Qubes OS 101
A Reasonably Secure Operating System
What is Qubes

- Qubes is an operating system
  - Runs on 64-bit Intel or AMD processor
  - Available as ISO
    - Live USB in progress
- Relies on virtual machines to create separate “domains” with varying levels of trust
- Qubes is really a Xen distribution
  - Xen is a virtual machine hypervisor
  - Strong ties to Linux
Domains?

- dom0
  - anon-whonix
  - sys-whonix
- sys-firewall
- sys-net
- disp*
- untrusted
- personal
- vault
- work
Domains?

- **dom0** – The screen and hardware manager
  - Must be ultimately trusted
  - Never do anything unsafe in dom0!
  - For example, no USB devices except for mouse and keyboard

- **sys-net** – Is a “NetVM”
  - Provides network services for other domains

- **sys-firewall** – Is a “ProxyVM”
  - Provides firewall services for other domains
Domains?

- **sys-whonix** – Is a “ProxyVM”
  - Provides Tor proxy services to other domains
  - Never do anything unsafe in sys-whonix

- **anon-whonix** – Is an “AppVM”
  - Runs applications over the Tor protocol

- **disp*** – Is a “DisposableVM”
  - Is a transient virtual machine
  - Completely reset when the application is closed
Domains

- **untrusted** – Is an “AppVM”
  - For tasks that are untrusted

- **personal** – Is an “AppVM”
  - For personal tasks that are moderately trusted

- **work** – Is an “AppVM”
  - For work tasks that are mostly trusted

- **vault** – Is an “AppVM”
  - No network access
  - Only perform fully trusted tasks
How is This Secure?

- The domains separate actions to malicious programs can’t access other (sensitive) domains
- The domains are based on a template
  - When a domain is shutdown, it reverts back to the template
  - Except, /rw, /usr/local, and /home changes are retained. In particular, the root and binaries are reset
- The DisposableVM is completely reset
Using the Clipboard

- Can copy/paste between domains
  1. Copy to the clipboard in the source domain
  2. Still in the source domain, use a Ctrl-Shift-c to transfer to the global clipboard
  3. In the destination domain, use Ctrl-Shift-v to transfer to the destination clipboard AND CLEAR THE GLOBAL CLIPBOARD
  4. Past from the clipboard in the destination domain
Copying Files

- Copy a from a domain
  - Use File Manager
    - Select “Copy to another AppVM”
    - Enter the destination AppVM
    - File appears in /home/user/QubesIncoming/.
  - Use Command Line
    - qvm-copy-to-vm
    - Require user interaction
Hardware Control

- You control the hardware attached to each domain
  - No microphone or camera access to a domain unless it is attached
  - But, can still watch videos
Other Operating Systems

- Can install any operating system into a new virtual machine
  - Specifically, a “Hardware VM” meaning it is fully virtualized
- Special case for Windows 7 as it supports
  - Seamless GUI mode
  - Secure Clipboard
  - Secure File Exchange
  - more...
Demonstration
What’s Next?

• Would you be interested in an installation party?
Current Issues

- Requires legacy boot mode
  - UEFI work in progress
Sources

- https://www.qubes-os.org/