

Wie kann ich Software für eine Distribution paketieren?

Chemnitzer Linux-Tage

10. März 2018

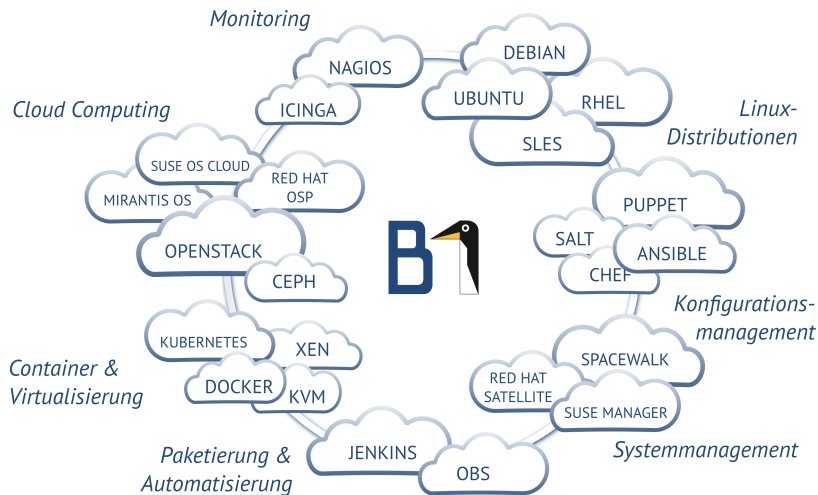


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Vorstellung B1 Systems

- gegründet 2004
- primär Linux/Open Source-Themen
- national & international tätig
- über 100 Mitarbeiter
- unabhängig von Soft- und Hardware-Herstellern
- Leistungsangebot:
 - Beratung & Consulting
 - Support
 - Entwicklung
 - Training
 - Betrieb
 - Lösungen
- Standorte in Rockolding, Köln, Berlin & Dresden

Schwerpunkte



Wie kann ich Software für eine Distribution
paketieren?



Einleitung

Agenda

- Möglichkeiten, um Software zu installieren
- Was sind Softwarepakete/-verwaltungen?
- Vorteile von Paketverwaltungen
- Was brauche ich zum Bau von Paketen?
- Paketieren mit dem Open Build Service

Möglichkeiten der Softwareinstallation

"Installationsvarianten"

- ohne Pakete:
 - `configure`, `make`, `make install`
 - Skripte, z.B. `install.sh`
 - manuelles Kopieren (`rsync`)
- Nutzung von Paketen

Installation

mit Paketen

Vorteile:

- Übersicht über installierte Software
- Unterstützung durch Paketverwaltungen/Metamanager
- Abhängigkeiten können berücksichtigt werden
- Validierung der Dateien möglich
- ...

Nachteile:

- (evtl.) Verzug bis neueste Software paketiert ist



Softwarepakete

Ian Murdock über Paketmanager

The single biggest advancement Linux has brought to the industry

Vorteile von Paketen

- definierbare Abhängigkeiten
- Datenbank aller installierten Pakete
- Zuordnung Datei ↔ Paket
- Validierung/Verifizierung der Dateien auf Veränderungen
- Routinen für Installation/Deinstallation

Paketaufbau

Pakete bestehen aus:

- Metainformationen
- Dateiarchiv
- Skripten

Metainformationen

RPM:

```
$ rpm -qi apache2
Name       : apache2
Version    : 2.4.29
Release    : 6.1
Architecture: x86_64
Install Date: Sun 25 Feb 2018 04:44:47 PM CET
Group      : Productivity/Networking/Web/Servers
Size       : 4258239
License    : Apache-2.0
Signature  : RSA/SHA256, Wed 14 Feb 2018 11:33:20 AM CET, Key ID
            b88b2fd43dbdc284
Source RPM : apache2-2.4.29-6.1.src.rpm
Build Date : Mon 05 Feb 2018 01:00:00 PM CET
Build Host : lamb55
Relocations : (not relocatable)
Packager   : https://bugs.opensuse.org
Vendor     : openSUSE
URL        : http://httpd.apache.org/
Summary    : The Apache Web Server Version 2.4
Description :
.....
Distribution: openSUSE Tumbleweed
```

