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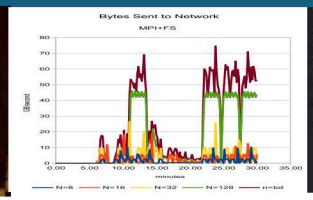
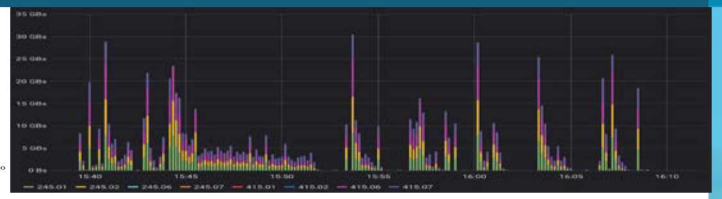
LDMS packaging: Moving from tribal knowledge to community knowledge





LDMSCON 2020

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Outline

- Motivation
- Where to find (or contribute) packaging methods for your platform

- Building rpms for a RHEL7 example
  - Changing which plugins you build

- Building rpms for TOSS3 example
  - Changing which sources you build from
  - Building in a private network

- Managing the repository

Why a distribution repository?

We want your recipe contributions because:

- *Packaging is a sport few get paid for, so*
  - we should amortize the time spent doing it across the community.
  - it must be done reproducibly***, with documentation***.

- Our LDMS community needs to share the build knowledge.

- Every likely build system is of interest.
  - E.g. expansion to Debian, spack, though there are other repositories for spack recipes.
  - Alternate packaging ***styles*** are also valuable.

OVIS packaging examples repository

https://github.com/ovis-hpc/distribution

- Directories, not branches.
- How-to documentation is required; build bot examples are necessarily incomplete.

RPM spec files capture all the specific dependencies of binary build, but

- Lack the details of getting code from git repository to tar file used in spec.
  - Need these, too. (Very recently LDMS 'release' tar files became usable)
- Are completely unportable (unless really ugly).
- Have huge similarities across platforms.
  - 'distribution' repo enables maintenance using graphical diff tools to compare recipes

A developer rpm build for RHEL 7

- So you want develop your own sampler or store and then test via rpm
  - You don't need all the other hpc bells & whistles enabled to develop yours.
  - First make sure the standard recipe works (your sudo usage may vary).

```
# git clone https://github.com/ovis-hpc/distribution.git ovis-distribution
# cd ovis-distribution/ovis-4.rhel7.base
# ./firesos                                  ;# handles downloading, tarring, launching rpmbuild for sos
# ./root-makerepo                            ;# move rpms generated to an rpm repo directory
# sudo rpm -Uvh ovis-local.repo/sosdb*rpm    ;# install sosdb
# ./fireldms                                 ;# handles downloading, tarring, rpmbuild for ldms
# ./root-makerepo                            ;# move rpms generated to an rpm repo directory
# sudo rpm -Uvh ovis-local.repo/ovis*.x86_64.rpm    ;# install ldms
```

Clone directory to ovis-4.rhel7.base.myplugin

```
File  Edit  View  Search  Terminal  Help
Cloning into 'ovis-distribution'...
done.
tmp # cd ovis-distribution/
ovis-distribution # ls
doc                                          ovis-4.toss3.base
OffGrid.md                                   README.md
ovis-4.rhel7.base                            support
ovis-4.toss3.atse-125.papi.llnllustre.sos    v3.4.13.toss3.base.mofed.rabbitmq
ovis-distribution # cp -ar ovis-4.rhel7.base ovis-4.rhel7.base.myplugin
ovis-distribution # cd ovis-4.rhel7.base.myplugin
ovis-4.rhel7.base.myplugin # # update the recipe name in the fire scripts
ovis-4.rhel7.base.myplugin # sed -i 's/ovis-4.rhel7.base/ovis-4.rhel7.base.myplugin/' fire*
ovis-4.rhel7.base.myplugin # ls
fireldms  firesos  inventory.sh  ldms.spec.in  README.md  root-makerepo  sos.spec.in
```

Then redo the rhel7 build following README

```
#./firesos
#./root-makerepo
#sudo rpm -Uvh ovis-local.repo/sosdb*rpm
#./fireldms
#./root-makerepo
#sudo rpm -Uvh ovis-local.repo/ovis*.x86_64.rpm
```

Changing the sampler plugins you build

- Edit ovis-distribution/ovis-4.rhel7.base.myplugin/fireldms

Line 80 or thereabouts defines list

```
SAMPLER_OPTS="
```

where you can add or edit the

```
--enable-$feature and --disable-$feature
```

flags you want.

