

System management with Spacewalk

Tips for managing CentOS

Christian Stankowic

<http://www.stankowic-development.net>, @stankowic_devel

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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

- 1 Motivation
 - Requirements and necessity
 - Spacewalk variety
 - News
- 2 Installation & administration
 - Basic setup
 - System maintenance
 - Errata for CentOS
- 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.*"
 - "*Can you make those adjustments quickly? I'm having a demo with the management in 10 minutes.*"
- **Result:** Standards and documentation are often neglected

Requirements and necessity

Product variety

- Central system management is **essential** - but which tool to use?
- The variety is very big, some examples¹
 - Puppet
 - Chef
 - Ansible
 - CFEngine
 - ...
- Management 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: Red Hat releases Satellite source code 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 are tested in Spacewalk and 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

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Filtern nach Systemgruppen-Namen:

25 Elemente pro Seite anzeigen

<input type="checkbox"/>	Updates	Gesundheit	Gruppenname	Systeme	Im SSM verwenden
<input type="checkbox"/>	⚠	🔌	CentOS	4	Im SSM verwenden
<input type="checkbox"/>	✔	🔌	Entwicklung	1	Im SSM verwenden
<input type="checkbox"/>	⚠	🔌	Internal	5	Im SSM verwenden
<input type="checkbox"/>	⚠	🔌	Linux	4	Im SSM verwenden
<input type="checkbox"/>	⚠	🔌	Produktiv	3	Im SSM verwenden
<input type="checkbox"/>	✔	🔌	Solaris	3	Im SSM verwenden
<input type="checkbox"/>	✔	🔌	Test	1	Im SSM verwenden
<input type="checkbox"/>	✔	🔌	Webserver	2	Im SSM verwenden

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[CSV herunterladen](#)





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

- > Overview
- > **Systems**
- > System Groups
- > System Set Manager
- > Advanced Search
- > Activation Keys
- > Stored Profiles
- > Custom System Info
- > Autoinstallation
- > Software Crashes

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 ?

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

[Download CSV](#)

Common features

- Multi-client-capability - possibility to represent multiple organizations including limitations
- Configuration management - multi-level deployment of configuration files
- Software/update management - central management and deployment of software packages
- Content provisioning/caching, no dedicated downloads per client necessary

Common features

- System provisioning - Systems are deployed based on your standards
- Security and license auditing - verifying compliance of security rules and license units
- Crash reporting - central storing of program aborts
- Monitoring² - very basic host monitoring

²Nagios / Icinga is definitely more powerful!

Differences

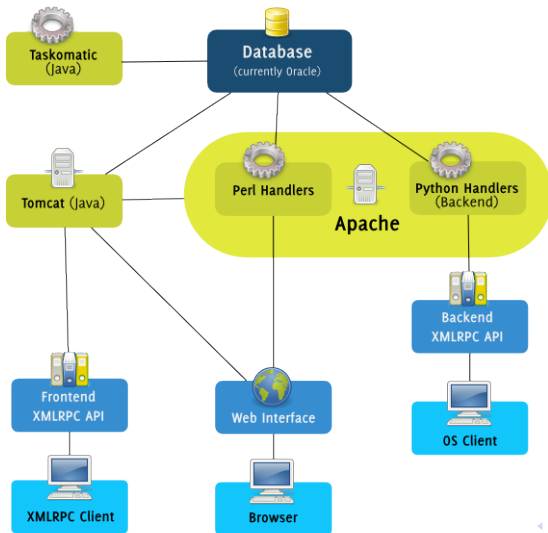
	Spacewalk	Satellite	SUSE Mgr.
Release	2-5 months	9-12 months	?
Arch	i386, x86_64	+ s390x	+ s390x, ia64, ppc/ppc64
Distro	EL, Debian ³ , openSUSE, Fedora	+ RHEL	+ RHEL ⁴ , SLES
Database	PostgreSQL, Oracle 10gR2/11g		
Exclusive	jQuery UI, Solaris, Power management ⁵	Solaris, RHN connection	jQuery UI, Power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

