
docker
Docker 101
AIS
ชีวิตในแบบคุณ
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docker

Outline

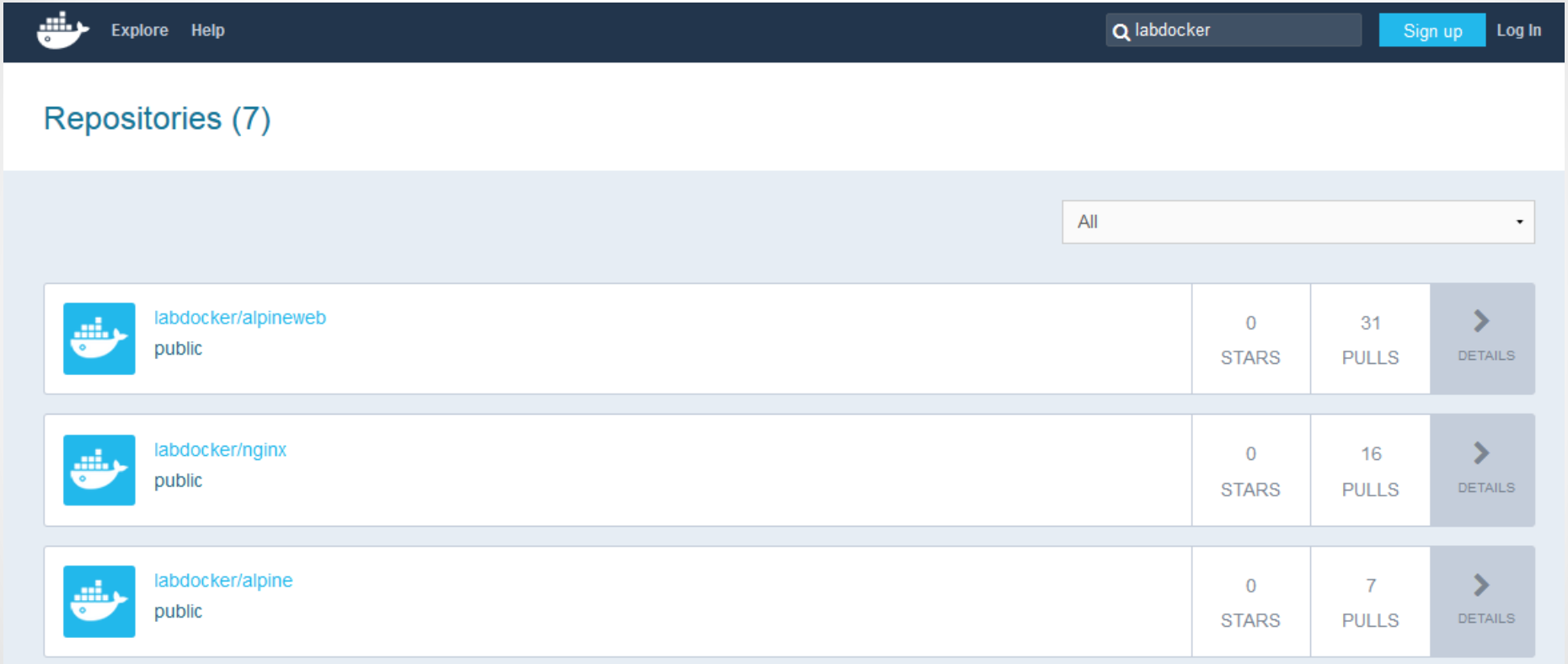
- Docker principle
- Platform of Docker
- Docker Use case: Nodejs
- Docker Network Principle
- Docker Use case: Reverse Proxy with NGINX
- Docker Use case: LINE Notify
- The Brief history of Docker & K8S
- Kubernetes & Swarm Demo

Prerequisite

- Windows (64 bit)/ Mac / Linux (64 bit)machine (ubuntu / alpine prefer)
- Tool for editor (vscode etc)
- Tool for shell (putty / terminal etc)
- Tool for transfer file (winscp / scp)
- Basic understand for linux operate
- Basic text editor skill (vim prefer) and linux structure
- Internet for download / upload image

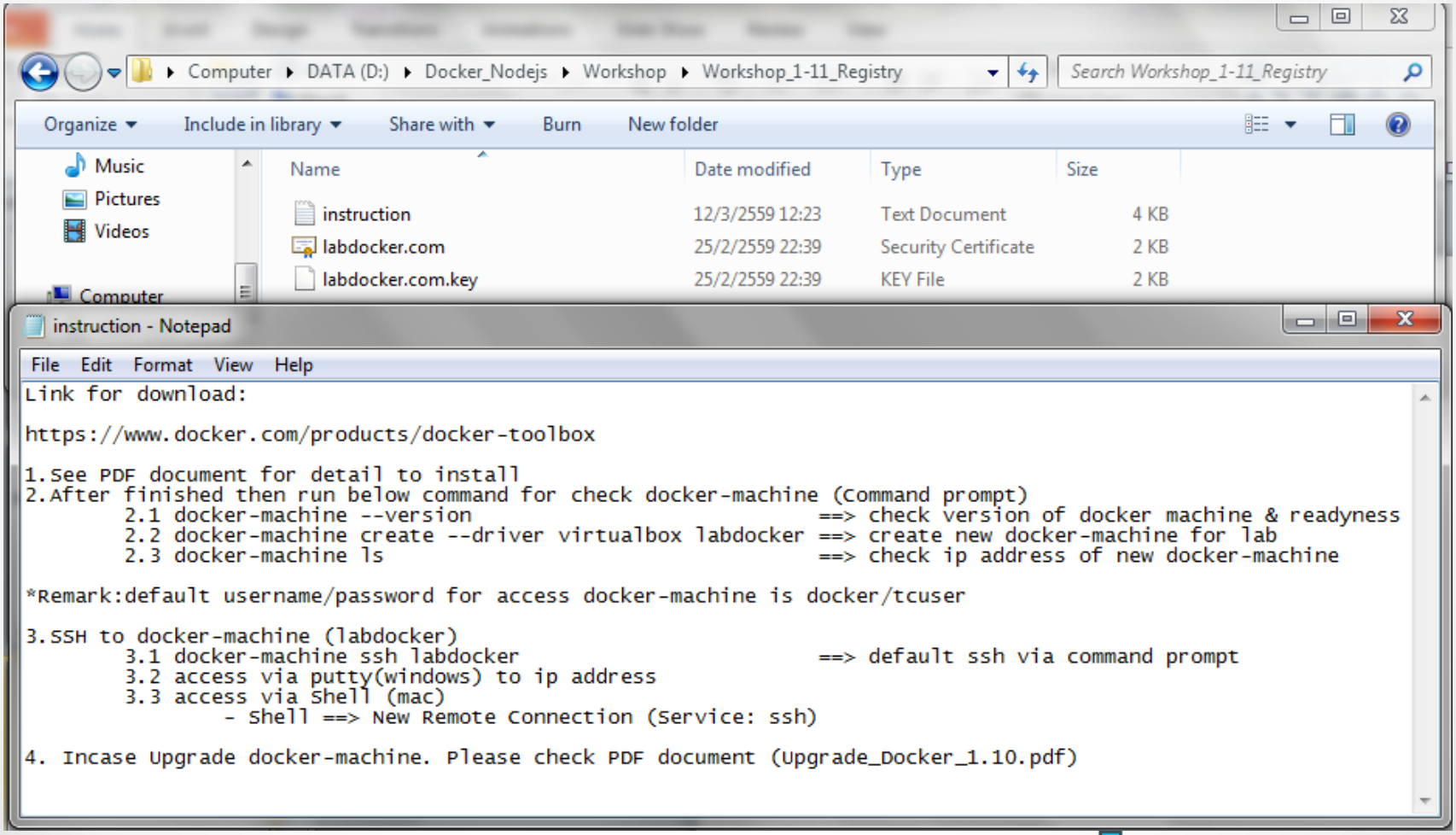
Lab Resource

- Repository for lab



Lab Resource

- Software in lab



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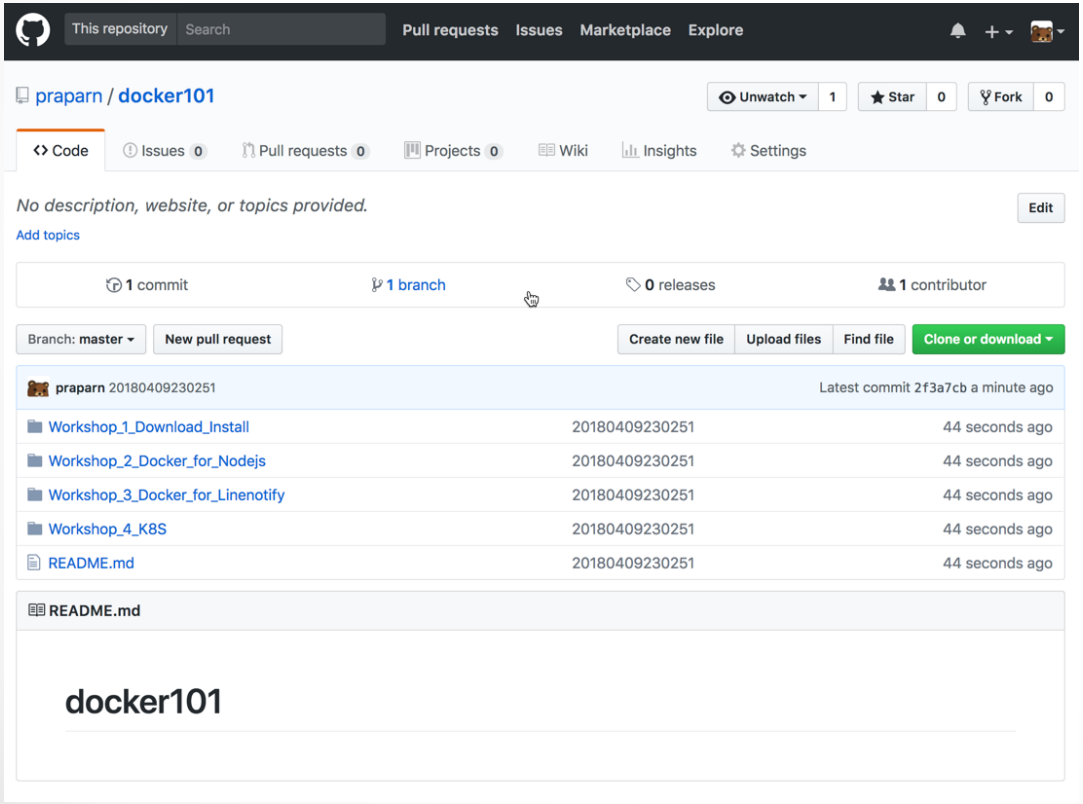
Lab Resource

- Download on Google Drive
  - https://goo.gl/Sb16HT
- Download on GitHub
  - git@github.com:praparn/docker101.git



Workshop 1: Download & Install

- https://www.docker.com/products/docker-toolbox
- Install the software
  - Windows : Windows_Install_Docker.pdf
  - Mac OS: Mac_Install_Docker.pdf

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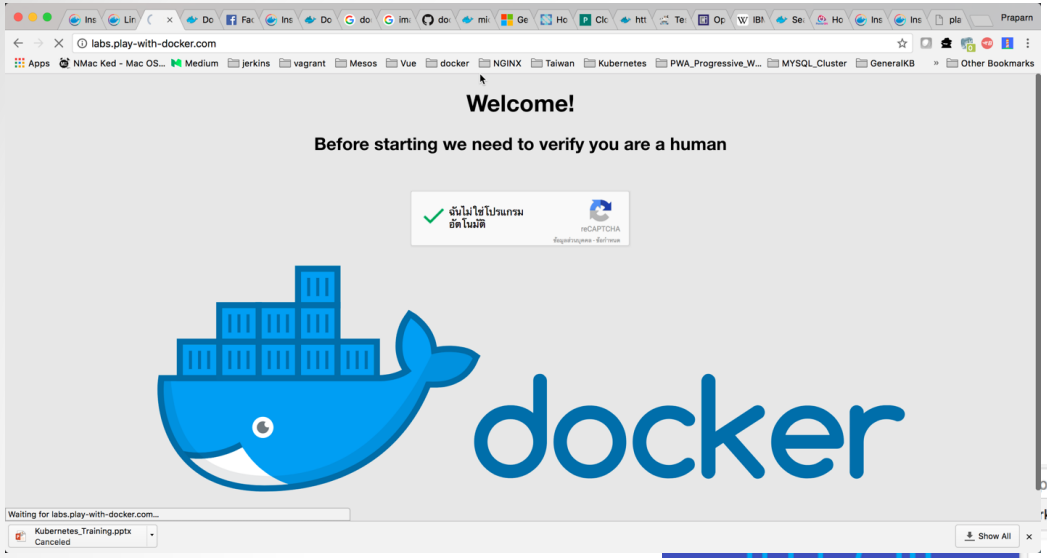
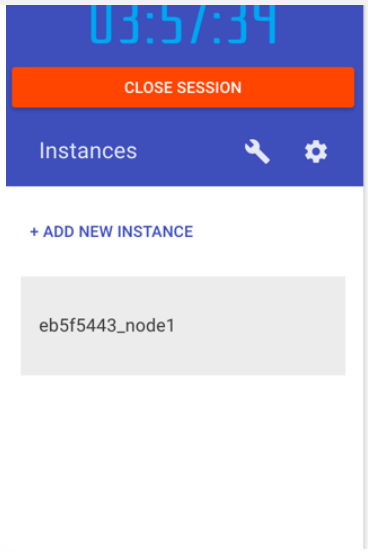
WorkShop





Docker: 101

Senior Infrastructure / System Engineer

Compute, Network & Storage System (CNS)

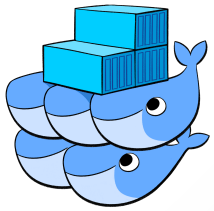
Infrastructure Enterprise Equipment

Virtual Machine for Open System in Prd

Core Application on IBM AS/400 System

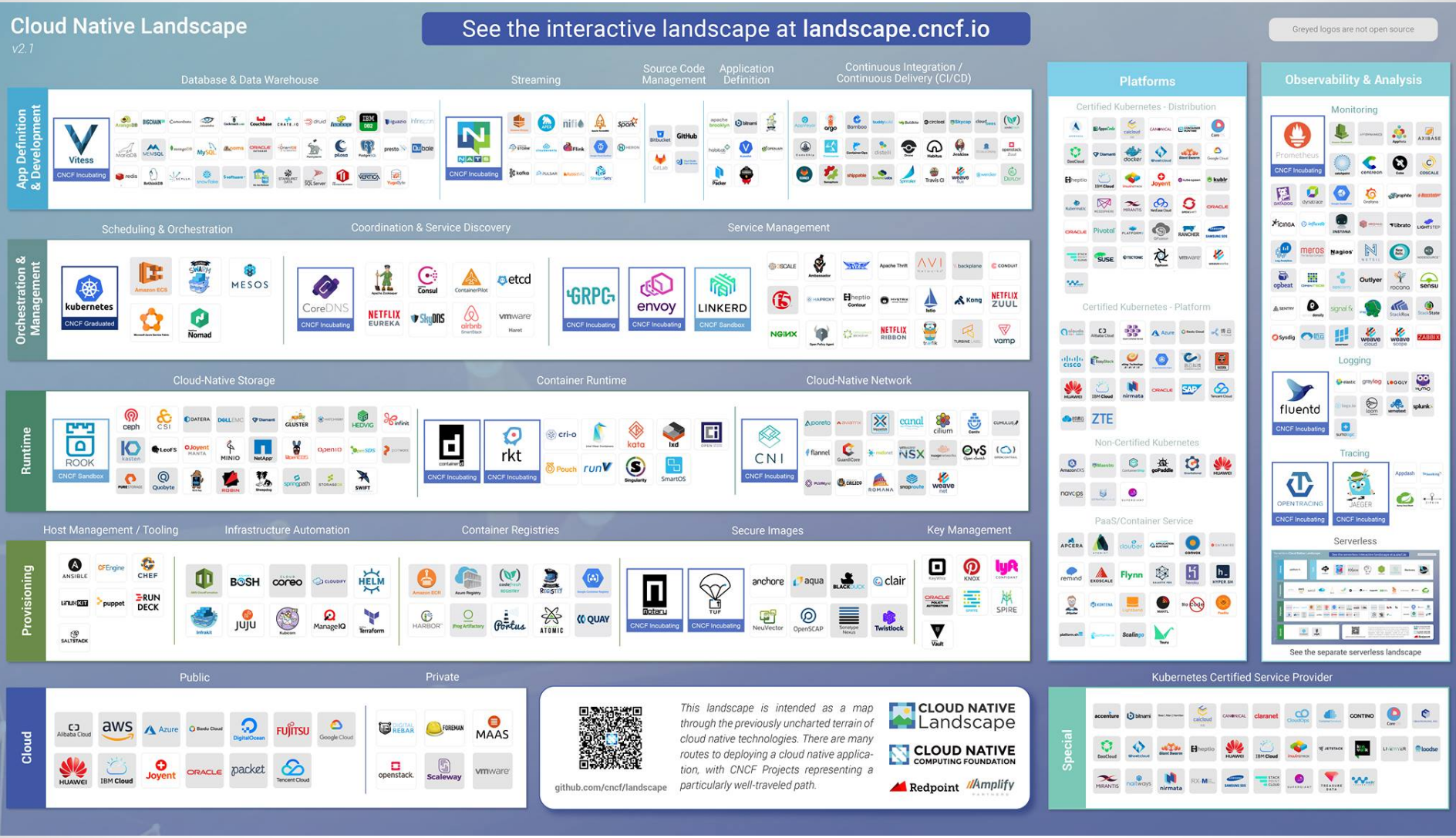
Instructor / Consult for Docker's Solution

Sense CITRIX



Docker: 101

Landscape of the world now



Docker: 101

docker

Landscape of the world now

Imagine how the world **should** work

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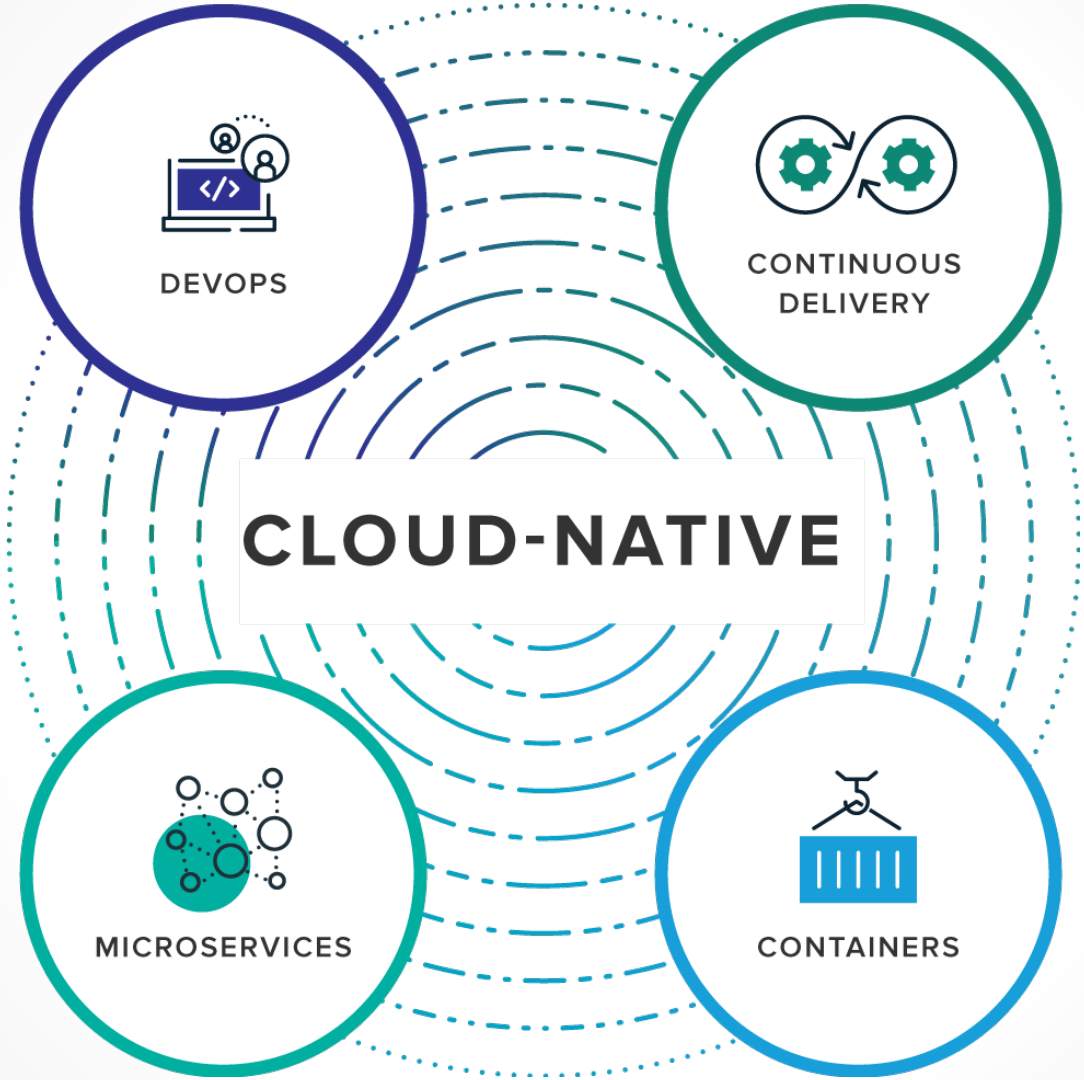
Landscape of the world now



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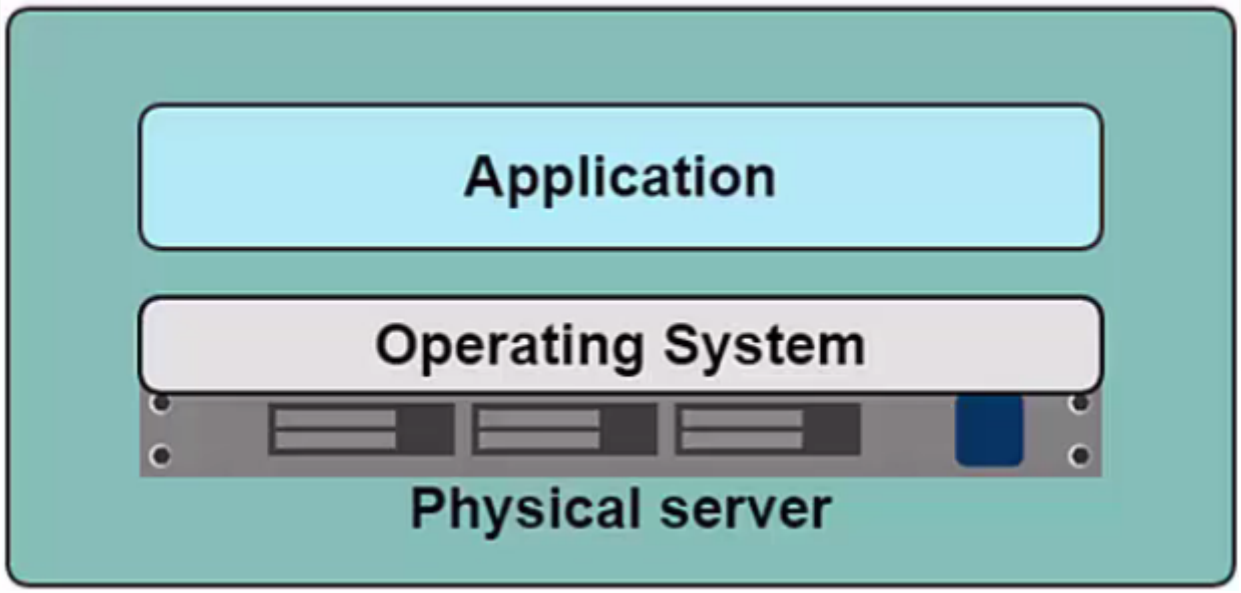
Docker Principle

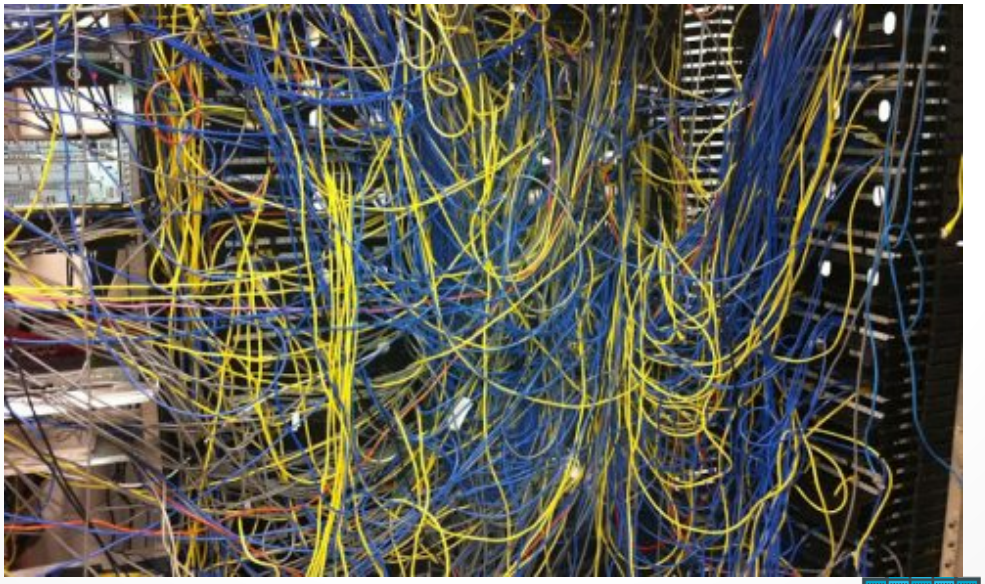
• • •

What is docker ?



docker

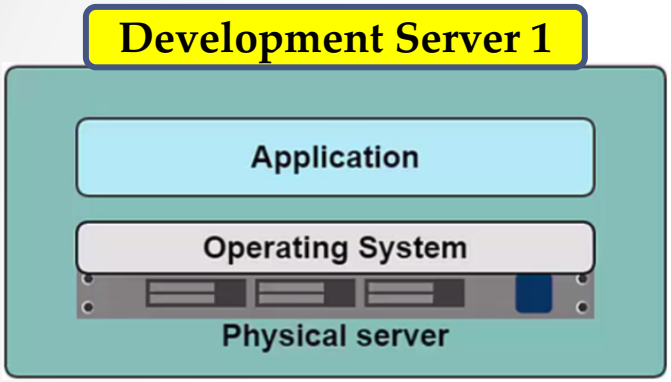
Existing Technology

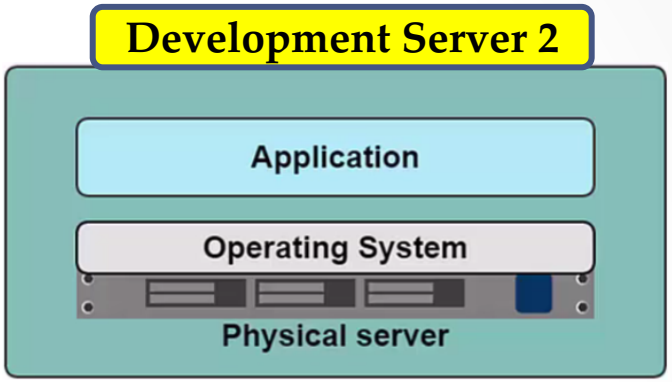


docker

Existing Technology

- Development Environment (Mix everything possible)





- Apache 2.20 Web Server
- PHP 5.5 Engine
- Larevel 4.1 Framework
- MaridDB 5.1
- Etc

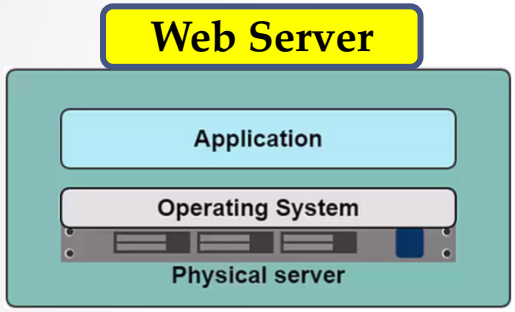
(All-in-One Server)

