

# Breathing life back into the terminal

Carsten Haitzler

<raster@rasterman.com>  
<c.haitzler@samsung.com>

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# What... Err.. Who am I?

Principal Engineer at Samsung Electronics HQ

Graphics Architect working on Tizen

Founder/Leader/Dictator Enlightenment/EFL etc.

Silly Weigugin hanging around in Asia





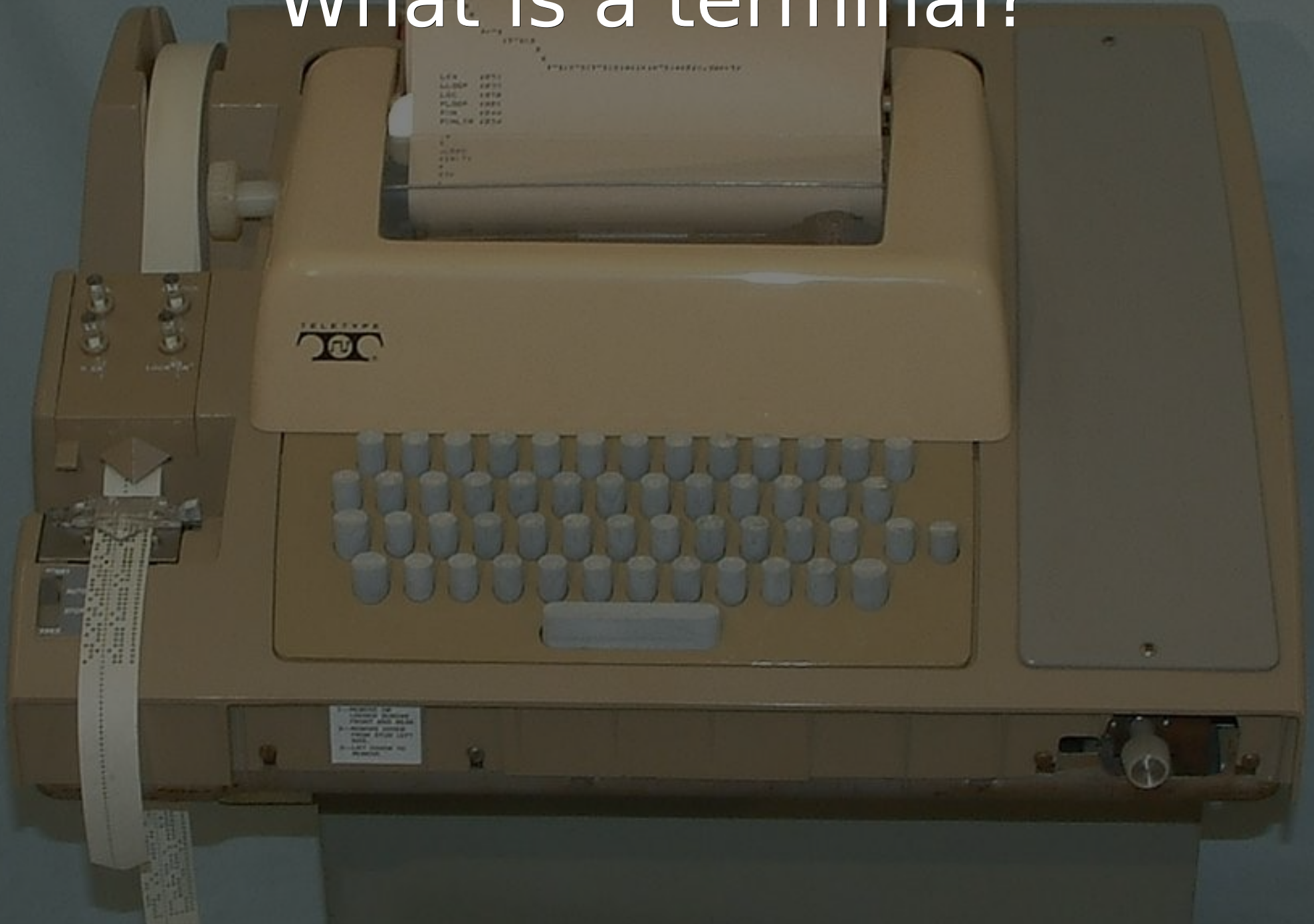




# Terminology



# What is a terminal?

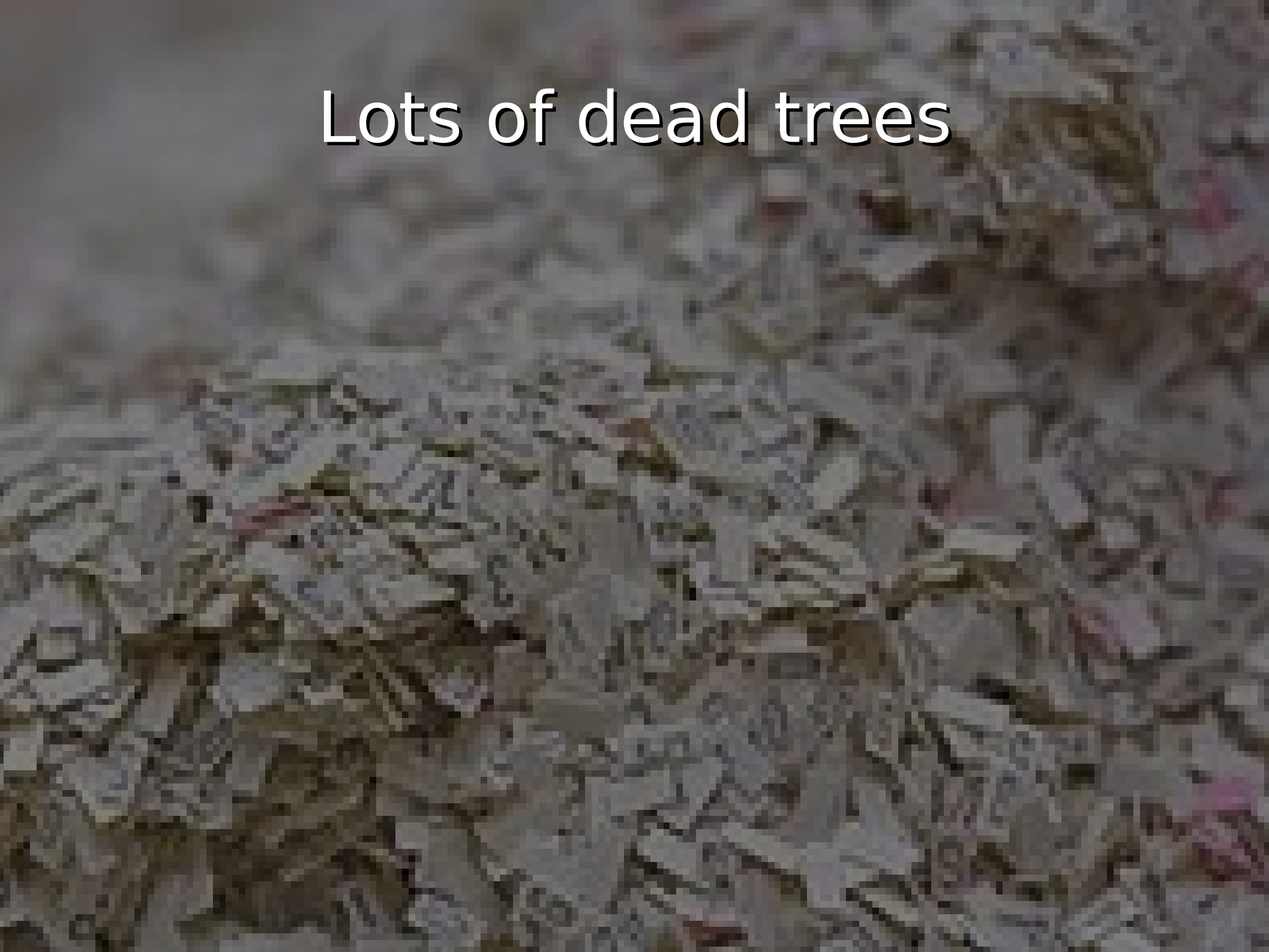




# Type + Print

- Type in
  - Simple characters
  - Simple controls
- Printer prints output results
  - Printer-like controls
  - Simple character support (no bitmaps etc.)

