VMS Software

VSI OpenVMS

DECwindows Motif for OpenVMS Management Guide

Operating System and Version: VSI OpenVMS IA-64 Version 8.4-1H1 or higher
VSI OpenVMS Alpha Version 8.4-2L1 or higher

Software Version: DECwindows Motif for OpenVMS Version 1.7F

VMS Software, Inc. (VSI)
Boston, Massachusetts, USA

DECwindows Motif for OpenVMS Management Guide

Legal Notice

Preface vii
1. About VSI vii
2. Intended Audience vii
3. Document Structure vii
4. VSI Encourages Your Comments vii
5. OpenVMS Documentation vii
6. Conventions viii

Chapter 1. System Overview 1
1.1. The DECwindows Client/Server Processing Model 1
1.1.1. The Client 2
1.1.2. The Transport 2
1.1.3. The Display Server 2
1.2. Optional Server Configurations 2
1.2.1. The Font Server 3
1.2.2. The Proxy Server 3
1.3. VSI DECwindows Motif for OpenVMS Components 4
1.3.1. Layered Product Components 4
1.3.2. Operating System Components 5

Chapter 2. Starting DECwindows Motif 7
2.1. Understanding the Startup Procedure 7
2.2. Using the DECW$STARTUP.COM Procedure 11
2.3. System Startup Considerations 11
2.3.1. Defining DECwindows System Logicals 11
2.3.2. Adjusting System Parameters 12

Chapter 3. Configuring the Display Server 15
3.1. Customizing the DECwindows Display Server 15
3.1.1. Using the DECW$PRIVATE_SERVER_SETUP File 15
3.1.2. The Display Server Customization Parameters 16
3.1.2.1. Server Process 18
3.1.2.2. Extensions 21
3.1.2.3. Security 23
3.1.2.4. Devices 24
3.1.2.5. Transport and Network Connections 29
3.1.2.6. Fonts 30
3.1.2.7. Keyboard 33
3.1.2.8. Mouse 35
3.1.2.9. Color Database 36
3.1.2.10. Screen Saver 36
3.1.2.11. Backing Store and Save Under 37
3.1.2.12. Error Reporting 38
3.1.3. Setting Cluster-Common Parameters 41
3.1.4. Setting Standalone System Parameters 42
3.1.5. Determining the Current Server Parameters 42
3.1.5.1. Displaying the Server Logical Name Table 42
3.1.5.2. Using the X Display Information Utility (xdpyinfo) 43
3.1.5.3. Using X Set Utility (xset) 46
3.2. Specifying the Network Transports 46
3.2.1. Using the Local Transport 47
3.2.2. Using the DECnet Transport 47
3.2.3. Using the TCP/IP Transport 47

3.2.4. Using the LAT Transport 47
3.2.5. Changing the Default Transports 48
3.3. Establishing Server Access Control 48
3.3.1. User-Based Access Control 48
3.3.2. Token-Based Access Control 48
3.3.2.1. Magic Cookie 49
3.3.2.2. Kerberos 49
3.3.3. The X Authority File 50
3.3.4. The Access Allowed File 51
3.3.5. The Access Trusted File 51
3.3.6. Choosing an Access Control Method 51
3.3.6.1. Applying Access Control to Connections Outside a Desktop Session 52
3.3.6.2. Applying Access Control to Connections Inside a Desktop Session 52
3.3.7. Enabling User-Based Access Control 52
3.3.8. Enabling Magic Cookie Access Control 54
3.3.9. Enabling Kerberos Access Control 55
3.3.10. Using the Security Extension 57
3.3.10.1. Enabling the Security Extension 58
3.3.10.2. Using the Security Policy File 58
3.4. Setting Up a Multihead System 58
3.4.1. System Setup 58
3.4.2. Configuring a Simple Multihead System 59
3.4.3. Configuring a Multihead System Using XINERAMA 59
3.4.3.1. Hardware and Configuration Requirements 59
3.4.3.2. Enabling the XINERAMA Extension 60
3.4.3.3. Arranging the Monitors 60
3.5. Changing the Default Keyboard Layout 60
3.5.1. Using the DECwindows Keymap Files 61
3.5.2. Using X Keyboard Keymap Files 61
3.5.2.1. The X Keyboard Components Database 62
3.5.2.2. Creating an X Keyboard Keymap File 63
3.5.2.3. Loading a Compiled Keymap File 64
3.5.2.4. Enabling AccessX Key Features 64
3.6. Specifying New Fonts 65
3.6.1. Using Third-Party Fonts 65
3.6.2. Enabling Support for Euro Currency Symbol 66
3.6.2.1. Displaying the Euro Symbol in VSI DECwindows Motif for OpenVMS Applications 66
3.6.2.2. Using the Keyboard to Manually Enter the Euro Symbol (Alpha Only) 66
3.6.3. Enabling Font Server Support 67
3.7. Setting up an LBX Proxy Server 67
3.7.1. Enabling the LBX Extension 68
3.7.2. Starting the Proxy Server 68
3.7.2.1. Authentication in a Proxy Server Environment 68
3.7.2.2. Starting a Managed Proxy Server 69
3.7.2.3. Starting a Standalone Proxy Server 69
3.7.3. Using the Proxy Server in an IPv6 Environment 70
3.7.4. Modifying the Default Proxy Server Process Characteristics 70
3.7.5. Stopping a Proxy Server 70
3.7.5.1. Stopping Automatically 70
3.7.5.2. Stopping Manually 71
3.7.6. The Proxy Manager Configuration File 71

3.7.7. Starting the Proxy Manager 72
3.7.7.1. Starting Automatically at VSI DECwindows Motif for OpenVMS Startup 72
3.7.7.2. Starting Manually 73
Chapter 4. Using DECwindows 75
4.1. Setting the Display 75
4.1.1. The Display Name Format 76
4.1.2. TCP/IP Host Name Translation 78
4.2. Understanding the Login Process 78
4.2.1. The New Desktop Login Sequence 78
4.2.2. The Traditional DECwindows Desktop Login Sequence 79
4.3. Customizing the Login Environment 81
4.3.1. Improving Application Startup Performance 81
4.3.2. Customizing the Login Screen (Traditional DECwindows Desktop Only) 81
4.3.2.1. Customizing the Logo and Login Screen Colors 81
4.3.2.2. Changing Positions of the Start Session and Set Password DialogBoxes 82
4.3.2.3. Disabling a Node Name Display in the Start Session DialogBox 83
4.3.3. Displaying Custom Messages Prior to Login (New Desktop Only) 83
4.3.4. Disabling the Suggested Password List (New Desktop Only) 83
4.3.5. Enabling Support for UNIX-Style Filenames (New Desktop Only) 84
4.3.5.1. Enabling in the File Selection Dialog Box 84
4.3.5.2. Enabling in the File Manager 84
4.4. Customizing the Startup Environment 84
4.4.1. Using the DECW$PRIVATE_APPS_SETUP File 84
4.4.2. Switching Between Desktops 87
4.4.3. Enabling Support for IPv6 87
4.4.4. Changing the Default Logo (Traditional DECwindows Desktop Only) 88
4.4.5. Displaying Logos on Systems with Personal-Use Licenses (Traditional DECwindows Desktop Only) 89
4.4.6. Displaying Console Messages 89
4.4.7. Creating Dedicated Accounts (Traditional DECwindows Desktop Only) 90
4.4.7.1. Modifying the Session Manager Command Procedure 91
4.4.7.2. Modifying the Session Manager Executable File 92
4.4.7.3. Modifying the Session Manager Profile File 94
4.4.8. Creating a Custom Bookreader Directory 95
4.5. Modifying Session Manager Behavior (Traditional DECwindows Desktop Only) 96
4.6. Modifying System Resource Files 96
4.7. Specifying Client Access Control 97
4.7.1. Setting Security Options 97
4.7.2. Refreshing Security Options During a Session 98
4.7.3. Enabling and Disabling Access Control at Login 98
4.7.4. Enabling Trusted Users to Unlock Paused Desktop Sessions 98
4.8. Customizing Print Formats 99
4.8.1. Defining Print Formats 99
4.8.2. Logical Names and Print Formats 99
Appendix A. Tuning the DECwindows System 101
A.1. Establishing UAF Parameters for DECwindows Applications 101
A.2. Establishing System Parameters for DECwindows Applications and the Display Server 102
A.3. Establishing Server Parameters for Non-VGA Devices 104
Appendix B. DECwindows Motif Keymap Names 107

Preface

1. About VSI

VMS Software, Inc. (VSI) is an independent software company licensed by Hewlett Packard Enterprise to develop and support the OpenVMS operating system.

2. Intended Audience

This manual is intended for experienced OpenVMS system administrators who need to manage and customize the VSI DECwindows Motif for OpenVMS (VSI DECwindows Motif for OpenVMS) software on clustered or standalone systems on the OpenVMS I64 or OpenVMS Alpha platform.

3. Document Structure

This manual is structured as follows:

- Chapter 1 provides an overview of the VSI DECwindows Motif for OpenVMS architecture and describes the various components.
- Chapter 2 describes the VSI DECwindows Motif for OpenVMS startup process and explains how to customize and tune the startup command procedure.
- Chapter 3 explains how to configure the X display server using symbols to customize such things as server process behavior, device setup, font setup, backing store, extensions, and error reporting. This chapter also includes examples for setting server access control, specifying alternate methods of transport, enabling font and proxy servers, and configuring multihead displays.
- Chapter 4 describes the client login procedure and explains how to customize the Session Manager environment. This includes descriptions of how to specify and manage the access control method used by client applications, specify an alternate logo, create dedicated accounts, and customize print formats.
- Appendix A lists the recommended minimum settings for UAF limits and system parameters on OpenVMS systems. It also contains tuning recommendations for non-VGA configurations.
- Appendix B contains a list of all the keymaps supported by VSI DECwindows Motif for OpenVMS. This appendix is arranged alphabetically by name and grouped by the language for which each keyboard is designed.

4. VSI Encourages Your Comments

You may send comments or suggestions regarding this manual or any VSI document by sending electronic mail to the following Internet address: <docinfo@vmssoftware.com>. Users who have VSI OpenVMS support contracts through VSI can contact <support@vmssoftware.com> for help with this product.

5. OpenVMS Documentation

The full VSI OpenVMS documentation set can be found on the VMS Software Documentation webpage at https://docs.vmssoftware.com.

6. Conventions

VMScluster systems are now referred to as OpenVMS Cluster systems. Unless otherwise specified, references to OpenVMS Cluster systems or clusters in this document are synonymous with VMScluster systems.

The contents of the display examples for some utility commands described in this manual may differ slightly from the actual output provided by these commands on your system. However, when the behavior of a command differs significantly between OpenVMS Alpha and Integrity servers, that behavior is described in text and rendered, as appropriate, in separate examples.

In this manual, every use of DECwindows and DECwindows Motif refers to DECwindows Motif for OpenVMS software.

The following conventions are also used in this manual:

Convention	Meaning
Ctrl/ *x*	A sequence such as **Ctrl/** *x* indicates that you must hold down the key labeled Ctrl while you press another key or a pointing device button.
PF1 *x*	A sequence such as PF1 *x* indicates that you must first press and release the key labeled PF1 and then press and release another key or a pointing device button.
Return	In examples, a key name enclosed in a box indicates that you press a key on the keyboard. (In text, a key name is not enclosed in a box.)
…	A horizontal ellipsis in examples indicates one of the following possibilities: ● Additional optional arguments in a statement have been omitted. ● The preceding item or items can be repeated one or more times. ● Additional parameters, values, or other information can be entered.
. . .	A vertical ellipsis indicates the omission of items from a code example or command format; the items are omitted because they are not important to the topic being discussed.
( )	In command format descriptions, parentheses indicate that you must enclose the options in parentheses if you choose more than one.
[ ]	In command format descriptions, brackets indicate optional choices. You can choose one or more items or no items. Do not type the brackets on the command line. However, you must include the brackets in the syntax for OpenVMS directory specifications and for a substring specification in an assignment statement.
[|]	In command format descriptions, vertical bars separate choices within brackets or braces. Within brackets, the choices are options; within braces, at least one choice is required. Do not type the vertical bars on the command line.
{ }	In command format descriptions, braces indicate required choices; you must choose at least one of the items listed. Do not type the braces on the command line.
bold text	This typeface represents the introduction of a new term. It also represents the name of an argument, an attribute, or a reason.

Convention	Meaning
italic text	Italic text indicates important information, complete titles of manuals, or variables. Variables include information that varies in system output (Internal error *number*), in command lines (/PRODUCER= *name*), and in command parameters in text (where *dd* represents the predefined code for the device type).
UPPERCASE TEXT	Uppercase text indicates a command, the name of a routine, the name of a file, or the abbreviation for a system privilege.
`Monospace type`	Monospace type indicates code examples and interactive screen displays. In the C programming language, monospace type in text identifies the following elements: keywords, the names of independently compiled external functions and files, syntax summaries, and references to variables or identifiers introduced in an example.
-	A hyphen at the end of a command format description, command line, or code line indicates that the command or statement continues on the following line.
numbers	All numbers in text are assumed to be decimal unless otherwise noted. Nondecimal radixes—binary, octal, or hexadecimal—are explicitly indicated.

Chapter 1. System Overview

This chapter provides an overview of the VSI DECwindows Motif for OpenVMS (VSI DECwindows Motif for OpenVMS) software. It describes the following topics:

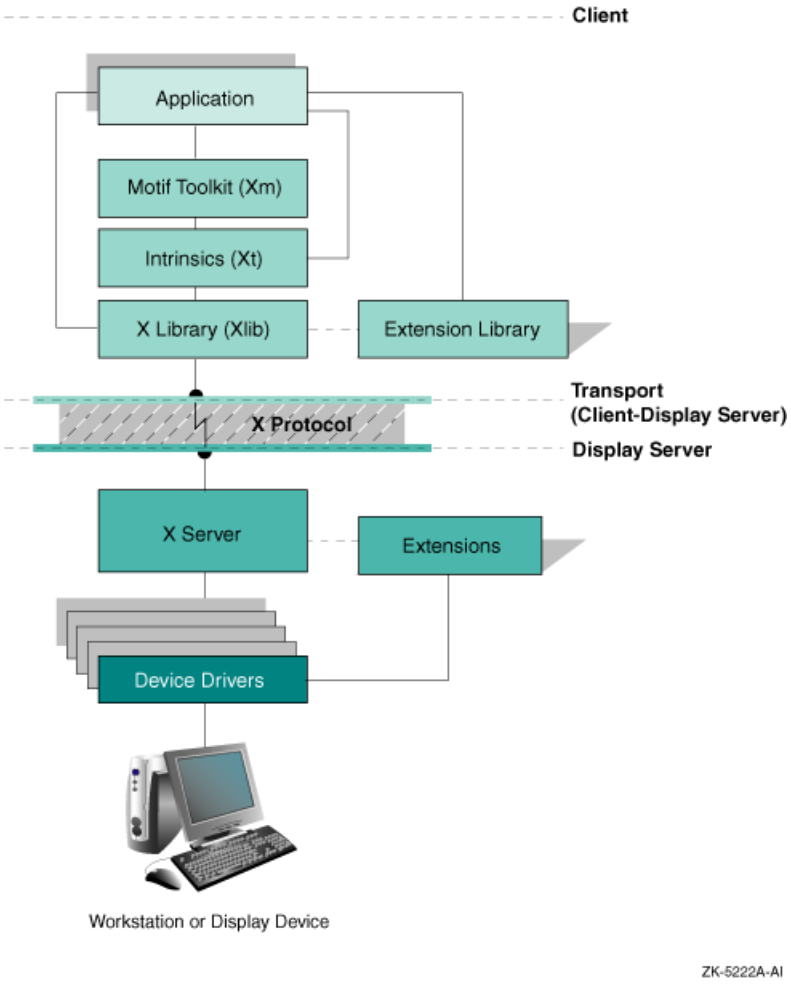
- The VSI DECwindows Motif for OpenVMS processing model and basic system architecture
- Optional font and proxy server configurations
- Components of the client and X display server software

1.1. The DECwindows Client/Server Processing Model

The VSI DECwindows Motif for OpenVMS software follows a client/server processing model, where the server is a single-shared process that performs operations at the request of many client processes.

Figure 1.1 illustrates the basic VSI DECwindows Motif for OpenVMS client/display server architecture.

Figure 1.1. DECwindows System Architecture: Basic



In most client/server relationships, the client system is located on the desktop, while the server system resides across the network. With VSI DECwindows Motif for OpenVMS, as in all X Window System environments, the server system resides on the desktop and displays graphics onscreen.

1.1.1. The Client

The **client** is a process, such as a desktop application or X Window System utility, that issues X protocol requests. For example, in the VSI DECwindows Motif for OpenVMS environment, desktop applications (such as DECterm) and X Window System utilities (such as xlsfonts) are the clients that interact with the X display server.

The client controls what appears on the display server system and generates the graphic interface with which the user interacts.

1.1.2. The Transport

In the DECwindows architecture, as with most client/server processing models, the client and display server may reside on separate systems. These systems are connected to each other by a network transport that is essentially transparent to the user.

The **transport** is responsible only for transferring data between the client and server systems—it does not alter the data in any way.

VSI DECwindows Motif for OpenVMS supports the following transport mechanisms:

- Local (shared memory)
- Local Area Transport (LAT)
- DECnet
- TCP/IP using either the Internet Protocol Version 4 (IPv4) or Internet Protocol Version 6 (IPv6) host name and address format

The client and server each maintain and manage their own interface to the network transport.

1.1.3. The Display Server

The **display server** enables client applications to interact with supported devices in a consistent manner. The display server manages the physical graphics display and perhipheral devices on behalf of the client applications. It receives X protocol requests from client applications through the transport layer and performs the functions required to fulfill the request for a specific device.

Essentially, the server converts data that represents the request into commands that can be executed by the appropriate graphics device. When a user enters application data with an input device (such as a mouse, keyboard, or touchpad), the display server receives input from the device drivers and passes protocol packets back through the transport layer(s) to X Library (Xlib) and X Toolkit Intrinsics (Xt) routines.

In order to communicate successfully, settings such as the access control method, communication protocol, and host name format must be compatible between the client and display server.

1.2. Optional Server Configurations

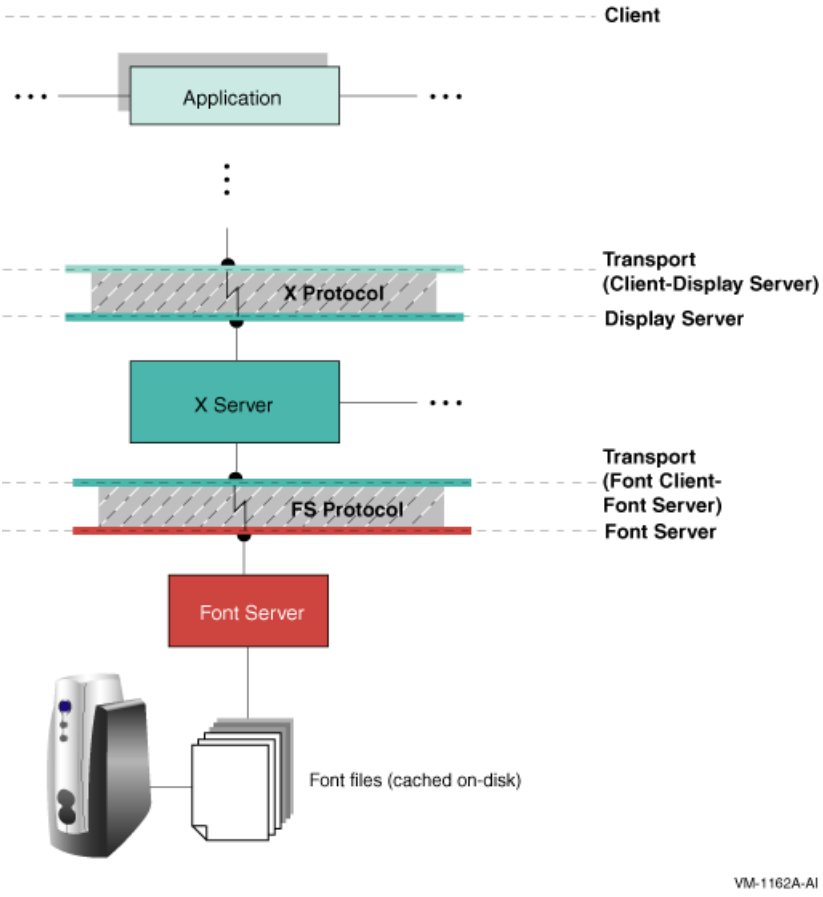
The basic system architecture can be extended to include other types of servers, as described in the following sections.

1.2.1. The Font Server

The X display server includes a font renderer that supports the use of one or more **font servers** to access font files distributed on systems other than the one on which the display server is running. Communication between the display and font servers uses the X Font Server (FS) protocol.

Figure 1.2 illustrates the VSI DECwindows Motif for OpenVMS architecture with a font server added.

Figure 1.2. DECwindows System Architecture: Font Server



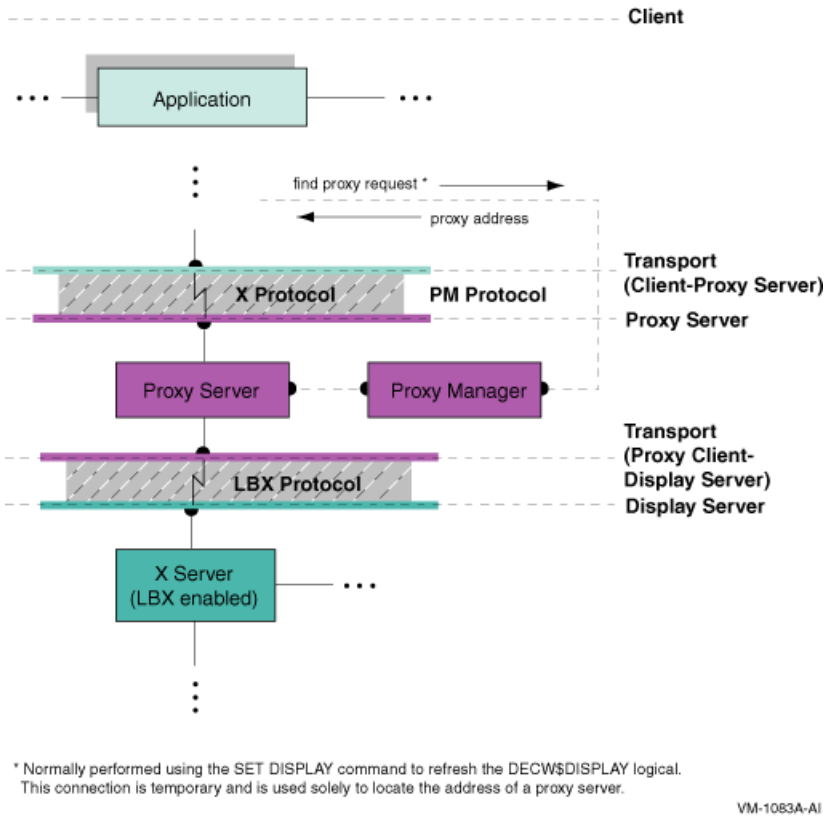
1.2.2. The Proxy Server

The proxy server appears to clients as any other X server. The **proxy server** accepts connection requests from a client and acts as an intermediary between the client and the X server. Communication between the proxy server and client uses the standard X protocol. Communication between the proxy and the X server uses the Low-Bandwidth X (LBX) protocol.

LBX is designed for those configurations where the display server is separated from the client by a slow speed line, such as a 56K dial-in modem or a wide-area network (WAN). When the X protocol was developed, it was used primarily over local area networks (LANs) and was not optimized for low-speed connections. LBX addresses this shortcoming by using a compression and caching scheme designed to minimize the data flow between the client and display server.

Figure 1.3 illustrates the VSI DECwindows Motif for OpenVMS server architecture with a proxy server added.

Figure 1.3. DECwindows System Architecture: Proxy Server



Optionally, the proxy server can be managed by a **proxy manager** application. Clients applications provide the requested X display server to the proxy manager. The manager, in turn, either finds the appropriate existing proxy server or starts a new instance of the proxy server automatically.

1.3. VSI DECwindows Motif for OpenVMS Components

This section lists the client components that comprise the VSI DECwindows Motif for OpenVMS layered product software and the display server and common components that are bundled with the OpenVMS operating system.

1.3.1. Layered Product Components

The following components make up the VSI DECwindows Motif for OpenVMS client software:

- Desktop applications
- X Window System utilities
- Session management utilities
- Programming libraries

  X Library (Xlib)
  X Toolkit Intrinsics (Xt)
  OSF/Motif toolkit (Xm)

VSI Extensions to Motif (DXm)
Inter-Client Exchange (ICE) and X Session Management (XSMP) Extensions

- Examples and sample widgets

1.3.2. Operating System Components

The following common and display server components are bundled with the OpenVMS operating system:

- X display server – Consists of the following shareable images:

  Main entry-point stub
  Device-independent server (DIX) image
  Device-dependent server (DDX) images
  Dynamically-loadable extensions

  The main image and DIX image are linked together. During initialization, depending on which graphics devices are available and have been selected, the DDX images are activated dynamically. The loadable extensions are activated dynamically either during initialization of the operating system or at first use.

- Transport interface – Consists of a single common image and a collection of transport-specific images.

  The common transport image is built into the display server. Based on the transport initialization parameters, the required transport-specific images are activated dynamically.

- Device drivers – The DECwindows display server uses two types of drivers: input and graphics/video.

- Data files – The display server references the following types of data files:

  X authority and access lists (control access to a server system)
  Font (contain detailed font descriptions)
  Keymap (define how keyboard keys are interpreted)
  Color database (define how color names and RGB values are associated)

Chapter 2. Starting DECwindows Motif

This chapter describes the DECwindows system startup process, which begins when the first DECwindows startup command file executes and continues until the DECwindows Start Session dialog box is displayed.

This chapter describes the following topics:

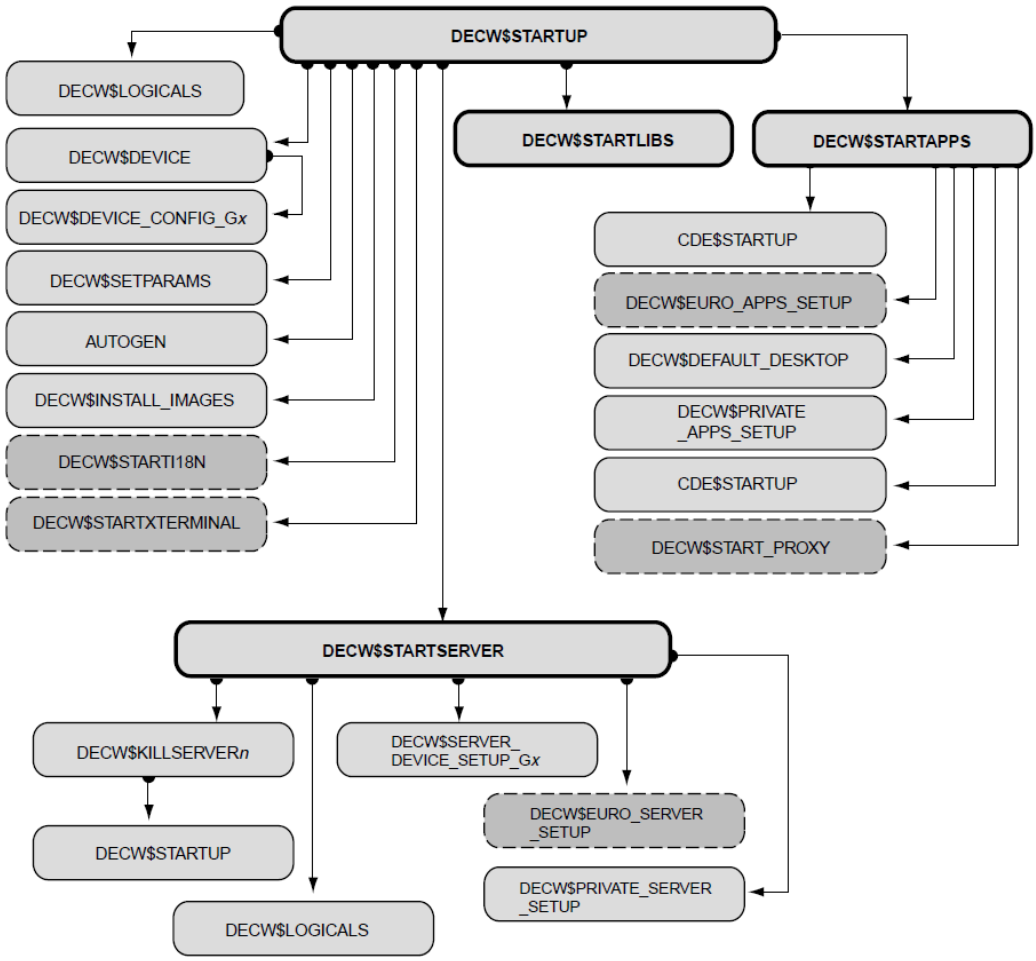
- Understanding the startup procedure
- Using the DECW$STARTUP.COM procedure
- System startup considerations

2.1. Understanding the Startup Procedure

This section describes the VSI DECwindows Motif for OpenVMS startup process. Figure 2.1 illustrates the startup sequence from when the VSI DECwindows Motif for OpenVMS startup command procedure, DECW$STARTUP, is invoked.

Note that some procedures are optional. For example, DECW$STARTI18N is only invoked if OpenVMS Internationalization (I18N) kit has been installed. These optional procedures appear shaded in the following diagram.

