COMPAQ

Software Product Description

PRODUCT NAME: Compaq TCP/IP Services for OpenVMS Version 5.3 SPD 46.46.15

DESCRIPTION

The Compaq TCP/IP Services for OpenVMS software product is the OpenVMS implementation of the industry-standard TCP/IP protocol suite and internet services for OpenVMS Alpha and OpenVMS VAX systems.b The kernel software is ported from the Compaq *Tru64* UNIX product, which is based on the Berkeley Software Distribution (BSD) Versions 4.3 and 4.4, with enhancements from Compaq Computer Corporation.

Internetworking with TCP/IP hides the hardware details of each individual network and allows computers to communicate independent of their physical network connections. Internetworking uses a uniform set of protocols to define behavior on an internet for all nodes using supported network media. TCP/IP provides both a standard transport mechanism and full-duplex, reliable, stream communication services for software applications.

Licenses

The following Compaq TCP/IP Services for OpenVMS licenses are available:

License	Description
Client	For customers who require only client components (FTP [client and server], IMAP, LPD, TELNET, SNMP, NTP, NFS client, Metric Server, POP, FINGER, RLOGIN, REXEC, RSH, RMT/RCD, and XDM).
Server	For customers who require full product functionality including all the client components, plus BIND, BOOTP, DHCP, TFTP, NFS Server, PC-NFS, and load broker.
Client upgrade	For customers who previously purchased a client license and now require full server functionality.

Network Interface Layer Support

With support for multiple network interfaces for each physical network controller, the Compaq TCP/IP Services for OpenVMS software allows OpenVMS systems to connect to individual host computers on different types of networks:

- Ethernet for IPv4 and IPv6
- Fiber Distributed Data Interface (FDDI) for IPv4 and IPv6
- Token Ring for IPv4
- Asynchronous transfer mode (ATM) (Alpha systems only) for IPv4

Individual host computers can also connect with other hosts or networks over serial communications lines using either the Serial Line Internet Protocol (SLIP or CSLIP) or the Point-to-Point Protocol (PPP).

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Internet Layer Support

The Compaq TCP/IP Services for OpenVMS product supports the following Internet layer protocols that work together to move data around the internet:

- Internet Protocol (IP) provides a connectionless packet delivery service for IPv4 and IPv6.
- Internet Control Message Protocol (ICMP) provides diagnostic functions and handles error and control messages for IPv4 and IPv6.
- Address Resolution Protocol (ARP) dynamically maps an IP address to a physical hardware address for IPv4.
- Neighbor Discovery discovers neighbors in the same link, dynamically detects routers, dynamically maps all IP addresses to a physical hardware address for IPv6, and maintains information about the paths to active neighbors.
- Path MTU for TCP and UDP calculates the most efficient means of transporting data across a network.
- Classless Interdomain Routing (CIDR) reduces routing tables and makes more efficient use of the IP address space.
- IPv6 mobile correspondent node allows the OpenVMS host to communicate with mobile nodes and other correspondent nodes.
- Routing protocols and routing daemons enable gateways to exchange current routing information about hosts and directly connected networks. Supported protocols include:
  - — Routing Information Protocol (RIP) Version 1 (RFC 1058) and RIP Version 2 (RFC 1388) for IPv4, and RIPng (RFC 2080) for IPv6
  - — Open Shortest Path First (OSPF) Version 2 (RFC 1583)
  - — Exterior Gateway Protocol (EGP) (RFC 904)
  - — Border Gateway Protocol (BGP) (RFC 1163, RFC 1267)
  - — Router Discovery (RFC 1256) for IPv4

The routing daemons ROUTED and GATED communicate with the kernel to add new routes or to delete or modify existing routes. The Enhanced Gateway Routing Daemon (GATED) is based on GateD Unicast Version 4.0.6, with advanced routing options.

