MARS Bundles

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ECMWF

Outline

- Packaging MARS server and client as “bundles”: what is this?
- MARS server bundle
- MARS client bundle
- Building and testing at ECMWF
- Future developments to improve deployment/maintenance

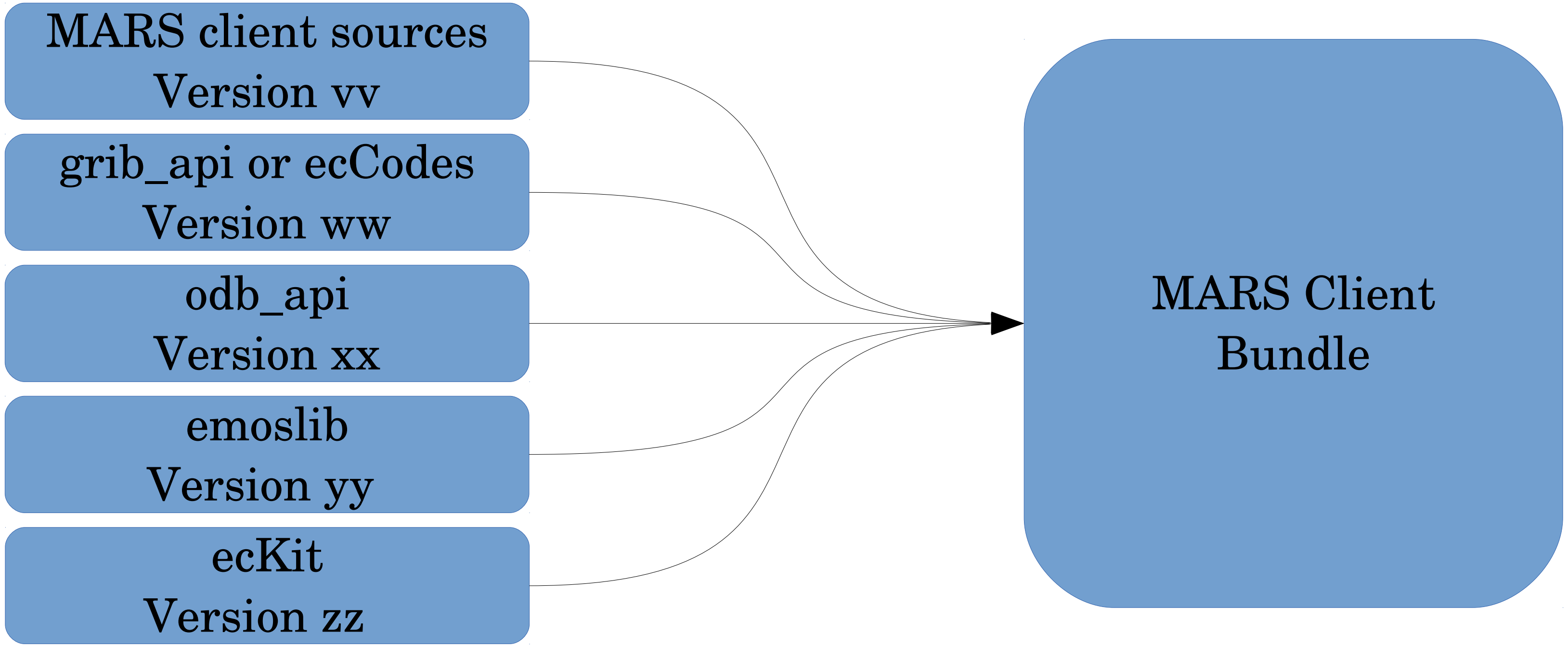
Requirements

- We would like to deploy often! → frequently, rapidly, consistently
- Controlled execution environment → as less influenced as possible by the external environment or users
- Separation of the components into building blocks → flexibility, separation of concerns
- Separate the configurations from the binaries/libraries → allow various release cycle lifetimes: configs vs binaries

to achieve this at ECMWF, we do bundles!

What is a bundle?

- Can be seen as a empty meta package like it is done in traditional package manager:
  - It contains a copy of the various components of the MARS client with a glue layer
  - Note that the configurations are excluded from the bundle



How is this implemented?

