Capgemini

CONSULTING.TECHNOLOGY.OUTSOURCING

.NET Core & Containers

Why should I care?

Daniel Musiał

IT T@lk, 29/09/2016

People matter, results count.

Agenda

1. Developers’ primary focus
2. Challenges of deployment
3. Achieving greater isolation
4. What is container-based virtualization?
5. How Docker simplifies containerization (DEMO)
6. Summary & Questions

Developers’ primary focus

```
public class TcpClientSample
{
    public static void Main()
    {
        byte[] data = new byte[1024]; string input, stringData;
        TcpClient server;
        try{
            server = new TcpClient(" . . . . ", port);
        }catch (SocketException){
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        }
        NetworkStream ns = server.GetStream();
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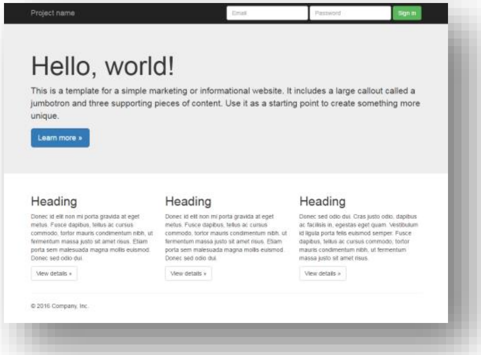

Hello, world!

This is a template for a simple marketing or informational website. It includes a large callout called a jumbotron and three supporting pieces of content. Use it as a starting point to create something more unique.

Heading

Donec id elit non mi porta gravida at eget metus. Fusce dapibus, tellus ac cursus commodo, tortor mauris condimentum nibh, ut fermentum massa justo sit amet risus. Etiam porta sem malesuada magna mollis euismod. Donec sed odio dui.

