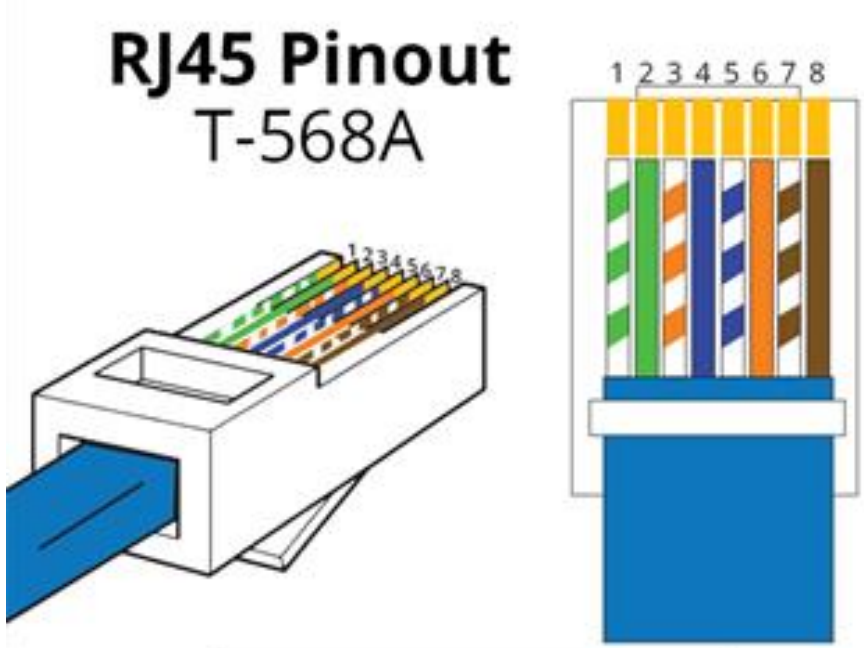
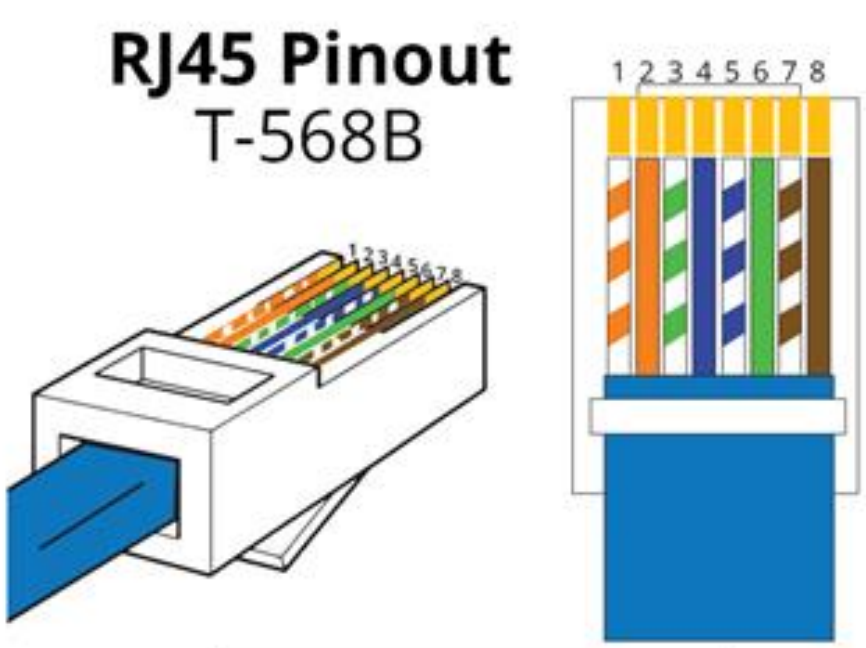
بخش دوم –شبکه

POWER
SYS
WPS
WLAN

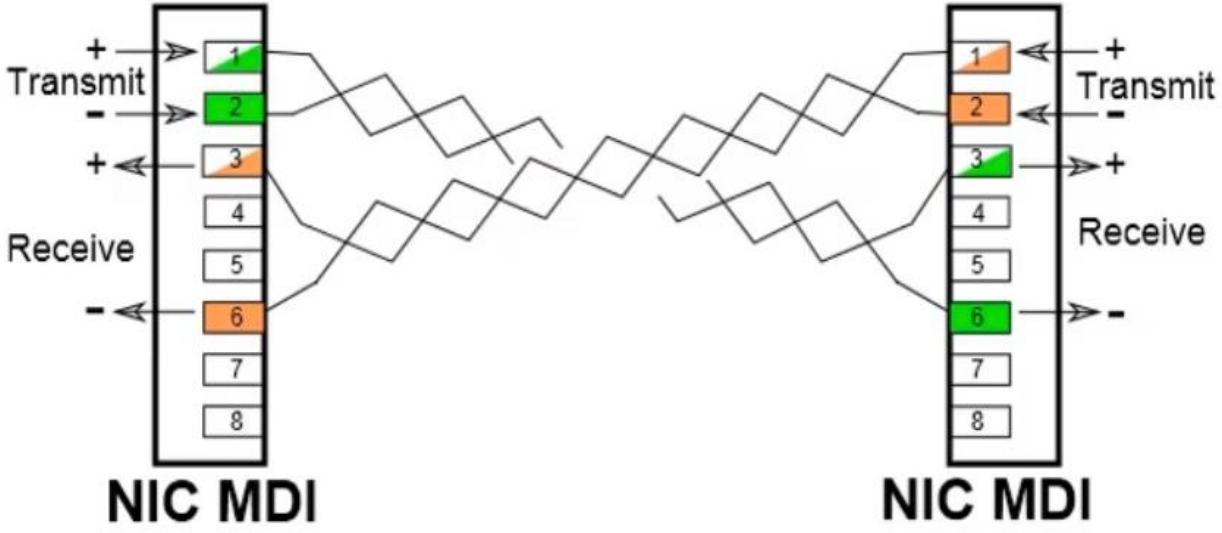
تفاوت کابل ها

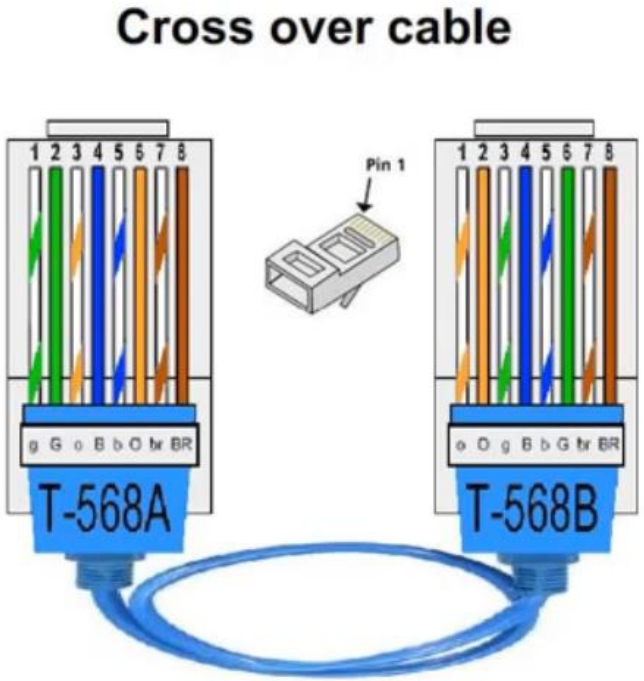


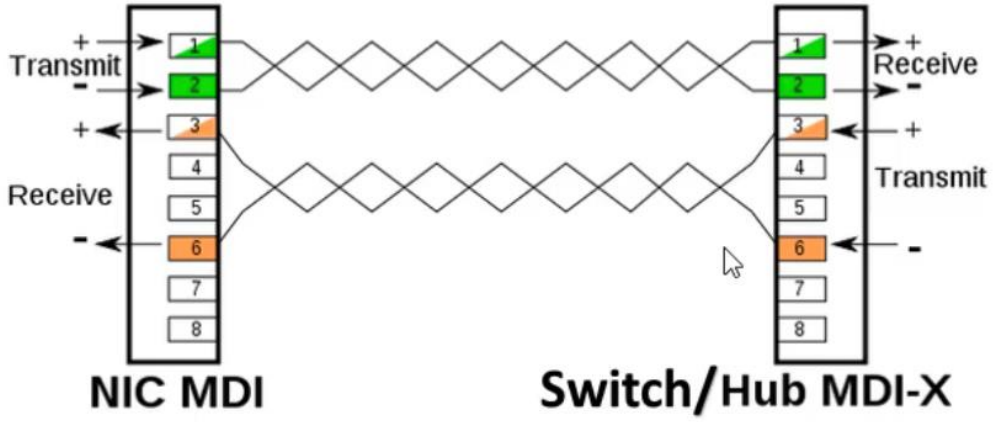
1. White Green	5. White Blue
2. Green	6. Orange
3. White Orange	7. White Brown
4. Blue	8. Brown



