

Implementation of Screen Capture in a Design Environment using EasyCapture

White Paper

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EasyCapture is an advanced tool for X Window screen capture designed to meet the complex requirements of technical and other workstation applications. It is designed for easy integration into applications.

The power of EasyCapture goes far beyond the standard **xwd** (X Window Dump) program. The limitations of **xwd** become noticeable when the screen contains many windows, and these are displayed in different color modes. Several CAD application are constructed like that. Enhanced X or GL screen capture offers the choice among full screen, a selected window, or an arbitrary rectangular area of the screen.

The original colors of individual windows are preserved with any combination of windows. Even when a window appears in false colors on the screen due to color table overrun, it is captured in its original colors and is saved correctly.

EasyCapture provides an environment which complements CAD, CAE and other UNIX applications with functions including:

Capture Modes:

- X Enhanced mode which exploits the full EasyCapture functionality. This is the default mode.
- XWD mode which is based on the standard **xwd** program. For simple requirements this mode offers a faster alternative.
- GL mode (IBM RS/6000 and Silicon Graphics) may be required to capture windows created by GL-based or other non-X applications.

Capture Types

- a single window, with or without its frame,
- the full screen,
- any rectangular area of the screen

Captured Image File

EasyCapture saves the captured screen image in a file in XWD format. This file can be imported into other applications, or converted into other formats.

Capture Options

-beep { true | false }

Issue a beep before and after screen capture. The default value is set in the initialization file).

-display *hostname:server.screen*

Specifies the display on which the screen capture is to be performed. If the display is not specified, the DISPLAY variable is used. If the DISPLAY variable is not set, the local screen (*hostname:0.0*) is the default display.

-application *window-id*

Specifies the window id of the main window of the calling application. The window id is used if the application is to be hidden during screen capture. When this option is specified an output file name must also be specified.

-delay *seconds*

This enforces a time delay (in seconds) when capturing. The delay applies if the graphical user interface of the application overlaps the screen area to be captured, and it has been specified that this window is hidden during capture. Occasionally, the system's event handling may initiate the capture event before the menu has been hidden, or the desired redraw events have completed; this conflict is resolved by inducing a delay. The default is supplied in the initialization file).

-capturemode { xe | xwd }

On all platforms choose between the following capture modes:

xe (X Enhanced Mode)

X Enhanced Mode is used for correct capture of all windows controlled by the X Window system. Colors of individual windows are preserved when you capture the full screen or a region with any combination of windows. Even when a window appears in pseudo-color on the screen (due to color map restrictions) it is captured with its original colors. This is the default capture mode (unless you change it in the initialization file).

xwd (XWD Mode)

For more simple requirements you can use XWD Mode as a faster alternative. The capture is performed by a system call to the X Window capture program **xwd** which must be on the path.

GL capture modes provide an additional choice on these two platforms:

IBM RS/6000

-capturemode { xe | xwd | gl1 | gl2 | gl3 | gl4 | gl5 }

Silicon Graphics

-capturemode { xe | xwd | gl }

Capture type options

A default interactive mode applies if no capture type option is supplied. If the command line supplies more than one capture type option only the last one is used.

-fullscreen

Specifies capture of the full screen.

-window *id*

Specifies capture of the window (excluding frame) with the specified id.

`-region widthxheight±xoffset±yoffset`

Specifies a particular region to capture in terms of screen pixel coordinates.

`-position`

Capture the window below the mouse pointer. The frame of the window is included if the mouse pointer is positioned on the frame.

Interactive mode

The default, if no capture type option is supplied, is an interactive mode. The capture selection is done with use of the mouse. The cursor changes to a cross. You can then define what you want to capture in one of the following four ways:

Full screen

Point at screen canvas and click a button on the mouse.

Window excluding frame

Point inside the window and click a button on the mouse.

Window including frame

Point at the window frame and click a button on the mouse.

Arbitrary rectangular region

1. Press mouse button to affix the first corner point of the region.
2. Drag the mouse pointer until the desired region is defined.
3. Release the mouse button to complete the definition. A rubber band appears while the mouse pointer is dragged.

Configuration of Hot Keys

It is possible to configure an X Window Manager to execute specific actions when some key combination is pressed. This is known as key binding.

The examples provided show how to bind two key combinations:

Bind Shift F1 to shell script `/mnt/hotkeys/shiftF1` which, for example, can contain the following line (which pipes the result of an interactively selected screen capture into Flexprint):

```
eccapt | fxgui
```

Bind Ctrl F1 to shell script `/mnt/hotkeys/ctrlF1` which, for example, in a similar way pipes a full screen capture into EasyPrint (the print component of EasyCopy/X):

```
eccapt -fullscreen | ecprint -ci p1 | lp -dacpr
```

Key binding is implemented by entries in the X Window Manager's resource file and application defaults file. The details depend on which X Window Manager you use, and detailed descriptions are available for:

Mwm (Motif Window Manager)

Dtwm (CDE Window Manager)

4Dwm (Window Manager on SGI workstations)

Vuewm (Window Manager on HP workstations)

Twm (Tab Window Manager)

Fvwm (Feeble Virtual Window Manager)

The following is an example on a customer specific implementation of **Hot-key invoked screen capture and print**. The combinations of keys to be pressed can be defined by the user - the PrintScreen button is frequently unused, so here is chosen SHIFT+PrtSc or Ctrl+PrtSc. The hot-keys are defined in the resource file of the window manager. Any of these two key combinations will invoke the script fxhot which calls the screen capture program eccapt. The resulting image data is subsequently processed by the printing program using the user's last saved settings. The resulting file is sent to the corresponding print queue using the lp or lpr print command.

If the script fails to detect the default printer, or this is not defined, it invokes **gui** of the printing program and opens the Control dialog that allows the user to select printer, change printer setup, page layout, and other options.

The two key combinations differ as to selection of capture type:

A) Predefined window (SHIFT+PrtSc):

The mouse pointer is placed over the window to be captured before the hot key is pressed. The window below the mouse pointer is captured. The frame of the window is included if the mouse pointer is positioned on the frame.

B) Dynamic (Ctrl+PrtSc)

The selection of capture type and item(s) to be captured are determined by mouse clicks after the hot key combination is pressed. The cursor changes to a cross. One can then define what to capture in one of the following four ways:

Full screen

Point at screen canvas and click a button on the mouse.

Window excluding frame

Point inside the window and click a button on the mouse.

Window including frame

Point at the window frame and click a button on the mouse.

Arbitrary rectangular region

1. Press mouse button to affix the first corner point of the region.
2. Drag the mouse pointer until the desired region is defined.
3. Release the mouse button to complete the definition. A rubber band appears while the mouse pointer is dragged.

The screen capture starts immediately when the contents have been defined. The result is printed on the default printer as selected in the printing programs Control dialog.

The user may also perform screen capture by means of the Capture menu in the Control dialog of the printing program.