Transport Layer Support

To provide either connection-oriented or connectionless data transmission between two hosts (local or remote), the Compaq TCP/IP Services for OpenVMS product supports both TCP and UDP protocols. These protocols form the bridge between the Application layer and the Internet layer:

- Transmission Control Protocol (TCP) provides reliable, connection-oriented, sequenced data transfers for applications that must guarantee delivery of the data.
- User Datagram Protocol (UDP) provides fast, connectionless data transfers for applications that do not require delivery confirmation.

This release supports the TCP Extensions for High Performance (RFC 1323), and the IETF Wireless TCP Standards for congestion on low-bandwidth high-delay wireless and satellite networks. The wireless TCP set of standards encompasses TCP Extensions for High Performance (RFC 1323), SACK (RFC 2018), and Path MTU Discovery for IPv4 (RFC 1191) and IPv6 (RFC 1981).

RFC 1323 includes support for PAWS (Protection Against Wrapped Sequence) numbers, which supplies time stamps on transactions to prevent wrapped sequence numbers and for TCP window scale, which provides window scale factors for TCP connections.

RFC 2018 defines TCP selective acknowledgment options, supporting multiple acknowledgment windows and allowing outstanding acknowledgments even if sequence numbers are not in order.

Application Layer Support

The Compaq TCP/IP Services for OpenVMS product supports numerous Application layer protocols that allow OpenVMS users to:

- Run software on remote systems
- Transfer data files between local and remote systems
- Share remote system resources such as disk storage space and printers as if they were directly connected to the user's local system
- Send and receive electronic mail messages locally or across the worldwide Internet
- Provide consistent, reliable, and efficient network services to all users on the internet

Remote Computing

With TELNET, an OpenVMS user can log in to remote hosts in the network. The TELNET features include:

- Simultaneous multiple sessions
- IBM 3270 model terminal emulation (TN3270)
- Support for both OpenVMS style and UNIX style interfaces
- Support for window sizing (rows and columns) and location options
- Kerberos authentication

The popular UNIX Remote commands, called R commands, let OpenVMS users work in accounts on remote internet hosts that are either UNIX or OpenVMS systems. The Compaq TCP/IP Services for OpenVMS software supports the RLOGIN, RSH, REXEC, and RMT/RCD commands.

The FINGER utility enables users to obtain information about each user on local or remote systems. This information includes user name, account name, and the program the user is running.

The X Display Manager Control Protocol (XDMCP) allows display devices to request that the login server present a login screen.

File Transfer

OpenVMS users transfer data files between local and remote systems through the use of the following components:

- File Transfer Protocol (FTP) creates, deletes, and copies files and directories between hosts.
- Trivial File Transfer Protocol (TFTP) transfers files using the UDP protocol and no authentication and is typically used during the bootstrap process of diskless systems.
- The remote copy (*rcp*) command copies files between the local host and a remote host or between two remote hosts.

FTP supports OpenVMS Extended File Specifications (long file names, deep directories, and extended character sets) for ODS-5 disks.

Resource Sharing

The Compaq TCP/IP Services for OpenVMS software provides network printing services through the line printer/line printer daemon (LPR/LPD) and the TELNET print symbiont (TELNETSYM).

- LPD provides remote printing services for UNIX and OpenVMS client hosts through local and remote print queues. Once the system manager sets up the print queues, OpenVMS client users enter the DCL command PRINT, and UNIX client users enter the *lpr* command.

LPD can be configured for clusterwide availability, providing load balancing and automatic failover for LPD-controlled print queues on the OpenVMS host.

- TELNETSYM provides remote print services that enable the use of standard OpenVMS printing features not available with LPR/LPD.

Network File System

The Network File System (NFS) server software allows NFS client users to gain transparent access to remote file services. With NFS, when a user accesses files and directories from a remote system, they appear to reside on the local system regardless of operating system, hardware type, or architectural differences between the local and remote systems. The PC-NFS daemon provides authentication services to PC-NFS clients.

