Diagram

OSI Model

OSI Model vs TCP/IP Model

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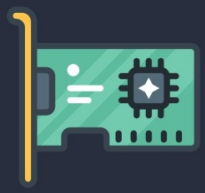
	OSI Model Layers	Function	TCP/IP Model Layers	PDUs	Hardware	Protocols
7.	Application 	Closest to the end user. This is the layer through which the application and the user communicate. For communication between web browsers and web server, application-specific protocols such as HTTP (Hyper Text Transfer Protocol) are utilized at this layer.	Application	Data	Gateways, Proxy Servers, Load Balancers PCs, mobile phones	DNS, FTP, SNMP, DHCP, SSH, SMTP POP3, LDAP, SMB, SSL, TLS NetBIOS HTTPS, HTTP, FTP, NFS,NTP, Telnet, IMAP, SSL, AFP, NetBIOS, RPC, SMB
6.	Presentation 	This layer formats the data so that it may be understood by the receiving application. This layer can also encrypt data as it is sent and decrypt it as it is received, ensuring that only the intended recipient can read it.				
5.	Session 	This layer controls host-to-host communication (sessions). It creates, manages, and destroys connections between a local application (such as your web browser) and a remote application (for example, youtube).				
4.	Transport 	To ensure that no data is lost, the transport layer is employed for error handling and sequencing. This layer also provides host-to-host communication also know as end-to-end communication.	Transport	Segment		TCP, UDP, RTP, SCTP,DCCP
