

# Why Containers

---

WILL TAKE OVER THE WORLD

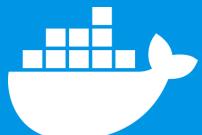
@EltonStoneman | elton@docker.com | #gids18



# Today

## WHY CONTAINERS WILL TAKE OVER THE WORLD

1. Because they solve **real problems**
2. Because they're **flexible**
3. Because they're **open**

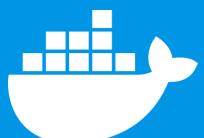


1.

Because They Solve  
Real Problems



# i. To The Cloud!



# i. To The Cloud!

- Agility
- Cost
- Freedom



App 1

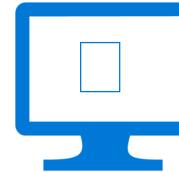
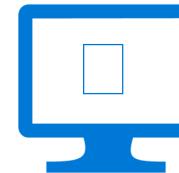
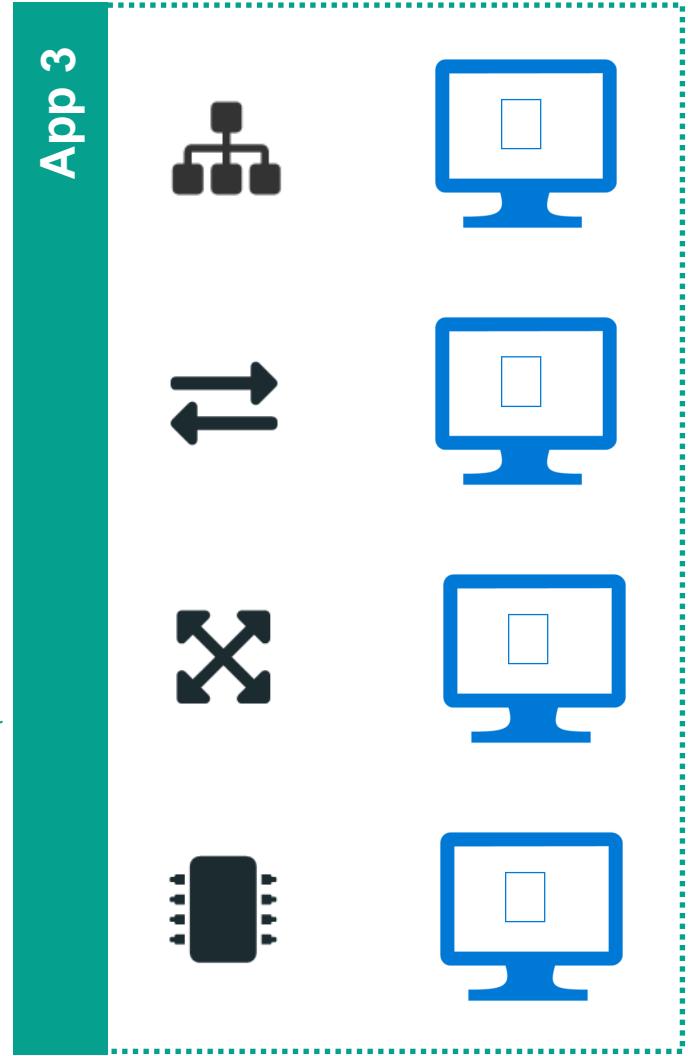
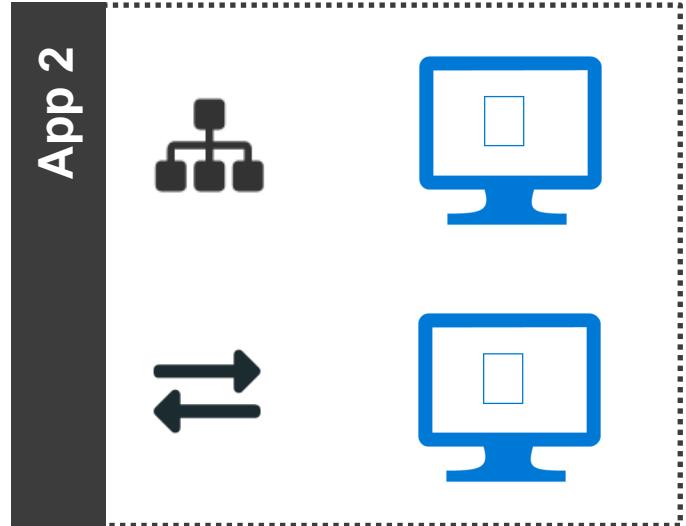
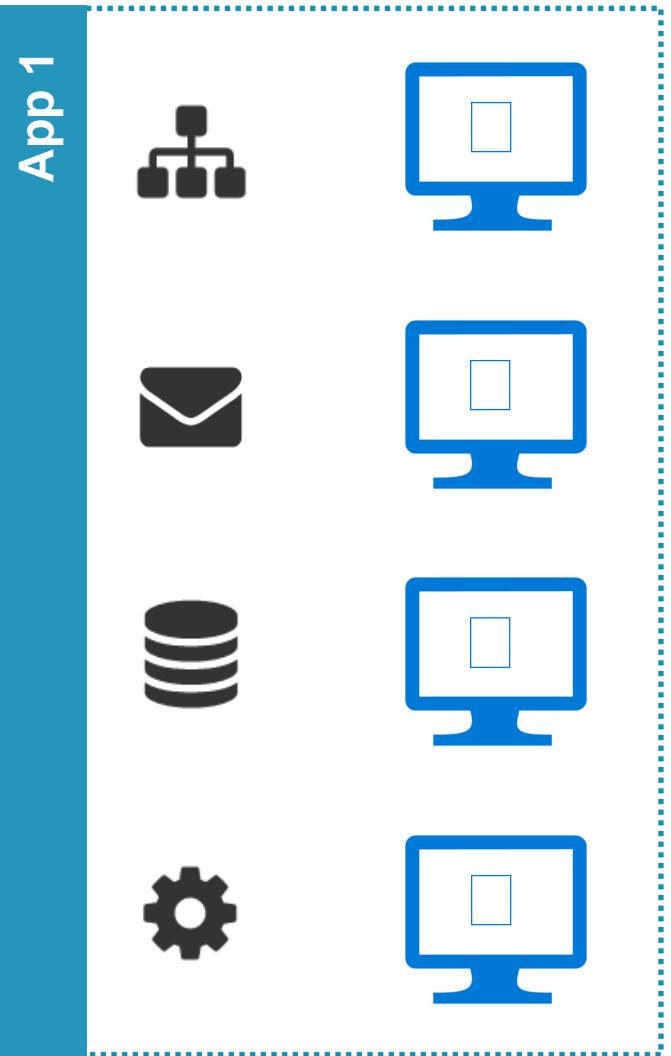


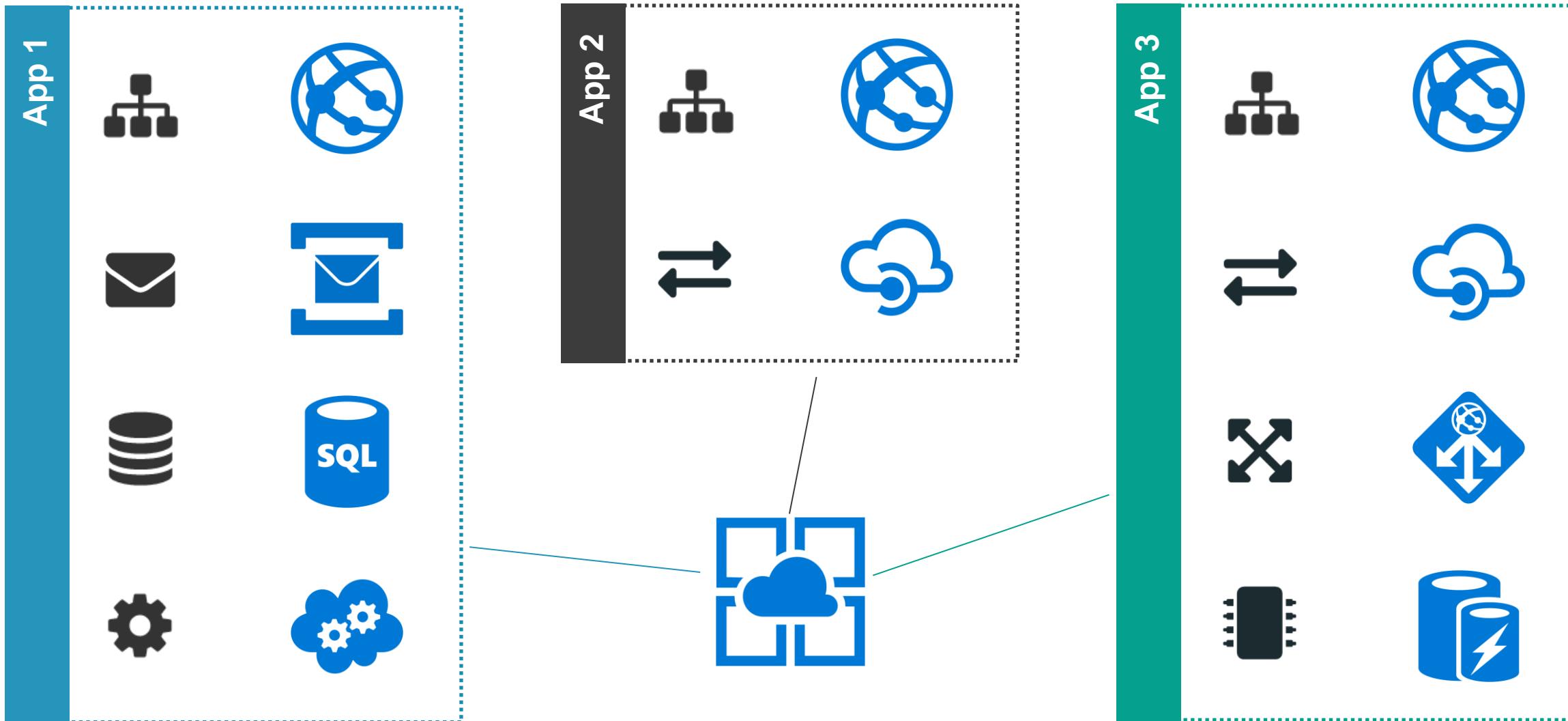
App 2

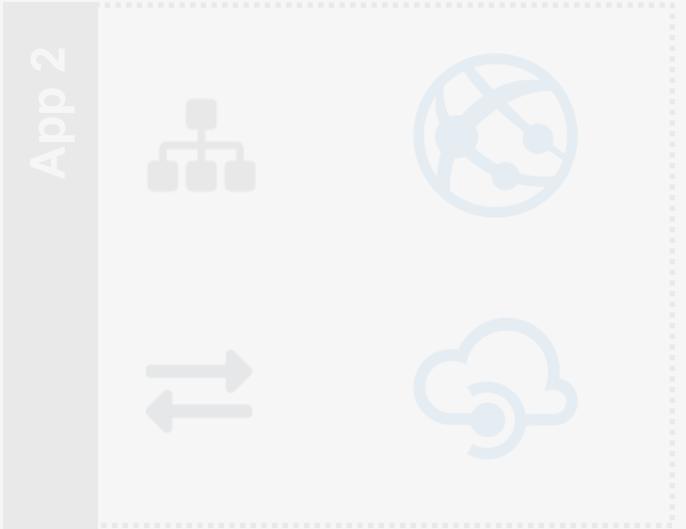
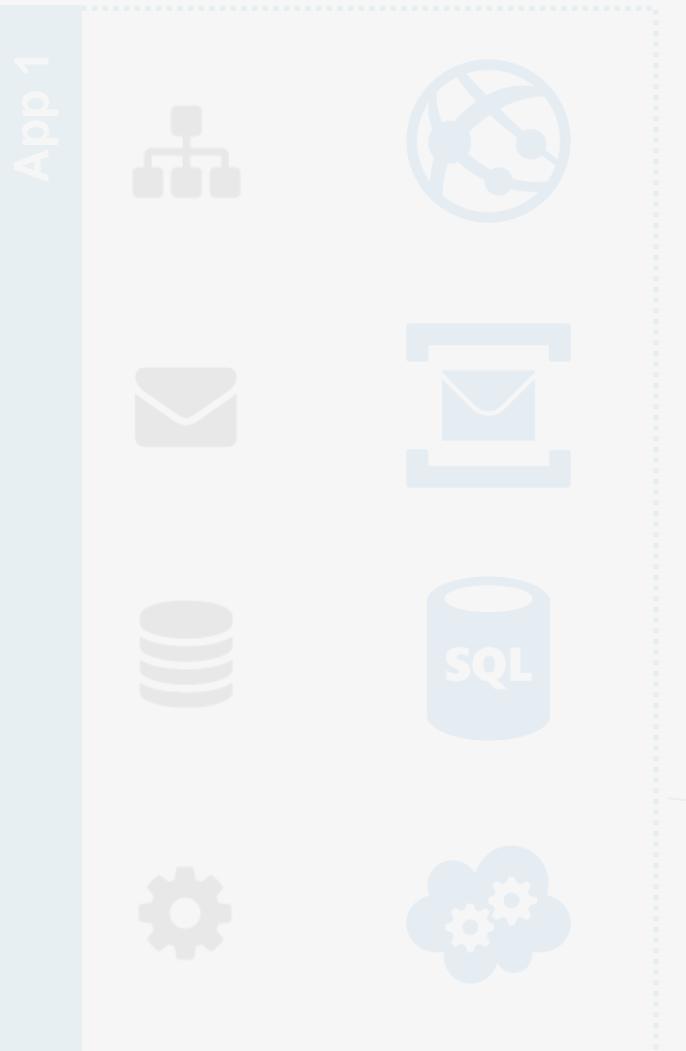


