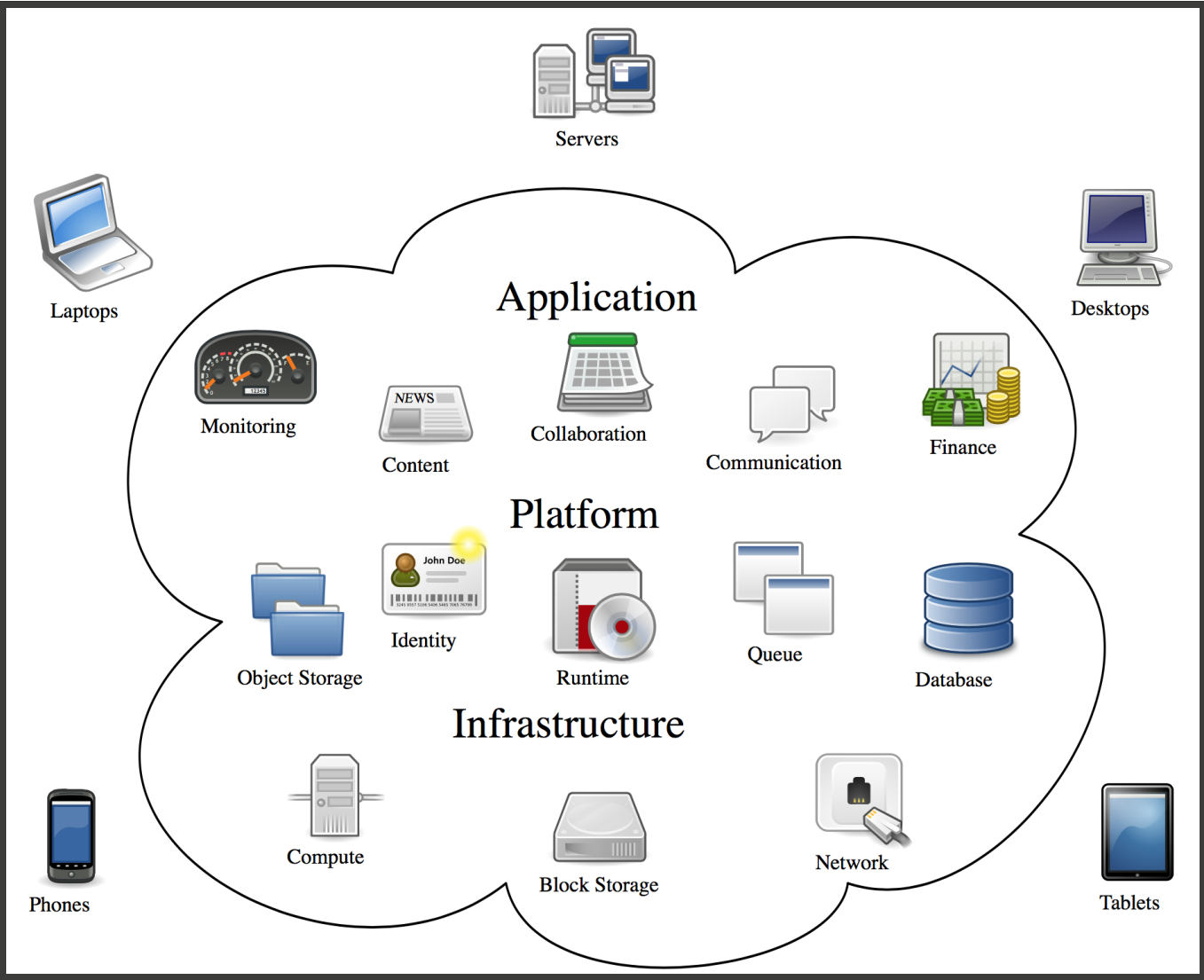# REVENGE OF THE QUIZ

IN THE CLOUD

CADEC 2016 - Peter Larsson

TASK: ARCHITECT FOR THE CLOUD & PAAS

GOAL: BUILD PORTABLE CLOUD APPS

99,999% uptime, i.e. **5,26 min** downtime/year:

- ## Fault-tolerant
  resilient to outages of power, data centers, networks, servers and backing services

- ## Upgradeable
  rolling updates, blue/green & canary deployments, portable

- ## Scalable
  elasticity and auto scaling

- ## Monitored
  dashboards, alarms and troubleshooting

- ## Secure
  access management, traceability, data integrity & confidentiality, disaster recovery

Public, Private & Hybrid Cloud Solutions

APP. ARCHITECTURE

HOW: TWELVE-FACTOR APP.

A methodology for building SaaS apps that:

- Are suitable for deployment on modern cloud platforms
- Use declarative formats for setup automation
- Have a clean contract with the underlying operating system
- Minimize divergence between development and production
- And can scale up without significant changes to tooling, architecture, or development practices.

http://12factor.net - Created by Adam Wiggins Nov 2011

THE PORTABLE "12FACTOR" QUIZ APP.

I. Codebase

II. Dependencies

III. Config

IV. Backing Services
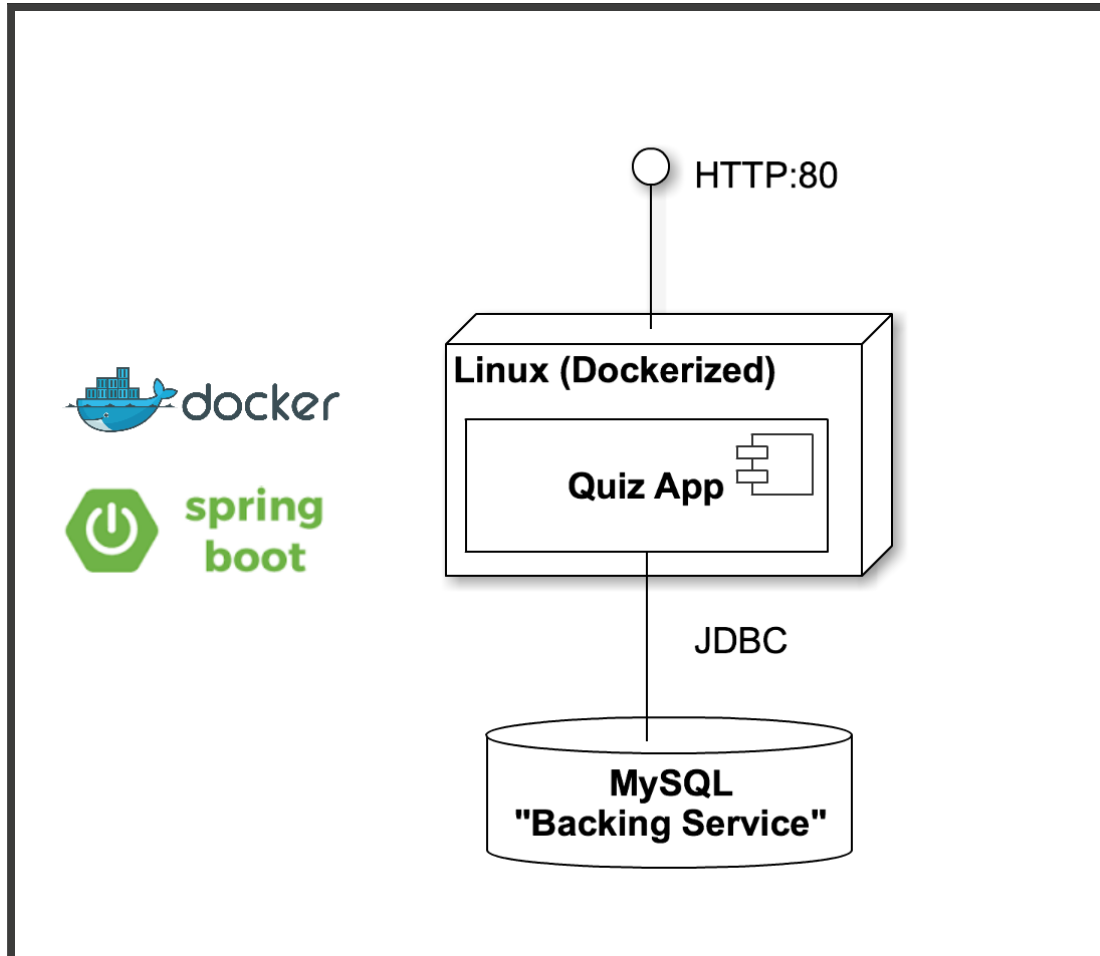
V. Build,release,run

VI. Processes

VII. Port Binding

VIII. Concurrency

IX. Disposability

X. Dev/prod parity

XI. Logs

XII. Admin processes

HTTP:80

docker

spring boot

Linux (Dockerized)

Quiz App

JDBC

MySQL "Backing Service"

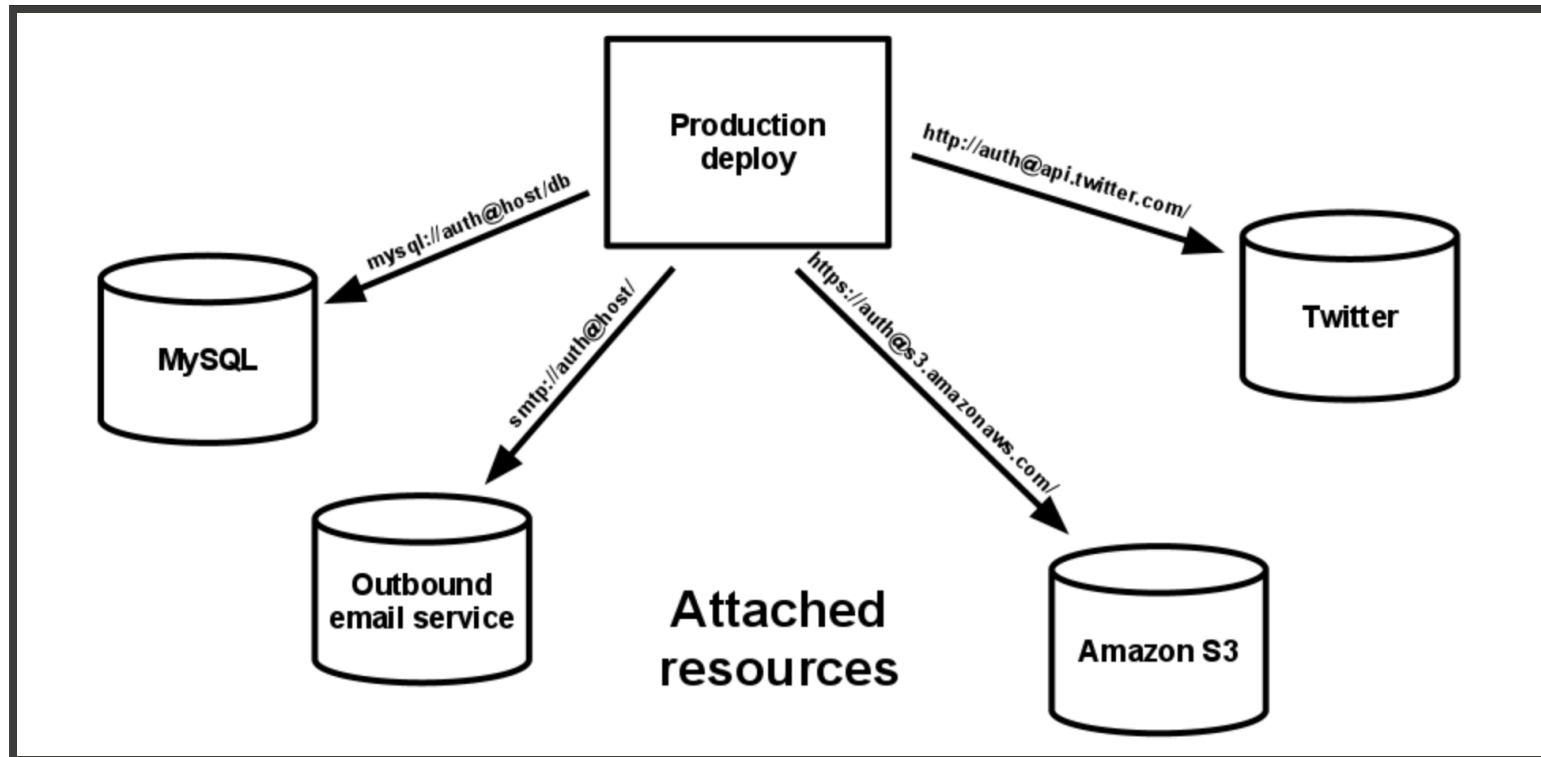Immutable & portable infrastructure with containers

