

CDE for the Solaris™ Operating Environment

A Technical White Paper



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Introduction

Servers and desktop systems are becoming more and more powerful every day, and operating environments must keep pace. Platforms like the Solaris™ Operating Environment offer stable programming interfaces, full support for multiprocessing and multithreading, application compatibility across product lines, Java™ technology integration and support, effective use of processor capabilities, and easy integration of emerging technologies — all the tools necessary to extract the performance and scalability needed by growing desktop, workgroup, and departmental computing environments.

The Solaris Operating Environment — the predominant UNIX® operating system — is a powerful force on the desktop. Built to enable high-performance, client/server applications in a distributed, networked environment, Solaris software provides the tools and technologies that enable users to do more with their systems than ever before, and make productive use of systems to foster corporate collaboration.

The Solaris Operating Environment offers:

- A Java technology-enabled environment
- Transparent access to systems, printers, remote databases, and other resources
- Internet-ready capabilities
- Built-in Web support
- Synchronization between desktop and personal digital assistants (PDAs)
- Scalability to support virtually any mix of applications and peripherals

As technology changes, so does the nature of desktop computing — and the desktop itself. The demands of today's heterogeneous environments, as well as IT, development organizations, and end users, mandate an environment that is similar across systems from multiple vendors and is easy to control, yet provides configuration flexibility to meet individual needs. The latest version of the Common Desktop Environment (CDE) for the Solaris Operating Environment provides all this and more — a standard desktop environment for the leading enterprise-wide operating environment. For users who value distributed network computing, CDE offers a high-performance, industry-standard desktop environment designed for productivity and collaboration.

CDE — Desktop Windowing in the Solaris Operating Environment

CDE is an advanced Motif-based desktop with an easy-to-use interface that delivers a consistent look and feel across UNIX platforms. It provides workstation users access to powerful client/server computing resources through an industry-standard interface that supports customizable workspaces, graphical system monitoring, and enhanced productivity tools. Designed with the UNIX environment in mind, CDE provides a host of features, including:

- An intuitive, familiar user interface and ease of use for consistency across platforms
- Comprehensive desktop office productivity tools
- Manageability through a customizable environment
- Increased personal and workgroup productivity and collaboration
- Transparent access to network resources
- A Java technology-enabled environment
- Easy network resource management
- PC integration and interoperability capabilities
- Synchronization with popular personal digital assistants (PDAs)
- Built-in, Web-rich features
- Desktop performance monitoring tools
- Adherence to standards

The seamless integration of the Solaris Operating Environment and CDE bring together PC-LAN and WAN connectivity, PC desktop integration, enterprise management features, and powerful development tools into a strategic software solution for businesses that want to sharpen their competitive edge with a powerful, integrated business network.

Ease of Use

Now more than ever, companies depend on computer systems to conduct business and communicate with customers, partners, and suppliers around the world. An increasing number of organizations are looking for an easy-to-use, flexible, and cost-effective desktop environment that will foster communication, improve productivity, and control operating costs. CDE provides such an interface, incorporating the most commonly used tools and advanced features into an integrated environment.

As the foundation for Sun's desktop, the latest version of CDE has been enhanced even further. Users, developers, and system administrators benefit from the robust and easy-to-use standards-based desktop through increased productivity, reduced user support and training, and built-in Web integration.

Easy-to-Use Interface

To be effective, desktop environments must be intuitive and easy to use. Whether navigating the desktop, launching applications, or managing files, the CDE graphical user interface (GUI) is simple to use and can be easily customized to fit individual needs (Figure 1). Should questions arise, an extensive online help system enables users to locate information quickly.

