Step-by-step

1. Overview

On ppc64le Power Linux, you could either use the OS shipped docker, for example, docker 1.10.3 with Ubuntu 16.04; or use the binaries from <https://master.dockerproject.org/,> if these two ways do not work for you, you could build docker from source code, the docker documentation <https://docs.docker.com/opensource/project/set-up-dev-env/> describes how to build docker from source code, but it is for x86 only, the build procedure on Power Linux is a little bit different. This article will walk you through the procedure of building docker on ppc64le Power Linux. The example in this article is ppc64le Ubuntu 16.04, it should also apply to the other Linux distributions.

1. Install Docker on the build machine

The docker build process is done in a docker instance, so the build machine needs to have docker installed. The docker version on the build machine does not matter much. The docker 1.10.3 shipped by Ubuntu 16.04 is good enough.

root@c910f03c01p06:~# apt-get install docker.io  
...  
root@c910f03c01p06:~# docker version  
Client:  
 Version: 1.10.3  
 API version: 1.22  
 Go version: go1.6.1  
 Git commit: 20f81dd  
 Built: Wed, 20 Apr 2016 14:19:16 -0700  
 OS/Arch: linux/ppc64le  
  
Server:  
 Version: 1.10.3  
 API version: 1.22  
 Go version: go1.6.1  
 Git commit: 20f81dd  
 Built: Wed, 20 Apr 2016 14:19:16 -0700  
 OS/Arch: linux/ppc64le  
root@c910f03c01p06:~#

1. Fetch the docker code from github

Clone the docker code from github

git clone https://github.com/docker/docker.git

1. Select the docker version to build

By default, the code is the master branch, if you want to build different docker versions, use “git tag” to check all the available docker versions tags, and then use “git checkout” to switch to version.

Note: the docker 1.11.0 is the first version that supports to be built through docker-build container, for the earlier version, please refer to http://www.ibm.com/developerworks/library/d-docker-on-power-linux-platform/ for the procedure.

