



zalando

# Radical Agility

with Autonomous Teams and Microservices in the Cloud

DevOps Con 2015 - Berlin - Germany

# AGENDA

**ABOUT US**

**RADICAL AGILITY**

**LEADERSHIP**

**ARCHITECTURE**

**INFRASTRUCTURE**

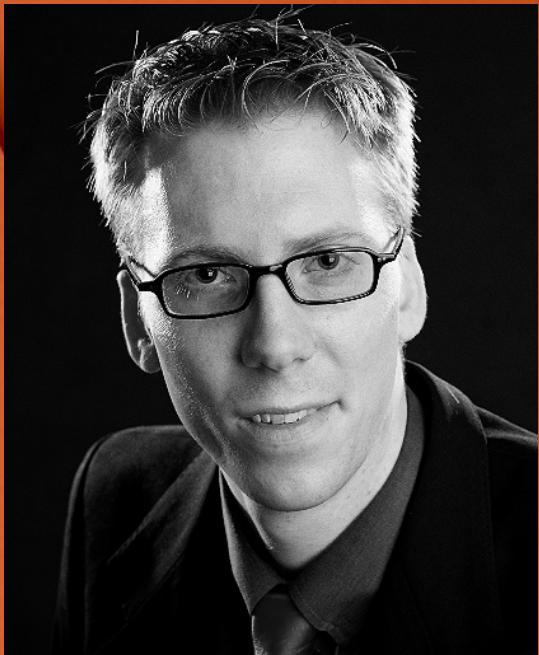
## ABOUT US



### Jan Löffler

- Head of Platform Engineering
- Twitter: @jlsoft2
- jan.loeffler@zalando.de

## ABOUT US



### Henning Jacobs

- STUPS Hacker
- Twitter: @try\_except\_
- [henning.jacobs@zalando.de](mailto:henning.jacobs@zalando.de)

# ONE of EUROPE'S LARGEST ONLINE FASHION RETAILERS

**15 countries**

**3 fulfillment centers**

**15+ million active customers**

**2.2+ billion € revenue 2014**

**130+ million visits per month**

**8.000+ employees**

**Visit us:** [tech.zalando.com](http://tech.zalando.com)





DAMEN

HERREN

KINDER



Mein Konto ▾



Wunschzettel



Warenkorb

News & Style

NEU!

Bekleidung

Schuhe

Sport

Accessoires

Wäsche

Premium

Marken

Sale

Lieblingsprodukt suchen...



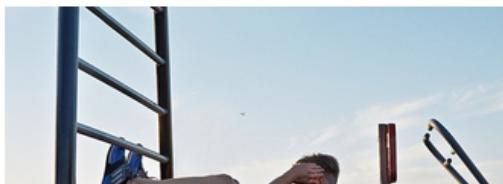
**ALLES AUF NEU!**

DAS IST DEIN BASIS-LAGER FÜR DEN SOMMER

ZUM GAP-SHOP >

ZU DEN PRODUKTEN >

ZU DEN NEUHEITEN >



**GET FIT FOR  
SUMMER!**

SO TRAINIERST DU

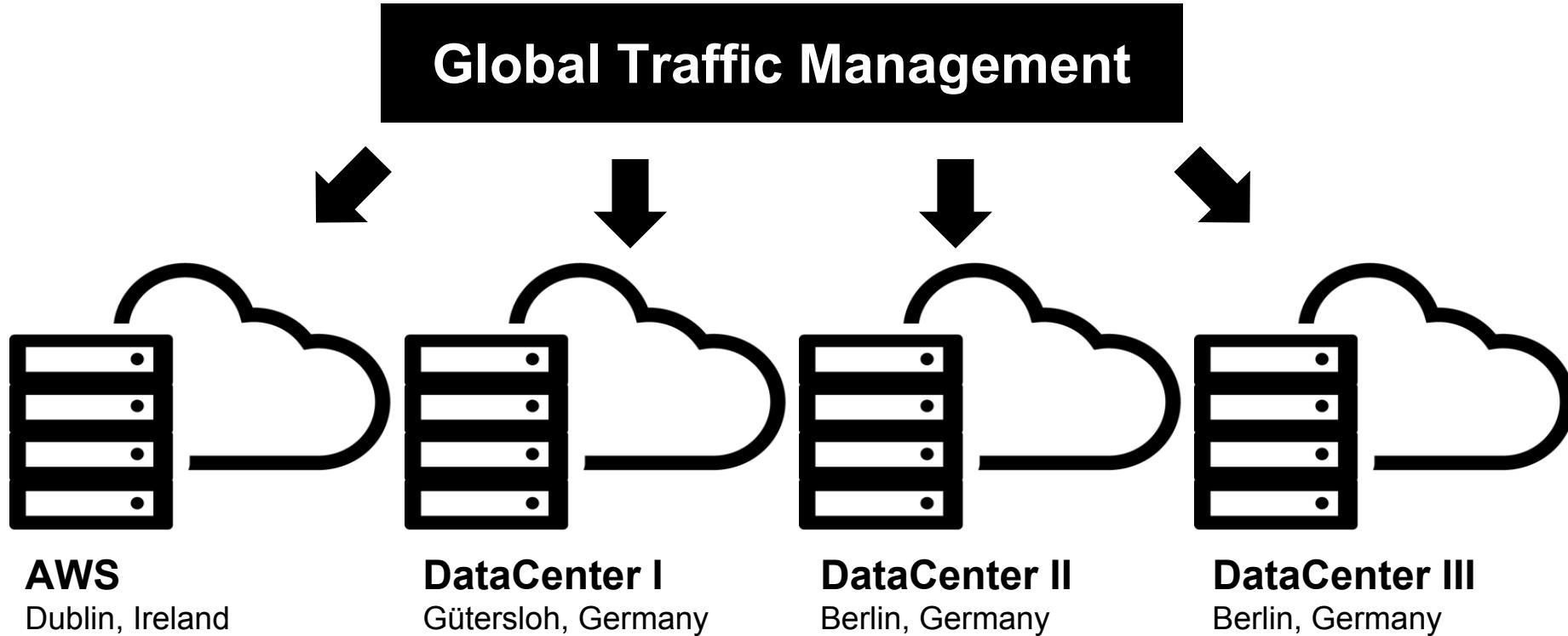




# ENVIRONMENT



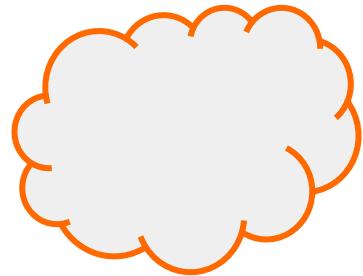
# DATACENTER ENVIRONMENT



# THE LOST HIGHWAY

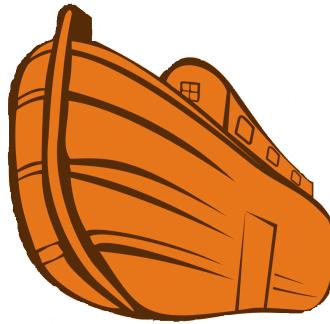
## CLOUD PROJECTS

**zCloud**



**2013**

**Noah's ARK**



**2013/14**

**Pequod**



**2014**





## THIS NEEDS TO STOP

Doing it yourself is not the most sensible thing.

Amazon invested already thousands of engineering hours... we must utilize this.

(Eric Bowman)

# RADICAL AGILITY



GOAL

DELIVER AMAZING  
PRODUCTS  
EFFICIENTLY AT  
SCALE, AND  
FEELING GREAT  
ABOUT IT.

