System management with Spacewalk

Tips for managing Linux and Solaris

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Free and Open Source Software Conference, 2014

whoami

`$ whoami`

- Christian Stankowic
- VMware, UNIX, Linux administrator
- Messer Information Services GmbH

`$ apropos`

- Spacewalk / RHN Satellite / SUSE Manager
- Icinga / OMD
- Enterprise Linux, SUSE, VMware vSphere

Agenda

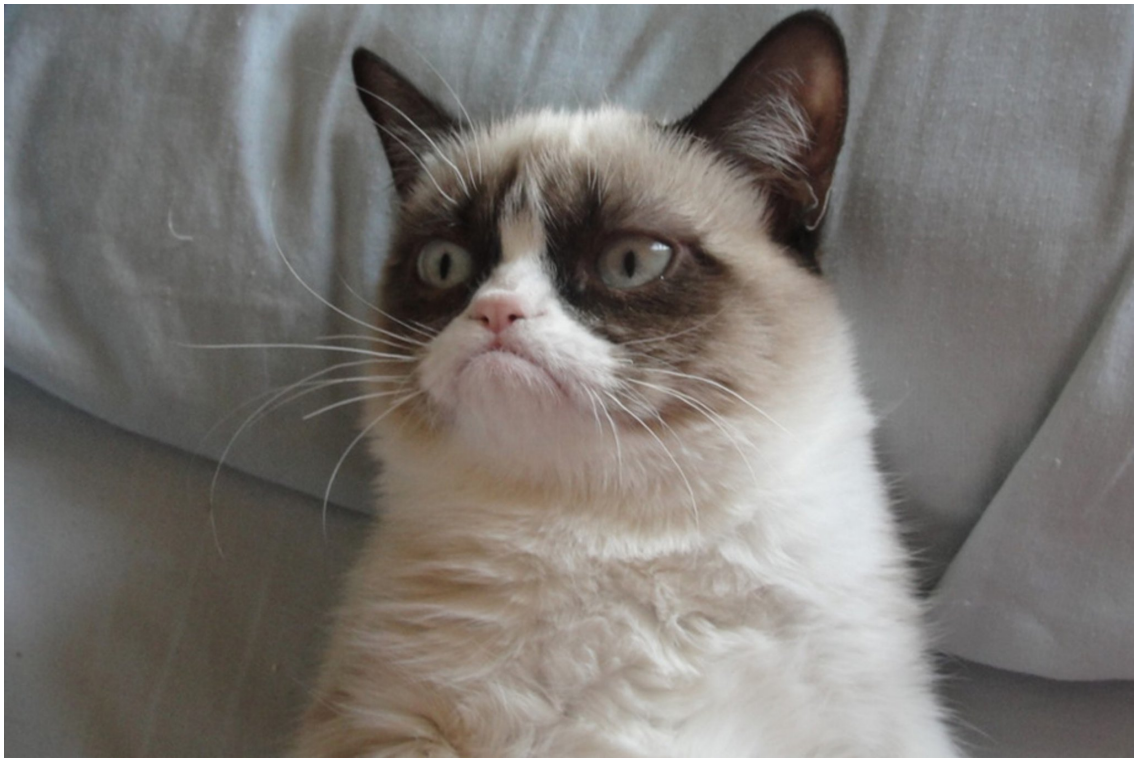
Agenda

Requirements and necessity
or: IT administrators tortures

- Normally *less* administrators manage *many* systems
- Often rapid projects and requests
  - "*We need 10 servers ASAP.*"
  - "*We need this till the end of the week - tomorrow.*"
  - "*Can you make those adjustments quickly? I'm having a demo with the management soon.*"

Requirements and necessity
or: IT administrators tortures

Resultat: Standards and documentation are often neglected



Requirements and necessity
Product variety

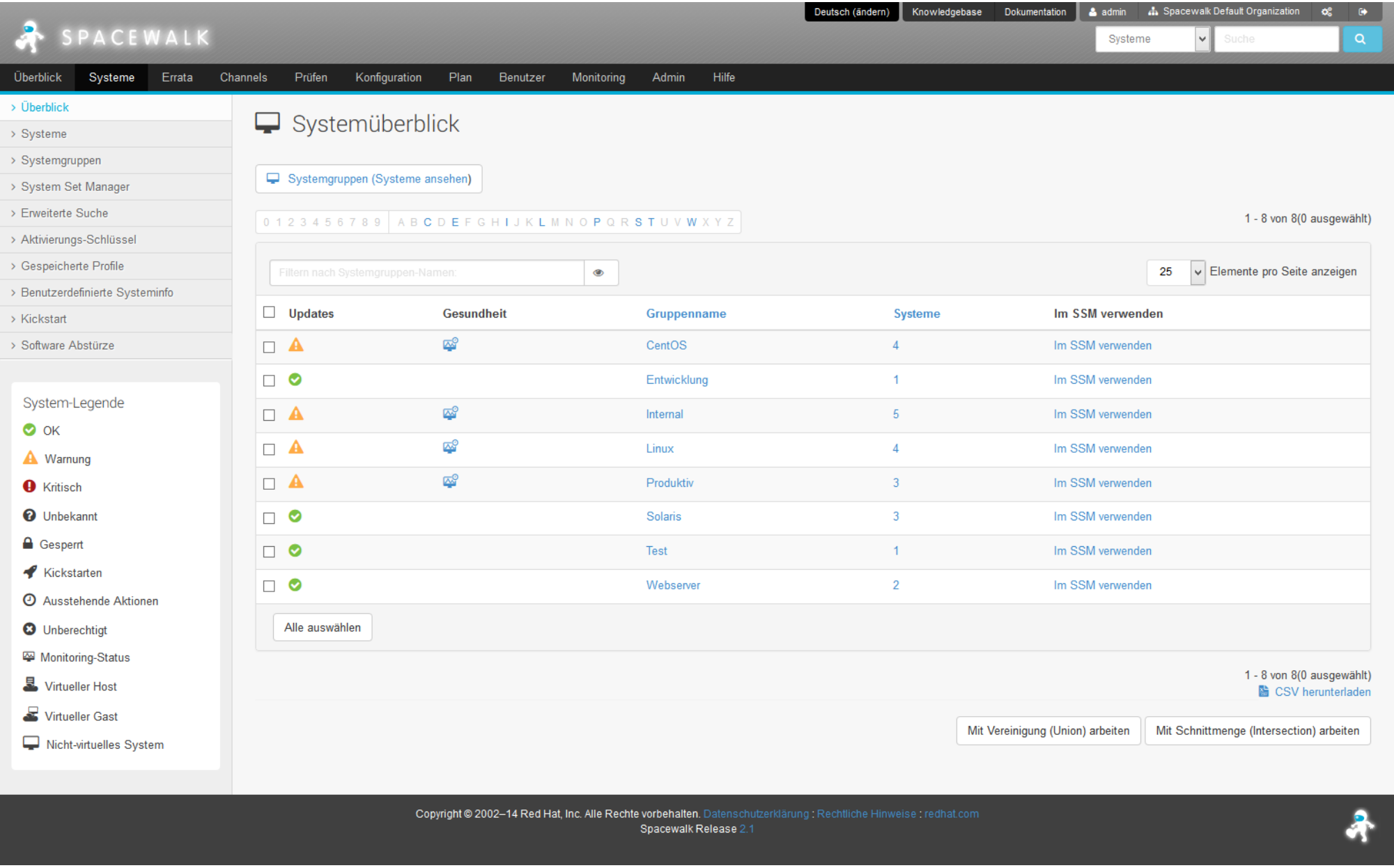
- Central system management is **essential** - but which tool?
- The variety is very big, some examples[1]
  - Puppet
  - Chef
  - Ansible
  - ...
- Alternative suites: Spacewalk, Red Hat Satellite, SUSE Manager
- Combines amongst others software, configuration and content management