Metainformationen

DEB:

```
$ apt show apache2
Package: apache2
Version: 2.4.25-3+deb9u3
Priority: optional
Section: httpd
Maintainer: Debian Apache Maintainers <debian-apache@lists.debian.org>
Installed-Size: 591 kB
Provides: httpd, httpd-cgi
Pre-Depends: dpkg (>= 1.17.14)
Depends: init-system-helpers (>= 1.18~), lsb-base, procs, perl, mime-
support, apache2-bin (= 2.4.25-3+deb9u3), apache2-utils (= 2.4.25-3+
deb9u3), apache2-data (= 2.4.25-3+deb9u3), perl:any
Recommends: ssl-cert
Suggests: www-browser, apache2-doc, apache2-suexec-pristine | apache2-
suexec-custom
Conflicts: apache2.2-bin, apache2.2-common
Replaces: apache2.2-bin, apache2.2-common
Homepage: http://httpd.apache.org/
Tag: role::metapackage, suite::apache
Download-Size: 235 kB
APT-Manual-Installed: yes
APT-Sources: http://httpredir.debian.org/debian stretch/main amd64
Packages
Description: Apache HTTP Server
```

Metainformationen

Zugehörige Dateien:

```
$ rpm -ql apache2
/etc/apache2
/etc/apache2/charset.conv
/etc/apache2/conf.d
/etc/apache2/default-server.conf
...

$ dpkg -L apache2
/.
/etc
/etc/apache2
/etc/apache2/apache2.conf
/etc/apache2/conf-available
/etc/apache2/conf-available/charset.conf
...
```


Softwarepakete bauen

Softwarepakete bauen

Benötigte Dateien

RPM

osc-0.162.1.tar.gz
osc.changes
osc.spec

DEB

osc-0.162.1.tar.gz
debian/changelog

debian/control
debian/copyright
debian/rules

Beispiel RPM

SPEC Datei 1/2

```
Name:                osc
Version:             0.162.1
Release:             0
Summary:             Open Build Service Commander
License:             GPL-2.0+
Group:               Development/Tools/Other
Url:                 https://github.com/openSUSE/osc
Source:              %{name}-%{version}.tar.gz
BuildRoot:           %{_tmppath}/%{name}-%{version}-build
BuildRequires:       rpm-python
Requires:            rpm-python
BuildArch:           noarch
%description
Commandline client for the Open Build Service.
```

Beispiel RPM

SPEC Datei 2/2

```
%prep
%setup -q

%build
%install
python setup.py install --prefix=%{_prefix} --root=%{buildroot}
ln -s osc-wrapper.py %{buildroot}/%{_bindir}/osc
mkdir -p %{buildroot}%{osc_plugin_dir}
mkdir -p %{buildroot}%{_localstatedir}/lib/osc-plugins
install -Dm0644 dist/complete.csh %{buildroot}%{_sysconfdir}/profile.d/osc
    .csh
...

%clean
rm -rf %{buildroot}

%files
....
```

Vorbereitung

Buildhost vorbereiten

- Buildtools installieren
- Bauabhängigkeiten installieren
- Kontrolldateien vorbereiten

Buildtools

RPM

- rpmbuild
- weitere Abhängigkeiten

DEB

- build-essentials
- debhelper
- dh-make
- quilt
- fakeroot
- lintian
- weitere Abhängigkeiten

Verzeichnisstruktur 1/2

RPM

```
~/rpmbuild/BUILD
~/rpmbuild/BUILDROOT
~/rpmbuild/RPMS
~/rpmbuild/RPMS/aarch64
~/rpmbuild/RPMS/amd64
~/rpmbuild/RPMS/i586
~/rpmbuild/RPMS/noarch
~/rpmbuild/RPMS/x86_64
~/rpmbuild/SOURCES
~/rpmbuild/SOURCES/osc-0.162.1.tar.gz
~/rpmbuild/SOURCES/osc.changes
~/rpmbuild/SPECS
~/rpmbuild/SPECS/osc.spec
~/rpmbuild/SRPMS
```

