

# Migrating HP VUE Desktop Customizations to CDE

With CDE becoming the UNIX<sup>®</sup> desktop standard, it is important to allow HP VUE users to preserve their customizations when moving over to the CDE desktop. A set of tools has been developed to make this transition as complete and effortless as possible.

**by Molly Joy**

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The HP Visual User Environment (HP VUE), combined with a set of applications, is a powerful graphical environment for interacting with the computer. It provides a consistent user interface and is based on OSF/Motif, which was created to enable different applications to behave the same way, eliminating the need for users to learn multiple command sets to control applications.

The need for standards was recognized early by Hewlett-Packard with its support for industry standards such as the X Consortium and the Open Software Foundation (OSF). Although HP VUE provided users with an easy-to-use desktop interface, there was no industry standard graphical user interface (GUI) for desktop computers running the UNIX operating system and the X Window System. What this meant was that even though Motif applications behaved the same across multiple platforms there was no commonality in the graphical user interface, which was referred to as a desktop. This was a serious limitation from the perspective of both the end user who had to learn to operate different desktops in a heterogeneous computing environment and the application developer who had to develop and integrate applications into multiple desktops. This was also a cost factor in enterprises with multivendor computing environments because of the costs involved in training users and integrating new systems into existing heterogeneous networked environments.

Hewlett-Packard has a long-standing commitment to open system standards. HP is one of four sponsor companies that contributed key technologies and helped to develop CDE (Common Desktop Environment). CDE's consistent look and feel is based on HP's proven and accepted HP VUE technology. This rich graphical user interface has become a core component of CDE.

Although HP VUE and CDE have the same look and feel, the two technologies are somewhat different with the result being that HP VUE customizations cannot be directly incorporated into the CDE desktop and be expected to work. HP's commitment to supporting customer investments dictated that a seamless transition from HP VUE to CDE was necessary. Even though a complete transition is not possible in some cases, the intent was to make the transition as complete and effortless as possible.

## Developing the Migration Tools

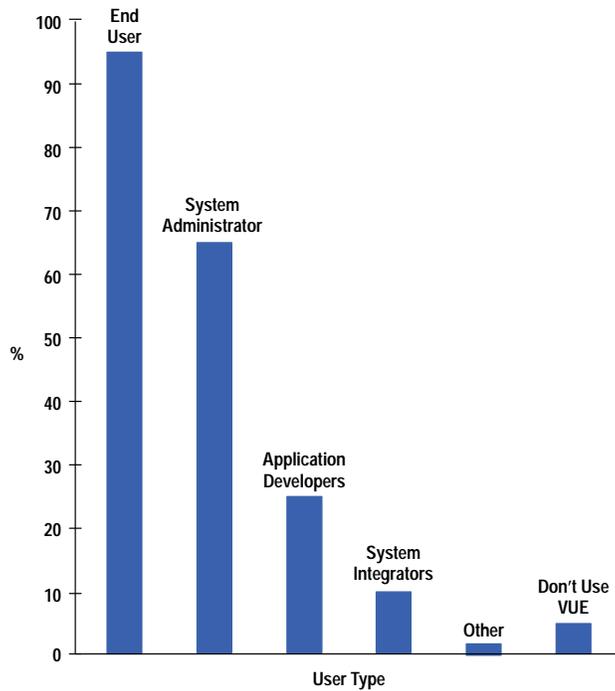
The decision to develop a set of tools to allow HP VUE-to-CDE migration was made in the second half of 1994. This decision included an agreement between Hewlett-Packard and TriTeal Corporation to develop these tools jointly. TriTeal and HP have a long history with the HP VUE product because through a licensing agreement with HP, TriTeal has marketed and sold HP-VUE on AIX, Solaris, SUN, DEC OSF/1 and AT&T GIS operating systems.

A customer survey was conducted by HP in June 1994 to help determine the user categories most concerned with migration. 213 customers were randomly surveyed. We had a 34% (73 responses) response rate. Fig. 1 shows the percentage of respondents falling into the various user categories. Respondents were allowed to select multiple categories. For example, almost all of the respondents were end users, and 65% of them were system administrators.

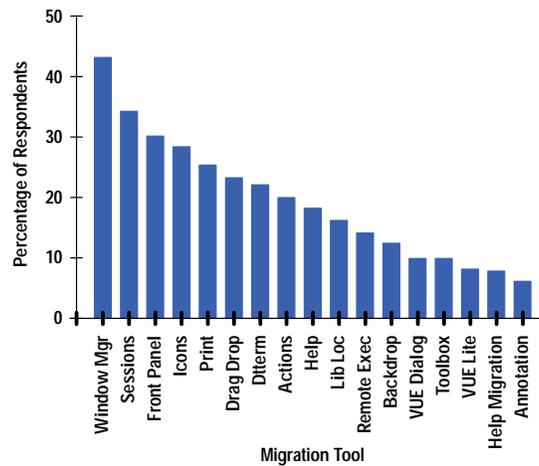
The survey listed areas of HP VUE customizations and asked customers to choose the areas for which CDE must provide a migration mechanism. Fig. 2 shows this list and the percentage of respondents choosing various areas for migration.

