Software Product Description

PRODUCT NAME: hp Wide Area Networking for Tru64 UNIX, V4.1
SPD 42.47.22

DESCRIPTION

HP Wide Area Networking for Tru64 UNIX is a layered software product for Alpha systems running *Tru64 UNIX*. It enables appropriately configured systems to connect to an X.25 Packet Switched Data Network (PSDN) by an X.25 Relay node on the same local area network (LAN) or directly by a synchronous communications link. The product provides further software enabling systems to support access to mobile packet–radio networks. Version 4.1 supports a TruCluster rolling upgrade.

The product supports communications by PSDNs conforming to ITU/TSS recommendation X.25 1980, 1984, and 1988 or to international standard ISO 8208. Refer to the *SUPPORTED PUBLIC NETWORKS* section for the list of supported PSDNs.

hp WAN for Tru64 UNIX also provides the device drivers and specific datalink protocol support for Hewlett-Packard Company synchronous communications options for *Tru64 UNIX* systems. Applications programming interfaces to the serial synchronous device drivers (HDLC framing operation) and to the datalink (LAPB, HDLC, LLC2) are included.

Wide Area Networking for Tru64 UNIX allows a *Tru64 UNIX* system to:

- Act as a packet–mode DTE connected to a supported PSDN
- Support ISO 8208 DTE to DTE point–to–point operation
- Act as a packet–mode DTE connected to a LAN
- Act as an X.25 Relay node conforming to ISO Technical Report 10029
- Act as a wireless server for mobile packet–radio network clients
- Provide an X.25 subnetwork for DECnet-Plus CONS and CLNS operation
- Provide a DEC–HDLC point–to–point datalink for DECnet-Plus CLNS operation

The following limitations of *Wide Area Networking for Tru64 UNIX* should be noted:

- Only one node in a TruCluster configuration can support WAN synchronous communications devices. Devices cannot be shared clusterwide.
- DCE mode is not supported.
- Use of the D–bit in data packets is not supported.
- Operation of the Internet protocol facilities (TCP/IP) over DEC–HDLC, available in the WANDD for ULTRIX product, is not supported.

Wide Area Networking for Tru64 UNIX supports the following functions:

- *X.25 Relay*

Wide Area Networking for Tru64 UNIX allows an appropriately configured Alpha system to relay X.25 packets between a LAN and a synchronous communications link to a PSDN.

- *DECnet-Plus Connectionless Network Service*

The product supports the use of the DEC–HDLC and X.25 protocols as subnetworks for the OSI Connectionless–Mode Network Service (CLNS).

- *DECnet-Plus Connection Oriented Network Service*

The product supports the OSI Connection Oriented Network Service (CONS) for communications over X.25 subnetworks.

- *TCP/IP over X.25*

An X.25 SVC can be used as the datalink protocol for IP traffic in accordance with RFC–1356 (which supersedes and is compatible with RFC–877).

- *Process–to–Process (X.25) Communications*

Wide Area Networking for Tru64 UNIX provides C callable library functions that allow user programs access to the X.25 network services, the LAPB/E datalink, and to the device drivers themselves (HDLC framing only).

- *Process–to–Terminal (X.29) Communications*

Through the programming interface, users of the *Tru64 UNIX* system may make outgoing calls to other HP or non–HP systems or suitable network PADs accessible by a PSDN.

- *Terminal–to–Process (X.29) Communications*

Remote terminals connected to the PSDN may access the *Tru64 UNIX* host running X.25 by means of an X.29 Switched Virtual Circuit (SVC) call.

- *Wireless Communications*

Wireless clients operating on mobile packet–radio networks using the supported mobile switches (see Table 4) can access a *Tru64 UNIX* server by means of X.25.

- *X.25 Mail*

The X.25 Mail utility allows communications across a PSDN by electronic mail between two systems running the Mail–11 protocol over X.25. This mail facility does not require DECnet to be installed on the system. Systems that support Mail–11 over X.25 include *Wide Area Networking for Tru64 UNIX* and VAX P.S.I.