Verzeichnisstruktur 2/2

DEB

```
cowsay -3.03+dfsg2
cowsay -3.03+dfsg2/cowsay .1
cowsay -3.03+dfsg2/ChangeLog
cowsay -3.03+dfsg2/INSTALL
cowsay -3.03+dfsg2/MANIFEST
cowsay -3.03+dfsg2/cowsay
cowsay -3.03+dfsg2/cows
cowsay -3.03+dfsg2/cows/luke-koala.cow
cowsay -3.03+dfsg2/cows/turtle.cow
cowsay -3.03+dfsg2/debian
cowsay -3.03+dfsg2/debian/compat
cowsay -3.03+dfsg2/debian/watch
cowsay -3.03+dfsg2/debian/patches
cowsay -3.03+dfsg2/debian/patches/head-in_tongue
cowsay -3.03+dfsg2/debian/copyright
cowsay -3.03+dfsg2/debian/docs
cowsay -3.03+dfsg2/debian/control
cowsay -3.03+dfsg2/debian/rules
cowsay -3.03+dfsg2/install.sh
cowsay -3.03+dfsg2/README
cowsay -3.03+dfsg2/LICENSE
cowsay -3.03+dfsg2/Wrap.pm.diff
cowsay -3.03+dfsg2/pgp_public_key.txt
```


Hilfstools

RPM

- RPM
 - rpmdev-newspec (rpmdevtools)
 - cpanspec
 - gem2rpm-opensuse
- DEB
 - dh_make
- quilt

Paketbau RPM

```
~/rpmbuild> rpmbuild -ba SPECS/osc.spec
...
Provides: config(osc) = 0.162.1-0 osc = 0.162.1-0
Requires(rpmlib): rpmlib(CompressedFileNames) <= 3.0.4-1 rpmlib(
  PayloadFilesHavePrefix) <= 4.0-1
Requires: /bin/bash /usr/bin/python python(abi) = 2.7
Checking for unpackaged file(s): /usr/lib/rpm/check-files /home/vagrant/
  rpmbuild/BUILDROOT/osc-0.162.1-0.x86_64
Wrote: /home/vagrant/rpmbuild/SRPMS/osc-0.162.1-0.src.rpm
Wrote: /home/vagrant/rpmbuild/RPMS/noarch/osc-0.162.1-0.noarch.rpm
Executing(%clean): /bin/sh -e /var/tmp/rpm-tmp.zdQPS8
+ umask 022
+ cd /home/vagrant/rpmbuild/BUILD
+ cd osc-0.162.1
+ rm -rf /home/vagrant/rpmbuild/BUILDROOT/osc-0.162.1-0.x86_64
+ exit 0
```

Paketbau DEB (unsignedes Paket)

```
cowsay-3.03+dfsg2> debuild -uc -us -b
cowsay-3.03+dfsg2> ls -l ../
cowsay-3.03+dfsg2
cowsay-off_3.03+dfsg2-4_all.deb
cowsay_3.03+dfsg2-4_all.deb
cowsay_3.03+dfsg2-4_amd64.buildinfo
cowsay_3.03+dfsg2-4_amd64.changes
```

Demo

RPM Paketbau

Demo

DEB Paketbau

Bauen für Upstream

- Guidelines beachten:
 - openSUSE: https://en.opensuse.org/openSUSE:Packaging_guidelines
 - Debian: <https://www.debian.org/doc/manuals/maint-guide/>
 - Fedora: <https://fedoraproject.org/wiki/Packaging:Guidelines>

Beispiel: openSUSE

- Blacklist beachten https://en.opensuse.org/openSUSE:Build_Service_application_blacklist
- keine vorgebauten Binaries/Libraries einpacken
- Macros nutzen wo verfügbar (Pfade, Scriptaufrufe)



Open Build Service

Open Build Service

- Plattform zum Bau von u.a. Softwarepaketen zur Verfügung gestellt vom openSUSE-Projekt
- steht jedem frei zur Verfügung zur kostenlosen Benutzung
- stellt automatisch Repositories zur Verfügung
- ermöglicht die Teilhabe an Paketpflege der openSUSE-Distribution

Features

- unterstützt Paketbau für verschiedene Distributionen
- stellt automatisch Repositories zur Verfügung
- unterstützt Bau von Images
- bietet Möglichkeiten zur Automatisierung
- gebaute Pakete werden am Ende des Bauvorgangs getestet
- baut Pakete automatisch neu bei Änderung in Abhängigkeiten
- reproduzierbare Builds, Buildenvironment kann wiederholt aufgebaut werden

Open Build Service

- öffentliche Instanz: <https://build.opensuse.org>
- kann lokal installiert werden

Open Build Service

collaboration Features

- Rechtevergabe auf Projekt-/Paketlevel
- Mitarbeit über Submitrequests jedem möglich

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[Community](#)
[Development](#)

[Watchlist](#)

[opensUSE Build Service](#)

[cschneemann | Home Project | Logout](#)

Welcome to opensUSE Build Service

The opensUSE Build Service is the public instance of the [Open Build Service \(OBS\)](#) used for development of the opensUSE distribution and to offer packages from same source for Fedora, Debian, Ubuntu, SUSE Linux Enterprise and other distributions...

