Tru64 UNIX

Adjusting Your Screen Settings

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This Best Practice describes how to configure the screen resolution, bit depth, and synchronization rate on Version 4.0 or higher of the Tru64™ UNIX operating system.

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This Best Practice describes how to configure the screen resolution, bit depth, and synchronization rate on Version 4.0 or higher of the Tru64™ UNIX operating system.

The procedures in this Best Practice can help you do the following:

- Reduce the size of everything on your desktop to allow more space for windows. Or, conversely, increase the size of everything on your desktop for better visibility and readability.
- Increase the number of available colors to enhance the appearance of images on your monitor.
- Increase the rate at which the image on your monitor is refreshed.

You can accomplish these tasks by changing the options for the X Server (or `Xdec` command) that controls the graphical environment on your Tru64™ UNIX system.

To configure the X Server, start by verifying that you meet the criteria specified in *Is This Best Practice Right for You?*.

To see other Best Practices documentation, visit the Tru64 UNIX Best Practices Web page.

Is This Best Practice Right for You?

Not all Best Practices apply to all configurations, so be sure that each Best Practice is appropriate for your system and circumstances. To use this Best Practice, you must meet the requirements described in the following table:

Requirement	Description
Operating System	Tru64 UNIX Version 4.0 or higher
Windowing System	Common Desktop Environment (CDE) or X Display Manager (XDM)

Requirement	Description
Impact on Availability	If your video card does not require changes to support new resolutions and bit depths, you can reconfigure your graphical environment without restarting the operating system; however, you must log out of your current login session to effect the changes.
Hardware	The video adapter that is incorporated into the system board of certain AlphaServers will not support higher resolutions or increased bit depths. See the documentation for your video card and monitor for additional restrictions. Also, see *Configuring Your Video Card and Monitor* for more information.
Software	If you have configured multiple monitors on your system by invoking the Xinerama extension to the X server, you can follow the procedure in this Best Practice. However, you must maintain common settings for all screens or you will experience problems.
Skill Level	You must have basic UNIX administration skills.

Before You Begin

Before you apply this Best Practice, you must understand some background information and perform some preliminary tasks.

Related Documentation

You will find it helpful to have the following documentation available during the procedure:

- The hardware documentation for your system
- The hardware documentation for your video option cards and monitors
- The online or hardcopy reference pages for your version of the operating system, particularly `Xdec`(1X), `xdpyinfo`(1X), and `sizer`(8)
- The *X Window System Environment* guide for your version of the operating system

Terminology

The following table defines terms related to screen settings:

Term	Definition
Resolution	Resolution indicates the number and configuration of the pixels your video card can display on a monitor. It is usually a function of the size and shape of your monitor and the amount of memory on your video card. The lowest common denominator for resolution is usually 640 x 480 pixels, but you can adjust the resolution so you are comfortable with the size, sharpness, and clarity of the image. Tru64 UNIX allows you to set the resolution for a screen by specifying the `-screen` option to the `Xdec` command. By default, the operating system configures a screen of 1024 x 768 pixels or 1280 x 1024 pixels, depending on your hardware.
Bit Depth	Bit depth (or color depth) indicates the number of colors (or shades of gray) that your video card can display. The higher the bit depth, the more colors will be displayed on your monitor. Video cards have a bit depth from 1 to 24. The number of colors a card can display is equal to 2 to the power of the bit depth. For example, an 8-bit card can display 256 colors (2^8). Tru64 UNIX allows you to set the bit depth for a screen by specifying the `-depth` option to the `Xdec` command. By default, the operating system configures a screen with 8–bit color. With selected video cards, you can increase the bit depth up to 24–bit color (16,777,216 colors).

Term	Definition
Visual Class	Visual classes (or visuals) are another way to indicate the number of colors that your video card can display. Tru64 UNIX allows you to set the visual class for a screen by specifying the `-vclass` option to the `Xdec` command. By default, the system runs in `PseudoColor` mode, which allows you to configure a screen with 8–bit color (256 colors). With selected video cards, you can increase the number of colors to 65,536 (16–bit color), or as many as 16,777,216 (24–bit color) by running in `TrueColor` mode.
Synchronization Rate	Synchronization rate indicates the frequency with which the image on your screen is refreshed. The image on your screen is actually composed of many horizontal lines that are redrawn at such a high rate that you usually cannot see it happening. However, if the synchronization rate is set too low for the current resolution, it might become irritating to your eyes. For example, if you increased the resolution of your screen from 640 x 480 to 1024 x 768 without adjusting the synchronization rate, you would notice that the screen is not refreshing fast enough. This happens because your monitor now has many more lines to draw in the same amount of time to update the screen. Increasing the rate at which these lines are drawn can alleviate the problem. Tru64 UNIX allows you to set the synchronization rate for a screen by specifying the `-vsync` option to the `Xdec` command. By default, the rate is set at 70 or 72 Hz to match the resolution of 1024 x 768 pixels or 1280 x 1024 pixels, respectively. This means that the screen is updated 70 to 72 times per second. If this is not sufficient, you can increase it as necessary; however, synchronization rates in excess of 75 Hz are generally not necessary unless you are configuring an extremely high-resolution monitor. In fact, higher synchronization rates can damage some older monitors. Always verify that your hardware can support the new rate.