- *GAP Client Support*

The GAP protocol allows X.25 connections to be made using a DECnet-Plus Session Control connection. Thus, you can route X.25 across a DECnet-Plus backbone. GAP Clients may initiate or receive GAP connectons, but require that a GAP Server be available to act as the gateway between the DECnet-Plus environment and the X.25 networking environment.

Features

Conformance to Standards

Wide Area Networking for Tru64 UNIX complies with the following standards:

- ITU/TSS recommendations—Q.921, Q.931, X.31 (1988), X.25 (1980, 1984, or 1988), X.3, X28, X.29
- International standards—ISO 8208, 7776, 8881, 8802/2, 8878, 8473, TR10029
- Internet RFCs—1356 (which supersedes and is compatible with 877), 1331, 1332

Virtual Circuits

Wide Area Networking for Tru64 UNIX offers communication over both Permanent Virtual Circuits (PVCs) and Switched Virtual Circuits (SVCs), and supports up to 4,096 virtual circuits in total per system. One virtual circuit is used for each incoming or outgoing X.29 terminal connection, for each X.25 call, and for each DECnet-Plus routing circuit and transport connection. The use of PVCs for X.29 communications is not defined by the 1980 and 1984 ITU/TSS recommendations, and is not available with *Wide Area Networking for Tru64 UNIX*. PVCs are not supported when using IP over X.25.

Process–to–Process Communications

The *Wide Area Networking for Tru64 UNIX* programming interface allows application programs to access X.25 packet level services by C callable library routines. Functions include the establishment and clearing of network connections, the transmission and reception of data, the sending and receiving of interrupt messages, and the resetting of virtual circuits. The interface also provides for the segmentation and recombination of messages that are longer than the packet size selected for the circuit.

This interface enables an application program using the X.25 library to communicate with complementary X.25 software on other systems (HP or non–HP).

The product also provides physical layer and datalink synchronous communications services to user–level processes that require direct access to the device drivers and datalink protocol. **Note that only HDLC–framing operation is supported.**

Terminal Communications

Wide Area Networking for Tru64 UNIX supports terminal communications according to ITU/TSS recommendations X.3, X.28, and X.29. Only those terminal parameters defined in the X.3 recommendation are explicitly supported. Network–specific enhancements or extensions to the X.3 parameters are available at both the X.29 and the host–based PAD user interface. Terminal processes that depend on these extensions may not

function correctly when used on other PSDNs or when accessing one PSDN by another, for example, international access.

The X.29 interactive terminal interface allows remote asynchronous terminals (character–mode DTEs) connected to the network to communicate with the *Tru64 UNIX* system in a manner similar to local terminals. The maximum number of terminals supported on a *Tru64 UNIX* system (both local and X.29 remote) cannot exceed the number for which the system has been configured.

When using applications designed for interactive, local terminal operations, transmission delays or PAD parameter settings can cause inconsistencies between incoming X.29 traffic and the application's operation. It may be necessary to make modifications to the application user interface or alter PAD parameter settings.

The X.29 interface includes a programming capability for the support of specific X.29 signalling requirements, including modification of PAD parameters.

Accounting

Accounting information is collected by a dæmon process and is made available to the user by a report writing utility.

For incoming X.29 calls, no information can be retrieved relating to the process or account onto which a user is logged.

Security

An extensive security facility is provided. Control of remote access to the system (incoming security) and local access to the network (outgoing security) are supported. Incoming and outgoing security can be based on any combination of:

- Normal or reverse charging
- DTE number
- Network (PSDN)
- Process (or user) making the outgoing call
- Application handling the incoming call

Network Management

The Network Control Language (NCL) is provided for the management of *Wide Area Networking for Tru64 UNIX* and DECnet-Plus. NCL provides X.25 network management facilities to:

- Define outgoing call destinations
- Define incoming call handling
- Modify X.25 frame and packet level parameters
- Define security parameters
- Modify network configuration
- Monitor connection statistics
- Perform network maintenance functions

The network manager can be notified of significant network events such as security violations or network failures through the event logging facility.

Problem solving is facilitated by the provision of the Common Trace Facility (CTF). CTF enables the user to trace and analyze frames passing between the PSDN and the *Wide Area Networking for Tru64 UNIX* system.

