

처음 뵙겠습니다 ?!

▷ 아직 설문 조사 안해주신 분들 꼭 참여해주세요

- <https://forms.gle/qhnDSrXqNyNn2rvr9>

▷ Camera는 가급적 켜 주시면 대단히 감사하겠습니다 !!!

- 너무 부끄러우면 Snap Camera를 사용하시는 것까지는~ ^^

▷ 오늘 수업 자료는 아래 링크에서 다운로드 받으실 수 있어요.

- <https://github.com/whatwant-school/kubernetes>

1st
Week

I am ground

People

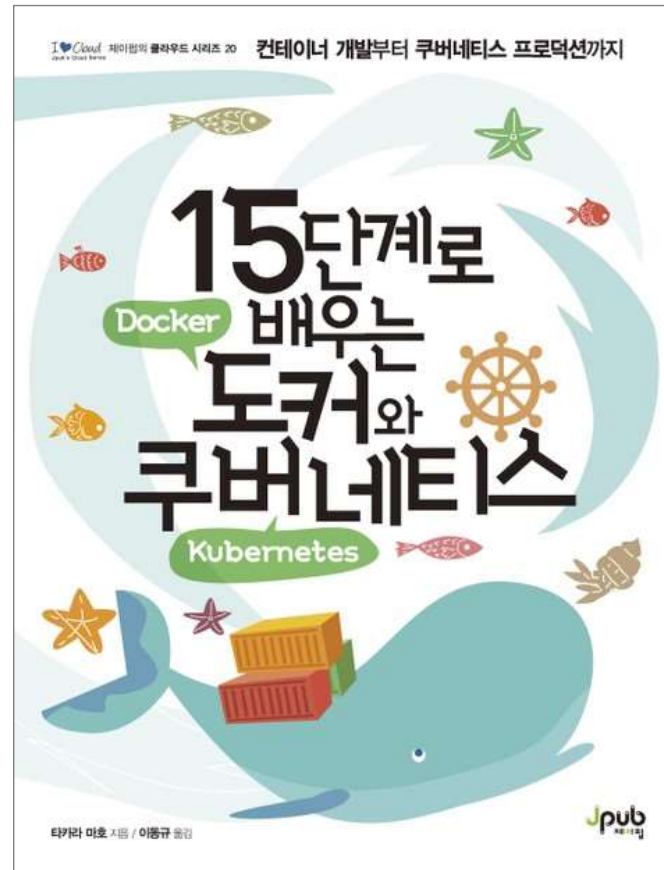
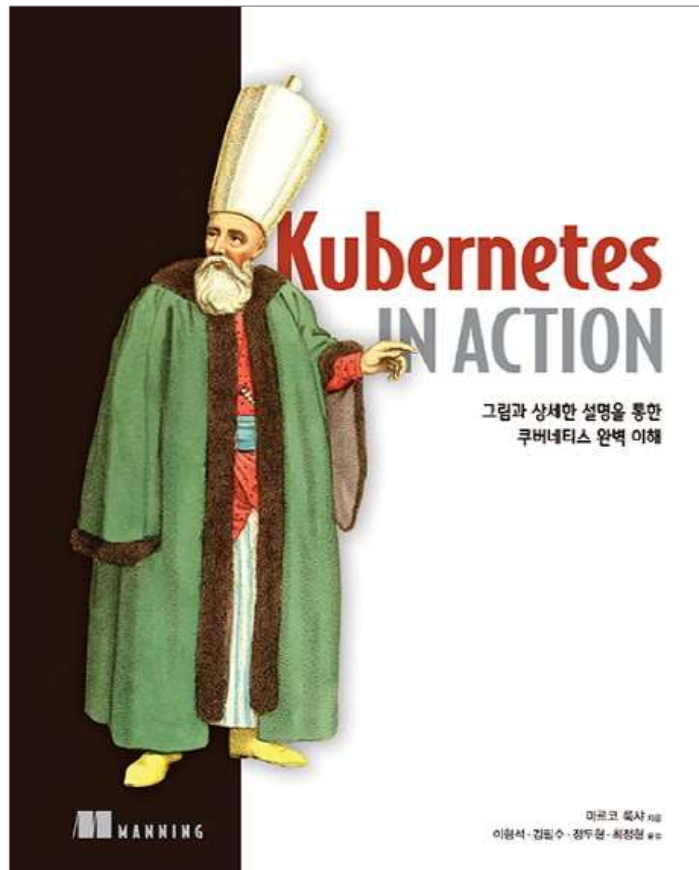
No	Date	E-mail	GitHub	퀴즈 닉네임
01	임현덕			
02	권준혁			
03	홍재환			
04	김형섭			
05	이성민			
06	박형태			
07	장경성			
08	김정규			
09	노윤정			
10	왕성현			
11	박준서			
12	이경아			
13	이상윤			
14	염혜원			

Survey

수업은 이렇게 진행하려고요

- ▷ 2시간 수업이지만, 조금 넘을 수도 있어요 (배고프겠지만, 공부에 대한 열정으로 극복해보아요!)
- ▷ 마지막 수업은 오프라인(강남캠퍼스)으로 했으면 좋겠어요 (상품 증정식도 있을거예요!)
- ▷ 로컬 실습 환경은 꼭 구성해서 직접 다루면서 공부할 수 있으면 좋겠습니다.
- ▷ 2시간 中 1시간은 플립-러닝으로 진행하고, 30분은 summary, 30분은 퀴즈 및 소통의 시간
- ▷ 예습은 선택, 복습은 필수 !!!
- ▷ Camera On은 필수, Mic On은 선택 !!!
- ▷ 질문을 창피해 하지 말아요. 같이 소통하면서 알찬 수업을 만들어요 !!!
- ▷ 공부도 중요하지만, 우리 서로의 인맥이 되어봐요 !!!

Books



but ...

Our goal is not to be ~~user~~,
to be administrator of K8s

Schedule

No	Date	Contents	발표자	퀴즈 1위	퀴즈 2위	퀴즈 3위
01	07.16	Container & Docker	박재규			
02	07.23	Pods & Namespaces				
03	07.30	ReplicaSet/DaemonSet/Job/CronJob				
04	08.06					
05	08.13					
06	08.20					
07	08.27					
08	09.03					
09	09.10					
10	09.17					
11	09.24					



Study Environment

S/W Development Environment

It's Linux !!



Container

A Brief History of Containers: From the 1970s Till Now

1979: Unix V7 – chroot 도입

2000: FreeBSD Jails – 서비스와 고객 서비스를 구분하기 위해 여러 개의 독립적이고 작은 시스템(jails)으로 분할

2001: Linux VServer - Jails와 유사하게, 리소스(파일 시스템, 네트워크 주소, 메모리)를 분할 할 수 있는 운영 체제 가상화를 Linux 커널 패치로 구현

2004: Solaris Containers – 첫 번째 공개 베타 출시

2005: Open VZ (Open Virtuozzo) - 가상화, 격리, 리소스 관리 및 체크 포인트를 위해 패치 된 Linux 커널을 사용하는 Linux 용 운영 체제 수준의 가상화 기술

2006: Process Containers - 2006년 Google 출시. 리소스 사용량(CPU, Mem, Disk I/O, NW)을 제한, 계산 및 격리하도록 설계. 1년 후 "cgroups"으로 이름 변경.

2008: LXC (Linux Containers) – 컨테이너 관리자의 가장 완벽한 최초 구현. cgroups & namespace를 사용하여 구현.

2011: Warden – CloudFoundry에서 초기에는 LXC를 사용하고 나중에 자체 구현으로 대체. cgroups, namespace 및 프로세스 수명주기 관리 서비스 포함.

2013: LMCTFY (Let Me Contain That For You) – Linux 애플리케이션 컨테이너를 제공하는 Google 컨테이너 스택의 오픈 소스 버전. 2015년 중단.

2013: Docker - 컨테이너 인기 폭발. 초기 단계 LXC 사용, 추후 자체 라이브러리 libcontainer로 대체.

2014: Kubernetes (Google)

2015: Kubernetes to CNCF

2016: The Importance of Container Security Is Revealed – DevSecOps

2017: Container Tools Become Mature – 컨테이너 도구의 성숙

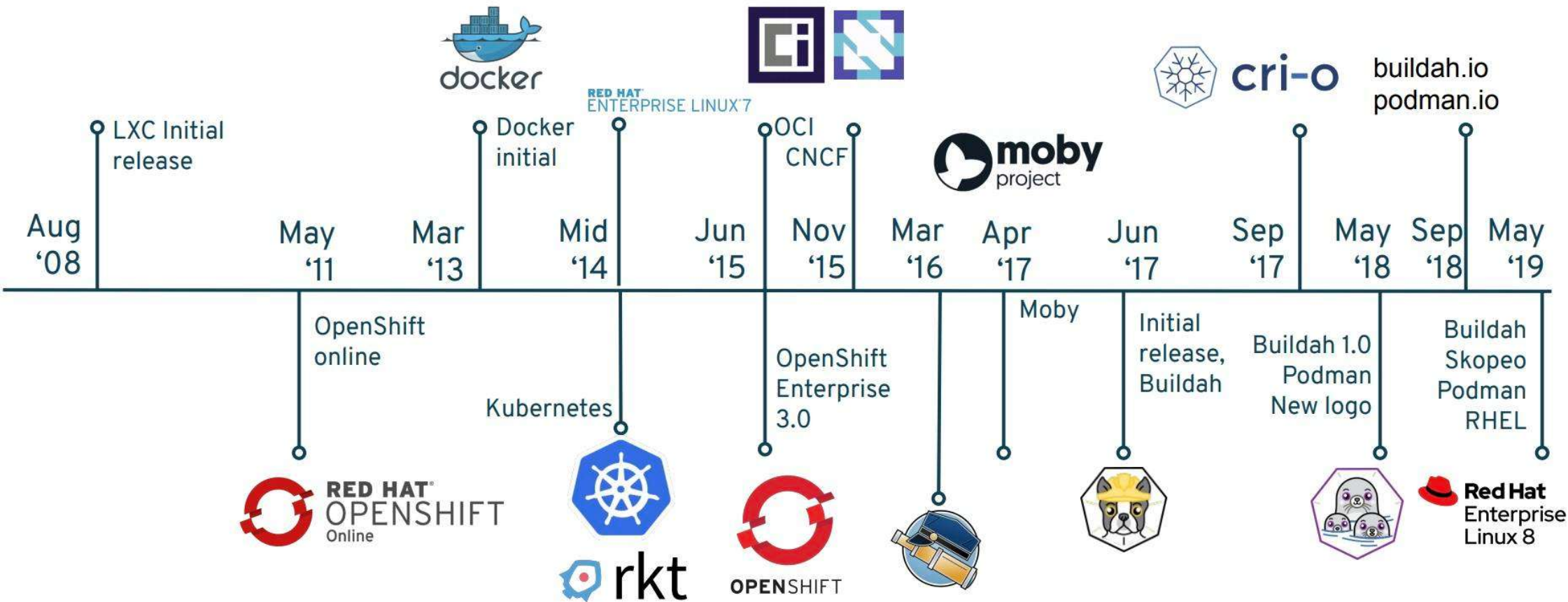
2017: containerd to CNCF (Docker)