For development/testing, disable everything you aren't testing to speed up the cycle.

Changing plugins for rhel7 in fireldms

File Edit View Search Terminal Help

```
"
SAMPLER_OPTS="
--enable-myplugin
--disable-cray_power_sampler
--disable-cray_system_sampler
--disable-aries-gpcdr
--disable-gpcdlocal
--disable-aries-mmr
--disable-ugni
--disable-perfevent
--disable-procdiskstats
--disable-atasmart
-- INSERT --                                    82,18         42%
```

Then redo the rhel7 build following README

```
#./firesos
#./root-makerepo
#sudo rpm -Uvh ovis-local.repo/sosdb*rpm
#./fireldms
#./root-makerepo
#sudo rpm -Uvh ovis-local.repo/ovis*.x86_64.rpm
```

Changing the repo or branch used for TOSS3

- cd ovis-distribution/ovis-4.toss3.base .
- edit **fireldms.**

Line 15 or nearby defines location

```
OVISREPO=https://github.com/ovis-hpc/ovis.git
```

Line 20 or nearby defines

```
ovis_branch=OVIS-4
```

  - Looks like the next slide
- Then ./fireovis & ./fireldms following ovis-4.toss3.base/README.md
  - This toss build recipe does **not** transfer configure pre-check arguments into ldms.spec like the ovis-4.rhel7.base recipe does.

- Edit **ldms.spec** `%configure` options to change plugins.

New source repo and branch in fireldms

File Edit View Search Terminal Help

```
packing=ovis-4.toss3.base

# each spec file has a corresponding PART. Change the part name if doing a new spec file for
other software.
PART=LDMS

# Place where we will find a repository to clone. may require setting http[s]_proxy in privat
e networks.
# In an isolated host, a clone pre-copied to a local file system should be used.
# OVISREPO=../../ovis
OVISREPO=https://github.com/baallan/ovis.git
#OVISREPO=https://github.com/ovis-hpc/ovis.git

# change OVISREPO and ovis_branch variables if you want to make local patches or
# test another ovis v4 development branch.
ovis_branch=OVIS-4-myplugin
                                                                    15,21         6%
```

How to build for TOSS3 in isolated networks

- Git makes this easy. Follow process at:
  https://github.com/ovis-hpc/distribution/blob/master/OffGrid.md
- Mirror the sources to your private host and untar it, then

```
# cd sources/distribution/ovis-4.toss3.base
```

- edit ./**fireldms**

Line 15 or nearby defines location

```
OVISREPO=https://github.com/ovis-hpc/ovis.git
```

use instead

```
OVISREPO=../../ovis
```

Then ./fireovis & ./fireldms following the local README.md

Mirroring process how-to from OffGrid.md

```
# mkdir sources
# cd sources
# git clone https://github.com/baallan/distribution.git
# git clone https://github.com/ovis-hpc/ovis.git
# git clone https://github.com/ovis-hpc/sos.git
# wget https://github.com/LLNL/ldms-plugins-
  llnl/releases/download/1.5/ldms-plugins-llnl-1.5.tar.gz
# cd ..
# tar czf sources.tar.gz sources
```

