RPM 101

The Red Hat Package Manager

An Introduction

Special Thanks

- Edward C.Bailey - Maximum RPM
- Dan Poirer - IBM
- Red Hat
- Others

RPM 101 Outline

- What is RPM and why should we use it
- Basic RPM functions
- Special Parameters or modifiers
- Directory layout and files
- Building packages and development
- The SPEC file

Why RPM ?

- RPM is a tool to manage applications and groups of applications.
- RPM packages can be verified prior to installation.
- RPM packages can be easily removed.
- Entire systems can be upgraded easily.
- RPM use can reduce the effort required to maintain and upgrade a system.

What is an RPM

- Binary packages - .rpm
  - Binary package
  - Platform specific
  - Precompiled and linked
- Source packages - .srpm
  - Source code - .src.rpm or .srpm
  - Not pre-compiled

Non-RPM application

- **`cc -o foobar foobar.c`**
- **`./configure ;make ;make install`**
- **`foobar.conf`** file editing
- Documentation installation
- Removal difficult
- A different method for different packages

Basic commands

- Install: **`rpm -i foobar.rpm`**
- Erase: **`rpm -e foobar`**
- Upgrade: **`rpm -U foobar.rpm`**
- Freshen: **`rpm -F`**
- Verify: **`rpm -V foobar.rpm`**
- Query: **`rpm -q`**

General options

- Verbose **`-v`**
- Very verbose **`-vv`**
- Alternate rpm root : **`--root <path>`**
- Alternate rpmrc file: **`--rcfile <rcfile>`**
- Alternate database: **`--dbpath <path>`**

RPM package install

- Download the package
  - binary - .rpm
  - source - .srpm or src.rpm
- Binary install: **`rpm -i foobar.rpm`**
- Source install: **`rpm -i foobar.srpm`**
  - Caution: Use a binary file download
- Can specify a URL for install over the ‘Net
  - **`rpm –i http://……`**

Install options

- Print hash marks: **`-h`** (or **`--hash`**)
- Installation tests only: **`--test`**
- Don't check dependencies: **`--nodeps`**
- Ignore package & file conflicts: **`--force`**
- Replace files from another package: **`--replacefiles`**
- Ignore package architecture: **`--ignorearch`**
- Ignore package operating system: **`--ignoreos`**

Install Hints

- Specify multiple packages on command line
- Order of install automatically determined by RPM
- One drawback: multiple dependencies are hard to determine
  - A->B->C->…

RPM -e foobar (Erase)

- Database checked for dependencies
- Pre-uninstall script executed
- Modified configuration files saved
- All package files deleted
- Post-uninstall script executed

Erase options

- Perform erase tests only: **`--test`**
- Don’t execute pre/post erase scripts: **`--noscripts`**
- Do not check for dependencies: **`--nodeps`**

Rpm -U foobar.rpm

- Package upgrade
- Old package is erased
- New package is installed
- All configuration files upgraded
- Old modified configuration files saved as **`file.rpmsave`**

Upgrade options

- Most options are the same as install.
- "Upgrade" to an older package:

  `--oldpackage`

  – Provides a "nice" way to back out when a upgraded package fails.
- Ignore file and package conflicts: **`--force`**

  – Make sure your backups are current !!!!

RPM package verification

- Verify package was correctly installed
  - Verify syntax: **`rpm -V foobar.rpm`**
- Verify package file has not been modified
  - **`rpm -K foobar.rpm`**
- PGP
  - Digital signature
  - PGP public and private keys

RPM Freshen

- **`rpm --freshen foobar.rpm`**
- **`rpm -F *`**
- A selective upgrade:
  - Upgrades only those packages currently installed

Information please

- **`rpm -q`** (or **`--query`**) options
  - Query selection by package
    - Package file: **`-p <file>`**
    - Package owning <file>: **`-f <file>`**
    - All packages: **`-a`**
    - group <group> **`-g <group>`**
    - Dependencies: **`--whatrequires`**

Query details

- Display the full package label
  - **`rpm -q -p foobar-1.1.2ac <null>`**
- Additional options
  - Summary: **`-i`**
  - List files in a package: **`-l`**(**`lc L`**)
  - List configuration files: **`-c`**
  - List documentation files **`-d`**
  - List files in a package w/state: **`-s`**

Miscellania

- Rebuild the rpm database: **`--rebuilddb`**
- Create new RPM database: **`--initdb`**
- Limit output: **`--quiet`**
- Help: **`--help`**
- Display rpm version: **`--version`**
- Extract file from package: **`rpmcpio`**

Files (RedHat)

- /etc/rpmrc
- /usr/src/redhat/SOURCES
- /usr/src/redhat/SPECS
- /usr/src/redhat/BUILD
- /usr/src/redhat/RPMS
- /usr/src/redhat/SRPMS

Files (SuSE)

- /usr/src/packages
- /usr/src/packages/BUILD
- /usr/src/packages/SOURCES
- /usr/src/packages/SPECS
- /usr/src/packages/RPMS
- /usr/src/packages/SRPMS

SPEC files

- Creating the Spec File
- The Preamble section
- The %prep Section
- The %build Section
- The %install Section
- The %files Section
- The install/uninstall scripts section
- The %clean section

Package build

- **`rpm -ba foobar.SPECS`**
- Results:
  - **`foobar.rpm`**
  - **`foobar.srpm`**
- Does the equivalent of:
  - **`./configure`**
  - **`make`**
  - **`make install –prefix=/var/<temp>`**
  - Builds binary and source packages
- Use **`rpm -i`** to then install