TCP/IP Services provides support for NFS Version 2 and Version 3 in the NFS server. The NFS client is limited to Version 2. The main benefit of NFS Version 3 is increased maximum file size—up to 1 terabyte for an OpenVMS file system and up to 4 gigabytes for a container file system.

Performance gains may result from the improvements to file-size processing and the enhanced write performance that allows the NFS server to acknowledge a write operation before the files are actually written to disk. Afterward, the server's response to a commit message confirms that the data has been written to disk.

The NFS server supports communication over both TCP and UDP. NFS over TCP allows file access over wide area links. The NFS client is limited to UDP only.

The NFS server and client support OpenVMS Extended File Specifications, including long file names, deep directories, and extended character sets on ODS-5 file structures.

Electronic Mail

With the Simple Mail Transfer Protocol (SMTP), OpenVMS users can send and receive electronic mail to and from local and remote hosts. The Compaq TCP/IP Services for OpenVMS implementation of SMTP uses the OpenVMS Mail facility, which automatically recognizes an SMTP host address in the format *smith@widgets.com*. SMTP provides support for SFF (Send From File) and outbound alias specification.

The following mail systems work with SMTP, providing reliable, server-based mail repositories for clients:

- Post Office Protocol (POP) server
- IMAP Mail server (Alpha systems only)

Network Services

With the following Compaq TCP/IP Services for OpenVMS management components, network and system managers can provide consistent, reliable, and efficient services to their users with minimal interruption:

- Simple Network Management Protocol (SNMP) Version 2 includes a master agent and subagents that allow the OpenVMS system to be managed by a management station on the network. This version includes the same features found in the Compaq *Tru64* UNIX SNMPv2 implementation, along with other improvements.
- Network Time Protocol (NTP) Version 4 provides a means to synchronize time and coordinate time distribution throughout a TCP/IP network. NTP provides accurate and dependable timekeeping for OpenVMS hosts on TCP/IP networks.
- Berkeley Internet Name Domain (BIND) is a distributed database system that distributes and manages host information so that hosts do not need to locally manage the address of every other host on the internet. The BIND 9 server (available on Alpha systems only) is based on the Internet Software Consortium's (ISC) BIND 9.2 implementation. It includes dynamic updates and BIND server cluster failover, which allows multiple BIND master servers to share a common database, thus providing both redundancy and a failover mechanism when one of the servers becomes unavailable. The BIND resolver on both VAX and Alpha systems, and the BIND server on VAX systems, are based on the ISC's BIND 8.2.1 implementation.
- Load broker supplies cluster load balancing, round-robin scheduling, and automatic failover.
- Metric server calculates and reports the DNS load on the local host. It includes dynamic configuration of logical names, which can be defined for CPU rating, compute interval, and debug level, as well as support for multihomed systems to allow load balancing of incoming traffic across multiple IP addresses.
- Portmapper is a database system that allocates ports so that system managers do not need to preconfigure client applications with port numbers for each service.
- Auxiliary server process is the Compaq TCP/IP Services for OpenVMS implementation of the UNIX internet daemon (*inetd*). The auxiliary server greatly simplifies application writing, manages overhead by reducing simultaneous server processes, provides system security through authentication of service requests, and supports event and error logging.
- Dynamic Host Configuration Protocol (DHCP) is a superset of the Bootstrap Protocol (BOOTP). In addition to BOOTP functionality (answering bootstrap requests), DHCP offers robust configuration services, including IP address, subnet masks, and default gateways. The DHCP server can be configured to support BOOTP clients. If BOOTP is enabled without DHCP, DHCP functionality is not available.
- DHCP dynamically updates BIND using a feature that allows DHCP clients to be configured with a registered name. DHCP uses this name to assign an address when it updates the BIND database. In addition, this release offers both a DHCP client and server, which provides a centralized approach to the configuration and maintenance of IP address space. With DHCP server, the system manager can provide dynamic allocation of IP addresses from an OpenVMS host.

