Current & Future Features of SUSE Linux Enterprise Server for System z

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Session 15688

Insert Custom Session QR if Desired.

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Continuously Running Systems

Best Managed

SUSE® Linux Enterprise 12

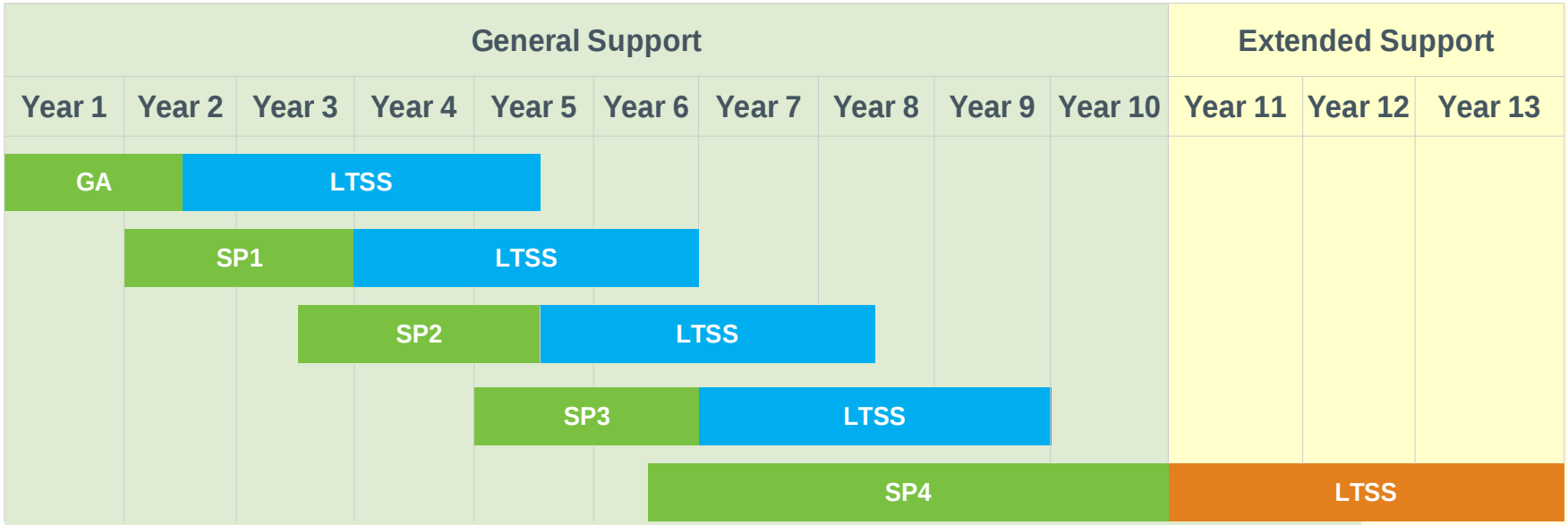
Made for Cloud

Most Interoperable OS

SUSE® Linux Enterprise Server 12

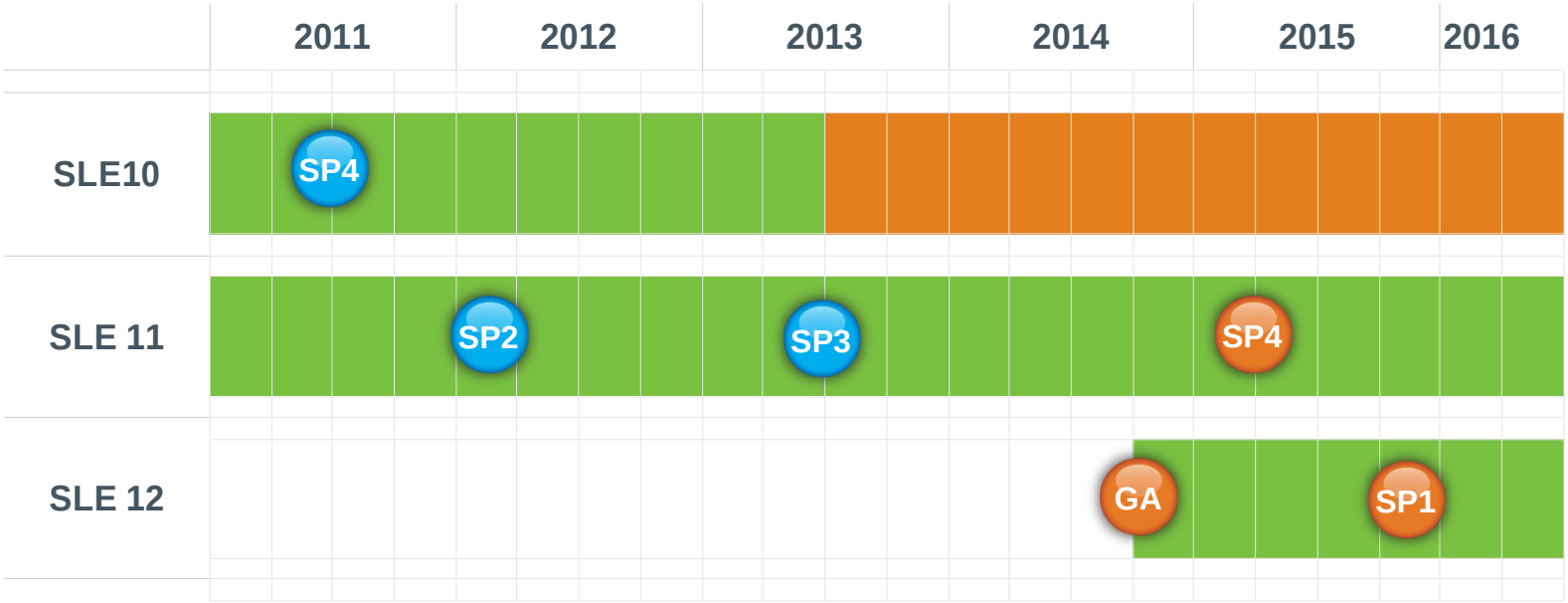
Lifecyle Model

10 years lifecycle + 3 years Extended Support



- **13-year lifecycle** (10 years general support, 3 years extended support)
- **5-year lifecycle per Service Pack** (2 years general + 3 years extended support)
- Long Term Service Pack Support (LTSS) available for all versions, including GA

SUSE® Linux Enterprise
Lifecycle & Code Streams



13-year lifecycle

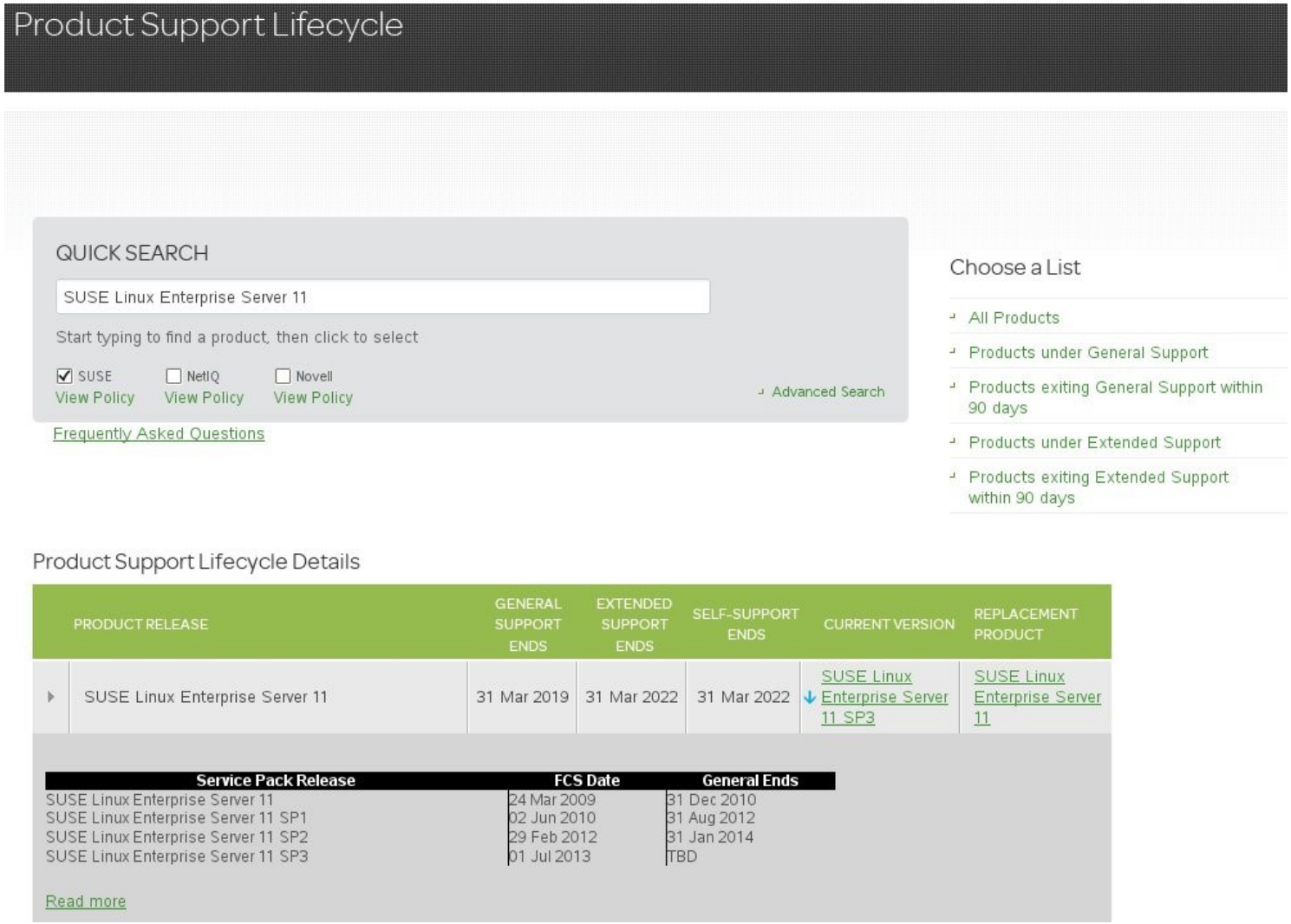
For SLES 11 and SLES 12,
10 years general support,
+3 years Long Term Support

SUSE Linux Enterprise 12

Long Term Service Pack
Support for every Service Pack

Tentative – Dates subject to change

http://www.suse.com/lifecycle/



Product Support Lifecycle

QUICK SEARCH

SUSE Linux Enterprise Server 11

Start typing to find a product, then click to select

☑ SUSE View Policy ☐ NetIQ View Policy ☐ Novell View Policy

Advanced Search

Frequently Asked Questions

Choose a List

- All Products
- Products under General Support
- Products exiting General Support within 90 days
- Products under Extended Support
- Products exiting Extended Support within 90 days

Product Support Lifecycle Details

PRODUCT RELEASE	GENERAL SUPPORT ENDS	EXTENDED SUPPORT ENDS	SELF-SUPPORT ENDS	CURRENT VERSION	REPLACEMENT PRODUCT
SUSE Linux Enterprise Server 11	31 Mar 2019	31 Mar 2022	31 Mar 2022	SUSE Linux Enterprise Server 11 SP3	SUSE Linux Enterprise Server 11