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Donec sed odio dui. Cras justo odio, dapibus ac facilisis in, egestas eget quam. Vestibulum id ligula porta felis euismod semper. Fusce dapibus, tellus ac cursus commodo, tortor mauris condimentum nibh, ut fermentum massa justo sit amet risus.

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¯_(ツ)_/¯

IT WORKS

on my machine

Developers' primary focus

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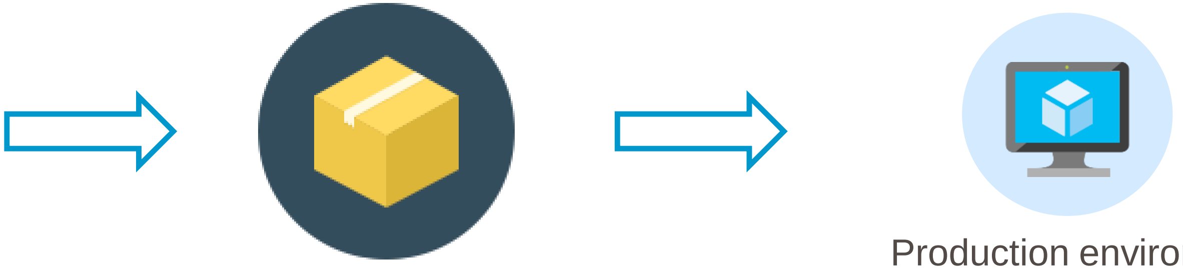


Production environment

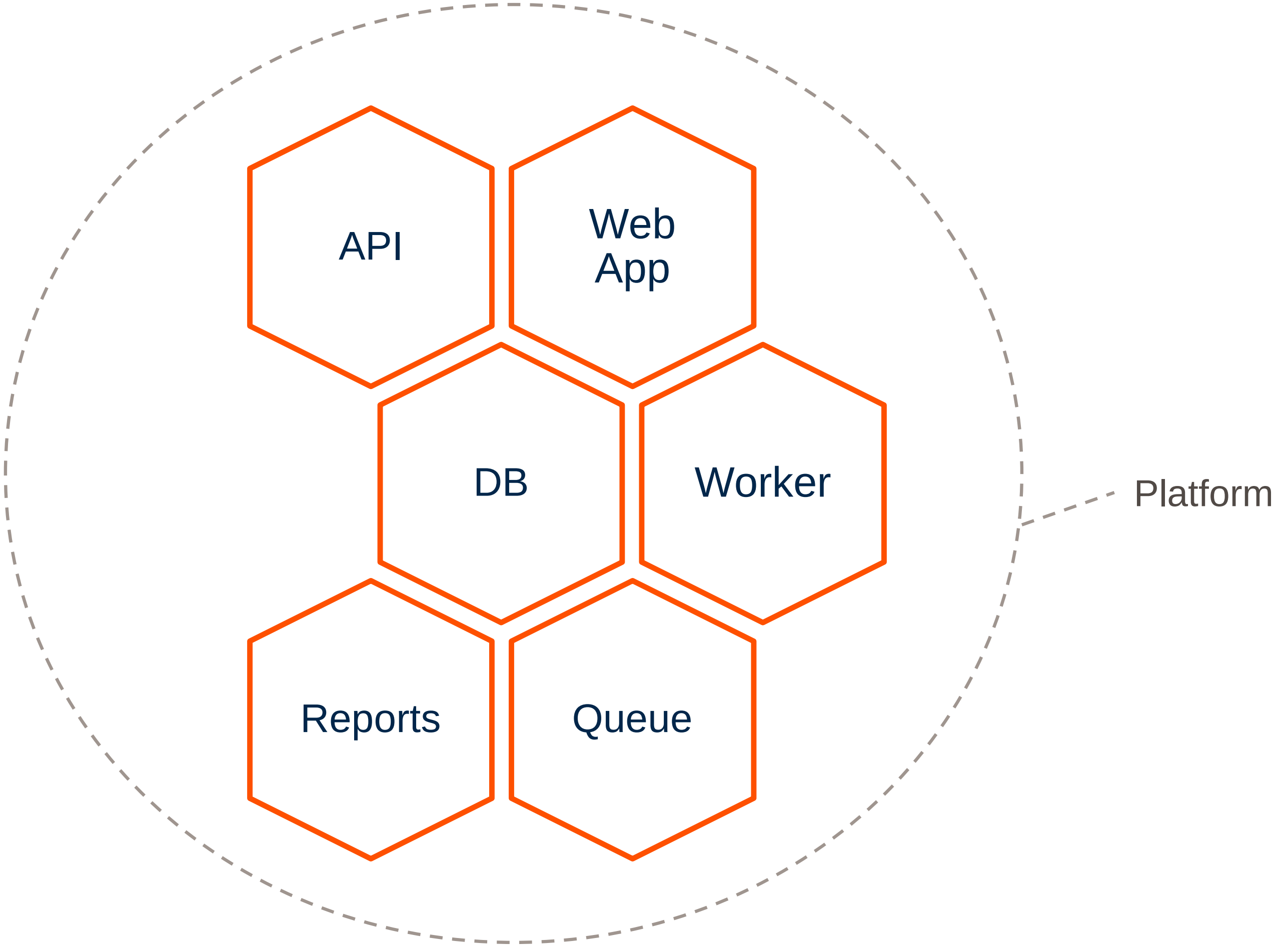
Challenges of deployment

1. Multi-component packages of software
2. Multiple dependencies and configurations
3. Multiple different deployment environments

Challenges of deployment

Multi-component packages of software

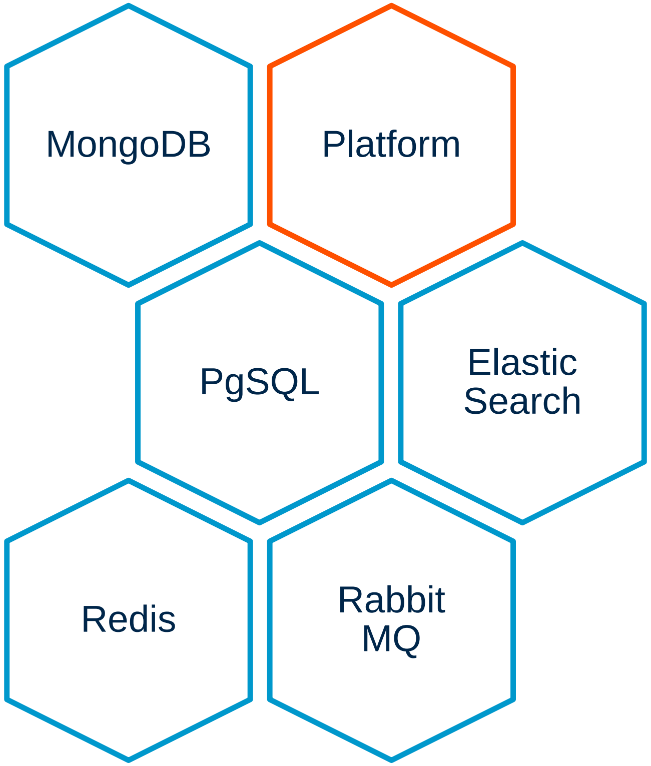
1



Challenges of deployment

Multiple dependencies and configurations

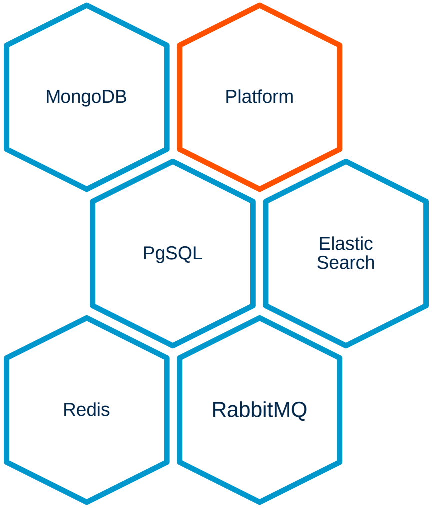
2



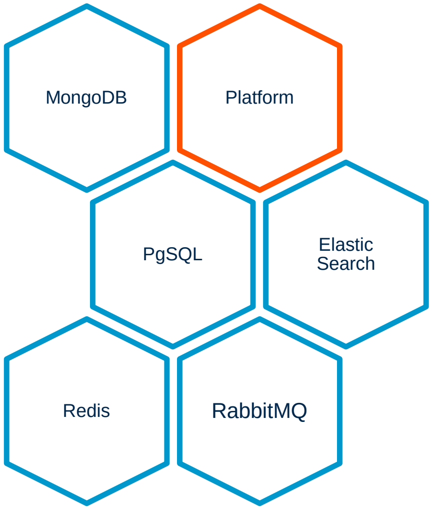
Challenges of deployment

Multiple different deployment environments

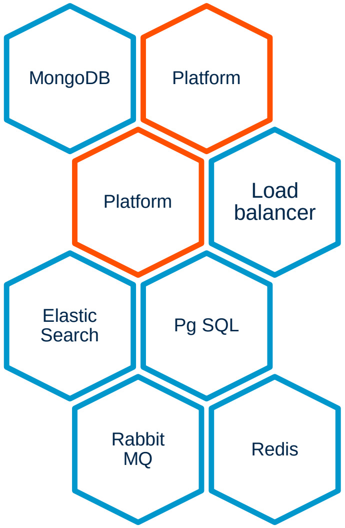
3



DEV

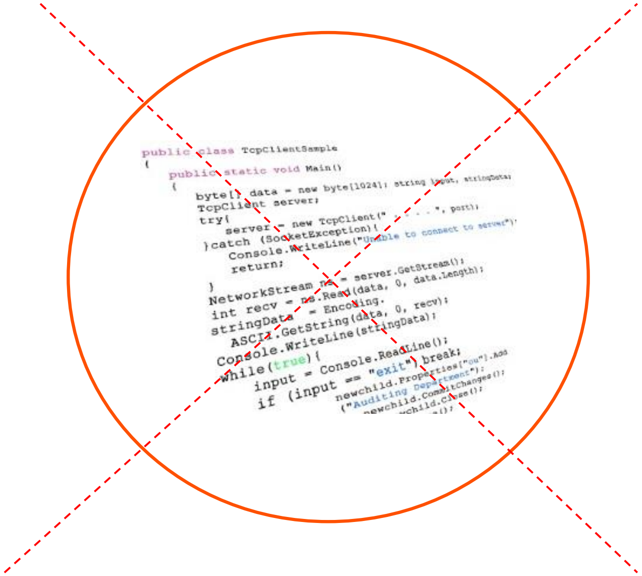


QA



PROD

Achieving greater isolation



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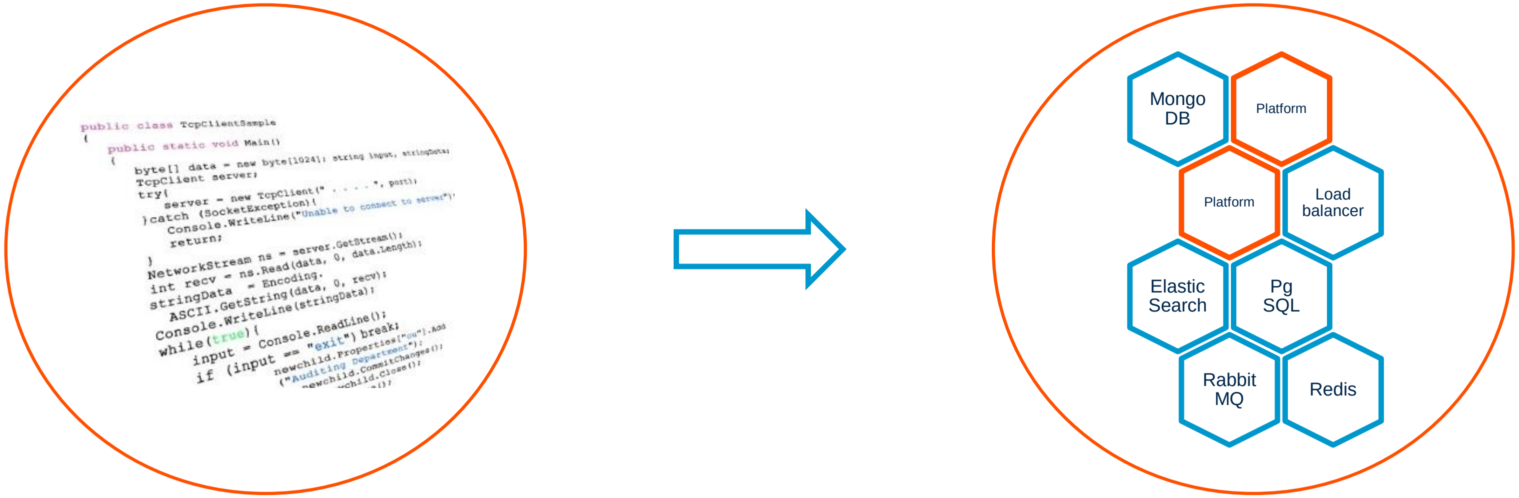
Software **does not** live in isolation!