- IIS 8.0
- .Net Framework 3.5
- ASP.NET
- Etc

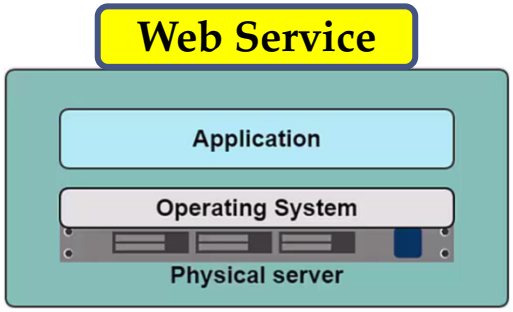
- Need concern about conflict component
- Survive among legacy dependency
- Lack for environment for fulfill develop & test (module test/integrate test/ UAT test / MOT test etc)
- Unexpected software conflict frequently occur
- Incomplete software's integrated test

Existing Technology

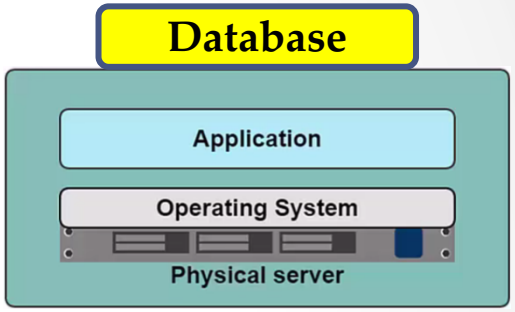
- Production Environment (Best design)
- Day 1: Application 1: Implement



- Apache 2.20 Web Server
- PHP 5.5 Engine
- Larevel 4.1 Framework



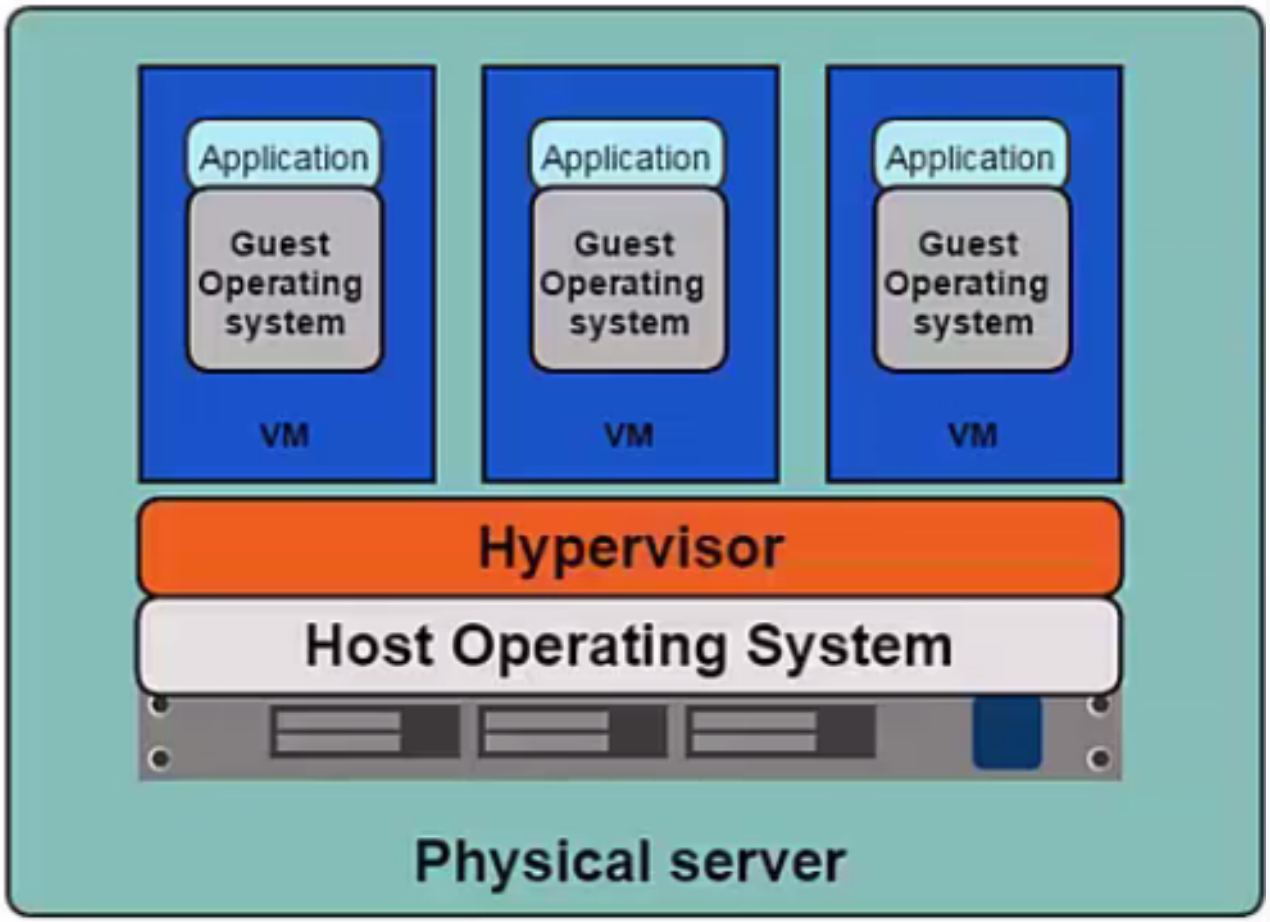
- IIS 8
- .Net FrameWork 3.5



- MariaDB 5.1

- Day 2: Application 2: Need to implement
  - Need PHP 7.0 ?
  - MariaDB 10.1.14 (Need search feature on 10.1)
- Problem ?
  - Possible to upgrade PHP to 7.0 ? / How to test existing application ?
  - What effect to MariaDB upgrade ?

What is docker ?



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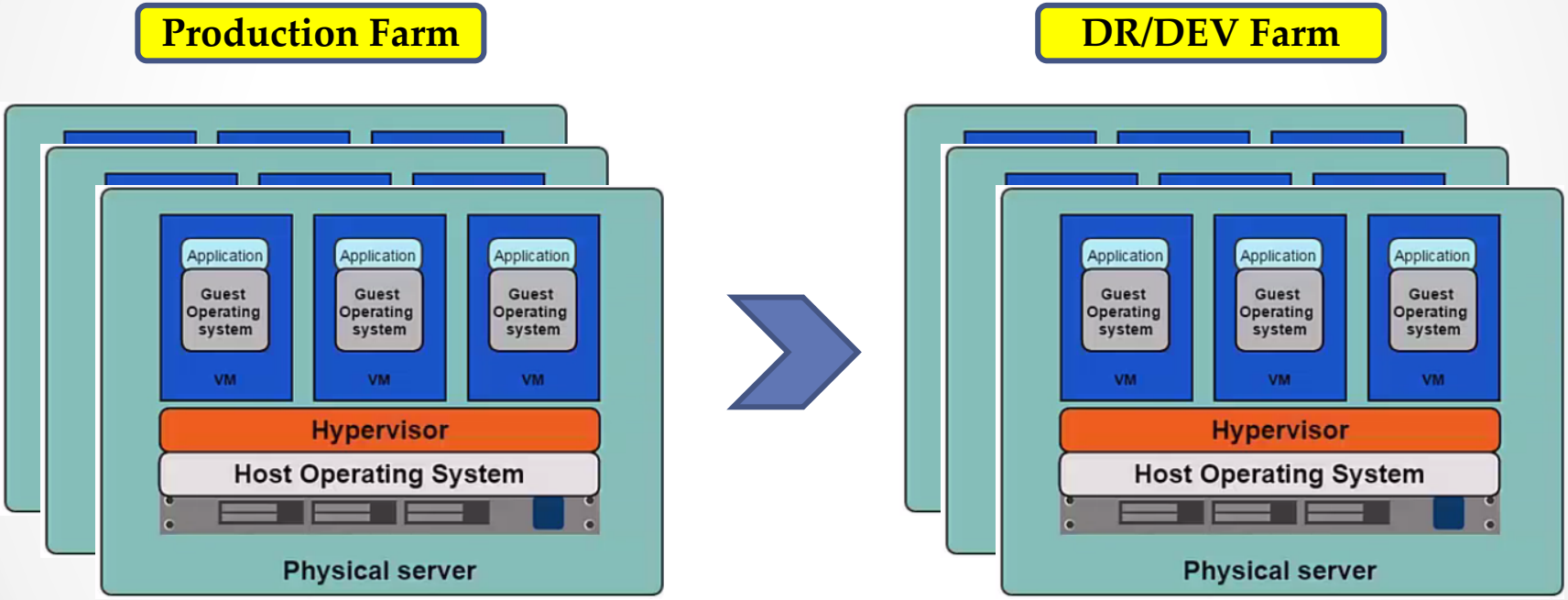
Existing Technology

- 1 Physical server : 1 – N VMWare (&OS)
- Virtualize Hardware (CPU, Memory, Disk, Network etc)

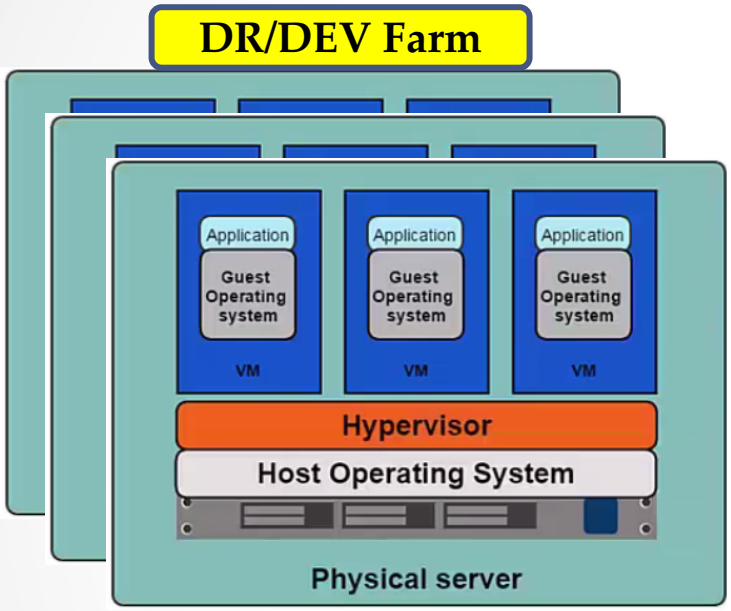


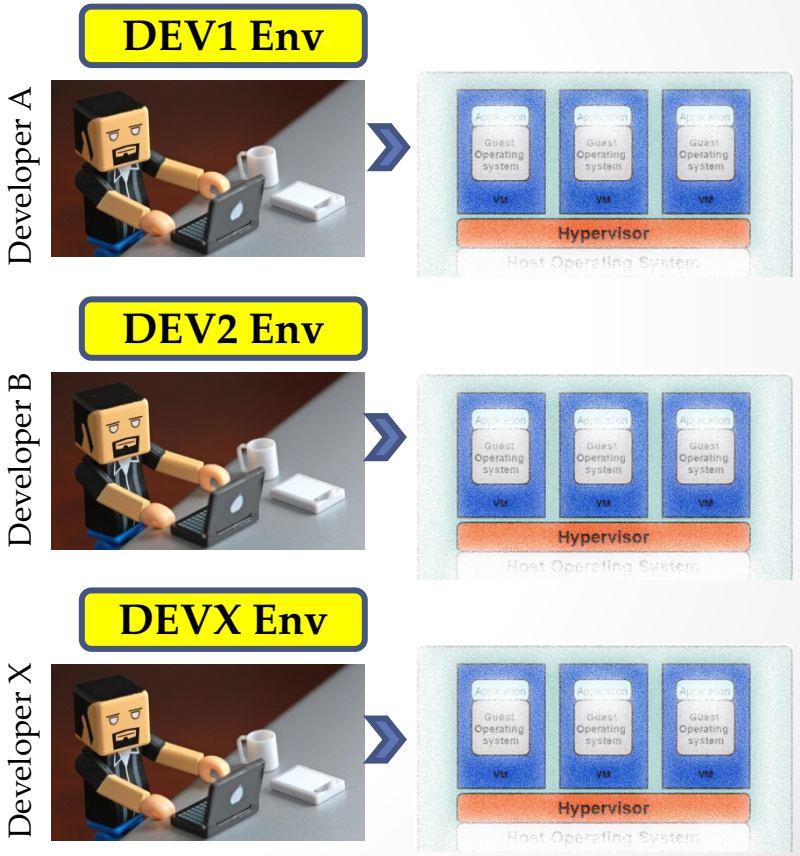
- Kernal-base virtual machine (KVM), Vmware, Virtualbox etc

docker

Existing Technology

- Development Environment (Clone from Production)



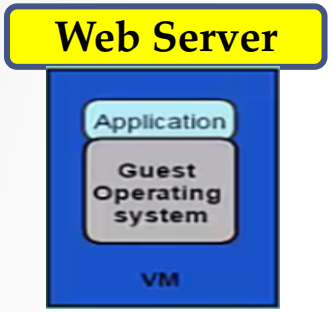


Virtual Machine reach limit:
- Resource insufficient (Almost from disk)
- Conflict version
- Huge of disk duplication
- Conflict & dependency still exist

docker

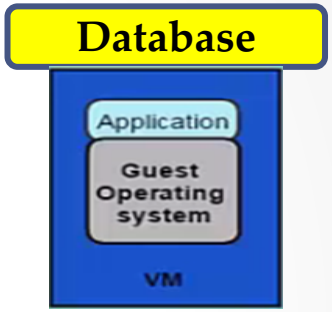
Existing Technology

- Production Environment
- Day 1: Application 1: Implement



- Apache 2.20 Web Server
- PHP 5.5 Engine
- Larevel 4.1 Framework

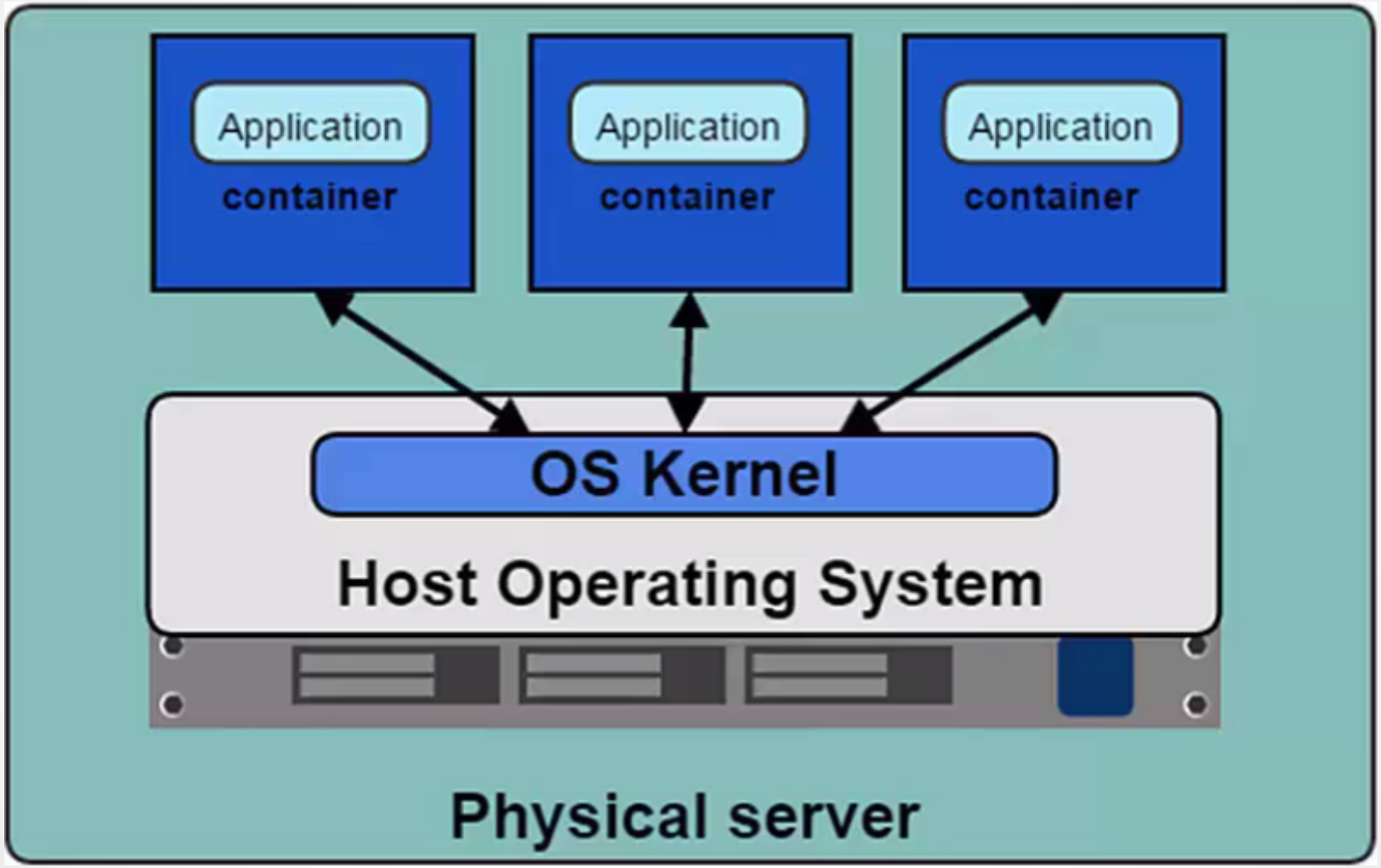
- IIS 8
- .Net FrameWork 3.5



- MariaDB 5.1

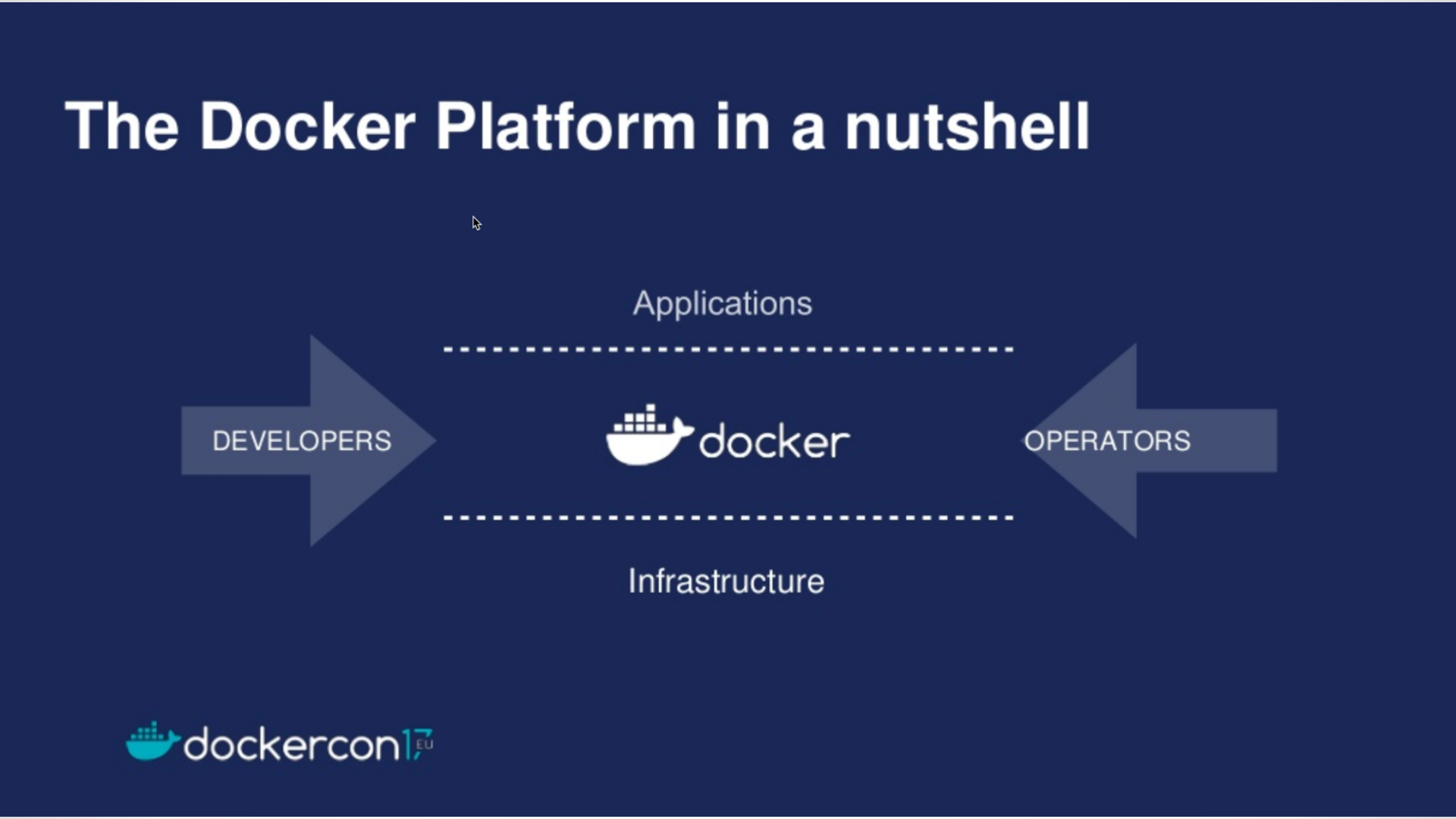
- Day 2: Application 2: Need to implement
  - Need PHP 7.0 ?
  - MariaDB 10.1.14 (Need search feature on 10.1)
- So… The problem still exist.

What is docker ?



docker

What is docker ?



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What is docker ?

Core Principles of the Docker Platform

INDEPENDENCE

OPENNESS

SIMPLICITY

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What is docker ?

- Docker **คือ** open platform solution **ที่ทำงานภายใต้คอนเซ็ปต์ของ** container virtualize technology (operating -system –level virtualization)
- **ผู้ใช้สามารถสร้างสภาพแวดล้อมเพื่อใช้ในพัฒนาโปรแกรมและส่งมอบเพื่อใช้งานในสภาพเดียวกัน**
- Build, Ship, Run
- **เหมาะสำหรับ** Developer, DevOps, Architecture, Engineer
- **เขียนด้วยภาษา** Go (1.8.3)(Now)
- **รองรับการติดตั้งบนบนลินุกซ์ 64 บิต** (kernel 3.1.0) (Official)
  - Ubuntu
  - Debian
  - Red Hat Enterprise Linux
  - CentOS
  - Fedora
  - Microsoft Windows Server 2016
  - Suse Linux Enterprise Server
  - Rasberry PI

What is docker ?

Desktop

Platform	Docker CE x86_64	Docker CE ARM	Docker EE
Docker for Mac (macOS)	✓		
Docker for Windows (Microsoft Windows 10)	✓		

Cloud

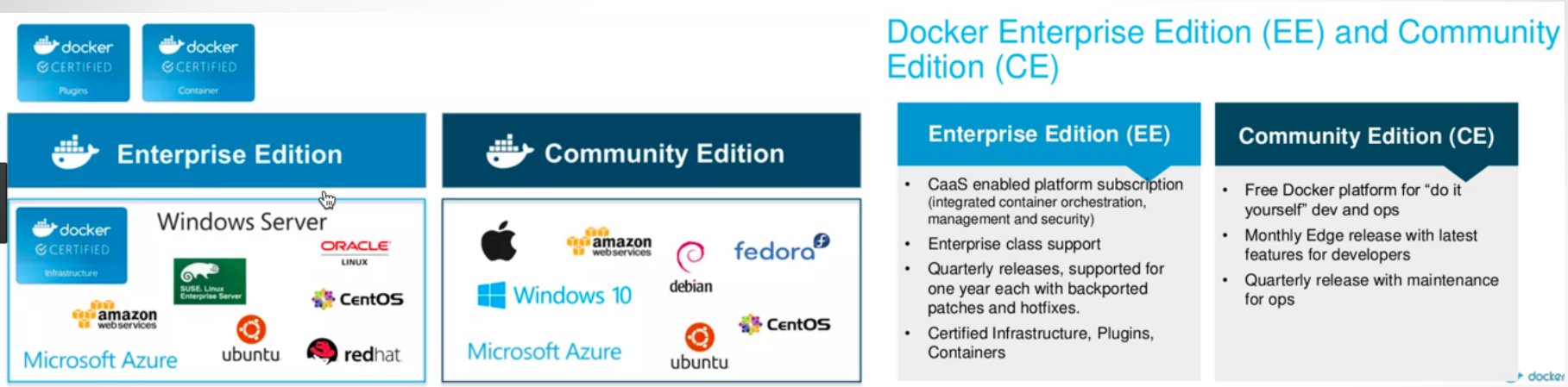
Platform	Docker CE x86_64	Docker CE ARM	Docker EE
Amazon Web Services	✓		✓
Microsoft Azure	✓		✓

See also Docker Cloud for setup instructions for Digital Ocean, Packet, SoftLink, or Bring Your Own Cloud.

Server

Platform	Docker CE x86_64	Docker CE ARM	Docker CE System Z (s390x)	Docker EE
CentOS	✓			✓
Debian	✓	✓		
Fedora	✓			
Microsoft Windows Server 2016				✓
Oracle Linux				✓
Red Hat Enterprise Linux				✓
SUSE Linux Enterprise Server				✓
Ubuntu	✓	✓	✓	✓

What is docker ?



Docker Enterprise Edition (EE) and Community Edition (CE)

Enterprise Edition (EE)	Community Edition (CE)
• CaaS enabled platform subscription (integrated container orchestration, management and security) • Enterprise class support • Quarterly releases, supported for one year each with backported patches and hotfixes. • Certified Infrastructure, Plugins, Containers	• Free Docker platform for "do it yourself" dev and ops • Monthly Edge release with latest features for developers • Quarterly release with maintenance for ops

Lifecycle

Squaring the circle: Faster releases and better stability

Docker EE Availability

Ref: https://blog.docker.com/2017/03/docker-online-meetup-recap-docker-enterprise-edition-ee-community-edition-ce/

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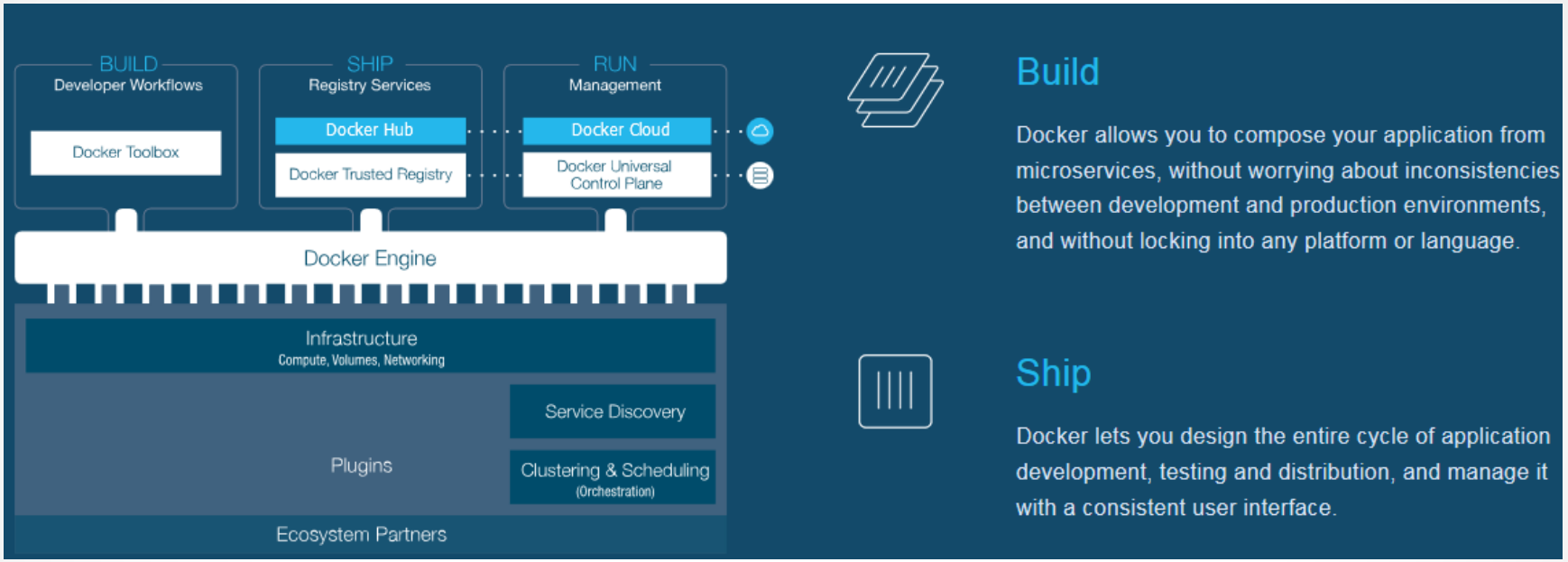
What is docker ?