Service Pack Release	FCS Date	General Ends
SUSE Linux Enterprise Server 11	24 Mar 2009	31 Dec 2010
SUSE Linux Enterprise Server 11 SP1	02 Jun 2010	31 Aug 2012
SUSE Linux Enterprise Server 11 SP2	29 Feb 2012	31 Jan 2014
SUSE Linux Enterprise Server 11 SP3	01 Jul 2013	TBD

Read more

Hardware
SUSE Linux Enterprise 12 is 64-bit

- 64-bit hardware is the future
  - 64-bit kernels only
  - Execution of 32-bit applications fully supported via 32-bit execution environment on top of 64-bit kernel
- Virtualization
  - KVM, Xen, z/VM, LPAR support (depends on architecture)
  - 64-bit host; 64-bit and 32-bit guests
- Hybrid Computing
  - Platform specific workloads, GPUs, special purpose PUs
- Device Driver Innovation
  - SUSE Solid Driver Program (SSDP)

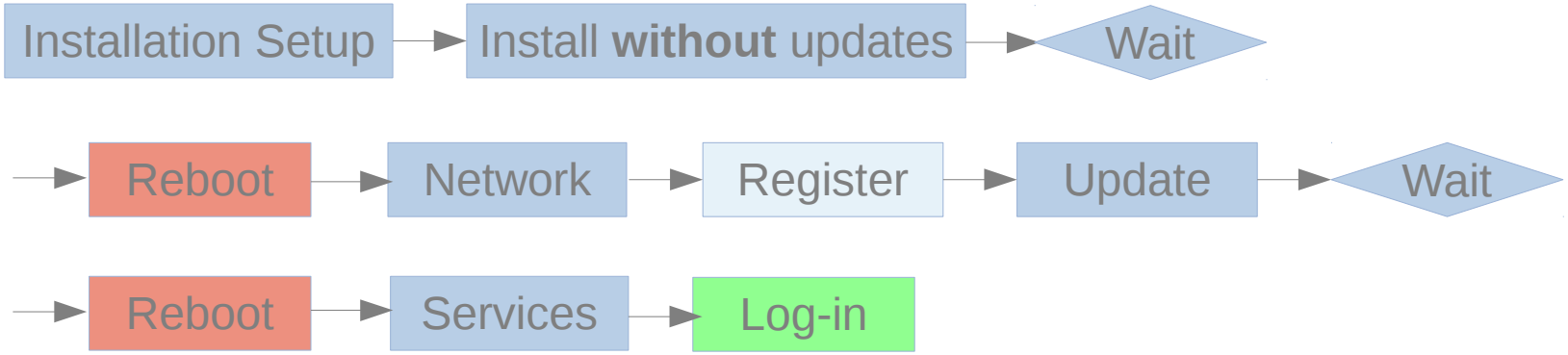
Technology
Systems Management

- Made for Cloud
  - Integration of SLES and SUSE Cloud
  - Best Guest → Best Cloud OS
- Overhaul of network management
  - Address the increased complexity of IaaS
- Improve monitoring support
- Kernel 3.12 based
- Systemd replaces SysVinit
- Standardize bootloader to Grub2

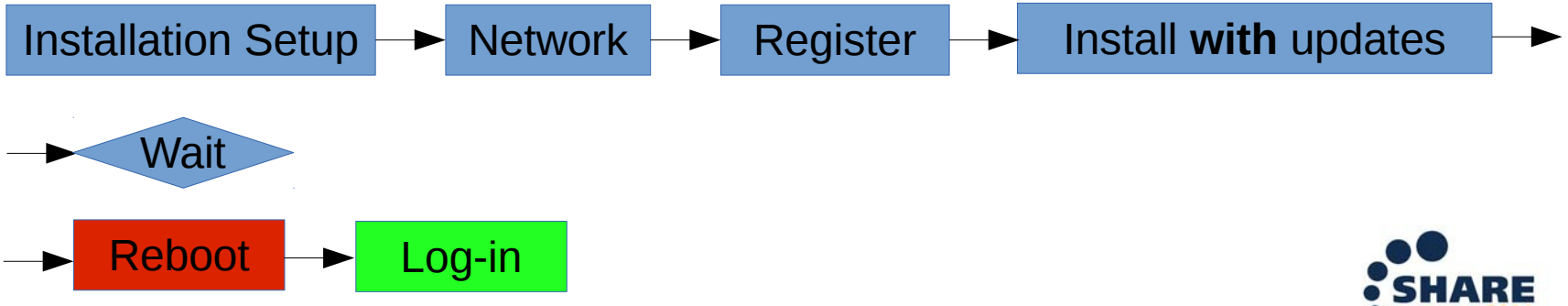
SUSE Linux Enterprise 12

Installer – Workflow

SUSE Linux Enterprise 11



SUSE Linux Enterprise 12

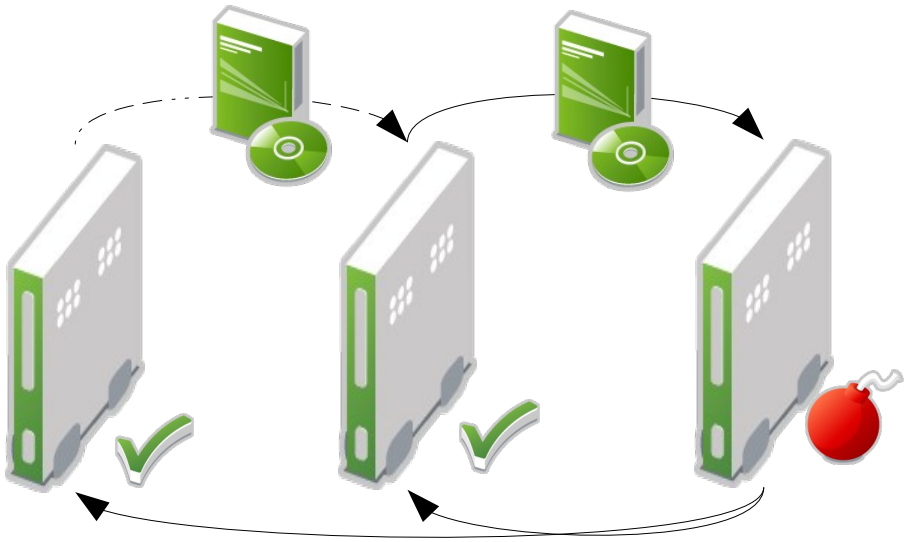


SUSE® Linux Enterprise

Continuously Running Systems (1)

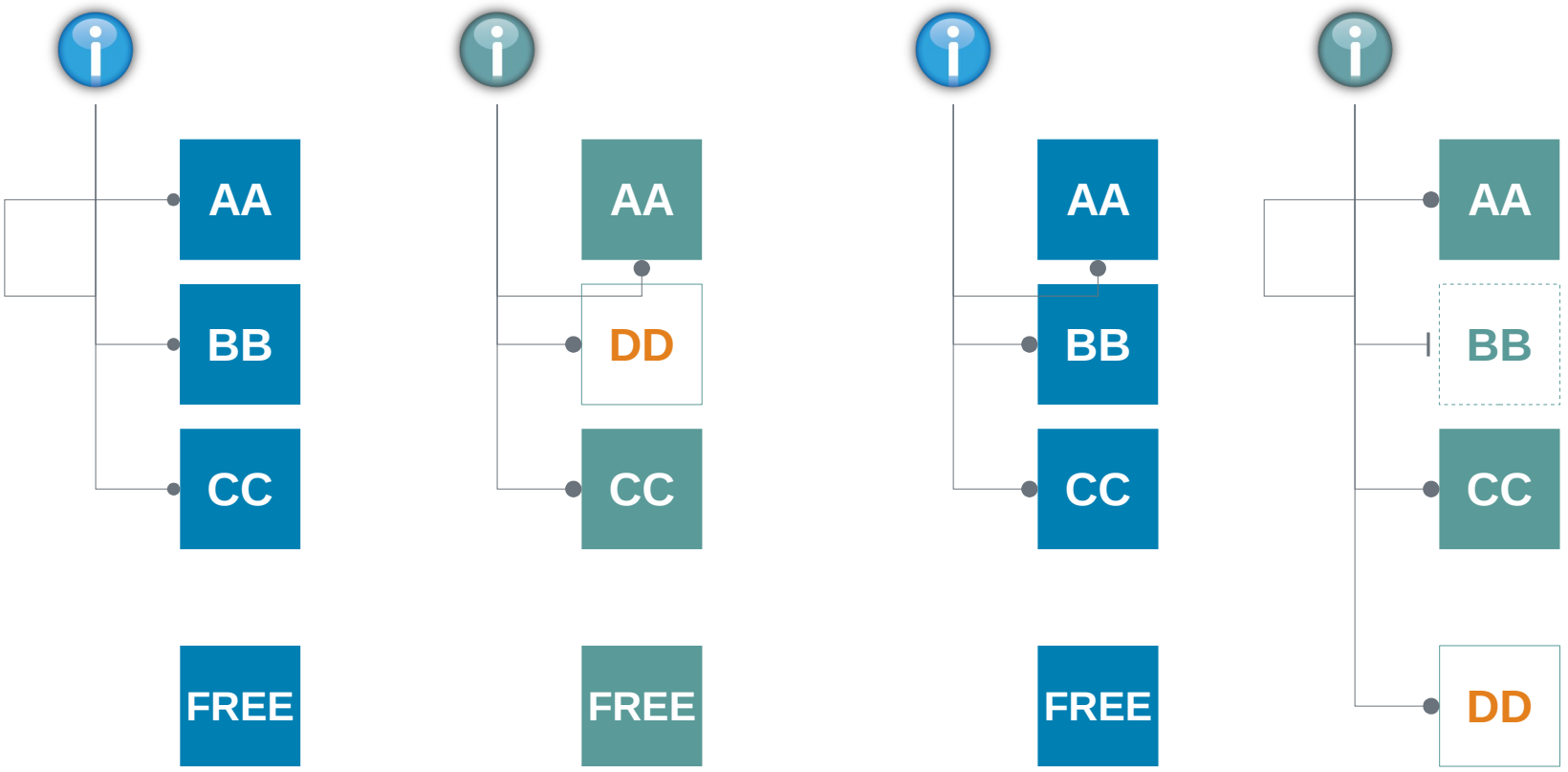
Snapshot & Rollback For Full System

- Restore the whole system to a known state that is working
- Reduce upgrade risk
- Components
  - ZYpp
  - Btrfs
  - Snapper
  - Grub2 Bootloader integration