Lots of dead trees

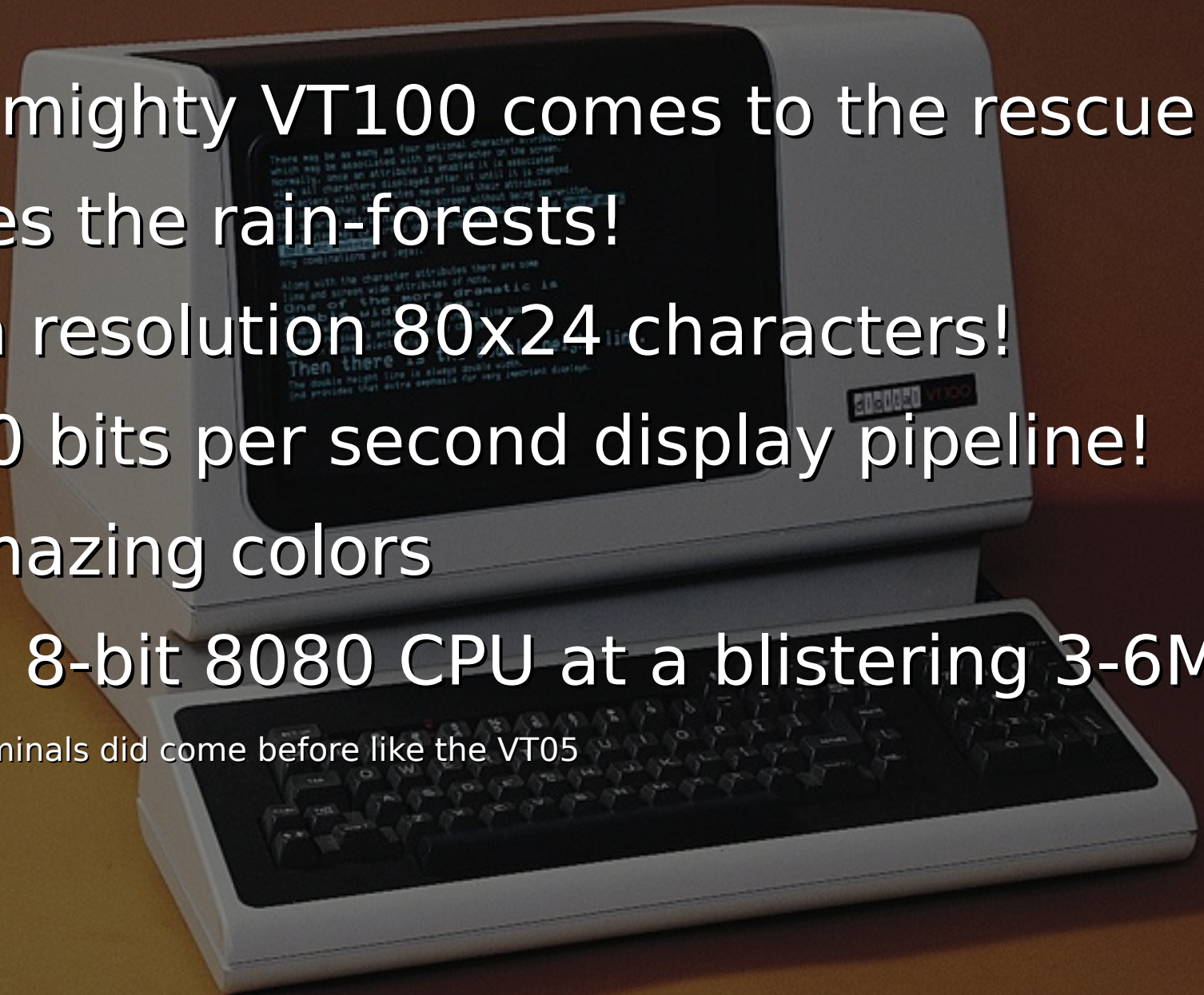


All hail the cereal terminal



# All hail the ~~cereal~~serial terminal

- The mighty VT100 comes to the rescue
- Saves the rain-forests!
- High resolution 80x24 characters!
- 1200 bits per second display pipeline!
- 2 amazing colors
- Intel 8-bit 8080 CPU at a blistering 3-6Mhz!
- Other terminals did come before like the VT05





# All hail the cerealserial terminal

- Makes for a nice cat carry case!