# 3 PRINCIPLES

# PURPOSE

# AUTONOMY

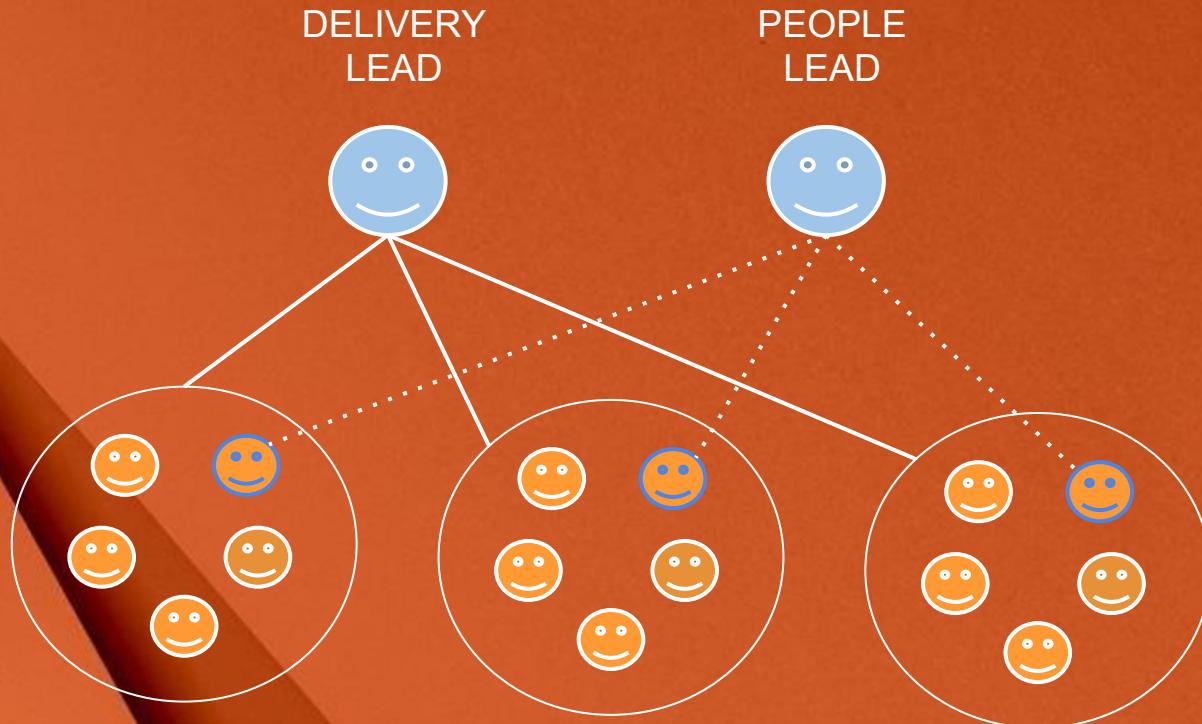
# MASTERY



LEADERSHIP

FROM  
CONTROL &  
COMMAND  
TO PURPOSE  
AND TRUST

# NEW LEADERSHIP



## PRODUCT

PRODUCT SPECIALIST      PRODUCT OWNER

## DELIVERY

DELIVERY LEAD

PEOPLE LEAD

## OVERARCHING

ADMIN & SUPPORT

EXECUTIVE SUPPORT

CONTROLLING

ONBOARDING &  
TECHADEMY

COMPLIANCE

INNOVATION LAB

AGILE COACHING

RISK ,  
SECURITY &  
STRATEGY

PROJECT  
MANAGEMENT

## BUSINESS ASSURANCE

GLOBAL  
REGRESSION

DELIVERY  
LEAD



ENGINEERING  
PRODUCTIVITY

PEOPLE LEAD



TECH  
SERVICE



STEERING

# ALIGNING TARGETS VIA OKR: WORK TOWARDS COMPANY PURPOSE



ARCHITECTURE

AN  
ARCHITECTURE  
FOR  
INNOVATION

# API FIRST



**REST**

# SAAS

# MICRO SERVICES



# CLOUD

A black and white aerial photograph of the ancient Mesoamerican city of Teotihuacan in Mexico. The image shows the iconic Pyramid of the Sun on the left, the Avenue of the Dead stretching towards the center, and various other pyramids and architectural structures. The landscape is arid with some scattered vegetation and modern buildings in the background under a cloudy sky.

INFRASTRUCTURE

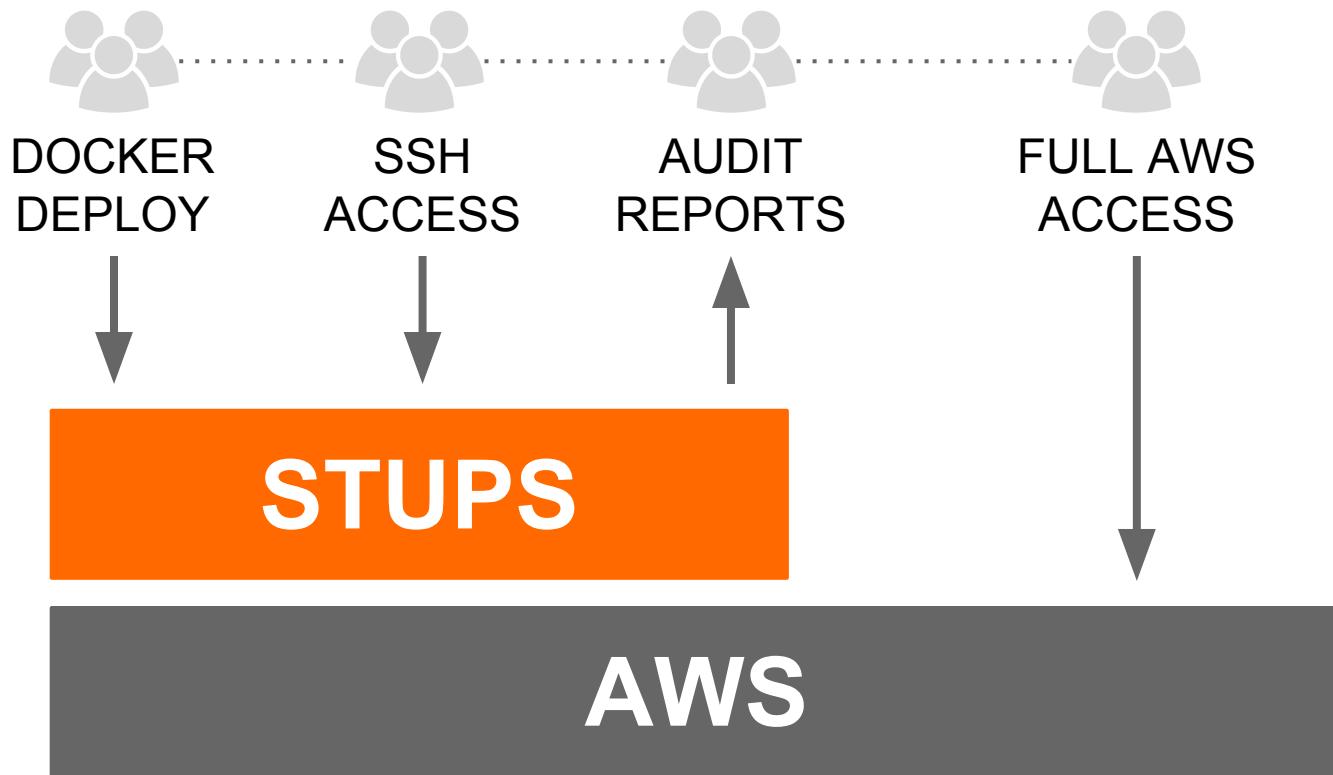
ROBUST  
PLATFORM  
SERVICES TO  
ENABLE  
AUTONOMY



# STUPS

STUPS To Unleash Penguin Swarms

# A PLATFORM ON TOP OF AMAZON WEB SERVICES



## AUTONOMY AND COMPLIANCE

STUPS offers  
**maximum freedom for developers**  
while enabling  
near-real-time audit compliance  
for every single application.