- MARS bundles are cmake projects pulling other cmake sub-projects and glue them together.
- At ECMWF, the bundles are coupled with git repositories and are able to pull each component from a git tag, a git branch or a git commit.
- We package the client and the server by pre-fetching the various components from our git repositories
- From the bundle, one can configure, compile and link the various bits together

MARS Server bundle 7.5.0.0

- The current components of the MARS server are:
  - `server: 7.5.0`
  - `grib_api: 1.14.5`
  - `odb_api: 0.10.2`
  - `ecKit: 0.6.2`
  - `ecBuild: 1.9.0`

- Minimum requirements:
  - `Cmake 2.8.11` (but ecbuild can fetch and build cmake for you!)

- You can always find out what are the component used by the server using the `marsadm` command “`version --long`”

configurations for the MARS server (`DHSHOME`)

- Mainly concerns the directories `admin`, `etc` and `mars` found in `$DHSHOME`.
- ECMWF provides "as is" template configurations and admin scripts and leaves to the external centres the responsibility to tailor these to their specific needs.
- 2 helper scripts "`setup_dhshome.pl`" and "`install_binaries`":
  - `setup_dhshome.pl` create a bare `DHSHOME` from scratch (templates) or can restore the specific `DHSHOME` of a core or a mover from a backup.
  - `install_binaries` takes care of fetching the binaries prepared by cmake/make and put them at the right place when the MARS server is down for maintenance or service session. (Never install the binaries with "make install" when the server is still running!!!)

MARS Client bundle 6.15.0.2

- The components of the MARS client are:
  - `client: 6.15.0`
  - `grib_api: 1.14.5`
  - `odb_api: 0.10.2`
  - `Libemos: 4.3.8`
  - `ecKit: 0.6.2`
  - `ecBuild: 1.9.0`

- The minimum requirements are:
  - `Cmake 2.8.11` (but ecbuild can fetch and build cmake for you!)

- The client always prints at the beginning of the execution what are the components it uses