Achieving greater isolation



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```
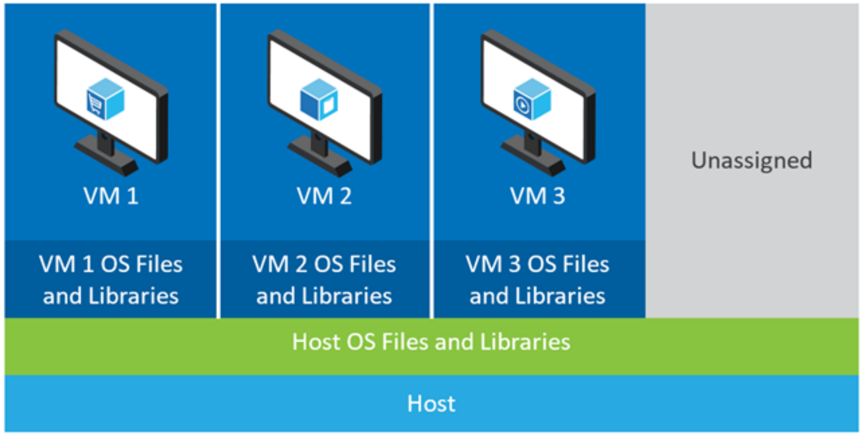

How can we achieve full isolation?

Achieving greater isolation
Virtual Machines

To provide full isolation VMs need to

- Have their own copies of OS files, libraries and application code
- Have a full in-memory instance of an OS
- Pay the cost of the OS boot and the in-memory footprint for its own private copies


VM 1
VM 2
VM 3
Unassigned
VM 1 OS Files and Libraries
VM 2 OS Files and Libraries
VM 3 OS Files and Libraries
Host OS Files and Libraries
Host

Can we do better?

Achieving greater isolation

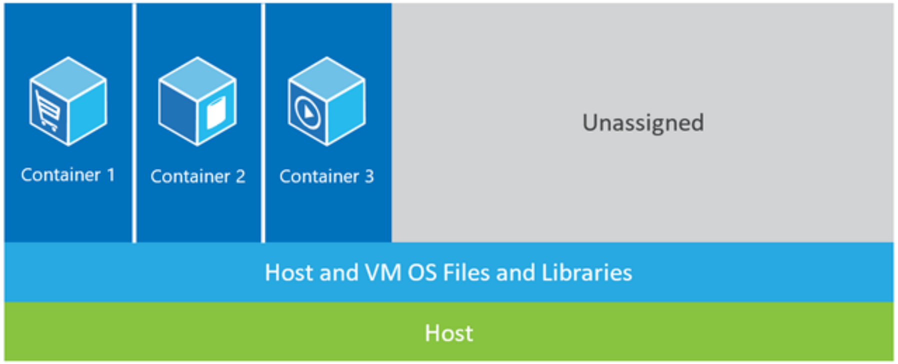
The Container Way

Achieving greater isolation

The Container Way

How containers differ from VMs?

- They share the host operating system, including the kernel and libraries.
- They don’t need to boot an OS, load libraries or pay a private memory cost for those files.
- They only consume as much incremental space (memory and disk space) as necessary for the application to run in the container.

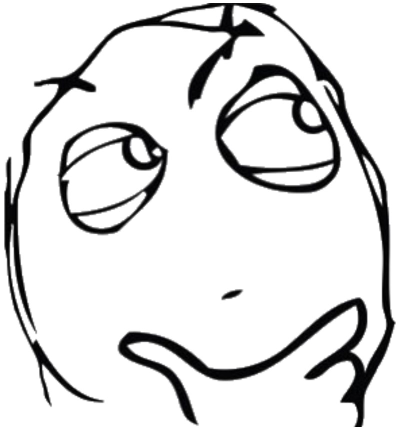


Containers are much more lightweight that VMs! They’re virtualized OSs

What is container-based virtualization?

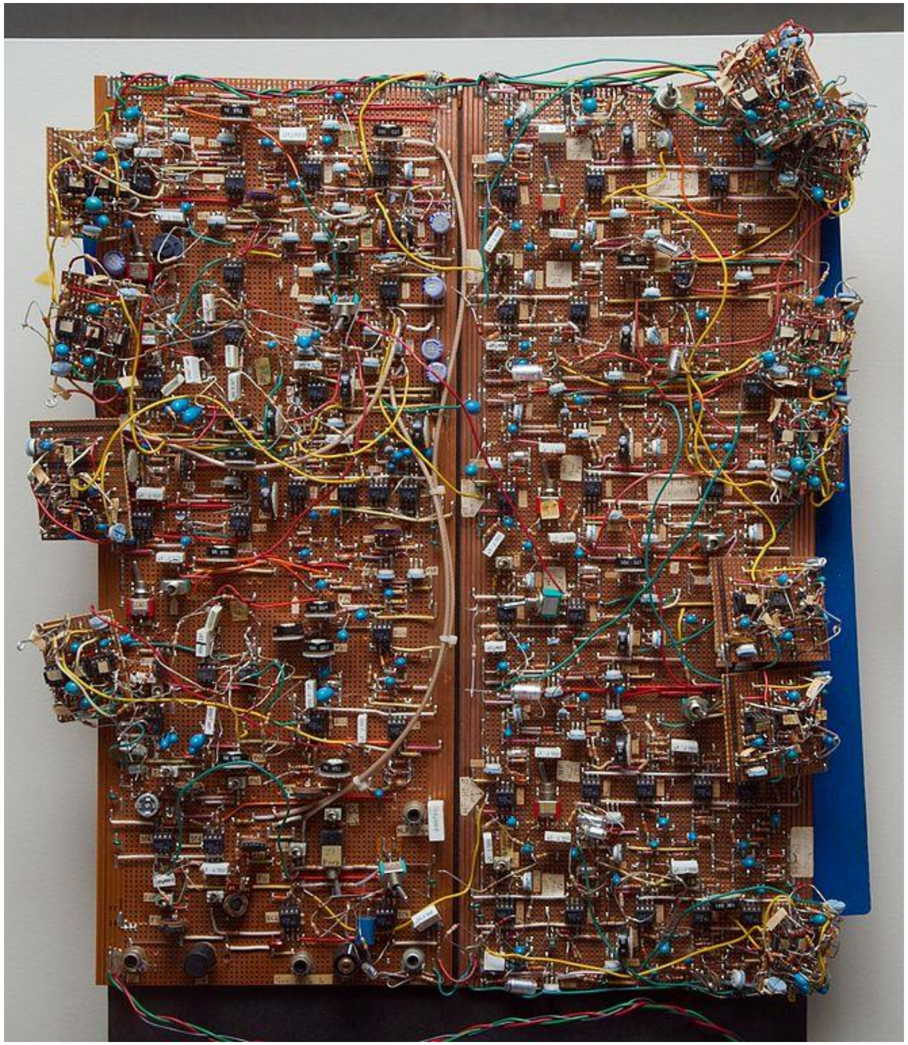
Is this a new concept? **No!**

- BSD Jails
- Unix Chroot / cgroups / namespace isolation
- Solaris Zones
- Other

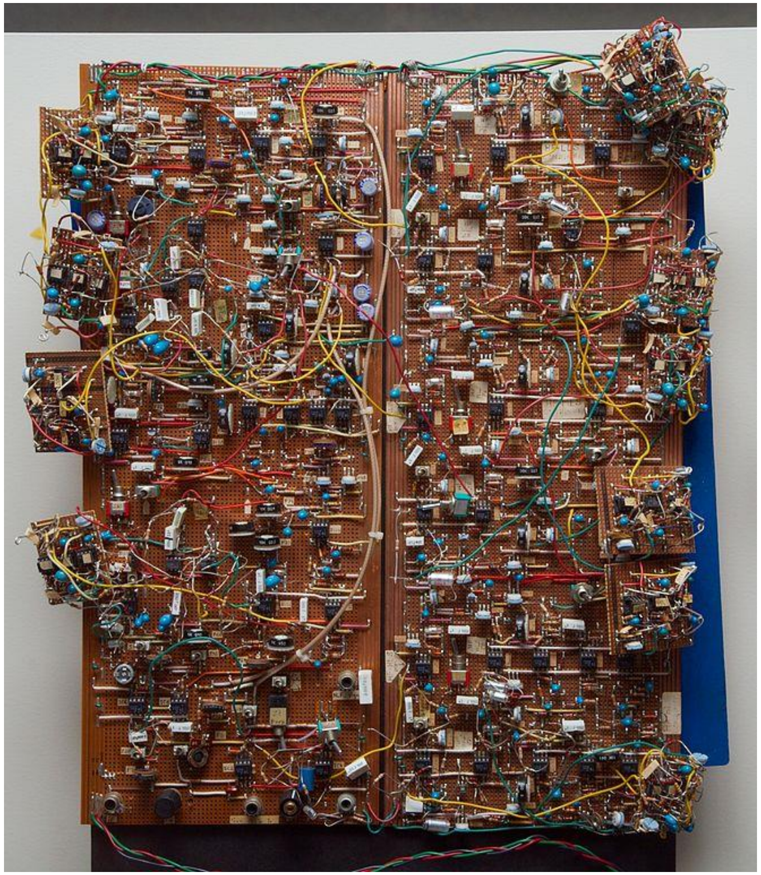


If it’s so great, why haven’t we used it before?