2018: The Gold Standard – 시장 표준

2019: A Shifting Landscape - 변화

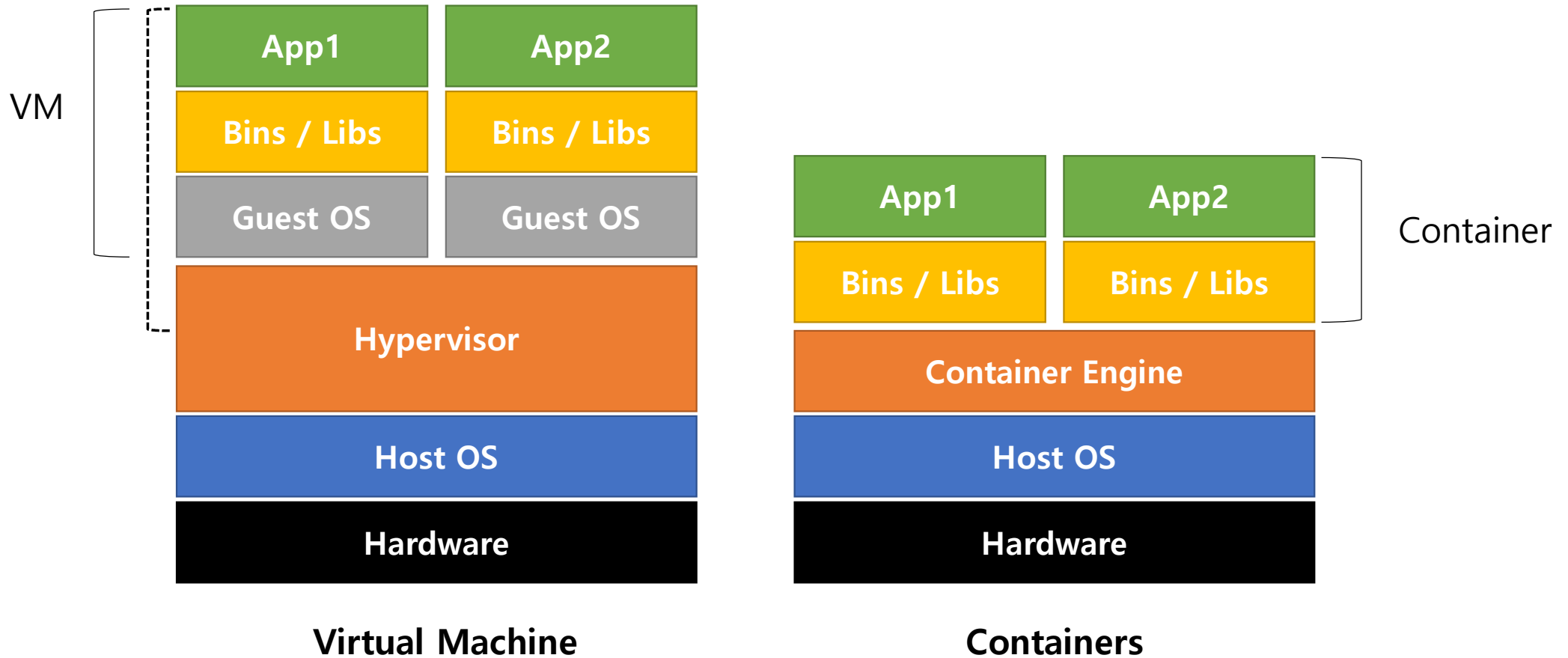
※ 참고 : <https://blog.aquasec.com/a-brief-history-of-containers-from-1970s-chroot-to-docker-2016>

Evolution of the open-source container

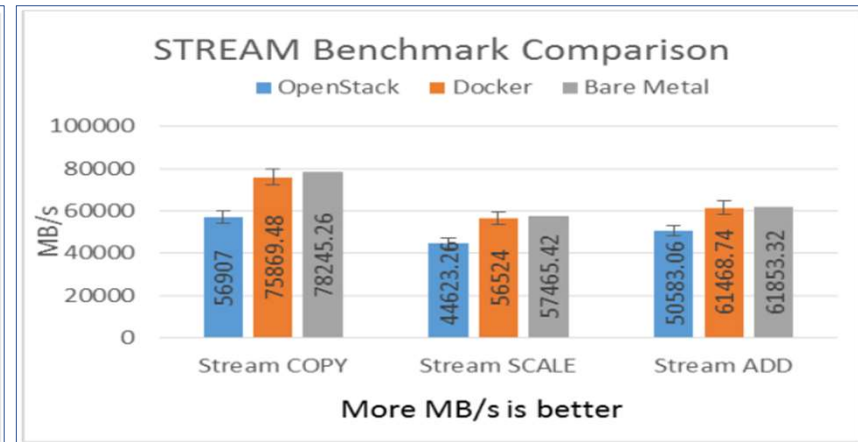
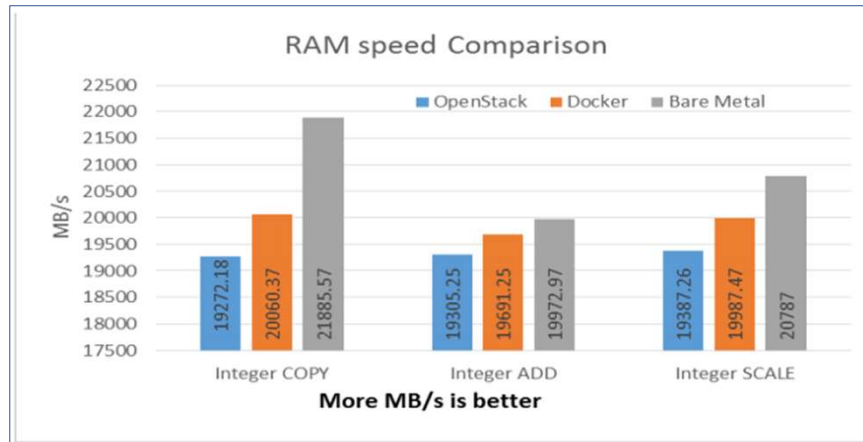
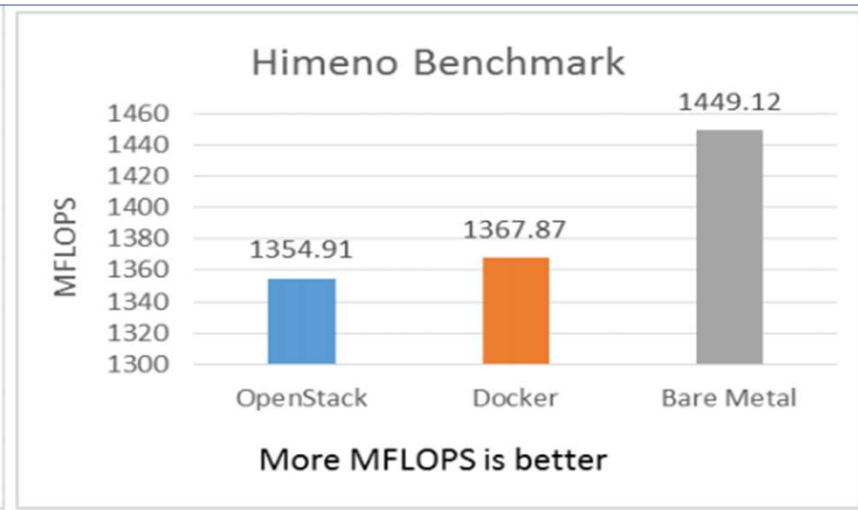
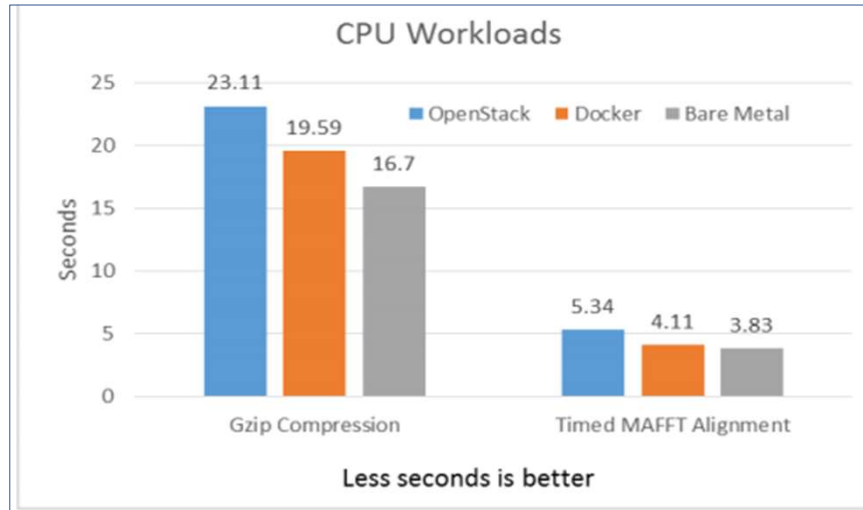


※ 참고 : <https://developer.ibm.com/tutorials/multi-architecture-cri-o-container-images-for-red-hat-openshift/>

