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What's New With SUSE Linux Enterprise Server 11 for System z

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Agenda

- Software packaging
- Software Adds/Removals
- Architecture
- Network Configuration
- File Systems
- Hardware Support
- Fibre Channel Protocol (FCP)
- z/VM Interoperability
- Installer



Agenda

- Performance Management
- Security
- System Management/Configuration
- Mono
- Miscellaneous
- Questions
- Backup Material



- SUSE Linux Enterprise Server 11 was launched on March 24, 2009.
- As is typical, major changes have been made across version boundary.
- Also as typical, close cooperation with IBM resulted in numerous specific enhancements for IBM hardware and software.
 - Approximately 100 features were requested by IBM specific to System z



Software packaging

- Reduction in inter-package dependencies
 - A more “minimal” installation pattern than before
 - A Minimal System pattern, intended for appliances
 - Extremely minimal. It boots, and that's about all
- The kernel has been split into multiple RPMs
 - Kernel-default-base
 - The actual kernel and a very small number of modules for things like SCSI, EXT3
 - Kernel-default
 - All the other kernel modules and particularly the hardware-dependent ones
- High Availability and Mono have been split out into separate “extensions.”



Software Packaging (2)

- The Software Development Kit is no longer a “dumping ground” for software that wasn't supported by Level 3/Engineering, or wasn't supported at all.
 - A new “Extras” software channel has been added that contains useful software, but is not supported by Novell.
- Multiple concurrently installed versions of a package
 - Primarily intended for kernels (yay!), but there may be more uses
- The command line software update tool (zypper) can operate on RPMs from a repository, an arbitrary URI, or a file on the local system, all with dependency resolution.



Software Adds/Removals

- Added:
 - Heartbeat2 has been replaced by openAIS and Pacemaker
 - java-1_4_2-ibm-1.4.2_sr12
 - java-1_6_0-ibm-1.6.0
 - ruby-1.8.7 (not Ruby on Rails)
 - FUSE (File system in USEr space)
 - "Command not found" handling in the shell



Software Adds/Removals

- Removed
 - java-1_5_0-ibm-1.5.0
 - Previously deprecated
 - CPINT (in favor of VMCP from s390-tools)
 - JFS (IBM's Journaling File System)
 - EVMS
 - rug / zmd
 - uw-imapd



Architecture

- Reduced duplication of code/function in YaST (including the installer)
- More consistent user interface in YaST
- Completely new “Partitioner” interface
- New command line “update stack” - zypper
 - Much faster than rug and zmd
- A new Architecture Level Set (ALS) beginning with SP1 or SP2
 - Only z9 and z10 hardware will be usable
 - Prior to this change, any zSeries or System z processor will be sufficient



Network Configuration

- Allow different host names for different IPs on different NICs
- Support qeth devices for bonding in YaST
- Network hardware configuration information no longer resides in /etc/sysconfig/hardware
 - Everything done in /etc/udev/rules.d/ now



File Systems

- EXT3 is now the default file system
 - Reiserfs and XFS are still included and supported
- Posix compliant OCFS2 - aka: General Purpose OCFS2
- OCFS2 enablement in openAIS / Pacemaker
- C-LVM2 enablement in openAIS / Pacemaker
 - Clustered LVM2, replaces EVMS
- Dynamic resizing of a Fibre Channel LUN
- Online resizing of a multipathed device
- Technology previews of EXT4, eCryptfs, and read-only root file systems



Hardware Support

- Sysplex Timer Protocol support (STP/ETR)
- GCC exploitation of latest hardware instructions
- GCC “tuning” for System z hardware
- binutils exploitation of latest hardware instructions
- Decimal floating point support in GCC backend
- binutils Decimal Floating Point support
- Long random numbers generation via exploitation of the latest cryptographic cards



Hardware Support (2)

- Selective logging of ECKD DASD devices
- High Performance FICON Infrastructure
- Hyper PAV support
- Vertical CPU management



Fibre Channel Protocol

- Performance Data collection and analysis
 - Kernel exploitation of hardware feature
 - User space tools
 - Intended to provide more visibility of the various FCP and SCSI components that affect performance
- Message cleanup
 - Help to reduce service costs
- Automatic Port Discovery
- LUN discovery user space tool
- Enhanced trace facility



z/VM Interoperability

- Exploitation of DCSSs above 2GB line
- Linux struct page elimination
 - Allows DCSS to become freely allocatable anywhere in the kernel address space without massive control block overhead
- Improved handling of dynamic subchannel mapping
- Extra kernel parameters via VMPPARM
 - `ipl #### (parm init=/bin/bash`