In particular, CDE brings frequently utilized tools to the forefront, giving users fast, intuitive access to the things they need most, including:

- *Login Manager* – Provides secured login to the desktop and is available automatically when the workstation is booted
- *CDE Remote Login* – Enables users to easily login from any remote Solaris software desktop
- *Session Manager* – A service that starts applications on the desktop at login and remembers their state upon log out
- *Window Manager* – Enables users to easily access workspaces and applications that are geared for different types of tasks

- *Workspace Manager* – Provides four work areas, each giving the user a separate view of the system
- *Drag and Drop* – Enables users to easily perform tasks such as dragging messages and files to printers, dropping appointments onto calendars, and more
- *Hot Keys* – Enables users to predefine a series of commands – or macros – to a given function key, thereby reducing the chance for errors and increasing productivity and efficiency
- *Internationalization* – Supports a number of different languages, making CDE the ideal environment for deployment throughout the global enterprise

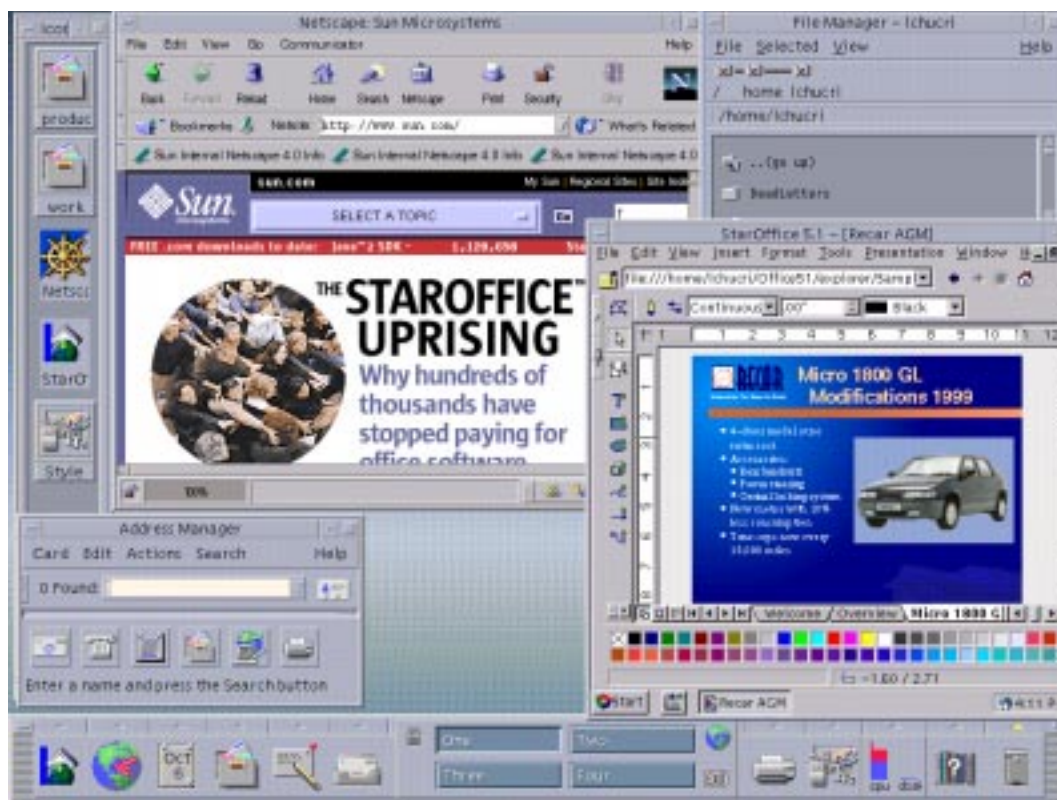


FIGURE 1 CDE provides an intuitive desktop interface.

Transparent Access to Network Resources

CDE enables organizations to take full advantage of all the features and benefits that the Solaris Operating Environment offers. For example, CDE allows complete, transparent access to network resources. Users can find and retrieve files, print to network printers, or run applications that are located on other systems.

CDE also provides comprehensive resources that enable desktop users, system administrators, and programmers to work together in a heterogeneous computing environment. Whether working alone or in groups, CDE enables people to exchange information and share resources across the network — quickly and efficiently.

Easy Network Resource Management

Because desktop systems are now the primary corporate workspace, users need an environment that enables them to find and utilize system, application, and data resources quickly and easily. CDE incorporates several tools that promote productivity.