Virtual Machine vs. Containers



Docker Container vs. Openstack VM vs. Bare Metal Server



※ 참고 : <http://ijeecs.iaescore.com/index.php/IJECS/article/view/7925>

Docker with Kernel



Linux Kernel

Namespaces

PID

MNT

IPC

UTS

NET

Cgroups

cpu

cpuset

memory

device

Networking

veth

bridge

iptables

Storage

device mapper

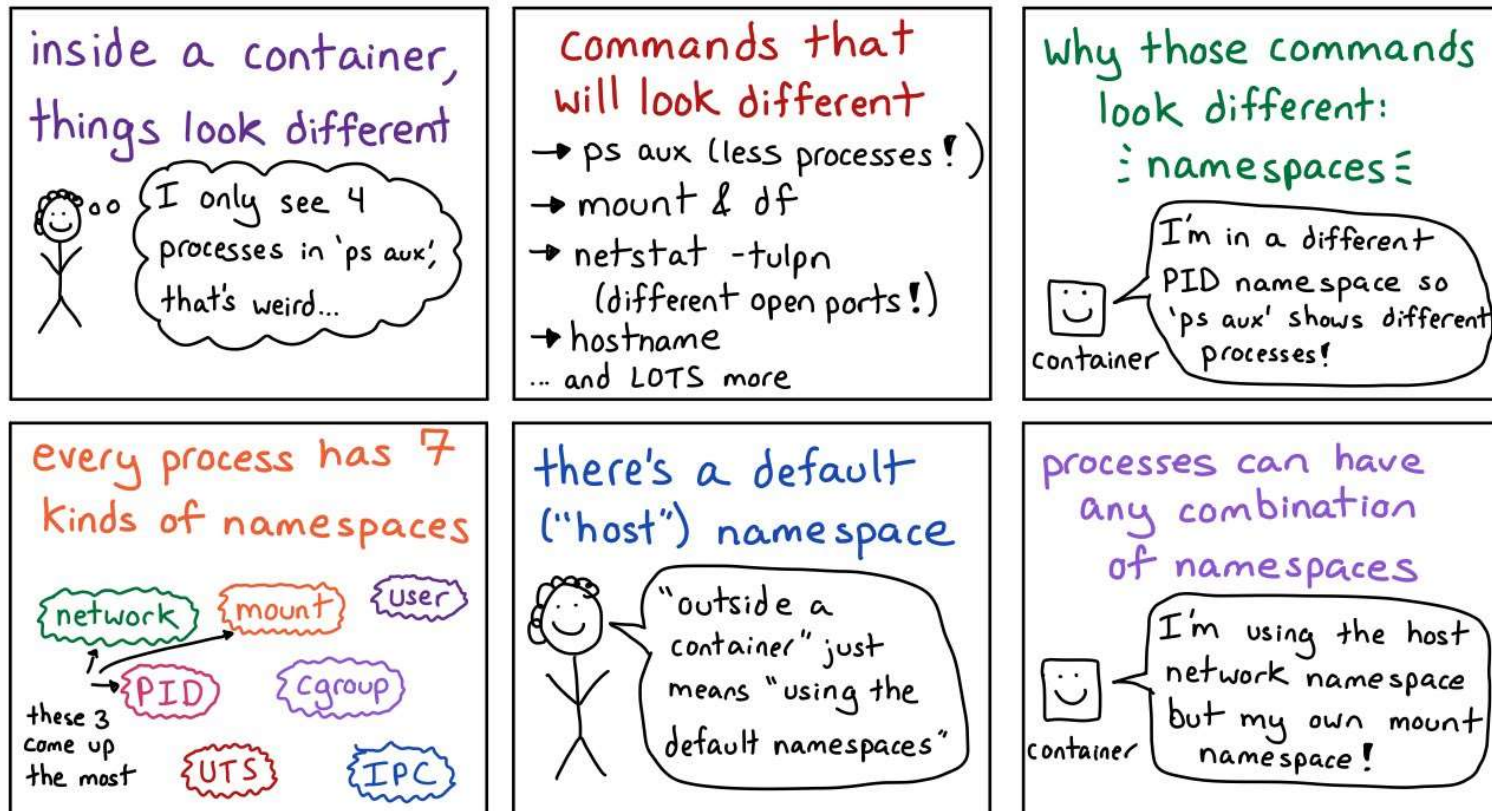
btrfs

aufs

namespaces

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namespaces



♥ this? more at wizardzines.com

namespaces

- ▷ a feature of the Linux kernel that **partitions kernel resources** such that one set of processes sees one set of resources while another set of processes sees a different set of resources.

```
> sudo ls -al /proc/1/ns
```

```
합계 0
dr-x--x--x 2 root root 0 12월 24 23:32 .
dr-xr-xr-x 9 root root 0 12월 24 23:02 ..
lrwxrwxrwx 1 root root 0 12월 24 23:32 cgroup -> 'cgroup:[4026531835]'
lrwxrwxrwx 1 root root 0 12월 24 23:32 ipc -> 'ipc:[4026531839]'
lrwxrwxrwx 1 root root 0 12월 24 23:32 mnt -> 'mnt:[4026531840]'
lrwxrwxrwx 1 root root 0 12월 24 23:32 net -> 'net:[4026531992]'
lrwxrwxrwx 1 root root 0 12월 24 23:32 pid -> 'pid:[4026531836]'
lrwxrwxrwx 1 root root 0 12월 24 23:32 pid_for_children -> 'pid:[4026531836]'
lrwxrwxrwx 1 root root 0 12월 24 23:32 user -> 'user:[4026531837]'
lrwxrwxrwx 1 root root 0 12월 24 23:32 uts -> 'uts:[4026531838]'
```

same namespaces

```
> sudo ls -al /proc/2/ns
```

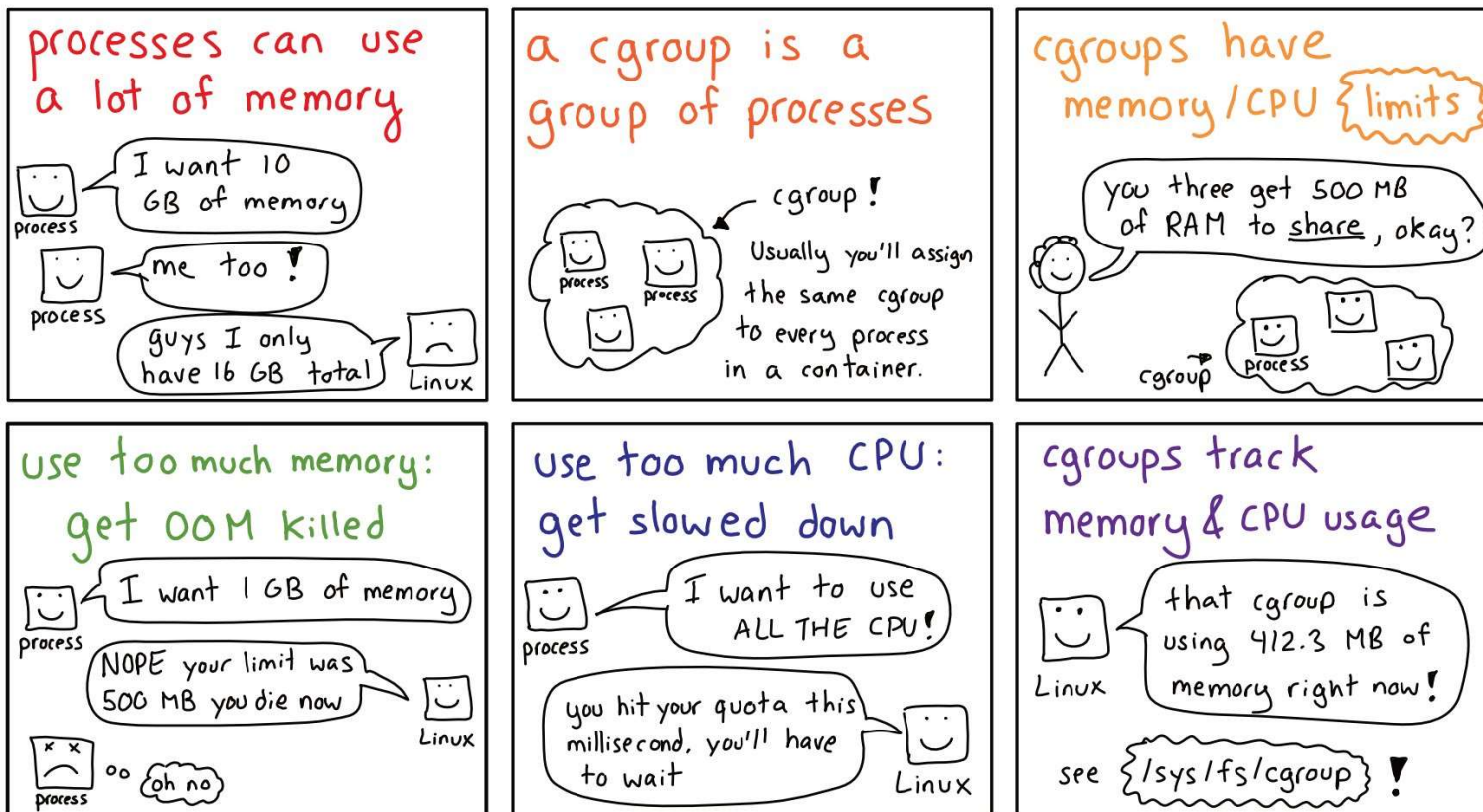
```
합계 0
dr-x--x--x 2 root root 0 12월 24 23:36 .
dr-xr-xr-x 9 root root 0 12월 24 23:02 ..
lrwxrwxrwx 1 root root 0 12월 24 23:36 cgroup -> 'cgroup:[4026531835]'
lrwxrwxrwx 1 root root 0 12월 24 23:36 ipc -> 'ipc:[4026531839]'
lrwxrwxrwx 1 root root 0 12월 24 23:36 mnt -> 'mnt:[4026531840]'
lrwxrwxrwx 1 root root 0 12월 24 23:36 net -> 'net:[4026531992]'
lrwxrwxrwx 1 root root 0 12월 24 23:36 pid -> 'pid:[4026531836]'
lrwxrwxrwx 1 root root 0 12월 24 23:36 pid_for_children -> 'pid:[4026531836]'
lrwxrwxrwx 1 root root 0 12월 24 23:36 user -> 'user:[4026531837]'
lrwxrwxrwx 1 root root 0 12월 24 23:36 uts -> 'uts:[4026531838]'
```

※ 참고 : https://en.wikipedia.org/wiki/Linux_namespaces

cgroups (control groups)

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cgroups



※ 참고 : <https://twitter.com/b0rk/status/1214341831049252870>

cgroups (control groups)

- ▷ Linux kernel feature that **limits**, accounts for, and isolates the resource usage (CPU, memory, disk I/O, network, etc.) of a **collection of processes**.

```
> ls -al /sys/fs/cgroup
합계 0
drwxr-xr-x 15 root root 380 7월 15 00:32 .
drwxr-xr-x  9 root root  0 7월 15 00:32 ..
dr-xr-xr-x  5 root root  0 7월 15 00:32 blkio
lrwxrwxrwx  1 root root 11 7월 15 00:32 cpu -> cpu,cpuacct
dr-xr-xr-x  5 root root  0 7월 15 00:32 cpu,cpuacct
lrwxrwxrwx  1 root root 11 7월 15 00:32 cpuacct -> cpu,cpuacct
dr-xr-xr-x  3 root root  0 7월 15 00:32 cpuset
dr-xr-xr-x  5 root root  0 7월 15 00:32 devices
dr-xr-xr-x  3 root root  0 7월 15 00:32 freezer
dr-xr-xr-x  3 root root  0 7월 15 00:32 hugetlb
dr-xr-xr-x  5 root root  0 7월 15 00:32 memory
lrwxrwxrwx  1 root root 16 7월 15 00:32 net_cls -> net_cls,net_prio
dr-xr-xr-x  3 root root  0 7월 15 00:32 net_cls,net_prio
lrwxrwxrwx  1 root root 16 7월 15 00:32 net_prio -> net_cls,net_prio
dr-xr-xr-x  3 root root  0 7월 15 00:32 perf_event
dr-xr-xr-x  5 root root  0 7월 15 00:32 pids
dr-xr-xr-x  3 root root  0 7월 15 00:32 rdma
dr-xr-xr-x  6 root root  0 7월 15 00:32 systemd
dr-xr-xr-x  6 root root  0 7월 15 00:32 unified
```

```
> cat /proc/cgroups
```

#subsys_name	hierarchy	num_cgroups	enabled
cpuset	10	1	1
cpu	5	65	1
cpuacct	5	65	1
blkio	8	65	1
memory	12	99	1
devices	2	65	1
freezer	9	1	1
net_cls	7	1	1
perf_event	6	1	1
net_prio	7	1	1
hugetlb	3	1	1
pids	11	68	1
rdma	4	1	1

※ 참고 : <https://en.wikipedia.org/wiki/Cgroups>

Container Network Model (CNM)

▷ Sandbox

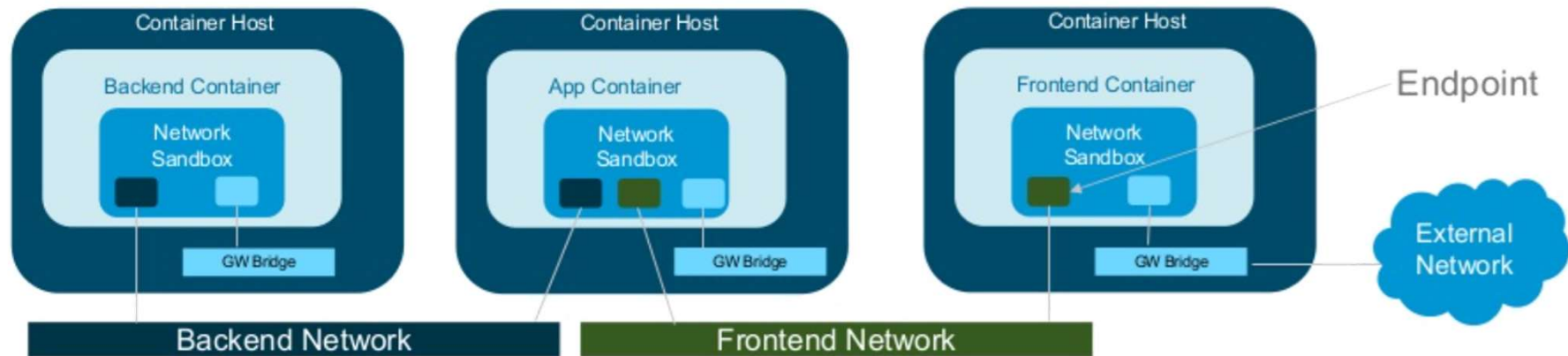
- A Sandbox contains the configuration of a container's network stack.
- This includes management of the container's interfaces, routing table and DNS settings.
- An implementation of a Sandbox could be a Linux Network Namespace, a FreeBSD Jail or other similar concept.