Figure 2.1. DECwindows Startup Command Procedure Flow



1. **DECW$LOGICALS.COM: Creates the DECW$LOGICAL_NAMES table.** DECwindows application startup and configuration parameters are defined during this step. The DECW $SYSCOMMON logical is also defined, which enables individual systems to override cluster-wide settings for data files (such as keymap and font files).

2. **DECW$DEVICE.COM: Loads and configures the DECwindows device drivers.** This procedure also defines the symbols used in subsequent phases of the DECwindows startup sequence. Before loading the specific device drivers, it executes the INIT portion of the DECW $PRIVATE_SERVER_SETUP file (if it exists), which allows systems to override automatic device selection.

   It then sets the symbol DECW$DEVICE, which contains a list of the graphics devices available to the display server. DECW$DEVICE.COM uses this list to invoke the device-specific configuration procedures, DECW$DEVICE_CONFIG_Gx, (where x represents the device type identifier, such as Z for GZA0).

3. **DECW$SETPARAMS.COM: Sets the required system parameter values.** This procedure sets the appropriate values for system parameters required during DECwindows startup.

   If one or more parameters are not set correctly, a list of parameters that need to be modified is displayed. The DECW$STARTUP.COM procedure asks if the user wants to run AUTOGEN. If you invoked DECW$STARTUP.COM with the RESTART parameter, the question displays on the system console.

If you answer NO to this question, DECW$STARTUP.COM displays a message stating that DECwindows cannot start until the system parameters are modified and exits. If you answer YES, DECW$STARTUP.COM runs AUTOGEN from the GETDATA phase to REBOOT. This modifies system parameters and then reboots system.

To bypass the system parameter check, define the logical name DECW$IGNORE_AUTOGEN before running DECW$STARTUP.COM (see Table 2.2).

4. **DECW$INSTALL_IMAGES.COM: Loads the system and transport shareable images.** By default, the following shareable images are installed in SYS$SHARE on startup:

   DECW$XPORT_SERVICES.EXE (memory resident)
   DECW$LCNLIBSHR.EXE (memory resident)
   DECW$XPORT_PTHREAD.EXE
   DECW$TRANSPORT_COMMON.EXE (memory resident)
   DECW$TRANSPORT_DECNET.EXE
   DECW$TRANSPORT_LOCAL.EXE
   DECW$TRANSPORT_TCPIP.EXE
   DECW$SECURITY.EXE
   DECW$SETSHODIS.EXE
   DECW$SETSHODISSHR.EXE (memory resident)
   DECW$XAUSHR.EXE (memory resident)
   DECW$TRANSPORT_LAT.EXE

5. **DECW$STARTI18N.COM: Sets the language locale (optional).** If the I18N option was chosen during DECwindows installation, the following functions are performed at system startup:

   a. Creates the language-specific directories.

   b. Specifies default system language.

   c. Modifies system logicals and default to reflect the appropriate language-specific directory specification.

   d. Runs the country-specific startup procedure, DECW$STARTI18N_xx_xx.COM, where xx_xx represents the language locale (such as, FR_FR).

6. **DECW$STARTXTERMINAL.COM: Installs support for X terminal emulators (optional).** If the logical DECW$INSTALL_XTERMINAL has been defined in the system startup procedure, the following functions are performed:

   a. Provides client support using the LAT transport.

   b. Adds XTDRIVER as class driver for Xlib to communicate to the LT driver.

   c. Installs DECW$TRANSPORT_LAT.EXE.

   d. Provides font file sharing through the DECW$FD process.

   e. Runs the font daemon process as a detached process.

   f. Installs the DECnet access gateway server image with SYSNAM privileges.

7. **DECW$STARTSERVER.COM: Starts the DECwindows display server.** This procedure performs the following:

a. Handles the RESTART option to the DECW$STARTUP procedure. If RESTART is selected, a command file named DECW$KILLSERVER*n*.COM is created and executed as a detached process with the process name "Server *n* Restart". This procedure stops the current server process and executes DECW$STARTUP.COM with P1 set to null.

b. Writes progress to a startup log file, SYS$MANAGER:DECW$STARTUP_n.LOG, and purges previous logs according to the value specified by the DECW$KEEPLIMIT logical. The default value is 2.

c. Creates the server-specific logical name table DECW$SERVERn_TABLE.

d. Executes the file SYS$MANAGER:DECW$EURO_SERVER_SETUP.COM, if the euro option was chosen at installation time. This changes the default paths for font and keymap files to euro-enabled files.

e. Invokes the server customization file DECW$PRIVATE_SERVER_SETUP.COM. See Section 3.1 for information about how to customize the display server.

f. Populates the server-specific logical name table based on symbols defined in DECW$DEVICE.COM, DECW$PRIVATE_SERVER_SETUP.COM, and DECW $EURO_SERVER_SETUP.COM (if it exists).

g. Checks for and starts the font server, if it has been defined.

h. Purges previous versions of the server error log file DECW$SERVER_*n*_ERROR.LOG.

i. Checks for the symbol DECW$SERVER_DUMP that indicates whether the server saves a process dump file when a server crash occurs. Setting this logical also disables the server's condition handler.

j. Checks for user-specified server process parameters. See Section 3.1.2.1 for a list of server process parameters that you can modify.

k. Determines the server executable name. Normally this is SYS$SYSTEM:DECW $SERVER_MAIN.EXE. An alternative server image executes if:

   - The logical DECW$SERVER_MAIN is defined to point to an alternative server executable file.

   - A file exists with the name SYS$SYSTEM:DECW$SERVER_MAIN_*xx*.EXE, where *xx* are the first two letters of the primary graphics device defined by the symbol DECW$DEVICE.

   Note that an alternate server image is executed only for bug fixes and special hardware releases.

l. Runs the display server image as a detached process using the device name and process parameter information collected.

8. **DECW$STARTLIBS.COM: Loads and configures the client and shared libraries.** This procedure performs the following:

   a. Defines DECwindows logicals.

   b. Installs Xlib, Xt, and other shared libraries.

   c. Connects the WSDRIVER for the DCL command SET DISPLAY.

9. **DECW$STARTAPPS.COM: Establishes the user application development environment.** This procedure also creates a WSA*n*: device in executive mode and creates a Start Session dialog box. If you have created the customization command files DECW$PRIVATE_APPS_SETUP.COM and DECW$EURO_APPS_SETUP.COM (if the euro option has been installed), they are invoked here. Use this file to customize the login sequence. See Section 4.4 for information about how to customize application startup.

2.2. Using the DECW$STARTUP.COM Procedure

Typically, DECW$STARTUP.COM is the only DECwindows command procedure that a system manager invokes directly. This procedure, located in the SYS$MANAGER directory, is called as follows:

- During system startup to invoke DECwindows Motif.
- By a privileged user to restart the display server, if required.
- By a privileged user to start the DECwindows server, libraries, or applications. “Starting” the libraries, for example, consists of defining logicals and installing images.

DECW$STARTUP.COM takes one parameter. Table 2.1 lists the possible parameter values and the procedure they invoke.

Table 2.1. Startup Parameter Values

P1 Value	Invokes...
" " (null)	The full startup process
RESTART	SYS$MANAGER:DECW$STARTSERVER.COM
I18N	SYS$MANAGER:DECW$STARTI18N.COM (if it exists)
XTERMINAL	SYS$STARTUP:DECW $STARTXTERMINAL.COM (if it exists)
SERVER	SYS$MANAGER:DECW$STARTSERVER.COM
LIBS	SYS$MANAGER:DECW$STARTLIBS.COM
APPS	SYS$MANAGER:DECW$STARTAPPS.COM

2.3. System Startup Considerations

The following sections describe actions you may want to take prior to invoking the VSI DECwindows Motif for OpenVMS system startup procedure.

2.3.1. Defining DECwindows System Logicals

Before starting DECwindows, you may want to make changes or add logicals to the system startup file, SYSTARTUP_VMS.COM, which is located in the SYS$MANAGER directory.

Table 2.2 lists each logical name and its meaning.

Table 2.2. System Logicals

Logical Name	Meaning
DECW$DEFAULT_TRANSPORT	Set the default transport used by the initial workstation display device at the start of a DECwindows session.
DECW$IGNORE_AUTOGEN	Do not verify SYSGEN parameters.
DECW$IGNORE_DECWINDOWS	Do not start up DECwindows.
DECW$IGNORE_SHARE_ADDRESS	Do not install images resident or with shared address data.
DECW$IGNORE_SUBPROCESS	Do not spawn as a subprocess.
DECW$IGNORE_WORKSTATION	Do not perform workstation-specific startup.
DECW$INSTALL_TCPIP	Include server support for the TCP/IP transport.
DECW$PARAMS_BEFORE_DEVICE	Check SYSGEN parameters before determining the display devices.
DECW$SETDISPLAY_DEFAULT_TRANSPORT	Set the default transport used by the DCL command SET DISPLAY/CREATE.
DECW$USEXLIBPG4	Use the Xlib C Run-Time Library (C RTL) locale functions.
OPC$OPA0_ENABLE	Send broadcast messages to the operator console (OPA0:).

2.3.2. Adjusting System Parameters

VSI DECwindows Motif for OpenVMS requires that some system parameters be set to specific minimum values. If the values are not set properly, the system prompts you to run AUTOGEN to modify the values. For information about these values, see Appendix A.

Caution

Parameter values set in SYS$SYSTEM:MODPARAMS.DAT override all other settings. Setting values in this file may prevent DECwindows Motif from starting.

To optimize system performance and use of physical memory, many DECwindows images are installed as resident (with shared address data) during system startup.

If VSI DECwindows Motif for OpenVMS software is started manually (outside of normal system startup), error messages similar to the following may be displayed:

```
$ @SYS$MANAGER:DECW$STARTUP
%INSTALL-I-NONRES, image installed ignoring '/RESIDENT' DISK$ALPHA:
<SYS0.SYSCOMMON.SYSLIB>DECW$XPORT_SERVICES.EXE
-INSTALL-E-NOGHREG, insufficient memory in the code or data granularity
 hint region
%INSTALL-I-NONRES, image installed ignoring '/RESIDENT' DISK$ALPHA:
<SYS0.SYSCOMMON.SYSLIB>DECW$LCNLIBSHR.EXE
-INSTALL-E-NOGHREG, insufficient memory in the code or data granularity
 hint region
%INSTALL-I-NONRES, image installed ignoring '/RESIDENT' DISK$ALPHA:
<SYS0.SYSCOMMON.SYSLIB>DECW$TRANSPORT_COMMON.EXE
```

```
-INSTALL-E-NOGHREG, insufficient memory in the code or data granularity
 hint region
.
.
.
```

These messages indicate that there is not enough memory in the granularity hints region to install the images as resident. As a result, the images are installed nonresident, without shared address data. These messages are not critical; however, the performance of these images may be affected, particularly during activation.

If these messages are displayed at startup, increase the value of one or more of the GH_* system parameters, such as GHRSRVPGCNT, and restart VSI DECwindows Motif for OpenVMS to ensure that resident images are installed successfully.

Chapter 3. Configuring the Display Server

This chapter describes how to configure the DECwindows display server and includes the following topics:

- Customizing the display server, which describes how to use the DECW $PRIVATE_SERVER_SETUP file and lists the available customization parameters
- Specifying network transports
- Establishing access control
- Setting up a multihead system
- Changing the default keyboard layout
- Specifying new fonts
- Setting up an LBX proxy server

3.1. Customizing the DECwindows Display Server

This section describes how to change the default behavior of the DECwindows display server using server customization parameters. It describes the available parameters and how to set them on cluster-common and standalone systems.

3.1.1. Using the DECW$PRIVATE_SERVER_SETUP File

The DECW$PRIVATE_SERVER_SETUP.TEMPLATE file is located in the SYS$MANAGER directory. This template file contains the information that you need to customize your VSI DECwindows Motif for OpenVMS display server environment.

When the display server is started, it looks in the logical name table (DECW$SERVER *n*_TABLE) for logical names that can override the default characteristics. The logical name table is created and populated during the DECwindows startup process, as described in Chapter 2. For each parameter defined in the DECW$PRIVATE_SERVER_SETUP.COM file, the startup procedure creates a logical name in the display-server logical name table.

Some parameters are used only during the startup procedure and do not have a matching logical name in the display server logical name table. These parameters either identify system parameters to be used in starting the display server process or are used in combination with other parameters to obtain the value of a logical name to be added to the display server logical name table.

If the display server does not find a logical name in its private logical name table, it looks in the system logical name table. Use the DCL command DEFINE/SYSTEM in the DECW $PRIVATE_SERVER_SETUP.COM file to define logicals for those functions that are supported but do not have an associated parameter in the version of OpenVMS that you are using.

3.1.2. The Display Server Customization Parameters

Table 3.1 lists the parameters alphabetically along with the type, default value, and range for each parameter.

Table 3.1. DECwindows Display Server Customization Parameters

Parameter	Type	Default Value	Range
DECW $CLIENT_ERROR_THRESHOLD	Integer	1	
DECW$CURSOR_SIZE	Integer	32	16,32
DECW $DEFAULT_KEYBOARD_MAP	String	NORTH_AMERICAN_LK401AA	
DECW$DEVICE	String list		
DECW$FONT_SERVERS	String list		
DECW $IPV6_FONT_SUPPORT	String		
DECW$KEYMAP	String		
DECW $MONITOR_DENSITY	Integer list	100	
DECW$PRIMARY_DEVICE	String		
DECW$RGBPATH	String	SYS$MANAGER:DECW $RGB.DAT	
DECW $SECURITY_POLICY	String		
DECW $SERVER_ACCESS_TRUSTED	String	SYS$MANAGER:DECW $SERVER_ACCESS_TRUSTED.DAT	
DECW $SERVER_ACCESS_ALLOWED	String	SYS$MANAGER:DECW $SERVER_ACCESS_ALLOWED.DAT	
DECW $SERVER_AUDIT_LEVEL	Integer	0	0,1,2,4
DECW $SERVER_BELL_BASE_VOLUME	Integer	50	0...100
DECW $SERVER_BUG_COMPATIBILITY	Boolean	True	
DECW $SERVER_DEFAULT_BACKING_STORE	Integer	0	0...2
DECW $SERVER_DEFAULT_VISUAL_CLASS	Integer	Device dependent	0...5
DECW$SERVER_DENSITY	Integer	100	75,100
DECW $SERVER_DISABLE_BACKING_STORE	Boolean	False	
DECW $SERVER_DISABLE_SAVE_UNDER	Boolean	False	

Parameter	Type	Default Value	Range
DECW $SERVER_DISABLESCREEN	Integer		0...15
DECW $SERVER_DISABLE_TEST	Boolean	False	
DECW$SERVER_DUMP	Boolean	False	
DECW $SERVER_EDGE_BOTTOM	Integer list		
DECW $SERVER_EDGE_LEFT	Integer list		
DECW $SERVER_EDGE_RIGHT	Integer list		
DECW $SERVER_EDGE_TOP	Integer list		
DECW $SERVER_ENABLE_ACCESSX	Integer	0	0,1
DECW $SERVER_ENABLE_KB_AUTOREPEAT	Boolean	True	
DECW $SERVER_ENABLESCREEN	Integer		0...15
DECW $SERVER_ENQUEUE_LIMIT	Integer	See Appendix A	
DECW $SERVER_ERROR_LOG_TO_KEEP	Integer	2	
DECW $SERVER_ERROR_THRESHOLD	Integer	10	
DECW $SERVER_EXTENSIONS	String list	XIE,DEC-XTRAP,MULTI-BUFFERING,SEC_XAG	
DECW $SERVER_FILE_LIMIT	Integer	200	
DECW $SERVER_FONT_CACHE_SIZE	Integer	0	
DECW $SERVER_FONT_CACHE_UNIT	Integer	128	
DECW $SERVER_KEYCLICK_VOLUME	Integer	0	0...100
DECW $SERVER_KEY_REPEAT_DELAY	Integer	660	0...1000
DECW $SERVER_KEY_REPEAT_INTERVAL	Integer	40	0...1000
DECW $SERVER_MOUSE_ACCELERATION	Integer	2	0..2
DECW $SERVER_MOUSE_THRESHOLD	Integer	4	

Parameter	Type	Default Value	Range
DECW $SERVER_ONLYSCREEN	Integer		0...15
DECW $SERVER_PAGE_FILE	Integer	See Appendix A	
DECW $SERVER_PRIORITY	Integer	6	1...15
DECW $SERVER_SCALE_BITMAP_FONTS	Boolean	False	
DECW$SERVER_SCREENS	String list		
DECW $SERVER_SCREEN_SAVER_INTERVAL	Integer	600	
DECW $SERVER_SCREEN_SAVER_PREFER_BLANKING	Boolean	True	
DECW $SERVER_SCREEN_SAVER_TIMEOUT	Integer	600	
DECW $SERVER_TRANSPORTS	String list		
DECW$SERVER_WSDEF	Integer	See Appendix A	
DECW $SERVER_WSEXTENT	Integer	See Appendix A	
DECW $SERVER_WSQUOTA	Integer	See Appendix A	
DECW $SERVER_XAUTHORITY	String		
DECW $SERVER_XKEYBOARD_COMPILED_DIR	String	SYS$COMMON: [SYS $KEYMAP.XKB .COMPILED]	
DECW $SERVER_XKEYBOARD_DIRECTORY	String	DECW$SYSCOMMON: [SYS$KEYMAP.XKB]	
DECW $SERVER_XKEYBOARD_LOAD_MAP	Integer	0	0,1
DECW $SERVER_XKEYBOARD_MAP	String	DIGITAL_US_LK201	
DECW $START_FONT_SERVER	Boolean		False
DECW $XPORT_SYNC_TIMEOUT	Integer	30000	

The following sections contain definitions and examples for all the parameters listed in Table 3.1.

3.1.2.1. Server Process

As part of the DECwindows startup process, the display server is invoked as a detached process. Normally, the default quotas assigned to the server process are sufficient. However, in some instances, certain parameters may need to be increased. By defining symbols in DECW $PRIVATE_SERVER_SETUP.COM, server process quotas can be adjusted.

For example, you might need to increase quota values in the following instances:

- **High memory usage –** This results from running applications that use many large pixmaps.

  To adjust for a high memory-usage environment, increase the value assigned to DECW $SERVER_PAGE_FILE. This controls the PGFLQUOTA of the server process. Note that this parameter is limited by the VIRTUALPAGECNT system parameter and by the size of the system page file. In addition, you may consider increasing the values for DECW$SERVER_WSDEF and DECW$SERVER_WSQUOTA.

- **Concurrent use of many fonts –** All font files that are referenced and for which font caching is enabled remain open until all of the client applications that reference those fonts are terminated.

  To adjust for this situation, increase the value of DECW$SERVER_FILE_LIMIT. This value must be greater than the total number of fonts used by any set of concurrently active client applications.

- **Request-intensive applications –** Some client applications send continuous requests that do not require a reply from the X display server. These requests can impact the processing time allocated to other applications. This can sometimes slow other applications, such as the Window Manager.

  To improve response-time, adjust the priority of the display server process by changing the value of DECW$SERVER_PRIORITY.

- **Concurrent use of many applications –** If a large number of client applications are connected to the same display server simultaneously, the network transport may require server additional resources.

For more information on tuning the DECwindows display server, see Appendix A.

DECW$SERVER_PRIORITY

The DECW$SERVER_PRIORITY parameter controls the priority of the display server process. This parameter enables you to reduce the priority of the server process and improve system performance in request-intensive situations where response time is sluggish.

Estimate the optimal priority for the server process; valid values range from 1 (low) to 15 (high). For the best results, VSI recommends that you use a mid-range value of 4, 5, or 6 (default). Setting the priority too low can reduce the responsiveness of input devices (such as keyboard or mouse actions).

The following symbol definition assigns a priority of 4 to the DECwindows display server:

Example

```
$ DECW$SERVER_PRIORITY == "4"
```

DECW$SERVER_WSDEF

This parameter defines the process limits (in pagelets) to be applied to the DECwindows display server process. DECW$SERVER_WSDEF values that are larger than the value of DECW $SERVER_WSQUOTA revert to the value of DECW$SERVER_WSQUOTA. For information about establishing working set sizes, see the *Guide to OpenVMS Performance Management*.

The following logical definition assigns a working set size of 5000 pagelets for the DECwindows display server:

Example

```
$ DEFINE DECW$SERVER_WSDEF 5000
```

DECW$SERVER_WSQUOTA

This parameter defines the maximum amount of physical memory (working set) that can be allocated to the DECwindows server. For information about establishing working set sizes, see the *Guide to OpenVMS Performance Management*.

The following logical definition establishes the maximum number of pagelets allocated to the DECwindows server as 10000:

Example

```
$ DEFINE DECW$SERVER_WSQUOTA 10000
```

DECW$SERVER_WSEXTENT

This parameter defines the absolute limit on physical memory that the DECwindows display server is to be allocated if the server requires more space than the DECW$SERVER_WSDEF value allots. The total number of pagelets allocated to the DECwindows server may exceed the value in DECW $SERVER_WSQUOTA (up to the value of DECW$SERVER_WSEXTENT if the additional pagelets are available). For information about establishing working set sizes, see the *Guide to OpenVMS Performance Management*.

The following logical definition allocates 20000 pagelets for the DECwindows server on an as-needed basis, not to exceed the value in DECW$SERVER_WSQUOTA:

Example

```
$ DEFINE DECW$SERVER_WSEXTENT 20000
```

DECW$SERVER_PAGE_FILE

This parameter defines the maximum amount of virtual memory (in pagelets) that the DECwindows display server can use.

The following logical definition increases the size of the page file to 1000000 blocks:

Example

```
$ DEFINE DECW$SERVER_PAGE_FILE 1000000
```

DECW$SERVER_FILE_LIMIT

This parameter defines the maximum number of files the server can open at onetime. It also represents the maximum number of concurrent client connections. The default is 200 files.

The following logical definition increases the maximum number of files the server can open to 275:

Example

```
$ DEFINE DECW$SERVER_FILE_LIMIT 275
```

DECW$SERVER_ENQUEUE_LIMIT

This parameter defines the maximum number of outstanding locks that can be used in sharing resources, particularly files, between processes. The default is 512 locks.

The following logical definition doubles the default enqueue limit to 1024locks:

Example

```
$ DEFINE DECW$SERVER_ENQUEUE_LIMIT 1024
```

3.1.2.2. Extensions

A feature of all the X display servers is the ability to support server extensions. These extensions are additions to the X display server that interpret additional protocol requests and perform new or improved functions.

While some extensions are built-in and always enabled, some require activation through a parameter definition. OpenVMS display servers support dynamically-loaded extensions. These extensions are contained in separate shareable images and are activated on demand. The advantage of dynamically loaded extensions is that the resources required by an extension are not used unless the extension is used.

The display server requires that certain dynamic extensions be loaded at server initialization time. Use the symbol DECW$SERVER_EXTENSIONS to identify which extensions to load.

DECW$SERVER_EXTENSIONS

This parameter is used to define a list of extensions to load at server initialization. The parameter translates to a list of dynamically-loadable extension images (in addition to the built-in extensions).

Table 3.2 lists the available server extensions. The default value for this parameter is "XIE,DEC-XTRAP,MULTI-BUFFERING,SEC_XAG".

Table 3.2. Loadable Display Server Extensions

Extension Name	Parameter Value	Description
Digital 2D Extension	D2DX	Enhances server performance in 2D graphics environment.
Digital Trapping Extension	DEC-XTRAP[1]	Performs event trapping and simulation.
Low-Bandwidth X Extension	LBX	Enables Low-Bandwidth X proxy capabilities.
X Double-Buffering Extension	DBE	Provides flicker-free windows and smooth animation.
X Imaging Extension	XIE [1]	Performs imaging operations locally.
X Keyboard Extension	XKB	Enables use of X keymaps, keyboard compilers, and the Access X keyboard features for the movement impaired.
X Multi-Buffering Extension	MULTI-BUFFERING [1]	Enables multi-buffered windows for smooth animation.
X Security and Application Group Extensions	SEC_XAG [1]	Enables X security and application grouping capabilities.
Xinerama Extension	XINERAMA	Enables configuration of multihead systems based on the XINERAMA protocol.

[1]Pre-loaded by default.

Table 3.3 lists the built-in server extensions.

Table 3.3. Built-in Display Server Extensions

Extension Name	Parameter Value	Description
Big Requests	BIG-REQUESTS	Extends the length field of a protocol request to a 32-bit value.
Colormap Utilization Policy	TOG-CUP	Provides colormap management policies to the display server.
DEC-Server-Mgmt-Extension	–	Provides server management functions used exclusively by the Session Manager.
Extended Visual Information	EVI	Enables a client to query the server for information about the core X visuals, such as colormap information or frame buffer levels.
MIT Miscellaneious	MIT-SUNDRY-NONSTANDARD	Provides miscellaneous bug compatibility mode control.
MIT Screen Saver	MIT-SCREEN-SAVER	Enables a client to be notified when the screen saver is activated or cycles.
MIT Shared Memory	MIT-SHM	Enables shared memory, fast Put Image support.
Non-Rectangular Window Shape	SHAPE	Enables non-rectangular windows.
X Miscellaneous	XC-MISC	Allows previously-used resource ID ranges to be retrieved from the display server.
X Synchronization	SYNC	Provides primitive calls that synchronize requests from multiple clients on different operating systems.
X Test	XTEST	Provides simple event trapping and simulation capabilities.

If you have images for user-written, third-party, or other X Window System extensions, you can also use this parameter to enable these extensions at server startup. Note that some graphics devices load additional extensions used by the device (such as XFree86-DRI, GLX, and SGI-GLX).

Note

To prevent server resource contention, some combinations of extensions should not be loaded on the same display server system. See the *VSI DECwindows Motif for OpenVMS Release Notes* for information on extension restrictions.

The following symbol definition specifies the range of server extensions to enable at startup:

Example

```
$ DECW$SERVER_EXTENSIONS == "XIE,DEC-XTRAP,XINERAMA,SEC_XAG,DBE"
```

DECW$SERVER_DISABLE_TEST

This parameter controls whether test extensions, XTEST and DEC-XTRAP, are enabled. Valid values for this parameter are T (True-disable) or F (False-enable) The default value is F.

The following symbol definition disables all test extensions:

Example

```
$ DECW$SERVER_DISABLE_TEST == "T"
```

3.1.2.3. Security

DECwindows supports the following mechanisms that enable you to manage access to the X display server:

- User-based access control using an authorized users list
- Token-based access control using an X authority file and the Magic Cookie (MIT-MAGIC-COOKIE-1) or Kerberos (MIT-KERBEROS-5) protocol
- Use of the Security extension (SECURITY)

Each of these methods provides additional means for defining which clients are authorized to connect to an X display server and what operations they can perform once connected. Use the parameters in this section to specify the location of the files used with these mechanisms (security policy, X authority, access allowed, and access trusted files).

See Section 3.3 for details on implementing an access control scheme for the display server.

DECW$SECURITY_POLICY

When using the Security extension, this parameter specifies the name of the security policy file. By default, no file is specified.

The following symbol definition specifies the security policy file SYS$MANAGER:DECW $SECURITY_POLICY.DAT:

Example

```
$ DECW$SECURITY_POLICY == "SYS$MANAGER:DECW$SECURITY_POLICY.DAT"
```

DECW$SERVER_XAUTHORITY

This parameter specifies the name of the X authority file referenced by the display server. This file provides records used to authorize client connections to the server. By default, no file is specified. This allows access to the server from the local SYSTEM account (via DECnet or the Local transport)without requiring additional authentication from the client.

If a file is specified, the values from this file are loaded into the server and can be used by all client connections. To allow a normal login process to occur, trusted access must be explicitly granted using the DECW$SERVER_ACCESS_TRUSTED.DAT file.

Note that the settings in the X authority file specified by DECW$SERVER_XAUTHORITY apply to server connections made before a user logs into the DECwindows desktop. Once a user logs into the desktop, the user's X authority settings are applied.

The following symbol definition specifies the X authority file SYS$MANAGER:DECW$XAUTH.DAT:

Example

```
$ DECW$SERVER_XAUTHORITY == "SYS$MANAGER:DECW$XAUTH.DAT"
```

DECW$SERVER_ACCESS_TRUSTED

This parameter specifies the name of the trusted access file. This file lists those clients who maintain trusted access to the server. The default file is SYS$MANAGER:DECW $SERVER_ACCESS_TRUSTED.DAT.

Note that the settings in the trusted access file specified by DECW$SERVER_ACCESS_TRUSTED apply to server connections made before a user logs into the DECwindows desktop. Once a user logs into the desktop, the user's access settings are applied.

The following symbol definition changes the trusted access file specification to DECW $SERVER1_ACCESS_TRUSTED.DAT:

Example

```
$ DECW$SERVER_ACCESS_TRUSTED == "SYS$MANAGER:DECW
$SERVER1_ACCESS_TRUSTED.DAT"
```

DECW$SERVER_ACCESS_ALLOWED

This parameter specifies the name of the access allowed file. This file lists those clients who are granted automatic access to the server without requiring additional authentication. The default file is SYS $MANAGER:DECW$SERVER_ACCESS_ALLOWED.DAT.

Note that the settings in the allowed access file specified by DECW$SERVER_ACCESS_ALLOWED apply to server connections made before a user logs into the DECwindows desktop. Once a user logs into the desktop, the user's access settings are applied.

The following symbol definition changes the allowed access file specification to DECW $SERVER1_ACCESS_ALLOWED.DAT:

Example

```
$ DECW$SERVER_ACCESS_ALLOWED == "SYS$MANAGER:DECW
$SERVER1_ACCESS_ALLOWED.DAT"
```

3.1.2.4. Devices

During startup, the DECwindows startup procedures attempt to identify and activate device-specific server components to manage all graphics devices of which the system is aware. You can use the symbols and logicals in this section to influence how many and which specific devices are used by the display server.