Technology Overview

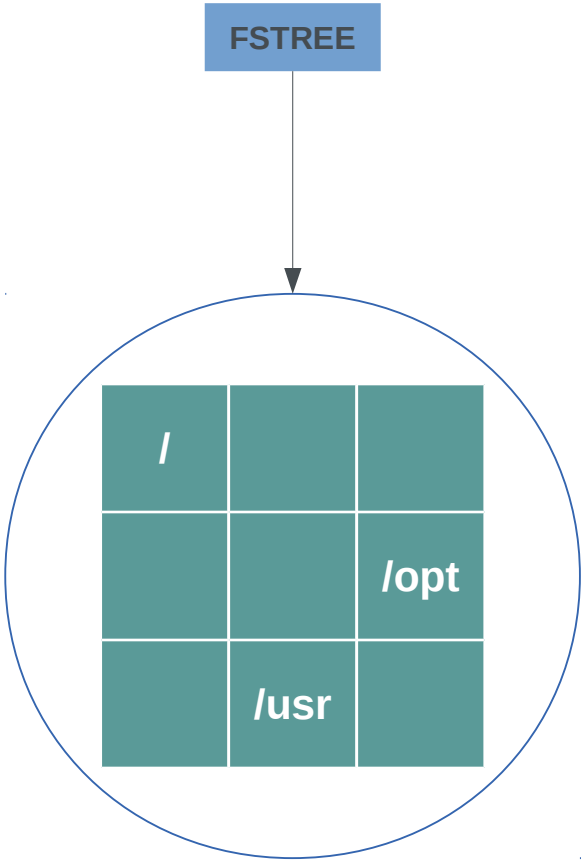
Btrfs Copy on Write



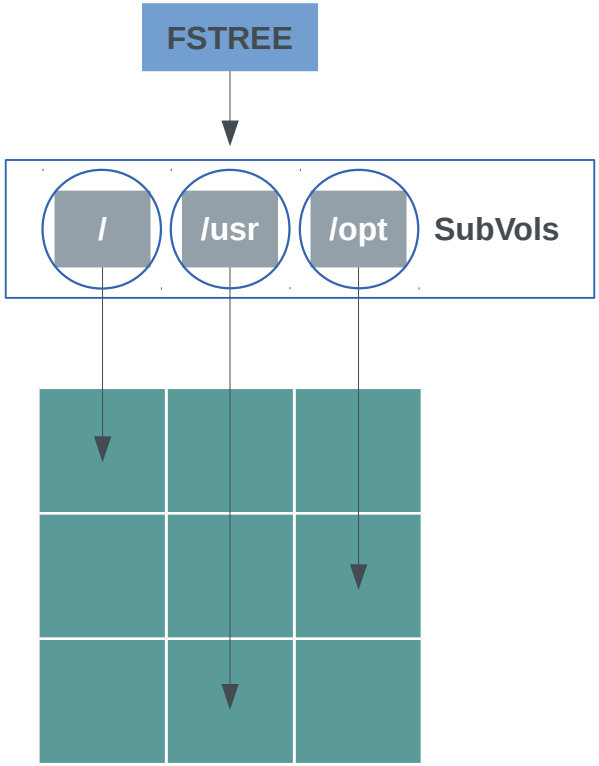
Technology Overview

Btrfs Subvolume

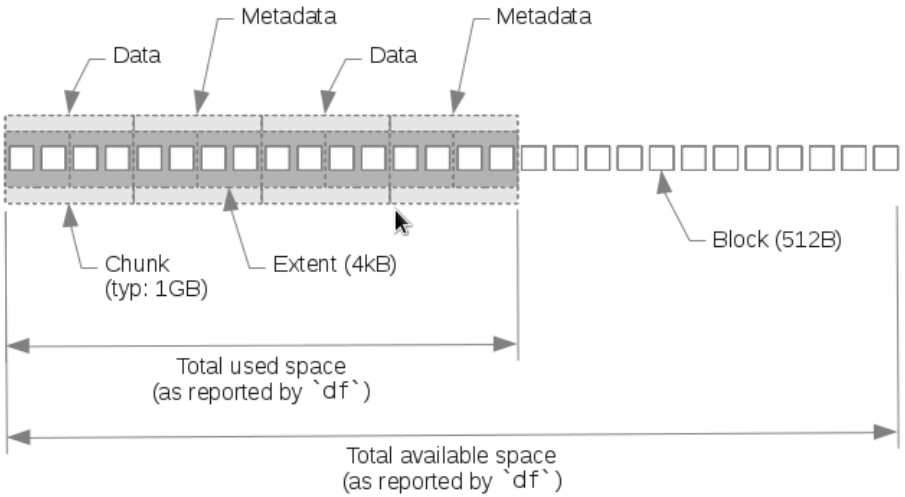
Normal Filesystem



With Subvolumes



Btrfs Disk Space And Extents



In case of a Btrfs filesystem on a single underlying block device

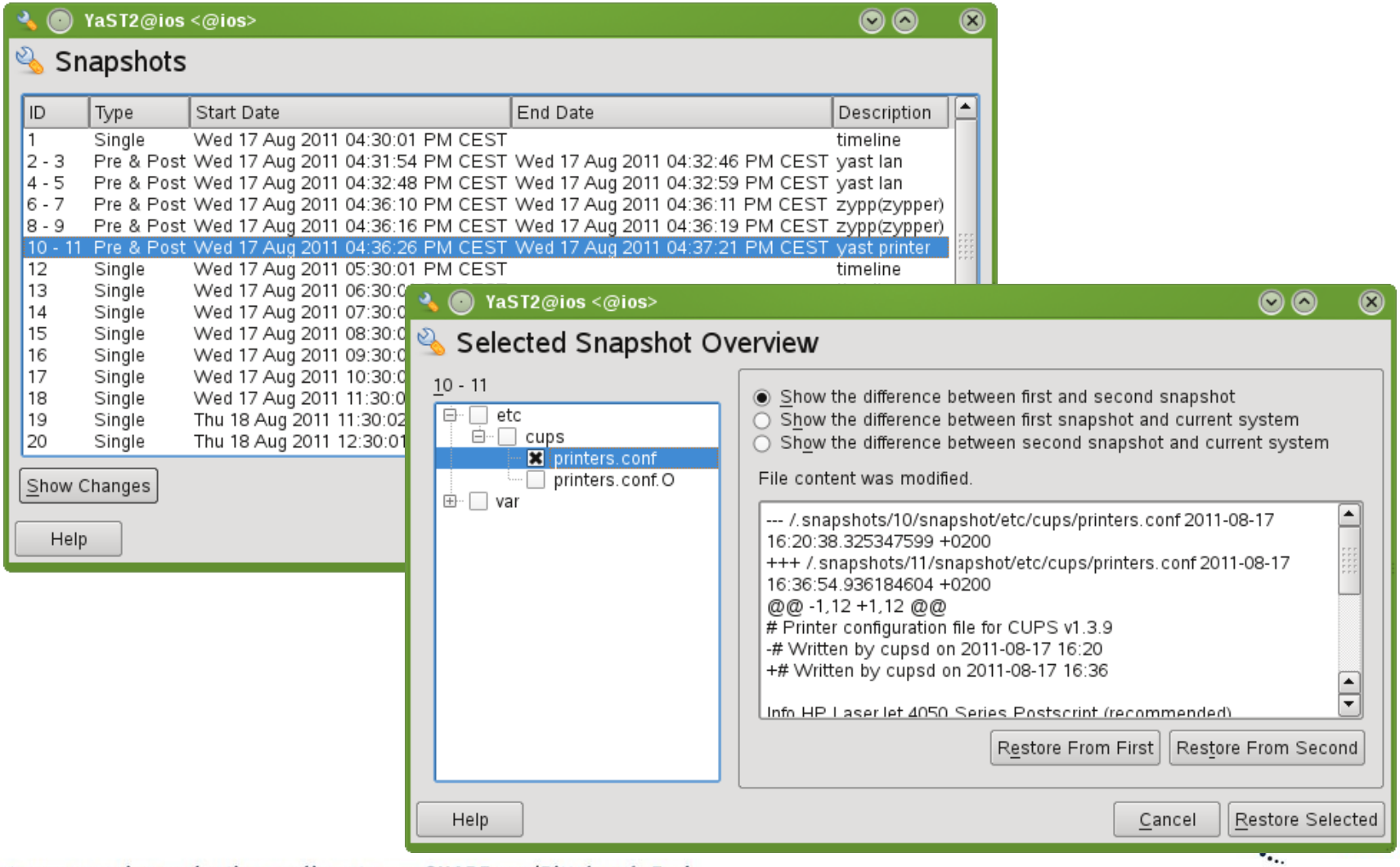
```
# btrfs filesystem df /
Data: total=14.50GB, used=12.20GB
System, DUP: total=8.00MB, used=12.00KB
System: total=4.00MB, used=0.00
Metadata, DUP: total=1.75GB, used=904.11MB

# df -h /
Filesystem      Size  Used Avail Use% Mounted on
/dev/sda7        20G   14G  4.3G  77% /
#
```

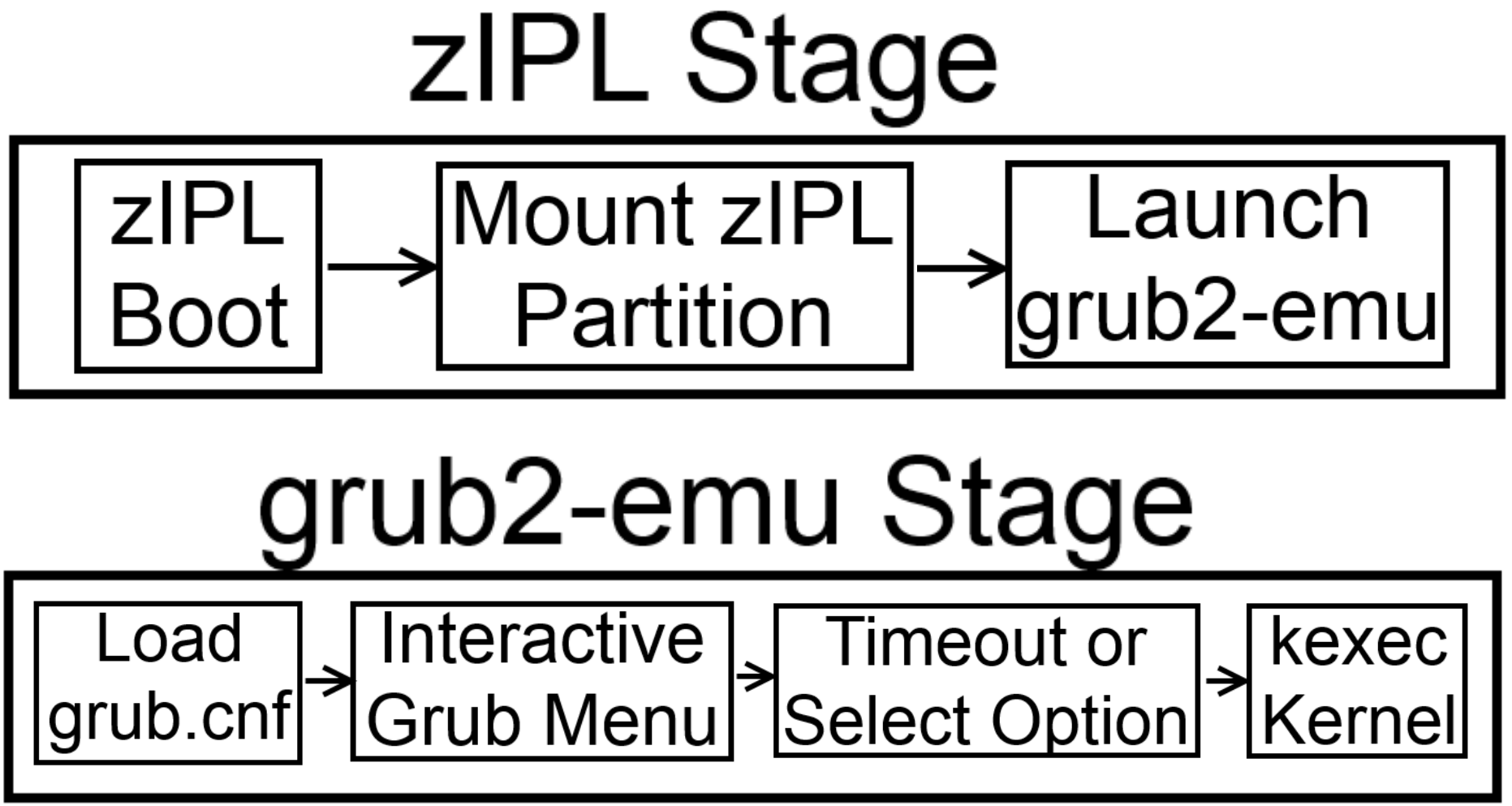
Disk utilization
12,2GB + 2x 0,9GB + = 14 GB

