Building Cloud Native Applications

4 Sessions

- 7th Feb - Cloud Platforms
- 14th Feb - DevOps
- 28th Feb - Uptime
- 7th March - Continuous Improvement

Hello!

I AM ED SHEE

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Cloud Landscape

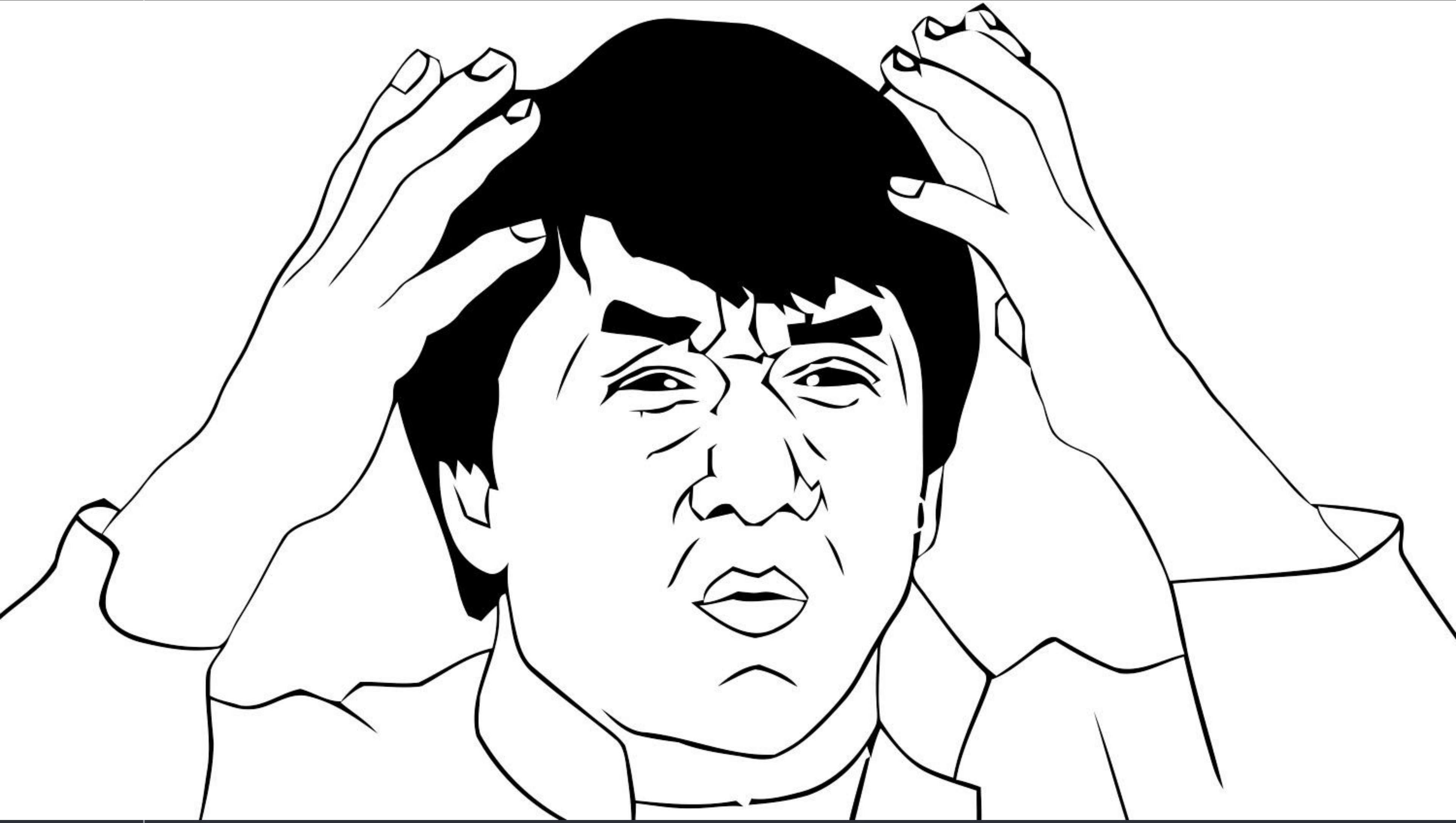
Let’s start with a bit of history…

The time of building apps and deploying them to cloud has passed… today's "Cloud Native" companies are putting cloud at the heart of application design.