- **Process Manager**

On occasion, users need to know how the operating environment and applications are utilizing system resources to help ensure that they (operating environment and applications) are operating at peak efficiency. The CDE Process Manager application enables users to locate and view critical process information graphically. In particular, the Process Manager provides an intuitive view as well as graphical tools to monitor and manage the following key tasks:

- Show user, system, or all processes
- Sort processes by resource consumption
- Suspend, resume, or kill processes
- Diagnose sick processes and contact owning users via Address Manager

- **File Manager**

The File Manager is a desktop application that helps users create, find, and use workspace objects such as files, folders, and applications, all of which are displayed as icons to make them easily identifiable.

The CDE File Manager provides several different views of the directory structure that help users locate important information. With the file find feature, users can search for files, folders, and programs with ease. In addition, the File Manager recognizes file formats for commonly used applications such as the StarOffice™ productivity suite and Applix, enabling users to share information with ease.

- System Information

Users and administrators alike need to be able to determine system configuration parameters so that they can identify system problems and help ensure repairs and upgrades are performed. CDE includes a System Information application that gives users and administrators the ability to view current system identity and configuration, including physical memory, swap space, and uptime.

- Print Manager and Print Client

Users need quick access to a variety of printers to enable best quality production – regardless of where those resources reside. CDE includes tools to manage local and remote printing resources. The Print Manager enables users to control print jobs and view print queue status. Users can print documents by simply dragging and dropping them to the printer of choice, as well as monitor activity on any network printer before sending documents for output. The Java technology-based Print Manager can be used in NIS, NIS+, FNS, and file name service environments. With the new Print Client feature, users can configure their own set of printers, including the default printer, without administrator intervention.

- Help System

No one can be expected to know an extensive desktop environment inside and out. CDE provides *balloon help*, as well as an *online help system* that enables users to browse for information on all desktop applications. This hyperlinked system helps both users and developers integrate applications with the CDE environment with supporting text, graphics, and the hierarchical viewing of content.

Increased Personal and Workgroup Productivity

To be as productive as possible, users need an integrated environment that lets them work on tasks concurrently and collaborate with other users. CDE includes several tools that foster corporate collaboration and increase personal productivity.

- Desktop Mail

The Web-enabled Desktop Mail tool in CDE recognizes URLs and provides e-mail capabilities that foster enterprise communication. Messages can be composed, sent, and received with ease. Support for POP3, IMAP4, and MIME attachments also enables users to send mixed media objects electronically. In addition, easy inbox and outbox organization, as well as the ability to create mail folders, helps users group and retain mail and mail header information for easy retrieval.

- **Workgroup Calendar**

Organizations are increasingly dependent upon corporate collaboration, and users need tools that permit them to manage their daily activities and coordinate with colleagues. CDE incorporates a Workgroup Calendar tool that enables users to schedule appointments and To Do items, set reminders, make and print appointment and To Do lists, browse other calendars, and schedule group appointments (Figure 2).

