cvmfs at Fermilab: User's Guide

Client configuration, with notes on the OSG / OASIS implementation

11/27/2013 S. Fuess

Document Set

This document is part of a set of documents describing how cvmfs is implemented and used at Fermilab. The document set consists of:

- cvmfs at Fermilab : Overview
- cvmfs at Fermilab : User's Guide <<< this document
- cvmfs at Fermilab : Release Manager's Guide
- cvmfs at Fermilab : System Manager's Guide

This document set reflects version 2.1.14 of the cvmfs product.

> *Note: cvmfs is implemented elsewhere in different modes. Where useful, the differences in other implementations are noted.*

References

The CERN VM File System (CernVM-FS, or cvmfs) was, as the name implies, originally developed at CERN for the function of distributing virtual machine (VM) images, and is a project within the larger CernVM toolkit. CernVM-FS was recognized as providing features as a stand-alone network file system. The home page is available at http://cernvm.cern.ch/portal/filesystem.

The OSG / OASIS implementation is documented at https://twiki.opensciencegrid.org/bin/view/Documentation/Release3/InstallCvmfs and https://www.opensciencegrid.org/bin/view/ReleaseDocumentation/OasisUpdateMethod.

Overview

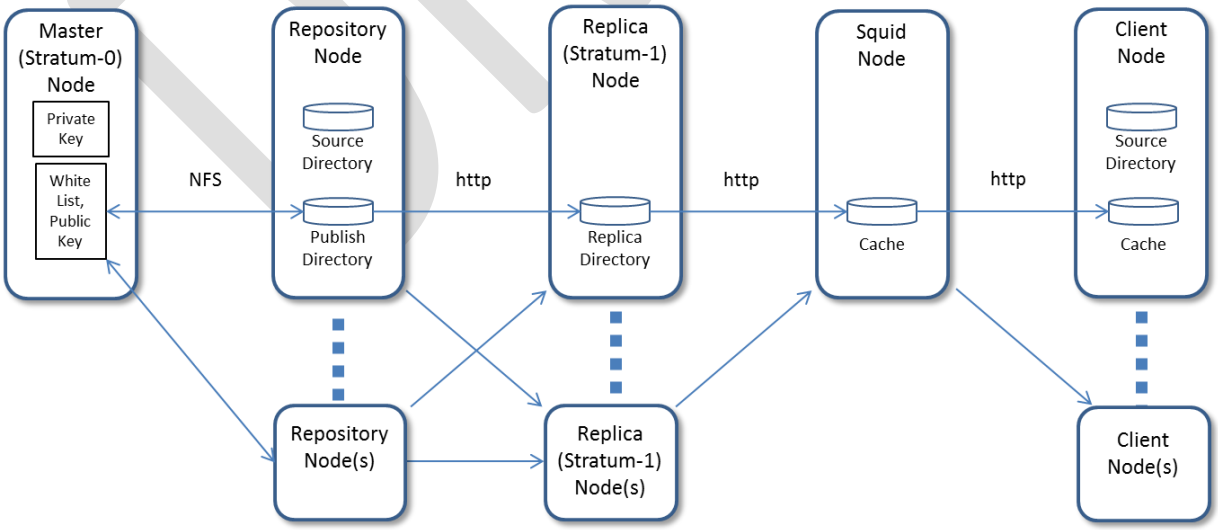

Figure 1 Elements of cvmfs file system

DRAFT

Figure 1 shows the elements within cvmfs and the path from the definitive source directory to the distributed copies of the source directory on the client nodes. Each of these elements is discussed in more detail in the following.

Note: The OSG configuration combines the *Repository* and *Publish* functions within a single node.

Client installation instructions

To use a cvmfs client on your own SL(F) node:

Preparation steps

- Need these RPMs

```
cvmfs-keys-1.4-1.osg.el6.noarch
cvmfs-2.1.14-1.osg.el6.x86_64
```

- cvmfs will cache its compressed, encrypted files in /var/cache/cvmfs2. You may want to create a separate mount point to avoid placing these files in the root file system. Note that the uncompressed distributions will appear under /cvmfs in autofs mounted fuse file systems, and not require separate disk space.
- A site squid server is recommended, but not required. The configuration differences are noted below.
- External access to the FNAL distributions will (eventually) be via a different set of stratum-1 servers, which will need to be configured with the net address/net block of the clients (strictly a security consideration). A site firewall rule may need to be similarly set.

