



Gentoo Prefix on CVMFS

HSF Packaging Meeting Tutorial

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Distribution Models for HEP

- ▶ Full OS, Virtual Machines, Containers
 - Base images with common HEP packages
 - Binary package servers with pre-compiled add-ons
 - Automated image build process with Catalyst
- ▶ Gentoo Prefix Environments
 - Packages installed within a prefix by non-root users
 - Good solution for distributing via CVMFS
 - Support for Mac OS X and other systems (users' laptops)
 - Experimental installations now available!

How to use Gentoo Prefix from CVMFS?

Gentoo prefix on Linux via CVMFS

```
$ /cvmfs/sft.cern.ch/lcg/contrib/gentoo/linux/startprefix # requires kernel 3.2+  
$ /cvmfs/sft.cern.ch/lcg/contrib/gentoo/linux/x86_64/startprefix
```

Gentoo prefix on MacOS via CVMFS

```
$ /cvmfs/sft.cern.ch/lcg/contrib/gentoo/macos/startprefix # built on Mac OS 10.12  
$ /cvmfs/sft.cern.ch/lcg/contrib/gentoo/macos/10.13/startprefix # recommended
```

Starting a busybox Docker container (on a machine with CVMFS installed)

```
$ docker run -it -v /cvmfs:/cvmfs:ro busybox \  
    /cvmfs/sft.cern.ch/lcg/contrib/gentoo/linux/bin/bash -l
```

Starting my custom container from docker hub (<https://hub.docker.com/r/amadio/lcg>)

```
# docker run -it -v /cvmfs:/cvmfs:ro amadio/lcg
```

Installing Gentoo and Gentoo Prefix

- ▶ Regular Gentoo Linux
 - Use the Gentoo Linux Handbook
 - https://wiki.gentoo.org/wiki/Handbook:Main_Page
- ▶ Using a Gentoo Linux docker container
 - Automated official images available for x86 and x86_64
 - <https://github.com/gentoo/gentoo-docker-images>
- ▶ Gentoo Prefix (Linux, Mac OS, UNIX, Windows)
 - Download and run the bootstrap script
 - Host system needs to have at least bash and a C/C++ compiler
 - <https://wiki.gentoo.org/wiki/Project:Prefix/Bootstrap>

Gentoo Prefix Installation

If bash is too old, bootstrap bash:

```
$ wget https://gitweb.gentoo.org/repo/proj/prefix.git/plain/scripts/bootstrap-bash.sh
$ chmod +x bootstrap-bash.sh
$ ./bootstrap-bash.sh /var/tmp/bash
$ export PATH="/var/tmp/bash/usr/bin:${PATH}"
```

Bootstrap prefix with interactive script:

```
$ wget https://gitweb.gentoo.org/repo/proj/prefix.git/plain/scripts/bootstrap-prefix.sh
$ chmod +x bootstrap-prefix.sh
$ ./bootstrap-prefix.sh
```

Docker container with HSF test drive stack using Portage:

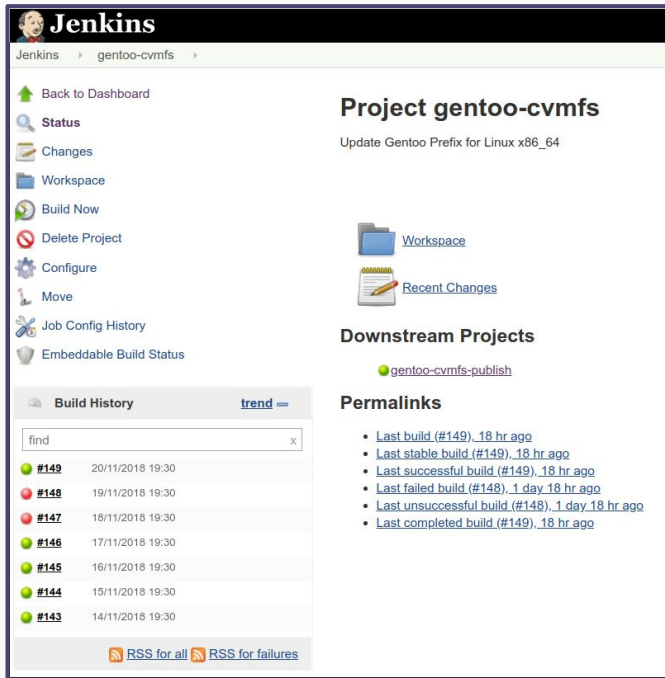
<https://github.com/HSF/packaging/tree/master/testdrive/portage>

