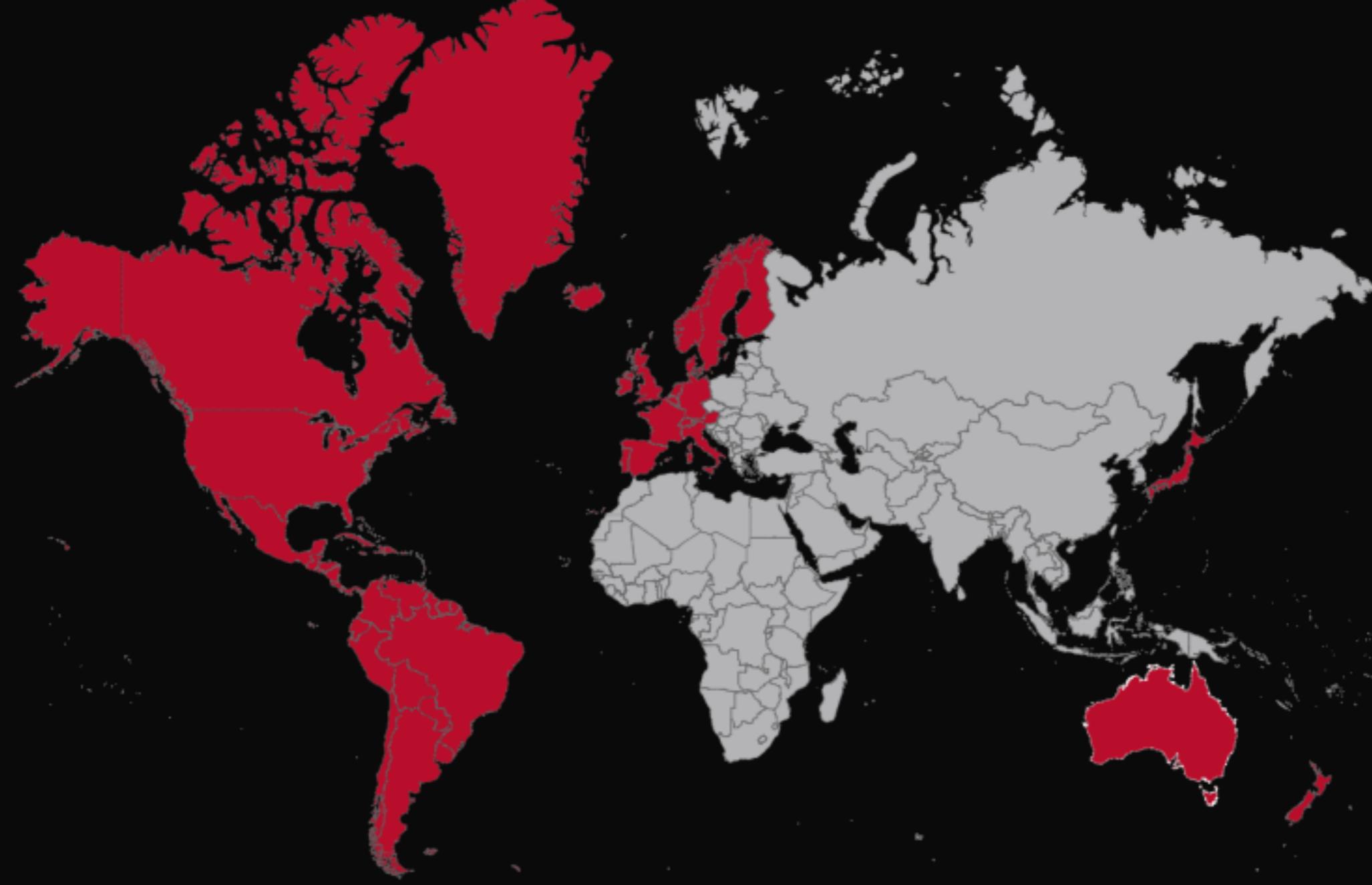




Containers at Netflix - An Evolving Story

Sangeeta Narayanan
Engineering Manager @Netflix
@sangeetan





Going Global

Recent Launches: Italy, Spain, Portugal
Early 2016: Korea, Hong Kong, Taiwan, Singapore



Growing BIGGER



Winning Moments of Truth

LEGENDS

2014 TV-14 1 Season

An amnesiac spy makes for a lethal agent. It's all good ... till he starts digging into the mystery of his past.

[+ MY LIST](#) [EPISODES](#)

Popular on Netflix



Trending Now



NETFLIX



SONS OF ANARCHY



FX



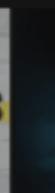
LIPS, LIBERTY AND THE PURSUIT OF ROMANCE



[Browse](#)[Kids](#)[DVD](#)[Search](#)

Sangeeta

Popular on Netflix



A NETFLIX ORIGINAL FILM BEASTS OF NO NATION

★★★★★ 2015 [NR] 2h 17m

When civil war tears his family apart, a young West African boy is forced to join a unit of mercenary fighters and transform into a child soldier.

Starring: Idris Elba, Abraham Attah, Kurt Egyiawan
Genres: Dramas, Dramas based on Books, Independent Dramas
This movie is: Violent

[MY LIST](#)



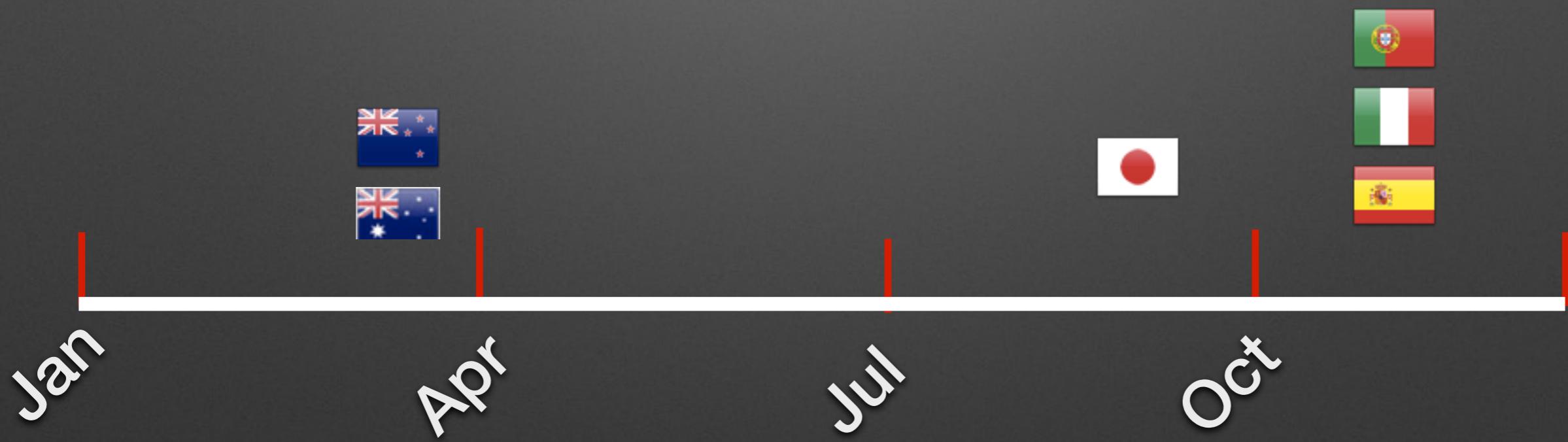
[OVERVIEW](#) [TRAILERS](#) [MORE LIKE THIS](#) [DETAILS](#)

Trending Now



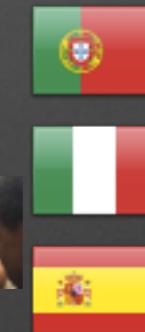
Getting BETTER

2015



2015

Jan



Apr

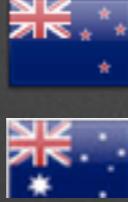
Jul

Oct

2015

A/B Tests

New features



Jan

Apr

Jul

Oct

2015

A/B Tests

New features

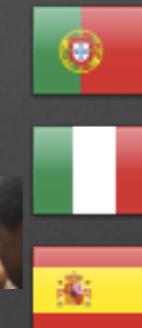
Jan



Apr



Jul



Oct



Going **FASTER**



NETFLIX

Browse ▾ Kids DVD

Popular on Netflix

FLASH BEASTS OF NO NATION JANE THE VIRGIN THE GUNMAN GOTHAM LEGENDS

A NETFLIX ORIGINAL FILM
BEASTS OF NO NATION

★★★★★ 2015 NR 2h 17m

When civil war tears his family apart, a young West African boy is forced to join a unit of mercenary fighters and transform into a child soldier.