Changing repo to local mirror: ../../sources/*

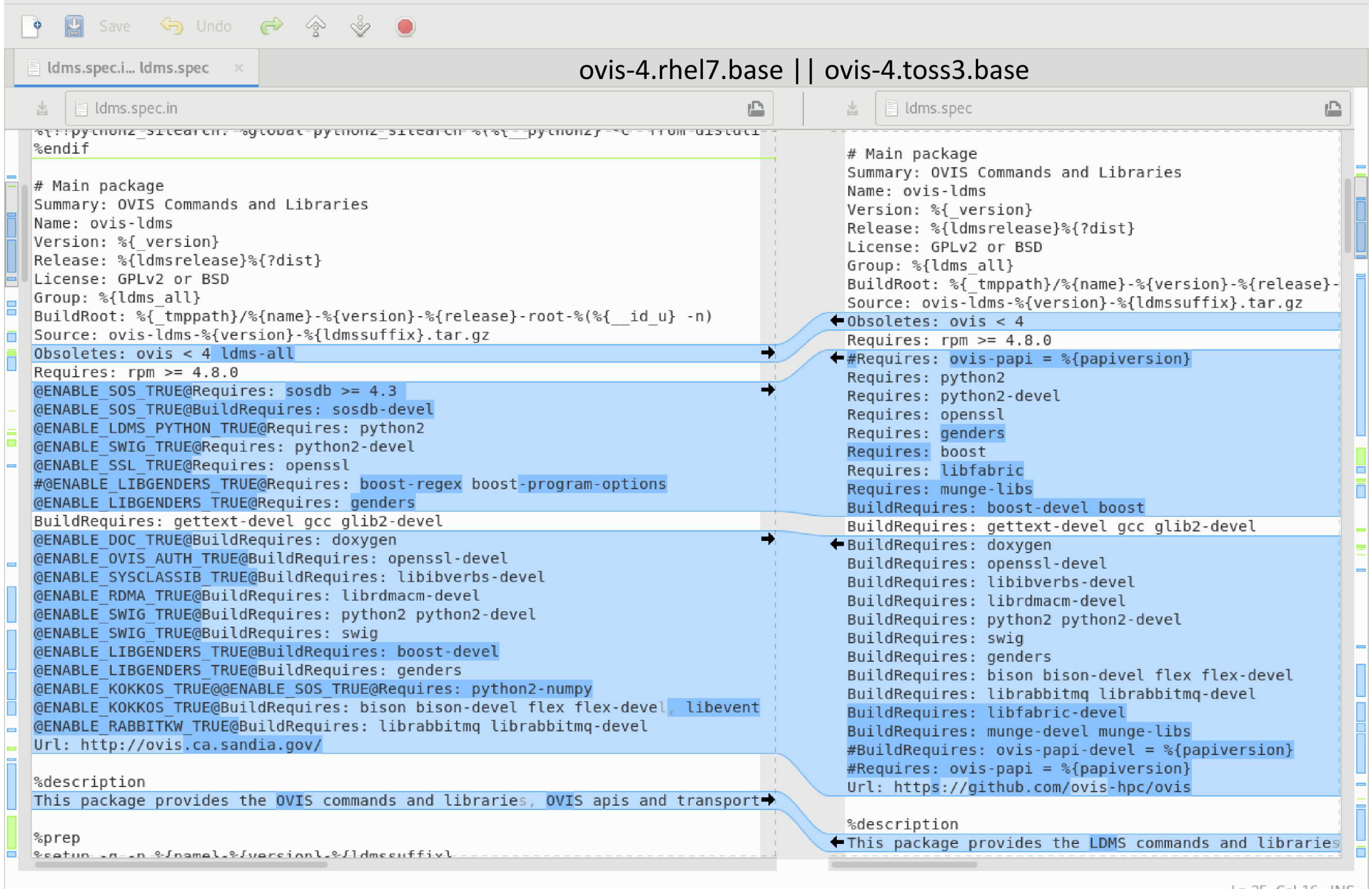
```
File  Edit  View  Search  Terminal  Help
packing=ovis-4.toss3.base

# each spec file has a corresponding PART. Change the part name if doing a new spec file for
other software.
PART=LDMS

# Place where we will find a repository to clone. may require setting http[s]_proxy in privat
e networks.
# In an isolated host, a clone pre-copied to a local file system should be used.
OVISREPO=../../ovis
#OVISREPO=https://github.com/ovis-hpc/ovis.git

# change OVISREPO and ovis_branch variables if you want to make local patches or
# test another ovis v4 development branch.
ovis_branch=OVIS-4

                                                                    13,18         6%
```

Comparing recipes for maintenance & learning

- Many recipes need the same change when a new configure option comes along.

- Often we want to know how a feature disabled in one recipe is enabled in another.
  - Often need not just `--enable-*` but some `--with-*=` arguments

- It’s all about dependencies, so a comparison example follows
  - Meld, kdiff3, vimdiff, or pick your favorite.


