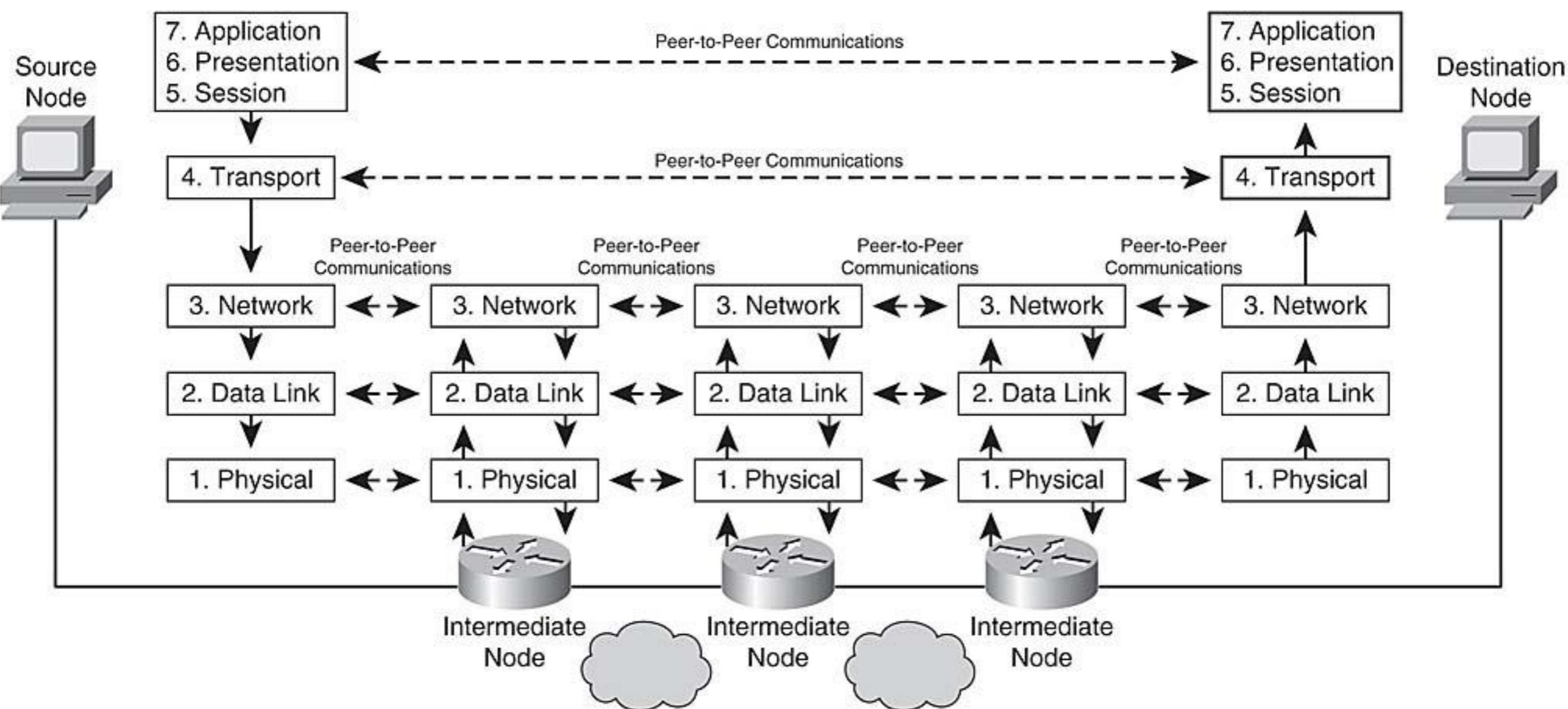
# Protokolový zásobník



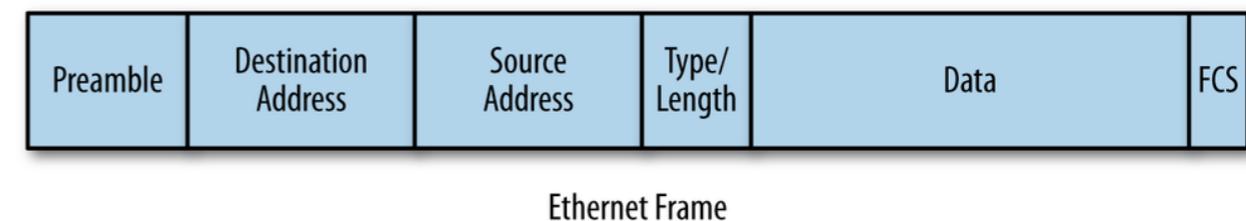
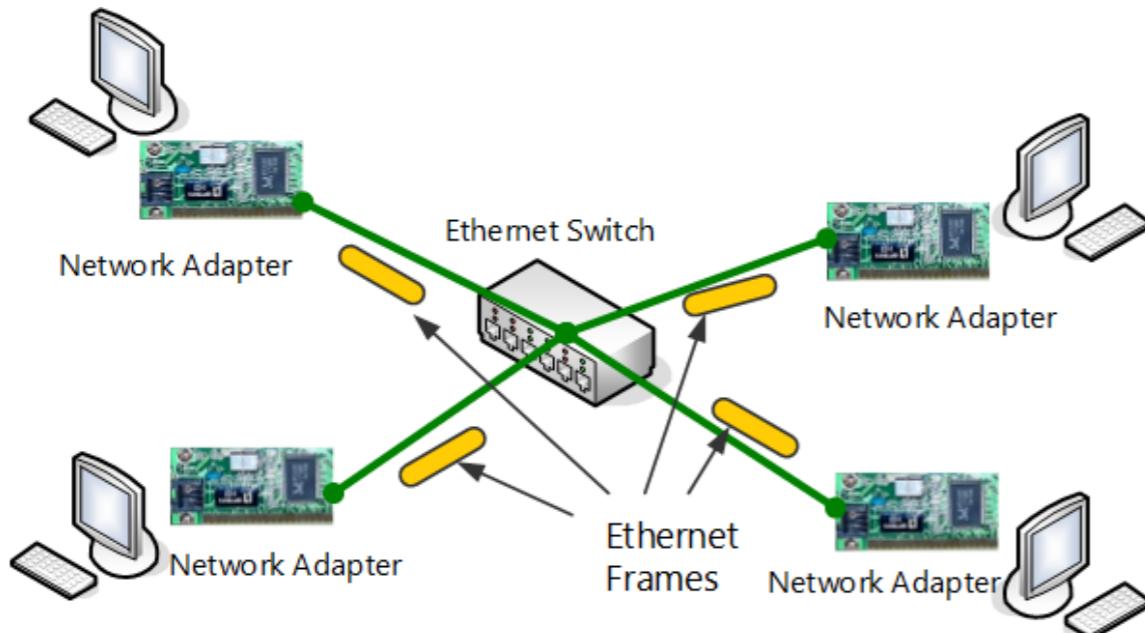
# Encapsulace