3.	Network 	The Network layer connects end hosts on different networks (i.e outside of your LAN). This layer handles logical addressing using IP addresses.	Internet	Packet	Routers, Layer 3 Switches, Brouters	ICMP, IGMP, IP,IPsec, NAT
2.	Data Link 	This layer facilitates node-to-node communication and data transfer (for example, pc to switch, switch to router and router to router). The physical address (MAC Address) is appended to the data at this layer, this includes the source and destination MAC addresses.	Network Acces Or Link Layer	Frame	Switches, Bridges, WiFi Access Points	ARP, Ethernet, Token Ring, PPP, ATM, SLIP, Wi-Fi (IEEE 802.11), Frame relay, MAC, PPP, LLDP, L2TP, VLAN, VTP, Bluetooth, ISDN
1.	Physical 	The physical layer is the OSI model's bottom layer. It specifies the physical properties of a medium that is used to carry data between devices. For example, Voltage levels, maximum transmission distances, physical connectors, and so forth. Digital bits are transformed to electrical signals for wired connections and radio signals for wireless transmission at this layer.		Bits	Network Cables (e.g ethernet, fiber, copper) Hubs, Repeaters, Network Interface Cards (NICs)	

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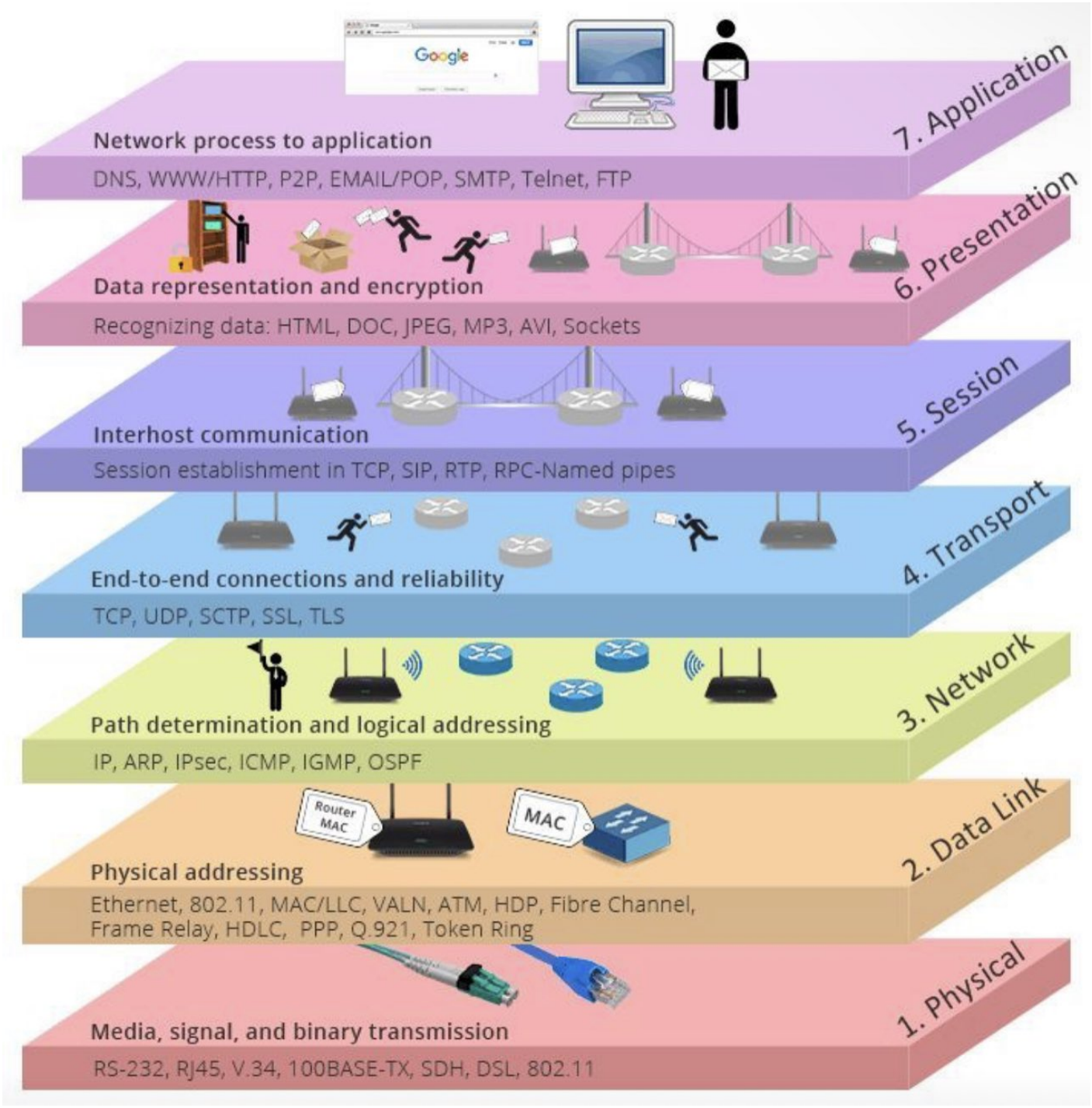
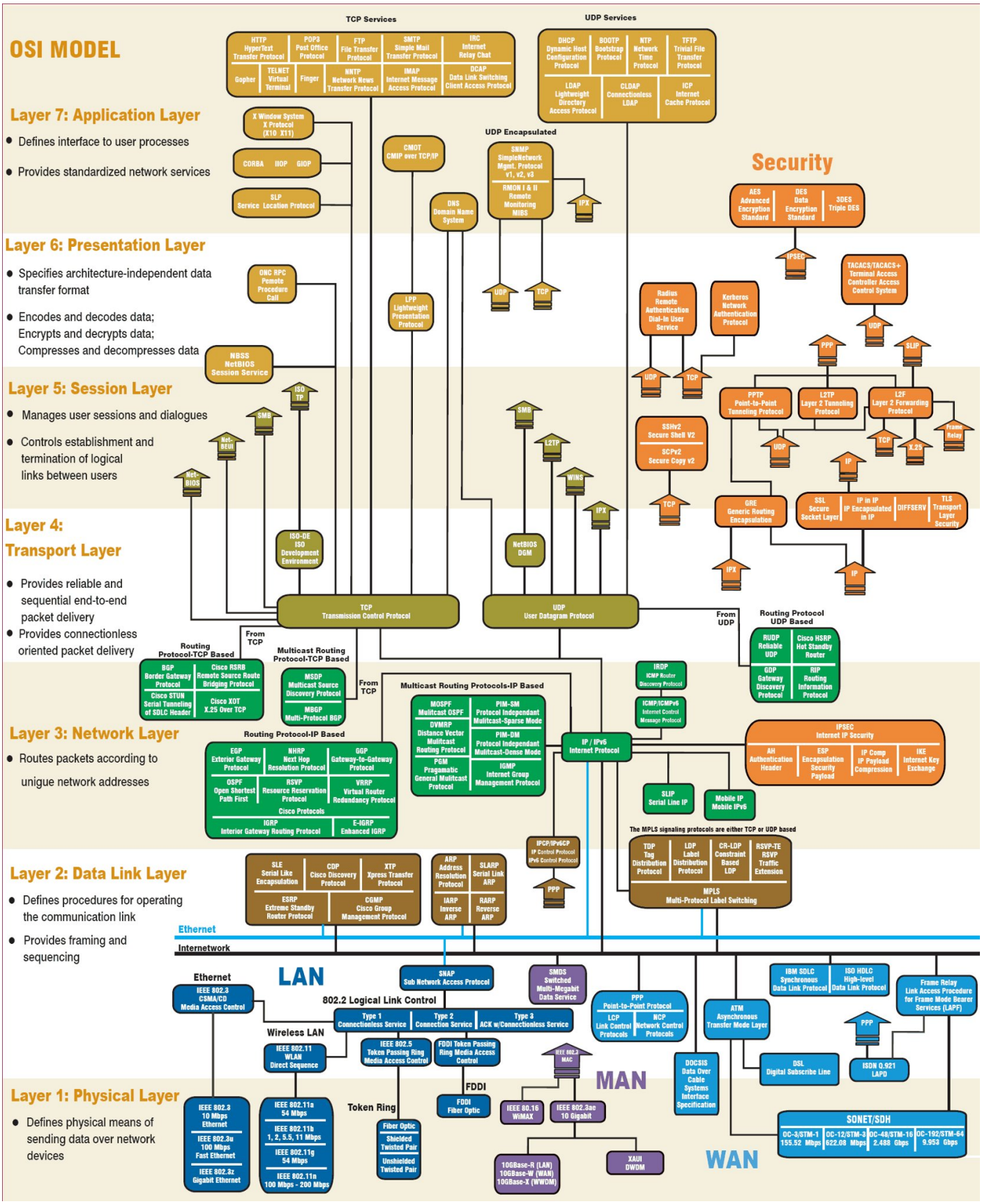
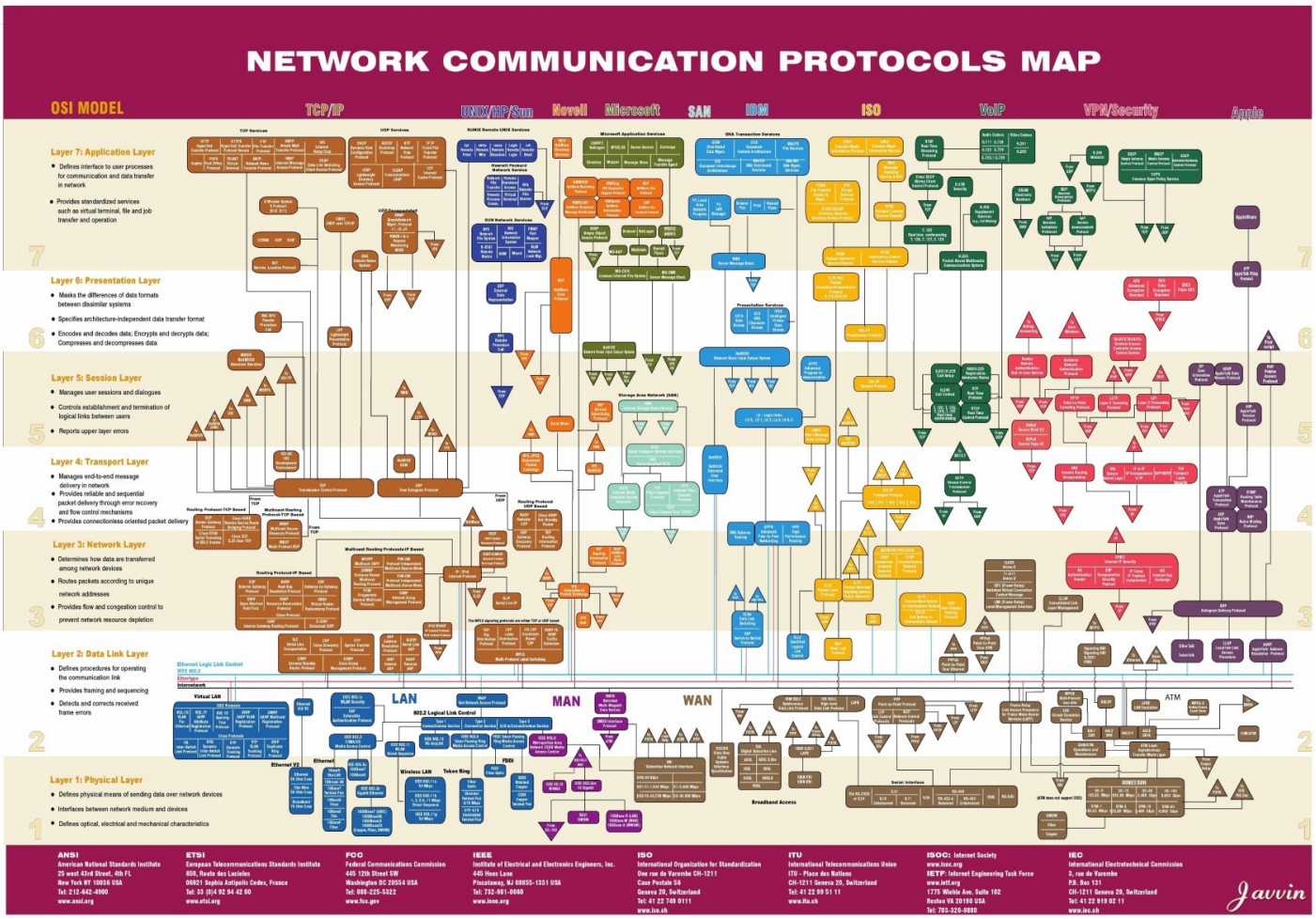
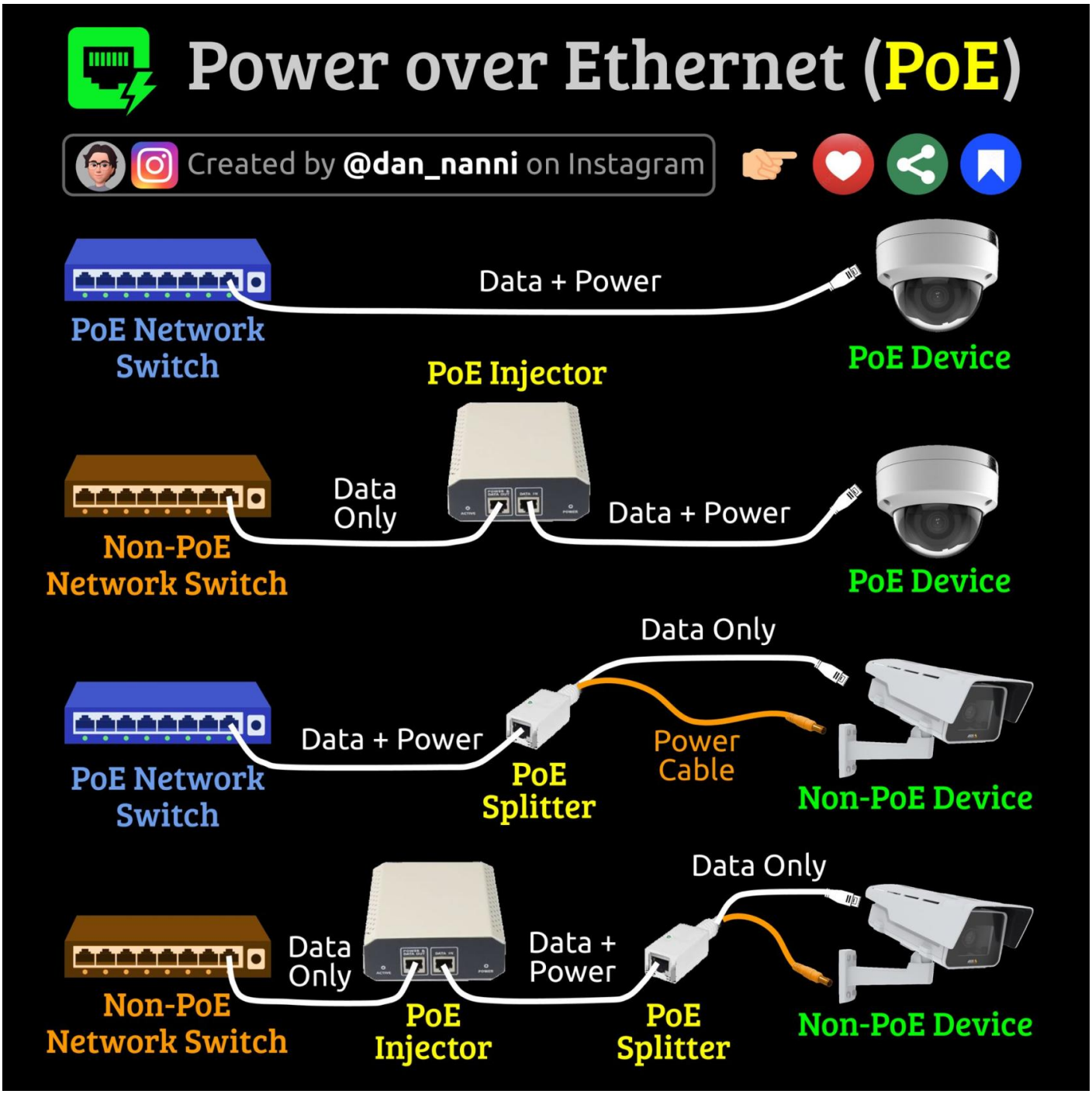

Google
7. Application
Network process to application
DNS, WWW/HTTP, P2P, EMAIL/POP, SMTP, Telnet, FTP
6. Presentation
Data representation and encryption
Recognizing data: HTML, DOC, JPEG, MP3, AVI, Sockets
5. Session
