Deploying EPICS Applications with rsync-dist

Benjamin Franksen, Götz Pfeiffer

Helmholtz-Zentrum Berlin für Materialien und Energie

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Task: deploy EPICS application's build results to remote servers

- deploy only what's needed (configurable, e.g. `db`, `dbd`, `bin`, `iocBoot`, ...)
- allow incremental update (i.e. one IOC at a time)
- easy fallback to previous versions
- (but don't waste too much disk space)
- conveniently install test and debug versions
  - scientific facilities often contain unique / prototype devices
- light-weight usage
  - don't require developers to invent names or log messages
  - no (explicit) login, execute from the command line inside developer's source tree

rsync-dist: a minimalistic approach

- the basic idea
  - deployed version = directory
  - version name = timestamp
  - symbolic name = symlink to version
- log files on server side and locally in user's home for auditing
- use `ssh` and the `ssh-agent` for password-less authorization and authentication
- reduce disk space overhead by sharing identical files: remotely, via ssh
  - create a recursive hard-linked copy of the version last distributed by this user
  - then *pull* new build artefacts using `rsync -a --delete` from the developer's directory
  - `rsync` does the right thing here: existing identical files are left alone, otherwise old version is removed before copying

Commands

`rsync-dist -c CONFIGFILE dist`

- create a unique new version (directory) in the form of a time stamp e.g. `2019-05-02T15:11:16`

`rsync-dist -c CONFIGFILE change-links -L NAME`

- change the symbolic link `NAME` to the last version distributed by this user
- used to *activate* a new version for some IOC

`rsync-dist -c CONFIGFILE change-links VERSION,NAME`

- change the symbolic link `NAME` to the given `VERSION`
- used for *fallback* to a previous version

Example of a configuration file

```
> cat configure/rsync-dist.IOC.config
RSYNC_DIST_HOST=iocadm@nfs.mlscs
RSYNC_DIST_PATH=/opt/IOC/MLS-Controls/dist
RSYNC_DIST_LINKPATH=/opt/IOC/MLS-Controls/links
RSYNC_DIST_PREFIX_DISTDIR=1
RSYNC_DIST_LOCALPATH=bin,db,dbd,iocBoot
RSYNC_DIST_CHECKSUM=1
```

Remarks:

- Configuration file usually kept in application's `configure` directory
- Many more configuration options available

Example use:

```
> rsync-dist-info.py -c configure/rsync-dist.IOC.config --filter-
    names=SIOC55C --names --last=5
name date                    version
SIOC55C:
     2019-05-10 15:51:15  2019-05-10T15:51:07
     2019-05-10 16:15:56  2019-05-10T16:15:48
     2019-05-10 16:18:07  2019-05-10T16:17:59
     2019-05-10 16:20:48  2019-05-10T16:20:40
*    2019-05-10 17:54:56  2019-05-10T17:54:48
```

The asterisk marks the currently active version for this IOC

Status

- in production use since 2007
- implemented in Perl
- pretty old code with a number of quirks, such as
  - does not like being interrupted (leaves lock files)
  - CLI could be more user-friendly, too many options
  - version/timestamp contains colon, tends to confuse third-party tools like ssh
- could use a clean re-write from scratch
- but the basic idea is sound and stood the test of time

Details

Docs	`https://www-csr.bessy.de/control/bii_scripts/html/scripts/rsync-dist.html`
Source	`https://www-csr.bessy.de/control/bii_scripts/repo/bii_scripts/`
Questions	`goetz.pfeiffer@helmholtz-berlin.de`