# Komunikace mezi koncovými stanicemi



# Zařízení - SWITCH

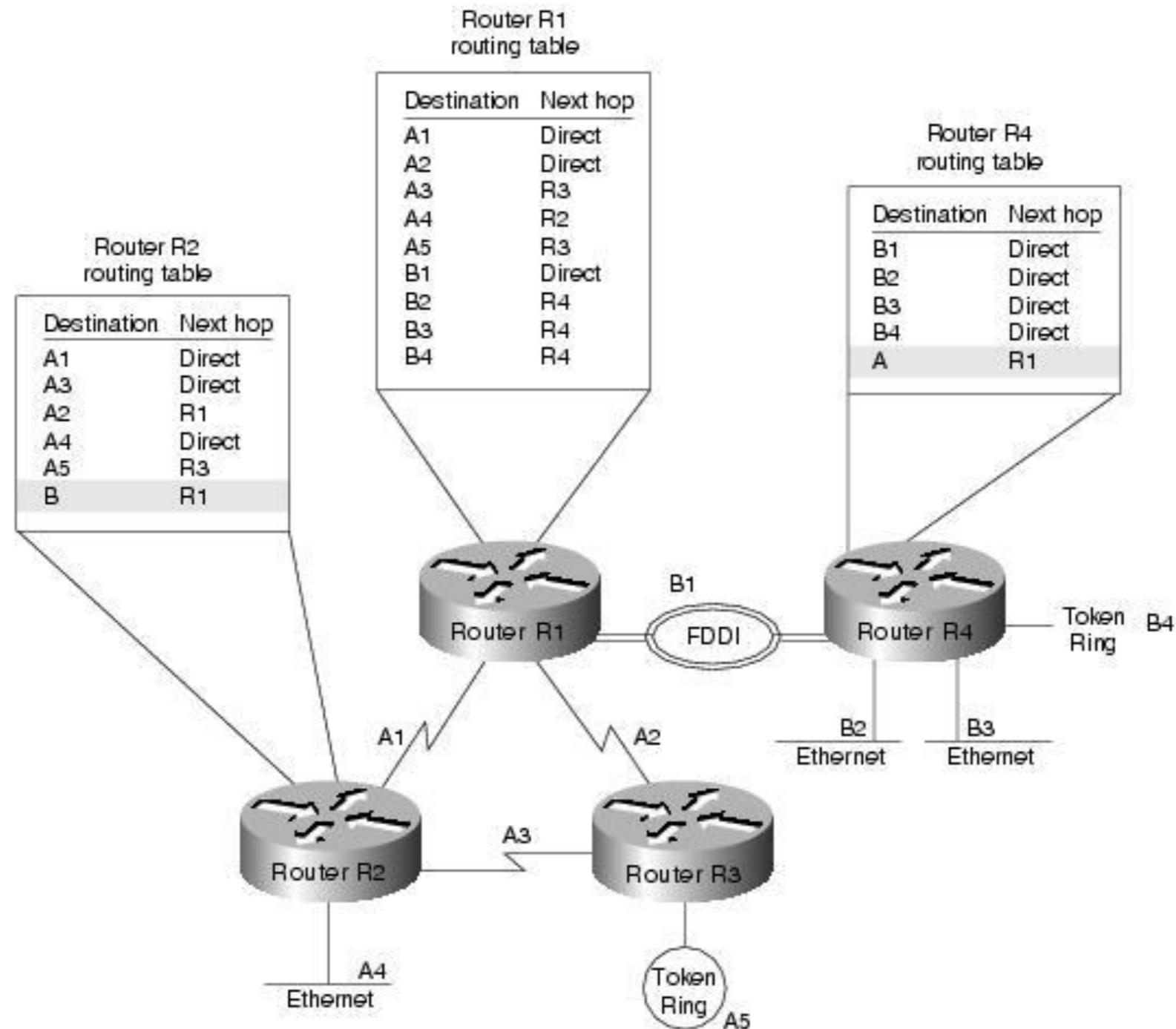


```
Switch#show mac-address-table
```

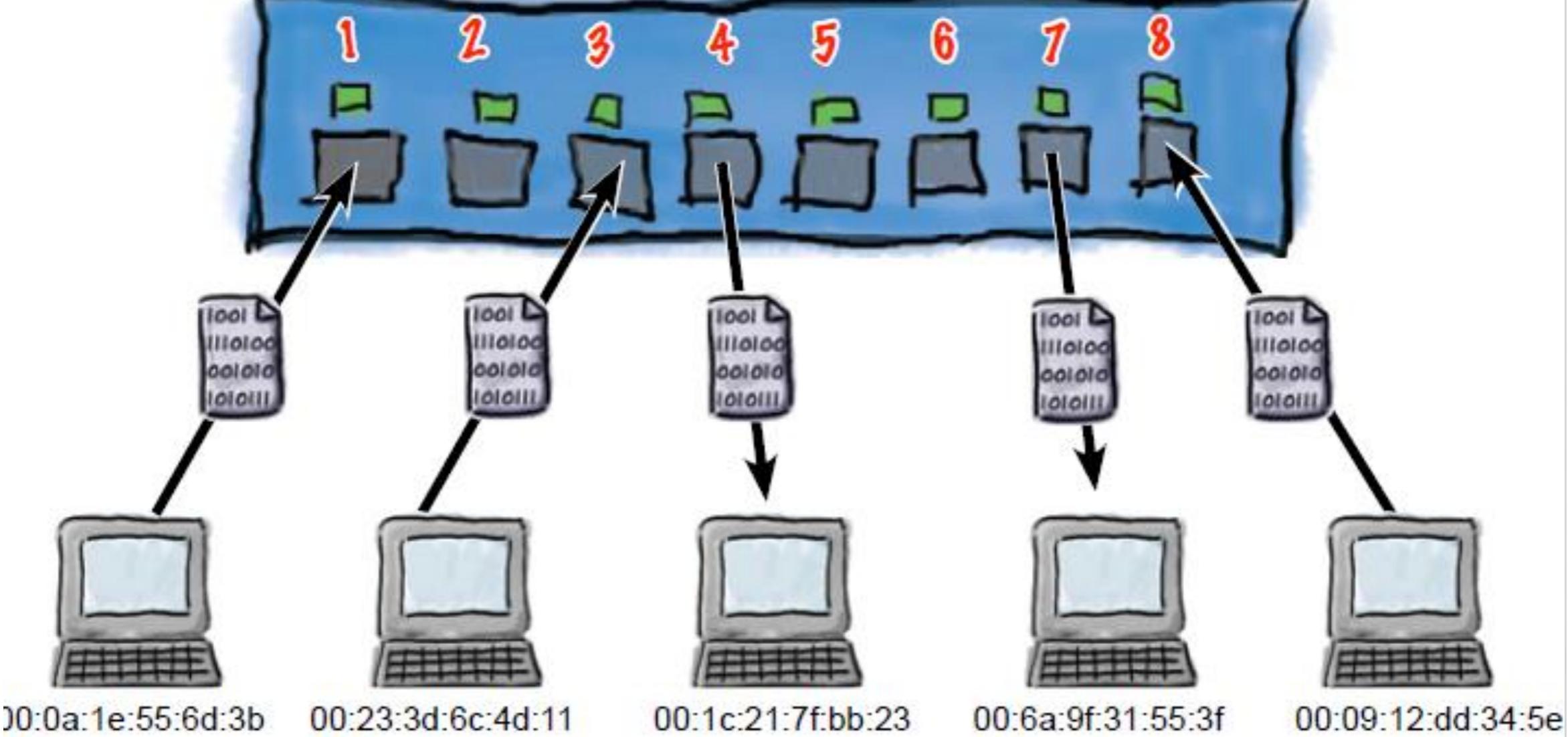
#### Mac Address Table

Mac Address	Ports
800C.E799.D8CH	1
9A7Y.F100.1HAV	2
A0E1.Y212.M2DA	3
108H.1NI9.HG11	4

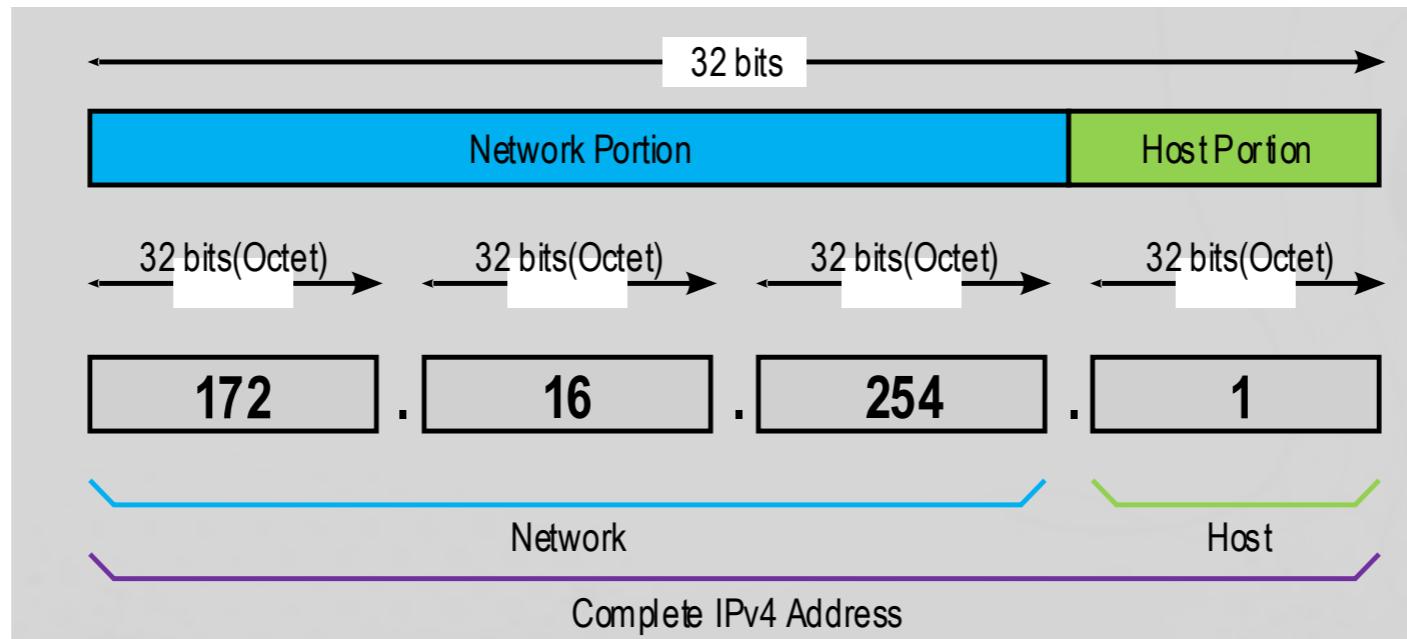
# Směrovač



# Adresování - MAC

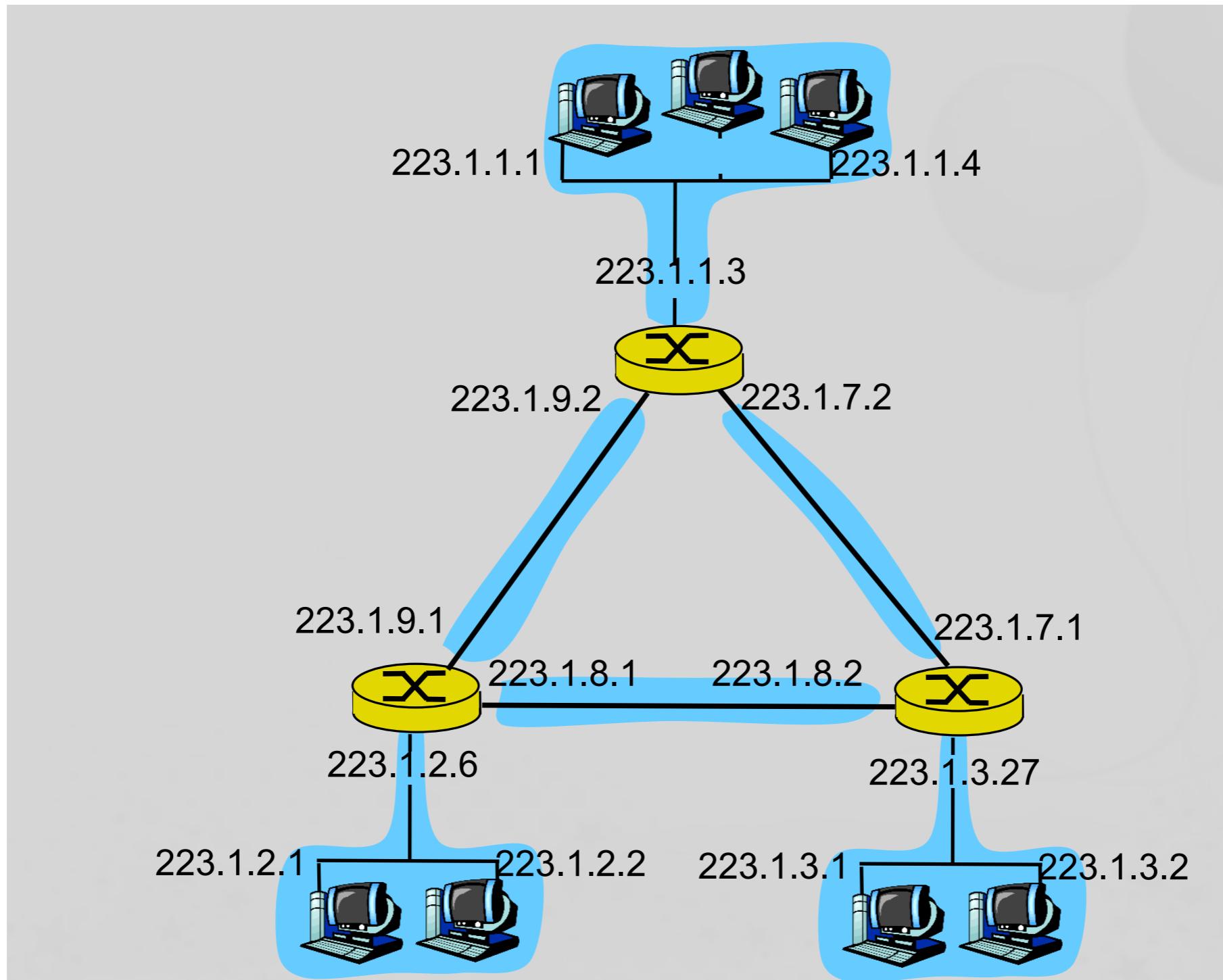


# Adresování IPv4



Class	Leading bits	Size of network number bit field	Size of rest bit field	Number of networks	Addresses per network	Total addresses in class	Start address	End address
Class A	0	8	24	128 ( $2^7$ ) ( $2^{24}$ )	16,777,216 ( $2^{24}$ )	2,147,483,648 ( $2^{31}$ )	0.0.0.0	127.255.255.255
Class B	10	16	16	16,384 ( $2^{14}$ )	65,536 ( $2^{16}$ )	1,073,741,824 ( $2^{30}$ )	128.0.0.0	191.255.255.255
Class C	110	24	8	2,097,152 ( $2^{21}$ )	256 ( $2^8$ )	536,870,912 ( $2^{29}$ )	192.0.0.0	223.255.255.255
Class D (multicast)	1110	not defined	not defined	not defined	not defined	268,435,456 ( $2^{28}$ )	224.0.0.0	239.255.255.255
Class E (reserved)	1111	not defined	not defined	not defined	not defined	268,435,456 ( $2^{28}$ )	240.0.0.0	255.255.255.255

# Adresování sítí



# Subnetting

IP address 192.35.128.93



Binary Form

Subnet Host bits

11000000.00100011.10000000.01011101

Extended network prefix

11111111.11111111.11111111.11100000

Subnet Mask

Address Range Net-1 (192.168.10.128/25)