Additionally, there is some information that the server cannot obtain from a device or that you may want to override about the display device. For example, you may need to provide information about a special type of monitor with limited color capabilities or construct a **multihead** system, which is a system that consists of multiple monitors that function as a single, virtual display.

DECwindows supports two types of multihead configurations:

- Simple configurations using the DECW$MULTI_HEAD parameter
- Advanced configurations based on the Xinerama extension (XINERAMA) and parameters

The XINERAMA (formerly known as Panoramix) enables you to construct a multihead system and has multiple parameters to define and enable the screens in the display, control their order, and set the boundary and shape of the display.

By default, all screens in a multihead display are enabled. You can use DECW $SERVER_ONLYSCREEN, DECW$SERVER_DISABLESCREEN to remove one or more screens from the from the display. Disabled screens are not initialized and are not assigned a screen number.

For instructions on how to configure a multihead display, see Section 3.4.

DECW$MULTI_HEAD

This parameter configures the system for multihead support. The DECW$MULTI_HEAD symbol is already set in the SYS$MANAGER:DECW$PRIVATE_SERVER_SETUP.TEMPLATE file.

To activate this parameter, copy the SYS$MANAGER:DECW $PRIVATE_SERVER_SETUP.TEMPLATE to DECW$PRIVATE_SERVER_SETUP.COM.

DECW$PRIMARY_DEVICE

The server uses this parameter to check for a device name by activating a specific DECW$DEVICE_ `xx`.COM procedure, where `xx` is the string supplied for the symbol. The following symbol definition assigns GXA0 as the primary device:

Example

```
$ DECW$PRIMARY_DEVICE == "GXA0"
```

DECW$DEVICE

This parameter allows you to identify those graphics devices that are used in a simple multihead configuration and specify their order. By default, the DECW$DEVICE values for will be determined based on the graphics devices installed on the system.

The following example shows a list of graphics devices to be controlled by one server, one mouse, and one keyboard:

Example

```
$ DECW$DEVICE == "GAA0,GAB0"
```

DECW$DEFAULT_VISUAL_CLASS

This parameter overrides the default visual class for each head on a mutihead system. The visual classes, which are numeric and match the definitions in DECW$INCLUDE:X.h, are as follows:

0 = StaticGray
1 = GrayScale
2 = StaticColor
3 = PseudoColor
4 = TrueColor
5 = DirectColor

The default for a specific device type is dependent on the hardware and is typically PseudoColor for an 8-plane color board, and TrueColor for a 24-plane option. If you have a monochrome display, you can change the default visual class to GrayScale, which causes the system to convert colors to levels of gray. Output for GrayScale is on the green lead. You can assign multiple values to this parameter for each head in a multihead system.

The following symbol definition specifies PseudoColor on head 0, TrueColor on head 1, StaticGray on head 2:

Example

```
$ DECW$SEVER_DEFAULT_VISUAL_CLASS == "3,4,0"
```

DECW$MONITOR_DENSITY

The monitor density defines the dots per inch (dpi) value of the monitor so that VSI DECwindows Motif for OpenVMS applications can determine the actual width of the screen.

The default value for the monitor density is the server density. Because few monitors are actually 75 or 100 dpi (the values used for DECW$SERVER_DENSITY with regard to font size), these values cannot be used to calculate accurately the actual width and length of items on the screen. By setting DECW $MONITOR_DENSITY to the actual value, you can obtain correct values for the width and height of the screen using Xlib routines.

Use the following method to calculate the actual monitor density:

1. Determine the pixel width of the screen.

   Generally, the number of pixels is either 1024 or1280, depending on the graphics adapter on your system. You can use the X Display Information utility (xdpyinfo) to obtain the pixel width and height of the current display (see Section 3.1.5.2).

2. Measure across the visible portion of the screen (in inches).

3. Divide the pixel value by the screen value.

   If you have a VRT19 monitor and SPX graphics, make this calculation:

   ```
   1280 pixels / 13.5 inches  = 94.81 dpi
   ```

By rounding the dpi value to the nearest integer, assign 95 to DECW$MONITOR_DENSITY, as shown in the following example:

Example

```
$ DECW$MONITOR_DENSITY == "95"
```

Note

Setting different values for the monitor density and the server density can cause display problems because you cannot scale the 75- and 100-dpi fonts to match the actual monitor density.

DECW$MONITOR_DENSITY can be set on a per-monitor basis. The following example shows how to set the monitor densities for a dual-head workstation,where screen 0 is set to 95 dpi and screen 1 is set to 75 dpi:

Example

```
$ DECW$MONITOR_DENSITY == "95,75"
```

DECW$SERVER_SCREENS

With a multihead system based on XINERAMA, screens are initialized in alphabetical order according to their device name versus their physical position. Use this parameter to change the order in which the screens are initialized.

The following symbol definition changes the initialization order in a four-screen multihead display:

Example

```
$ DECW$SERVER_SCREENS == "GYB0,GYA0,GYD0,GYC0"
```

DECW$SERVER_ENABLESCREEN

With a multihead system based on XINERAMA, you can choose tore-enable disabled screens in the display individually. This parameter enables the specified screen(s). The valid value ranges from0 to 15, which represents the maximum number of screens supported by the extension.

The following example enables the second screen (1) in a four-screen (0,1,2,3) multihead display:

Example

```
$ DECW$SERVER_ENABLESCREEN == "1"
```

DECW$SERVER_DISABLESCREEN

With a multihead system based on XINERAMA, you can choose to disable each screen in the display individually. This parameter disables the specified screen. The valid value ranges from 0 to 15, which represents the maximum number of screens supported by the extension.

Once a screen is disabled, it is no longer initialized as part of the display and is not assigned a screen number. Note that this changes the existing screen order and alters the display of any predefined edge attachments.

The following symbol definition disables the third screen (2) in a four-screen (0,1,2,3) multihead display:

Example

```
$ DECW$SERVER_DISABLESCREEN == "2"
```

DECW$SERVER_ONLYSCREEN

With a multihead system based on XINERAMA, you can choose to enable individual screens in the display at the exclusion of all others. This parameter explicitly enables the specified screen and disables all others. The valid value ranges from 0 to 15, which represents the maximum number of screens supported by the extension.

The following symbol definition enables the second screen (1) and disables all other screens (0,2,3) in a four-screen (0,1,2,3) multihead display:

Example

```
$ DECW$SERVER_ONLYSCREEN == "1"
```

DECW$SERVER_EDGE_LEFT

With a multihead system based on XINERAMA, edge controls are used to define the boundaries of the virtual display. This parameter determines to what screen(s) the left boundary of the display is attached. The values are determined by screen number, for example:

```
left-screen , index-screen , right-screen
```

where `index-screen` represents the number of the screen to which you want the boundary attached, `left-screen` indicates the number of the screen directly to the left of the index, and `right-screen` indicates the number of the screen directly to the right of the index. Repeat this pattern for each screen to which you want the border attached. A value of -1 equates to none.

The following symbol definition specifies the left edge of a square, four-screen display arranged in the following order:

0 1
2 3

where the left edge of the second and fourth screens (indices 1 and 3) are attached to the first and third screens (0,2):

Example

```
$ DECW$SERVER_EDGE_LEFT == "-1,0,-1,2"
```

DECW$SERVER_EDGE_RIGHT

With a multihead system based on XINERAMA, edge controls are used to define the boundaries of the virtual display. This parameter determines to what screen the right boundary of the display is attached. The values are determined by screen number, for example:

```
right-screen , index-screen , left-screen
```

where `index-screen` represents the number of the screen to which you want the boundary attached, `right-screen` indicates the number of the screen directly to the right of the index, and `left-screen` indicates the number of the screen directly to the left of the index. Repeat this pattern for each screen to which you want the border attached. A value of -1 equates to none.

The following symbol definition specifies the right edge of a square, four-screen display arranged in the following order:

0 1
2 3

where the right edges of the first and third screens (indices 0 and 2) are attached to the second and fourth screens (1,3):

Example

```
$ DECW$SERVER_EDGE_RIGHT == "1,-1,3,-1"
```

DECW$SERVER_EDGE_TOP

With a multihead system based on XINERAMA, edge controls are used to define the boundaries of the virtual display. This parameter determines to what screen the top boundary of the display is attached. The values are determined by screen number, for example:

```
top-screen , index-screen , bottom-screen
```

where `index-screen` represents the number of the screen to which you want the boundary attached, `top-screen` indicates the number of the screen directly above the index, and `bottom-screen` indicates the number of the screen directly below the index. Repeat this pattern for each screen to which you want the border attached. A value of -1 equates to none.

The following symbol definition specifies the top edge of a square, four-screen display arranged in the following order:

0 1
2 3

where the top edges of the third and fourth screens (indices 2 and 3) are attached to the first and second screens (0,1):

Example

```
$ DECW$SERVER_EDGE_TOP == "-1,-1,0,1"
```

DECW$SERVER_EDGE_BOTTOM

With a multihead system based on XINERAMA, edge controls are used to define the boundaries of the virtual display. This parameter determines to what screen the bottom boundary of the display is attached. The values are determined by screen number, for example:

```
bottom-screen , index-screen , top-screen
```

where `index-screen` represents the number of the screen to which you want the boundary attached, `bottom-screen` indicates the number of the screen directly below the index, and `top-screen` indicates the number of the screen directly above the index. Repeat this pattern for each screen to which you want the border attached. A value of -1 equates to none.

The following symbol definition specifies the bottom edge of a square, four-screen display arranged in the following order:

0 1
2 3

where the bottom edges of the first and second screens (indices 0 and 1) are attached to the third and fourth screens (2,3):

Example

```
$ DECW$SERVER_EDGE_BOTTOM == "2,3,-1,-1"
```

3.1.2.5. Transport and Network Connections

The transport is the link between DECwindows client applications and the display server. Use the symbols in this section to control the types of available network transport links and the timing characteristics of the link.

DECW$SERVER_TRANSPORTS

You can specify which network transports your server monitors for incoming connections. Valid values for DECW$SERVER_TRANSPORTS are "DECNET", "LOCAL", "TCPIP", and "LAT". The default value for this parameter depends on the value of the DECW$INSTALL_TCPIP system logical. If the

logical is set to True, the default value is "DECNET,LOCAL,TCPIP"; if the logical is not set, the default value is "DECNET,LOCAL."

The following example shows how to specify DECnet, local, and TCP/IP as the transports you will use:

Example

```
$ DECW$SERVER_TRANSPORTS == "DECNET,LOCAL,TCPIP"
```

DECW$XPORT_SYNC_TIMEOUT

This parameter defines the transport timeout value (in milliseconds). The default is 30000 milliseconds (30 seconds). If the client does not take action to empty its buffers before the timeout, the server disconnects the client.

The following logical definition extends the timeout value to 60000milliseconds (1 minute):

Example

```
$ DEFINE/SYSTEM DECW$XPORT_SYNC_TIMEOUT 60000
```

3.1.2.6. Fonts

Displaying text is one of the major tasks of the display server. To display text, the display server is given a font name and a set of characters to be drawn. Usually, the font name corresponds to a particular font file resident on a server system (either display server or font server). When trying to match a font name with a font file, the display server searches the **font path**, which is an ordered list of directories. Each valid font directory contains a font directory file (DECW$FONT_DIRECTORY*.DAT) that lists font file names and corresponding font names. The display server searches each directory file, in order, until it finds a matching font name.

In addition, DECwindows Motif supports font alias files (DECW$FONT_ALIAS*.DAT),which can reside in any valid font directory. These files map one font name to a different font name. After the display server checks the font directory file in a given font directory without finding a match, it will then search the font alias file, if it exists. If it finds a match in the alias file, the translated font name is substituted and the search is restarted from the beginning of the font path.

3.1.2.6.1. Font Path

As stated in Section 3.1.2.6, the font path is an ordered list of directories in which font files that are available to the display server reside. The font path is constructed from a number of setup parameters.

The type of available graphics devices may also influence the contents of the font path. The logical name DECW$FONT in the server logical name table contains the font path. The font path is a subset of the following directories:

SYS$COMMON:[SYSFONT.DECW.CURSOR32]
SYS$COMMON:[SYSFONT.DECW.CURSOR16]
SYS$COMMON:[SYSFONT.DECW.100DPI]
SYS$COMMON:[SYSFONT.DECW.75DPI]
SYS$COMMON:[SYSFONT.DECW.COMMON]

The following directories are also included in the font path:

SYS$COMMON:[SYSFONT.DECW.SPEEDO]
SYS$COMMON:[SYSFONT.DECW.TRUETYPE]
SYS$COMMON:[SYSFONT.DECW.TYPE1]

Pointers to font servers can also be added to the end of the font path. For more information, see the section called “DECW$FONT_SERVERS”.

A variant of each directory exists for user-supplied and euro-enabled fonts, for example: SYS $COMMON:[SYSFONT.DECW.USER_100DPI]. For more information, see Section 3.6.

DECW$SERVER_DENSITY

The server density value is used to determine the font size to use, either 75or 100 dots per inch (dpi). If you have a 100-dpi monitor, you can have a screen density of 75 or 100 dpi. Fonts intended for 75-dpi monitors that are displayed on 100-dpi monitors may appear small and difficult to read.

The following symbol definition sets the screen density to use 100-dpi fonts:

Example

```
$ DECW$SERVER_DENSITY == "100"
```

DECW$CURSOR_SIZE

This parameter defines which cursor font directories are included in the font path. It can be set to 16 to include only the 16x16 cursors or to 32 to include both the 32x32 and 16x16 cursor. The larger cursor size resulting from a value of 32 is usually appropriate for a100-dpi display.

The following symbol definition sets the cursor size to 16x16:

Example

```
$ DECW$CURSOR_SIZE == "16"
```

DECW$FONT_SERVERS

You can add font servers to the font path by defining the symbol DECW$FONT_SERVERS in the site-specific server section of the file SYS$MANAGER:DECW$PRIVATE_SERVER_SETUP.COM.

Multiple font servers can be added by defining the symbol as a comma-separated list. The symbol is not case sensitive.

The following symbol adds the font server ASHFLD::FONTSRV to the font path:

Example

```
$ DECW$FONT_SERVERS == "DECNET/ASHFLD::FONTSRV"
```

DECW$IPV6_FONT_SUPPORT

This parameter controls how the TCP and TCPIP transport names are interpreted in the DECW $FONT_SERVER definition and whenever a client specifies an explicit font server path. Set the parameter to one of the following values:

- TCP_IS_INET6

  The TCP and TCPIP transport names are interpreted as synonyms for theINET6 transport. Using this value enables IPv6 as the default transport between the display server and its font servers when the TCP or TCPIP transport name is specified. Note that this setting requests the IPv6 transport be used as a default. If the IPv6 transport is not available for the specified node, the IPv4 transport is used.

- DISABLED

The TCP and TCPIP transport names are interpreted as synonyms for the INET transport. This is the default value if the parameter is undefined. Using this value sets IPv4 as the transport between the display server and its font server when a TCP or TCPIP transport name is specified. A client can still request the IPv6 transport by explicitly specifying the INET6 transport in its font server path.

The following example specifies the transport names TCP and TCPIP be interpreted as synonyms for the INET6 transport:

Example

```
$ DECW$IPV6_FONT_SUPPORT == TCP_IS_INET6
```

3.1.2.6.2. Font Caching

A font file contains a compressed binary representation of all the **glyphs**, or characters, within that font. For example, the following font file contains all the information for the glyphs in the Helvetica 12-point font:

```
DECW$SYSCOMMON:[SYSFONT.DECW.100DPI]HELVETICA12_100DPI.DECW$FONT
```

The DECwindows display server supports the portable compiled format (PCF) that was introduced with the X11R5 display server. PCF is a modified font format that includes bit/byte ordering and alignment information as part of the font data and allows for vendor-independent font support.

DECW$SERVER_FONT_CACHE_SIZE

This parameter defines the number of units to allocate for each font. It only applies to 16-bit .PCF fonts. The default is 1024.

The following logical definition reduces the font cache size to 512:

Example

```
$ DEFINE/SYSTEM DECW$SERVER_FONT_CACHE_SIZE 512
```

DECW$SERVER_FONT_CACHE_UNIT

This parameter defines the bytes per unit. The default is 128.

The following logical definition increases the number of bytes per unit to 512:

Example

```
$ DEFINE/SYSTEM DECW$SERVER_FONT_CACHE_UNIT 512
```

3.1.2.6.3. Font Scaling

In addition to supporting several formats of scalable outline fonts, the DECwindows display server also can scale any of its bitmap fonts to any size.

Note, however, that the quality of these scaled bitmap fonts is significantly less than the original bitmap fonts or even comparable scaled outline fonts. By default, this capability is disabled. In some cases, this reduction in quality may be an acceptable tradeoff, given the greater flexibility in font sizes.

DECW$SERVER_SCALE_BITMAP_FONTS

This parameter enables the scaling of bitmap fonts to render arbitrary point-size characters. The default value is False (disabled).

The following logical definition enables scalable fonts:

Example

```
$ DEFINE/SYSTEM DECW$SERVER_SCALE_BITMAP_FONTS TRUE
```

3.1.2.7. Keyboard

Some default characteristics of the keyboard attached to the server system can be modified. These include keyboard operations, such as keyclick and bell volume and autorepeat, as well as how the keyboard keys are mapped to keyboard independent symbols used by client applications.

Additionally, the X Keyboard extension (XKB) provides enhanced capabilities for defining the keyboard layout and audio feedback. Use the parameters in this section when using XKB to specify the settings for the X Keyboard layout files. See Section 3.5 for instructions on how to load custom key map and keyboard layout files.

Some of the keyboard settings in this section can be overridden by the Session Manager. Setting these symbols takes effect before the user logs in or if you are not using DECwindows Session Manager.

DECW$KEYMAP

The DECW$KEYMAP parameter translates to the directory specification where keyboard mapping files reside. It is provided for your reference only. Do not modify its value.

DECW$DEFAULT_KEYBOARD_MAP

You can specify the language for which your keyboard is designed. Valid values for DECW $DEFAULT_KEYBOARD_MAP are the file names (without file type) in the SYS$COMMON:[SYS $KEYMAP.DECW.SYSTEM] and SYS$COMMON:[SYS$KEYMAP.DECW.USER] directories.

For a list of valid key map names, see Appendix B.

The following symbol definition changes the keyboard layout to a Dutch typewriter layout:

Example

```
$ DECW$DEFAULT_KEYBOARD_MAP == "DUTCH_LK201LH_TW"
```

DECW$SERVER_BELL_BASE_VOLUME

This parameter determines the volume of the bell sound in a keyboard. Values are from 0 to 100, with 100 being the loudest. The default volume level is 50.

The following logical definition sets the volume to one quarter of full volume:

Example

```
$ DEFINE/SYSTEM DECW$SERVER_BELL_BASE_VOLUME 25
```

DECW$SERVER_ENABLE_ACCESSX

This parameter enables the AccessX keyboard features for disabled users,such as sticky keys or slow keys. The valid values are 0 (disabled) or 1 (enabled). The default is 0.

The following example enables the AccessX features:

Example

```
$ DECW$SERVER_ENABLE_ACCESSX == "1"
```

DECW$SERVER_ENABLE_KB_AUTOREPEAT

Keyboard autorepeat is an option that causes a character to repeat itself automatically while that character key is pressed. You can enable this option by specifying True for this parameter.

The following logical definition enables keyboard autorepeating of typed characters:

Example

```
$ DEFINE/SYSTEM DECW$SERVER_ENABLE_KB_AUTOREPEAT T
```

DECW$SERVER_KEYCLICK_VOLUME

This parameter determines the volume of the click sound in a keyboard.Values are from 0 to 100, with 100 being the loudest. The default is 0.

The following symbol definition sets the volume to one quarter of fullvolume.

Example

```
$ DEFINE/SYSTEM DECW$SERVER_KEYCLICK_VOLUME 25
```

DECW$SERVER_KEY_REPEAT_DELAY

When using XKB, this parameter specifies the number of milliseconds before a keystroke is first repeated. The valid values for this parameter are 0 to 1000.The default is 660.

The following symbol definition specifies the delay for keystroke repetition:

Example

```
$ DECW$SERVER_KEY_REPEAT_DELAY == "800"
```

DECW$SERVER_KEY_REPEAT_INTERVAL

When using XKB, this parameter specifies the number of milliseconds between repeated keystrokes. The valid values for this parameter are 0 to 1000. The default is 40.

The following symbol definition specifies the interval for keystroke repetition:

Example

```
$ DECW$SERVER_KEY_REPEAT_INTERVAL == "20"
```

DECW$SERVER_XKEYBOARD_COMPILED_DIR

When using XKB, this parameter specifies the default directory for all compiled X keyboard files. This directory is also where the server places any keymap files that it compiles on demand. The default is SYS$COMMON:[SYS$KEYMAP.XKB.COMPILED].

The following symbol definition changes the root directory to SYS$COMMON:[SYS $KEYMAP.XKB.SERVER1]:

Example

```
$ DECW$SERVER_XKEYBOARD_COMPILED_DIR == "SYS$COMMON:[SYS
$KEYMAP.XKB.SERVER1]"
```

DECW$SERVER_XKEYBOARD_DIRECTORY

When using XKB, this parameter specifies the default root directory for all X keyboard files. All component source X keyboard files are stored in subdirectories under this root directory. The default is DECW$SYSCOMMON:[SYS$KEYMAP.XKB].

The following symbol definition changes the root directory to SYS$COMMON:[SYS$KEYMAP.XKB]:

Example

```
$ DECW$SERVER_XKEYBOARD_DIRECTORY == "SYS$COMMON:[SYS$KEYMAP.XKB]"
```

DECW$SERVER_XKEYBOARD_LOAD_MAP

When using XKB, this parameter loads the X keyboard layout specified by DECW $SERVER_XKEYBOARD_MAP. The valid values for this parameter are 0 (disabled)or 1 (enabled). The default is 0. When this parameter is disabled, the DECwindows keyboard maps are used.

The following symbol definition loads the default DECwindows keyboard map file:

Example

```
$ DECW$SERVER_XKEYBOARD_LOAD_MAP == "1"
```

DECW$SERVER_XKEYBOARD_MAP

When using XKB, this parameter specifies the default X keyboard layout file for your keyboard. The default is DIGITAL_US_LK201. If the compiled layout file is not available in the area specified by DECW$SERVER_XKEYBOARD_COMPILED_DIR, the display server will attempt to compile the file on-demand based on data in the X keyboard components database.

The following symbol definition changes the X Keyboard layout to an alternate keyboard layout:

Example

```
$ DECW$SERVER_XKEYBOARD_MAP == "DIGITAL_US_LK401"
```

3.1.2.8. Mouse

Use the symbols in this section to modify mouse pointer characteristics. All the mouse pointer settings in this section are overridden by the Session Manager. Setting these symbols takes effect before the user logs in or if you are not using DECwindows Session Manager.

DECW$SERVER_MOUSE_ACCELERATION

This parameter defines the relationship of mouse movement to pointer movement. The possible values are as follows:

2 (fast)
1 (medium)
0 (slow)

The following logical definition causes the pointer to move at the fast speed in relation to your mouse movements:

Example

```
$ DEFINE/SYSTEM DECW$SERVER_MOUSE_ACCELERATION 2
```

DECW$SERVER_MOUSE_THRESHOLD

This parameter defines the minimum motion of the mouse (in pixels) at which the DECwindows server is notified of the motion. The default is 4 pixels.

The following logical definition causes the mouse to be very sensitive to movement, resulting in the report of movement to the DECwindows server:

Example

```
$ DEFINE/SYSTEM DECW$SERVER_MOUSE_THRESHOLD 1
```

3.1.2.9. Color Database

The display server uses a color database file to translate color names passed to the server from client applications into RGB values. Use the symbols in this section to modify color database characteristics.

DECW$RGBPATH

This parameter defines the RGB database filename to be used with the display server. The default name is SYS$MANAGER:DECW$RGB.DAT.

The following symbol definition changes the filename value to DECW$RGBPATH.DAT:

Example

```
$ DECW$RGBPATH == "SYS$MANAGER:DECW$RGBPATH.DAT"
```

3.1.2.10. Screen Saver

The screen saver causes the monitor to go blank after a specified length of time (10 minutes by default) during which no user input occurs. Note that the actual value is specified in seconds.

Optionally, the server displays a black or white X of a random size and location on the screen when the screen saver timeout expires. A second parameter specifies the interval after which the screen saver pattern is repainted.

Note

VSI does not recommend this screen saver for normal use because the screen background remains visible.

DECW$SERVER_SCREEN_SAVER_PREFER_BLANKING

This parameter determines the method by which screen saver is performed. When the value is True (the default), the DECwindows server causes the video device driver to turn off the video signal when the Screen Saver timeout expires. When the value is False, the DECwindows server blanks the screen when the timeout expires.

The following logical definition causes the screen to be cleared when the screen saver timeout expires:

Example

```
$ DEFINE/SYSTEM DECW$SERVER_SCREEN_SAVER_PREFER_BLANKING F
```

DECW$SERVER_SCREEN_SAVER_TIMEOUT

This parameter defines the initial time (in minutes) before the screen saver is activated, after which the screen saver interval takes effect. The default is 600 seconds (10 minutes).

The following logical definition causes the initial screen saver time to be 5 minutes:

Example

```
$ DEFINE/SYSTEM DECW$SERVER_SCREEN_SAVER_TIMEOUT 5
```

DECW$SERVER_SCREEN_SAVER_INTERVAL

This parameter defines the number of minutes the server waits before repainting the screen background. The screen saver rearranges the screen pixels to avoid burning the screen phosphor. Some servers use nonblanking screen savers, such as swimming fish or logos. The default is 600seconds (10 minutes).

The following logical definition causes the background screen to be repainted in 7-minute intervals:

Example

```
$ DEFINE/SYSTEM DECW$SERVER_SCREEN_SAVER_INTERVAL 7
```

3.1.2.11. Backing Store and Save Under

In general, it is the responsibility of the client application to restore occluded regions of the screen once they are exposed. However, the display server has several techniques available to perform this operation on behalf of the client. These are the backing store and save under options.

Backing store saves portions of windows in server memory just before they are obscured. Later, when the portions are exposed, the server can repaint them without involving the client. This can drastically reduce the time required to repaint, particularly for windows containing complex graphics or for environments where the client/server link is slow.

Save under is a similar mechanism where just prior to painting a window, the server saves the portion of the screen that is about to be obscured.

Both of these mechanisms are available by default and can be set on a window-by-window basis. Heavy use of these mechanisms does increase the memory requirements of the server. You may want to disable these features when debugging client applications to ensure that the application handles all expose events properly.

Note

Both backing store and save under put a significant burden on the DECwindows server and can reduce performance.

DECW$SERVER_DEFAULT_BACKING_STORE

You can enable this option in three types of window states. The following table lists possible values for the symbol and their meanings:

Value	Meaning
2	Enable backing store at all times
1	Enable backing store only when window is mapped
0	Indeterminate; depends on the server and the device being used

A True value for DECW$SERVER_DISABLE_BACKING_STORE causes the backing store option not to be used. The value for DECW$SERVER_DEFAULT_BACKING_STORE can be overridden in applications on a per-window basis.

The following logical definition causes the server to save and restore windows when the windows are mapped to the screen:

Example

```
$ DEFINE/SYSTEM DECW$SERVER_DEFAULT_BACKING_STORE 1
```

DECW$SERVER_DISABLE_BACKING_STORE

Use this parameter to disable backing store support. The default value is False so that backing store is enabled by default.

When DECW$SERVER_DISABLE_BACKING_STORE is set to True (disable backing store),restart the server, at which time the backing store option is disabled. Thereafter, to reenable backing store, deassign or redefine DECW$SERVER_DISABLE_BACKING_STORE and restart the server.

If your application window comes up blank, then the application is requesting backing store incorrectly and waiting for an expose event to begin processing. Either modify your application so that it does not request backing store, or set DECW$SERVER_DISABLE_BACKING_STORE to True, and restart the DECwindows display server.

The following symbol definition disables backing store:

Example

```
$ DECW$SERVER_DISABLE_BACKING_STORE == "T"
```

DECW$SERVER_DISABLE_SAVE_UNDER

The save under option records window information that may be hidden when another window is placed on top. You can disable this option by specifying True for this parameter.

The save under option is similar to the backing store option, but only the occluded portions of windows are saved by the server so that when that portion of the window becomes visible, the server redraws that portion of the window.

The following symbol definition disables the server's save under option:

Example

```
$ DEFINE/SYSTEM DECW$SERVER_DISABLE_SAVE_UNDER T
```

3.1.2.12. Error Reporting

The display server creates a log file into which it writes informational and error messages to aid in troubleshooting problems. The log file is called SYS$MANAGER:DECW$SERVER_ n_ERROR.LOG, where n is the server number (usually 0).

The display server uses a condition handler to trap error conditions (such as an access violation) that might otherwise cause the display server to stop. If the condition handler detects a nonfatal error, it tries to allow the display server to continue. The condition handler always records the error in the error log file. If the condition handler detects errors for a single client (2 by default), it disconnects the client.

When the condition handler recovers from an error, the display server may lose track of some resources, such as memory. Therefore, after a number of these exceptions (10 by default), the condition handler broadcasts a message to all users on the system indicating that the display server may be running in a degraded mode and suggests that the display server should be restarted. If you see a message like this, restart the display server at the next convenient opportunity. See Section 2.2 for instructions for restarting the server.

DECW$SERVER_AUDIT_LEVEL

This parameter controls whether normal client connect/disconnect messages are logged in the error log file. Valid values for this parameter are:

0 (disabled)
1 (enabled)
2 (enabled with success messages)
4 (enabled with security logging)

The default value is 0.