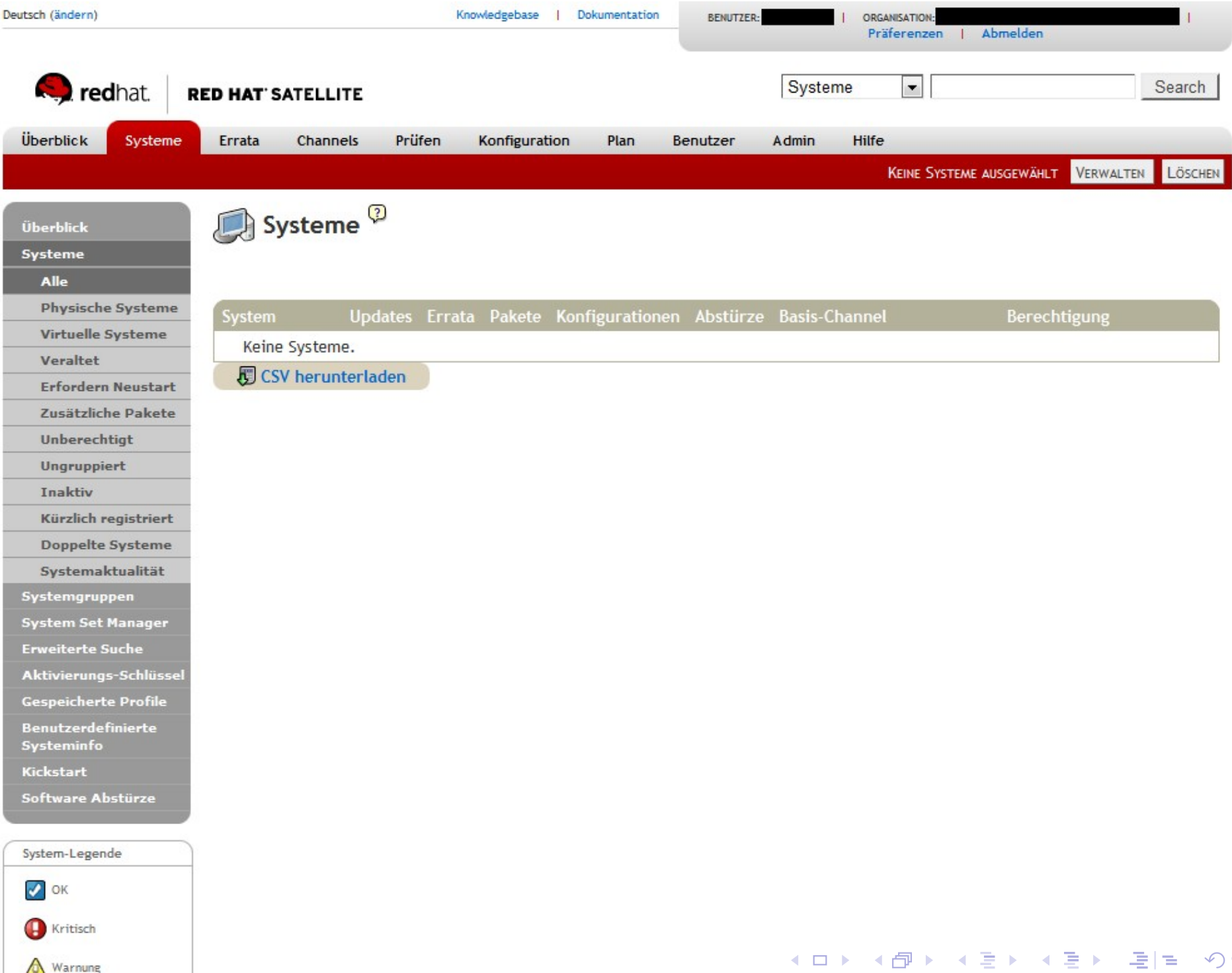
[1] These tools are only offering some of the Spacewalk features