WHAT DOES CLOUD NATIVE EVEN MEAN?

kubernetes	Prometheus	OPENTRACING	fluentd	GRPC	containerd
Orchestration	Monitoring	Distributed Tracing API	Logging	Remote Procedure Call	Container Runtime
rkt	CNI	envoy	JAEGER	notary	TUF
Container Runtime	Networking API	Service Mesh	Distributed Tracing	Security	Software Update Spec

WHAT DOES CLOUD NATIVE EVEN MEAN?



CLOUD COMPUTING IS EVOLVING...

Key driving forces:

- The rise of microservices
- Containerization
- Infrastructure becoming a commodity

Microservices

What’s the big deal?

MICROSERVICE ARCHITECTURE

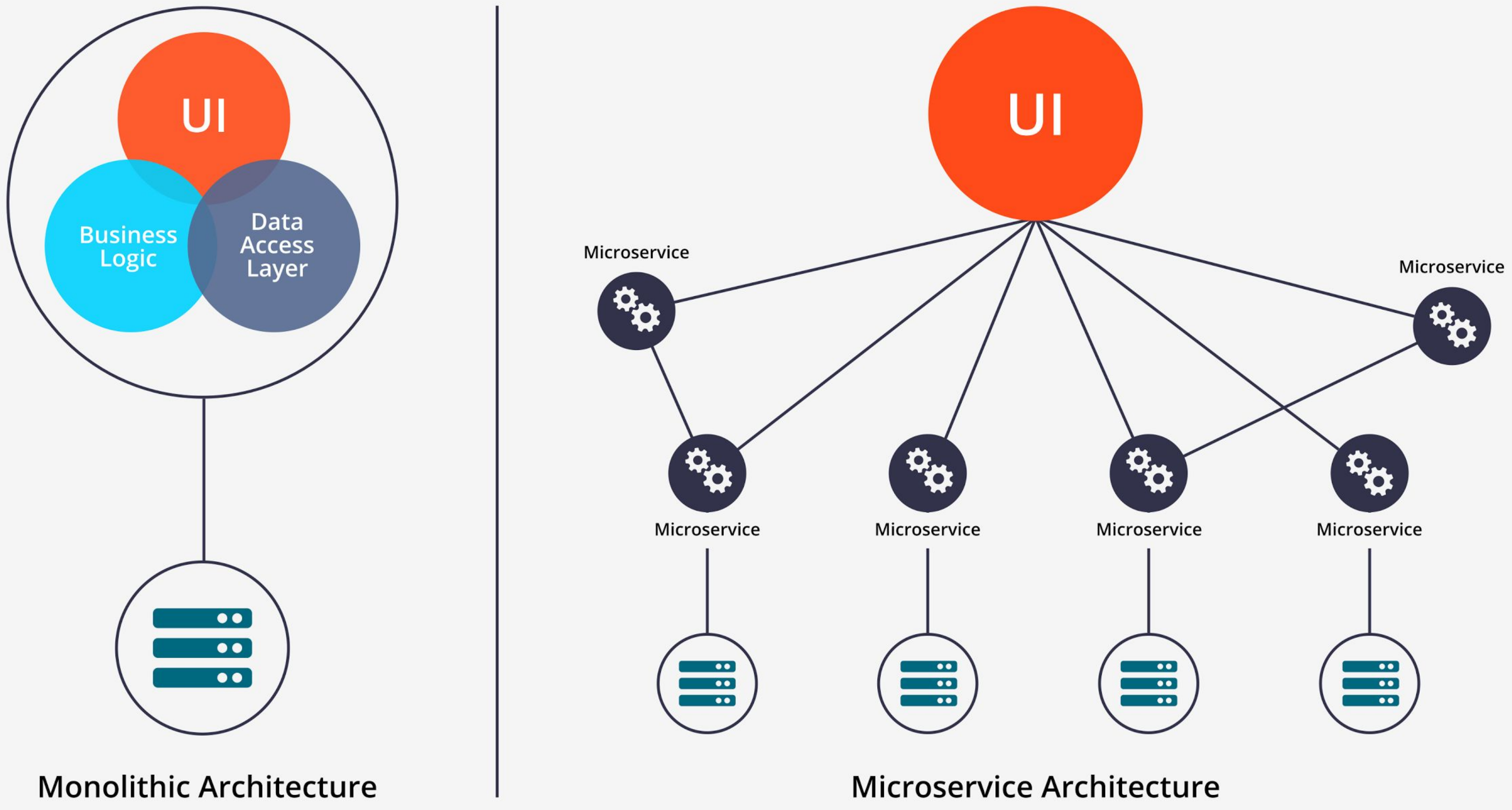