Spec File Contents

```
Name:          ucdsnmp
Copyright:     GPL
Version:       4.2.1
Release:       8
Summary:       UCD SNMP daemon
Group:         Networking/Daemons
URL:           http://sourceforge.net/projects/net-snmp
Provides:     snmp
Obsoletes:    snmp
#Requires:
Autoreqprov: on
BuildRoot:    /var/tmp/%{name}-root
Source:       ucd-snmp-%{version}.tar.bz2
Source1:      rc.config.snmp
Source2:      rc.ucd-snmp
Source3:      ucdsnmp.conf
Patch:        ucd-snmp-%{version}-destdir.dif
Patch1:       ucd-snmp-%{version}-linux.dif
Patch2:       ucd-snmp-%{version}-bufferoverflow.dif
Patch3:       ucd-snmp-%{version}-security.dif
Patch4:       ucd-snmp-%{version}-security2.dif
Patch5:       ucd-snmp-%{version}-security3.dif
Patch6:       ucd-snmp-%{version}-recvfrom.dif
```

Spec File Contents


```
%description
UCD SNMP daemon.

Authors:
--------
    Wes Hardaker <wjhardaker@ucdavis.edu>

SuSE series: n

%prep
%setup -q -n ucd-snmp-%{version}
%patch
%patch1 -p1
%patch2
%patch3 -p1
%patch4 -p1
%patch5 -p1
%patch6
```

Spec File Contents


```
%prep
%setup -q -n ucd-snmp-%{version}
%patch
%patch1 -p1
%patch2
%patch3 -p1
%patch4 -p1
%patch5 -p1
%patch6
```

Spec File Contents


```
%build
%{suse_update_config}
autoconf
CFLAGS="$RPM_OPT_FLAGS -D_GNU_SOURCE -I/usr/include/db1 -Wall"
\
        ./configure --prefix=/usr \
        --bindir=/usr/bin --sbindir=/usr/sbin \
        --with-sys-contact="root@localhost" \
        --with-logfile=/var/log/ucd-snmp.log \
        --with-mib-modules="host ucd-snmp/pass_persist" \
        --with-persistent-directory=/var/ucd-snmp \
        --with-sys-location="unknown" \
        --with-libwrap=/usr/lib/libwrap.a \
        --with-defaults \
        --enable-shared \
        --without-root-access \
        --mandir=%{_mandir}
make
```

Spec File Contents


```
%install
rm -Rf $RPM_BUILD_ROOT
mkdir -p $RPM_BUILD_ROOT/etc/init.d
mkdir -p $RPM_BUILD_ROOT/var/adm/fillup-templates
mkdir -p $RPM_BUILD_ROOT/usr/sbin
make DESTDIR=$RPM_BUILD_ROOT install
install -m 555 %{SOURCE1} $RPM_BUILD_ROOT/var/adm/fillup-
templates/rc.config.snmp
install -m 755 %{SOURCE2} $RPM_BUILD_ROOT/etc/init.d/snmpd
install -m 600 %{SOURCE3} $RPM_BUILD_ROOT/etc/ucdsnmpd.conf
ln -sf ../../etc/init.d/snmpd $RPM_BUILD_ROOT/usr/sbin/rcsnmpd
```

Spec File Contents


```
%{?suse_check}
%post
echo "Updating etc/rc.config..."
if [ -x bin/fillup ] ; then
  bin/fillup -q -d = etc/rc.config var/adm/fillup-
templates/rc.config.snmp
else
  echo "ERROR: fillup not found. This should not happen. Please
compare"
  echo "etc/rc.config and var/adm/fillup-
templates/rc.config.snmp and"
  echo "update by hand."
fi
# Create symbolic run level links during installation
sbin/insserv etc/init.d/snmpd
exit 0
%postun
# Rearrange run level symlinks after removing the init script
sbin/insserv etc/init.d/
exit 0
```

Spec File Contents

```
%files
%doc AGENT.txt COPYING ChangeLog EXAMPLE.conf EXAMPLE.conf.def
FAQ NEWS PORTING README README.cmu README.snmpv3 TODO
README.thread
%config(noreplace) /etc/ucdsnmpd.conf
%config /etc/init.d/snmpd
%config /var/adm/fillup-templates/rc.config.snmp
/usr/bin/*
/usr/include/ucd-snmp
/usr/lib/lib*.so
%doc %{_mandir}/man1/*.1.gz
%doc %{_mandir}/man3/*.3.gz
%doc %{_mandir}/man5/*.5.gz
%doc %{_mandir}/man8/*.8.gz
/usr/sbin/*
/usr/share/snmp
/var/ucd-snmp
```

References

- Maximum RPM, Taking the Red Hat Package Manager to the Limit,
  - By Edward C. Bailey
- Don Poiner, Software Engineer, IBM
  - Packaging software with RPM, Part 1, 2 and 3
    - http://www-106.ibm.com/developerworks/library/l-rpm1/
    - http://www-106.ibm.com/developerworks/library/l-rpm2/
    - http://www-106.ibm.com/developerworks/linux/library/l-rpm3.html
- The great folks @ RPM.org, http://www.rpm.org

- This presentation has been prepared and is licensed under the GNU GPL Version 2 license. Any or all slides may be used as needed.
- Good luck and fortunes as you use RPM
  - Anonymous