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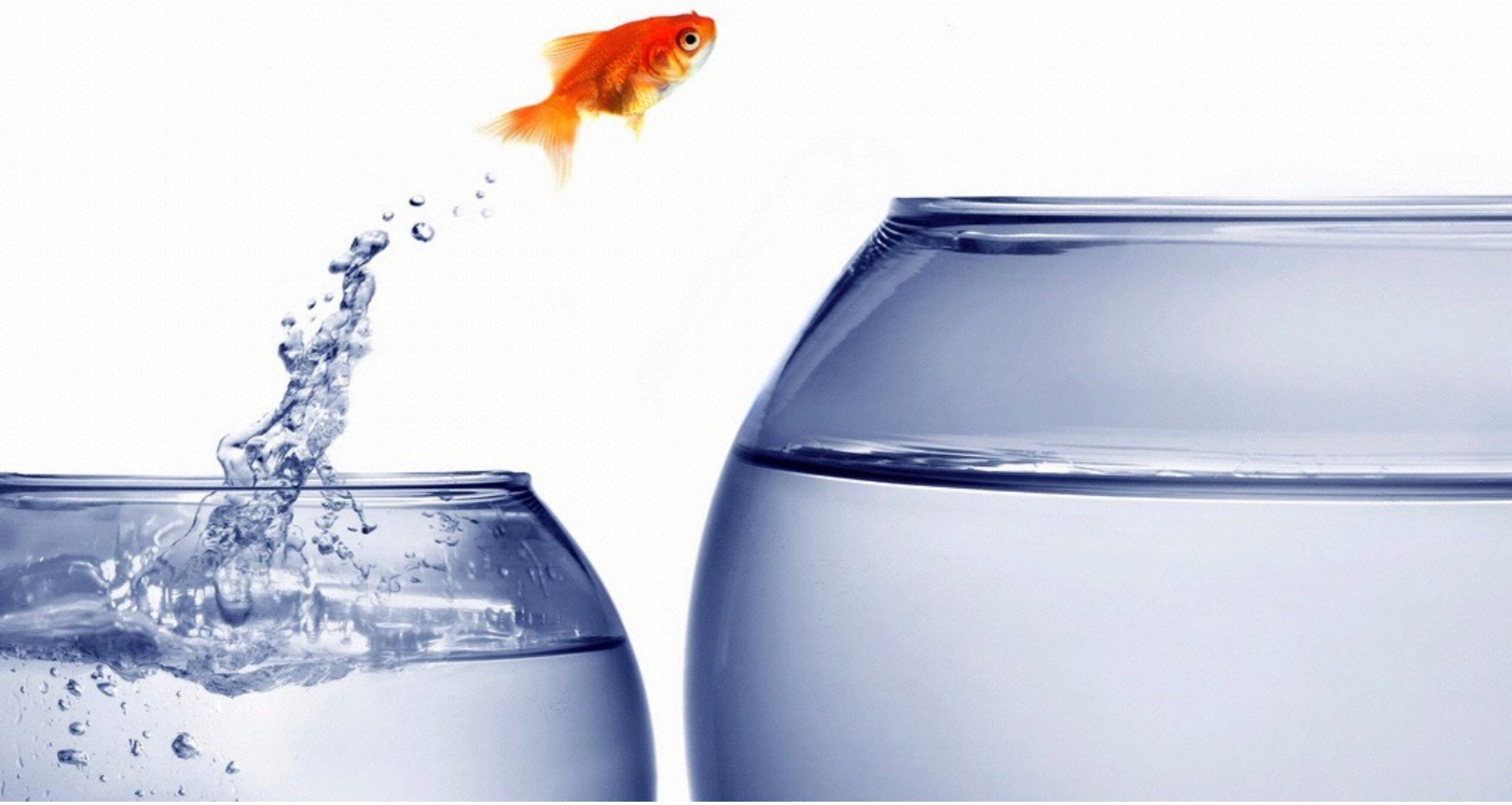
+ MY LIST