Operating-system-level virtualization

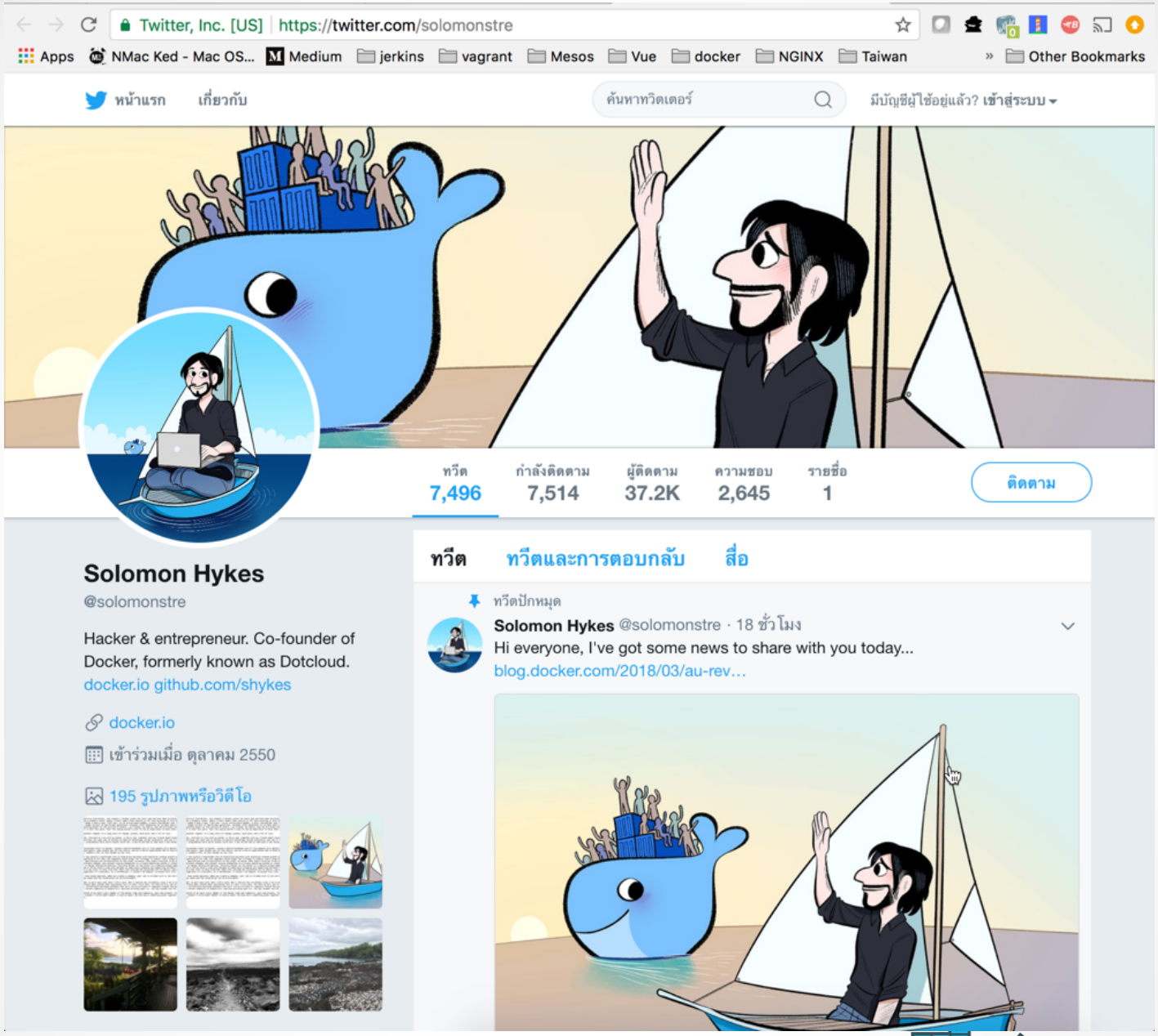
Mechanism	Operating system	License	Available since/between	Features									
				File system isolation	Copy on Write	Disk quotas	I/O rate limiting	Memory limits	CPU quotas	Network isolation	Nested virtualization	Partition checkpointing and live migration	Root privilege isolation
chroot	most UNIX-like operating systems	varies by operating system	1982	Partial[a]	No	No	No	No	No	No	Yes	No	No
Docker	Linux[7]	Apache License 2.0	2013	Yes	Yes	Not directly	Not directly	Yes	Yes	Yes	Yes	No	No
Linux-VServer (security context)	Linux	GNU GPLv2	2001	Yes	Yes	Yes	Yes[b]	Yes	Yes	Partial[c]	?	No	Partial[d]
lmctfy	Linux	Apache License 2.0	2013	Yes	Yes	Yes	Yes[b]	Yes	Yes	Partial[c]	?	No	Partial[d]
LXC	Linux	GNU GPLv2	2008	Yes[g]	Yes	Partial[e]	Partial[f]	Yes	Yes	Yes	Yes	No	Yes[g]
LXD	Linux	Apache License 2.0	2015	Yes	Yes	Partial(see LXC)	Partial(see LXC)	Yes	Yes	Yes	Yes	Partial[g]	Yes
OpenVZ	Linux	GNU GPLv2	2005	Yes	No	Yes	Yes[h]	Yes	Yes	Yes[i]	Partial[j]	Yes	Yes[k]
Virtuozzo	Linux, Windows	Proprietary	2000[14]	Yes	Yes	Yes	Yes[i]	Yes	Yes	Yes[i]	Partial[m]	Yes	Yes
Solaris Containers (Zones)	illumos (OpenSolaris), Solaris	CDDL, Proprietary	2004	Yes	Yes (ZFS)	Yes	Partial[n]	Yes	Yes	Yes[o][17][18]	Partial[p]	Partial[q][r]	Yes[s]
FreeBSD jail	FreeBSD	BSD License	2000[20]	Yes	Yes (ZFS)	Yes[t]	No	Yes[21]	Yes	Yes[22]	Yes	No	Yes[23]
sysjail	OpenBSD, NetBSD	BSD License	2006–2009 (As of March 3, 2009, it is no longer supported)	Yes	No	No	No	No	No	Yes	No	No	?
WPARs	AIX	Proprietary	2007	Yes	No	Yes	Yes	Yes	Yes	Yes[u]	No	Yes[25]	?
HP-UX Containers (SRP)[v]	HPUX	Proprietary	2007	Yes	No	Partial[w]	Yes	Yes	Yes	Yes	?	Yes	?
iCore Virtual Accounts	Windows XP	Proprietary/Freeware	2008	Yes	No	Yes	No	No	No	No	?	No	?
Sandboxie	Windows	Proprietary/Shareware	2004	Yes	Yes	Partial	No	No	No	Partial	No	No	Yes
Spoon	Windows	Proprietary	2012	Yes	Yes	No	No	No	No	Yes	No	No	Yes
VMware ThinApp	Windows	Proprietary	2008	Yes	Yes	No	No	No	No	Yes	No	No	Yes

Reference: https://en.wikipedia.org/wiki/Operating-system-level_virtualization

Docker: 101

Docker History

- A dotCloud (PAAS provider) project
- Initial commit January 18, 2013
- Docker 0.1.0 released March 25, 2013
- 18,600+ github stars, 3800+ forks,740 Contributors…. and continues
- dotCloud pivots to docker inc. October 29, 2013


Twitter, Inc. [US] https://twitter.com/solomonstre
Apps NMac Ked - Mac OS... Medium jerkins vagrant Mesos Vue docker NGINX Taiwan Other Bookmarks
หน้าแรก เกี่ยวกับ
ค้นหาทวิตเตอร์
มีบัญชีผู้ใช้อยู่แล้ว? เข้าสู่ระบบ
ทวีต 7,496
กำลังติดตาม 7,514
ผู้ติดตาม 37.2K
ความชอบ 2,645
รายชื่อ 1
ติดตาม
Solomon Hykes
@solomonstre
Hacker & entrepreneur. Co-founder of Docker, formerly known as Dotcloud.
docker.io github.com/shykes
docker.io
เข้าร่วมเมื่อ ตุลาคม 2550
195 รูปภาพหรือวิดีโอ
ทวีต
ทวีตและการตอบกลับ
สื่อ
ทวีตปักหมุด
Solomon Hykes @solomonstre · 18 ชั่วโมง
Hi everyone, I've got some news to share with you today...
blog.docker.com/2018/03/au-rev…

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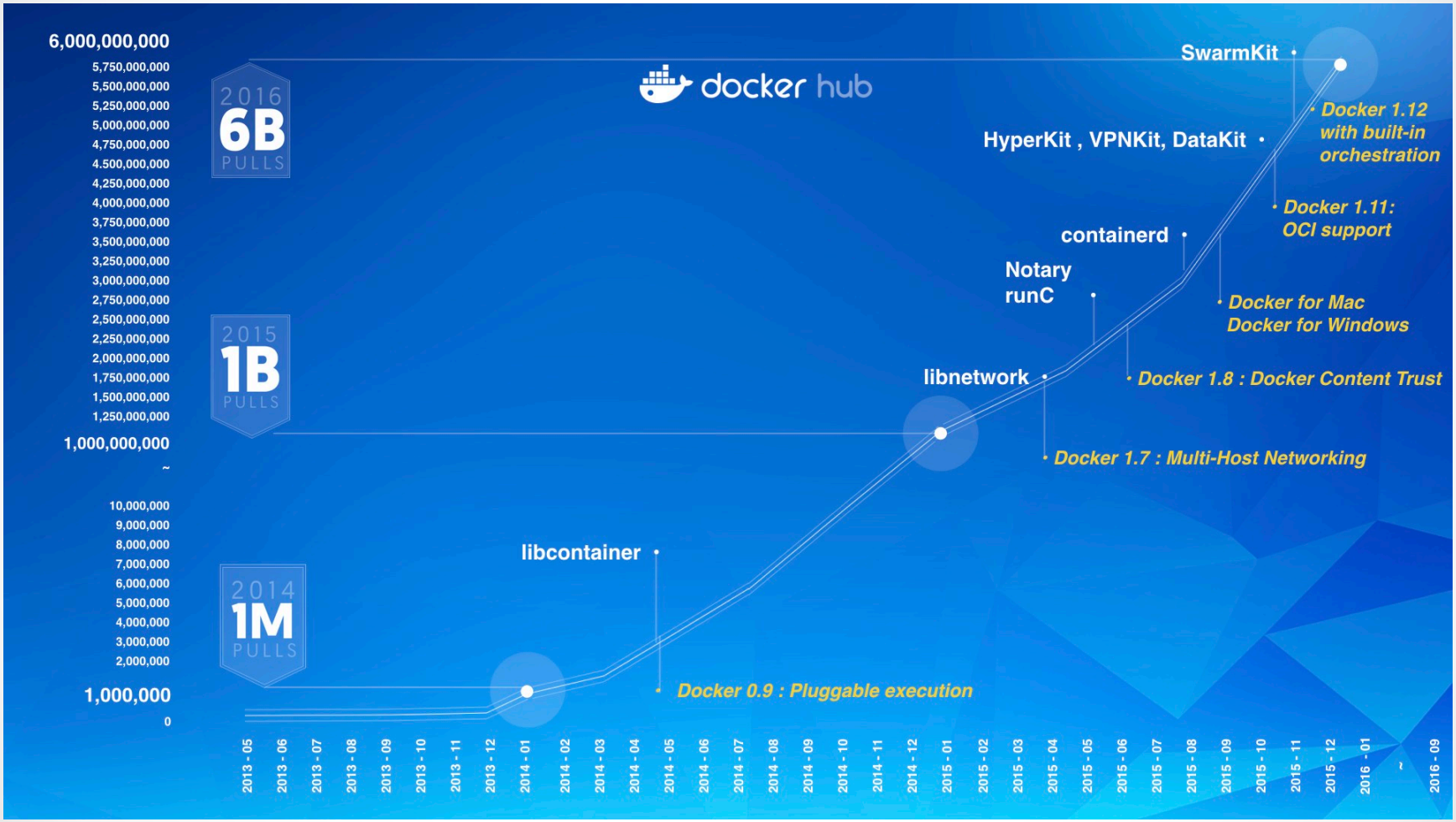
Growth of Docker (2016 stats)



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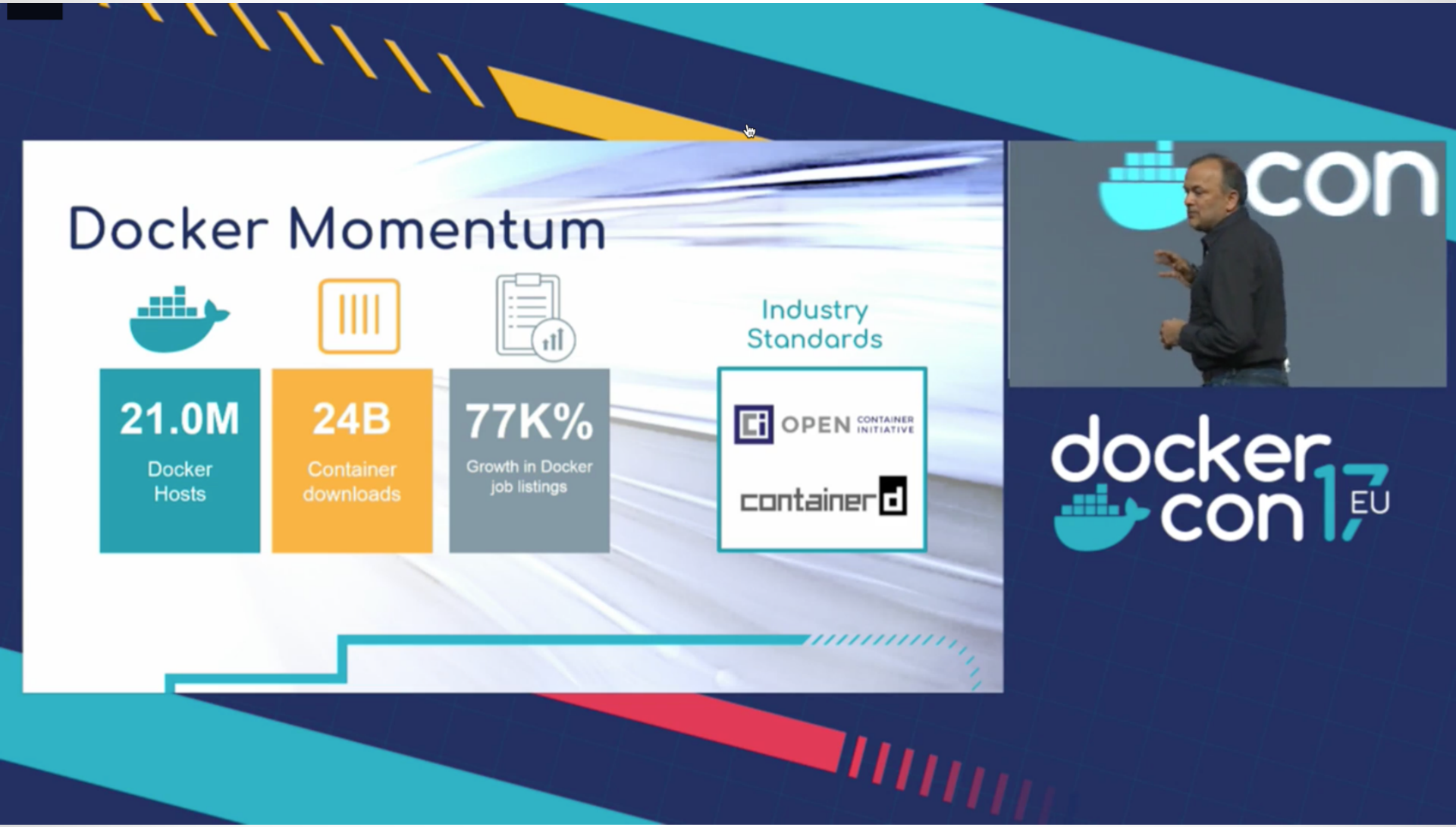
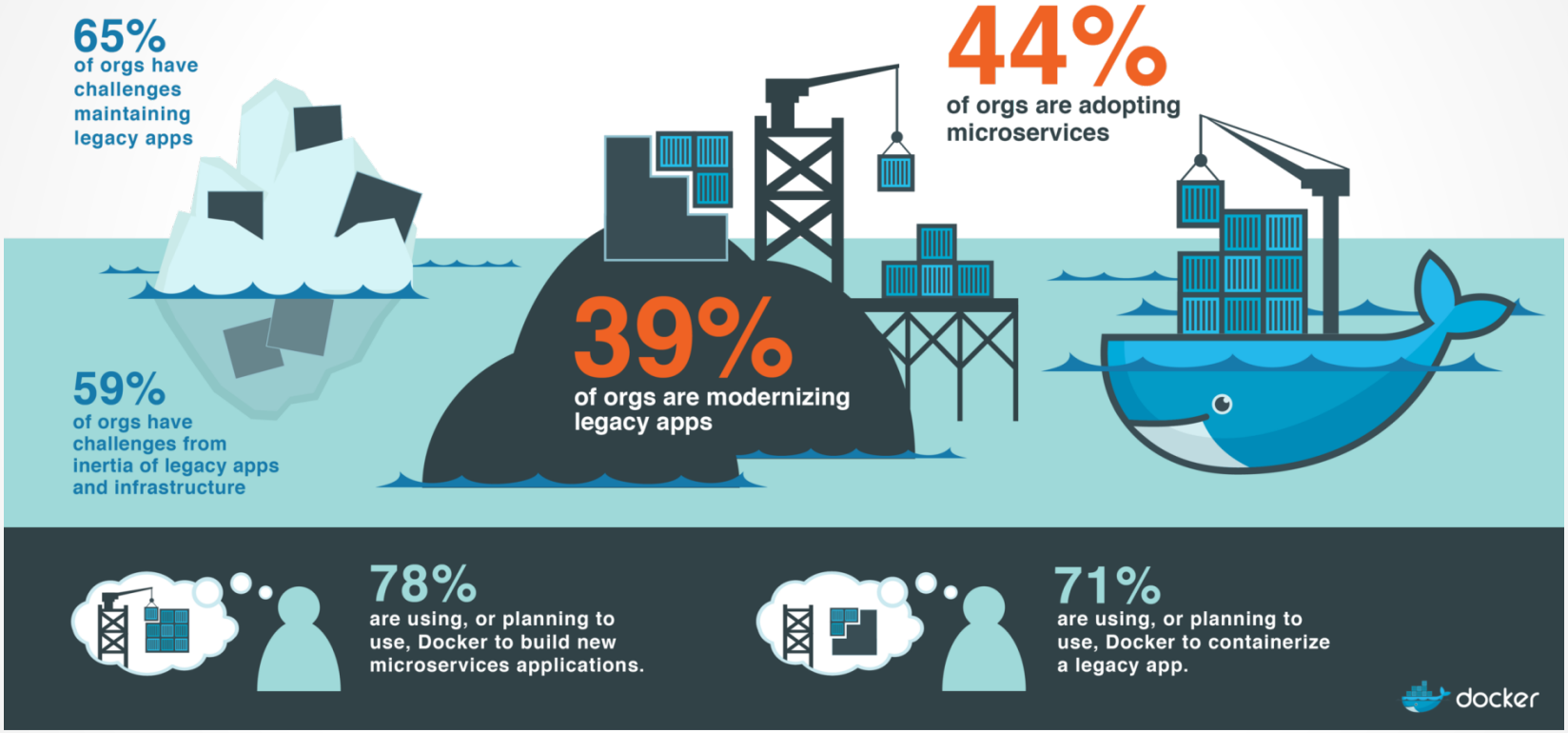
Growth of Docker (Now)



Trend of Modernize Application



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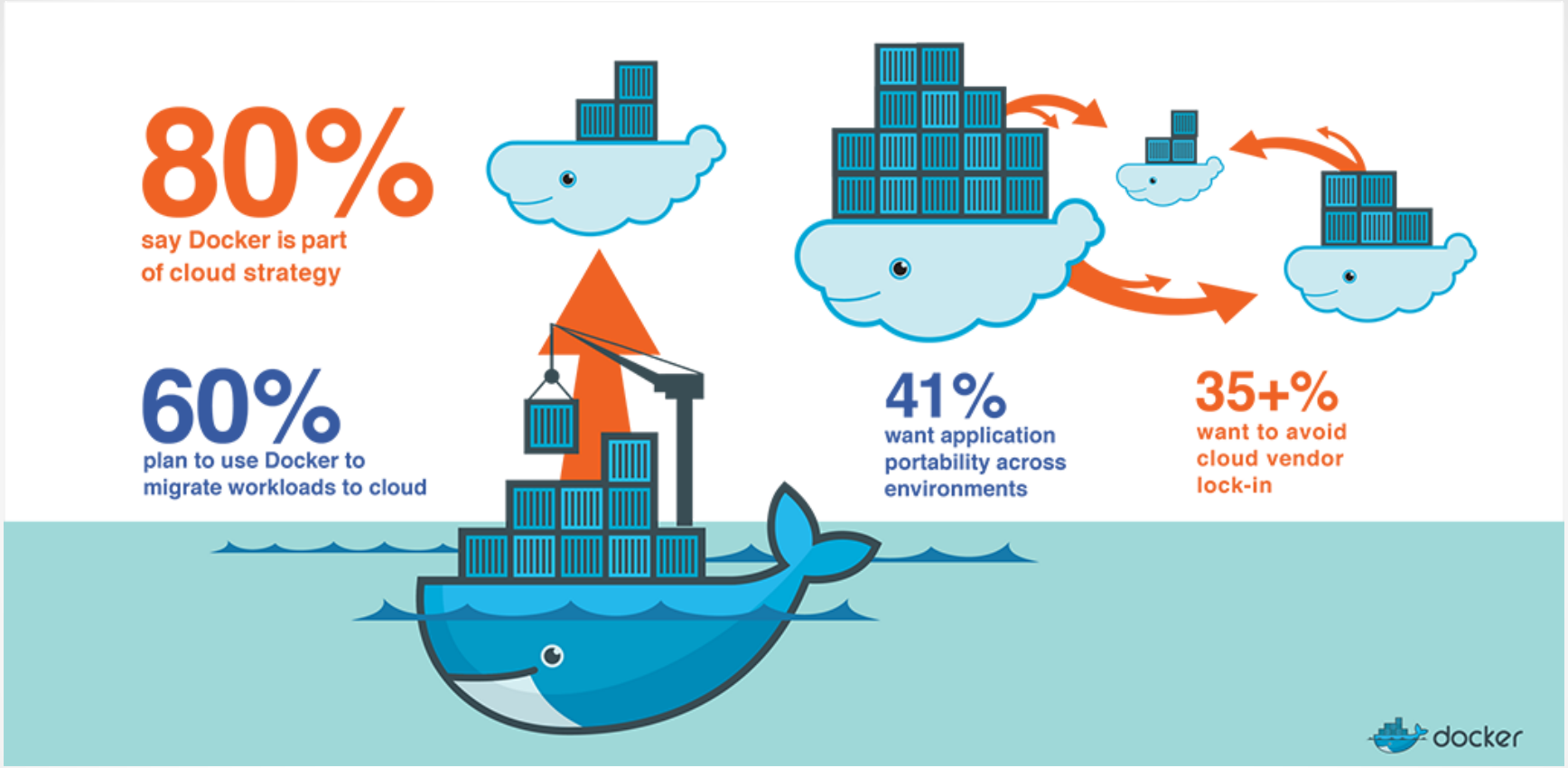
Could Strategy Survey



Docker in Thailand

- 3 Enterprise Communication on Implement Phase
- 2 Bank on R&D

docker

Who use docker now ?

docker

Who use docker now ?

Visa Today

- Live in production for 6 months
- 100K transactions per day
- 10X app scalability
- Multiple clusters across multiple regions

docker

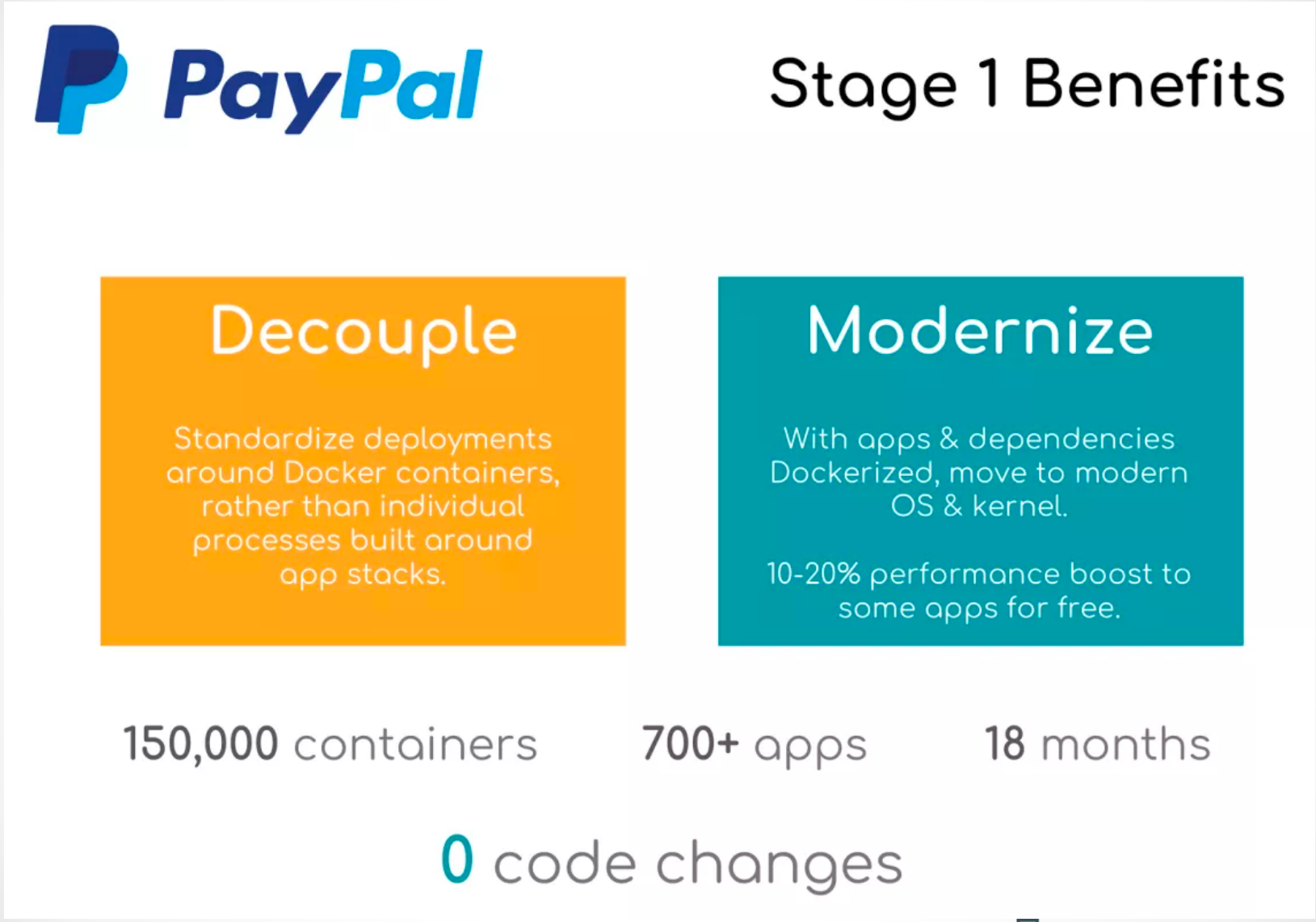
Who use docker now ?

docker

Who use docker now ?

Who use docker now ?

Who use docker now ?



docker

Who use docker now ?

Later Stage Benefits

1 Resource Efficiency

50% fewer vCPUs in QA

25% fewer vCPUs in Prod

2 Security

Revoke access to Prod

Automate patching

3 No VM Provisioning

Scale containers (fast)

Not VMs (slow)

4 Availability

Increased resiliency

"Anything can run anywhere"

5 Availability Zones

Application deployments of an entire AZ in a few hours.