The following symbol definition enables minimal audit logging:

Example

```
$ DECW$SERVER_AUDIT_LEVEL == "1"
```

DECW$SERVER_BUG_COMPATIBILITY

Inconsistencies between pre–X11R4 servers and the X11 protocol allowed some undefined bits to be set in some X requests. By strictly enforcing this part of the protocol, however, some applications that set undefined bits no longer worked. By setting bug compatibility to True (default), the server will continue to allow these applications to work; however, the applications should be recoded to comply with the X11 protocol.

The following symbol definition allows pre–X11R4 servers and X11 protocol applications to function correctly:

Example

```
$ DECW$SERVER_BUG_COMPATIBILITY == "T"
```

DECW$SERVER_DUMP

Setting this parameter to True adds the /DUMP qualifier to the DCL RUN command, which causes a process dump if the server crashes. Specifying True also automatically disables the server condition handler (sets DECW$SERVER_DISABLE_CH to True).

The following logical definition adds the /DUMP qualifier to the DCL RUN command and disables the server condition handler:

Example

```
$ DEFINE DECW$SERVER_DUMP T
```

DECW$SERVER_ERROR_LOG_TO_KEEP

This parameter defines the number of versions of the error log file to save. The default is two versions.

The following symbol definition causes the DECwindows server to save the three most recent versions of the error log file:

Example

```
$ DECW$SERVER_ERROR_LOG_TO_KEEP == "3"
```

DECW$CLIENT_ERROR_THRESHOLD

This parameter defines the number of protocol errors generated by a single client above which the client will be terminated. The default is one protocol error.

The following logical definition causes the DECwindows display server to terminate a client after 10 or more protocol errors have been generated:

Example

```
$ DEFINE/SYSTEM DECW$CLIENT_ERROR_THRESHOLD 10
```

DECW$SERVER_ERROR_THRESHOLD

This parameter defines the total number of server errors allowed (10 by default) before reporting the following message:

```
Server internal runtime error threshold exceeded (code =
%x),server performance may be degraded.
```

The symbol *%x* is replaced by the condition code (in hexadecimal) that forced the error. The most typical value is “c”, specifying an access violation.

The following message is also broadcast to all logged-in terminals:

```
DECW$SERVER_ERROR: internal runtime error threshold exceeded.
Performance may be degraded, restart DECwindows software when
convenient by @SYS$MANAGER:DECW$STARTUP RESTART.
```

After every five server errors that exceed the threshold, the following message is sent to the SYS $MANAGER:DECW$SERVER_0_ERROR.LOG log file and broadcast to terminals connected to the server:

```
Server performance still degrading...
```

Three categories of errors are handled by the condition handler of the server and are reported to the log file; where *%d* is decimal value and *%x* is hexadecimal value.

- **Errors that count toward the client error threshold**
  - If the error count is less than the client error threshold, the following error is reported:

    ```
    opcode %d is ignored due to internal runtime error %x
    for client %d ( error = %d)
    ```

  - If the error count equals or exceeds the client error threshold, the following error is reported:

    ```
    Client %d has made too many runtime errors %d,
    ```

```
   its connection is marked for termination
```

- **Errors that disconnect a client**

  ```
  Client %d has been disconnected due to unrecoverable
  runtime error %x detected while processing opcode %d
  ```

  Or, if the server is processing an opcode for a server extension,the following message is displayed:

  ```
  Exception trapped while processing extension opcode %d
  (extension id=%d)
  ```

- **Errors that terminate the server**

  ```
  Unrecoverable server internal error (error code = %d) found,
  terminating all connections.
     .
     .
     .
    List of active images and
    call chain at time of the error
     .
     .
     .
  ** SERVER INTERNAL RUNTIME ERROR ENCOUNTERED,
  SERVER HAS JUST CRASHED!! **
  ****************************************
  ```

The following logical definition causes the DECwindows server to report a system degradation message after 20 server errors have accumulated:

Example

```
$ DEFINE/SYSTEM DECW$SERVER_ERROR_THRESHOLD 20
```

3.1.3. Setting Cluster-Common Parameters

If DECW$PRIVATE_SERVER_SETUP.COM is placed in SYS$COMMON:[SYSMGR], symbols defined within the file apply to every system that shares that system disk, which is usually every member of a cluster.

To customize the DECwindows environment for all systems in an OpenVMS cluster, perform the following steps:

1. Copy the template file into SYS$COMMON:[SYSMGR]DECW $PRIVATE_SERVER_SETUP.COM.

2. Edit the command file and search for the section titled *Cluster-Common or Standalone Workstation Setup*. If no such section exists, search for node_list = "".

3. Add any customizations in this section.

4. Restart the DECwindows display server with the following command:

   ```
   $ @SYS$STARTUP:DECW$STARTUP RESTART
   ```

   You need to restart DECwindows on each system on which you want the customizations to take effect.

Caution

Restarting the DECwindows server disconnects all current client processes.

3.1.4. Setting Standalone System Parameters

In some cases, one or more systems in a cluster have special server requirements. Use one of the following methods to customize specific systems in your cluster:

- Create a private copy of the DECW$PRIVATE_SERVER_SETUP.COM file and place it in SYS$SPECIFIC:[SYSMGR] on each system that you want customized.
- Use the node list facility in the DECW$PRIVATE_SERVER_SETUP.COM file, as follows:
  1. Edit the DECW$PRIVATE_SERVER_SETUP.COM and search for node_list = "".
  2. Add the nodes in your cluster between the quotation marks. For example:

     ```
     $ node_list = "NODE1/NODE2/NODE3"
     ```

  3. At the end of the command procedure, add a label and your system-specific definitions.

The following example shows how to customize NODE1, NODE2, and NODE3.

```
$!
$! server symbol definitions for NODE1
$!
$DO_NODE1:
$ DECW$SERVER_TRANSPORTS == "DECNET,LOCAL,TCPIP,LAT"
$ EXIT
$!
$! server symbol definitions for NODE2
$!
$DO_NODE2:
$ DECW$SERVER_DENSITY == "75"
$ EXIT
$!
$! server symbol definitions for NODE3
$!
$DO_NODE3:
$ DECW$DEFAULT_KEYBOARD_MAP == "US_LK201AA"
$ EXIT
```

3.1.5. Determining the Current Server Parameters

This section lists the commands that you can use to determine the current server settings.

3.1.5.1. Displaying the Server Logical Name Table

You can use the DCL SHOW LOGICAL command to display all of the logical names in the server logical name table that are defined from symbols specified in the DECwindows startup process.

The following example shows how to enter the command and illustrates a typical display:

```
$ SHOW LOGICAL/TABLE=DECW$SERVER0_TABLE
(DECW$SERVER0_TABLE)
```

```
  "DECW$COLOR" = "TRUE"
  "DECW$DEFAULT_FONT" = "FIXED"
  "DECW$DEFAULT_KEYBOARD_MAP" = "NORTH_AMERICAN_LK401AA"
  "DECW$FONT" = "DECW$SYSCOMMON:[SYSFONT.DECW.USER_CURSOR32]"
        = "DECW$SYSCOMMON:[SYSFONT.DECW.CURSOR32]"
        = "DECW$SYSCOMMON:[SYSFONT.DECW.USER_CURSOR16]"
        = "DECW$SYSCOMMON:[SYSFONT.DECW.CURSOR16]"
        = "DECW$SYSCOMMON:[SYSFONT.DECW.USER_100DPI]"
        = "DECW$SYSCOMMON:[SYSFONT.DECW.100DPI]"
        = "DECW$SYSCOMMON:[SYSFONT.DECW.USER_75DPI]"
        = "DECW$SYSCOMMON:[SYSFONT.DECW.75DPI]"
        = "DECW$SYSCOMMON:[SYSFONT.DECW.USER_COMMON]"
        = "DECW$SYSCOMMON:[SYSFONT.DECW.COMMON]"
        = "DECW$SYSCOMMON:[SYSFONT.DECW.SPEEDO]"
        = "DECW$SYSCOMMON:[SYSFONT.DECW.TYPE1]"
        = "DECW$SYSCOMMON:[SYSFONT.DECW.USER_TYPE1]"
        = "DECW$SYSCOMMON:[SYSFONT.DECW.TRUETYPE]"
        = "DECW$SYSCOMMON:[SYSFONT.DECW.USER_TRUETYPE]"
  "DECW$KEYBOARD" = "OPA2:"
  "DECW$KEYMAP" = "DECW$SYSCOMMON:[SYS$KEYMAP.DECW.USER]"
        = "DECW$SYSCOMMON:[SYS$KEYMAP.DECW.SYSTEM]"
  "DECW$MONITOR_DENSITY" = "100"
  "DECW$POINTER" = "TTA0:"
  "DECW$RGBPATH" = "SYS$MANAGER:DECW$RGB.DAT"
  "DECW$SERVER_AUDIT_LEVEL" = "4"
  "DECW$SERVER_BUG_COMPATIBILITY" = "Y"
  "DECW$SERVER_DISABLE_BACKING_STORE" = "FALSE"
  "DECW$SERVER_DISABLE_CH" = "N"
  "DECW$SERVER_DISABLE_TEST" = "F"
  "DECW$SERVER_ENABLE_ACCESSX" = "0"
  "DECW$SERVER_EXTENSIONS" = "Xie"
        = "Multi-Buffering"
        = "Sec_Xag"
  "DECW$SERVER_KEY_REPEAT_DELAY" = "660"
  "DECW$SERVER_KEY_REPEAT_INTERVAL" = "40"
  "DECW$SERVER_SCREENS" = "GYA0"
  "DECW$SERVER_TRANSPORTS" = "DECNET"
        = "LOCAL"
        = "TCPIP"
        = "LAT"
  "DECW$SERVER_XKEYBOARD_COMPILED_DIR" = "SYS$COMMON:[SYS
$KEYMAP.XKB.COMPILED]"
  "DECW$SERVER_XKEYBOARD_DIRECTORY" = "DECW$SYSCOMMON:[SYS$KEYMAP.XKB]"
  "DECW$SERVER_XKEYBOARD_LOAD_MAP" = "0"
  "DECW$SERVER_XKEYBOARD_MAP" = "DIGITAL_US_LK201"
  "DECW$SYSCOMMON" = "SYS$SYSROOT"
  "DECW$XPORT_LRP_SIZE" = "32768"
  "DECW$XSIZE_IN_PIXELS" = "1280"
  "DECW$YSIZE_IN_PIXELS" = "1024"
```

3.1.5.2. Using the X Display Information Utility (xdpyinfo)

You can use the X Display Information utility (xdpyinfo) to query the server directly and report various server parameters.

Before running this utility, make sure you have the correct display selected by using the SET DISPLAY command.

The following example shows how to invoke xdpyinfo and illustrates a typical display:

```
$ SET DISPLAY/CREATE/NODE=node_name
$ RUN DECW$UTILS:XDPYINFO

name of display:    _WSA1:
version number:    11.0
vendor string:    DECWINDOWS Hewlett-Packard Development Company OpenVMS
vendor release number:    8002
maximum request size:  65535 longwords (262140 bytes)
motion buffer size:  0
bitmap unit, bit order, padding:    32, LSBFirst, 32
image byte order:    LSBFirst
number of supported pixmap formats:    6
supported pixmap formats:
    depth 1, bits_per_pixel 1, scanline_pad 32
    depth 4, bits_per_pixel 8, scanline_pad 32
    depth 8, bits_per_pixel 8, scanline_pad 32
    depth 12, bits_per_pixel 32, scanline_pad 32
    depth 24, bits_per_pixel 32, scanline_pad 32
    depth 32, bits_per_pixel 32, scanline_pad 32
keycode range:    minimum 8, maximum 255
number of extensions:    17
    DEC-Server-Mgmt-Extension
    ServerManagementExtension
    SHAPE
    MIT-SHM
    Extended-Visual-Information
    XTEST
    BIG-REQUESTS
    MIT-SUNDRY-NONSTANDARD
    MIT-SCREEN-SAVER
    SYNC
    XC-MISC
    TOG-CUP
    Xie
    DEC-XTRAP
    Multi-Buffering
    SECURITY
    XC-APPGROUP
default screen number:    0
number of screens:    1
screen  0:
  dimensions:    1280x1024 pixels (325x260 millimeters)
  resolution:    100x100 dots per inch
  depths (1):    8  root window id:    0x2e
  depth of root window:    8 planes
  number of colormaps:    minimum 1, maximum 1
  default colormap:    0x21
  default number of colormap cells:    256
  preallocated pixels:    black 0, white 1
  options:    backing-store YES, save-unders YES
  current input event mask:    0x0
  number of visuals:    10
  default visual id:  0x22
  visual:
    visual id:    0x22
    class:    PseudoColor
```

```
  depth:    8 planes
  size of colormap:    256 entries
  red, green, blue masks:    0x0, 0x0, 0x0
  significant bits in color specification:    8 bits
visual:
  visual id:    0x23
  class:    PseudoColor
  depth:    8 planes
  size of colormap:    256 entries
  red, green, blue masks:    0x0, 0x0, 0x0
  significant bits in color specification:    8 bits
visual:
  visual id:    0x24
  class:    DirectColor
  depth:    8 planes
  size of colormap:    8 entries
  red, green, blue masks:    0xe0, 0x1c, 0x3
  significant bits in color specification:    3 bits
visual:
  visual id:    0x25
  class:    GrayScale
  depth:    8 planes
  size of colormap:    256 entries
  red, green, blue masks:    0x0, 0x0, 0x0
  significant bits in color specification:    8 bits
visual:
  visual id:    0x26
  class:    StaticGray
  depth:    8 planes
  size of colormap:    256 entries
  red, green, blue masks:    0x0, 0x0, 0x0
  significant bits in color specification:    8 bits
visual:
  visual id:    0x27
  class:    StaticColor
  depth:    8 planes
  size of colormap:    256 entries
  red, green, blue masks:    0xe0, 0x1c, 0x3
  significant bits in color specification:    8 bits
visual:
  visual id:    0x28
  class:    TrueColor
  depth:    8 planes
  size of colormap:    8 entries
  red, green, blue masks:    0xe0, 0x1c, 0x3
  significant bits in color specification:    3 bits
visual:
  visual id:    0x29
  class:    TrueColor
  depth:    8 planes
  size of colormap:    8 entries
  red, green, blue masks:    0xe0, 0x1c, 0x3
  significant bits in color specification:    3 bits
visual:
  visual id:    0x2a
  class:    TrueColor
  depth:    8 planes
  size of colormap:    8 entries
```

```
    red, green, blue masks:    0xe0, 0x1c, 0x3
    significant bits in color specification:    3 bits
  visual:
    visual id:    0x2b
    class:    TrueColor
    depth:    8 planes
    size of colormap:    8 entries
    red, green, blue masks:    0xe0, 0x1c, 0x3
    significant bits in color specification:    3 bits
```

3.1.5.3. Using X Set Utility (xset)

Use the X Set utility (xset) to query the server directly for parameter settings. Running xset is a good method to determine the current font path.

Before running this utility, make sure you have the correct display selected by using the SET DISPLAY command.

The following command shows how to invoke xset and illustrates a typical display:

```
$ SET DISPLAY/CREATE/NODE=node_name
$ MCR DECW$UTILS:XSET Q

Keyboard Control:
  auto repeat:  on    key click percent:  25    LED mask:  00000000
  auto repeating keys:  0000000000000000
                        0000c0ffffffffff
                        ffffffffff27f8ff
                        ffffffffffffffff
  bell percent:  0    bell pitch:  400    bell duration:  100
Pointer Control:
  acceleration:  7/1    threshold:  3
Screen Saver:
  prefer blanking:  yes    allow exposures:  yes
  timeout:  600    cycle:  600
Colors:
  default colormap:  0x21    BlackPixel:  0    WhitePixel:  1
Font Path:
DECW$SYSCOMMON:[SYSFONT.DECW.CURSOR32],DECW$SYSCOMMON:
[SYSFONT.DECW.CURSOR16],
DECW$SYSCOMMON:[SYSFONT.DECW.100DPI],DECW$SYSCOMMON:[SYSFONT.DECW.75DPI],
DECW$SYSCOMMON:[SYSFONT.DECW.USER_COMMON],DECW$SYSCOMMON:
[SYSFONT.DECW.COMMON],
DECW$SYSCOMMON:[SYSFONT.DECW.SPEEDO],DECW$SYSCOMMON:[SYSFONT.DECW.TYPE1],
DECW$SYSCOMMON:[SYSFONT.DECW.TRUETYPE],CDE$SYSTEM_DEFAULTS:
[CONFIG.XFONTS.C.100DPI],
CDE$SYSTEM_DEFAULTS:[CONFIG.XFONTS.C.75DPI],CDE$SYSTEM_DEFAULTS:
[CONFIG.XFONTS.C]
Bug Mode: compatibility mode is enabled
```

3.2. Specifying the Network Transports

As illustrated in Chapter 1, the DECwindows transport interface is a general data-transfer mechanism for moving X protocol requests between a client and server.

The following sections briefly describe the supported transports and how to enable them for use by the X display server. See Section 4.1 for information about how to set the transport for the client.

3.2.1. Using the Local Transport

The local transport is the default network transport, which is always available. Use local transport when a DECwindows client and the display server are running on the same OpenVMS system. The local transport generally improves performance because data is transferred between client and server more directly through shared memory. This mechanism reduces the number of data copies in the system and eliminates the extra overhead incurred by network access.

3.2.2. Using the DECnet Transport

DECwindows also provides support for the DECnet transport. Before you can enable and use this transport, either the VSI DECnet Phase IV for OpenVMS or VSI DECnet-Plus (Phase V) for OpenVMS software must be installed and running on the system.

See the DECnet product documentation for information on installing and running the networking software.

Note

If DECnet or TCP/IP is shut down while the server is attached to it, the transport will continuously poll the network to reattach when the network is restarted.

3.2.3. Using the TCP/IP Transport

DECwindows Motif supports both the Internet Protocol Version 4 (IPv4) and Internet Protocol Version 6 (IPv6) implementations of the TCP/IP transport, as described in Chapter 4. Before you can enable and use this transport, the VSI TCP/IP Services for OpenVMS software or a supported third-party TCP/IP product must be installed and running as part of system startup.

The TCP/IP Services software is configured to run at system startup by default. If you are using a third-party product, see the product documentation for instructions on how to install and configure the software.

You can conserve memory and process slots by configuring VSI TCP/IP Services for OpenVMS software for the minimum DECwindows requirement to support the X protocol. DECwindows only requires that INET_ACP be running. For more information about TCP/IP concepts and configuring the network software, see the TCP/IP Services for OpenVMS documentation.

3.2.4. Using the LAT Transport

DECwindows supports LAT as a network transport mechanism for displaying to other OpenVMS Alpha and OpenVMS I64 workstations. Before you can enable and use LAT transport, you must start the LAT software on both the DECwindows client and server systems. Refer to the *LATCP Utility Reference Manual* for details on starting and configuring the LAT software.

In order to use LAT as a transport, the LAT service X$SERVER must be present on the display server system. Define the following logical to force the DECwindows startup procedure to create the LAT service:

```
$ DEFINE /SYSTEM DECW$INSTALL_XTERMINAL SERVER
```

You must define this logical before DECwindows is started. VSI suggests that you define this logical in SYS$MANAGER:SYLOGICALS.COM.

3.2.5. Changing the Default Transports

The DECnet and local transports are enabled by default. To enable or disable transports for your display server, modify the DECW$PRIVATE_SERVER_SETUP.COM file and redefine the DECW $SERVER_TRANSPORTS parameter.

Example 3.1 shows a sample setup for a system to use TCP/IP and local connections but not DECnet connections.

Example 3.1. Sample Setup for Transport Connections

```
$do_TCPIP:
$ decw$server_transports == "TCPIP,LOCAL"
$ exit
$ !
```

3.3. Establishing Server Access Control

The following sections describe the access control schemes supported by VSI DECwindows Motif for OpenVMS and how to use them to manage access to the X display server.

3.3.1. User-Based Access Control

User-based access control authorizes access to the X display server based on the triplet of host, transport, and user name (such as, DECNET ZEPHYRJONES). The user name, node name, and transport information you provide acts as a filter to screen out all except a selected class of users.

User-based access control is always available, as long as there are entries in either the authorized users list or access allowed list. Due to lack of encryption and the inability to specify user names in the TCP/IP environment,this form of access control is the least secure and is recommended for authorizing access in local, DECnet, or LAT environments only.

3.3.2. Token-Based Access Control

Token-based access control authorizes access to the X display server based on the presentation of a valid password or token by a client application during a connection request. The level to which the client is authenticated and the method of authentication varies depending on the protocol in use: Magic Cookie (MIT-MAGIC-COOKIE-1) or Kerberos(MIT-KERBEROS-5).

In general, each time a client application attempts to connect to a server protected with token-based access control, it references an X authority file to determine the appropriate protocol to apply and authentication method to follow in order to grant the connection.

Not only do token-based protocols offer greater protection, but they also provide more control over the operations that can be performed over an open server connection. For example, a token could be used to grant or deny trust privileges. Untrusted connections to an X display server significantly restrict the operations that can be performed over the connection.

Note

Additional X Window System security protocols, such as XDM-AUTHORIZATION-1 andSUN-DES-1, are not currently supported. Any third-party client applications using these protocols to access a DECwindows X display server will default to user-based access control.

3.3.2.1. Magic Cookie

Magic Cookie was designed to provide a more secure alternative to the host-based security mechanism available in previous releases of the X Window System. The first protocol to use a token-based approach, it provided the initial, standard means for restricting access to the X display server on a user level.

Magic cookie authorizes connections to a server based on a client presenting a binary numeric value, known as a **cookie**, to the server. Normally, the client obtains this cookie value from an X authority file; however, some programs may use alternate mechanisms.

Each entry in the X authority file for Magic Cookie access control specifies:

the address of the X display device
the protocol name (MIT-MAGIC-COOKIE-1)
a random, numeric cookie value

When Magic Cookie is used to authorize connections during a VSI DECwindows Motif for OpenVMS session, a cookie is generated each time a user successfully logs into their local VSI DECwindows Motif for OpenVMS desktop. The magic cookie authorizing the local connection, along with the device,transport, and protocol name is passed to the X display server and stored in the current X authority file (SYS$LOGIN:DECW$XAUTHORITY.DECW$XAUTH).

Each time a client application attempts to connect to the display server during the session, the application must present a valid cookie to the server along with the connection request. If the cookie matches any one of the cookies maintained by the X display server, the connection is authorized, access is granted, and the display is opened. When the user logs out of the VSI DECwindows Motif for OpenVMS session, the server is reset, and the cookie is discarded.

Due to the use of a randomly-generated value, Magic Cookie provides a more secure form of access control than the user-based scheme. However, the cookies are sent across the network unencrypted, leaving them prone to interception. As a result, this form of access control is recommended for authorizing connections across local area networks (LANs), limited DECnet environments, across TCP/IP networks that have been secured using another form of protection.

3.3.2.2. Kerberos

Kerberos authorizes connections to an X display server based on a combination of the following:

the protocol name (MIT-KERBEROS-5) in the X authority file
a list of valid Kerberos principals and their associated passwords
presentation of valid credentials

Kerberos credentials, or **tickets**, are a set of electronic information that can be used to verify the identity of a **principal**.These principals are stored in an Authorized Principals list kept on the server system. With Kerberos, client applications run by a valid principal send requests for a ticket from the Kerberos **Key Distribution Center (KDC)** each time they attempt to connect to the Kerberos-protected X display server.

Once Kerberos access control is enabled on the server, a new ticket is requested from the KDC automatically each time a user logs into their local desktop. The KDC creates a **ticket-granting ticket (TGT)** associated with the user's principal name, encrypts it using the password as the key, and returns the encrypted TGT.

If the TGT is decrypted successfully, the user is authenticated and the TGT is cached. The TGT permits the authenticated principal to obtain additional tickets. These additional tickets grant access to specific

services, in this case, access to the X display server from other client applications. The requesting and granting of these additional tickets happens transparently.

With VSI DECwindows Motif for OpenVMS, user-to-user authentication is employed. In this model, both the client and server use a Kerberos client at each end of the connection to verify the identify of the user (principal). Once the principal is authenticated at both ends of the connection, access is granted to the server.

By default, each TGT expires at a specified time. If a TGT has expired or been compromised, you can choose to revoke the current TGT and generate a new TGT by forcing a Kerberos login.

Kerberos is the most secure form of access control since it encrypts the initial authentication information between the requesting client and the server system. Therefore, it is the recommended method for authorizing remote client connections over insecure networks, such as the Internet.

Note

Kerberos is designed to generate a session key that can be used to encrypt all data transmitted over a network connection. The X Window System uses this key only to encrypt the initial authentication messages. Once the identity of the client has been reliably verified, all subsequent data is sent across the network channel unencrypted. As a result, the server itself can remain susceptible to some forms of network-level attacks.

3.3.3. The X Authority File

The **X authority file** is a binary data file that contains information used to authorize connections to the X display server. Each time a client application attempts to connect to an X server, it references the current X authority file to determine the appropriate **authorization key** to apply in order to authenticate the connection.

Each authorization key consists of the protocol name and token, which can be one of the following depending on the protocol in use:

- MIT-MAGIC-COOKIE-1 + cookie value
- MIT-KERBEROS-5 + encrypted TGT (cached separately)

By default, an X authority file is created automatically the first time a user logs into a desktop on a system configured for Magic Cookie or Kerberos access control. The file is stored in that user's OpenVMS login directory (SYS$LOGIN:DECW$XAUTHORITY.DECW$XAUTH). Each time the user subsequently logs into a desktop on that system, a new authorization key is generated, passed to the X display server, and written to the user's X authority file. This key controls access to the X display server during the VSI DECwindows Motif for OpenVMS session.

A separate X authority file can be defined manually (using the DECW$SERVER_XAUTHORITY symbol) for those client applications that require access to a server outside of the normal VSI DECwindows Motif for OpenVMS login process.

If the Security extension is enabled, authorization keys can also be manually generated. Manually-generated keys can be used to further restrict server access. The generated key is stored in the X authority file on the client system overwriting any value already present for the specified display server. The key can be distributed to different client systems to allow connections to a specific server and can be revoked to stop subsequent connections.

Generated keys are assigned an **authorization ID** that associates the key with the user who generated the key. As a result, only the user who generated the key can revoke the key.

3.3.4. The Access Allowed File

The **access allowed file** is an ASCII text file that grants additional OpenVMS users access to the X display server automatically at server startup.

The access allowed settings remain in effect until a user logs into a VSI DECwindows Motif for OpenVMS desktop. Once a user logs into a desktop and begins a VSI DECwindows Motif for OpenVMS session, any security options defined by the Session Manager for that user are applied.

Once the user ends the session, the server is reinitialized, and the access allowed settings are restored.

Caution

The access allowed file is intended for use on workstations that do not normally use the VSI DECwindows Motif for OpenVMS login process. Do not use this file on workstations that rely on the VSI DECwindows Motif for OpenVMS login process to restrict access to the X server, as it can compromise the security of the VSI DECwindows Motif for OpenVMS system.

For example, a user granted access through an access allowed file could spoof a login window that captures the passwords of other users attempting to log into a VSI DECwindows Motif for OpenVMS desktop.

3.3.5. The Access Trusted File

Trusted users are those who are authorized to change security settings. The **access trusted file** is an ASCII text file that identifies which OpenVMS users can change the access control settings fora particular display server.

By default, the local SYSTEM account is granted trust privileges (over the local or DECnet transport). Entries in this file are automatically added to the access allowed list, unless a token-based authentication scheme is in place. In that case, trusted users must be granted access to the X display server either through a manual entry to the access allowed list or through an entry in the appropriate X authority file.

Similar to the settings in an access allowed file, access trusted settings remain in effect until a user logs into a VSI DECwindows Motif for OpenVMS desktop.

3.3.6. Choosing an Access Control Method

When configuring access control for the X display server, you can choose to apply one or a combination of schemes depending upon your network environment. For example, you may choose to use Kerberos to authorize all remote server connections over TCP/IP and Magic Cookie to authorize LAN network connections.

When used in combination, the most restrictive access control scheme presented by the client always takes precedence. For example, if the server has all three schemes enabled, and the requesting client is using Magic Cookie, the server will attempt to authorize the connection via Magic Cookie. Note that with Magic Cookie access control, user-based access is available by default. If the client attempts and fails to connect to the server using a token-based scheme but is also a member of the authorized users list, then access will still be granted.

However, before enabling an access control scheme, you must first determine the server connection environment, as described in the following sections. For example, some VSI DECwindows Motif for

OpenVMS systems only run applications outside of a desktop session. For these systems,you should apply access control only to connections made outside of a VSI DECwindows Motif for OpenVMS session. Applying access control to connections both inside and outside a desktop session can result in a situation where the initial VSI DECwindows Motif for OpenVMS login process cannot login.

3.3.6.1. Applying Access Control to Connections Outside a Desktop Session

Enabling access control outside of a VSI DECwindows Motif for OpenVMS desktop session allows authorized OpenVMS users to run client applications on systems without a login process. This type of access control is used typically for systems that function as a standalone X display server, rather than an interactive VSI DECwindows Motif for OpenVMS workstation.

Use the server customization parameters and either the access allowed file or X authority file to set access control.

3.3.6.2. Applying Access Control to Connections Inside a Desktop Session

Use the Security Options dialog box to set the access control scheme in effect inside a VSI DECwindows Motif for OpenVMS session. The options in the dialog box enable you to set the access control scheme used by the local X display server,to authorize other users access to the display server, and to specify the scheme local client applications use when connecting to a display server.

Accessed from the Session Manager (Traditional Desktop) or Style Manager (New Desktop), the settings in the Security Options dialog box are identical. Note,however, that each desktop stores the settings differently:

- Settings in the Traditional Desktop are stored in the DECW$SMB_SECURITY.DAT file as soon as the changes are applied.
- Settings in the New Desktop are saved whenever a session is saved (such as when saving a new home session or when saving the current session). Note that on the New Desktop, if you chose to restore the home session on next login, any changes will be lost unless you save them by updating the home session.