OVERVIEW TRAILERS MORE LIKE THIS DETAILS

Trending Now

MAD MEN Narcos







Cloud Native Architecture





Automation & Tooling



Culture

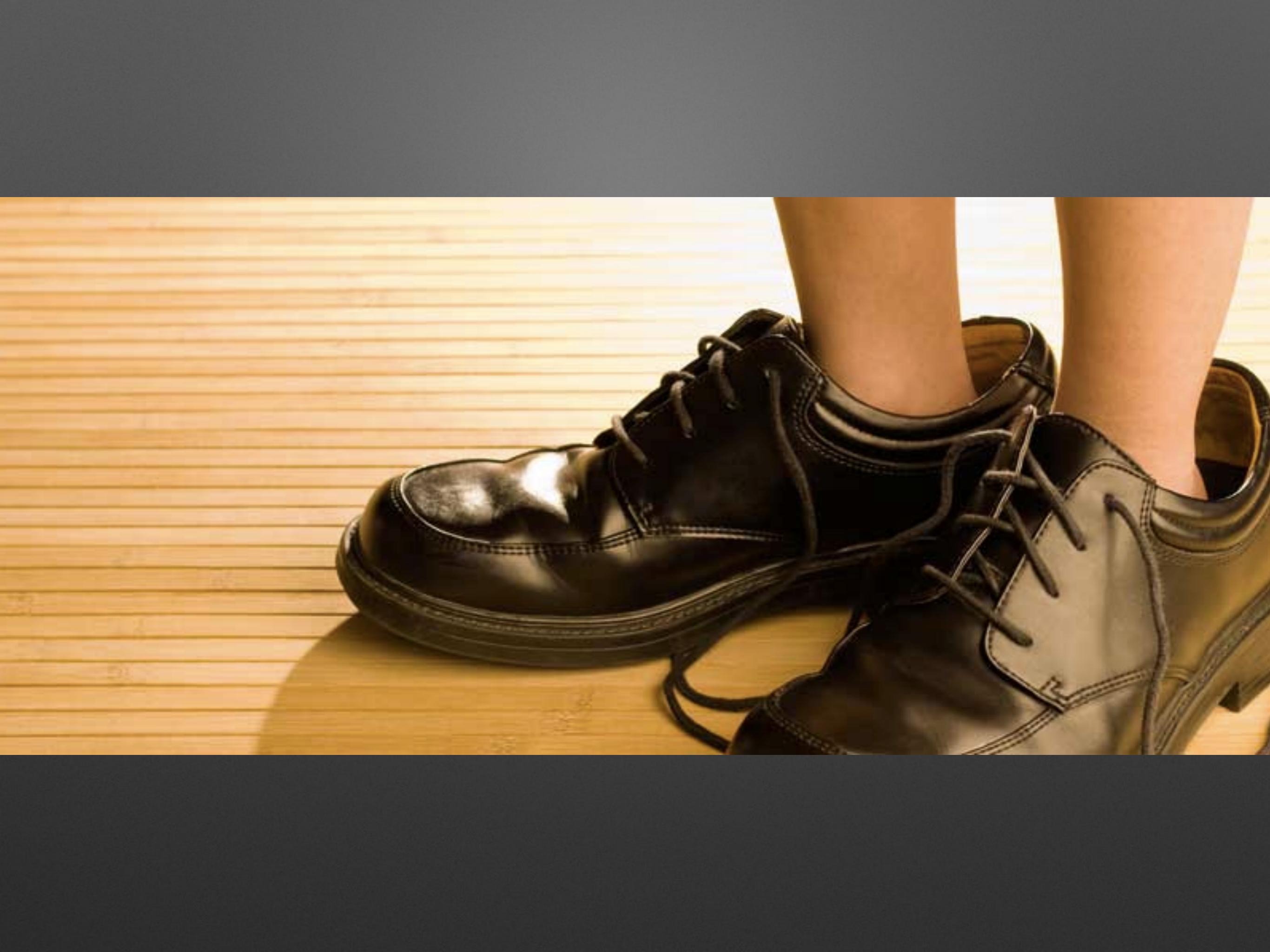
New Considerations

Diversity - Users, Tech stacks, Workloads

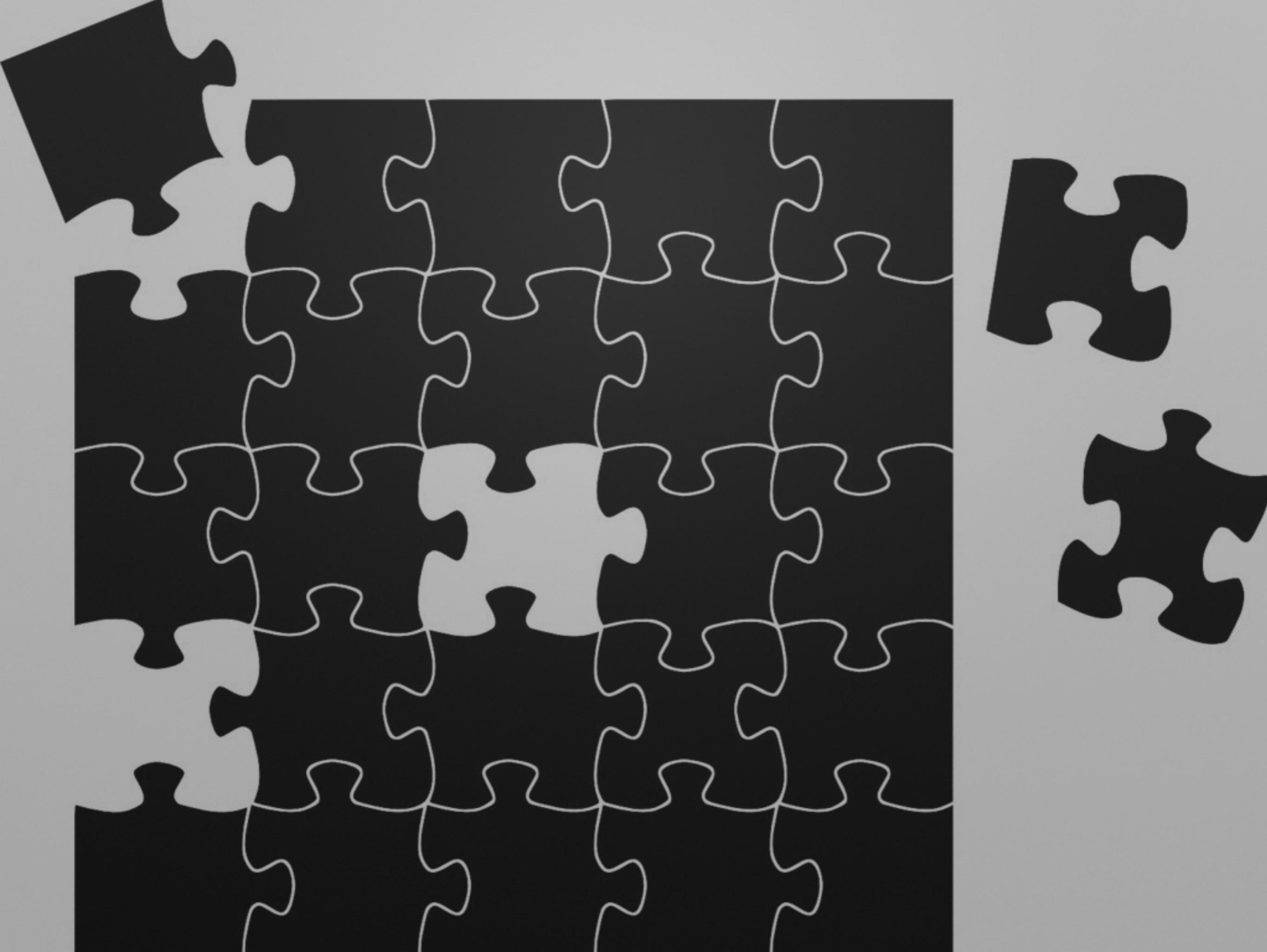
Dev Ex - Dev iterations, Debugging, Packaging