# Crazy people wanted pixels

- Text just was not good enough
- All the trendy people were doing it
- It sold more hardware

XSET(1) XSET(1)

## NAME

xset - user preference utility for X

## SYNOPSIS

```
xset [-display display] [-b on/off] [-c volume] [[+-]dpms] [dpms standby [suspend  
[ off]]] [dpms force standby/suspend/off/on] [[-+]fp[+=]  
[rate]]] [led on/off] [led default [integer]] [led  
on/off] [mouse [accelmult [accelthold]]] [m[ouse]  
default] [p pixel color] [[-]r [keycode]] [r on/off] [r rate delay  
[rate]] [s [length [period]]] [s blank/noblank] [s expose/noexpose] [s  
on/off] [s default] [s activate] [s reset] [q]
```

## DESCRIPTION

This program is used to set various user preference options of the display.

## OPTIONS

**-display display**

This option specifies the server to use; see *X(7)*.

## b

The **b** option controls bell volume, pitch and duration. This option accepts up to three numerical parameters, a preceding dash(-), or a 'on/off' flag. If no parameters are given, or the 'on' flag is used, the system defaults will be used. If the dash or 'off' are given, the bell will be turned off. If only one numerical parameter is given, the bell volume will be set to that value, as a percentage of its maximum. Likewise, the second numerical parameter specifies the bell pitch, in hertz, and the third numerical parameter specifies the duration in milliseconds. Note that not all hardware can vary the bell characteristics. The X server will set the characteristics of the bell as closely as it can to the user's specifications.

macbook

```
Dec 5 23:55 octave-bug-2.1.72  
Dec 5 23:55 octave-bug -> octave-bug-2.1.72  
Dec 5 23:55 octave-2.1.72  
Dec 5 23:55 octave -> octave-2.1.72  
Dec 5 23:55 mkoctfile-2.1.72  
Dec 5 23:55 mkoctfile -> mkoctfile-2.1.72  
Dec 5 23:55 ncgen  
Dec 5 23:55 ncdump  
Dec 5 23:55 blas-config  
Dec 9 12:31 oneko  
Dec 9 13:56 neko -> oneko  
Dec 13 21:54 unrar  
Jan 29 20:23 xdaliclock  
Feb 15 23:08 xsetroot  
Feb 15 23:11 oclock  
Feb 15 23:11 xconsole  
Feb 15 23:19 xcalc  
Feb 15 23:19 xbiff  
Feb 15 23:20 xset  
Feb 15 23:20 xman  
Feb 15 23:20 xeyes  
Feb 15 23:20
```