3.3.7. Enabling User-Based Access Control

The following sections describe how to apply user-based access control to server connections outside and inside a desktop session.

Note that user-based access control over the TCP/IP Services transport uses the getnameinfo function to obtain the name of the peer system and matches this value against the values supplied by the user. If the address is an IPv4-mapped IPv6 address, the getnameinfo is called using the AF_INET family and the IPv4 address extracted from the IPv4-mapped IPv6 address. Otherwise, the getnameinfo function is called with AF_INET6 and the IPv6 address. IPv4 connections that fail reverse name translation are represented in IPv4 format. All other connections that fail reverse name translation are represented in IPv6 format.

If the address used is link local, a scope identifier is included in the string returned by the TCP/IP Services getnameinfo function. The server matches this against a host name in the authorized users list regardless of whether the enter contains a scope identifier or not. For example,a returned value of `test12i6%WE1` matches either `test12i6%WE1` or `test12i6`.

For Server Connections Outside a Desktop Session

To apply user-based access control to server connections made from outside of a VSI DECwindows Motif for OpenVMS session, do the following:

Caution

Authorizing TCPIP host connections to an X server using an access allowed file entry provides unauthenticated access to a VSI DECwindows Motif for OpenVMS system. This could leave the system vulnerable to unwanted intrusion, Denial of Service (DoS) attacks, and possible data loss.

To ensure the proper level of system security, VSI strongly recommends that a token-based scheme (such as Magic Cookie or Kerberos) be used to authorize remote access to an X server over TCP/IP. Not only do these schemes provide greater system protection, they also allow you to grant (or deny) access on aper-user basis.

1. Modify the SYS$MANAGER:DECW$PRIVATE_SERVER_SETUP.COM file and define the value of the DECW$SERVER_ACCESS_ALLOWED and DECW$ACCESS_TRUSTED parameters so that they refer to the location where the files are stored, such as:

   ```
   $ DECW$SERVER_ACCESS_ALLOWED == "SYS$MANAGER:DECW
   $SERVER1_ACCESS_ALLOWED.DAT"
   $ DECW$SERVER_ACCESS_TRUSTED == "SYS$MANAGER:DECW
   $SERVER1_ACCESS_TRUSTED.DAT"
   ```

2. Create and edit the access allowed and access trusted files adding the appropriate user entries. Each entry follows the `transport-host-username` format. Note that the only valid transport values are DECNET, TCPIP, and LOCAL. The transport synonyms TCP, INET, INET6, and DNET described in Table 4.1 are not supported.

   For example, the following entries grant user JONES local access to the server as well as network access from node ZEPHYR through the DECnet transport:

   ```
   DECNET ZEPHYR JONESLOCAL 0 JONES
   ⋮
   ```

   Note that when using TCP/IP as the network transport, access and trust privileges can only be assigned to a host rather than to specific users. TCP/IP does not provide the user specification as part of the data provided on are mote connection.

   As a result, file entries for hosts using TCP/IP must contain an asterisk (*) for the user specification. This grants all users on a particular host system access privileges when they connect to the X display server using TCP/IP. For example, the following entry grants access to all users on node ZEPHYR through the TCP/IP transport:

   ```
   TCPIP ZEPHYR *
   ⋮
   ```

3. Save the files and restart the server. The new access and trust privileges are applied automatically at system startup.

For Connections Inside a Desktop Session

To apply user-based access control to server connections made from inside a VSI DECwindows Motif for OpenVMS desktop session:

1. Do one of the following, depending on the desktop:

   - From the Traditional Desktop, choose Security... from the Session Manager Options menu.
   - From the New Desktop, click the Style Manager Security control.

   The Security Options dialog box is displayed.

2. Under Server Access Control, click Users... to display the Configure Users dialog box.

3. Type the node, the user name, and the method of transport for the users you want to authorize.

4. Click on the Add button. The users are added to the Authorized Users list.

5. Click on OK to save and apply the changes and close the Configure Users dialog box.

To disable user-based access control, you must remove all users from the Authorized Users list.

To remove a user name, first click on the names you want to remove. Then click on the Remove button. Finally, click on OK or Apply. The users will no longer have authorized access to the system.

3.3.8. Enabling Magic Cookie Access Control

The following sections describe how to apply Magic Cookie access control to server connections outside and inside a desktop session.

For Connections Outside a Desktop Session

To apply Magic Cookie access control to server connections made from outside of a VSI DECwindows Motif for OpenVMS session, do the following:

1. Log into the SYSTEM account or another privileged account.

2. Modify the DECW$PRIVATE_SERVER_SETUP.COM file and define the value of the DECW $SERVER_XAUTHORITY parameter so that it refers to the location where the X authority file will be stored, for example:

   ```
   $ DECW$SERVER_XAUTHORITY == "SYS$MANAGER:SERVER_ZEPHYR.DECW$XAUTH"
   ```

3. Using the X Authority File utility (xauth), manually create the X authority file for the server and add the appropriate entries. For example, the following command creates the new X authority file SERVER_ZEPHYR.DECW$XAUTH, adds the entry for the local transport, specifies the Magic Cookie protocol, and assigns a cookie value of 12345abcdef56789:

   ```
   $ XAUTH -f SYS$SYSROOT:[SYSMGR]SERVER_ZEPHYR.DECW$XAUTH ADD -
   _$ :0 MIT-MAGIC-COOKIE-1 12345abcdef56789
   ```

   The cookie in this file is loaded into the X server at startup and can be used to authorize all client connections.

4. Save the file and restart the server.

5. Propagate the key to all client systems using the xauth utility. For additional information on using the xauth utility, see the *VSI DECwindows Motif for OpenVMS New Features* manual or refer to the online help.

For Connections Inside a Desktop Session

To apply Magic Cookie access control to server connections made from inside of a VSI DECwindows Motif for OpenVMS session, do the following:

1. Do one of the following, depending on the desktop:
   - From the Traditional Desktop, choose Security... from the Session Manager Options menu.
   - From the New Desktop, click the Style Manager Security control.

   The Security Options dialog box is displayed.
2. Under Server Access Control, choose the Magic Cookie option.
3. Click on OK to save and apply the changes and close the Security Options dialog box.
4. Once enabled, a cookie is generated each time you log into the desktop. To grant other users access to the X display server, you must propagate the cookie to their X authority file using the xauth utility.

   For additional information on using the xauth utility, see the *VSI DECwindows Motif for OpenVMS New Features* manual or refer to the online help.

To disable Magic Cookie, deselect the Magic Cookie option and click OK or Apply.

To prevent other users from accessing the current session using the current cookie value, click on the Create Cookie button. The new cookie value is added to your default X authority file.

Note

Any client applications that are connected to the X display server when a new cookie is generated will remain connected. Authentication occurs only during the initial connection to the server.

3.3.9. Enabling Kerberos Access Control

In order to enable Kerberos, you must first have performed the following on the server system:

1. Installed and configured the TCP/IP for OpenVMS software with a domain name server.
2. Installed and configured the Kerberos Client for OpenVMS software, as described in the *Kerberos Client for OpenVMS Installation Guide and Release Notes.*
3. Obtained the following information:
   - Location of the KDC
   - The appropriate node, domain, and realm information for adding principals
   - Your principal name and password
4. Enabled the TCP/IP transport by defining the DECW$SERVER_TRANSPORTS parameter in SYS $MANAGER:DECW$PRIVATE_SERVER_SETUP and then restart the server.

   Note that Kerberos access control is not supported in TCP/IP environments that use IPv6. If Kerberos and IPv6 are enabled, the server connection attempt will fail with a KERBEROS error

indicating that the network address is invalid. To use Kerberos access control, specify the INET transport name (as described in Table 4.1). This forces the use of IPv4 addresses.

The following sections describe how to apply Kerberos access control to server connections outside and inside a desktop session.

For Connections Outside a Desktop Session

To apply Kerberos access control to server connections made from outside of a VSI DECwindows Motif for OpenVMS session, do the following:

1. Invoke the Kerberos Administration utility, as follows:

   ```
   $ KERBEROS/INTERFACE=DECWINDOWS/ADMIN
   ```

2. Create the following principal, keytab file, and keytab file entry. Refer to your Kerberos Client for OpenVMS documentation for information on how to use the Kerberos Administration Utility.

   - Create the principal x0/ `host@REALM`, for example:

     ```
     x0/system@ORG.COMPANY.COM
     ```

   - Create the keytab file SYS$SYSROOT:[SYSMGR]DECW$X0.KEYTAB.
   - Create an entry in that keytab file for principal x0.

3. Modify the DECW$PRIVATE_SERVER_SETUP.COM file and define the values of the following parameters so that they refer to the location where the X authority file, access allowed, and access trusted files will be stored, for example:

   ```
   $ DECW$SERVER_XAUTHORITY == "SYS$MANAGER:SERVER_ZEPHYR.DECW$XAUTH"
   $ DECW$SERVER_ACCESS_ALLOWED == "SYS$MANAGER:DECW
   $SERVER_ZEPHYR_ACCESS_ALLOWED.DAT"
   $ DECW$SERVER_ACCESS_TRUSTED == "SYS$MANAGER:DECW
   $SERVER_ZEPHYR_ACCESS_TRUSTED.DAT"
   ```

4. Using the xauth utility, manually create the X authority file for the server, and add the appropriate entries. For example, the following command creates the new X authority file SERVER_ZEPHYR.DECW$XAUTH, adds the entry for the local transport, specifies the Kerberos protocol, and assigns a value that identifies the keytab file:

   ```
   $ XAUTH -f SYS$SYSROOT:[SYSMGR]SERVER_ZEPHER.DECW$XAUTH -
   _$ ADD :0 MIT-KERBEROS-5 -
   _$ """CS:X0,SYS$SYSROOT:[SYSMGR]DECW$X0.KEYTAB"""
   ```

5. Manually create an access trusted file in the location specified by the DECW $SERVER_ACCESS_TRUSTED parameter and add an entry for the SYSTEM account, as follows:

   ```
   * SYSTEM 0
   ```

6. Manually create an access allowed file in the location specified by the DECW $SERVER_ACCESS_ALLOWED parameter and place an entry in the file for each Kerberos principal you want to grant access to the server. Each entry for a Kerberos principal in an access allowed file follows the `protocol-principal@realm-accessrights` format, where `accessrights` can be NONE, ALL, or *.

   For example, the following entry in an access allowed file grants principal JONES access to the server through the TCP/IP transport:

```
KERBEROS jones@ORG.COMPANY.COM ALL
⋮
```

7. Save the file and restart the server.

For Connections Inside a Desktop Session

To apply Kerberos access control to server connections made from inside of a VSI DECwindows Motif for OpenVMS session, do the following:

1. Do one of the following, depending on the desktop:
   - From the Traditional Desktop, choose Security... from the Session Manager Options menu.
   - From the New Desktop, click the Style Manager Security control.

   The Security Options dialog box is displayed.
2. Click on the Configure Principals button.
3. Enter the specification(s) for the Kerberos principal(s) you want to add to the Authorized Principals list.

   The format of a typical Kerberos principal is `primary/instance@REALM`.
4. Click on the Add button. The principal is added to the Authorized Principals box.
5. Click on OK to save and apply the changes and close the Configure Principals dialog box.
6. Under Server Access Control, choose Kerberos and click OK.

   The Kerberos Login dialog box is displayed, and you are prompted to log in and verify your Kerberos credentials.
7. Enter your Kerberos principal name and password and click OK. Note that principal names and passwords are case-sensitive.

To disable Kerberos, deselect the Kerberos option, remove all principals from the list, and click OK or Apply.

To prevent one or more principals from accessing your session, first click on the name(s) you want to remove. Then click on the Remove button. Finally, click on OK or Apply. The principal will no longer have authorized access to your workstation.

If you believe the current ticket has been compromised, you can deny access to your session and force principals to repeat the login and authentication process by clicking on the Revoke Ticket button.

3.3.10. Using the Security Extension

The Security extension (SECURITY) enables you to manually generate authorization keys using the xauth utility or the SET DISPLAY/GENERATE command. This allows you to specify one of the following additional attributes to apply to a server connection:

- UNTRUSTED – Indicates that this is an **untrusted connection**. An untrusted connection severely restricts the operations that can be performed over the connection. Client applications running over an untrusted connection are allowed limited access to X server extensions and are prevented from

accessing windows other than those created by the application. This is the default attribute for all authorization keys.

- TRUSTED – Indicates that this is a **trusted connection**.A trusted connection allows all client operations (except those that change access control parameters) to occur over the connection.
- TIMEOUT – Sets an expiration period for the token.
- GROUP – Indicates the application group to which the token applies.

Note

Client applications that have not been coded to allow for use over an untrusted connection may behave unexpectedly. See the specification for the Security extension from the X. Org Foundation for a description of the limitations of an untrusted connection.

3.3.10.1. Enabling the Security Extension

To enable the Security extension, modify the SYS$MANAGER:DECW $PRIVATE_SERVER_SETUP.COM file and redefine the DECW$SERVER_EXTENSIONS parameter so that it includes a value of "SEC_XAG." For example:

```
$ decw$server_extensions == "SEC_XAG"
```

Save the file and restart the server.

3.3.10.2. Using the Security Policy File

The **security policy file** enables you to configure the server to allow certain actions (at the X atom level) to be performed over untrusted network connections. This file establishes one or more site policies that specify the set of allowable actions through a series of field definitions.

A sample file has been provided with VSI DECwindows Motif for OpenVMS and is located in DECW $EXAMPLES:DECW$SECURITY_POLICY.TXT. Use this file as a template when creating a policy file. Security policies are described in the *Security Extension Specification* published by the X. Org Foundation. Refer to this specification for details regarding the use and definition of security policies.

To establish a security policy file on a VSI DECwindows Motif for OpenVMS system, do the following:

1. Copy DECW$EXAMPLES:DECW$SECURITY_POLICY.TXT to another file, make the necessary changes, and save the file to an alternate location on the system.
2. Modify the DECW$PRIVATE_SERVER_SETUP.COM file, and define the value of the DECW $SECURITY_POLICY parameter to point to the location where security policy file resides.
3. Save the file and restart the server.

3.4. Setting Up a Multihead System

Multihead systems enable you to connect multiple monitors to a system to form a single display. The following sections describe the system setup prerequisites and the supported methods for configuring multihead systems.

3.4.1. System Setup

Before setting up a multihead system, you must first do the following:

1. **Disable VGA services. –** Some video cards can dynamically disable or enable VGA services as necessary,but others require that you manually disable VGA using a jumper setting on the video card. Refer to the documentation for your video cards to determine if this change is required. If so, make this change prior to installing the cards in your system.

   Warning

   If you install multiple video cards on a system without disabling VGA services on all but one of the cards, all of the cards will compete for control of the video subsystem at boot time, resulting in possible system damage.

   ---

2. **Install the video cards. –** Shut down the OpenVMS system and install the video cards, as instructed by the hardware documentation.

   Turn the power back on and reboot the operating system. During startup, the OpenVMS operating system will verify that the video cards were installed correctly.

3.4.2. Configuring a Simple Multihead System

The DECW$PRIVATE_SERVER_SETUP.TEMPLATE file includes the following command to set up your system for multihead use:

```
$ IF DECW$DEVICE_COUNT .GT. 1 THEN DECW$MULTI_HEAD == 1
```

The template file is located in the SYS$MANAGER directory. To invoke multihead support, copy the template file to SYS$MANAGER:DECW$PRIVATE_SERVER_SETUP.COM. Editing of this file is not needed.

3.4.3. Configuring a Multihead System Using XINERAMA

The Xinerama extension (XINERAMA) enables you to connect multiple monitors to a single system running to create a unified virtual display. In contrast to simple multihead systems, XINERAMA provides control over the arrangement of the screens and desktop. You can customize the number, order, and configuration of each screen in the display, and you can drag windows and text from screen to screen on the desktop.

The following sections describe how to configure a multihead system using XINERAMA.

3.4.3.1. Hardware and Configuration Requirements

XINERAMA is supported only in a homogeneous graphics environment. Each multihead configuration must consist of common video cards, bit depths, visual classes, screen resolutions, and monitors of a similar size. The monitors must also be arranged into a rectangle–without gaps in between.

See the *VSI DECwindows Motif for OpenVMS Software Product Description* for a list of the currently supported video graphics cards; see Section 3.1.2.4 for a description of the logicals you can use to change the default values for these graphics settings.

The display server supports up to 16 monitors in a multihead configuration. Note that the actual number of monitors you can use may be further limited by the number of available option card slots.

3.4.3.2. Enabling the XINERAMA Extension

Although this extension is part of the X display server, it is not enabled by default.

To enable XINERAMA, modify the DECW$PRIVATE_SERVER_SETUP.COM file and redefine the parameter DECW$SERVER_EXTENSIONS so that it includes a value of "XINERAMA." For example:

```
$ DECW$SERVER_EXTENSIONS == "DEC-XTRAP,XINERAMA"
```

Save the file and restart the server.

3.4.3.3. Arranging the Monitors

By default, the system uses the physical location of the video cards on the system bus to assign the device names (such as, GYA0, GYB0, etc.). The devices are subsequently assigned screen numbers and initialized in alphabetical order according to device name.

For example in a four-monitor multihead configuration, if you have connected the cables to the video cards in the proper order and placed the monitors side-by-side, the screens should be numbered in either ascending (0, 1, 2, 3) or descending (3, 2, 1, 0) order.

On OpenVMS systems, the order in which screens are initialized is key to proper edge and pointer attachment. *Screen 0 should be initialized first (representing the top-left corner of the virtual display)*, followed by the remaining screens in sequential order, ending with the highest screen number (representing the bottom-right corner of the virtual display). If the screens are not in the proper order, you can do one of the following depending on your screen configuration:

- Physically move the monitors to the correct placement.
- Reconnect the cables in the correct order.
- Edit the DECW$PRIVATE_SERVER_SETUP.COM file and define the DECW $SERVER_SCREENS parameter so that it overrides the default screen initialization order.

Once the screens are in the appropriate order, you can further customize the virtual display using the following edge attachment parameters in DECW$PRIVATE_SERVER_SETUP.COM:

DECW$SERVER_EDGE_LEFT
DECW$SERVER_EDGE_RIGHT
DECW$SERVER_EDGE_TOP
DECW$SERVER_EDGE_BOTTOM

These parameters control where each edge of the virtual display is attached.

When the setup process is complete, all the monitors should be active and organized in the proper arrangement. Once you restart VSI DECwindows Motif for OpenVMS,the login dialog box for the session is displayed at the center of the virtual display, and you should be able to open application windows and drag them from screen to screen.

3.5. Changing the Default Keyboard Layout

There are two types of keyboard layouts available to VSI DECwindows Motif for OpenVMS: the DECwindows keymaps and the X Keyboard keymaps. The following sections describe how to change the default keyboard settings outside of a desktop session. Note that these settings can be overridden by the Session Manager during a desktop session, as described in the *Using VSI DECwindows Motif for OpenVMS* and *Getting Started With the New Desktop* manuals.

See Appendix B for a listing of all languages, keyboard models, and keymap names.

3.5.1. Using the DECwindows Keymap Files

To override the default keyboard layout and specify a DECwindows keymap file, determine the correct name from the model number of your keyboard, as follows:

1. Turn the keyboard upside down and look for a label that specifies the model number. The model number should be in a format similar to LK401-- *xx*.

   The model number may also be listed as simply LK401. In this case, the information you need is in another part of the label, where there will be a number that has the format *nn-nnnnn-xx*.

2. Use the *xx* part of this number to choose a keymap name from Appendix B. The table is arranged based on the language for which each keyboard is designed.

   Choose the keymap ending in:

   _DP for the data processing keyboard layout
   _TW for the typewriter layout
   _LK for an LK-series layout
   _PC for a PC-based layout

3. After you choose a keymap name, modify the DECW$PRIVATE_SERVER_SETUP.COM file. For example, to change the keyboard layout to a Dutch typewriter layout, add the following line to DECW$PRIVATE_SERVER_SETUP.COM:

   ```
   $ DECW$DEFAULT_KEYBOARD_MAP == "DUTCH_LK201LH_TW"
   ```

4. Add a line similar to this for each workstation that does not have a North American keyboard layout, or add this line to the common section for all workstations (if all the workstations use the same keyboard layout).

Example 3.2 shows a sample setup for two workstations with Dutch keyboards and 100-dpi monitors.

Example 3.2. Sample Setup for Dutch Keyboards and 100-dpi Monitors

```
$do_DUTCH:
$do_DUTCH2:
$ decw$server_density == 100
$ decw$default_keyboard_map == "DUTCH_LK201LH_DP"
$ exit
```

3.5.2. Using X Keyboard Keymap Files

The X Keyboard keymap files are the standard X Window System alternative to the keymaps provided with VSI DECwindows Motif for OpenVMS. They are intended to supplement, rather than replace, the VSI DECwindows Motif for OpenVMS keymap files.

You can compile X Keyboard layout files to create loadable keymaps using the X Keyboard Compiler utility (xkbcomp), as described in the following section,or the server will compile the files as needed.

Also, since the X Keyboard keymap format (.XKM) is the accepted,vendor-independent standard for loadable keyboards, you can choose to load. XKM files from other X11R6-based systems and X Window System software providers.

3.5.2.1. The X Keyboard Components Database

The X display server maintains a database of X keyboard components and common keyboard mappings. When combined, these components provide a complete description of a keyboard and its behavior.

The server loads the database from the compiled keymap file specified by the DECW $SERVER_XKEYBOARD_MAP parameter. This file is located in the directory defined by the DECW $SERVER_XKEYBOARD_COMPILED_DIR parameter. If the compiled keymap file does not exist, the server runs the xkbcomp utility to compile the file from its component sources.

The following keyboard component source files comprise the database and are used to produce the loadable keymap files:

- **Keymap source files –** These are the upper-level source files that are specified as input files on the xkbcomp utility command line. The keymap source files reference the other component source files during compilation to produce a complete, loadable keymap (.XKM) file.

  These files are stored in the KEYMAP.DIGITAL subdirectory of the root directory specified by the DECW$SERVER_XKEYBOARD_DIRECTORY parameter. There is one keymap file for each supported language variant, for example:

  DECW$SYSCOMMON:[SYS$KEYMAP.XKB.KEYMAP.DIGITAL]US
  DECW$SYSCOMMON:[SYS$KEYMAP.XKB.KEYMAP.DIGITAL]JAPANESE

- **Keycode component source files –** These files specify the range and interpretation of the raw keycodes reported by the input device. They set the keycode symbolic names, the minimum and maximum legal keycodes for the keyboard, and the symbolic name for each key.

  The keycode files can also contain aliases for keys,symbolic names for indicators, and a description of which indicators are physically present.

  The keycode component source files are stored in the KEYCODES.DIGITAL subdirectory of the root directory specified by the DECW$SERVER_XKEYBOARD_DIRECTORY parameter, for example:

  DECW$SYSCOMMON:[SYS$KEYMAP.XKB.KEYCODES.DIGITAL]LK
  DECW$SYSCOMMON:[SYS$KEYMAP.XKB.KEYCODES.DIGITAL]PC

- **Types source files –** These files specify the layout types that can be associated with the various keyboard keys. They affect the types symbolic name and the list of layout types associated with the keyboard.

  The types component can also contain real modifier bindings and symbolic names for one or more virtual modifiers.

  These files are stored in the TYPES subdirectory under the root directory specified by the DECW $SERVER_XKEYBOARD_DIRECTORY parameter, for example:

  DECW$SYSCOMMON:[SYS$KEYMAP.XKB.TYPES]BASIC
  DECW$SYSCOMMON:[SYS$KEYMAP.XKB.TYPES]DEFAULT

- **Compatibility map source files –** These files specify the rules used to assign actions to keyboard symbols (keysyms) based on the XKB capability (aware or unaware) between the client and server. The XKB capability is determined through the following compatibility transformations:

  XKB extension state to core state

Core keyboard mapping to XKB keyboard mapping
XKB keyboard mapping to Core keyboard mapping

The compatibility map component affects the compatibility symbolic name,the symbol compatibility map, and the group compatibility map. This component can also specify maps for indicators, as well as the real modifier bindings and symbolic names for some virtual modifiers.

The compatibility map source files are stored in the COMPAT subdirectory under the root directory specified by the DECW$SERVER_XKEYBOARD_DIRECTORY parameter, for example:

DECW$SYSCOMMON:[SYS$KEYMAP.XKB.COMPAT]BASIC
DECW$SYSCOMMON:[SYS$KEYMAP.XKB.COMPAT]DEFAULT

- **Symbols source files –** These files specify the symbols bound to each keyboard key. They affect the key symbol mappings for each key, the keyboard modifier mapping, and the symbolic names for the keyboard symbol groups. The symbols component can also contain explicit actions and behaviors for some keys or the real modifier bindings and symbolic names for some virtual modifiers.

  The symbols source files are stored in the SYMBOLS and SYMBOLS.DIGITAL subdirectories under the root directory specified by the DECW$SERVER_XKEYBOARD_DIRECTORY parameter, for example:

  DECW$SYSCOMMON:[SYS$KEYMAP.XKB.SYMBOLS]US
  DECW$SYSCOMMON:[SYS$KEYMAP.XKB.SYMBOLS.DIGITAL]SWISS_FRENCH

- **Geometry source files –** These files define the geometry of the keyboard. They define the geometry symbolic name and the keyboard geometry description. The geometry component can also contain aliases for keys or symbolic names for indicators and might affect the set of indicators that are physically present. Key aliases defined in the geometry component of a keyboard mapping override those defined in the keycodes component.

  These files are stored in the GEOMETRY subdirectory under the root directory specified by the DECW$SERVER_XKEYBOARD_DIRECTORY parameter, for example:

  DECW$SYSCOMMON: [SYS$KEYMAP.XKB.GEOMETRY.DIGITAL]LK
  DECW$SYSCOMMON: [SYS$KEYMAP.XKB.GEOMETRY.DIGITAL]PC

- **Other directories –** The SEMANTICS subdirectory of the base directory DECW $SERVER_XKEYBOARD_DIRECTORY contains a set of files that define the default semantics for keyboard types and compatibility components.

  Files in the base directory DECW$SERVER_XKEYBOARD_DIRECTORY and in subdirectories TMP and RULES are used by the server and should not be modified.

3.5.2.2. Creating an X Keyboard Keymap File

To create an X Keyboard keymap file, do the following:

1. Edit one or more of the component source files described in Section 3.5.2.1 and make the necessary changes. For example, to swap the left and right parenthesis for all US keymaps, edit SYS $COMMON:[SYS$KEYMAP.XKB.SYMBOLS.DIGITAL]US, as follows:

```
⋮
   19       key <AE09> {       [              9,      parenleft ] };
   20       key <AE10> {       [              0,     parenright ] };
```

```
⋮
```

2. Using the xkbcomp utility, compile the component source files to create the modified keymap file. For example, to create a modified keymap file for DIGITAL_US_LK401, compile the sources as follows:

```
$ xkbcomp -RDECW$SYSCOMMON:[SYS$KEYMAP.XKB] -xkm -m lk401 -
_$ DECW$SYSCOMMON:[SYS$KEYMAP.XKB.KEYMAP.DIGITAL]us -
_$ -o SYS$COMMON:[SYS$KEYMAP.XKB.COMPILED]digital_us_lk401.xkm
```

You can then load the modified, compiled keymap file as described in Section 3.5.2.3.

3.5.2.3. Loading a Compiled Keymap File

To load a compiled X Keyboard keymap file, do the following:

1. Modify the DECW$PRIVATE_SERVER_SETUP.COM file, and define the value of the DECW $SERVER_EXTENSIONS parameter so that it enables the use of the X Keyboard (XKB) extension, similar to the following:

```
$ DECW$SERVER_EXTENSIONS == "XKB,XINERAMA"
```

2. Define the value of the parameter DECW$SERVER_XKEYBOARD_LOAD_MAP to enable the use of X Keyboard keymaps:

```
$ DECW$SERVER_XKEYBOARD_LOAD_MAP=="1"
```

3. Define the value of the DECW$SERVER_XKEYBOARD_COMPILED_DIR parameter to point to where the keymap files are located. This directory is also where the server places any keymap files that it compiles on demand.

4. Define the value of the DECW$SERVER_XKEYBOARD_MAP parameter to point to the default X Keyboard keymap to load at server startup.

5. Save the file and restart the server.

3.5.2.4. Enabling AccessX Key Features

To enable AccessX key features, do the following:

1. Edit the DECW$PRIVATE_SERVER_SETUP.COM file.

2. Define the value of the DECW$SERVER_EXTENSIONS parameter so that it enables the use of the X Keyboard (XKB) extension, similar to the following:

```
$ DECW$SERVER_EXTENSIONS == "XKB,XINERAMA"
```

3. Set the value of the DECW$SERVER_ENABLE_ACCESSX parameter to 1 (enabled).

4. Save the file and restart the server.

You can then further configure the AccessX features using the accessx utility or use the slow and sticky key functions, as follows:

To...	Perform This Action...
Toggle slow keys	Hold Shift key by itself for eight seconds

To...	Perform This Action...
Toggle sticky keys	Press and release the left or right Shift key five times in a row, without any intervening key events and with less than 30 seconds delay between consecutive presses
Turn off sticky keys	Simultaneously press two or more modifier keys.

3.6. Specifying New Fonts

You can add support for new fonts by doing the following:

1. Place the DECW$FONT file in the DECW$SYSCOMMON: [SYSFONT.DECW.USER_ *xx*] directory.

2. Update the font database for the server by entering the following command from a privileged account:

   ```
   $ @SYS$UPDATE:DECW$MKFONTDIR
   ```

   This command creates new font directories for all layered-product fonts and runs automatically when DECwindows is installed.

