

Software Product Description

PRODUCT NAME: DEC Distributed Computing Services for OpenVMS,
Version 1.0

SPD 43.11.01

DESCRIPTION

The DEC Distributed Computing Services (DECdcs) software integrates remote OpenVMS AXP (AXP) compute server systems into the OpenVMS VAX (VAX) computing environment. It extends the OpenVMS VAX environment to control jobs executing on remote OpenVMS AXP compute servers.

The DECdcs software provides:

- VAX users and applications with the capability to submit jobs to remote AXP compute servers via familiar OpenVMS batch commands
- Remote interactive access to server applications that use DECwindows (or X Windows) to display back onto the client
- Synchronization with the jobs on the compute servers via standard OpenVMS batch synchronization techniques (e.g., the DCL command SYNCHRONIZE)
- A high degree of compatibility with other OpenVMS batch mechanisms, so that the jobs seem like normal jobs to OpenVMS users
- Systems and applications programmers with the tools to "hide" the remote system from the OpenVMS end user—the VAX end user can access the compute power of the remote AXP systems without being aware that the server is another node
- Sharing of a single AXP compute server among a number of OpenVMS systems or VMSclusters
- Use of a number of servers from a single OpenVMS system or VMScluster

DECdcs uses DECnet to communicate with remote AXP servers. All job and control information passes between the local VAX client and the remote AXP server via the network connection; no other optional software is required for DECdcs operation.

Data and file sharing between the clients and remote servers depends on the nature and design of the application that is sent to the server. The choice of file sharing method is part of the application design process.

The system manager can designate the number of job streams to allow per client or server system, so that servers of varying capacity can be accommodated. In addition, job limits can be placed on the clients. This provides the ability to ensure equitable sharing of a server among multiple client systems—no single client system will be allowed to monopolize all of the job slots on the server system.

Features

The most important feature of the DECdcs software is its ability to allow a VAX user to use local OpenVMS commands to execute a job on a remote compute server. To the OpenVMS end user, the job appears to be executing on the local VAX system or VMScluster.

The fact that most of the existing OpenVMS batch features are available to the DECdcs user means that applications can be built to integrate the best features of OpenVMS and the remote systems. For example, an OpenVMS job running on a VAXstation could consolidate data, dispatch a compute-intensive processing phase to an AXP server, and then wait for the remote phase to complete, before continuing with the rest of the job on the local workstation.

It is also possible for OpenVMS application programs to create jobs on remote systems by calling DECdcs through the \$SNDJBC system service programming interface to the OpenVMS batch system. This service allows an OpenVMS program to create jobs, and other system service calls to allow the program to monitor the progress of the job—for example, to wait for its completion.

Interactive Remote Programs

Through the client/server split inherent in DECwindows, it is possible to use DECdcs to integrate interactive remote applications with a local workstation. A user on a VAXstation can easily initiate a remote job that will use the VAXstation's display for a remote AXP job's interactive input and output.

These features can be used to create applications where the user is unaware that certain functions are done on VAX systems, and other functions are handled

by remote AXP systems. For example, an OpenVMS DECwindows application could be written so that a click on a menu item on the VAXstation could cause a DECdcs remote job to be started on the server.

That remote job would execute on a remote AXP compute server, and then create a window back on the VAXstation—and the end user would not even be aware that the window actually came from a job running on the AXP server. The user simply selects a menu item, and a window appears on his/her VAXstation.

OpenVMS Programming

The VAX user or application submits a standard DCL command procedure to the queue controlled by the DECdcs software. Because this procedure executes in the environment of the AXP server system, certain guidelines should be followed by this command procedure, as described in the *DECdcs User's Manual*. This may require some changes to local command procedures, so that they will operate correctly on the remote system.

File and Data Sharing

File access and sharing are done according to application needs. The programmer decides on an appropriate model for sharing information between the OpenVMS VAX system and the remote server:

- Use DECnet remote file access to allow the AXP jobs to read and write the files on the VAX client system
- Copy files from the client system to the remote system (e.g., using RMS with DECnet or the DCL command COPY) and process them on local disks on the server machine, and then copy output files back to the client
- Maintain files on local storage on the remote server system and do only local processing
- Any combination of these methods

The choice of file access method will be determined by application design and local configuration and network load. For example, if the application performs heavy I/O to an exclusively accessed file, then it may be desirable to place that file on local storage during the run.

DECdcs provides what is basically a production environment so that remote applications can be controlled by OpenVMS users. DECdcs does not provide an extended development environment, although the DECdcs environment could be used for program development. Most likely, however, the application developer would want to use the normal interactive environment and tools available on the server system to develop the applications.

Security

The DECdcs software maintains a database to determine which VAX client systems are allowed to interact with which remote AXP servers. This password-protected database helps ensure that only authorized nodes are permitted to send jobs to the compute servers.