Network Address

192.168.10.10000000 = 192.168.10.128

First Usable IP Address for Host

192.168.10.10000001 = 192.168.10.129

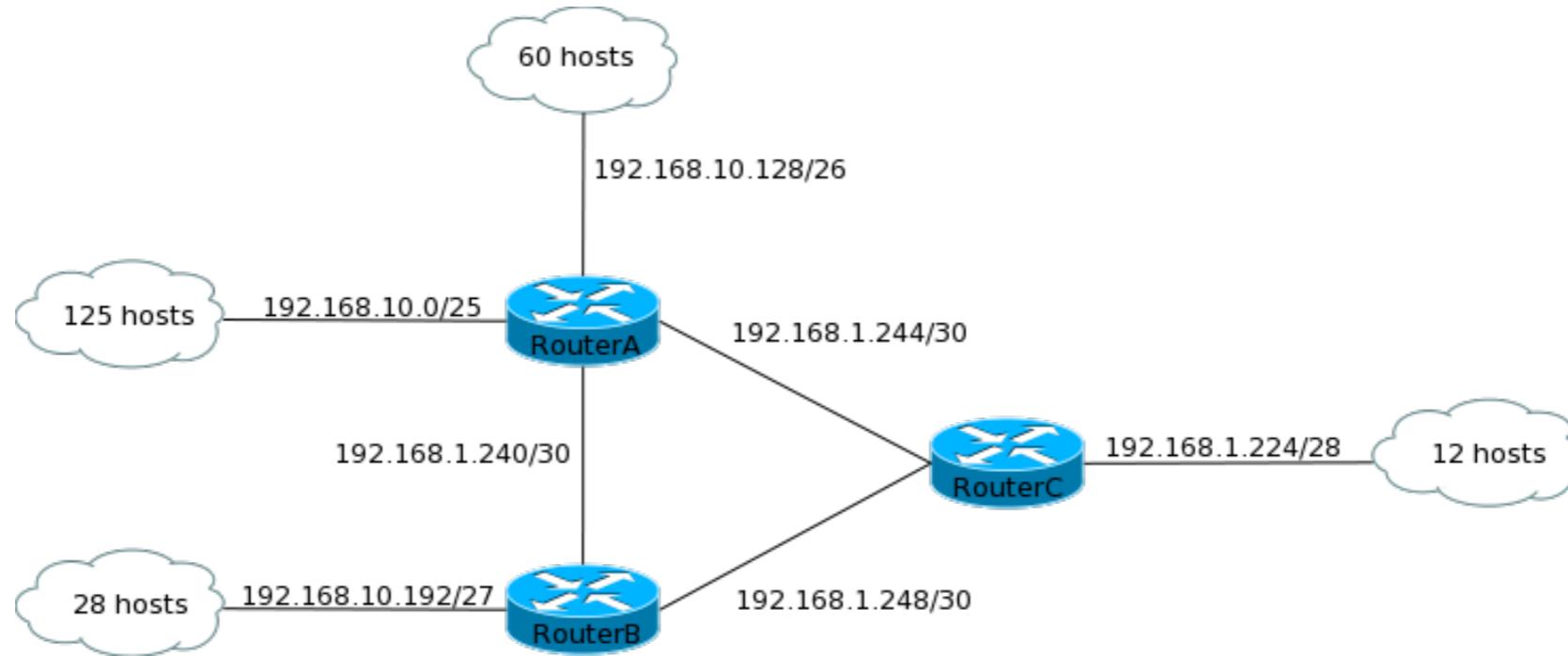
Last Usable IP Address for Host

192.168.10.11111110 = 192.168.10.254

Broadcast IP Address

192.168.10.11111111 = 192.168.10.255

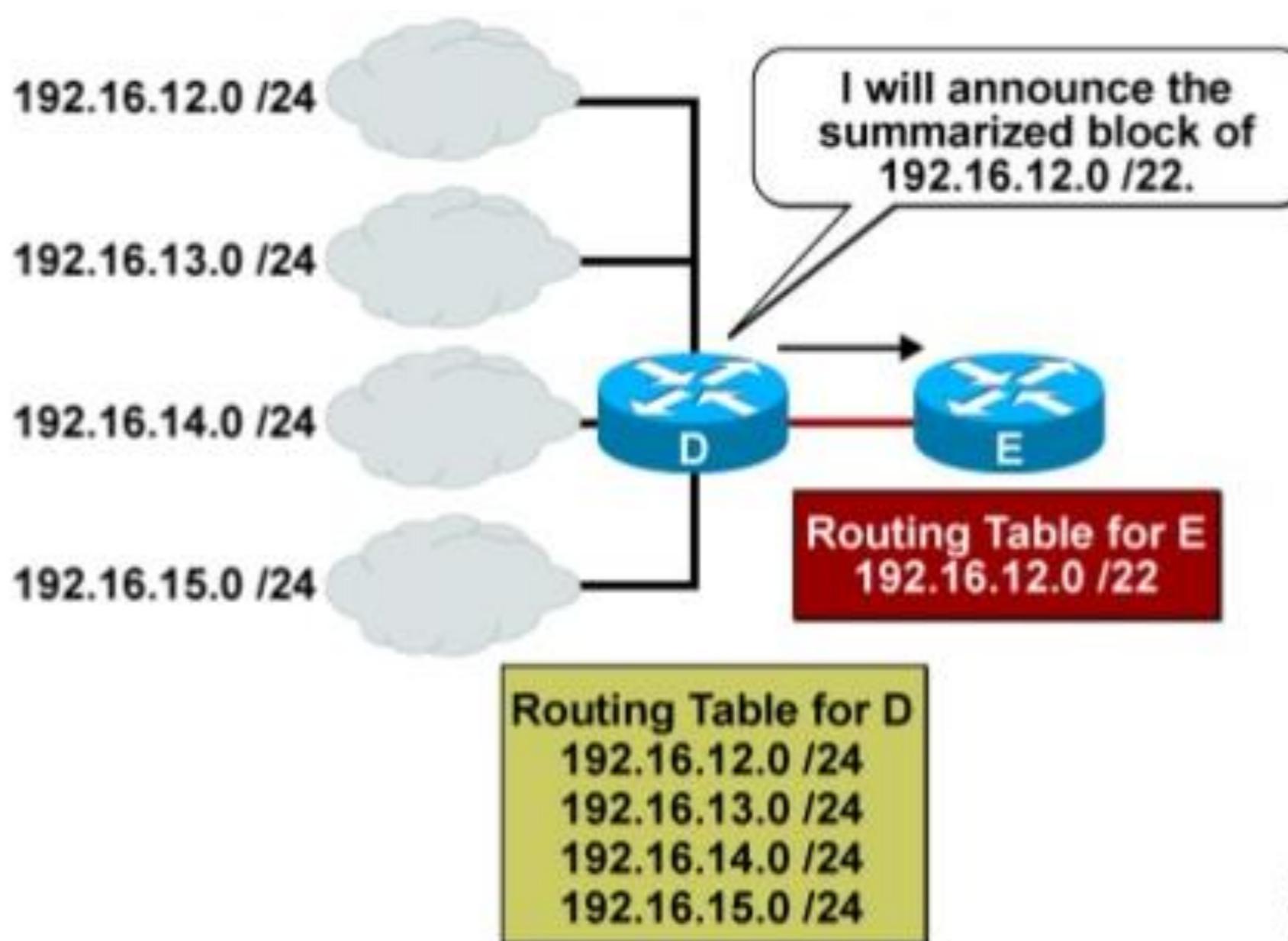
# VLSM



Subnet Prefix / CIDR	Subnet mask	Usable IP address/hosts	Usable IP addresses + Network and Broadcast address
/26	255.255.255.192	62	64
/27	255.255.255.224	30	32
/28	255.255.255.240	14	16
/29	255.255.255.248	6	8
/30	255.255.255.252	2	4