1. White Orange	5. White Blue
2. Orange	6. Green
3. White Green	7. White Brown
4. Blue	8. Brown


+
Transmit
-
+
Receive
-
1
2
3
4
5
6
7
8
NIC MDI
+
Transmit
-
+
Receive
-
1
2
3
4
5
6
7
8
NIC MDI


Cross over cable
1 2 3 4 5 6 7 8
Pin 1
1 2 3 4 5 6 7 8
T-568A
T-568B


Transmit
Receive
Receive
Transmit
NIC MDI
Switch/Hub MDI-X

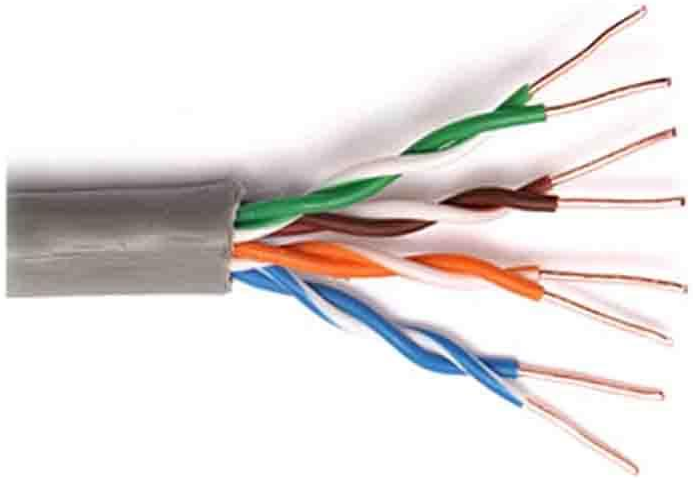
انواع کابل های شبکه

Cat 5 vs Cat 5e vs Cat 6 Cable

	Cat 5	Cat 5e	Cat 6
Frequency	100 MHz	100 MHz	250 MHz
Characteristic Impedance	100 ohms (+/- 15%)	100 ohms (+/- 15%)	100 ohms (+/- 15%)
Max Cable Length	100 Metres	100 Metres	100 Metres
Data Performance	10 Mbs	100 Mbs	1 Gbs
Max Speed Data	10/100 Mpbs	1 Gbs	10 Gbs