App 3



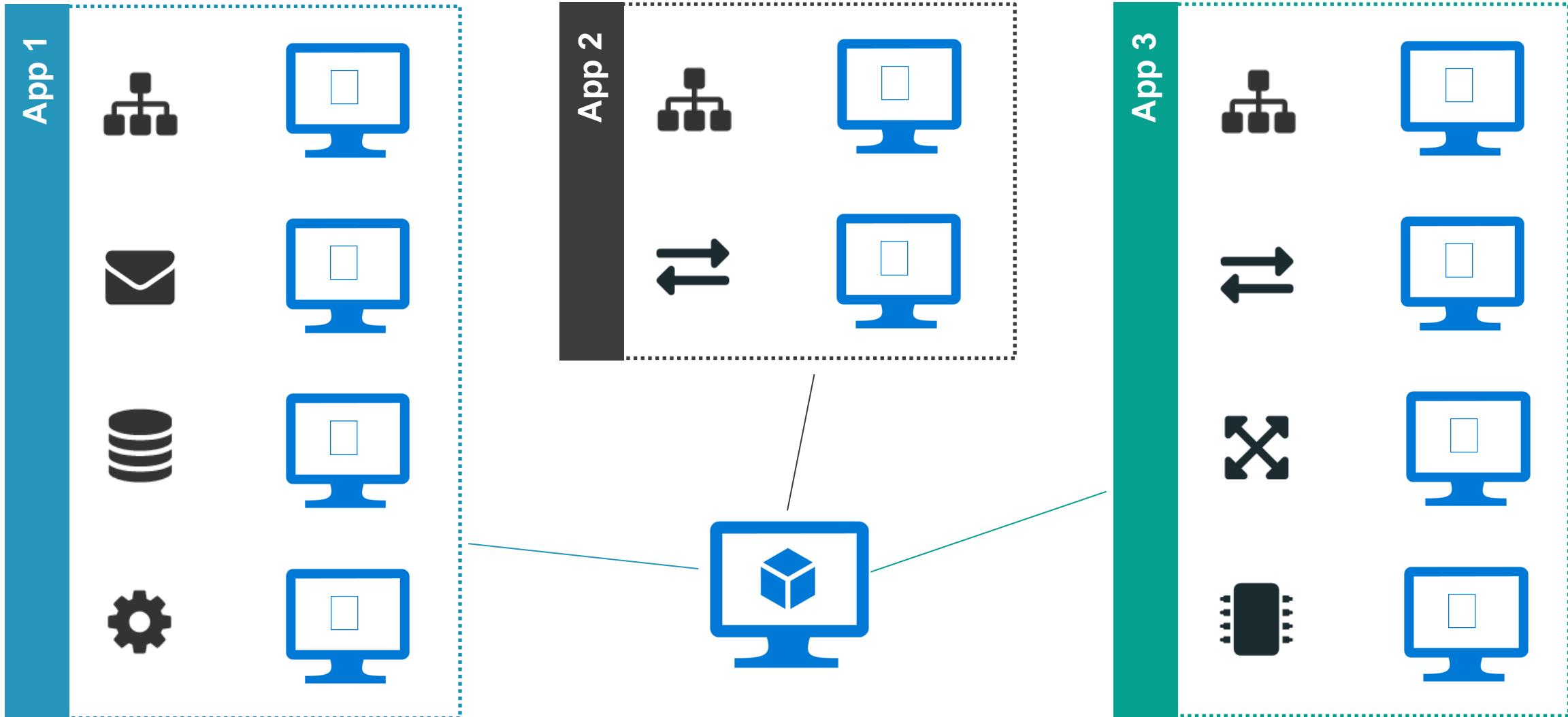


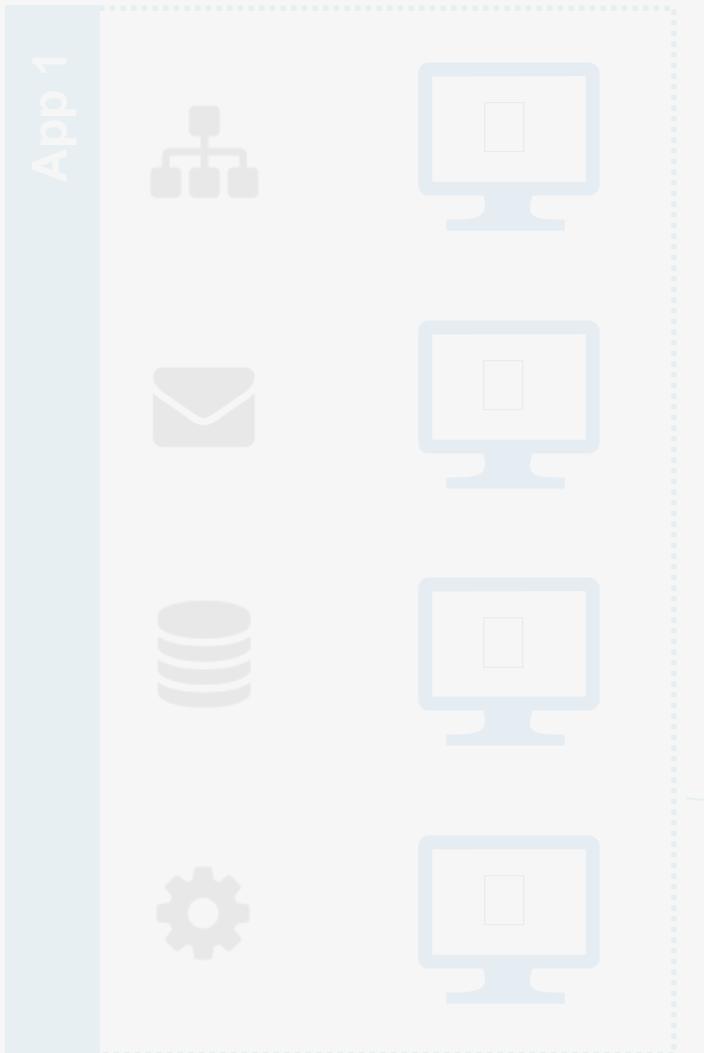




✓ **Agility**  
\* **Cost**  
○ **Freedom**

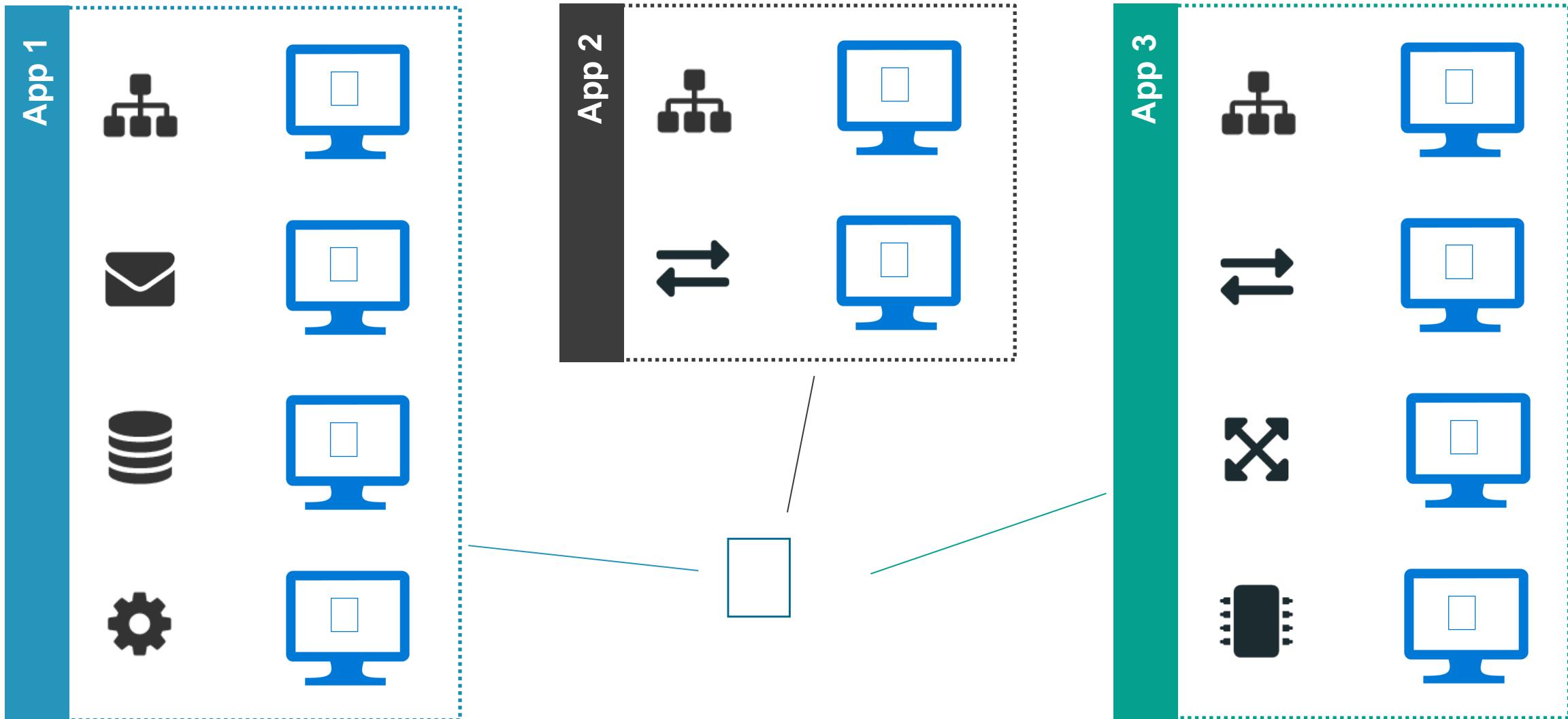






\* **Agility**  
○ **Cost**  
✓ **Freedom**





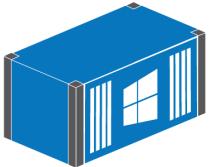
**TEST** | 10x VMs | \$1.4K / mth

**PROD** | 25x VMs | \$3.4K / mth





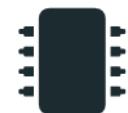
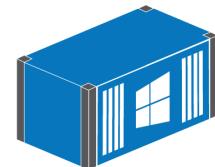
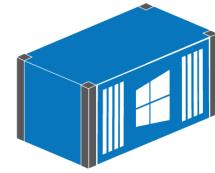
App 1