Save
Undo
ldms.spec.i... ldms.spec
ovis-4.rhel7.base || ovis-4.toss3.base
ldms.spec.in
ldms.spec
%endif
Main package
Summary: OVIS Commands and Libraries
Name: ovis-ldms
Version: %{_version}
Release: %{ldmsrelease}%{?dist}
License: GPLv2 or BSD
Group: %{ldms_all}
BuildRoot: %{_tmppath}/%{name}-%{version}-%{release}-root-%(%{__id_u} -n)
Source: ovis-ldms-%{version}-%{ldmssuffix}.tar.gz
Obsoletes: ovis < 4 ldms-all
Requires: rpm >= 4.8.0
@ENABLE_SOS_TRUE@Requires: sosdb >= 4.3
@ENABLE_SOS_TRUE@BuildRequires: sosdb-devel
@ENABLE_LDMS_PYTHON_TRUE@Requires: python2
@ENABLE_SWIG_TRUE@Requires: python2-devel
@ENABLE_SSL_TRUE@Requires: openssl
#@ENABLE_LIBGENDERS_TRUE@Requires: boost-regex boost-program-options
@ENABLE_LIBGENDERS_TRUE@Requires: genders
BuildRequires: gettext-devel gcc glib2-devel
@ENABLE_DOC_TRUE@BuildRequires: doxygen
@ENABLE_OVIS_AUTH_TRUE@BuildRequires: openssl-devel
@ENABLE_SYSCLASSIB_TRUE@BuildRequires: libibverbs-devel
@ENABLE_RDMA_TRUE@BuildRequires: librdmacm-devel
@ENABLE_SWIG_TRUE@BuildRequires: python2 python2-devel
@ENABLE_SWIG_TRUE@BuildRequires: swig
@ENABLE_LIBGENDERS_TRUE@BuildRequires: boost-devel
@ENABLE_LIBGENDERS_TRUE@BuildRequires: genders
@ENABLE_KOKKOS_TRUE@@ENABLE_SOS_TRUE@Requires: python2-numpy
@ENABLE_KOKKOS_TRUE@BuildRequires: bison bison-devel flex flex-devel, libevent
@ENABLE_RABBITKW_TRUE@BuildRequires: librabbitmq librabbitmq-devel
Url: http://ovis.ca.sandia.gov/
%description
This package provides the OVIS commands and libraries, OVIS apis and transport
%prep
Main package
Summary: OVIS Commands and Libraries
Name: ovis-ldms
Version: %{_version}
Release: %{ldmsrelease}%{?dist}
License: GPLv2 or BSD
Group: %{ldms_all}
BuildRoot: %{_tmppath}/%{name}-%{version}-%{release}-
Source: ovis-ldms-%{version}-%{ldmssuffix}.tar.gz
Obsoletes: ovis < 4
Requires: rpm >= 4.8.0
#Requires: ovis-papi = %{papiversion}
Requires: python2
Requires: python2-devel
Requires: openssl
Requires: genders
Requires: boost
Requires: libfabric
Requires: munge-libs
BuildRequires: boost-devel boost
BuildRequires: gettext-devel gcc glib2-devel
BuildRequires: doxygen
BuildRequires: openssl-devel
BuildRequires: libibverbs-devel
BuildRequires: librdmacm-devel
BuildRequires: python2 python2-devel
BuildRequires: swig
BuildRequires: genders
BuildRequires: bison bison-devel flex flex-devel
BuildRequires: librabbitmq librabbitmq-devel
BuildRequires: libfabric-devel
BuildRequires: munge-devel munge-libs
#BuildRequires: ovis-papi-devel = %{papiversion}
#Requires: ovis-papi = %{papiversion}
Url: https://github.com/ovis-hpc/ovis
%description
This package provides the LDMS commands and libraries

ovis-4.rhel7.base VS ovis-4.toss3.base

- Uses ldms configure in firerpms to control plugins and dependencies.
- Disables high speed network and other HPC samplers.
- Disables RabbitMQ stores.
- Disables slurm-related bits.

- Uses fixed dependencies and plugin list.
- Enables HPC samplers.
- Enables RabbitMQ stores.
- Enables slurm-related bits.
- Enables munge authentication.

We can look in the distribution repository instead of asking a mailing list or opening an issue to find out what options to use.

Development plans

Finish porting and documenting legacy recipes

- ovis-4.cle7.base: Cray Linux Environment 7.
- ovis-4.cle6.base: Cray Linux Environment 6.
- ovis-4.rhel7.sc: Redhat 7 Software Collections for /opt.

New stuff

- ovis-4.rhel7.base.opt_anaconda_3: RHEL 7 with non-RPM /opt/anaconda/3 .
- ovis-4.u18.base: Ubuntu 18 (20?).

And what else?

- Get community input for new recipes.
- RHEL 8 introduces containers.
  - May change how we package for large systems
    - Or not...
  - Waiting to see where TOSS 4 and CLE 8 are headed

- Give us your suggestions or questions on Github.
  https://github.com/ovis-hpc/distribution/issues