▷ Endpoint

- An Endpoint joins a Sandbox to a Network.
- An implementation of an Endpoint could be a veth pair, an Open vSwitch internal port or similar

▷ Network

- A Network is a group of Endpoints that are able to communicate with each-other directly.
- An implementation of a Network could be a VXLAN Segment, a Linux bridge, a VLAN, etc.

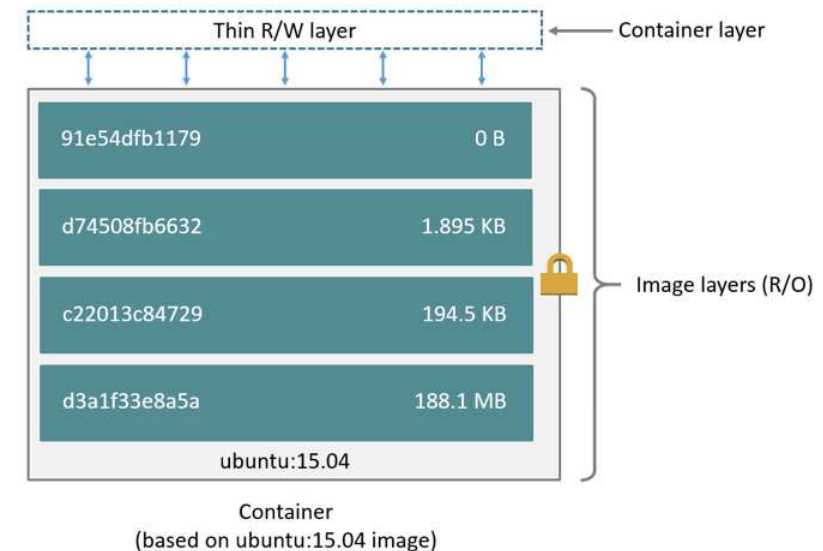
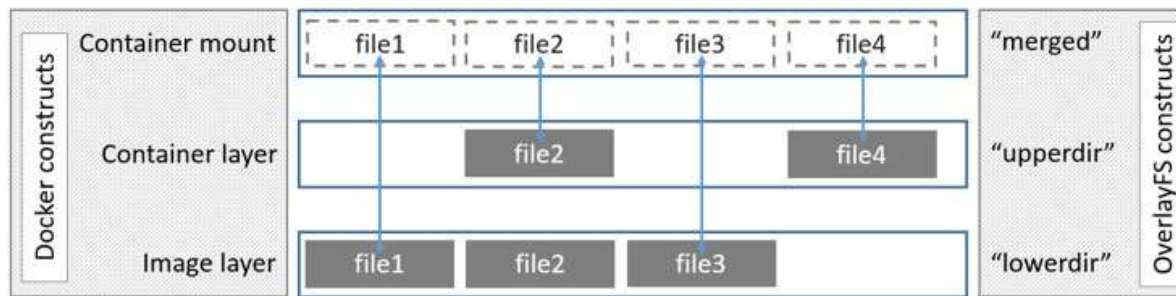


※ 참고 : <https://www.slideshare.net/OpenNetworkingSummit/container-networking-deep-dive>

Docker Storage Driver

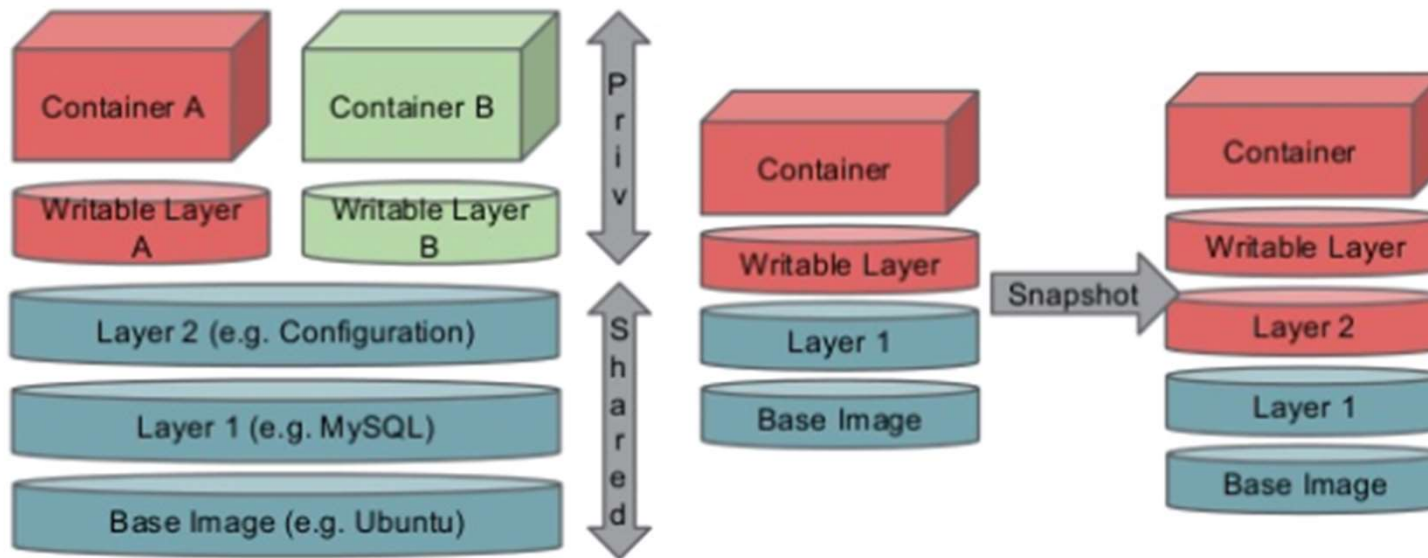
▷ Docker supports the following storage drivers

- **overlay2** : 기본 드라이버
- **aufs** : Docker 18.06 및 이전 버전에서 사용
- **fuse-overlayfs** : Rootless 지원 안되는 호스트에서 Rootless Docker를 사용할 때
- **devicemapper** : production 환경을 위해서는 direct-lvm 필요.
- **btrfs** and **zfs** : "snapshots" 같은 고급 기능을 지원하지만 설치와 유지보수가 까다로움.
- **vfs** : 테스트 목적으로만 사용하는 것을 권장