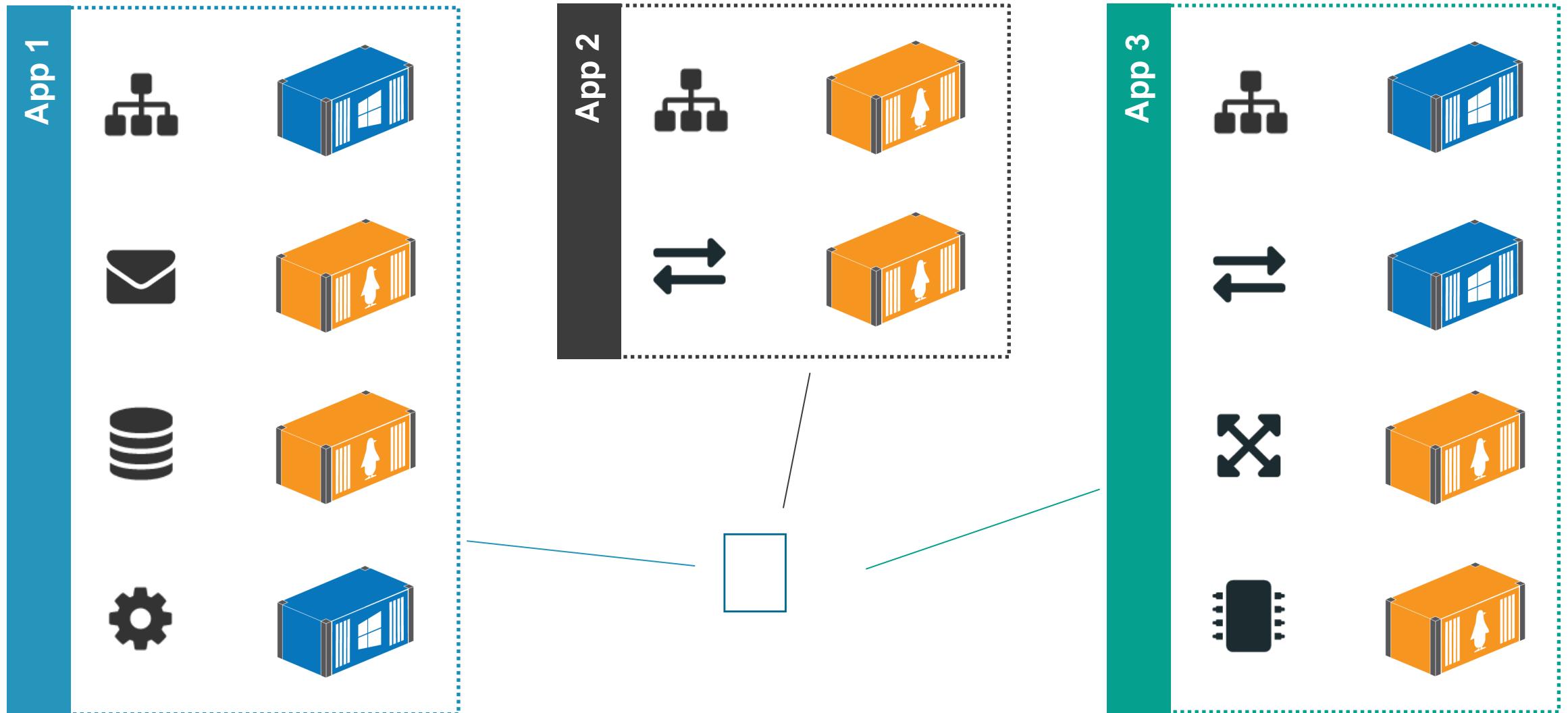


App 2



App 3

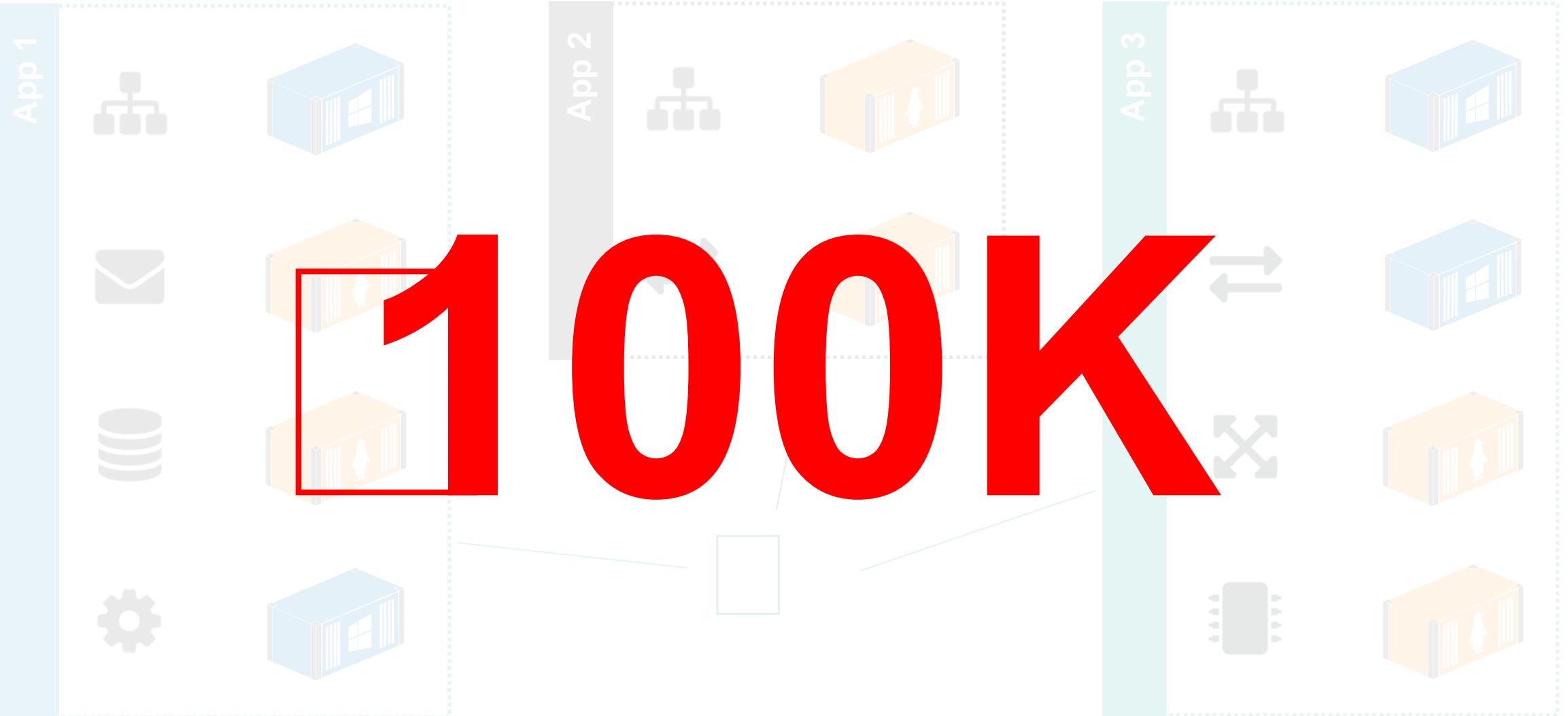


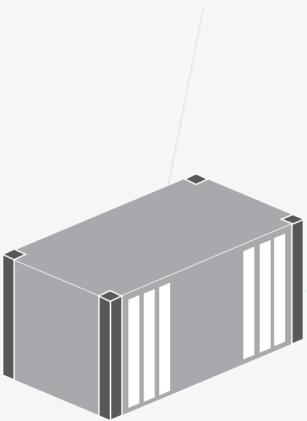
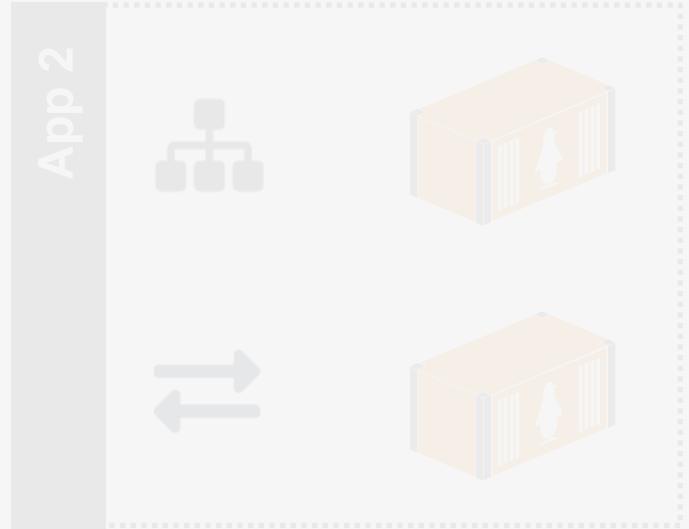
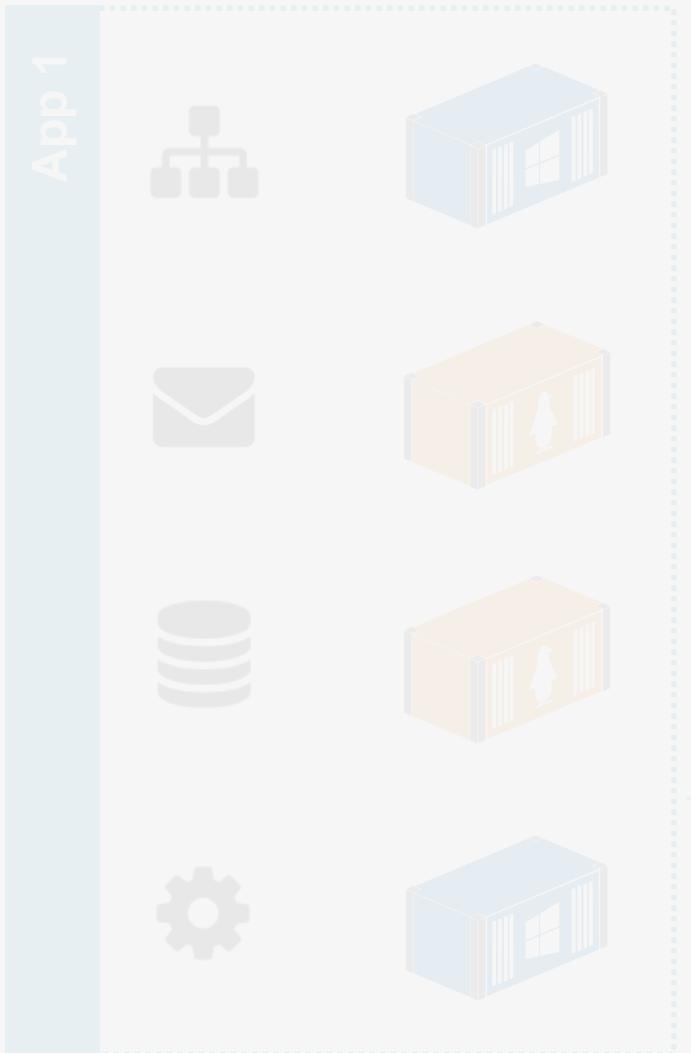