## STUPS IN A NUTSHELL



**One AWS account per Team**

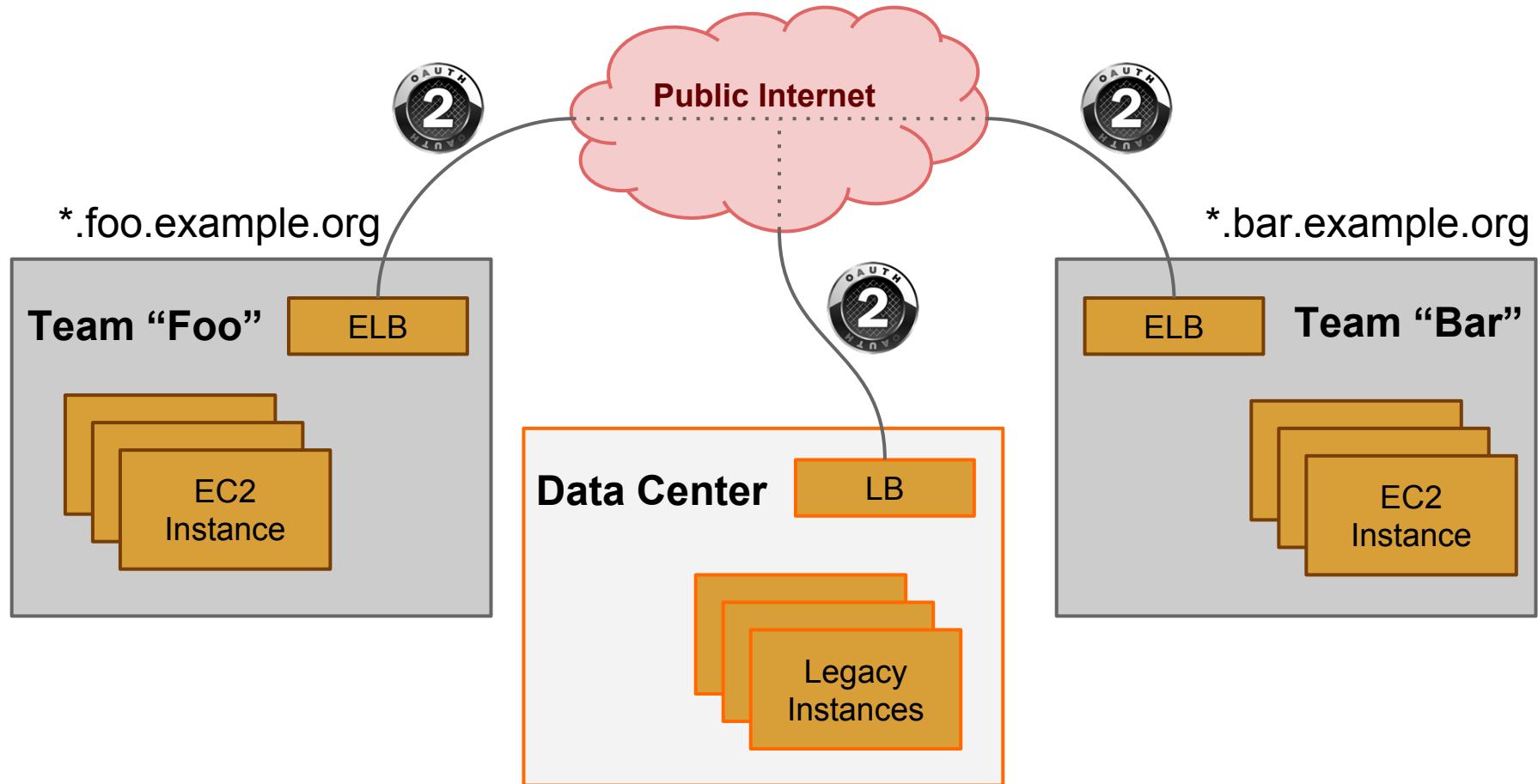
**Deployment with Docker**

**Managed SSH Access**

**REST/OAuth 2.0 mandatory**

**Supports Traceability of Changes**

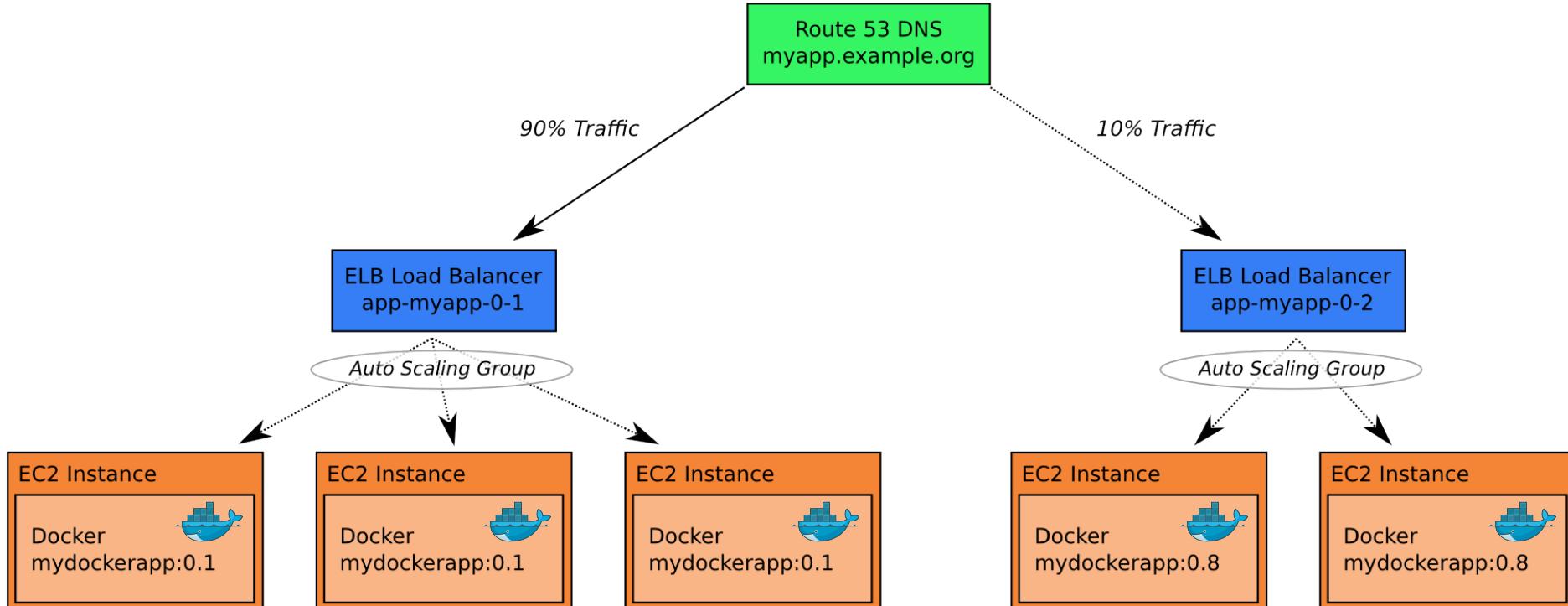
# ISOLATED AWS ACCOUNTS



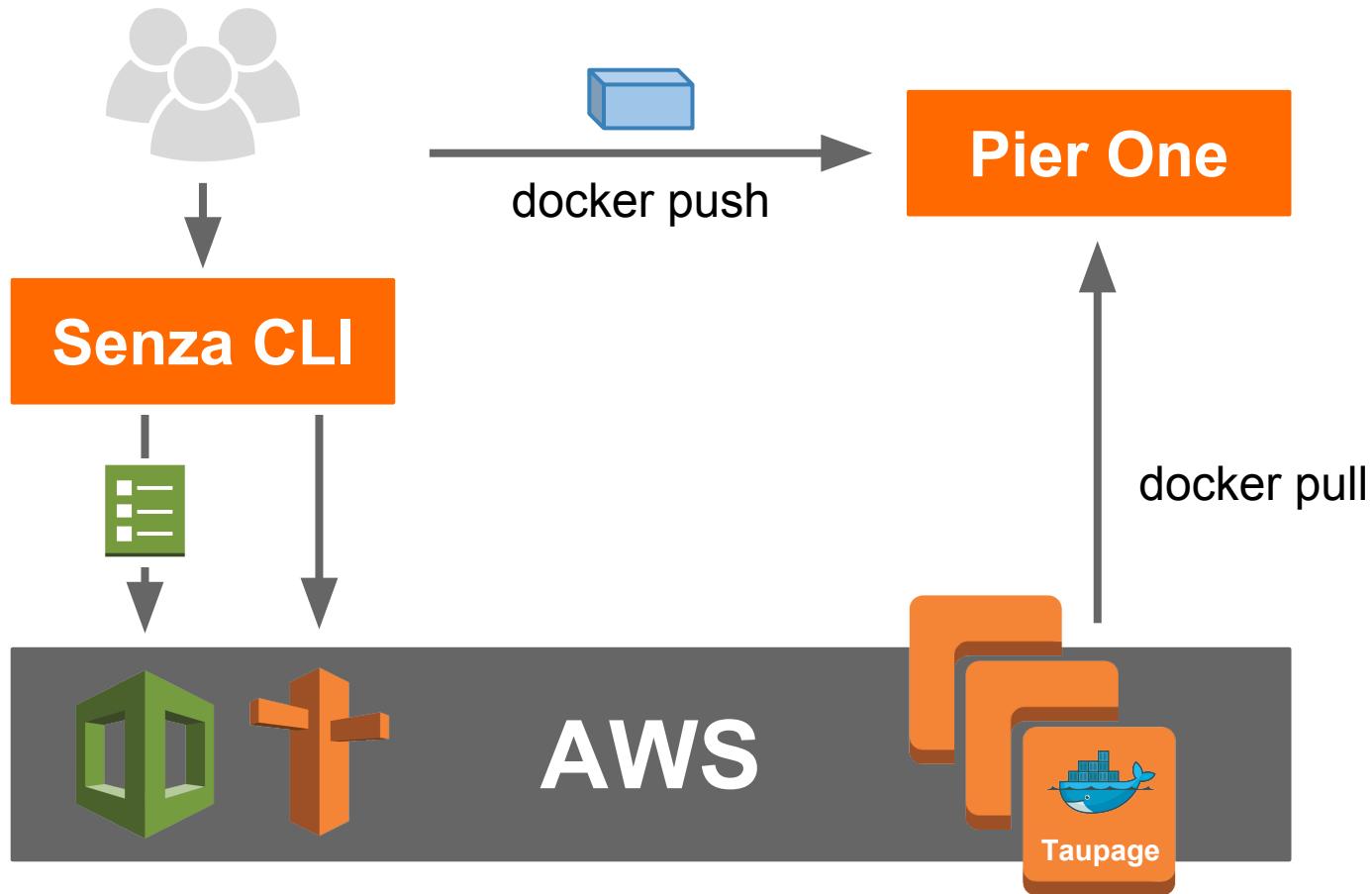


**DEPLOYMENT**

# IMMUTABLE STACKS



## DEPLOYMENT WITH SENZA



# SENZA: DEFINITION YAML



```
SenzaInfo:
  StackName: hello-world
  Parameters:
    - ImageVersion:
        Description: "Docker image version of hello-world."
SenzaComponents:
  - Configuration:
      Type: Senza::StupsAutoConfiguration # auto-detect network setup
  - AppServer: # will create a launch configuration and auto scaling group with scaling triggers
      Type: Senza::TaupageAutoScalingGroup
      InstanceType: t2.micro
      SecurityGroups:
        - app-hello-world
      IamRoles:
        - app-hello-world
      ElasticLoadBalancer: AppLoadBalancer
      TaupageConfig:
        runtime: Docker
        source: "stups/hello-world:{{Arguments.ImageVersion}}"
        ports:
          8080: 8080
  - AppLoadBalancer: # creates an ELB entry and Route53 domains to this ELB
      Type: Senza::WeightedDnsElasticLoadBalancer
      HTTPPort: 8080
      HealthCheckPath: /
      SecurityGroups:
```

# SENZA: BOOTSTRAP NEW CLOUD FORMATION STACK



```
- $ senza init helloworld.yaml
Please select the project template
1) bgapp: Background app with single EC2 instance
2) postgresapp: HA Postgres app, which needs an S3 bucket to store WAL files
3) webapp: HTTP app with auto scaling, ELB and DNS
Please select (1-3): 3
Application ID [hello-world]:
Docker image without tag/version (e.g. "pierone.example.org/myteam/myapp") [stups/hello-world]:
HTTP port [8080]:
HTTP health check path [/]:
EC2 instance type [t2.micro]:
Mint S3 bucket name [zalando-stups-mint-786011980701-eu-west-1]:
Checking security group app-hello-world.. OK
Checking security group app-hello-world-lb.. OK
Checking IAM role app-hello-world.. OK
IAM role app-hello-world already exists. Do you want Senza to overwrite the role policy? [y/N]:
Generating Senza definition file helloworld.yaml.. OK
```