Interhost communication
Session establishment in TCP, SIP, RTP, RPC-Named pipes
4. Transport
End-to-end connections and reliability
TCP, UDP, SCTP, SSL, TLS
3. Network
Path determination and logical addressing
IP, ARP, IPsec, ICMP, IGMP, OSPF
Router MAC
MAC
2. Data Link
Physical addressing
Ethernet, 802.11, MAC/LLC, VALN, ATM, HDP, Fibre Channel,
Frame Relay, HDLC, PPP, Q.921, Token Ring
1. Physical
Media, signal, and binary transmission
RS-232, RJ45, V.34, 100BASE-TX, SDH, DSL, 802.11


OSI MODEL
TCP Services
UDP Services
HTTP HyperText Transfer Protocol
POP3 Post Office Protocol
FTP File Transfer Protocol
SMTP Simple Mail Transfer Protocol
IRC Internet Relay Chat
Gopher
TELNET Virtual Terminal
Finger
NNTP Network News Transfer Protocol
IMAP Internet Message Access Protocol
DCAP Data Link Switching Client Access Protocol
DHCP Dynamic Host Configuration Protocol
BOOTP Bootstrap Protocol
NTP Network Time Protocol
TFTP Trivial File Transfer Protocol
LDAP Lightweight Directory Access Protocol
CLDAP Connectionless LDAP
ICP Internet Cache Protocol
Layer 7: Application Layer
Defines interface to user processes
Provides standardized network services
X Window System X Protocol (X10 X11)
CORBA IIOP GIOP
SLP Service Location Protocol
CMOT CMIP over TCP/IP
DNS Domain Name System
UDP Encapsulated
SNMP SimpleNetwork Mgmt. Protocol v1, v2, v3
RMON I & II Remote Monitoring MIBS
IPX
Security
AES Advanced Encryption Standard
DES Data Encryption Standard
3DES Triple DES
IPSEC
TACACS/TACACS+ Terminal Access Controller Access Control System
