SPICE and desktop virtualization

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What is SPICE

- **Simple Protocol for Independent Computing Environments**
- **Virtual desktop infrastructure**
  - SPICE network protocol.
  - Virtual hardware (QXL).
  - Server and client implementations.
SPICE history

- Created by Qumranet.
  - Startup company which created KVM.
  - Acquired by Red Hat.
- freedesktop.org project since January 2010.
- SPICE support merged into qemu during 0.14 development cycle.
Server and desktop virtualization

● Server virtualization is commonplace these days, every hoster has offers.

● Virtual machine.
  ● CPU & memory.
  ● Storage.
  ● Network.

● Administrator access.
  ● Text mode (ssh, serial line).
  ● Low end graphics (vnc).

● For desktop virtualization you need more ...
Wanted: better graphics

• Powerful graphics
  • ideally 3D which is good enough for desktop effects.
    • gnome shell
    • windows aero
• Multihead support.
## SPICE: QXL graphics adapter

- Virtual PCI Device.
- Two variants, with and without VGA compatibility, for multihead.
- 3D support not yet available.

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SPICE: QXL rendering

QEMU VM

Guest

QXL

Ifb

renderer

spice server

vnc / sdl

display cursor

spice client

renderer

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Wanted: multimedia
SPICE: sound + video

- Sound forwarding.
- Video stream support.
  - Recognized by screen update patterns.
- Time stamps for synchronization.
QEMU: audio devices

- Intel HDA support (merged in 0.14).
  - Fix Win7 64bit sound issue.
- Experimental USB audio bits (not merged).
Wanted: Desktop Integration.

- Resize guest display.
- Cut+paste.
- Needs guest cooperation.
SPICE: vm channel & guest agent

- Channel between guest and spice client.
  - Nowadays a virtio-serial port.
  - Used to be a PCI device.
- Provides additional features when the agent is installed and active in the guest.
  - Guest Display configuration (including multihead).
  - Cut+paste support.
  - Absolute mouse events without USB tablet.
Wanted: USB support
SPICE: USB forwarding

- Remote USB protocol (currently in development).
- Will also be usable without SPICE.
QEMU: USB needs some love

- Add physical port handling (started in 0.14).
- savevm / migration support (started in 0.14).
- Remote wake-up support (merged in 0.14).
  - Fix CPU burning.
  - Needs guest help.
- Get ready for USB 2.0 and 3.0 (started in 0.14).
  - Fix, improve and cleanup the USB subsystem.
  - Finally merge EHCI support.
- Improve isochronous xfers support (started in master).
Wanted: printing

- Print to the printer next to you, not the one in the server room or data center.
SPICE: network tunneling

- Allow guests to access network resources (i.e. printers) in the client network.
- Experimental, off by default.
  - Configuration & Security issues.
- Need to check out other options.
  - USB Printer?
  - Cloud printing?
Big picture: Network protocol & Guest devices
Integrate SPICE

- New spice-gtk client project.
  - libraries with glib objects and gtk widgets.
  - gtk-based client application “spicy”.
- virt-manager supports spice (0.8.7+).
- vinagre supports spice (3.0).
Getting started

• Easy way: Fedora 15 & virt-manager.

• Starting qemu + client manually:
  
  • qemu command line:
    qemu -vga qxl -usbdevice tablet \ 
    -spice port=1234,disable-ticketing
  
  • classic spice client command line:
    spicec -h localhost -p 1234
  
  • spicy: Just start it, comes up with a dialog. Command line options work too.
Enable TLS, server side

- qemu -readconfig spice.cfg

```conf
[spice]
  port = "5920"
  # disable-ticketing = "on"
  password = "secret"

tls-port = "5921"
  x509-cacert-file = "/home/kraxel/mini-ca/data/ca.crt"
  x509-cert-file = "/home/kraxel/mini-ca/rincewind.crt"
  x509-key-file = "/home/kraxel/mini-ca/rincewind.key"
  tls-channel = "main"
  tls-channel = "inputs"
  plaintext-channel = "display"
```
Enable TLS, client side

```
spicy -h rincewind.home.kraxel.org   \
    -p 5920 -s 5921 -w secret           \
    --ca-file /home/kraxel/mini-ca/data/ca.crt
```

- CA certificate can also be copied / symlinked to $HOME/.spicec/spice_truststore.pem
Enable agent, qemu config

- qemu -readconfig vmchannel.cfg

```ini
[chardev "vmchannel"]
  backend = "spicevmc"
  name    = "vdagent"

[device]
  driver = "virtio-serial"

[device]
  driver = "virtserialport"
  name   = "com.redhat.spice.0"
  chardev = "vmchannel"
```
Enable agent, guest setup

- Windows
  - Fetch vdagent.zip from spice-space.org, unpack somewhere.
  - Run `vdservice install`
- Fedora 14+15, RHEL 6.1
  - `yum install spice-vdagent`
- Other Linux guests:
  - Get the bits from http://cgit.freedesktop.org/spice/linux/vd_agent/
Ressources

- www.spice-space.org
  - Wiki, docs, downloads.
- spice-devel@lists.freedesktop.org
- cgit.freedesktop.org
  - Most git repositories are in the spice section.
  - The X11 qxl driver is in the x.org drivers section.
- http://gitorious.org/spice-gtk