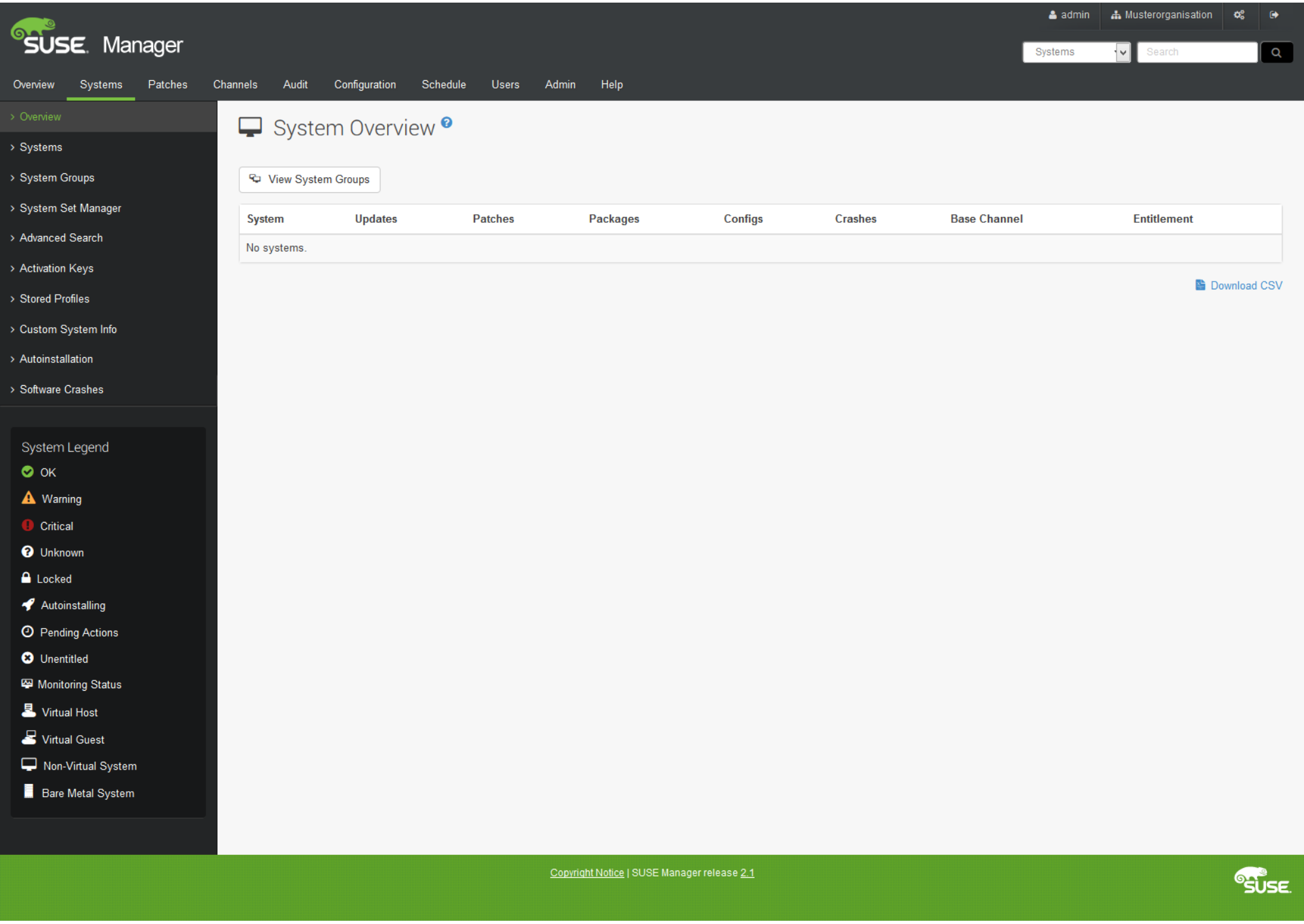
Agenda

Spacewalk variety

- 2002: First version of Red Hat Network Satellite Server
- 2008: Satellite source code releases as Spacewalk
- Spacewalk is the upstream project for Red Hat Satellite Server and SUSE Manager
- Service contract for SUSE Manager and Red Hat Satellite needed, Spacewalk is free
- Features tested in Spacewalk, often adopted in the Enterprise products


Deutsch (ändern)
Knowledgebase
Dokumentation
admin
Spacewalk Default Organization
SPACEWALK
Systeme
Suche
Überblick
Systeme
Errata
Channels
Prüfen
Konfiguration
Plan
Benutzer
Monitoring
Admin
Hilfe
Überblick
Systeme
Systemgruppen
System Set Manager
Erweiterte Suche
Aktivierungs-Schlüssel
Gespeicherte Profile
Benutzerdefinierte Systeminfo
Kickstart
Software Abstürze
System-Legende
OK
Warnung
Kritisch
Unbekannt
Gesperrt
Kickstarten
Ausstehende Aktionen
Unberechtigt
Monitoring-Status
Virtueller Host
Virtueller Gast
Nicht-virtuelles System
Systemüberblick
Systemgruppen (Systeme ansehen)
0 1 2 3 4 5 6 7 8 9 A B C D E F G H I J K L M N O P Q R S T U V W X Y Z
1 - 8 von 8(0 ausgewählt)
Filtern nach Systemgruppen-Namen:
25
Elemente pro Seite anzeigen
Updates
Gesundheit
Gruppenname
Systeme
Im SSM verwenden
CentOS 4 Im SSM verwenden
Entwicklung 1 Im SSM verwenden
Internal 5 Im SSM verwenden
Linux 4 Im SSM verwenden
Produktiv 3 Im SSM verwenden
Solaris 3 Im SSM verwenden
Test 1 Im SSM verwenden
Webserver 2 Im SSM verwenden
Alle auswählen
1 - 8 von 8(0 ausgewählt)
CSV herunterladen
Mit Vereinigung (Union) arbeiten
Mit Schnittmenge (Intersection) arbeiten
Copyright © 2002–14 Red Hat, Inc. Alle Rechte vorbehalten. Datenschutzerklärung : Rechtliche Hinweise : redhat.com
Spacewalk Release 2.1