# CIDR

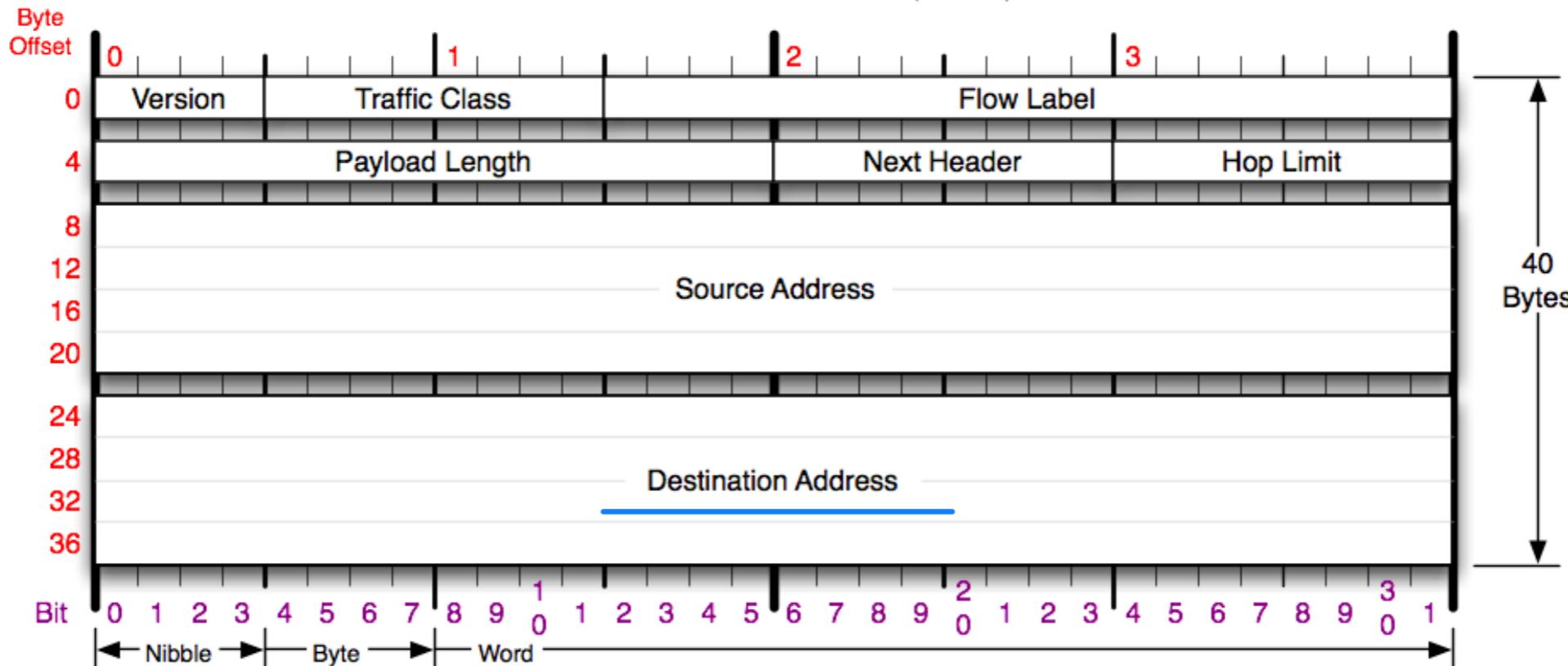
riesi ESP



# IPv6

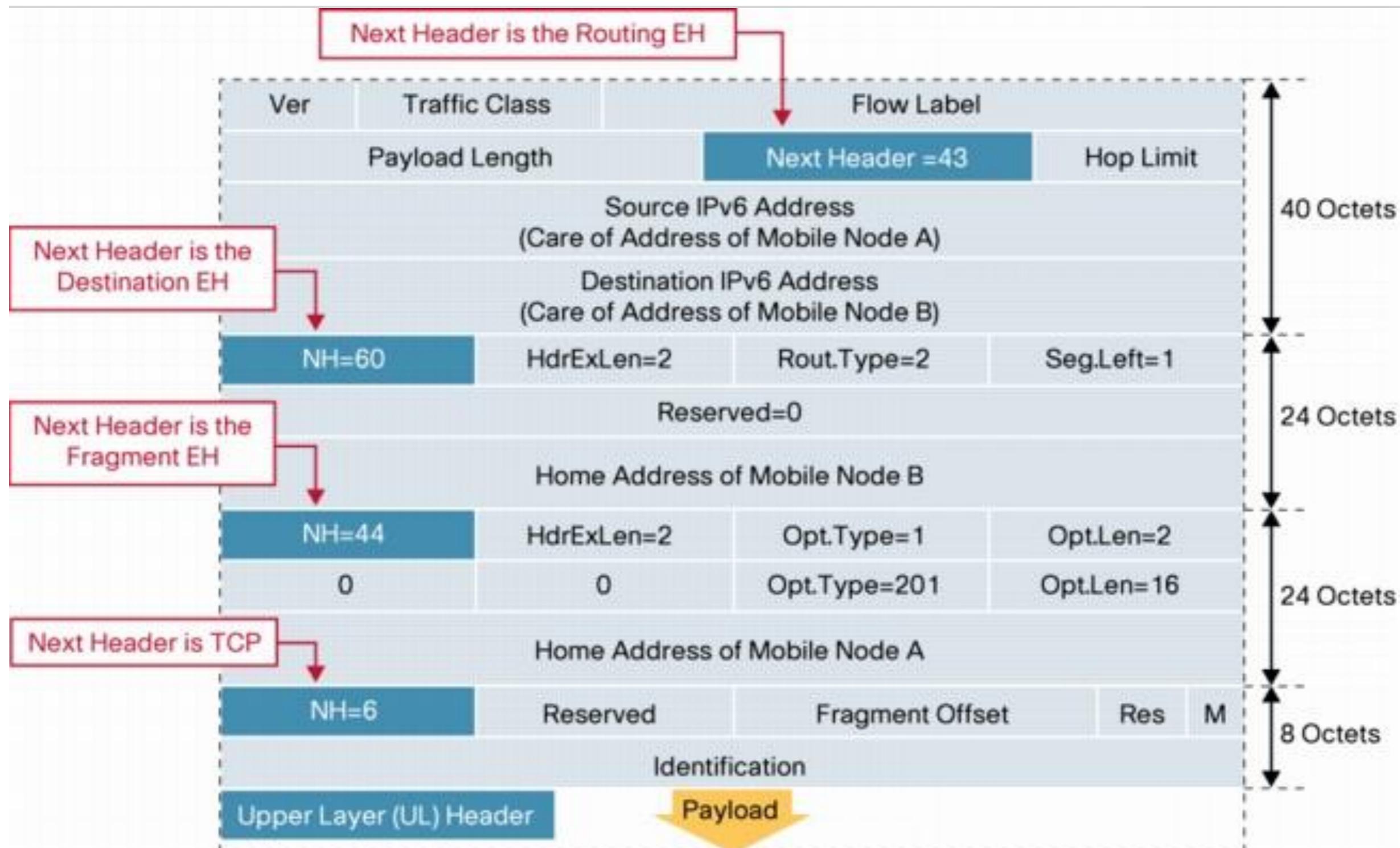
2<sup>128</sup>

## IP Header (version 6)

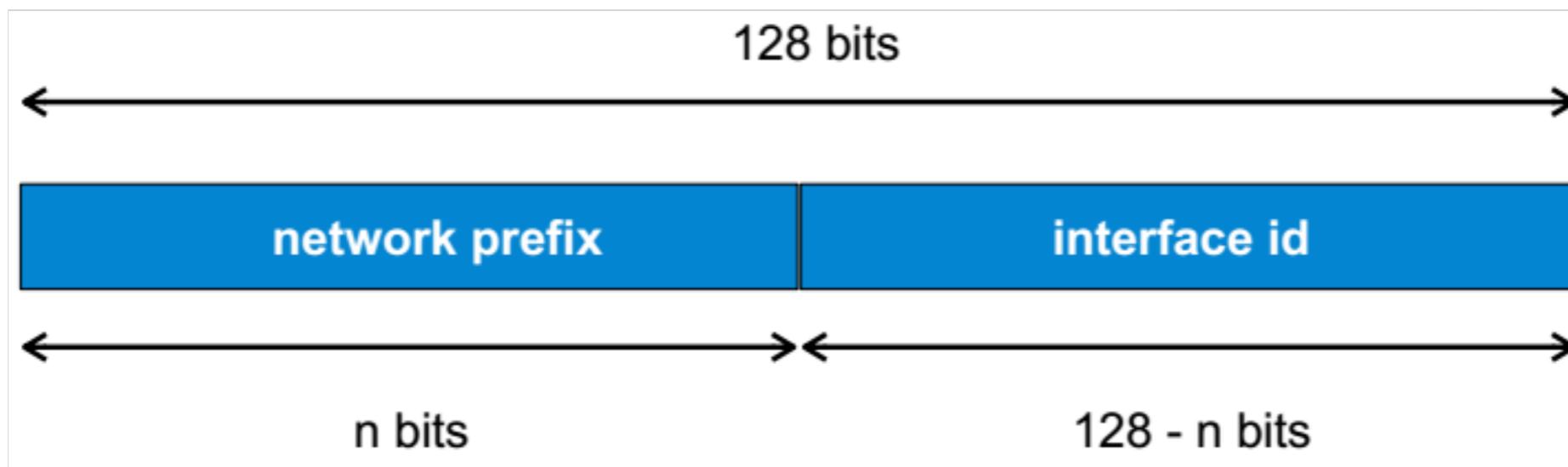
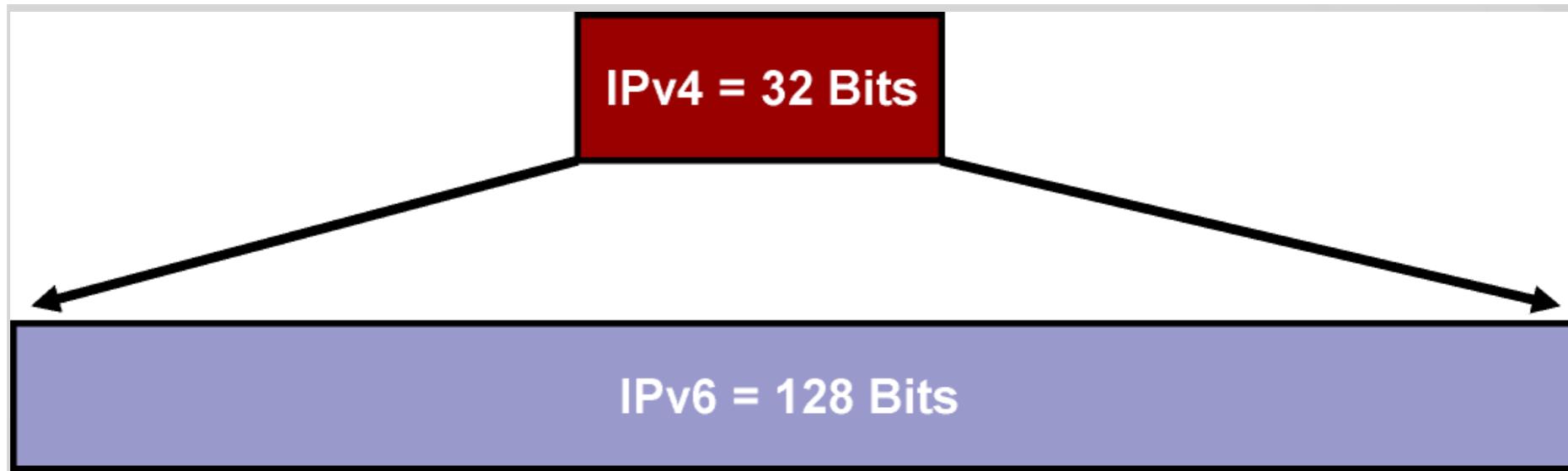


Version	Payload Length	Next Header	Hop Limit
Version of IP Protocol. 4 and 6 are valid. This diagram represents version 6 structure only.	16-bit unsigned integer. Length of the IPv6 payload, i.e., the rest of the packet following this IPv6 header, in octets. Any extension headers are considered part of the payload.	8-bit selector. Identifies the type of header immediately following the IPv6 header. Uses the same values as the IPv4 Protocol field.	8-bit unsigned integer. Decremented by 1 by each node that forwards the packet. The packet is discarded if Hop Limit is decremented to zero.
Traffic Class	Source Address	Destination Address	RFC 2460
8 bit traffic class field.	128-bit address of the originator of the packet.	128-bit address of the intended recipient of the packet (possibly not the ultimate recipient, if a Routing header is present).	Please refer to RFC 2460 for the complete Internet Protocol version 6 (IPv6) Specification.
Flow Label			
20 bit flow label.			