Communications Interfaces

Refer to the CONFIGURATION GUIDELINES section in this Software Product Description and to your local hardware service provider for complete information on the synchronous controller cards supported by *Wide Area Networking for Tru64 UNIX*.

In addition to the synchronous controller cards listed in this Software Product Description, operation over CSMA/CD (ISO 8802/3) and FDDI (ISO 9314) networks is supported through the LLC2 protocol.

Optional Facility Support

Table 1 describes the Optional User Facilities of the 1988 ITU/TSS X.25 recommendations that *hp WAN for Tru64 UNIX* supports.

Support for any facility is dependent on the PSDN used. The product documentation describes specific facility availability for supported PSDNs.

Table 1

Optional X.25 User Facilities Support

ITU/TSS X.25 (1988) reference	Optional User Facility	Support[1]
6.1	Online facility registration	no
6.2	Extended packet sequence numbering	yes
6.3	D–bit modification	n/a
6.4	Packet retransmission	no
6.5	Incoming calls barred	n/a
6.6	Outgoing calls barred	n/a
6.7	One–way logical channel outgoing	yes
6.8	One–way logical channel incoming	yes

6.9	Nonstandard default packet sizes	yes
6.10	Nonstandard default window sizes	yes
6.11	Default throughput class assignment	yes
6.12	Flow control parameter negotiation	yes
6.13	Throughput class negotiation	yes
6.14.1	Closed User Group (CUG)	yes
6.14.2	CUG with outgoing access	yes
6.14.3	CUG with incoming access	yes
6.14.4	Incoming calls barred within a CUG	n/a
6.14.5	Outgoing calls barred within a CUG	n/a
6.14.6	CUG selection	yes
6.14.7	CUG with outgoing access selection	yes
6.15.1	Bilateral Closed User Group (BCUG)	yes
6.15.2	BCUG with outgoing access	n/a
6.15.3	BCUG selection	yes
6.16	Fast select	yes
6.17	Fast select acceptance	n/a
6.18	Reverse charging	yes
6.19	Reverse charging acceptance	n/a
6.20	Local charging prevention	n/a
6.21.3	NUI selection	yes
6.22	Charging information	yes
6.23.2	RPOA selection	yes
6.24	Hunt group	no [2]
6.25.1	Call redirection	n/a
6.25.2.2	Call deflection selection	no
6.25.3	Call redirection or call deflection notification	yes
6.26	Called line address modified notification	no
6.27	Transit delay selection and indication	yes
6.28	TOA/NPI address selection and indication	no
7.1	Non–X.25 facilities	yes
G.3.1	Calling Address Extension	yes
G.3.2	Called Address Extension	yes
G.3.3.1	Minimum throughput class	yes
G.3.3.2	End–to–end transit delay	yes
G.3.3.3	Priority	yes
G.3.3.4	Protection	yes
G.3.4	Expedited data negotiation	yes

[1] Refers to those features of a facility that are relevant to the operation of a DTE. ''n/a'' refers to DCE facilities requiring no action from the DTE.

[2] The individual DTEs must be assigned addresses independent of the hunt group address.

INSTALLATION

HP recommends that a customer's first purchase of this software product include HP Installation Services. These services provide for installation of the software product by an experienced HP Software Specialist. Only customers experienced with HP's X.25 products should attempt installation.

Customer Responsibilities

In some cases, the X.25 may impose restrictions, limitations, or requirements on the proposed HP network configuration. The customer must ensure these are understood and adhered to for each network.

Before installation of the software, the customer must:

- Previously have installed all requisite software and hardware, including terminals
- Obtain, install, and demonstrate as operational any modems and other equipment and facilities necessary to interface to HP's communications equipment
- Demonstrate equivalence of operation for modems other than Bell 208A, 208B, 209, 212A synchronous modems, or, in Europe, use only PTT approved modems
- Subscribe to the Open User Group and to at least two SVCs to complete the product's installation checkout (this test loops information from the *Wide Area Networking for Tru64 UNIX* system to the PSDN and back to the *Wide Area Networking for Tru64 UNIX* system). Systems in Closed User Groups only, or where the PSDN does not support calls to the originating DTE address, require specially negotiated arrangements for HP installation of the product
- Make available for a reasonable period of time, as mutually agreed by HP and the customer, all hardware, communications facilities, and terminals that are to be used during an HP supervised installation

HARDWARE REQUIREMENTS

Processors Supported

Alpha processors listed in the Tru64 UNIX Software Product Description (SPD 70.70.xx) are supported.