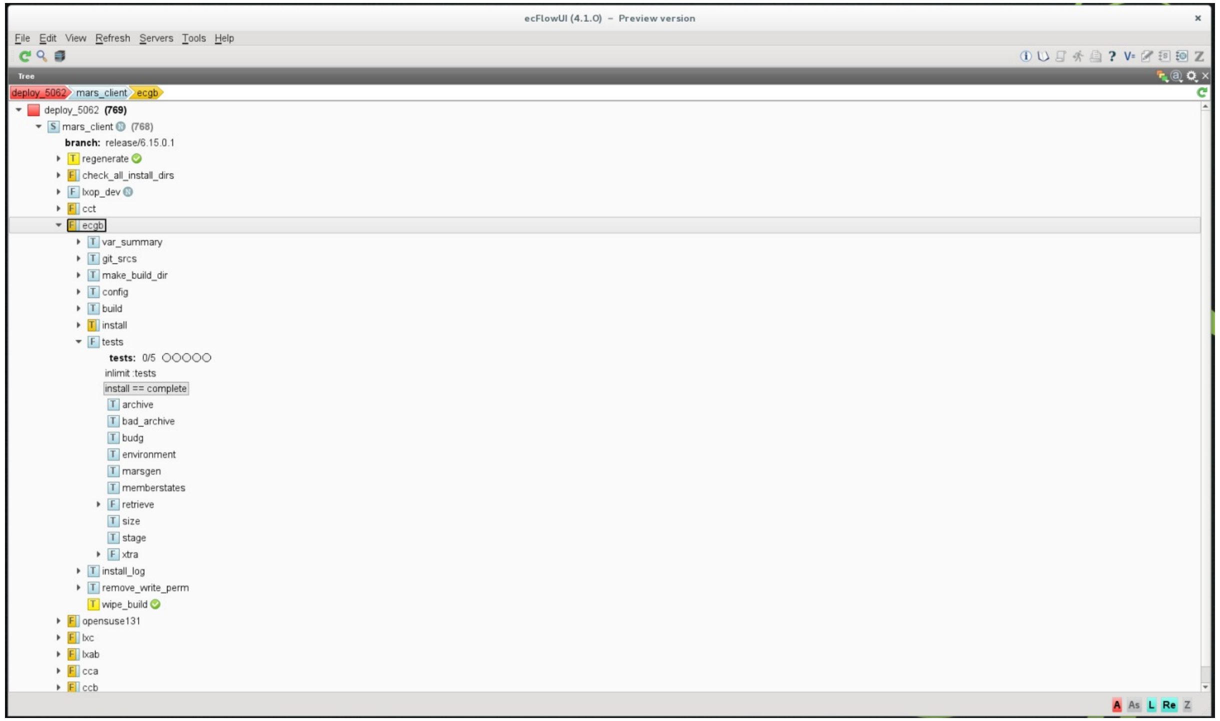
Configurations for the MARS client

- This concerns the directories where the language files, the list of MARS databases and the requests checks are stored.
- We keep in `/usr/local/apps/mars`:
  - 2 sets of configurations in `configs/prod` and `configs/test`
  - Several versions of the binaries/libraries in timestamped directories `versions/2016MMDDHHMMSS`

- This allows flexibility, fast switch between version and very good restore capability
- If you want to deploy the client as a "module":
  - don't make your mars client modules dependent on grib_api or libemos modules, build private copy with the bundle
  - make sure that your mars client wrapper de-reference any `GRIB_DEFINITION_PATH` (and other problematic environment variables) set by your users!

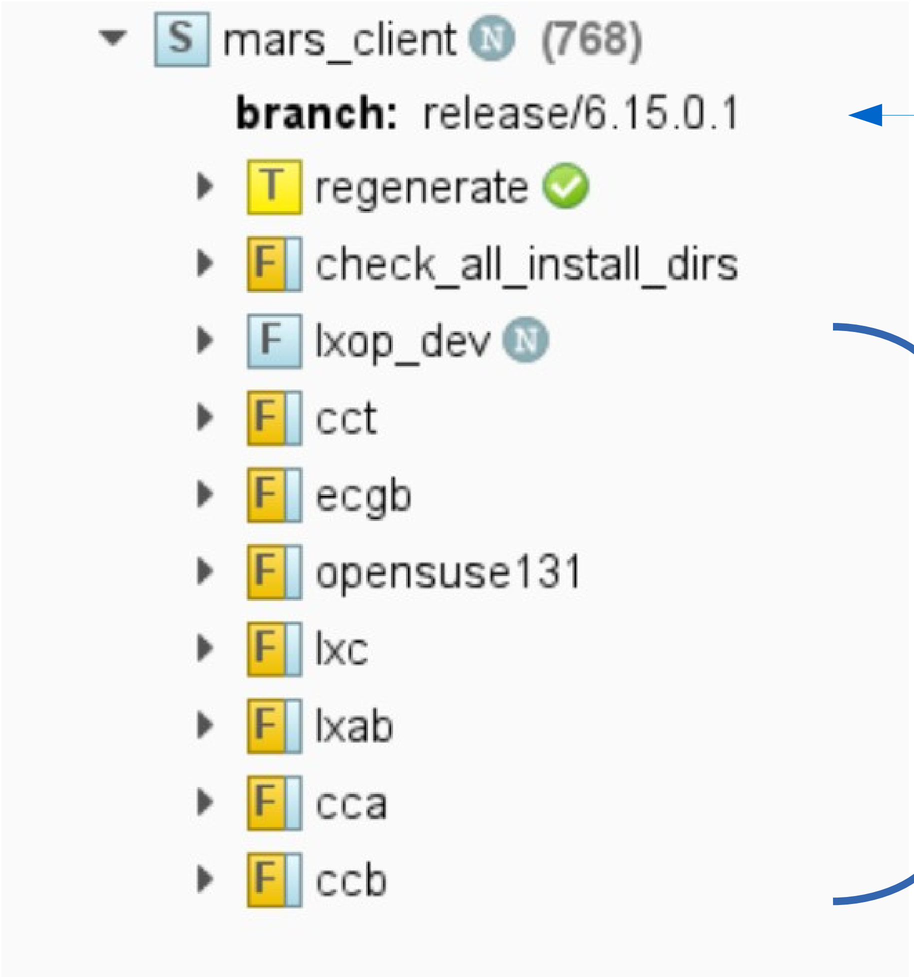
Building and testing at ECMWF

- We use an ecflow suite, called “metabuilder”, to build and test the MARS client on all our supported platforms: HPC (cca,ccb,cct), clusters (lxab,lxop,lxc, etc.) or workstations (opensuse, etc.)