Deutsch (ändern)
Knowledgebase | Dokumentation
BENUTZER: [redacted] | ORGANISATION: [redacted] |
Präferenzen | Abmelden
redhat. RED HAT SATELLITE
Systeme
Search
Überblick
Systeme
Errata
Channels
Prüfen
Konfiguration
Plan
Benutzer
Admin
Hilfe
KEINE SYSTEME AUSGEWÄHLT
VERWALTEN
LÖSCHEN
Überblick
Systeme
Alle
Physische Systeme
Virtuelle Systeme
Veraltet
Erfordern Neustart
Zusätzliche Pakete
Unberechtigt
Ungruppiert
Inaktiv
Kürzlich registriert
Doppelte Systeme
Systemaktualität
Systemgruppen
System Set Manager
Erweiterte Suche
Aktivierungs-Schlüssel
Gespeicherte Profile
Benutzerdefinierte Systeminfo
Kickstart
Software Abstürze
Systeme
System
Updates
Errata
Pakete
Konfigurationen
Abstürze
Basis-Channel
Berechtigung
Keine Systeme.
CSV herunterladen
System-Legende
OK
Kritisch
Warnung


admin
Musterorganisation
SUSE Manager
Systems
Search
Overview
Systems
Patches
Channels
Audit
Configuration
Schedule
Users
Admin
Help
Overview
Systems
System Groups
System Set Manager
Advanced Search
Activation Keys
Stored Profiles
Custom System Info
Autoinstallation
Software Crashes
System Overview
View System Groups
System
Updates
Patches
Packages
Configs
Crashes
Base Channel
Entitlement
No systems.
Download CSV
System Legend
OK
Warning
Critical
Unknown
Locked
Autoinstalling
Pending Actions
Unentitled
Monitoring Status
Virtual Host
Virtual Guest
Non-Virtual System
Bare Metal System
Copyright Notice | SUSE Manager release 2.1
SUSE

Common features

- Multi-client-capability
- Configuration management
- Software/update management
- Content provisioning/caching, no dedicated downloads per client necessary

Common features

- System provisioning
- Security and license auditing
- Crash reporting
- Monitoring[2]

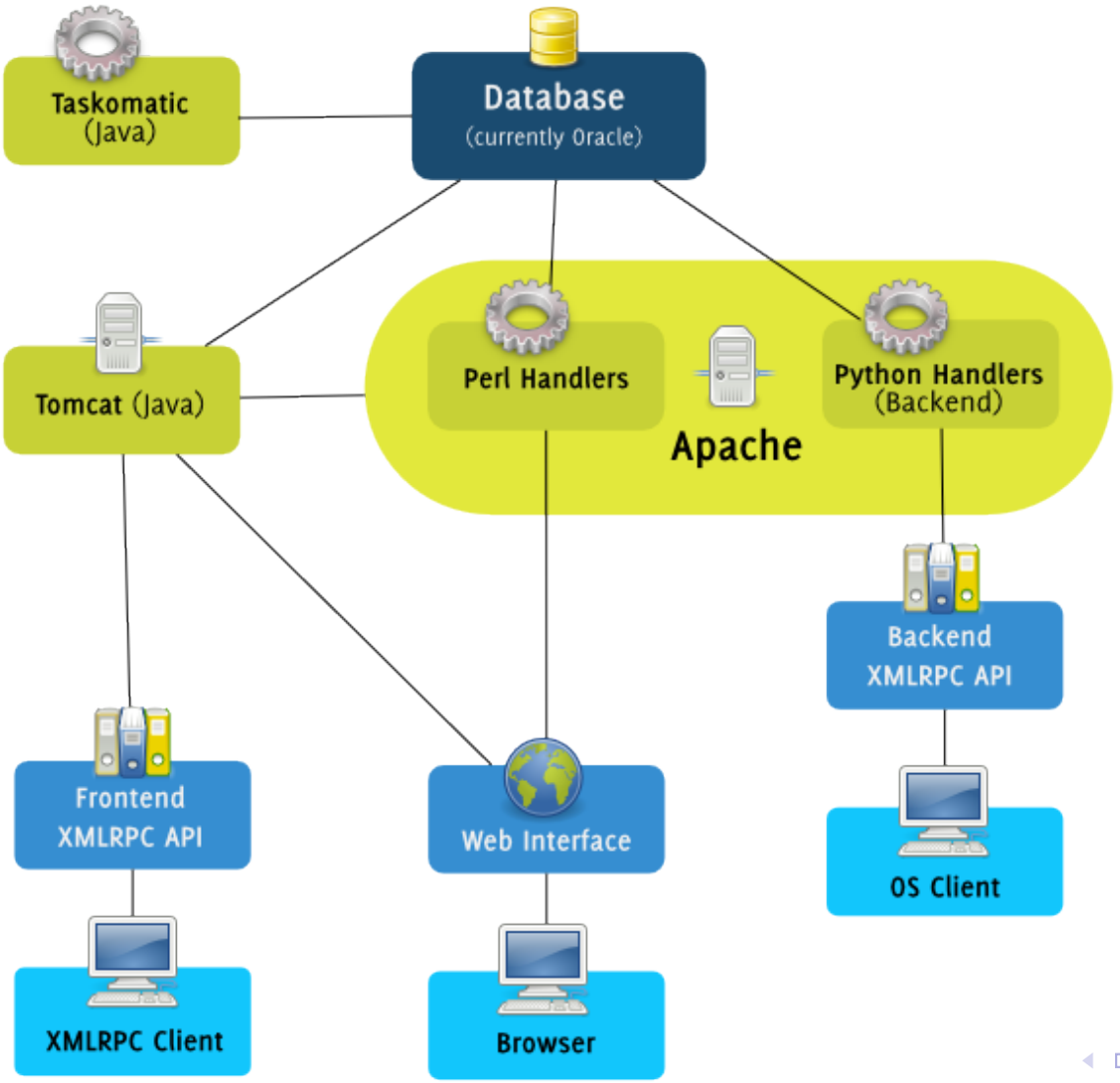
[2] Nagios / Icinga is definitely more powerful!

