

網路基礎班

Layer 2 – Layer 4

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| | OSI Layer | TCP/IP | Datagrams are called |
|----------|-------------------------|--|----------------------|
| Software | Layer 7 Application | HTTP, SMTP, IMAP, SNMP, POP3, FTP | Upper Layer Data |
| | Layer 6 Presentation | ASCII Characters, MPEG, SSL, TSL, Compression (Encryption & Decryption) | |
| | Layer 5 Session | NetBIOS, SAP, Handshaking connection | |
| | Layer 4 Transport | TCP, UDP | Segment |
| | Layer 3 Network | IPv4, IPv6, ICMP, <u>IPSec</u> , MPLS, ARP | Packet |
| Hardware | Layer 2 Data Link | Ethernet, 802.1x, PPP, ATM, <u>Fiber Channel</u> , MPLS, FDDI, MAC Addresses | Frame |
| | Layer 1 Physical | Cables, Connectors, Hubs (DLS, RS232, 10BaseT, 100BaseTX, ISDN, T1) | Bits |

OSI (Open Source Interconnection) 7 Layer Model

| Layer | Application/Example | Central Device/ Protocols | DOD4 Model |
|---|---|--|---|
| Application (7) Serves as the window for users and application processes to access the network services. | End User layer Program that opens what was sent or creates what is to be sent Resource sharing • Remote file access • Remote printer access • Directory services • Network management | User Applications SMTP | G A T E W A Y Process |
| Presentation (6) Formats the data to be presented to the Application layer. It can be viewed as the "Translator" for the network. | Syntax layer encrypt & decrypt (if needed) Character code translation • Data conversion • Data compression • Data encryption • Character Set Translation | JPEG/ASCII EBDIC/TIFF/GIF PICT | |
| Session (5) Allows session establishment between processes running on different stations. | Synch & send to ports (logical ports) Session establishment, maintenance and termination • Session support - perform security, name recognition, logging, etc. | Logical Ports RPC/SQL/NFS NetBIOS names | |
| Transport (4) Ensures that messages are delivered error-free, in sequence, and with no losses or duplications. | TCP Host to Host, Flow Control Message segmentation • Message acknowledgement • Message traffic control • Session multiplexing | F I L T E R I N G P A C K E T TCP/SPX/UDP Routers IP/IPX/ICMP | Host to Host |
| Network (3) Controls the operations of the subnet, deciding which physical path the data takes. | Packets ("letter", contains IP address) Routing • Subnet traffic control • Frame fragmentation • Logical-physical address mapping • Subnet usage accounting | | Internet |
| Data Link (2) Provides error-free transfer of data frames from one node to another over the Physical layer. | Frames ("envelopes", contains MAC address) [NIC card — Switch — NIC card] (end to end) Establishes & terminates the logical link between nodes • Frame traffic control • Frame sequencing • Frame acknowledgment • Frame delimiting • Frame error checking • Media access control | Switch Bridge WAP PPP/SLIP | Can be used on all layers Network |
| Physical (1) Concerned with the transmission and reception of the unstructured raw bit stream over the physical medium. | Physical structure Cables, hubs, etc. Data Encoding • Physical medium attachment • Transmission technique - Baseband or Broadband • Physical medium transmission Bits & Volts | Hub Land Based Layers | |