Portage Basics

- ▶ Basic documentation
 - <https://wiki.gentoo.org/wiki/Portage>
 - <https://wiki.gentoo.org/wiki/Handbook:AMD64/Working/Portage>
- ▶ Development documentation
 - <https://devmanual.gentoo.org>
 - https://wiki.gentoo.org/wiki/Basic_guide_to_write_Gentoo_Ebuilds
 - <https://devmanual.gentoo.org/ebuild-writing/functions>
- ▶ Custom package repository
 - <https://wiki.gentoo.org/wiki/Handbook:AMD64/Portage/CustomTree>
- ▶ Package manager specification
 - https://wiki.gentoo.org/wiki/Project:Package_Manager_Specification

Gentoo Prefix Automation on Jenkins

Update stack on VM



The screenshot shows the Jenkins web interface for the project 'gentoo-cvmfs'. The page title is 'Project gentoo-cvmfs' with the subtitle 'Update Gentoo Prefix for Linux x86_64'. On the left sidebar, there are navigation links: 'Back to Dashboard', 'Status', 'Changes', 'Workspace', 'Build Now', 'Delete Project', 'Configure', 'Move', 'Job Config History', and 'Embeddable Build Status'. The main content area includes a 'Workspace' folder icon, a 'Recent Changes' icon, and a 'Downstream Projects' section with a link to 'gentoo-cvmfs-publish'. Below that is a 'Permalinks' section with a list of build links: 'Last build (#149), 18 hr ago', 'Last stable build (#149), 18 hr ago', 'Last successful build (#149), 18 hr ago', 'Last failed build (#148), 1 day, 18 hr ago', 'Last unsuccessful build (#148), 1 day, 18 hr ago', and 'Last completed build (#149), 18 hr ago'. At the bottom left, there is a 'Build History' table with a search box and a list of recent builds.

Build Number	Time
#149	20/11/2018 19:30
#148	19/11/2018 19:30
#147	18/11/2018 19:30
#146	17/11/2018 19:30
#145	16/11/2018 19:30
#144	15/11/2018 19:30
#143	14/11/2018 19:30

Publish to CVMFS with rsync

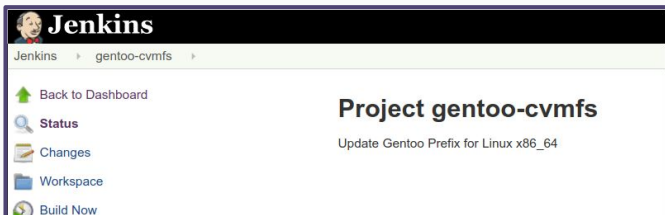


The screenshot shows the Jenkins web interface for the project 'gentoo-cvmfs-publish'. The page title is 'Project gentoo-cvmfs-publish' with the subtitle 'Publish Gentoo Prefix for Linux x86_64 to CVMFS'. The left sidebar is identical to the previous screenshot. The main content area includes a 'Workspace' folder icon, a 'Recent Changes' icon, and an 'Upstream Projects' section with a link to 'gentoo-cvmfs'. Below that is a 'Permalinks' section with a list of build links: 'Last build (#125), 18 hr ago', 'Last stable build (#125), 18 hr ago', 'Last successful build (#125), 18 hr ago', and 'Last completed build (#125), 18 hr ago'. At the bottom left, there is a 'Build History' table with a search box and a list of recent builds.