Snapshots in SUSE® Linux Enterprise 12

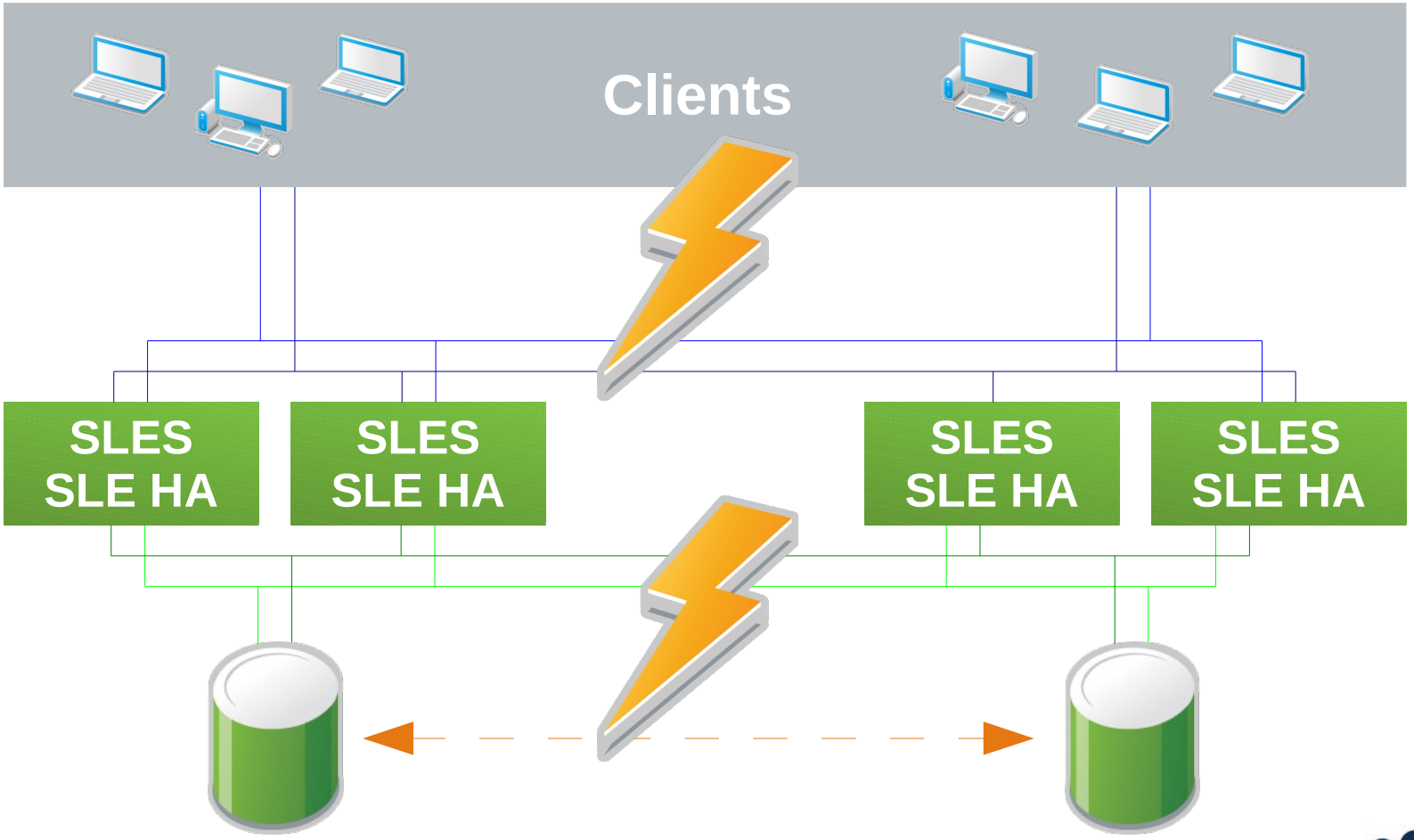
YaST2 Management



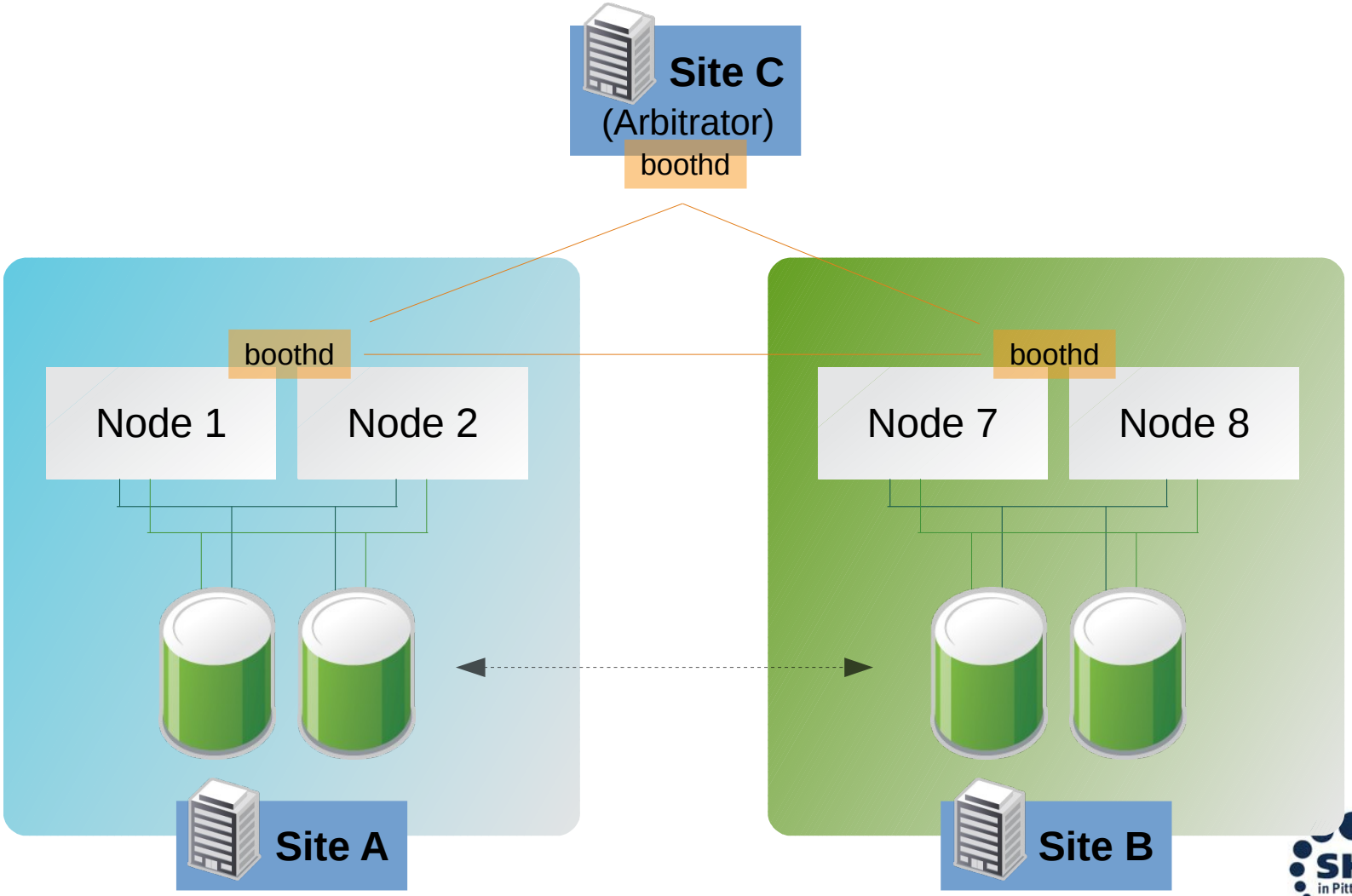
Grub 2 boot process



Local & Stretched Cluster



Geo Cluster – Setup



Outlook

https://www.suse.com/promo/kgraft.html

Live Kernel Patching with kGraft

Try it today

Downtime is expensive

Planned or unplanned—downtime is still expensive. What if you could:

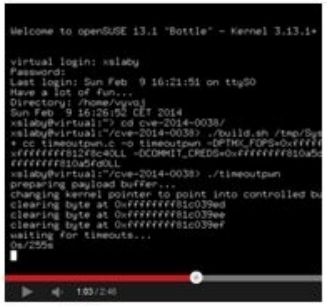
- apply critical updates to a running system, without having to reboot the server?
- eliminate costly planned downtime?

Now you can.

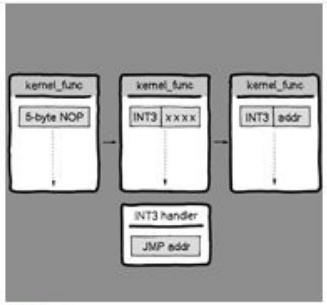
Introducing live kernel patching with kGraft. Technology from SUSE Labs that makes live kernel patching possible.