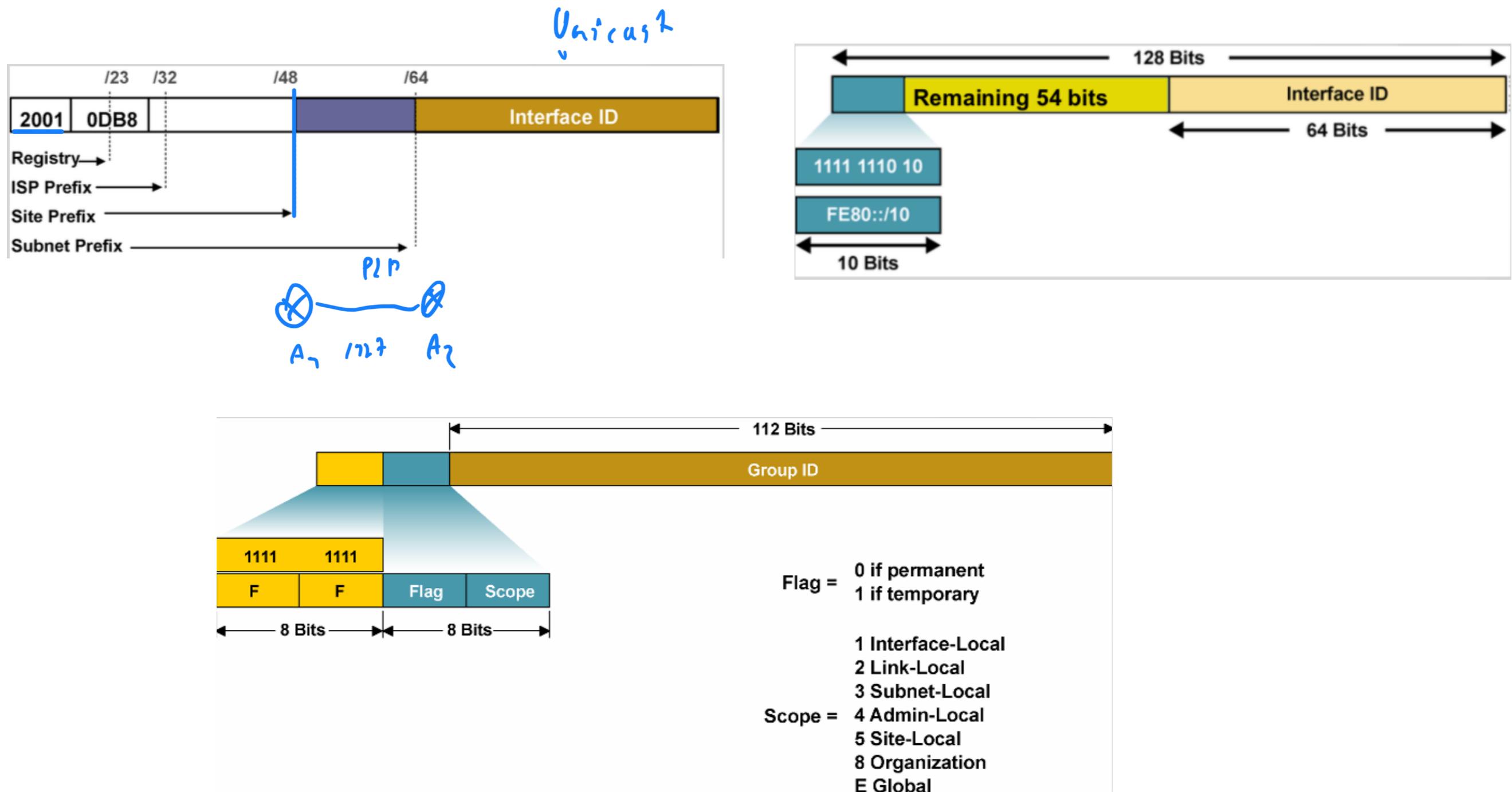
# IPv6 Hlavíčky



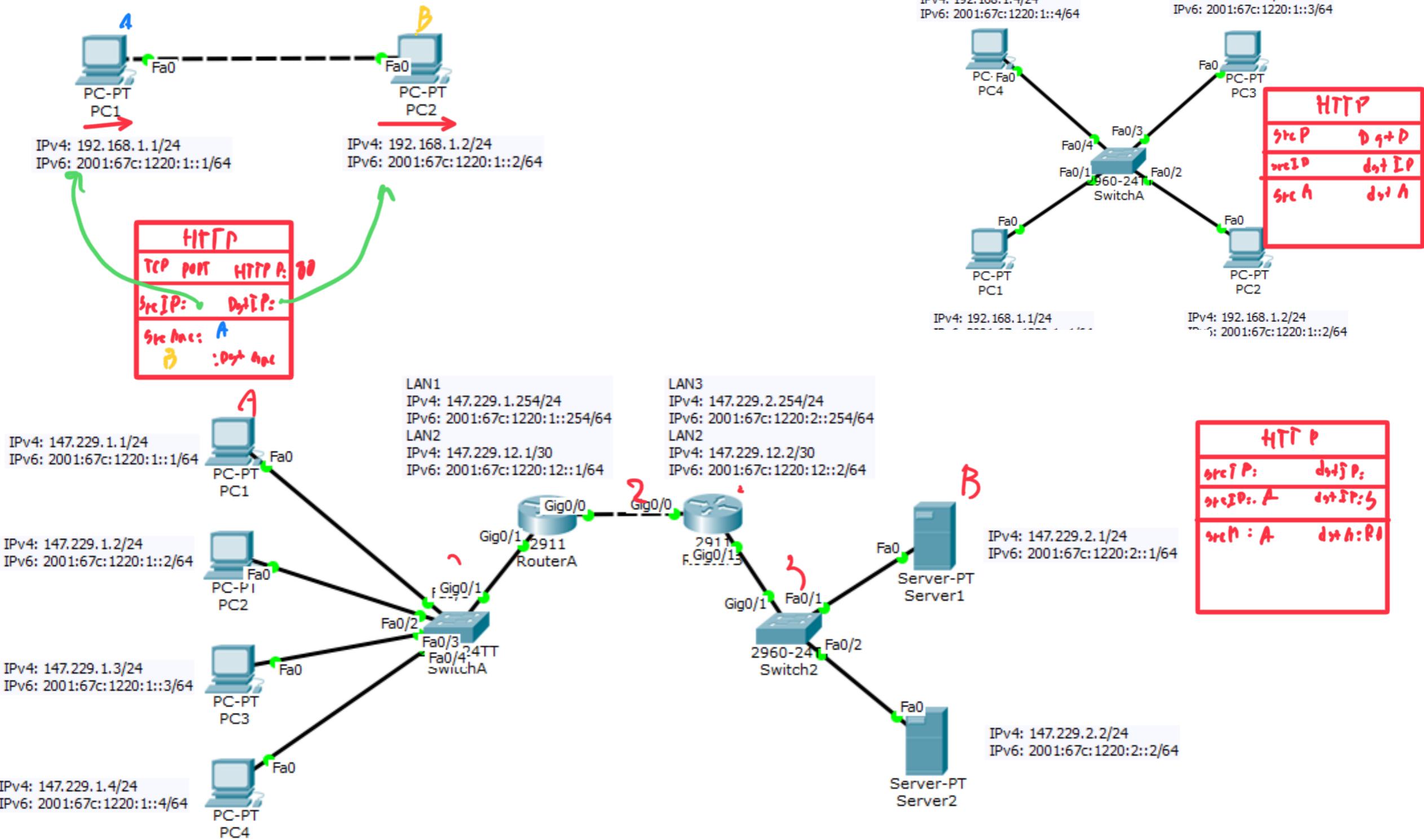
# IPv6 Adresy



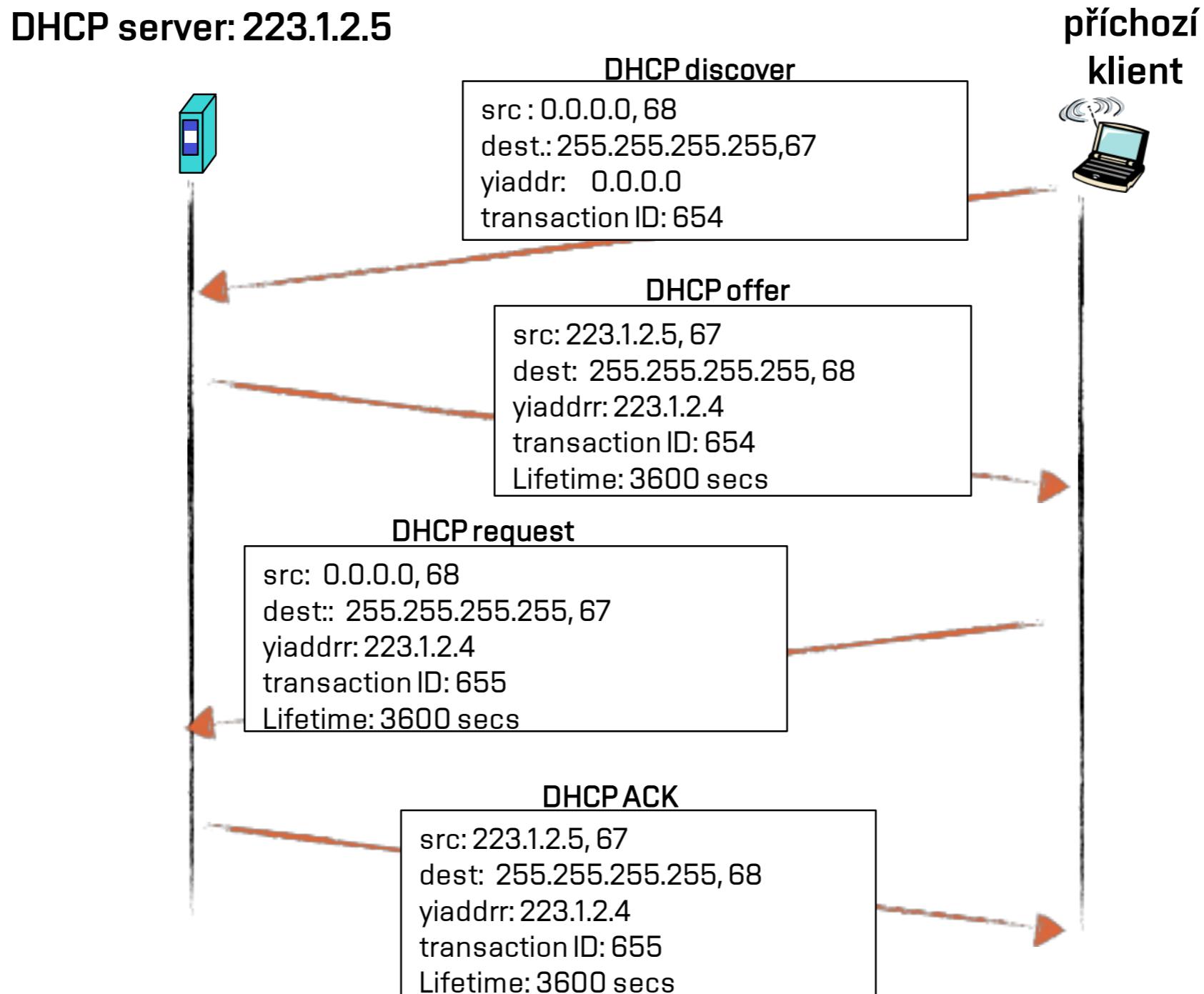
# Typy IPv6 Adres



# Přenos paketů

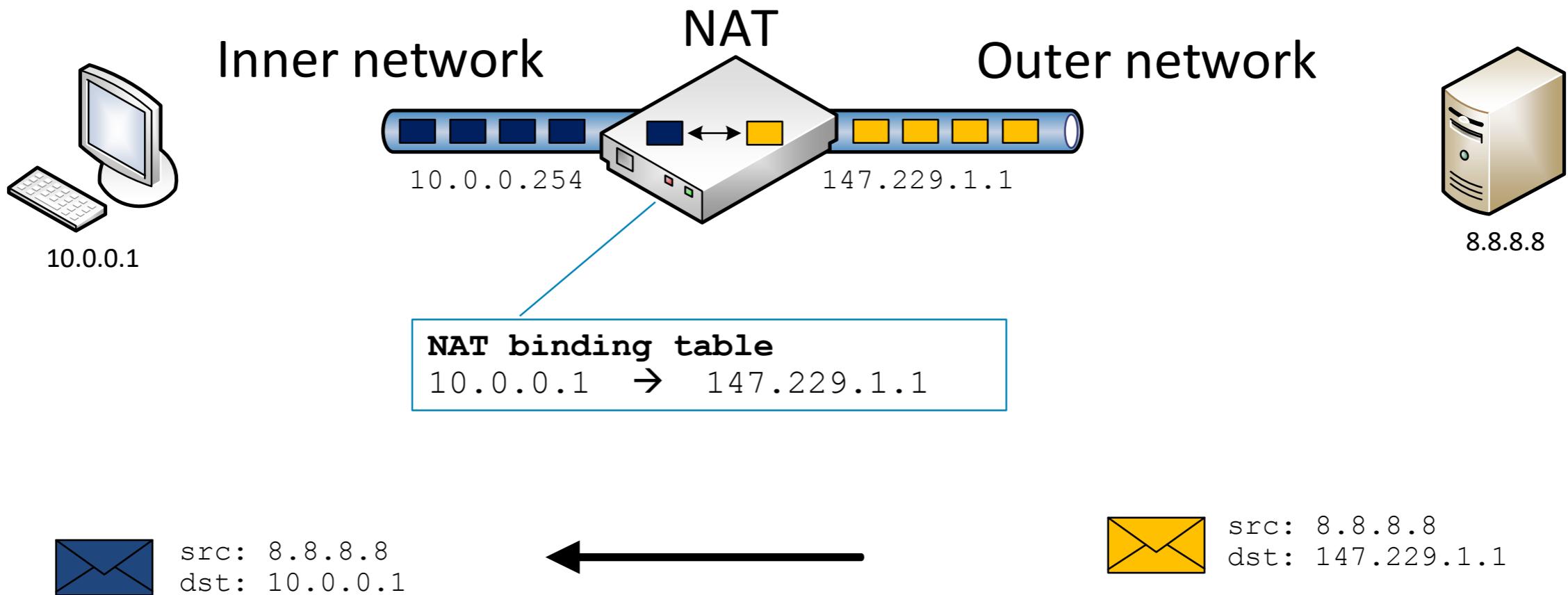


# DHCP

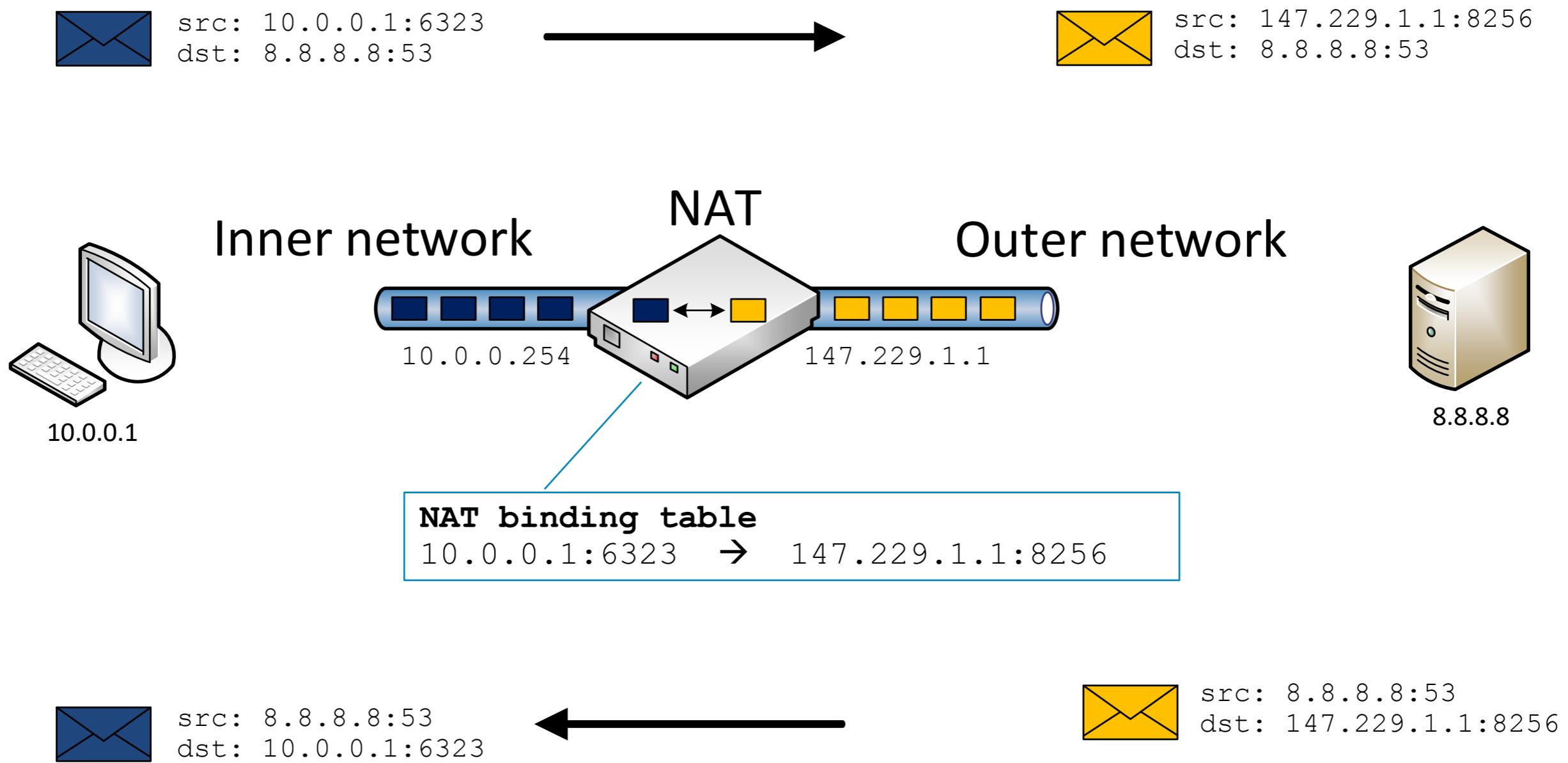