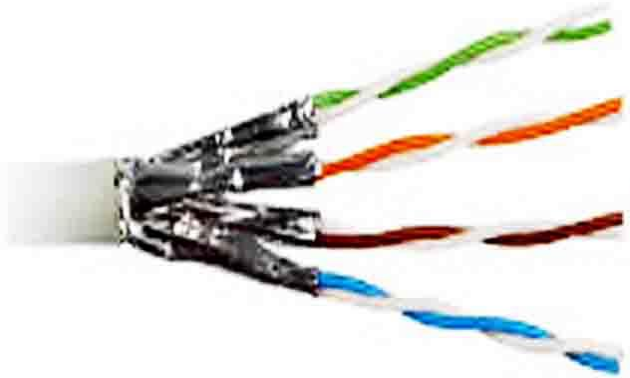
VOIP

UTP & STP



UTP

UNSHIELDED TWISTED PAIR CABLE

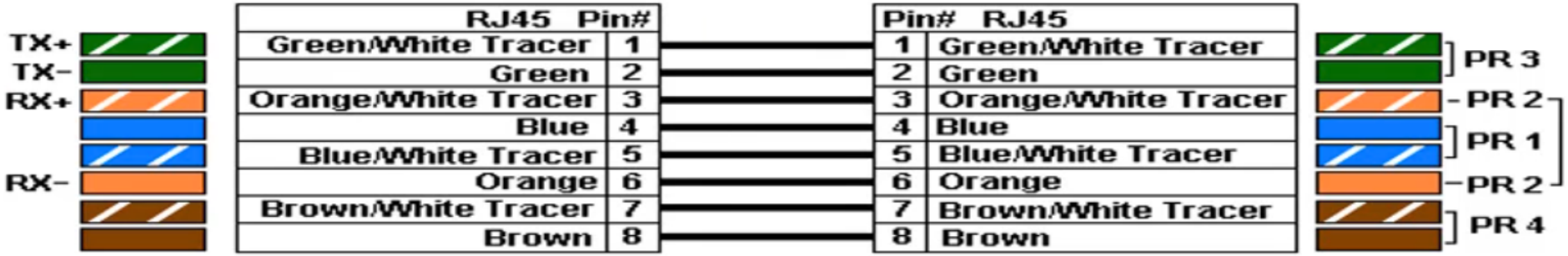


STP

SHIELDED TWISTED PAIR CABLE

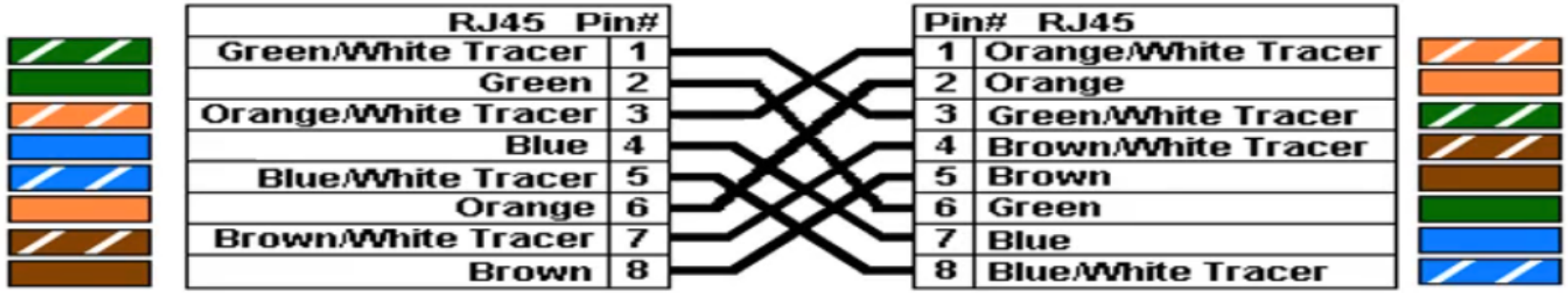
Color Standard
EIA/TIA T568A

Ethernet Patch Cable



Color Standard
EIA/TIA T568A

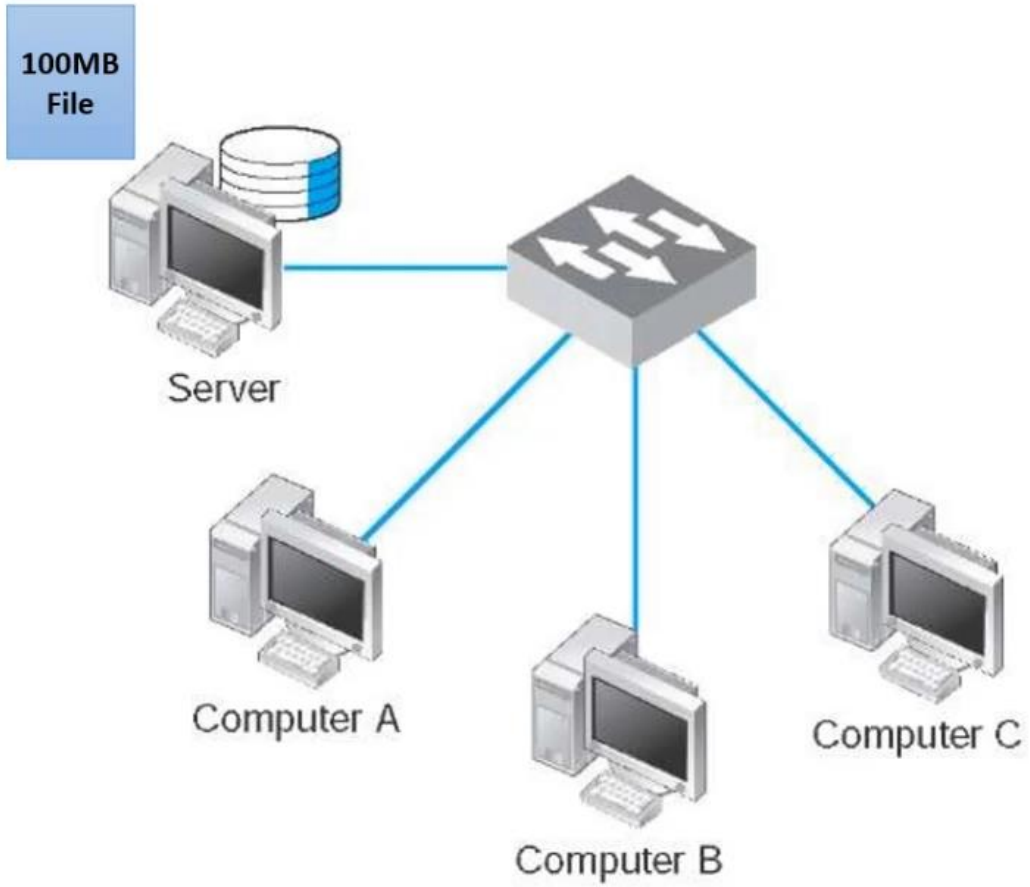
Ethernet Crossover Cable

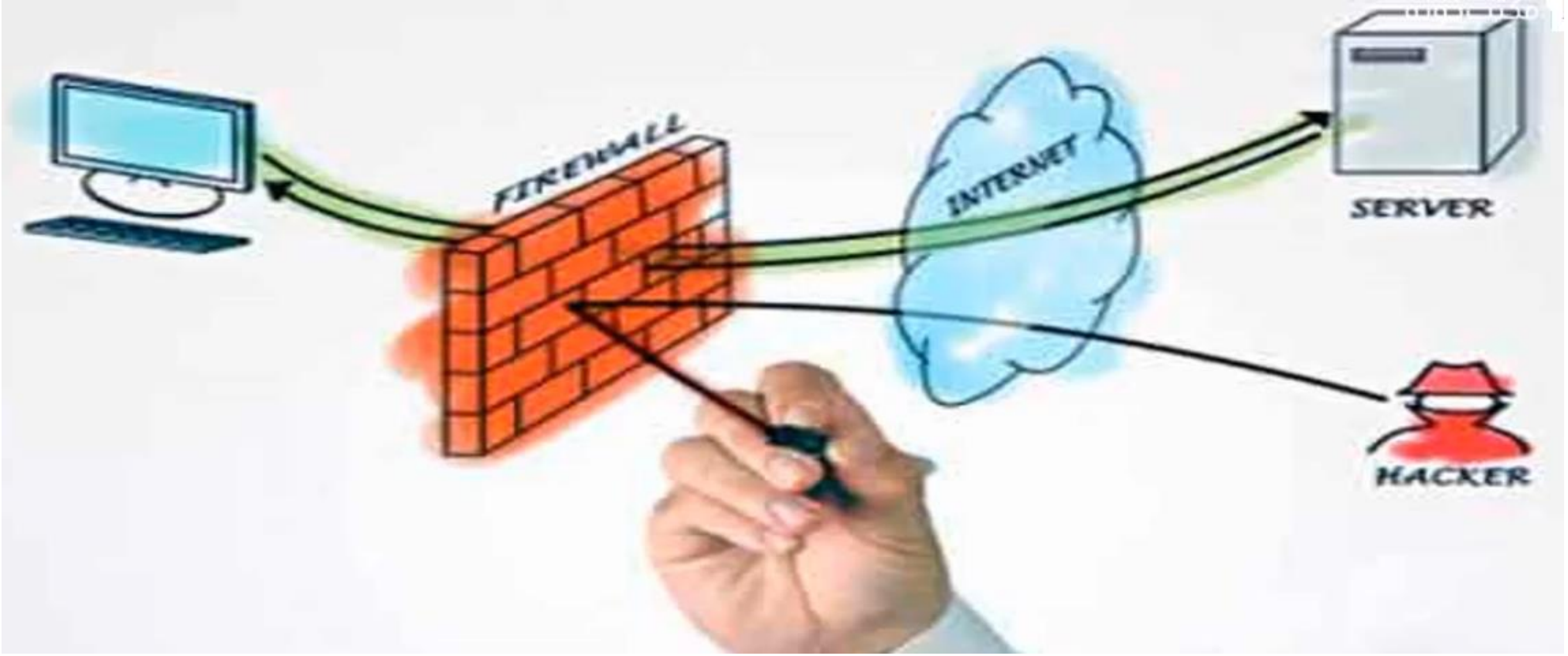


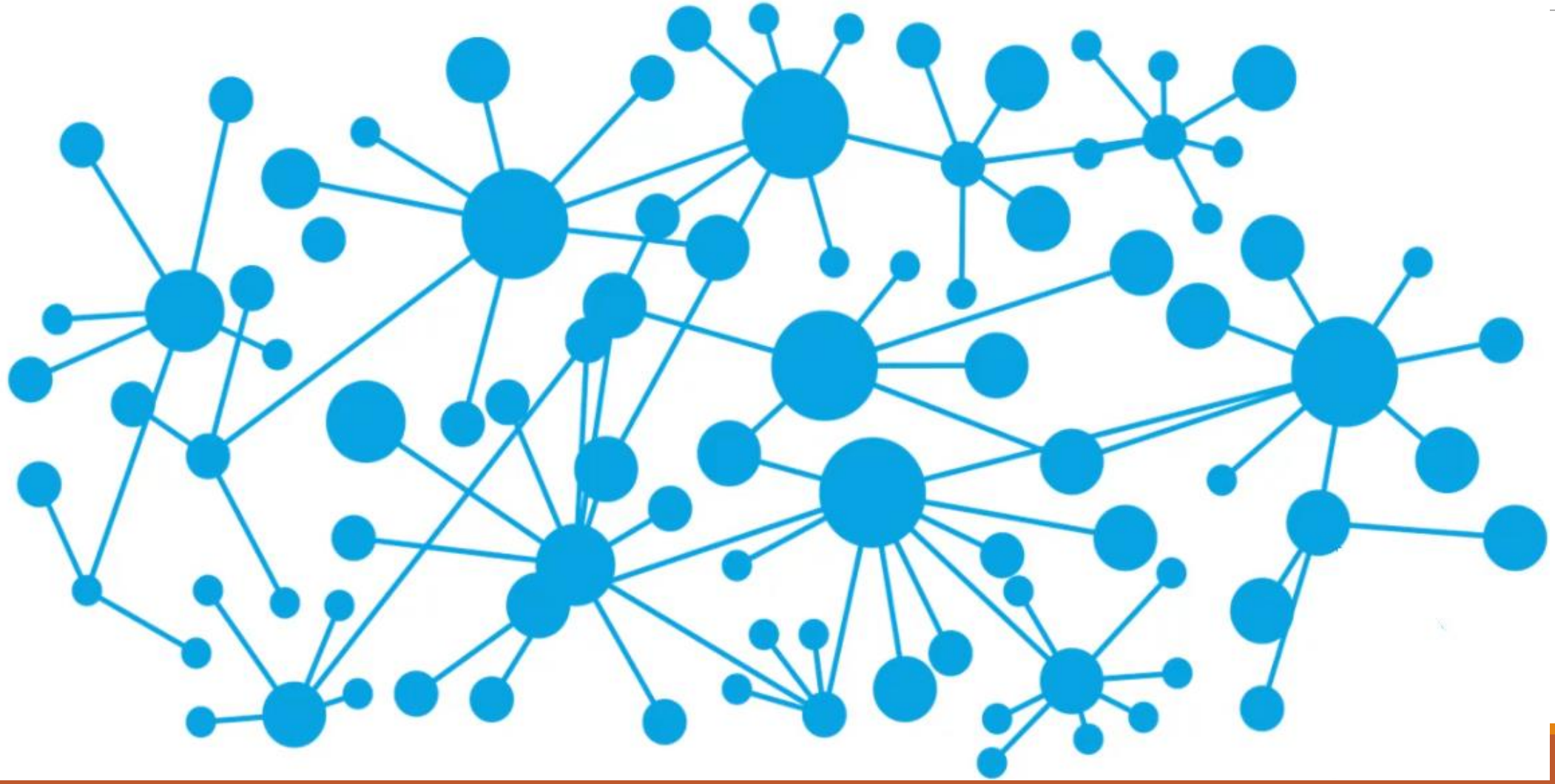
"A" is earlier

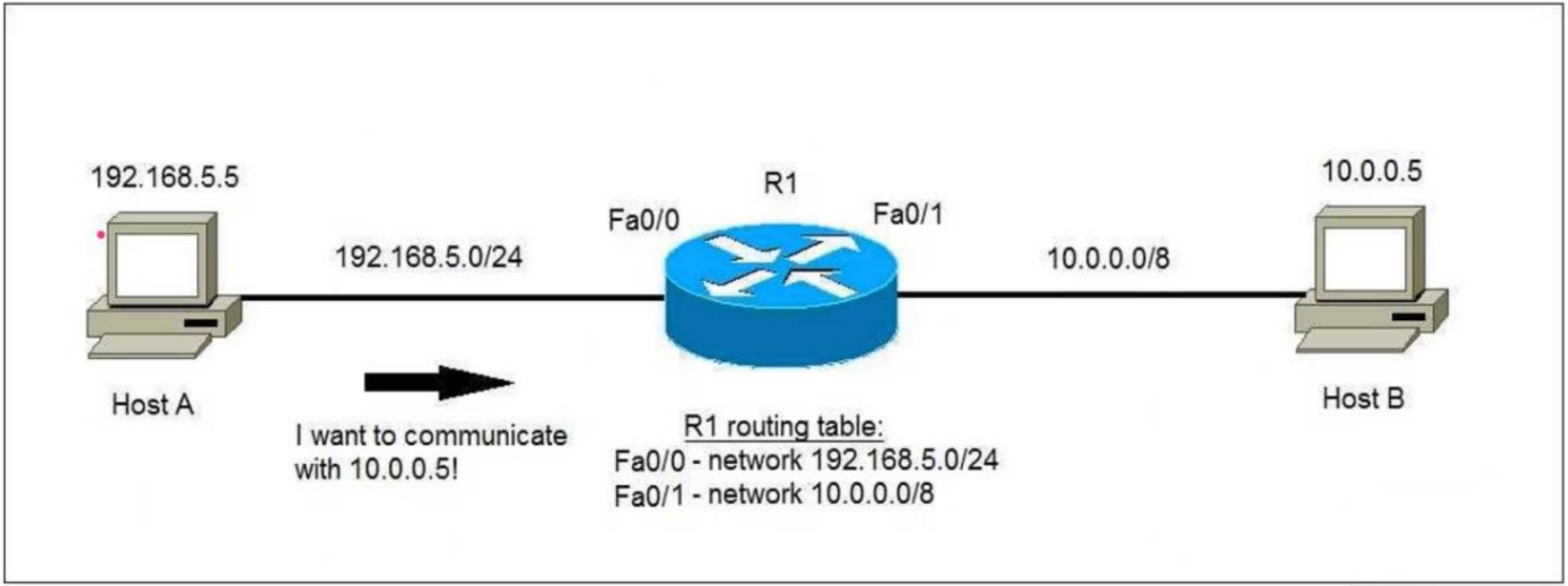
طرز کاری سوییچ و هاب

سناریوی اول




FIREWALL
INTERNET
SERVER
HACKER

