



RPM Basics

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VM Workshop 2015

What is RPM?

- Red Hat Package Manager
- Native package manager on RHEL, Fedora, SUSE, some Mandriva
- RPM/SRPM files contain binaries and/or source code

Why use RPM?

- Software installation and removal
- Configuration changes
- Same packing process for source, script, binary, config files, other
- For the end user



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“rpm” command

```
dharman centos7-x64 ~ $ rpm -qi rpm-build
Name       : rpm-build
Version    : 4.11.1
Release    : 25.el7
Architecture: x86_64
Install Date: Mon 15 Jun 2015 09:24:33 AM PDT
Group      : Development/Tools
Size       : 325755
License    : GPLv2+
Signature  : RSA/SHA256, Sat 14 Mar 2015 01:33:05 AM PDT, Key ID 24c6a8a7f4a80eb5
Source RPM : rpm-4.11.1-25.el7.src.rpm
Build Date : Thu 05 Mar 2015 09:27:41 PM PST
Build Host : worker1.bsys.centos.org
Relocations : (not relocatable)
Packager   : CentOS BuildSystem <http://bugs.centos.org>
Vendor     : CentOS
URL        : http://www.rpm.org/
Summary    : Scripts and executable programs used to build packages
Description:
The rpm-build package contains the scripts and executable programs
that are used to build packages using the RPM Package Manager.
dharman centos7-x64 ~ $
```



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“rpm” command

```
dharmman centos7-x64 ~ $ rpm -ql rpm-build | head -20
/usr/bin/gendiff
/usr/bin/rpmbuild
/usr/bin/rpmspec
/usr/lib/rpm/brp-compress
/usr/lib/rpm/brp-java-gcjcompile
/usr/lib/rpm/brp-python-bytecompile
/usr/lib/rpm/brp-python-hardlink
/usr/lib/rpm/brp-strip
/usr/lib/rpm/brp-strip-comment-note
/usr/lib/rpm/brp-strip-shared
/usr/lib/rpm/brp-strip-static-archive
/usr/lib/rpm/check-buildroot
/usr/lib/rpm/check-files
/usr/lib/rpm/check-prereqs
/usr/lib/rpm/check-rpaths
/usr/lib/rpm/check-rpaths-worker
/usr/lib/rpm/config.guess
/usr/lib/rpm/config.sub
/usr/lib/rpm/debugedit
/usr/lib/rpm/desktop-file.prov
dharmman centos7-x64 ~ $
```



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“rpm” command

```
dharman centos7-x64 ~ $ rpm -qa | grep rpm-build
rpm-build-libs-4.11.1-25.el7.x86_64
rpm-build-4.11.1-25.el7.x86_64
dharman centos7-x64 ~ $
```



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“rpm” command

```
dharman centos7-x64 ~ $ rpm -qf /usr/bin/rpmbuild
rpm-build-4.11.1-25.e17.x86_64
dharman centos7-x64 ~ $
```



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“rpm” command

```
dharman centos7-x64 ~ $ rpm -qpl rpmbuild/SRPMS/openssl-1.0.1e-42.el7.8.src.rpm
Makefile.certificate
README.FIPS
ec_curve.c
ectest.c
hobble-openssl
make-dummy-cert
openssl-0.9.6-x509.patch
openssl-0.9.8a-no-rpath.patch
openssl-0.9.8b-test-use-localhost.patch
openssl-0.9.8j-version-add-engines.patch
openssl-1.0.0-beta4-ca-dir.patch
openssl-1.0.0-beta5-enginesdir.patch
openssl-1.0.0-beta5-readme-warning.patch
openssl-1.0.0-timezone.patch
openssl-1.0.0c-rsa-x931.patch
openssl-1.0.0d-apps-dgst.patch
openssl-1.0.0d-xmpp-starttls.patch
openssl-1.0.0e-chil-fixes.patch
openssl-1.0.0e-doc-noeof.patch
openssl-1.0.1-beta2-dtls1-abi.patch
openssl-1.0.1-beta2-fips-md5-allow.patch
openssl-1.0.1-beta2-padlock64.patch
openssl-1.0.1-beta2-ssl-op-all.patch
```


Yum

- Uses RPM and provides additional package management functionality
- Install, delete, update, search, dependencies
- Pointed at repositories (local or external)

RPM build setup

```
$ sudo yum install rpm-build redhat-rpm-config
```

```
$ sudo yum install rpmlint make gcc
```

```
$ mkdir -p ~/rpmbuild/{BUILD,RPMS,SOURCES,SPECS,SRPMS}
```

```
$ echo '%_topdir %(echo $HOME)/rpmbuild' > ~/.rpmmacros
```

```
$ echo '%packager First Last <user@example.com>' >> ~/.rpmmacros
```



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RPM build setup

```
dharman centos7-x64 ~ $ cat .rpmmacros
%_topdir %(echo $HOME)/rpmbuild
%packager Dustin Harman <dharman@sinenomine.net>
dharman centos7-x64 ~ $ ls rpmbuild/
BUILD  BUILDROOT  RPMS  SOURCES  SPECS  SRPMS
dharman centos7-x64 ~ $
```

RPM build directory

%_topdir (set via ~/.rpmmacros)

- SOURCES
- SPECS
- RPMS
 - noarch
 - s390x...
- SRPMS
- BUILD

Spec file

- Tags
 - Name, Version, Release, Summary
 - Group, License, URL, SourceN, PatchN
 - Requires, BuildRequires
 - BuildRoot, BuildArch
- Scripts
 - %prep, %build, %install, %clean
- Other
 - %description
 - %files
 - %changelog

RPM Macros

- %setup
- %patchN
- %configure
- %{_bindir}...
- %config,%config(noreplace)
- %define

Conditionals

- `%ifarch s390x`
- `%ifnarch s390x`
- `%else`
- `%endif`

Generate patch files

```
$ cp -rp ./source ./source-new
```

[Make your changes to new source]

```
$ diff -ru ./source ./source-new >| ~/rpmbuild/SOURCES/source.patch
```

Patch1: source.patch

```
%patch1 -p0
```


“rpmbuild” command

- `rpmbuild -bs <specfile>`
 - Build source RPM
- `rpmbuild -bb <specfile>`
 - Build binary RPM
- `rpmbuild -ba <specfile>`
 - Build all RPMs (binary and source)
- `rpmbuild --rebuild <source rpm>`



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“rpmbuild” magic

- Requires
- Debuginfo packages

Debugging

- Check the rpmbuild/BUILD directory
- `rpm --eval %macro`
- `rpmlint`

Compatibility issues

- Third-party repositories
- Mock
- Hash algorithm changes

Yum Repository Creation

```
$ sudo yum install createrepo
```

```
$ createrepo /srv/example/repo
```

```
[examplerepo]
```

```
name = Example Repository
```

```
baseurl = file:///srv/example/repo/
```

```
baseurl = http://server/example/repo/
```



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Recommended reading

- rpm(8), rpmbuild(8), yum(8), createrepo(8)
- *Maximum RPM*: www.rpm.org/max-rpm



Spec file walkthrough and demo



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Questions?

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