Management Control Program

The Compaq TCP/IP Services for OpenVMS product provides the Management Control Program, which is a comprehensive, easy-to-use network management tool based on familiar OpenVMS DCL command syntax. These commands let system managers configure and monitor the product components locally.

The flexible configuration process includes an interactive configuration procedure.

Startup and shutdown files are provided for individual services, allowing system managers to stop and start individual services without affecting the operation of the remaining TCP/IP Services software.

Support for both DCL or UNIX management commands provides a choice of methods for configuring and managing the network connections and the TCP/IP Services software.

UNIX Network Management Utilities

The Compaq TCP/IP Services for OpenVMS product provides UNIX networking management utilities for system managers who are experienced in managing and troubleshooting the UNIX network subsystem. Supported utilities include:

- *arp*
- *finger*
- *ifconfig*
- *netstat*
- *ping*
- *ripquery*
- *route*
- *sysconfig*
- *sysconfigdb*
- *tcptrace*
- *traceroute*

Subsystems can be configured in the *sysconfigtab* database.

Note that some UNIX flags and parameters may not be supported.

Error Message Documentation

The Compaq TCP/IP Services for OpenVMS product provides online help for error messages for TCP/IP facilities and components. The information is included as part of the OpenVMS Help Message utility (MSGHLP).

Application Programming Interfaces (APIs)

The Compaq TCP/IP Services for OpenVMS product provides the following APIs for programmers to develop customized applications:

- Berkeley Sockets and Sockets Library provide UNIX like access for TCP, UDP, and raw IP to applications written in the C programming language. The library includes support for:
  - — Both IPv4 and IPv6 basic socket interface extensions for IPv6 (RFC 2553 and IETF updates)
  - — Advanced sockets API for IPv6 (RFC 2292 and IETF updates)
- The $QIO interface extends the OpenVMS system services for socket communications, providing access to TCP, UDP, and IP for applications written in supported programming languages.
- The SRI $QIO interface translates older, incompatible SRI $QIO interfaces into $QIO interfaces.
- ONC RPC provides an industry-standard, portable API for programmers who do not have an in-depth knowledge of networking protocols. This is an efficient alternative to application development using sockets.
- Extensible Simple Network Management Protocol (eSNMP) provides routines for building SNMP subagents.

PATHWORKS, Advanced Server, and DECnet over TCP/IP

The Compaq TCP/IP Services for OpenVMS product includes the PATHWORKS IP (PWIP) driver and the PWIP ancillary control process (PWIP_ACP) for improved PATHWORKS/Advanced Server and TCP/IP integration.

The PWIP driver allows communication between OpenVMS systems running both PATHWORKS Advanced Server and TCP/IP Services software, and personal computers running PATHWORKS 32 client software. It also enables the DECnet-over-TCP/IP feature, which is included with the DECnet-Plus for OpenVMS. (For more information, see the DECnet-Plus for OpenVMS documentation.)

INSTALLATION AND CONFIGURATION

System managers install the Compaq TCP/IP Services for OpenVMS product using the POLYCENTER Software Installation utility. A menu-driven configuration procedure makes it easy to enable either all components and services or only those needed.

HARDWARE REQUIREMENTS

Supported Processors

The Compaq TCP/IP Services for OpenVMS product supports central processing units (CPUs) running OpenVMS. For a complete list of hardware products, see the SPD for the specific OpenVMS operating system release.

Required Network Controllers

The Compaq TCP/IP Services for OpenVMS software supports all network devices listed in the software product description for the OpenVMS operating system for Alpha and VAX systems (SPD 25.01.*xx*).

The Compaq TCP/IP Services for OpenVMS software can share an Ethernet interface with other Compaq networking products such as DECnet-Plus for OpenVMS.

Memory Requirements

The following table shows the minimum amount of memory required for the Compaq TCP/IP Services for OpenVMS product under the client or server license.