Configuration steps

- /etc/cvmfs/config.d will need files added for each <repo>, eg

```
lbnecfs.fnal.gov.conf
oasis.opensciencegrid.org.conf
```

- The contents of /etc/cvmfs/config.d/lbnecfs.fnal.gov.conf

```
CVMFS_SERVER_URL="http://cfs01.fnal.gov/opt/lbnecfs.fnal.gov;h
ttp://cfs02.fnal.gov/opt/lbnecfs.fnal.gov"
CVMFS_PUBLIC_KEY=/etc/cvmfs/keys/fnal.gov.pub
```

  The contents of /etc/cvmfs/config.d/oasis.opensciencegrid.org.conf

```
CVMFS_SERVER_URL="http://cvmfs.fnal.gov/cvmfs/oasis;http://oas
is-replica.opensciencegrid.org/cvmfs/oasis"
CVMFS_PUBLIC_KEY=/etc/cvmfs/keys/oasis.opensciencegrid.org.pub
```

- Need to create /etc/cvmfs/default.local

  Example contents to match above set of repos:

```
CVMFS_CACHE_BASE=/var/cache/cvmfs2
CVMFS_CHECK_PERMISSIONS=no
CVMFS_REPOSITORIES=lbnecfs.fnal.gov,oasis.opensciencegrid.org
```

DRAFT

```
CVMFS_HTTP_PROXY=squid.fnal.gov:3128
```

- Need a copy of the master public keys. This can be copied from elsewhere, or the contents for the file /etc/cvmfs/keys/fnal.gov.pub


```
-----BEGIN PUBLIC KEY-----
MIIBIjANBgkqhkiG9w0BAQEFAAOCAQ8AMIIBCgKCAQEAuru0HM6iD4dSjHudEkTb
k4fbcyTeAQh6WZnNoJotuy+lNxwsMyTQRYqcT6qFu2J6WTp816YhXKLq4tqmTD7w
xkahBM+1mTDe+ZHbLRpGF5op46tDdBv/xFXTcBAjcRVXAQ7w4bCzc1h3SiDnHV6p
gKI0DhaHaxdXBHi6BVrnQ1n12NdZn2CZjDX+5ornoNpLnOiU1yQo/pPj83pCD8zO
nrV8Dji3cGPw1n5fAvtSOZ6uLv5t81UVxQZLG18HQXefyIRqpdSVwzcraAXXw1rT
3gik4d750E7ykVWSCROkKd77F2b2/T6CPCvOfktKn/OzAYktuTHltd1ofJ/hDUKU
IwIDAQAB
-----END PUBLIC KEY-----
```


For the file /etc/cvmfs/keys/oasis.opensciencegrid.org.pub


```
-----BEGIN PUBLIC KEY-----
MIIBIjANBgkqhkiG9w0BAQEFAAOCAQ8AMIIBCgKCAQEAqQGYXTp9cRcMbGeDoijB
gKNTCEpIWB7XcqIHVXJjfxEkycQXMyZkB7O0CvV3UmmY2K7CQqTnd9ddcApn7BqQ
/7QGP0H1jfXLfqVdwnhyjIHxmV2x8GIHRHFA0wE+DadQwoi1G0k0SNxOVS5qbdeV
yiyKsoU4JSqy5l2tK3K/RJE4htSruPCrRCK3xcN5nBeZK5gZd+/ufPIG+hd78kjQ
Dy3YQXwmEPm7kAZwIsEbMa0PNkp85IDkdR1GpvRvDMCRmUaRHrQUPBwPIjs0akL+
qoTxJs9k6quV0g3Wd8z65s/k5mEZ+AnHHI0+0CL3y80wnuLSBYmw05YBtKyoa1Fb
FQIDAQAB
-----END PUBLIC KEY-----
```


- Need to create or edit /etc/fuse.conf to contain:

```
user_allow_other
```

- /etc/auto.master will need the line

```
/cvmfs   /etc/auto.cvmfs
```

(Note: /etc/auto.cvmfs is part of the cvmfs RPM)

- If selinux is used, edit the file /etc/selinux/config to contain:

```
SELINUX=disabled
```

If this is necessary, you likely have to reboot the machine to keep selinux from interfering.

- Helpful commands:

```
cvmfs_config             (will show options)
cvmfs_config chksetup    (will help show problems in setup)
```

Testing

- Accessing the repository directory <repo> will cause the automount:
  ls /cvmfs/<repo>

DRAFT