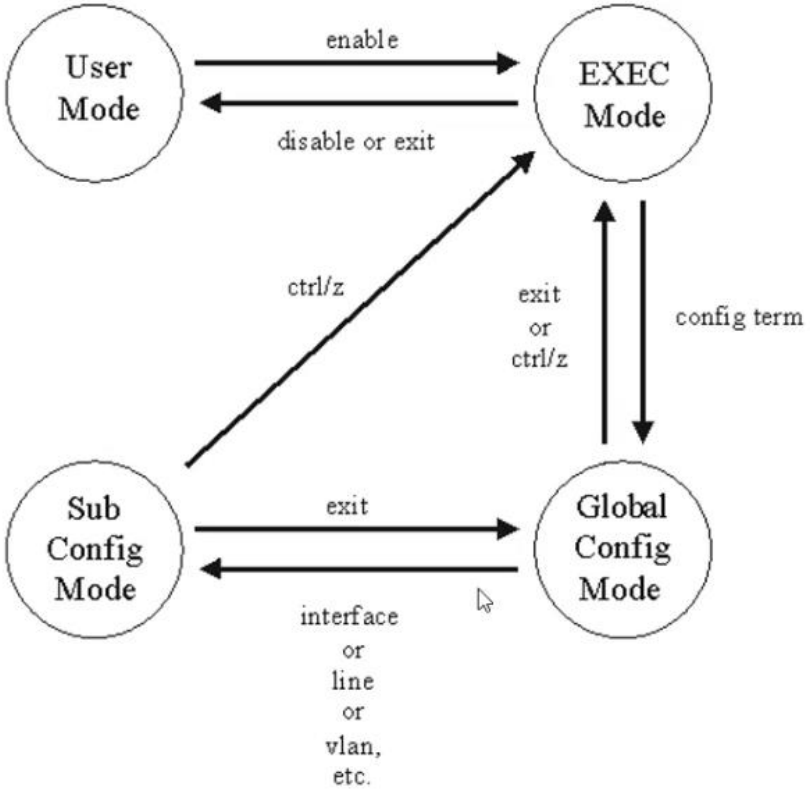



192.168.5.5
R1
10.0.0.5
Fa0/0
Fa0/1
192.168.5.0/24
10.0.0.0/8
Host A
Host B
I want to communicate
with 10.0.0.5!
R1 routing table:
Fa0/0 - network 192.168.5.0/24
Fa0/1 - network 10.0.0.0/8

Cisco

CISCO

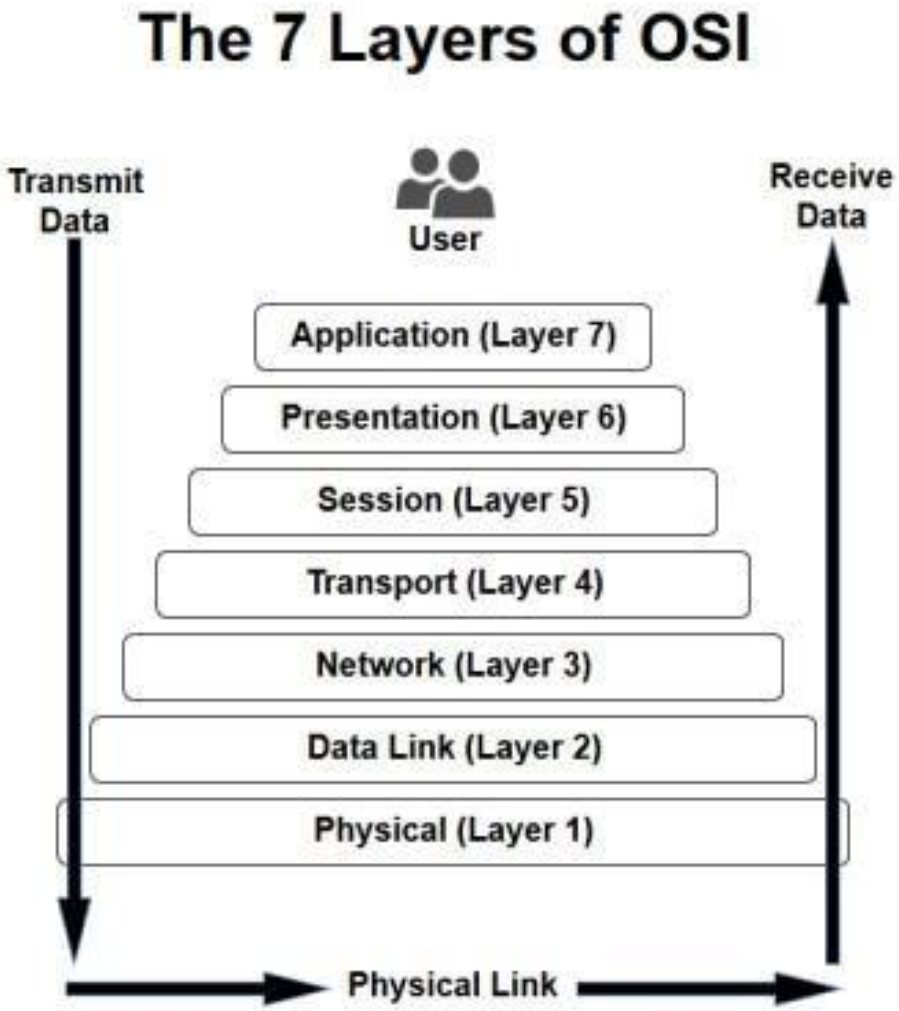
CISCO
ROUTERS
Cisco 2851
Cisco 3825
Cisco 2821
Cisco 3845
Cisco 2811
Cisco 7201
Cisco 2801
Cisco 7204 VXR
Cisco 7206 VXR
Cisco 7609
Cisco 7613


User Mode
enable
disable or exit
EXEC Mode
ctrl/z
exit or ctrl/z
config term
Sub Config Mode
exit
Global Config Mode
interface or line or vlan, etc.