Layer 6: Presentation Layer
Specifies architecture-independent data transfer format
Encodes and decodes data; Encrypts and decrypts data; Compresses and decompresses data
ONC RPC Remote Procedure Call
LPP Lightweight Presentation Protocol
UDP
TCP
Radius Remote Authentication Dial-In User Service
Kerberos Network Authentication Protocol
PPP
SLIP
NBSS NetBIOS Session Service
Layer 5: Session Layer
Manages user sessions and dialogues
Controls establishment and termination of logical links between users
ISO TP
SMB
Net-BEUI
Net-BIOS
L2TP
WINS
IPX
SSHv2 Secure Shell V2
SCPv2 Secure Copy v2
PPTP Point-to-Point Tunneling Protocol
L2TP Layer 2 Tunneling Protocol
L2F Layer 2 Forwarding Protocol
Frame Relay
X.25
IP
GRE Generic Routing Encapsulation
SSL Secure Socket Layer
IP in IP IP Encapsulated in IP
DIFFSERV
TLS Transport Layer Security
Layer 4: Transport Layer
Provides reliable and sequential end-to-end packet delivery
Provides connectionless oriented packet delivery
ISO-DE ISO Development Environment
NetBIOS DGM
TCP Transmission Control Protocol
UDP User Datagram Protocol
From TCP
From UDP
Routing Protocol-TCP Based
BGP Border Gateway Protocol
Cisco RSRB Remote Source Route Bridging Protocol
Cisco STUN Serial Tunneling of SDLC Header
Cisco XOT X.25 Over TCP
Multicast Routing Protocol-TCP Based
MSDP Multicast Source Discovery Protocol
MBGP Multi-Protocol BGP
Routing Protocol UDP Based
RUDP Reliable UDP
Cisco HSRP Hot Standby Router
GDP Gateway Discovery Protocol
RIP Routing Information Protocol
