DOCKER / VIRTUALIZATION 8

How to Install, Run and Delete Applications inside Docker Containers – Part 2

by Matei Cezar | Published: January 28, 2016 | January 28, 2016

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Following the previous Docker article, this tutorial will discuss how to save a Docker container into a new image, remove a container and run a **Nginx** web server inside a container.

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Install and Run Applications in Docker Containers – Part 2

Requirements

- Install Docker on CentOS and RHEL 7/6

How To Run and Save a Docker Container

1. In this example we will run and save an **Ubuntu** based Docker container where **Nginx** server will be installed. But before committing any changes to container, first start the container with the below command which installs **Nginx** daemon into Ubuntu image:

```
# docker run ubuntu bash -c "apt-get -y install nginx"
```

```
[root@tecmint ~]# docker run ubuntu bash -c "apt-get -y install nginx"
Reading package lists...
Building dependency tree...
Reading state information...
The following extra packages will be installed:
  fontconfig-config fonts-dejavu-core geoip-database libfontconfig1
  libfreetype6 libgd3 libgeoip1 libjbig0 libjpeg-turbo8 libjpeg8 libtiff5
  libvpx1 libx11-6 libx11-data libxau6 libxcb1 libxdmcp6 libxml2 libxpm4
  libxslt1.1 nginx-common nginx-core sgml-base xml-core
Suggested packages:
  libgd-tools geoip-bin fcgiwrap nginx-doc sgml-base-doc debhelper
The following NEW packages will be installed:
  fontconfig-config fonts-dejavu-core geoip-database libfontconfig1
  libfreetype6 libgd3 libgeoip1 libjbig0 libjpeg-turbo8 libjpeg8 libtiff5
  libvpx1 libx11-6 libx11-data libxau6 libxcb1 libxdmcp6 libxml2 libxpm4
  libxslt1.1 nginx nginx-common nginx-core sgml-base xml-core
0 upgraded, 25 newly installed, 0 to remove and 0 not upgraded.
Need to get 5612 kB of archives.
After this operation, 19.8 MB of additional disk space will be used.
Get:1 http://archive.ubuntu.com/ubuntu/ trusty/main libgeoip1 amd64 1.6.0-1 [71.
0 kB]
_
```

Install Nginx on Ubuntu Docker Container

2. Next, after **Nginx** package is installed, issue the command `docker ps -l` to get the **ID** or **name** of the running container.

```
# docker ps -l
```

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```
[root@tecmint ~]# docker ps -l
CONTAINER ID        IMAGE               COMMAND                  CREATED
   STATUS                      PORTS               NAMES
5976e4ae287c        ubuntu              "bash -c 'apt-get -y   3 minutes ago
   Exited (0) 3 minutes ago                        compassionate_mayer
[root@tecmint ~]# _
```

Find Docker Container ID Name

And apply changes by running the below command:

```
# docker commit 5976e4ae287c ubuntu-nginx
```


Here, `5976e4ae287c` represents the container `ID` and `ubuntu-nginx` represents the name of the newly image that has been saved with committed changes.

In order to view if the new image has been successfully created just run `docker images` command and a listing of all saved images will be shown.

```
# docker images
```

```
[root@tecmint ~]# docker ps -l
CONTAINER ID        IMAGE               COMMAND                  CREATED
   STATUS                      PORTS               NAMES
5976e4ae287c        ubuntu              "bash -c 'apt-get -y   6 minutes ago
   Exited (0) 6 minutes ago                        compassionate_mayer
[root@tecmint ~]# docker commit 5976e4ae287c ubuntu-nginx
7c664e7ec222f91d92a12be33482772f7686416b8314b2dff8811d950b16daac
[root@tecmint ~]# docker images
REPOSITORY          TAG                 IMAGE ID            CREATED
VIRTUAL SIZE
ubuntu-nginx        latest              7c664e7ec222        19 seconds ago
206 MB
ubuntu              latest              8693db7e8a00        8 days ago
187.9 MB
hello-world         latest              975b84d108f1        3 months ago
960 B
[root@tecmint ~]# _
```

Docker Container Changes

Chances are that the installation process inside the container finishes fast which leads to a non-running container (container is stopped). In this case the `docker ps` command won't show any output because no container is running.

In order to be able to still get the container's id run `docker ps -a | head -3` to output the most recent containers and identify the container based on the

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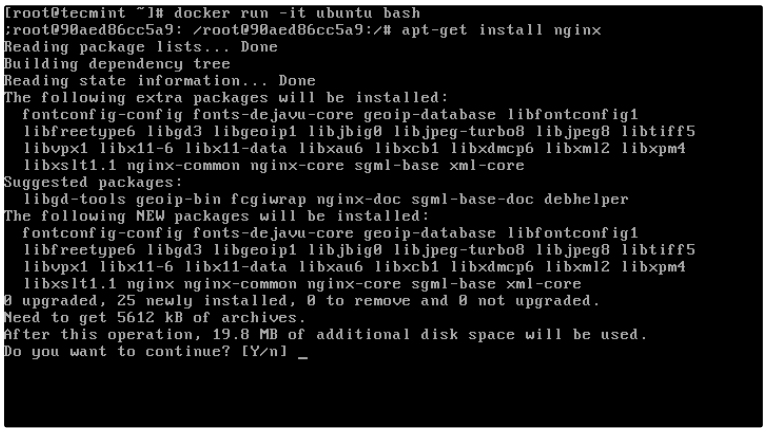
3. Alternatively, you can actively enter container session by running `docker run -it ubuntu bash` command and execute further `apt-get install nginx` command. While the command is running, detach from the container using `Ctrl-p + Ctrl-q` keys and the container will continue running even if the Nginx installation process finishes.