It was decided early that the migration tools would be a set of shell scripts, modularized so that customers could run them to suit their specific needs. It was also recognized that although converters would be written to deal with the common kinds of customizations, it would be impossible to cater to all types and forms of customization. The tools would be written to be noninvasive and not change any of the HP VUE customizations.

**Fig. 1.** The categories of users interested in migration tools.



**Fig. 2.** The areas of interest for the type of migration tools.



### The Difference Between HP VUE and CDE

A brief look at the major differences between HP VUE and CDE will help explain what the various converters written for migration have to accomplish. Converters were written for:

- Actions and file types
- Icon image files
- Toolboxes
- Front-panel and session customizations

**Actions and File Types.** Actions make it easier to run applications by representing the applications as icons that can be manipulated. When an action is created, the application is integrated into the user's graphical environment, teaching the desktop how to run the application.

A file type (referred to as a data type in CDE) provides the ability for different types of files to have different appearance and behavior. The file-type accomplishes this by:

- Defining a unique icon for the each file in the file manager windows
- Providing a custom actions menu for tasks that users do with data files

**Fig. 3.** Action and file type definitions in HP VUE and CDE.

<pre> HP VUE  ACTION ImageViewClient ARG-TYPES      * TYPE           COMMAND WINDOW-TYPE    NO-STDIO EXEC-HOST      hpcvusa EXEC-STRING    usr/bin/X11/imageview\                %(File)Arg_1%  L-ICON        imagevw.l S-ICON        imagevw.s DESCRIPTION    This action invokes the\                image Viewer, on the\                client side if possible  END  FILETYPE BM L-ICON        bitmap.l S-ICON        bitmap.s ACTIONS       ImageViewClient DESCRIPTION    A BM file contains data\                in the X11 bitmap format.  FILE-PATTERN  *.bm END </pre>	<pre> CDE  ACTION ImageViewClient { ARG-TYPE      * TYPE         COMMAND WINDOW-TYPE   NO-STDIO EXEC_HOST    hpcvusa EXEC_STRING   /usr/bin/X11/imageview\                %(File)Arg_1%  ICON         imagevw DESCRIPTION   This action invokes the\                Image Viewer, on the client\                side if possible }  DATA_ATTRIBUTES BM { ICON         bitmap ACTIONS      ImageViewClient DESCRIPTION   A BM file contains data in\                the X11 bitmap format. }  DATA_CRITERIA BM1 { DATA_ATTRIBUTES_NAME BM NAME_PATTERN *.bm } </pre>
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- Providing context sensitivity for actions (for example, different versions of the print action can be written for different file types, creating a file-type-sensitive printer control for the front panel).

Both HP VUE and CDE use actions and file (data) typing in the same way. Both maintain a database of actions and file type.

File types, used in conjunction with actions, can be thought of as components that create a grammar for a user's system. If files are thought of as nouns, then file types are the adjectives and actions are the verbs. Like grammar, the pieces are related to one another. There are rules that govern how they are put together and how they affect one another. It's these rules that have changed between HP VUE and CDE. This can be better illustrated with action and file type definitions in the two environments (see Fig. 3).

While action definitions have undergone only minor syntactical changes between HP VUE and CDE, the file type definitions have undergone some major changes between the two environments. In addition, the file naming convention and the locations of files that contain actions and file types have changed between HP VUE and CDE.

Unlike the file type definition in HP VUE, the CDE definition consists of the following two separate database record definitions:

- DATA\_ATTRIBUTE. This definition describes the data type's name and the appearance and behavior of files of this type.
- DATA\_CRITERIA. This definition describes the typing criteria. Each criteria definition specifies the DATA\_ATTRIBUTE definition to which the criteria apply.

There must be at least one DATA\_CRITERIA definition for each DATA\_ATTRIBUTE definition. A DATA\_ATTRIBUTE definition can have multiple DATA\_CRITERIA definitions associated with it. DATA\_CRITERIA and DATA\_ATTRIBUTE records are described in the [Article 3](#).

To allow applications integrated into HP VUE to be integrated into CDE, a converter had to be written to do the necessary syntactical conversions. These include the syntactical differences illustrated in Fig. 3, as well as others not shown in Fig. 3. The tool also writes these changes to files with the appropriate CDE suffix.

### Icon Image Files

Icons are an important part of the visual appearance of both HP VUE and CDE. Icons are associated with actions, data types, front-panel controls, and minimized application windows. For HP VUE components, icon image file names use the convention: `basename.size.format`, where `basename` is the name used to reference the image, `size` indicates the size of

the file (l for large, m for medium, or s for small), and format indicates the type of image file (pm for X pixmaps or bm for X bitmaps). The different desktop components such as the file manager and the workspace manager choose the icon to be displayed based on the size field in the icon name.

In CDE, the same format applies. However, there are four different sizes: large (l), medium (m), small (s), and tiny(t), and the sizes are used differently. For example, by default the file manager in HP VUE uses large (.l) icons whereas in CDE the file manager expects medium icons (.m). To migrate these customized icons to the CDE desktop, a tool was written to do the necessary icon name mapping to allow the customized icons to be displayed by the different CDE desktop components.