ecFlowUI (4.1.0) – Preview version
File Edit View Refresh Servers Tools Help
Tree
deploy_5062 mars_client ecgb
A As L Re Z

```
deploy_5062 (769)
  S mars_client (768)
    branch: release/6.15.0.1
    T regenerate
    F check_all_install_dirs
    F lxop_dev
    F cct
    F ecgb
      T var_summary
      T git_srcs
      T make_build_dir
      T config
      T build
      T install
      F tests
         tests: 0/5 ○○○○○
        inlimit :tests
        install == complete
        T archive
        T bad_archive
        T budg
        T environment
        T marsgen
        T memberstates
        F retrieve
        T size
        T stage
        F xtra
      T install_log
      T remove_write_perm
      T wipe_build
    F opensuse131
    F lxc
    F lxab
    F cca
    F ccb
```

Building and testing the client at ECMWF (cont.)

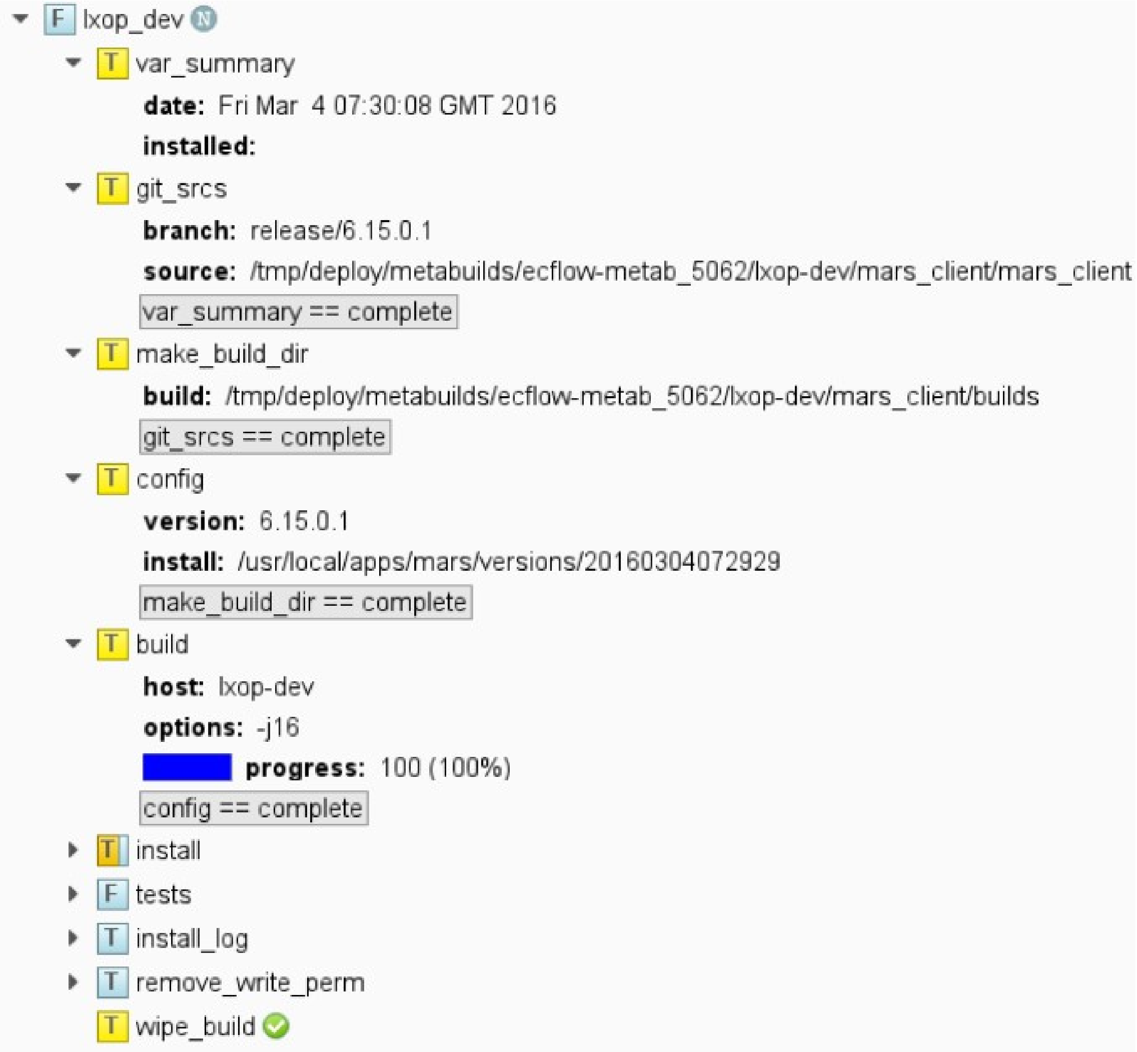


```
▾ S mars_client N (768)
    branch: release/6.15.0.1
  ▸ T regenerate ✓
  ▸ F check_all_install_dirs
  ▸ F lxop_dev N
  ▸ F cct
  ▸ F ecgb
  ▸ F opensuse131
  ▸ F lxc
  ▸ F lxab
  ▸ F cca
  ▸ F ccb
```