Image credit: Weaveworks - https://www.weave.works/

MONOLITHS

Advantages

- Easier to develop
- Self-contained
- Easy to deploy at small sizes

Disadvantages

- Code complexity
- Changes get harder as size grows
- Must test entire monolith

MICROSERVICES

Advantages

- Simpler codebase
- Fast deployments
- Independent scaling

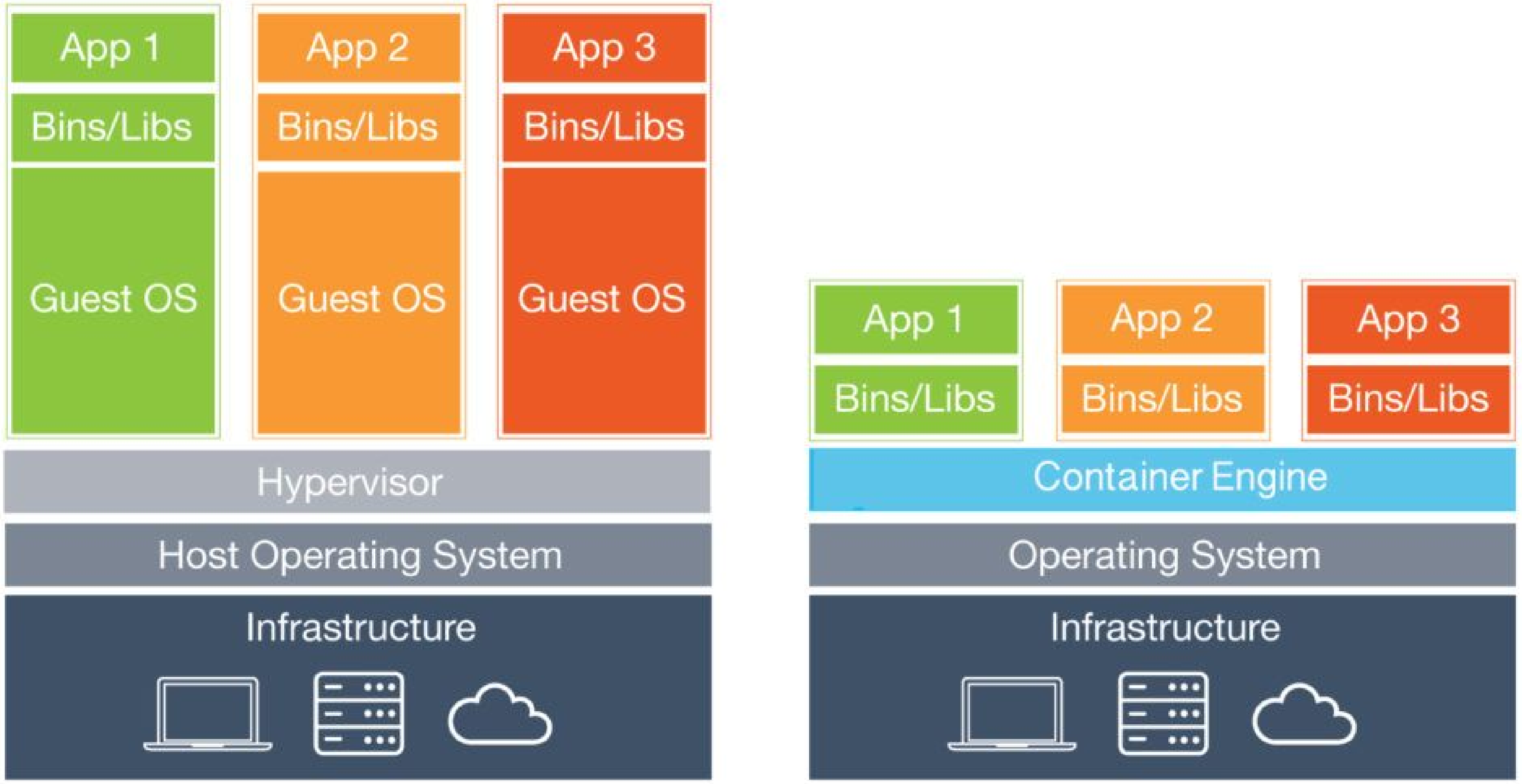
Disadvantages

- Monitoring more complicated
- Data duplication
- Testing can be difficult

Containers

What's the big deal?

CONTAINER ARCHITECTURE



Hypervisor-based Virtualization

Container virtualization

Image credit: https://www.twistlock.com/

WHY IS CONTAINERISATION USEFUL?

Consistency

Application and dependencies packaged in to the container means it will run the same regardless of where it is run.

Speed

Containers can deploy in milliseconds.

Container images are much more lightweight.

Open

Containers are open source and supported on hundreds of clouds.

Build your container once and run it anywhere!

Cloud Platforms

What’s the big deal?

CLOUD PLATFORMS

	Traditional IT	Cloud VMs	Cloud Platforms
Data	🟥	🟥	🟥
Code	🟥	🟥	🟥
Runtime	🟥	🟥	🟩
Middleware	🟥	🟥	🟩
Operating System	🟥	🟥	🟩
Virtualization	🟥	🟩	🟩
Networking	🟥	🟩	🟩
Storage	🟥	🟩	🟩
Servers	🟥	🟩	🟩

CLOUD PLATFORMS

But what about?