Installer

- Support for 2 OSA Ports per CHPID
- Support root on encrypted file system
- The default /etc/fstab entries have been changed to by-path for System z
 - /dev/disk/by-path instead of /dev/disk/by-id
 - The /dev/disk/ entries provide persistent device names
- Support for installation on multipathed device
- CMS script for initial IPL under z/VM



Performance Management

- Integrate Performance Management MIBs used by Velocity Software into net-snmp
- Control groups
 - Replacement for CKRM (Class-based Kernel Resource Management)
- CPU sets
 - Full CPU administration capabilities for Linux kernel
 - Based on Control Groups
- See prior slides for the FCP-related changes



Security

- 'Security health status' YaST Module
 - 'Bastille' like functionality
 - Under YaST -> Security and Users -> Local Security
- Basic SELinux enablement
 - Includes
 - Kernel built to support SELinux
 - Patches to all common user space packages
 - Necessary libraries shipped
 - Does *not* include:
 - SELinux specific software packages (e.g. checkpolicy, policycoreutils, selinux-doc)
 - SELinux policies
 - QA will be run with SELinux *disabled*



System Management/Configuration

- Kernel message numbers
 - Prefixes a message number to kernel messages issued by the s390 architecture and drivers
 - No, it's not the same as the Messages and Codes manuals
- Support for dynamic memory attach/detach
- Standby memory add via SCLP (LPAR mode)
- Standby CPU activation/deactivation (LPAR mode)
- dm-multipath support for xDR/GDPS
- Block layer I/O cancel (abort) capability
 - Potentially used for xDR



System Management/Configuration (2)

- Call Home data support
- Dynamic add of cryptographic card
- Re-IPL from different device
- SCSI Standalone dumper
- Crash: Support for S390 stand alone dump
- Crash: Support for Cross-Architecture Debugging
- utmp format that is compatible between 32 and 64 bit
- Kernel Virtual Machine (KVM) Technology Preview



SUSE Linux Enterprise Mono Extension

- A .NET application framework that allows you to run .NET-based applications on SUSE Linux Enterprise Server
 - Run .NET applications on Linux (including ASP.NET)
 - Mainframe support for .NET applications
 - Performance and scalability advantages over Windows
 - Target Linux from Visual Studio
- Develop anywhere – Deploy anywhere
 - Includes a toolchain for Linux
 - Runtime is binary-compatible with .NET on Windows
- A complete and modern development platform for Linux

SUSE Linux Enterprise Mono Extension (2)



- The necessary software to develop and run .NET client and server applications across platforms on Linux, Solaris, Mac OS X, Windows, and Unix
- A thriving open source project with a growing community
- What Can You Do with Mono?
 - Migrate Microsoft .NET desktop and server applications to Linux without significant investment in rewriting code
 - Target multiple platforma and increase addressable market
 - Leverage existing expertise in computer languages for more efficient development



Miscellaneous

- kexec for system reboots
 - Loads new kernel and branches to it from a running kernel
 - Faster reboots for all architectures
- traceroute over TCP as well as UDP

Questions



Backup Material





Selected software versions at GA

- snmp-mibs-5.4.2.1-8.1.s390x.rpm
- openldap2-2.4.12-7.13.s390x.rpm
- openssh-5.1p1-41.24.s390x.rpm
- openssl-0.9.8h-30.11.s390x.rpm
- openssl-ibmca-1.0.0-104.10.s390x.rpm
- oracleasm-2.0.5-7.6.s390x.rpm
- orarun-1.9-172.19.s390x.rpm
- perl-5.10.0-64.42.s390x.rpm
- php5-5.2.6-50.17.s390x.rpm
- postfix-2.5.6-1.14.s390x.rpm
- postgresql-8.3.5-2.15.s390x.rpm
- python-2.6.0-8.7.s390x.rpm
- rpm-4.4.2.3-37.8.s390x.rpm
- ruby-1.8.7.p72-5.21.s390x.rpm
- s390-tools-1.8.0-43.2.s390x.rpm
- samba-3.2.7-11.6.s390x.rpm
- xorg-x11-7.4-9.15.s390x.rpm
- apache2-2.2.10
- binutils-2.19-11.28.s390x.rpm
- cups-1.3.9-8.14.s390x.rpm
- e2fsprogs-1.41.1-13.9.s390x.rpm
- freeradius-server-2.1.1-7.6.s390x.rpm
- fuse-2.7.2-61.14.s390x.rpm
- gcc-4.3-62.198.s390x.rpm
- glibc-2.9-13.2.s390x.rpm
- gnome-applets-2.24.1-3.27.s390x.rpm
- kde4-4.1.3-3.31.s390x.rpm
- kernel-default-2.6.27.19-5.1.s390x.rpm
- krb5-1.6.3-133.10.s390x.rpm
- mono-core-2.0.1-1.17.s390x.rpm
- mysql-5.0.67-13.15.s390x.rpm
- mysql-client-5.0.67-13.15.s390x.rpm
- mysql-Max-5.0.67-13.15.s390x.rpm
- net-snmp-5.4.2.1-8.1.s390x.rpm