Download and try it

More information



Demo Video



Slideshow

Blog

Overhaul Network Management

SUSE Linux Enterprise 12

Network Management

The “Wicked” Project

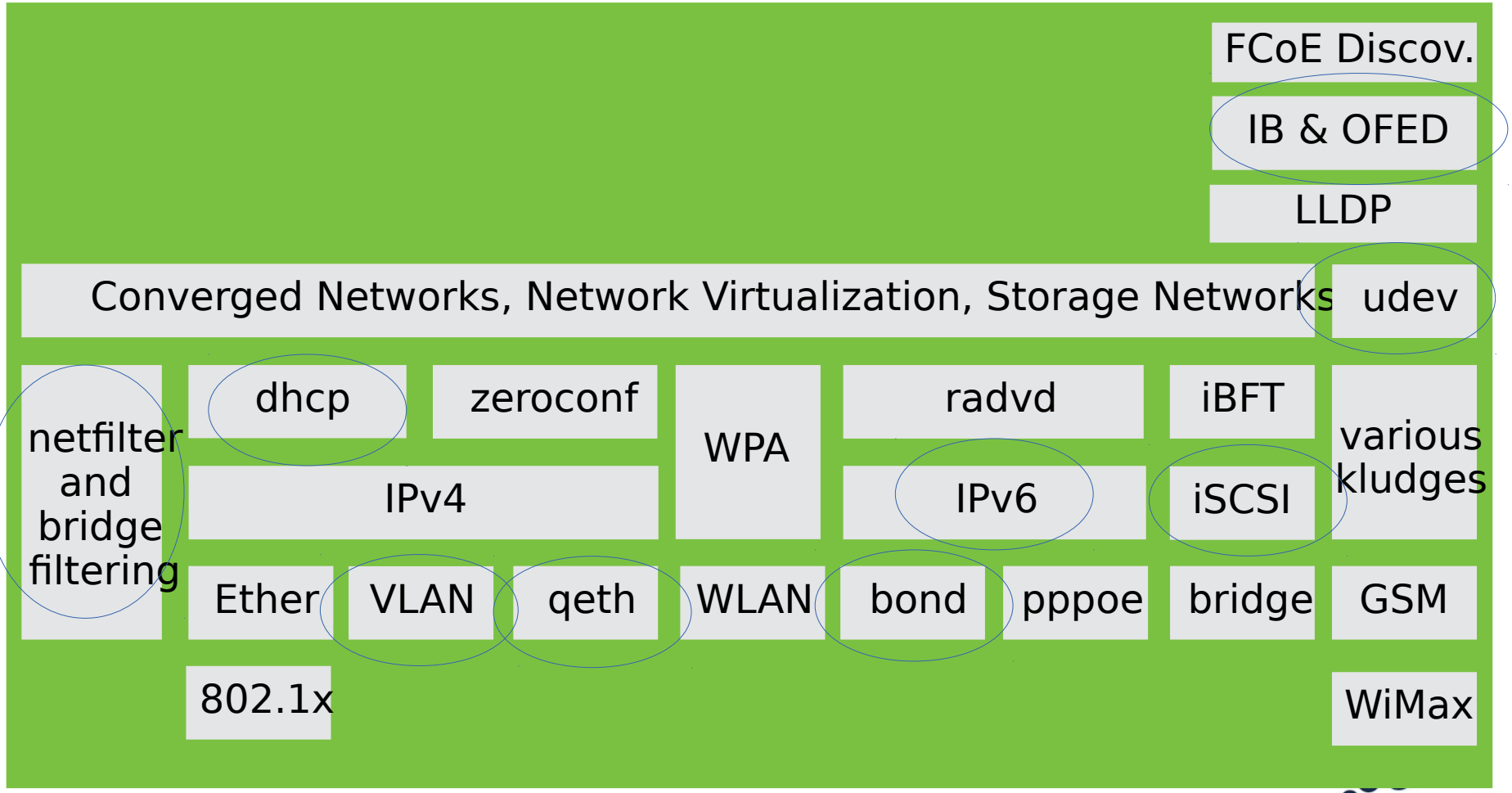
Goal

- Cope with increasingly complex configurations
- Data Center and End Users
- Benefit
  - Network configuration as a service
  - Smooth adoption & migration

Technical Attributes

- Architecture-independent
- Extensible
- Small footprint
- Event based

2012: The Universe Changed Again



Implementation Decisions

- Client / Server model
  - DBus Service (provided by a daemon)
- Layered architecture
  - providing separate DBus interfaces
- Structured configuration files
  - XML for now
- Stateless (mostly)
- Extensible
  - Server can be extended with scripts

Supporting Migration

- Existing Configuration files
  - wicked client can read ifcfg files
    (both the green and the red flavours)
  - Plan to provide ifup wrapper scripts
- Testing
  - Conflict as little as possible with existing infrastructure
  - Just drop in and test

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Technology – Systemd

Init Replacement – bring up system and start services

- Bring up system and start services
- Integrate system wide ulimit settings and CGroups
- Activation via Socket and d-bus
- Command line “systemctl”

Compatibility with SystemV init scripts

- Provide infrastructure for existing ISV applications
- LSB compatibility

SUSE specific usability enhancements

- Keep insserv, chkconfig and /sbin/service
- Old style (calling “rc...”) redirected to systemctl
- LSB compatibility for targets like $network...

Journal

- Logs facilities bundled in systemd since v38
- Structured logs (stored in binary format on disk, supports compression, rotation)
- Each record is associated with emitting services: allow to see “last log output” when checking a service status
- Can be configured to have persistent (on disk) journal or not (for embedded)
- Allow unprivileged users to have their own separate journal
- Each entry is cryptographically hashed along hash of previous entries (à la git)
- Can work peacefully with various syslog implementations
- Stored on disk by default (use systemd-logger package and /var/log/journal directory)

SUSE Linux Enterprise 12
Made for Cloud – Vision

	In Your Data Center	In the Clouds
Guest	Perfect Guest	Available in Public Clouds
Host	**z/VM & KVM** Dual Hypervisor Support	Cloud Hosts

SUSE Linux Enterprise 12

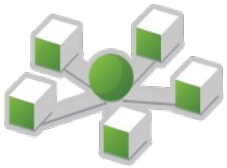
Made for Cloud – Hypervisor Support

Virtualization Technology Support

- z/VM
  - Full support and exploitation of z/VM related features
  - Proven mission critical track record
- LXC
  - Linux Containers & Control Groups
  - “OS level partitioning”
- *KVM – technical preview*
  - *I/O improvements, storage and network device hotplugging*

SUSE Linux Enterprise 12

Interoperability - Vision



- Network
  - IPv6 (USGv6)

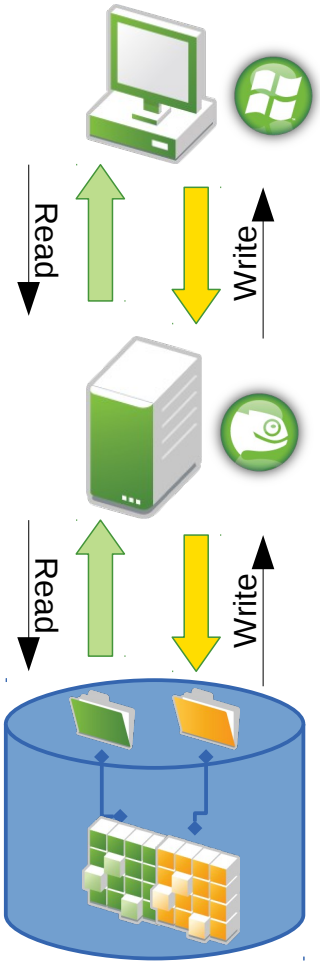
- Virtualization and Cloud

- Operating Systems Interop
  - Windows
  - UNIX
  - Linux
  - z/VM, z/OS, z/VSE

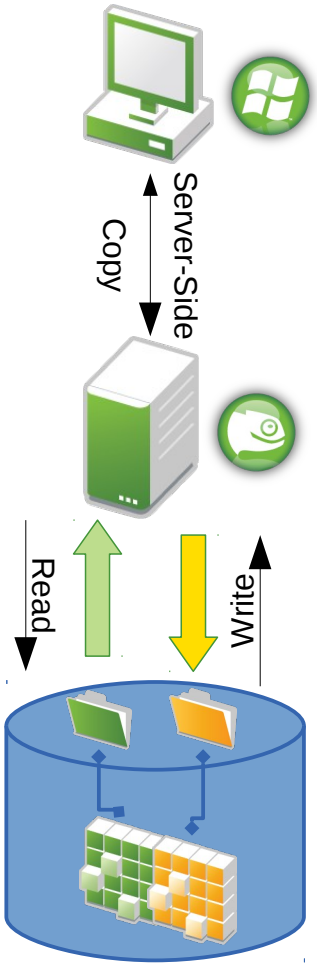
- Standards Compliance
  - Accessibility
  - Security (NIST, BSI)

SUSE Linux Enterprise 12

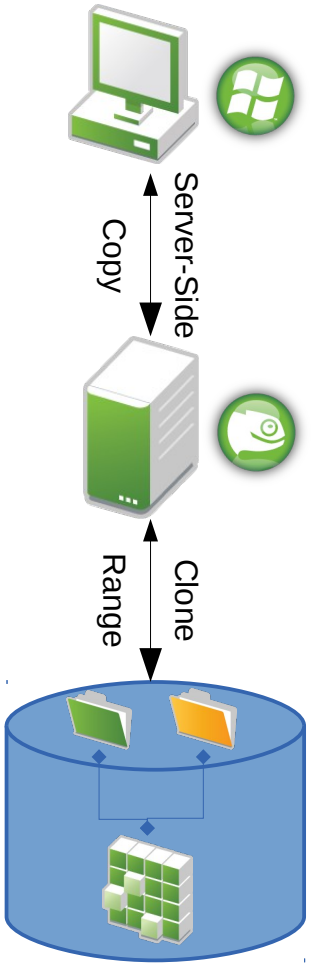
Interoperability – Samba 4



Traditional Copy



Server-Side Copy



Btrfs Enhanced Server-Side Copy

SUSE® Linux Enterprise Server for System z 12

- IBM zEnterprise exploitation
  - zEC12, zBC12, z/VM 6.3, z196 EC, z114 BC support
  - ALS to march=z196, mtune=zEC12 (incl. toolchain)
  - zBX support (blade center extension)
- Improved RAS tools and System z specific support
  - kdump based stand-alone dump
  - CryptoExpress4 support
  - s390-tools
  - ...

QSAM Access Method for Data sharing with z/OS

Fate 315314 / LTC 92768

- **Description:** enhances the functionality of the s390-tools to allow to access z/OS legacy data directly on the DASD storage devices from a Linux system. Stage 1 comprises non-concurrent access, that is Linux access to z/OS data occurs regardless of z/OS processing (user needs to ensure data is not modified during Linux reading it).
- **Customer benefit**

technical	business
• **NOTE: be aware of the consequences regarding sharing data on disk between system** • Uses new filesystem zdsfs	• By avoiding FTP or NFS transfer of data from z/OS the turnaround time for batch processing is significantly reduced.

SLES	11	12
SP0	-	yes
SP1	-	tbd
SP2	-	tbd
SP3	-	tbd
SP4	tbd	tbd

yes = included / no = not included
tbd = to be done

Provide install pattern for HW crypto stack
Fate 316143 / LTC 96192

- **Description:** Providing an install pattern for the crypto HW stack on System z per selection in installer significantly improves the setup and usability experience for crypto customers and removes complex manual installation steps

- **Customer benefit**

technical	business
• All required modules are provided in a dedicated installation pattern	• Ease of installation • Use of hardware crypto acceleration frees up processor resources for other workloads

SLES	11	12
SP0	-	yes
SP1	-	tbd
SP2	-	tbd
SP3	-	tbd
SP4	tbd	tbd

yes = included / no = not included
tbd = to be done

Fill entropy pool with hwrandom

Fate 310591 / [LTC -]

- **Description:** z10 processor and successors have a random number generator built in, that can be accessed at /dev/hwrng if active. However, with z90crypt device driver and crypto express cards /dev/random delivers hardware generated random numbers at high rate.