6 Consistent Platform

Consistent tooling

Standard playbook across app stacks

> 50% boost

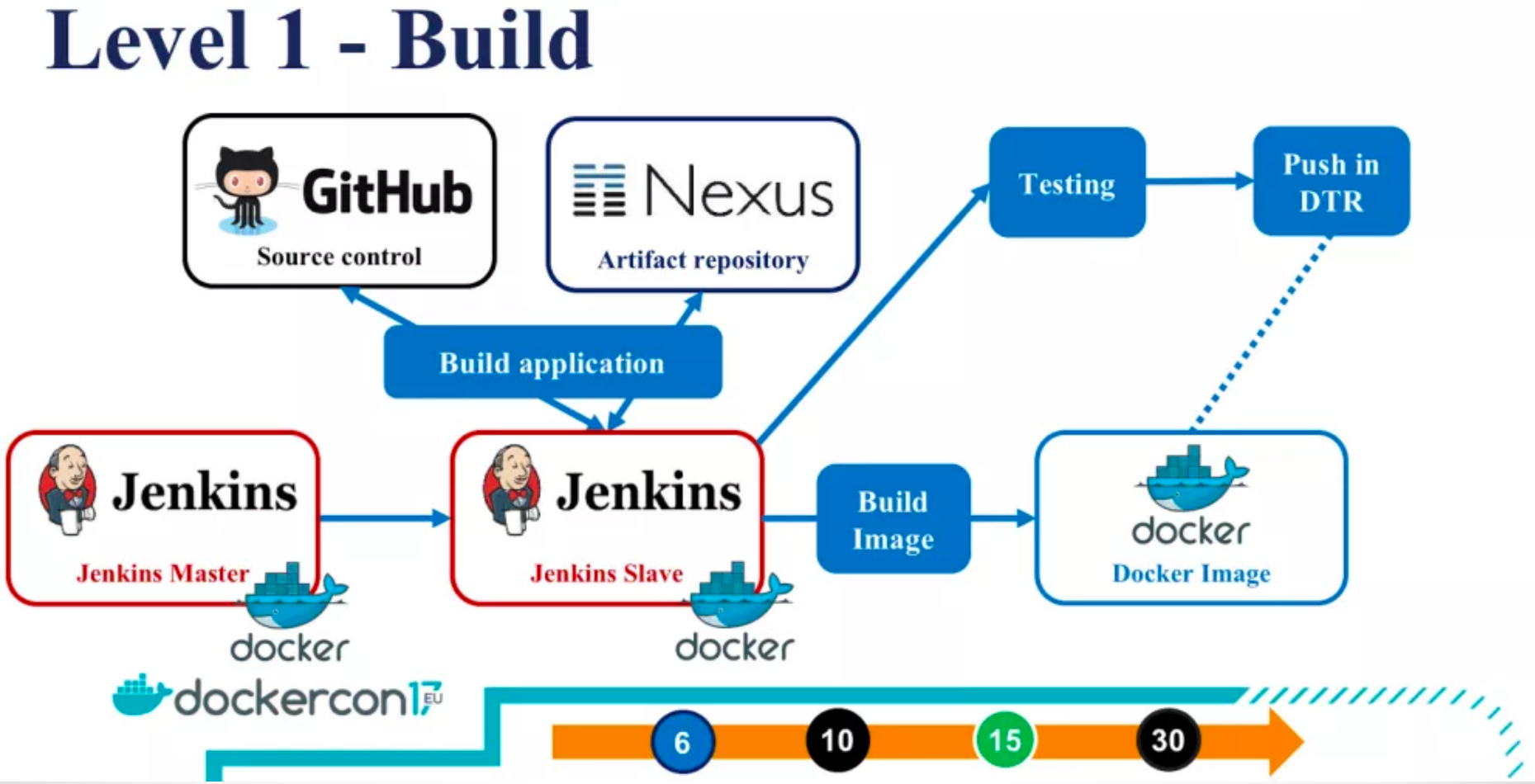
to developer local build-deploy-test speed

Developer Freedom

for greenfield apps

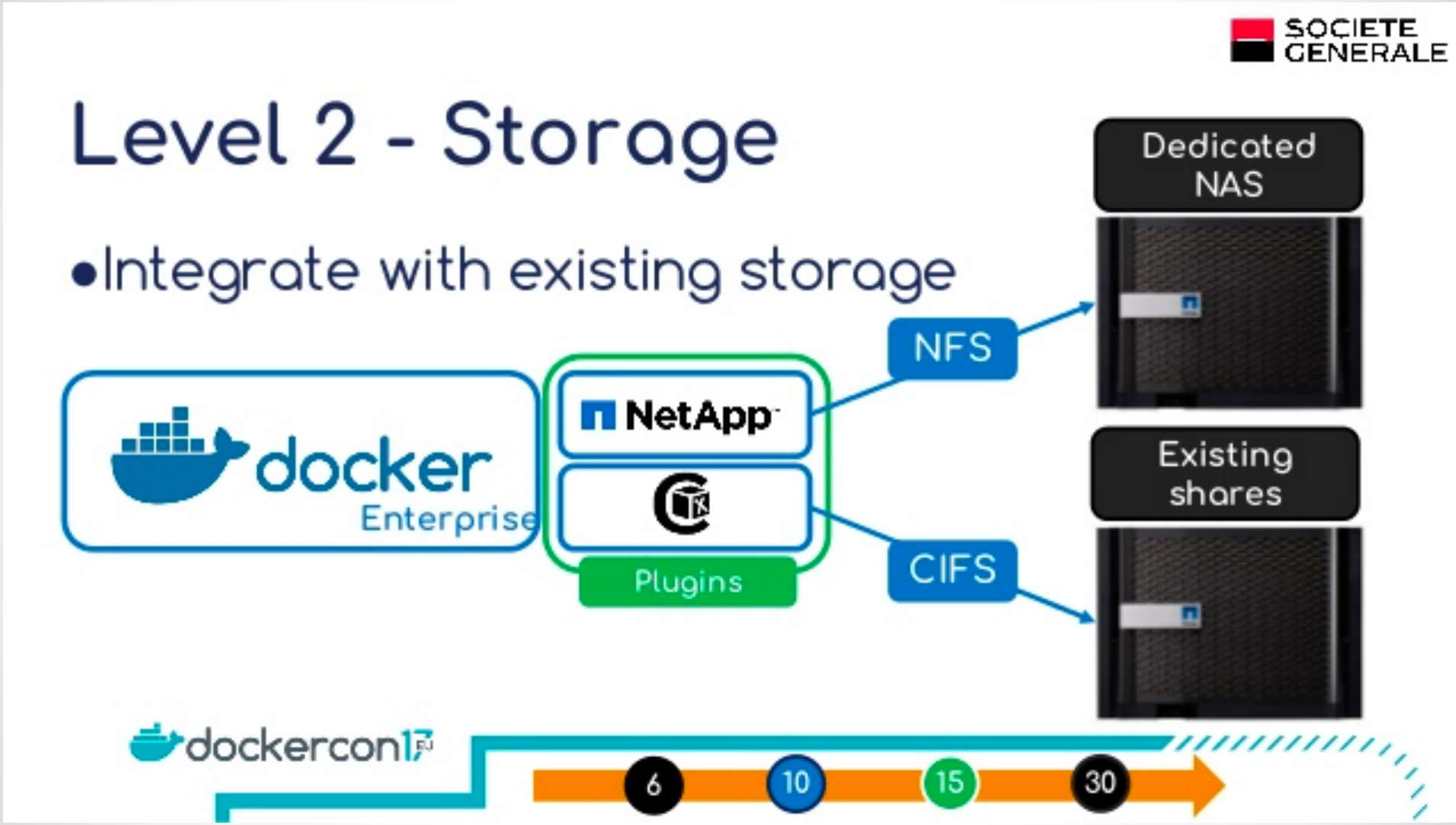
Who use docker now ?

SOCIETE GENERALE



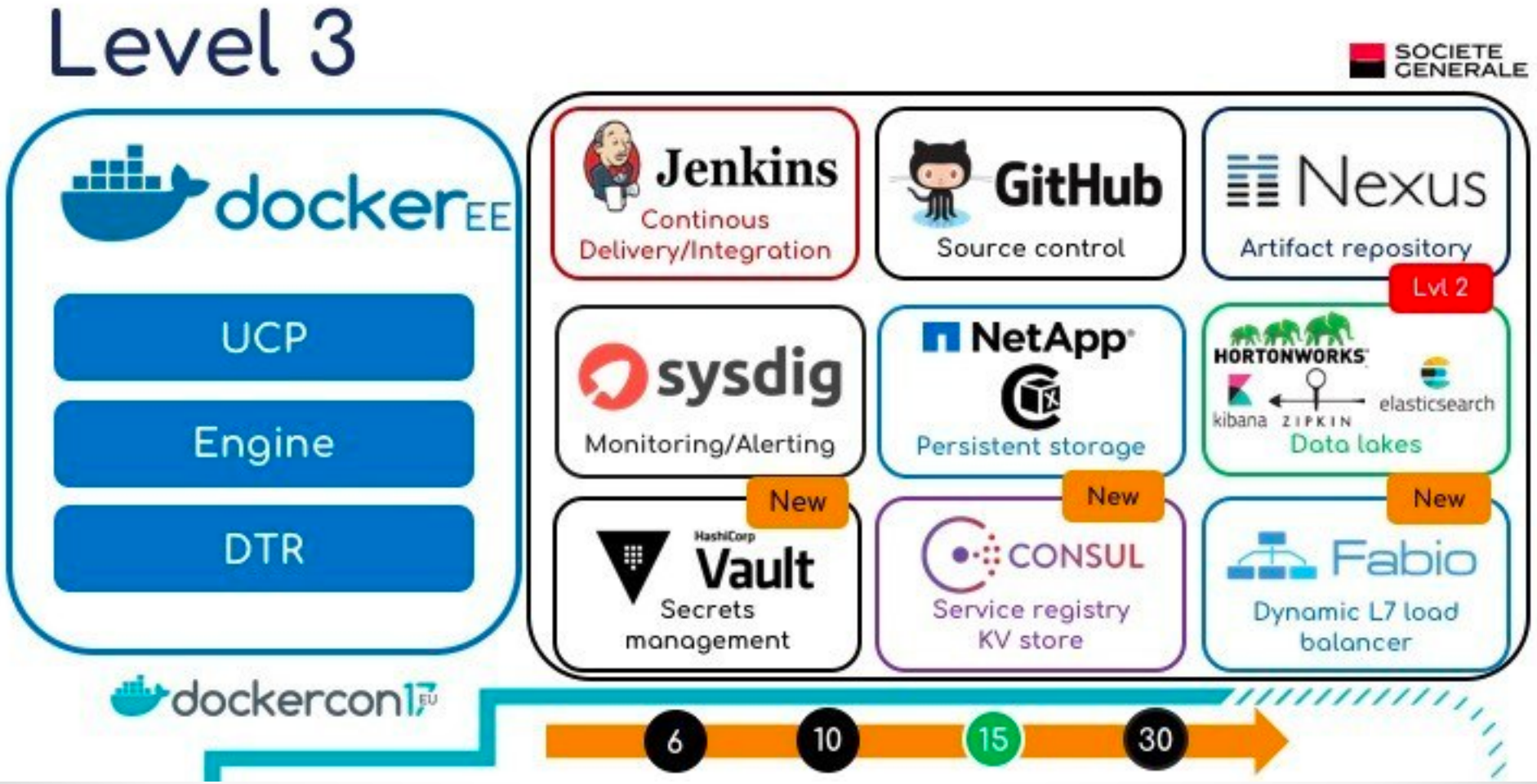
docker

Who use docker now ?



docker

Who use docker now ?



docker

Who use docker now ?

About MetLife

- Global Fortune 500® 128 Company
- 100 Million Customers
- $500 Billion total assets under investment
- $63 Billion in revenue in 2017

dockercon17 EU

MetLife

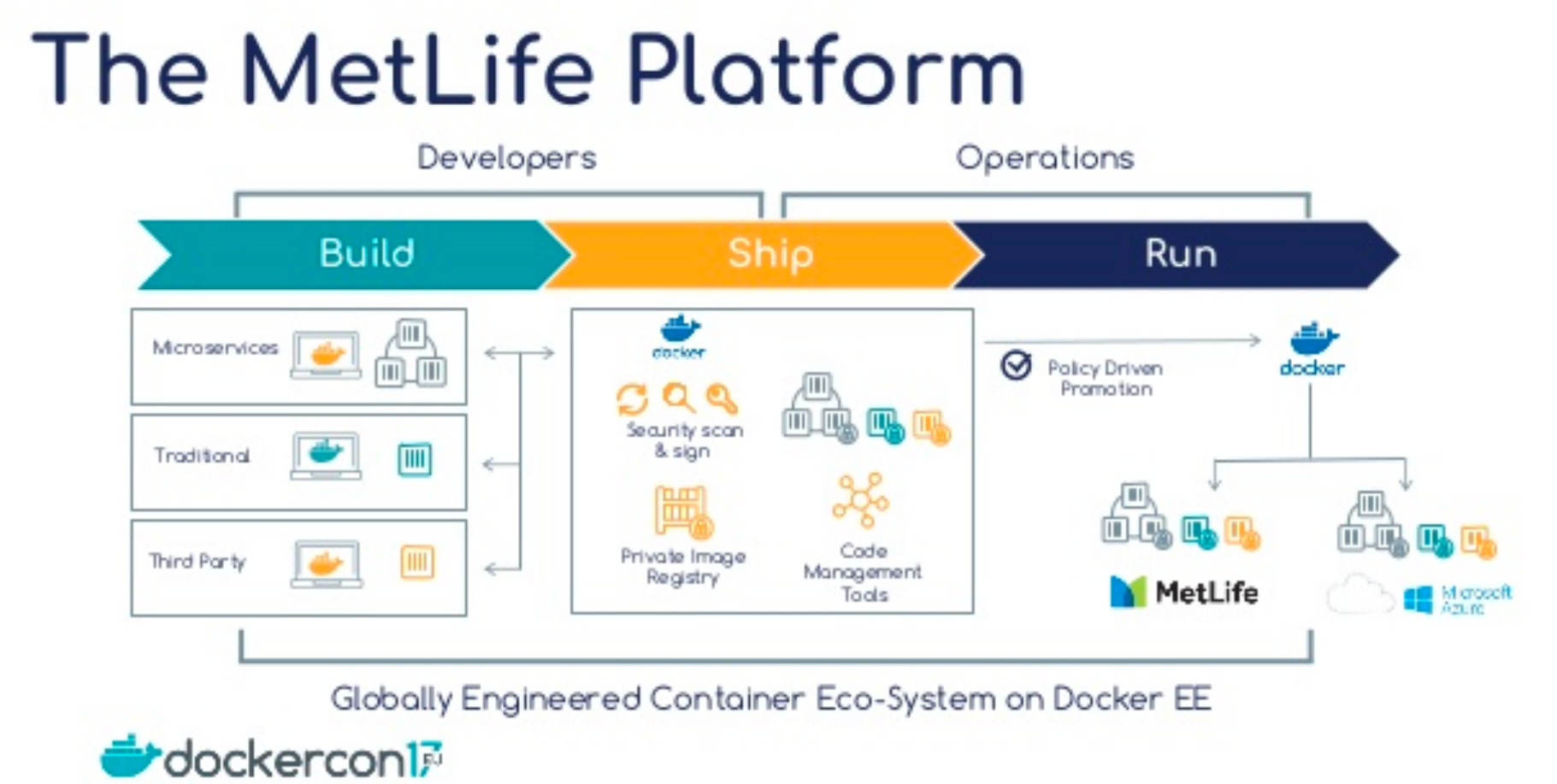
Even Old Elephants Can Dance

- Concept to production in 5 months
- The spark of innovation is spreading at MetLife
- Docker and DevOps change your culture
- Check out Tim Tyler's session

11:15 AM - Docker 0 to 60 in 5 Months: How a Traditional Fortune 40 Company Turns on a Dime

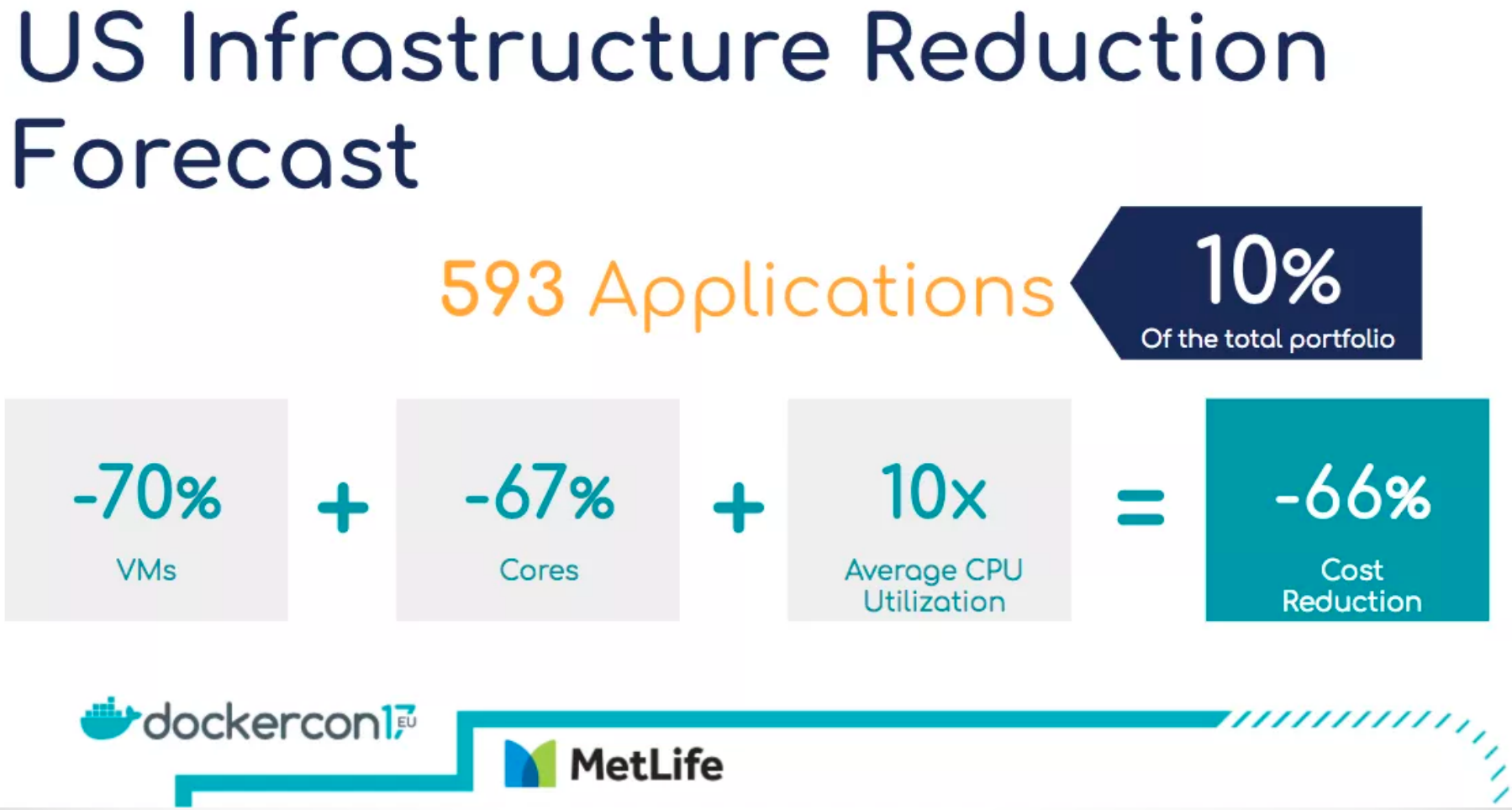
docker

Who use docker now ?



docker

Who use docker now ?



docker

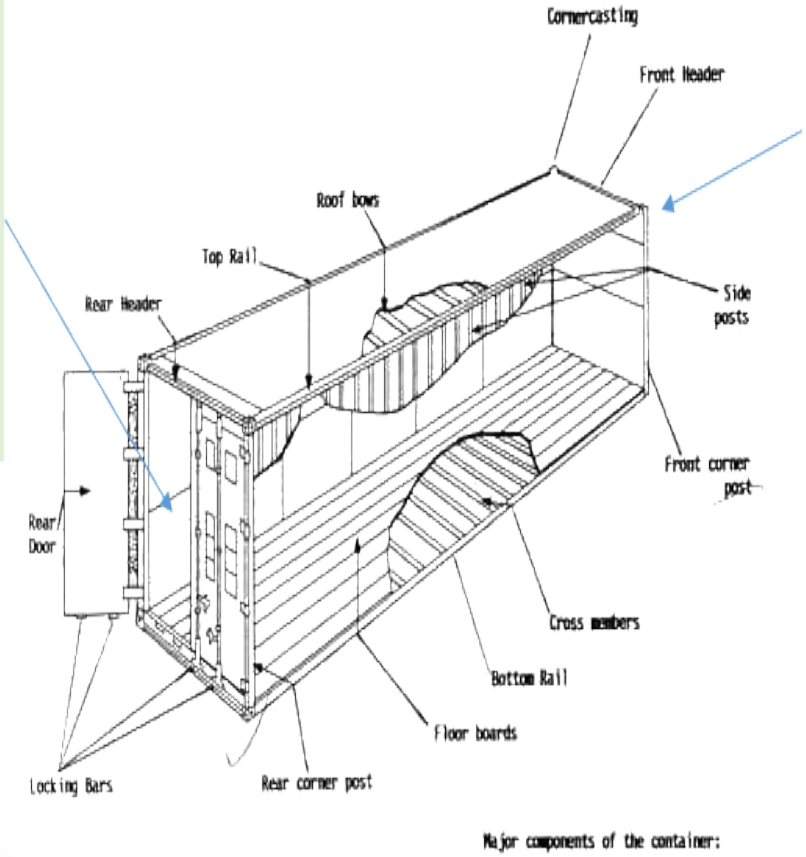
Who use docker now ?

What Cool of Docker ?

- รวบรวมทุกสิ่งที่จำเป็นต้องใช้ในการรันโปรแกรมไว้ใต้ container (component, library etc)
- ขนาดไฟล์ container มีขนาดเล็กมาก (เทียบกับขนาดไฟล์ของ virtual machine หรือ os)
- มี overhead ในการรันโปรแกรมทรัพยากรต่ำ
- ลดระยะเวลาในการติดตั้งและทดสอบโปรแกรม
- ส่งมอบโปรแกรมไปทำงานบนเครื่องแม่ข่าย production ได้โดยไม่มีความจำเป็นต้องปรับแต่งระบบใหม่ (zero configure)
- สามารถรันโปรแกรมได้บนเครื่องแม่ข่ายทุกๆระบบปฏิบัติการฯ ที่ติดตั้ง docker ได้
- สามารถ scale-out ได้ง่ายในอนาคต
- World open for docker !!!

Separate of Concern

- Dan the Developer
  - Worries about what's "inside" the container
    - His code
    - His Libraries
    - His Package Manager
    - His Apps
    - His Data
  - All Linux servers look the same



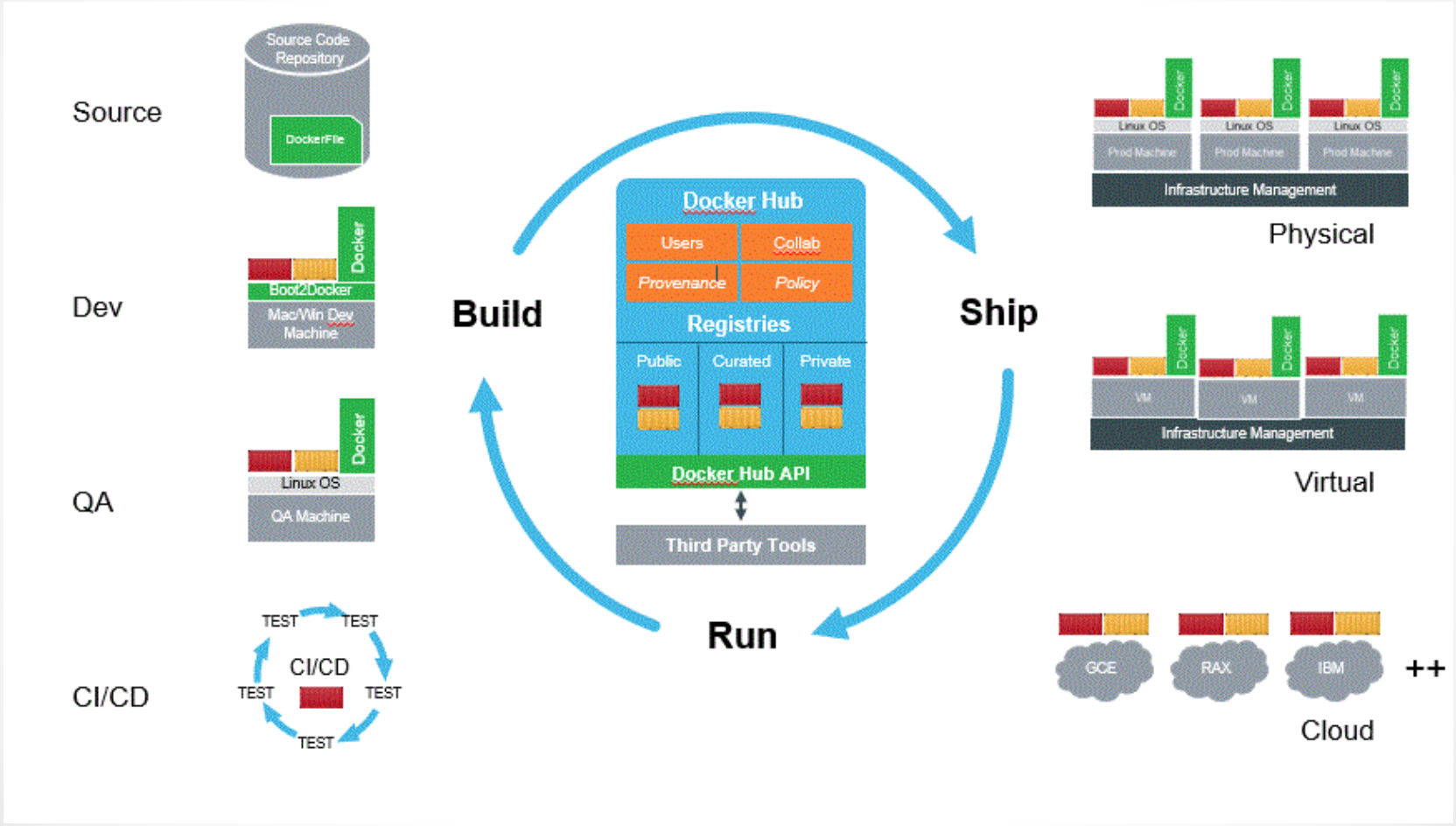
Major components of the container:

- Oscar the Ops Guy
  - Worries about what's "outside" the container
    - Logging
    - Remote access
    - Monitoring
    - Network config
  - All containers start, stop, copy, attach, migrate, etc. the same way