root@c910f03c01p06:~/docker# git branch  
\* master  
root@c910f03c01p06:~/docker# git tag  
0.0.3  
autorun/1  
builder/1  
builder/2  
debian/0.1.1-1  
docs-v1.12.0-rc4-2016-07-15  
upstream/0.1.1  
upstream/0.1.2  
upstream/0.1.3  
upstream/0.1.4  
v0.1.0  
v0.1.1  
v0.1.2  
v0.1.3  
v0.1.4  
v0.1.5  
v0.1.6  
v0.1.7  
v0.1.8  
v0.10.0  
v0.11.0  
v0.11.1  
v0.12.0  
v0.2.0  
v0.2.1  
v0.2.2  
v0.3.0  
v0.3.1  
v0.3.2  
v0.3.3  
v0.3.4  
v0.4.0  
v0.4.1  
v0.4.2  
v0.4.3  
v0.4.4  
v0.4.5  
v0.4.6  
v0.4.7  
v0.4.8  
v0.5.0  
v0.5.1  
v0.5.2  
v0.5.3  
v0.6.0  
v0.6.1  
v0.6.2  
v0.6.3  
v0.6.4  
v0.6.5  
v0.6.6  
v0.6.7  
v0.7.0  
v0.7.0-rc1  
v0.7.0-rc2  
v0.7.0-rc3  
v0.7.0-rc4  
v0.7.0-rc5  
v0.7.0-rc6  
v0.7.0-rc7  
v0.7.1  
v0.7.2  
v0.7.3  
v0.7.4  
v0.7.5  
v0.7.6  
v0.8.0  
v0.8.1  
v0.9.0  
v0.9.1  
v1.0.0  
v1.0.1  
v1.1.0  
v1.1.1  
v1.1.2  
v1.10.0  
v1.10.0-rc1  
v1.10.0-rc2  
v1.10.0-rc3  
v1.10.0-rc4  
v1.10.1  
v1.10.1-rc1  
v1.10.2  
v1.10.2-rc1  
v1.10.3  
v1.10.3-rc1  
v1.10.3-rc2  
v1.11.0  
v1.11.0-rc1  
v1.11.0-rc2  
v1.11.0-rc3  
v1.11.0-rc4  
v1.11.0-rc5  
v1.11.1  
v1.11.1-rc1  
v1.11.2  
v1.11.2-rc1  
v1.12.0-rc1  
v1.12.0-rc2  
v1.12.0-rc3  
v1.12.0-rc4  
v1.2.0  
v1.3.0  
v1.3.1  
v1.3.2  
v1.3.3  
v1.4.0  
v1.4.1  
v1.5.0  
v1.5.0-rc1  
v1.5.0-rc2  
v1.5.0-rc3  
v1.5.0-rc4  
v1.6.0  
v1.6.0-rc1  
v1.6.0-rc2  
v1.6.0-rc3  
v1.6.0-rc4  
v1.6.0-rc5  
v1.6.0-rc6  
v1.6.0-rc7  
v1.6.1  
v1.6.2  
v1.7.0  
v1.7.0-rc1  
v1.7.0-rc2  
v1.7.0-rc3  
v1.7.0-rc4  
v1.7.0-rc5  
v1.7.1  
v1.7.1-rc1  
v1.7.1-rc2  
v1.7.1-rc3  
v1.8.0  
v1.8.0-rc1  
v1.8.0-rc2  
v1.8.0-rc3  
v1.8.1  
v1.8.2  
v1.8.2-rc1  
v1.8.3  
v1.9.0  
v1.9.0-rc1  
v1.9.0-rc2  
v1.9.0-rc3  
v1.9.0-rc4  
v1.9.0-rc5  
v1.9.1  
v1.9.1-rc1  
xdocs-v1.10-09-05-2016  
xdocs-v1.10-28-mar-2016  
root@c910f03c01p06:~/docker# git checkout -b v1.11.2 v1.11.2   
Switched to a new branch 'v1.11.2'  
root@c910f03c01p06:~/docker#