## Toolboxes

In HP VUE, toolboxes are containers for applications and utilities. Each application or utility is represented by an icon called an action icon. The toolboxes in HP VUE include:

- Personal toolbox. This toolbox is one that is personally configured with actions created by the user or copied from other toolboxes.
- General toolbox. This toolbox contains applications and utilities built into HP VUE or provided by the system administrator.
- Network toolbox. This toolbox allows the user to have access to actions on other systems.

CDE replaces toolboxes with the application manager. The application manager integrates local and remote applications into the desktop and presents them to the user in a single container. A goal of the migration tools was to incorporate the personal and general toolboxes into the CDE desktop so that the users could continue to use their favorite application or utility from the CDE desktop. A decision was made not to migrate the network toolbox because the HP VUE and CDE approaches to the application server are radically different. It is easier to configure a CDE application server than an HP VUE application server.

## Workspace Manager Customizations

The workspace manager controls how windows look, behave, and respond to input from the mouse and keyboard. In HP VUE the workspace manager gets information about the front panel, window menus, workspace menus, button bindings, and key bindings from a resource file called `sys.vuewmrc`. In CDE this information is divided into two files, which reside in different locations: `dtwm.fp` (front-panel definitions) and `dtwmrc` (menus, button and key bindings).

**Front-Panel Customizations.** The front panel is a special desktop window that contains a set of controls for doing common tasks. The front panel has undergone a visual as well as a definition change between HP VUE and CDE. In the case of HP VUE, there are three main elements to the front panel: the main panel, which includes both the top and bottom row, and subpanels (Fig. 4a). In CDE there is no bottom row. Instead, some of the controls that resided in the HP VUE bottom row, such as the busy signal, exit, and lock buttons have moved to the workspace switch in CDE, while the other controls are available through the personal applications slideup (see Fig. 4b). The toolbox in HP VUE has been replaced by the application manager.

Besides the visual differences, the front-panel definitions for panel, box, and control have also changed. To state it simply, in HP VUE, a container (panel) has knowledge of its contents (box), but a box has no knowledge of its parent (panel). In CDE the reverse is true (e.g., a box knows about its parent (panel), and a control knows about its parent (box) but not vice versa. Fig. 5 shows these differences.

Since there were both syntactical and logic differences between the HP VUE and CDE front panels, this was one of the most difficult converters to write. While preserving user customizations, the converter also had to replace HP VUE controls with their equivalent CDE counterparts (e.g., replacing the toolbox with the application manager). In the case of a one-to-one mapping between an HP VUE control and a CDE control such as the mail icon, the converter has to migrate any customizations made to these controls in HP VUE or replace them with the equivalent CDE defaults.

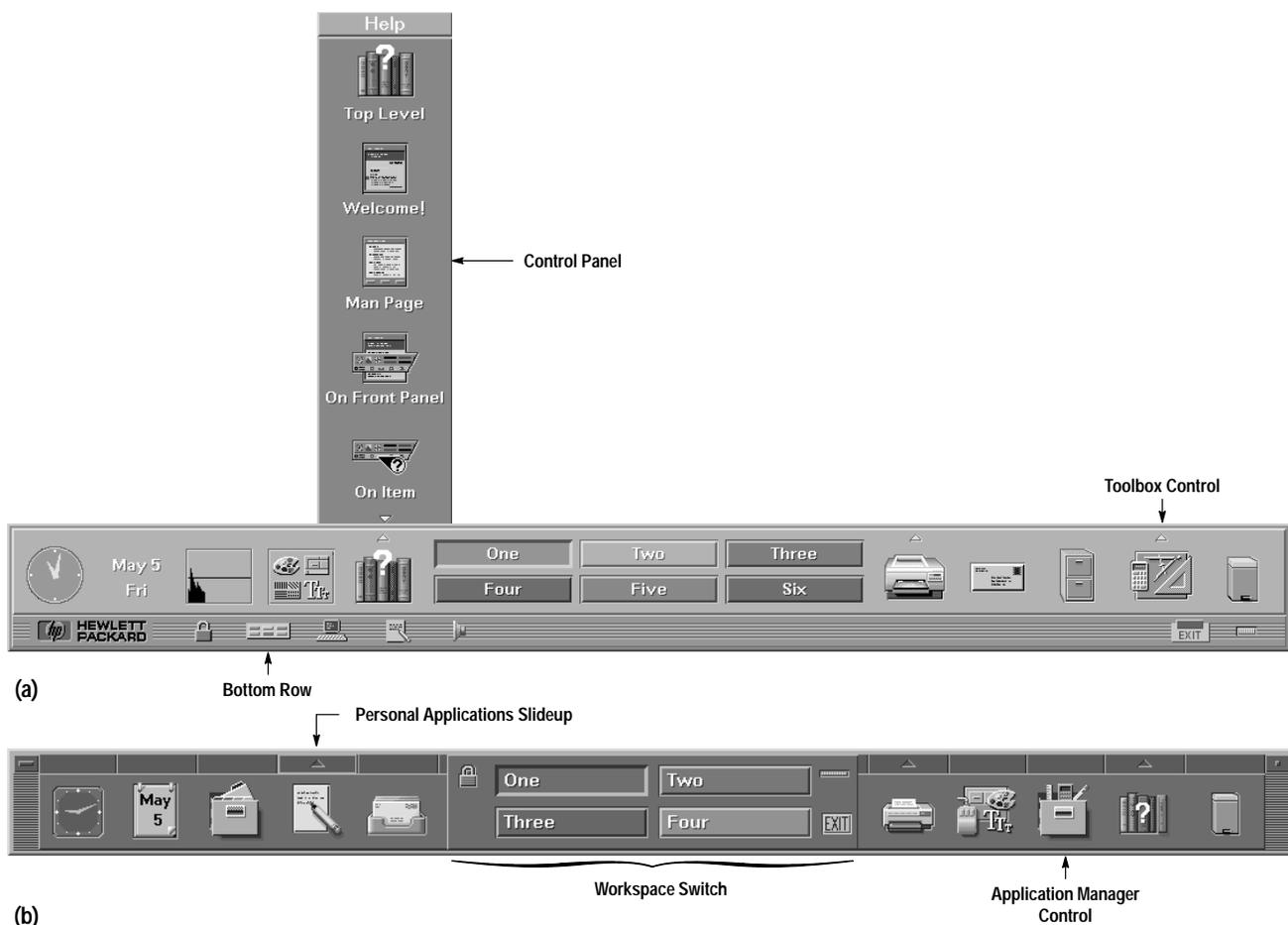
**Session Customizations.** A session refers to the state of the desktop between the time the user logs in and the time the user logs out. A session is characterized by:

- The applications that are running
- The icons on the desktop
- The look (colors, fonts, size, location, etc.) of application windows
- Other settings controlled by the X server such as mouse behavior, audio, volume, and keyboard click.

Sessions are divided into two categories: current sessions and home sessions. A current session is one that is stored at logout so that when a user logs in again the session state at logout is reestablished. A home session, which is explicitly stored by the user at some other time during a session, allows the user to return to some known session.

Session information is stored in the files listed in Table I.

**Fig. 4. (a) HP VUE default front panel. (b) CDE default front panel.**



**Table I  
Session Files**

File	Contents
vue.session	The names of active clients and their window geometries, workspaces, states (normalized or minimized), and startup strings.
vue.resources	The resources for the active clients (including the workspace manager) in the session.
vue.settings	Server and session manager settings such as screen-saver timeout, audio, and keyboard repeat.

Since the goal of the migration tools was to allow a seamless transition from HP VUE to CDE, we determined that it was necessary to bring over the users' sessions, so that their CDE sessions resembled HP VUE sessions as much as possible. A converter was written to convert the appropriate session files to their CDE equivalents. This meant creating equivalent dt.session, dt.resources, and dt.settings files with the names of HP VUE clients being replaced with their CDE counterparts if they existed. For example, substituting VUEwm with Dtwm and VUEfile with Dtfile.

### A Graphical User Interface for Migration Tools

While the individual converters were being developed, a graphical user interface for the converters was being designed. Migration tool users can be classified into two groups: system administrators and end users. The interfaces for the migration tool had to be tailored to the needs of these two types of users even though the converters being used were essentially the same. This involved several iterations on paper of the various dialogs that would take the user through the migration process. Since all of the converters were written using shell scripts to allow easier modification by the customer if needed, a decision was made to use dtksh for developing the GUI. Dtksh is a utility that provides access to a powerful user interface from Korn shell scripts. Dtksh is part of the CDE API.

**Fig. 5. Front panel definitions in HP VUE and CDE.**

```

HP VUE
PANEL FrontPanel /* Parent references
                                child */
{
  BOX          Top      /* child */
  BOX          Bottom  /* child */
}

BOX Top
{
  TYPE          primary
  CONTROL      Clock   /* child */
  CONTROL      Date    /* child */
  CONTROL      Load    /* child */
  .
  .
  .
}
CONTROL Clock
{
  TYPE          clock
  SUBPANEL     ClockSubpanel
  HELP_TOPIC   FPClock
}

BOX ClockSubpanel
{
  TYPE          subpanel
  TITLE        "Time Zones"
  HELP_STRING  "This subpanel contains
time-related funtions"
  CONTROL      JapaneseClock
}

CONTROL JapaneseClock
{
  TYPE          button
  IMAGE         clock
  PUSH_ACTION   f.action TimeJapanese
  LABEL        "Japan"
}

CDE
PANEL FrontPanel /* Parent has no references to
                                children */
{
  DISPLAY_HANDLES      True
  DISPLAY_MENU         True
  DISPLAY_MINIMIZE     True
  CONTROL_BEHAVIOR     single_click
  DISPLAY_CONTROL_LABELS False
  HELP_TOPIC           FPOnItemFrontPanel
  HELP_VOLUME          FPanel
}

BOX Top
{
  CONTAINER_NAME FrontPanel /*child references parent */
  POSITION_HINTS first
  HELP_TOPIC      FPOnItemBox
  HELP_VOLUME     FPanel
}

CONTROL Clock
{
  TYPE          clock
  CONTAINER_NAME Top /* child references parent */
  CONTAINER_TYPE BOX
  POSITION_HINTS 1
  ICON          Fpclock
  LABEL         Clock
  HELP_TOPIC    FPOnItemClock
  HELP_VOLUME   FPanel
}

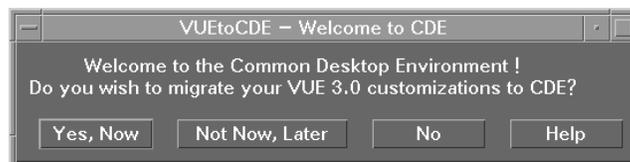
SUBPANEL ClockSubpanel
{
  CONTAINER_NAME CLOCK /* child references parent */
  TITLE          "Time Zones"
}
CONTROL JapaneseClock
{
  TYPE          icon
  CONTAINER_NAME ClockSubpanel/* child references parent */
  CONTAINER_TYPE SUBPANEL
  POSITION_HINTS 1
  ICON          clock
  LABEL         Japan
  PUSH_ACTION   TimeJapanese
  HELP_TOPIC    FPOnItemClock
  HELP_VOLUME   FPanel
}