※ 참고 : <https://docs.docker.com/storage/storagedriver/overlayfs-driver/>

Docker Storage Driver



※ 참고 : <https://docs.docker.com/storage/storagedriver/overlayfs-driver/>

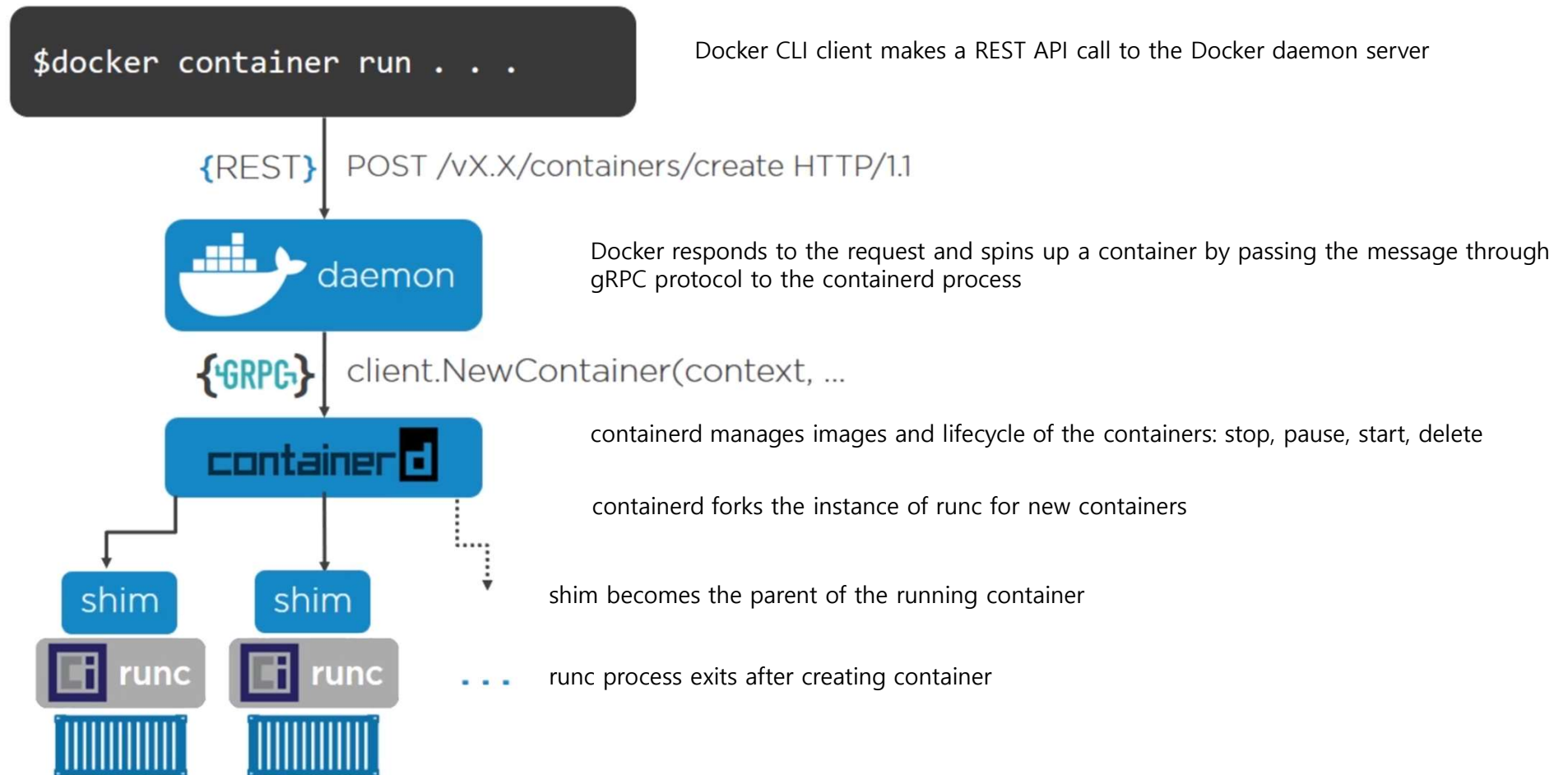


Breaktime



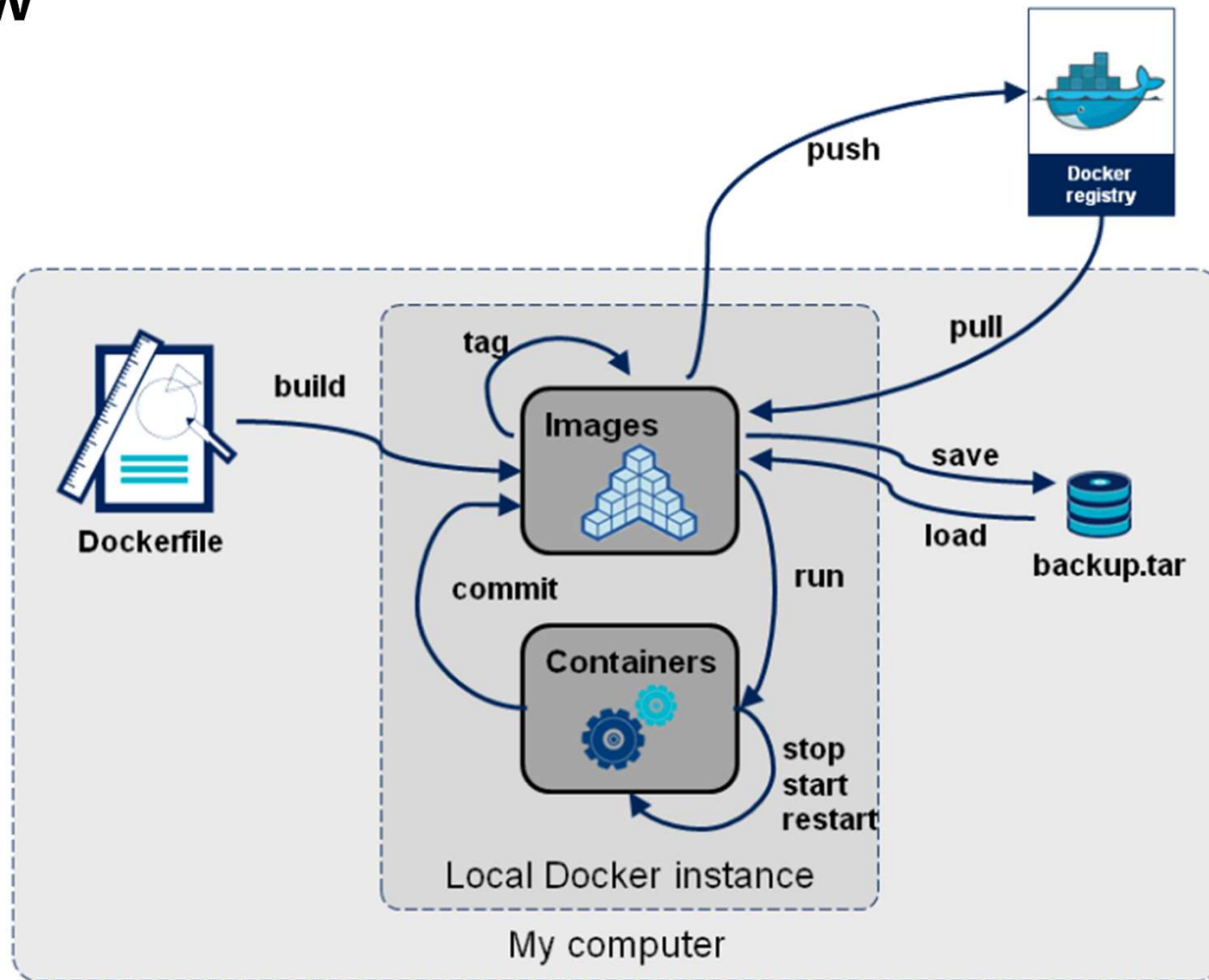
Docker

Docker Engine Architecture



※ 참고 : <https://betterprogramming.pub/docker-for-front-end-developers-c758a44e622f>

Docker flow



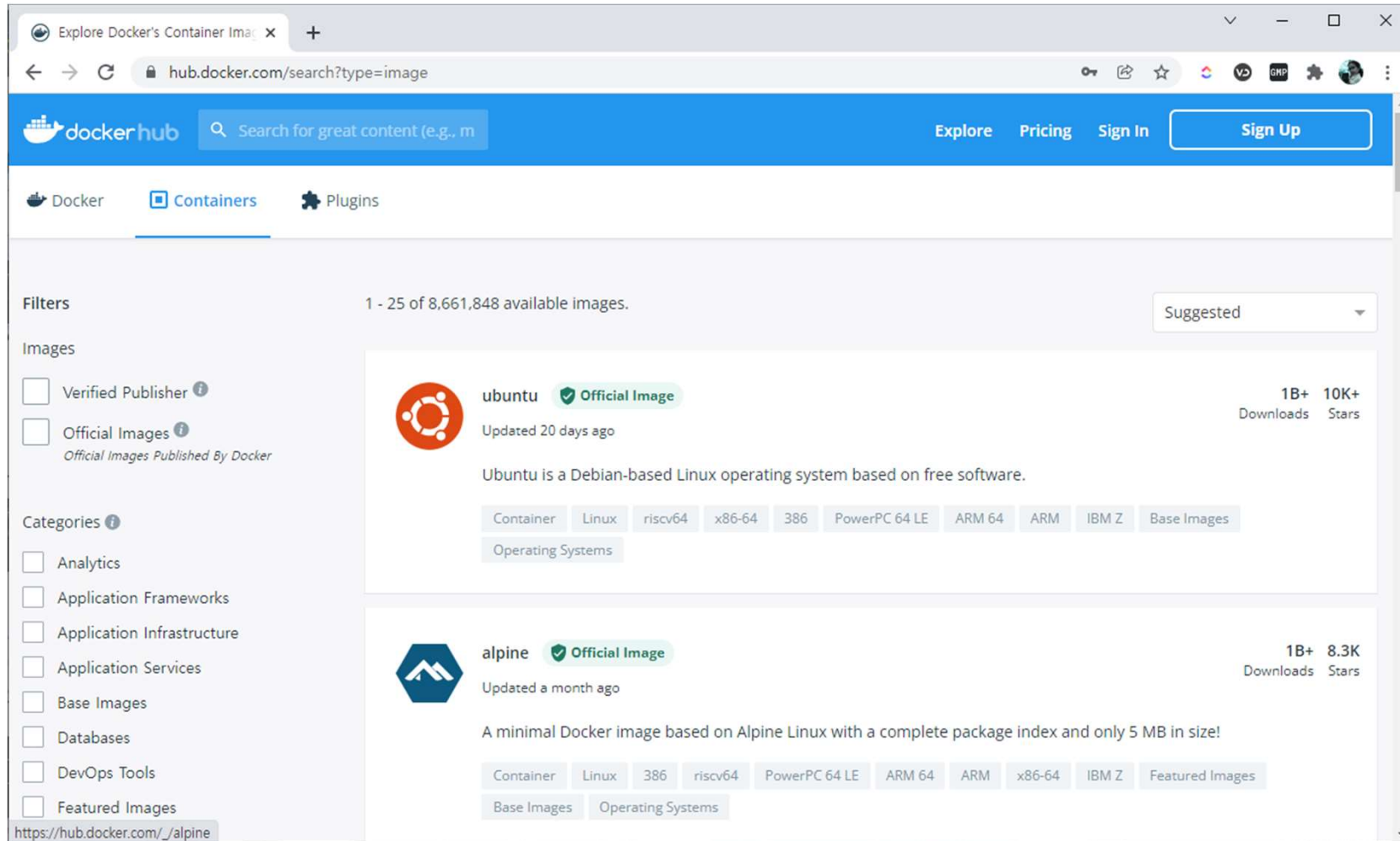
※ 참고 : <https://blog.wonizz.tk/2019/07/31/docker-dockerfile/>

Dockerfile

```
1  # fetch node v4 LTS codename argon
2  FROM node:argon
3
4  # Request samplename build argument
5  ARG samplename
6
7  # Create app directory
8  RUN mkdir -p /usr/src/spfx-samples
9  WORKDIR /usr/src/spfx-samples
10
11 #Install app dependencies
12 RUN git clone https://github.com/SharePoint/sp-dev-fx-webparts.git .
13 WORKDIR /usr/src/spfx-samples/samples/$samplename
14
15 # install gulp on a global scope
16 RUN npm install gulp -g
17
18 # RUN ["npm", "install", "gulp"]
19 RUN npm install
20 RUN npm cache clean
21
22 # Expose required ports
23 EXPOSE 4321 35729 5432
24
25 # Run sample
26 CMD ["gulp", "serve"]
27
```

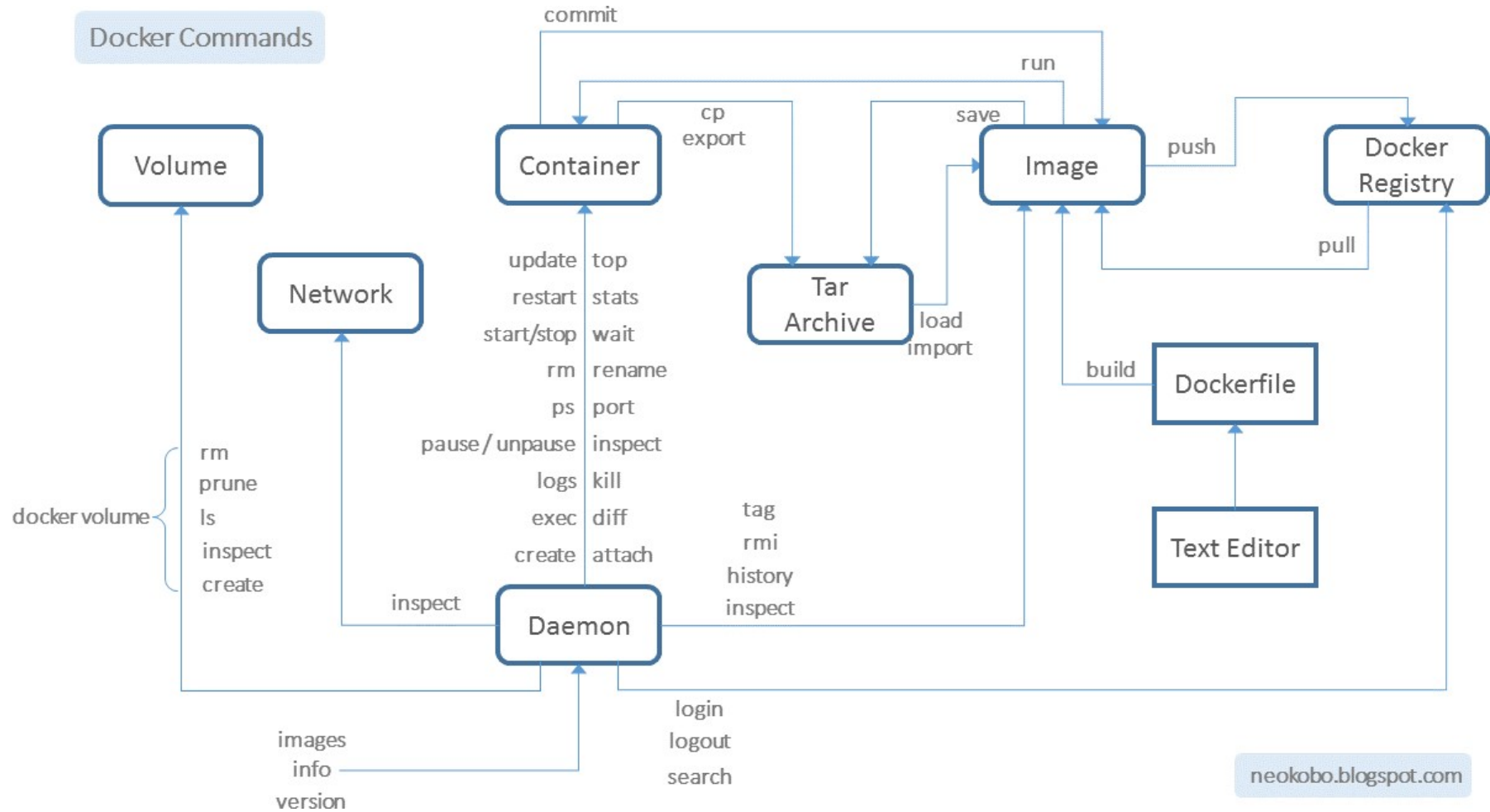
※ 참고 : <https://n8d.at/how-to-run-sharepoint-pattern-and-practices-samples-through-docker/>