What is container-based virtualization?



How Docker simplifies containerization



docker

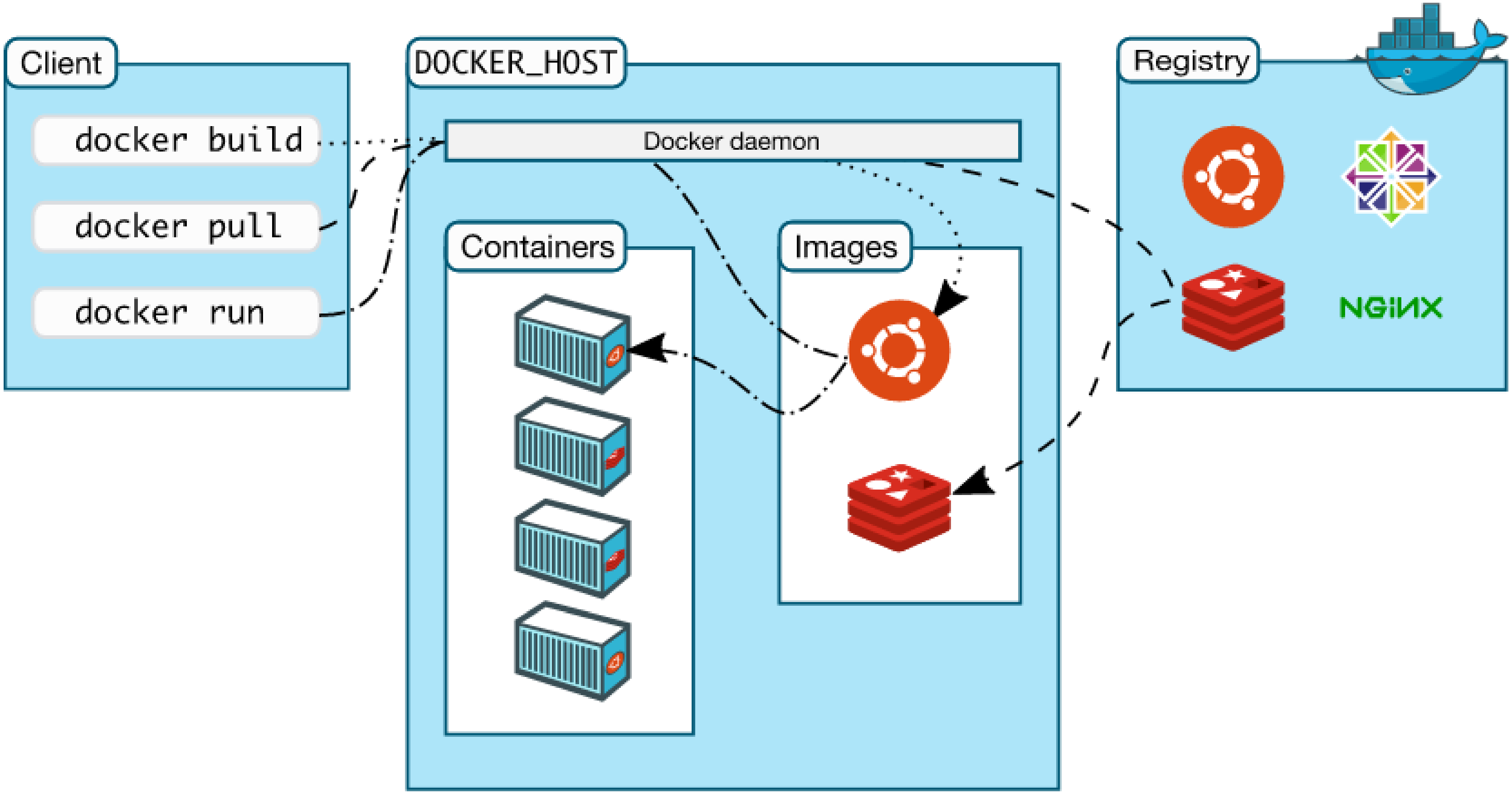
How Docker simplifies containerization

What is Docker?

