NETWORK ASSOCIATES GUIDE TO COMMUNICATIONS PROTOCOLS

TCP/IP · **Novell NetWare** · **IBM Protocols** · **ISO** · **DECnet Phase IV** · **XNS Xerox Network System** · **AppleTalk** · **Banyan VINES**

7 APPLICATION LAYER
- Provides interface to end-user processes
- Provides standardized services to applications

Hewlett-Packard Network Services: Network File Transfer, Remote Database Access, RFA Remote File Access, Remote Process Comm., Virtual Terminal

DHCP Dynamic Host Configuration Protocol · BOOTP Bootstrap Protocol · NTP Network Time Protocol · TFTP Trivial File Transfer Protocol

SUN Network Services: NFS Network File System, NIS YP Network Information System, PMAP Port Mapper, Statd Status Daemon, Mount, NLM Network Lock Mgr.

X Windows System (X10 / X11) · CMOT (CMIP over TCP/IP) (see also ISO)

ARPA Services: HTTP HyperText Transfer Protocol, FTP File Transfer Protocol, TELNET Virtual Terminal, SMTP Simple Mail Transfer Protocol

RUNIX Remote UNIX Services: lpr Remote Print, rcp Remote Copy, rexec Remote Execution, login Remote Login, rsh Remote Shell

DNS Domain Name System · SNMP Simple Network Mgmt. Protocol v1, v2, v2c · ND Network Disk

NDS NetWare Directory Services · NetWare Lite

SNA Transaction Services: DDM Distributed Data Mgmt., DCA Document Content Architecture, SNA/FS File Services, DIA Document Interchange Architecture, SNA/DS SNA Distributed Services, SNA/MS SNA Mgmt. Services

Browse File · Print · Named Pipes · SMB Server Message Block · RPL Remote Program Load

From IPX · From VSPP · From TCP

CMIP Common Mgmt. Information Protocol · DS Directory Services X.500 · FTAM File Transfer Access and Mgmt. · MHS Mail Handling Service X.400 · MMS Manufacturing Messaging Service · ODA Office Document Architecture · VT Virtual Terminal

ROSE · RTSE · ACSE

ACSE - Association Control Service Element
ROSE - Remote Operation Service Element
RTSE - Reliable Transfer Service Element

DAP Data Access Protocol · MOP Maintenance Operations Protocol

NICE Network Information and Command Exchange Protocol · CTERM Network Command Terminal

XNS Application Services: Application Support, Filing, Mail, Printing, Virtual Terminal · GAP Gateway Access Protocol

VINES Application Services: StreetTalk, Mail(IM-III), Network Mgmt., Server Service, PC Backend, VINES Security, Echotest, File Service, Talk, Async, STDA, Deflector, Diagnostic, NetBIOS over VINES, Print Service, Semaphore, SNA Service, SX Service

AFP AppleTalk Filing Protocol · Postscript · To Oracle TNS · SMB · 3270 Data Stream · NAMED PIPES for OS/2

6 PRESENTATION LAYER
- Specifies architecture-independent data transfer format
- Encodes and decodes data; encrypts and decrypts data; compresses data

From DECnet NSP · LPP Lightweight Presentation Protocol · XDR External Data Representation · From IPX

NCP NetWare Core Protocol

Presentation Services: 3270 Data Stream, SCS SNA Character Stream, IPDS Intelligent Printer Data Stream · LU6.2 Logical Unit

X.25 PAD Packet Assembler/Disassembler Protocol X.3, X.28, X.29

NetBIOS

Connection-oriented Presentation Protocol · ASN.1

XNS Courier: Message Stream, Object Stream, Block Stream · VINES NETRPC

5 SESSION LAYER

DAP Lightweight Directory Access Protocol · To NetBIOS · RPC Remote Procedure Call · To VFRP · To VINES NETRPC

SAP Service Advertising Protocol · Burst Mode

NetBEUI · Data Flow Control · To NetBIOS · ISO NetBIOS · Connection-oriented Session Protocol

DNS Distributed Name Server · SCP Session Control Protocol · SCS · To NetBIOS · FOUND Foundation Services

XNS Courier: Bulk Data Transfer Protocol

Keiwet Session Protocol · ZIP Zone Information Protocol · ASP AppleTalk Session Protocol · PAP Printer Access Protocol · From UDP · To Ipt · To IPX · To DDP · To ARP

4 TRANSPORT LAYER
- Manages network layer connections
- Provides reliable packet delivery mechanism

To PPTP · To DLSw SSP · To ISO-TP · To IPX · ISO-DE ISO Development Environment · To VFRP

TCP Transmission Control Protocol · UDP User Datagram Protocol

SPX, SPX2 Sequenced Packet Exchange

Transmission Control · TRANSPORT PROTOCOL TPO, TP1, TP2, TP3, TP4 · NSP Network Services Protocol DNA

LAT Local Area Transport Protocol · LAVC

ADSP AppleTalk Data Stream Protocol · AEP AppleTalk Echo Protocol · ATP AppleTalk Transaction Protocol · NBP Name Binding Protocol