Docker Hub (Registry)



※ 참고 : <https://hub.docker.com/>

Docker command



※ 참고 : <http://neokobo.blogspot.com/2017/12/docker-command-flowchart.html>



Docker Hands-On

Agenda

- ▷ VirtualBox Install
- ▷ Ubuntu Install
- ▷ Docker Install
- ▷ Hands-On
- ▷ Tip #1 - DockerHub
- ▷ Tip #2 - Katacoda

VirtualBox Install

A screenshot of the VirtualBox.org website as seen through a web browser. The browser's address bar shows 'virtualbox.org'. The website features a blue header with the VirtualBox logo on the left and a search bar on the right. The main content area has a large 'VirtualBox' title and a 'Welcome to VirtualBox.org!' message. Below this, there is a paragraph describing VirtualBox as a powerful x86 and AMD64/Intel64 virtualization product. A large blue button with white text says 'Download VirtualBox 6.1'. To the left of the main content, there is a sidebar with links: 'About', 'Screenshots', 'Downloads', 'Documentation' (with sub-links for 'End-user docs' and 'Technical docs'), 'Contribute', and 'Community'. To the right, there is a 'News Flash' section with a list of recent releases and updates, including dates like 'May 17th, 2021' and 'November 22nd, 2021'.

Oracle VM VirtualBox

virtualbox.org

search...
Login Preferences

VirtualBox

Welcome to VirtualBox.org!

VirtualBox is a powerful x86 and AMD64/Intel64 virtualization product for enterprise as well as home use. Not only is VirtualBox an extremely feature rich, high performance product for enterprise customers, it is also the only professional solution that is freely available as Open Source Software under the terms of the GNU General Public License (GPL) version 2. See "About VirtualBox" for an introduction.

Presently, VirtualBox runs on Windows, Linux, Macintosh, and Solaris hosts and supports a large number of guest operating systems including but not limited to Windows (NT 4.0, 2000, XP, Server 2003, Vista, Windows 7, Windows 8, Windows 10), DOS/Windows 3.x, Linux (2.4, 2.6, 3.x and 4.x), Solaris and OpenSolaris, OS/2, and OpenBSD.

VirtualBox is being actively developed with frequent releases and has an ever growing list of features, supported guest operating systems and platforms it runs on. VirtualBox is a community effort backed by a dedicated company: everyone is encouraged to contribute while Oracle ensures the product always meets professional quality criteria.

Download
VirtualBox 6.1

Hot picks:

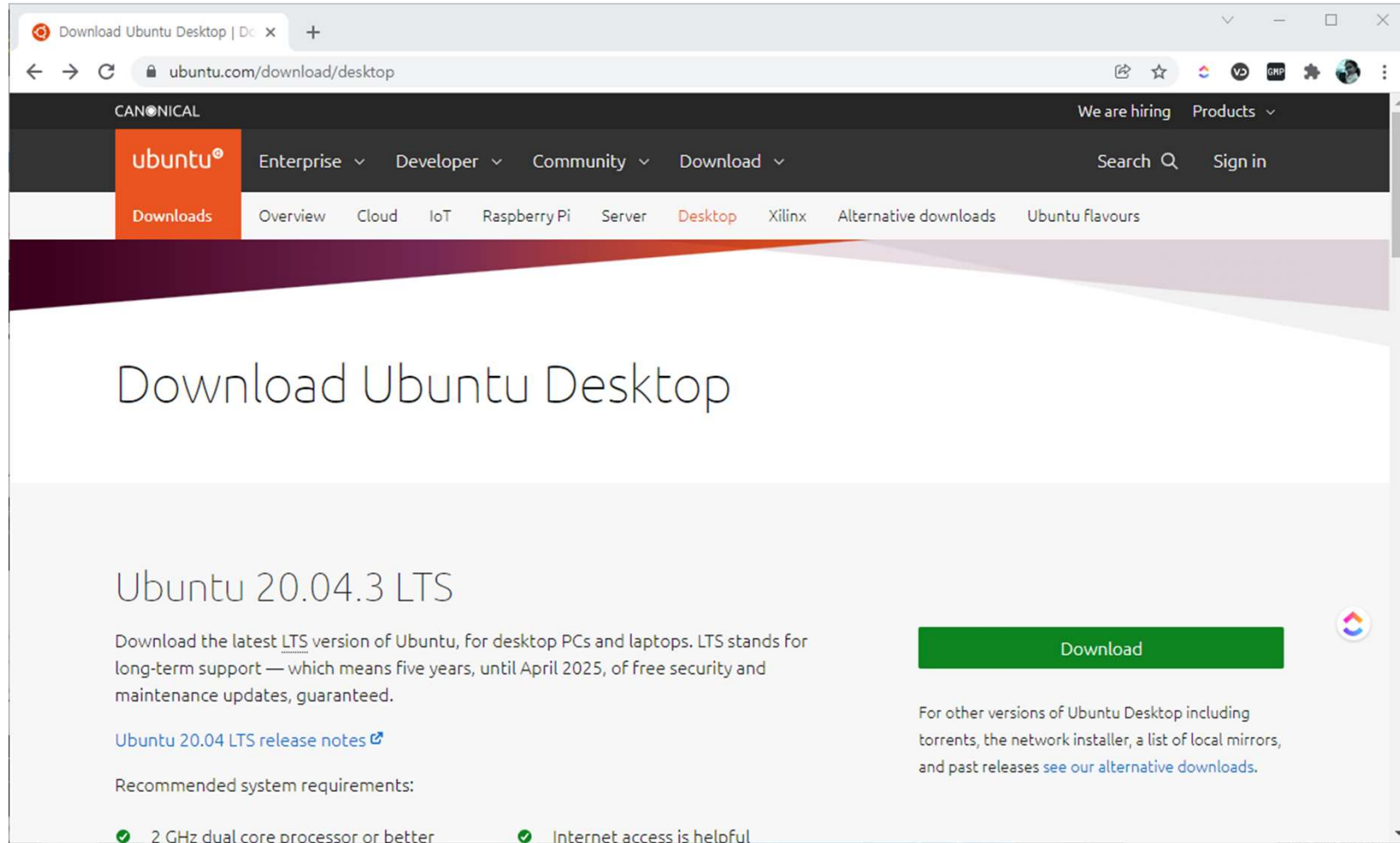
- Pre-built virtual machines for developers at [Oracle Tech Network](#)
- **Hyperbox** Open-source Virtual Infrastructure Manager [project site](#)
- **phpVirtualBox** AJAX web interface [project site](#)

News Flash

- **Important** May 17th, 2021
We're hiring!
Looking for a new challenge? We're hiring a VirtualBox senior developer in 3D area (Europe/Russia/India).
- **New** November 22nd, 2021
VirtualBox 6.1.30 released!
Oracle today released a 6.1 maintenance release which improves stability and fixes regressions. See the [Changelog](#) for details.
- **New** October 19th, 2021
VirtualBox 6.1.28 released!
Oracle today released a 6.1 maintenance release which improves stability and fixes regressions. See the [Changelog](#) for details.
- **New** July 28th, 2021
VirtualBox 6.1.26 released!
Oracle today released a 6.1 maintenance release which improves stability and fixes regressions. See the [Changelog](#) for details.
- **New** July 20th, 2021
VirtualBox 6.1.24 released!
Oracle today released a 6.1 maintenance release which improves stability and fixes regressions. See the [Changelog](#) for details.
- **New** April 29th, 2021
VirtualBox 6.1.22 released!
Oracle today released a 6.1 maintenance release which improves stability and fixes regressions. See the [Changelog](#) for details.

※ 참고 : <https://www.virtualbox.org/>

Ubuntu Install



※ 참고 : <https://ubuntu.com/download/desktop>

Docker Install

Ubuntu 배포판 확인

```
> lsb_release -a
```

```
No LSB modules are available.  
Distributor ID:      Ubuntu  
Description:         Ubuntu 18.04.6 LTS  
Release:             18.04  
Codename:            bionic
```

패키지 및 버전 확인



<https://download.docker.com/linux/ubuntu/dists/>

```
> wget https://download.docker.com/linux/ubuntu/dists/bionic/pool/stable/amd64/containerd.io_1.4.12-1_amd64.deb  
> wget https://download.docker.com/linux/ubuntu/dists/bionic/pool/stable/amd64/docker-ce-cli_20.10.12~3-0~ubuntu-bionic_amd64.deb  
> wget https://download.docker.com/linux/ubuntu/dists/bionic/pool/stable/amd64/docker-ce_20.10.12~3-0~ubuntu-bionic_amd64.deb  
  
> sudo dpkg --install ./containerd.io_1.4.12-1_amd64.deb  
> sudo dpkg --install ./docker-ce-cli_20.10.12~3-0~ubuntu-bionic_amd64.deb  
> sudo dpkg --install ./docker-ce_20.10.12~3-0~ubuntu-bionic_amd64.deb  
  
> sudo usermod -aG docker $USER  
  
> docker --version  
Docker version 20.10.12, build e91ed57  
  
> docker run hello-world
```

Just do - docker build

index.html

```
<!doctype html>
<html lang="en">
<head>
  <meta charset="utf-8">
  <title>Kubernetes</title>
</head>
<body>
  <h2>Hello from Nginx container</h2>
</body>
</html>
```

Dockerfile

```
FROM nginx:latest

COPY ./index.html /usr/share/nginx/html/index.html
```

예제 파일 내려 받은 후 docker image 빌드

```
> git clone https://github.com/whatwant-school/advanced-kubernetes.git
> cd advanced-kubernetes/01-week/
```

```
> docker build -t webserver .
...
```

```
> docker images
```

REPOSITORY	TAG	IMAGE ID	CREATED	SIZE
webserver	latest	6223db426adf	42 seconds ago	141MB
nginx	latest	f6987c8d6ed5	3 days ago	141MB
hello-world	latest	feb5d9fea6a5	3 months ago	13.3kB