# SENZA: MANAGE STACKS



~ \$ senza list

Stack Name	Ver.	Status	Created	Description
essentials	b10	CREATE_COMPLETE	3d ago	Essentials (ImageVersion: 0.1.0-SNAPSHOT)
even	b29	CREATE_COMPLETE	10d ago	Even (ImageVersion: 0.3-SNAPSHOT)
fullstop	b8	CREATE_COMPLETE	2h ago	Fullstop version 0.6
hello-world	1	CREATE_COMPLETE	47h ago	Hello World ()
kio	b35	CREATE_COMPLETE	47h ago	Kio (ImageVersion: 0.1.0-SNAPSHOT)
mint-storage	b12	CREATE_COMPLETE	8d ago	Mint Storage (ImageVersion: 0.1.0-SNAPSHOT)
pierone	b19oauth	CREATE_COMPLETE	27h ago	Pierone (ImageVersion: 0.2-SNAPSHOT)
pierone	b20	CREATE_COMPLETE	3h ago	Pierone (ImageVersion: 0.1-SNAPSHOT)
swagger	b6	CREATE_COMPLETE	10d ago	Swagger (ImageVersion: 0.4-SNAPSHOT)
twintip-crawler	b9	CREATE_COMPLETE	8d ago	Twintip Crawler (ImageVersion: 0.1.0-SNAPSHOT)
twintip-storage	b15	CREATE_COMPLETE	8d ago	Twintip Storage (ImageVersion: 0.1.0-SNAPSHOT)
vivi	2	CREATE_COMPLETE	24h ago	Vivi version 0.1
yourturn	b51	CREATE_COMPLETE	3h ago	YourTurn version 0.24-SNAPSHOT
zmon-agent	1	CREATE_COMPLETE	15m ago	Zmon Agent (AgentVersion: 0.5)
zmon-appliance	22	ROLLBACK_COMPLETE	40m ago	Zmon Appliance (AgentVersion: 0.5, WorkerVersion: 0.8, SchedulerVersion: 0.2)
zmon-appliance	23	CREATE_COMPLETE	18m ago	Zmon Appliance (WorkerVersion: 0.8, SchedulerVersion: 0.2)

~ \$ senza instances pierone

Stack Name	Ver.	Resource ID	Instance ID	Public IP	Private IP	State	LB Status	Launched
pierone	b20	AppServer	i-cb242e2d		172.31.160.20	RUNNING	IN_SERVICE	3h ago
pierone	b20	AppServer	i-db18023c		172.31.159.168	RUNNING	IN_SERVICE	3h ago
pierone	b19oauth	AppServer	i-dfd6de39		172.31.168.182	RUNNING	IN_SERVICE	27h ago
pierone	b19oauth	AppServer	i-fe649654		172.31.134.149	RUNNING	IN_SERVICE	27h ago

~ \$ senza status pierone

Stack Name	Ver.	Status	Inst.#	Running	Healthy	LB Status	HTTP	Main DNS
pierone	b19oauth	CREATE_COMPLETE	2	2	2	IN_SERVICE	OK	no
pierone	b20	CREATE_COMPLETE	2	2	2	IN_SERVICE	OK	yes



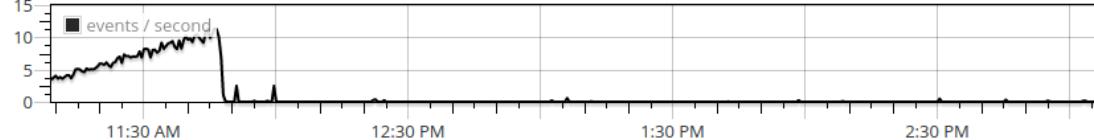
**LOGGING**

# APPLICATION LOGS: TAUPAGE SUPPORTS LOGENTRIES AND SCALYR

https://www.scalyr.com/events?filter=\$logfile%3D%27%2Fvar%2Flog%2Fapplication.log%27%20\$serverHost%3D%27pierone%27&startTime=4%20hours&offset=end&ascending=f