- **Customer benefit**

technical	business
• Use /dev/random as a source of random numbers generated by hardware at a high rate • Avoids stalling of processes querying for randomness	• Better scalability for workloads with lots of processes requiring randomness to execute or proceed • Improved security if using a CEX card (larger keys at a faster rate)

SLES	11	12
SP0	-	yes
SP1	-	tbd
SP2	yes	tbd
SP3	yes	tbd
SP4	tbd	tbd

yes = included / no = not included
tbd = to be done

Software Management

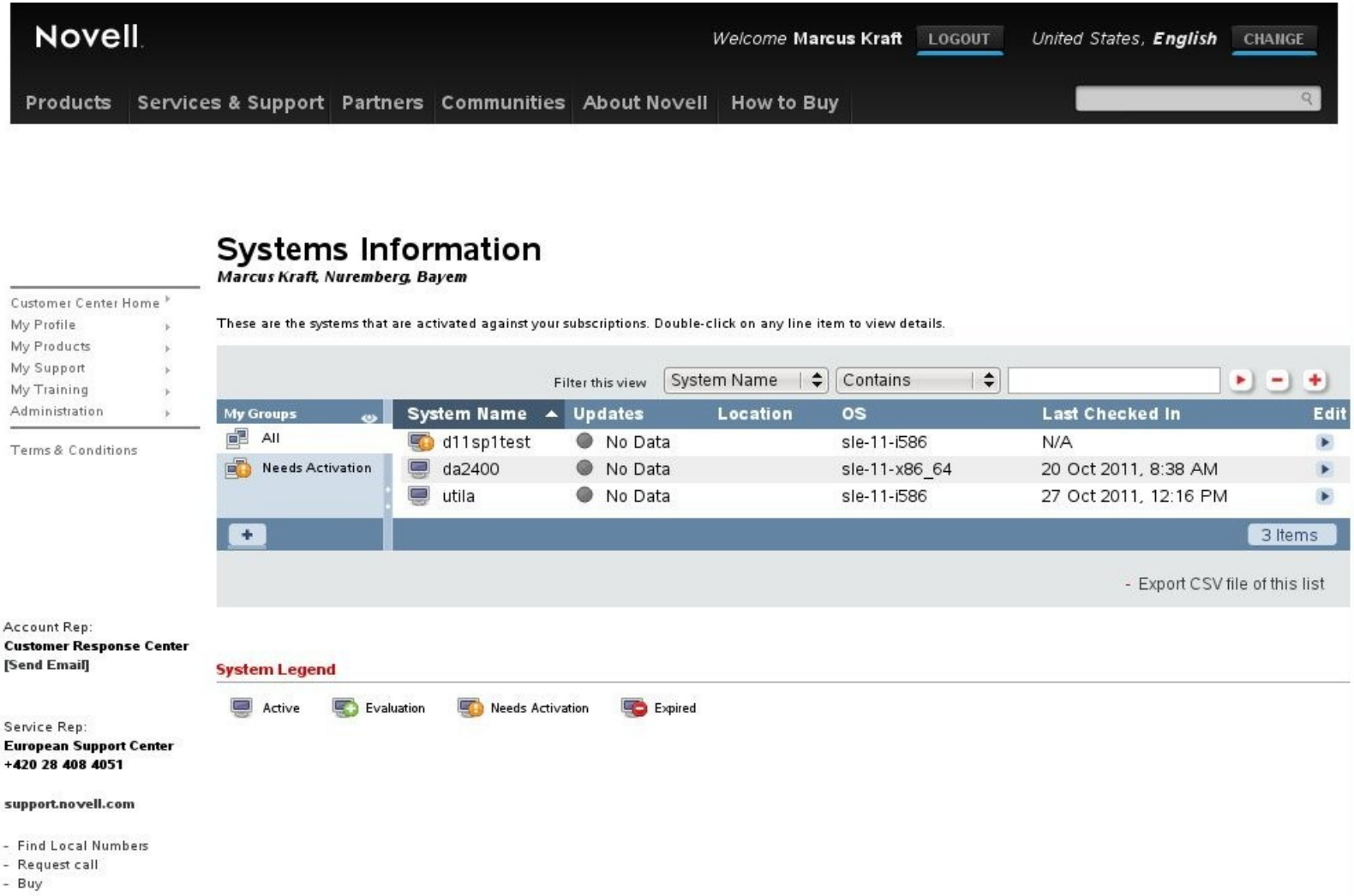
SUSE Linux Enterprise 12

Modules

- Components of SUSE Linux Enterprise
  - Flexible lifecylce (different from the base product)
  - Delivered on-line
  - Fully supported

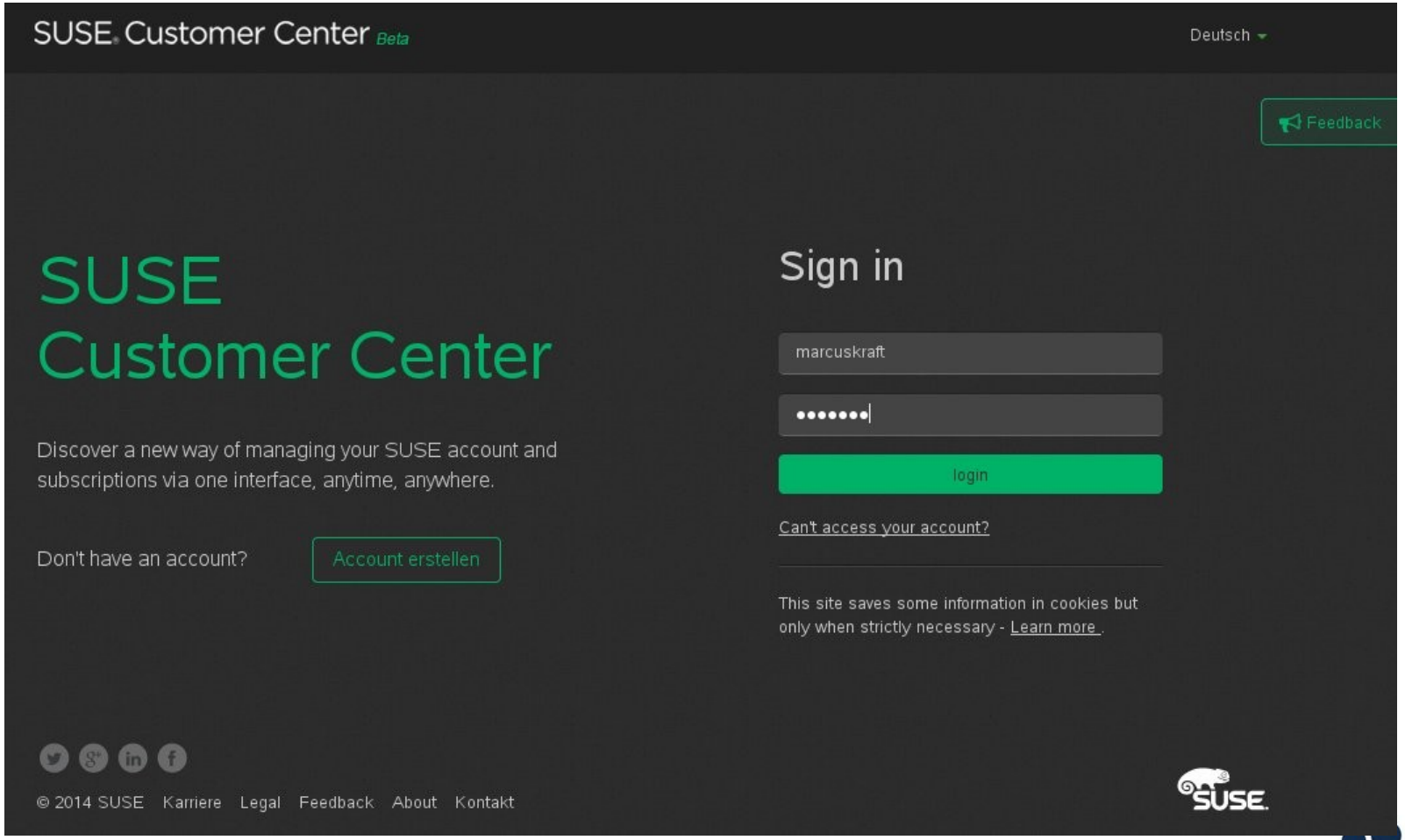
- List of modules
  - Web and Scripting
  - Legacy
  - Toolchain
  - Public Cloud
  - Advanced Systems Management