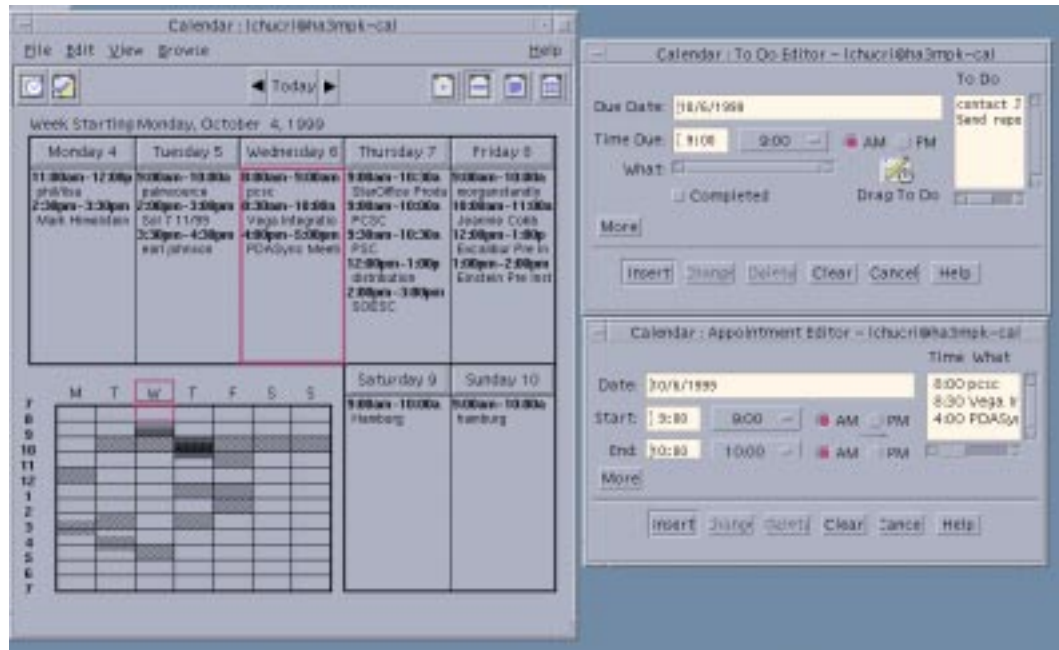


FIGURE 2 Workgroup Calendar provides users with the ability to schedule both individual and group appointments.

- **Address Manager**

The Address Manager enables users to search for other users and groups, save that information in an electronic card, and launch activities such as scheduling appointments, sending e-mail, and dialing telephone numbers. All of this helps to save time and increase productivity.

- **Text Editor**

The Text Editor enables users to easily create and revise ASCII documents such as memos, mail messages, or resource files. The built-in Spelling Checker enables users to check documents before sending them to other users.

- Spelling Checker

The Spelling Checker provides paragraph formatting and checks spelling. It is integrated with the Mail Tool and Text Editor, enabling users to create professional, readable documents and mail messages.

- Text and Voice Notes, Audio Manager

Once available only for the advanced user, text and voice notes are gaining mainstream popularity. Today, users want to be able to add text and voice note reminders to the desktop. CDE incorporates single-click controls that enable users to instantly record voice or text input for convenient and reliable future access. With the Audio Manager application, users can record and play a variety of industry-standard audio formats. These audio files are easily attached to mail messages.

Manageability Through a Customizable Environment

System management and administration has long been a difficult issue. With teams of administrators supporting thousands of users, organizations are finding that users need a desktop environment that they can manage and customize to fit their individual needs. CDE is such an environment. Its high degree of customization helps users tune the desktop for their individual preferences as well as their productivity needs.

Enhanced Front Panel

The CDE Front Panel is a special desktop window that contains a set of controls for handling common tasks. It moves with users as they switch between workspaces. From the Front Panel, users can easily manage applications, files, and network services (Figure 3). In the latest release of CDE, the Front Panel has been enhanced to provide users with quick access to favorite Web links, electronic cards, mail folders, addresses, and hosts. Users may also add and delete action buttons to launch frequently used applications and scripts.



FIGURE 1 The Front Panel provides users with global access to all applications and scripts.

Control Panel

Users need to be able to customize the look and feel of their desktops from a single location. A consistent location from which desktop customization tools can be accessed enhances the user experience and fosters productivity. The CDE Control Panel is a unified, extensible launch pad for desktop customization that enables users to manage the look and feel of the desktop through a variety of integrated tools.

- **Workspace Manager**

With the Workspace Manager, users can create pop-up menus that contain items for managing the desktop. Users can generate numerous virtual desktops and organize them by theme, project, or other classifications, creating multiple intuitive views into the system.
- **Workspace Menu Customizer**

With CDE, users can easily customize menus by dragging and dropping items in a File Manager window to create workspace submenus.
- **Style Manager**

No two people favor exactly the same color scheme for their desktop. With the Style Manager, users can easily customize the desktops appearance and personalize it by changing the color palette, fronts, backdrops, mouse, keyboard, beep, screen, window, and startup characteristics.
- **Icon Editor**

In some cases, users may want or need to create or alter the look of icons on their desktop. The Icon Editor enables them to dynamically design and change icons as needed.