- **osad** - Open Source Architecture Daemon
- Service for maintaining systems in real-time
- Pending actions are started using the Jabber protocol
- Network port **5222/tcp** needs to be opened on the client

Spacewalk architecture

Additional components

- **tftp-server** - minimal FTP server which is required for booting clients from the network
- **cobblerd** - installation service that is able to configure TFTP, DHCP and DNS automatically
- **Spacewalk Proxy** - recommended when maintaining systems in different locations separated by WAN
- Software packages are cached locally reducing load and 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>

Action-Chaining

Example

- Installing patches on a system mounted `/usr`⁸ read-only
- Directly installing the patches fails because of missing write support
- Solution: Prepend remote command while planning the task: `mount -o remount, rw /usr`
- **Disadvantage:** After installation another remote command needs to be executed to ensure security: `mount -o remount, ro /usr`

⁸Paranoid administrators are doing this!

Action-Chaining

Example

- Using Action-Chains dependencies are defined:
 - 1 Remount of **/usr** with (**rw**)
 - 2 Installing the updates
 - 3 Another remount with **ro**
- Particular actions are completed sequentially
- Following actions aren't executed in case of an error

Edit

Action	Delete
1. Run a remote command on 1 system	delete action
2. Install or update <code>tzdata</code> on 1 system	delete action
3. Run a remote command on 1 system	delete action

Save Cancel Discarding all Changes

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System requirements

- 2 GB memory (4 GB recommended)
- Enterprise Linux 5/6 host system⁹
- Spacewalk repository
- RHEL Server Optional channel¹⁰
- JPackage and EPEL repository¹¹
- Fedora 20: install `rpm-build` and `rpm-python` and downgrade RPM libraries¹²

⁹Versions newer than Spacewalk 2.2 are only supporting EL6

¹⁰Red Hat Enterprise Linux only

¹¹CentOS/Scientific Linux/OEL only

¹²Version 4.11.1-7.fc20

Network

- FQDN and Shortname needs to be available¹³
- Firewall configuration
 - tcp 80,443 - web interface
 - tcp 5222 - task scheduling (client systems)
 - tcp 5269 - task scheduling (Proxy)
 - udp 69 - TFTP (Kickstart)

¹³Check using `hostname -s|-f!`

Storage capacity

Storage needs are calculated like this:

- At least 12 GB for PostgreSQL database¹⁴
- 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

¹⁴Oracle: 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 software packages: **1,4 GiB** ($6367 * 230 \text{ KiB}$)
- CentOS 6 Updates: **500 KiB**
 - 1103 software 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: make sure to use Oracle Instant client¹⁵
- More information: <https://fedorahosted.org/spacewalk/wiki/FullOracleSetup>

¹⁵The 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**
 - If required: enable Solaris support
 - Create additional user accounts in **Users**
 - Create additional organizations (e.g. subsidiary companies) and organization trusts
 - ...

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Channels, child channels and repositories

- Every distribution (e.g. CentOS 6) are mapped to one or more channels
- All channels are marked unique using a label, assigning additional “human-readable“ names is possible
- Each channel can consist of multiple child channels
- Every channel is synchronized using a repository (network mirror)
- Access to the particular channels can be limited per system

Channels, child channels and repositories

Example

Channel-Name	Anbieter	Pakete	Erratas	Systeme
<input type="checkbox"/> CentOS 5 Base i386	Spacewalk Default Organization	0	0	0
<input checked="" type="checkbox"/> 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
└─ Stankovic 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 is synchronized using `spacewalk-repo-sync`
- It's a good idea to run this tool every night in a cronjob

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

- 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 of the 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 (e.g. web servers, database servers, . . .)
- All systems of a group can be managed like a single host
- Facilitates maintaining big system landscapes
- **Tip:** create 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 (e.g. depending on network and/or application)
- If a configuration file is part of two channels the first occurrence is selected
- Uploading/customizing central configuration files is done using the WebUI

¹⁶Symbolic links and binary files are also supported!