- Health management
- Load balancing
- Scaling
- Deployment
- OS patching

Cloud platforms can automate all of these capabilities for you

CLOUD PLATFORM PROVIDERS

CLOUD FOUNDRY

HEROKU

App Engine

OPENSHIFT

Elastic Beanstalk

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Cloud Foundry Basics

The platform built for cloud native development

STEPS IN A MANUAL CLOUD DEPLOYMENT

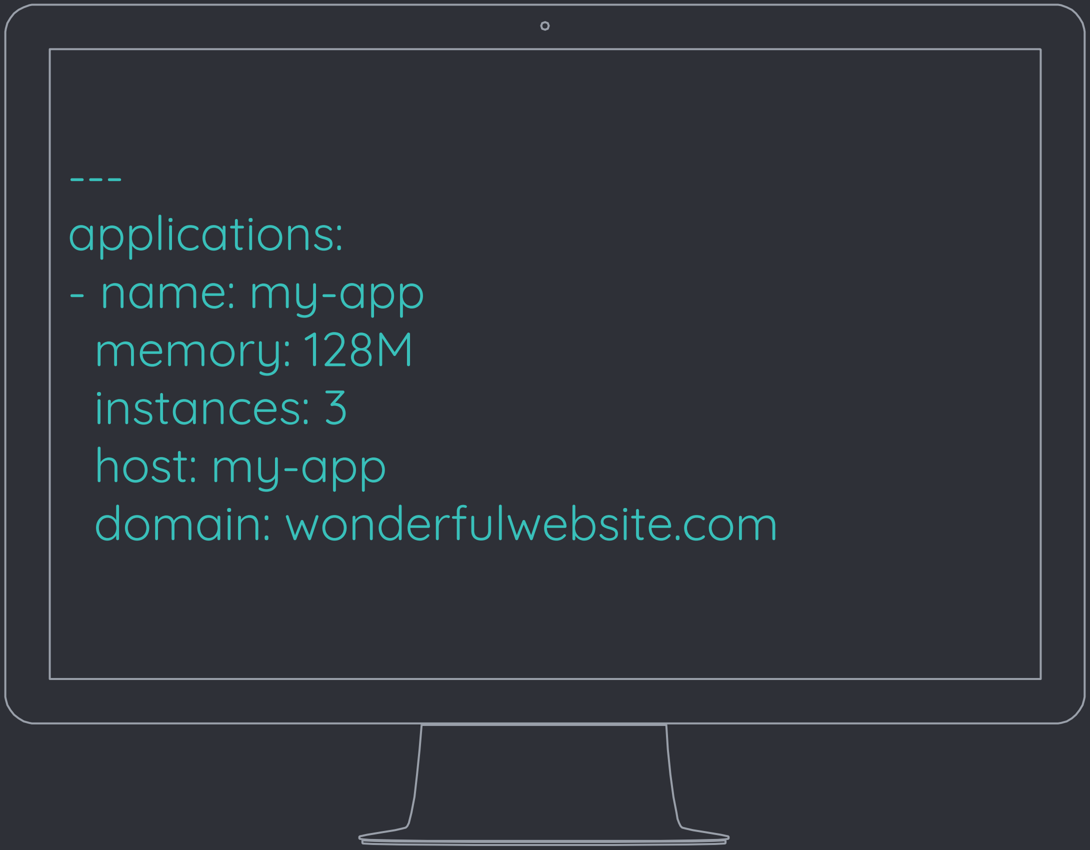
- Request VM
- Connect to VM
- Update/patch OS
- Configure firewall and networking
- Install runtime
- Install and configure middleware
- Install application dependencies
- Start application

STEPS IN A CLOUD FOUNDRY DEPLOYMENT

- “cf push APP_NAME”
- “cf push APP_NAME [-b BUILDPACK_NAME] [-c COMMAND] [-f MANIFEST_PATH | --no-manifest] [--no-start] [-i NUM_INSTANCES] [-k DISK] [-m MEMORY] [-p PATH] [-s STACK] [-t HEALTH_TIMEOUT] [-u (process | port | http)] [--no-route | --random-route | --hostname HOST | --no-hostname] [-d DOMAIN] [--route-path ROUTE_PATH]”

MANIFEST

Tells Cloud Foundry what to do with your application



```
---
applications:
- name: my-app
  memory: 128M
  instances: 3
  host: my-app
  domain: wonderfulwebsite.com
```

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12 Factor Applications

Building with cloud platforms in mind

THE 12 FACTOR APP

Codebase

One codebase tracked in revision control, many deploys

Dependencies

Explicitly declare and isolate dependencies

Config

Store config in the environment

Backing Services

Treat backing services as attached resources

Build, Release, Run

Strictly separate build and run stages

Processes

Execute the app as one or more stateless processes

THE 12 FACTOR APP

Port Binding

Export services via port binding

Concurrency

Scale out via the process model

Disposability

Maximize robustness with fast startup and graceful shutdown

Dev/Prod Parity

Keep development, staging, and production as similar as possible

Logs

Treat logs as event streams

Admin Processes

Run admin/management tasks as one-off processes

Thanks!

ANY QUESTIONS?

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