Installing and Configuring xorg

A full window system (X11R6) is available from `xorg`

Supports various window managers.
KDE Gnome Unity fvwm twm fluxbox blackbox ...

Supports a virtual screen that is bigger (often 3x3) than the actual screen.
With some window managers you just keep scrolling with others you have separate panels.

Issue: different video chip sets have different capabilities and different command sets.

Issue: different monitors have different capabilities.

When started X11 probes for the chip set and the monitor.
It selects drivers and a screen resolution that are compatible with both.

If you have an old monitor, it may not support a probe and you may need to use manual configuration. (See next slide.)

Configuring X11

X will read information from a configuration file if it exists. That file is:

`/etc/X11/xorg.config`
but an individual user can override this with a configuration file in their home directory.

Building the configuration file:
Run `X -configure` (or `xorgsetup`) and answer the questions.

`xorgsetup` will build the configuration file

Notes on the questions will be covered in the following slides.

X always prints what it finds and sets up (whether it uses a configuration file or probes) into a log file called `Xorg.0.log` which it places in the standard log directory.

Mice

Mouse: X likes 3 buttons, some older mice have 2.

(Again newer mice support a probe so they won't need this.)

Emulate3Buttons: press both buttons for middle button

ChordMiddle: the middle button is there, but it pretends its a combined left/right press

Is the mouse on the serial, PS/2 or USB port
For full options listing see manual entry for `xorg.config`
or the comments in the configuration file

Usually the config specifies `/dev/mouse` which is a soft link to the real device driver interface.

Monitor

Monitor Identifier:
for reference from other sections

Horizontal sync rate: number of lines (of dots) per second
which can be drawn on the screen.
(dot clock / dots per line is an upper limit)
Needs also tolerance for start/stop/fly back
Usually 15-90 KHz
Specify the limits of your monitor,
video card takes care of itself

Vertical Refresh rate: number of times screen per second
the screen is redrawn
(Horiz rate / lines per screen is an upper limit)
Needs tolerance, especially fly back
Usually 50-100 Hz
76Hz: Monitor can do 76 vertical refreshes per second.
Be careful, this is for a particular resolution,
at higher resolutions the rate may be slower.

Mode entries: (modelines)
On many newer cards, the card gives enough information
so X11 can compute the allowed mode entries.
Mode entries can use either one line or structure format.

`Modeline "640x480" 25.5 640 664 760 800 480 491 493 525`
A list of possible modes for the monitor.
A resolution, a clock rate, timing information and flags.
If an entry in this list doesn't fall within the monitor
limitations, it is ignored
monitor supports this resolution at this dot clock speed.
clock: dot clock rate used for this resolution
Horizontal timings: the number of dots per line, the
number of dots drawn, start overlap, stop overlap, fly
back allowance
You've got to start early to build horizontal speed. affects
your left margin
You can't stop on a dime (stop overlap)
You need time to get to the start of the next line.
Verticle timings: lines per screen, overlaps and flybacks
Wrong numbers: screen offcenter, not full width/height,
bad display at borders.

X automatically generates modelines if there is no
configuration file (see the log file).

Video Chip Set

Identifier
driver to use
display information
Dot clock rates supported.

The driver tells X11 how to talk to the video card. There
are numerous drivers (you can get a list when you run
`X -configure`

Screens
A screen is a combination of a device and a monitor.

It has an identifier, a device, a monitor, a color depths,
and a list of supported resolutions. Display subsections
(color depth, list of resolutions)

ServerLayout
Associates a screen, a pointer device (mouse) and a
keyboard.

Programs and Hot Keys

`startx`: start the window system

`control-alt-backspace` will shutdown X and return you to a non-graphical screen.

`xvidtune`: display the settings being used
(and allow you to exprement with overriding them)

`control-alt+` (the + on the number pad) will step you to the next allowable resolution (if there is one).

`control-alt-` (the – on the number pad) will step you to the previous allowable resolution (if there is one).

Stepping cycles, when you reach the end of the list of Modes, it stps back to the first one in the list.

Control Files

`.xinitrc`

Controls initial windows and selection of window manager.

```
xterm -n "x1" -g 80x56-0+0 -sb -sl 300 &
xterm -n "x2" -g 80x24+0+0 -sb -sl 300 &
xterm -n "x3" -g 80x24+0-0 -sb -sl 300 &
xsetroot -solid blue
twm
```

At startup there are three windows.
An 80x65 in the upper right.
An 80x24 in the upper left.
An 80x10 in the lower left.
For these windows a scroll bar is activated and the scroll length is set to 300 lines.

The background is set to blue.

The `twm` window manager is started.

Note: `twm` must be last
When twm exits, X will shutdown.

System default: `/etc/X11/xinit/xinitrc`
(A link to the rc for the default window manager.)
User override: `~/.xinitrc,`

Application Defaults

User override `~/.Xdefaults`
System: `/etc/X11/app-defaults/APPNAME`

Sets default values for various applications.

Example:
Launch options (`-sl 100`) can override these defaults.

`xterm*scrollBar:on`

`xterm*scrollLines:300`

`xterm*VisualBell:on`

`xterm*JumpScroll:on`

On starting an xterm:
There is a scroll bar, the scroll length is 300.
If the program beeps at you, the window "blinks"
When you scroll down a line, the window jumps
(it doesn't smoothly scroll)

In the system files (`/etc/X11/app-defaults/XTerm`)
the "`xterm`" is omitted (e.g. `*scrollBar:on`)

Window Managers

Menus, task bars, the overall format of the screen and
the borders of windows
are controlled by the window manager.

The contents of a window
are controlled by the application.

Most/all keystrokes and mouse clicks in a window
are handled by the application.
Other keystrokes and mouse clicks
are handled by the window manager.

You may select from several window managers.
Each of the window managers is configurable.

Some window managers use configuration files,
some use whole directories.

We will cover a sample of some of these configurations in
the following slides.

Some allow system defaults all allow user overrides.

twm

Configuration file: `.twmrc`

File content examples:

```
Button1 = : title : f.raise
"F1" = : window : f.lower
Button1 = : root : f.menu "Xterm"
menu "Xterm"
{
"Xterm" f.title
"65:" f.exec "xterm -n 'x4' -g 80x65+0+0 &"
}
```

Clicking left mouse button in title bar brings window to front.

Hitting F1 key when in the window, pushes window behind others.

Left mouse down while not in a window brings up the xterm menu.

The xterm menu has one selection that pops up a 65 line window.

fvwm

Configuration file: `.fvwm/.fvwm2rc`

File content example:

```
AddToMenu MenuName
 + Xterm   Exec exec xterm -e tcsh
```

gnome

Configuation directory: `.gnome/`

The configuration directory contains a database.

You edit this database with `gconftool` or `gconf-editor`.