Master Thesis:
Open-Source Multimedia Session-Management For ThinClients Based On The X Windowing System

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Sensitization for Session-Management

- applications keep on running, even on logout
- free workplace roaming without time loss (also from office $\mapsto$ teleworking)
- existing approaches
  - proprietary (Microsoft Terminal Server, Citrix Metaframe)
  - pixel-based (VNC, SunRay)
- my approach: X-Ray (open source)
  - X based, so sends native X commands
  - uses full client-side hardware optimization
Multimedia Extensions

- sound forwarding
  - server-side /dev/dsp splitting, net-fwd to thinclients
  - optimizations like on-the-fly MP3 compression, bandwidth adaption
  - multiple existing approaches:
    * test, optimize and glue together (eg. MP3 compression: icecast)

- video optimization
  - tunneling of the not yet decoded video stream, not via NFS!
  - thinclient decompresses stream locally
  - overlays video contents to correct screen position
  - should be based on xmps (open source video player ~ mpeg1,divx,avi)
X Windowing System Entities

- these entities may be allocated by each X application:
  - Colormaps
  - Pixmaps
  - Cursors
  - Fonts
  - Graphic Contexts (GCs)
  - Windows
X Windowing System Protocol Primitives

- draw primitives on pixmaps or windows (so called drawables) using GCs with linestyles, font sizes, fg+bg colors, ...
  - XDrawRectangle, XDrawArc
  - XPutImage, XGetImage

- move, resize, (un)map windows

- events like mouse movements, Keyboard keystrokes, window obscurces and redraws, ...
Existing Tool: XNest

- feels like a "real" X-server for apps
- opens a window on another X, displaying the apps
- really sends X commands over the line (XDrawLine, XMoveWindow, ...)

App 1
App 2
App 3
... 
App n

Xnest
Virtual X

X

XNest
X-Ray

App 1
App 2
App 3
...
App n

X-Ray Virtual X

X-Ray server-side
fulldraw
clientdraw
migrate

X-Ray client-side
X-Ray via ML-View

App 1
App 2
App 3
...  
App n

X-Ray server-side

X-Ray Virtual X

ML-View

X-Compression

X-Ray client-side

X

X

**X-Ray Connect**

1. **session request** (user, password, display)

2. check for running session, else load-balanced X-Ray start (UID, display)

3. connect to TC1 (display)

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**Diagram:**

- **Server Cluster**
  - 3. connect to TC1 (display)

- **Connector**
  - 2. check for running session, else load-balanced X-Ray start (UID, display)

- **ThinClient 1**
  - 1. session request (user, password, display)
X-Ray Disconnect

1. session close (user, passwd, display)
2. check for running session (UID)
3. disconnect to TC1 (display)