**TEST** | 3x VMs | **\$0.4K / mth**

**PROD** | 7x VMs | **\$0.9K / mth**







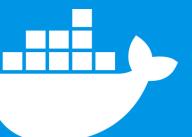
✓ **Agility**

✓ **Cost**

✓ **Freedom**



# ii. Cloud Native Apps



## ii. Cloud Native Apps

- Agility
- Scale
- Fault-tolerance

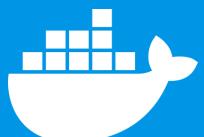


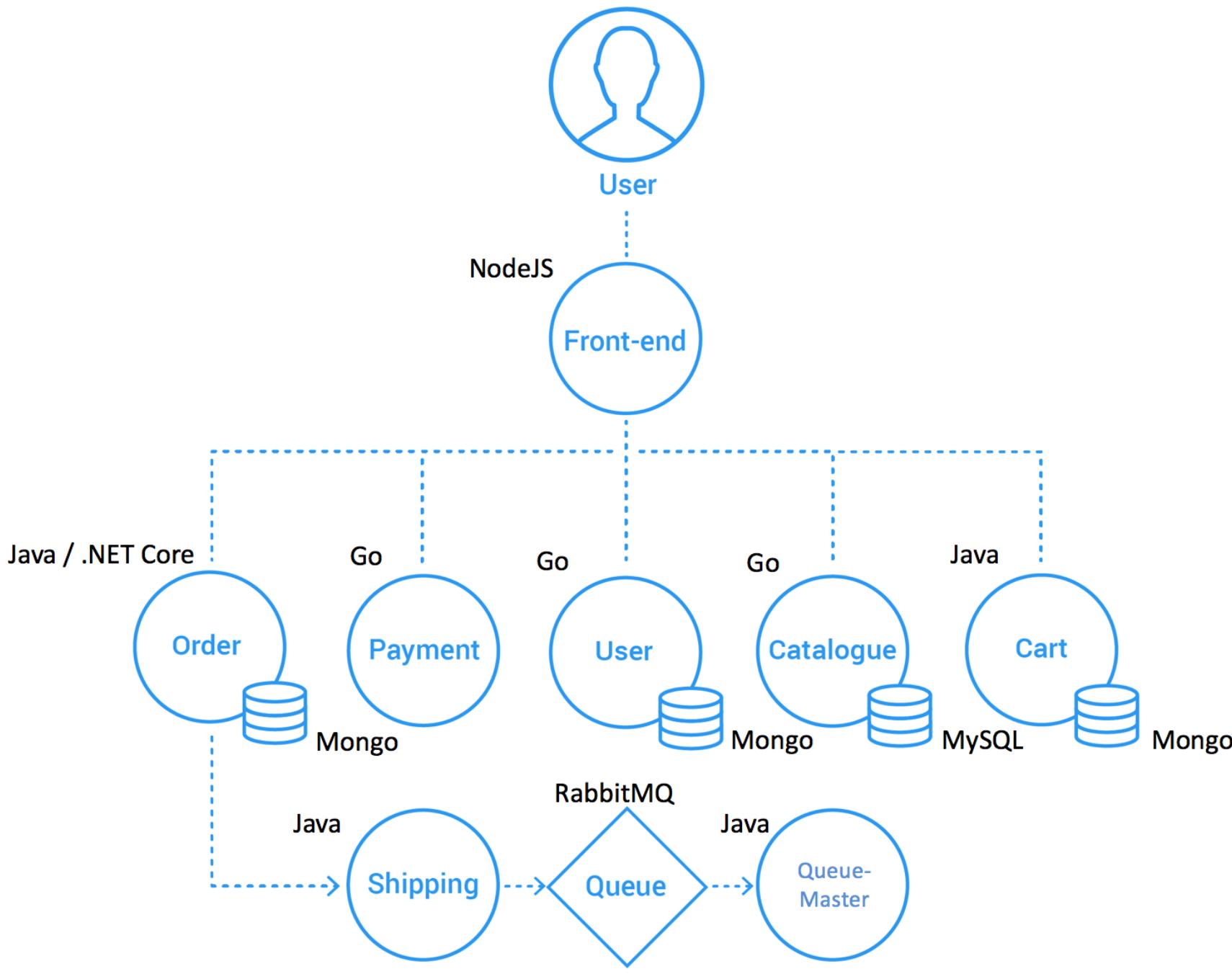


# CLOUD NATIVE COMPUTE FDN

- Container packaged
- Dynamically managed
- Micro-services oriented

\* <https://www.cncf.io/about/charter/>





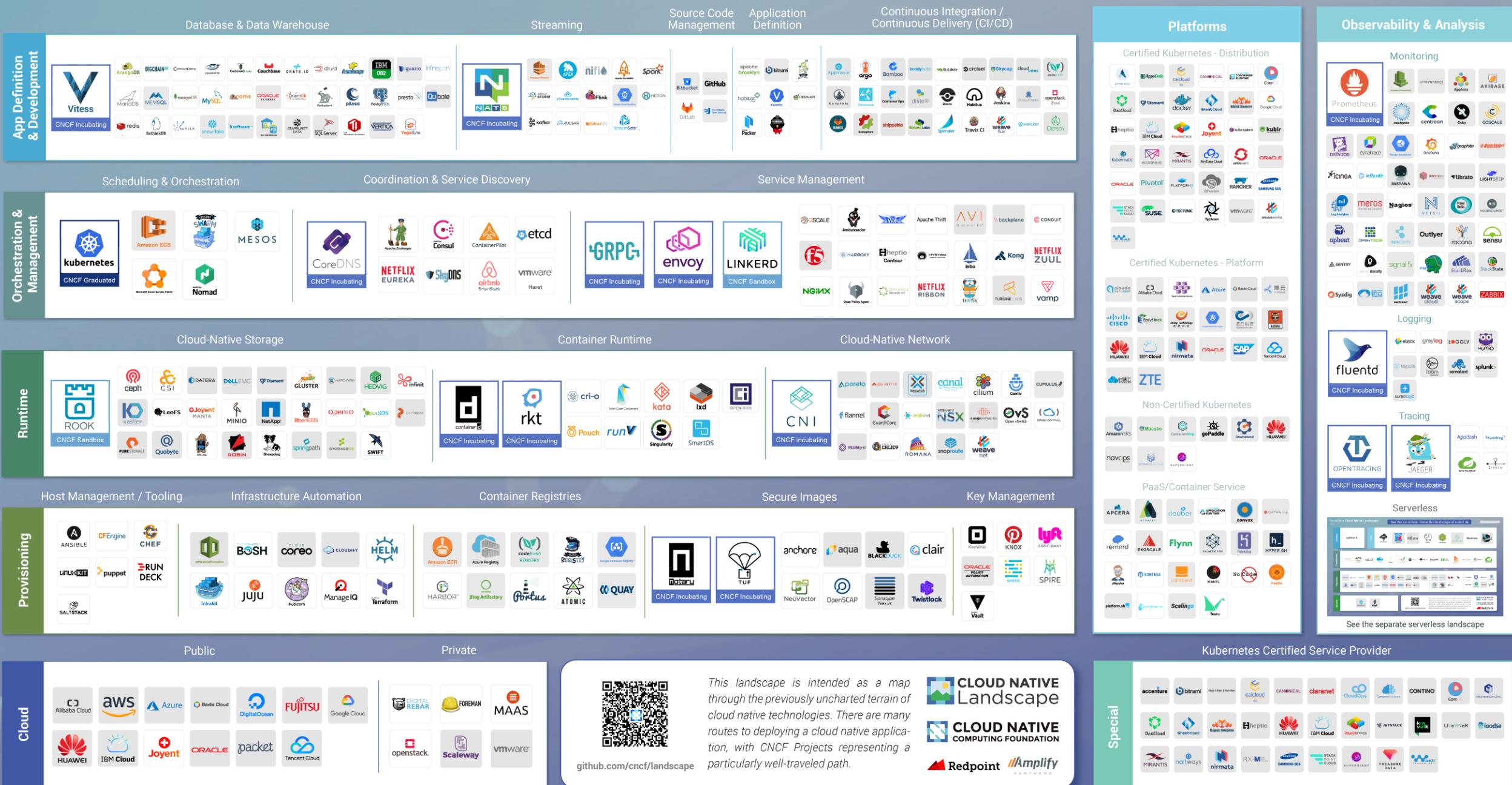


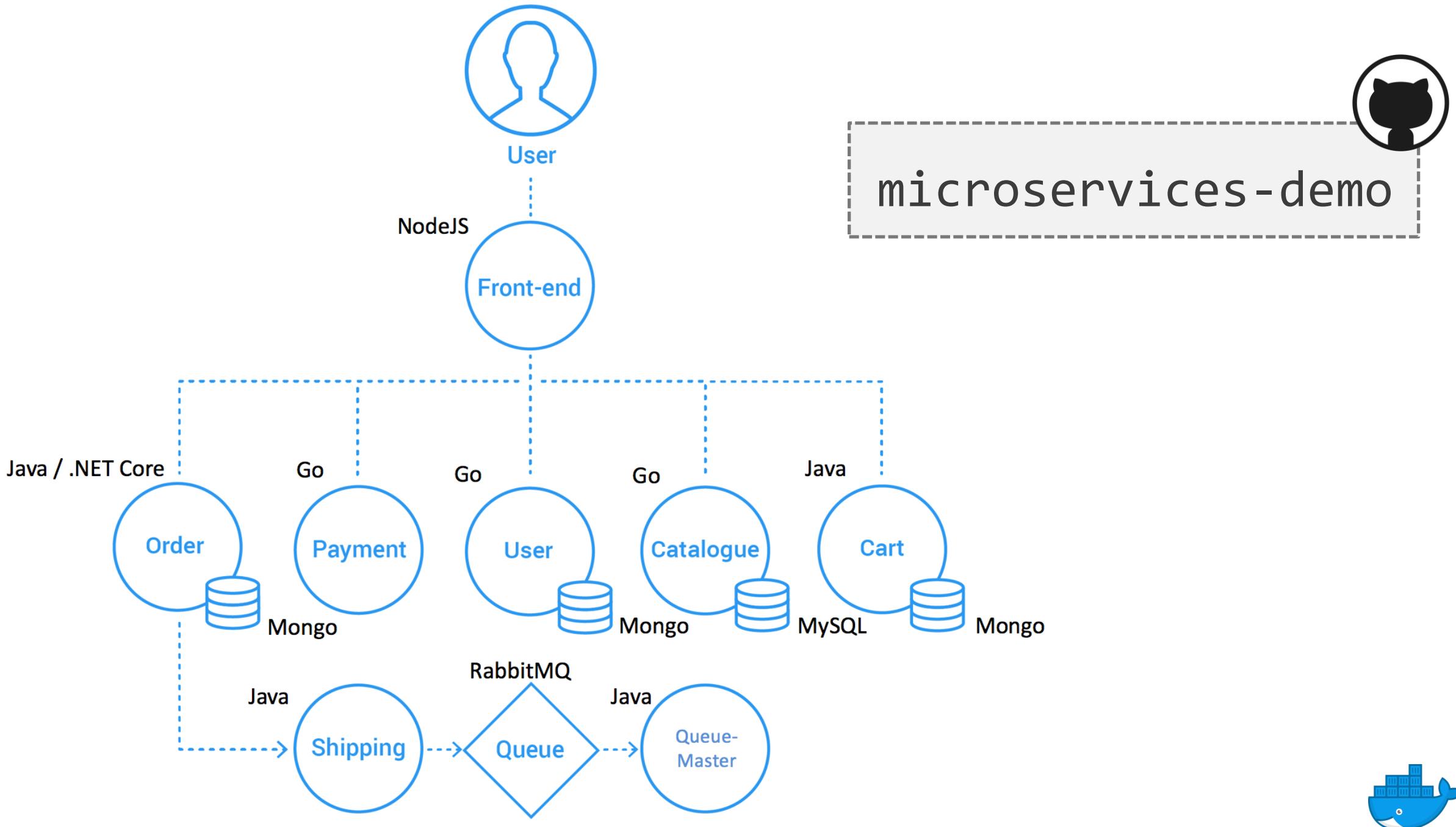
✓ **Agility**

✓ **Scale**

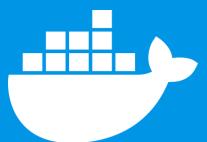
✓ **Fault-tolerance**







> demo



```
PS> docker stack deploy -c sockshop-stack.yml sockshop
Creating network sockshop_default
Creating service sockshop_shipping
Creating service sockshop_rabbitmq
Creating service sockshop_carts
Creating service sockshop_orders-db
Creating service sockshop_front-end
Creating service sockshop_payment
Creating service sockshop_user-db
Creating service sockshop_catalogue
Creating service sockshop_user
Creating service sockshop_orders
Creating service sockshop_carts-db
Creating service sockshop_catalogue-db
```

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12 Service(s)

Dashboard

User Management

Shared Resources

Kubernetes

Swarm

Services



Actions ▾

Create Service

<input type="checkbox"/>	Status	Name	Image	Mode	Updated At	Last Error
<span>● 1/1</span>	sockshop_carts-db	mongo:3.4@sha256:cb4b...	Replicated	a minute ago	No errors	
<span>● 1/1</span>	sockshop_shipping	weaveworksdemos/ship...	Replicated	2 minutes ago	No errors	
<span>● 1/1</span>	sockshop_orders-db	mongo:3.4@sha256:cb4b...	Replicated	2 minutes ago	No errors	
<span>● 1/1</span>	sockshop_orders	weaveworksdemos/orde...	Replicated	a minute ago	No errors	
<span>● 1/1</span>	sockshop_catalogue	weaveworksdemos/catal...	Replicated	2 minutes ago	No errors	
<span>● 1/1</span>	sockshop_user	weaveworksdemos/user:...	Replicated	a minute ago	No errors	
<span>● 1/1</span>	sockshop_payment	weaveworksdemos/pay...	Replicated	2 minutes ago	No errors	
<span>● 1/1</span>	sockshop_rabbitmq	rabbitmq:3.6.8@sha256:...	Replicated	2 minutes ago	No errors	
<span>● 1/1</span>	sockshop_carts	weaveworksdemos/carts...	Replicated	2 minutes ago	No errors	
<span>● 1/1</span>	sockshop_user-db	weaveworksdemos/user-...	Replicated	2 minutes ago	No errors	
<span>● 1/1</span>	sockshop_catalogue-db	weaveworksdemos/catal...	Replicated	a minute ago	No errors	
<span>● 1/1</span>	sockshop_front-end	weaveworksdemos/front...	Replicated	2 minutes ago	No errors	



Docs

Kubernetes API Docs

Live API



HOME

CATALOGUE ▾

0 items in cart



## WE LOVE SOCKS!

Fun fact: Socks were invented by woolly mammoths to keep warm. They died out because stupid humans had to cut their legs off to get their socks.

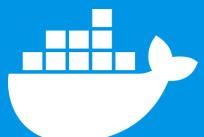
## BEST PRICES

We price check our socks with trained monkeys back at the office.

## 100% SATISFACTION GUARANTEED

Free returns on most items. Hamsters are non-returnable once spoken to.