Memory Requirements

In addition to the memory requirements of *Tru64 UNIX* and user applications, the minimum memory requirements of *Wide Area Networking for Tru64 UNIX* are:

- Two MB for software and data structures
- Memory for each active virtual circuit (see Table 2)

Table 2 lists the memory requirements of SVCs for varying values of X.25 data and window size. The figures represent an upper bound only. The figures quoted should only be used as a guide to sizing a system to provide adequate X.25 performance. The product will require less memory than quoted. However, an underconfigured system will display reduced performance, not only for X.25 communications but also for other processes.

Table 2
Memory Requirements

X.25 Data Size	X.25 Window Size	Max. memory per SVC (KB) Incoming [3] LAPB	LLC2	Outgoing
128	2	1	16	4
	7	1	32	5
	127	1	32	20
512	2	1	16	6
	7	2	32	8
	127	2	32	69
1024	2	16	16	6
	7	32	32	12
	127	32	32	134
4096	2	8	8	12
	7	8	8	32
	127	8	8	524

[3]Memory requirements of incoming SVCs with small data sizes (<600 bytes) vary between datalinks. Memory requirements of incoming SVCs with large data sizes and outgoing SVCs are independent of datalink.

Communications Devices Required

hp WAN for Tru64 UNIX requires one or more synchronous controller cards when directly connected to one of the following:

- A PSDN through the X.25 protocol
- Another system using DECnet-Plus over X.25
- Another HP system using DECnet-Plus over DEC–HDLC

See the Software Product Description for Tru64 UNIX (SPD 70.70.xx) for a list of supported systems and the synchronous devices available on those systems. For additional information on the configuration and performance of these devices, see the *CONFIGURATION GUIDELINES* section.

For operation using the ISO 8802–2 protocol (LLC2) the product requires a LAN device. The product supports HP's ISO 8802–3 (CSMA/CD) and ISO 9341 (FDDI) devices for use with the LLC2 protocol.

For operation over LLC2 to an X.25 Relay node, the supported relay nodes are:

- DEC Network Integration Server (DECNIS) 500/600 (SPD 36.05.xx)
- An Alpha system running *Wide Area Networking for Tru64 UNIX* configured for X.25 relay operation
- An Alpha system running X.25 for OpenVMS Alpha Systems V1.3 or higher

For operation over DECnet-Plus using the Gateway Access Protocol (GAP), the supported connector nodes are:

- DEC Network Integration Server (DECNIS) 500/600 (SPD 36.05.xx)
- DECnet-Plus for OpenVMS VAX (version appropriate to currently supported versions of OpenVMS VAX) configured for X.25 multi-host operation (SPD 25.03.xx)
- DECnet-Plus for OpenVMS Alpha and X.25 (versions of these two products appropriate to currently supported versions of OpenVMS Alpha) configured for GAP Server support (SPD 50.45.xx and 47.37.xx)).

For additional information on the configuration and performance of these relay nodes, consult your local hardware service provider and relevant Software Product Descriptions.

Disk Space Required

The disk space required for installation and use of the product is:

- 1 MB on the *opt* file system
- 62 MB on the *usr* file system
- 22 MB on the *var* file system

These sizes are approximate. The actual sizes will vary depending on the user's system environment, configuration, and software options.

OPTIONAL HARDWARE

Additional communications devices, subject to limitations, are described in the *CONFIGURATION GUIDELINES* section.

SOFTWARE REQUIREMENTS

Tru64 UNIX Operating System V5.1 or V5.1A (SPD 70.70.xx).

OPTIONAL SOFTWARE

DECnet-Plus V5.1A (SPD 41.92.xx).

GROWTH CONSIDERATIONS

The minimum hardware and software requirements for any future version of this product may be different from the requirements for the current version.