```

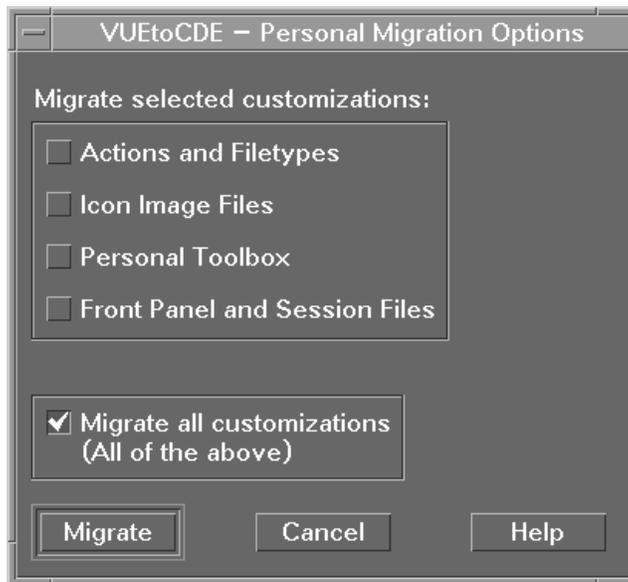
The different converters were gathered together into a migration application called VUEtoCDE. To run the migration tools, the VUEtoCDE migration product has to be installed on the system after CDE has been installed. The first time the user (system administrator or end user) logs into the system the migration dialog box (Fig. 6) appears if the user's home directory contains a .vue directory. The assumption here is that the user has used HP VUE and might choose to move HP VUE 3.0 customizations to CDE. Several options are provided by which the user could migrate now or later or not at all. The user can invoke the tool from the application manager at any time.

If the user chooses to migrate, the tool determines if the user is a system administrator or an end user and presents the appropriate dialog. Fig. 7 is the dialog presented to the end user when the Yes,Now button is selected.

**Fig. 6. Initial migration dialog.**



**Fig. 7. User-level migration.**



The thinking here was that more often than not, the user would choose the one-step migration (default option), but we wanted to provide choices for those who didn't want the default option. Also, by choosing the various converter options, the user can exercise a specific converter in the event that it did not work as expected in the one-step migration.

The converters were designed to avoid modifying any of the HP VUE directories, allowing the user to rerun the converters as many times as needed. In the case of actions, file types, and icons the converter expects an HP VUE source directory and a CDE destination directory. This allows the user to enter nonstandard source and destination locations for action, file type, and icon image files. When a nonstandard destination is entered, the tool displays a message that this path has to be added to the user's .dtprofile file with a specific input environment variable to update the global search path. This option was chosen over having the tool modify the user's .dtprofile, which was considered to be too invasive. Initially, the user is presented with the default HP VUE and CDE locations (see Fig. 8), but the user can type in as many source and destination directories as desired.

Because of the shift from toolboxes in HP VUE to the application manager in CDE, the migration of a toolbox to any location other than the CDE application manager is not straightforward. It requires some in-depth understanding of how to integrate applications into the CDE desktop before the user can specify a nonstandard destination for an HP VUE toolbox. Thus, the migration tool disallows specifying a nonstandard destination and only provides the flexibility of choosing the name of the application group for an HP VUE toolbox (see Fig. 9).

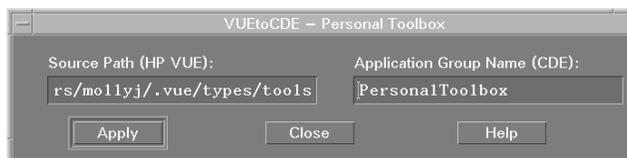
Each converter that is run generates a log file in a directory prepended with the user's login name (e.g., mollyj\_Vue2Cde\_Log) in /tmp, allowing for faster diagnosis of problems.

