

# Novell Update

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# Roadmap Items

# High Level Objectives

- SUSE Linux Enterprise Server 10 SP2
  - Tools and hypervisor moving to Xen 3.2
  - Linux kernel version stays at 2.6.16
    - > with Xen 3.2 kernel modifications
- Expand hardware support
  - Extend host platform support
  - Extend virtualized IO device support
- Enable virtualization capabilities all Novell product offerings
  - Goals to extend virtualization support to the desktops
  - Goals to extend support for additional guest OSes

# Paravirtualized Guest Update

- Novell Guests
  - Open Enterprise Server 2 (Linux & NetWare)
    - > Released October 2007
  - SLES 9 SP4
    - > Release 4<sup>th</sup> Quarter 2007
  - SUSE Linux Enterprise Desktop 10 SP2 (SLED)

# Windows Server 2008 (Longhorn)

- Novell to introduce Xen Support for Elightened Longhorn
  - Introduce sometime post Xen 3.2 (calendar '07)
  - Set of GPL extensions to the hypervisor
    - > Extensions built on Hypervisor Extension Framework
    - > To support specific guest OS requirements
    - > Optimize guest performance
    - > Avoid performance penalties to other guests

# Paravirtual Drivers

- Novell Virtual Machine Driver Pack
  - PV Driver Portfolio (storage/network, 32/64)
    - > SLES 9, 10
    - > RHEL 4, 5
    - > OES 2 Linux & NetWare
    - > Windows 2K, XP, 2K3, Vista, Longhorn
      - » WHQL certifications: As required drive patches into Xen enabling PV drivers to pass guest OS certifications/validations
  - Goals to improve upon live migration of FV guests with PV drivers

# Management API Direction

- Abstract CIM based management of Xen through libvirt
- Justification
  - Customer demand is driving management solution vendors to provide options
    - > Choice of virtualization technologies and management application
  - xen-cim participation has been quite limited
    - > Novell, IBM, Unisys
    - > Desire to create a larger CIM provider development community
- Call to action
  - Finish Xen API (Effort needs rejuvenation)
  - Move libvirt to Xen API
  - Contribute to CIM providers development

# Usability Issues - Summary

# Outstanding Usability Issues

- Spring 2007 summit I mentioned many highly visible usability issues.
  - Some progress has been made but many issues remain
    - > Removable Media
    - > Legacy OS Support
    - > Graphics Card Issues
    - > Mouse and Pointer Issues
    - > Networking
    - > Power Management
    - > Migration
    - > Scheduler
    - > Performance Issues
    - > Community and Upstreaming
  - There are a lot of areas where contribution is welcome

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# Usability Issues- Detail (Current Status)

# Removable media support

- Need support to insert/remove media
  - Necessary for paravirtual guests. (Bugzilla #'s 252254, 308124, 305765, 308122, 211215)
    - > Novell to push a number of patches fixing issues for removable media in FV guests.
  - Many operating systems have add on products requiring post install access to media (CD, DVD, etc.) (306935)
    - > Current support is too complex for your typical user
  - Possibly implement as an xm command
    - > Need control via API as well
- USB support

# Legacy OS Support

- Complete real-mode emulation for fully virtualized guests
- Enable support for legacy OS

# Graphics Card Issues

- Accelerated Graphics
  - XGL doesn't work under Xen in many cases
- Certain graphics cards have problems under Xen

# Mouse and Pointer Issues

- Tracking issues
  - Neither PV nor FV Linux track well (247398, 240384)
  - Windows pointers track fine

# Networking

- Needs to be easier to configure / more robust
  - Possibly just a distro issue but we could benefit from better xentools/linux integration

# Power Management

- Support power management in hypervisor
  - ACPI sleep states
  - CPU Frequency Scaling (259985)
  - Feature parity with KVM. (259985, 200482)
  - Suspend to disk or RAM (163626)
- Especially important for desktop virtualization
- Some progress has been made in this area

# Migration Issues

- Migration of 32 bit guests in a 64-bit environment
- Authentication
  - Early support in the XenAPI in xen-unstable, but it would be nice to have the authentication mechanism be pluggable.
- Improve Security
  - Encrypt data sent over the wire
- Transactional protocol
  - Protocol needs transactional semantics. If any errors occur, VM should still be running on original machine. (#173821, 180536, 196171, 239782)
  - Needs to ensure that the migration can succeed before it begins
  - Needs to ensure that it did succeed before shutting down VM on original server (239782, 180536, 173821, etc.)

# Scheduler

- Improve Credit Scheduler
  - Often needlessly moves VMs between physical CPUs. (#262582)
  - Need smarter CPU-VM affinity optimizations
  - Default behaviour for credit scheduler could be more efficient
  - Performance scaling as the number of VMs is increased.

# Performance Issues

- Need more testing by everyone
- More effort to ensure code submissions are not only technically correct but do not degrade performance

# Community and Upstreaming

- Get Xen PV support accepted into upstream Linux!
  - Significantly reduce to work distros have to make Xen technology available to public
  - Enterprise distros stick with a kernel version for the life of the product.
    - > Back porting is time consuming and painful

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# Near Term Initiatives

# Mouse

- We are looking into adding a PV mouse driver for HVM
  - Eliminate the need to do a mouse grab from within a viewport.
  - For Linux SAX or YaST will be enhanced to detect the Xen PV mouse and use that during install.

# CDROM

- PV CDROM driver
  - This will allow multiple CD install for SLES 9 and other offerings without having to use ISO images.

# Video

- Working on making the PV FB driver support multiple resolutions.
  - If possible resolution would be configured via the normal domU video configuration tools.
  - Otherwise resolution would be set in the vm config file.

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# Novell Contribution

# Novell Ongoing Contribution

- Many contributions of late
  - performance improvement for the page table handling code
  - sysenter/syscall support for 32-bit apps
  - video handling (namely frame buffer based output)
  - information retrieval from BIOS through real mode
  - avoiding aliases though multiple mappings of the same page with different caching attributes
  - machine check handling
  - Linux build logic simplification
  - debugging resource virtualization (debug regs as well as related MSRs, likewise for various non-debugging MSRs)
  - up-merges of Linux mainline releases (not used by the community so far)
  - many small and mid-size adjustments

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