Differences

	Spacewalk	Satellite	SUSE Mgr.
Release	2-5 months	9-12 months	?
Arch	i386, x86_64	+ s390x	+ s390x, ia64, ppc/ppc64
Distro	EL, Debian[3], openSUSE, Fedora	+ RHEL	+ RHEL[4], SLES
Database	PostgreSQL, Oracle 10gR2/11g		
Exclusive	jQuery UI, Solaris, Power management[5]	Solaris, RHN connection	jQuery UI, Power management

[3] limited support
[4] omits Red Hat support, *SUSE Expanded Support*
[5] enables cobbler to kickstart hosts more efficient

Spacewalk architecture



Spacewalk architecture
Open Source Architecture Daemon

(*missing in figure*)

- **osad** - Open Source Architecture Daemon
- Real-time system management
- Action are started using the Jabber protocol
- Network port **5222/tcp** needs to be opened on the client

Spacewalk architecture
Additional components

- **tftp-server** - required for client network boot
- **cobblerd** - automatic TFTP, DHCP and DNS configuration
- **Spacewalk Proxy** - software packages are cached locally, reducing load/traffic

Agenda

New in Spacewalk 2.2

- Version 2.2 was released on 07/16/2014
- Enterprise Linux 7 clients are now supported[6]
- Read-only API user for auditing purposes
- Action-Chains, grouping interdependent actions[7]
- Updated Perl, Python and Ruby API (new calls)
- Solaris support now deprecated

[6] Host: Enterprise Linux 5/6

[7] Demo: `http://turing.suse.de/%7Esmoioli/Action%20Chaining%20screencast.webm`

Agenda

System requirements

- 2 GB+ memory
- Enterprise Linux 5/6 host [8]
- Spacewalk repository
- RHEL Server Optional channel[9]
- JPackage and EPEL repository[10]
- Fedora 20: install `rpm-{build,python}`, downgrade RPM libraries[11]

[8] Versions newer than Spacewalk 2.2 are only supporting EL6
[9] Red Hat Enterprise Linux only
[10] CentOS/Scientific Linux/OEL only
[11] Version 4.11.1-7.fc20

Network

- FQDN and short name needs to be available[12]
- Firewall configuration
  - tcp 80,443 - web interface
  - tcp 5222 - task scheduling (client systems)
  - tcp 5269 - task scheduling (Proxy)
  - udp 69 - TFTP (Kickstart)

[12] Check using `hostname -s|-f`!

Storage capacity

Storage calculation:

- At least 12 GB for PostgreSQL database[13]
- At least 6 GB for RPM packages
- Depending on your system landscape
  - 250 KiB per registered system
  - 500 KiB per software channel
  - 230 KiB per package in software channel

[13] Oracle: differing depending on version and edition

Storage capacity
Example

Example calculation:

- 10 CentOS 6 systems, 2 repositories (`base` + `updates`)
- 10 systems: **3 MiB** (10* 250 KiB)
- CentOS 6 Base: **500 KiB**
  - 6367 packages: **1,4 GiB** (6367 * 230 KiB)
- CentOS 6 Updates: **500 KiB**
  - 1103 packages: **248 MiB** (1103 * 230 KiB)
- Summary: 1,7 GiB

Installation

- PostgreSQL:
  `yum install spacewalk-{,setup-}postgresql`
- Oracle:
  - `yum install spacewalk-{,setup,oracle}`
  - XE: use Oracle Instant client[14]
  - Details: `https://fedorahosted.org/spacewalk/wiki/FullOracleSetup`

[14] The XE client isn't working *at all*!

Initial configuration

Listing 1: Initial configuration

```
# spacewalk-setup --disconnected
Admin Email Address? admin@localhost
CA certificate password?
Organization? MyCompany
...
** SSL: Generation CA certificate.
...
# chkconfig spacewalk-service on
# service spacewalk-service start
```

Initial configuration

- **Disable** `Admin -> Spacewalk Configuration -> Disconnected Spacewalk`
- Customize to match your company's structure
  - Enable Solaris support?
  - Create additional user accounts
  - Create additional organizations and trusts
  - ...

Channels, child channels and repositories

- Every distribution are mapped to one or more channels
- Each channel can consist of multiple child channels
- Every channel is synchronized using a repository
- Channel access can be limited per system

Channels, child channels and repositories

Example

Channel-Name	Anbieter	Pakete	Erratas	Systeme
CentOS 5 Base i386	Spacewalk Default Organization	0	0	0
CentOS 6 Base - x86_64	Spacewalk Default Organization	6483	292	4
└ CentOS 6 Extras - x86_64	Spacewalk Default Organization	14	0	4
└ CentOS 6 Updates - x86_64	Spacewalk Default Organization	2348	476	4
└ EPEL EL6 - x86_64	Spacewalk Default Organization	11633	4397	4
└ OMD x86_64	Spacewalk Default Organization	31	0	1
└ RepoForge EL6 x86_64	Spacewalk Default Organization	4718	0	0
└ RepoForge Extras EL6 x86_64	Spacewalk Default Organization	711	0	0
└ Spacewalk Client - x86_64	Spacewalk Default Organization	27	0	4
└ Stankowic x86_64	Spacewalk Default Organization	9	0	4
└ VMware Tools for EL6 x86_64	Spacewalk Default Organization	41	0	4

Channels, child channels and repositories

- Repository content synchronization: `spacwalk-repo-sync`
- Cronjob or taskomatic plan

Listing 2: Synchronize repository

```
1 # /usr/bin/spacewalk-repo-sync --channel ↙
    ↳ centos6-base-x86_64 --url http://mirror.↙
    ↳ centos.org/centos/6/os/x86_64/ --type ↙
    ↳ yum
```

Channels, child channels and repositories

Access limitation per system

Software-Channel-Subskriptionen

Dieses System hat den Basis-Channel subskribiert, welcher an erster Stelle aufgelistet ist, sowie die markierten Channels unten, falls vorhanden. Deaktivierte Kontrollkästchen weisen auf Channels hin, die nicht manuell subskribiert bzw. abbestellt werden können.