※ 참고 : <https://www.docker.com/blog/how-to-use-the-official-nginx-docker-image/>

Just do - docker run / ps

빌드한 이미지를 (container로) 실행하자

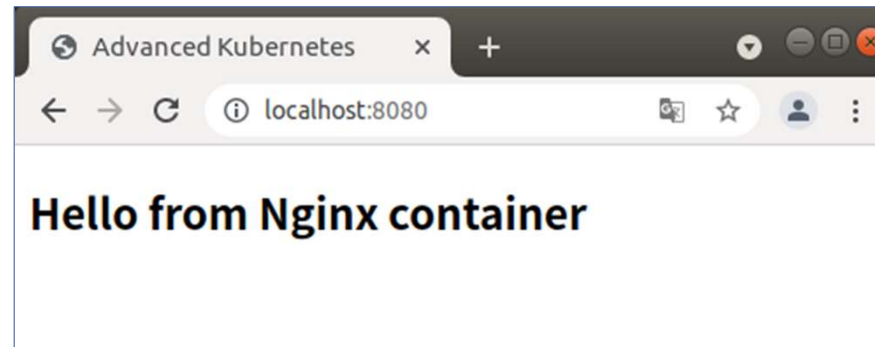
```
> docker run -it --rm -d -p 8080:80 --name web webserver
```

```
4ade5015b7f84e3f115331072a18038819e39dbf65c54cd7413d153900b93264
```

```
> docker ps -al
```

CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS	PORTS	NAMES
4ade5015b7f8	webserver	"/docker-entrypoint..."	42 seconds ago	Up 41 seconds	0.0.0.0:8080->80/tcp, :::8080->80/tcp	web

Chrome을 통해서 웹페이지 확인



Just do - docker stop / images / rmi

동작하고 있는 container를 중단해보자

> **docker ps -a**

CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS	PORTS	NAMES
4ade5015b7f8	webserver	"/docker-entrypoint..."	42 seconds ago	Up 41 seconds	0.0.0.0:8080->80/tcp, :::8080->80/tcp	web

> **docker stop 4ade5015b7f8**

4ade5015b7f8

등록되어 있는 image를 확인하고, 삭제해보자

> **docker images**

REPOSITORY	TAG	IMAGE ID	CREATED	SIZE
webserver	latest	6223db426adf	7 hours ago	141MB
nginx	latest	f6987c8d6ed5	4 days ago	141MB

> **docker rmi webserver**

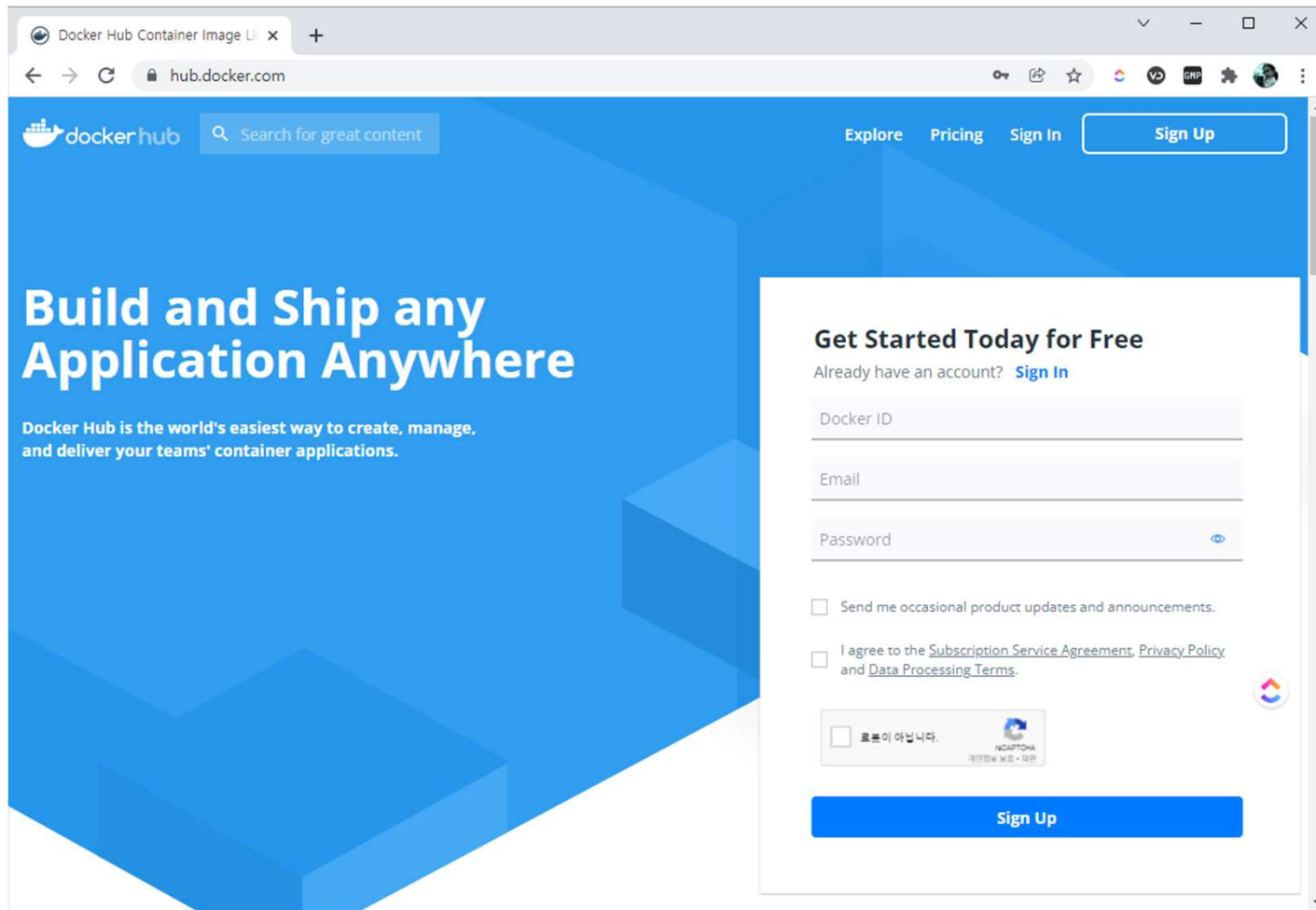
Untagged: webserver:latest
Deleted: sha256:6223db426adf9a43a506b324924f450b6c466ea2ee60cf8cc165d923d9806f3c
Deleted: sha256:572dc68dceacf746d58efe16951ec47936d46d68e2d27e089a05f8cd79738895



Tip #1 - DockerHub

DockerHub - Sign Up / In

<https://hub.docker.com/>



The screenshot shows the Docker Hub website in a web browser. The browser's address bar displays 'hub.docker.com'. The page features a blue header with the Docker Hub logo, a search bar, and navigation links for 'Explore', 'Pricing', 'Sign In', and a prominent 'Sign Up' button. The main content area has a blue background with the text 'Build and Ship any Application Anywhere' and a sub-headline: 'Docker Hub is the world's easiest way to create, manage, and deliver your teams' container applications.' On the right side, a white sign-up form is overlaid. The form is titled 'Get Started Today for Free' and includes a link for users who already have an account. It contains input fields for 'Docker ID', 'Email', and 'Password'. Below these fields are two checkboxes: one for receiving product updates and another for agreeing to the terms of service. At the bottom of the form is a blue 'Sign Up' button. A small CAPTCHA widget is visible at the bottom of the form.

Docker Hub Container Image LI x +

hub.docker.com

dockerhub Search for great content

Explore Pricing Sign In Sign Up

Build and Ship any Application Anywhere

Docker Hub is the world's easiest way to create, manage, and deliver your teams' container applications.

Get Started Today for Free

Already have an account? [Sign In](#)

Docker ID

Email

Password

☐ Send me occasional product updates and announcements.

☐ I agree to the [Subscription Service Agreement](#), [Privacy Policy](#) and [Data Processing Terms](#).

☐ 로봇이 아닙니다. NCAPTCHA

Sign Up

DockerHub - Create Repository

The first screenshot shows the Docker Hub homepage. The user is logged in as 'whatwant'. The 'Create Repository' button is visible in the top right navigation bar. Below the navigation bar, there is a search bar and a dropdown menu with 'whatwant' selected. A 'Create Repository' button is also present in the main content area.

The second screenshot shows the 'Create Repository' page. The URL is `hub.docker.com/repository/create?namespace=whatwant`. The page has a breadcrumb trail: 'Repositories > Create'. The main heading is 'Create Repository'. There is a dropdown menu with 'whatwant' selected and a text input field containing 'sample-web'. Below this, there is a text input field containing 'advanced kubernetes'. To the right of the input fields, there is a 'Pro tip' section with the following text: 'You can push a new image to this repository using the CLI'. Below this, there is a code block with the following commands: `docker tag local-image:tagname new-repo:tagname` and `docker push new-repo:tagname`. Below the code block, there is a note: 'Make sure to change *tagname* with your desired image repository tag.' At the bottom of the page, there is a 'Visibility' section with the text 'Using 1 of 1 private repositories. [Get more](#)'. There are two radio buttons: 'Public' (selected) and 'Private'. The 'Public' option is described as 'Appears in Docker Hub search results'. The 'Private' option is described as 'Only visible to you'. At the bottom right, there are 'Cancel' and 'Create' buttons.

Create Repository

whatwant sample-web

advanced kubernetes

Pro tip

You can push a new image to this repository using the CLI

```
docker tag local-image:tagname new-repo:tagname
docker push new-repo:tagname
```

Make sure to change *tagname* with your desired image repository tag.

Visibility

Using 1 of 1 private repositories. [Get more](#)

☒ **Public** Appears in Docker Hub search results

☐ **Private** Only visible to you

[Cancel](#) [Create](#)

DockerHub - docker login / tag / push

DockerHub 권한을 위해 로그인 필요하다

```
> docker login
```

```
...
```

```
Login Succeeded
```

앞에서 진행해왔던 이미지를 재사용 해보자

```
> git clone https://github.com/whatwant-school/advanced-kubernetes.git
```

```
> cd advanced-kubernetes/01-week/
```

```
> docker build -t webserver .
```

```
...
```

업로드 하기 전에 tagging을 하고 push

```
> docker tag webserver:latest whatwant/sample-web:v0.1
```

```
> docker push whatwant/sample-web:v0.1
```

```
The push refers to repository [docker.io/whatwant/sample-web]
```

```
ba032a7dca37: Pushed
```

```
51a4ac025eb4: Mounted from library/nginx
```

```
...
```

```
2edcec3590a4: Mounted from library/nginx
```

```
v0.1: digest: sha256:f47f5ecb4f828d28f930a9c262f33066c5ca59e6b3f72c2ac882c71e3e981e31 size: 1777docker build -t webserver .
```

DockerHub - Repository

The screenshot shows the DockerHub interface for the repository 'whatwant/sample-web'. The page includes a navigation bar with the DockerHub logo, a search bar, and links to Explore, Repositories, Organizations, and Help. The repository name 'whatwant/sample-web' is displayed in the breadcrumb navigation. The 'General' tab is selected, showing the repository name, description 'advanced kubernetes', and the last push time '2 minutes ago'. A section for 'Tags and Scans' shows a table with one tag 'v0.1' and a 'VULNERABILITY SCANNING - DISABLED' status. A 'Public View' button is visible next to the 'Docker commands' section, which shows the command 'docker push whatwant/sample-web:tagname'. The 'Automated Builds' section is also visible, with a 'Public View' button and a 'Learn more' link.