SUPPORTED PUBLIC NETWORKS

Table 3 shows the public PSDNs supported by the product in the countries shown. In addition, certain private PSDNs have been tested by HP and appropriate profiles have been included with the product. For more detail, consult your local HP office.

Table 3
Supported Public Networks

Country	Public Networks [5]
Argentina	Arpac
Australia	Austpac
Austria	Datex–P
Belgium	DCS
Brazil	Renpac
Canada	Datapac
	Infoswitch
Chile	VTRnet
Denmark	Datapak
Eire	Eirpac
Finland	Datapak
France	Transpac
Germany	Datex–P
Hong Kong	Datapak
	Inet
	Intelpak
Indonesia	SKDP
Ireland	Ciepac
Italy	Itapac
Japan	CC–VAN
	DDX–P 80/84
	Jaisnet
	Tymnet®
	Venus LP
Luxembourg	Luxpac
Malaysia	Maypac
Mexico	Telepac
Netherlands	Datanet 1
New Zealand	Pacnet
Norway	Datapak
Pakistan	Paknet
Philippines	Datanet
Portugal	Telepac
Singapore	Telepac
South Korea	Dacomnet
Spain	Iberpac
Sweden	Datapak
	Datapak II
Switzerland	Telepac
Taiwan	Pacnet
Thailand	Thaipak
Turkey	Turpak
United Kingdom	PSS [6]
	Postgem
	Mercury

[5] Trademarks under which these services are offered are proprietary to the respective PTTs.

[6] PSS is only supported when the Extended Facilities option has been subscribed.

Table 3 (Cont.)
Supported Public Networks

United States	Accunet® Autonet® Bell Atlantic CompuServe® ConnNet FedexITC FreedomNet II Impacs Infonet Mark*Net Extended Service Pacific Bell PPSnet Pulselink Sprintnet Telenet® Tymnet US West Digipac Western Union PTN–1 Worldnet

[5]Trademarks under which these services are offered are proprietary to the respective PTTs.

Table 4 lists the mobile switches supported by *Wide Area Networking for Tru64 UNIX* in the countries shown.

Table 4
Supported Mobile Packet–Radio Switches

Country	Switch Vendor	Switch
Asia	**Motorola**	**DataTAC5000**
Australia	**Motorola**	**DataTAC5000**
Germany	**Motorola**	**DataTAC6000**
U.S.A.	**Motorola**	**DataTAC4000**
U.S.A.	**Ericsson**	**Mobitex**

CONFIGURATION GUIDELINES

For direct connection of the Alpha system to a PSDN, operation of the product requires the use of one or more synchronous controller cards. However, support for synchronous communication controllers is limited to a single node in a TruCluster environment. The following devices are supported by *hp WAN for Tru64 UNIX*:

- *Integral SCC device*
  - — A single port multifunction device on the system motherboard. Only the synchronous communications function is supported.
  - — Limited modem signalling capabilities. Local and remote loopback signals and DTE–sourced clock are not provided.
- *WANcontroller 720 (DSYT1)*
  - — A single slot dual port TURBOchannel serial synchronous communications adapter.
  - — For systems with no available TURBOchannel slots, an extender box may be required.
- *DNSES*
  - — A single slot dual port serial synchronous communications EISA adapter.
- *PBXDD–Ax*
  - — A range of single slot multi-port (2 and 4) serial synchronous communications PCI adaptors.
- *PBXDI–Ax*
  - — A single slot dual or quad port serial synchronous communications ISA adapter.
- *PBXDP–Ax* (retired December 2000)
  - — A single slot dual, quad, or octal port serial synchronous communications PCI adapter.

Note: Additional factors to consider when configuring hardware devices for use with the product are:

- Hardware configuration limits, such as power supply, backplane space, bus throughput, mapping registers, and any other restrictions on the number of devices per CPU or per bus must be observed. **Consult your local hardware service provider for further information.**
- CPU utilization. Ensure sufficient CPU power will be available to drive the required number of lines at the desired speeds and leave sufficient margin for application processing.

See the Tru64 SPD (SPD 70.70.xx) for a list of supported systems and the synchronous controllers available for each system.

The operational characteristics of each device supported by WAN for Tru64 UNIX are given in Table 5.

