Desktop Virtualization with SPICE

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Agenda

- Overview

- Devices (vmchannel, QXL)

- Recent Changes

- TODO List

- Use spice: getting started

- Q+A
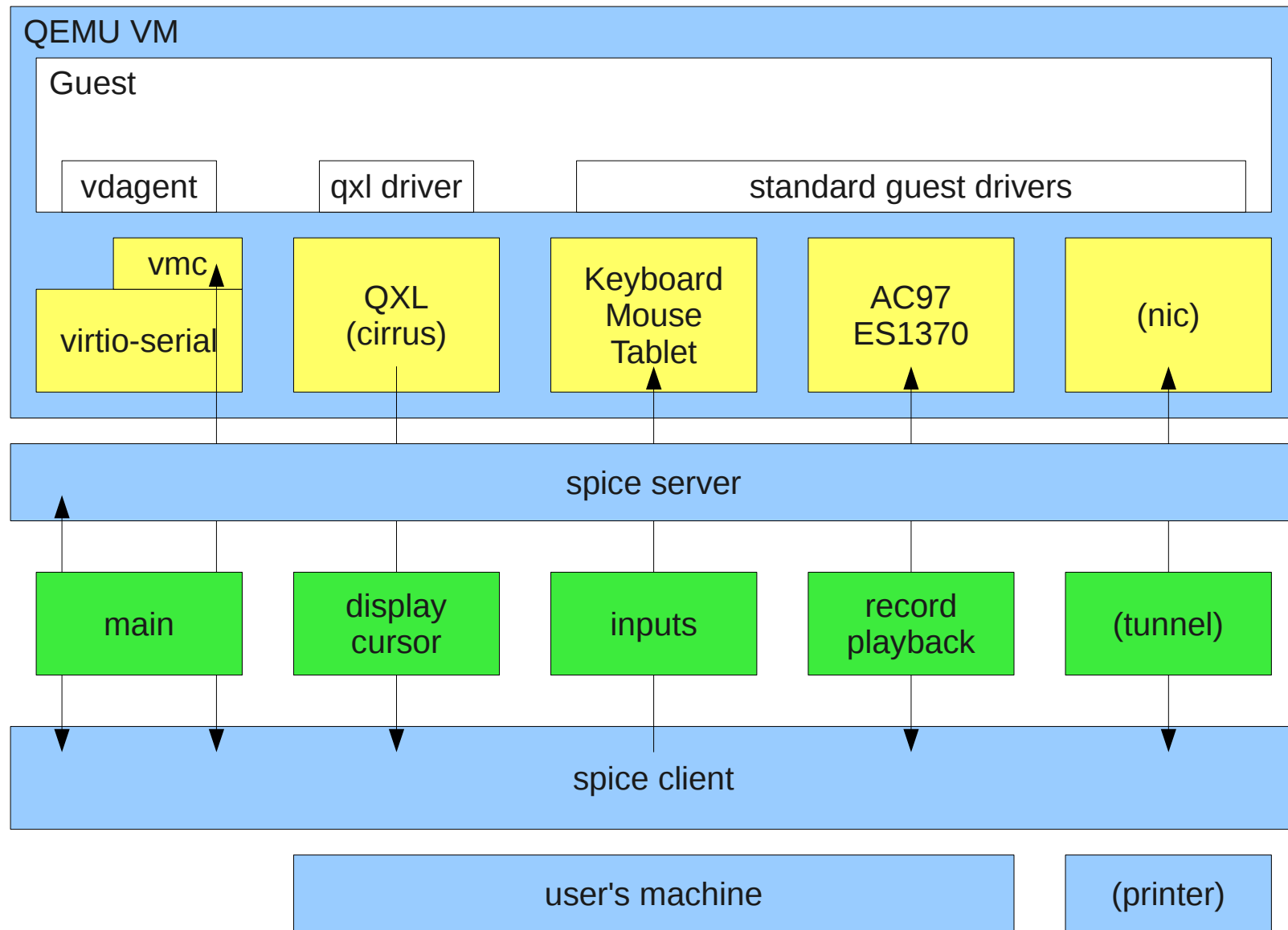
- Demo (?)