- Open Source engine for creating and managing containers (native support for Linux, Mac and Windows)
- Allows to create and run containers based on **images** with lightweight footprint and minimal overhead
- Allows to create and share custom images (Docker Hub)
- Provides a standard and simple way of automating image creation (Dockerfile) and composition (docker-compose)

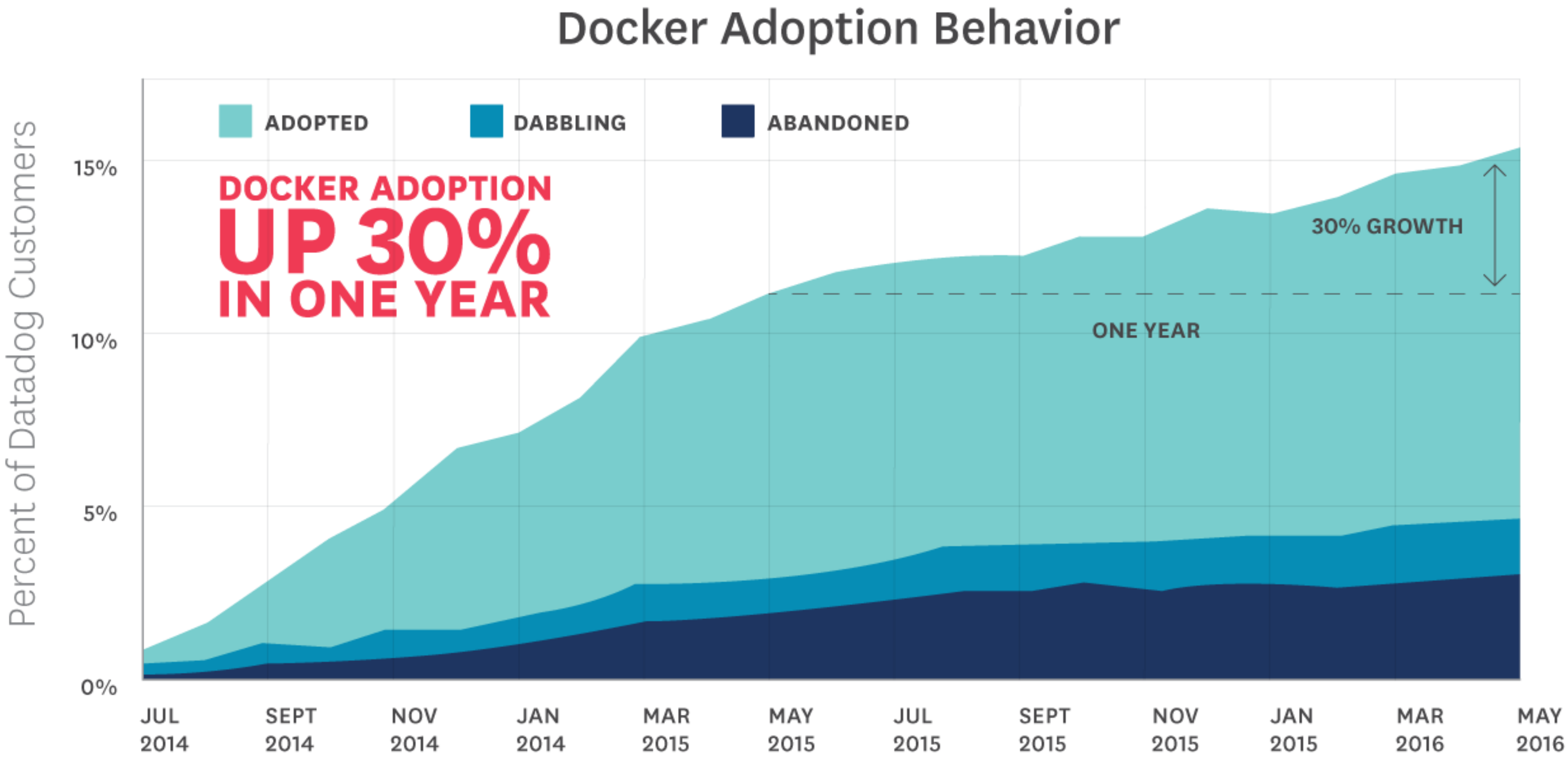
Build once, run anywhere

How Docker simplifies containerization



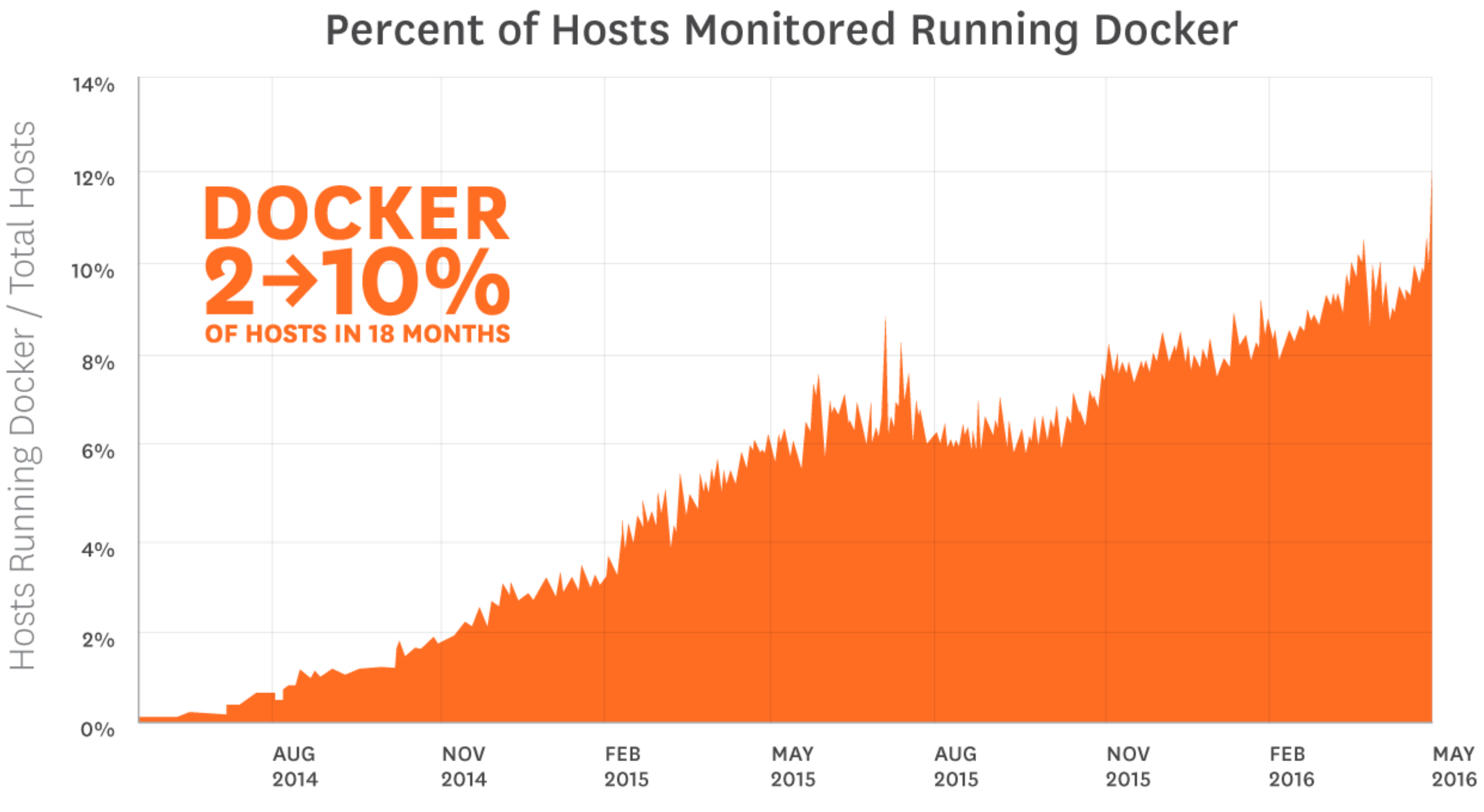