Novell Customer Center

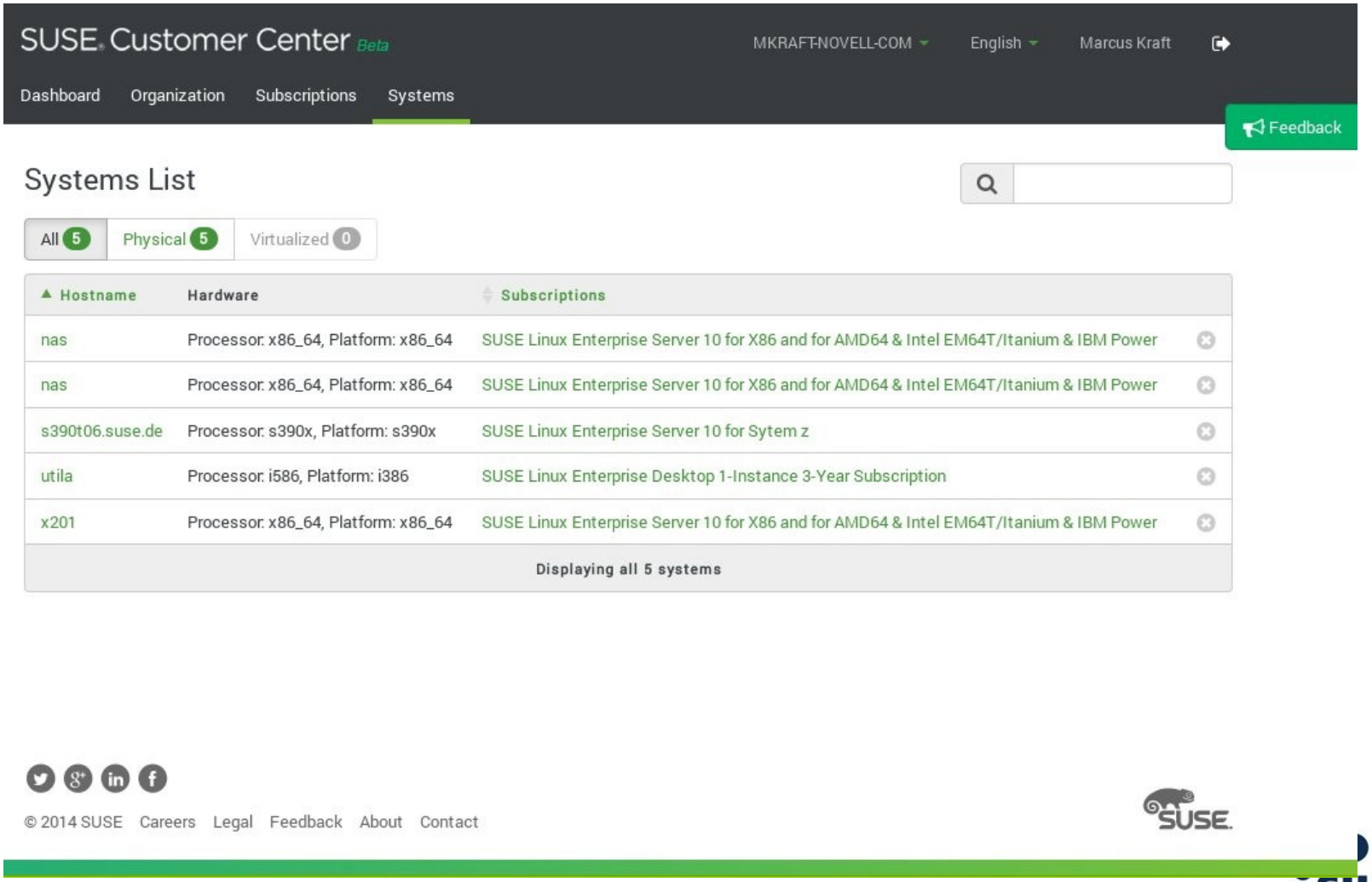


SUSE Customer Center

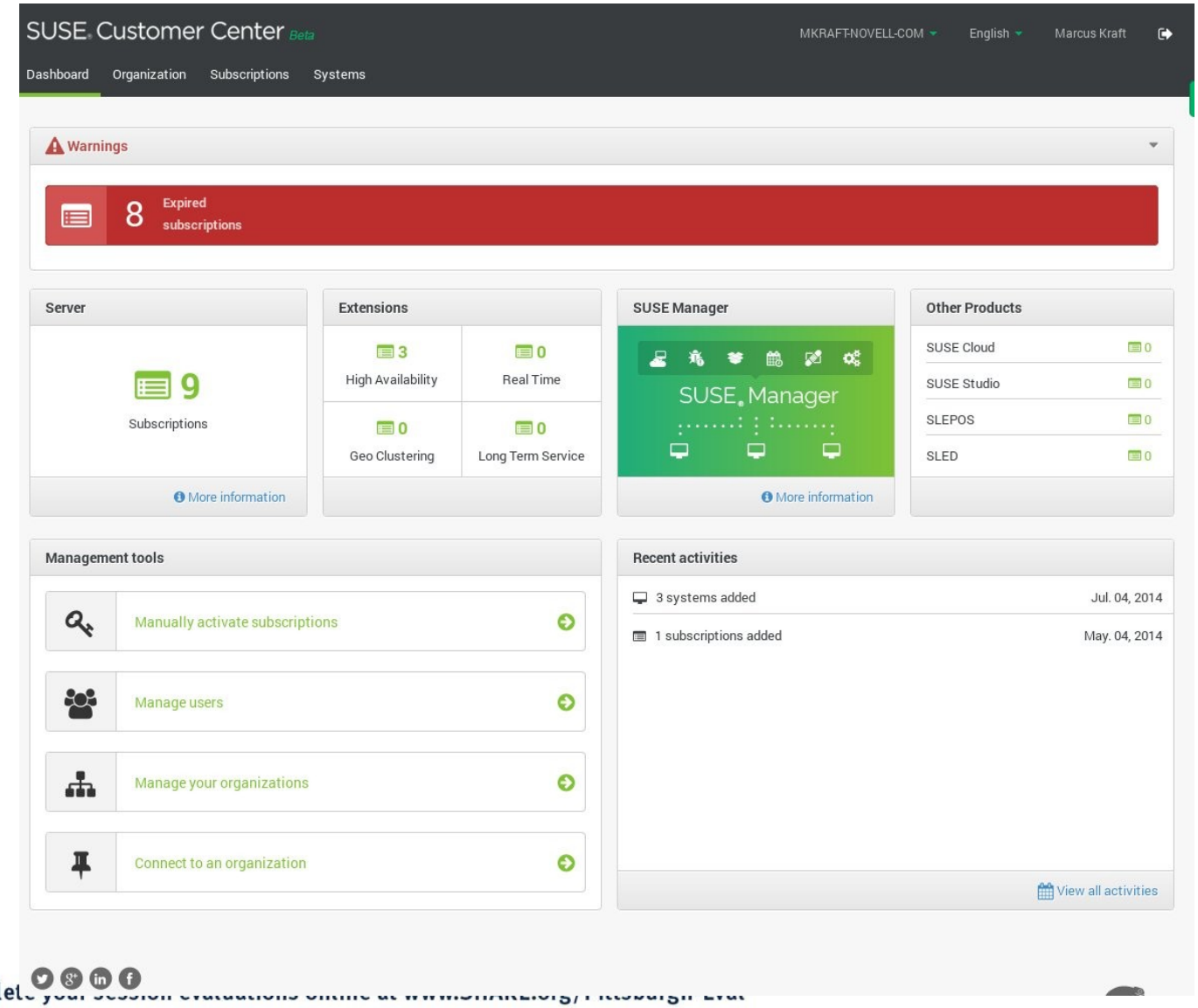
scc.suse.com



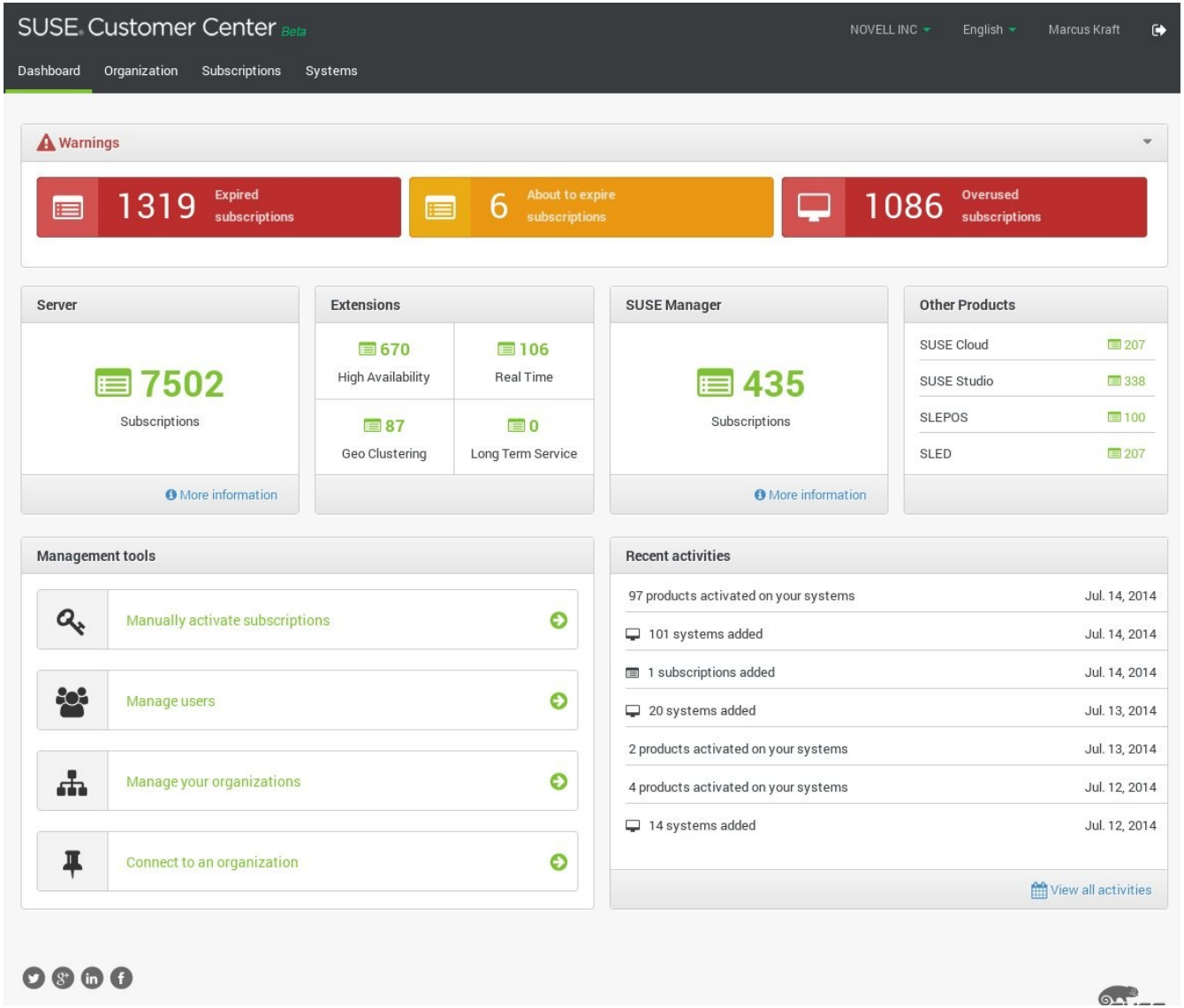
SUSE Customer Center



SUSE Customer Center

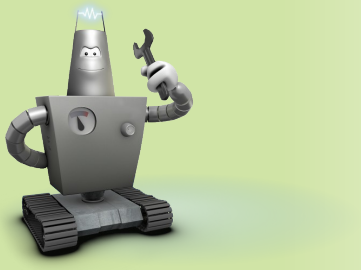


SUSE Customer Center



How to build a SUSE environment

BUILD
your workloads



SUSE Studio
Build workloads for any platform and the cloud

MANAGE
your environment

SUSE Manager
Manage Linux workloads across platforms

Towards Zero Downtime

Best Managed

SUSE® Linux Enterprise 12

Made for Cloud

Most Interoperable OS

Appendix

SLES for System z 11 SP3 (contact mkraft@suse.com)

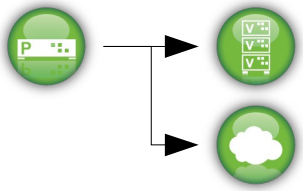
SUSE® Linux Enterprise 12
Systems Management Today

- Unattended migration reduces cost and downtime
  - SUSE Linux Enterprise 11 SP3 to SUSE Linux Enterprise 12
  - SUSE Linux Enterprise 11 SP4 to SUSE Linux Enterprise 12
  - SUSE Linux Enterprise 11 SP4 to SUSE Linux Enterprise 12 SP1
- Example: *http://www.suse.com/documentation/sles11/book_sle_deployment/?page=/documentation/sles11/book_sle_deployment/data/cha_update_auto.html*

- Migration requires system start with SLES 12
  - Shutdown SLES 11 based system
  - Boot / IPL with SLES 12 system
  - Update SLES 11 → 12 system on disk (pool + updates)
  - Reboot to SLES 12 system

SUSE Linux Enterprise 12 – Systems Management

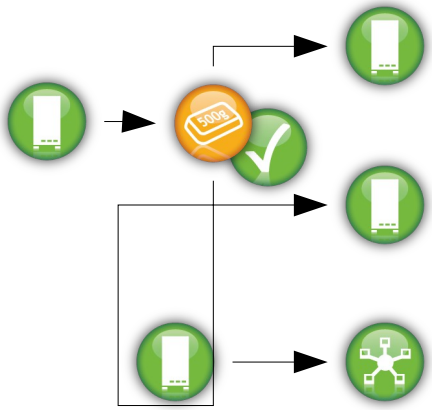
Advanced Systems Management – Use Cases



Physical to Virtual (P2V) or **Physical to Cloud** (P2C) ***migrations*** and server ***consolidation***

OS and/or application ***modernization***

Disaster Recovery; (Backup and Restore)



Building and maintaining a "**Golden Image**" for the datacenter (but desktop/branch office scenarios as well)