1. Create the docker-build image

The docker code ships the Dockerfile.ppc64le to create the docker-build image on Power Linux. The process may take a few minutes.

docker build -t docker-build -f Dockerfile.ppc64le .

After the process is finished, there will be an image named docker-build on the build machine.

root@c910f03c01p06:~# docker images  
REPOSITORY TAG IMAGE ID CREATED SIZE  
docker-build latest 87e58f170711 9 seconds ago 2.406 GB  
ppc64le/gcc 5.3 0713b81c948b 2 weeks ago 1.389 GB  
root@c910f03c01p06:~#

1. Start a development container

Use the newly built docker-build image to start a development container.

docker run --privileged --rm -ti docker-build /bin/bash

1. Build docker

In the development container, use the script **hack/make.sh** to build the docker binaries. The build may take one or two minutes.

root@35dfe05b4531:/go/src/github.com/docker/docker# hack/make.sh binary   
# WARNING! I don't seem to be running in a Docker container.  
# The result of this command might be an incorrect build, and will not be  
# officially supported.  
#  
# Try this instead: make all  
#  
  
---> Making bundle: binary (in bundles/1.11.2/binary)  
Building: bundles/1.11.2/binary/docker-1.11.2  
Created binary: bundles/1.11.2/binary/docker-1.11.2  
++ '[' -x /usr/local/bin/docker-runc ']'  
++ echo 'Copying nested executables into bundles/1.11.2/binary'  
Copying nested executables into bundles/1.11.2/binary  
++ for file in containerd containerd-shim containerd-ctr runc  
+++ which docker-containerd  
++ cp /usr/local/bin/docker-containerd bundles/1.11.2/binary/  
++ '[' hash == hash ']'  
++ hash\_files bundles/1.11.2/binary/docker-containerd  
++ '[' 1 -gt 0 ']'  
++ f=bundles/1.11.2/binary/docker-containerd  
++ shift  
+++ dirname bundles/1.11.2/binary/docker-containerd  
++ dir=bundles/1.11.2/binary  
+++ basename bundles/1.11.2/binary/docker-containerd  
++ base=docker-containerd  
++ for hashAlgo in md5 sha256  
++ command -v md5sum  
++ cd bundles/1.11.2/binary  
++ md5sum docker-containerd  
++ for hashAlgo in md5 sha256  
++ command -v sha256sum  
++ cd bundles/1.11.2/binary  
++ sha256sum docker-containerd  
++ '[' 0 -gt 0 ']'  
++ for file in containerd containerd-shim containerd-ctr runc  
+++ which docker-containerd-shim  
++ cp /usr/local/bin/docker-containerd-shim bundles/1.11.2/binary/  
++ '[' hash == hash ']'  
++ hash\_files bundles/1.11.2/binary/docker-containerd-shim  
++ '[' 1 -gt 0 ']'  
++ f=bundles/1.11.2/binary/docker-containerd-shim  
++ shift  
+++ dirname bundles/1.11.2/binary/docker-containerd-shim  
++ dir=bundles/1.11.2/binary  
+++ basename bundles/1.11.2/binary/docker-containerd-shim  
++ base=docker-containerd-shim  
++ for hashAlgo in md5 sha256  
++ command -v md5sum  
++ cd bundles/1.11.2/binary  
++ md5sum docker-containerd-shim  
++ for hashAlgo in md5 sha256  
++ command -v sha256sum  
++ cd bundles/1.11.2/binary  
++ sha256sum docker-containerd-shim  
++ '[' 0 -gt 0 ']'  
++ for file in containerd containerd-shim containerd-ctr runc  
+++ which docker-containerd-ctr  
++ cp /usr/local/bin/docker-containerd-ctr bundles/1.11.2/binary/  
++ '[' hash == hash ']'  
++ hash\_files bundles/1.11.2/binary/docker-containerd-ctr  
++ '[' 1 -gt 0 ']'  
++ f=bundles/1.11.2/binary/docker-containerd-ctr  
++ shift  
+++ dirname bundles/1.11.2/binary/docker-containerd-ctr  
++ dir=bundles/1.11.2/binary  
+++ basename bundles/1.11.2/binary/docker-containerd-ctr  
++ base=docker-containerd-ctr  
++ for hashAlgo in md5 sha256  
++ command -v md5sum  
++ cd bundles/1.11.2/binary  
++ md5sum docker-containerd-ctr  
++ for hashAlgo in md5 sha256  
++ command -v sha256sum  
++ cd bundles/1.11.2/binary  
++ sha256sum docker-containerd-ctr  
++ '[' 0 -gt 0 ']'  
++ for file in containerd containerd-shim containerd-ctr runc  
+++ which docker-runc  
++ cp /usr/local/bin/docker-runc bundles/1.11.2/binary/  
++ '[' hash == hash ']'  
++ hash\_files bundles/1.11.2/binary/docker-runc  
++ '[' 1 -gt 0 ']'  
++ f=bundles/1.11.2/binary/docker-runc  
++ shift  
+++ dirname bundles/1.11.2/binary/docker-runc  
++ dir=bundles/1.11.2/binary  
+++ basename bundles/1.11.2/binary/docker-runc  
++ base=docker-runc  
++ for hashAlgo in md5 sha256  
++ command -v md5sum  
++ cd bundles/1.11.2/binary  
++ md5sum docker-runc  
++ for hashAlgo in md5 sha256  
++ command -v sha256sum  
++ cd bundles/1.11.2/binary  
++ sha256sum docker-runc  
++ '[' 0 -gt 0 ']'  
  
root@35dfe05b4531:/go/src/github.com/docker/docker#

After the build process is finished, you will be able to find the binaries under directory bundles/latest/binary/.