How Docker simplifies containerization (DEMO)

How Docker simplifies containerization



Source: Datadog

How Docker simplifies containerization



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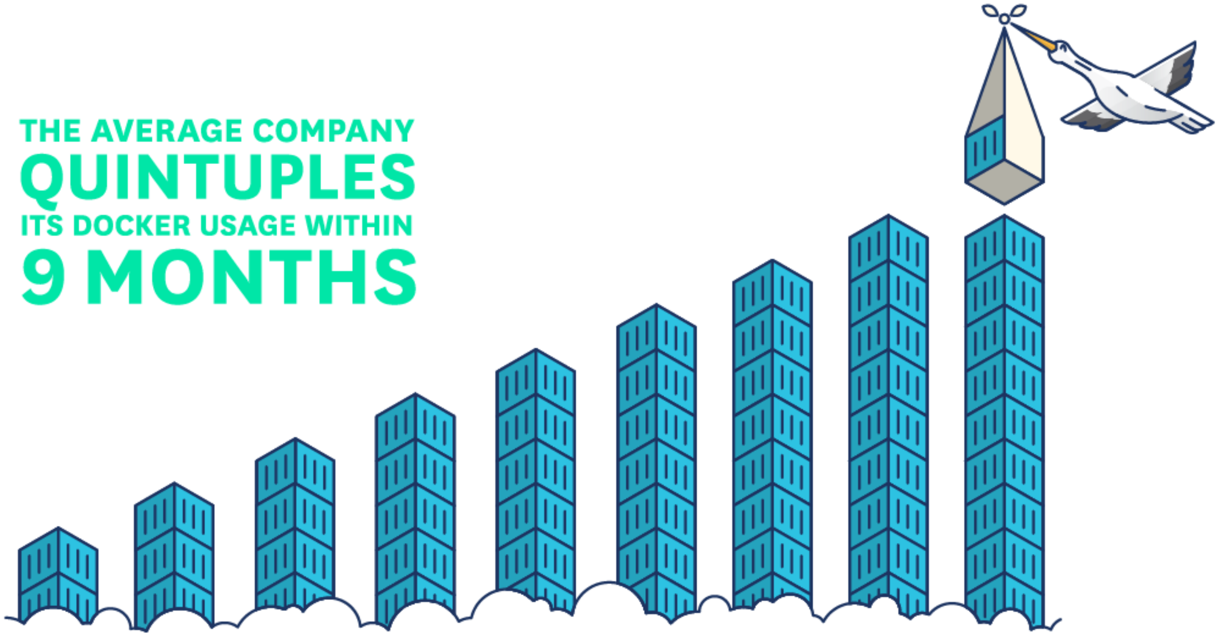
How Docker simplifies containerization



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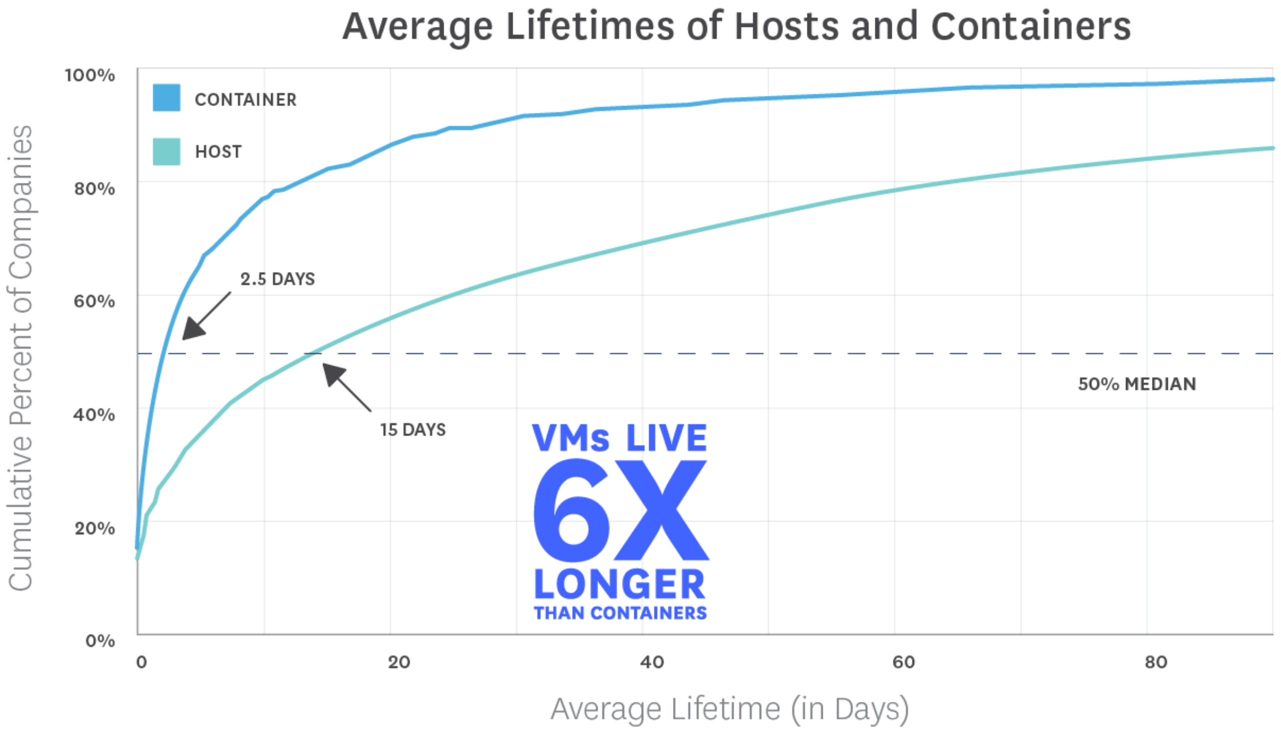
How Docker simplifies containerization



Source: Datadog

...so why should I care?

1. You want rapid deployment