III. CONFIG

Store config in the environment

- Strict separation of config from code
- In a twelve-factor app, env vars are granular controls, each fully orthogonal to other env vars. They are never grouped together as "environments"

IV. BACKING SERVICES

Treat backing services as attached resources

The code for a twelve-factor app makes no distinction between local and third party services

VI. PROCESSES

Execute the app as one or more stateless processes

- Twelve-factor processes are stateless and share-nothing. Any data that needs to persist must be stored in a stateful backing service, typically a database
- The twelve-factor app never assumes that anything cached in memory or on disk will be available on a future request or job

IX. DISPOSABILITY

Maximize robustness with fast startup and graceful shutdown

- The twelve-factor app's processes are disposable, meaning they can be started or stopped at a moment's notice
- Processes shut down gracefully when they receive a SIGTERM signal from the process manager
- Processes should also be robust against sudden death

X. DEV/PROD PARITY

Keep development, staging, and production as similar as possible

- The twelve-factor app is designed for continuous deployment by keeping the gap between development and production small
- The twelve-factor developer resists the urge to use different backing services between development and production
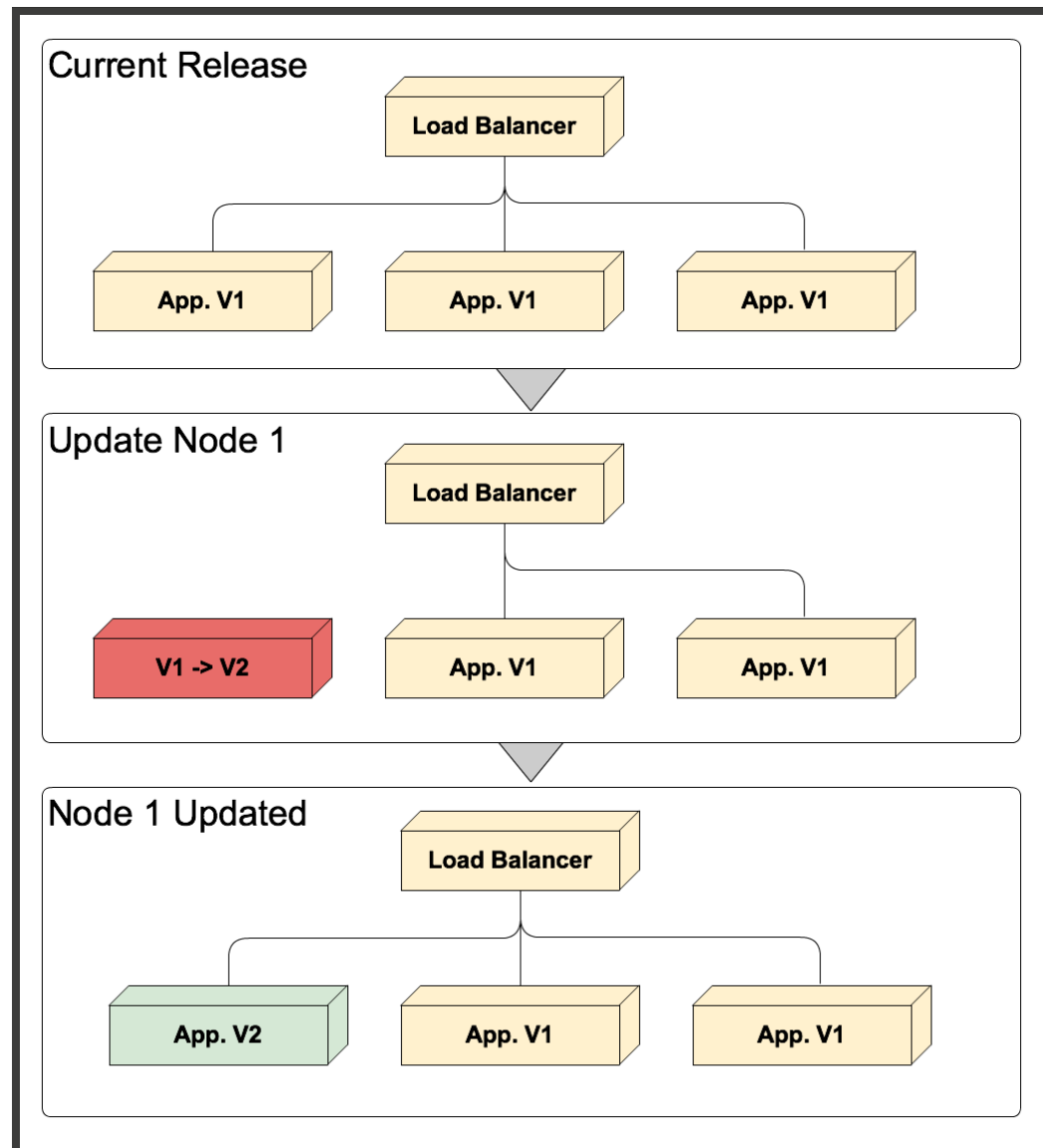
XI. LOGS