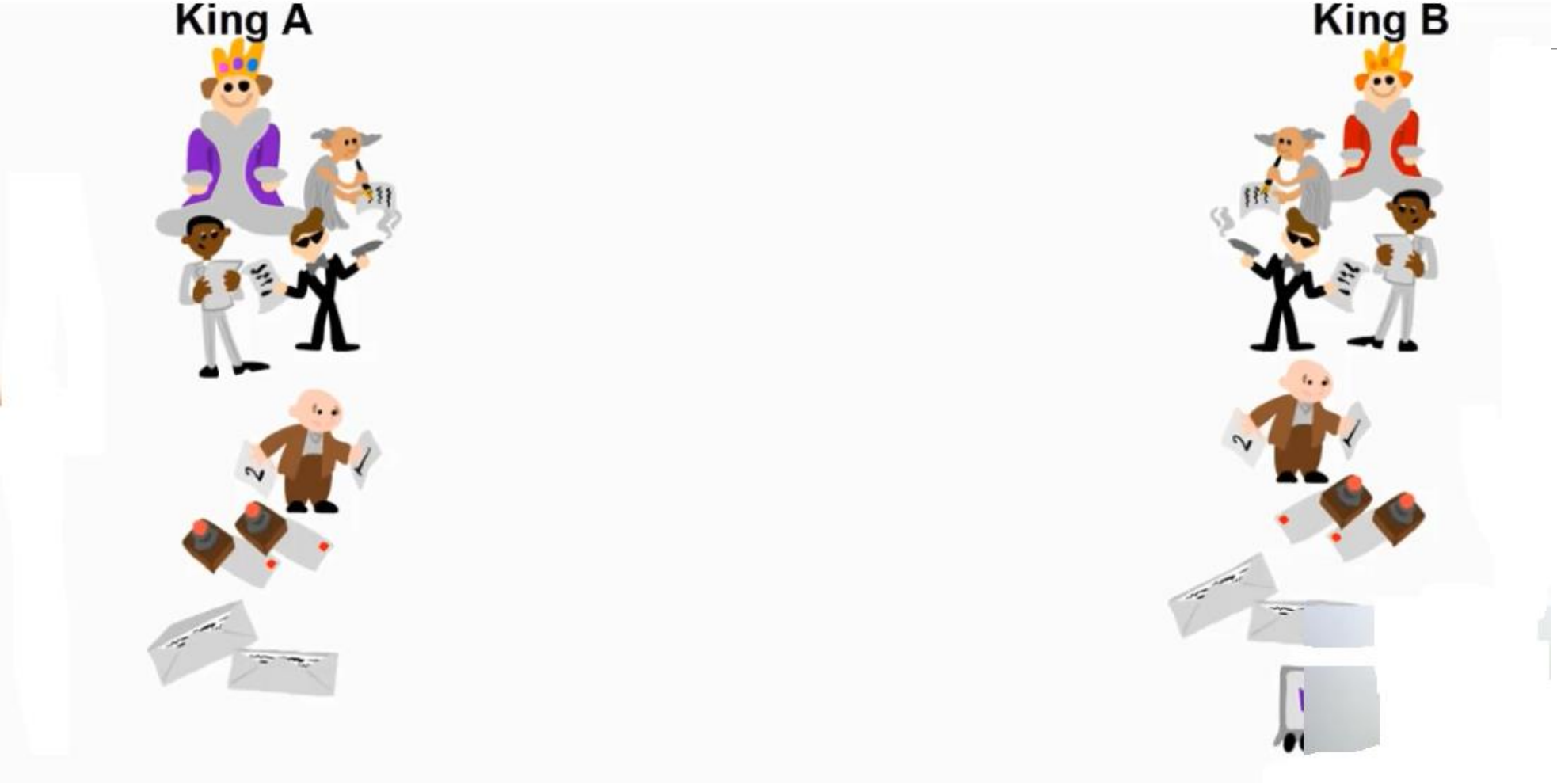
Sharing

مدل OSI

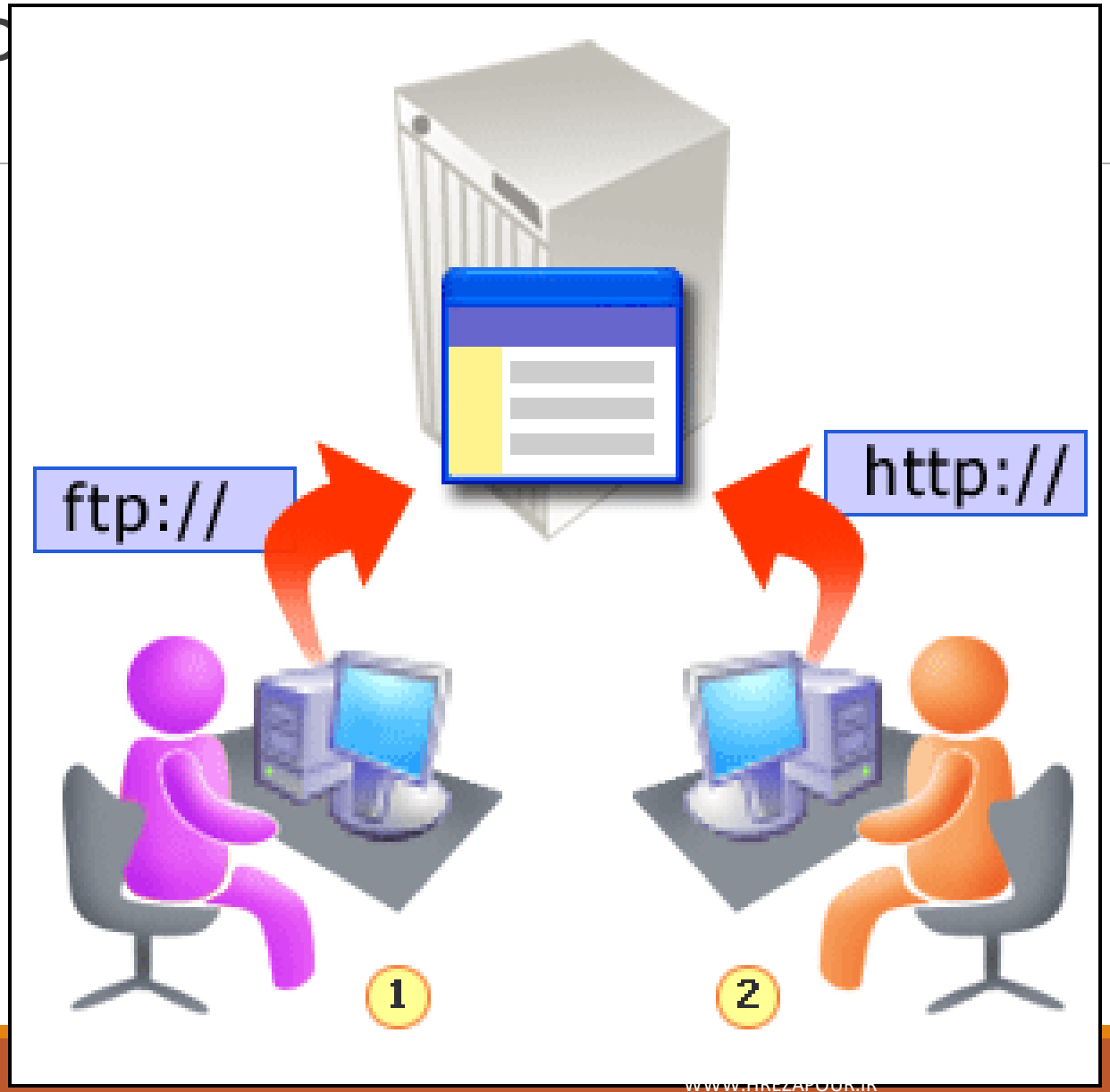
OSI Model
7 Application
6 Presentation
5 Session
4 Transport
3 Network
2 Data link
1 Physical