Getting Information About Your Current Configuration

You can use the `xdpyinfo` and `sizer` commands to collect information about your currrent X Server settings.

The `xdpyinfo` command displays information about version of the operating system, the supported extensions to the X Server, and your screen settings. For example:

```
# xdpyinfo
```

```
name of display:    tigger:0.0
version number:    11.0
vendor string:    Compaq Computer Corporation Tru64 UNIX V5.0
vendor release number:    6300
.
.
.
default screen number:    0
number of screens:    1

screen #0:
  dimensions:    2048x768 pixels (560x235 millimeters)
  resolution:    93x83 dots per inch
  depths (2):    1, 24
  root window id:    0x27
  depth of root window:    24 planes
  number of colormaps:    minimum 1, maximum 1
  default colormap:    0x22
  default number of colormap cells:    256
  preallocated pixels:    black 0, white 16777215
  options:    backing-store YES, save-unders YES
  largest cursor:    64x64
  current input event mask:    0x70003c
    ButtonPressMask          ButtonReleaseMask        EnterWindowMask
    LeaveWindowMask          SubstructureRedirectMask FocusChangeMask
    PropertyChangeMask
  number of visuals:    2
  default visual id:  0x20
  visual:
    visual id:    0x20
    class:    TrueColor
    depth:    24 planes
    available colormap entries:    256 per subfield
    red, green, blue masks:    0xff, 0xff00, 0xff0000
    significant bits in color specification:    8 bits
  visual:
    visual id:    0x21
    class:    TrueColor
    depth:    24 planes
    available colormap entries:    256 per subfield
    red, green, blue masks:    0xff, 0xff00, 0xff0000
    significant bits in color specification:    8 bits
```

From this output, you can determine that the system is running Tru64 UNIX Version 5.0. You can also see that the user has a screen of 2048 x 768

pixels (an abnormally wide screen size) in `TrueColor` mode, which means that the system is capable of displaying millions of colors.

If you use the `sizer` command on the same system, you can gather more information about the screen resolution:

```
# sizer -gr
1024x768 1024x768
```

From this output, you can determine that the system is running two monitors, each with a resolution of 1024 x 768 pixels. Because the `xdpyinfo` command described a single screen with a resolution of 2048 x 768, you can conclude that the system is running the Xinerama extension to the X Server, which is treating both monitors as one contiguous screen. (See the Best Practice for *Configuring Multiple Monitors on a Single System* for more information about Xinerama.)

Using the `sizer` command, we can also determine the type of video card that is in use:

```
# sizer -gt
COMET
COMET
```

This system contains two COMET, or Elsa GLoria (PBXGK-B*x*), cards.

Configuring Your Video Card and Monitor

Although most video cards and monitors are capable of supporting alternate screen resolutions, bit depths, and synchronization rates, you must check your hardware documentation to verify this support. Even the cards and monitors that do support these changes occasionally require you to change the settings of one or more jumpers or switches to enable a different configuration.

Check your hardware documentation and determine if you need to make any hardware changes before you start the procedure. Otherwise, reconfiguring the X Server could result in inconsistent video output and make it difficult for you to return to your previous configuration.

The procedure indicates the point at which you should make these hardware changes, if necessary.

Configuring Multiple Monitors and Xinerama

If you have configured multiple monitors on your system, the X Server will allow you to set a different resolution, bit depth, and synchronization rate for each one. However, if you have enabled the Xinerama extension, the

settings for all screens must be identical; otherwise, you will encounter problems.

See the Best Practice for *Configuring Multiple Monitors on a Single System* for more information.

Applying the Best Practice

Before you configure your screen resolution, bit depth, and synchronization rate, be sure to follow the recommendations in *Before You Begin*.

Note

If you are not familiar with configuring the X Server, it is best to change one setting at a time and verify that it works before moving on to additional settings. This will make troubleshooting easier.