CentOS 6 Base - x86_64

- [x] CentOS 6 Extras - x86_64 * (unbegrenzt)
- [x] CentOS 6 Updates - x86_64 * (unbegrenzt)
- [x] EPEL EL6 - x86_64 * (unbegrenzt)
- [x] OMD x86_64 * (unbegrenzt)
- [ ] RepoForge EL6 x86_64 * (unbegrenzt)
- [ ] RepoForge Extras EL6 x86_64 * (unbegrenzt)
- [x] Spacewalk Client - x86_64 * (unbegrenzt)
- [x] Stankowic x86_64 * (unbegrenzt)
- [x] VMware Tools for EL6 x86_64 * (unbegrenzt)

Maintenance tasks

- Some possible system maintenance tasks:
  - Installing, updating and removing software packages
  - Applying errata
  - Executing shell commands
  - Restarting systems
  - Updating configuration files
  - and much more. . .

Maintenance tasks
System Set Manager

- Similar systems can be grouped (web/database servers,. . .)
- All systems of a group can be managed like a single host
- Facilitates maintaining big system landscapes
- **Tip:** groups per application and priority (test, development, production)

Configuration management

- Configuration files[15] are stored in one or more configuration channels
- Channels can be ordered hierarchically (depending on network/application, . . .)
- If a configuration file is part of multiple channels the first occurrence is selected
- Uploading/customizing central configuration files using the WebUI

[15] Symbolic links and binary files are also supported!

Configuration management

- WebUI offers an integrated ASCII editor
- **Macros** can insert system profile values (hostname, IP address,...)[16]
- Updates stored as revisions, MD5 checksum verification
- No automatic update rollouts

[16] See Red Hat Satellite documentation

Configuration management
Example

- Specify:
  - File name/path
  - Owner and file mode
  - SELinux context
  - custom macro delimiter (if necessary)
  - Configuration file content
- Configuration files can also be uploaded

Configuration management

Example - Configuration channel priorities

1 - 2 von 2**(0 ausgewählt)**

Filtern nach Channel-Name:

	Channel-Name	Channel-Label	Dateien insgesamt	Einsetzbare Dateien*	Position
☐	stankowic-lan	stankowic-lan	1 Datei	1 Datei	1
☐	stankowic-generic	stankowic-generic	3 Dateien	3 Dateien	2

Configuration management

Beispiel - Deploying a new revision

Datei mit eingesetzten Dateiversionen vergleichen

Sie können die Revision 2 dieser Datei mit Versionen dieser Datei, die auf Systemen eingesetzt werden, abgleichen. Bitte wählen Sie unten die Systeme, mit denen Sie diese Datei abgleichen möchten (dies plant eine Aktion, die bei der nächsten Anmeldung des Systems stattfindet).

1 - 7 von 7**(4 ausgewählt)**

	Systemname	Zuletzt bekannte eingesetzte Version
☑	st-dc.stankowic.loc	Revision 1 von stankowic-generic
☑	st-devel.stankowic.loc	Revision 1 von stankowic-generic
☑	st-storage.stankowic.loc	Revision 1 von stankowic-generic
☑	st-web03.stankowic.loc	Revision 1 von stankowic-generic
☐	tvm-oi151a8.localdomain.loc	Niemals
☐	tvm-sol10.localdomain.loc	Niemals
☐	tvm-sol11.localdomain.loc	Niemals

Dateiabgleich planen

Agenda

CEFS - CentOS Errata for Spacewalk

- RHEL customers are receiving errata by RHN
- CentOS fixes are marked as regular updates
- CEFS service[17] creates errata automatically (mailing lists)
- CEFS imports errata locally
- Errata information can be combined with **Red Hat Security Announcements** (RHSA), more details

[17] Thank you very much, Steve!

CEFS - CentOS Errata for Spacewalk

Example

Listing 3: Import recent errata

```
1 $ wget -N http://cefs.steve-meier.de/errata.↙
    ↳ latest.xml
2 $ ./errata-import.pl --server localhost --↙
    ↳ errata errata.latest.xml --include-↙
    ↳ channels=... --publish
```

1. Downloading recent definitions
2. Importing errata
   - **–errata** - XML file
   - **–include-channels** - import for these channels
   - **–publish** - publish errata

CEFS - CentOS Errata for Spacewalk

CESA-2014:1075 - Security Advisory

Details | Pakete | Betroffene Systeme

Übersicht

Moderate CentOS qemu-kvm Update

Ausgegeben: 22.08.14
Aktualisiert: 22.08.14
Von:

Thema

Not available

Beschreibung

KVM (Kernel-based Virtual Machine) is a full virtualization solution for Linux on AMD64 and Intel 64 systems. The qemu-kvm package provides the user-space component for running virtual machines using KVM.

Two integer overflow flaws were found in the QEMU block driver for QCOW version 1 disk images. A user able to alter the QEMU disk image files loaded by a guest could use either of these flaws to corrupt QEMU process memory on the host, which could potentially result in arbitrary code execution on the host with the privileges of the QEMU process. (CVE-2014-0222, CVE-2014-0223)

Red Hat would like to thank NSA for reporting these issues.