The 7 Layers of OSI
Transmit Data
User
Receive Data
Application (Layer 7)
Presentation (Layer 6)
Session (Layer 5)
Transport (Layer 4)
Network (Layer 3)
Data Link (Layer 2)
Physical (Layer 1)
Physical Link

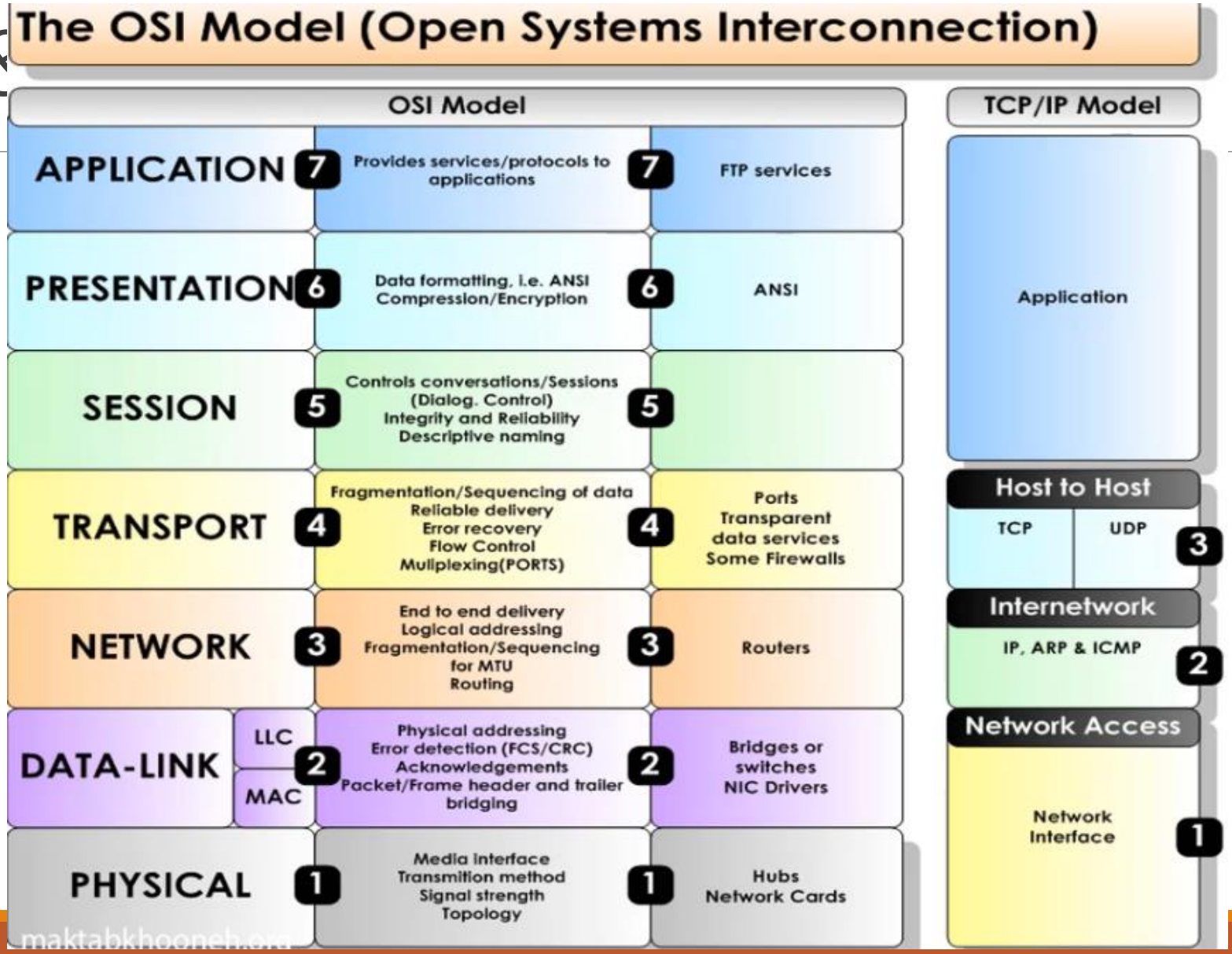
OSI Model



HTTP



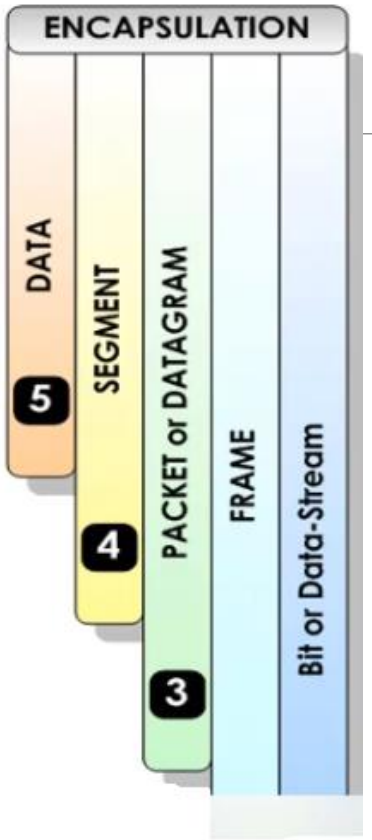
OSI &


The OSI Model (Open Systems Interconnection)
OSI Model
TCP/IP Model
APPLICATION 7
Provides services/protocols to applications
7
FTP services
PRESENTATION 6
Data formatting, i.e. ANSI Compression/Encryption
6
ANSI
SESSION 5
Controls conversations/Sessions (Dialog. Control) Integrity and Reliability Descriptive naming
5
TRANSPORT 4
Fragmentation/Sequencing of data Reliable delivery Error recovery Flow Control Mulipleking(PORTS)
4
Ports Transparent data services Some Firewalls
NETWORK 3
End to end delivery Logical addressing Fragmentation/Sequencing for MTU Routing
3
Routers
DATA-LINK
LLC
MAC
2
Physical addressing Error detection (FCS/CRC) Acknowledgements Packet/Frame header and trailer bridging
2
Bridges or switches NIC Drivers
PHYSICAL 1
Media Interface Transmition method Signal strength Topology
1
Hubs Network Cards
Application
Host to Host
TCP
UDP
3
Internetwork
IP, ARP & ICMP
2
Network Access
Network Interface
1

The OSI Model (Open Systems Interconnection)

OSI Model					TCP/IP Model
APPLICATION	7	Provides services/protocols to applications	7	FTP services	Application
PRESENTATION	6	Data formatting, i.e. ANSI Compression/Encryption	6	ANSI	
SESSION	5	Controls conversations/Sessions (Dialog. Control) Integrity and Reliability Descriptive naming	5		
TRANSPORT	4	Fragmentation/Sequencing of data Reliable delivery Error recovery Flow Control Multiplexing(PORTS)	4	Ports Transparent data services Some Firewalls	Host to Host: TCP, UDP (3)
NETWORK	3	End to end delivery Logical addressing Fragmentation/Sequencing for MTU Routing	3	Routers	Internetwork: IP, ARP & ICMP (2)
DATA-LINK (LLC, MAC)	2	Physical addressing Error detection (FCS/CRC) Acknowledgements Packet/Frame header and trailer bridging	2	Bridges or switches NIC Drivers	Network Access
PHYSICAL	1	Media interface Transmition method Signal strength Topology	1	Hubs Network Cards	Network Interface (1)