# NAT

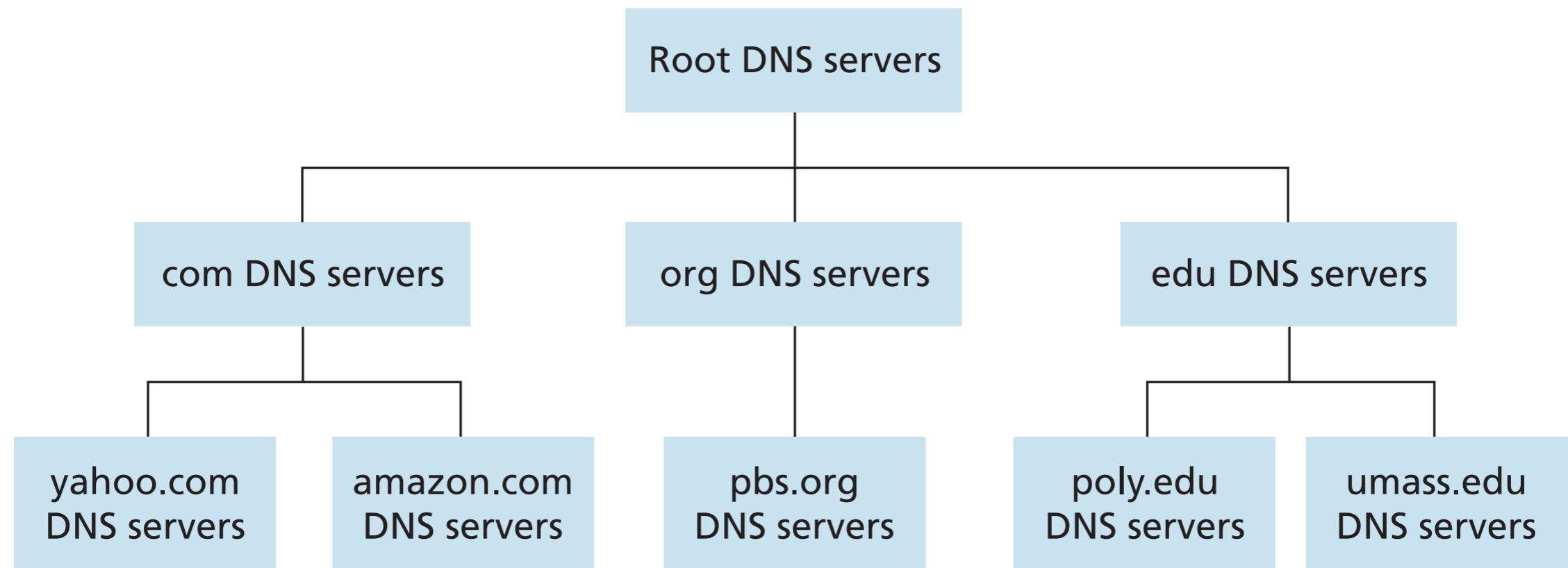
 src: 10.0.0.1  
dst: 8.8.8.8 →  src: 147.229.1.1  
dst: 8.8.8.8



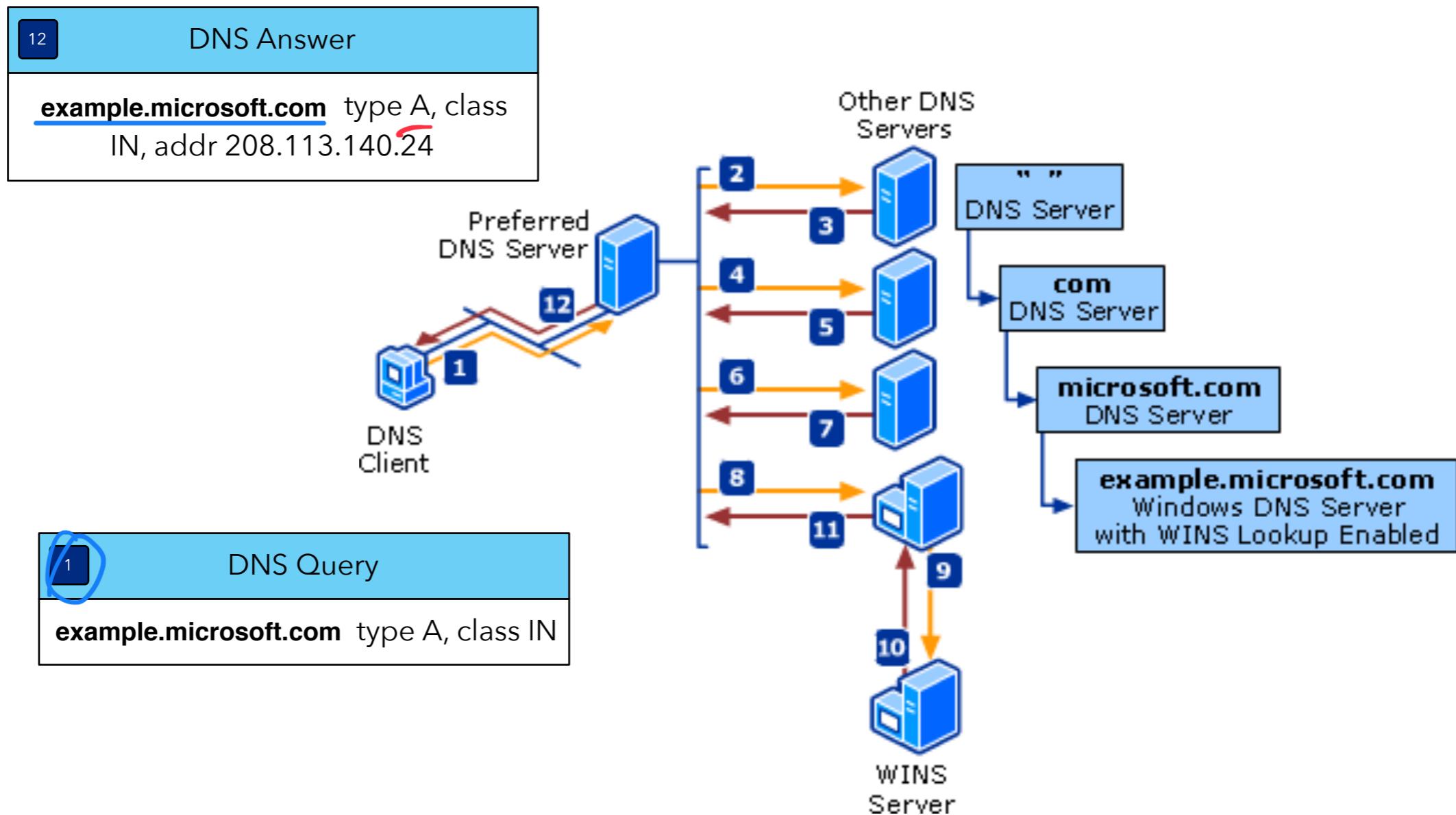
# NAPT, PAT



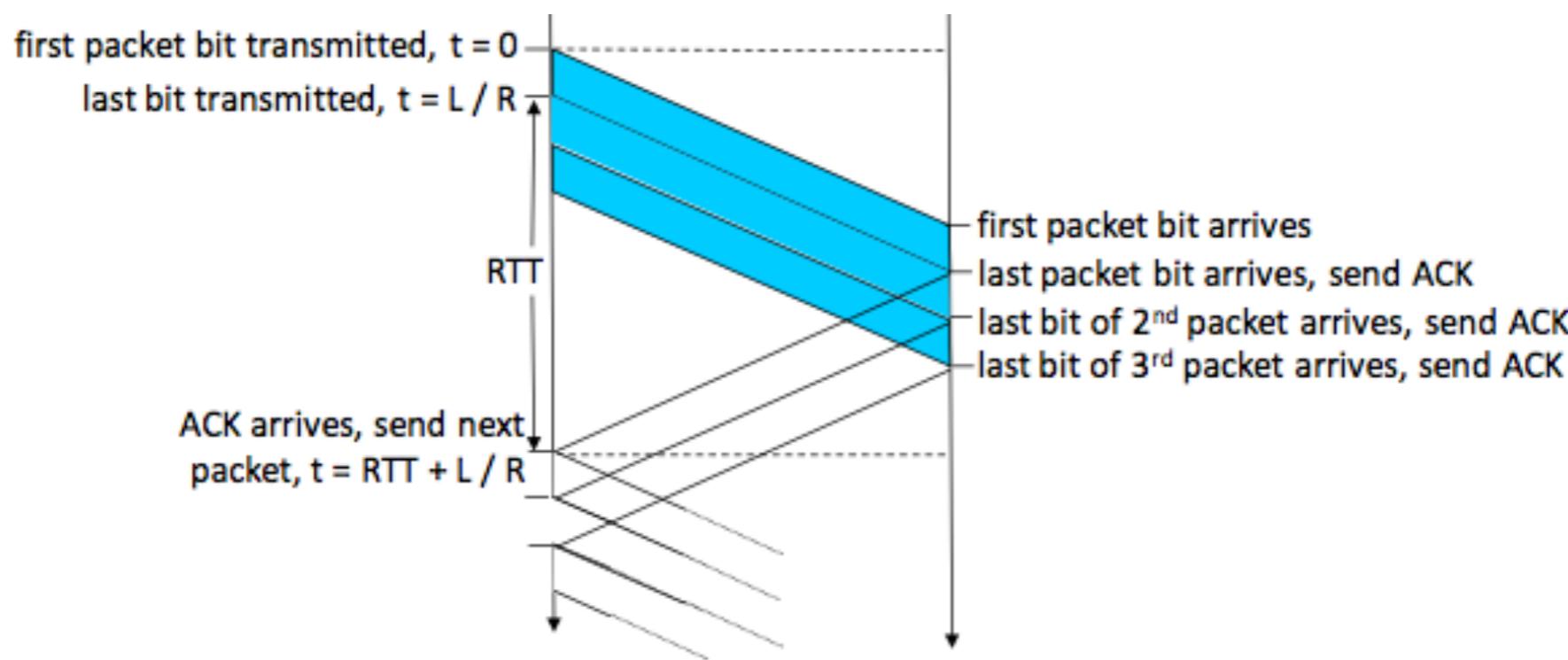
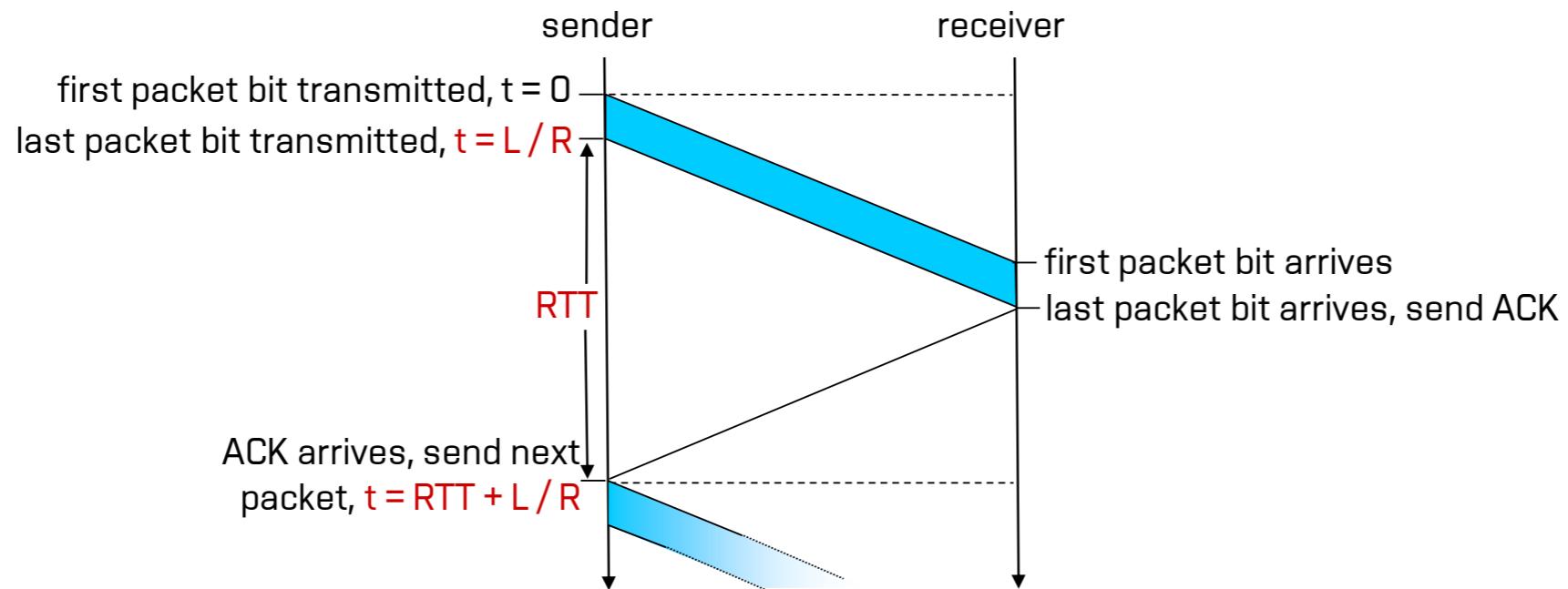
# DNS