When the user has completed the personal migration, a final dialog is displayed that contains a special button for exiting the current CDE session. This button is necessary because of the design of the CDE session manager. Ordinarily, when the user logs out, the contents of the current session are written to the current session configuration files, overwriting the previous contents. Thus, if the user were to simply log out after migration, the migrated session files would be overwritten. To prevent this problem, the CDE session manager provides a special termination option used only by the VUEtoCDE tool. This option ends the current session without saving it so that the migrated session information is preserved and available at next login.

**Fig. 8. Actions and file types conversion.**



**Fig. 9. Toolbox conversion.**



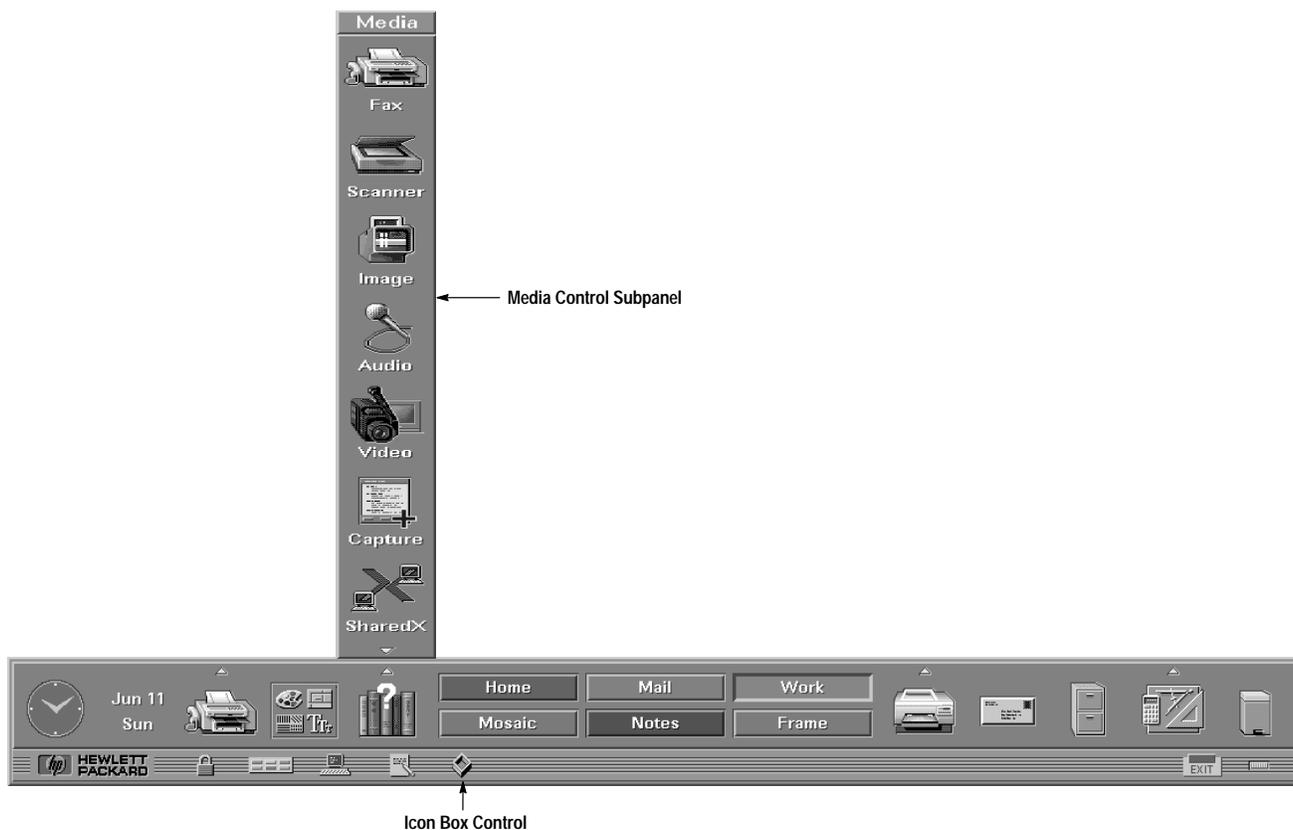
### Migration of a User's Front-Panel Customizations

Consider the simple case of an HP VUE front panel that has been customized to add a media control with a corresponding subpanel in the top row and an icon box in the bottom box (see Fig. 10). The user running the migration tools would expect these controls to be migrated over to the CDE front panel. The results are shown in Fig. 11. The media subpanel has been migrated to the main CDE front panel and the icon box to the personal applications subpanel because of the absence of a bottom row in the default CDE front panel. The personal applications subpanel and the application manager icon are placed after the trash icon. These two controls do not have analogs in HP VUE, and a decision had to be made regarding the placement of these two controls on the converted front panel. Since an HP VUE front panel could take any shape or form (multiple rows versus just a top and bottom row), a definitive location was needed for these two controls. A decision was made to place them as the last two controls of the last row in the converted front panel. This conversion can be achieved either by clicking the Migrate button on the dialog box shown in Fig. 7, which results in migrating all customizations, or by selecting from the same dialog box one of the following options and then clicking the Migrate button:

- Actions and File types
- Icon Image Files
- Front Panel and Session Files

Now that we have illustrated how the tools convert a front panel with some relatively simple customizations, we would like to illustrate what the migration tool can do in cases where the customizations are complex and unconventional.