2. You want less sleepless nights before a production deployment
3. You want to microservice your app and/or go DevOps with your team
4. You want to safe time by reusing publicly available images
5. You want to be up-to-date with latest cloud trends

Where's the catch?

1 Container management, orchestration and activity logging becomes a challenge

2 Potential mass security threats because of shared kernel

Questions

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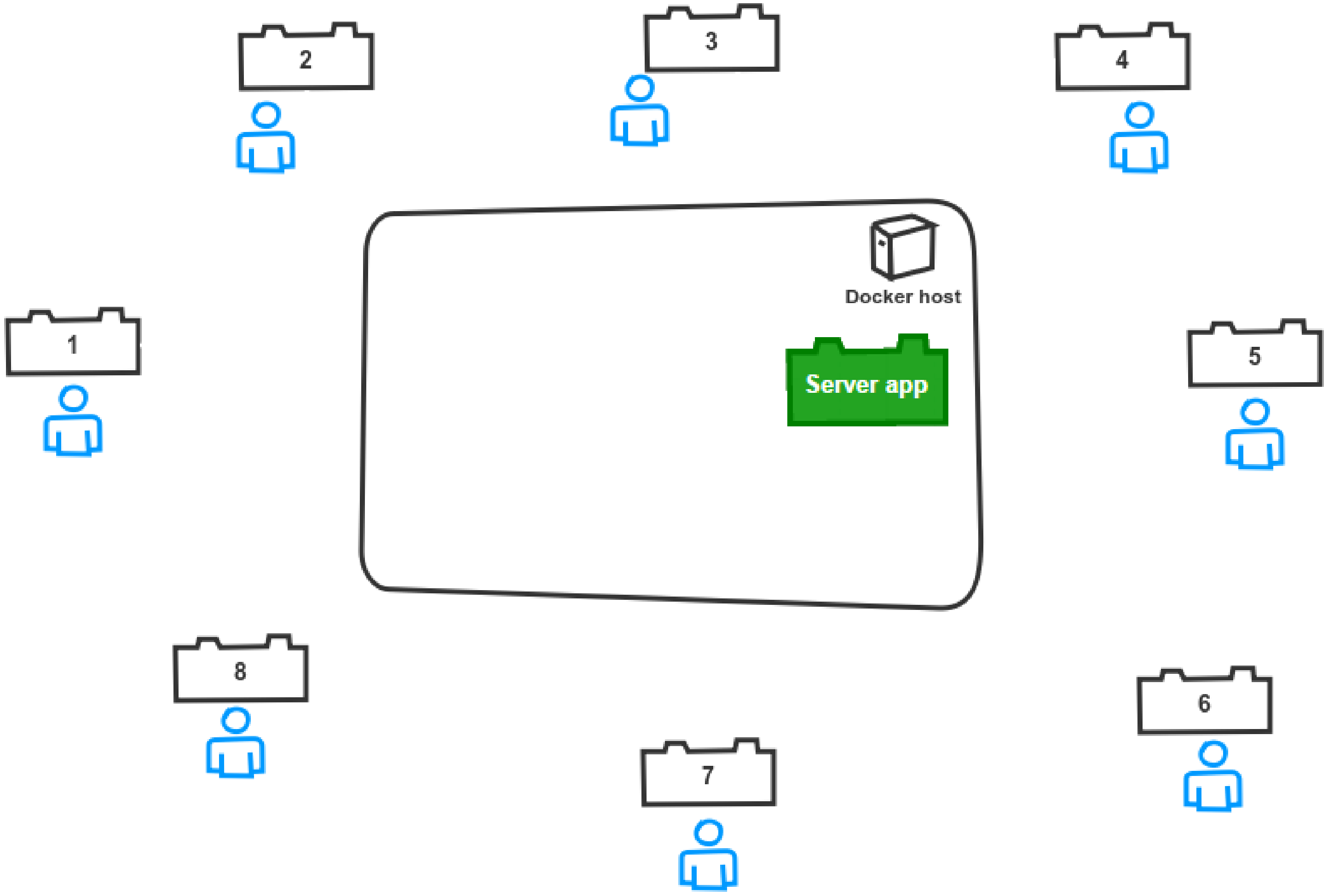
