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

Michael Kropfberger, 9555885
mailto:michael.kropfberger@gmx.net

Sensitization for Session-Management

- applications keep on running, even on logout
- free workplace roaming without time loss (also from office $\rightsquigarrow$ 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 $\rightsquigarrow$ mpeg1,divx,avi)

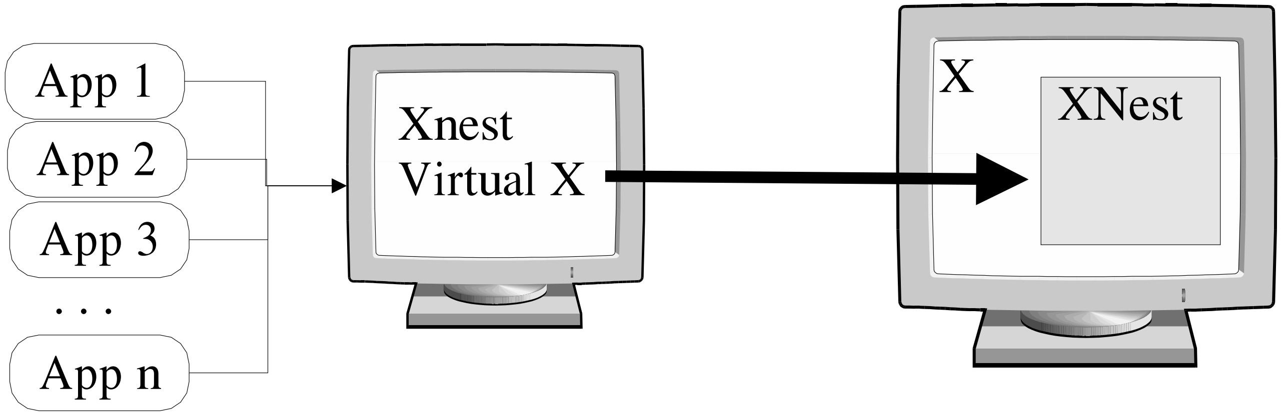
X Windowing System Entities

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

X Windowing System Protocol Primitives

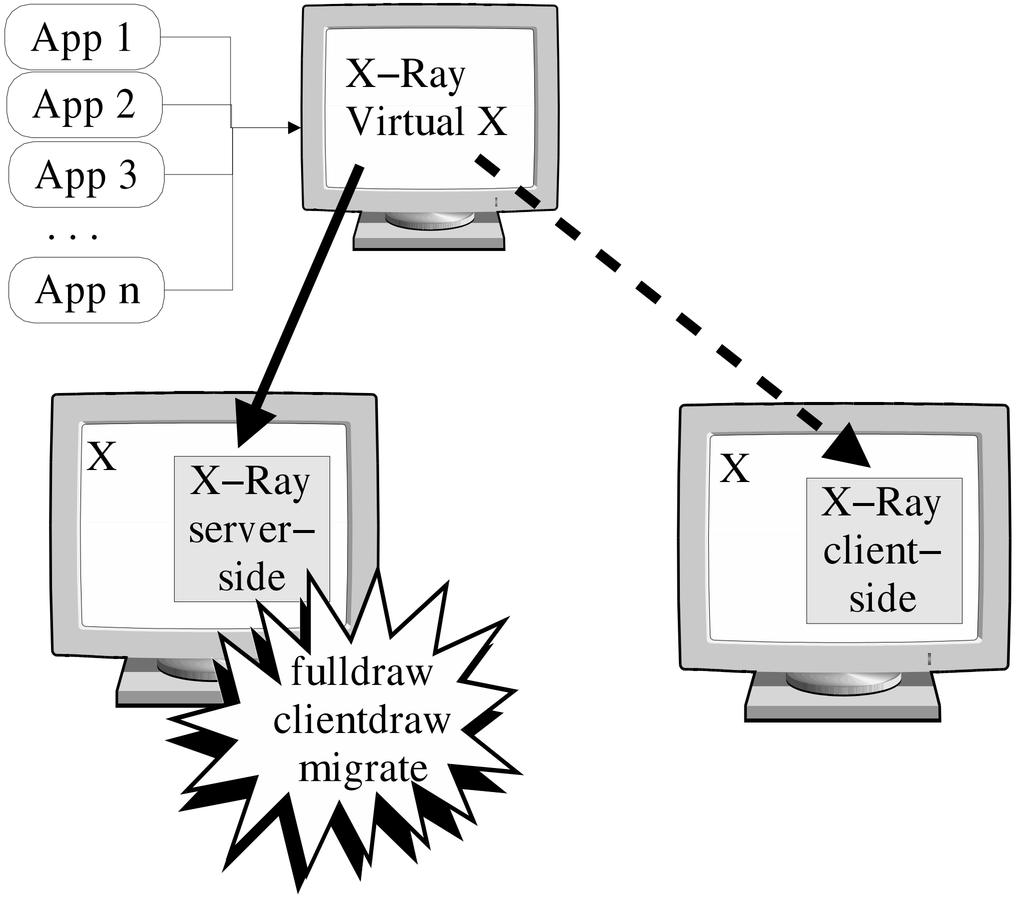
- draw primitives on pixmaps or windows (so called drawables) using GCs with linestyles, font sizes, fg+bg colors, ...
  - XDrawRectangle, XDrawArc
  - XPutImage, XGetImage
- move, resize, (un)map windows
- events like mouse movements, Keyboard keystrokes, window obscures and redraws, ...