Standards Support

- Compatibility and Interoperability
 - Linux Standards Base 3.2
 - ODF Alliance (OpenDocument Format)
 - WS-I (Web Service Interoperability Organization)
 - Organization for the Advancement of Structured Information Standards (OASIS)
- Management
 - Distributed Management Task Force
- Accessibility and Internationalization
 - Section 508
 - I18N



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SUSE Linux Enterprise High Availability Extension



- An affordable, integrated suite of robust, open source clustering technologies
- Advantages
 - Maintain business continuity
 - Protect data integrity
 - Reduce unplanned downtime for mission critical workloads
- Key Features
 - Flexible, policy driven clustering solution
 - Cluster-aware file system and volume manager
 - Continuous data replication
 - User-friendly tools, and resource agents out of the box

SUSE Linux Enterprise Server System Requirements



- SUSE Linux Enterprise Server 9 SP4:
 - IBM S/390, zSeries z800, z890, z900, z990, or IBM System z9, z10 servers
- SUSE Linux Enterprise Server 10 for System z:
 - IBM zSeries z800, z890, z900, z990, or IBM System z9, z10 servers
- SUSE Linux Enterprise Server 11 for System z:
 - IBM System z9 or System z10 servers
- One or more network connections
- 512MB RAM for initial installation; more or less may be required subsequently, depending on workload needs.

SUSE Linux Enterprise Server System Requirements (2)



- The equivalent of one or more IFLs or full-speed standard CPs for acceptable performance
 - Some workloads perform better with 2 processors, regardless of total capacity available
- Approximately 3GB of disk storage for a default initial Linux guest system; more or less disk storage may be required depending on your workload requirements.

Ten Application Categories for System z Servers



In decreasing order of desirability:

- Data intensive - Large working set and/or high I/O content applications
- I/O bound - High I/O content applications
- Mixed low - Multiple, data intensive applications or skewed OLTP, MQ applications
- Mixed high - Multiple, CPU-intensive simple applications
- Database - Oracle DBMS or dynamic HTTP server

Ten Application Categories for System z Servers (2)



- Java light - Data-intensive Java applications
- Java heavy - CPU-intensive Java applications
- Skewless OLTP - Simple and predictable transaction processing
- Protocol serving - Static HTTP, firewall, etc.
- CPU intensive - High use of the CPU to do numerical calculations



Common Linux for System z Workloads

- Most popular proprietary applications: IBM WebSphere family, Oracle Database, SAP, and applications from BEA and CA
- Most popular open source applications—Apache Web Server, MySQL and PostgreSQL, OpenLDAP Directory Server and Samba
- Business applications with large amounts of I/O are “good fit” applications; whereas, applications with large amounts of computation have not been considered good fits.
- New IBM System z10 server with 4.4GHz quad-core processors broadens list of good fit applications to include CPU intensive applications.
- White paper titled Workloads for SUSE Linux Enterprise Server for System z describes characteristics of workloads for System z servers.

Integrated Systems Management Package Management Subsystem



- ZYpp: Core of the new software management stack
- ZYpper: Command line package manager
 - Manipulates package repositories (like the Build Service)
 - Search for, install, remove, or update packages and more
- libzypp: Software management library that provides all the functionality for a package manager
 - APIs for
 - Package repository management
 - Solving packages, products, patterns and patches (installation, removal, update and distribution upgrade operations) dependencies
 - Committing the transaction to the system over a rpm target
 - Browsing available and installed software
 - A suite of maintained solving test cases



