

System management with Spacewalk

Tips for managing Linux and Solaris

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OpenRheinRuhr, 2014

whoami

```
$ whoami
```

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

```
$ apropos
```

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

Agenda

1 Motivation

- Requirements and necessity
- Spacewalk variety
- News

2 Installation & administration

- Basic setup and system maintenance
- Errata for CentOS
- Solaris

3 Tips & tricks

- Kickstart automation
- Clean-up
- Patch reporting

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Requirements and necessity

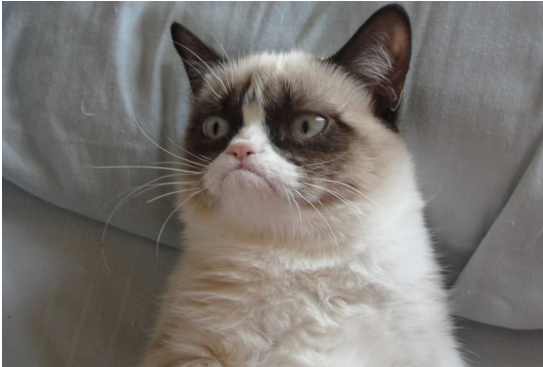
or: IT administrators tortures

- 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.*"
 - "*Could you **just do this...***"

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 examples¹
 - Puppet
 - Chef
 - Ansible
 - ...
- Alternative suites: Spacewalk, Red Hat Satellite, SUSE Manager
- Combines amongst others software, configuration and content management

¹These tools are only offering some of the Spacewalk features 

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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

- > 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)

☐ 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

25 Elemente pro Seite anzeigen

1 - 8 von 8(0 ausgewählt)
[CSV herunterladen](#)

Mit Vereinigung (Union) arbeiten Mit Schnittmenge (Intersection) arbeiten





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

System Legend

-  OK
-  Warning
-  Critical
-  Unknown
-  Locked
-  Autoinstalling
-  Pending Actions
-  Unentitled
-  Monitoring Status
-  Virtual Host
-  Virtual Guest
-  Non-Virtual System
-  Bare Metal System

 System Overview
 View System Groups

System	Updates	Patches	Packages	Configs	Crashes	Base Channel	Entitlement
No systems.							

 Download CSV

Common features

- Multi-client-capability
- Configuration management
- Software/update management
- Content provisioning/caching

Common features

- System provisioning
- Security and license auditing
- Crash reporting
- Monitoring²

²Nagios / Icinga is definitely more powerful!

Differences

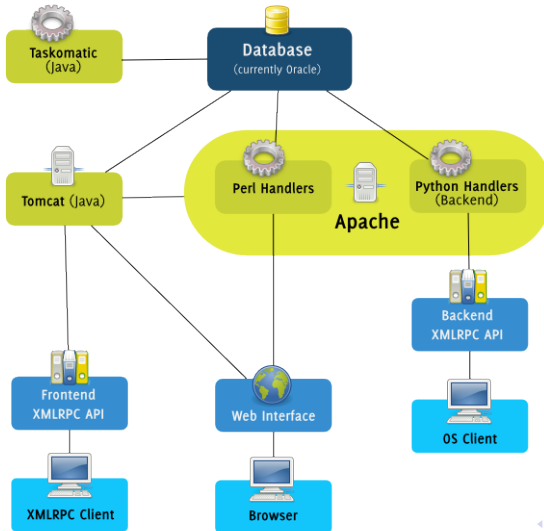
	Spacewalk	Satellite	SUSE Mgr.
Release	2-5 months	9-12 months	?
Arch	i386, x86_64	+ s390x	+ s390x, ia64, ppc/ppc64
Distro	EL, Debian ³ , openSUSE, Fedora	+ RHEL	+ RHEL ⁴ , SLES
Database	PostgreSQL, Oracle 10gR2/11g		
Exclusive	jQuery UI, Solaris, Power management ⁵	Solaris, RHN connection	jQuery UI, Power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

³limited support

⁴omits Red Hat support, *SUSE Expanded Support*

⁵enables 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

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New in Spacewalk 2.2

- Version 2.2 was released on 07/16/2014
- Enterprise Linux 7 clients are now supported⁶
- Read-only API user for auditing purposes
- Action-Chains, grouping interdependent actions⁷
- Updated Perl, Python and Ruby API (new calls)
- Solaris support now deprecated

⁶Host: Enterprise Linux 5/6

⁷Demo: <http://turing.suse.de/%7Esmoioli/Action%20Chaining%20screencast.webm>

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System requirements

- 2 GB+ memory
- Enterprise Linux 5/6 host⁸
- Spacewalk repository
- RHEL Server Optional channel⁹
- JPackage and EPEL repository¹⁰
- Fedora 20: install `rpm-{build,python}`, downgrade RPM libraries¹¹

⁸Versions newer than Spacewalk 2.2 are only supporting EL6

⁹Red Hat Enterprise Linux only

¹⁰CentOS/Scientific Linux/OEL only

¹¹Version 4.11.1-7.fc20

Network

- FQDN and short name needs to be available¹²
- Firewall configuration
 - tcp 80,443 - web interface
 - tcp 5222 - task scheduling (client systems)
 - tcp 5269 - task scheduling (Proxy)
 - udp 69 - TFTP (Kickstart)

¹²Check using `hostname -s|-f!`

Storage capacity

Storage calculation:

- At least 12 GB for PostgreSQL database¹³
- 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

¹³Oracle: differing depending on version and edition 

Storage capacity

Example

Example calculation:

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

Installation

- PostgreSQL:

```
yum install spacewalk-{,setup-}postgresql
```

- Oracle:

- `yum install spacewalk-{,setup,oracle}`
- XE: use Oracle Instant client¹⁴
- Details: <https://fedorahosted.org/spacewalk/wiki/FullOracleSetup>

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

Initial configuration

Listing 1: Initial configuration

```
1 # spacewalk-setup --disconnected
2 Admin Email Address? admin@localhost
3 CA certificate password?
4 Organization? MyCompany
5 ...
6 ** SSL: Generation CA certificate.
7 ...
8 # chkconfig spacewalk-service on
9 # 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

Creating channels and Repositories

- Creation using web interface or
`spacewalk-common-channels`
- Tool offers database popular repositories¹⁵

Listing 2: Creating needed channels/repositories

```
1 # spacewalk-common-channels -u admin -a ↵  
    ↵ x86_64 centos6,centos6-updates  
2 # spacewalk-common-channels -u admin -a i386 ↵  
    ↵ 'fedora20*'
```

¹⁵e.g. CentOS, EPEL, Fedora, openSUSE, Oracle Linux, Spacewalk client

Channels, child channels and repositories

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

Listing 3: Synchronize repository

```
1 # /usr/bin/spacwalk-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

- ☒ CentOS 6 Extras - x86_64 * (unbegrenzt)
- ☒ CentOS 6 Updates - x86_64 * (unbegrenzt)
- ☒ EPEL EL6 - x86_64 * (unbegrenzt)
- ☒ OMD x86_64 * (unbegrenzt)
- ☐ RepoForge EL6 x86_64 * (unbegrenzt)
- ☐ RepoForge Extras EL6 x86_64 * (unbegrenzt)
- ☒ Spacewalk Client - x86_64 * (unbegrenzt)
- ☒ Stankowic x86_64 * (unbegrenzt)
- ☒ 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 files¹⁶ 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

¹⁶Symbolic links and binary files are also supported! 

Configuration management

- WebUI offers an integrated ASCII editor
- **Macros** can insert system profile values (hostname, IP address,...)¹⁷
- Updates stored as revisions, MD5 checksum verification
- No automatic update rollouts

¹⁷See 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		

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- Solaris

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- Clean-up
- Patch reporting

CEFS - CentOS Errata for Spacewalk

- RHEL customers are receiving errata by RHN
- CentOS fixes are marked as regular updates
- CEFS service¹⁸ creates errata automatically (mailing lists)
- CEFS imports errata locally
- Errata information can be combined with **Red Hat Security Announcements** (RHSA), more details

¹⁸Thank you very much, Steve!

CEFS - CentOS Errata for Spacewalk

Example

Listing 4: 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
```

❶ Downloading recent definitions

❷ 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.

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Solaris integration



Solaris integration

- Spacewalk / Red Hat Satellite are offering “UNIX support”¹⁹
- Solaris systems can be registered / managed like Linux hosts
- SUN/Oracle Solaris 8 to 10 (x86 + SPARC) officially supported
- Unofficially also working²⁰:
 - Oracle Solaris 11
 - OpenIndiana / OpenSolaris
 - Illumos derivatives should also work

¹⁹ *deprecated* since Spacewalk 2.2

²⁰ 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 erroneous

Installation - Solaris

- Download appropriate Solaris Bootstrap package²¹:
`http://spacewalkproject.org/solaris`²²
- Install OpenSSL and ZIP libraries and GCC runtime²³
- Install Bootstrap package and adjust LD Library paths
- Register system using `rhnreg_ks`, optionally enable remote configuration (`rhn-actions-control`)

²¹Use `i386-sol10` for newer versions

²²on Satellite local: `http://fqdn/pub/bootstrap/`

²³`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 manifest²⁴ (or use mine):
 - `https://github.com/stdevel/rhnsd-solman`
 - `svcadm validate|import rhnsd.xml`
 - `svcadm enable rhnsd`
- `# ps -ef|grep -i rhnsd`

²⁴Details: <http://st-devel.net/blssv>

Upload Solaris packages

- Download `.pkg` package
- Convert package in `.mpm` using `solaris2mpm`²⁵
- Upload file to Satellite / Spacewalk server using `rhnpush`

The screenshot shows the 'Pakete' (Packages) tab in the Spacewalk web interface. At the top, there are tabs for 'Details', 'Manager', 'Pakete', 'Patches', 'Patch-Cluster', 'Subskribierende Systeme', and 'Zielsysteme'. Below the tabs, the text 'Dieser Channel enthält die folgenden Pakete:' is followed by a search bar and a pagination indicator '1 - 1 von 1'. A table lists the packages, with columns for 'Paket', 'Zusammenfassung', and 'Inhaltenanbieter'. The table contains one entry: 'WSwebmin-1.680-1_PSTAMP_Jamie_Cameron.i386-solaris' with a summary of 'Webmin - Web-based system administration' and an unknown provider. At the bottom right, there is a link to 'CSV herunterladen'.

Paket	Zusammenfassung	Inhaltenanbieter
WSwebmin-1.680-1_PSTAMP_Jamie_Cameron.i386-solaris	Webmin - Web-based system administration	Unknown

²⁵Use `--select-arch` in case of errors!

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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
- 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, Fedora²⁶
- Download: <https://github.com/stdevel/mkelfs>

²⁶more distros planned!

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

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- **Clean-up**
- Patch reporting

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

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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

I SHOULD AUTOMATE THIS CRAP



Patch reporting

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

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

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

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 20141109*.csv`
- 5 (*Sign document and be happy about having saved time*)

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 you for your attention!

Questions / feedback?

Stay in touch:

Twitter: @stankowic_devel

Also check-out my blog for Spacewalk stuff:

<http://www.stankowic-development.net>