And was warm enough to sit on

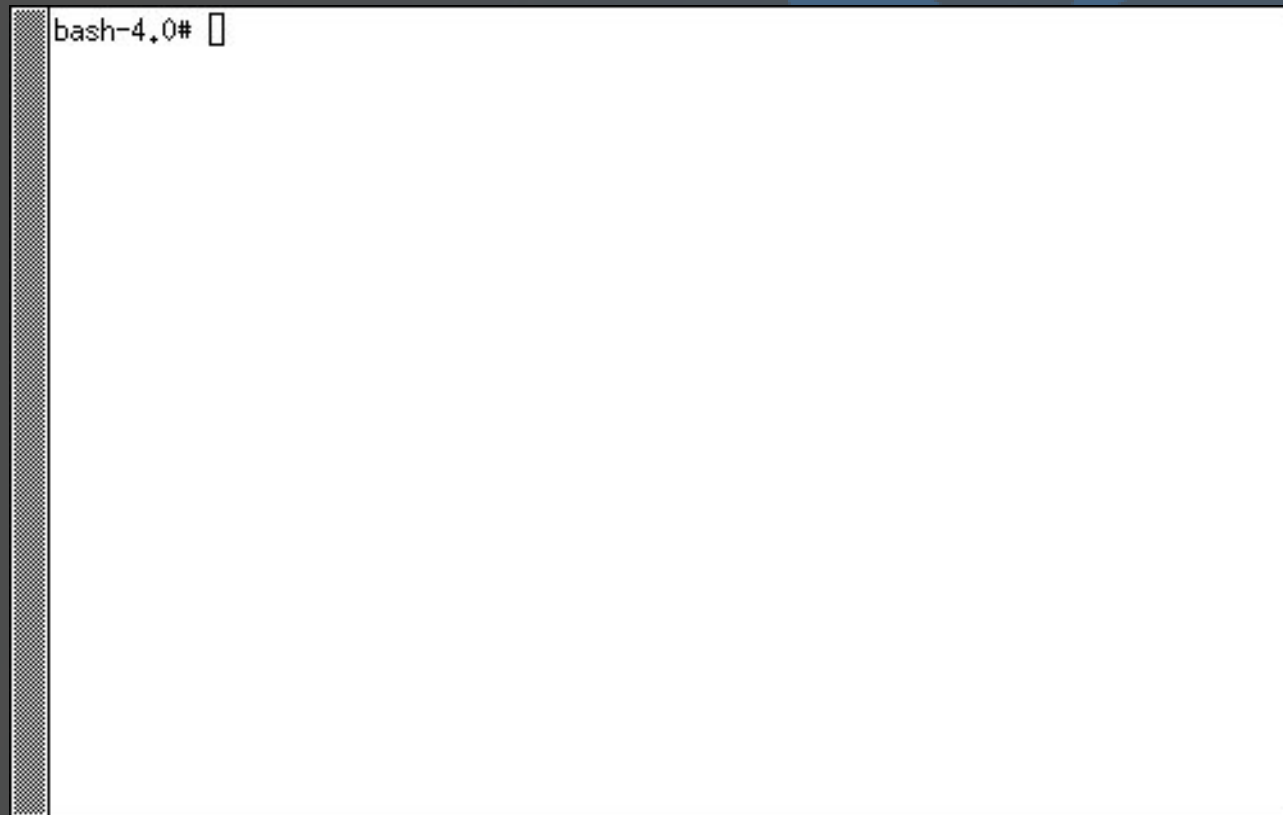


# But we still used terminals

- Totally addicted to text
- You can pry my grep out of my cold dead hands
- Massive install-base of command-line software
- Functional and efficient for those that learned the command-line world



# Behold ... the XTERM!



# The VT100 returns

- Software emulation of the VT100
- Adds other terminal types too
- Almost limitless scrollback support
- Can do... **COLOR!**
- Doesn't require half your desk to run
- Begins with a cool letter 'X' like X-Men!

# Has awesome code

```
/*  
 *                               W A R N I N G  
 *  
 * If you think you know what all of this code is doing, you are  
 * probably very mistaken.  There be serious and nasty dragons here.
```

- Excerpt direct from xterm source

# And the beat goes on

- Lots of other terminals were created
  - Fewer dragons in them
- Rxvt
- Urxvt
- Eterm
- Konsole
- Gnome-terminal
- Terminator
- Xfce-terminal...

But finally the one you all were  
waiting for...



# TERMINOLOGY



YAY





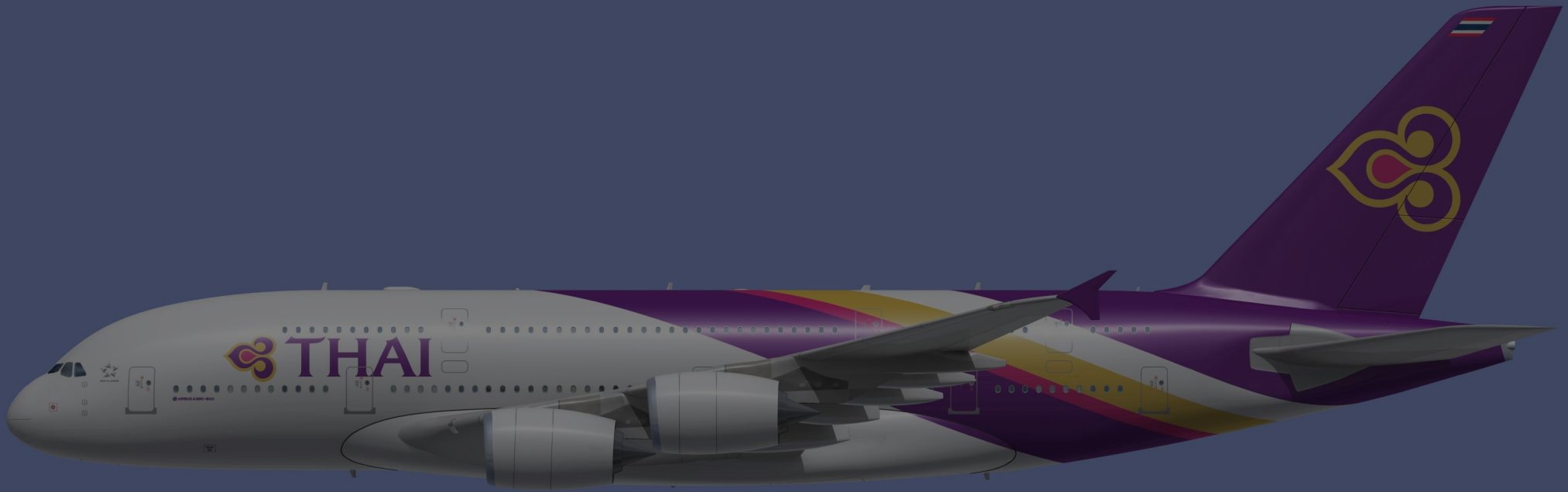
# How did it come about?