3.6.1. Using Third-Party Fonts

If you want to use a third-party font, choose one of the following options:

Font File is in BDF Format

1. Obtain the font source in bitmap distribution format (BDF).

2. Compile the font with the FONT command, as follows:

   ```
   $ FONT file-name
   ```

   See the VMS DECwindows Guide to Xlib(Release 4) Programming: MIT C Binding manual for a full description of the FONT command.

3. Copy the resulting *.PCF file to one of the following directories:

   ```
   SYS$COMMON:[SYSFONT.DECW.USER_75DPI]
   SYS$COMMON:[SYSFONT.DECW.USER_100DPI]
   SYS$COMMON:[SYSFONT.DECW.COMMON_USER]
   ```

4. Create new font directories from a privileged account using the following command:

   ```
   $ @SYS$UPDATE:DECW$MKFONTDIR
   ```

End the current session and start a new session for the new font to become available.

Other Third-Party Fonts

To use other third-party fonts, create a DECW$FONT_ALIAS.DAT file in the appropriate font directory.

The format of the font alias file is:

```
alias-font-name actual-font-name
```

If the font names contain embedded spaces, enclose the names in double quotes (" ").

The `alias-font-name` value is the third-party font name, and the `actual-font-name` value is a DECwindows font name.

See the VMS DECwindows Guide to Xlib(Release 4) Programming: MIT C Binding and *VSI DECwindows Motif for OpenVMS New Features* manuals for supported DECwindows font names.

3.6.2. Enabling Support for Euro Currency Symbol

VSI DECwindows Motif for OpenVMS includes support for the euro currency symbol. The euro font sets are installed during the base OpenVMS operating system installation. Choosing the euro option during installation allows you to then enable and display the euro symbol on systems running VSI DECwindows Motif for OpenVMS Version 1.3 or higher.

To enable euro support, you need to load the font definitions. Do this by creating a set of euro setup command files, as follows:

```
$ COPY SYS$COMMON:[SYSMGR]DECW$EURO_APPS_SETUP.TEMPLATE -
_$ SYS$COMMON:[SYSMGR]DECW$EURO_APPS_SETUP.COM
$ COPY SYS$COMMON:[SYSMGR]DECW$EURO_SERVER_SETUP.TEMPLATE -
_$ SYS$COMMON:[SYSMGR]DECW$EURO_SERVER_SETUP.COM
```

Restart your VSI DECwindows Motif for OpenVMS system. The command files are run automatically as part of the VSI DECwindows Motif for OpenVMS startup procedure.

Support for the euro locale by the OpenVMS C Run-Time Library is not required for base VSI DECwindows Motif for OpenVMS euro support. However, if you want to run Motif applications in a euro locale, you must install euro locale support, which is included in the OpenVMS Alpha and OpenVMS I64 media kits.

3.6.2.1. Displaying the Euro Symbol in VSI DECwindows Motif for OpenVMS Applications

Once euro support is enabled on your system, you can display the euro sign with any ISO8859-1 bitmap font on your workstation, with no additional setup. VSI DECwindows Motif for OpenVMS applications that use standard ISO Latin-1 fonts to display text will display the euro sign for character 0xA4. The character set portion of the X Logical Font Description (XLFD) name for these fonts is ISO8859-1.

To display the euro sign in a DECterm window, be sure the following two items are selected in the DECterm General Options dialog box:

UPSS ISO Latin-1
8-Bit Multinational Characters

3.6.2.2. Using the Keyboard to Manually Enter the Euro Symbol (Alpha Only)

Once euro support is enabled, you can manually enter the symbol using one of the following key sequences, depending on the type of keyboard attached to your system:

Keyboard Type	Keymap	Key Sequence

LK-style	*LK201* keymap	Use the same key sequence you use for the universal currency symbol. For example:
		
		`Compose+Space o x or Compose+Space O X`
		`Compose+Space x o or Compose+Space X O`
		`Compose+Space 0 x or Compose+Space 0 X`
		`Compose+Space x 0 or Compose+Space X 0`

LK-style	*LK401* keymap [1]	Left Compose + E
PC-style [2]	*LK44* keymap	Right Alt + E

[1]Note that the RUSSIAN_LK401_BT keymap does not support the LeftCompose + E key sequence. The POLISH_LK401_BT keymap supports euro input using the LeftCompose + U key sequence.

[2]Such as, LK44*-**, PCXA*-**, or LK97W-**

3.6.3. Enabling Font Server Support

You can add font servers to the font path by defining the symbol DECW$FONT_SERVERS in the site-specific server section of the file SYS$MANAGER:DECW$PRIVATE_SERVER_SETUP.COM. Depending on the transport type, use one of the following methods:

- To add support for the TCP/IP transport, specify TCP as the network connection type that will communicate with the font server. Replace `node` with the Internet node name. Specify the TCP/IP port number for `port_number`, as shown in the following example:

  ```
  $ DECW$FONT_SERVERS == "TCP/node::port_number"
  ```

- To add support for the DECnet transport, specify DECNET as the network connection type that will communicate with the font server. Replace `node` with the DECnet node name. Specify the DECnet object name for `network_object`.

  ```
  $ DECW$FONT_SERVERS == "DECNET/node::network_object"
  ```

Multiple font servers can be added by defining the symbol as a comma-separated list. The symbol is not case sensitive.

3.7. Setting up an LBX Proxy Server

As illustrated in Figure 1.3, DECwindows supports LBX proxy server implementations. An LBX proxy server implementation can be configured as one of three types:

- **Managed –** The proxy server is managed by a proxy manager. The server can be used by multiple clients to access multiple X display servers. Clients do not need to know the proxy server's server number, they simply provide the requested X display server to the proxy manager. The manager, in turn, either finds the appropriate existing proxy server or starts a new instance of the proxy server automatically.

- **Unmanaged –** The proxy server is started manually. The proxy manager is aware of the server. The proxy server can be used by multiple clients to access multiple X display servers.

- **Standalone –** The proxy server is started manually. The proxy manager is not aware of the proxy server. The server can be used by multiple clients to access a single X display server. Clients need to know the proxy server's number.

VSI DECwindows Motif for OpenVMS currently supports the managed and standalone configurations.

In order to use the proxy server and proxy manager components, the LBX option must have been chosen during DECwindows installation. See the *VSI DECwindows Motif for OpenVMS Installation Guide* for information about installing LBX support.

The following sections describe how to enable the LBX extension and configure a proxy server implementation.

Note

Because the communication between the client and the proxy server uses the unoptimized X protocol, the client and the proxy server should always be on the same node or on the same LAN.

Although LBX reduces data flow between systems, it is not recommended fora LAN-only environment. While it does reduce overall traffic flow, this comes at a cost of increased processing requirements. This generally results in as light decrease in performance in a LAN-only environment.

3.7.1. Enabling the LBX Extension

The use of LBX requires that the X display server be capable of interpreting the LBX protocol. On VSI DECwindows Motif for OpenVMS systems, you must enable the use of the LBX protocol through the DECW$SERVER_EXTENSIONS parameter.

To enable the LBX extension, modify the SYS$MANAGER:DECW $PRIVATE_SERVER_SETUP.COM file and redefine the DECW$SERVER_EXTENSIONS parameter so that it includes a value of "LBX." For example:

```
$ DECW$SERVER_EXTENSIONS == "LBX"
```

Save the file and restart the server.

3.7.2. Starting the Proxy Server

How you start an LBX proxy server determines the proxy server's type and how a client accesses the proxy server. Both methods use the LBXPROXY command; see the online help for the command to learn more about the available qualifiers and their values.

Before you start an LBX proxy server, ensure that the proxy server is properly authorized to connect to the X display server, as described in Section 3.7.2.1.

3.7.2.1. Authentication in a Proxy Server Environment

When the proxy server connects to an X server, the proxy server undergoes authentication in the same manner as a client. How the proxy server obtains its authentication information depends on the type of proxy server.

A managed proxy server obtains its authentication information from the proxy manager. The proxy manager in turn receives the authentication information from the client. The client's default

authentication information is contained in the client's X authority file. The client can control which X authority file is used by using the /XAUTHORITY qualifier to the SET DISPLAY command. The client can supply explicit authentication information on the SET DISPLAY command using the /LBXAUTHENTICATE and /LBXDATA qualifiers. The client also has the option of using the /NOLBXAUTHENTICATE qualifier to specify that the authentication information come from the proxy server's current X authority file. For more information about the SET DISPLAY command qualifiers for LBX, see *VSI OpenVMS DCL Dictionary: N-Z*.

A standalone proxy server obtains its authentication information from the information present in the current X authority file.

3.7.2.2. Starting a Managed Proxy Server

To start a managed LBX proxy server, place the following LBX service entry in the proxy manager's configuration file (see Section 3.7.6).

```
LBX MANAGED COMMAND SYS$MANAGER:DECW$LBXPROXY_SUB ["qualifiers"]
```

After the proxy manager is configured, no specific action is required to start the proxy server; the proxy manager starts the server when the manager receives the first client request.

3.7.2.3. Starting a Standalone Proxy Server

You can start a standalone LBX proxy server either in the current process or as a detached process. To start a standalone proxy server in the current process, use the LBXPROXY command.

```
LBXPROXY [qualifiers]
```

For example, to start a proxy server in the current process, assign it a server number of 50, and have the server act as a proxy for the X display server on remote1.cmp.com, use the following command:

```
$ LBXPROXY /DISPLAY="REMOTE1.CMP.COM:0"/SERVER=50/FIXED_SERVER
```

To start a proxy server as a detached process, use the DECW$LBXPROXY command procedure.

```
@SYS$MANAGER:DECW$LBXPROXY ["lbxproxy-qualifiers"] ["run-qualifiers"]
```

For example, to start a proxy server as a detached process, assign it a server number of 50, and have the server act as a proxy for the X display server onremote1.cmp.com, use the following command:

```
$ @SYS$MANAGER:DECW$LBXPROXY "/DISPLAY=""REMOTE1.CMP.COM:0""" + -
_$ "/SERVER=50/FIXED_SERVER"
```

Use the *run-qualifiers* parameter to pass any qualifiers to the RUN command used to invoke the LBXPROXY image. One use of this parameter might be to override the default LBXPROXY process characteristics or any values set by the logicals provided to modify these defaults.

See the online help for the LBXPROXY command to learn more about the available qualifiers and their values.

Note

To start an LBX proxy server as a detached process requires the DETACH privilege or maximum available detached process quota. To modify the process quotas for a detached process requires the DETACH privilege.

3.7.3. Using the Proxy Server in an IPv6 Environment

The proxy server listens on all configured transports specified with the /TRANSPORT qualifier when the proxy server is started. If the TCPIP transport has been selected, then the proxy server listens on all configured TCP/IP interfaces, regardless of whether they are IPv4- or IPv6-compatible.

The /DISPLAY qualifier allows the additional transport names discussed in Chapter 4. The interpretation of the TCP and TCPIP transport names as seen by the proxy server process is governed by the DECW $IPV6_SUPPORT logical name defined in the DECW$PRIVATE_APPS_SETUP.COM file.

3.7.4. Modifying the Default Proxy Server Process Characteristics

Table 3.4 lists the logicals that are provided to override the default LBXPROXY process characteristics specified on the RUN command generated by SYS$MANAGER:DECW$LBXPROXY.

Table 3.4. LBXPROXY Process Characteristic Logicals

Logical	RUN Command Qualifier
DECW$LBX_AST_LIMIT	/AST_LIMIT
DECW$LBX_BUFFER_LIMIT	/BUFFER_LIMIT
DECW$LBX_DUMP	/DUMP
DECW$LBX_ENQUEUE_LIMIT	/ENQUEUE_LIMIT
DECW$LBX_EXTENT	/EXTENT
DECW$LBX_FILE_LIMIT	/FILE_LIMIT
DECW$LBX_IO_BUFFERED	/IO_BUFFERED
DECW$LBX_IO_DIRECT	/IO_DIRECT
DECW$LBX_LOG	/ERROR
DECW$LBX_MAXIMUM_WORKING_SET	/MAXIMUM_WORKING_SET
DECW$LBX_PAGE_FILE	/PAGE_FILE
DECW$LBX_PRIORITY	/PRIORITY
DECW$LBX_PROCESS_NAME	/PROCESS_NAME
DECW$LBX_QUEUE_LIMIT	/QUEUE_LIMIT
DECW$LBX_WORKING_SET	/WORKING_SET

3.7.5. Stopping a Proxy Server

You can stop an LBX proxy server either automatically or manually.

3.7.5.1. Stopping Automatically

To stop an LBX proxy server automatically, use the /ONEXIT=TERMINATE qualifier when you start the server. For standalone proxy servers, specify this qualifier either on the LBXPROXY command line or in the *lbxproxy-qualifiers* parameter of the SYS$MANAGER:DECW$LBXPROXY command procedure.

For managed servers, specify this qualifier in the *parameters* argument in the LBX service definition in the proxy manager's configuration file.

Note

If not already terminated, all managed proxy servers automatically terminate when their proxy manager is terminated.

3.7.5.2. Stopping Manually

To stop an LBX proxy server manually, use the DCL STOP command.

3.7.6. The Proxy Manager Configuration File

The proxy manager configuration file contains the information that the proxy manager needs in order to locate proxy services. Each line in the configuration file can contain one of the following:

- **Comment –** Comment lines must begin with an exclamation character (!) in the first character position. All other characters in the line are ignored.
- **Managed service entry –** Managed service entries have the following format:

  ```
  service-name MANAGED COMMAND command-file [parameters]
  ```

  where:

service-name	Specifies the name of the managed service. The service name is case-insensitive. If the file contains multiple entries with the same service name, only the first occurrence has any effect. For the LBX service, the service name must be LBX. Service names must use characters in the X Portable Character Set with the exception of the Space, Tab, and Newline characters.
command-file	Specifies the name of the command procedure that the proxy manager should invoke to create a new instance of a proxy server for this service. For the LBX service, this argument is usually SYS$MANAGER:DECW $LBXPROXY_SUB.COM.
parameters	Specifies any parameters to pass to the command procedure specified in the *command-file* argument. All characters following the space after the *command-file* argument are passed as parameters to the command procedure. For the LBX service, the command procedure expects one quoted parameter, that is, one or more command qualifiers.

  Currently, the only managed service supplied with VSI DECwindows Motif for OpenVMS is LBX.

- **Unmanaged service entry –** Unmanaged service entries have the following format:

  ```
  service-name UNMANAGED address
  ```

  where:

service-name	Specifies the name of the unmanaged service. The service name is case-insensitive. If the file contains multiple entries with the same service name, the manager tries each entry in order until an active and available proxy server is found. Service names must use characters in the X Portable Character Set with the exception of the Space, Tab, and Newline characters.
address	Specifies the address of the proxy server in Inter-Client Exchange (ICE) format.

Currently, no unmanaged service is supplied with VSI DECwindows Motif for OpenVMS.

3.7.7. Starting the Proxy Manager

You can configure the proxy manager either to start automatically when VSI DECwindows Motif for OpenVMS starts or to start manually at a later time.

3.7.7.1. Starting Automatically at VSI DECwindows Motif for OpenVMS Startup

To start the proxy manager at VSI DECwindows Motif for OpenVMS startup, edit the SYS $MANAGER:DECW$PRIVATE_APPS_SETUP.COM file. For more information on customizing the Session Manager environment, see Chapter 4.

Table 3.5 describes the symbols present in this file that control the proxy manager.

Table 3.5. Global Symbols Controlling the Proxy Manager

Symbol	Description
DECW$PROXY_MANAGER_CONFIG	Specifies the name of the proxy manager's configuration file. The definition of this symbol causes the DECwindows startup process to start the proxy manager. The file name specified by this symbol overrides any configuration file specified in the DECW$PROXY_MANAGER_OPTIONS symbol. A default configuration file, SYS $MANAGER:DECW$LBXPROXY.DECW $PMCFG, is provided at installation time. This file has a single service entry for the LBX service.
DECW$PROXY_MANAGER_LOG	Specifies the name of the file that the proxy manager should use to log events. If the proxy manager starts and this symbol is undefined, the default log file is SYS$MANAGER:DECW $PROXYMANAGER.LOG.
DECW$PROXY_MANAGER_OPTIONS	Specifies any qualifiers that should be included on the XPROXYMANAGER command line when the proxy manager is started. Note that the configuration file specified by the DECW $PROXY_MANAGER_CONFIG symbol always has precedence over any value specified by this symbol.
DECW$PROXY_MANAGER_QUOTAS	Specifies any qualifiers to include on the RUN command line used to start the proxy manager.

Note

If you restart VSI DECwindows Motif for OpenVMS while a proxy manager process is running, the proxy manager does not restart automatically. To ensure that the proxy manager restarts (with any associated options) during DECwindows startup, stop the proxy manager process prior to restarting DECwindows.

Also note that when restarting the proxy manager as part of DECwindows startup,the owner of the proxy manager process is the user who issues the VSI DECwindows Motif for OpenVMS startup command. If DECwindows is started as part of system startup, the owner is the SYSTEM account. If DECwindows is started from another account, verify that the owner of that account has been granted access to the X display server.

3.7.7.2. Starting Manually

To start the proxy manager manually, use the XPROXYMANAGER command:

```
XPROXYMANAGER [qualifiers]
```

For example, to start a proxy manager using the configuration file SYS$MANAGER:DECW $LBXPROXY.DECW$PMCFG and the log file SYS$MANAGER:DECW$PM.LOG, use the following command:

```
$ XPROXYMANAGER/CONFIGURATION=SYS$MANAGER:DECW$LBXPROXY.DECW$PMCFG -
_$ /LOG=SYS$MANAGER:DECW$PM.LOG
```

See the online help for the XPROXYMANAGER command to learn more about the available qualifiers and their values.

Chapter 4. Using DECwindows

This chapter includes the following information that you can use after DECwindows has started. It describes the following topics:

- Setting the display
- Understanding the VSI DECwindows Motif for OpenVMS login process on both the New Desktop and Traditional DECwindows Desktop
- Customizing the login environment
- Customizing the startup environment
- Modifying the default behavior of the Session Manager
- Modifying system resource files
- Specifying client access control
- Customizing print formats

Note

The information in this chapter is not intended to be a comprehensive source of basic and advanced user information for each desktop. Rather, it is intended to supplement the material in the following manuals:

- *VSI OpenVMS DCL Dictionary: N-Z* (SET DISPLAY and SHOW DISPLAY commands)
- *Getting Started With the New Desktop*
- *Using VSI DECwindows Motif for OpenVMS*

4.1. Setting the Display

When a client application starts up, it opens one or more connections to adisplay server. The display server can be on the local system or on a remote system. The application needs to tell the underlying Xm, Xt, or Xlib routines the display server's node name and other connection information. This information is contained in a string called a **display name**.

In X Window System terms, the display name “specifies the hardware display name,which determines the display and communications domain to be used. [...] if the display name is NULL, it defaults to the value of the DISPLAY environment variable.”

On OpenVMS systems, the display name takes the form of either a WSA device that contains the necessary server information or a display name string that specifies the necessary server information explicitly. If neither form of display name is provided, Xlib translates the logical name DECW $DISPLAY to obtain the display name. If the DECW$DISPLAY logical name is undefined, then Xlib translates the logical name DISPLAY. If the DISPLAY logical name is undefined, then Xlib translates the logical name SYS$OUTPUT.

You must have previously created the WSA device and specified the display server information using one or more SET DISPLAY commands. If no SET DISPLAY commands are issued, the DECW$DISPLAY and DISPLAY logical names are inherited from the parent process. Note that the SET DISPLAY command also sets the DECW$DISPLAY and DISPLAY logical names when the /CREATE qualifier is used and no logical name is specified.

4.1.1. The Display Name Format

The display name string format is as follows:

[transport/]

[node[:]]

[server[.screen]]

[transport/]

Specifies the transport to use to connect to the display server. You can specify any of the following transports. Table 4.1 lists all transport names supported by VSI DECwindows Motif for OpenVMS and their meaning. Note that the implementation of some transport names may differ slightly from that defined in the X specifications.

Table 4.1. Supported VSI DECwindows Motif for OpenVMS Transport Names

Transport Name	Meaning
DECNET	Uses the DECnet network protocols.
DNET	The X Window System name for the DECnet network protocols. DNET is equivalent to DECNET, in most instances.
INET	Uses the TCP over the IPv4 protocol. This option adds support for the X synonym for TCPIP. With the addition of IPv6 support, this is one of two transports to which TCPIP equates.
INET6	Uses the TCP over the IPv6 protocol, if available. If the IPv6 protocol is not available, the IPv4 protocol is used. This is one of two transports to which TCPIP equates.
LAT	Uses the LAT protocol. There is no X equivalent for this transport.
LOCAL	Uses shared memory between the server and client processes within the same host.
TCP	The X Window System name for the TCPIP protocol option. TCP is equivalent to TCPIP.
TCPIP	Uses the TCP protocol over a version of IP. Previously, this option was an X synonym for INET. With the addition of IPv6 support, this option now equates to either INET or INET6 depending on the setting of the DECW$IPV6_SUPPORT logical name. (See Section 4.4.3 for information about setting this logical name.)

This parameter is optional. By default, node names ending in a single colon use the TCPIP transport. If you specify a second colon instead of a transport name,the DECNET transport is used. If a DECnet node name ends in a colon, enclose the node name in double quotation marks (""). Addresses ending in a triple colon (:::) are interpreted either as INET6 or DECnet.

The *node* parameter must specify a node value compatible with the specified transport. When parsing the display name string, VSI DECwindows Motif for OpenVMS does not verify that the *node* and *transport* parameters are compatible. Incompatible parameters will cause a failure when the connection is actually

attempted. If both the transport and node display name parameters are omitted, the LOCAL transport is assumed.

[node[:]]

Specifies the DECnet node, TCP/IP host, LAT address, or local system name of the display server. Specify one of the following:

DECnet node	For the DECNET or DNET transport, specify a DECnet Phase-IV node name, a DECnet Phase-IV address, a DECnet Phase-V node name or alias, or a DECnet Phase-V address. Use 0 to specify the local node. DECnet node names can be enclosed in quotes (" ").
TCP/IP host	For the TCPIP, TCP, INET, or INET6transport, specify a TCP/IP host name or address. See Table 4.2 and Table 4.3 for more information. Use 0 to specify the local node.
LAT service name	For the LAT transport, specify the name of the local system. The transport uses this value as a service name only.
Local system name	For the LOCAL transport, specify the name of the local system or 0.

All node names or addresses must be followed by a colon in addition to any trailing colons within the actual *node* parameter. You can optionally include a second colon to specify the DECNET transport; seethe *transport* parameter description for more information. If both the transport and node display name parameters are omitted, the LOCAL transport is assumed.

When specifying a TCP/IP host name or address for the INET6 transport (or the TCPIP or TCP transports if DECW$IPV6_SUPPORT is defined as TCP_IS_INET6), specify any of the IPv6 formats in Table 4.2.

Table 4.2. Supported IPv6 Host Name and Address Formats

Format	**Example**
IPv6 host name or fully-qualified domain name	ashfld.franklin.mass.us
IPv6 normal address	FEDC:BA98:7694:3210:FEDC:BA98:7654:3210
IPv6 compressed address	::7654:3210
IPv4-compatible IPv6 address	::978.765.432.1
IPv4-mapped IPv6 address	::FFFF:978.765.432.1
RFC 2732 style IPv6 literal address	[FEDC:BA98:7694:3210:FEDC:BA98:7654:3210]

When specifying a TCP/IP host name or address for the INET, INET6, TCPIP, or TCP transport, specify any of the IPv4 formats in Table 4.3.

Table 4.3. Supported IPv4 Host Name and Address Formats

Format	**Example**
IPv4 host name or fully-qualified domain name	ashfld.franklin.mass.us
IPv4 normal address	978.765.432.10

[server]

Specifies the decimal number of the display server on the X server display system. Display numbers usually start at 0. A single display server system usually uses the number 0.

[*screen*]

Specifies the decimal number of the screen to be used on the specified X display server. Screen numbers start at 0. This parameter is optional. The default is screen number 0.

4.1.2. TCP/IP Host Name Translation

The method used to translate a host name depends on whether IPv6 or IPv4 is selected. If the INET6 or TCPIP transport is specified, and the logical name DECW$IPV6_SUPPORT is defined as "TCP_IS_INET6", the TCP/IP Services getaddrinfo function is used to retrieve the address information from either the local database or the domain name server. If multiple addresses are available, all IPv6 addresses are tried before any IPv4 addresses. The order in which addresses are tried within each IP version is indeterminate.

If the INET transport is specified, and the logical name DECW$IPV6_SUPPORT is not defined as "DISABLED", the TCP/IP Services getaddrinfo function is used to retrieve the IPv4 address information from either the local database or the domain name server. If multiple IPv4 addresses are available, the order in which the addresses are tried is indeterminate.

If the INET or TCPIP transport is specified, and the logical name DECW$IPV6_SUPPORT is defined as "DISABLED", the TCP/IP Services get hostbyaddr function is used to retrieve the address information from either the local database or the domain name server. This method is only provided for compatibility with earlier versions of VSI DECwindows Motif for OpenVMS.

4.2. Understanding the Login Process

This section describes the DECwindows login process, which begins when the Start Session dialog box appears to after the Session Manager starts.

4.2.1. The New Desktop Login Sequence

When you enter a correct user name and password in the Start Session dialog box, the following events occur:

1. **LOGINOUT.EXE: Calls routines within DECW$LOGINOUT.EXE.** It performs the following functions:

    a. Checks the DW-MOTIF license to verify that the system is licensed to open connections to the display server. If not, DECW$LOGINOUT.EXE displays a warning message, restarts itself, and exits. A new Start Session dialog box displays.

    b. Changes the input pointer to a watch cursor.

    c. Modifies the authorized and trusted user lists to allow you to run applications that connect to the display server and change security settings. Also removes previously set server security settings.

    d. Instructs the server to impersonate a user logging in so that the owner of the server process changes to the user.

    e. Sets a random magic cookie value in the server and stores it in the X authority file DECW $ENDSESSION.DECW$XAUTH. This cookie guarantees that the process will be able to connect to the server to terminate the session.

f. Instructs the DTGREET process to terminate.

g. Starts a process that executes DTHELLO.EXE that displays the welcome screen and holds a connection to the server during the startup process.

h. Sets the process name to DTSESSION.

i. Initializes the accumulated CPU time for the Start Session process to zero so that the user process is not charged for time spent displaying the Start Session dialog box.

j. Passes CDE$SYSTEM_DEFAULTS:[BIN]XSESSION.COM as the command procedure that DCL executes.

k. Exits and passes control of the process to DCL.

2. **XSESSION.COM: Runs as the Session Manager's default DCL command procedure.** It performs the following functions:

   a. If the logical name DECW$SM_WSQUOTA is defined, sets the Session Manager process's working set quota to the value of the logical name.

   b. Runs the system login command procedure as determined by the SYS$SYLOGIN logical name. By default, this is SYLOGIN.COM.

   c. If you did not specify /NOCOMMAND after the user name in the Start Session dialog box, executes your LOGIN.COM (or other login command procedure as specified in the UAF record). You can redefine the DECW$USER_DEFAULTS logical name in your LOGIN.COM to change the directory that is used for your resource files.

   d. If Kerberos authentication is required, the process displays the Kerberos login dialog box. It requests a principal and password and generates a ticket.

   e. Inserts and removes entries from the user's default X authority file, as required.

   f. Executes SYS$MANAGER:DECW$SYLOGIN.COM, if it exists.

   g. Executes SYS$LOGIN:DECW$LOGIN.COM, if it exists.

   h. Runs CDE$SYSTEM_DEFAULTS:[BIN]DTSESSION.EXE to start Session Manager.

4.2.2. The Traditional DECwindows Desktop Login Sequence

When you enter a correct user name and password in the Start Session dialog box, the following events occur:

1. **LOGINOUT.EXE: Calls routines within DECW$LOGINOUT.EXE.** It performs the following functions:

   a. Checks the DW-MOTIF license to verify that the system is licensed to open connections to the display server. If not, DECW$LOGINOUT.EXE displays a warning message, restarts itself, and exits. A new Start Session dialog box displays.

   b. Changes the input pointer to a watch cursor.

c. Modifies the authorized and trusted user lists to allow you to run applications that connect to the display server and change security settings. Also removes previously set server security settings.

d. Instructs the server to impersonate a user logging in so that the owner of the server process changes to the user.

e. Sets a random magic cookie value in the server and stores it in the X authority file DECW $ENDSESSION.DECW$XAUTH. This cookie guarantees that the process will be able to connect to the server to terminate the session.

f. Starts a process that executes DECW$WAITFORSM.EXE, which holds a connection to the server during the startup process.

g. Sets the process name to DECW$SESSION.

h. Initializes the accumulated CPU time for the Start Session process to zero so that the user process is not charged for time spent displaying the Start Session dialog box.

i. Passes SYS$MANAGER:DECW$STARTSM.COM as the command procedure that DCL executes.

j. Exits and passes control of the process to DCL.

2. **SYS$MANAGER:DECW$STARTSM.COM: Runs as the Session Manager's default DCL command procedure.** It performs the following functions:

a. If the logical name DECW$SM_WSQUOTA is defined, sets the Session Manager process's working set quota to the value of the logical name.

b. Executes the system login command procedure as determined by the SYS$SYLOGIN logical name. By default, this is SYLOGIN.COM.

c. If you did not specify /NOCOMMAND after the user name in the Start Session dialog box, executes your LOGIN.COM (or other login command procedure as specified in the UAF record). You can redefine the DECW$USER_DEFAULTS logical name in your LOGIN.COM to change the directory that is used for your resource files.

d. Executes SYS$SYSTEM:DECW$WSINIT.EXE to read your workstation customization files. This program opens a connection to the display server and makes Xlib calls to apply your customizations, setting the screen background, pointer shape and color, and other workstation settings. It also creates a property on the root window to communicate your customizations to DECwindows applications that are started later.