Treat logs as event streams

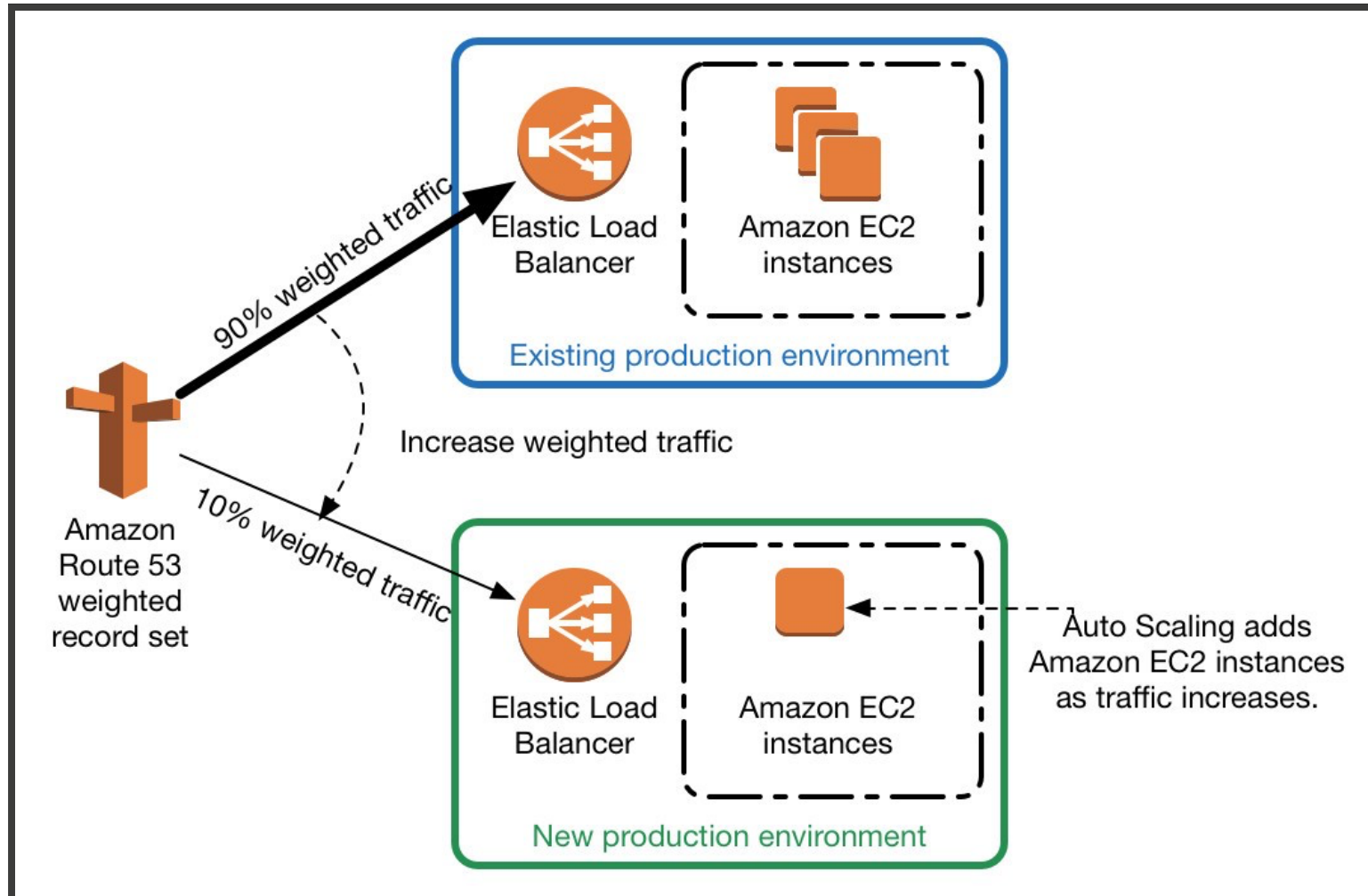A twelve-factor app never concerns itself with routing or storage of its output stream