Preparing to Edit the X Server Configuration File

To change the aforementioned settings, start by performing the following steps:

1. Log in as root.
2. Before making any changes to your current configuration, make a backup copy of your X Server configuration file by entering the following command:

   ```
   # cp /usr/var/X11/Xserver.conf /usr/var/X11/Xserver.conf.bak
   ```

   This could save you trouble later if you need to recover your settings.
3. Open the `/usr/var/X11/Xserver.conf` file with a text editor and find the `args < >` statement at the end of the file. It looks similar to this:

   ```
   args <
    -pn
   >
   ```

Configuring Screen Resolution (Screen Size)

To adjust the screen resolution, do the following:

1. Open the `Xserver.conf` file as specified in *Preparing to Edit the X Server Configuration File*.
2. Add the `-screen` option, as follows:

   ```
   args <
    -pn
    -screen resolution
   >
   ```

   Replace *resolution* with the desired resolution. Possible settings include the following:

   - 1920 x 1200 pixels
   - 1280 x 1024 pixels
   - 1024 x 768 pixels
   - 800 x 600 pixels
   - 640 x 480 pixels

   The lower the number of pixels, the larger the images will appear on your screen.

   For example, if you want a screen that is 1024 x 768 pixels, enter the following line:

   ```
    -screen 1024x768
   ```

   Some experimentation will be necessary to determine the optimum resolution for your hardware and personal preferences. If you find that the items on your desktop are too small or too large, try another setting, or revert to the default setting.

   Note that the `-screen` option indicates the resolution for all of the monitors connected to your system. If you have enabled multiple monitors, and you want to specify different settings for each one, you can include additional `-screen` options as necessary (`screen0`, `screen1`, `screen2`, `screen`*x*...). For example, if you have two monitors of different sizes, your settings might appear as follows:

   ```
    -screen0 1024x768 -screen1 800x600
   ```

3. Save the `Xserver.conf` file.
4. If necessary, shut down the system and make changes to your hardware settings as discussed in *Configuring Your Video Card and*

Monitor. If no hardware changes are necessary, reboot the system or follow the instructions in *Restarting the X Server* to effect the changes.

Changing Bit Depth (Number of Colors)

To adjust the bit depth, do the following:

1. Open the `Xserver.conf` file as specified in *Preparing to Edit the X Server Configuration File*.
2. Add the `-vclass` and `-depth` options, as follows:

   ```
   args <
    -pn
    -vclass vclass -depth depth
   >
   ```

   Replace *vclass* with the desired visual class. Possible settings include the following:

   - `TrueColor` — 24-bit (16777216 colors) or 16-bit (65536 colors)
   - `PseudoColor` — 8-bit (256 colors)

   Replace *depth* with the appropriate bit depth for the chosen visual class. Valid bit depths are 24, 16, and 8.

   For example, if you want your screen to be capable of displaying millions of colors, enter the following line:

   ```
    -vclass TrueColor -depth 24
   ```

   Note that the `-vclass` and `-depth` options indicate the settings for all of the monitors connected to your system. If you have enabled multiple monitors, and you want to specify different settings for each one, you can include additional options as necessary (`vclass0`, `vclass1`, `vclass2`, `vclassx`...). For example, if you have two monitors, and only one of your video cards is capable of supporting higher bit depths, your settings might appear as follows:

   ```
    -vclass0 TrueColor -depth0 24 -vclass1 PseudoColor -depth1 8
   ```

3. Save the `Xserver.conf` file.
4. If necessary, shut down the system and make changes to your hardware settings as discussed in *Configuring Your Video Card and Monitor*. If no hardware changes are necessary, reboot the system or follow the instructions in *Restarting the X Server* to effect the changes.

Changing Synchronization Rate (Refresh Rate)

Note

It is best not to change the synchronization rate unless you are experiencing a specific problem with the rate at which your screen is refreshed.

Higher synchronization rates can damage some older monitors; therefore, before making a change, check your documentation to verify that your hardware can support a higher rate.

To adjust the sychronization rate, do the following:

1. Open the `Xserver.conf` file as specified in *Preparing to Edit the X Server Configuration File*.
2. Add the `-vsync` option, as follows:

   ```
   args <
    -pn
    -vsync rate
   >
   ```

   Replace *`rate`* with the desired synchronization rate. Recommended settings include the following:

   - 75 Hz (best for resolution of 1920 x 1200 pixels)
   - 72 Hz (best for resolution of 1280 x 1024 pixels)
   - 70 Hz (best for resolution of 1024 x 768 pixels)
   - 60 Hz (best for resolutions of 640 x 480 pixels or 800 x 600 pixels)

   Some experimentation might be necessary to find the optimum setting, but it is best to stay in this range. Higher rates are usually unnecessary unless you are configuring an extremely high-resolution monitor.

   Note that the `-vsync` option indicates the synchronization rate for all of the monitors connected to your system. If you have enabled multiple monitors, and you want to specify different settings for each one, you can include additional options as necessary (`vsync0`, `vsync1`, `vsync2`, `vsyncx`...). For example, if you have two monitors with different resolutions, your settings might appear as follows:

   ```
    -vsync0 60 -vsync1 75
   ```

3. Save the `Xserver.conf` file.

4. If necessary, shut down the system and make changes to your hardware settings as discussed in *Configuring Your Video Card and Monitor*. If no hardware changes are necessary, reboot the system or follow the instructions in *Restarting the X Server* to effect the changes.