Standard OpenVMS security mechanisms, such as Access Control Lists on the DECdcs queues, can be used to restrict access to authorized individuals on the client system. Other users would be prevented from sending jobs to the system.

The security for shared files is provided by the network file access protocols of DECnet.

DECdcs maintains an outbound proxy database on the client system. This allows a user to have different usernames on the client and server systems. It also permits the system manager of the client system to designate a single username on the remote system for certain groups to share, without requiring the manager of the server system to be involved.

On the server system, DECdcs maintains an inbound proxy database. DECdcs will not run a user job unless it finds a proxy entry covering that user. Wildcard proxy entries can be used to map entire client systems, or to specify that a job should run under the same username on the server system as on the client. A privileged job will not be run unless the system manager on the server system specifies that a certain user be permitted to run with privileges—wildcard entries will not permit privileged jobs to run. The system manager of the server system can specify the set of privileges that are allowed for wildcard entries.

HARDWARE REQUIREMENTS

The client components of DECdcs can be installed on any OpenVMS VAX processor or configuration as specified in the System Support Addendum (SSA 43.11.01-x).

The server components of DECdcs can be installed on any OpenVMS AXP system or server configuration as specified in the System Support Addendum (SSA 43.11.01-x).

The client and server must have network connections to each other. Usually, they would be on the same local area network. The DECdcs software will work over wide area network connections, but the lower bandwidth typical of wide area networks would have to be considered in the application design.

SOFTWARE REQUIREMENTS

For Client Systems:

OpenVMS VAX Operating System

DECnet/OSI for OpenVMS VAX

For Server Systems:

OpenVMS AXP Operating System

DECnet for OpenVMS AXP

Refer to the System Support Addendum (SSA 43.11.01-x) for availability and required versions of prerequisite /optional software.

ORDERING INFORMATION

OpenVMS VAX-Based Client Systems

Client Software Licenses: QL-07NAA-3B

Software Update Service: QT-07NAA-DB

OpenVMS AXP-Based Server Systems

Server Software Licenses: QL-07PA*-AA

Software Update Service: QT-07PA*-L9

* Denotes variant fields. For additional information on available licenses, refer to the appropriate price book.

General

Media (TK50)* & Documentation: QA-07NAA-H5

Media & Documentation Service: QT-07NAA-E5

Digital CD-ROM Software Library for OpenVMS AXP:
QA-03XAA-HA

Software Documentation: QA-07NAA-GZ

Documentation Support Service: QT-07NAA-KZ

* Either media kit contains both the client and server software modules.

SOFTWARE LICENSING

This software is furnished under the licensing provisions of Digital Equipment Corporation's Standard Terms and Conditions.

DECdcs consists of client and server software modules. Both modules are licensed.

A client license enables a client connection to remote servers and controls the number of concurrent jobs that a client will allow. A single client license consists of eight units. Each client/server connection consumes three units. Each job dispatched to a server requires one unit to run. Hence, a single client license allows a single server connection plus the ability to run five concurrent jobs. Alternatively, it allows two server connections and two concurrent jobs. Purchasing extra client licenses will extend the number of server connections and/or the number of jobs.

A server license is required to enable client connection to the server. The server license purchased must match the machine type on which the DECdcs server software will run. Up to eight client systems are allowed per server process. The number of jobs issued to the server is controlled via the client licenses.

For more information about Digital's licensing terms and policies, contact your local Digital office.

SOFTWARE WARRANTY

Warranty for this software product is provided by Digital with the purchase of a license for the product as defined in the Software Warranty Addendum of this SPD.

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System Support Addendum

PRODUCT NAME: DEC Distributed Computing Services for OpenVMS,
Version 1.0

SSA 43.11.01-A

HARDWARE REQUIREMENTS

Processors Supported as DECdcs Clients:

VAX: VAX 4000 Model 100,
VAX 4000 Model 200,
VAX 4000 Model 300,
VAX 4000 Model 400,
VAX 4000 Model 500,
VAX 4000 Model 600

VAX 6000 Model 200 Series,
VAX 6000 Model 300 Series,
VAX 6000 Model 400 Series,
VAX 6000 Model 500 Series,
VAX 6000 Model 600 Series

VAX 8200, VAX 8250, VAX 8300,
VAX 8350, VAX 8500, VAX 8530,
VAX 8550, VAX 8700, VAX 8800,
VAX 8810, VAX 8820, VAX 8830,
VAX 8840

VAX 9000 Model 210,
VAX 9000 Model 400 Series

VAX-11/780, VAX-11/785

MicroVAX: MicroVAX II, MicroVAX 2000,
MicroVAX 3100 Model 10/10E,
MicroVAX 3100 Model 20/20E,
MicroVAX 3100 Model 30,
MicroVAX 3100 Model 40,
MicroVAX 3100 Model 80,
MicroVAX 3100 Model 90,
MicroVAX 3300, MicroVAX 3400,
MicroVAX 3500, MicroVAX 3600,
MicroVAX 3800, MicroVAX 3900