Scalry® Overview Search ▾ Dashboards ▾ Alerts Help ▾ Settings ▾ henning.jacobs@zalando.de ▾

Search: Log Facets Histogram Graph Maximize + Help ⓘ



May 21, 2015

```
May 21 11:06:04 ip-172-31-160-20 docker/800488d94562[781]: INFO [qtp676538195-31] [PUT /v1/images/79a5395da3d43cb02f6c2481564b5f430e4c4ec555746414039acb01c7b45067/layer <- 94.13]
May 21 11:06:05 ip-172-31-160-20 docker/800488d94562[781]: INFO [qtp676538195-30] [PUT /v1/images/1b90866e82278545ba9a6682d58795a185752c372a0769431478beab391eeaf9/layer <- 94.13]
May 21 11:06:04 ip-172-31-159-168 docker/065c084d1f02[834]: INFO [qtp735140074-69] [PUT /v1/images/ff76c69c3d3aba94f6561f9f5e41b9d30bbefe659569fdcb2a69617ecd651638/layer <- 94.1]
May 21 11:06:05 ip-172-31-159-168 docker/065c084d1f02[834]: INFO [qtp735140074-40] [PUT /v1/images/bc9fb348209b1e760c1070186c7c61de631eeb8e9316574cf53a85c84cab55e/layer <- 94.1]
May 21 11:06:08 ip-172-31-159-168 docker/065c084d1f02[834]: INFO [qtp735140074-65] [PUT /v1/images/6ec43bd887c495a3490d9416f3440f059e8661955b5886adefc7269351c5b0/layer <- 94.1]
May 21 11:06:08 ip-172-31-159-168 docker/065c084d1f02[834]: INFO [qtp735140074-66] [PUT /v1/images/f5e752ccfb8f2082f4b985bbfaaf312076f955e9ca56062aabf96e24dde1/layer <- 94.1]
May 21 11:06:07 ip-172-31-160-20 docker/800488d94562[781]: INFO [qtp676538195-31] [PUT /v1/images/813df8bb2827c1867dcc0884fa8f5ccb4ab1df31689506dd7d846426e283c8/layer <- 94.13]
May 21 11:06:09 ip-172-31-160-20 docker/800488d94562[781]: INFO [qtp676538195-58] [PUT /v1/images/ebb046f9b5ac8307abde3899d89a00c494827f62cb2173cc1a364cd8f1107c7/layer <- 94.13]
May 21 11:06:11 ip-172-31-160-20 docker/800488d94562[781]: INFO [qtp676538195-31] [PUT /v1/images/e0e5ac96aeed4ec8f7f135af5bfb633bf78d0f2665b5807d253ca658357cda/layer <- 94.13]
May 21 11:06:11 ip-172-31-159-168 docker/065c084d1f02[834]: INFO [qtp735140074-51] [PUT /v1/images/55b118c0e08a6e6444d48586b71704a53219db45e2244d82eb54ce9080fa570b/layer <- 94.1]
May 21 11:06:12 ip-172-31-159-168 docker/065c084d1f02[834]: INFO [qtp735140074-66] [PUT /v1/images/lafe2f4ca42e8d71fa3e3b321b442bcbbd15754ae6085ba8499787024858bf6/layer <- 94.1]
May 21 11:06:13 ip-172-31-160-20 docker/800488d94562[781]: INFO [qtp676538195-30] [PUT /v1/repositories/acid/spilo/tags/0.8-SNAPSHOT <- 94.135.236.129] o.z.s.p.api-v1 - Updated
May 21 11:11:50 ip-172-31-160-20 docker/800488d94562[781]: INFO [qtp676538195-71] [PUT /v1/repositories/stups/zmon-aws-agent/tags/0.3 <- 94.135.236.132] o.z.s.p.api-v1 - Stored
May 21 11:11:50 ip-172-31-159-168 docker/065c084d1f02[834]: INFO [qtp735140074-66] [PUT /v1/images/b82e5ce0d0ab036f7b55307a6c5ce9d869ec64b39541b9334a877a6244a249f/layer <- 94.1]
May 21 11:42:29 ip-172-31-159-168 docker/065c084d1f02[834]: INFO [qtp735140074-66] [PUT /v1/repositories/automata/jenkinstest/tags/1.596.2 <- 94.135.236.133] o.z.s.p.api-v1 - St
May 21 11:58:39 ip-172-31-160-20 docker/800488d94562[781]: INFO [qtp676538195-38] [PUT /v1/images/73d7a3416ad5d82f7a404f744a7cf27bd429pb9b6c622c9aa9f05e9833b99f4/layer <- 94.13]
May 21 11:58:40 ip-172-31-160-20 docker/800488d94562[781]: INFO [qtp676538195-31] [PUT /v1/images/095e2250b67a02908ce0802a9738cd75427f16de64128f48dbebb0f02fa5cc/layer <- 94.13]
May 21 11:58:40 ip-172-31-160-20 docker/800488d94562[781]: INFO [qtp676538195-71] [PUT /v1/images/b3b59818883e859cff55eaedf657b02cbc75eb0f0a15127fb2d3e9695b3/layer <- 94.13]
May 21 11:58:42 ip-172-31-159-168 docker/065c084d1f02[834]: INFO [qtp735140074-66] [PUT /v1/images/42b03297d923d1bf5f2e12-2067-a502-2e23-2a1d-7192b5e8c69d2/layer <- 94.13]
```



# SSH ACCESS

## SSH ACCESS: TIME-LIMITED ACCESS TO ANY TEAM SERVER



**MONITORING**

# ZMON

ZMON 2.0   Dashboards   Check defns   Alert defns   Reports   Trial Run   0 in queue, 12/12 active workers, 212.20/s   17:31   hjacobs ▾

### Even Latency

441.1

### Pier One Requests/s

Even Requests/s

### STUPS Application Errors

a-even[701] (13.93)

Platform/Software: Infinity

### ZMON Worker outdated (3)

i-3b6b1891[701] ( /zmon-worker:0.30-cloudwatch) , i-11d23bf7[701] ( /zmon-worker:0.30) , i-b50e1753[178] ( /zmon-worker:0.30)

### Even Requests

aws-ac[701] ({"requests\_per\_sec":0.05,"http5xx\_errors\_per\_sec":0,"http4xx\_errors\_per\_sec":0,"latency\_ms":441.0972...})

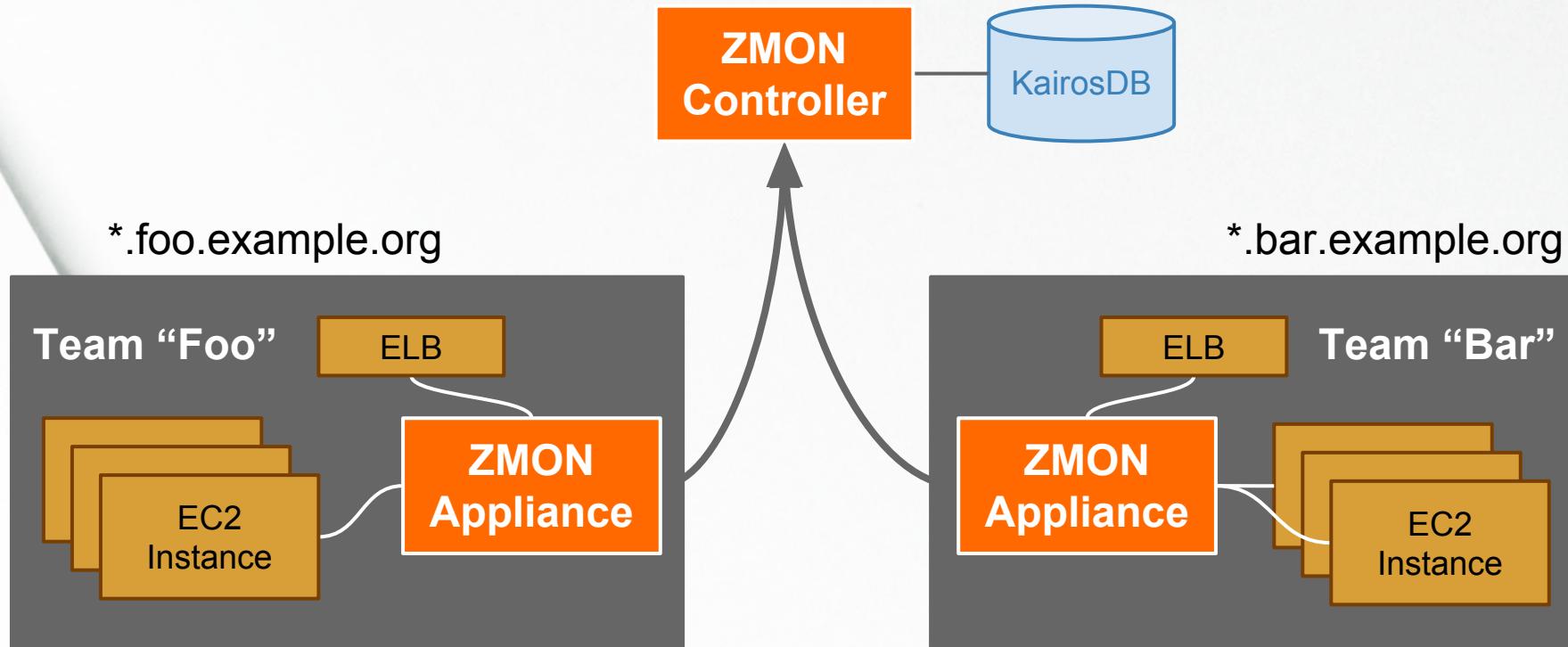
### Odd Host Unreachable (9)