Multicast Routing Protocols-IP Based
MOSPF Multicast OSPF
DVMRP Distance Vector Multicast Routing Protocol
PGM Pragamatic General Multicast Protocol
PIM-SM Protocol Independant Multicast-Sparse Mode
PIM-DM Protocol Independant Multicast-Dense Mode
IGMP Internet Group Management Protocol
IRDP ICMP Router Discovery Protocol
ICMP/ICMPv6 Internet Control Message Protocol
Layer 3: Network Layer
Routes packets according to unigue network addresses
Routing Protocol-IP Based
EGP Exterior Gateway Protocol
NHRP Next Hop Resolution Protocol
GGP Gateway-to-Gateway Protocol
OSPF Open Shortest Path First
RSVP Resource Reservation Protocol
VRRP Virtual Router Redundancy Protocol
Cisco Protocols
IGRP Interior Gateway Routing Protocol
E-IGRP Enhanced IGRP
IP / IPv6 Internet Protocol
IPSEC Internet IP Security
AH Authentication Header
ESP Encapsulation Security Payload
IP Comp IP Payload Compression
IKE Internet Key Exchange
SLIP Serial Line IP
Mobile IP Mobile IPv6
The MPLS signaling protocols are either TCP or UDP based
TDP Tag Distribution Protocol
LDP Label Distribution Protocol
CR-LDP Constraint Based LDP
RSVP-TE RSVP Traffic Extension
MPLS Multi-Protocol Label Switching
IPCP/IPv6CP IP Control Protocol IPv6 Control Protocol
Layer 2: Data Link Layer
Defines procedures for operating the communication link
Provides framing and sequencing
SLE Serial Like Encapsulation
CDP Cisco Discovery Protocol
XTP Xpress Transfer Protocol
ESRP Extreme Standby Router Protocol
CGMP Cisco Group Management Protocol
ARP Address Resolution Protocol