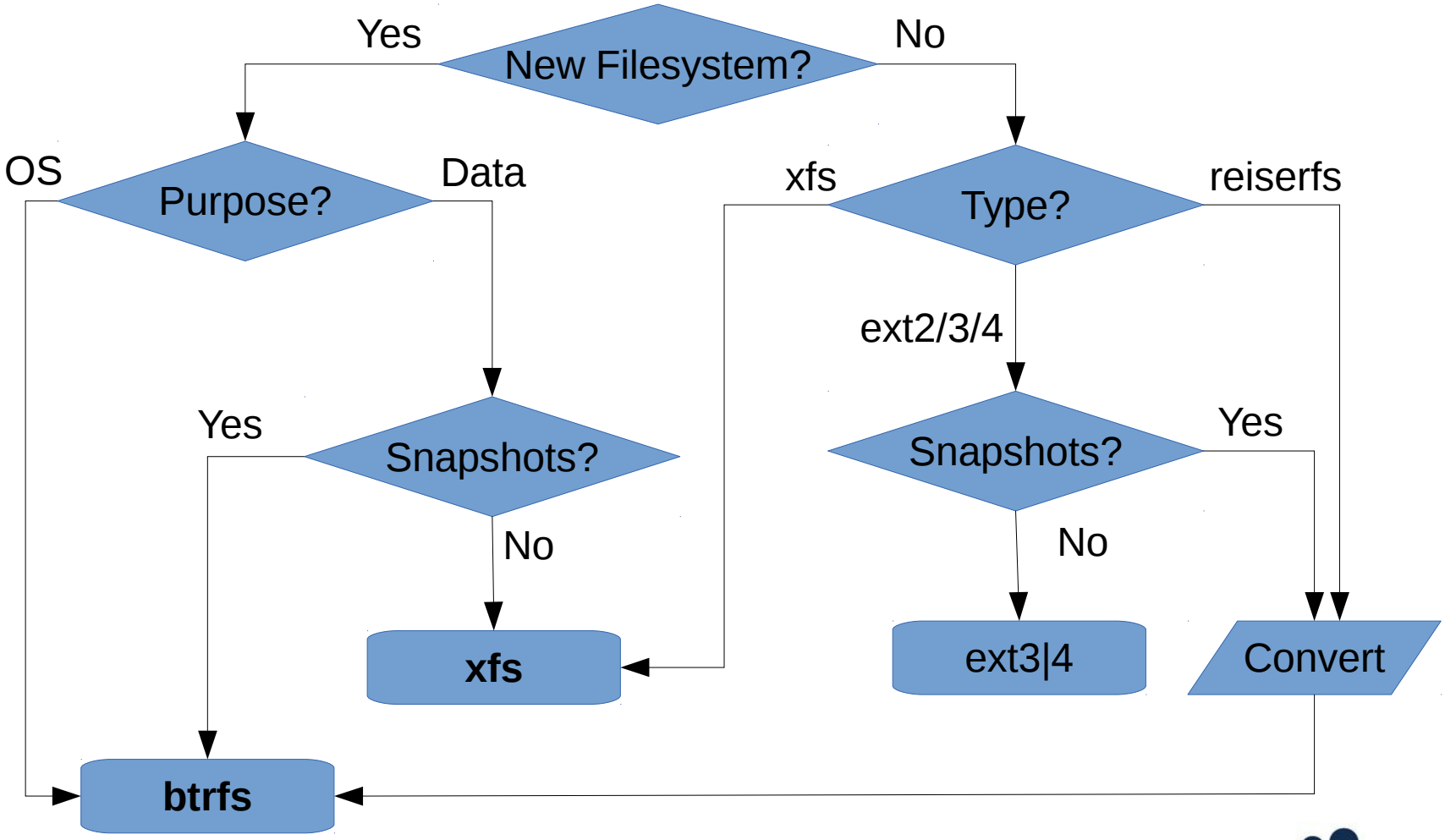
Cluster/Scale-out scenarios

SUSE Linux Enterprise 12 – Systems Management

Advanced Systems Management

Tech Preview in SUSE Linux Enterprise 12 GA

Filesystem recommendations



Note: the conversion to btrfs from ext2/3 leaves a copy of the old file system which should be deleted at some p

Major Linux (local) Filesystems

Feature	ext 2/3	reiserfs	xfs	ext4	btrfs
Data/Metadata Journaling	•/•	•/•	○/•	•/•	CoW
Journal internal/external	•/•	•/•	•/•	•/•	CoW
Offline extend/shrink	•/•	•/•	○/○	•/•	•/•
Online extend/shrink	•/○	•/○	•/○	•/○	•/•
Inode-Allocation-Map	table	u.B*-tree	B+-tree	table	B-tree
Sparse Files	•	•	•	•	•
Tail Packing	○	•	○	○	•
Defrag	○	○	•	•	•
ExtAttr / ACLs	•/•	•/•	•/•	•/•	•/•
Quotas	•	•	•	•	Subvol.
max. Filesystemsize	16 TiB	16 TiB	8 EiB	1 EiB	16 EiB
max. Filesize	2 TiB	1 EiB	8 EiB	1 EiB	16 EiB

Default Filesystem for the data

Default Filesystem for the OS

SUSE Linux Enterprise 12

Interoperability – Samba 4

- Better Distributed Filesystem (DFS) capabilities
- File Server Remote VSS Protocol (FSRVP)
  - Server: integration with btrfs and Snapper
  - Client
- Server-side copy enhancements (btrfs backend)
- Protocol enhancements
  - Encryption
  - SMB 3.0 negotiation

Benefit

- Authentication with recent Windows / AD Servers
- Linux Server behaves as expected (FSRVP)

What is systemd ?

- systemd is a system and session manager for Linux, compatible with SysV and LSB init scripts.
- systemd
  - Provides aggressive parallelization capabilities,
  - Uses socket and D-Bus activation for starting services,
  - Offers on-demand starting of daemons,
  - Keeps track of processes using Linux cgroups,
  - Supports snapshotting and restoring of the system state,
  - Maintains mount and automount points
  - Implements an elaborate transactional dependency-based service control logic.
- It can work as a drop-in replacement for sysvinit.

Systemctl: Start / Stop Service

- systemctl start|stop|restart|try-restart|reload foobar.service

- systemctl kill foobar.service
- systemctl kill -s SIGKILL foobar.service
- systemctl kill -s HUP –kill-who=main crond.service

Systemctl: Service status

- systemctl : give you a list of all started services and their status
- systemctl status foobar.service : status for one specific service

```
$ systemctl status icecream.service
icecream.service - LSB: icecc
      Loaded: loaded (/etc/init.d/icecream)
      Active: active (running) since Fri, 2013-04-19 09:27:31 CEST; 4 days ago
      CGroup: name=systemd:/system/icecream.service
          ├ 4786 /usr/sbin/icecc-scheduler -d -l /var/log/icecc_sch...
          └ 4791 /usr/sbin/iceccd -d -l /var/log/iceccd --nice 5 -u...

Apr 19 09:27:31 foobar systemd[1]: Starting LSB: icecc...
Apr 19 09:27:31 foobar icecream[4777]: Starting Distribut...
Apr 19 09:27:31 foobar systemd[1]: Started LSB: icecc.
```

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Interoperability - IPv6

- Leading OS – IPv6 compatibility and certification (USGv6)
  - https://www.iol.unh.edu/services/testing/ipv6/usgv6tested.php
- Tested scenarios
  - DHCP6 server and client
  - IPv6 support in NFS
  - Ensure IPv6 capabilities with UEFI network boot
- Network services
- System Installation & Patching over IPv6

Benefit

- Deploy and use in pure IPv6 environment
- Scale networks beyond IPv4 limitations
- Answer compliance needs

SUSE® Linux Enterprise 12

Security and Certifications

Standards and Certifications

- Preparation for
  - Common Criteria certification and
  - FIPS 140-2/-3 validation
- NIST (SP) 800-131a compliance

Linux Security Modules

- SELinux support
  - including MLS policy
  - SELinux not default due to performance impact (~7%)
- AppArmor support

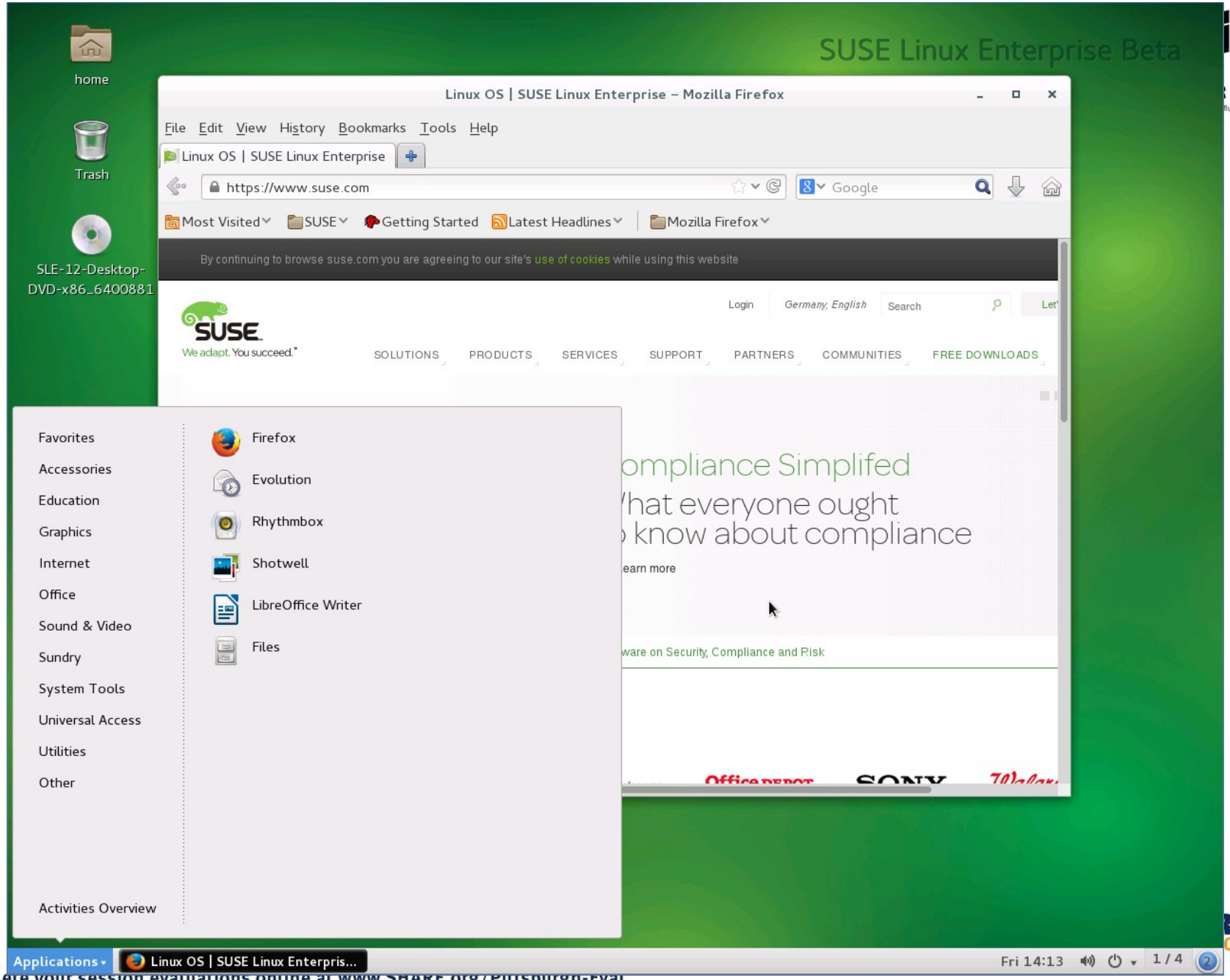
Research

- Next level of Trusted Computing / Attestation

SUSE Linux Enterprise Desktop 12

Highlights

- Standalone Product & Extension to SUSE Linux Enterprise Server 12
  - Easily combine SLES and SLED in one supported system
- One Tool to get the job done
- Modernized User Interface and applications
- Customized GNOME 3 Classic Mode as the desktop environment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home
Trash
SLE-12-Desktop-DVD-x86_6400881
Linux OS | SUSE Linux Enterprise – Mozilla Firefox
File Edit View History Bookmarks Tools Help
Linux OS | SUSE Linux Enterprise
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ware on Security, Compliance and Risk
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Internet
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