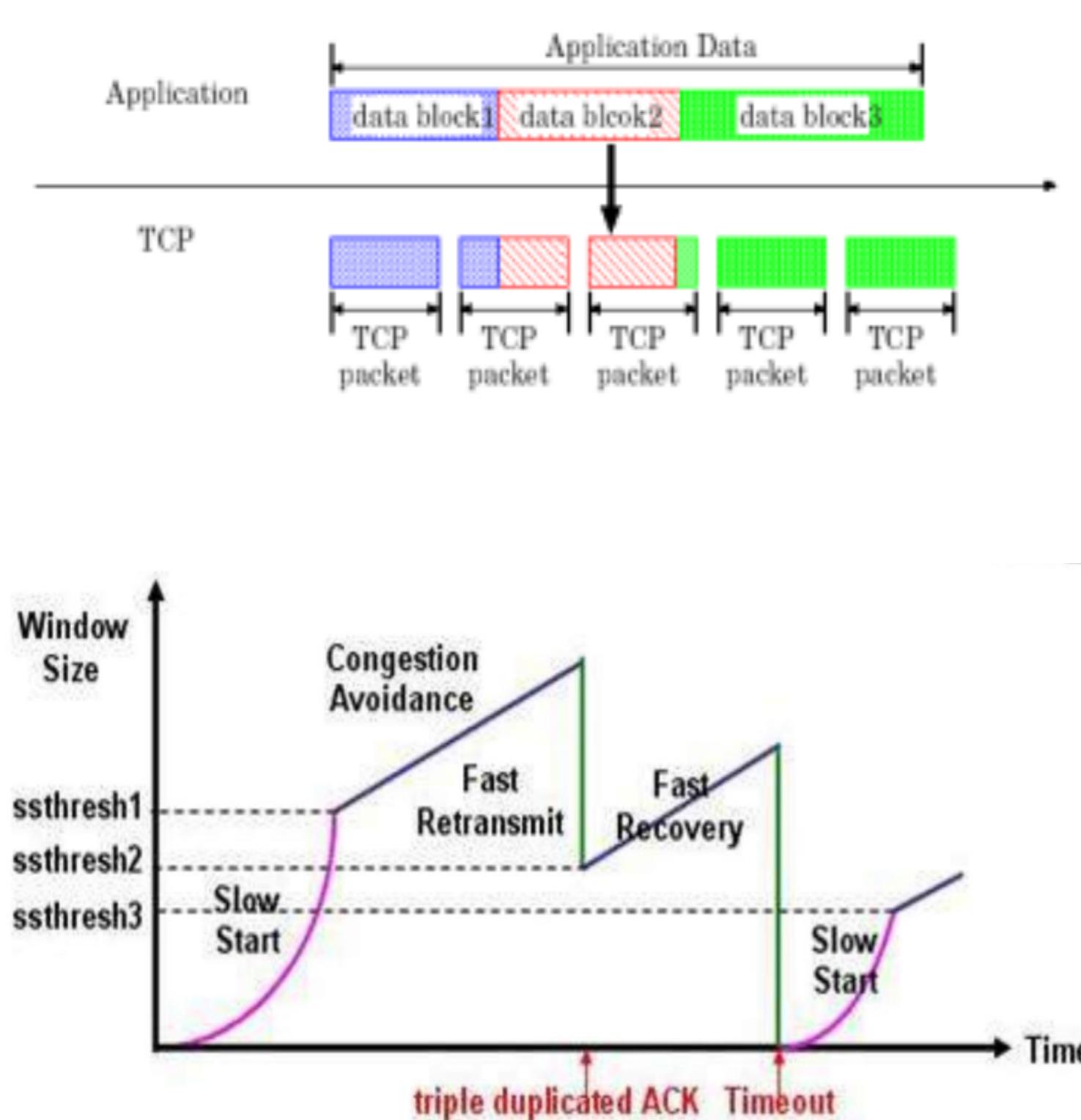
# DNS Resolution



# Spolehlivý přenos



# TCP

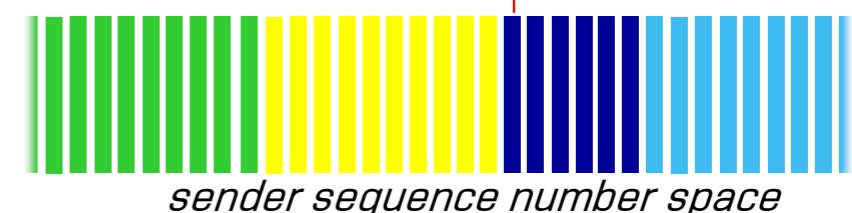


Spk, cisla

outgoing segment from sender

source port #	dest port #
sequence number	
acknowledgement number	
	rwnd
checksum	urg pointer

window size  
 $N$



sent  
ACKed

sent, not-  
yet ACKed  
("in-flight")