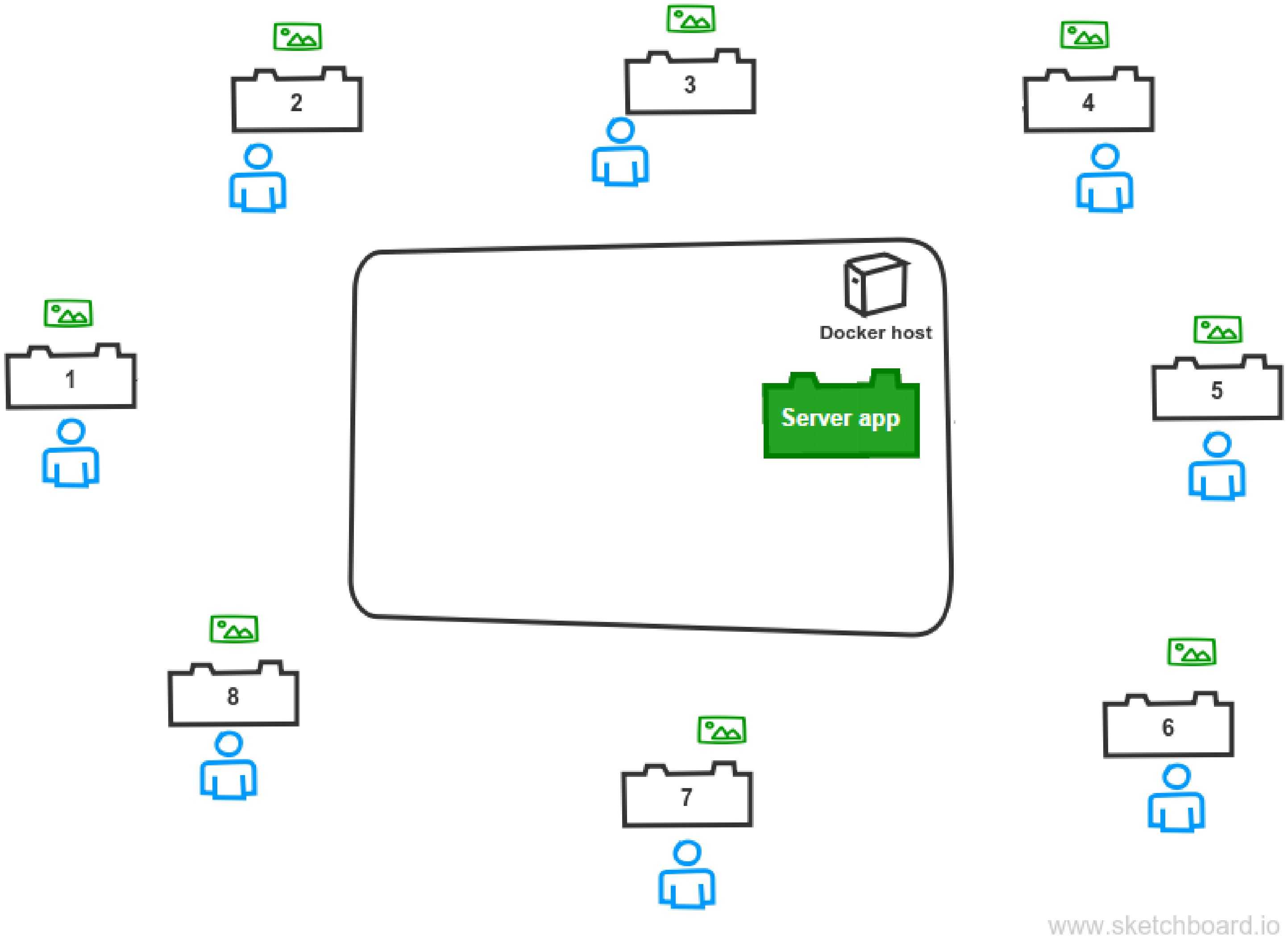
Workshops

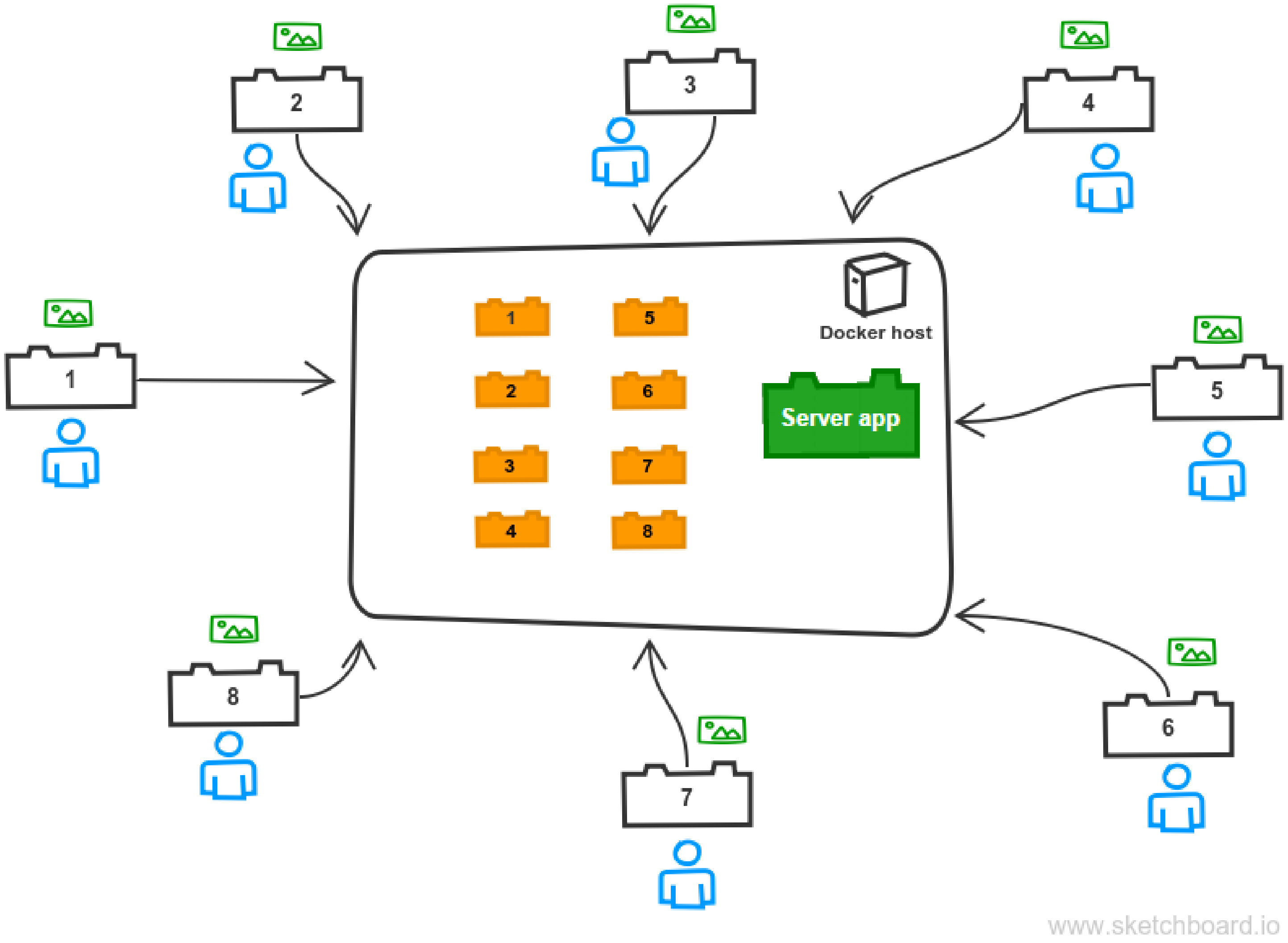


www.sketchboard.io

Workshops



Workshops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Docker host
Server app
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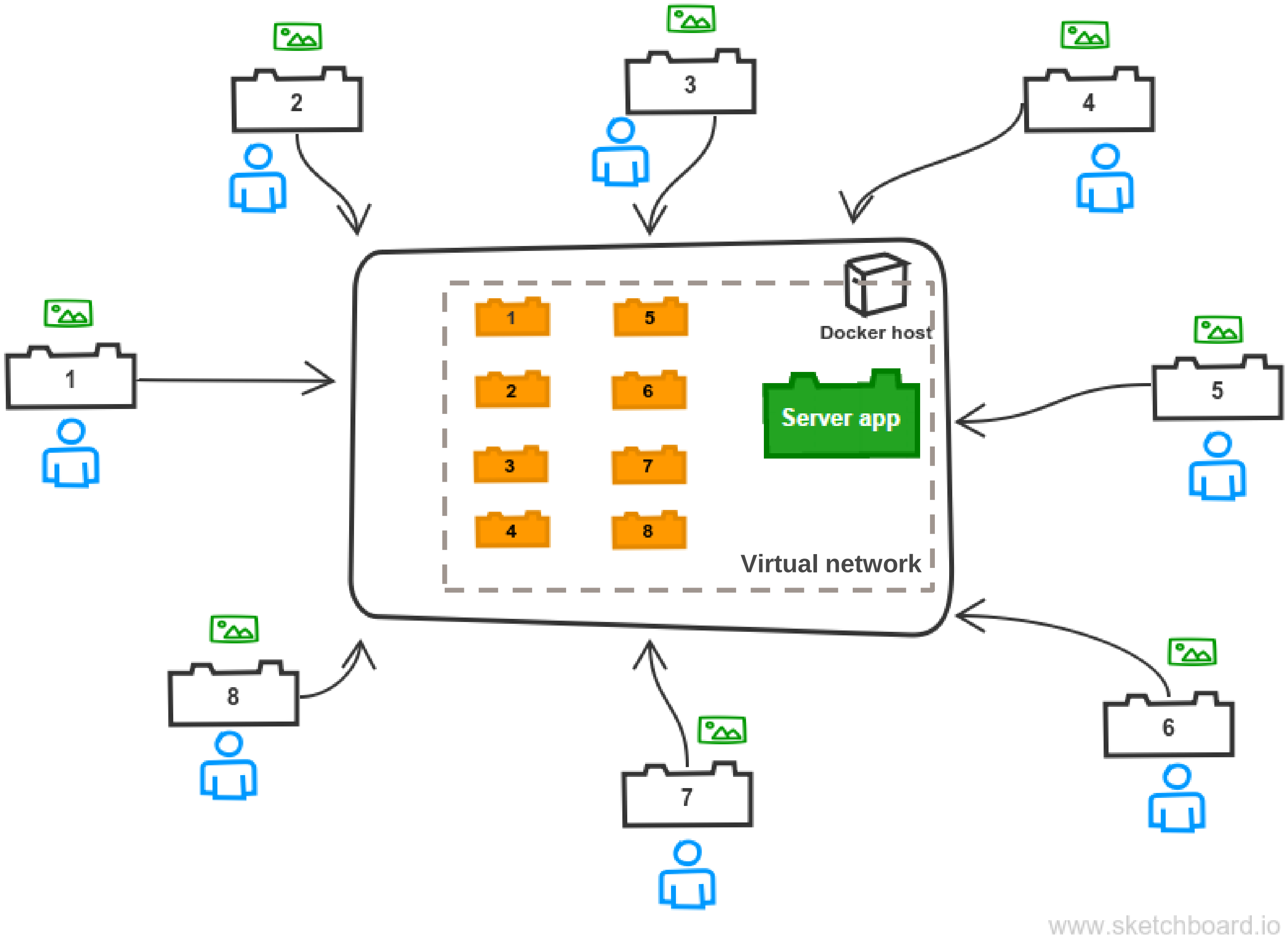
www.sketchboard.io

Workshops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Workshops

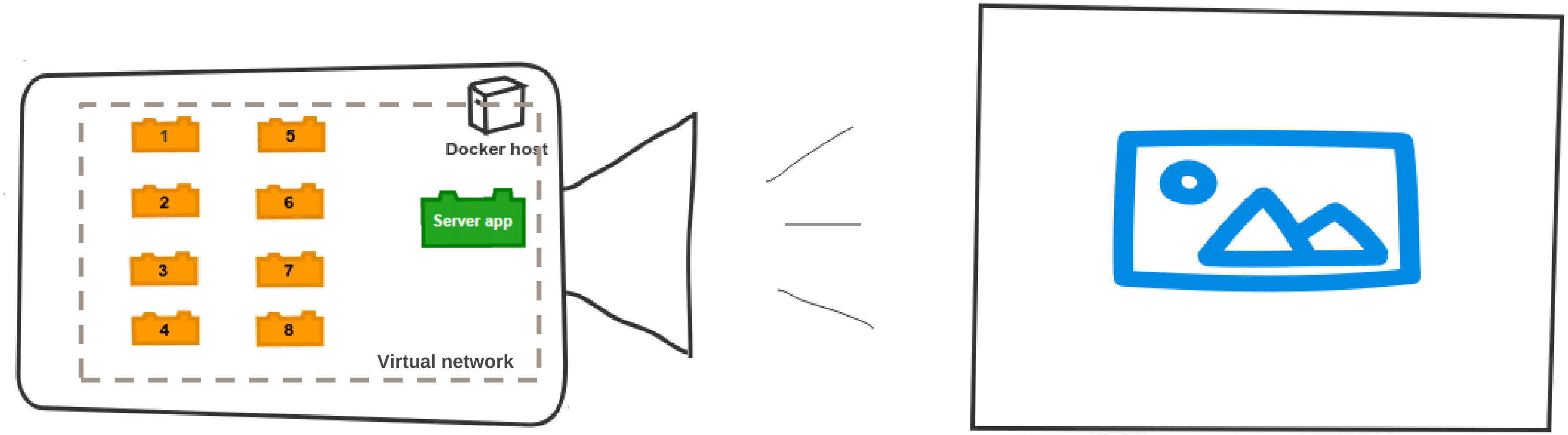

Image credits

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