shop[team-service] ({"eu-central-1":"OK","eu-west-1":"[Errno -2] Name or service not known"}) , dotoolling[team-service] ({"eu-central-1":"OK","eu-west-1":"[Errno -2] Name or service not known","eu-west-1":"[Errno -2] Name or service not known..."}), platform[team-service] ({"eu-central-1":"OK","eu-west-1":"[Errno -2] Name or service not known"}) More...

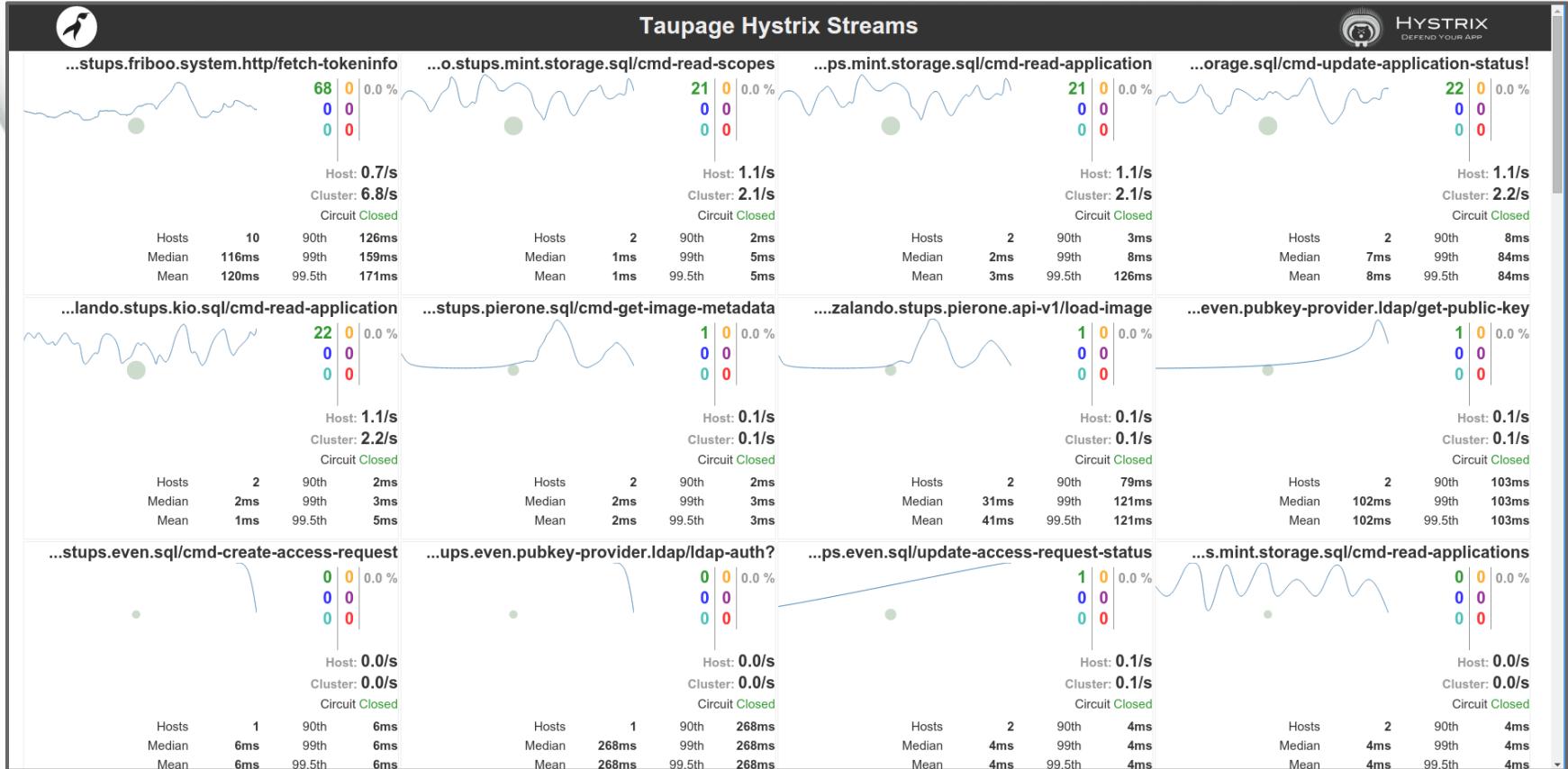
### Alerts (11) In downtime (0) OK (11)

Actions	Name	Timestamp	Last run	Value
	elb-cucumber-report-7[178]	2015-05-29 16:58 (31s ago)	30ms	404
	elb-docs-2[178]	2015-05-29 16:58 (31s ago)	13ms	200
	elb-essentials-b14[701]	2015-05-29 16:57 (37s ago)	16ms	200
	elb-even-b35[701]	2015-05-29 16:58 (7s ago)	44ms	200
	elb-even-b37[701]	2015-05-29 16:57 (37s ago)	25ms	200
	elb-fullstop-g7[701]	2015-05-29 16:58 (7s ago)	43ms	404

# ZMON APPLIANCE



# HYSTRIX TURBINE





OAUTH

# OAUTH: APPLICATION REGISTRATION IN YOUR TURN

The screenshot shows a user interface for managing applications. On the left is a sidebar with three items: 'Search' (with a magnifying glass icon), 'Applications' (with a 3D cubes icon), and 'Resource Types' (with a key icon). The main panel has a header 'Applications' and a button '+ Create Application'. Below is a list of service names:

- [Brand Solutions Insights](#)
- [Brand Solutions Insights Jobs](#)
- [essentials](#)
- [even](#)
- [fullstop.](#)
- [Kio](#)
- [mint](#)
- [Pier One](#)
- [Service User Service](#)
- [Team Service](#)
- [TWINTIP](#)
- [YOUR TURN](#)

## Create a new application

Active application

### Team ID

The ID of the owning team.

stups

### Application ID

The ID of the application.

plerone

### Name

The full name of your application.

Pier One

### Subtitle

A few words on what it is.

The Docker registry

### Service URL

Where your application will run.

https://

### SCM URL

Where you manage your source code.

<https://github.com/zalando-stups/plerone.git>

### Documentation URL

Where your documentation is.