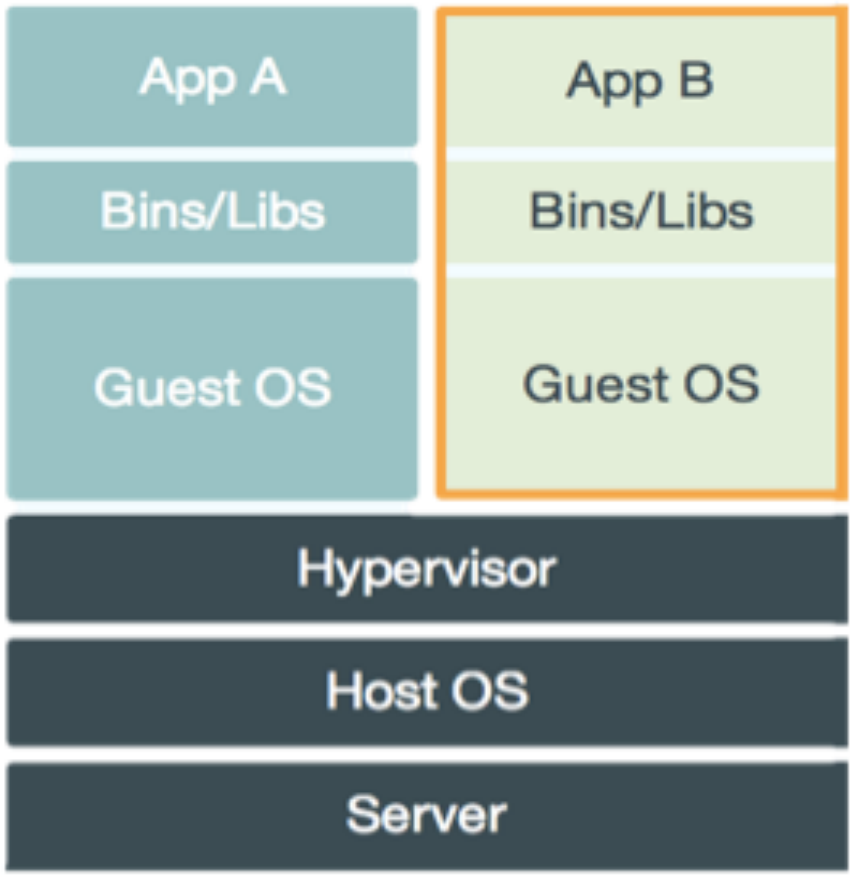
docker

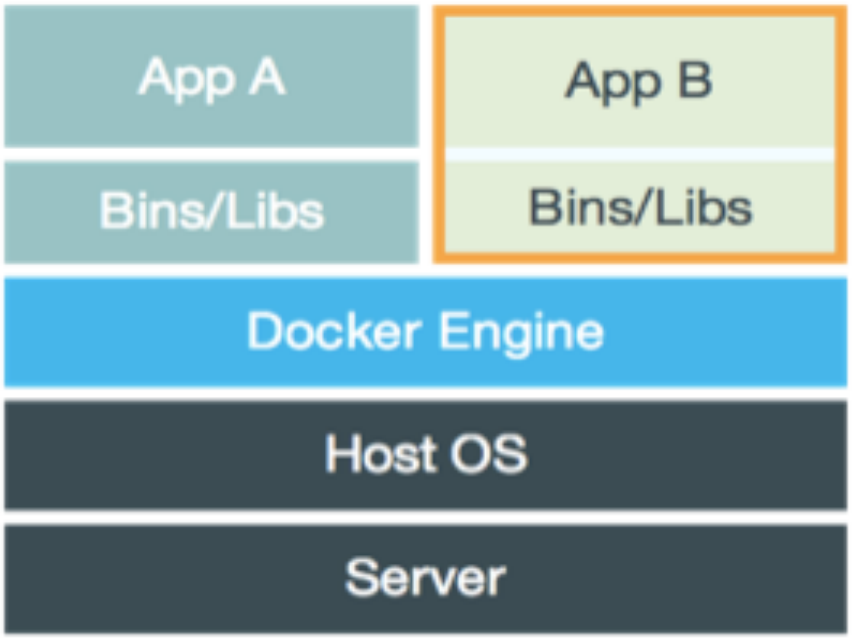
Benefit of docker for DevOps

- Build-Ship-Run



Docker vs VMWare





docker

Docker Version

```
ip-192-168-1-112% docker version
Client:
 Version:       18.03.0-ce
 API version:   1.37
 Go version:    go1.9.4
 Git commit:    0520e24
 Built: Wed Mar 21 23:06:22 2018
 OS/Arch:       darwin/amd64
 Experimental:  true
 Orchestrator:  kubernetes

Server:
 Engine:
  Version:      18.03.0-ce
  API version:  1.37 (minimum version 1.12)
  Go version:   go1.9.4
  Git commit:   0520e24
  Built:        Wed Mar 21 23:14:32 2018
  OS/Arch:      linux/amd64
  Experimental: true
ip-192-168-1-112%
```

```
ip-192-168-1-112% docker info
Containers: 22
 Running: 22
 Paused: 0
 Stopped: 0
Images: 41
Server Version: 18.03.0-ce
Storage Driver: overlay2
 Backing Filesystem: extfs
 Supports d_type: true
 Native Overlay Diff: true
Logging Driver: json-file
Cgroup Driver: cgroupfs
Plugins:
 Volume: local
 Network: bridge host ipvlan macvlan null overlay
 Log: awslogs fluentd gcplogs gelf journald json-file logentries splunk syslog
Swarm: inactive
Runtimes: runc
Default Runtime: runc
Init Binary: docker-init
containerd version: cfd04396dc68220d1cecbe686a6cc3aa5ce3667c
runc version: 4fc53a81fb7c994640722ac585fa9ca548971871
init version: 949e6fa
Security Options:
 seccomp
  Profile: default
Kernel Version: 4.9.87-linuxkit-aufs
Operating System: Docker for Mac
OSType: linux
Architecture: x86_64
CPUs: 4
Total Memory: 1.952GiB
Name: linuxkit-025000000001
ID: WWTW:NOOB:UC5K:7G2P:S3YX:RBCW:GD3J:7HKY:LJDM:6SYT:M7OF:SGXX
Docker Root Dir: /var/lib/docker
Debug Mode (client): false
Debug Mode (server): true
 File Descriptors: 140
 Goroutines: 132
 System Time: 2018-04-09T15:06:53.068007752Z
 EventsListeners: 2
HTTP Proxy: docker.for.mac.http.internal:3128
HTTPS Proxy: docker.for.mac.http.internal:3129
Registry: https://index.docker.io/v1/
Labels:
Experimental: true
Insecure Registries:
 127.0.0.0/8
Live Restore Enabled: false

ip-192-168-1-112%
```


What's New

docker

Docker's History of contribution to the OCI

Docker has lead the development of OCI from the initial commit to the donation of runc and Docker V2 Image format as a base for the image format specification.

2014

- **FEBRUARY 18** First commit of libcontainer
- **FEBRUARY 20** nsinit is developed - the inspiration for runC
- **MAR 7** Docker 0.9 ships with libcontainer as the default runtime

2015

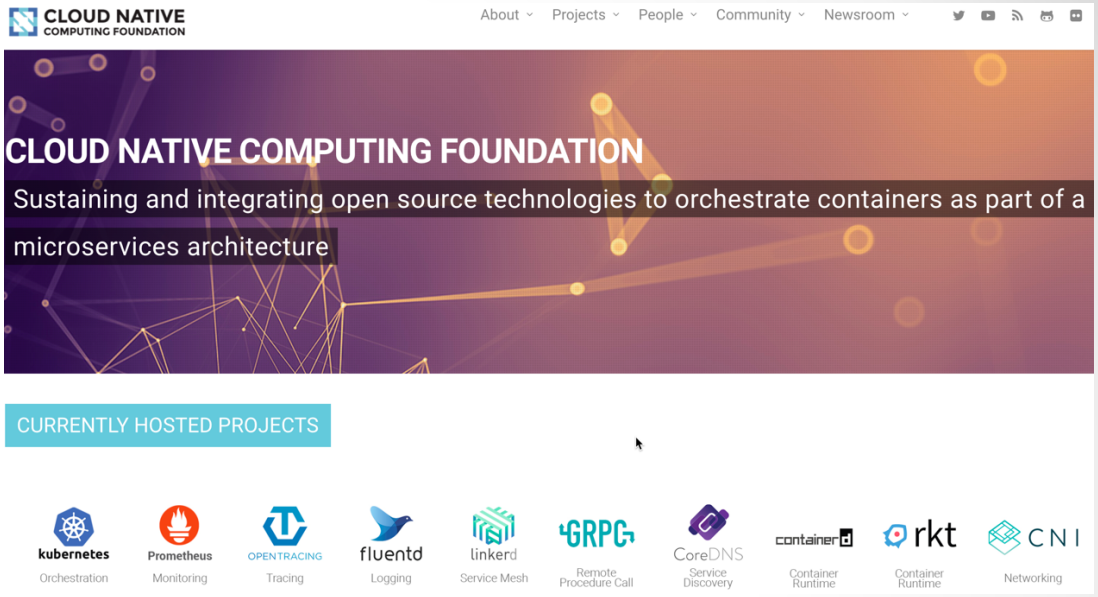
- **APRIL** Support for V2 of content addressable Docker Registry API released - groundwork for the OCI Image Specification
- **MAY 1** Docker moves to donate its image format and runtime
- **MAY/ JUNE** Docker works with Inaugural participants and Linux Foundation to donate container format/runtime
- **JUNE 22** Docker announces donation of base container format and runtime, runC*, the cornerstone for the OCI
- **DECEMBER 17** Docker announces containerd, a daemon to manage runc

2016

- **JANUARY** Formation of the OCI TOB - 2 Docker maintainers - Michael Crosby and Diogo Monica join effort
- **FEBRUARY** Schema2 of Docker's V2 Image Format support
- **APRIL** Docker image format donated to the OCI
- **DECEMBER** Docker spins out containerd

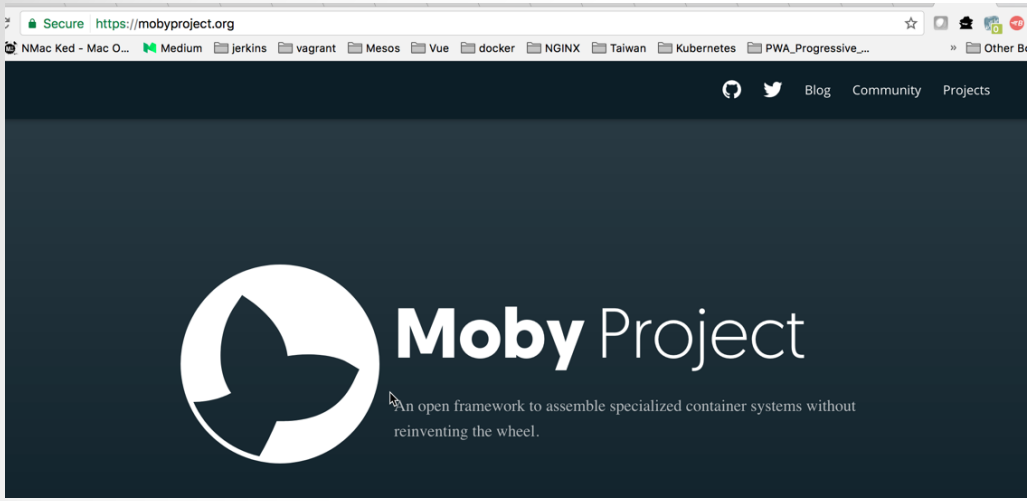
2017

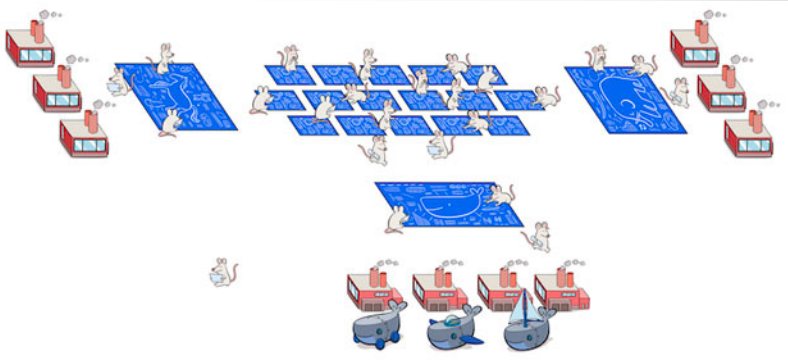
- **MARCH** Docker donates containerd to the CNCF
- **APRIL** Docker announces project Moby
- **JULY** 1.0 of OCI runtime and image format

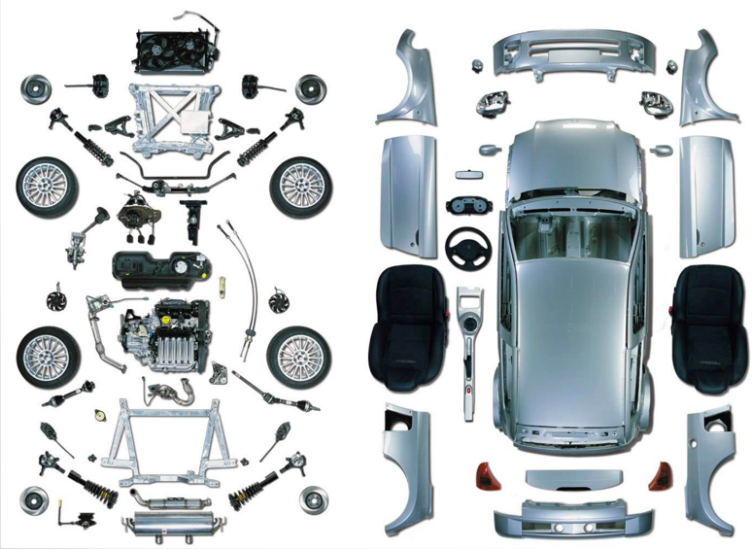


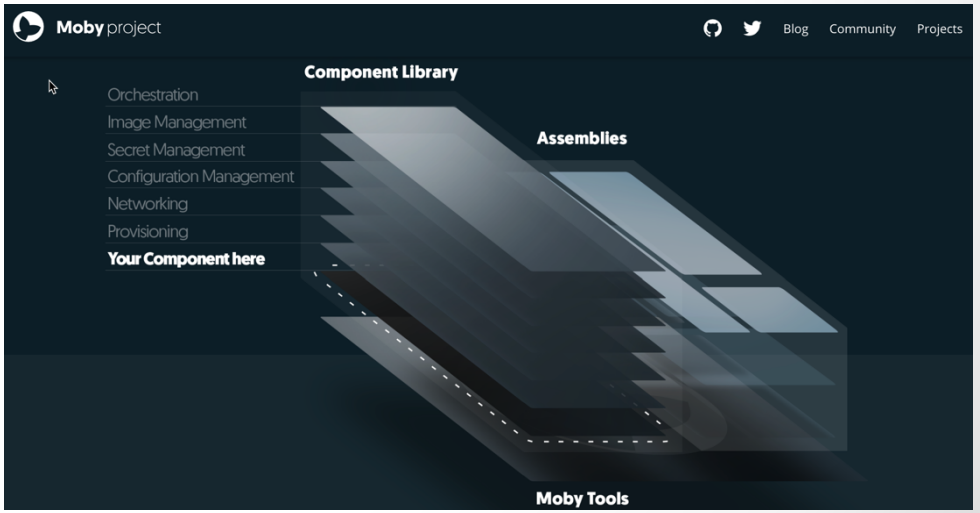
docker

What's New









docker

What's News

17.06.0-ce (2017-06-28)

> **Note**: Docker 17.06.0 has an issue in the image builder causing a change in the behavior of the `ADD` instruction of Dockerfile when referencing a remote `.tar.gz` file. The issue will be fixed in Docker 17.06.1.

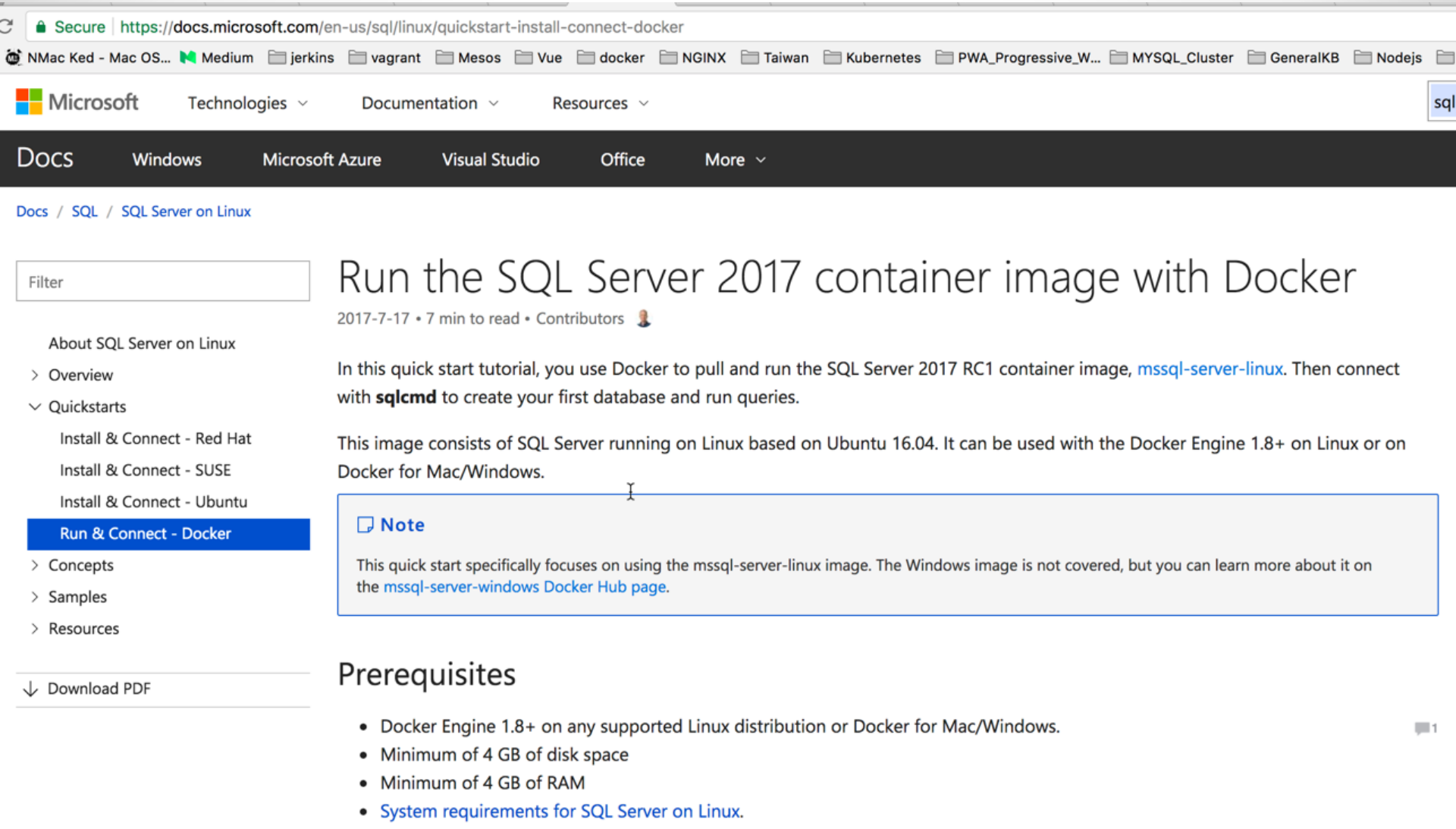
> **Note**: Starting with Docker CE 17.06, Ubuntu packages are also available for IBM z Systems using the s390x architecture.

> **Note**: Docker 17.06 by default disables communication with legacy (v1) registries. If you require interaction with registries that have not yet migrated to the v2 protocol, set the `--disable-legacy-registry=false` daemon option. Interaction with v1 registries will be removed in Docker 17.12.

Server

Platform	Docker CE x86_64	Docker CE ARM	Docker CE System Z (s390x)	Docker EE
CentOS	✓			✓
Debian	✓	✓		
Fedora	✓			
Microsoft Windows Server 2016				✓
Oracle Linux				✓
Red Hat Enterprise Linux				✓
SUSE Linux Enterprise Server				✓
Ubuntu	✓	✓	✓	✓

What's News



docker

Platform of Docker

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Platform of Docker

- Docker Toolbox (Legacy) for Desktop (Docker CE)
  - Install docker toolbox on machine will Create VM (Oracle VirtualBox)
  - Dockertoolbox for MAC
  - Dockertoolbox for Windows (7,8,10)

- Docker Native for Desktop (Docker CE)
  - Docker for MAC (Moby Linux (xhyve engine))
  - Docker for Windows (Moby Linux (hyper-v engine))

- Docker Native for Server (Docker CE/EE)
  - Docker for Windows 2016 (EE)
  - Docker for Ubuntu,CENTOS (CE/EE)
  - Docker for Debian (EE/ARM)
  - Docker for Red Hat Enterprise/SUSE/Oracle Linux (EE)
  - Docker for Fedora (CE)

Platform of Docker

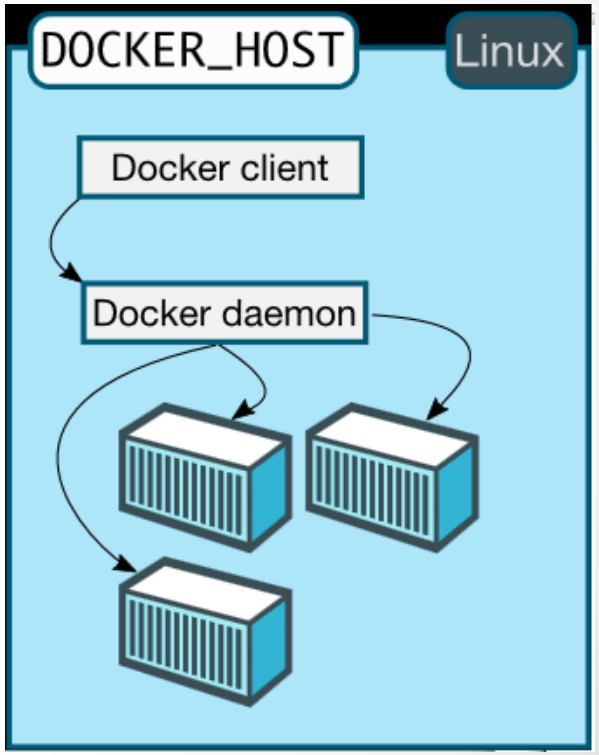
- Pros and Cons.
- Docker Toolbox
  - Pros
    - Compatible for All (Windows 7, 8, 10, MAC OS X)
    - Limit result for operate
    - Suitable for simulate multiple node or swarm
  - Cons
    - Multiple step for transfer source code and debug
    - Overhead for VirtualBox

Platform of Docker

- Pros and Cons.
- Docker for Windows or MAC
  - Pros
    - Full integrate with Machine (No need virtualbox)
      - Auto-update
      - File sharing (Host🡐 🡒 Container)
      - Http-proxy
      - Custom docker-registry
  - Cons
    - Single Node all case
    - Limit for

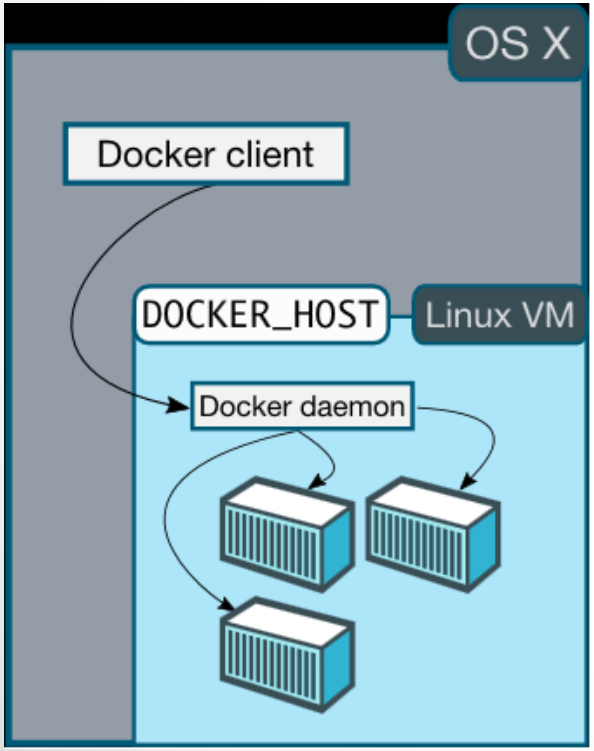
Platform of Docker

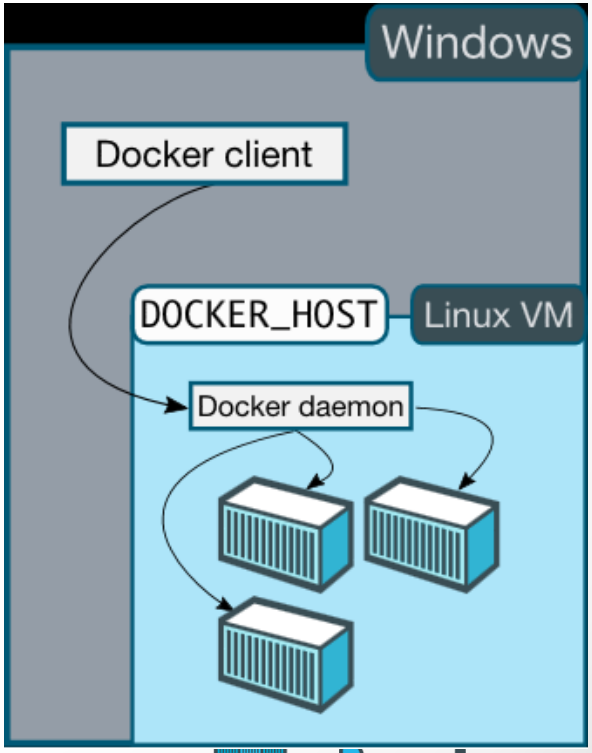
- **Docker Native for Desktop/Server**
- การติดตั้ง docker ลงบนเครื่อง linux server / windows (non-toolbox) / mac (non-toolbox) เมื่อเกิดการรัน container ขึ้น docker daemon จะให้บริการบนเครื่อง linux server ที่ทำการติดตั้งโดยตรง ซึ่งเราสามารถเรียกใช้งานโปรแกรมบนเครื่องได้ทันที



Linux vs Windows vs MAC OS

- **Docker ToolBox**
- การติดตั้ง docker ลงบนเครื่อง windows หรือ mac os จะมีการติดตั้ง virtual machine ใหม่ขึ้นบนเครื่องเพื่อให้บริการสำหรับ docker โดยเฉพาะดังนั้นเมื่อมีการสั่งรันจึงเกิดการ remote run ไปยังเครื่อง virtual machine (docker-machine)





WorkShop

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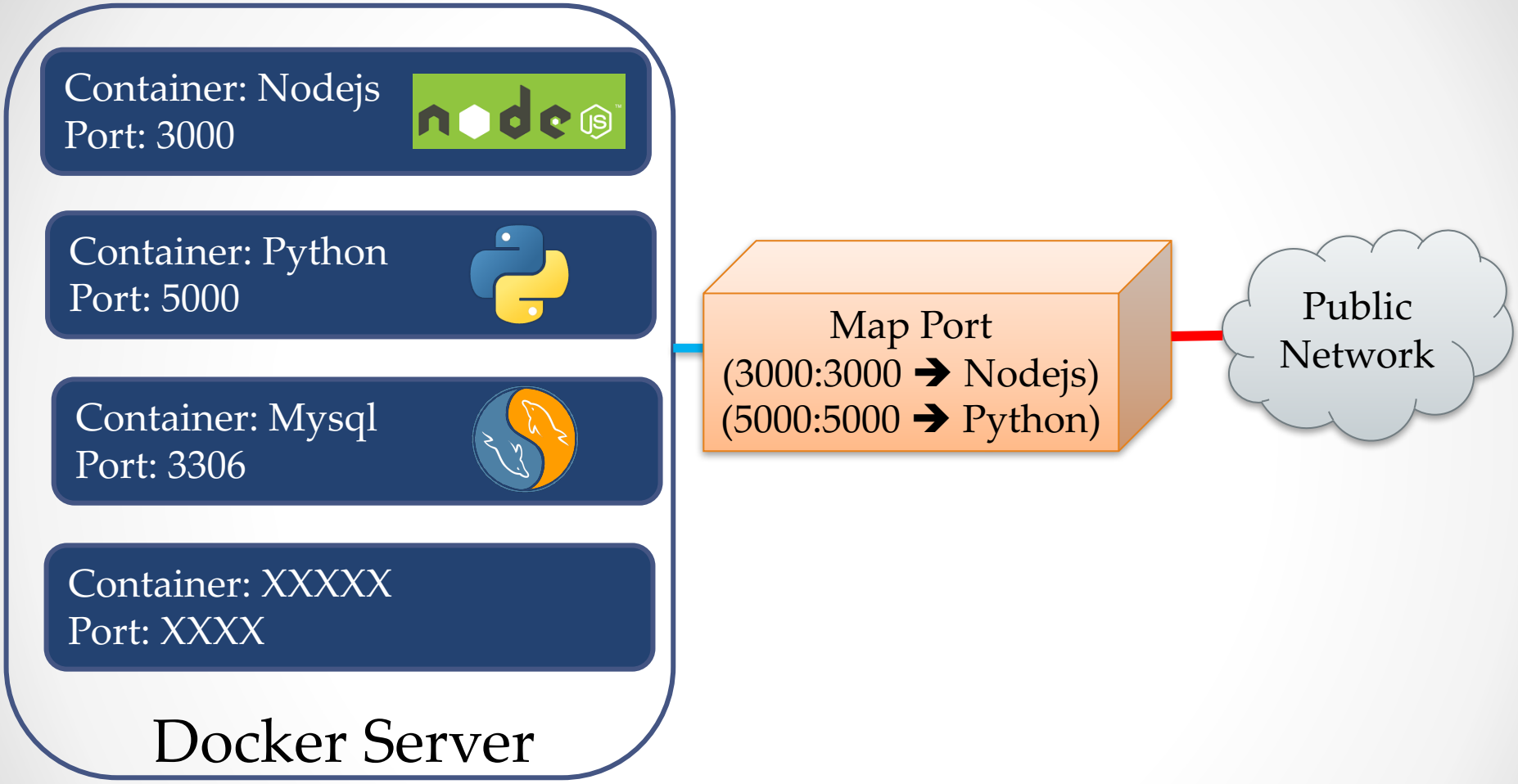
WorkShop