Docker Hub

hub.docker.com/repository/docker/whatwant/sample-web

dockerhub Search for great content Explore Repositories Organizations Help Upgrade whatwant

whatwant Repositories sample-web Using 1 of 1 private repositories. [Get more](#)

General Tags Builds Collaborators Webhooks Settings

Advanced Image Management
View all your images and tags in this repository, clean up unused content, recover untagged images. Available with Pro, Team and Business subscriptions. [View preview](#)

whatwant / sample-web
advanced kubernetes
Last pushed: 2 minutes ago

Docker commands [Public View](#)
To push a new tag to this repository,
`docker push whatwant/sample-web:tagname`

Tags and Scans **VULNERABILITY SCANNING - DISABLED** [Enable](#)
This repository contains 1 tag(s).

TAG	OS	PULLED	PUSHED
v0.1	linux	2 minutes ago	2 minutes ago

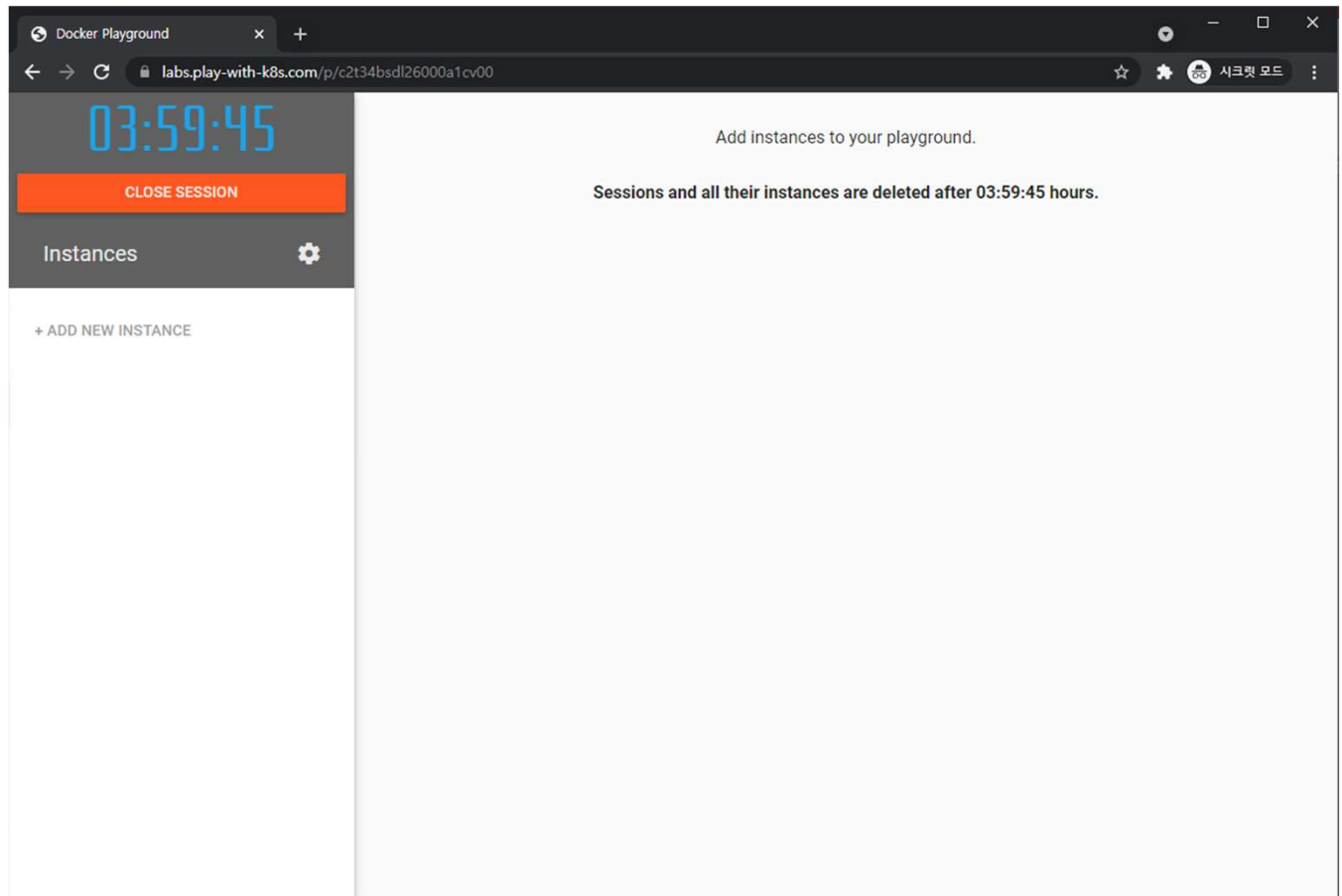
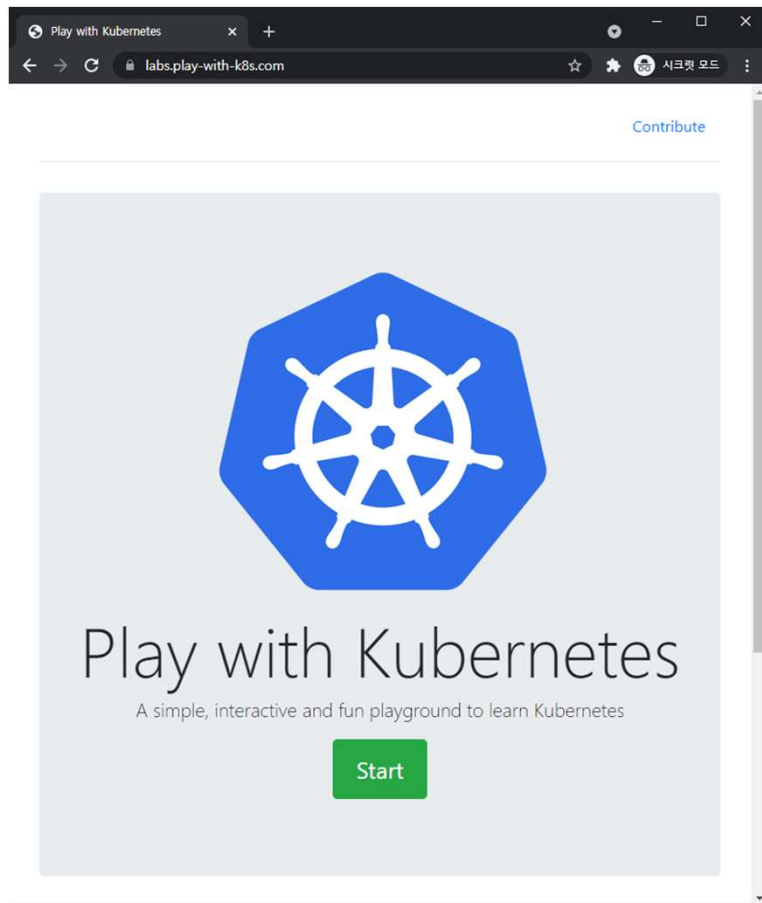
[See all](#)

Automated Builds
Manually pushing images to Hub? Connect your account to GitHub or Bitbucket to automatically build and tag new images whenever your code is updated, so you can focus your time on creating.
Available with Pro, Team and Business subscriptions.
[Upgrade to Pro](#) [Learn more](#)

Tip #2 - Play with Kubernetes

실습 환경 : <https://labs.play-with-k8s.com/>

- 여러 개의 instance 생성 가능, but 4시간 무료 사용
- disk 관련된 제약 등 불편함은 존재

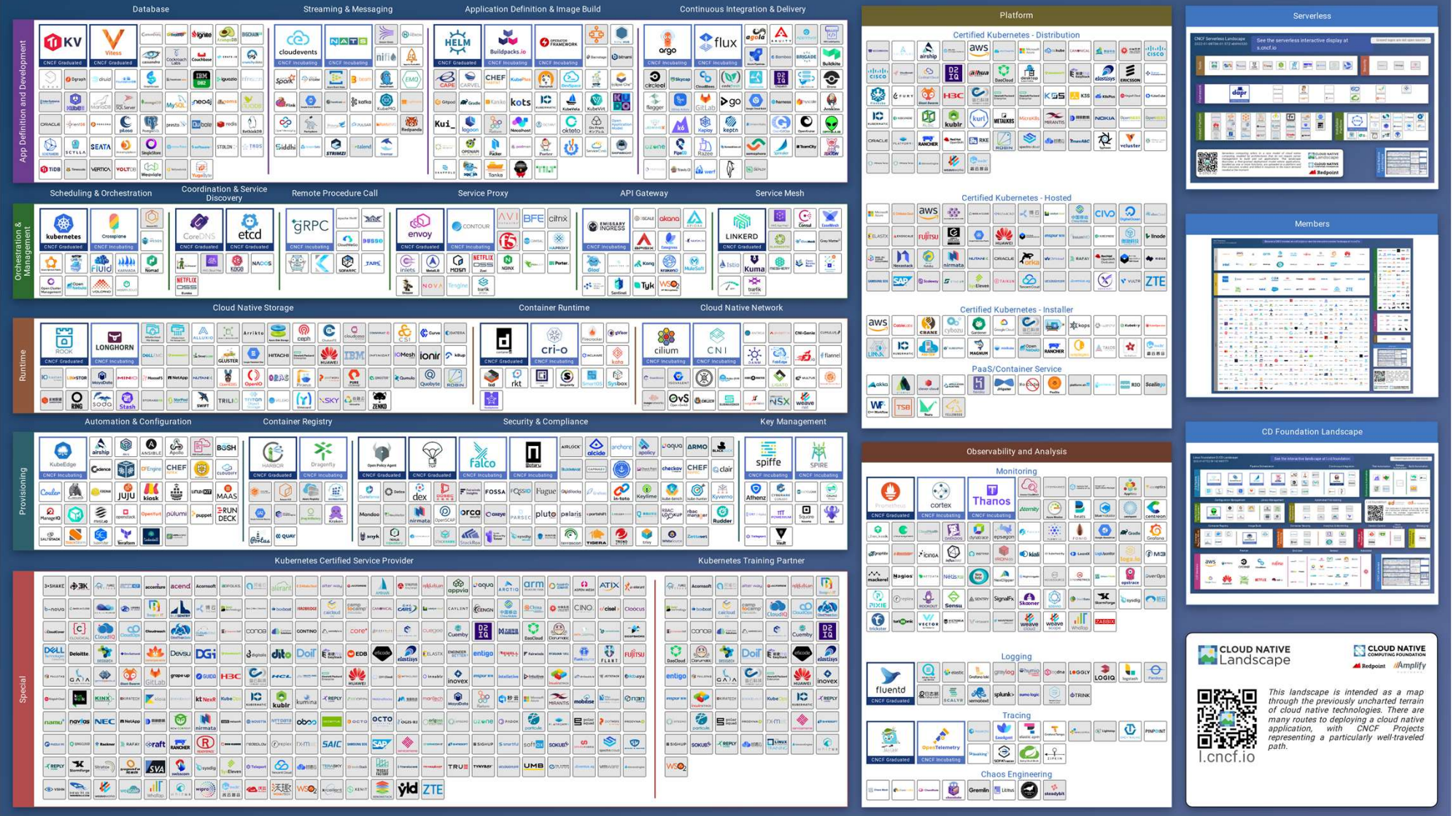


Tip #3 - CNCF

CNCF Cloud Native Landscape
2022-01-08T06:01:57Z eb896530

Overwhelmed? Please see the CNCF Trail Map. That and the interactive landscape are at l.cncf.io

Greyed logos are not open source



※ 참고 : <https://landscape.cncf.io/images/landscape.png>



<https://kahoot.it/>