<https://github.com/zalando-stups/plerone/docs>

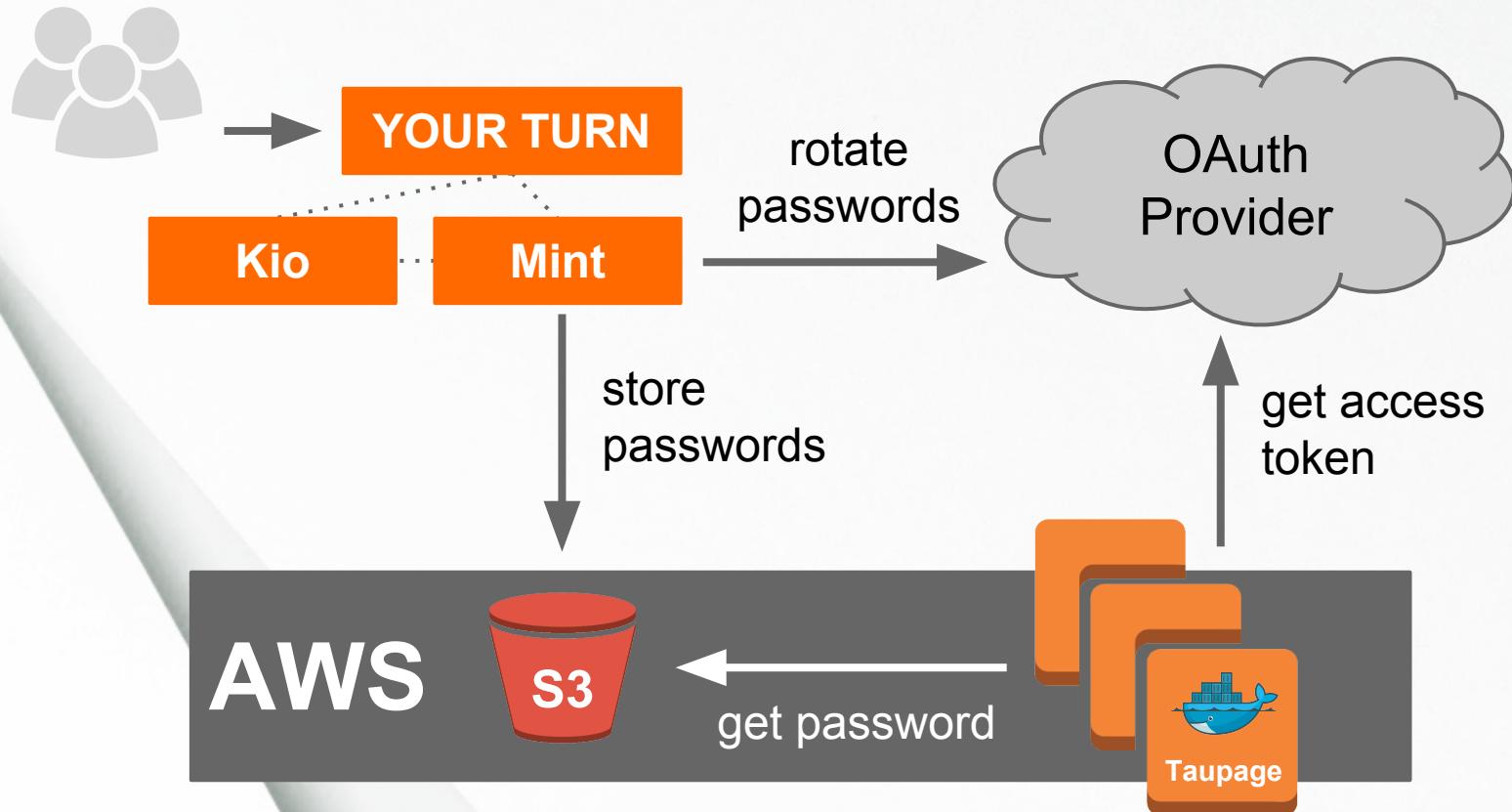
### Specification URL

Where you manage your tickets.

<https://github.com/zalando-stups/plerone/issues>

### Description

# OAUTH: CREDENTIAL DISTRIBUTION VIA S3 BUCKETS



## LINKS

STUPS Frontpage

<http://stups.io>

STUPS Documentation

<http://docs.stups.io>

GitHub Repositories

<https://github.com/zalando-stups>

Trying out Senza and Taupage

<http://docs.stups.io/en/latest/user-guide/standalone-deployment.html>



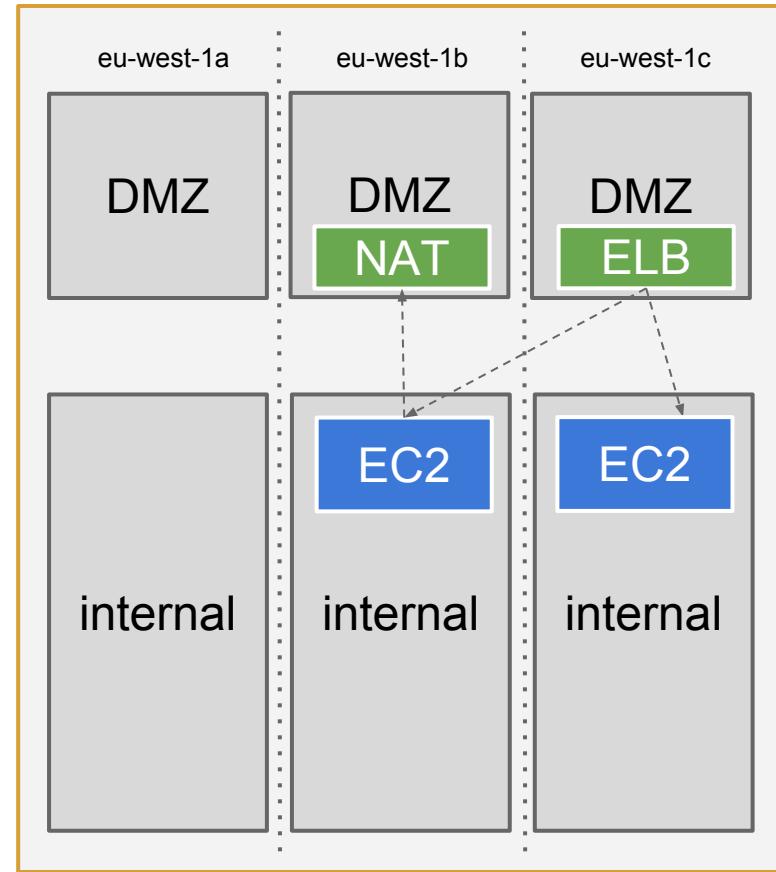


QUESTIONS?