Container: Nodejs
Port: 3000
Container: Python
Port: 5000
Container: Mysql
Port: 3306
Container: XXXXX
Port: XXXX
Docker Server
Map Port
(3000:3000 ➔ Nodejs)
(5000:5000 ➔ Python)
Public
Network

WorkShop

- Part1: NODEJS

Container Name: NODEJS
IP Address: X.X.X.X (Port: 3000:3000)

Docker-Server:
Path: /Workshop_2_Docker_for_Nodejs/app

Server.js → Compile → Homepage.jade (Content HTML)

Server-Side request jade to compile (HTML+Javascript)

Default.jade (Menu HTML)

WorkShop

Server.js

```
var express = require('express')
  , logger = require('morgan')
  , app = express()
  , template = require('jade').compileFile(__dirname + '/source/templates/homepage.jade')

app.use(logger('dev'))
app.use(express.static(__dirname + '/static'))

app.get('/', function (req, res, next) {
  try {
    var html = template({ title: 'Home' })
    res.send(html)
  } catch (e) {
    next(e)
  }
})

app.listen(process.env.PORT || 3000, function () {
  console.log('Listening on http://localhost:' + (process.env.PORT || 3000))
})
```

WorkShop

Homepage.jade


```
extend default

block content
  p.
    Welcome to Example "Nodejs Thailand WebPage" that build from Nodejs, Express under
    Docker for NodeJS version 1.0. This example webpage is come from container technology (Docker)

  p.
    Docker and Container Technology is formally call "OS level virtualization" and also
    known as containerization, refers to an operating system feature in which the kernel
     allows the existence of multiple isolated user-space instances. Such instances,
     called containers,[1] partitions, virtualization engines (VEs) or jails
     (FreeBSD jail or chroot jail), may look like real computers from the point of view
     of programs running in them. A computer program running on an ordinary person's
     computer's operating system can see all resources (connected devices, files and folders
     , network shares, CPU power, quantifiable hardware capabilities) of that computer.
     However, programs running inside a container can only see the container's contents
     and devices assigned to the container.
```


WorkShop

Default.jade


```
doctype html
html
  head
    link(rel='stylesheet', href='/css/index.css')
    title Nodejs Thailand
  body
    .header
      h1.page-title Nodejs Thailand

    ul.nav
      li: a(href='/') Home
      li: a(href='https://www.docker.com') Docker Website
      li: a(href='https://nodejs.org/en/') NodeJS Website
      li: a(href='https://www.facebook.com/praparn.lungpoonlap') About Me

    .main-content
      block content

    .footer
      p Copyright © 2018 Praparn Luangphoonlap. Labdockerthailand ® is a Registered Trademark of Docker (un)Ltd. in the Earth and other
```


WorkShop

Dockerfile

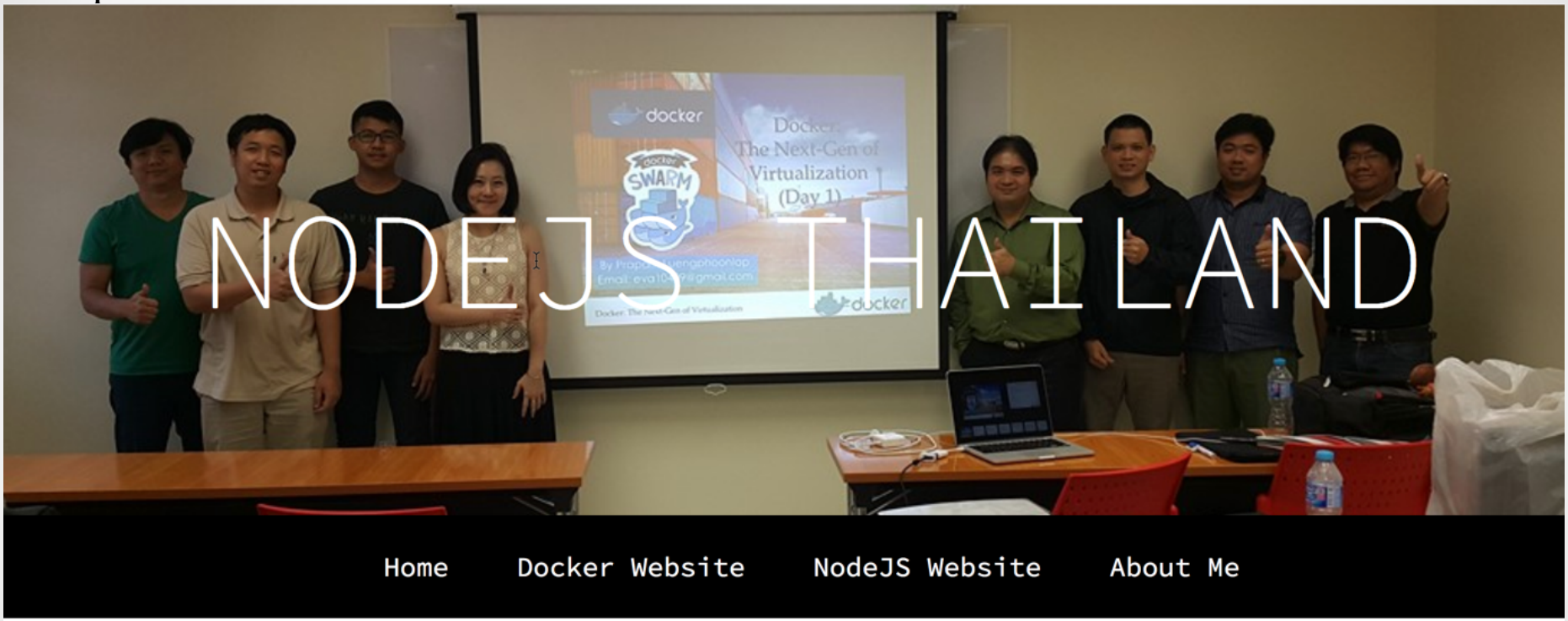
```
FROM bitnami/node:latest
MAINTAINER Praparn Lueangphoonlap (eva10409@gmail.com)
LABEL Description="NodeJS Workshop" Version="1.0"
ENV NODE_VERSION=v6.12.2 NPM_VERSION=3.10.10
RUN mkdir /nodejs
COPY ./app/. /app/
WORKDIR /app
RUN npm i && \
    npm run build
ENTRYPOINT ["node","server.js"]
EXPOSE 3000
```

Docker Run

```
docker@labdocker:~$ docker pull labdocker/nodejsbitnami:latest
latest: Pulling from labdocker/nodejsbitnami
Digest: sha256:f1fd52b61b2a32bae96723b8aea907f58aa18412aae37aa1f517536af3a8b8ba
Status: Image is up to date for labdocker/nodejsbitnami:latest
docker@labdocker:~$ docker run -dt --name nodejs -p 3000:3000 labdocker/nodejsbitnami:latest
0b5ed4ad6802711825337e744d89fb62c79159e4fa545b783bdbc49ad1170ce3
docker@labdocker:~$ docker ps
CONTAINER ID        IMAGE                           COMMAND             CREATED             STATUS              PORTS                    NAMES
0b5ed4ad6802        labdocker/nodejsbitnami:latest   "node server.js"    2 seconds ago       Up 2 seconds        0.0.0.0:3000->3000/tcp   nodejs
docker@labdocker:~$
```


WorkShop

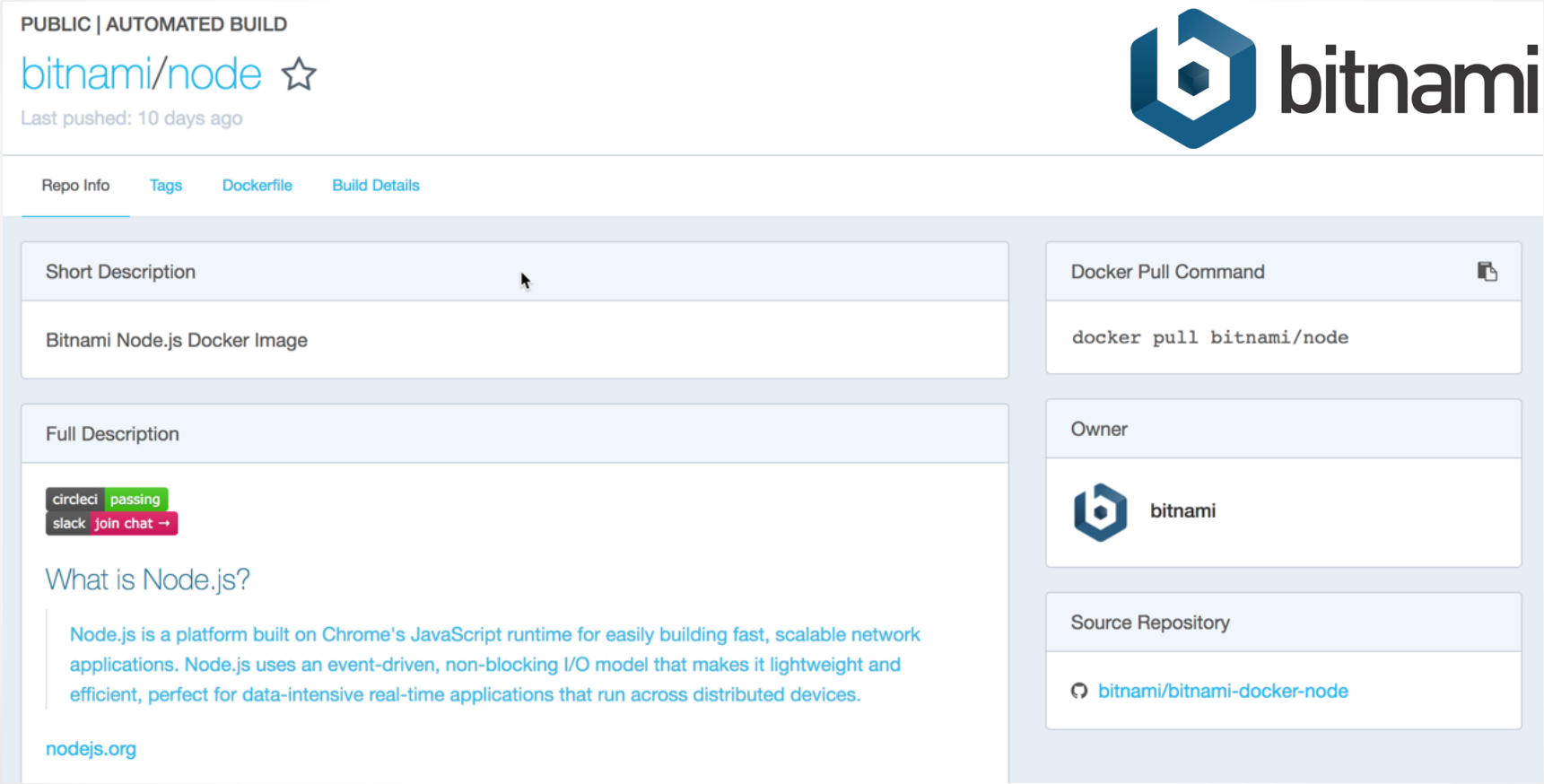
Output



docker

WorkShop

- This example nodejs images from “Bitnami”



https://github.com/bitnami/bitnami-docker-node

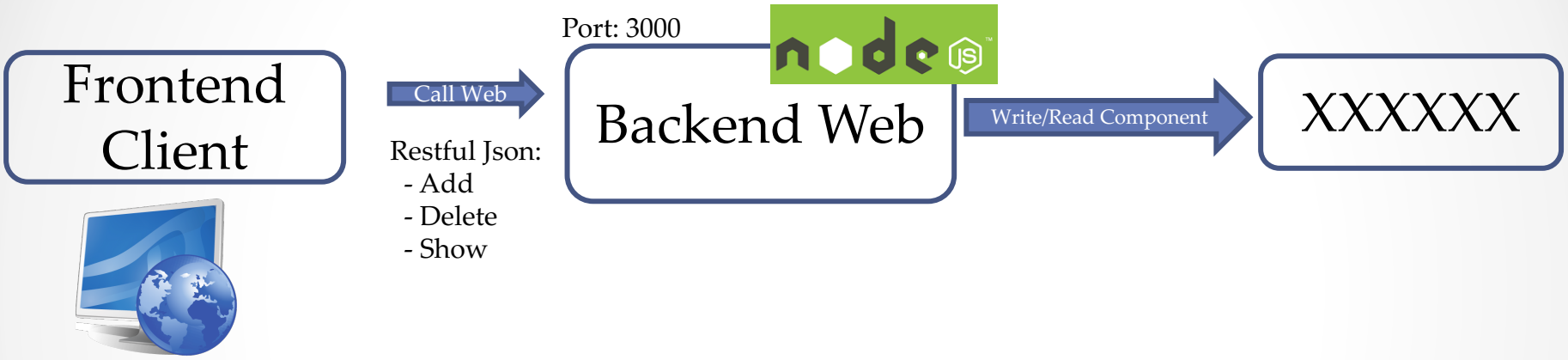
docker

WorkShop

- Why “bitnami” ?
  - Bitnami closely tracks upstream source changes and promptly publishes new versions of this image using our automated systems.
  - With Bitnami images the latest bug fixes and features are available as soon as possible.
  - Bitnami containers, virtual machines and cloud images use the same components and configuration approach - making it easy to switch between formats based on your project needs.
  - Bitnami images are built on CircleCI and automatically pushed to the Docker Hub.
  - **All our images are based on minideb a minimalist Debian based container image which gives you a small base container image and the familiarity of a leading linux distribution**

WorkShop

- Basic Component



Docker Network

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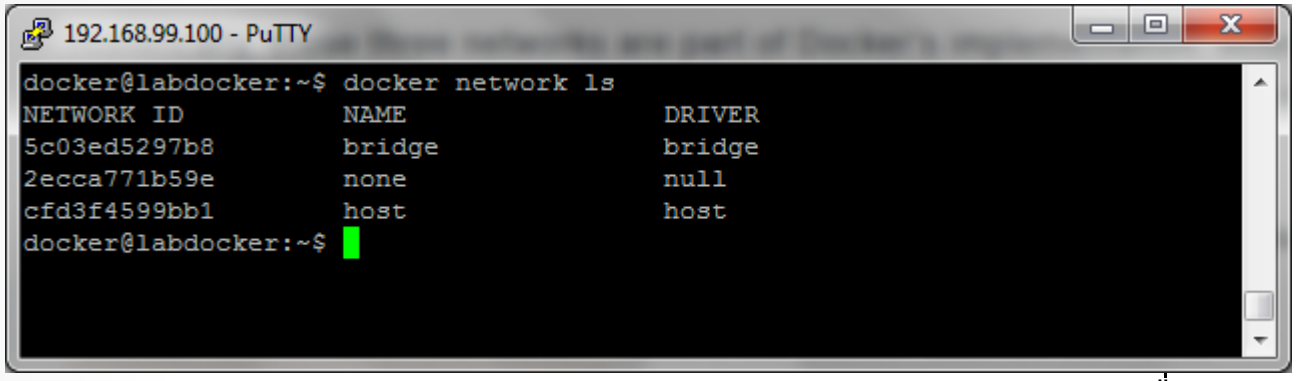
Docker Network

- Software define network by design (virtual switch)
- default docker จะจัดเตรียม network มาให้สามรูปแบบ

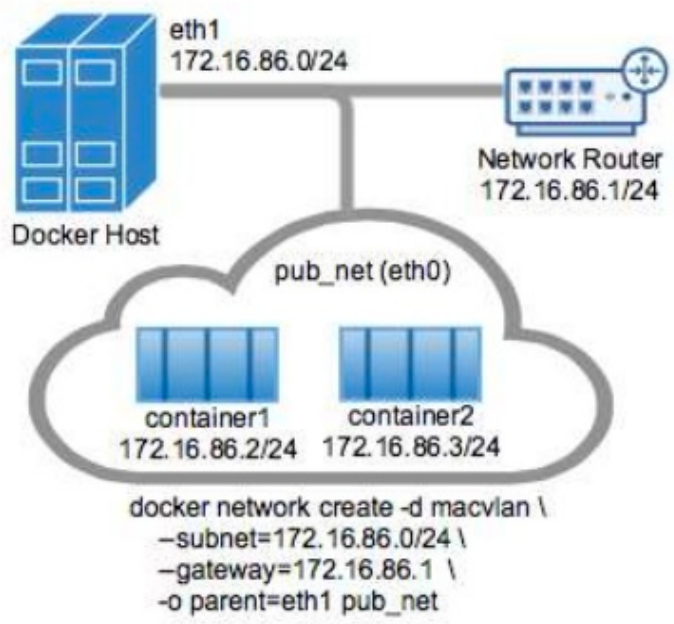


- **bridge** คือ default network สำหรับให้ container เชื่อมต่อออกสู่โลกภายนอกผ่าน virtual switch "docker0" โดยใช้ network stack ของ container เองในการเชื่อมต่อ (route mode)
- **none** คือ network loopback (127.0.0.1) สำหรับ container ที่ไม่มีการเชื่อมต่อออกไปด้านนอก
- **host** คือ network host ที่ container ใช้งาน host network stack ในการทำงาน

  (ใช้ในกรณี ต้องการ network performance สูงสุด) (security concern)

Docker Network

- Additional network type
- **MACVLAN**

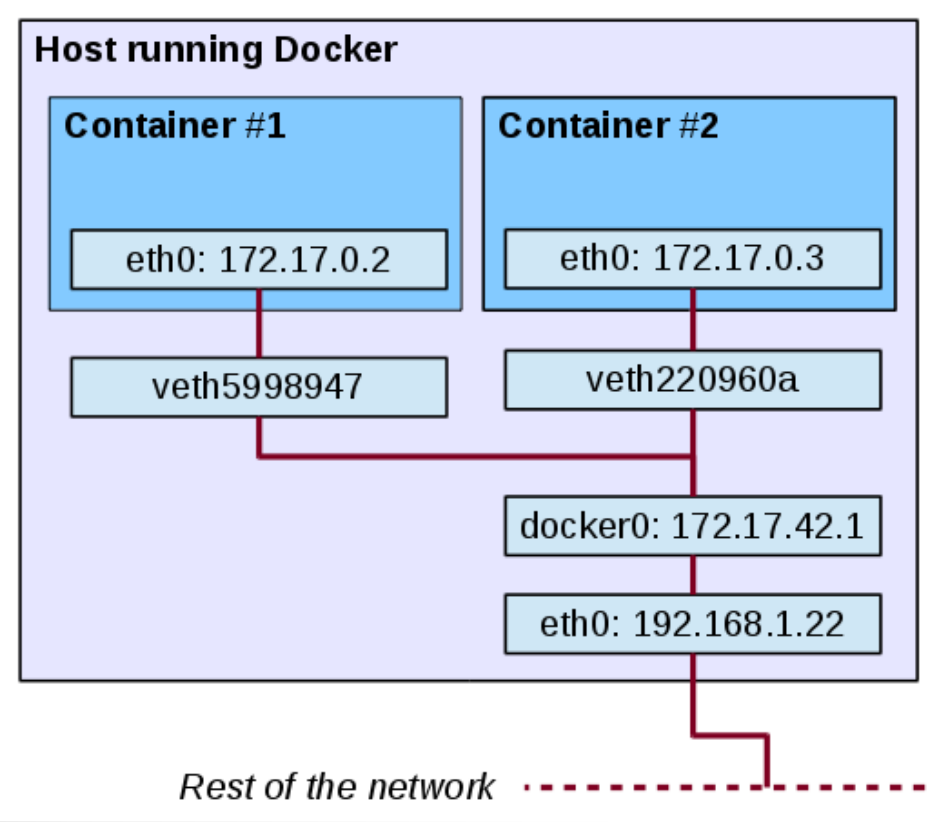


- **Overlay (Swarm Mode)**
- **3rd Party Network Plugin (Swarm Mode)**

docker

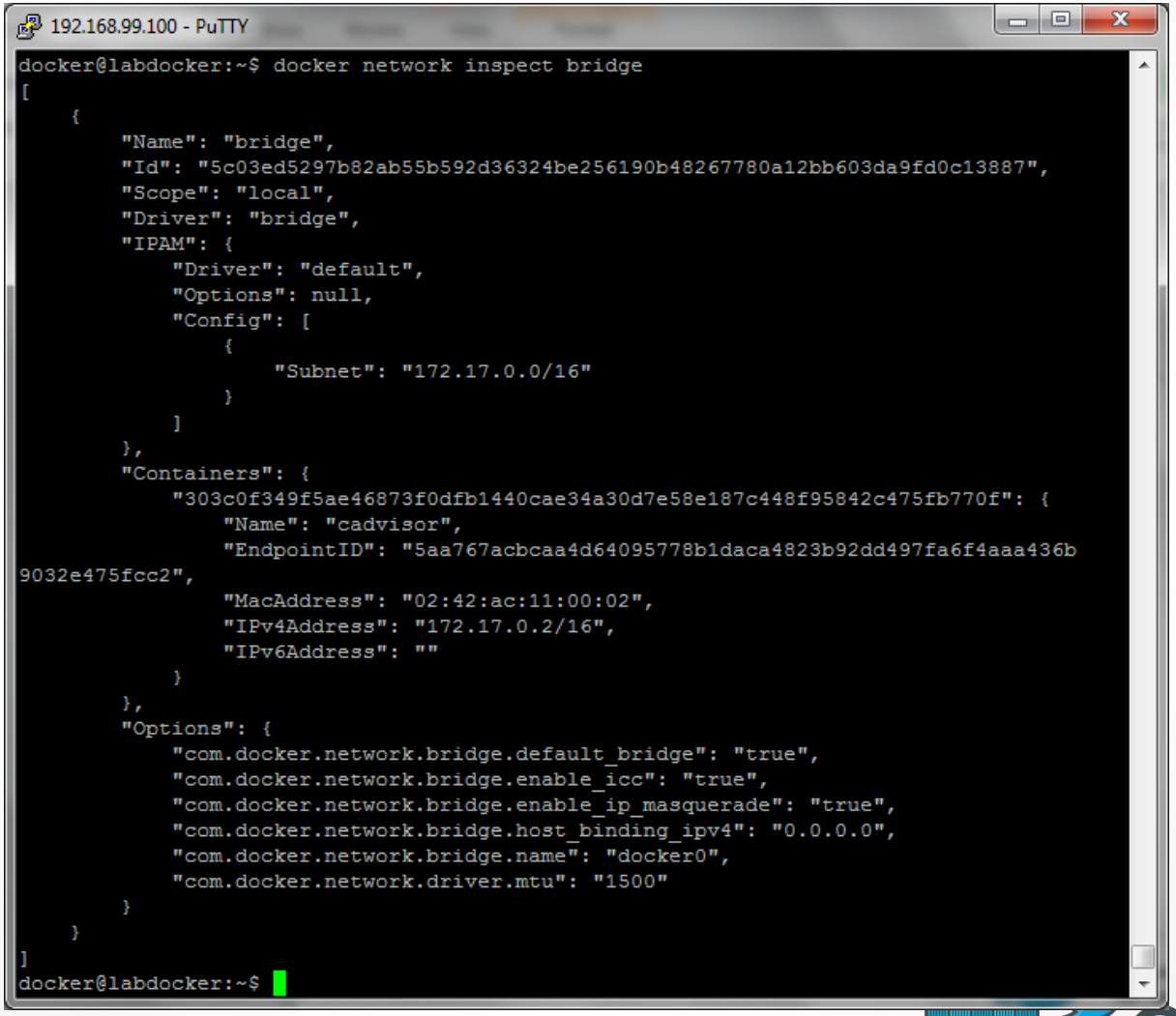
Docker Network

- bridge (default) เมื่อสั่งรัน container ในระบบโดยไม่ได้ระบุ network ใดๆ container จะถูกเพิ่ม ipaddress, subnet เข้าสู่ bridge network โดยอัตโนมัต



Docker Network

- docker network inspect bridge



Docker Network

- Option เกี่ยวกับ network สำหรับสั่ง run container

--dns= x.x.x.x (Default --name,--net-alias,--link also dns internal docker)
--net="<bridge/none/host/custom>"
--net-alias = "xxxx" <new in 1.11>
--add-host="xxxx"
--mac-address="xx:xx:xx:xx"
--ip="x.x.x.x"
--ipv6="xx:xx:xx:xx" <new in 1.11>
-p, --publish = 9999:9999
-P, --publish-all ➔ Auto map network

```
docker run  -i -t --rm --name nodejs -p 3000:3000 \
  labdocker/alpineweb:latest node nodejs/hello.js
```


Docker Network

- สร้าง custom virtual switch เพื่อจัดระเบียบและแบ่งแยก network ของ application ออกจากกัน (Recommend for Production)

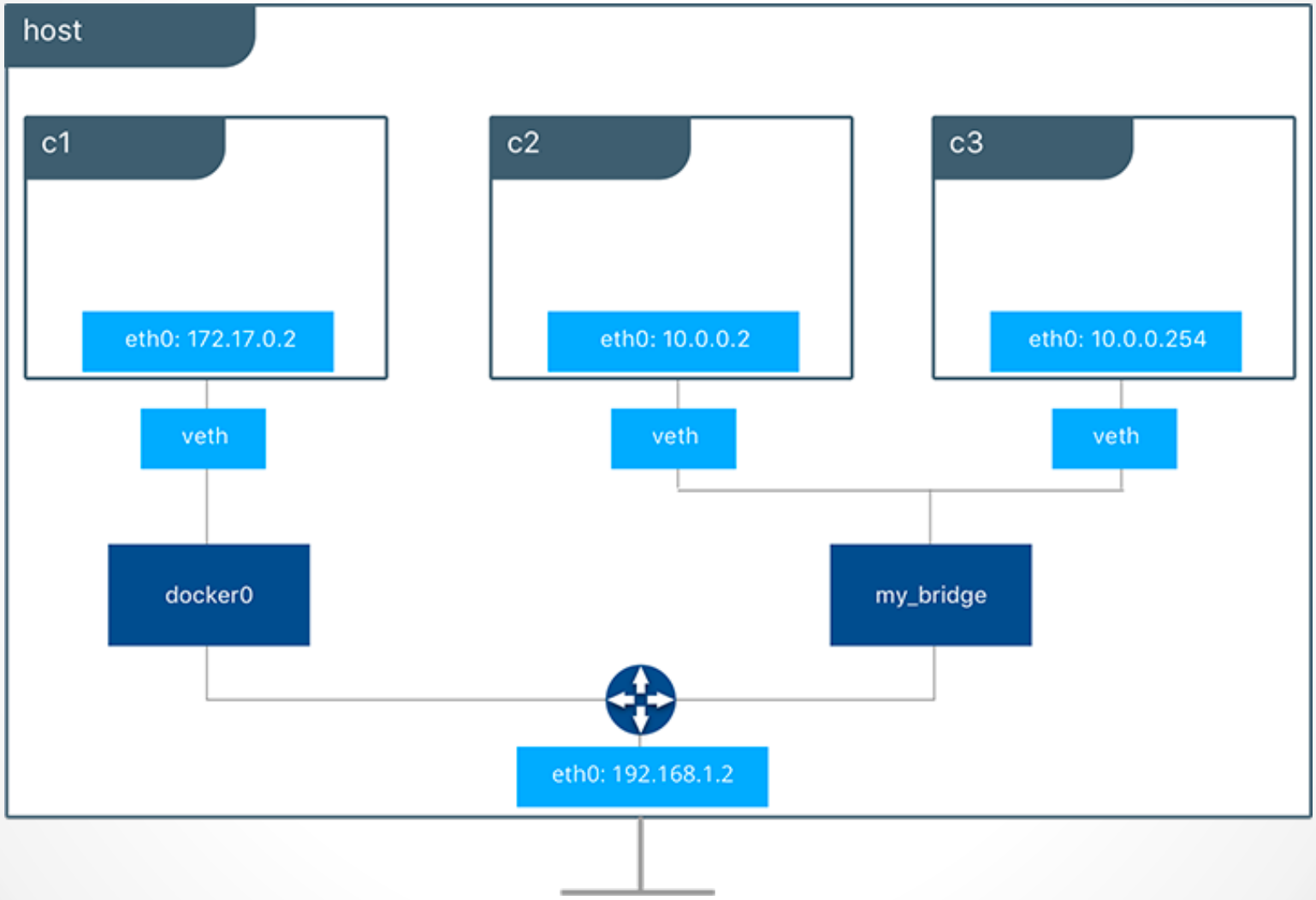
```
docker network create --driver  <default/null/host> name
```

```
Ex: docker network create --driver  default netweb
```

```
Ex: docker network rm netweb
```