Please find further details of this service on our [wiki pages](#)

This instance offers a special [package search interface](#). Users of any distribution can search their for built packages for their distribution. For developers it is an efficient place to build up groups and work together through its project model.

Your Home

All Projects

Search

New Project

Status Monitor

New Image

System Status

The above graphs show the number of active build jobs last week, currently 967 of 1189 build hosts are busy building packages. At the moment 82411 packages are waiting on the different architectures.

opensUSE Build Service hosts 49,431 projects, with 440,665 packages, in 76,996 repositories and is used by 50,528 confirmed developers.

Sponsor

Enabling today. Inspiring tomorrow.

Announcements

[adrianSuSE](#) wrote about 8 hours ago

We may be not reachable for short times this saturday, 10th March due to network maintenance work.

[adrianSuSE](#) wrote 13 days ago

We deploy speed improvements for the scheduler. Due to the potential risk of a regression, we do this in steps. Currently only active for home projects.

[adrianSuSE](#) wrote 5 months ago

Ubuntu 17.10 got added

[adrianSuSE](#) wrote 5 months ago

There will be a power outage in our server room next weekend, 14-15 October. OBS will be offline during that time!

Latest Updates

- [python-supervisor](#) now
- [no-zeromq](#) now
- [test-DVD-aB6_64](#) now
- [libopenshot-audio](#) now

B1 Systems GmbH

Softwarepaketierung

37/48

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[opensUSE Build Service > Projects](#)
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Main Projects

[openSUSE Factory](#): The next openSUSE distribution
[openSUSE Maintenance](#): The openSUSE Maintenance project

Public Projects

Include home projects [Create new project](#)
 Show entries Search:

Name	Title
openSUSE Leap	openSUSE Leap
openSUSE Leap 15.0	openSUSE Leap 15.0
openSUSE Leap 15.0 Images	
openSUSE Leap 15.0 Images: ToTest	openSUSE Leap 15.0 Test Snapshots
openSUSE Leap 15.0 Non-Free	Non Free parts of openSUSE Leap 15.0 distribution.
openSUSE Leap 15.0 Non-Free Update	Online updates for openSUSE Leap 15.0 Non-Free
openSUSE Leap 15.0 Ports	
openSUSE Leap 15.0 Ports Staging	openSUSE Leap 15.0 Ports Staging
openSUSE Leap 15.0 Ports: ToTest	openSUSE Leap 15.0 Ports Test Snapshots
openSUSE Leap 15.0 Rings	
openSUSE Leap 15.0 Rings: 0-Bootstrap	The bootstrap cycle of factory
openSUSE Leap 15.0 Rings: 1-MinimalX	2nd ring based on Bootstrap and building minimalX DVD
openSUSE Leap 15.0 Rings: 2-TestDVD	A pretty much complete DVD
openSUSE Leap 15.0 SLE-workarounds	SLE packages in Leap with workarounds
openSUSE Leap 15.0 Staging	openSUSE Leap 15.0 Staging
openSUSE Leap 15.0 Staging A	skelcd-control-openSUSE
openSUSE Leap 15.0 Staging A DVD	
openSUSE Leap 15.0 Staging: ad-1	libguestfs
openSUSE Leap 15.0 Staging: ad-10	h323plus
openSUSE Leap 15.0 Staging: ad-104	nagios-rpm-macros
openSUSE Leap 15.0 Staging: ad-105	perl-OpenGL_tomoe-gtk
openSUSE Leap 15.0 Staging: ad-108	kernel-coverage
openSUSE Leap 15.0 Staging: ad-11	jrnlb, jthread
openSUSE Leap 15.0 Staging: ad-111	pgadmin3
openSUSE Leap 15.0 Staging: ad-116	container-diff

Showing 1 to 25 of 150 entries (Filtered from 2,313 total entries) [Previous](#) [Next](#)