VAXstation: VAXstation II, VAXstation 2000,
VAXstation 3100 Model 30,
VAXstation 3100 Model 38,
VAXstation 3100 Model 40,
VAXstation 3100 Model 48,
VAXstation 3100 Model 76,
VAXstation 3200, VAXstation 3500

VAXstation 4000 Model 60,
VAXstation 4000 Model 90,
VAXstation 4000 VLC

VAXserver: VAXserver 3100 Model 10/10E,
VAXserver 3100 Model 20/20E,
VAXserver 3300, VAXserver 3400,
VAXserver 3500, VAXserver 3600,
VAXserver 3800, VAXserver 3900

VAXserver 4000 Model 200,
VAXserver 4000 Model 300,
VAXserver 4000 Model 500

VAXserver 6000 Model 210,
VAXserver 6000 Model 220,
VAXserver 6000 Model 310,
VAXserver 6000 Model 320,
VAXserver 6000 Model 410,
VAXserver 6000 Model 420,
VAXserver 6000 Model 510,
VAXserver 6000 Model 520,
VAXserver 6000 Model 610,
VAXserver 6000 Model 620,
VAXserver 6000 Model 630

Processors Supported as DECdcs Servers:

Alpha AXP: DEC 3000 Model 400 AXP Workstation,
DEC 3000 Model 400 AXP Server,
DEC 3000 Model 500 AXP Workstation,
DEC 3000 Model 500 AXP Server

DEC 4000 Model 610 AXP System

DEC 7000 Model 610 AXP System

DEC 10000 Model 610 AXP System

Processors Not Supported as DECdcs Clients:

Note: DECdcs is user-mode code with no explicit processor or hardware dependencies.

The following systems are listed as *not supported* because qualification has not been completed on these processors.

VAX:	VAX 7000 Model 600 Series
	VAX 9000 Model 110, VAX 9000 Model 300 Series
	VAX 10000 Model 600 Series
	VAX 8600, VAX 8650
	VAX-11/730, VAX-11/750
	VAXft Model 110, VAXft Model 310, VAXft Model 410, VAXft Model 610, VAXft Model 612
VAXstation:	VAXstation 3520, VAXstation 3540
VAXserver:	VAXserver 3602
Retired:	MicroVAX I, VAXstation I, VAX-11/725, VAX-11/782, VAXstation 8000

Other Hardware Required:

Systems must have a network interconnect device that is supported by DECnet.

Disk Space Requirements (Block Cluster Size = 1):

Minimum disk space required for installation:	4,500 blocks
Maximum disk space required for installation:	9,000 blocks
Disk space required for DECdcs client (permanent):	750 blocks
Disk space required for DECdcs server (permanent):	650 blocks
Optional disk space for documentation (permanent):	up to 3,500 blocks

CLUSTER ENVIRONMENT

This layered product is fully supported when installed on any valid and licensed VAXcluster* configuration without restrictions. The *HARDWARE REQUIREMENTS* sections of this product's Software Product Description and System Support Addendum detail any special hardware required by this product.

* V5.x VAXcluster configurations are fully described in the VAXcluster Software Product Description (29.78.xx) and include CI, Ethernet, and Mixed Interconnect configurations.

SOFTWARE REQUIREMENTS

For Client Systems:

OpenVMS VAX Operating System V5.2 - V5.5-2
DECnet/OSI for OpenVMS VAX V5.5

For Server Systems:

OpenVMS AXP Operating System V1.0
DECnet for OpenVMS AXP V1.0

OpenVMS Tailoring:

The following OpenVMS classes are required for full functionality of this layered product:

- BASE — OpenVMS Required Saveset
- NET — Network Support
- USER — Secure User's Environment

The following OpenVMS class is required during the installation of this layered product, but is not required after installation:

- PROG — Programming Support

For more information on OpenVMS classes and tailoring, refer to the operating system Software Product Descriptions.

GROWTH CONSIDERATIONS

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

DISTRIBUTION MEDIA

This product is available on the Digital CD-ROM Software Library for OpenVMS AXP. The Software documentation is also available separately.

The product is also available on a TK50 tape cartridge.

The installation documentation contains directions for installing the product over the network. (i.e. for installing the server from a TK50 on the client or installing the client from the CD-ROM on the server)

During the installation procedure the installer will be given the option of providing the documentation files. Documentation files are provided in PostScript® format, line printer format, and online Bookreader format.

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Documentation Support Service: QT-07NAA-KZ

* Either media kit contains both the client and server software modules.

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