- สามารถเพิ่มเติม option ในการสร้าง virtual switch เพิ่มเติม
  - -d macvlan -o parent = กำหนด vlan tagging
  - --subnet = xx (ระบุ ip address ของ virtual switch (Ex: 192.168.100.0/24))
  - --ip-range = xx (ระบุ ip address ที่จะส่งให้ container ทำงาน) (Ex: 192.168.100.128/25)
  - --gateway = xx (ระบุ ip address gateway) (Ex: 192.168.100.5)
  - --opt = custom option
    - --opt="com.docker.network.mtu"="1500"
    - --opt="com.docker.network.bridge.host_binding_ipv4"=x.x.x.x

Docker Network



docker

Docker Network

- การเพิ่ม network ใน container

```
docker network connect <network > <container >
```

```
Ex: docker network connect webnet web1
```

- การลด network ใน container

```
docker network disconnect <network > <container >
```

```
Ex: docker network disconnect webnet web1
```


Docker Network

- Link container (add on /etc/hosts)

```
docker –dt --name web1 labdocker/alpineweb sh
```

```
docker –dt --name web2 --link web1:webmaster \
labdocker/alpineweb sh
```

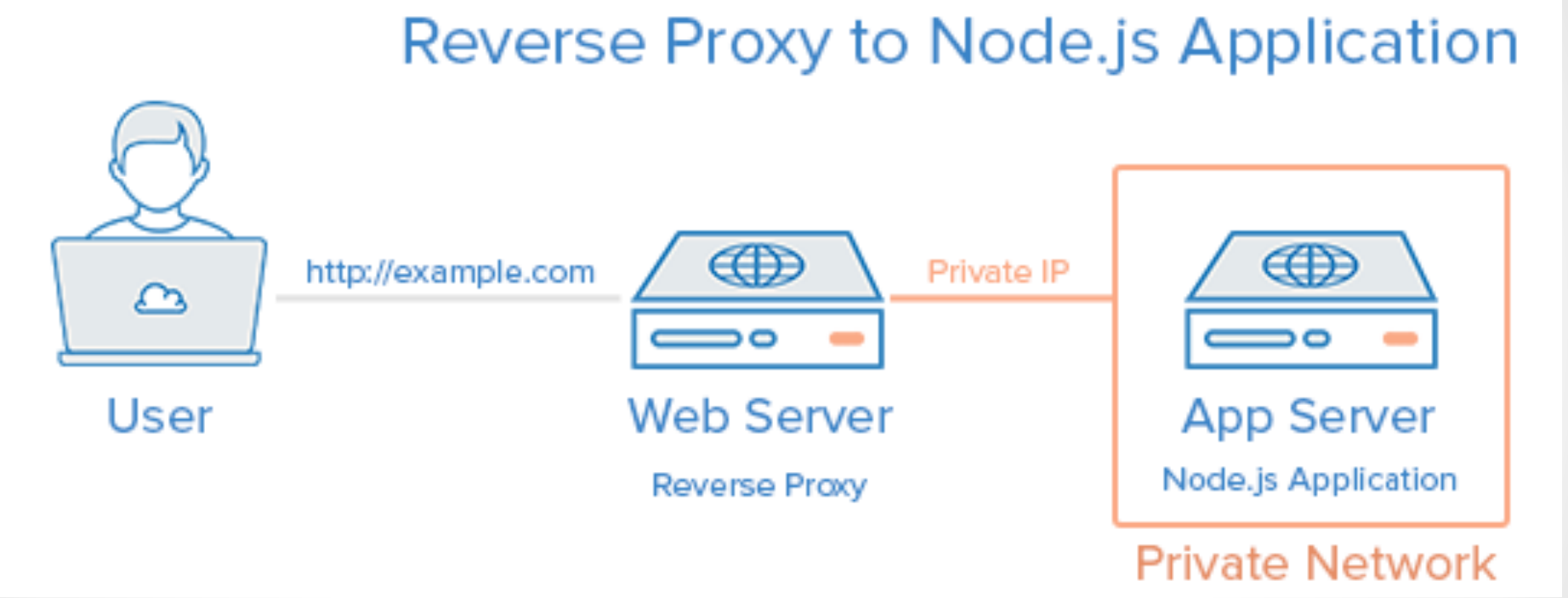
- DNS resolve on docker network (Recommend for Production)

Docker Network

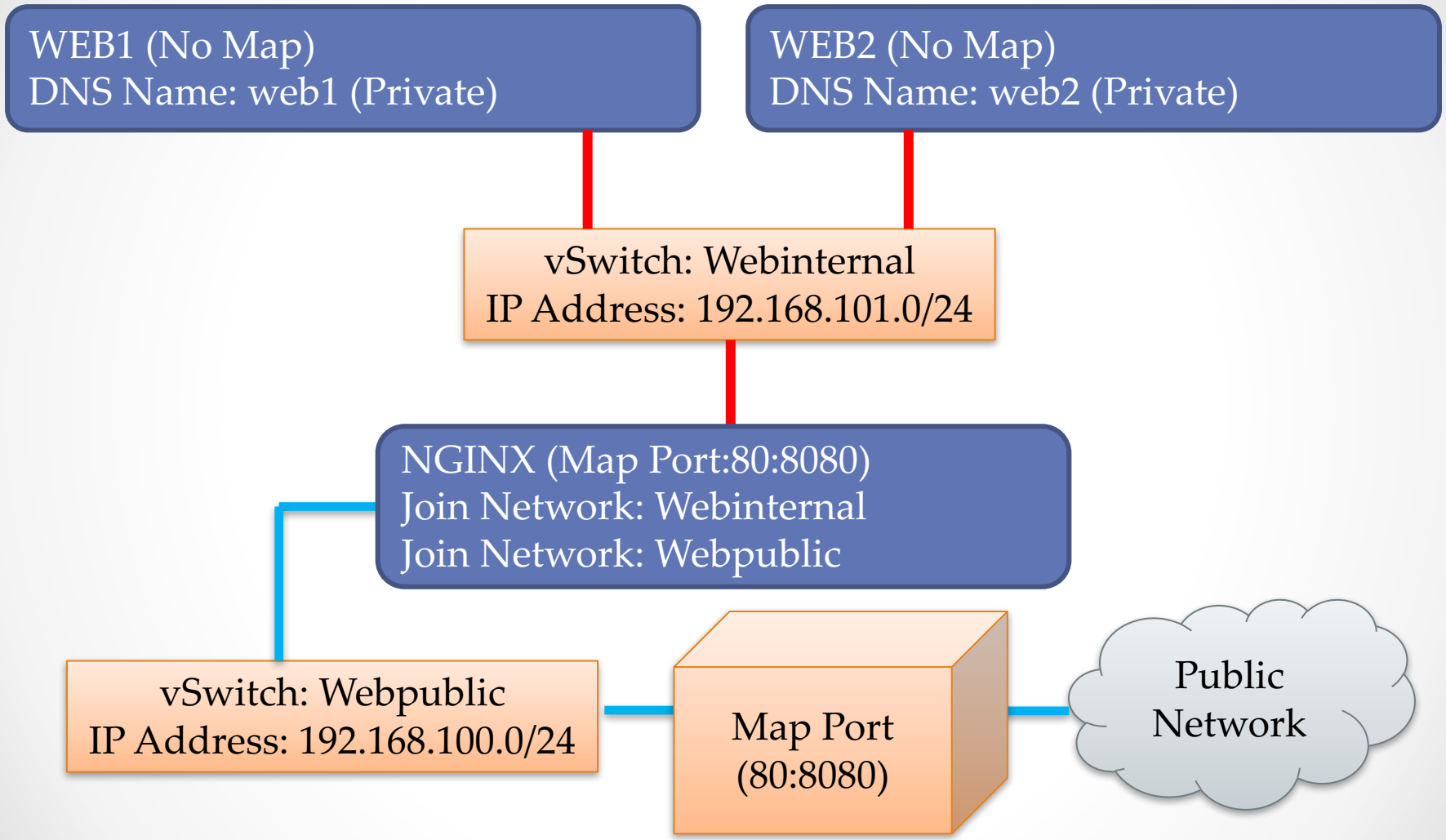
- Reverse Proxy Network (DNS)
- Purpose: ทำการ Deploy nodejs webserver ด้วย solution proxy ของ nginx (load balance / reverse proxy)

- **public network** เพื่อให้บุคคลภายนอกเข้าใช้งานผ่าน nginx server (reverse proxy)
  - IP Address: 192.168.100.0/24
  - Range Address: 192.168.100.128 – 192.168.100.256
  - MTU: 1500
- **private network** เพื่อให้ nginx server เข้าเรียกใช้งาน nodejs web server
  - IP Address: 192.168.101.0/24
  - Range Address: 192.168.101.128 – 192.168.101.256
  - MTU: 9000

Docker Network

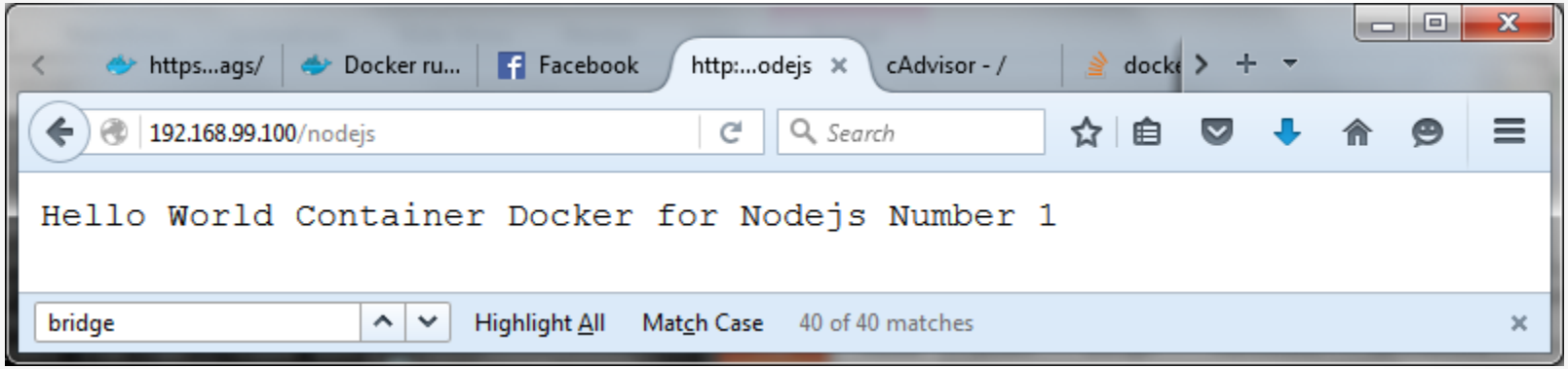


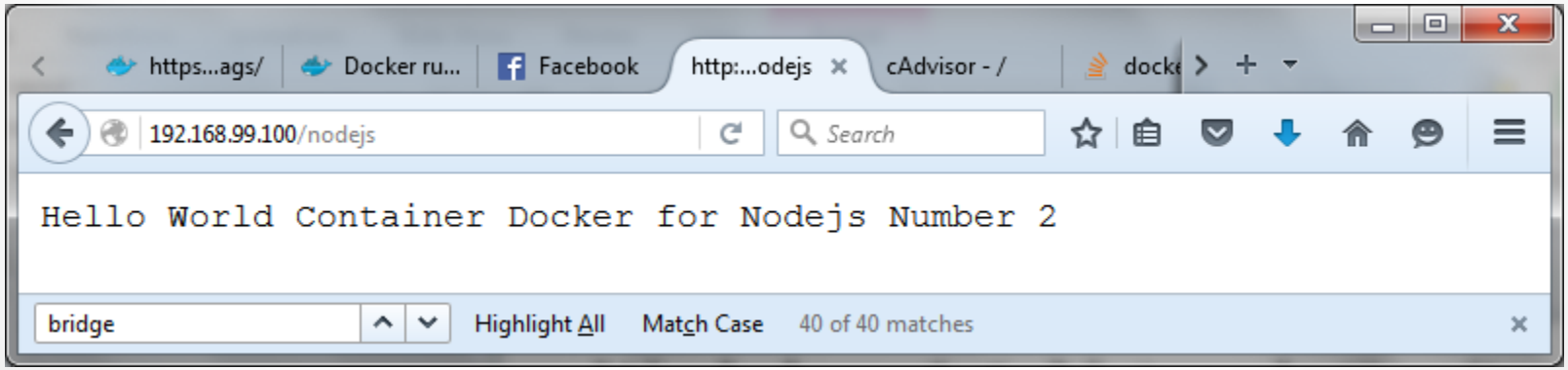
Docker Network



Docker Network

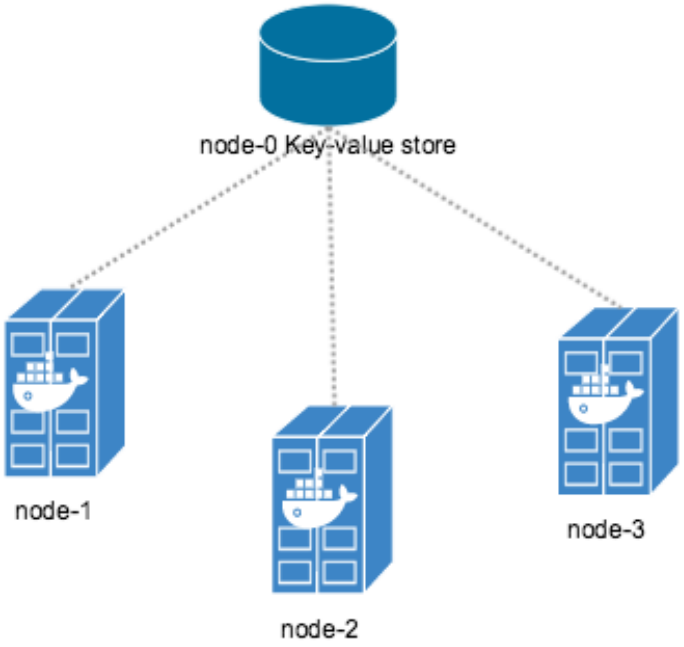
- url: http://<ip address of docker-machine/nodejs





Docker Network

- Network across host (Overlay Network)



Docker Network

- 3rd Party Network Plugin

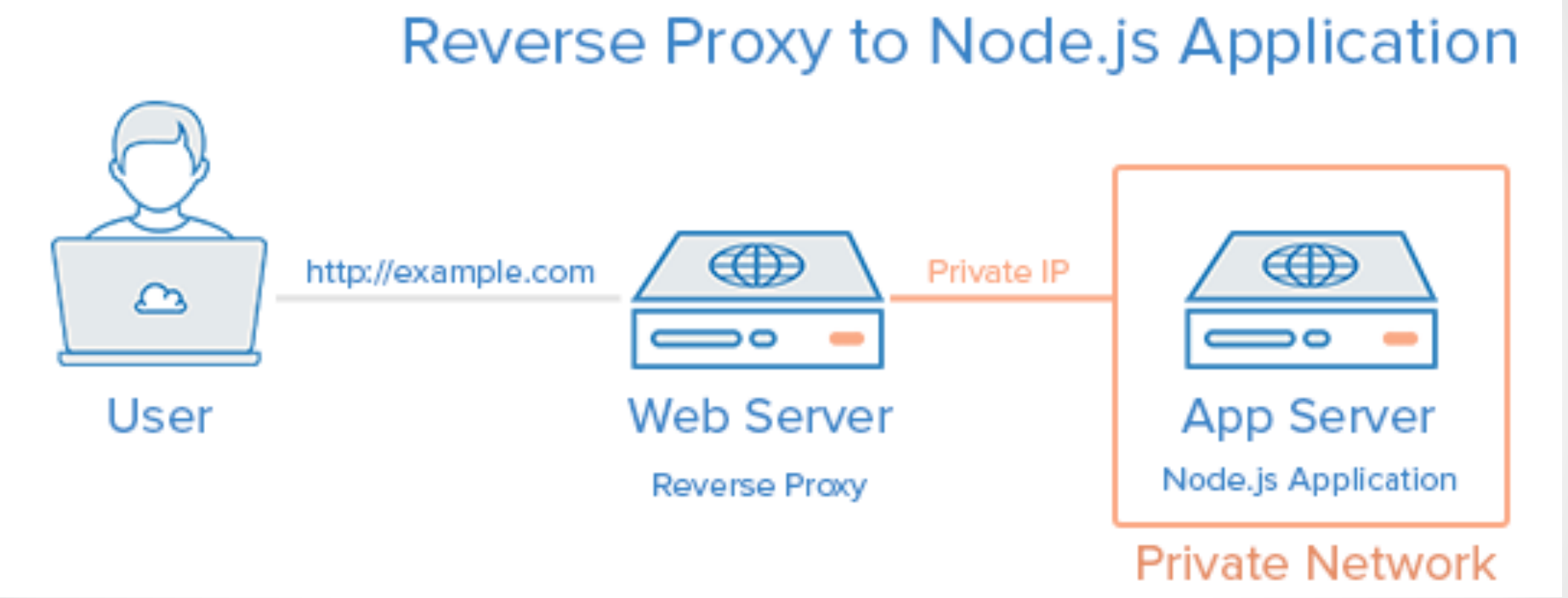
Driver	Description
contiv	An open source network plugin led by Cisco Systems to provide infrastructure and security policies for multi-tenant microservices deployments. Contiv also provides integration for non-container workloads and with physical networks, such as ACI. Contiv implements remote network and IPAM drivers.
weave	A network plugin that creates a virtual network that connects Docker containers across multiple hosts or clouds. Weave provides automatic discovery of applications, can operate on partially connected networks, does not require an external cluster store, and is operations friendly.
calico	An open source solution for virtual networking in cloud datacenters. It targets datacenters where most of the workloads (VMs, containers, or bare metal servers) only require IP connectivity. Calico provides this connectivity using standard IP routing. Isolation between workloads — whether according to tenant ownership or any finer grained policy — is achieved via iptables programming on the servers hosting the source and destination workloads.
kuryr	A network plugin developed as part of the OpenStack Kuryr project. It implements the Docker networking (libnetwork) remote driver API by utilizing Neutron, the OpenStack networking service. Kuryr includes an IPAM driver as well.

Docker Remote IPAM Drivers

Community and vendor created IPAM drivers can also be used to provide integrations with existing systems or special capabilities.

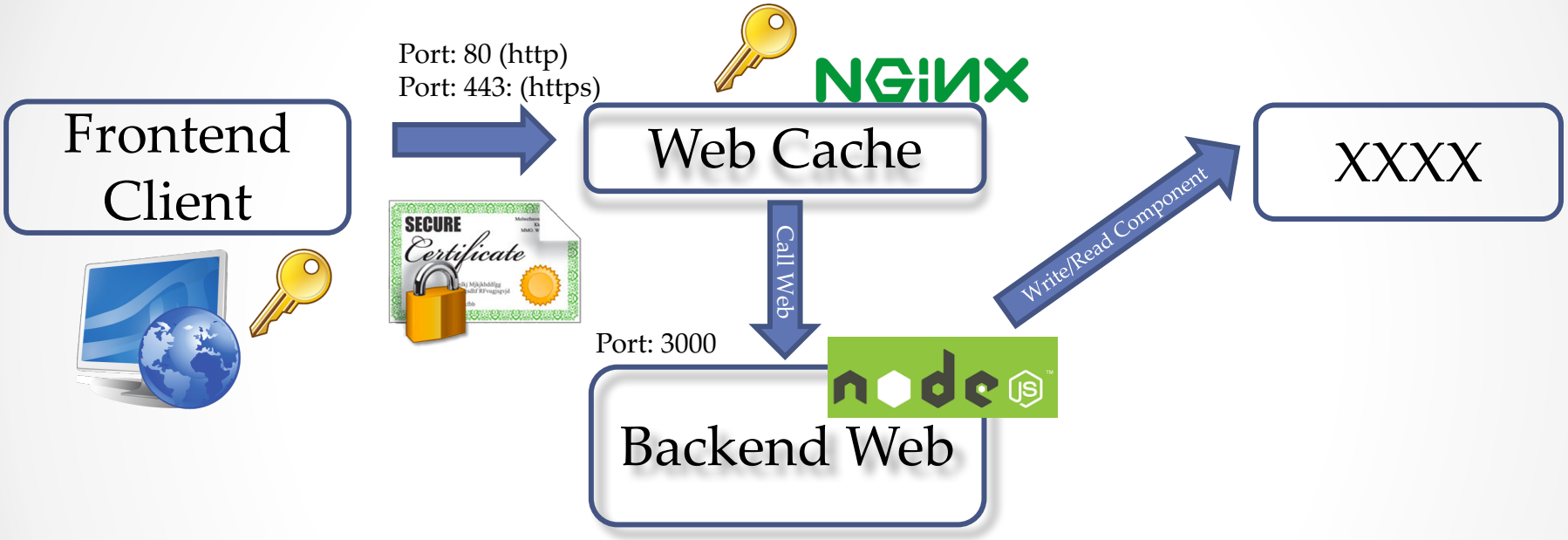
Driver	Description
infoblox	An open source IPAM plugin that provides integration with existing Infoblox tools.

Docker Network



WorkShop

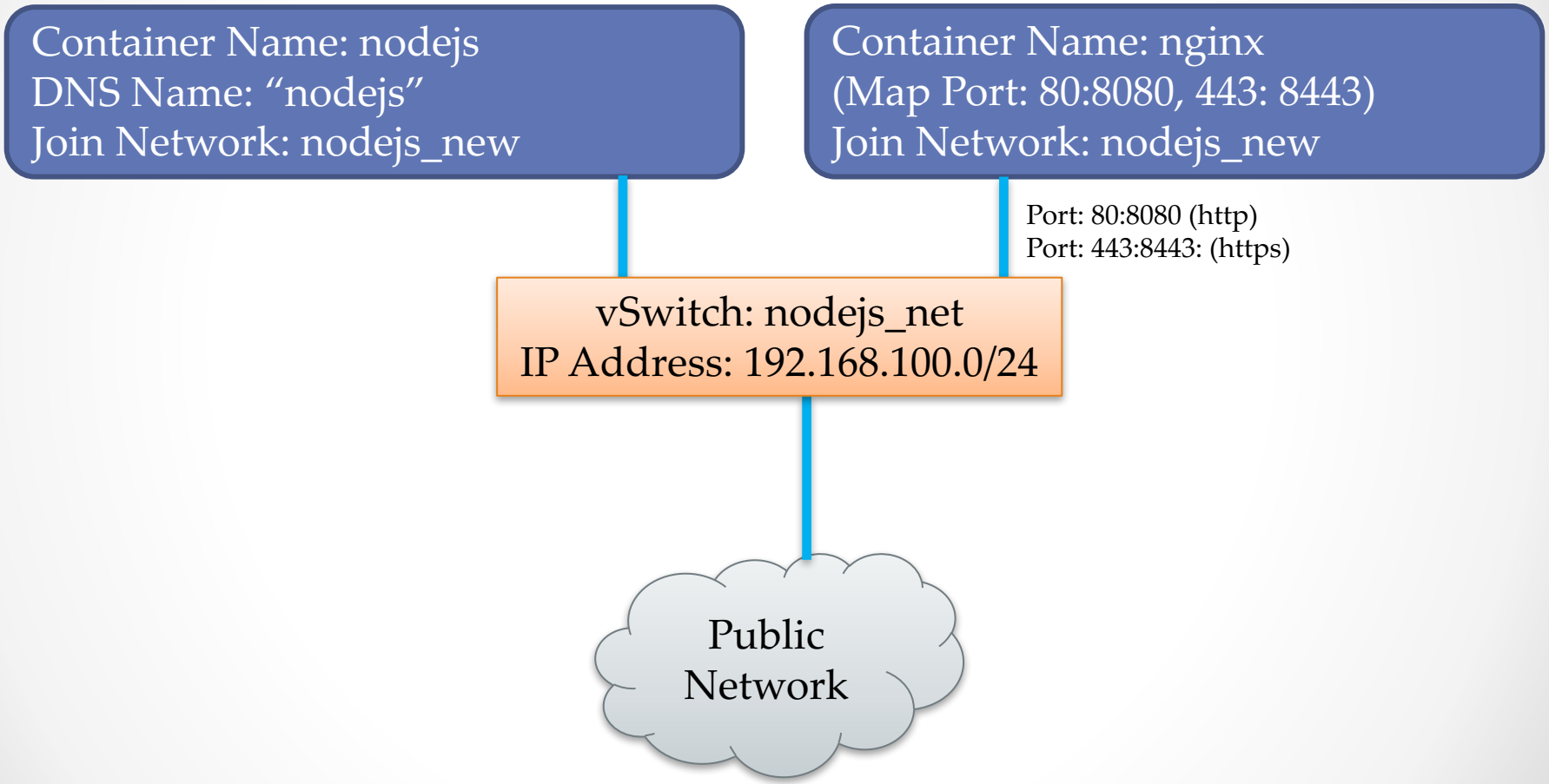
- Optimize for WorkLoad



docker

WorkShop

- NODEJS with NGINX



docker

WorkShop

vhost.conf

```
server {
        listen 8080;
        listen 8443 ssl;
        ssl_certificate         /bitnami/nginx/conf/bitnami/certs/server.crt;
        ssl_certificate_key     /bitnami/nginx/conf/bitnami/certs/server.key;
        client_body_buffer_size 100M;
        index index.html        index.htm;
            location / {
            #root /opt/bitnami/nginx/conf/vhosts/404
                #index 404.html
        }
        }
server {
        listen 8080;
        listen 8443 ssl;
        server_name www.nodejsthailand.com;
        ssl_certificate         /bitnami/nginx/conf/bitnami/certs/www.nodejsthailand.com.crt;
        ssl_certificate_key     /bitnami/nginx/conf/bitnami/certs/www.nodejsthailand.com.key;
        client_body_buffer_size 100M;
        index index.html        index.htm;
        location / {
        proxy_pass http://nodejs:3000;
        proxy_next_upstream error timeout invalid_header http_500 http_502 http_503 http_504;
        proxy_redirect off;
        proxy_buffering off;
        proxy_set_header        Host            $host;
        proxy_set_header        X-Real-IP       $remote_addr;
        proxy_set_header        X-Forwarded-For $proxy_add_x_forwarded_for;
        proxy_set_header        X-Forwarded-Proto       $scheme;
        }
        }
```


WorkShop

For 404 default
Case: Access to other name (Denied Access)

WorkShop

dockerfile

```
FROM bitnami/nginx:latest
MAINTAINER Praparn Lueangphoonlap (eva10409@gmail.com)
LABEL Description="NGINX Reverse Proxy" Version="1.0"
COPY /conf/. /bitnami/nginx/conf
COPY /404/. /app
EXPOSE 8080 8443
```