**Fig. 10. User's customized HP VUE front panel.**



**Fig. 11. Converted CDE front panel.**

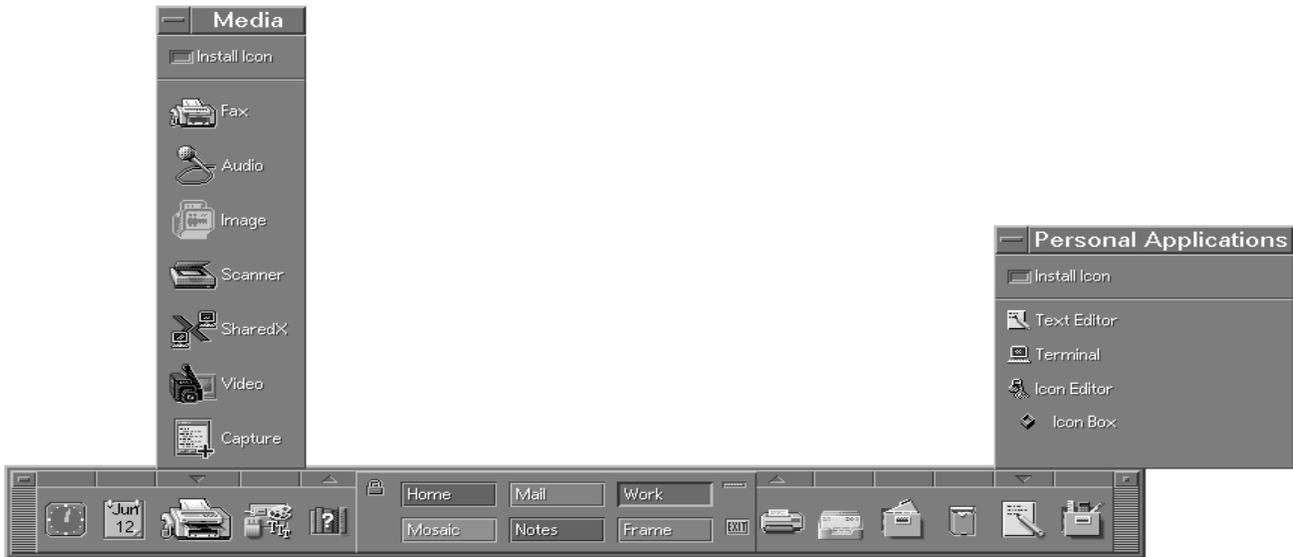
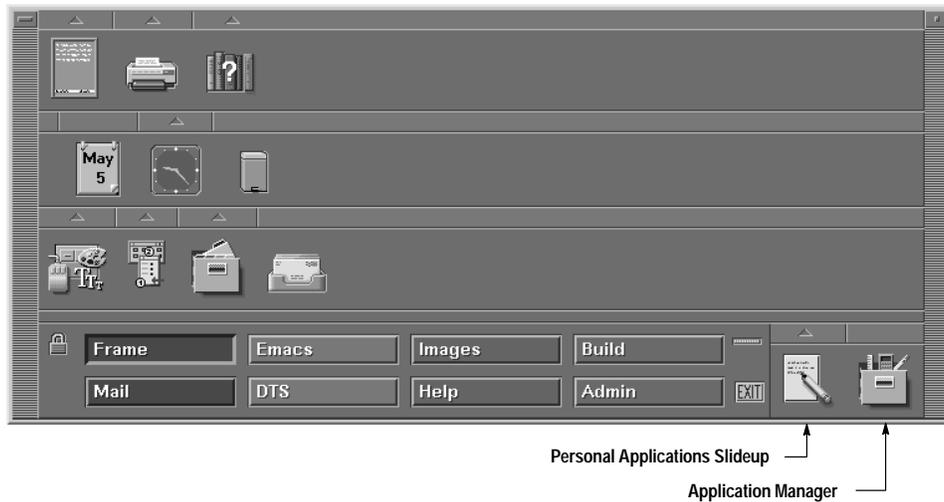


Fig. 12 shows an example of a highly customized HP VUE front panel. It's a box with five rows and several subpanels. During the development phase of our project this panel was considered to be the ultimate test for the front-panel converter. This front panel helped shatter several assumptions made in the design and pushed the limits of the front-panel converter. The desire here was to preserve the row positions and subpanels while modifying the front panel so that it conformed to the CDE default front panel. What we ended up with is a reasonably accurate conversion (Fig. 13). The HP VUE front panel had five rows, one of which was the bottom row. This translated to four rows in CDE since the default CDE front panel does not have a bottom row. The HP VUE controls in the bottom row (e.g., lock, exit, and busy controls), for which there are CDE equivalents, are not migrated unless they have been customized. This also applies to the terminal window and text editor controls in the bottom row for which there are CDE equivalents in the personal applications slideup. Any other customized controls in the bottom row are also moved to the personal applications slideup.