Restarting the X Server

If you are using the CDE display manager, you can restart the X Server by doing the following:

1. Log out of CDE.
2. On the CDE login screen, click on the Options button and select Reset Login Screen from the pull-down menu.

This option restarts the X Server. When the process is complete, the CDE login screen is displayed.

If you are using the XDM, you can restart the X Server by doing the following:

1. As root, enter the following command to stop the X Server:

   ```
   # /sbin/init.d/xlogin stop
   ```

   The session shuts down and your screen becomes blank.
2. Press the Enter key to display the `login:` prompt, and log in as root.
3. Enter the following command to restart the X Server:

   ```
   # /sbin/init.d/xlogin start
   ```

   The X Server starts and the multi-user login screen is displayed.

Verifying Success

When you complete the procedure, you should see the appropriate changes on your screen or screens. For example, you should see a bigger/smaller image, more colors, or a faster refresh rate.

If the Best Practice was not successful, see *Troubleshooting* for information about identifying and solving problems.

Troubleshooting

If you determine that the Best Practice was not successful, as described in *Verifying Success*, use the following table to identify and solve problems:

Problem	Possible Solutions
Image on the screen is distorted or unstable (shakes, vibrates, flickers), the monitor is making high-pitched noises, or no improvement is evident.	**Note** If the image on the screen is so distorted that you cannot perform some of these steps, see *Recovering Your Previous Settings*. Follows these steps to fix the problem: 1. Verify that your video card and monitor are capable of supporting the settings you have chosen. (Remember that improper settings can cause damage to your system.) 2. Verify that you have not made a typographical error in the `Xserver.conf` file. 3. Try an alternate setting, such as a lower resolution, reduced bit depth, or slower synchronization rate. 4. If you are running the Xinerama extension, verify that the settings are identical for each monitor.

Problem	Possible Solutions
X Server fails to start and the screen is blank.	If the X Server fails to start, it likely indicates the improper usage of an `Xdec` command option. Follow these steps to fix the problem: 1. Press the Enter key to display a `login:` prompt, and log in as root. 2. Check the contents of the `/var/dt/Xerrors` file for error messages. 3. Edit the `Xserver.conf` file to fix any problems. 4. Execute the following command to start the X Server again: `# /sbin/init.d/xlogin start`
Cannot add or modify desktop color schemes under CDE Style Manager.	This is a bug for which there is currently no fix. As a workaround, choose an existing color scheme from the list of palettes.

Recovering Your Previous Settings

If you experience a problem where the screen is distorted after you make changes to your configuration, and you cannot see what you are doing to revert to your previous settings, use one of the procedures in the following two sections to resolve the problem.

Log in from a Remote System

If you have access to a remote system, follow these steps to recover your previous settings:

1. Log in (as root) to your local system from the remote system. (If you cannot log in directly as root, log in as a user with the appropriate privileges and use the `su` command to switch to the root user.)
2. Edit the `Xserver.conf` file to make changes as necessary. Or, you can recover your previous settings from the backup of the file that you made during the procedure by entering the following command:

   `# cp /usr/var/X11/Xserver.conf.bak /usr/var/X11/Xserver.conf`

3. Enter the following command to stop the X Server:

   ```
   # /sbin/init.d/xlogin stop
   ```

4. Log out of the remote system and return to the local system. The screen on the local system should be blank.
5. Press the Enter key to display the `login:` prompt, and log in as root.
6. Enter the following command to restart the X Server:

   ```
   # /sbin/init.d/xlogin start
   ```

When the X Server starts, your screen should be back to normal.

Log into Single-User Mode

If you do not have access to a remote system, follow these steps to recover your previous settings:

1. Halt the system or turn it off and on again to get to the console prompt. If your system boots automatically when you turn it on, you will need to type Control-C several times to stop it.
2. At the console prompt, enter the following command to boot the system to single-user mode:

   ```
   >>> boot -fl s
   ```

3. Log in as root.
4. Enter the following commands to mount local file systems and attach swap space to the system:

   ```
   # /sbin/bcheckrc
   # /sbin/swapon -a
   ```

5. Edit the `Xserver.conf` file to make changes as necessary. Or, you can recover your previous settings from the backup of the file that you made during the procedure by entering the following command:

   ```
   # cp /usr/var/X11/Xserver.conf.bak /usr/var/X11/Xserver.conf
   ```

6. Execute the following command to initiate multi-user mode and start the X Server:

   ```
   # sync
   # init 3
   ```

When the X Server starts, your screen should be back to normal.

Comments and Questions

We value your comments and questions on the information in this document. Please mail your comments to us at this address:

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