WorkShop

Dockerfile

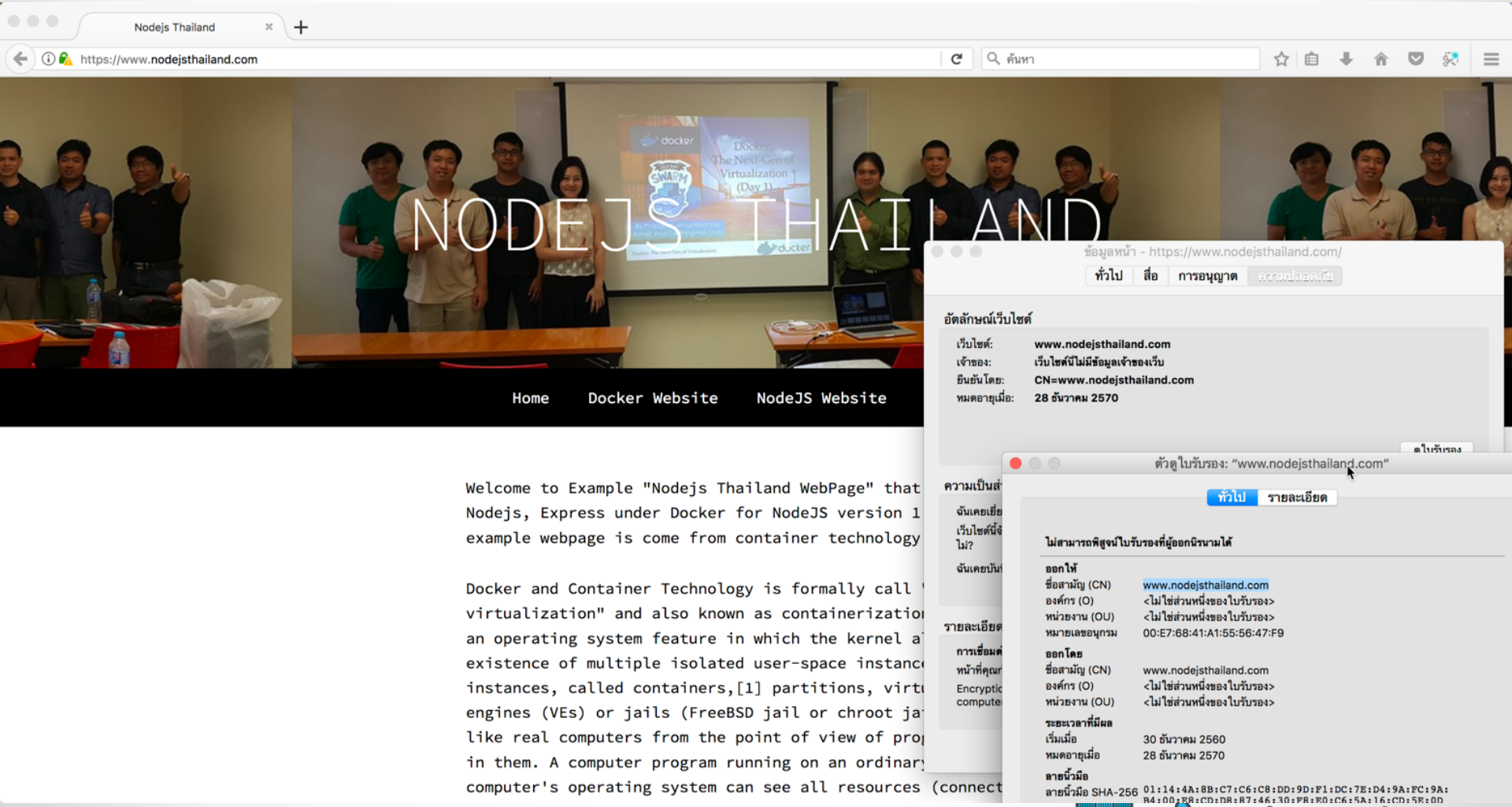
```
FROM bitnami/node:latest
MAINTAINER Praparn Lueangphoonlap (eva10409@gmail.com)
LABEL Description="NodeJS Workshop" Version="1.0"
ENV NODE_VERSION=v6.12.2 NPM_VERSION=3.10.10
RUN mkdir /nodejs
COPY ./app/. /app/
WORKDIR /app
RUN npm i && \
    npm run build
ENTRYPOINT ["node","server.js"]
EXPOSE 3000
```

Docker Run

```
docker@labdocker:~$ docker run -dt --name nodejs --net nodejs_net \
> --net-alias nodejs labdocker/nodejsbitnami:latest
19c2df807044b78b077a3b2ad7c6b517b67c2635278f0712d1c9023fe9b4e2f6
docker@labdocker:~$ docker run -dt --name nginx -p 80:8080 -p 443:8443 --net nodejs_net \
>     --net-alias nginx labdocker/nginxbitnami:latest
63f2f5067342e43dfeb6af6e9fdb10c4dfa8a2f8b7acfe54135770a2f40d33af
docker@labdocker:~$ docker ps
CONTAINER ID        IMAGE                              COMMAND                  CREATED             STATUS              PORTS                                        NAMES
63f2f5067342        labdocker/nginxbitnami:latest      "/app-entrypoint.sh …"   6 seconds ago       Up 5 seconds        0.0.0.0:80->8080/tcp, 0.0.0.0:443->8443/tcp   nginx
19c2df807044        labdocker/nodejsbitnami:latest     "node server.js"         12 seconds ago      Up 11 seconds       3000/tcp                                     nodejs
docker@labdocker:~$
```

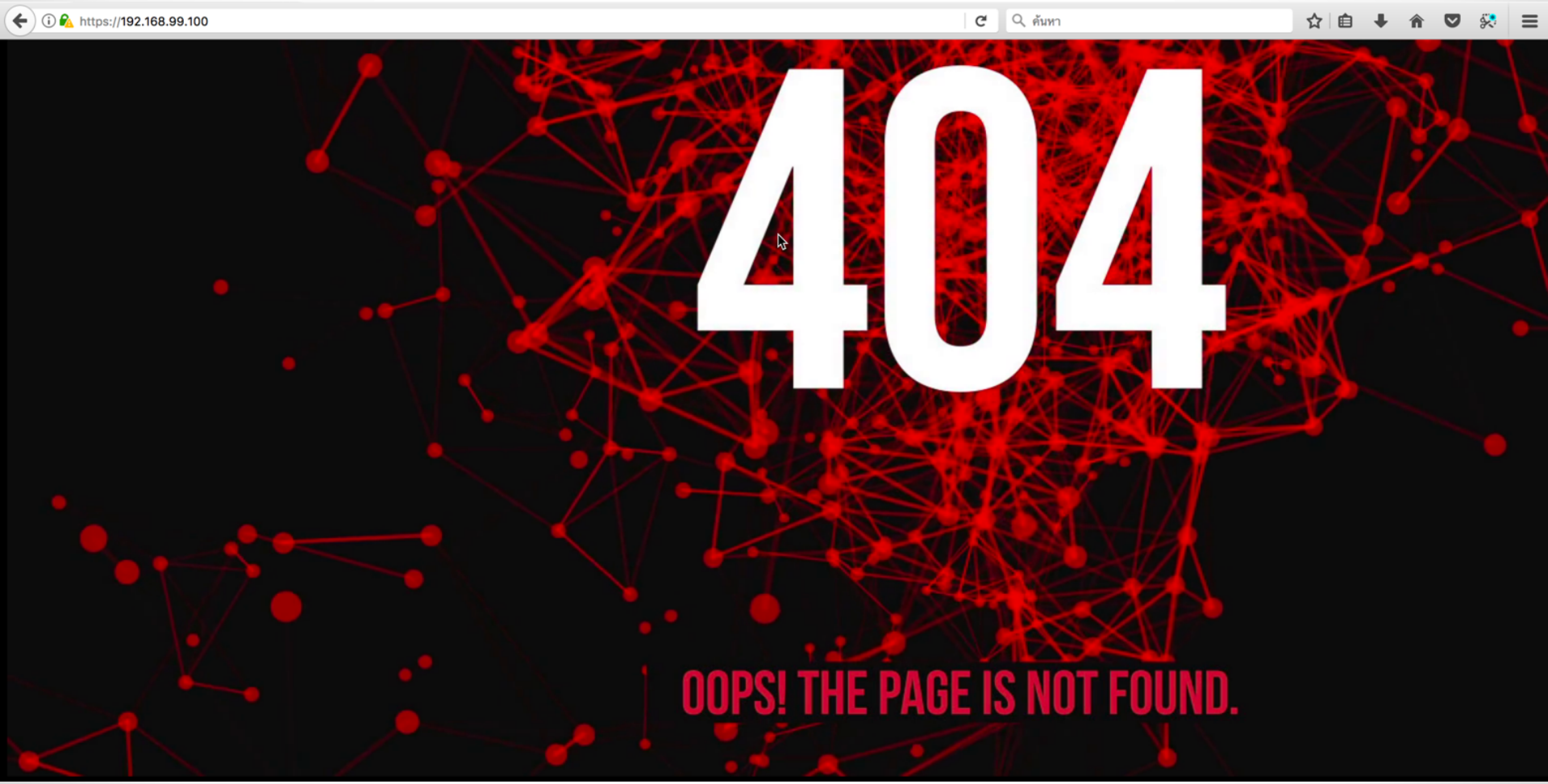

WorkShop

Output: https://www.nodejsthailand.com



WorkShop

Output: https://localhost , https://x.x.x.x



WorkShop

- DAEMON LINE BOT

ธนาคารแห่งประเทศไทย

ข้อมูลทั่วไปของ API

ประเภทของ API :	REST
ประเภทของข้อมูล :	JSON
ความปลอดภัย :	PUBLIC

ตำแหน่งที่อยู่ของ API

https://iapi.bot.or.th/Stat/Stat-ReferenceRate/DAILY_REF_RATE_V1/

พารามิเตอร์ใน Header

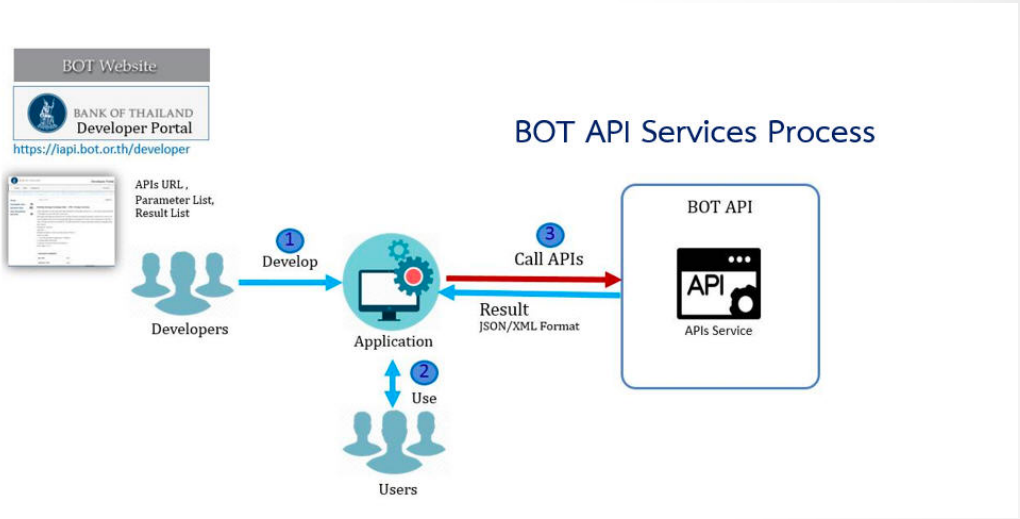
api-key : xk3h6ash-ahw5l3mch6hl3-2hhg6l4mng2346l34l6

ข้อมูลพารามิเตอร์สำหรับการใช้งาน API

ชื่อตัวแปร	ประเภท	คำอธิบาย
start_period	Datetime	วันที่เริ่มต้นงวดข้อมูล (YYYY-MM-DD) เช่น 2017-06-30
end_period	Datetime	วันที่สิ้นสุดงวดข้อมูล (YYYY-MM-DD) เช่น 2017-06-30

ข้อมูลพารามิเตอร์ที่จะได้รับ

ชื่อ	ประเภท	คำอธิบาย
report_name_eng	String	ชื่อรายงาน ภาษาอังกฤษ
rereport_name_th	String	ชื่อรายงาน ภาษาไทย
report_uoq_name_eng	String	หน่วย ภาษาอังกฤษ
report_uoq_name_th	String	หน่วย ภาษาไทย
report_source_of_data	String	แหล่งที่มาของข้อมูล
report_remark_eng	String	หมายเหตุ รายงานภาษาอังกฤษ
report_remark_th	String	หมายเหตุ รายงานภาษาไทย
last_updated	String	วันที่แก้ไขข้อมูลล่าสุด
period	String	วันที่งวดข้อมูล
rate	String	อัตรา



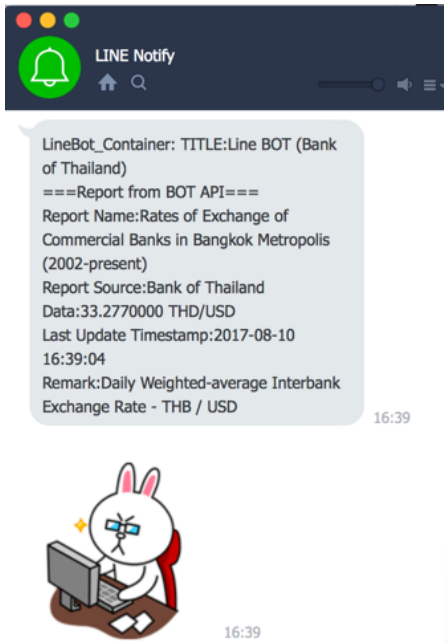
docker

WorkShop

- DAEMON LINE BOT

```
docker@labdocker:~$ docker container run --rm --name linebot -e "TITLE=Line BOT (Bank of Thailand)" -e "TOKEN=EIeqyillzkzp
aCo1ROrebZTcGbIyzDZHpOjcdd0t6CX" labdocker/linenotify:bot_v1
null
{"statusCode":200,"body":"{\"status\":200,\"message\":\"ok\"}","headers":{"server":"nginx","date":"Sat, 20 Jan 2018 03:12:
22 GMT","content-type":"application/json;charset=UTF-8","transfer-encoding":"chunked","connection":"keep-alive","keep-aliv
e":"timeout=3","x-ratelimit-limit":"1000","x-ratelimit-imagelimit":"50","x-ratelimit-remaining":"998","x-ratelimit-imagere
maining":"50","x-ratelimit-reset":"1516421345"},"request":{"uri":{"protocol":"https:","slashes":true,"auth":null,"host":"n
otify-api.line.me","port":443,"hostname":"notify-api.line.me","hash":null,"search":null,"query":null,"pathname":"/api/noti
fy","path":"/api/notify","href":"https://notify-api.line.me/api/notify"},"method":"POST","headers":{"Content-Type":"applic
ation/x-www-form-urlencoded","authorization":"Bearer EIeqyillzkzpaCo1ROrebZTcGbIyzDZHpOjcdd0t6CX","content-length":466}}}
"{\"status\":200,\"message\":\"ok\"}"
docker@labdocker:~$
```

```
const request = require('request');
const qs = require('querystring');
const TITLE=process.env.TITLE;
const KEY =process.env.KEY; //Input API-KEY to Header
//const KEY="U9G1L457H6DCugT7VmBaEacbHV9RX0PySO05cYaGsm";
const URL =process.env.URL; //Input URL for Request
//const URL="https://iapi.bot.or.th/Stat/Stat-ReferenceRate/DAILY_REF_RATE_V1/?";
//const TOKEN = 'EIeqyillzkzpaCo1ROrebZTcGbIyzDZHpOjcdd0t6CX';
const TOKEN=process.env.TOKEN; //Input TOKEN LINE
//Set Date
var dateFormat = require('dateformat');
var daynow = new Date(); // Today!
daynow.setDate(daynow.getDate() - 1); // Yesterday!
var daynow=dateFormat(daynow, "yyyy-mm-dd");
var DAYSTARTPERIOD=daynow;
var DAYENDPERIOD=daynow;
//Set Date
var stickerPkg=2; //stickerPackageId
var stickerId=161; //stickerId
var Message="";
//Setup QueryString
var querystring = qs.stringify({
    start_period: DAYSTARTPERIOD,
    end_period: DAYENDPERIOD
});
//Setup QueryString
function callback(error, response, body) {
  //console.log(URL+querystring);
  //console.log('Response Code: '+ response.statusCode);
  //console.log(body)
  if (!error && response.statusCode == 200) {
    var info = JSON.parse(body);
```



WorkShop

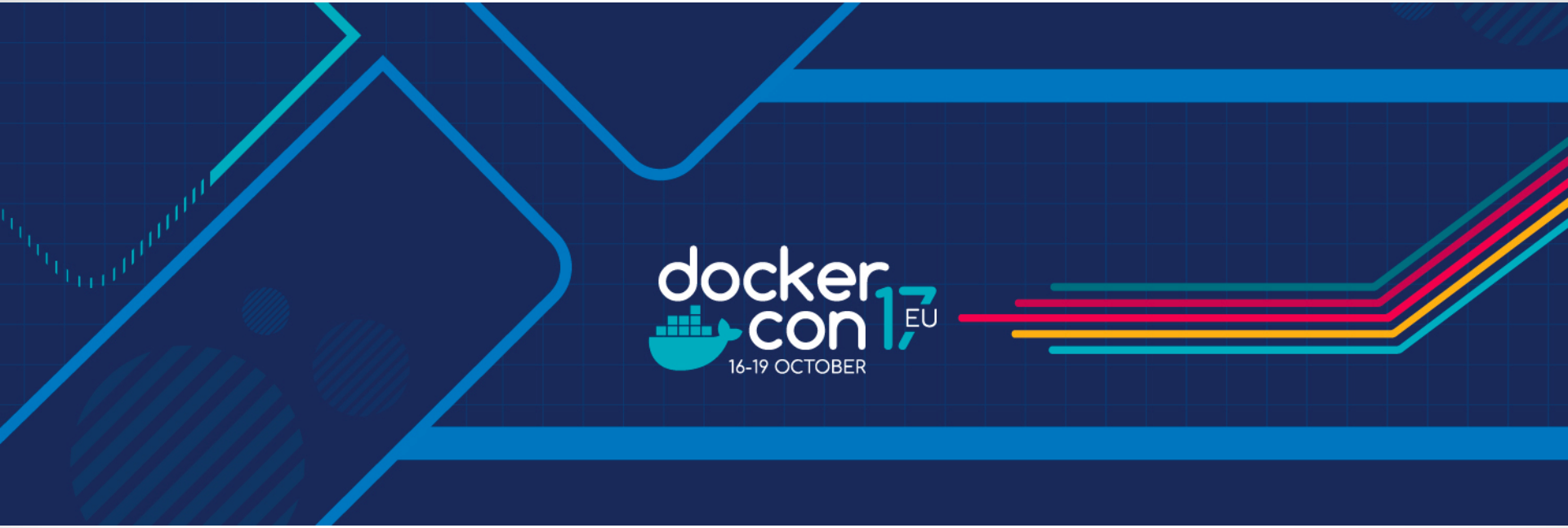
- DAEMON LINE BOT
- สั่งรัน container แบบ Daemon โดยตั้งชื่อว่า linebot เพื่อทำการดึงข้อมูลจาก API ของธนาคารแห่งประเทศไทยออกมาแล้วส่ง LINE Notify ไปหา Token Key ที่กำหนด

```
docker container run -it --rm --name linebot \
-e TITLE="Line BOT (Bank of Thailand)” \
 -e "TOKEN=<LINE TOKEN>"
labdocker/linenotify:bot_v1
```


The brief history of Docker & K8S

• • •

The brief history of Docker & K8S



docker

The brief history of Docker & K8S

- "We are one big community"

docker
con 17 EU

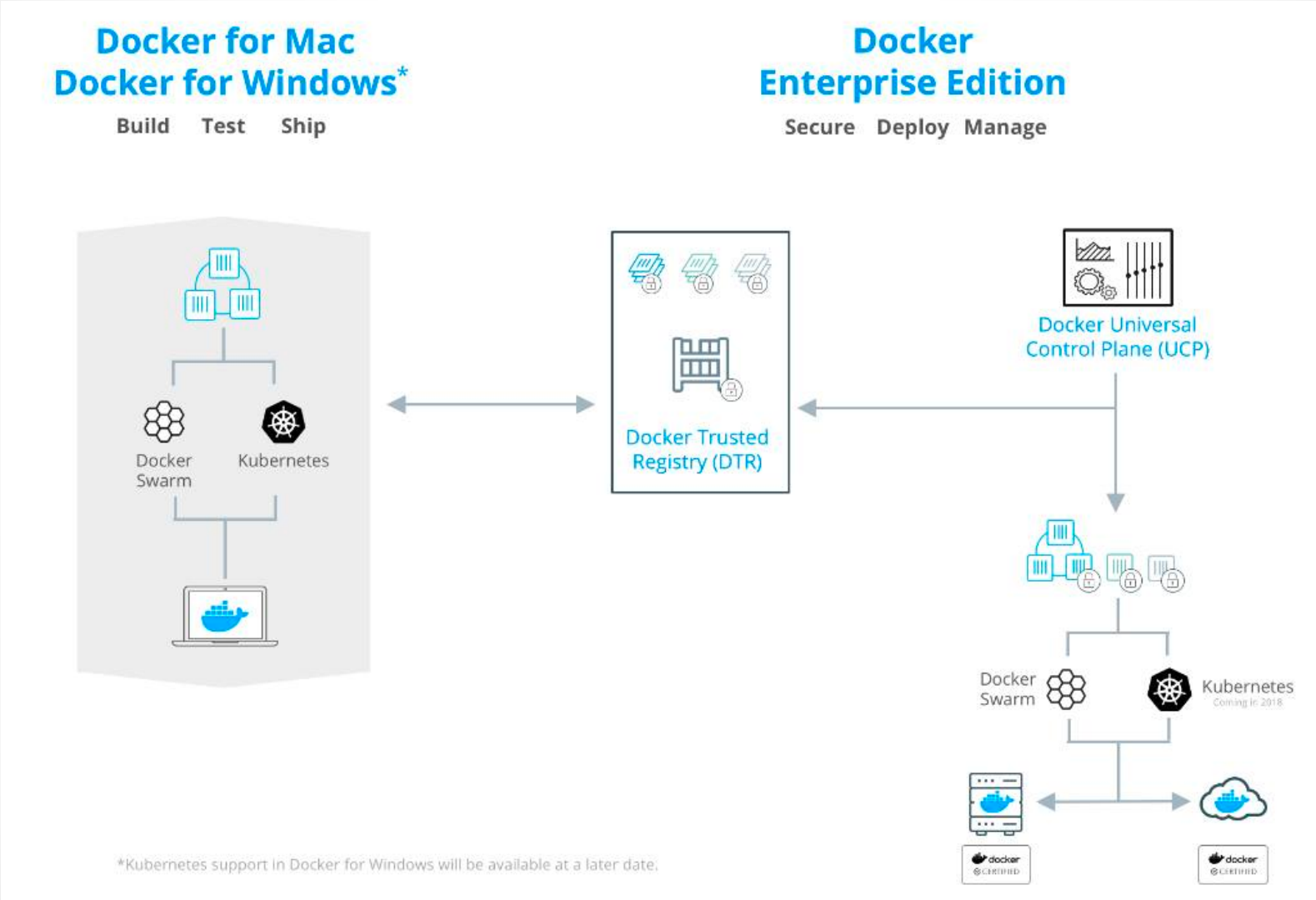
docker

The brief history of Docker & K8S

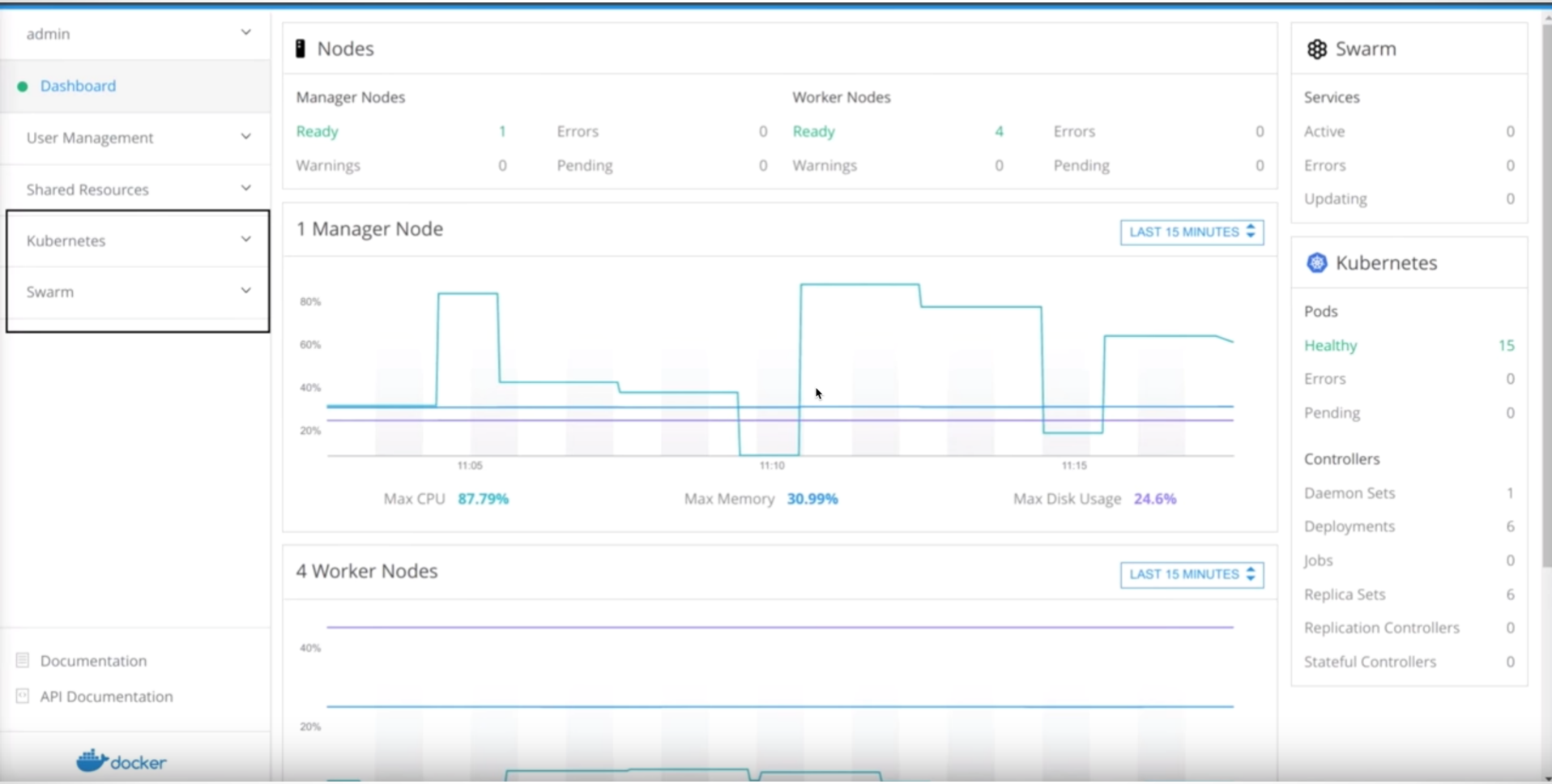
- Official support orchestrator both K8S and Swarm

docker

The brief history of Docker & K8S



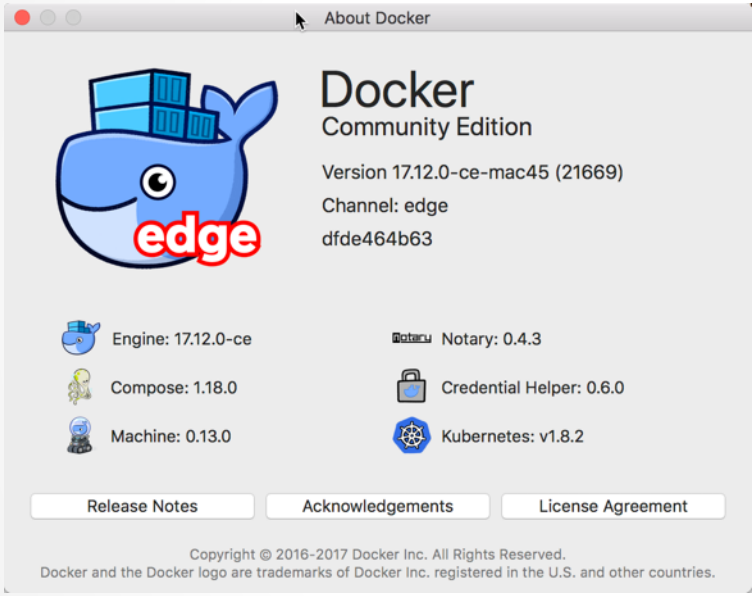
The brief history of Docker & K8S



docker

The brief history of Docker & K8S

- Docker Community Edition (CE)
  - Docker for Windows (**Available Now with Edge Edition !!!**)
  - Docker for MAC (**Available Now with Edge Edition !!!**)



docker

The brief history of Docker & K8S

What are the best Docker orchestration tools?

11	77	Mar 13, 2018
OPTIONS CONSIDERED	RECOMMENDATIONS	LAST UPDATED

THE BEST 1 OF 11 OPTIONS WHY?

11 Options Considered	Price	Last Updated
THE BEST Kubernetes	GET IT HERE	Mar 13, 2018
Docker Swarm	GET IT HERE	Dec 11, 2017
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Nomad	GET IT HERE	Sep 23, 2017
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Reference: https://www.slant.co/topics/3929/~docker-orchestration-tools

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