root@35dfe05b4531:/go/src/github.com/docker/docker# ls -l bundles/latest/binary/  
total 69832  
lrwxrwxrwx 1 root root 13 Jul 22 02:54 docker -> docker-1.11.2  
-rwxr-xr-x 1 root root 35978776 Jul 22 02:54 docker-1.11.2  
-rw-r--r-- 1 root root 48 Jul 22 02:54 docker-1.11.2.md5  
-rw-r--r-- 1 root root 80 Jul 22 02:54 docker-1.11.2.sha256  
-rwxr-xr-x 1 root root 12880512 Jul 22 02:54 docker-containerd  
-rwxr-xr-x 1 root root 10265368 Jul 22 02:54 docker-containerd-ctr  
-rw-r--r-- 1 root root 56 Jul 22 02:54 docker-containerd-ctr.md5  
-rw-r--r-- 1 root root 88 Jul 22 02:54 docker-containerd-ctr.sha256  
-rwxr-xr-x 1 root root 3995544 Jul 22 02:54 docker-containerd-shim  
-rw-r--r-- 1 root root 57 Jul 22 02:54 docker-containerd-shim.md5  
-rw-r--r-- 1 root root 89 Jul 22 02:54 docker-containerd-shim.sha256  
-rw-r--r-- 1 root root 52 Jul 22 02:54 docker-containerd.md5  
-rw-r--r-- 1 root root 84 Jul 22 02:54 docker-containerd.sha256  
-rwxr-xr-x 1 root root 8339384 Jul 22 02:54 docker-runc  
-rw-r--r-- 1 root root 46 Jul 22 02:54 docker-runc.md5  
-rw-r--r-- 1 root root 78 Jul 22 02:54 docker-runc.sha256  
root@35dfe05b4531:/go/src/github.com/docker/docker#

**Note:** starting from docker 1.12, the binaries are put into two subdirectories binary-client and binary-daemon. Here is an example:

root@c6296691f39e:/go/src/github.com/docker/docker# ls -l bundles/latest/binary-client/  
total 15284  
lrwxrwxrwx 1 root root 17 Jul 20 02:59 docker -> docker-1.12.0-dev  
-rwxr-xr-x 1 root root 15640576 Jul 20 02:59 docker-1.12.0-dev  
-rw-r--r-- 1 root root 52 Jul 20 02:59 docker-1.12.0-dev.md5  
-rw-r--r-- 1 root root 84 Jul 20 02:59 docker-1.12.0-dev.sha256  
root@c6296691f39e:/go/src/github.com/docker/docker# ls -l bundles/latest/binary-daemon/  
total 81612  
-rwxr-xr-x 1 root root 11429368 Jul 20 03:00 docker-containerd  
-rwxr-xr-x 1 root root 10732136 Jul 20 03:00 docker-containerd-ctr  
-rw-r--r-- 1 root root 56 Jul 20 03:00 docker-containerd-ctr.md5  
-rw-r--r-- 1 root root 88 Jul 20 03:00 docker-containerd-ctr.sha256  
-rwxr-xr-x 1 root root 4004264 Jul 20 03:00 docker-containerd-shim  
-rw-r--r-- 1 root root 57 Jul 20 03:00 docker-containerd-shim.md5  
-rw-r--r-- 1 root root 89 Jul 20 03:00 docker-containerd-shim.sha256  
-rw-r--r-- 1 root root 52 Jul 20 03:00 docker-containerd.md5  
-rw-r--r-- 1 root root 84 Jul 20 03:00 docker-containerd.sha256  
lrwxrwxrwx 1 root root 23 Jul 20 03:00 docker-proxy -> docker-proxy-1.12.0-dev  
-rwxr-xr-x 1 root root 3059670 Jul 20 03:00 docker-proxy-1.12.0-dev  
-rw-r--r-- 1 root root 58 Jul 20 03:00 docker-proxy-1.12.0-dev.md5  
-rw-r--r-- 1 root root 90 Jul 20 03:00 docker-proxy-1.12.0-dev.sha256  
-rwxr-xr-x 1 root root 8979512 Jul 20 03:00 docker-runc  
-rw-r--r-- 1 root root 46 Jul 20 03:00 docker-runc.md5  
-rw-r--r-- 1 root root 78 Jul 20 03:00 docker-runc.sha256  
lrwxrwxrwx 1 root root 18 Jul 20 03:00 dockerd -> dockerd-1.12.0-dev  
-rwxr-xr-x 1 root root 45304600 Jul 20 03:00 dockerd-1.12.0-dev  
-rw-r--r-- 1 root root 53 Jul 20 03:00 dockerd-1.12.0-dev.md5  
-rw-r--r-- 1 root root 85 Jul 20 03:00 dockerd-1.12.0-dev.sha256  
root@c6296691f39e:/go/src/github.com/docker/docker#

1. Verify the build

Copy the docker binaries to /usr/bin in the docker development container, start the daemon and verify if it is working correctly.