Agenda

Solaris integration

Solaris integration

- Spacewalk / Red Hat Satellite are offering “UNIX support“[18]
- Solaris systems can be registered / managed like Linux hosts
- SUN/Oracle Solaris 8 to 10 (x86 + SPARC) officially supported
- Unofficially also working[19]:
  - Oracle Solaris 11
  - OpenIndiana / OpenSolaris
  - Illumos derivates (napp-it, SmartOS,...) should also work

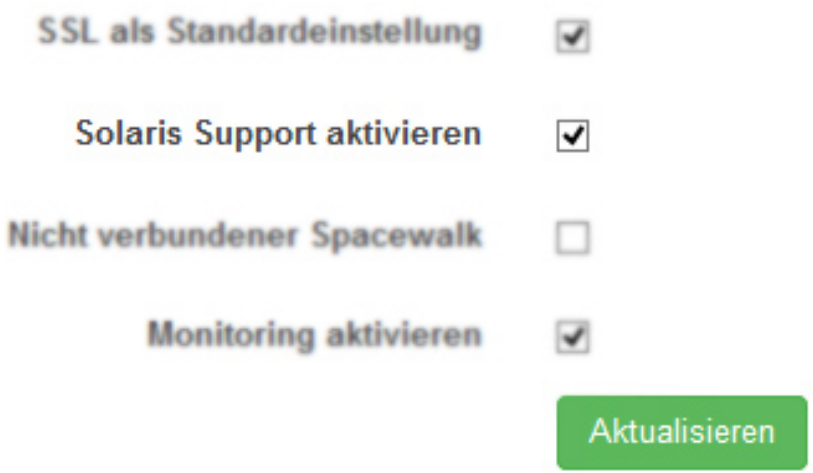
[18] *deprecated* since Spacewalk 2.2
[19] successfully tested

Limitations

- Software cannot be imported using repositories
- `.pkg` files need to be converted (`solaris2mpm`) and uploaded
- Real-time maintenance (`osad`) not possible, `rhnsd` checks periodically
- Remote commands unreliable on some architectures/releases
- Hardware / package information partially errorneous

Preparation - Spacewalk

- Enable Solaris support
- Restart Spacewalk / Red Hat Satellite
- Create Solaris base channel and sub-channels
- Create activation key and link with base channel



Installation - Solaris

- Download appropriate Solaris Bootstrap package[20]: `http://spacewalkproject.org/solaris`[21]
- Install OpenSSL and ZIP libraries and GCC runtime[22]
- Install Bootstrap package and adjust LD Library paths
- Register system using `rhnreg_ks`, enable remote configuration (`rhn-actions-control`, optional)

[20] Use `i386-sol10` for newer versions

[21] on Satellite local: `http://fqdn/pub/bootstrap/`

[22] `SUNWgccruntime`, `SUNWopensslr`, `SUNWzlib` packages

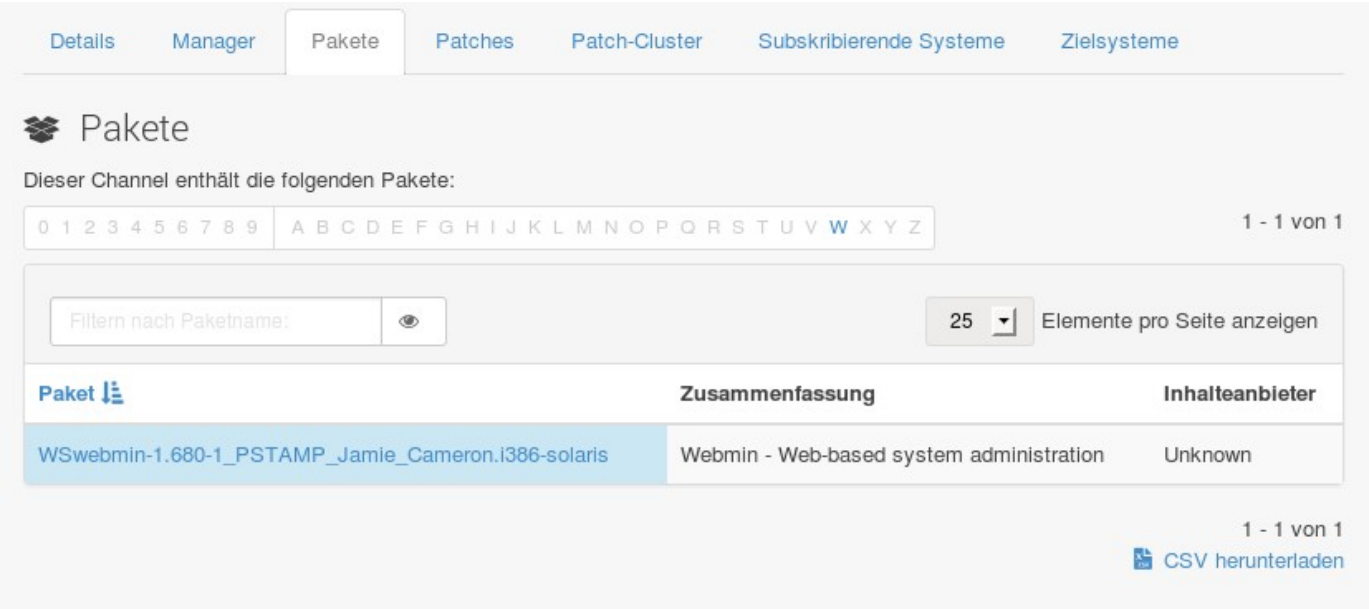
Installation - Solaris

- Configure `rhnsd` (set interval)
- Up to Solaris 9: create / start init script
  - `/etc/init.d/rhnsd start`
- Solaris 10+: create SMF manifest[23] (or use mine):
  - `https://github.com/stdevel/rhnsd-solman`
  - `svcadm validate|import rhnsd.xml`
  - `svcadm enable rhnsd`
- `# ps -ef|grep -i rhnsd`

[23] Details: `http://st-devel.net/blssv`

Upload Solaris packages

- Download `.pkg` package
- Convert package in `.mpm` using `solaris2mpm`[24]
- Upload file to Satellite / Spacewalk server using `rhnpush`



[24] Use `--select-arch` in case of errors!

