Pain and Redemption on the Linux Desktop

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Pain and Redemption on the Linux Desktop

- What would make us happy

Pain and Redemption on the Linux Desktop

- What would make us happy
- How sad we are today

Pain and Redemption on the Linux Desktop

- What would make us happy
- How sad we are today
- Where the ice cream can be found

Features of a Happy Desktop

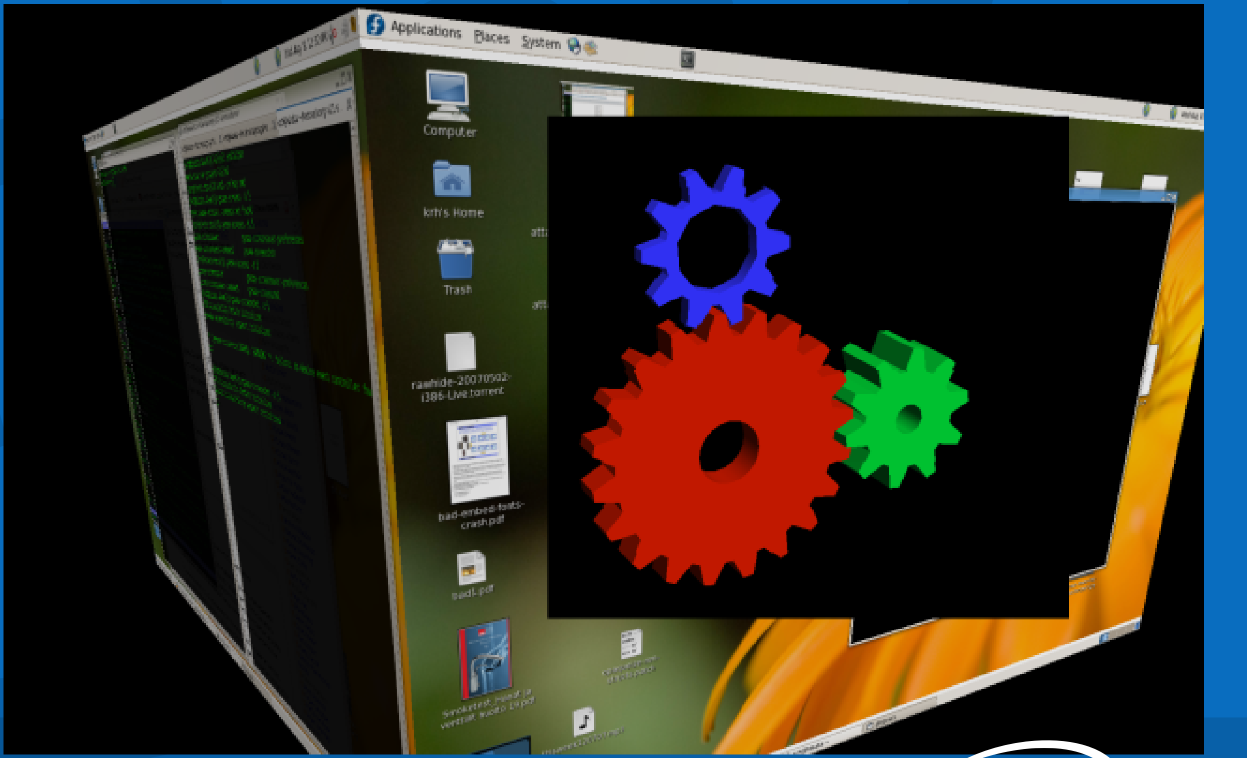
- Fully composited (♥♥♥ compiz ♥♥♥)
- No tearing
- Integrated video, 3D, 2D APIs
- Flicker-free boot
- Fast user switching
- Hotplug everywhere
- Lower power
- Faster. Everywhere.
- Reducing root code

Where Are We Now

The long and winding road…

Composted Desktop

- 2D: Stylin'
- Textured video works great
- Overlay video cannot work
- 3D: not so much



Tear Free

- 3D only
- Endangers kittens

API Integration

- Video cannot draw to pixmaps
- Video sometimes uses overlays
- 3D cannot draw to/from pixmaps
- 2D cannot draw to/from textures
- Major loss here.

Flicker-free Booting

- Hardware Logo screen
- Grub
- Kernel messages
- Kernel console font setting
- Flash to black
- Flash to backlight off
- Flash to solid color
- Flash to GDM login

Fast User Switching

- VT switch is so pretty
- Limited to one 3D session at a time

Hotplug Everywhere

- Video output switching works finally
- Cannot resize framebuffer
- One framebuffer per GPU. GPU limits max width.

Lower power

- Framebuffer Compression
- 2D spins on GPU
- 3D melts CPU, has inefficient compiler
- Video uses small piece of GPU

Faster

- Render needs to be accelerated
- Video needs MC accel at least
- 3D GLSL compiler is primitive

X Security Issues

- Entire X server runs as root
- X server maps all I/O ports
- X server maps graphics card
- No longer directly configures PCI (yay!)

How Do We Get To Oz?

Follow the yellow brick road…

Compositing 3D Applications

- Eliminate shared back/depth buffers
- Create per-window back/depth buffers
- Swap buffers to window redirection buffer
- DRI2 demo already done by KRH

Syncronizing to Retrace

- 2D application/compositing mgr conventions
- XvPutImage needs to use DRM buffer swap
- AIGLX needs to use DRM buffer swap
- Nothing going on here

Integrated drawing APIs

- Video: XvPutImage to pixmap. Abondon overlays
- 3D: GLX draw to X pixmaps. X reference GLX textures
- TTM-based 2D driver on a branch

Flicker Free Boot

- DRM-based mode setting
- graphical console on top of DRM
- handwaving for correct default mode
- DRM stuff is on a branch

Fast user switching

- Multiple DRM masters
- Multiple frame buffers in DRM
- Code is in Fedora, not upstream yet

Resize framebuffer

- Move to EXA
- Finish TTM transition
- Fix 3D driver to actually check
- Eric says this requires us to abandon existing DRI apps

Shatter: multiple framebuffers

- Spilt screen across framebuffers
- Multiple clip lists for each window
- Multiple back/depth-buffers for each window for 3D
- Ajax has some ideas and a bit of code

Lower power

- DRM-based 2D drivers
- XvMC support extended to non-MPEG formats
- Jbarnes hacking on more LVDS power saving
- Zhenyu has XvMC for 915 and 965
- Airlied has DRM 2D drivers.

Faster

- Pervasive Render acceleration
- Eric and Carl have 965 going much better

Security

- Kernel mode setting
- DRM-based 2D drawing
- X server runs as 'nobody'
- Jbarnes and Airlied have demos working