Configuration management

- WebUI offers an integrated ASCII editor
- Particular system profile values (e.g. hostname, IP address,...)¹⁷ can be assigned using **macros**
- Updates are stored as revisions, each revision is holding a MD5 checksum
- Configuration files aren't deployed automatically, validation by the administrator is needed

¹⁷See Red Hat Satellite documentation

Configuration management

Example

- Creating a new configuration file specifying:
 - File name/path
 - Owner and file mode
 - SELinux context
 - custom macro delimiter (if necessary)
 - Configuration file content
- Alternatively configuration files can also be uploaded

Configuration management

Example - Configuration channel priorities

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Filtern nach Channel-Name:



<input type="checkbox"/>	Channel-Name	Channel-Label	Dateien insgesamt	Einsetzbare Dateien*	Position
<input type="checkbox"/>	 stankowic-lan	stankowic-lan	1 Datei	1 Datei	1
<input type="checkbox"/>	 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).

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<input type="checkbox"/>	Systemname	Zuletzt bekannte eingesetzte Version
<input checked="" type="checkbox"/>	 st-dc.stankowic.loc	Revision 1 von  stankowic-generic
<input checked="" type="checkbox"/>	 st-devel.stankowic.loc	Revision 1 von  stankowic-generic
<input checked="" type="checkbox"/>	 st-storage.stankowic.loc	Revision 1 von  stankowic-generic
<input checked="" type="checkbox"/>	 st-web03.stankowic.loc	Revision 1 von  stankowic-generic
<input type="checkbox"/>	 tvn-oi151a8.localdomain.loc	Niemals
<input type="checkbox"/>	 tvn-sol10.localdomain.loc	Niemals
<input type="checkbox"/>	 tvn-sol11.localdomain.loc	Niemals

Dateiabgleich planen

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CEFS - CentOS Errata for Spacewalk

- RHEL customers are receiving errata automatically by Red Hat Network
- CentOS fixes are only displayed as regular updates
- Thanks to CEFS¹⁸ errata are created automatically (analysis of mailing lists)
- CEFS imports and published errata
- CentOS errata can be combined with **Red Hat Security Announcements** (RHSA) to include more details

¹⁸Thank you very much for the great service, 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
```

❶ Downloading recent definitions

❷ Importing errata

- **-errata** - XML file path
- **-include-channels** - import for these channels
- **-publish** - publish errata afterwards

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 - Clean-up
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Kickstart automation

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

Kickstart automation

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

Kickstart automation

Examples

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

- Downloads CentOS 6.5, x86_64 and creates a 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
- Pre-existing files are overwritten, no output

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Clean-up

- All tasks executed using Spacewalk are documented as actions
- This also includes automated tasks (e.g. checking deployed configurations)!
- Additional researching is often not required, deleting actions is often forgotten
- **Result:** the database is full of unneeded information!



Clean-up

- `arsa` can help you!
- Python tool for archiving and deleting actions
- Good idea to run as cronjob, e.g. weekly execution
- Download at <https://github.com/stdevl/arsa>



Clean-up

Examples

```
./arsa.py -l
```

- Lists all completed actions (dry-run)

```
./arsa.py -rf
```

- Archives completed and failed actions
- Deletes all 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
- There must be a way to automate this. . .

Patch reporting

- `satprep` can help you!
- Python toolkit for creating detailed patch reports per host
- Reports are created as PDF using $\text{T}_{\text{E}}\text{X}$
- Lists patch-relevant and also general system information
- Download at

<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	<input type="checkbox"/>	Cluster system	<input checked="" type="checkbox"/>	Update operating system	<input checked="" type="checkbox"/>	Update application	<input type="checkbox"/>
Hardware change	<input type="checkbox"/>	Other tasks (please specify)					

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

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 and patch information: `./satprep_snapshot.py`
- 2 Patching and rebooting systems if necessary
- 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

Additional meta information are captured using custom info keys:

- `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 can be customized:

- Potrait / landscape
- Company logo
- Selecting particular system, patch and errata information
- A conventional T_EXdocument 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://www.github.com/stdevl>
mkelfs, arsa, satprep, ... tools.
Christian Stankowic
-  <http://red.ht/1mJA1q1>
Manage Solaris with Spacewalk and Red Hat Satellite
Christian Stankowic, Guest post in official Red Hat blog

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`