Docker 1.11.x:

root@35dfe05b4531:/go/src/github.com/docker/docker/bundles/latest/binary# cp \* /usr/bin/  
root@35dfe05b4531:/go/src/github.com/docker/docker/bundles/latest/binary# docker daemon &  
[1] 3251  
root@35dfe05b4531:/go/src/github.com/docker/docker/bundles/latest/binary# time="2016-07-22T03:00:06.688704000Z" level=info msg="New containerd process, pid: 3257n"   
time="2016-07-22T03:00:07.693665000Z" level=info msg="[graphdriver] using prior storage driver "aufs""   
time="2016-07-22T03:00:07.702814000Z" level=info msg="Graph migration to content-addressability took 0.00 seconds"   
time="2016-07-22T03:00:07.703883000Z" level=warning msg="Running modprobe bridge br\_netfilter failed with message: modprobe: ERROR: ../libkmod/libkmod.c:557 kmod\_search\_moddep() could not open moddep file '/lib/modules/4.4.0-21-generic/modules.dep.bin'nmodprobe: ERROR: ../libkmod/libkmod.c:557 kmod\_search\_moddep() could not open moddep file '/lib/modules/4.4.0-21-generic/modules.dep.bin'n, error: exit status 1"   
time="2016-07-22T03:00:07.704702000Z" level=warning msg="Running modprobe nf\_nat failed with message: `modprobe: ERROR: ../libkmod/libkmod.c:557 kmod\_search\_moddep() could not open moddep file '/lib/modules/4.4.0-21-generic/modules.dep.bin'`, error: exit status 1"   
time="2016-07-22T03:00:07.705503000Z" level=warning msg="Running modprobe xt\_conntrack failed with message: `modprobe: ERROR: ../libkmod/libkmod.c:557 kmod\_search\_moddep() could not open moddep file '/lib/modules/4.4.0-21-generic/modules.dep.bin'`, error: exit status 1"   
time="2016-07-22T03:00:07.795015000Z" level=info msg="Default bridge (docker0) is assigned with an IP address 172.18.0.0/16. Daemon option --bip can be used to set a preferred IP address"   
time="2016-07-22T03:00:07.872663000Z" level=warning msg="Your kernel does not support swap memory limit."   
time="2016-07-22T03:00:07.873190000Z" level=info msg="Loading containers: start."   
  
time="2016-07-22T03:00:07.873257000Z" level=info msg="Loading containers: done."   
time="2016-07-22T03:00:07.873286000Z" level=info msg="Daemon has completed initialization"   
time="2016-07-22T03:00:07.873317000Z" level=info msg="Docker daemon" commit=b9f10c9 graphdriver=aufs version=1.11.2   
time="2016-07-22T03:00:07.878478000Z" level=info msg="API listen on /var/run/docker.sock"   
  
root@35dfe05b4531:/go/src/github.com/docker/docker/bundles/latest/binary# docker version  
Client:  
 Version: 1.11.2  
 API version: 1.23  
 Go version: go1.6.2  
 Git commit: b9f10c9  
 Built: Fri Jul 22 02:53:19 2016  
 OS/Arch: linux/ppc64le  
  
Server:  
 Version: 1.11.2  
 API version: 1.23  
 Go version: go1.6.2  
 Git commit: b9f10c9  
 Built: Fri Jul 22 02:53:19 2016  
 OS/Arch: linux/ppc64le  
root@35dfe05b4531:/go/src/github.com/docker/docker/bundles/latest/binary#