Hanging out in Seoul...  
wanting a better terminal





Flew off to thailand...



Hung out on a beach for a week

And on the 7<sup>th</sup> day...



# Why YAY?

This is better said as a demo...



# Why YAY?

- First terminal to use modern EFL
  - Eterm definitely does not
- Written-from-scratch terminal emulation
  - No dragons
- 256 colors supported
- Compressed in-memory scrollback
  - Not logged to disk like some terminals

# Why YAY?

- ARGB Transparency supported
- Bitmap and outline fonts supported
- Unicode UTF8 supported out of the box
- Input methods for complex languages
- Single or multiple process model
- Tabs
- Splits

# Why YAY?

- Background images/animations/video etc.
- Inlined images/video/animations etc.
- Inlined thumbnails
- Built-in popup of media files
- URL/path highlighting
- Auto fetch of http/ftp content
- Themes

# Why YAY?

- Wayland already supported
- Works in raw framebuffer without X11
- Should work in Tizen already
- Built in config UI
  - No command-line or text files needed
- Pretty theme by default
- OpenGL(ES) rendering already possible



# Why YAY?

- Speed

- Almost as fast as urxvt (fastest terminal)
- Beats almost everyone despite fancier display
  - 10x - `time cat pg100.txt`

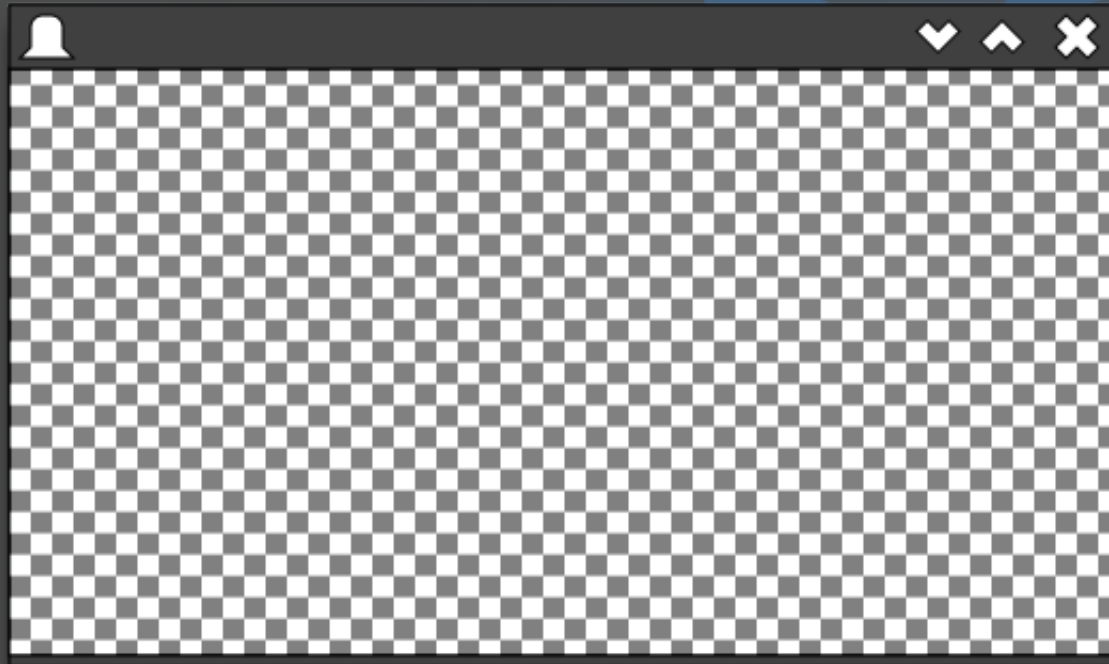
\* N.B. These times vary based on driver (below on intel)

