FreeRDS and its X friends

David “Hardening” FORT
contact@hardening-consulting.com
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About the author

- A linux and OSS addict since 1994.
- Active FreeRDP and FreeRDS developer.
- The author of the « famous » wayland RDP compositor.
Agenda

- FreeRDS architecture overview
- Xrds
- Wayland FreeRDS compositor
FreeRDS
FreeRDS > RDP protocol (1/2)

• Quite old and 90s tainted protocol
  – slow/fast path
  – weird ROP
  – funny bits saving

• Almost all specs are « public »
• Security used to be an option

• Vector operations in the past, codecs now

• Channels: printing, bi-directionnal sound, serial port redirection, drive sharing, remote coffee?
FreeRDS > the project

- An OSS RDP server (Apache2 licence)
- To be (fully) published soon
- Inspired by Xrdp but based on FreeRDP
- Young (2013)
FreeRDS > features

• Security : RDP4, TLS, NLA
• Encoding : raw bitmap, planar codec, remoteFx
• External channel handling
• Session reconnection
• Session shadowing
FreeRDS > entities
FreeRDS > in pratice

- Written in C (FreeRDS) and C++ (sessionManager), CMake
- Based on FreeRDP
- Linux for now but targets multi-platform
- Protobuf, thrift and D-Bus
- A library to help building content providers
FreeRDS > under the hood (1/3)

• Unix socket as a control channel
  – Signaling messages
  – Mouse moves
  – Key presses
• Shared memory
  – Framebuffer
  – Damaged regions
• At connection, FreeRDS sends
  – Version
  – Screen depth / size
  – Keyboard layout
• Content provider answers
  – Byte / bits per pixel
  – Scanline
  – Size
FreeRDS > under the hood (3/3)
FreeRDS > key points

- FreeRDS does RDP
- Content provider creates the visible content
Xrds
• X11 content provider
• A headless X server like x11vnc
• FreeRDS DDX, (currently) based on Xorg 1.15
• Links against the content provider helper library
• One mouse (client side pointer)
• One keyboard : a xkb layout for the remote RDP keyboard layout
• Functional xrandr
• External program (channel) for clipboard
• Supports reconnection
So...
I love it when a plan comes together
Xrds > xrandr m'a tuer...

- Fake modelines, timing, EDID block
- Use the right unit
- Race conditions
- Shut up the Desktop Environment
• **Problem**: application updating pointers at a mad rate

• **Solution**: check pointer changed (pointer cache)
• Problem: old flash player constantly updates the whole screen when the video is paused

• Solution: frame comparison
  – Split damage in 32x32 tiles
  – Compute the real damage

• Nice gains even with a fullscreen video
• Full X11 environment under FreeRDS

• Gains for other content providers
FreeRDS compositor
• A FreeRDS backend for weston
• An advanced prototype
• Your remote desktop running weston
FreeRDS compositor > features

- Uses the pixman renderer
- 1 seat (except with shadowing)
- Maps the RDP layout to a XKB layout
- Works

- Give it a try!
Next...
Future work

- Add support for extended RDP input to weston / Xrds (multitouch)
- RDP clipboard in weston
- Graphics with the egfx channel
Questions?

Me: contact@hardening-consulting.com

Sponsors: office@thincast.com

FreeRDP: http://github.com/FreeRDP/FreeRDP

FreeRDS: http://github.com/FreeRDS/FreeRDS

Weston backend: http://github.com/hardening/weston
Extra slides
Steps for an RDP server - should compile ...

```
$ ./rdp-server
bash: ./rdp-server: No such file or directory
$
```
Steps for an RDP server - listener not listening

$ xfreerdp /v:<my host>
freerdp_set_last_error 0x2000C
Error: protocol security negotiation or connection failure
$

Steps for an RDP server - black screen
Steps for an RDP server - fireworks
Steps for an RDP server - artifacts

21:48
10 Jan 2014

Login
Password

local\madrie

domain: local login: madrie

Connect Cancel
Steps for an RDP server - go for a beer

21:51
10 Jan 2014