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Using LHCb Software with docker containers

Introduction

This is a short guide to use the LHCb software stack via docker containers. Docker is a lightweight virtualization environment with few to none overhead compared to bare metal execution of programs. More documentation about `docker` can be found here: <https://www.docker.io/>

Installation of docker

Instructions to install docker are available on the `docker` website: <http://docs.docker.io/installation>

Installation on SLC-6.5

Starting with SLC-6.5, docker is available from EPEL, so it is as simple as:

```
$ sudo yum -y install docker-io
```

Installation on other Linux distributions

Other Linux distributions are usually more up-to-date than what SLC provides. `docker` is thus already available on Ubuntu, Fedoras (≥ 19) and others.

Refer to <http://docs.docker.io/installation> for the specifics.

Installation on OSX

Installation on OSX is a bit more convoluted: (as of 2014/06) you need to install a thin linux VM in which docker is installed. All these installations instructions are documented here:

<http://docs.docker.io/installation/mac/> and packaged into a single `boot2docker` binary which manages the lifetime of the linux-VM (including downloading it, installing it, configuring it, provisioning it and even ssh-ing into it)

Docker containers for HEP software

A number of containers for HEP has been pre-packaged and made available on the docker index: <https://index.docker.io/>

They are defined from this git repository: <https://github.com/hepsw/docks>

This repository (as of 2014/11) contains:

- `hepsw/slc5-base` a container with a bare and base installation of SLC-5.x
- `hepsw/slc-base` a container with a bare and base installation of SLC-6.x
- `hepsw/slc-dev` a container with a few programs and libraries on top of `hepsw/slc-base` to ease development
- `hepsw/cc7-base` a container with a bare and base installation of CERN Centos-7.x
- `hepsw/cvmfs-base` a container with CernVMFS installed and configured to mount the SFT installation from LCG, and the CernVM-prod one
- `hepsw/cvmfs-atlas` a container providing the ATLAS software via CernVMFS
- `hepsw/cvmfs-cms` a container providing the CMS software via CernVMFS

- `hepsw/cvmfs-lhcb` a container providing the LHCb software stack via CernVMFS
- `hepsw/cvmfs-lsst` a container providing the LSST software stack via CernVMFS
- `hepsw/lhcb-base` a container providing the tools to install LHCb software via RPMs
- `hepsw/lhcb-gaudi` a container providing a Gaudi installation (via the LHCb RPMs)
- `hepsw/lhcb-davinci` a container providing a DaVinci installation (via the LHCb RPMs)

Note that because `hepsw/lhcb-gaudi` and `hepsw/lhcb-davinci` are pretty huge container (resp. 4Gb and 10Gb), they haven't been uploaded on the `docker` index, you will need to build them locally.

Usage

Once `docker` has been properly installed, one can run *e.g.* the `hepsw/cvmfs-lhcb:latest` container like so:

```
$ docker run -h dev --privileged -i -t hepsw/cvmfs-lhcb:latest
```

This will download the `hepsw/cvmfs-lhcb` container from the index if this hasn't been already done, and then will drop you into a `bash` session with the proper LHCb environment configured (*i.e.* `LbLogin`). Then any LHCb software provided by CernVMFs is available *via SetupProject*.

Each container provided by `hepsw/docks` has more documentation. See for example:
<https://github.com/hepsw/docks/tree/master/cvmfs-lhcb>

Caveat emptor

in `docker-io 1.0.0-3.el6` there might be an issue running container in privileged mode, which should be fixed in the next release (https://bugzilla.redhat.com/show_bug.cgi?id=1111233)

-- SebastienBinet - 05 Jun 2014

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