TCP/IP

第7层 应用层
各种应用程序协议，如 HTTP、FTP、SMTP、POP3。

第6层 表示层
信息的语法语义以及它们的关联，如加密解密、转换翻译、压缩解压缩。

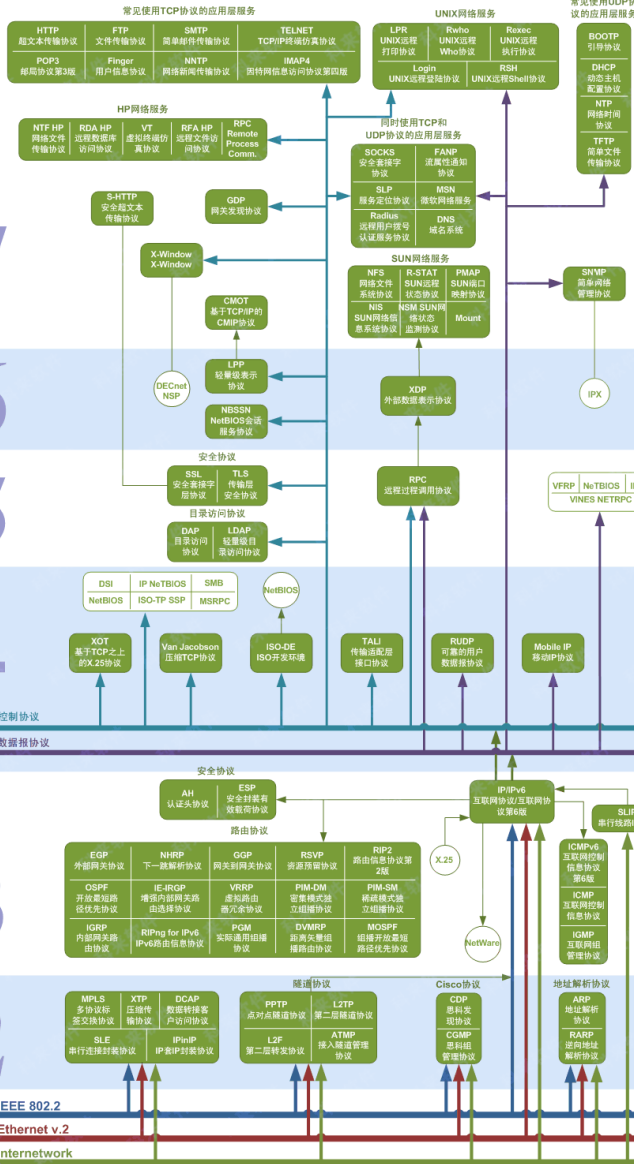
第5层 会话层
不同机器上的用户之间建立及管理会话。

第4层 传输层
接受上一层的数据，在必要的时候把数据进行分割，并将这些数据交给网络层，且保证这些数据能有效到达对端。

第3层 网络层
控制子网的运行，如逻辑编址、分组传输、路由选择。

第2层 数据链路层
物理寻址，同时将原始比特流转变为逻辑传输线路。

第1层 物理层
机械、电子、定时接口通信信道上的原始比特流传输。



7

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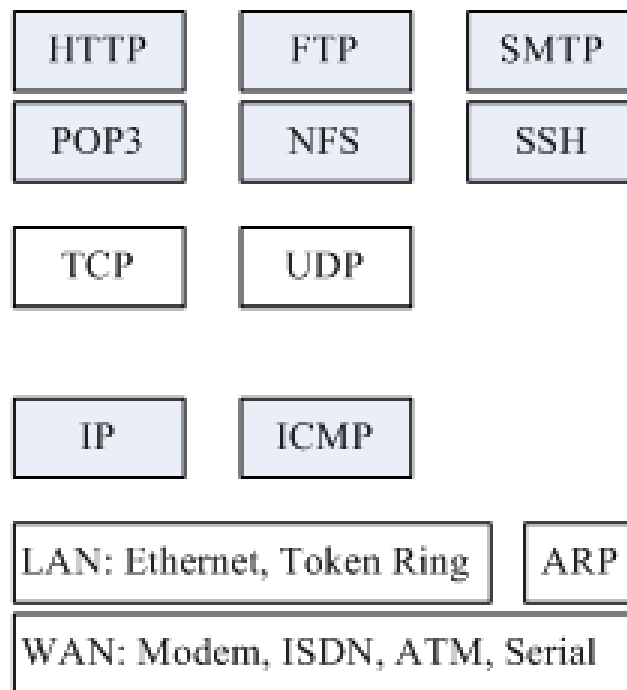
OSI 七層協定



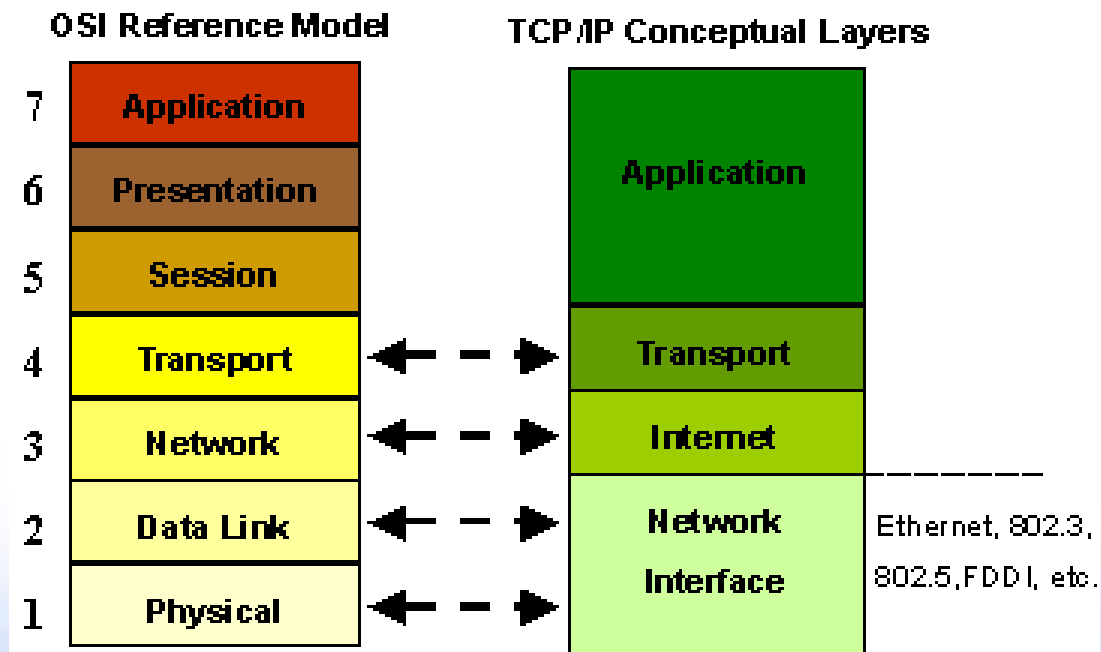
TCP/IP



相關通訊協定與標準



OSI 協定 vs. TCP/IP 協定



高市網使用中的虛擬**IP**網段

| 使用網段 | 用途 | 備註 |
|---------------|------------|----|
| 10.242.0.0/16 | 各校L3 Wan介面 | |
| 10.241.0.0/16 | 各校L3 Wan介面 | |
| 172.21.0.0/16 | 全市無線網路 | |
| 172.22.0.0/16 | 全市無線網路 | |