Build Number	Time
#125	20/11/2018 19:31
#124	17/11/2018 19:37
#123	16/11/2018 19:32
#122	15/11/2018 19:32
#121	14/11/2018 19:38

Gentoo Prefix Automation on Jenkins

Update stack on VM



Jenkins > gentoo-cvmfs >

Back to Dashboard

Status

Changes

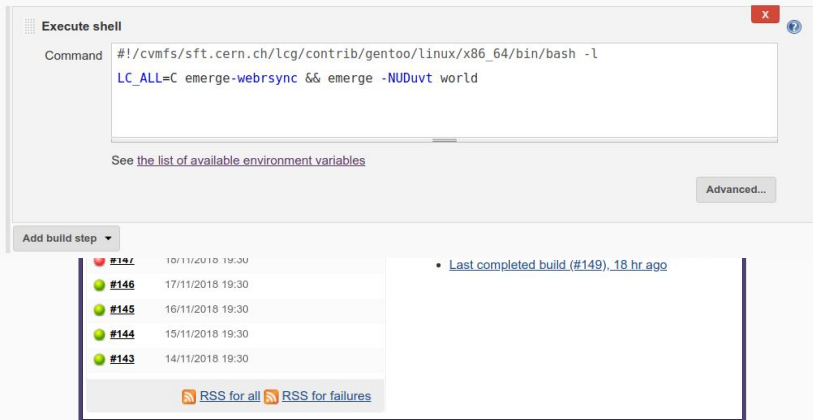
Workspace

Build Now

Project gentoo-cvmfs

Update Gentoo Prefix for Linux x86_64

Build



Execute shell

```
Command #!/cvmfs/sft.cern.ch/lcg/contrib/gentoo/linux/x86_64/bin/bash -l
LC_ALL=C emerge-websync && emerge -NUDvvt world
```

See the [list of available environment variables](#)

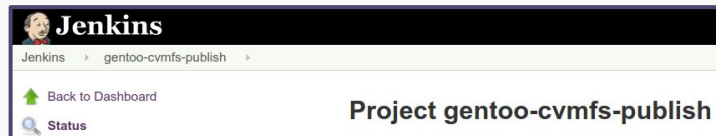
Advanced...

Add build step ▾

#147	10/11/2018 19:30	• Last completed build (#149), 18 hr ago
#146	17/11/2018 19:30	
#145	16/11/2018 19:30	
#144	15/11/2018 19:30	
#143	14/11/2018 19:30	

RSS for all RSS for failures

Publish to CVMFS with rsync



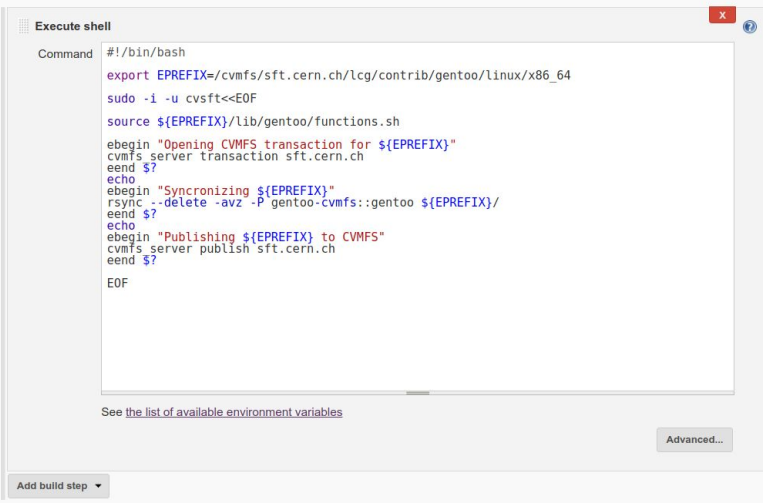
Jenkins > gentoo-cvmfs-publish >

Back to Dashboard

Status

Project gentoo-cvmfs-publish

Build



Execute shell

```
Command #!/bin/bash
export EPREFIX=/cvmfs/sft.cern.ch/lcg/contrib/gentoo/linux/x86_64
sudo -i -u cvsft<<EOF
source ${EPREFIX}/lib/gentoo/functions.sh
ebegin "Opening CVMFS transaction for ${EPREFIX}"
cvmfs_server transaction sft.cern.ch
end $?
echo
ebegin "Synchronizing ${EPREFIX}"
rsync --delete -avz -P gentoo-cvmfs::gentoo ${EPREFIX}/
end $?
echo
ebegin "Publishing ${EPREFIX} to CVMFS"
cvmfs_server publish sft.cern.ch
end $?
EOF
```

See the [list of available environment variables](#)

Advanced...

Add build step ▾

Live Demo and Q&A

Thank you!