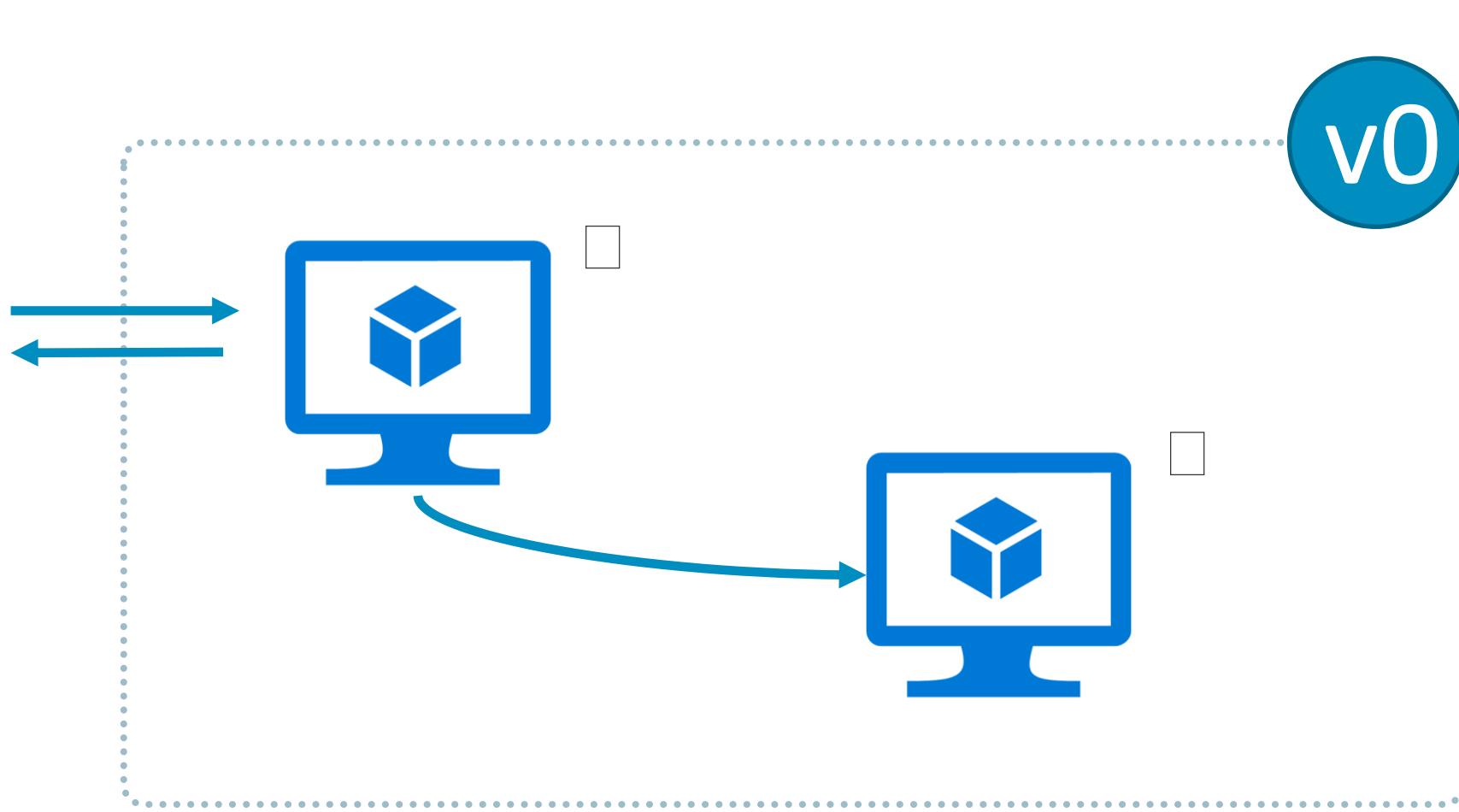
# iii. Modernizing Traditional Apps

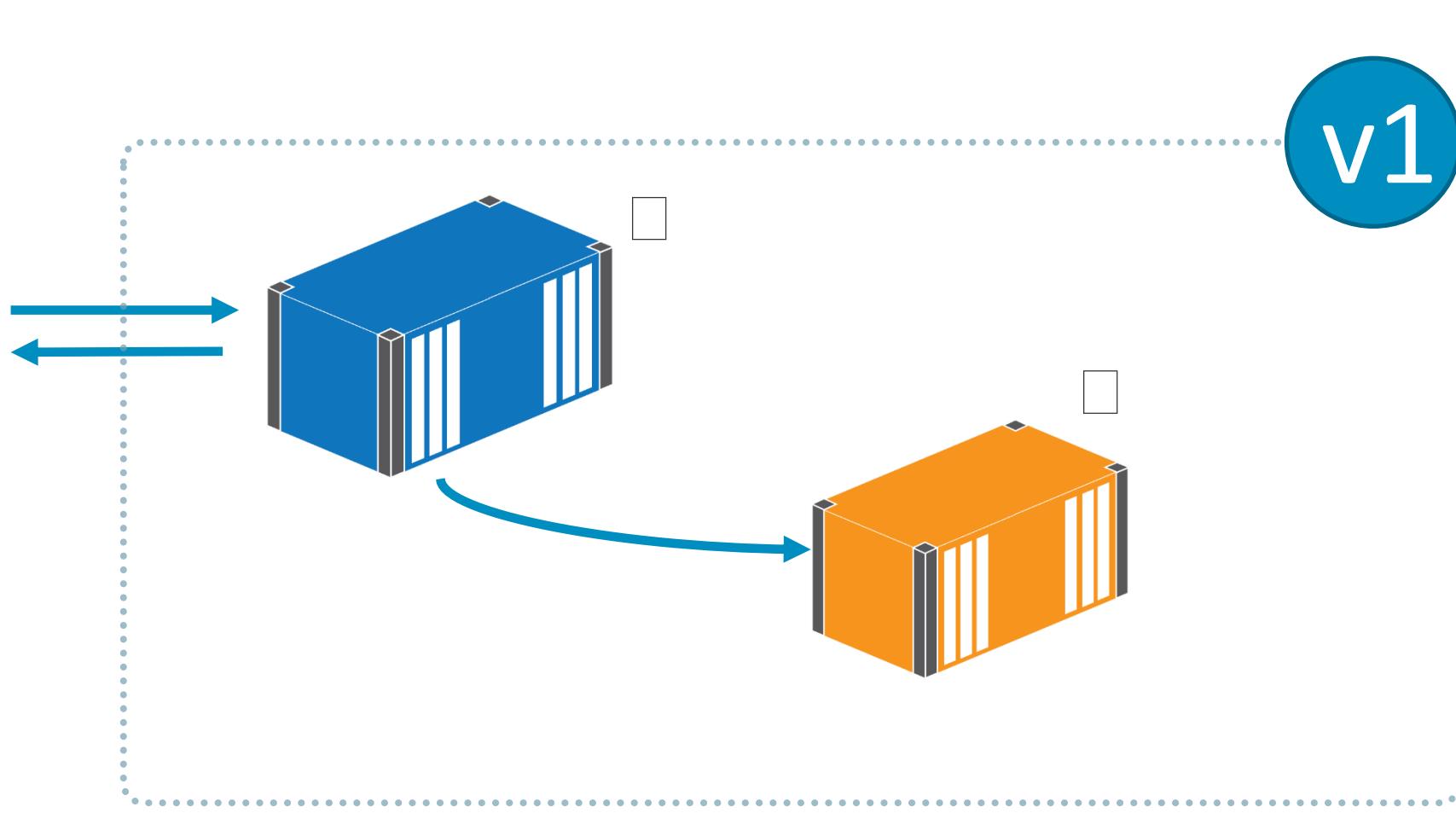


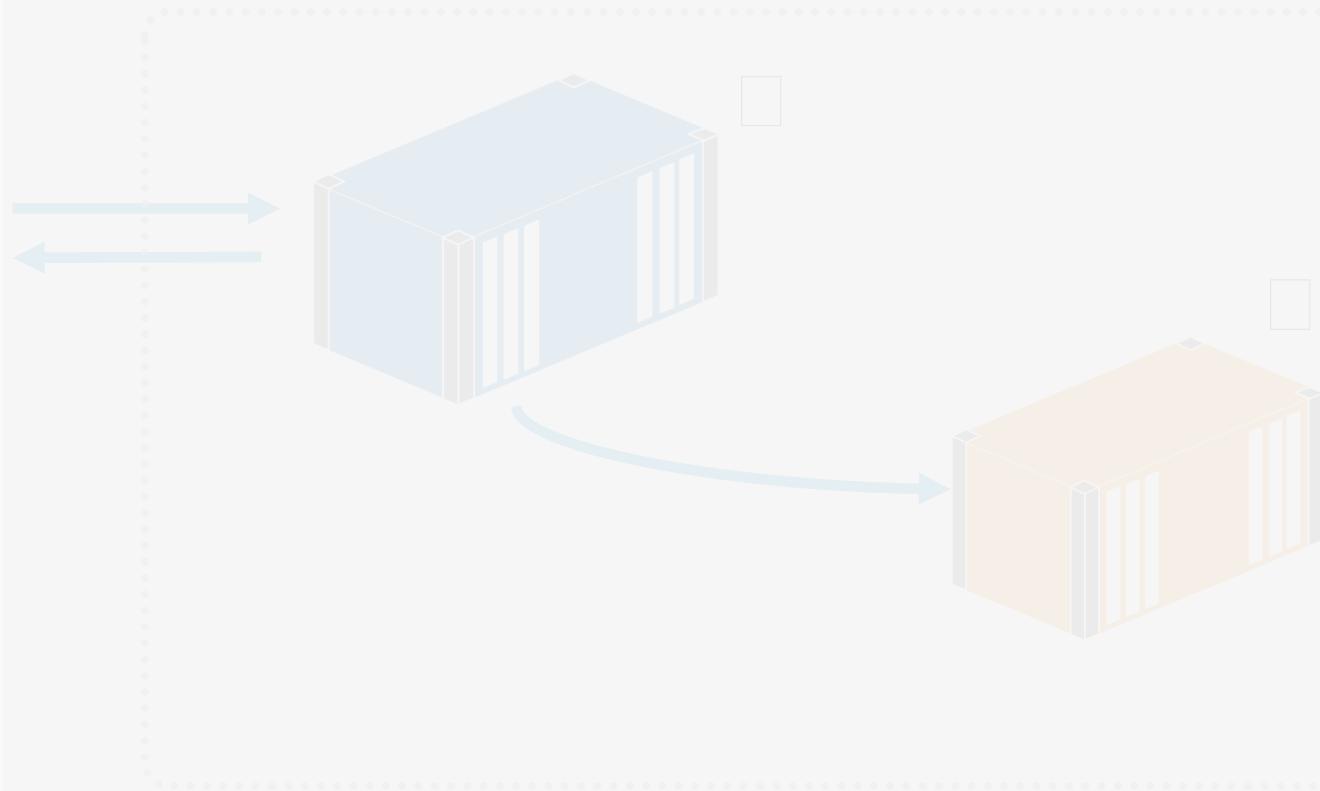
# iii. Modernizing Traditional Apps

- Portability
- Security
- Efficiency





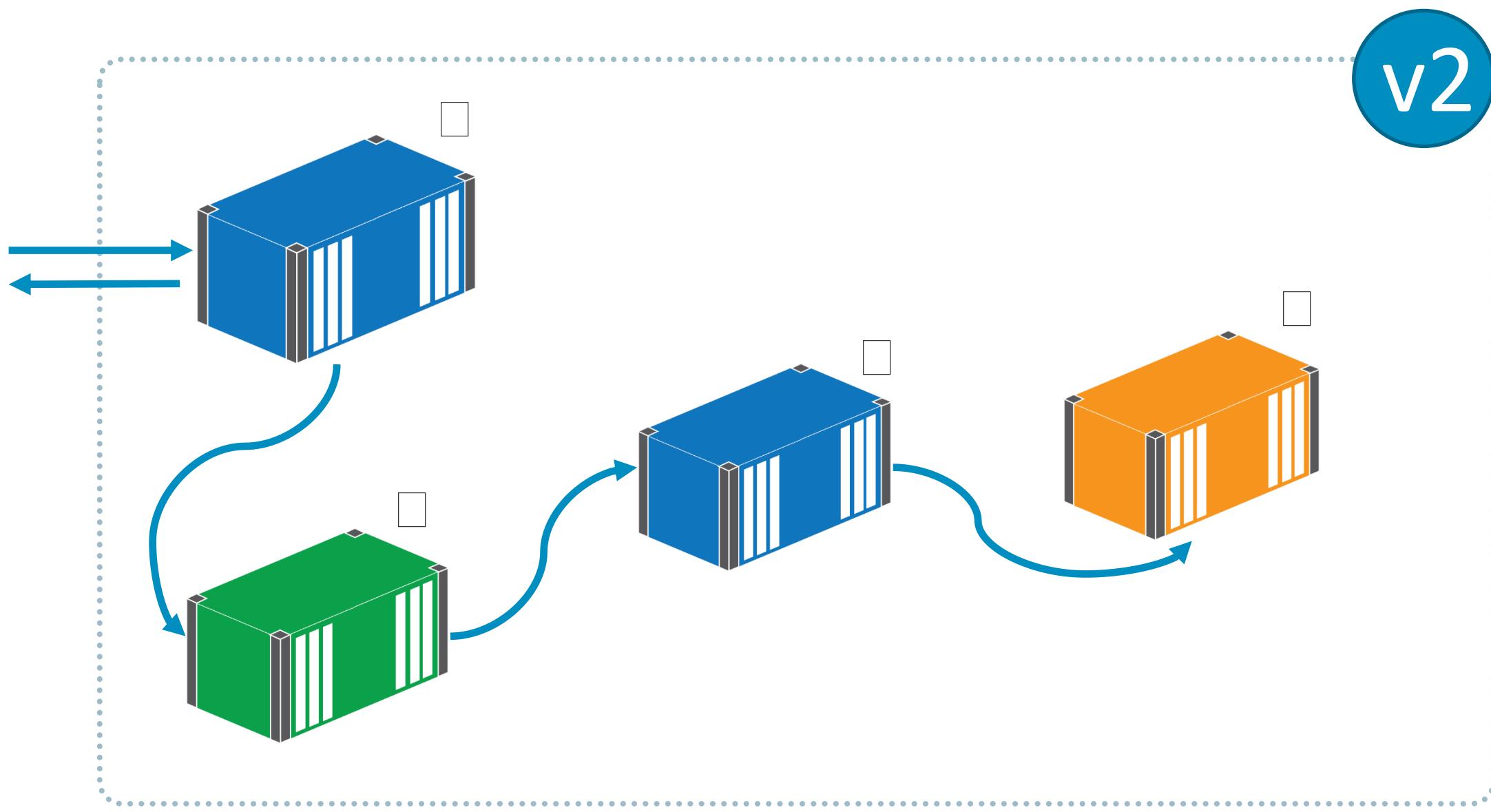




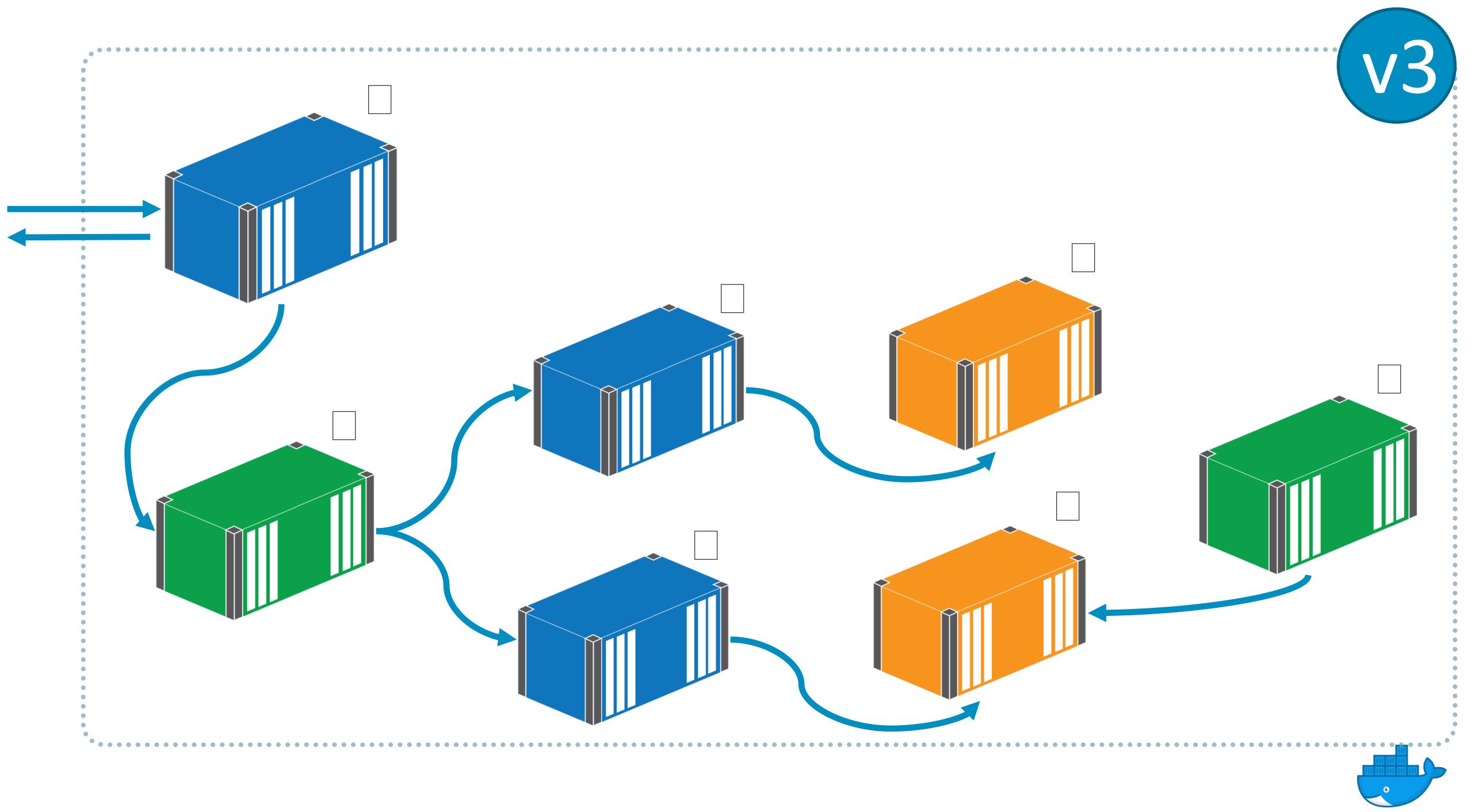
v1

- ✓ Portability
- ✓ Security
- ✓ Efficiency

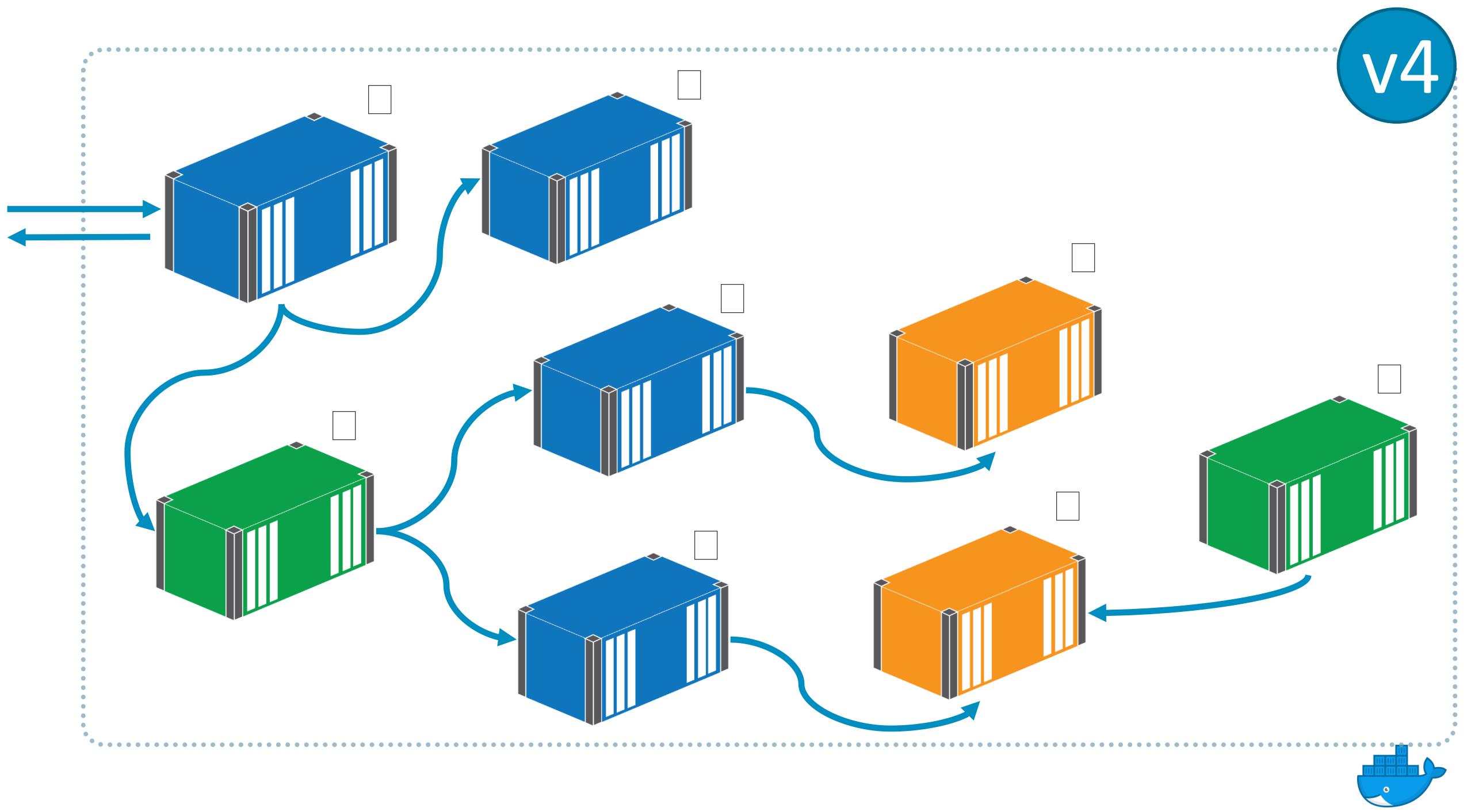




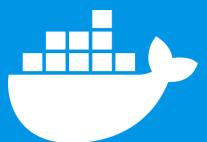
v3



v4



> demo



```
PS> docker stack deploy -c signup-stack-v1.yml signup
Creating network signup_app-net
Creating service signup_signup-app
Creating service signup_signup-db
```

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Dashboard

User Management

Shared Resources

Collections

Stacks

Containers

2 Service(s)



Actions

Create Service

<input type="checkbox"/>	Status	Name	Image	Mode	Updated At	Last Error
	1/1	signup_signup-db	dockersamples/mta-dev-...	Replicated	2 minutes ago	No errors
	1/1	signup_signup-app	dockersamples/mta-dev-...	Replicated	2 minutes ago	No errors

Images

Nodes

Kubernetes

Swarm

Docs

Kubernetes API Docs

Live API

# Have you tried Play with Docker?

A simple, interactive and fun playground to learn Docker.

## Docker from the comfort of your browser

Play with Docker (PWD) gives you a configured Docker setup running in the cloud, which you manage from your browser.

There's a playground for just trying things out - like Docker Swarm mode - and there are self-paced training labs too.

[Play with Docker](#)

| [PWD Classroom](#)