Docker 1.12 and above:

root@c6296691f39e:/go/src/github.com/docker/docker/bundles/latest# cp binary-client/\* /usr/bin/  
root@c6296691f39e:/go/src/github.com/docker/docker/bundles/latest# cp binary-daemon/\* /usr/bin/  
root@c6296691f39e:/go/src/github.com/docker/docker/bundles/latest# dockerd &  
[1] 6074  
root@c6296691f39e:/go/src/github.com/docker/docker/bundles/latest# time="2016-07-22T03:02:24.458809000Z" level=info msg="New containerd process, pid: 6080"   
time="2016-07-22T03:02:25.625007000Z" level=info msg="[graphdriver] using prior storage driver "aufs""   
time="2016-07-22T03:02:25.639865000Z" level=info msg="Graph migration to content-addressability took 0.00 seconds"   
time="2016-07-22T03:02:25.640370000Z" level=warning msg="Your kernel does not support swap memory limit."   
time="2016-07-22T03:02:25.641309000Z" level=info msg="Loading containers: start."   
time="2016-07-22T03:02:25.643143000Z" level=warning msg="Running modprobe bridge br\_netfilter failed with message: modprobe: ERROR: ../libkmod/libkmod.c:557 kmod\_search\_moddep() could not open moddep file '/lib/modules/4.4.0-21-generic/modules.dep.bin'nmodprobe: ERROR: ../libkmod/libkmod.c:557 kmod\_search\_moddep() could not open moddep file '/lib/modules/4.4.0-21-generic/modules.dep.bin'n, error: exit status 1"   
time="2016-07-22T03:02:25.644631000Z" level=warning msg="Running modprobe nf\_nat failed with message: `modprobe: ERROR: ../libkmod/libkmod.c:557 kmod\_search\_moddep() could not open moddep file '/lib/modules/4.4.0-21-generic/modules.dep.bin'`, error: exit status 1"   
time="2016-07-22T03:02:25.646017000Z" level=warning msg="Running modprobe xt\_conntrack failed with message: `modprobe: ERROR: ../libkmod/libkmod.c:557 kmod\_search\_moddep() could not open moddep file '/lib/modules/4.4.0-21-generic/modules.dep.bin'`, error: exit status 1"   
time="2016-07-22T03:02:25.675377000Z" level=warning msg="Could not load necessary modules for IPSEC rules: Running modprobe xfrm\_user failed with message: `modprobe: ERROR: ../libkmod/libkmod.c:557 kmod\_search\_moddep() could not open moddep file '/lib/modules/4.4.0-21-generic/modules.dep.bin'`, error: exit status 1"   
time="2016-07-22T03:02:25.817748000Z" level=info msg="Default bridge (docker0) is assigned with an IP address 172.18.0.0/16. Daemon option --bip can be used to set a preferred IP address"   
time="2016-07-22T03:02:25.872894000Z" level=info msg="Loading containers: done."   
time="2016-07-22T03:02:25.873027000Z" level=info msg="Daemon has completed initialization"   
time="2016-07-22T03:02:25.873074000Z" level=info msg="Docker daemon" commit=724c69f graphdriver=aufs version=1.12.0-dev   
time="2016-07-22T03:02:25.913108000Z" level=info msg="API listen on /var/run/docker.sock"   
  
root@c6296691f39e:/go/src/github.com/docker/docker/bundles/latest# docker version  
Client:  
 Version: 1.12.0-dev  
 API version: 1.25  
 Go version: go1.6.3  
 Git commit: 724c69f  
 Built: Wed Jul 20 02:58:38 2016  
 OS/Arch: linux/ppc64le  
  
Server:  
 Version: 1.12.0-dev  
 API version: 1.25  
 Go version: go1.6.3  
 Git commit: 724c69f  
 Built: Wed Jul 20 02:58:38 2016  
 OS/Arch: linux/ppc64le  
root@c6296691f39e:/go/src/github.com/docker/docker/bundles/latest#

1. Copy the docker binaries to the other machines

You could copy the docker binaries to the other Power Linux machines and run docker using these binaries. There are quite a few packaging changes in Docker 1.11.x and 1.12.x, so it is recommended to uninstall the existing docker installation on the machine before copying these binaries.