Existing Tool: XNest



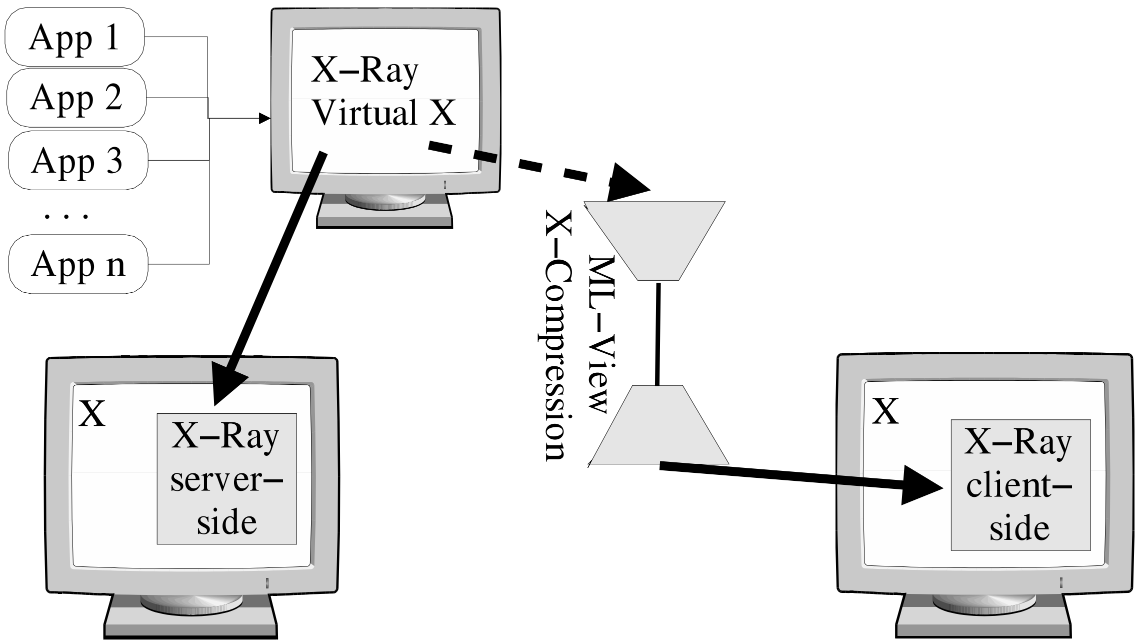
- feels like a “real” X-server for apps
- opens a window on another X, displaying the apps
- really sends X commands over the line (XDrawLine, XMoveWindow, ...)

X-Ray

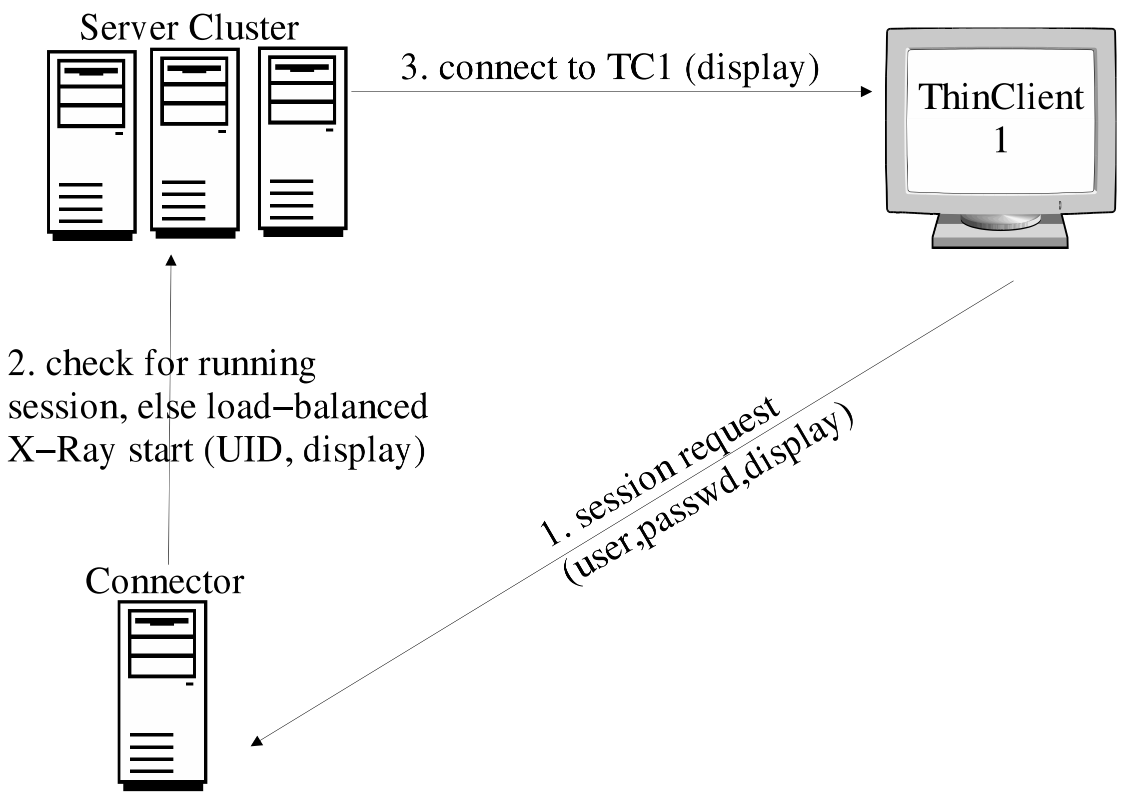


App 1
App 2
App 3
. . .
App n
X–Ray
Virtual X
X
X–Ray
server–
side
fulldraw
clientdraw
migrate
X
X–Ray
client–
side

X-Ray via ML-View



X-Ray Connect



X-Ray Disconnect