```
# docker run -it ubuntu bash
# apt-get install nginx
```



Install Nginx on Docker Container

Then, get the running container id with `docker ps` and commit changes. When finished, re-enter to container console using `docker attach` and type `exit` to stop container.

```
# docker ps
# docker attach 3378689f2069
# exit
```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Attach Docker Container

4. To further test if the recently image has been committed properly (in this case **Nginx** service has been installed), execute the below command in order to generate a new container which will output if Nginx binary was successfully installed:

```
# docker run ubuntu-nginx whereis nginx
```

Generate New Docker Container

5. To remove a container use the `rm` command against a container ID or name, which can be obtained using `docker ps -a` command:

```
# docker ps -a
# sudo docker rm 36488523933a
```

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Remove Docker Container

How to Run Nginx inside Docker Container

6. In this part we will concentrate on how you can run and access a network service, such as a **Nginx** web server, inside Docker, using the `ubuntu-nginx` image created earlier where Nginx daemon was installed.

The first thing that you need to do is to create a new container, map host-container ports and enter container shell by issuing the below command:

```
# docker run -it -p 81:80 ubuntu-nginx /bin/bash
# nginx &
```

Here, the `-p` option exposes the host port to container port. While the host port can be arbitrary, with the condition that it should be available (no other host services should listen on it), the container port must be exactly the port that the inside daemon is listening to.

Once you're connected to container session, start **Nginx** daemon in background and detach from container console by pressing `Ctrl-p + Ctrl-q` keys.

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Run Nginx Inside Docker Container

7. Now, run `docker ps` to get the state of your running container. You can also view host network sockets by issuing the following command:

```
# docker ps
OR
# netstat -tlpn
```

View Docker Container Running State

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8. In order to visit the page served by the Nginx container, open a browser from a remote location in your LAN and type the IP address of your machine using the HTTP protocol.

Verify Nginx Running under Docker Container

9. To stop the container run the following command followed by container ID or name:

```
# docker ps
# docker stop fervent_mccarthy
# docker ps
```

Stop Running Docker Container

As alternative to stop the running container, enter container shell command prompt and type exit to finish process:

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```
# docker attach fervent_mccarthy
# exit
```

Be aware that using this kind of containers to run web servers or other kind of services are best suited only for development purposes or tests due to the fact that the services are only active while the container is running. Exiting the container disrupts all running services or any changes made.

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kosmos June 13, 2016 at 6:52 am

Hi, when I run the command # docker run ubuntu bash -c “apt-get -y install nginx”

i got this error message

[root@ip-172-31-19-219 ~]# docker run ubuntu bash -c “apt-get -y install nginx”
Reading package lists…
Building dependency tree…
Reading state information…
E: Unable to locate package nginx

Thanks!

Reply

Matei Cezar June 21, 2016 at 8:20 pm

What image are you using? verify /etc/apt/sources.list and always run sudo apt-get update before installing anything so that the package list is up-to-date.

Reply

Debojyoti Bose October 21, 2016 at 1:28 pm

The above error indicates that the repos (universe) inside the **sources.list** doesn’t have the required package (nginx) for the image ‘ubuntu’. Things will work If you try using the image ‘**docker.io/nickistre/ubuntu-lamp**‘, you will be able install the nginx daemon inside the container.

```
[root@docker ~]# docker images
REPOSITORY                  TAG       IMAGE ID       CREATED          SIZE
ubuntu-nginx                latest    7f6682022f10   23 minutes ago   642.6 MB
docker.io/nickistre/ubuntu-lamp   latest    28db94cff13b   7 days ago       634.5 MB
[root@docker ~]# docker run ubuntu-nginx whereis nginx
nginx: /usr/sbin/nginx /etc/nginx /usr/share/nginx /usr/share/man/man1/nginx.1.gz
[root@docker ~]#
```

Reply

Shambhu March 29, 2016 at 5:54 pm

hi,
Could you please let me know how can I set IP in docker image ?

Reply

Matei Cezar March 30, 2016 at 4:01 pm

You cannot set an IP address inside a docker container, but you can create a bridge interface on the host and instruct a docker container to use that bridge using the -b option.

Reply

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Shambhu March 30, 2016 at 4:44 pm

Hi,
Thanks But after apache install how I will call at browser ? Could you please share any doc or tutorial for this ?

I will be thank full

Reply

Ravi February 4, 2016 at 11:09 pm

Please post next part of Docker..

Many Thanks
Ravi

Reply

Ravi Saive February 5, 2016 at 10:56 am

@Ravi

Already published part 3, here is the link just go through it..

http://www.tecmint.com/build-and-configure-docker-container-images-with-dockerfile/

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