Downloads Support Community Development Watchlist

openSUSE Build Service > Projects > openSUSE:Leap.15.0 > Overview cschneemann | Home Project | Logout

Overview Repositories Monitor Requests Users Subjects Advanced

openSUSE Leap 15.0

No description set

Request role addition Request deletion

78 build errors
 1 Release Target
 254 open requests
 2 linking projects

Packages (11703)

Show 25 entries Search:

Name	Changed
abiword	3 months ago
abiword-docs	3 months ago
abook	3 months ago
abotimg	3 months ago
acarsdec	a month ago
acbuild	a month ago
accerciser	a month ago
accountsservice	2 months ago
acct	3 months ago
ack	a month ago
acl	5 months ago
acpi	3 months ago
acpica	a month ago
acpid	3 months ago
acklibd	3 months ago
adaptec-firmware	6 months ago
adaptx	3 months ago
adidaswatch	3 months ago
adina-th-fonts	3 months ago
adimex	6 months ago
adminer	14 days ago
adms	3 months ago
adns	3 months ago
adobe-sourcecodepro-fonts	6 months ago
adobe-sourcehansans-fonts	3 months ago

Showing 26 to 50 of 11,703 entries Previous Next

Build Results

Category	Package	Status	Count
images	i586	disabled	9687
	i586	excluded	2166
	local	succeeded	4
ports	x86_64	disabled	4
	x86_64	excluded	11845
	x86_64	disabled	4
ports	aarch64	disabled	11853
	armv6l	disabled	11853
	ppc	disabled	11853
	ppc64	disabled	11853
standard	i586	succeeded	2084
	i586	failed	1
	i586	unresolvable	41
	i586	disabled	9687
	i586	excluded	40
standard	x86_64	succeeded	11864
	x86_64	failed	31
	x86_64	unresolvable	5
standard	x86_64	disabled	4
	x86_64	excluded	149

Downloads Support Community Development Watchlist

openSUSE Build Service > Projects > openSUSE:Leap.15.0 > osc cschneemann | Home Project | Logout

Overview Repositories Revisions Requests Users Advanced

openSUSE Build Service Commander

[Download package](#)

Commandline client for the openSUSE Build Service.

See <http://en.opensuse.org/openSUSE:OSC>, as well as http://en.opensuse.org/openSUSE:Build_Service_Tutorial for a general introduction.

[Branch package](#) [Submit package](#) [Request role addition](#) [Request deletion](#)

Source Files

Show entries Search:

Filename	Size	Changed	Actions
_service	447 Bytes	3 months ago	Download
appimage.yml	1.04 KB	9 months ago	Download
debian.changelog	41.5 KB	3 months ago	Download
debian.tar.gz	2.16 KB	8 months ago	Download
osc-0.162.1.tar.gz	344 KB	3 months ago	Download
osc.changes	94.5 KB	3 months ago	Download
osc.dic	209 Bytes	3 months ago	Download
osc.spec	4.81 KB	3 months ago	Download
PKGBUILD	400 Bytes	3 months ago	Download

Showing 1 to 9 of 9 entries [Previous](#) [Next](#)

Latest Revision

[Yuchen Lin \(maxlin_factory\)](#) accepted request 555853 [3 months ago](#) (revision 3)
Automatic request from SUSE-SLE-15-GA by UpdateCrawler

[Files changed](#) [Browse Source](#)

Comments for openSUSE:Leap.15.0 (0)

Add a new comment (markdown markup supported)

[Add comment](#)

Build Results **Rpmlint Results**

OSC

images

- [local](#) [excluded](#)
- [i586](#) [disabled](#)

ports

- [x86_64](#) [excluded](#)
- [ppc64](#) [disabled](#)
- [ppc](#) [disabled](#)
- [armv6l](#) [disabled](#)
- [s390x](#) [disabled](#)

standard

- [x86_64](#) [succeeded](#)
- [i586](#) [disabled](#)

Source Files (show unmerged sources)

Show entries Search:

Filename	Size	Changed	Actions
_service	447 Bytes	3 months ago	
appimage.yml	965 Bytes	3 months ago	
debian.changelog	41.5 KB	3 months ago	
debian.tar.gz	2.16 KB	8 months ago	
osc-0.162.1.tar.gz	344 KB	3 months ago	
osc.changes	94.5 KB	3 months ago	
osc.dsc	209 Bytes	3 months ago	
osc.spec	4.81 KB	3 months ago	
PKGBUILD	490 Bytes	3 months ago	