maktabkhooneh.com



SMB
Server Message Block Protocol Version2

SMB2

NetBIOS } Application Layer

Transmission Control Protocol → پروتکل TCP که اطلاعات لایه ۴ اینجا قرار دارد

Internet Protocol Version → اطلاعات لایه ۳ (لایه IP) در اینجا قرار دارد

Source سیستم مبدا

Destination سیستم مقصد

Ethernet II → اطلاعات لایه ۲ یا Data-link و Mac مبدا و مقصد در اینجا قرار دارد

Frame → پایین ترین لایه و اطلاعاتی که برای دیتا وجود دارد در اینجا قرار دارد

فایل شیرینگ ویندوز روی پورت TCP=445

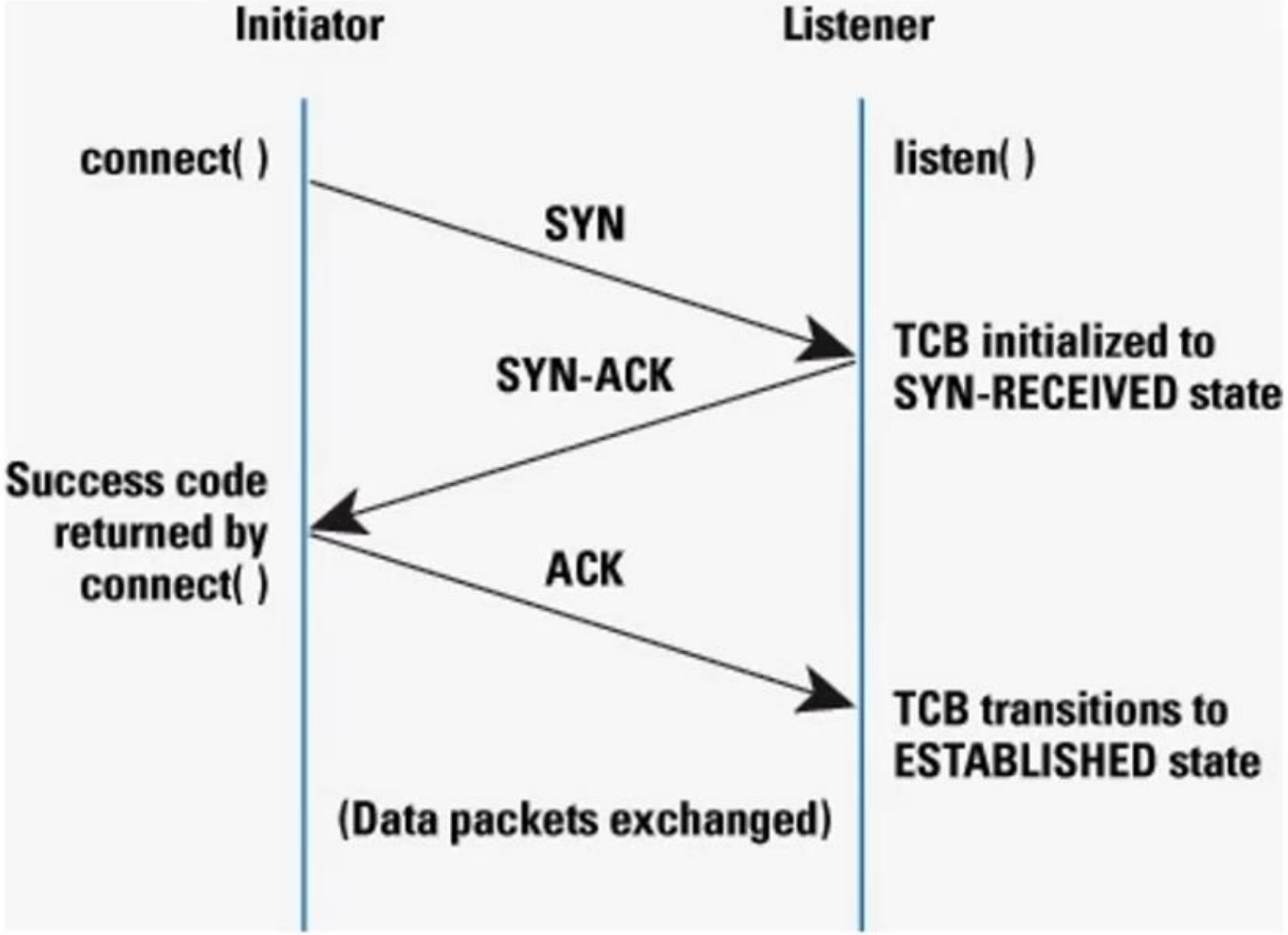
طول بسته حداقل ۶۴ بایت و حداکثر ۱۵۰۰ بایت

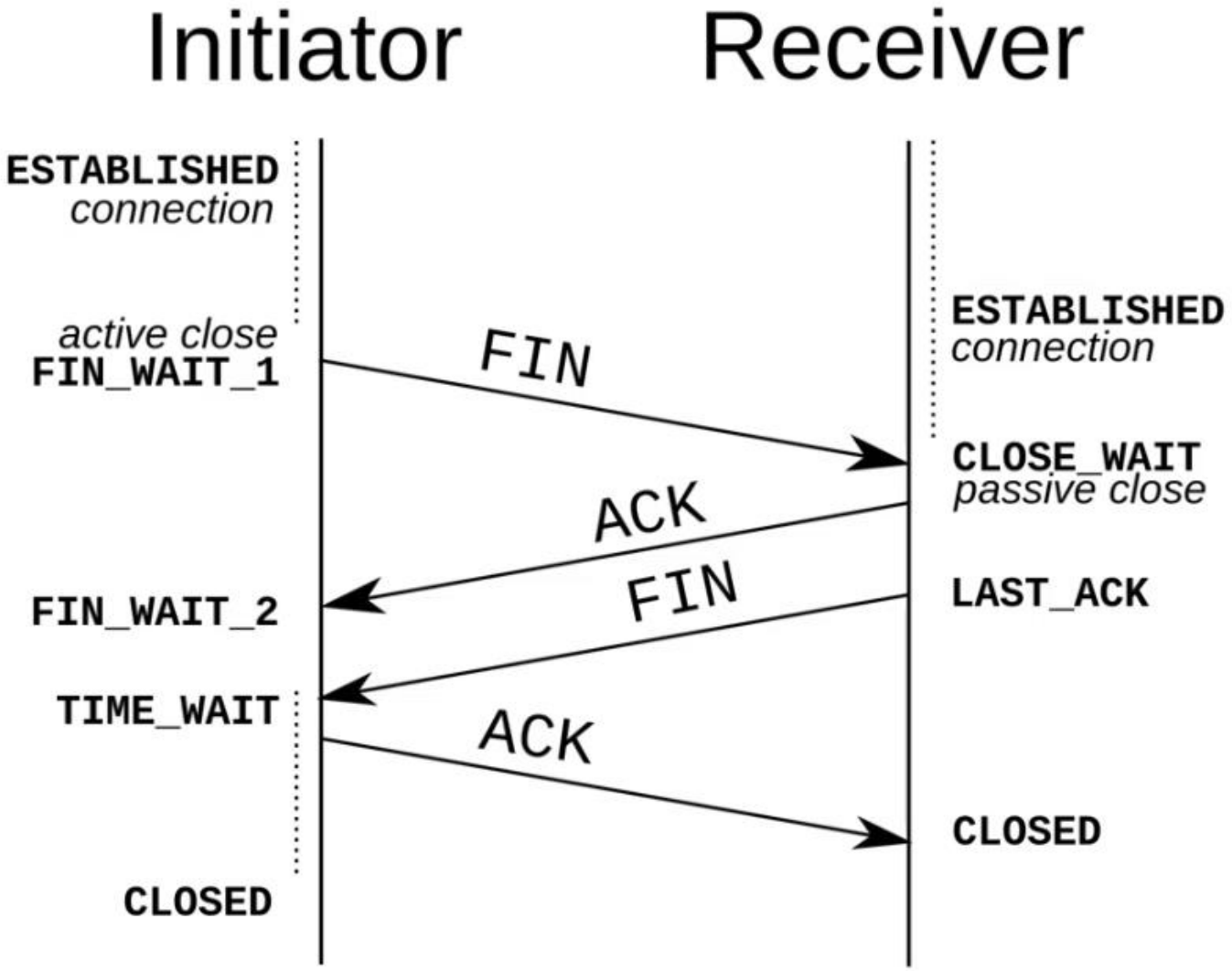
TCP & UDP

TCP	UDP
Reliable	Unreliable
Connection-oriented	Connectionless
Segment retransmission and flow control through windowing	No windowing or retransmission
Segment sequencing	No sequencing
Acknowledge segments	No acknowledgement