SPP Sequence Packet Protocol · PEP Packet Exchange Protocol · VIPC VINES Interprocess Communications Protocol · VSPP VINES Sequenced Packet Protocol

3 NETWORK LAYER
- Addresses and routes packets

DVMRP Distance Vector Multicast Routing Protocol · IGMP Internet Group Mgmt. Protocol · RSVP Resource Reservation Protocol

ARP Address Resolution Protocol · RARP Reverse ARP

OSPF Open Shortest Path First Routing · IGRP/EIGRP Interior Gateway Routing CISCO · GGP Gateway to Gateway · EGP Exterior Gateway · BGP Border Gateway · RIP Routing Information

RIP Routing Information Protocol · NLSP NetWare Link Services Protocol · IPX – Internetwork Packet Exchange · IPX WAN 2

IP Internet Protocol · ICMP Internet Control Message Protocol · SLIP Serial Line IP · CSLIP Compressed Slip · X.25 Packet Level Protocol

HPR High Performance Routing · APPN Advanced Peer-to-Peer Networking · DLSw Data Link Switching · SSP Switch to Switch Protocol · Path Control · QLLC Qualified Logical Link Control

NETWORK PROTOCOL CONP Connection-oriented Network Protocol · CLNP Connectionless Network Protocol · IS-IS Intermediate System to Intermediate System · Dual IS-IS · ES-IS End System to Intermediate System · DRP DECnet Routing Protocol

IDP Internetwork Datagram Protocol · RIP Routing Information Protocol · Error Protocol · Echo Protocol

AURP AppleTalk Update-based Routing Protocol · RTMP Routing Table Maintenance Protocol · DDP Datagram Delivery Protocol · AARP AppleTalk Address Resolution Protocol · Apple - LAP Link Access Protocol

VRTP/VSRTP VINES (Sequenced) Routing Update Protocol · VARP/VSARP VINES (Sequenced) Address Resolution Protocol · VICP VINES Internet Control Protocol · VIP VINES Internet Protocol · VFRP VINES Fragmentation Protocol

802.2 / Ethernet V.2 / Internetwork

2 DATA LINK LAYER
- Frames packets
- Controls physical layer data flow

LANs · 802.2 Logical Link Control
- Type 1 Connectionless Service
- Type 2 Connection Service
- Type 3 ACK Connectionless Service

Sub Network Access Protocol (SNAP)

Ethernet Data Link Control · IEEE 802.3 CSMA/CD Media Access Control · IEEE 802.12 VG-AnyLAN · IEEE 802.5 Token Passing Ring Media Access Control · FDDI Token Passing Ring Media Access Control ANSI · IEEE 802.6 Metropolitan Area Network DQDB Media Access Control

ATM (Not through X.25): AAL1 CBR, AAL2 VBR, AAL3/4, AAL5 Data · VLANs Virtual LANs · AAL ATM - Adaption Layer · ATM - Layer Asynchronous Transfer Mode · DSI, DS3 SONET

ISDN (via X.25): ISDN Integrated Services Digital Network

Frame Relay: HDLC LAPB (ISO 7776) High-level Data Link Control Link Access Procedure · PPP Point to Point · LAP -A

SMDS: SMDS Switched Multi-megabit Data service · SIP SMDS Interface Protocol · SDLC Synchronous Data Link Control

WANs

Ethernet V.2 / Ethernet / Token Ring / FDDI: SNI Subscriber Network Interface · DSO PLCP - 64 Kbps · G.703 PLCP · DS1 PLCP - T1 - 1.544 Mbps · DS3 PLCP - T3 - 45 Mbps · SONET

1 PHYSICAL LAYER
- Interfaces between network medium and network devices
- Defines electrical and mechanical characteristics

Ethernet 50 ohm coax Thin Wire 50 ohm coax · Broadband 75 ohm coax · 1 BASE5 StarLAN · 10 BROAD 36 · 10 BASE-T Twisted Pair · 10 BASE5 Thick · 10BASE2 Thin · 10 BASE-F (A or P) Fiber · 100 BASET · 100 BASEX

Fiber Optic Shielded Twisted Pair 4/16 Mbps · UTP 4/16 Unshielded Twisted Pair · FDDI Fiber Optic · SDDI Shielded Copper · CDDI Copper Twisted Pair

ISDN: ISDN-B 64 Kbps · ISDN-D 16 Kbps BRI 64 Kbps PRI · ISDN H 384 Kbps · ISDN H1 1.536 Mbps · H12 1.92 Mbps · BRI - Basic Rate Interface · PRI - Primary Rate Interface

V.35 · EIA RS-232D or V.24 · RS-449 · EIA RS-423 Unbalanced · RS-422-A Balanced · ANSI T-1.617 NXD Frame Format · From Broadband ISDN

Modem Standards: V.21 AT&T 103 300 bps · V.22 AT&T 212 1200 bps · AT&T 209 9600 bps · V.22 bis 2400 bps · V.26 2400 bps · V.26 bis 2400 bps · V.27 bis 4800 bps · V.29 9600 bps · V.32 9600 bps · V.32 bis 14.4 kbps · V.42 Error Correction via MNP5 or LAPM · V.42 bis Data Compression using L-Z derivative · IBM Channel

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