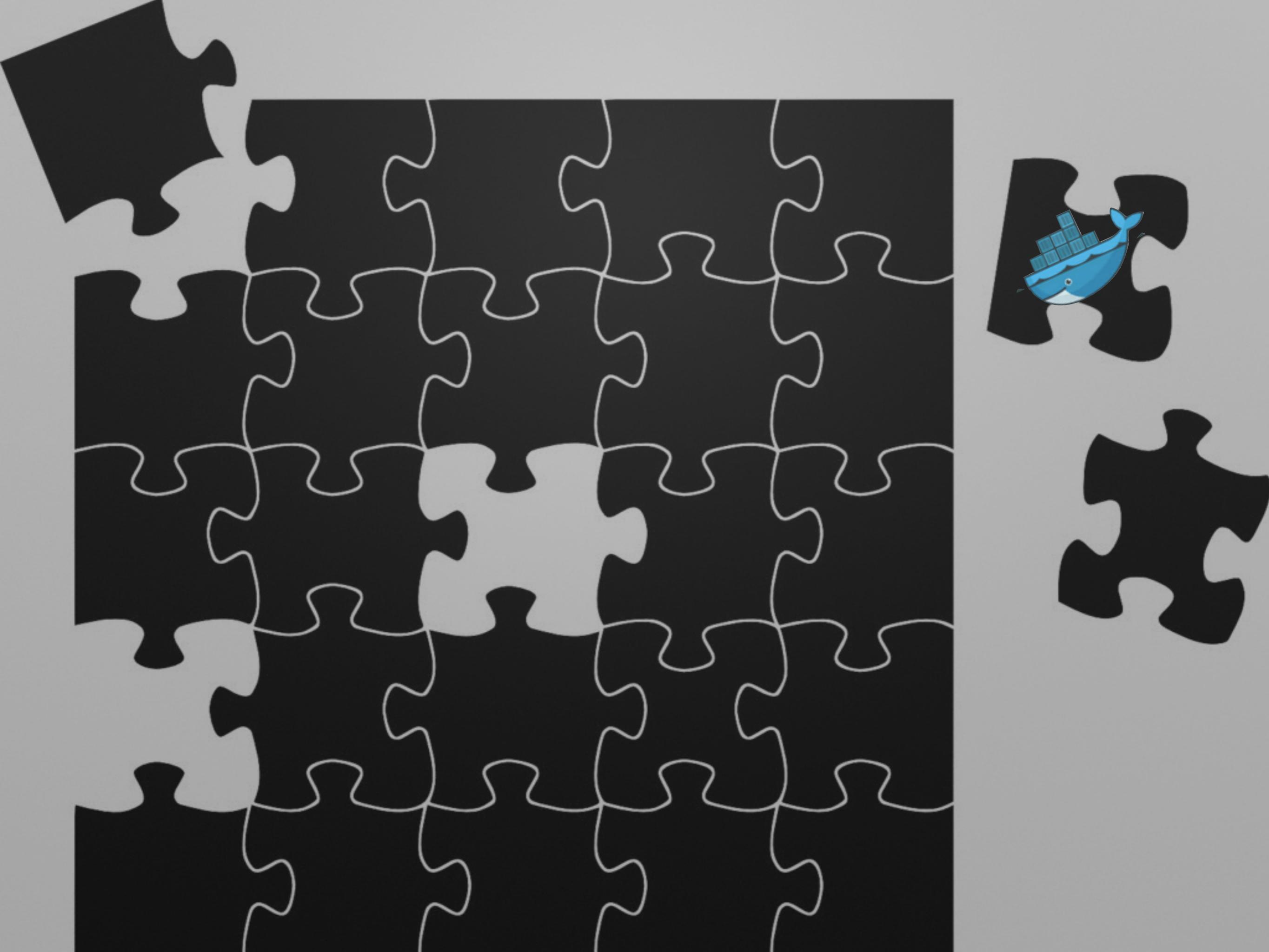
Rapid Delivery

Resource Sharing









Why Docker?

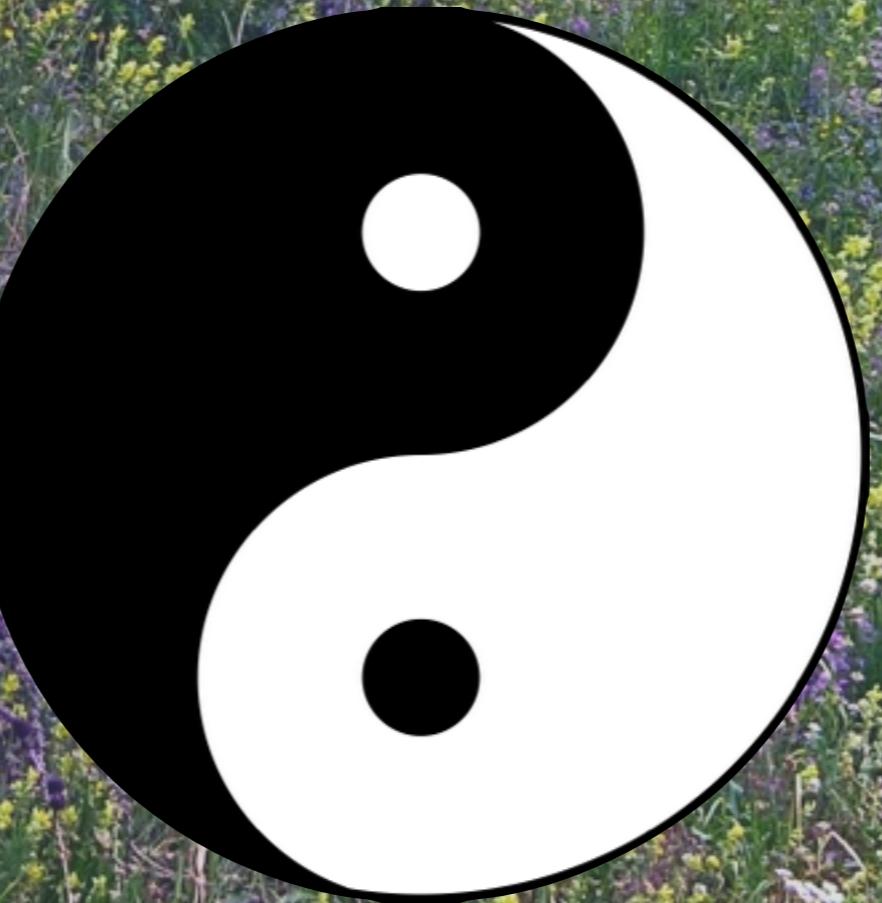
Dev-centric packaging & reproducibility

Infrastructure abstraction

Faster dev iterations

Resource sharing





Docker @Netflix - Use Cases

Algorithms Engineering

Data Pipeline

Edge Engineering

Docker @Netflix - Use Cases

Algorithms Engineering

Data Pipeline

Edge Engineering

Algorithms Engineering

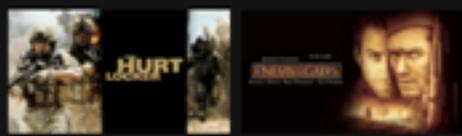
R&D of algorithmic components for product

Top Picks for Sangeeta



Suspenseful Movies

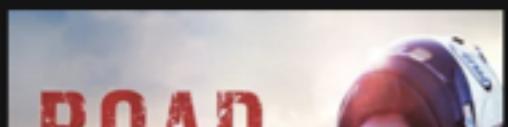
Based on your interest in:

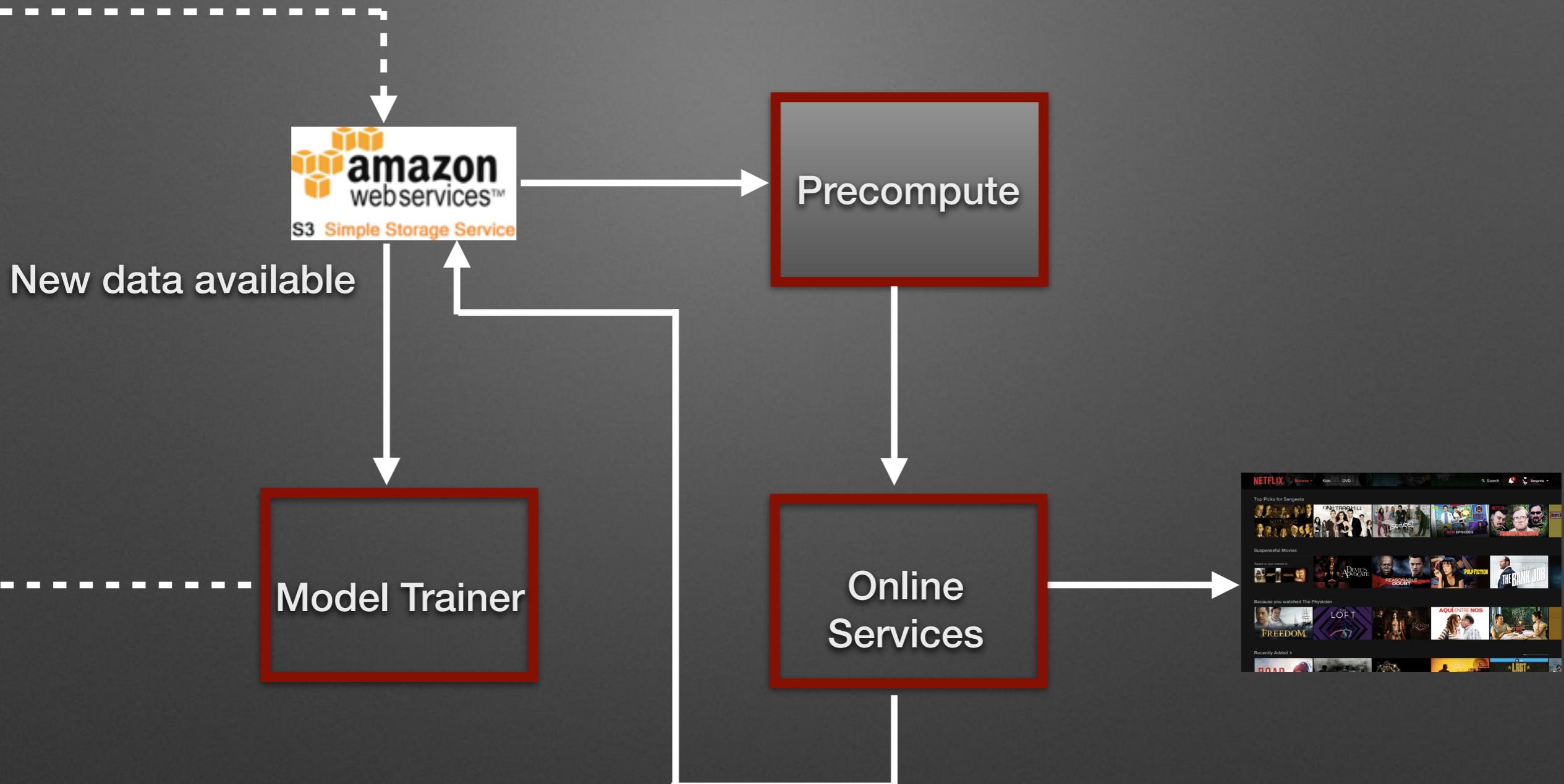


Because you watched The Physician



Recently Added >





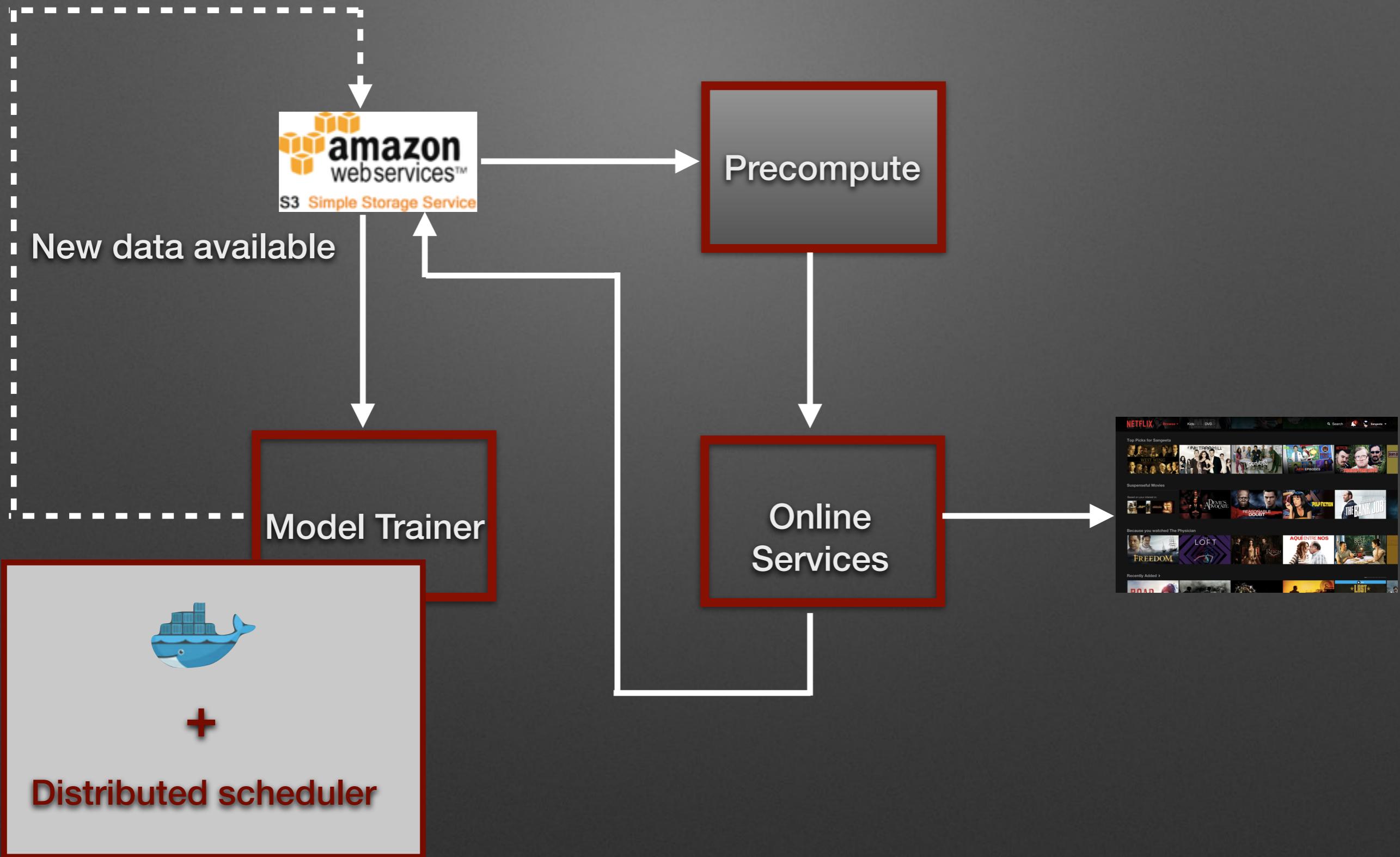
Requirements

Infrastructure abstraction



Polyglot support & Local Dev Ex

Dynamic resource allocation &
distributed job scheduling



Model Trainer

Spinnaker

Other Apps

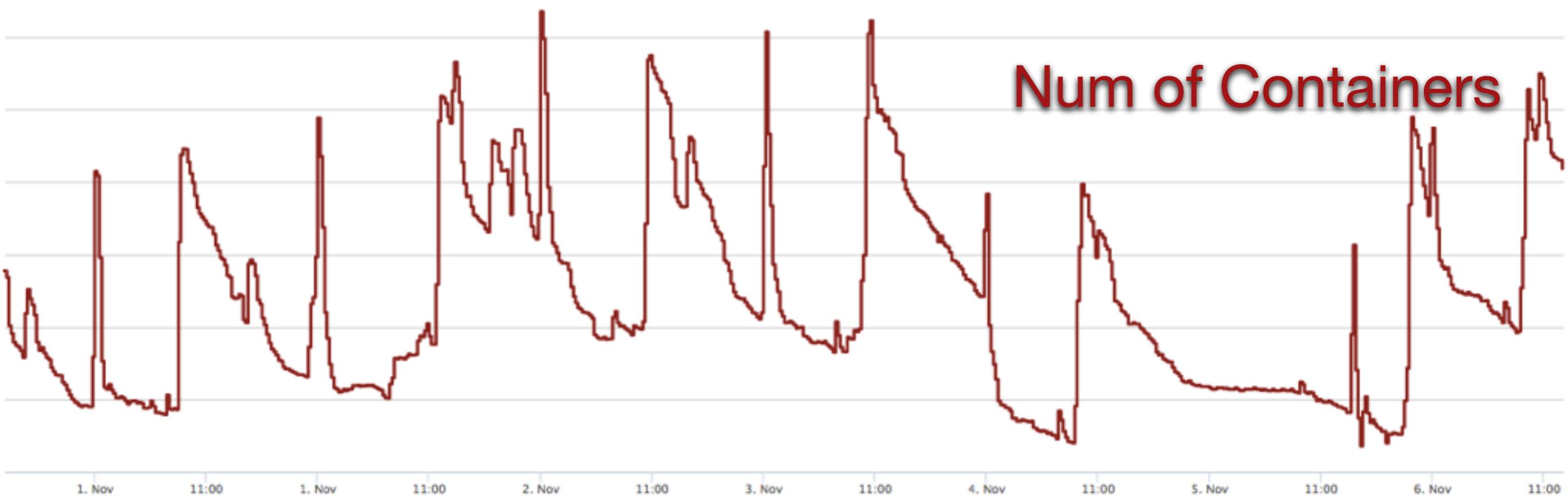
Distributed Scheduling & Task Management