## Interested? Get the newsletter!

Give us your details and we'll keep you posted.

It only takes 30 seconds to sign up.

And we probably won't spam you very much.

[Sign Up »](#)

```
PS> docker stack deploy -c signup-stack-v4.yml signup
Creating service signup_signup-homepage
Updating service signup_signup-db (id: ou76tm13b2ys6k16g9j73jn81)
Updating service signup_signup-app (id: z5sbkiyu1f6xdbbki6u5wvm6e
)
Creating service signup_message-queue
Creating service signup_elasticsearch
Creating service signup_signup-save-handler
```

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Dashboard

User Management

Shared Resources

Collections

Stacks

Containers

6 Service(s)



Actions ▾

Create Service

	Status	Name	Image	Mode	Updated At	Last Error
	1/1	signup_signup-homepage	dockersamples/mta-dev-...	Replicated	5 minutes ago	No errors
	1/1	signup_elasticsearch	dockersamples/elasticse...	Replicated	4 minutes ago	No errors
	1/1	signup_message-queue	nats:nanoverserver@sha25...	Replicated	4 minutes ago	No errors
	2/2	signup_signup-save-handle	dockersamples/mta-dev-...	Replicated	4 minutes ago	No errors
	1/1	signup_signup-db	dockersamples/mta-dev-...	Replicated	5 minutes ago	No errors
	1/1	signup_signup-app	dockersamples/mta-dev-...	Replicated	4 minutes ago	No errors

Kubernetes

Swarm

Docs

Kubernetes API Docs

Live API

## Play with Docker

### The Playground

LAUNCH

## Play with Docker

### The Classroom

LAUNCH

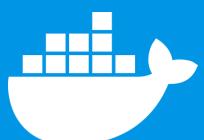
## Play with Docker

### The Newsletter

SIGN UP!