usable  
but not  
yet sent

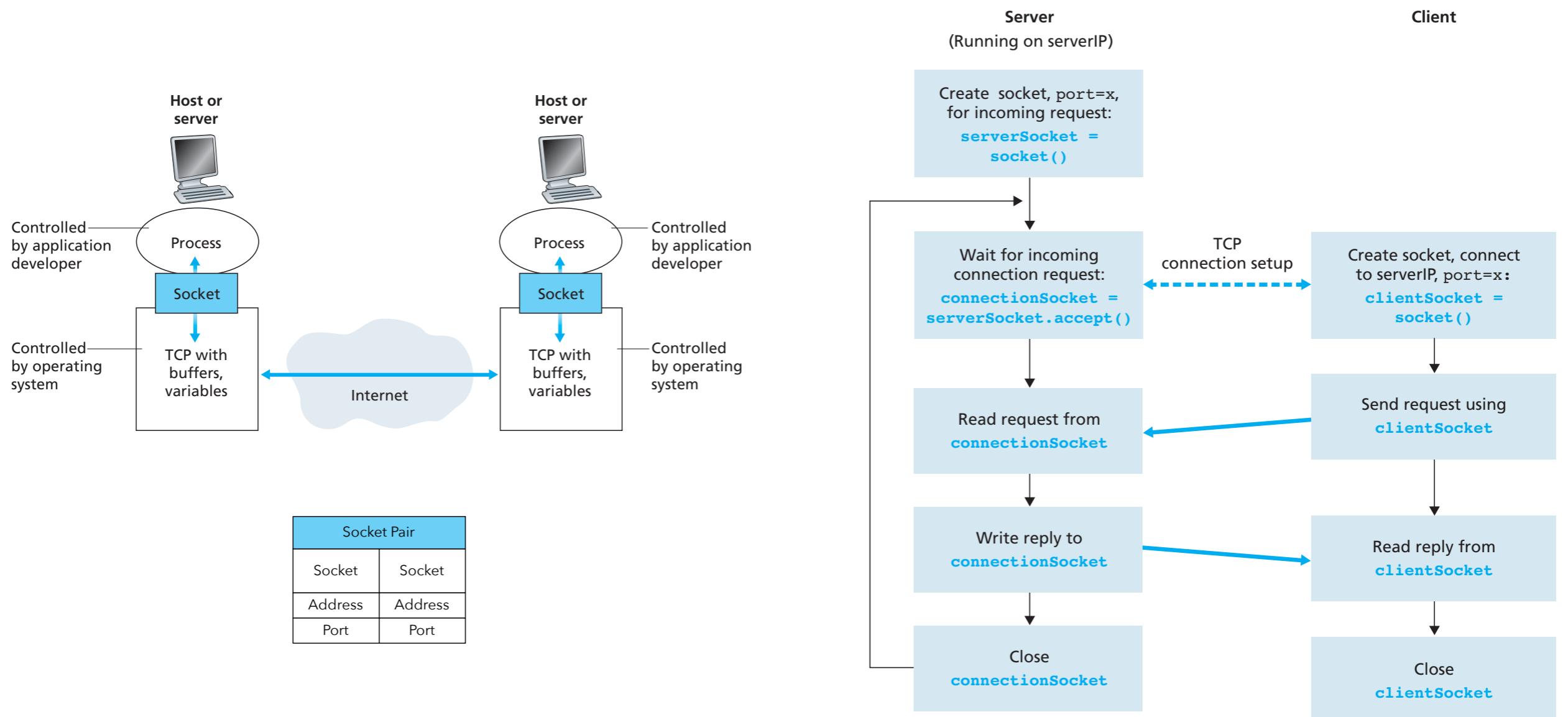
not  
usable

incoming segment to sender

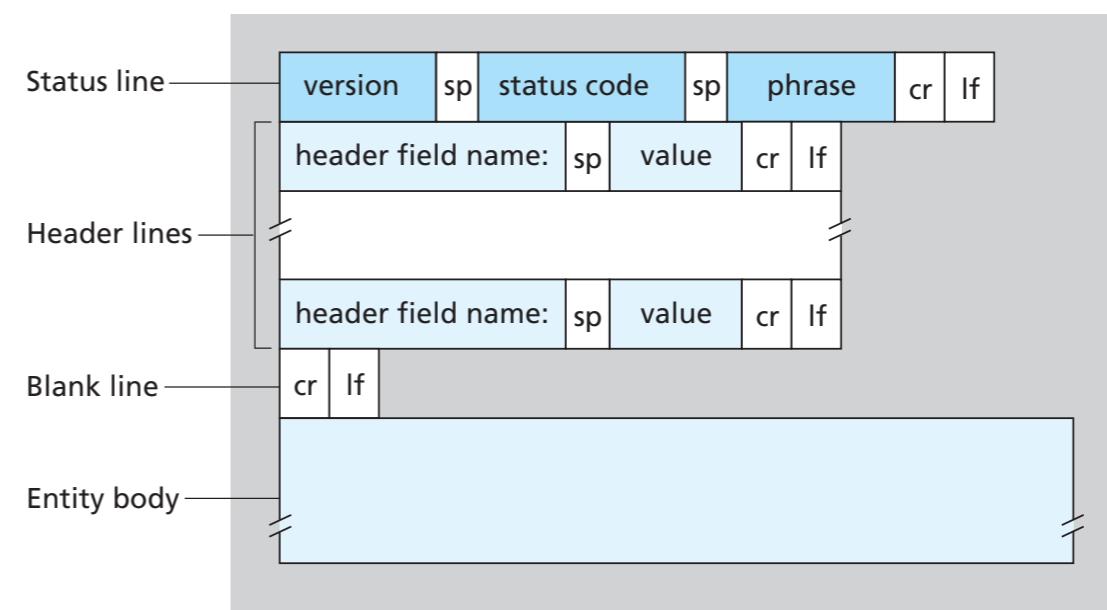
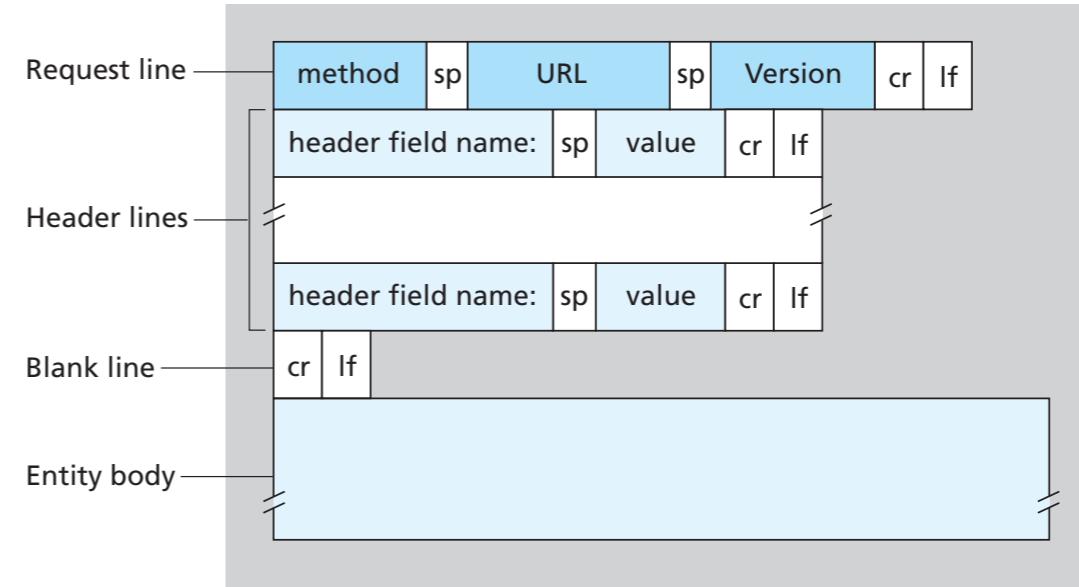
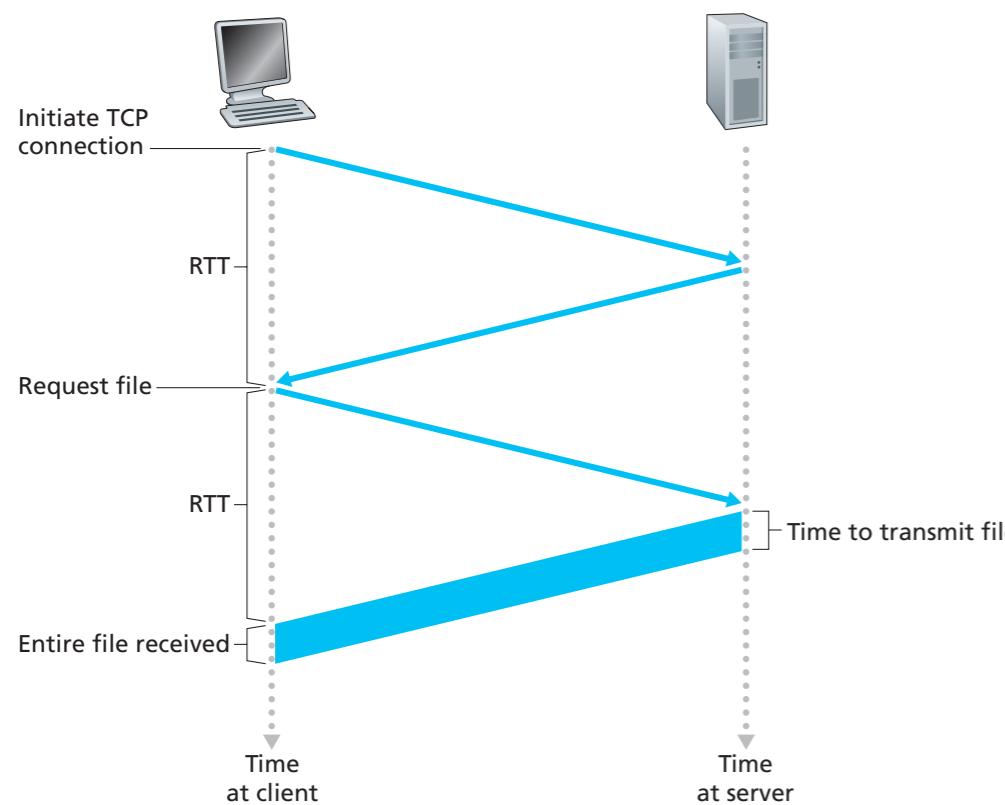
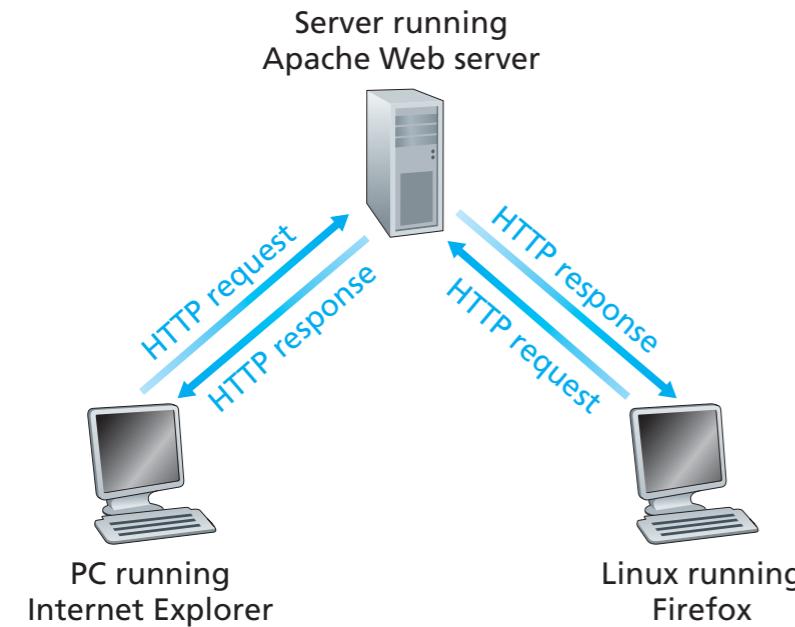
source port #	dest port #
sequence number	
acknowledgement number	
A	rwnd
checksum	urg pointer

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hr potudelip

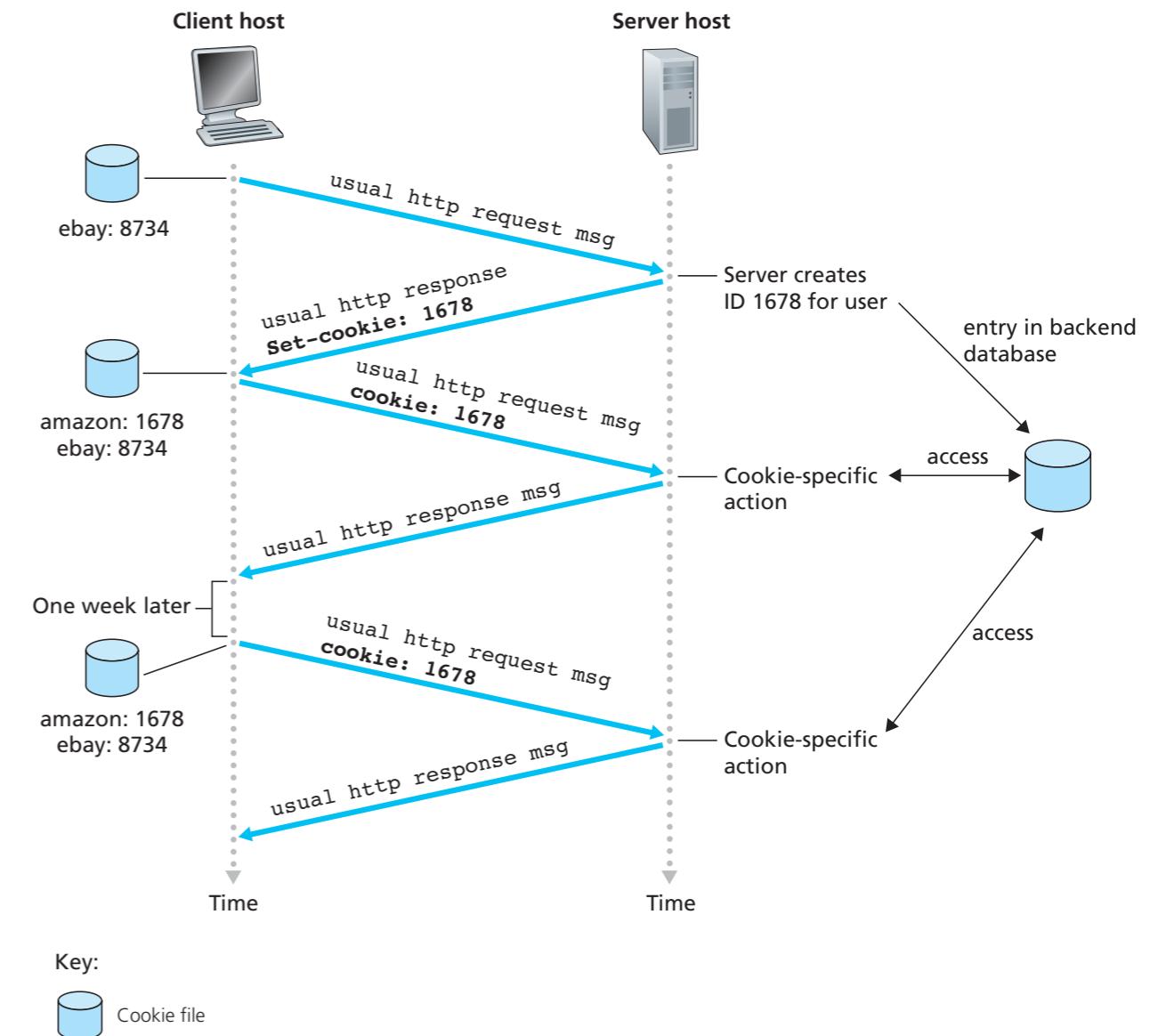
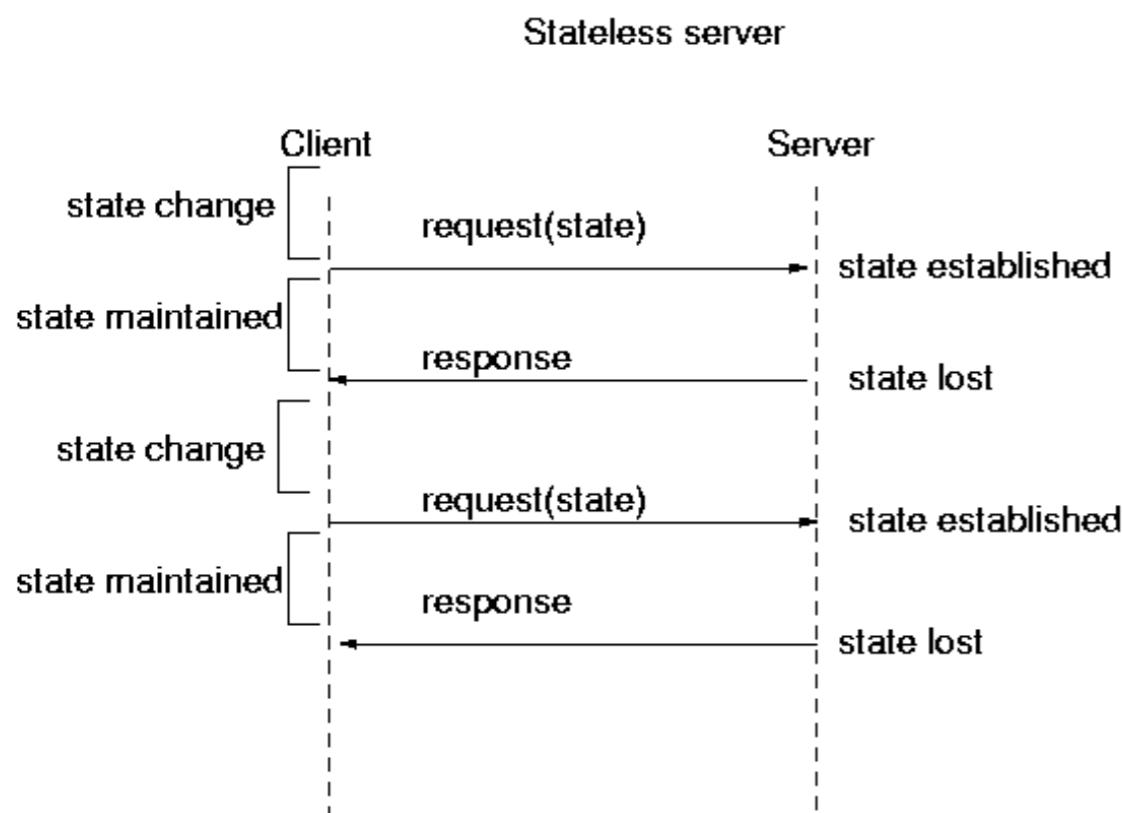
# Applikace



# HTTP



# HTTP stav



# Závěr

- Aplikační vrstva
- Programování síťových aplikací
- Transportní vrstva
- Síťová vrstva
  - Adresování
  - Směrování
  - Multicast
  - IPv6
  - LAN Technologie

F50 15j  
→ určitý

TCP/IP RM  
Aplik  
Presen  
Session  
Int.  
Link.  
Netw.