Fenzo



Amazon Virtual
Private Cloud (VPC)

Num of Containers



Infrastructure abstraction

Polyglot + Local Dev

Distributed Scheduling

Docker @Netflix - Use Cases

Algorithms Engineering

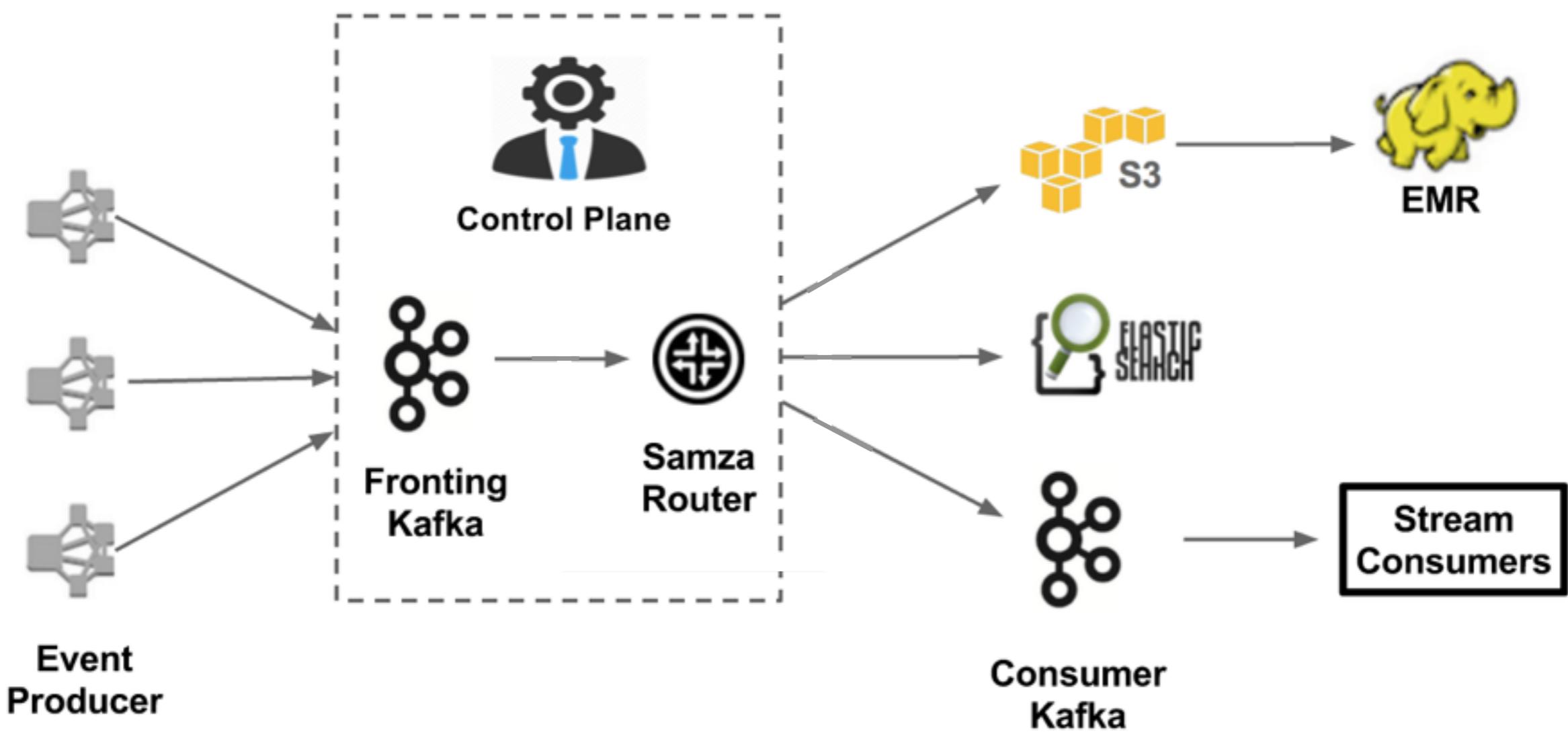
Data Pipeline

Edge Engineering

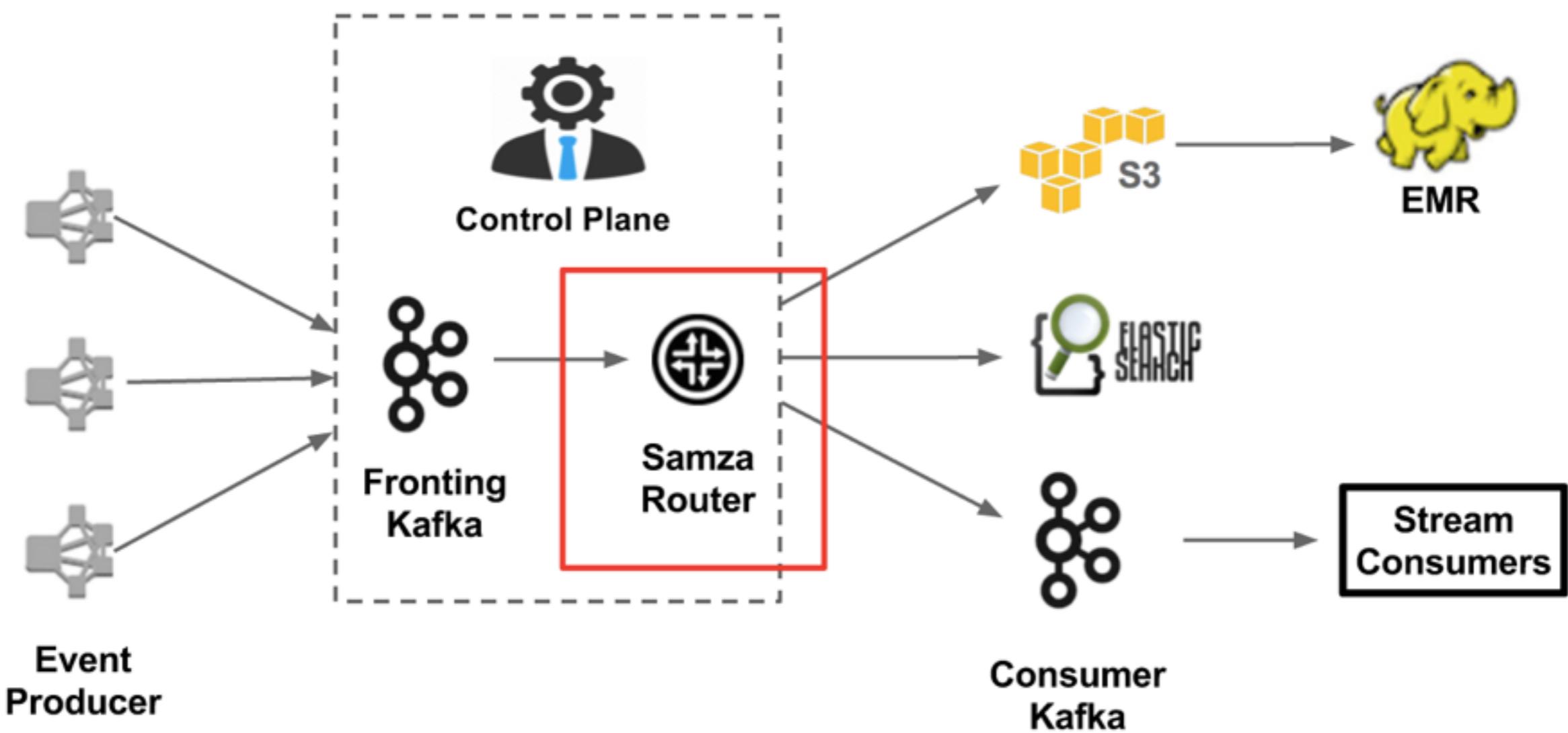
Data Pipeline

Publish, Collect, Process, Move Data

Keystone



Keystone



Requirements

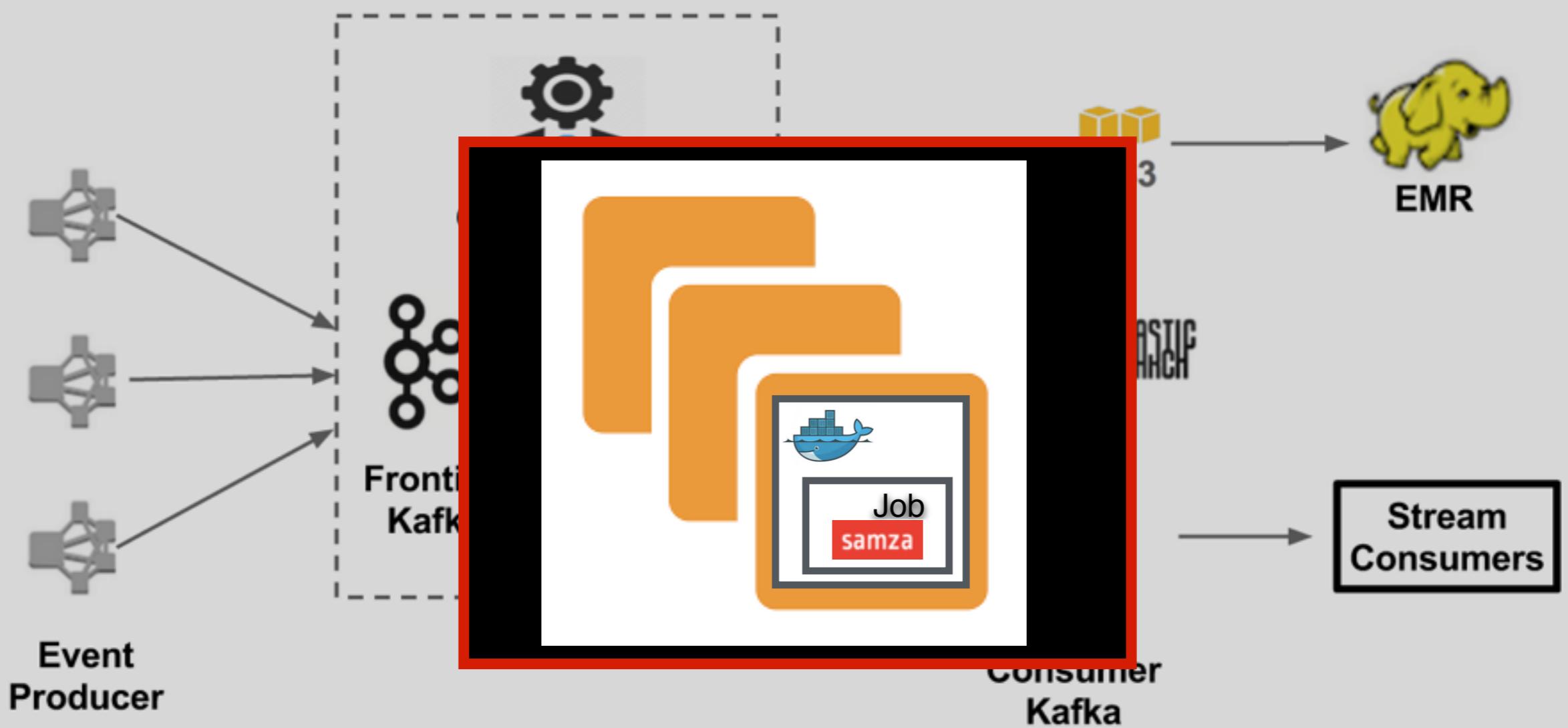
Local Dev Ex



Infrastructure abstraction

Fine-grained resource management

Keystone





Infrastructure abstraction

Local Dev Ex

Fine grained resource Management

Docker @Netflix - Use Cases

Algorithms Engineering

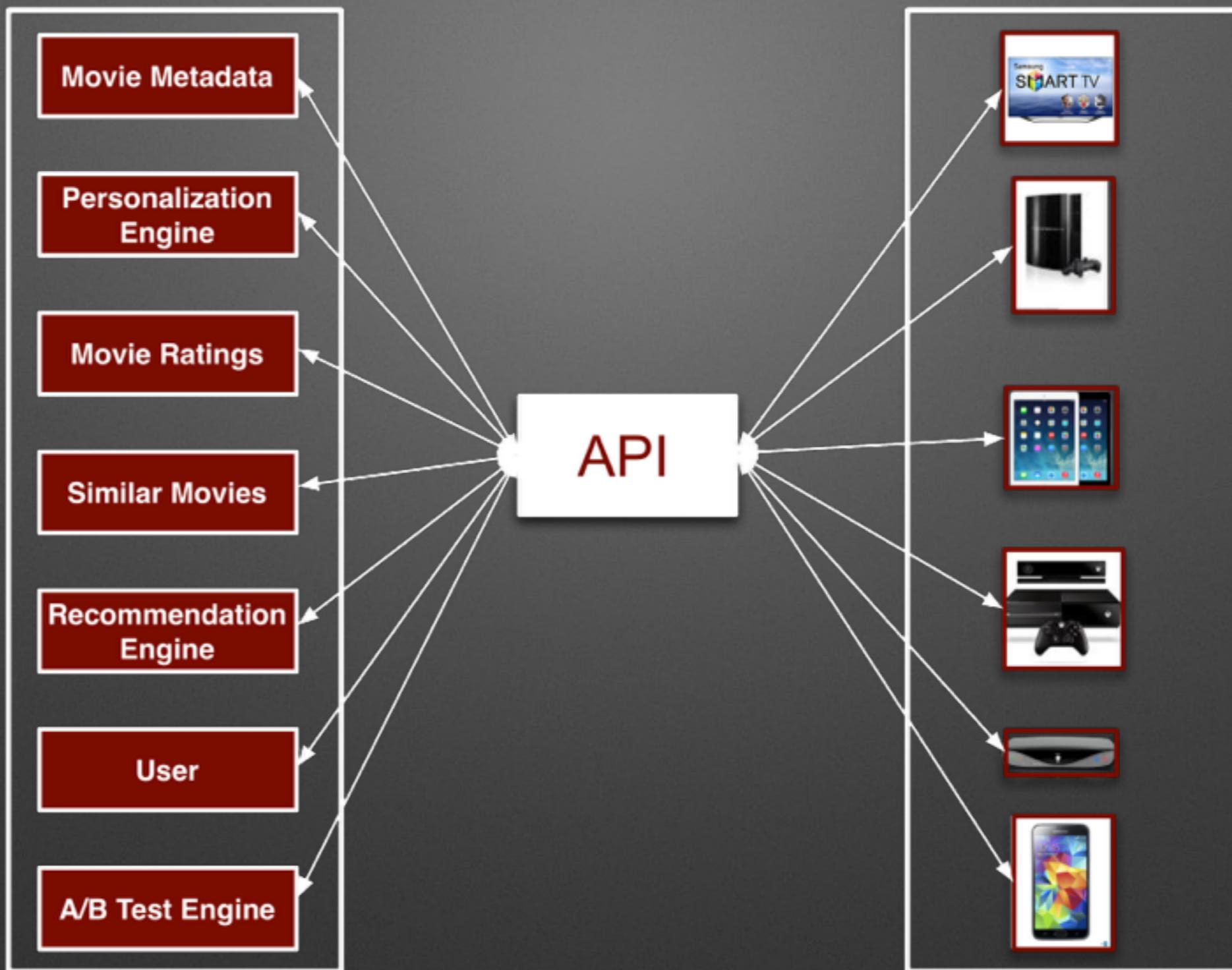