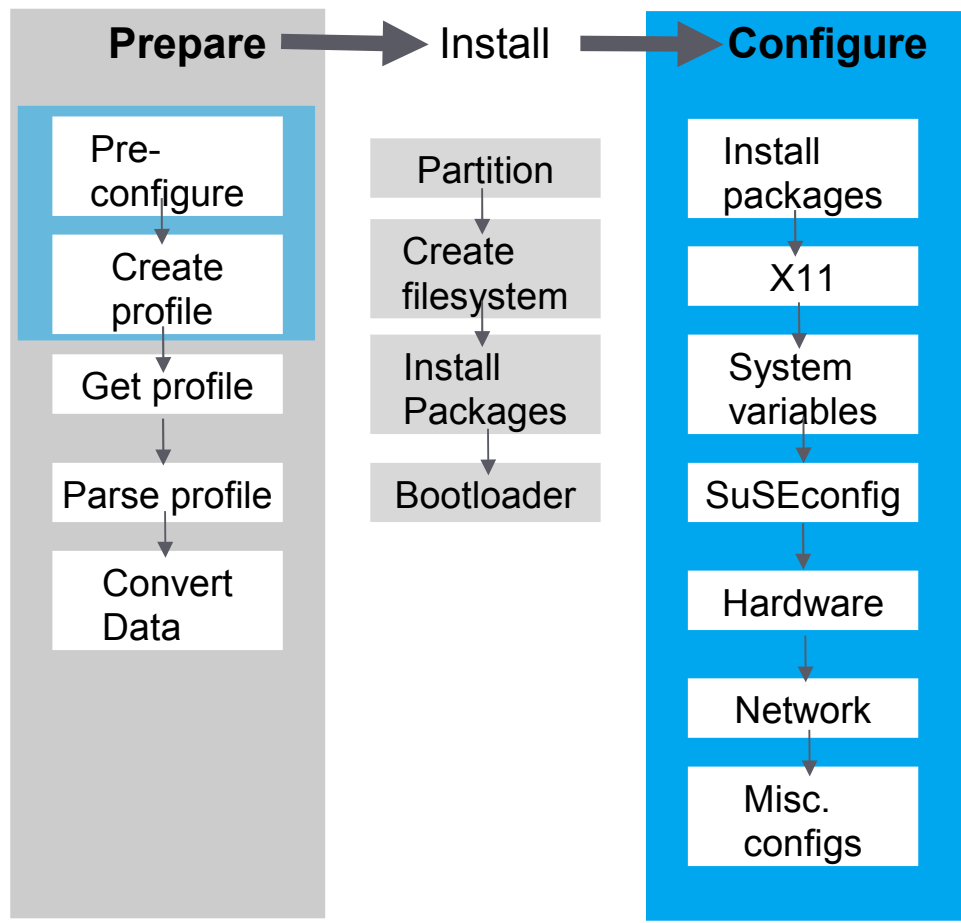
Integrated Systems Management YaST

- Unified and consistent single interface to all systems management tasks via modules
 - Desktop environment independent
 - Two graphical and two text mode interfaces
 - Development platform for 3rd party modules
- Configure every aspect of the server
 - Installation / configuration
 - partitioning and file systems, LVM, boot loader, timezone
 - Software management: update, software selection, product creation, installation server
 - User management (local, NIS, LDAP, Kerberos), sudo
 - Hardware: DASD, FCP, OSA, DUMP device



Integrated Systems Management AutoYast

- A tool for installing SUSE Linux Enterprise on systems with as much (or little) automation as you want
- Works in networked and non-networked environments
- Very flexible
- Very scalable
- Easy to use



Integrated Systems Management Common Information Model (CIM)

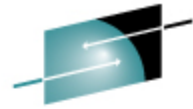


- Support for open Common Information Model management industry standards, basis for development of standards-based cross-platform management tools
- Key Components:
 - Small Footprint CIM Broker (SFCB)
 - Storage Management Provider (SMI-S providers for Volume Management & Snapshot, libstorage)
 - Virtualization Management Provider (libvirt)
 - Power Management Provider
 - Software Management Provider PackageKit Technology preview