Seq num

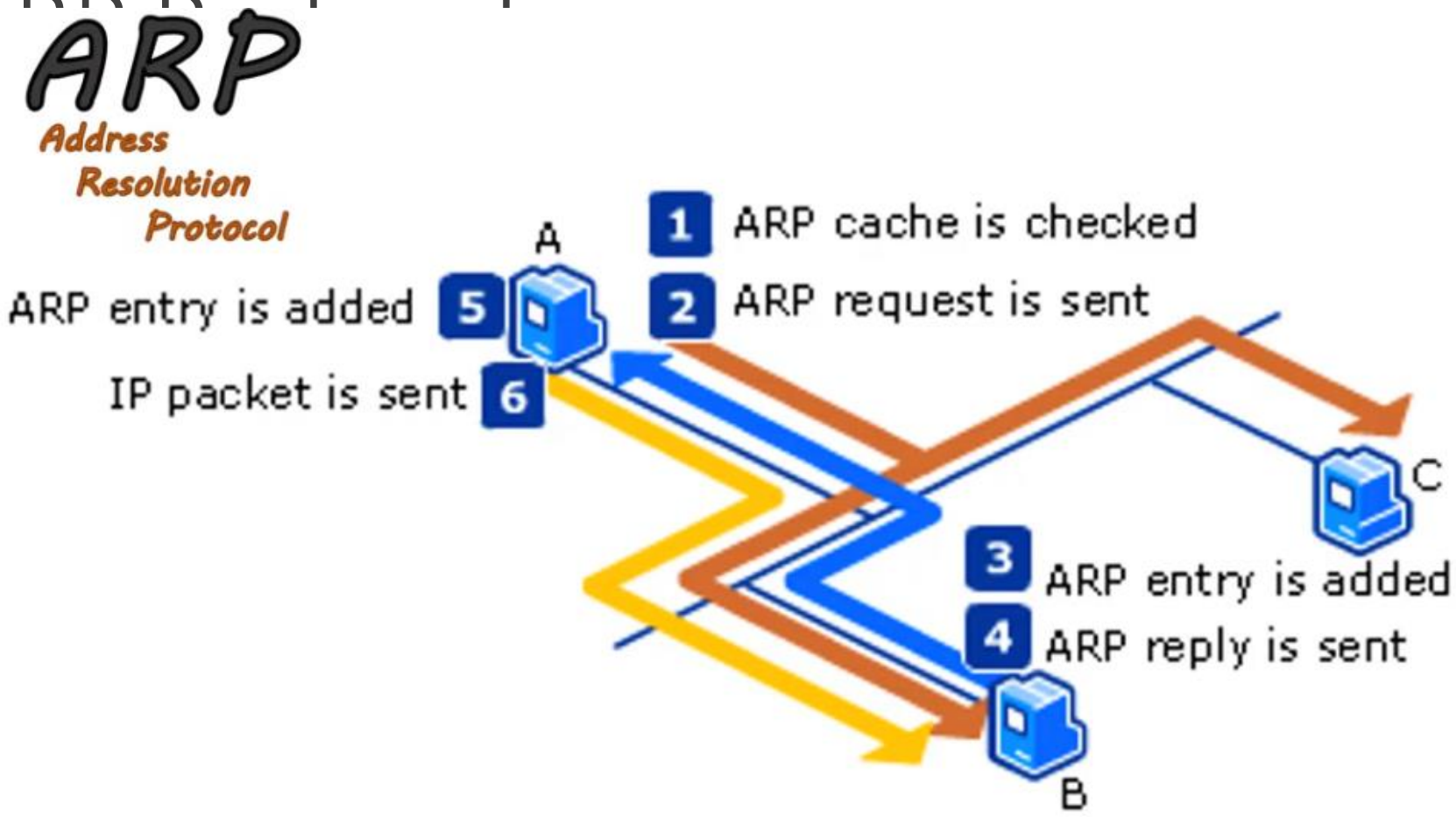
ایجاد ارتباط در پروتکل TCP

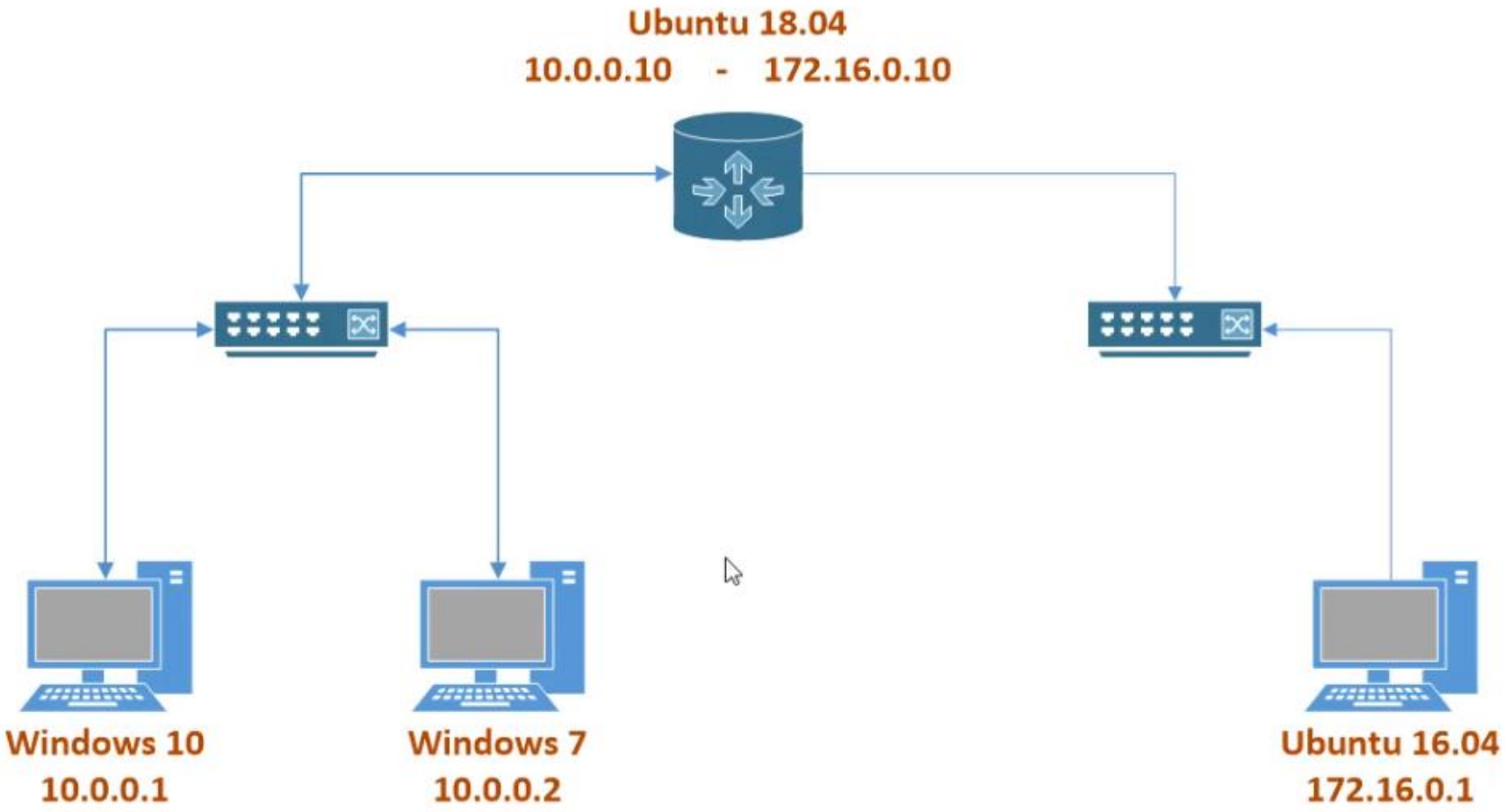




NTPپروتکلی که برای Synchronize ساعت استفاده و با UDPکار میکند

ARP


ARP
Address
Resolution
Protocol
A
1 ARP cache is checked
2 ARP request is sent
ARP entry is added 5
IP packet is sent 6
C
3 ARP entry is added
4 ARP reply is sent
B


Ubuntu 18.04
10.0.0.10 - 172.16.0.10
Windows 10
10.0.0.1
Windows 7
10.0.0.2
Ubuntu 16.04
172.16.0.1