Evolving Xen Paravirtualisation

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Basic Xen Concepts

Control Domain aka Dom0
- Dom0 kernel with drivers
- Xen Management Toolstack
- Trusted Computing Base

Guest Domains
- Your applications
- Your user's applications

Driver/Stub/Service Domain(s)
- A “driver, device model or control service in a box”
- De-privileged and isolated
- Lifetime: start, stop, kill
PV Domains

Limitations
- limited set of virtual hardware

Advantages
- Fast
- Works on any system
- (even without virt extensions)
HVM Domains

Disadvantages
• Slower than PV due to Emulation (mainly I/O devices)

Advantages
• Install the same way as native Operating System

Stub Domains
• Security
• Isolation
• Reliability and Robustness
# PV Spectrum

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<th>PV</th>
<th>PVHVM</th>
<th>PV I/O</th>
<th>HVM</th>
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PV Evolution: PVH

- PV with Hardware
- Developed by Mukesh @ Oracle
- Targeting 4.3 Release
PVH: Why?

- System call performance on 64-bit x86
- PV MMU changes are large
  - Harder to port new guests OSes to Xen
  - Not always popular with maintainers
- Hardware has gotten better
  - New capabilities
  - Better capabilities
## PVH: Spectrum

### Virtualisation Spectrum

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Xen on ARM

- PVH like model from day 1
  - Uses new ARMv7 + v8 HYP mode
  - Hardware paging, interrupts
- Kernel side upstream from 3.7
  - ~1,000 LoC
  - took ~1 release cycle
- ARMv7 in 4.3, ARMv8 Preview
• IRC:
  • ##xen @ Freenode
• Lists:
  • xen-{users,devel,api}@lists.xen.org
• Wiki:
  • http://wiki.xen.org/

Questions ...

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PVH: Still PV

- OS is still fundamentally aware
  - But needs to do less about it
- No emulation
  - ... or device models
- Mix & match hardware and software
  - Find the sweet spot
Conclusions

- PV Xen is continuing to evolve
- Take advantage of the best mix of software and hardware features
- Retain the advantages of a PV system