Multiple Monitor Support

While most users run applications that can adequately display information on a single monitor, situations arise in which multiple screens can have a dramatic impact. CDE supports multiple monitor schemes that function as a single large display, a long panorama, or a grid of monitors (Figure 4).

- In Xinerama mode, up to 12 monitors can be configured as a single logical screen, enabling applications to be displayed in a panoramic view across an expanded desktop.
- Up to 16 monitors can be configured as individual screens, with a separate front panel on each monitor.



FIGURE 2 Xinerama allows CDE to display one logical screen image across multiple monitors.

Interoperability on the Desktop

To remain competitive in an increasingly efficient global marketplace, organizations must be able to access and provide more information faster and with greater reliability and accuracy than ever before. Technology, better data distribution, integrated business processes, and networked communications are essential if companies are to increase global corporate collaboration, streamline overhead costs, and use information more effectively to enhance the value of their products and services.

The ability to share information is essential, and organizations are finding that it is necessary to move data between desktop systems, PC-based laptops, and PDAs, as well as run applications over the network. It is imperative that these systems be able to exchange information and provide a uniform user interface while ensuring data security and integrity.

Consistent Interface Across Multiple Platforms

CDE provides unprecedented interoperability and consistency across enterprise hardware platforms and operating systems. Because CDE is a joint effort supported by many industry leaders, users are assured of a common user interface on all systems that support it. CDE is currently offered on the SPARC™ and Intel architectures, and is compatible with industry standards such as Motif, X11, MIME, and XAPIA. In addition, users can access Microsoft Windows applications with an optional SunPCi™ adapter card and software.

PC Interoperability

Today, organizations understand that users need access to a variety of computing resources, from powerful systems to sophisticated enterprise applications. In addition, users demand the powerful productivity applications they are familiar with, and want to be able to run those programs on their desktops, laptop computers, and PDAs, synchronizing them as needs dictate. Users require more than just file sharing — they want data consistency and integrity as well.

Sun understands that PC interoperability is essential, and provides three applications with CDE that foster its use: Solaris PDASync, PC launcher, and PC file viewer.

Solaris PDASync — Powered by HotSync

The use of PDAs to take notes, remember appointments, and store customer names and addresses is on the rise, and users are finding they need to be able to coordinate the PDA information with their desktop systems. The new Solaris PDASync Java technology-based software, available with CDE, enables users to synchronize popular desktop applications such as Desktop Mail and Calendar Manager with Palm OS-compatible devices, so they can be more effective and organized whether at the office, at home, or on the road (Figure 5).

Key features of Solaris PDASync include:

- Java technology conduits, linking Sun's key desktop productivity tools with organizer applications running on Palm computing platform handheld devices
- Easy conduit management
- Java synchronization software
- Java technology-based Backup and Installer applications
- Integration with CDE Desktop Mail, Calendar Manager, Address Manager, Text Note, and more



FIGURE 1 Solaris PDASync software enables data synchronization between the Solaris Operating Environment and Palm computing hand-held devices.

PC Launcher

Users are moving data between systems more than ever before, so they need a mechanism that enables them to easily view, edit, print, exchange, and share PC files within a heterogeneous enterprise environment. The new PC launcher (SPARC platform only) gives SunPCi users seamless access and power to view, edit, and print popular types of PC files or attachments instantly by automatically launching the associated Microsoft Windows application and file.

By incorporating PC launcher into the CDE desktop, users can share attachments and files created by Microsoft Word, Excel, and PowerPoint, Lotus 1-2-3, AutoCAD, and other applications. With PC launcher, corporations acquire seamless interoperability and a cost-effective solution for exchanging and sharing documents across the enterprise.