QUIZ APP. DEMO

DEPLOY ARCHITECTURE

ROLLING UPDATES

Current Release

Load Balancer

App. V1 **App. V1** **App. V1**

Update Node 1

Load Balancer

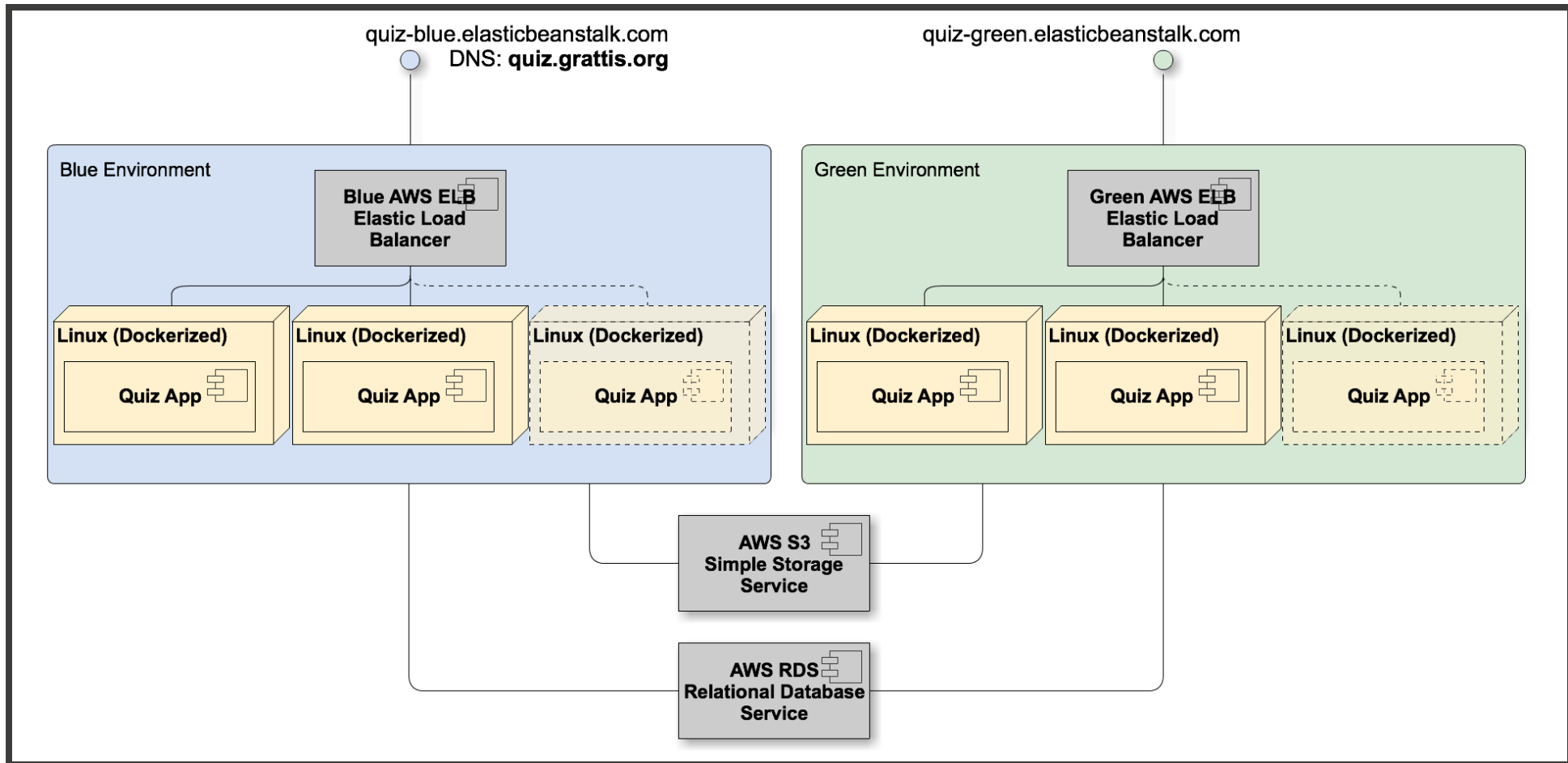**V1 -> V2** **App. V1** **App. V1**

Node 1 Updated

Load Balancer

App. V2 **App. V1** **App. V1**

BLUE/GREEN & CANARY DEPLOYMENT

Amazon Web Services Example

QUIZ APP. AWS EB DEPLOYMENT

QUIZ APP. PAAS DEPLOYMENTS

Public PaaS	Docker support	Portability
Amazon AWS	Elastic Beanstalk, Container Service, Registry	Fully
Google App Engine	Computing Engine, Container Cluster, Registry	Fully
Heroku	Proprietary packaging	Limited
Pivotal Web Services	Cloud Foundry has support, but not yet PWS	-
Red Hat Openshift	Container Cluster for Enterprise & Dedicated offerings only	-

FINALLY

12FACTOR

- 12factor methodology is great but there are some additional aspects to consider, as for example:
  - A robust health-check service
  - Resilience to backing service breaches (during startup)
  - Keep track of time zones

DOCKER

- If you haven't yet adopted Docker it's time to start now!
  - Doesn't fit all kinds of Apps. (requires a highly automated environment and *12factorish* Apps)
  - Private Docker registry is probably required for most Enterprises

QUIZ - TOP 8 STANDINGS

#	Email	Score	Elapsed

Refresh

THAT'S ALL!