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What is SPICE

- **S**imple **P**rotocol for **I**ndependent **C**omputing **E**nvironments.

- Virtual Desktop Infrastructure.

  - Network Protocol.

  - Guest Devices.

  - Guest Agent.

  - Server implementation.

  - Client application.

- Created by Qumranet.

- freedesktop.org project since January '10.

Network Protocol & Guest Devices

QEMU VM

Guest

vdagent	qxl driver	standard guest drivers

vmc

| virtio-serial | QXL (cirrus) | Keyboard Mouse Tablet | AC97 ES1370 | (nic) |

spice server

| main | display cursor | inputs | record playback | (tunnel) |

spice client

| user's machine | (printer) |

VM channel device

- communication path between guest and spice client.
  - Uses virtio-serial port nowdays (RHEL-6 & upstream).
  - Used to be a PCI device (RHEL-5).
  - Display information.
  - Mouse events.
  - (Cut+Paste).

QXL Device

bar 0 ram	VGA framebuffer (8M)
	commands, command data
	cmd rings, control fields (8k)

| bar 1
vram | surfaces:

offscreen pixmaps
(textures) |

| bar 2
rom | qxl device info (8k) |

| bar 3
io | initialization + reset |

- Bar 0+1 are 64M by default.
- Surfaces are new in spice 0.6.
- Two device revisions
  - Rev 1 – spice 0.4
  - Rev 2 – spice 0.6 (backward compatible)

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QXL Rendering

- QXL device passes commands to the spice server.

- Spice server:

  - Shared library, runs async (thread).

  - Tracks render command dependencies.

  - Sends commands to the client.

  - Can render too ("local rendering") if needed.

- Spice client:

  - Processes commands.