Git branch (or tag, commit)

Platforms to deploy/test

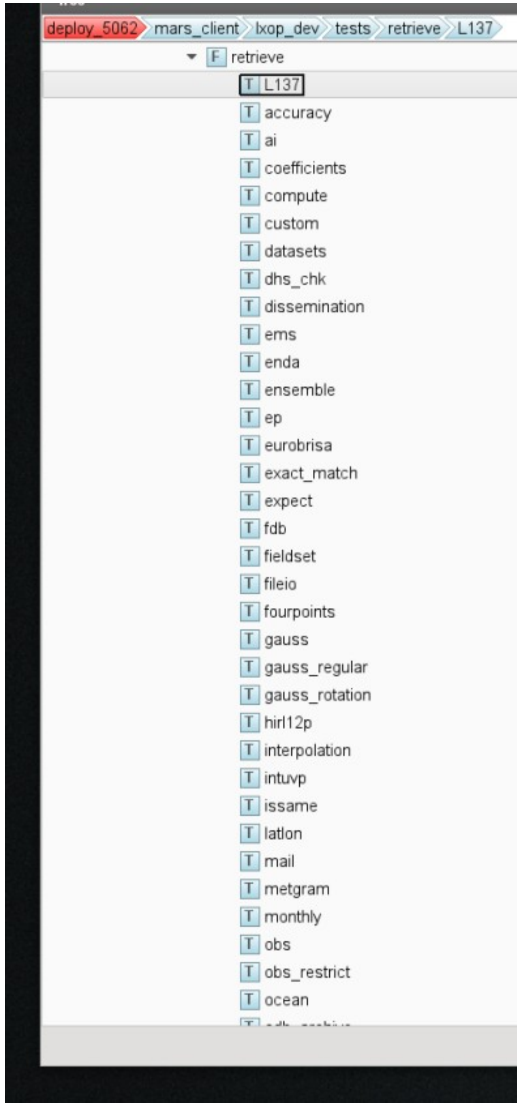
Building and testing the client at ECMWF (cont.)



```
▼ F lxop_dev N
    ▼ T var_summary
          date: Fri Mar  4 07:30:08 GMT 2016
          installed:
    ▼ T git_srcs
          branch: release/6.15.0.1
          source: /tmp/deploy/metabuilds/ecflow-metab_5062/lxop-dev/mars_client/mars_client
          var_summary == complete
    ▼ T make_build_dir
          build: /tmp/deploy/metabuilds/ecflow-metab_5062/lxop-dev/mars_client/builds
          git_srcs == complete
    ▼ T config
          version: 6.15.0.1
          install: /usr/local/apps/mars/versions/20160304072929
          make_build_dir == complete
    ▼ T build
          host: lxop-dev
          options: -j16
          ■ progress: 100 (100%)
          config == complete
    ▶ T install
    ▶ F tests
    ▶ T install_log
    ▶ T remove_write_perm
      T wipe_build ✓
```

Various tasks of the building process, here for cluster lxop_dev

Building and testing the client at ECMWF (cont.)