Note

If you are logging in to a DECwindows Motif system for the first time after having used the XUI version of DECwindows, DECW$WSINIT.EXE will read your XUI resource files and convert them to DECwindows Motif format.

---

e. If Kerberos authentication is required, the process displays the Kerberos login dialog box. It requests a principal and password and generates a ticket.

f. Inserts and removes entries from the user's default X authority file, as required.

g. Executes SYS$MANAGER:DECW$SYLOGIN.COM, if it exists.

h. Executes SYS$LOGIN:DECW$LOGIN.COM, if it exists.

i. Runs SYS$SYSTEM:DECW$SESSION.EXE to start Session Manager.

4.3. Customizing the Login Environment

The following sections describe techniques to improve or customize the default DECwindows login environment.

4.3.1. Improving Application Startup Performance

Extensive SYLOGIN.COM or LOGIN.COM command procedures can slow down application startup. Many of the operations performed in a SYLOGIN.COM or LOGIN.COM are meaningless for DECwindows application startup. Therefore, the SYLOGIN.COM and LOGIN.COM files should be conditionalized for DECwindows application startup performance.

When starting a DECwindows application, only a minimum of SYLOGIN.COM and LOGIN.COM commands should be executed. Typically,the commands that should be executed are the redefinition of DECW$USER_DEFAULTS(if present), and other logical name definitions if the user will be referencing them from within the context of a DECwindows application.

The following code segment can be inserted into SYLOGIN.COM and LOGIN.COM immediately following the commands necessary for DECwindows:

```
$ mode = f$mode()
$ tt_devname = f$trnlnm("TT")
$ session_mgr_login = (mode .eqs. "INTERACTIVE") .and.  -
      (f$locate("WSA",tt_devname) .ne. f$len(tt_devname))
$ session_detached_process = (mode .eqs. "INTERACTIVE") .and. -
      (f$locate("MBA",tt_devname) .ne. f$len(tt_devname))
$ if session_mgr_login .or. session_detached_process then exit
```

4.3.2. Customizing the Login Screen (Traditional DECwindows Desktop Only)

You can customize the VSI DECwindows Motif for OpenVMS login screen to display alternate logos or screen colors. To customize the login screen, create a file named DECW$LOGIN.DAT in the SYS$MANAGER directory that contains your resource definitions. The custom resource definitions from SYS$MANAGER:DECW$LOGIN.DAT are merged with the resource definitions supplied by VSI in SYS$COMMON:[DECW$DEFAULTS.SYSTEM]DECW$LOGIN.DAT to form the new login screen.

Keep customized versions of the DECW$LOGIN.DAT resource file in the SYS$MANAGER directory, and **not** in DECW$SYSTEM_DEFAULTS, to prevent your customized file from being overwritten when upgraded to a newer version of VSI DECwindows Motif for OpenVMS software. In addition,storing the file in the SYS$MANAGER directory prevents the custom file from superseding the file that is supplied by VSI.

4.3.2.1. Customizing the Logo and Login Screen Colors

You can define the resources in Table 4.4 to control the position and colors of the logo and the color of the screen background in the Start Session screen.

Table 4.4. Moving the Logo and Changing Login Screen Colors

Resource	Description
rootColor	Color of the screen background.
logoColor	Color of the logo (default is burgundy).
logoX	x position of the logo (default is 0).
logoY	y position of the logo (default is 75).
centerLogoX	Boolean; if true (default), the logo is centered horizontally on the screen.

For example, to position the logo at x=100, y=600, add the following resource definitions to the SYS $MANAGER:DECW$LOGIN.DAT file:

```
decw$login.logoX: 100
decw$login.logoY: 600
decw$login.centerLogoX: false
```

4.3.2.2. Changing Positions of the Start Session and Set Password DialogBoxes

You can define the resources in Table 4.5 to control the position of the Start Session and Set Password dialog boxes.

Table 4.5. Changing Position of the Start Session and Set Password Dialog Boxes

Resource	Description
centerStartSessionX	Boolean; if true (default), the Start Session dialog box is centered horizontally.
centerStartSessionY	Boolean; if true (default), the Start Session dialog box is centered vertically.
centerSetPasswordX	Boolean; if true (default), the Set Password dialog box for expired passwords is centered horizontally.
centerSetPasswordY	Boolean; if true (default), the Set Password dialog box is centered vertically.

For example, to position the Start Session dialog box at x=100, y=600,add the following resource definitions to the SYS$MANAGER:DECW$LOGIN.DAT file:

```
decw$login.centerStartSessionX: false
decw$login.centerStartSessionY: false
decw$login.HiddenShell.x: 100
decw$login.HiddenShell.y: 600
```

To position the Set Password dialog box at x=30, y=100, add the following resource definitions to the SYS$MANAGER:DECW$LOGIN.DAT file:

```
decw$login.centerSetPasswordX: false
decw$login.centerSetPasswordY: false
decw$login.SetPasswordShell.x: 30
decw$login.SetPasswordShell.y: 100
```

4.3.2.3. Disabling a Node Name Display in the Start Session DialogBox

To prevent a node name from being displayed in the Start Session dialog box, add the following resource definition to the SYS$MANAGER:DECW$LOGIN.DAT file:

```
decw$login.displayNodeName: false
```

4.3.3. Displaying Custom Messages Prior to Login (New Desktop Only)

System managers or other privileged users can display custom messages (such as greetings, security updates, and system broadcasts) prior to session log in on the New Desktop.

At session startup, VSI DECwindows Motif for OpenVMS searches for the message file SYS $MANAGER:DECW$GREET.TXT. If the file is found, a window that contains the text from the message file is displayed in front of the login dialog box. Users must then press the **Return** key or click OK to continue and log into their New Desktop session. If the file is not found, the window is not displayed, and users can log into their New Desktop session directly.

To create a custom message, do the following:

1. Log into SYSTEM (or another privileged account).
2. Create the file DECW$GREET.TXT in one of the following locations:
   - For standalone systems, create the file in the directory SYS$SPECIFIC:[SYSMGR].
   - If you want to display a message across a cluster, create the file in the directory SYS $COMMON:[SYSMGR].
3. Enter the message text that you want displayed. The text is displayed according to the font family and language variant currently defined in CDE$SYSTEM_DEFAULTS:[CONFIG]XCONFIG.DAT and CDE$SYSTEM_DEFAULTS:[CONFIG.%L]XRESOURCES.DAT. All printable characters supported by the current font family and variant are valid for display.

   Also note that there are no explicit size requirements; the message window will size itself dynamically. Extremely long lines (those that are too long to fit on the screen itself) may be truncated.

   Note

   Lines that do not contain any text or formatting characters are ignored. To insert a blank line in the message file, enter at least one space character <sp> at the beginning of the line.
4. Save the file and restart the desktop session.

4.3.4. Disabling the Suggested Password List (New Desktop Only)

You can disable the display of the suggested password list when logging into New Desktop with an expired password.

To suppress the suggested password list, define the system logical CDE$NOGENPWD to a non-zero value, as follows:

```
$ DEFINE/SYSTEM CDE$NOGENPWD 1
```

4.3.5. Enabling Support for UNIX-Style Filenames (New Desktop Only)

You can display file and device names in UNIX-style format in the File Selection widget and the File Manager.

When this feature is enabled, file and directory specifications are displayed according to UNIX pathname conventions, such as using slashes instead of square brackets to delimit directory trees. In addition, the case of device names is preserved when displaying UNIX-style pathnames versus being converted to uppercase.

The following sections briefly describe how to enable this feature.

4.3.5.1. Enabling in the File Selection Dialog Box

To enable the display of UNIX-style filenames in the File Selection dialog box,set one or more of the following logicals to a non-zero value:

DECC$FILENAME_UNIX_ONLY (CRTL mode)
DECW$XM_FORCE_UNIX_NAMES_TO_VMS

These logicals can be defined system-wide by adding them to the SYS $MANAGER:SYLOGICALS.COM file, or defined on a per-user basis by adding them to each user's DECW$LOGIN.COM or LOGIN.COM file.

To force the File Selection dialog box to return selected filenames in OpenVMS format while displaying them in UNIX format, define the logical DECW$XM_UNIX_NAMES_TO_VMS. This enables other applications that rely on filenames in OpenVMS format to interact successfully with the File Selection dialog box while still displaying filenames in UNIX format.

4.3.5.2. Enabling in the File Manager

To enable the display of UNIX-style filenames in the File Manager,set the logical CDE $DTFILE_UNIX_NAMES to a non-zero value.

This logical can be defined system-wide by adding it to the SYS$MANAGER:SYLOGICALS.COM file, or defined on a per-user basis by adding it to each user's DECW$LOGIN.COM or LOGIN.COM file.

4.4. Customizing the Startup Environment

This section provides an overview of how to change the default VSI DECwindows Motif for OpenVMS startup environment using application customization parameters.

4.4.1. Using the DECW$PRIVATE_APPS_SETUP File

The DECW$PRIVATE_APPS_SETUP.TEMPLATE file is located in the SYS$MANAGER directory. This template file contains information you can use to customize your VSI DECwindows Motif for OpenVMS startup environment.

By using this file, you can modify the client areas listed in Table 4.6. Desktop-dependent parameters are noted. See the *Getting Started With the New Desktop* manual for additional parameters that are specific to the New Desktop environment.

Table 4.6. Client Areas That Can Be Modified

Client Area	Global Symbol	Default
Applications		
Bookreader online book directory	DECW$BOOK	SYS$SYSROOT:[DECW $BOOK]
FileView command file directory	VUE$LIBRARY[1]	DECW$SYSCOMMON: [VUE$LIBRARY.USER], DECW$SYSCOMMON: [VUE$LIBRARY.SYSTEM]
FileView public profile file directory	VUE$LIBRARY_WRITE [1]	SYS$COMMON: [VUE$LIBRARY.USER]
Console Window		
Enable or disable the display of system messages in the console window	DECW $CONSOLE_SELECTION	Disable
Specify the position of the console window	DECW $CONSOLE_GEOMETRY	-0,-0
Desktop		
Desktop to run at session startup	DECW $START_NEW_DESKTOP	True (Run New Desktop)
Display Devices		
SET DISPLAY command parameters	DECW$APPSNODE DECW$APPSSERVER DECW$APPSSCREEN	Node 0 Server 0 Screen 0
Enable or disable support for IPv6 over the TCP/IP transport	DECW$IPV6_SUPPORT	None
Examples and Tutorials		
Example program directory	DECW$EXAMPLES[2]	SYS$SYSROOT: [SYSHLP.EXAMPLES.DECW]
Computer-based instruction file directory	DECW$CBI	SYS$SYSROOT: [SYSCBI.DECW$CBI]
Keymaps		
Keymap file directory	DECW$KEYMAP	DECW$SYSCOMMON:

Client Area	Global Symbol	Default
		[SYS $KEYMAP.DECW.USER],DECW $SYSCOMMON: [SYS $KEYMAP.DECW.SYSTEM]
Login		
LOGINOUT log file	DECW$LOGINLOG	None
Use multiple connections during loginout	DECW$LOGINMANY	False
Login logo	DECW$LOGINLOGO[1]	None
Run login logo in a subprocess	DECW$LOGINLOGOSUB[1]	False (detached process)
Provide data from the specified X authority file during loginout	DECW $LOGIN_XAUTHORITY	SYS$LOGIN: DECW$XAUTHORITY.DECW $XAUTH
Proxy Manager		
Proxy Manager configuration file	DECW $PROXY_MANAGER_CONFIG	None
Proxy Manager log file	DECW $PROXY_MANAGER_LOG	None
Default command line options for the Proxy Manager application at startup	DECW $PROXY_MANAGER_OPTIONS	/PORT=6500/TRANSPORT= "LOCAL,TCPIP,DECNET"
Default command line options to run when the Proxy Manager is started as a detached process	DECW $PROXY_MANAGER_QUOTAS	/PROCESS_NAME=DECW $PROXY
Session Management		
Command that runs a session	DECW$SESSIONMAIN[1]	Run SYS$SYSTEM: DECW$SESSION
Command that resets a session	DECW$SESSIONEND[1]	None
Enable or disable session logging	DECW$SESSIONLOG[1]	True (Log file on)
System Startup		
DCL command executed when DECwindows startup is complete	DECW$MAINAPP[1]	Run SYS$SYSTEM: DECW$STARTLOGIN
Command procedure that runs after user authorization is complete	DECW$SESSIONCOM	SYS$MANAGER: DECW$STARTSM.COM
VSI DECwindows Motif for OpenVMS SYLOGIN command procedure	DECW$SYLOGINCOM	None
UNIX Compatibility		

Client Area	Global Symbol	Default
Define logical names for UNIX compatibility	DECW$UNIXLOGICALS	True
User Resources		
Command that initializes the system with the correct user resource values	DECW$SESSIONINIT	Run SYS$SYSTEM: DECW$WSINIT
Utilities		
X Window System Utilities directory	DECW$UTILS	SYS$SYSROOT:[SYSHLP. EXAMPLES.DECW.UTILS]

[1]Traditional DECwindows Desktop only.

[2]If you redefine this symbol to point to another directory, you must also change the definition of the DECW$UTILS symbol accordingly.

To customize any of these areas, copy the SYS$MANAGER: DECW $PRIVATE_APPS_SETUP.TEMPLATE file to SYS$MANAGER: DECW $PRIVATE_APPS_SETUP.COM, as in the following example:

```
$ COPY SYS$COMMON:[SYSMGR]DECW$PRIVATE_APPS_SETUP.TEMPLATE -
_$ SYS$COMMON:[SYSMGR]DECW$PRIVATE_APPS_SETUP.COM/LOG
```

Then edit the file to change the appropriate symbol.

The following sections contain examples for customizing the DECwindows client environment using the template file.

This file contains two sections, a Cluster Common section, and a Cluster Member Workstation-Specific section. Add the new symbol to the appropriate section.

4.4.2. Switching Between Desktops

To load a different desktop than the one chosen during installation, set the value of the DECW $START_NEW_DESKTOP symbol in DECW$PRIVATE_APPS_SETUP.COM to either TRUE (for the New Desktop) or FALSE (for the Traditional DECwindows Desktop).

If file SYS$MANAGER:DECW$PRIVATE_APPS_SETUP.COM does not already exist, create it from the template, as follows:

```
$ COPY SYS$MANAGER:DECW$PRIVATE_APPS_SETUP.TEMPLATE -
_$ SYS$COMMON:[SYSMGR]DECW$PRIVATE_APPS_SETUP.COM
```

4.4.3. Enabling Support for IPv6

Enable use of IPv6 by defining the global symbol DECW$IPV6_SUPPORT in the DECW $PRIVATE_APPS_SETUP.COM file. Users can override the resulting systemwide logical, if required. Define the symbol using one of the following values:

- TCP_IS_INET6

  Use this value if your network has been configured to support IPv6. The TCPIP and TCP transport names are interpreted as synonyms for theINET6 transport. Note that the INET6 transport attempts to use IPv6 where available; it does not guarantee that the IPv6 will be used. Individual programs can explicitly specify either the INET6 or INET transport option.

If you set this value, and your domain name servers are not configured to handle IPv6, then you may experience delays when opening display connections.

- DISABLED

  Use this value only if an application opens display connections from user-mode AST routines. The TCPIP and TCP transport names are interpreted as synonyms for the INET transport. The INET6 transport option is not available.

- "any other value"

  Use this value if your network does not support IPv6, or if IPv6 is only used for select IPv6-over-IPv4 tunnels. The TCPIP and TCP transport names are synonyms for the INET transport. Unlike the DISABLED option, individual programs can explicitly specify either the INET6 or INET transport option. This is the default value if the logical name is undefined.

The default behavior of this logical provides display name and client-server connection functionality identical to previous versions of VSI DECwindows Motif for OpenVMS.

Note

The TCP_IS_INET6 option uses the TCP/IP Services getaddrinfo function instead of the gethostbyaddr function. TCP/IP Services does not support use of its getaddrinfo function from within AST routines. VSI recommends that you use the DISABLED option if your application opens the DECwindows transport from within an AST routine. All VSI DECwindows Motif for OpenVMS applications support the TCP_IS_INET6 option.

4.4.4. Changing the Default Logo (Traditional DECwindows Desktop Only)

You can substitute the default VSI logo with an alternate logo by running a separate application that displays your logo.

To do this, you need to define a global symbol in the DECW$PRIVATE_APPS_SETUP.COM file and create a DCL command file that contains the commands to display your logo. For example, to display your own logo on the login screen:

- Create a command file (SYS$MANAGER:LOGO.COM, for example).
- Define the global symbol DECW$LOGINLOGO in SYS$MANAGER:DECW $PRIVATE_APPS_SETUP.COM, with its value set to the name of your command file. Note that this command file is run by the system account.

To create a custom logo, do the following:

1. If the SYS$MANAGER directory does not contain a command file, copy the template file to a command file:

   ```
   $ COPY SYS$COMMON:[SYSMGR]DECW$PRIVATE_APPS_SETUP.TEMPLATE -
   _$ SYS$SPECIFIC:[SYSMGR]DECW$PRIVATE_APPS_SETUP.COM/LOG
   ```

2. Edit the file and define the symbol DECW$LOGINLOGO to point to the command file that displays your custom logo.

Add the following line:

```
$ DECW$LOGINLOGO == "SYS$MANAGER:MYLOGO.COM"
```

3. Create the command file that displays your logo. This needs to be the filename and directory specified in step 2. Note that the command file runs as a detached process under the SYSTEM account. Be careful not to give users access to the system through your custom logo. Do not run applications like FileView or DECterm as a custom logo.

   For example, the file SYS$MANAGER:MYLOGO.COM could contain this command to display the icosahedron that is shipped as an example program:

   ```
   $ RUN DECW$EXAMPLES:ICO
   ```

4. Restart DECwindows by rebooting your workstation running DECW$STARTUP, as follows.

   ```
   $ @SYS$STARTUP:DECW$STARTUP RESTART
   ```

   To restore the VSI logo, you need to remove the definition of DECW$LOGINLOGO from your DECW$PRIVATE_APPS_SETUP.COM file and restart DECwindows.

4.4.5. Displaying Logos on Systems with Personal-Use Licenses (Traditional DECwindows Desktop Only)

If a license for VSI DECwindows Motif for OpenVMS has not been registered for the SYSTEM account, DECwindows does not display customized login logos. This can occur on systems with VSI DECwindows Motif for OpenVMS personal-use licenses that do not include SYSTEM on the list of authorized DECwindows users.

To display a customized logo on a VSI DECwindows Motif for OpenVMS with a personal-use license, add the following definition to the SYS$MANAGER:DECW$PRIVATE_APPS_SETUP.COM file:

```
$ DECW$LOGINLOGOSUB == "TRUE"
```

After editing the setup file, restart VSI DECwindows Motif for OpenVMS, as follows:

```
$ @SYS$MANAGER:DECW$STARTUP RESTART
```

VSI DECwindows Motif for OpenVMS login starts the logo process as a subprocess instead of as a detached process.

4.4.6. Displaying Console Messages

You can choose to display operator messages (OPCOM) in the console window using the Console Window application. The console window is a six-line display area at the top of the screen.

Note

If you select an alternate port (other than OPA0:) for console communications,the DECwindows Console Window is disabled and console broadcasts are enabled. Refer to the owner's guide for your workstation for information about selecting the Alternate Console port.

Specify how to display messages by defining the global symbol DECW$CONSOLE_SELECTION in the DECW$PRIVATE_APPS_SETUP.COM file. Enter one of the following values: WINDOW, DISABLE, or ENABLE.

- WINDOW

  Displays console messages in the Console Window application. If you specify the WINDOW value, the Console Window is displayed in the lower right corner of the login screen by default and continues to be displayed after the user logs in to the system.

  The Console Window application shares the same executable file and looks similar to the Message Window. However, a menu bar is not displayed in the Console Window; it reads its resources from the DECW$CONSOLE.DAT file instead of from the DECW$MESSAGEPANEL.DAT file. Internally, the Console Window is invoked by running the DECW$MESSAGEPANEL.EXE executable with the command line option *-console*.

  To control the initial position of the Console Window and the classes of OPCOM output that are enabled, you can the define the DECW$CONSOLE_GEOMETRY global symbol in the file SYS $MANAGER:DECW$PRIVATE_APPS_SETUP.COM.

  The DECW$CONSOLE_GEOMETRY symbol specifies the value of the *-geometry* option in the DECW$MESSAGEPANEL.EXE command line; this command is used to start the ConsoleWindow application. The default value is “-0-0”, which specifies the location of the window in the lower right corner of the screen.

  To position the window at the lower left corner of the screen, for example,add the following line to the command file SYS$MANAGER:DECW$PRIVATE_APPS_SETUP.COM:

  ```
  $ DECW$CONSOLE_GEOMETRY == "+0-0"
  ```

- DISABLE (default)

  Disables broadcasts to the OPA0: device. Console messages are not displayed.

- ENABLE

  Displays console messages in the console window.

Note

Although ENABLE was the default value in previous releases of DECwindows Motif, it is recommended that you do not use this option. Displaying console messages by default in the console window can corrupt the contents of the workstation display.

4.4.7. Creating Dedicated Accounts (Traditional DECwindows Desktop Only)

If you are a system manager, you can set up user accounts to run only certain applications. For example, you might want users to use only the Bookreader application.

This section describes the following three methods for setting up dedicated DECwindows accounts:

- Modifying the Session Manager command procedure
- Modifying the Session Manager executable file

- Modifying the Session Manager profile file

4.4.7.1. Modifying the Session Manager Command Procedure

You can define the global symbol DECW$SESSIONCOM in the SYS$MANAGER:DECW $PRIVATE_APPS_SETUP.COM file so that when a user logs in, LOGINOUT runs a command file other than DECW$STARTSM.COM. This action bypasses Session Manager altogether.

In Example 4.1, DECW$SESSIONCOM is defined in DECW$PRIVATE_APPS_SETUP.COM to point to the private command procedure SYS$MANAGER: PRIVATE_SESSIONCOM.COM. The default command file is SYS$MANAGER:DECW$STARTSM.COM.

Because DECW$SESSIONCOM is defined in the system logical name table, it affects Session Manager startup for every user name. Your private command file must check the user name under which it is running and run the normal DECW$STARTSM.COM procedure for non dedicated accounts.

Note

With this method, the following startup command procedures (normally executed from DECW $STARTSM.COM) do not run:SYLOGIN.COM, LOGIN.COM, DECW$SYLOGIN.COM, and DECW $LOGIN.COM.

To modify the Session Manager command procedure:

1. Create the command procedure shown in Example 4.1.

Example 4.1. Using a Private Session Manager Command File

```
$ CREATE SYS$MANAGER:PRIVATE_SESSIONCOM.COM
$!
$! Check to see whether this is the dedicated DECwindows account.
$! If it isn't, run the normal procedure to start Session Manager.
$!
$ username = F$USER()
$ IF F$LOCATE("BOOK_READER", username) .NE. F$LENGTH(username) -
 THEN GOTO dedicated$!$! Normal, nondedicated DECwindows login
$!
$ @SYS$MANAGER:DECW$STARTSM$ EXIT
$!

$! Dedicated DECwindows login.  Run Bookreader and then exit.
$!
$ dedicated:
$!
$ RUN SYS$SYSTEM:DECW$WSINIT
$ display = F$TRNLNM("DECW$DISPLAY")
$ RUN/DETACHED/OUTPUT='display' SYS$SYSTEM:DECW$MWM  ❶
$ RUN SYS$SYSTEM:DECW$BOOKREADER
$ endsession := $DECW$ENDSESSION ❷
$ endsession -noprompt ❸
$ STOP/ID=0  ❹
```

❶ DECW$MWM is the Motif WindowManager. Its SYS$OUTPUT definition needs to be set to the translation of DECW$DISPLAY so that DECW$DISPLAY is defined correctly in the detached process.

❷ DECW$ENDSESSION resets the server and displays a Start Session dialog login box.
❸ The -noprompt qualifier prevents DECW$ENDSESSION from asking the user to confirm whether to end the session. (If the user cancels the End Session operation, the workstation will be unusable because Bookreader will exit and the login box will not be displayed.)
❹ STOP/ID=0 logs out the process without writing an error message to SYS$OUTPUT.

2. Define the DECW$SESSIONCOM symbol in DECW$PRIVATE_APPS_SETUP.COM as follows:

```
$ DECW$SESSIONCOM :== SYS$MANAGER:PRIVATE_SESSIONCOM.COM
```

If SYS$MANAGER:DECW$PRIVATE_APPS_SETUP.COM does not already exist, create it as follows from the template file:

```
$ COPY SYS$MANAGER:DECW$PRIVATE_APPS_SETUP.TEMPLATE -
_$ SYS$COMMON:[SYSMGR]DECW$PRIVATE_APPS_SETUP.COM
```

3. Restart DECwindows by entering the following command:

```
$ @SYS$MANAGER:DECW$STARTUP RESTART
```

This step is necessary for the changes to DECW$PRIVATE_APPS_SETUP.COM to take effect.

4. Log in to the dedicated account on a DECwindows system.

After entering the user name and password of the dedicated account,Bookreader starts and Session Manager is not displayed. When the user exits from Bookreader, the PRIVATE_SESSIONCOM.COM procedure ends the session operation and then logs out. The End Session command displays the Start Session screen.

4.4.7.2. Modifying the Session Manager Executable File

You can define DECW$SESSIONMAIN in the SYS$MANAGER: DECW $PRIVATE_APPS_SETUP.COM file so that DECW$STARTSM.COM runs the specified command file instead of DECW$SESSION.EXE. Session Manager reads resource files and runs login command files but does not display the Session Manager menu bar. With this method, ensure that the End Session command does not prompt for confirmation.

When DECW$STARTSM.COM starts (that is, if DECW$SESSIONCOM has its default value), it starts Session Manager by running the DCL command that is stored in the logical name DECW $SESSIONMAIN. To define this logical name, edit SYS$MANAGER: PRIVATE_APPS_SETUP.COM so that it defines the global symbol DECW$SESSIONMAIN as the DCL command to execute.

This method is similar to the one described in the Section 4.4.7.1except that, with this method, DECW $STARTSM.COM executes the SYLOGIN.COM,LOGIN.COM, DECW$SYLOGIN.COM, and DECW $LOGIN.COM command procedures. Also, DECW$STARTSM.COM executes DECW$WSINIT.EXE, so the private command procedure does not need to do so.

To modify the Session Manager executable file:

1. Create the command procedure shown in Example 4.2.

Example 4.2. Modifying the Session Manager Executable File

```
$ CREATE SYS$MANAGER:PRIVATE_SESSIONMAIN.COM
$!
```

```
$! Check to see whether this is the dedicated DECwindows account.
$! If it isn't, run the normal procedure to start Session Manager.
$!
$ username = F$USER()
$ IF F$LOCATE("BOOK_READER", USERNAME) .NE. F$LENGTH(USERNAME) -
 THEN GOTO dedicated$!$! Normal, nondedicated DECwindows login
$!
$ RUN SYS$SYSTEM:DECW$SESSION$ EXIT
$!
$! Dedicated DECwindows login.  Run Bookreader and then exit.
$!
$ dedicated:
$!
$ display = F$TRNLNM("DECW$DISPLAY")
$ RUN/DETACHED/OUTPUT='display' SYS$SYSTEM:DECW$MWM    ❶
$ RUN SYS$SYSTEM:DECW$BOOKREADER
$ endsession := $DECW$ENDSESSION    ❷
$ endsession -noprompt    ❸
$ STOP/ID=0    ❹
```

❶ DECW$MWM is the Motif Window Manager. Its SYS$OUTPUT definition needs to be set to the translation of DECW$DISPLAY so that DECW$DISPLAY is defined correctly in the detached process.

❷ DECW$ENDSESSION resets the server and displays a new Start Session screen.

❸ The -noprompt qualifier prevents DECW$ENDSESSION from displaying the End Session prompt. (If the user cancels the End Session prompt,the workstation will be unusable because Bookreader will exit and the Start Session screen will not be displayed.)

❹ STOP/ID=0 logs out the process without writing a message to SYS$OUTPUT.

2. Define the DECW$SESSIONMAIN symbol in DECW$PRIVATE_APPS_SETUP.COM.

   Edit this command procedure to define DECW$SESSIONMAIN. Note that the symbol must be defined as a DCL command (unlike DECW$SESSIONCOM, which is defined as the name of a command procedure).

   ```
   $ DECW$SESSIONMAIN :== @SYS$MANAGER:PRIVATE_SESSIONMAIN.COM
   ```

   If SYS$MANAGER:DECW$PRIVATE_APPS_SETUP.COM does not already exist, create it as follows from the template file:

   ```
   $ COPY SYS$MANAGER:DECW$PRIVATE_APPS_SETUP.TEMPLATE -
   _$ SYS$COMMON:[SYSMGR]DECW$PRIVATE_APPS_SETUP.COM
   ```

3. Restart DECwindows by entering the following command:

   ```
   $ @SYS$MANAGER:DECW$STARTUP RESTART
   ```

   This step is necessary for the changes to DECW$PRIVATE_APPS_SETUP.COM to take effect.

4. Log in to the dedicated account on a DECwindows system.

After entering the user name and password of the dedicated account,Bookreader starts and the Session Manager menu bar is not displayed. When the user exits Bookreader, the PRIVATE_SESSIONMAIN.COM procedure performs an End Session operation and then logs out. The End Session command displays a DECwindows Start Session screen.