SLARP Serial Link ARP
IARP Inverse ARP
RARP Reverse ARP
Ethernet
Internetwork
LAN
Ethernet
IEEE 802.3 CSMA/CD Media Access Control
SNAP Sub Network Access Protocol
SMDS Switched Multi-Megabit Data Service
802.2 Logical Link Control
Type 1 Connectionless Service
Type 2 Connection Service
Type 3 ACK w/Connectionless Service
PPP Point-to-Point Protocol
LCP Link Control Protocols
NCP Network Control Protocols
ATM Asynchronous Transfer Mode Layer
IBM SDLC Synchronous Data Link Protocol
ISO HDLC High-level Data Link Protocol
Frame Relay Link Access Procedure for Frame Mode Bearer Services (LAPF)
Wireless LAN
IEEE 802.11 WLAN Direct Sequence
IEEE 802.5 Token Passing Ring Media Access Control
FDDI Token Passing Ring Media Access Control
IEEE 802.3 MAC
MAN
DOCSIS Data Over Cable Systems Interface Specification
DSL Digital Subscribe Line
PPP
ISDN Q.921 LAPD
Layer 1: Physical Layer
Defines physical means of sending data over network devices
IEEE 802.3 10 Mbps Ethernet
IEEE 802.3u 100 Mbps Fast Ethernet
IEEE 802.3z Gigabit Ethernet
IEEE 802.11a 54 Mbps
IEEE 802.11b 1, 2, 5.5, 11 Mbps
IEEE 802.11g 54 Mbps
IEEE 802.11n 100 Mbps - 200 Mbps
Token Ring
Fiber Optic
Shielded Twisted Pair
Unshielded Twisted Pair
FDDI
FDDI Fiber Optic
IEEE 80.16 WiMAX
IEEE 802.3ae 10 Gigabit
10GBase-R (LAN) 10GBase-W (WAN) 10GBase-X (WWDM)
XAUI DWDM
WAN
SONET/SDH
OC-3/STM-1 155.52 Mbps
OC-12/STM-3 622.08 Mbps
OC-48/STM-16 2.488 Gbps
OC-192/STM-64 9.953 Gbps



Power over Ethernet (PoE)



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