Singularity Container Documentation

Release 3.0

Admin Docs

Dec 04, 2018

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CHAPTER

ONE

ADMIN QUICK START

This document will cover installation and administration points of `Singularity` on a Linux host. For all other information, see the user guide.

For any additional help or support contact the Sylabs team.

1.1 Installation

This section will explain the process of installing `Singularity` from source and building your own binary packages.

1.1.1 Install Build Dependencies

`Singularity` requires several libraries and development tools to be installed before you can build it from source.

```
$ sudo yum -y update
$ sudo yum -y groupinstall "Development Tools"
$ sudo yum -y install git libseccomp-devel libuuid-devel openssl-devel squashfs-tools␣
↪wget
```

Note: Both `squashfs-tools` and `libseccomp-devel` are optional dependencies but are required for full functionality.

1.1.2 Install Go

`Singularity` is written primarily in Go, and you will need Go >= 1.11 installed to build it from source.

```
$ export VERSION=1.11 OS=linux ARCH=amd64
$ wget https://dl.google.com/go/go$VERSION.$OS-$ARCH.tar.gz
$ sudo tar -C /usr/local -xzf go$VERSION.$OS-$ARCH.tar.gz
```

Post installation, you will need to setup your environment for Go.

```
$ echo 'export GOPATH=${HOME}/go' >> ~/.bashrc
$ echo 'export PATH=/usr/local/go/bin:${PATH}:${GOPATH}/bin' >> ~/.bashrc
$ source ~/.bashrc
```

Note: You may need to add the path `/usr/local/go/bin` to the `secure_path` option in your `sudoers` config.

1.1.3 Download Source

`Singularity` source code is available on `Github`. You can either download a versioned tarball from the releases page or clone our `git` repository.

After you clone the `git` repository, you can optionally `checkout` the `tag` of a specific version to install (e.g. `v3.0.1`)

```
$ mkdir -p $GOPATH/src/github.com/sylabs
$ cd $GOPATH/src/github.com/sylabs
$ git clone https://github.com/sylabs/singularity
$ git tag --list
$ git checkout v3.0.1
```

1.1.4 Configure the Build

`Singularity` uses a custom build system. You will configure the build using the `mconfig` script.

Note: You can see all of the options for `mconfig` by using the `-h` option.

```
$ cd $GOPATH/src/github.com/sylabs/singularity
$ ./mconfig --prefix=/usr/local --localstatedir=/var
```

1.1.5 Configuration (`localstatedir`)

The local state directories used by `Singularity` at runtime will be placed under the supplied `prefix` option. This will cause issues if that directory tree is read-only or if it is shared between several hosts or nodes that might run `Singularity` simultaneously.

In such cases, you should specify the `localstatedir` option. This will override the `prefix` option, instead placing the local state directories within the path explicitly provided. Ideally this should be within the local filesystem, specific to only a single host or node.

In the case of cluster nodes, you will need to create the following directories on all nodes, with `root:root` ownership and `0755` permissions

```
${localstatedir}/singularity/mnt

${localstatedir}/singularity/mnt/container

${localstatedir}/singularity/mnt/final

${localstatedir}/singularity/mnt/overlay

${localstatedir}/singularity/mnt/session
```

1.1.6 Build from Source

After you configure the build you can finish building `Singularity` from source.

```
$ make -C builddir
$ sudo make -C builddir install
```

Note: `Singularity` must be installed as `root` for full functionality.

Note: `Singularity` must be installed to a file system that allows SUID programs for full functionality.

1.1.7 Build an RPM from Source

Note: This process was greatly improved in version `3.0.1` and we suggest you use at least that version if you wish to build RPMs.

You will use the `rpm` `Makefile` target to build a `Singularity` RPM.

```
$ ./mconfig
$ make -C builddir rpm
```

You will find the `Singularity` RPMs built in your home directory, at `~/rpmbuild/`.

If you would like to further customize the `Singularity` installation, you can instead use the `dist` `Makefile` target and run `rpmbuild` yourself.

```
$ ./mconfig
$ make -C builddir dist
$ rpmbuild -tb --define="_prefix /opt/singularity" singularity-*.tar.gz
```