Key features of PC launcher include:

- Automatic launching of associated Microsoft Windows applications and files with a single mouse click
- Easy editing, viewing, printing, searching, and navigating of PC file attachments and Microsoft Windows .exe files
- Ability to copy and paste text from Microsoft Windows applications into Solaris software-based applications
- Quick and easy access to PC file attachments in CDE Mail and File Manager, as well as drag and drop any file on the CDE front panel icon
- Supports Microsoft Windows shortcuts from the Solaris desktop, enabling users to keep relevant PC applications on the Solaris CDE front panel and workspace

- Support for defining additional file types for other Microsoft Windows applications using standard CDE tools
- Built-in icon identification support for Microsoft Windows applications, including Microsoft Word, Excel, and PowerPoint, Lotus, WordPerfect, AMI Professional, QuattroPro, Corel, Freelance, as well as BMP, DXF, GEM, and PIC graphic files

PC File Viewer

Users are sharing information more than ever before, and often they need a way to view, exchange, and share PC files within a heterogeneous environment. The CDE PC file viewer (SPARC platform only) provides the power to view and copy text from many popular types of PC files or attachments instantly —whether or not the originating application is installed on their desktop. By incorporating PC file viewer into the Solaris desktop, users can share attachments and files created by Microsoft Word, Excel, and PowerPoint, Lotus 1-2-3, AutoCAD, and other applications.

A cost-effective solution for exchanging and sharing documents across the enterprise, PC file viewer features include:

- WYSIWYG viewing of fully formatted documents – documents are displayed just as they were intended to appear when originally created
- WYSIWYG display of file attachments in color
- Easy viewing, searching, and navigating of file attachments
- Simple tools for copying and pasting text into Solaris software-based applications
- Ability to cut and paste text from word processing, spreadsheet, and presentation files into any Solaris software-based application such as Text Editor, dtmail, FrameMaker, StarOffice, or Applix products
- Provides a single bridge between Microsoft Windows and Solaris software-based documents
- Easy and quick access to file attachments in CDE Mail and File Manager; automatically identifies the file type and launches PC file viewer
- Access to 17 file types without requiring the originating application

Netscape™ Application Launcher

The ability to browse the corporate intranet and the Internet has become ubiquitous; users have come to expect this functionality in every desktop system. For years, Sun systems have supported the Netscape™ browser, a leading force in making the network accessible. Netscape has been extended further through the Internet-ready features of the Solaris Operating Environment. No longer do users need to run the entire Netscape environment on Sun systems — HTML and mail files can be launched automatically with the appropriate Netscape application, such as Composer or Messenger.

With the Netscape application launcher, CDE users can invoke the Communicator's mailer, HTML Composer, and News reader directly from CDE. Or, users can invoke the Netscape HTML Composer by choosing Edit from the action menu of any HTML object, including files, attachments, workspace objects, and so on. By making individual components of Netscape more readily available, users gain easy access and launching of Netscape file attachments such as HTML and mail from the Solaris desktop.

Web-Enabled Solaris Desktop

The new X11R6.4 Web-enabling technology in CDE enables users to move from place to place without losing the functionality of their desktop. Now, users enjoy browser-based access to corporate X applications for remote access through the Internet or intranet.

Image Viewing

Most documents today are circulated electronically, so users need a way to view them regardless of the tool with which they were created. CDE includes three tools that enable the manipulation files and images from other systems.

- *Image Viewer* – Enables users to view, edit, print, and translate the file formats of monochrome and color images, as well as multiple-page documents such as PostScript™ files. Rotation, zoom, and conversion capabilities allow users to display images and PostScript files. Image Viewer also integrates with the mail tool, so users can read both image and PostScript attachments by simply double-clicking on them.
- *Snapshot* – Enables users to capture, edit, print, and translate the file formats of monochrome and color images as well as multiple page documents, such as PostScript files. Users can capture snapshots of windows, user-defined regions, or the entire desktop screen.
- *SDTimage* – Enables users to capture screen images quickly and easily from the UNIX command line.