Data Pipeline

Edge Engineering

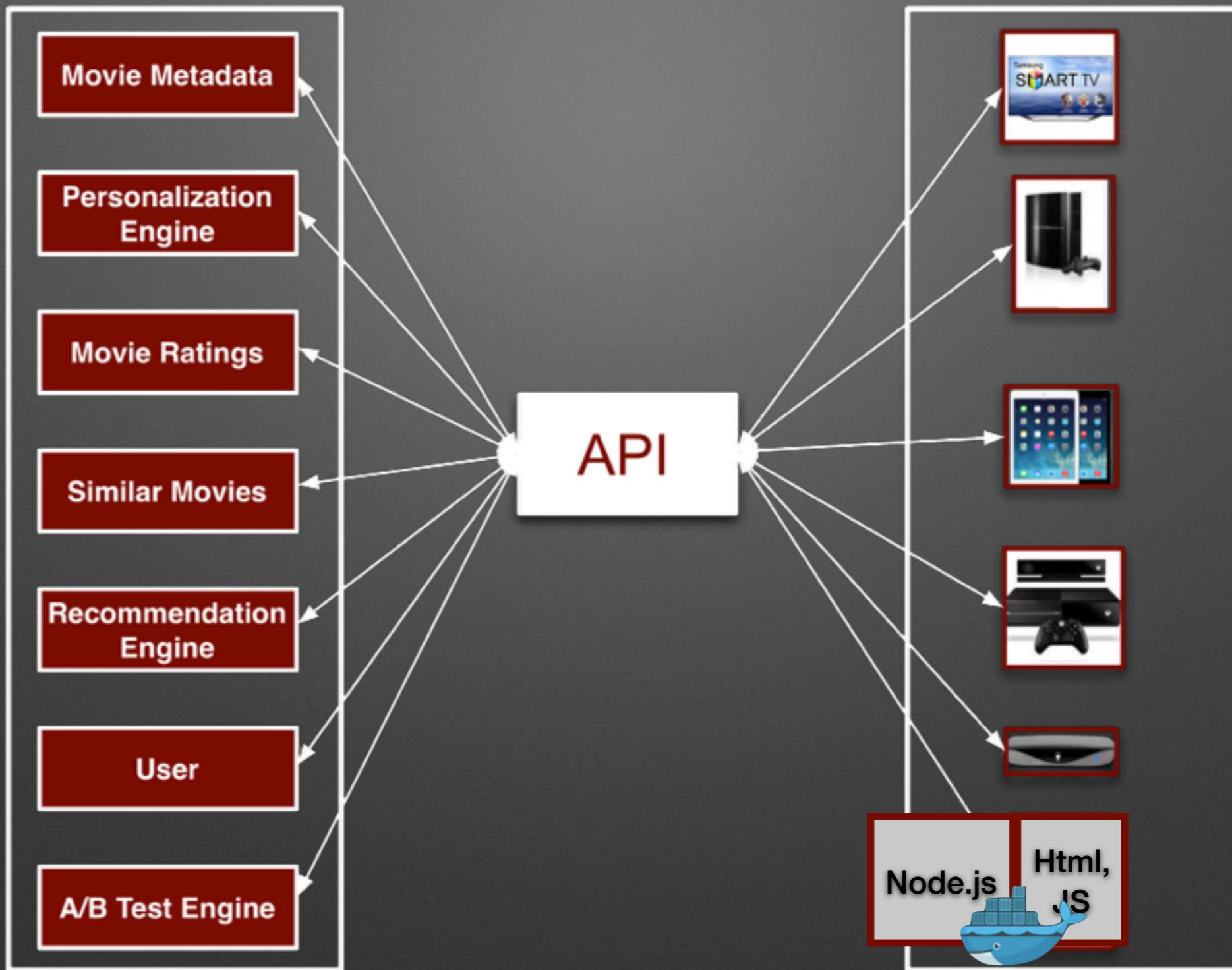
Edge Engineering

Entry point to Netflix for all device traffic

Automation & Tools



Automation & Tools



Requirements

Infrastructure abstraction



Local dev, Polyglot - Java, Groovy,
Node.js

Fine-grained resource
management

Requirements++

Ops Tooling

Networking, IPC

Security

Insights

Failure Testing

Performance

And more...



*Long running Services
vs.
Batch Jobs*

Requirements++

Ops Tooling

Networking, IPC

Security

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Failure Testing

Performance

And more...



*Long running Services
vs.
Batch Jobs*