GNOME Terminal	107.08
XTerm	26.56
5.30 Konsole	
2.58 Terminology	
2.32 URxvt	

# But why should that matter?

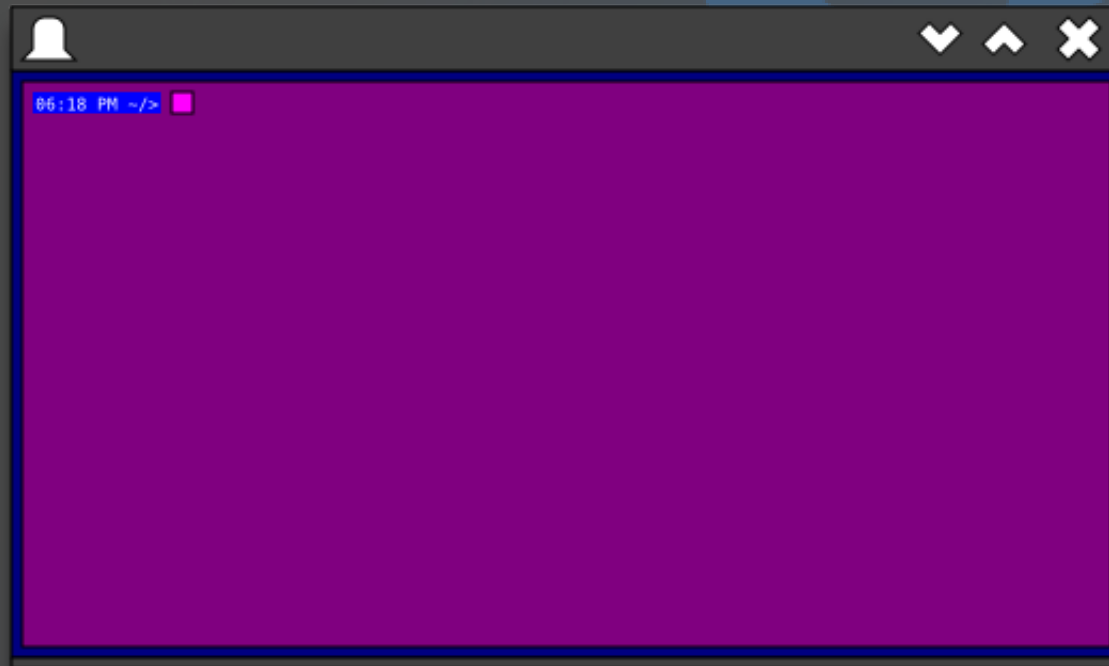
- All of these features with a small codebase
  - ~21,000 Lines of code only for everything
- EFL brings most things for free
- Memory footprint kept reasonable
- You KNOW you want cat gifs as a terminal wallpaper
- Structure & development are simple

# All things start with a window



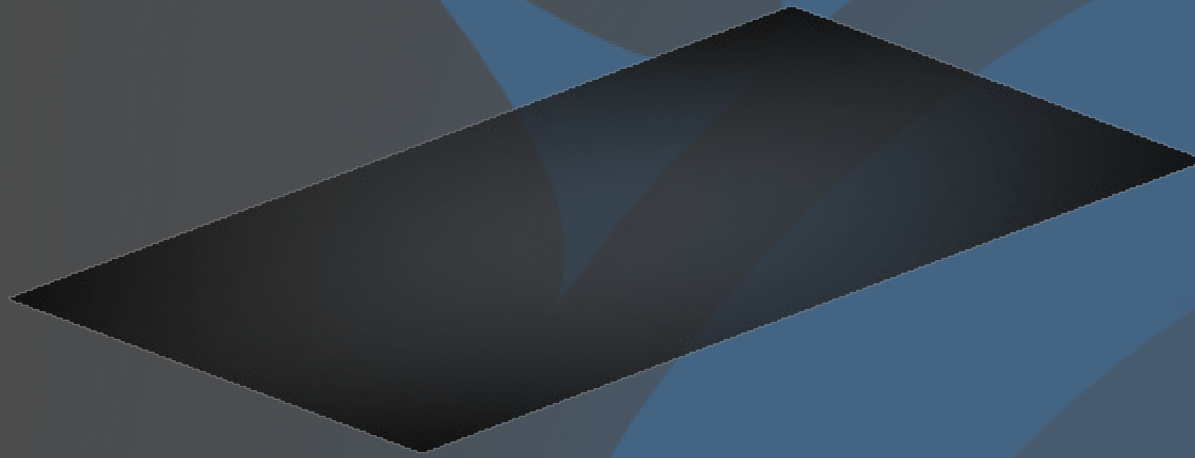
- WM provides frame (except Wayland)
- Check area provides by application