Showing 1 to 9 of 9 entries

Previous Next

Latest Revision

Adrian Schrotter (adrianSuSE) committed 3 months ago (revision 264)
[simplify](#)

Files changed Browse Source

Build Results **Rpmsint Results**

osc

Appimage	i586	unresolvable
	x86_64	failed
Appimage.arm	armv7l	failed
	aarch64	failed
Arch	i586	unresolvable
	x86_64	unresolvable
CentOS_5	i586	failed
	x86_64	failed
CentOS_6	i586	successful
	x86_64	successful
CentOS_7	x86_64	successful
Debian_5.0	i586	successful
	x86_64	successful
Debian_7.0	i586	successful
	x86_64	successful
Debian_8.0	i586	successful
	x86_64	successful
Debian_9.0	i586	successful
	x86_64	successful
	aarch64	successful
Debian_Next	i586	successful
	x86_64	successful
Fedora_19	i586	successful
	x86_64	successful
Fedora_20	i586	successful
	x86_64	successful
Fedora_21	i586	successful
	x86_64	successful
Fedora_22	i586	successful
	x86_64	successful
Fedora_23	i586	successful
	x86_64	successful
Fedora_24	i586	successful
	x86_64	successful
Fedora_25	i586	successful
	x86_64	successful
	armv7l	successful
	aarch64	successful
Fedora_26	i586	successful
	x86_64	successful

Ablauf des Bauvorgangs

- 1 Job wird erstellt mit allen Abhängigkeiten
- 2 Job wird einem Worker zugewiesen
- 3 Buildroot wird innerhalb einer VM/eines Containers erstellt
- 4 ... Bauvorgang ...
- 5 fertiges Paket wird extrahiert und an Backend übertragen
- 6 Online Repository wird erstellt/aktualisiert

Interaktionsmöglichkeiten

- Webinterface (<https://build.opensuse.org>)
- Kommandozeilenclient: `osc`
- API

osc Features

- interagiert über API mit Buildservice
- bedient sich „svn nah“
- verschiedene Buildroots möglich:
 - chroot (default)
 - kvm (`-vm-type=kvm -vm-memory=MEMORY` in MB)

osc 1/3

Paket bauen

```
> osc co openSUSE:Tools osc
> cd openSUSE:Tools/osc
appimage.yml
debian.changelog
debian.tar.gz
osc-0.162.1.tar.gz
osc.changes
osc.dsc
osc.spec
PKGBUILD
_service
openSUSE:Tools/osc > osc build openSUSE_Factory x86_64
openSUSE:Tools/osc > osc build Debian_7.0 x86_64
openSUSE:Tools/osc > osc build --vm-type=kvm --vm-memory=4096 Debian_7.0
x86_64
```

osc 2/3

RPM Paket bauen

```
> osc co openSUSE:Tools osc
> cd openSUSE:Tools/osc
openSUSE:Tools/osc > osc build openSUSE_Factory x86_64

[ 44s] RPMS/noarch/osc-0.162.1-230.3.noarch.rpm
[ 44s] SRPMS/osc-0.162.1-230.3.src.rpm
[ 44s] OTHER/_statistics
[ 44s] OTHER/rpmlint.log
```

osc 3/3

DEB Paket bauen

```
> osc co openSUSE:Tools osc
> cd openSUSE:Tools/osc
openSUSE:Tools/osc > osc build Debian_9.0 x86_64

...
/var/tmp/build-root/Debian_7.0-x86_64/usr/src/packages/SOURCES.DEB/osc_0
.162.1.dsc
/var/tmp/build-root/Debian_7.0-x86_64/usr/src/packages/SOURCES.DEB/osc_0
.162.1.orig.tar.gz
/var/tmp/build-root/Debian_7.0-x86_64/usr/src/packages/SOURCES.DEB/osc_0
.162.1.diff.gz

/var/tmp/build-root/Debian_7.0-x86_64/usr/src/packages/DEBS/osc_0.162.1
_all.deb
```

Vielen Dank für Ihre Aufmerksamkeit!

Bei weiteren Fragen wenden Sie sich bitte an info@b1-systems.de
oder +49 (0)8457 - 931096