4.4.7.3. Modifying the Session Manager Profile File

This method starts Session Manager normally, but the system manager customizes its menus to remove any applications that are not started automatically. By removing certain applications, you can limit user access to applications.

With this method, the Session Manager menu bar is displayed, and the user can interact with whatever dialog boxes the system manager does not disable.

To modify the Session Manager profile file:

1. Log in to the dedicated account on a DECwindows system.

   When you enter the user name and password of the dedicated account, Session Manager starts.

2. Add the applications to the automatic startup list that you want to be displayed when a user logs in.

   Choose Automatic Startup... from the Session Manager Options menu. Session Manager displays the Automatic Startup dialog box.

   Use this dialog box to remove any undesired applications, such as FileView,from the automatic startup list. (For more information about using the Automatic Startup dialog box, see *Using VSI DECwindows Motif for OpenVMS*.)

   Note

   Do not remove Window Manager from the automatic startup list.

   For this example add Bookreader to the list and click on OK.

3. Remove Applications from the Session Manager menu bar.

   Choose Menu Bar... from the Session Manager Options menu. Session Manager displays the Menu Bar dialog box.

   Use this dialog box to remove the applications you do not want to be displayed. (For more information about using the Menus dialog box, see *Using VSI DECwindows Motif for OpenVMS*.)

   Click on OK to save your changes and to dismiss the dialog box.

4. Choose Save Session Manager from the Session Manager Options menu to save your menu bar settings.

5. Remove any menu items that you do not want to be displayed on the Options menu.

   Choose Menus... from the Session Manager Options menu and remove the following menu items from the Session Manager Options menu:

   Automatic Startup...
   Menus...
   Menu Bar...
   Save Session Manager

   You should also remove any other menu items that you do not want users to have access to in the dedicated account, such as Security.

After removing the items, click on OK to dismiss the dialog box and to save your menu settings.

6. Choose End Session from the Session Manager Session menu.

   Session Manager logs you out of the dedicated account and displays the DECwindows login box.

7. Log back in to the dedicated account.

To test your changes, log in to the dedicated account from the DECwindows login box. Bookreader and Session Manager should start up by default, and you should not be able to start any other application. To log out, choose End Session from the Session Manager menu.

If you decide to make the account non dedicated again, or if you want to make changes in a dialog box that you have removed from the system menu bar,delete or rename the file VUE$PROFILE.VUE$DAT in the dedicated account's SYS$LOGIN directory.

4.4.8. Creating a Custom Bookreader Directory

When you start Bookreader, the system uses the logical name DECW$BOOK to locate the file LIBRARY.DECW$BOOKSHELF. By default, the logical name DECW$BOOK equates to SYS $SYSROOT:[DECW$BOOK]. You can create a private directory containing the file LIBRARY.DECW $BOOKSHELF.

To do this, you need to create the directory and then define a global symbol in the DECW $PRIVATE_APPS_SETUP.COM file.

To create a private Bookreader directory called SYS$COMMON: [DECW$BOOK_LOCAL], you need to:

1. Create the directory, giving the world read access as in the following example:

```
$ CREATE/DIRECTORY/PROTECTION=WORLD:R -
_$ SYS$COMMON:[DECW$BOOK_LOCAL]
```

2. Copy the Bookreader LIBRARY.DECW$BOOKSHELF file to the new directory.

```
$ COPY SYS$SYSROOT:[DECW$BOOK]LIBRARY.DECW$BOOKSHELF -
_$ SYS$COMMON:[DECW$BOOK_LOCAL]/LOG
```

3. If the SYS$MANAGER directory does not contain the DECW$PRIVATE_APPS_SETUP.COM command file, copy the template file to a command file.

```
$ COPY SYS$MANAGER:DECW$PRIVATE_APPS_SETUP.TEMPLATE -
_$ SYS$MANAGER:DECW$PRIVATE_APPS_SETUP.COM/LOG
```

4. Edit the file and define the global symbol DECW$BOOK to point to your personal Bookreader directory.

   Add the following line:

```
$ DECW$BOOK == "SYS$COMMON:[DECW$BOOK_LOCAL]"
```

5. Restart DECwindows Motif, as follows:

```
$ @SYS$MANAGER:DECW$STARTUP RESTART
```

4.5. Modifying Session Manager Behavior (Traditional DECwindows Desktop Only)

You can modify the behavior of the DECwindows Session Manager by using several logical names. These logicals are not normally used; however, they may help in special circumstances, such as running two Session Managers on the same system. Table 4.7 lists the logicals and their meaning.

Table 4.7. Session Manager Logicals

Logical Name	Meaning
DECW$VUENOAUTOSTART	Prevents applications in the Session Manager autostart list from being started.
DECW$VUENORESET	Prevents Session Manager from resetting the display server when Session Manager exits.
DECW$VUELOGINOUTPUT	Saves any output from the login command files (SYSLOGIN, LOGIN, DECW$LOGIN) as applications start up from Session Manager. You can access this information by clicking on the SHOW OUTPUT button in the Work in Progress dialog box, which is located in the Session menu in the Session Manager window.

You can define these logicals in a DECterm or in the login command files (SYSLOGIN, LOGIN, DECW$LOGIN). To set any of these logical, define the logical name to any value, as in the following example:

```
$ DEFINE DECW$VUENOAUTOSTART 1
```

4.6. Modifying System Resource Files

Most DECwindows applications provide dialog boxes that contain options for customizing your DECwindows environment and saving your settings. For example, using Session Manager Options menu, you can look at many predefined settings and then choose and save new settings.

However, not all applications provide dialog boxes for changing and saving settings. For example, some applications let you change and save the size or location of the application's main window and others do not. To change and save settings that are not available from dialog boxes, you can specify resources in a DECW$XDEFAULTS.DAT file.

Caution

Use extreme caution when modifying resources for the following reasons:

- Options dialog boxes cannot be used to change settings that are specified in the DECW $XDEFAULTS.DAT file.
- In future DECwindows releases, application dialog boxes might contain the options you have added to your X defaults file. You will have to modify your DECW$XDEFAULTS.DAT file to reflect these changes.

- Error handling for resources is not available in this version of DECwindows. Syntax errors in resource files might cause DECwindows to fail without providing error messages.
- Using a large DECW$XDEFAULTS.DAT file significantly degrades application startup performance.

To use resources to change application settings,create a file (DECW$XDEFAULTS.DAT) in the directory specified by the logical name DECW$USER_DEFAULTS. In this file, specify the resources for the application settings you want to change. Alternatively, if your changes are specific to one application, you can modify that application's resource file (for example, DECW$MAIL.DAT).

Note that each resource specification in the DECW$XDEFAULTS.DAT file follows explicit syntax rules. For more information about the resource syntax, see the VMS DECwindows Guide to Xlib(Release 4) Programming: MIT C Binding or X Window System.

See the *Getting Started With the New Desktop* and *Using VSI DECwindows Motif for OpenVMS* manuals for resource information on application-specific resources.

4.7. Specifying Client Access Control

When a client application connects to an X display server, the server determines which access control scheme to use by referencing the current X authority file. The X authority file identifies the protocol to use based on the workstation to which the client is connecting. You can make changes to the X authority file using the Security Options dialog box.

4.7.1. Setting Security Options

To specify the access control scheme client applications on this workstation follow when connecting to an X server:

1. Do one of the following, depending on the desktop:
   - From the Traditional Desktop, choose Security... from Session Manager's Options menu.
   - From the New Desktop, click the Style Manager Security control.

   The Security Options dialog box is displayed.
2. Under Client Access Control, choose one of the following:

   Authorized Users List
   Kerberos
   Magic Cookie
3. Click on OK to save and apply the changes and close the Security Options dialog box.

   All subsequent client applications run from this system by the current user will apply this access control scheme when connecting to local X servers.

Note

Changes to client access control settings impact the contents of the default X authority file entries (local and DECnet) for the current user only, and do not impact any other access control settings in place on the system.

4.7.2. Refreshing Security Options During a Session

In some cases, you may want to specify an alternate X authority file for the current session. However, changing security options during a session can prevent client applications from subsequently accessing the X server. This condition occurs when performing the following sequence of tasks while a VSI DECwindows Motif for OpenVMS session is in progress:

1. Changing or resetting the client access control method to token-based access control.

2. Specifying an alternate X authority file for the current display device used by the session.

Once you specify an alternate X authority file, the original settings used to grant access during the session no longer apply, and the new settings are not available to clients.

To refresh the security options and synchronize the client and server authorization entries:

1. Choose Security... from the Session Manager's (Traditional DECwindows Desktop) or the Style Manager's (New Desktop) Options menu.

2. From the Security Options dialog box, do one of the following:

   - For Magic Cookie access control, click on Create Cookie.

   - For Kerberos access control, deselect the Kerberos option under Client Access Control, and click on Apply. Then reselect the option, and click on Apply.

   Both actions create a new X authority entry in both the server and the alternate X authority file.

If you cannot access the Session Manager or Style Manager, exit and restart your VSI DECwindows Motif for OpenVMS session. Exiting the current session restores the server to its default state.

4.7.3. Enabling and Disabling Access Control at Login

VSI DECwindows Motif for OpenVMS does not enable access control by default. Instead,the product uses access control set by the server at startup time.

To force the DECwindows Session Manager to enable or disable access control explicitly at login time, you can define one of the following logical names:

```
$ DEFINE/SYSTEM/EXECUTIVE DECW$LOGIN_ACCESS_CONTROL ENABLE
$ DEFINE/SYSTEM/EXECUTIVE DECW$LOGIN_ACCESS_CONTROL DISABLE
```

If the logical name is not defined, or if it is defined to some other value, such as “SERVER”, DECwindows login neither enables nor disables access control.

In most cases, it should not be necessary to define the logical name.

4.7.4. Enabling Trusted Users to Unlock Paused Desktop Sessions

You can grant a VSI DECwindows Motif for OpenVMS user the ability to unlock a VSI DECwindows Motif for OpenVMS session paused using the Screen Lock function.

To specify a trusted user, define the system logical DECW$TRUSTED_UNPAUSE logical, as follows, where `username` represents the name of an OpenVMS user:

```
$ DEFINE/SYSTEM DECW$TRUSTED_UNPAUSE "username"
```

Note that for screen unlock to function properly, the session user and any specified trusted users must share the same level of password access.

4.8. Customizing Print Formats

This section describes how to define print formats and lists the logical names and associated print formats for VSI DECwindows Motif for OpenVMS software. Depending on your configuration, VSI DECwindows Motif for OpenVMS customization tasks can include defining logical names to specify print formats.

Before you start up the system, edit the OpenVMS startup procedure to define the logical names that associate print queues with print formats. This startup procedure will subsequently call the VSI DECwindows Motif for OpenVMS startup procedure. You can also add these logicals to your login command file.

4.8.1. Defining Print Formats

Many VSI DECwindows Motif for OpenVMS applications use the Print dialog box to queue files or screens to a printer. By default, all printing devices on the system are displayed in the Printer list box. However, print queues can be associated with print formats through the definition of logical names. You define the logical name in the OpenVMS startup command procedure before the call to the VSI DECwindows Motif for OpenVMS startup procedure. Separate the list of print queues with commas or spaces,with the first queue being the default choice.

You can customize the list of printer queues displayed in the Print dialog box by defining any of the logical names in Table 4.8. This method is faster than making the Print dialog box derive the names of all the queues on the system, most of which do not apply to the print format under consideration. The following example shows how to define logical names for print formats in the OpenVMS startup files:

```
   $ Define DECW$PRINTER_FORMAT_TEXT   "CLUSTER_LN03,CLUSTER_PRINT, -
   _$ ANSI_ARTWRK,ANSI_PROTON"
   $ Define DECW$PRINTER_FORMAT_LINE   "CLUSTER_PRINT"
   $ Define DECW$PRINTER_FORMAT_ANSI2
"CLUSTER_LN03,ANSI_ARTWRK,ANSI2_PROTON"
   $ Define DECW$PRINTER_FORMAT_ANSI
"CLUSTER_LN03,ANSI_ARTWRK,ANSI_PROTON"
   $ Define DECW$PRINTER_FORMAT_PS     "PS_ARTWRK,PS_PROTON"
   $ Define DECW$PRINTER_FORMAT_REGIS  "SYS$NULL"
```

For example, if DECW$PRINTER_FORMAT_ANSI2 is defined as CLUSTER_LN03, ANSI_ARTWRK, ANSI2_PROTON, then when you selectANSI2 from the Print Format list box, only CLUSTER_LN03, ANSI_ARTWRK, and ANSI2_PROTON are shown in the Printer list box, with CLUSTER_LN03being the default choice.

4.8.2. Logical Names and Print Formats

Table 4.8 lists the logical names and the associated print formats in the VSI DECwindows Motif for OpenVMS product.

Table 4.8. Logical Names for the Print Dialog Box

Logical Name	Print Format
DECW$PRINTER_FORMAT_DEFAULT	Default

Logical Name	Print Format
DECW$PRINTER_FORMAT_TEXT	Text
DECW$PRINTER_FORMAT_LINE	Line printer
DECW$PRINTER_FORMAT_TERM	Terminal
DECW$PRINTER_FORMAT_ANSI2	ANSI2
DECW$PRINTER_FORMAT_ANSI	ANSI
DECW$PRINTER_FORMAT_PS	PostScript
DECW$PRINTER_FORMAT_REGIS	ReGIS
DECW$PRINTER_FORMAT_TEK	TEKTRONIX
DECW$PRINTER_FORMAT_DDIF	DDIF

You can define the logical names in systemwide logical name tables and users can override the logicals when necessary.

Appendix A. Tuning the DECwindows System

This appendix lists the recommended values for quotas and system parameters for DECwindows Motif systems.

A.1. Establishing UAF Parameters for DECwindows Applications

DECwindows applications can be sensitive to user authorization file (UAF) limits. If problems occur while starting a session or while starting applications, or if an application disappears without an error message, check the UAF limits of the account under which the session was started.

Table A.1 describes suggested UAF limits. The specific numbers given are intended only as guidelines. The correct UAF parameters depend on your applications and processes. For more information see the *VSI OpenVMS System Manager's Manual*.

Table A.1. Recommended Settings for UAF Limits

Limit	Setting	Usage
ASTLM	100	Asynchronous system trap (AST) queue limit
BIOLM	100	Buffered I/O count limit
BYTLM	100000	I/O byte limit
DIOLM	100	Direct I/O count limit
ENQLM	300	Enqueue lock limit
FILLM	100	Open file limit
MAXDETACH	0	Maximum detached processes for a single user name (0 = no limit)
MAXJOBS	0	Maximum active processes for a single user name (0 = no limit)
MAXACCTJOB	0	Maximum active processes for a single account (0 = no limit)
PGFLQUOTA	70000	Paging file limit
PRCLM	10	Subprocess creation limit
TQELM	10	Timer queue entry limit
WSDEFAULT	1024	Default working set size
WSEXTENT	8192	Working set extent
WSQUOTA	2048	Working set quota

A.2. Establishing System Parameters for DECwindows Applications and the Display Server

Because most DECwindows processes, especially DECterm windows, run in detached mode, you may need to increase the values of certain system parameters. Table A.2 and Table A.3 list these parameters, their minimum settings, add values, and usage for Alpha and I64systems. An **add value** is the increment by which AUTOGEN increases the parameter to allow for resource usage by VSI DECwindows Motif for OpenVMS.

See the *VSI OpenVMS System Management Utilities Reference Manual* for information about modifying system parameters.

Table A.2 lists the parameters, minimum settings, add values, and usage for OpenVMS Alpha systems.

Table A.2. Recommended Settings for System Parameters on Alpha Systems

Parameter	Minimum	Add Value	Description
GBLSECTIONS	600	280	System global sections
GBLPAGES	150000	92000	System global page table entries
GBLPAGFIL	4096	768	System global page-file sections limit
NPAGEDYN	1348576	300000	System nonpaged dynamic pool
PAGEDYN	704288	180000	System paged dynamic pool
SWPOUTPGCNT	512	–	Minimum process page size before swapping
MAXBUF	8192	–	Maximum buffer size
CHANNELCNT	255	–	System permanent I/O channel limit
PROCSECTCNT	128	–	Process image section descriptor limit
WSMAX	12000	–	Process working set maximum
CLISYMTBL	512	–	Minimum size of the command interpreter symbol table
PQL_MPGFLQUOTA	32768	–	Minimum page file quota
PQL_MASTLM	100	–	Minimum AST limit
PQL_MBIOLM	100	–	Minimum buffered I/O limit
PQL_MDIOLM	100	–	Minimum direct I/O limit

Parameter	Minimum	Add Value	Description
PQL_MFILLM	100	–	Minimum open file limit
PQL_MBYTLM	100000	–	Minimum buffered I/O byte limit
PQL_MPRCLM	10	–	Minimum subprocess limit
PQL_MENQLM	300	–	Minimum enqueued lock limit
PQL_MWSDEFAULT	1024	–	Minimum working set default
PQL_MWSQUOTA	2048	–	Minimum working set quota
PQL_MWSEXTENT	8192	–	Minimum working set extent
GH_RES_CODE	1584	560	Resident image code granularity hint region limit
IMGREG_PAGES	10000	3160	Minimum number of reserved pages for installing images with shareable address data

Table A.3 lists the parameters, minimum settings, add values, and usage for OpenVMS I64 systems.

Table A.3. Recommended Settings for System Parameters on I64 Systems

Parameter	Minimum	Add Value	Description
GBLSECTIONS	1000	400	System global sections
GBLPAGES	150000	92000	System global page table entries
GBLPAGFIL	4096	768	System global page-file sections limit
NPAGEDYN	4194304	300000	System nonpaged dynamic pool
PAGEDYN	4194304	180000	System paged dynamic pool
SWPOUTPGCNT	512	–	Minimum process page size before swapping
MAXBUF	8192	–	Maximum buffer size
CHANNELCNT	255	–	System permanent I/O channel limit
PROCSECTCNT	64	–	Process image section descriptor limit
WSMAX	131072	–	Process working set maximum

Parameter	Minimum	Add Value	Description
CLISYMTBL	512	–	Minimum size of the command interpreter symbol table
PQL_MPGFLQUOTA	32768	–	Minimum page file quota
PQL_MASTLM	100	–	Minimum AST limit
PQL_MBIOLM	100	–	Minimum buffered I/O limit
PQL_MDIOLM	100	–	Minimum direct I/O limit
PQL_MFILLM	100	–	Minimum open file limit
PQL_MBYTLM	100000	–	Minimum buffered I/O byte limit
PQL_MPRCLM	10	–	Minimum subprocess limit
PQL_MENQLM	300	–	Minimum enqueued lock limit
PQL_MWSDEFAULT	4096	–	Minimum working set default
PQL_MWSQUOTA	8192	–	Minimum working set quota
PQL_MWSEXTENT	16384	–	Minimum working set extent
GH_RES_CODE	3072	1450	Resident image code granularity hint region limit
IMGREG_PAGES	10000	–	Minimum number of reserved pages for installing images with shareable address data

A.3. Establishing Server Parameters for Non-VGA Devices

The DECwindows X display server requires specific tuning for graphics-intensive and 3D applications because of greater demand for system resources. You may need to make adjustments for server quotas on 3D-accelerated systems. These are minimum values suggested for a system with as little as 64 MB of physical memory and for running complex clients.

Table A.4 lists the recommended minimum quota values for non-VGA devices. These server quotas can set by defining global symbols in the file DECW$PRIVATE_SERVER_SETUP.COM. If the file does not exist, copy the file SYS$MANAGER:DECW$PRIVATE_SERVER_SETUP.TEMPLATE to SYS$COMMON:[SYSMGR]DECW$PRIVATE_SERVER_SETUP.COM, as described in Section 3.1.

Table A.4. Minimum Server Quotas for Non-VGA Devices

Quota	Value
DECW$SERVER_FILE_LIMIT	400
DECW$SERVER_ENQUEUE_LIMIT	2000
DECW$SERVER_WSDEF	10240
DECW$SERVER_WSQUOTA	16384

Tuning for Animation Applications

If your application involves lengthy animation sequences of large models or assemblies, performance can be improved by setting the following server working set quotas and values as follows:

Quota	Value
DECW$SERVER_WSDEF	10240
DECW$SERVER_WSQUOTA	20480

Note

These parameters should not be tuned upward unless you have at least 128 MB of physical memory.

Tuning for Memory-Intensive Applications

If you are running one or more memory-intensive applications on a system with a substantial amount of physical memory (512 MB or greater), performance can be optimized by setting the following server quotas and values:

Quota	Value
DECW$SERVER_FILE_LIMIT	6000
DECW$SERVER_WSDEF	32768
DECW$SERVER_WSQUOTA	65536
DECW$SERVER_PAGE_FILE_QUOTA	2000000

Determining Tuning Needs

To determine whether you need to set larger parameters, monitor the server process during the heaviest display usage. If the working set use approaches the maximum values, then you need to adjust the value of the DECW$SERVER_WS* server parameters.

However, do not set large values unless it is necessary. If you set these values too high, performance may be degraded. Optimal DECwindows server performance depends on application demands and available physical memory.

The next time you restart the server, the new values will take effect. If, after initial tuning and considerable use, the server is failing or is unnecessarily unresponsive, the server may have run out of memory or memory may have become fragmented. A particularly demanding application may require that you give the server even larger DECW$SERVER_PAGE_FILE_QUOTA value. Note that pagefile quota for the server is derived from system page files.

If the server error log SYS$MANAGER:DECW$SERVER_0_ERROR.LOG contains the statement `xxx: Out of memory`, increase the pagefile quota for the server. Set this quota by modifying the DECW$SERVER_PAGE_FILE_QUOTA parameter in the file DECW $PRIVATE_SERVER_SETUP.COM. Note that in multihead configurations, the DECW $SERVER_PAGE_FILE_QUOTA parameter should be increased to meet your system requirements.

Appendix B. DECwindows Motif Keymap Names

Table B.1 lists the DECwindows Motif keymap names. The table is arranged based on the language for which each keyboard is designed.

For information about changing the default keyboard layout, see Section 3.5.

Table B.1. DECwindows Motif Keymap

Language	Model	DECwindows Keymap Name
Austrian/German	LK201–(AG,LG,BG,MG)	AUSTRIAN_GERMAN_LK201LG_DP
		AUSTRIAN_GERMAN_LK201LG_TW
	LK201–(NG,PG)	AUSTRIAN_GERMAN_LK201NG_DP
		AUSTRIAN_GERMAN_LK201NG_TW
	LK401–(AG)	AUSTRIAN_GERMAN_LK401AG_TW
	LK444–(AG)	AUSTRIAN_GERMAN_LK444AG_LK
		AUSTRIAN_GERMAN_LK444AG_PC
Belgian/French	LK201–(AP,LP,BP,MP)	BELGIAN_FRENCH_LK201LP_DP
		BELGIAN_FRENCH_LK201LP_TW
	LK401–(AP)	BELGIAN_FRENCH_LK401AP_DP
		BELGIAN_FRENCH_LK401AP_TW
	LK444–(AP)	BELGIAN_FRENCH_LK444AP_LK
		BELGIAN_FRENCH_LK444AP_PC
British	LK201–(AE,LE,BE,ME)	BRITISH_LK201LE_DP
		BRITISH_LK201LE_TW
	LK401–(AA,PA)	BRITISH_LK401AA_DP
		BRITISH_LK401AA_TW
	LK444–(AE)	BRITISH_LK444AE_LK
		BRITISH_LK444AE_PC
Canadian/French	LK201–(AC,LC,BC,MC)	CANADIAN_FRENCH_LK201LC_DP
		CANADIAN_FRENCH_LK201LC_TW
	LK401–(AC,LC,BC,MC)	CANADIAN_FRENCH_LK401AC_DP
Canadian/French	LK444–(AC,LC,BC,MC)	CANADIAN_FRENCH_LK401AC_TW
		CANADIAN_FRENCH_LK444AC_LK
		CANADIAN_FRENCH_LK444AC_PC
Czech	LK401–(BV)	CZECH_LK401_BV
Danish	LK201–(AD,LD,BD,MD)	DANISH_LK201LD_DP
		DANISH_LK201LD_TW

Language	Model	DECwindows Keymap Name
	LK201–(ED,RD,FD)	DANISH_LK201RD_DP
		DANISH_LK201RD_TW
	LK401–(AD,LD,BD,MD)	DANISH_LK401AD_DP
		DANISH_LK401AD_TW
	LK444–(AD,LD,BD,MD)	DANISH_LK401AD_LK
		DANISH_LK401AD_PC
Dutch	LK201–(AH,LH,BH,MH)	DUTCH_LK201LH_DP
		DUTCH_LK201LH_TW
	LK201–(NH,PH)	DUTCH_LK201NH
	LK401–(NH,PH)	DUTCH_LK401AH
	LK444–(NH,PH)	DUTCH_LK444AH_LK
		DUTCH_LK444AH_PC
Finnish	LK201–(AF,LF,BF,MF)	FINNISH_LK201LF_DP
		FINNISH_LK201LF_TW
	LK201–(NX,PX)	FINNISH_LK201NX_DP
		FINNISH_LK201NX_TW
	LK401–(AF,LF,BF,MF)	FINNISH_LK401AF_DP
		FINNISH_LK401AF_TW
	LK444–(CA)	FINNISH_LK401CA_LK
		FINNISH_LK401CA_PC
Flemish	LK201–(AB,LB,BB,MB)	FLEMISH_LK201LB_DP
		FLEMISH_LK201LB_TW
	LK401–(AB,LB,BB,MB)	FLEMISH_LK401AB_DP
		FLEMISH_LK401AB_TW
	LK444–(AB,LB,BB,MB)	FLEMISH_LK401AB_LK
		FLEMISH_LK401AB_PC
Hungarian	LK401–(BQ)	HUNGARIAN_LK401_BQ
Icelandic	LK201–(AU,LU,BU,MU)	ICELANDIC_LK201LU_DP
		ICELANDIC_LK201LU_TW
Italian	LK201–(AI,LI,BI,MI)	ITALIAN_LK201LI_DP
		ITALIAN_LK201LI_TW
	LK401–(AI,LI,BI,MI)	ITALIAN_LK401AI_DP
Italian	LK444–(AI,LI,BI,MI)	ITALIAN_LK401AI_TW
		ITALIAN_LK444AI_LK
		ITALIAN_LK444AI_PC
North American	LK201–(AA,LA,BA,MA)	NORTH_AMERICAN_LK201LA

Language	Model	DECwindows Keymap Name
	LK401–(AA,LA,BA,MA)	NORTH_AMERICAN_LK401AA
	LK443–(AA,LA,BA,MA)	NORTH_AMERICAN_LK443AA_LK
		NORTH_AMERICAN_LK443AA_PC
Norwegian	LK201–(AN,LN,BN,MN)	NORWEGIAN_LK201LN_DP
		NORWEGIAN_LK201LN_TW
	LK201–(EN,RN,FN)	NORWEGIAN_LK201RN_DP
		NORWEGIAN_LK201RN_TW
	LK401–(AN,LN,BN,MN)	NORWEGIAN_LK401AN_DP
		NORWEGIAN_LK401AN_TW
	LK444–(AN,LN,BN,MN)	NORWEGIAN_LK444AN_LK
		NORWEGIAN_LK444AN_PC
Polish	LK401–(BP)	POLISH_LK401_BP
Portuguese	LK201–(AV,LV,BV,MV)	PORTUGUESE_LK201LV
	LK401–(AV,LV,BV,MV)	PORTUGUESE_LK401AV
	LK444–(AV,LV,BV,MV)	PORTUGUESE_LK444AV_LK
		PORTUGUESE_LK444AV_PC
Russian	LK401–(BT)	RUSSIAN_LK401_BT
Slovak	LK401–(CZ)	SLOVAC_LK401_CZ
Spanish	LK201–(AS,LS,BS,MS)	SPANISH_LK201LS_DP
		SPANISH_LK201LS_TW
	LK401–(AS,LS,BS,MS)	SPANISH_LK401AS_DP
		SPANISH_LK401AS_TW
	LK444–(AS,LS,BS,MS)	SPANISH_LK444AS_LK
		SPANISH_LK444AS_PC
Swedish	LK201–(AM,LM,BM,MM)	SWEDISH_LK201LM_DP
		SWEDISH_LK201LM_TW
	LK201–(NM,PM)	SWEDISH_LK201NM_DP
		SWEDISH_LK201NM_TW
	LK401–(AM,LM,BM,MM)	SWEDISH_LK401AM_DP
		SWEDISH_LK401AM_TW
	LK444–(CA)	SWEDISH_LK444CA_LK
		SWEDISH_LK444CA_PC
Swiss/French	LK201–(AK,LK,BK,MK)	SWISS_FRENCH_LK201LK_DP
		SWISS_FRENCH_LK201LK_TW
Swiss/French	LK401–(AK,LK,BK,MK)	SWISS_FRENCH_LK401AK_DP

Language	Model	DECwindows Keymap Name
		SWISS_FRENCH_LK401AK_TW
	LK444–(AK,LK,BK,MK)	SWISS_FRENCH_LK444AK_LK
		SWISS_FRENCH_LK444AK_PC
	LK201–(AL,LL,BL,ML)	SWISS_GERMAN_LK201LL_DP
		SWISS_GERMAN_LK201LL_TW
	LK401–(AL,LL,BL,ML)	SWISS_GERMAN_LK401AL_DP
		SWISS_GERMAN_LK401AL_TW
	LK444–(CH)	SWISS_GERMAN_LK401CH_LK
		SWISS_GERMAN_LK401CH_PC
Combined US/UK	LK201–(EE,RE,PE)	UK_LK201RE
		US_LK201RE
	LK401–(EE,RE,PE)	UK_LK401AA
		US_LK401AA
	LK443–(EE,RE,PE)	UK_LK443AA_LK
		US_LK443AA_PC