# iv. Innovation



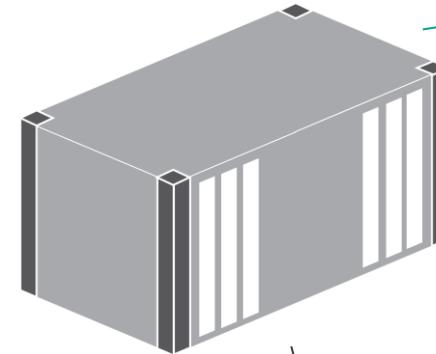
# iv. Innovation

✓ If we don't,  
someone else will





Serverless



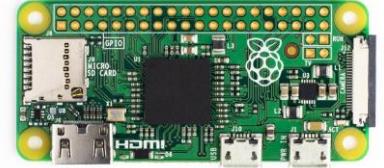
IoT



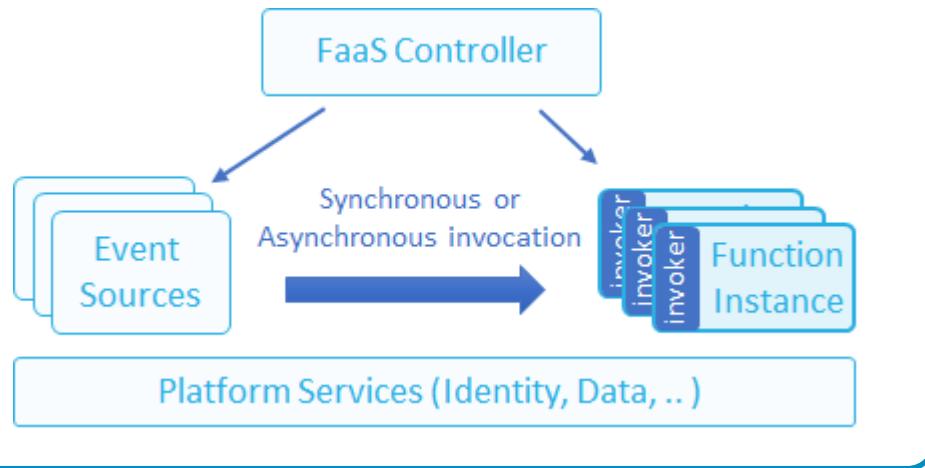
Machine Learning



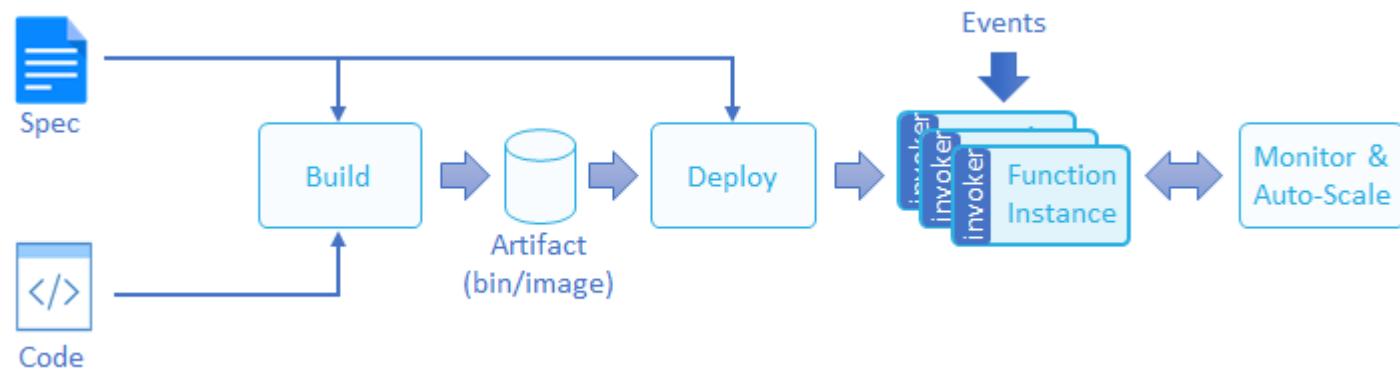
TensorFlow



## Architecture



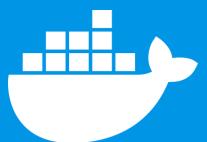
## Pipeline



\* <https://github.com/cncf/wg-serverless>



> demo



```
elton@ub1604-01:~$ sudo docker run -p 8070:8070 -v /var/run/docker.sock:/var/run/docker.sock -v /tmp:/tmp nuclio/playground:stable-amd64
18.04.27 07:42:26.904 nd.platform.docker.runner (D) Executing {"command": "docker version"}
18.04.27 07:42:26.922 nd.platform.docker.runner (D) Command executed successfully {"output": "Client:\n Version: 17.09.0-ce\n API version: 1.30 (downgraded from 1.32)\n Go version: go1.8.3\n Git com\n mit: afdb6d4\n Built: Tue Sep 26 22:39:28 2017\n OS/Arch: linux/amd64\n Server:\n Version: 17.06.2-ee-8\n API version: 1.30 (minimum version 1.12)\n Go version: go1.8.7\n Git commit: 4e8ed51\n Built: Fri Mar 30 01:34:39 2018\n OS/Arch: linux/amd64\n Experimental: false\n", "stderr": "", "exitCode": 0}
18.04.27 07:42:26.923 playground (I) Starting {"name": "local", "noPull": false, "defaul\n tCredRefreshInterval": ""}
18.04.27 07:42:26.923 playground (I) Read version {"version": {"label": "0.3.4", "git_comm\n it": "adcfb8c72d9f067d37b6797c37a7e3e34a46b167", "os": "linux", "arch": "amd64", "go_version": ""}}
18.04.27 07:42:26.923 playground.docker.runner (D) Executing {"command": "docker version"}
18.04.27 07:42:26.940 playground.docker.runner (D) Command executed successfully {"output": "Client:\n Version: 17.09.0-ce\n API version: 1.30 (downgraded from 1.32)\n Go version: go1.8.3\n Git com\n mit: afdb6d4\n Built: Tue Sep 26 22:39:28 2017\n OS/Arch: linux/amd64\n Server:\n Version: 17.06.2-ee-8\n API version: 1.30 (minimum version 1.12)\n Go version: go1.8.7\n Git commit: 4e8ed51\n Built: Fri Mar 30 01:34:39 2018\n OS/Arch: linux/amd64\n Experimental: false\n", "stderr": "", "exitCode": 0}
18.04.27 07:42:26.941 playground.server (D) Registered resource {"name": "functions"}
18.04.27 07:42:26.942 playground.server (D) Registered resource {"name": "invocations"}
18.04.27 07:42:26.944 playground.server (D) Registered resource {"name": "sources"}
18.04.27 07:42:26.944 playground.server (D) Registered resource {"name": "tunnel"}
18.04.27 07:42:26.944 playground.server (W) Failed to login with docker keys {"err": "Failed to\n read docker key directory"}
18.04.27 07:42:26.945 playground.server (I) Initialized {"assetsDir": "/etc/nuclio/playground/a
```

ucp.sixeyed.com:8070

Search

nuclio Functions > dates Code Configure Triggers Deploy New

```
// Uses moment.js (installed as part of the build) to add a given amount of time
// to "now", and returns this as string. Invoke with a JSON containing:
// - value: some number
// - unit: some momentjs unit, as a string - e.g. days, d, hours, milliseconds
//
// For example, the following will add 3 hours to current time and return the response:
// {
//   "value": 3,
//   "unit": "hours"
// }

var moment = require('moment');

exports.handler = function(context, event) {
    var request = JSON.parse(event.body);
    var now = moment();

    context.logger.infoWith('Adding to now', {
        'request': request,
        'to': now.format()
    });

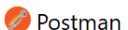
    now.add(request.value, request.unit);

    context.callback(now.format());
};
```

Log

Clear

2018-04-27T07:59:43.704Z [INFO]: Deploying function  
2018-04-27T07:59:43.720Z [INFO]: Building  
2018-04-27T07:59:43.742Z [INFO]: Cleaning up before deployment  
2018-04-27T07:59:43.778Z [INFO]: Function already exists, deleting  
2018-04-27T07:59:44.263Z [INFO]: Staging files and preparing base images  
2018-04-27T07:59:44.263Z [INFO]: Building processor image  
2018-04-27T07:59:44.426Z [INFO]: Build complete [result: {"Image":"nuclio/processor-dates:latest","UpdatedFunctionConfig":{"metadata":{"name":"dates","namespace":"nuclio"},"spec":{"build":{"commands":["npm install --global moment"],"path":"/tmp/nuclio-build-400956114/download/dates.js"},"handler":"dates.js:handler","replicas":1,"resources":{},"runtime":"nodejs"}}}]  
2018-04-27T07:59:46.614Z [INFO]: Function deploy complete [httpPort: 39787]



File Edit View Help

New

Import

Runner

My Workspace



IN SYNC



function - dates

No Environment



▶ function - dates

Examples (0)

POST

http://ucp.sixeyed.com:39787

Params

Send

Save

Authorization

Headers (1)

Body

Pre-request Script

Tests

Cookies Code

form-data  x-www-form-urlencoded

raw  binary

JSON (application/json)

```
1 {  
2   "value": 3,  
3   "unit": "hours"  
4 }
```

Body

Cookies

Headers (4)

Test Results

Status: 200 OK

Time: 62 ms

Size: 143 B

Pretty

Raw

Preview

Text



Save Response

1 2018-04-27T11:01:31+00:00

elton

Dashboard

User Management

Shared Resources

Collections

Stacks

Containers

4 Stacks



Create Stack

Type	Name	Services/Containers	Networks	Volumes	Secrets
Swarm Services	sockshop	12	1	0	0
Swarm Services	signup	6	1	0	0
Basic Containers	Docker Universal Control Plane ikrohhz5w0fyf176out0t6b9c	9	0	0	-
Basic Containers	Docker Trusted Registry 2.5.0 - (Replica e1cbba914eed)	9	0	0	-

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18 Service(s)



Actions ▾

Create Service

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Volumes 17

Networks 14

Secrets 0

Docs

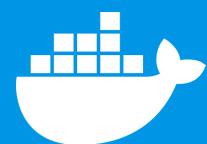
Kubernetes API Docs

Live API



<input type="checkbox"/>	Status	Name	Image	Mode	Updated At	Last Error
	● 1/1	sockshop_carts-db	mongo:3.4@sha256:cb4...	Replicated	37 minutes ago	No errors
	● 1/1	sockshop_shipping	weaveworksdemos/ship...	Replicated	38 minutes ago	No errors
	● 1/1	sockshop_orders-db	mongo:3.4@sha256:cb4...	Replicated	38 minutes ago	No errors
	● 1/1	signup_signup-homepage	dockersamples/mta-dev...	Replicated	27 minutes ago	No errors
	● 1/1	sockshop_orders	weaveworksdemos/orde...	Replicated	37 minutes ago	No errors
	● 1/1	sockshop_catalogue	weaveworksdemos/catal...	Replicated	37 minutes ago	No errors
	● 1/1	signup_elasticsearch	dockersamples/elasticse...	Replicated	27 minutes ago	No errors
	● 1/1	signup_message-queue	nats:nanoserver@sha25...	Replicated	27 minutes ago	No errors
	● 1/1	sockshop_user	weaveworksdemos/user...	Replicated	37 minutes ago	No errors
	● 1/1	sockshop_payment	weaveworksdemos/pay...	Replicated	38 minutes ago	No errors
	● 2/2	signup_signup-save-handle	dockersamples/mta-dev...	Replicated	27 minutes ago	No errors
	● 1/1	signup_signup-db	dockersamples/mta-dev...	Replicated	27 minutes ago	No errors
	● 1/1	sockshop_rabbitmq	rabbitmq:3.6.8@sha256:...	Replicated	38 minutes ago	No errors
	● 1/1	sockshop_carts	weaveworksdemos/carts...	Replicated	38 minutes ago	No errors
	● 1/1	sockshop_user-db	weaveworksdemos/user...	Replicated	38 minutes ago	No errors

# v. DevOps



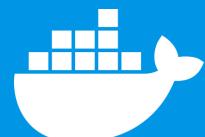
# v. DevOps

- ✓ Agility
- ✓ Quality
- ✓ Value



# DevOps is C. A. L. M. S.

- Culture
- Automation
- Lean
- Metrics
- Sharing



# Docker Underpins C. A. L. M. S.

- Culture | Common artifacts
- Automation | Build, ship & run
- Lean | Incremental updates
- Metrics | Consistent landscape
- Sharing | Production-grade OSS

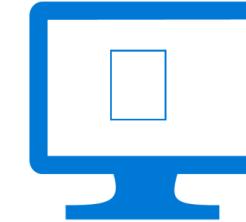




MSBuild  
NuGet

MSIs and ZIPs  
PowerShell

IIS Manager  
SCOM

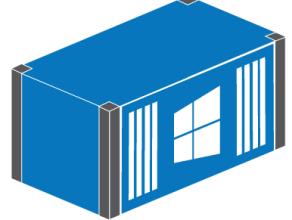


Make  
Maven

JARs and WARs  
Bash

Bash  
Nagios





MSBuild  
NuGet

MSIs and ZIPs  
PowerShell

IIS Manager  
SCOM

# Dockerfile

Make  
Maven

# Docker Image

JARs and WARs  
Bash

Bash  
Nagios



2.

Because They're Flexible



**Migrate  
as-is**

**Adopt  
platform idioms**

**Adapt  
to new runtime**

**Extract  
key features**

**Rebuild  
and renew**



- Binaries
- Setup
- Artifacts

- Configuration
- Monitoring
- Logging

- Fault-tolerance
- Scaling
- Statelessness

- Performance
- Functionality
- Fast updates

- Architecture
- Tech stack
- Paradigms

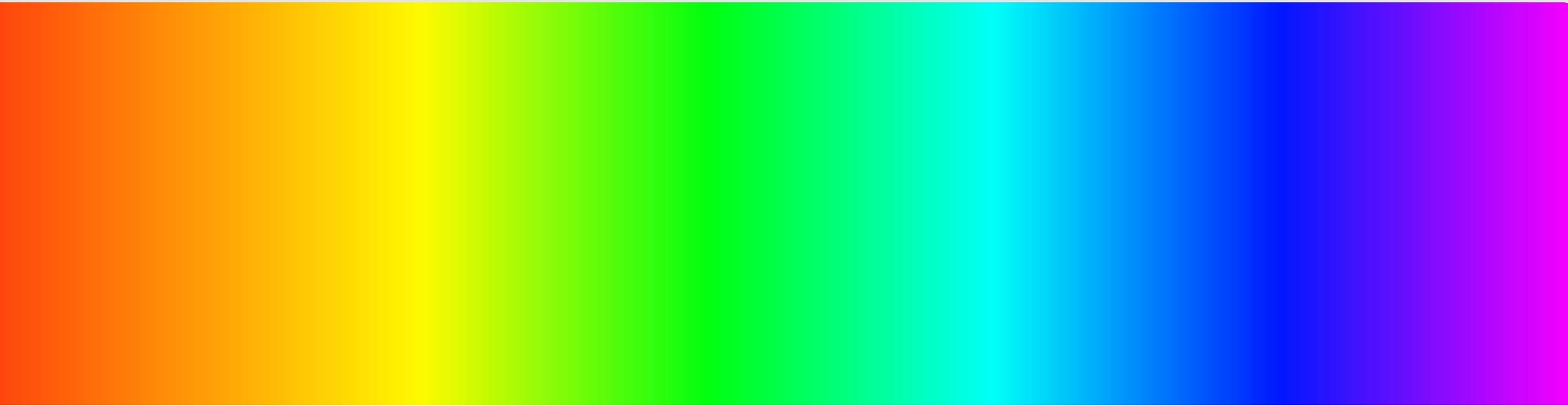
Migrate  
as-is

Adopt  
platform idioms

Adapt  
to new runtime

Extract  
key features

Rebuild  
and renew



• Binaries  
• Setup  
• Artifacts

• Configuration  
• Monitoring  
• Logging

• Fault-tolerance  
• Scaling  
• Statelessness

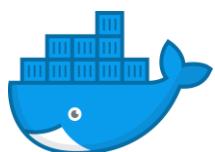
• Performance  
• Functionality  
• Usability