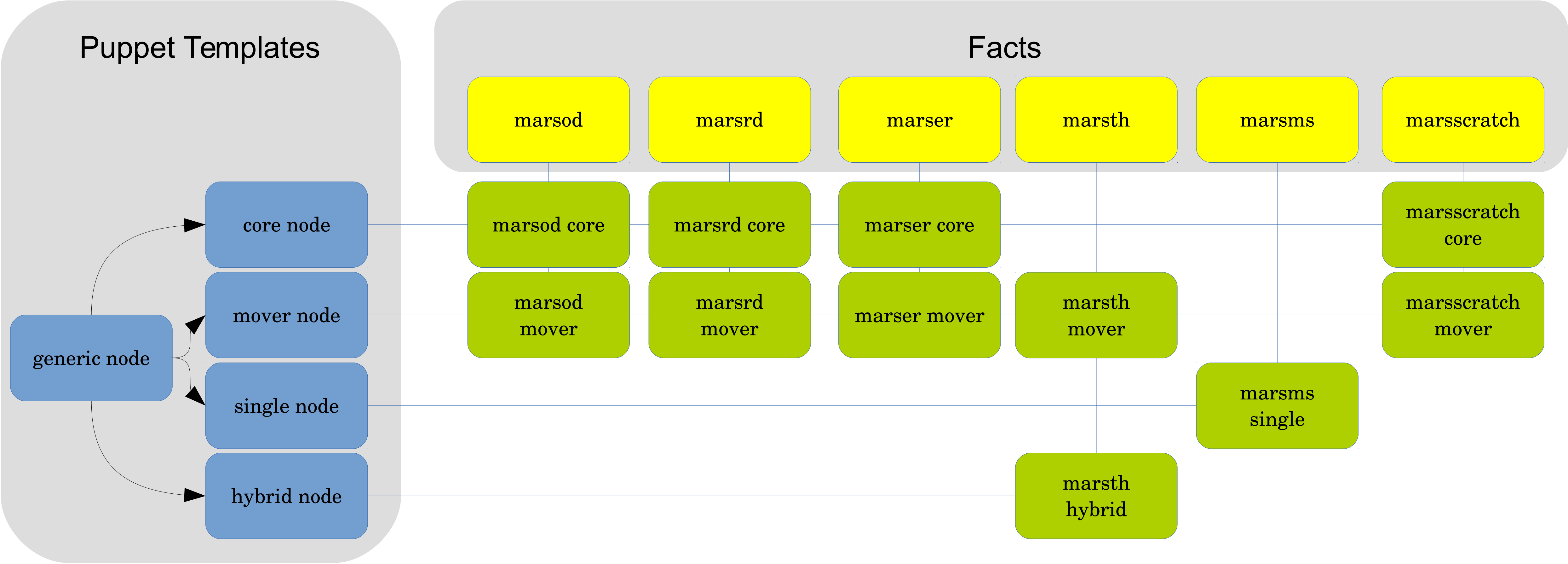
deploy_5062 > mars_client > lxop_dev > tests > retrieve > L137

```
▾ F retrieve
    T L137
    T accuracy
    T ai
    T coefficients
    T compute
    T custom
    T datasets
    T dhs_chk
    T dissemination
    T ems
    T enda
    T ensemble
    T ep
    T eurobrisa
    T exact_match
    T expect
    T fdb
    T fieldset
    T fileio
    T fourpoints
    T gauss
    T gauss_regular
    T gauss_rotation
    T hirl12p
    T interpolation
    T intuvp
    T issame
    T latlon
    T mail
    T metgram
    T monthly
    T obs
    T obs_restrict
    T ocean
    T odb_archive
```

tests!!!
many tests!
then more tests,
then even more tests!

Future for the server configurations: puppet

- Manage by puppet because it becomes unmanageable with a simple script like `setup_dhshome.pl`



Questions?