Standards

Much of today's software is limited to a specific environment — it often runs only on a given operating system or hardware platform, requiring complete replacement even for a simple software upgrade. Such limits are confining, and with the nature and function of software changing rapidly, organizations are being forced to focus on protecting their investments in both hardware and software solutions.

Adherence to standards is an excellent method for securing investment protection. Through the consistent use of platform-independent technology, such as open Internet and established industry standards, organizations can rest assured that the tools they employ today will remain useful for the long term. CDE supports a variety of industry and de facto standards to help assure support for existing and future applications.

- **Windowing Environment Standards**
 - CDE supports Motif 1.2 and X11R6.4, enabling maximum interoperability with other X window system vendors.
- **X11R6.4 Support**
 - Web-enabled support provides browser-based access to corporate X applications for remote users through the Internet or intranet.
 - Xinerama support provides one logical screen image that can be displayed across multiple monitors.
 - Color Utilization Policy (CUP) support minimizes color map flashing.
 - Xprint extension provides a framework for X applications to render on non-display devices, such as printers and fax machines.
 - Energy Star support provides power management controls that conserve workstation power.
 - Developer toolkit includes new public APIs and documentation for Xinerama, XPrint, XKB, DPMS, and CUP extensions.

- **Media Standards**

CDE supports a variety of audio and video standards, such as Java™ Media Framework (JMF), MPEG 1 and 2, Apple Quicktime, and MIDI, to enable compatibility and optimal performance. JMF is a Java technology-based application that provides a streaming video file format for MPEG 1 and 2, Quicktime, and AVI, as well as audio support for MIDI. With JMF, users can take advantage of real-time video creation and broadcast functionality.

MPEG 1 and 2 provide smooth video compression and decompression to support real-time video creation and broadcast, while Quicktime supports video recording and playback. MIDI enables the connection of musical devices to the system.

Other media standards supported include AIFF, AVI, GSM, WAV, RMF, VIVO, and AU.

- **Mail Standards**

CDE supports common desktop mail standards, including MIME, POP3, and IMAP4. The Lightweight Directory Access Protocol (LDAP) for accessing online directory services is also supported.

- **Smart Card Support**

CDE is smart card-ready, providing the latest security technology available for Sun systems. This technology enables users to be authenticated using a smart card when logging into CDE, and reauthenticated after a screen lock or when the card is removed. Both external and internal smart card devices are supported.

- **Removable Media Manager**

The new Removable Media Manager is a GUI-based menu that enables users to easily manage removable media devices. Support for DVD-ROM, ZIP, JAZ, Rmdisk, as well as floppy and CD-ROM devices results in plug-and-play access to standards-based peripherals.

- **I/O Technology Support**

New support has been added to 1394 as well as quality enhancements for PCMCIA.

- **Energy Star Compliance**

CDE complies with Energy Star requirements, reducing or virtually eliminating unnecessary power consumption. Sun includes Power Management™ software for SPARC desktop systems, enabling users to minimize power consumption on desktop systems when they are not being used.

System Requirements

The heterogeneous environments of today's organizations dictate that applications run on a variety of platforms. CDE meets these needs, and is available on a variety of SPARC and Intel Architecture personal computers and workstations running the Solaris 8 Operating Environment.

CDE requires a minimum of 64 Mbytes of memory; 128 Mbytes of memory is recommended for optimal performance.

Summary

Rarely do products so completely address user needs — with so little compromise — as CDE. Developed with a set of architectural features that make it one of the richest desktop systems available, it incorporates state-of-the-art interoperability, an intuitive interface, high reliability, tools that foster productivity and collaboration, and access to the power of the Solaris Operating Environment — giving it the key characteristics demanded by users business-critical computing environments around the world.

- Delivers an intuitive, familiar user interface plus ease of use for consistency across platforms
- Provides comprehensive desktop office productivity tools
- Enhances manageability through a customizable environment
- Increased personal and workgroup productivity and collaboration
- Offers transparent access to network resources
- Eases network resource management
- Provides PC integration and interoperability
- Includes built-in Web and Internet features
- Delivers a robust Java environment
- Adheres to industry standards



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