Agenda

Kickstart automation

- Enterprise Linux needs Kickstart distribution and profile
- KS distribution consists of a minimal boot environment
- Required files are stored on DVD or network mirrors
- KS profile starts distribution + installation
- **Disadvantage:** manual work needed

Kickstart automation

- `mkelfs` can help you!
- Python tool for downloading needed files from network mirrors
- Can also create Kickstart distributions
- Supports CentOS, Scientific Linux, Fedora
- Download: `https://github.com/stdevel/mkelfs`

Kickstart automation
Examples

```
./mkelfs.py --release 6.5 --arch x86_64 -c
```

- Downloads CentOS 6.5, x86_64, creates KS distribution
- Files are stored in **/var/satellite/kickstart_tree**

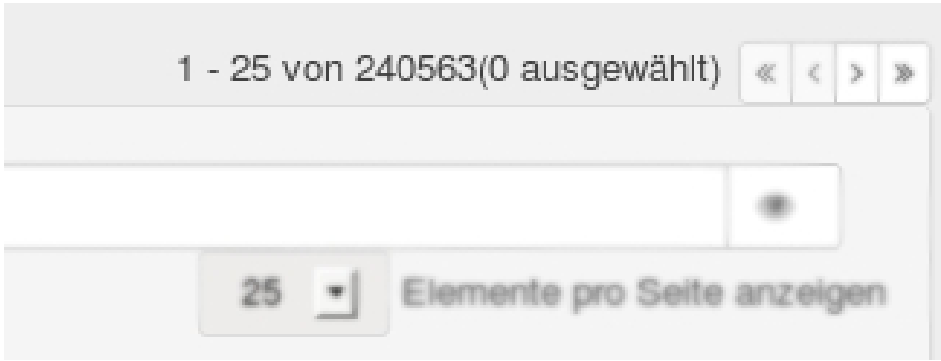
```
./mkelfs.py -r 6.2 -a i386 -o scientific -fq
```

- Downloads ScientificLinux 6.2, i386
- overwrites pre-existing files, no output

Agenda

Clean-up

- All executed tasks are documented as actions
- also includes automated tasks (checking deployed configurations)!
- Additional researching often not required, deleting actions mostly forgotten
- **Result:** database is full unneeded information!



Clean-up

- `arsa` can help you!
- Python tool for archiving / deleting actions
- Good idea to run as weekly cronjob
- Download: `https://github.com/stdevel/arsa`

Clean-up
Examples

`./arsa.py -l`

- Lists completed actions (dry-run)

`./arsa.py -rf`

- Archives completed and failed actions
- Deletes archived actions afterwards

Agenda

Patch reporting

- Management often requests detailed patch reports
- Might be **essential** depending on the companies certification (e.g. ISO/IEC 27001:2005)
- Very time-consuming task depending on system landscape
- There must be a way to automate this...


I SHOULD AUTOMATE THIS CRAP
imgflip.com

Patch reporting

- `satprep` can help you!
- Python toolkit for creating detailed patch reports
- Reports are created as PDF using TEX
- Lists patch-relevant and also general system information
- Download: `https://github.com/stdevel/satprep`

stdevel

System maintenance report					
IP:	192.168.178.110	**Date:**	2014-07-28	**Time from:**	
Responsible:	Christian Stankowic	**Sign:**		**Time to:**	

Meta information and planned tasks							
Standalone system	☐	Cluster system	☑	Update operating system	☑	Update application	☐
Hardware change	☐	Other tasks (please specify)					

Procedure checklist			
Task	**Success**		**Error description/notes**
	Yes	**No**	
Hardware check	☐	☑	not a physical host
Snapshot of virtual machine created	☐	☐	
Monitoring disabled	☐	☐	
Tasks (see above) realised	☐	☐	
System rebooted	☐	☑	no reboot required
Application up and running	☐	☐	
Backup services up and running	☐	☐	
Anti-virus services up and running	☐	☐	
Cluster test	☐	☐	
Monitoring enabled	☐	☐	

List of installed patches				
Type	**Name**	**Date**	**Description**	**Reboot required**
Product Enhancement Advisory	CEEA-2014:0774	6/22/14	CentOS tzdata Update	no

Patch reporting
Functionality

1. Creating a snapshot of relevant errata / patch information: `./satprep_snapshot.py`
2. Patching and rebooting systems
3. Creating another snapshot: `./satprep_snapshot.py`
4. Calculating the delta and creating PDF reports: `./satprep_diff.py 20140707*.csv`
5. (*Sign document and be happy about having saved time*)

Patch reporting
Functionality

Custom info keys defining meta information:

- `SYSTEM_OWNER` - System owner
- `SYSTEM_CLUSTER` - Cluster node / standalone system
- `SYSTEM_MONITORING` - monitoring state
- `SYSTEM_MONITORING_NOTES` - notes about system monitoring
- `SYSTEM_BACKUP` - Backup state
- ...

Patch reporting
Customization

Reports customization:

- Potrait / landscape
- Company logo
- Selecting particular system, patch and errata information
- Conventional TEXdocument is used as template

Further information I

`http://fedorahosted.org/spacewalk`

Spacewalk wiki.

`http://cefs.steve-meier.de`

CentOS Errata for Spacewalk.

Steve Meier

`http://red.ht/1mJA1q1`

Manage Solaris with Spacewalk and Red Hat Satellite

Christian Stankowic, Guest post in official Red Hat blog

`http://www.freiesmagazin.de`

Spacewalk articles

Christian Stankowic, 08/2014 - xx/2014

Thank your for your attention!

Questions / feedback?

Stay in touch:

Twitter: `@stankowic_devel`

Also check-out my blog for Spacewalk stuff:
`http://www.stankowic-development.net`