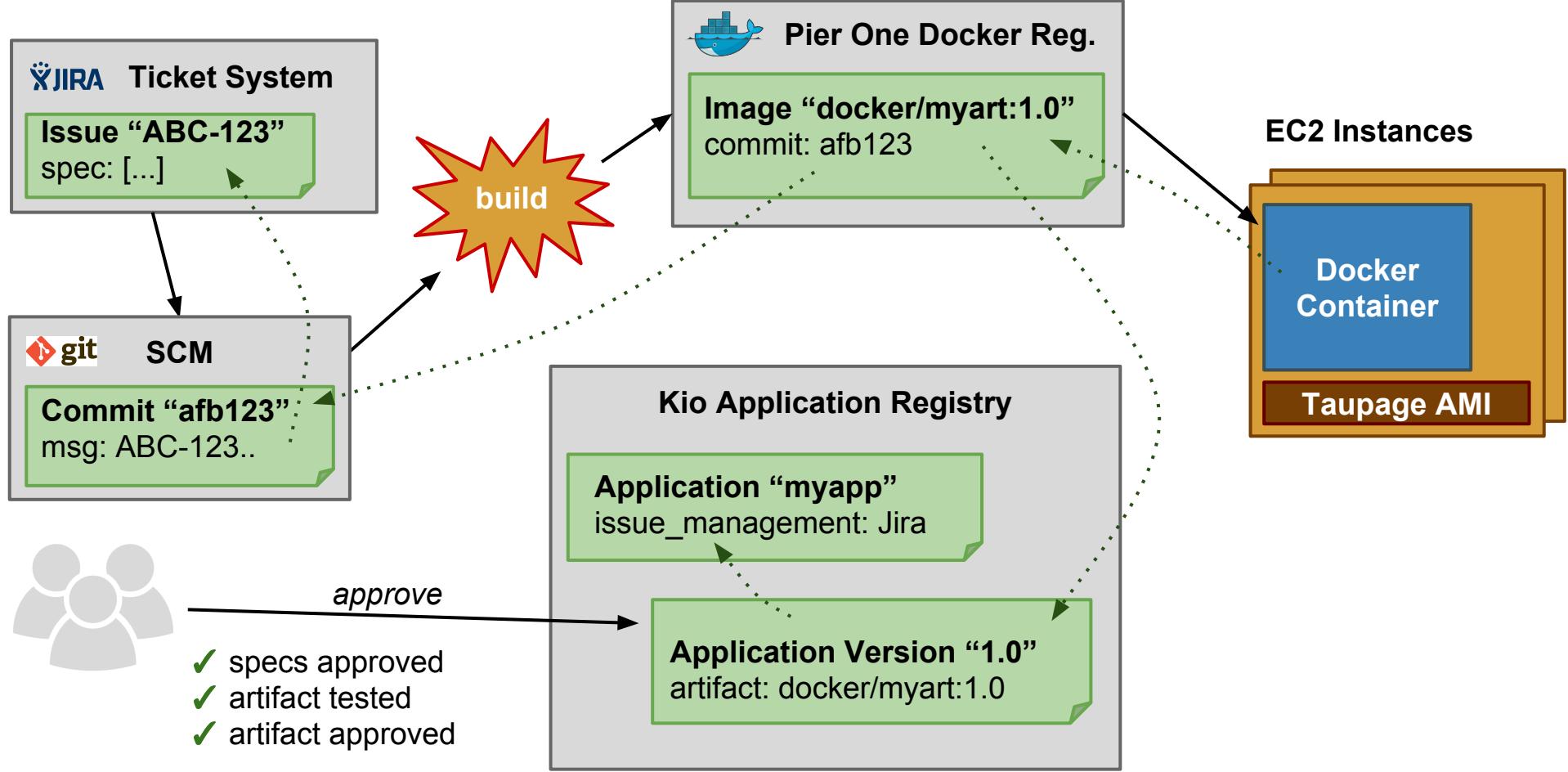
# BACKUP

## STUPS: AWS ACCOUNT VPC SETUP

- ELB for inbound traffic
- NAT instances for outbound
- HTTPS Only
- Internal subnets for app instances



# STUPS: TRACEABILITY



# ZALANDO TECH CONSTITUTION PT. 1

**INDIVIDUAL RIGHTS**

You have the right to **be trusted**.

You have the right to **make informed decisions**.

You have the right to **achieve mastery** in support of purpose.

You have the right to **challenge** when purpose is unclear.

You have the right to build a **personal brand** related to work.

You have the right to **challenge anything** and anyone for the betterment of Zalando, its people and its values.

**INDIVIDUAL RESPONSIBILITIES**

You have the responsibility to **do the right thing** when your boss is wrong.

You have the responsibility to **work towards purpose**.

You have the responsibility to **be excellent** to each other.

You have the responsibility to **strive for mastery** in yourself and others.

You have the responsibility to **make decisions informed** by facts and peer review.

You have the responsibility to **be accountable** for and to learn from the consequences of your decisions.

You have the responsibility to be **open to coaching and peer review**.

**TEAM RIGHTS**

Your team has the right to **self-organize** to achieve autonomy, mastery and purpose for the team.

Your team has the right to **deliver products** the team is proud of.

Your team has the right to **make decisions** about the means and tools of delivery and operation.

Your team has the right to **take reasonable risks** to achieve greatness.

**TEAM RESPONSIBILITIES**

Your team has the responsibility to **own and operate applications** long term, efficiently and according to their purpose.

Your team has the responsibility to deliver to the **highest standard** appropriate to the purpose.

Your team has the responsibility to **play by the rules**, when the rules exist.

Your team has the responsibility to **strive for mastery** and purpose within the team.

Your team has the responsibility to create a **positive and open team culture**.

Your team has the responsibility to **encourage mobility and knowledge sharing**.

Your team has the responsibility to **challenge and improve** what doesn't work.

Your team has the responsibility to **foster a culture of peer review**, inside and outside the team.

# ZALANDO TECH CONSTITUTION PT. 2

## ZALANDO RIGHTS

We have the right to expect each individual to act in the best interest of Zalando.

We have the right to expect everyone to adhere to this constitution.

We have the right to expect each team to deliver great products,

We have the right to change its purpose over time.

We have the right to experiment with how to organize,

We have the right to impose rules which teams and individuals must follow.

## ZALANDO RESPONSIBILITIES

We have the responsibility to impose as few rules as possible.

We have the responsibility to be as transparent as possible, about all things.

We have the responsibility to be the champions of autonomy by trusting individuals and teams.

We have the responsibility to provide the resources for mastery.

We have the responsibility to communicate purpose openly and consistently, and to drive shared focus.

We have the responsibility to provide the best tools and environment for teams to achieve greatness.

We have the responsibility to acknowledge the individual's purpose.

We have the responsibility to defend these rights absolutely.

# ENGINEER

DELIVERS CUTTING EDGE SOFTWARE PRODUCTS END  
TO END

MAINTAINS AND OPERATES THE SOFTWARE PRODUCTS

IS ACCOUNTABLE FOR HIGH QUALITY OF SOFTWARE  
PRODUCTS AND THEIR SPECIFICATION

# PRODUCER

ACCOUNTABLE FOR NON-CORE ENGINEERING TASKS  
NECESSARY FOR SUCCESSFUL E2E DELIVERY AND  
OPERATION

ORGANIZES TEAM EXTERNAL PROJECT DEPENDENCIES,  
EXTERNAL DELIVERABLES AND ROADMAPS

TAKES CARE AND GETS RID OF IMPEDIMENTS

# DELIVERY LEAD

DELIVER  
TRUST BASED LEADERSHIP  
UNDERSTAND THE BUSINESS  
DRIVE PURPOSE  
SUPPORT AUTONOMY

# DELIVERY LEAD

DEVELOPS VISION AND ENSURES HIGH QUALITY  
CUTTING EDGE PRODUCT DELIVERY

BUILDS POWERFUL TEAMS

ENABLES TEAMS AND CHALLENGES DECISIONS

OVERSEES ALL TECHNICAL TOPICS

# PEOPLE LEAD

ENABLES PEOPLE TO CONTINUOUSLY GROW AND  
DEVELOP THEIR CAREER THROUGH ROTATIONAL TOUR  
OF MASTERY

ALIGNS COMPANY AND TEAM PURPOSE WITH PEOPLE'  
S DRIVERS

CONTRIBUTES TO ALL PEOPLE RELATED TOOLS AND  
PROCESSES AND ENSURES THAT THEY ARE STATE OF  
THE ART

# PEOPLE LEAD

COACH  
SUPPORT  
SUPPORT AUTONOMY  
DRIVER OF MASTERY  
TOURS OF MASTERY  
LOTS OF DIRECTS

# ABSTRACT

What we've built at Zalando is complex. Supporting – profitably – a publicly traded e-commerce company that does business in 15 diverse European markets, with more than 15 million active users who all speak different languages, use different payment methods, prefer different shipping methods, and have different product tastes, has required nonstop innovation. Until recently we've focused on building a unified, comprehensive retail system, quickly, that solves just our problems. But to truly fight against complexity – particularly the accidental complexity that slows down our development process – we have adopted a microservices architecture. And when it comes to DevOps, we've gone a step beyond the "You build it, you run it" motto--working in autonomous teams with DevOps treated as a "first-class entity."

In this talk, Henning Jacobs (Software Architect) and Jan Löffler (Head of Platform Engineering) will share their experience implementing “Radical Agility” from a DevOps perspective. “Radical Agility” is the Zalando technology team’s multi-pronged approach to managing the complexity that results from building an architecture of massive size. Henning and Jan will focus on how microservices enable Zalando’s engineers to move faster and build systems that scale, *at scale*, and avoid dependencies. They will show how microservices, in conjunction with a cloud infrastructure, support teams as they try strive for autonomy. Finally, they will draw upon their experiences to show how this all works in practice, and discuss what is organizationally and architecturally necessary to make DevOps a top priority for all members of your tech organization.