System	Minimum Memory
OpenVMS VAX	24 MB
OpenVMS Alpha	32 MB

Disk Space Requirements

The approximate amount of space required on the system disk to support the Compaq TCP/IP for OpenVMS software under the client or server license is as follows. Actual sizes may vary depending on the system environment, configuration, and software options.

System	Free Blocks Required
OpenVMS VAX	70,000
OpenVMS Alpha	125,000

CLUSTER SUPPORT

The Compaq TCP/IP Services for OpenVMS product is fully supported when installed on any valid and licensed OpenVMS Cluster configuration.

SOFTWARE REQUIREMENTS

To qualify for a software support contract, the Compaq TCP/IP Services for OpenVMS product requires the following OpenVMS operating system versions:

- For OpenVMS VAX systems, Version 7.2 or 7.3
- For OpenVMS Alpha systems, Version 7.2-2 or 7.3

Client access requires a system that supports the protocols specified by NFS Version 2 or Version 3, and all TCP/IP application protocols defined by the TCP/IP Request for Comments (RFCs).

For Systems Running XDMCP: DECwindows Motif for OpenVMS, Version 1.2-5 (or later)

GROWTH CONSIDERATIONS

The minimum hardware and software requirements for any future version of the Compaq TCP/IP Services for OpenVMS product may be different from the minimum requirements for the current version.

DISTRIBUTION MEDIA

Media and documentation for the Compaq TCP/IP Services for OpenVMS product are available on the Compaq CD-ROM Software Library for OpenVMS.

- To order the Compaq CD-ROM Software Library for OpenVMS for Alpha systems, use order number QA–03XAA–H8.
- To order the Compaq CD-ROM Software Library for OpenVMS for VAX systems, use order number QA–5G88A–H8.

ORDERING INFORMATION

Compaq TCP/IP Services for OpenVMS Alpha Server

Software Licenses: QL–0LXA*–**
Software Documentation: QA–0LXAA–GZ
Software Product Services: QT–0LXA*–**

Compaq TCP/IP Services for OpenVMS Alpha Client

Software Licenses: QL–0M2A*–**
Software Documentation: QA–0LXAA–GZ
Software Product Services: QT–0M2A*–**

Compaq TCP/IP Services for OpenVMS Alpha Client Upgrade

Software License: QL–0PHA*–**
Software Documentation: QA–0LXAA–GZ
Software Product Services: QT–0PHA*–**

Compaq TCP/IP Services for OpenVMS VAX Server

Software Licenses: QL–VHRA*–**
Software Media: QA–VHRAA–H*
Software Documentation: QA–VHRAA–GZ
Software Product Services: QL–VHRA*–**

Compaq TCP/IP Services for OpenVMS VAX Client

Software Licenses: QL–GL7A*–**
Software Documentation: QA–VHRAA–GZ
Software Product Services: QT–GL7A*–**

Compaq TCP/IP Services for OpenVMS VAX Client Upgrade

Software License: QL–OPJA*–**
Software Documentation: QA–VHRAA–GZ
Software Product Services: QT–OPJA*–**

* Denotes variant fields. For additional information about available licenses, services, and media, refer to the appropriate price book. This ordering information was valid at the time of release. Contact your Compaq representative for current ordering information.

SOFTWARE LICENSING

This software is furnished under license only. For more information about Compaq licensing terms and policies, contact your Compaq representative.

The client license provides complete product functionality except for the following server components: NFS server, BIND server, PC-NFS server, the remote BOOT server, the DHCP server, and the RMT/RCD server.

License Management Facility Support

The Compaq TCP/IP Services for OpenVMS product supports the OpenVMS License Management Facility (LMF).

For information about the License Management Facility, see the software product description for the OpenVMS operating system for Alpha and VAX systems (SPD 25.01.xx), or consult the OpenVMS documentation.

SOFTWARE WARRANTY

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

SOFTWARE PRODUCT SERVICES

A variety of service options are available from Compaq. For detailed information about the service options, contact your local Compaq office.

The product information in this SPD was valid at time of release. For current product information, contact your local Compaq office.

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