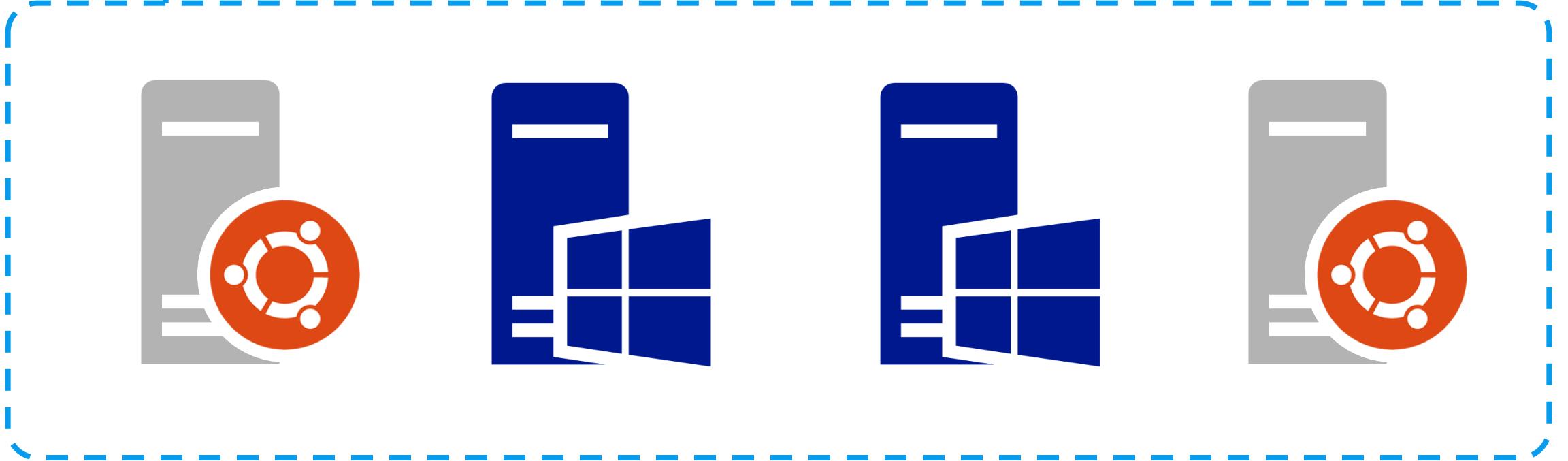
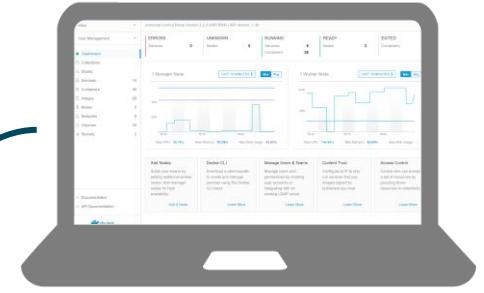
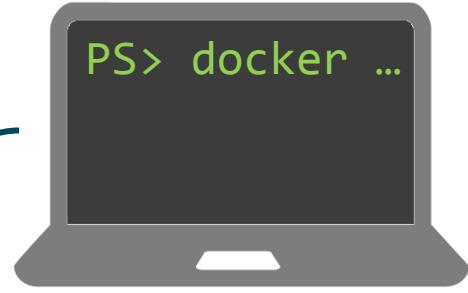
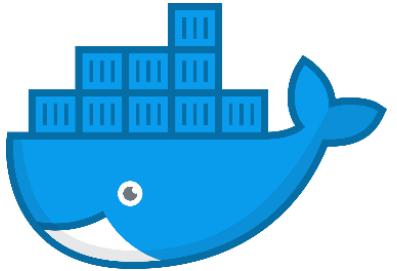
• Architecture  
• Tech Stack  
• Paradigm

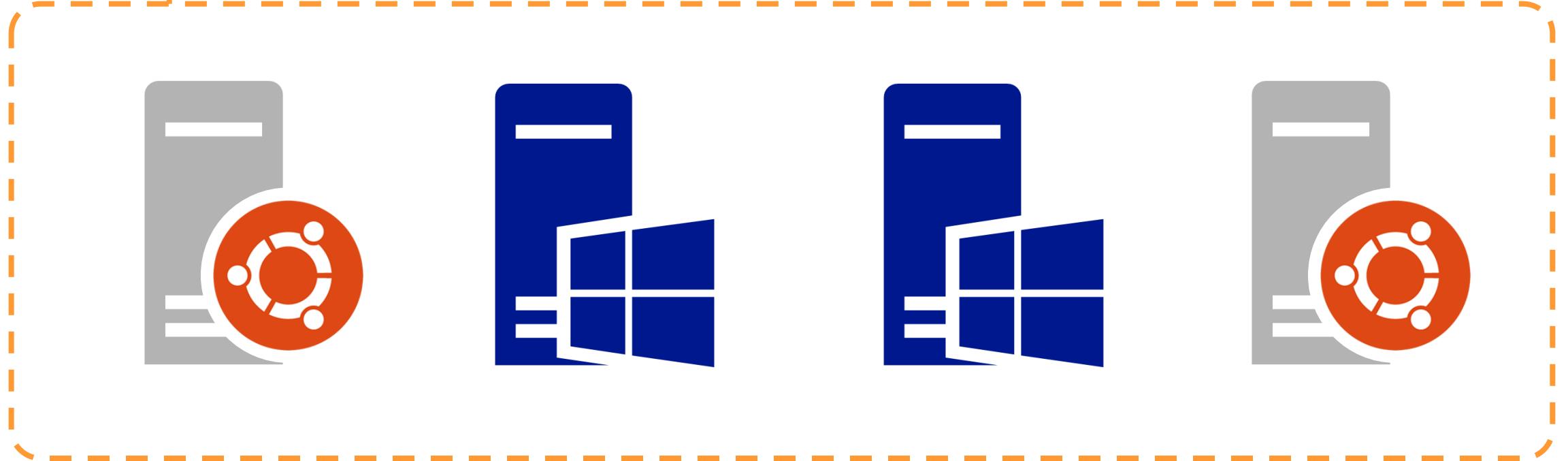
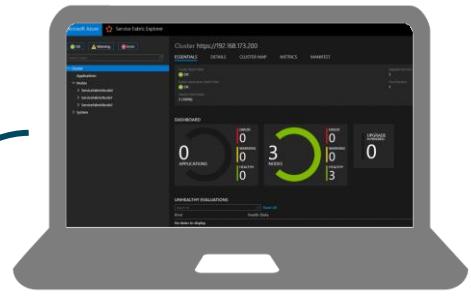
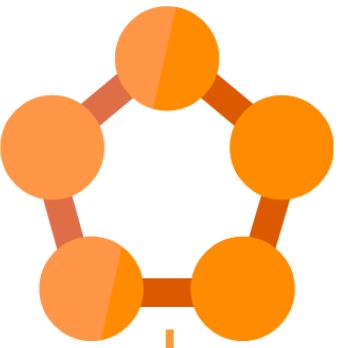
[https://is.gd/about\\_mta](https://is.gd/about_mta)

3.

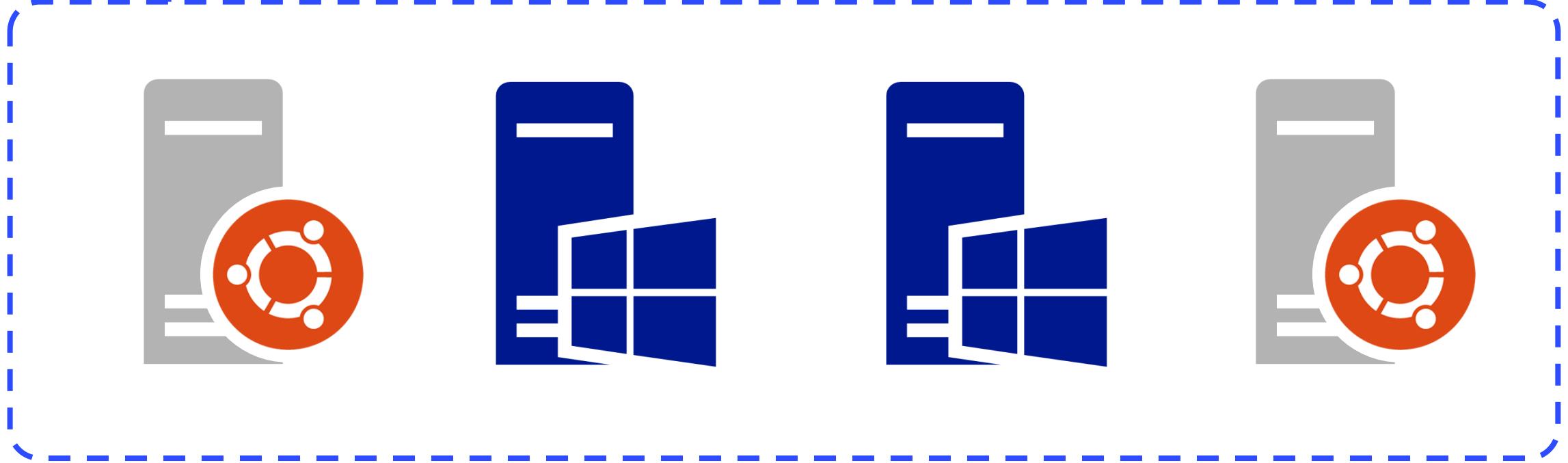
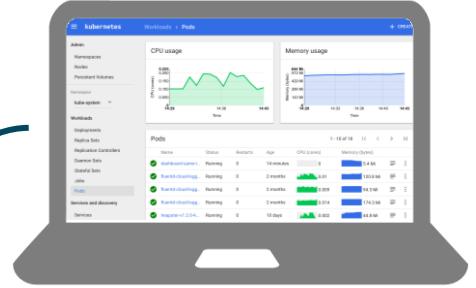
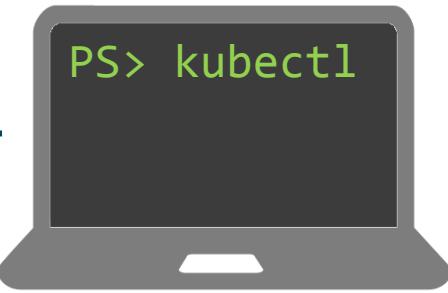
Because They're Open



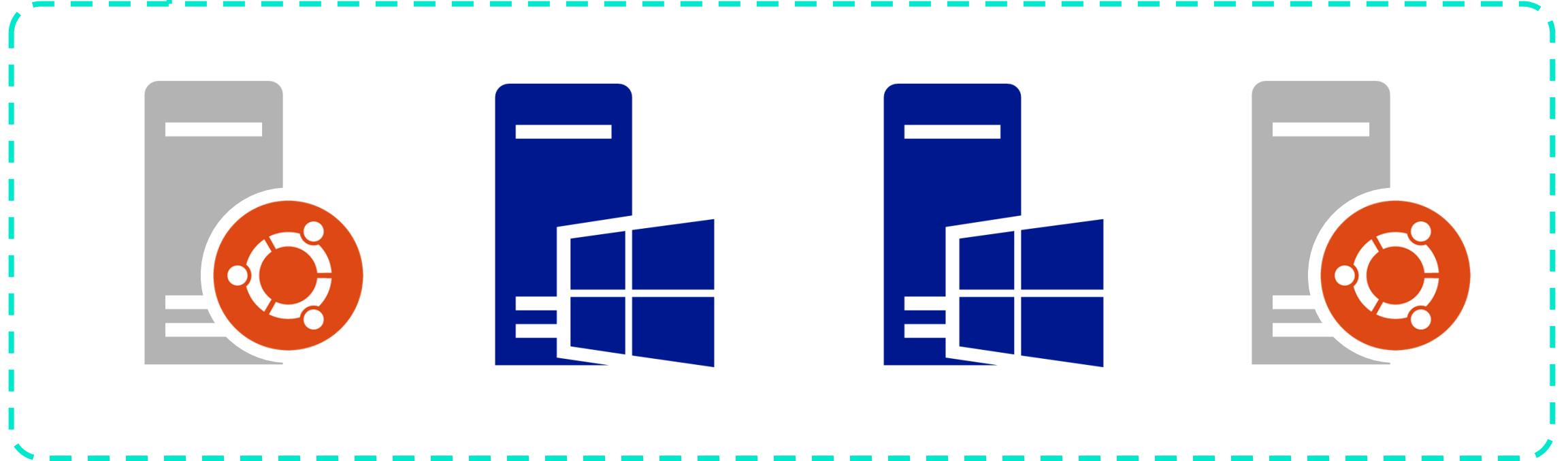
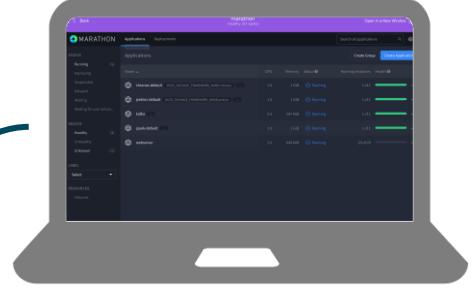
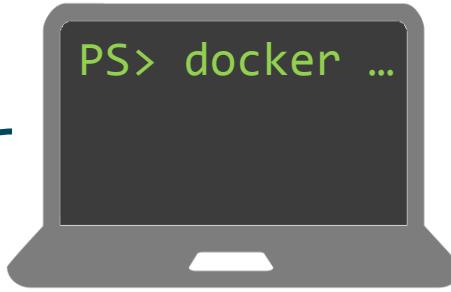




In beta!



Coming soon...



build

ship

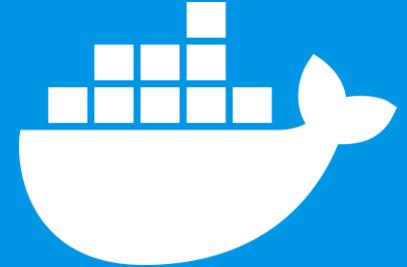
run



# NEXT STEPS

- Demos | [is.gd/30rcog](https://is.gd/30rcog)
- Workshop | [is.gd/YvMAAH](https://is.gd/YvMAAH)
- MTA for .NET devs | [dockr.ly/mta-dev](https://dockr.ly/mta-dev)
- Pluralsight | Modernizing .NET Apps w/ Docker





**THANK YOU :)**

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