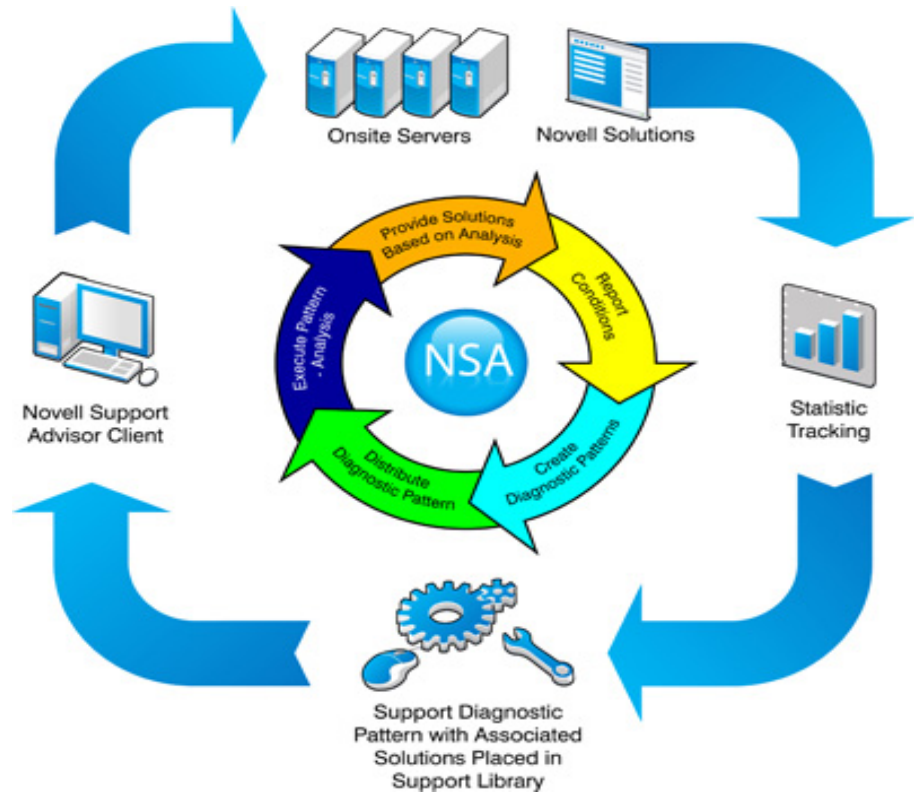
Integrated Systems Management Supportability Infrastructure



- Novell Support Link
 - Built-in into SLE, easily file a support incident with Novell Technical Services
 - YaST module enables quick reporting of an incident
 - Review any and all data before submitting, and discard any bit considered sensitive
 - Enables diagnostics performed by the Novell Support Advisor
- Enablement for Novell Support Advisor
 - System Discovery based upon IP address or range, or DNS name
 - SUSE Linux Enterprise Server Health Diagnosis, with recommended solutions
 - Authentication support for Novell Customer Center
 - Automated Support Diagnostic Pattern deployment
 - Centralized Novell Technical Services Link



Novell Support Advisor



Integrated Systems Management Novell Customer Center (NCC)



- The Novell Customer Center remains at the heart of Novell's relationship with the customers to manage SUSE Linux Enterprise subscriptions
 - Review, download of released updates
 - Subscription, renewal of entitlements
 - Access to knowledge base
 - Monitoring of your deployments
 - Repositories for maintenance and install use
- Additionally, in cooperation with the SMT ability to automatically assign registration codes

Integrated Systems Management Subscription Management Tool (SMT)



- The Subscription Management Tool (SMT) is a local package proxy tightly integrated with Novell's support infrastructure
 - Saves bandwidth
 - Preserves firewall perimeter
 - Helps automatically assign registration codes to devices
 - Preserves Novell Customer Center functionality
 - Enables high-security disconnected operations
 - Facilitates tracking your deployments or migrations
- Included at no cost in SLES entitlement
- SMT supports SLE 11 as a client at SLE 11 GA

Enhancements introduced in SUSE Linux Enterprise Server 10 SP2



- Install/firstboot support for kdump configuration
- Kernel Named Save Segment (NSS) support
- Provide Linux process data into z/VM monitor stream
- System z support for processor degradation
- In-Kernel crypto exploitation of new CP Assist functions (AES 192 / 256 and SHA 384 / 512)
- Large page support
- CPU Node Affinity
- HiperSockets Layer2 and IPv6 support
- STSI change for capacity provisioning

Enhancements introduced in SUSE Linux Enterprise Server 10 SP2 (2)



- skb scatter-gather support for large incoming messages
- FCP performance data collection - adapter statistics
- Dynamic CHPID reconfiguration via SCLP
- z/VM unit-record device driver and user tool
- OSA 2 Ports per CHPID support
- User space tooling for auto-adaptive CPU and memory mgmt
- Dynamic CPU hotplug daemon for System z
- Software Support for CP Assist Instructions AES & SHA