Migration

- VM migration.
    - save/load qxl state.
    - spice server must process all outstanding commands.
- spice client migration.
    - "switch-host": just connect to target host.
    - "seamless": client connects to target while VM migration is running.
        - minimize switchover latency.
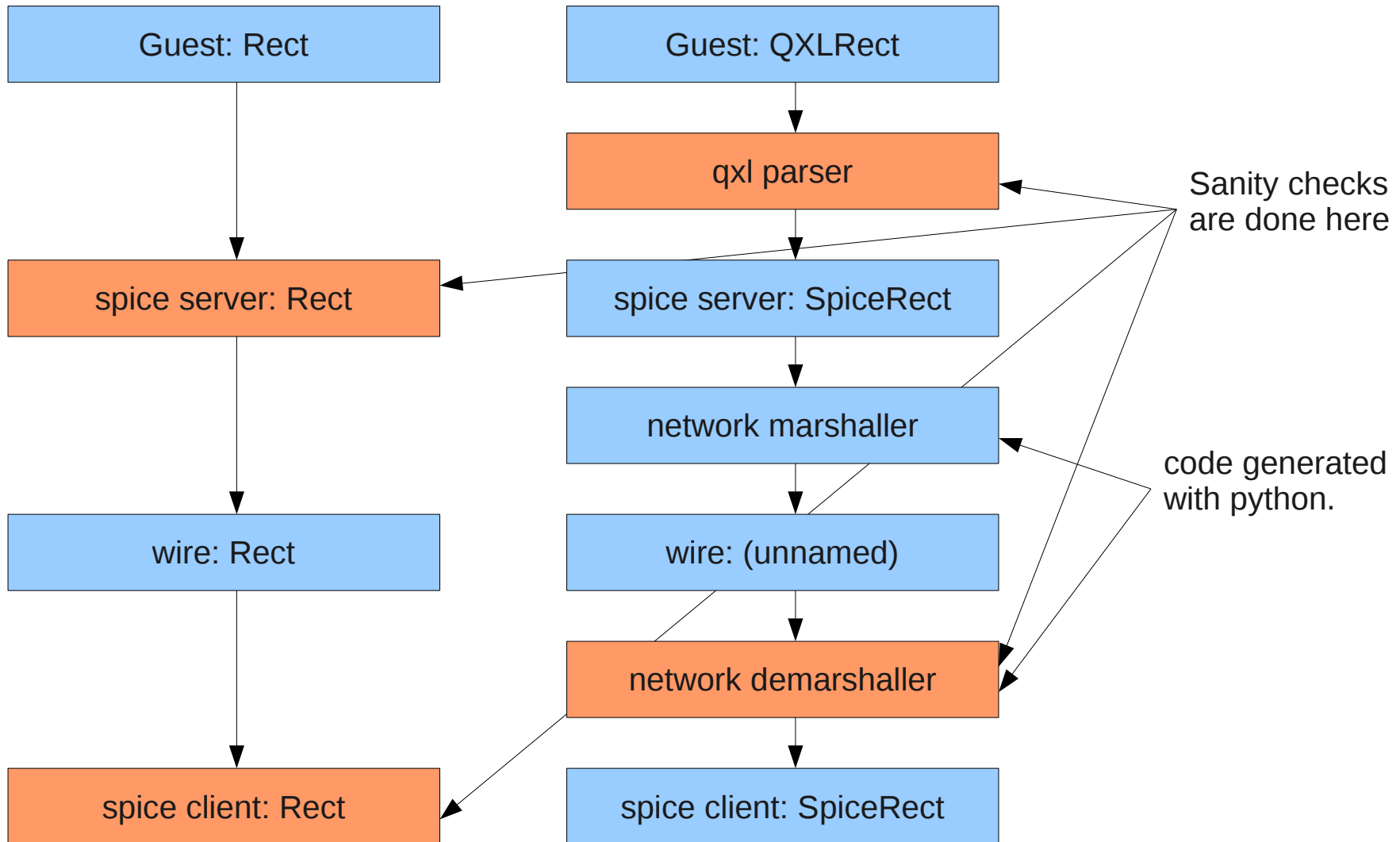
Recent Changes

- Simplify build.
  - Merge pixman changes upstream.
  - Ditch dependency on patched cairo.
  - Ditch dependency on ffmpeg.
- New libspice-server API.
- Fixup data structures (next slide).
- QXL/Display: Surfaces, WAN compression.
- Network protocol optimizations.

Data structure fixups

How it used to work.

How it works today.

Guest: Rect

Guest: QXLRect

qxl parser

spice server: Rect

spice server: SpiceRect

Sanity checks
are done here

network marshaller

wire: Rect

wire: (unnamed)

code generated
with python.

network demarshaller

spice client: Rect

spice client: SpiceRect

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TODO List

- Merge into upstream qemu.

  - plan: early in 0.14 devel cycle.

- Create libspice-client, gtk widget.

- Portability fixes.

- More cleanups.

- Tunnel & Printing.

- USB forwarding.

Using spice: getting started

- qemu -spice port=1234,disable-ticketing -vga qxl -usbdevice tablet

- spicec -host localhost -p 1234

- fedora guest: yum install xorg-x11-drv-qxl

- windows guest: spice-space.org has drivers

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Using spice: with guest agent

- qemu: add "-device virtio-serial -device spicevmc", remove usb tablet.

- fedora guest: yum install vdagent.

  - Tiny daemon feeding uinput, grew from test tool.

  - Long-term the X-Server should handle this.

- windows guest:

  - install virtio-serial driver from spice-space.org

    - Installing driver hangs winxp for me :-(

  - fetch+unpack vdagent zip, run "vdservice.exe install".

Ressources

- www.spice-space.org
  - Wiki, docs & downloads
- cgit.freedesktop.org
  - spice git repositories.
  - also qemu with spice patches (branches spice.v$nr).
- kraxel.fedorapeople.org/spice/, F14, rawhide
  - fedora packages.
- spice-devel@lists.freedesktop.org
  - developer mailing list