Table 5
Synchronous Controller Card Characteristics

Device	Max. line speed (Kbps)	Max. HDLC data size (bytes)	Max.X.25 data size (bytes) [7]	Supported interface standards
PBXDD–Ax PCI	2x2400, 4x2400	8300	4096	EIA–232 EIA–449 EIA–530 V.11 V.24/V.35
PBXDP–Ax	2x2400, 4x2400 or 8x1200	8300	4096	EIA–232 EIA–422 EIA–423 EIA–530 V.24/V.28 V.35 X.21 EIA–485
PBXDI–Ax	2x2000	8300	4096	EIA–232 EIA–530 V.24/V.28 V.35 X.21 [8]
DNSES	2x64 or 1x2000	4080	2048	EIA–232 EIA–422 EIA–423 V.10/V.11 V.24/V.35
DSYT1	2x64 or 1x2000	4080	2048	EIA–232 EIA–422 EIA–423 V.10/V.11 V.24/V.35
SCC	19.2	1018	512	EIA–232 V.24 [9]

[7] Fragmentation of larger data sizes is supported.

[8] X.21 electrical levels and connector in data–leads only communication. X.21 call control is **not** supported.

[9] The following circuits are **not** supported:

CCITT 113	Transmitter Signal Element Timing (DTE)
CCITT 140	Remote Loopback
CCITT 141	Local Loop Request
CCITT 142	Test Mode

Lack of support for circuit CCITT 113 means that an external clock source is required.

Lack of support for circuits CCITT 140, 141, and 142 means that automatic switching of the modem into loopback mode is not possible.

DISTRIBUTION MEDIA

The *hp WAN for Tru64 UNIX* software and documentation are shipped as part of the *Tru64 UNIX* Layered Products CDROM.

ORDERING INFORMATION

Software Licenses:	QL–MVDA*–** (Full Function)
Software Media/Documentation:	QA–054AA–H8
Software Documentation:	QA–MVDAA–GZ
Software Product Services:	QT–MVDA*–**

* Denotes variant fields. For additional information on available licenses, services, and media, refer to the appropriate price book. The above information is valid at time of release. Please contact your local HP office for the most up–to–date information.

SOFTWARE LICENSING

Specific functions of the *Wide Area Networking for Tru64 UNIX* product are enabled by the licenses described in Table 6.

Table 6
Software Licenses

License	Function Enabled
DECnet-Plus	DECnet-Plus applications over CONS/LLC2 or CLNS/DEC–HDLC
WAN Support (Full Function)	All functions over LAPB, LLC2, and wireless

This software is furnished only under a license. For more information about HP's licensing terms and policies, contact your local HP office.

License Management Facility Support

This layered product supports the *Tru64 UNIX* License Management Facility.

License units for this product are allocated on an Unlimited System Use basis.

For more information on the License Management Facility, refer to the *Tru64 UNIX* Operating System Software Product Description (SPD 70.70.xx) or documentation.

SOFTWARE PRODUCT SERVICES

A variety of service options are available from HP. For more information, contact your local HP office.

SOFTWARE WARRANTY

This software is provided by HP with a 90 day conformance warranty in accordance with the HP warranty terms applicable to the license purchase.

HP has designed or adapted this software product to operate with equipment conforming to the ISO standards 7776/8208 and with the public networks in the associated countries and with certain private PSDNs that have been tested and approved by HP.

HP cannot offer its standard warranty for this software unless it has been tested with such networks and the software configured appropriately. Such a testing service is available from HP on request, and will permit both full HP support of the *Wide Area Networking for Tru64 UNIX* product and also ensure that *Wide Area Networking for Tru64 UNIX* is optimally configured against the PSDN concerned.

The presence of a network/country combination in the list of supported public PSDNs indicates HP's commitment to support *Wide Area Networking for Tru64 UNIX* when using that public network service. It does not necessarily imply that network certification by the particular networking authority has been granted for all or any hardware devices supported by the *Wide Area Networking for Tru64 UNIX* software product. Please contact your local HP office for up–to–date information regarding supported configurations and certification status.

The above information is valid at time of release. Please contact your local HP office for the most up–to–date information.