# All things start with a window



- All window content made up of objects
- Each object in the scene graph as properties and content of its own

# Basic application layout



- Add a base with shading
- Can see through to windows below

# Add some cats



- No app complete without fluff
- Fluff is independent – can animate alone

# The terminal object goes in



- Is a grid of text chars that mirror terminal
- Simply layers/overlays on what is under

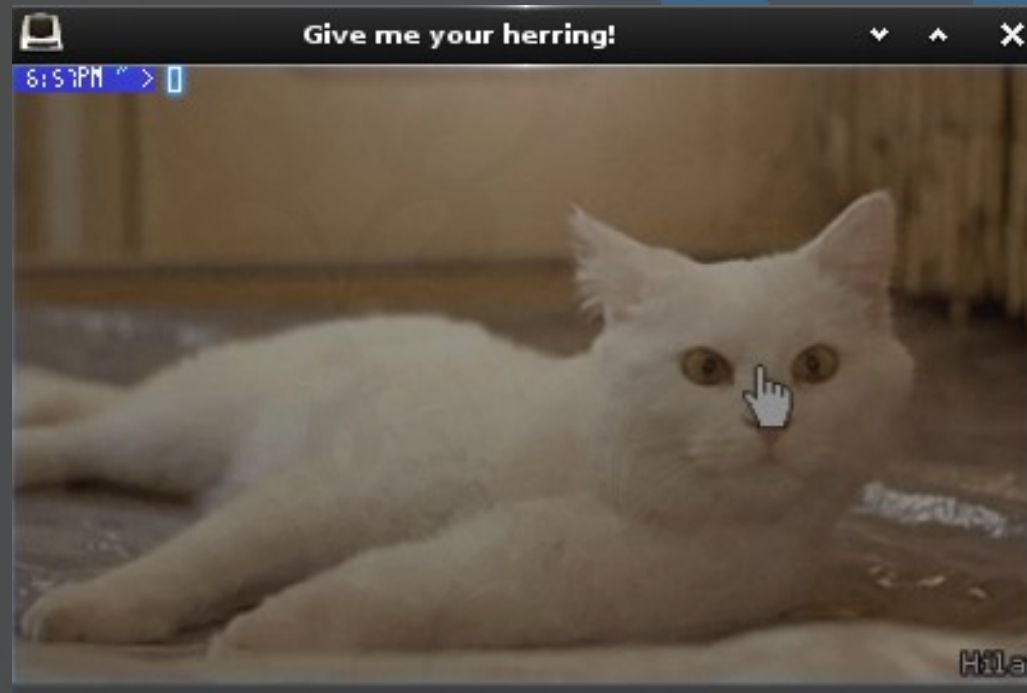
# Add some shine



- Alpha channels allow lighting effects
- Are composited at runtime by Evas



# Coming together



- All the layers and elements make up the UI
- All objects/layers are independent

# Coming together



- Same media objects re-used for popups
- Re-used for inline media too

# Coming together



- Smart objects act as “classes” to save work
- Pre-made smart objects like emotion give you video and audio

# Easy to use to learn EFL

- About half of code directly related to terminal emulator, not “UI”
- Any specific UI feature only between 220-1300 Lines of C each
  - Self-contained UI units
- Acts as a good example of using EFL in apps
- My cat approves of its code

# Where?

#e, #edevdevelop on irc.freenode.net

<http://www.enlightenment.org>

<http://www.enlightenment.org/p.php?p=about/terminology>

<http://git.enlightenment.org/apps/terminology.git>

Terminology 0.4 Alpha release + EFL 1.8 Alpha + E 0.18 Alpha

<https://phab.enlightenment.org/phame/live/3/>

Q&A

Flames, Grills and Happiness

