Desktop Virtualization with SPICE

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What is SPICE

- Virtual **Desktop** Infrastructure.
- **S**imple **P**rotocol for **I**ndependent **C**omputing **E**nvironments.
- Created by Qumranet.
- freedesktop.org project since January '10.
Network Protocol & Guest Devices

QEMU VM

Guest

vdagent  qx1 driver  standard guest drivers

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 between guest and spice client.
  - Mouse events.
  - Display information.
  - (Cut+Paste).
  - Uses virtio-serial port now days
  - Used to be a PCI device.
# QXL Device

<table>
<thead>
<tr>
<th>bar 0 ram</th>
<th>VGA framebuffer (8M)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>rendering commands, command data</td>
</tr>
<tr>
<td></td>
<td>cmd rings, control fields (8k)</td>
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<table>
<thead>
<tr>
<th>bar 1 vram</th>
<th>surfaces:</th>
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<tbody>
<tr>
<td></td>
<td>offscreen pixmaps (textures)</td>
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<table>
<thead>
<tr>
<th>bar 2 rom</th>
<th>qxl device info (8k)</th>
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| bar 3 io | initialization + reset |

- Paravirtual graphics device.
- Two QXL device revisions
  - Rev 1 – spice 0.4
  - Rev 2 – spice 0.6
QXL Rendering

QEMU VM

Guest

QXL

Ifb

spice server

renderer

display cursor

spice client

renderer

vnc / sdl

QXL Rendering

QEMU VM

Guest

QXL

Ifb

spice server

renderer

display cursor

spice client

renderer

vnc / sdl
Migration

Source Host

QEMU VM
  Guest
  QXL
  spice server

Target Host

QEMU VM
  Guest
  QXL
  spice server

VM migration

client migration

spice client
Recent Changes (0.4 -> 0.6)

- 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

spice 0.4.x

Guest: Rect
spice server: Rect
wire: Rect
spice client: Rect

spice 0.6.x

Guest: QXLRect
qxl parser
spice server: SpiceRect
network marshaller
wire: (unnamed)
network demarshaller
spice client: SpiceRect

Sanity checks are done here

code generated with python.
TODO List

• Merge into upstream qemu.
  • plan: early in 0.14 devel cycle.
• Create libspice-client, gtk widget.
  • at alpha stage now.
• 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
- linux guest:
  - yum install xorg-x11-drv-qxl
  - http://cgit.freedesktop.org/xorg/driver/xf86-video-qxl
- windows guest:
  - spice-space.org has qxl drivers
Using spice: with guest agent

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

- linux guest:
  - http://cgit.freedesktop.org/~jwrdegoede/vdagent-linux/

- windows guest:
  - install virtio-serial driver from spice-space.org.
  - 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).
- spice-devel@lists.freedesktop.org
  - developer mailing list
- Packages: Fedora 14.