**Fig. 12. A highly customized HP VUE front panel.**



**Fig. 13.** A migrated CDE front panel.



HP VUE controls that do not map to controls in CDE are removed. Keeping this in mind, note the one-to-one mapping of controls to rows between the HP VUE panel in Fig. 12 and the CDE panel in Fig. 13. What is unexpected is the extra space seen at the end of rows in the converted CDE front panel. The reason for this is that the application manager and the personal applications slideup, which have no analogs in HP VUE, need a definitive location in the converted front panel. The decision to place them as the last two controls in the last row of the converted front panel has resulted in this row being rather long, creating the extra space. Other factors that have contributed to this extra space are the area around the workspace switch, which did not exist in HP VUE, the space taken by the window frame, which was missing in the HP VUE front panel, and the size of the default workspace buttons in CDE, which are wider than their HP VUE counterparts.

### System-Level Migration

In designing the system-level migration, the thinking was that system administrators typically do not like one-step migrations but would much rather do a step-by-step migration to allow more control. Exactly the same converters available to the user are available here with the defaults being set to system level. Log files for the converters are created in a directory called `System_VuetoCde_Log` in `/tmp`. The system-level migration options and the front-panel and session files conversion menu are shown in Fig. 14.

### Remote Execution from the CDE Desktop

In addition to the options specified in the `VUEtoCDE-System Migration Options` dialog in Fig. 14a, a command-line converter is available to create a minimum CDE fileset for remote execution.

The fileset required on a remote machine for an HP VUE action to execute remotely is different from that required for CDE remote execution. While HP VUE requires the `spcd` service, CDE relies on `dtspcd` and `ToolTalk`® services. `spcd`, `dtspcd`, and `ToolTalk` are services that allow actions to invoke applications that run on remote machines. A converter was written to build the minimum CDE fileset that could then be installed on the remote machine (if CDE is not already installed) to allow actions to continue working from the CDE desktop after migration. This converter does not provide as complete a migration as some of the other converters because system files have to be modified manually as well. Nevertheless it was felt that any form of help provided during this transition from HP VUE to CDE would be worthwhile.

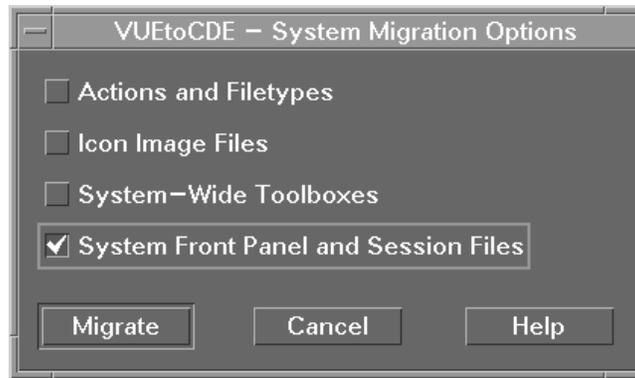
### Usability Testing

The migration tools underwent usability testing at HP's Corvallis and Fort Collins laboratories. Several system administrators and end users were asked to run the migration tools. These sessions were remotely observed by the engineer conducting the tests. These sessions were also videotaped and reports were put together by the usability engineer and sent to the learning products and development engineers. This input was used to further modify the tools, online help, and documentation. Most often the confusion was over the choice of names for buttons or not having enough feedback when a task was completed.

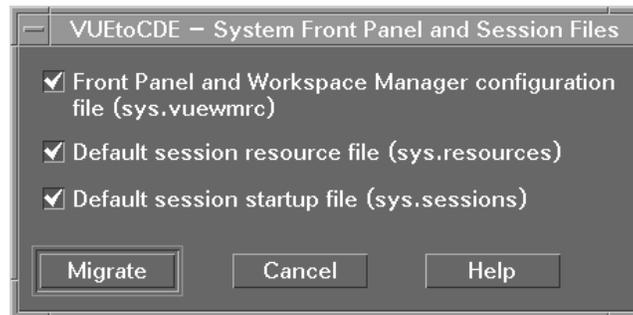
### Conclusion

Although the migration tools described here do not provide a complete migration from HP VUE to CDE, the converters do bring over a large portion of a user's customizations through an easy-to-use graphical user interface. Since HP is committed to its customers, we will continue to support HP VUE as long as our customers want it, but we hope that

**Fig. 14.** (a) System-level migration options. (b) Front-panel and session files conversion.



(a)



(b)

these tools will be an incentive for HP VUE users to embrace CDE sooner rather than later and make CDE the true desktop standard.

### Acknowledgments

I would like to acknowledge Steve Beal, from TriTeal Corporation, who collaborated in developing the converters for the HP VUE to CDE migration suite. Special thanks to Anna Ellendman, Julia Blackmore, and Ellen McDonald of the learning products team for their valuable user interface design reviews and testing. I also wish to acknowledge Jay Lundell, a former HP employee, for his insightful human factors review and project managers Ione Crandell and Bob Miller for their support.

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