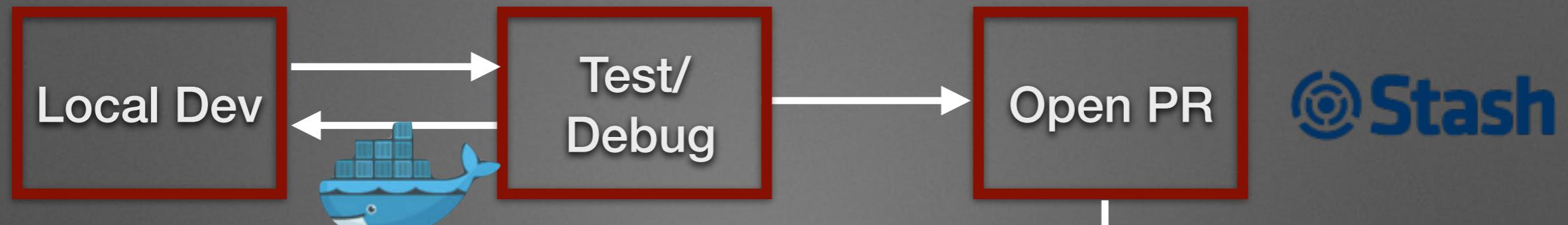
Modules / all

▶ Search

Filter...



Name	Version	Stack	Region	Meta
/shakti/primer-ludo-no-remote/setVideoRating	1	test	*	API, java-1.7.0+groovy-2.3.6, com.netflix.api.endpoint.BaseEnd
/shakti/primer-ludo-no-remote/wigenre	1	test	*	API, java-1.7.0+groovy-2.3.6, com.netflix.api.endpoint.BaseEnd
/shakti/primer-ludo-no-remote/ratinghistory	1	test	*	API, java-1.7.0+groovy-2.3.6, com.netflix.api.endpoint.BaseEnd
/shakti/primer-ludo-no-remote/geo	1	test	*	API, java-1.7.0+groovy-2.3.6, com.netflix.api.endpoint.BaseEnd
/ecapi/account/subscription/plancancel	1	*	*	API, java-1.7.0+groovy-2.3.6, com.netflix.api.endpoint.BaseEnd
/shakti/primer-ludo-no-remote/densityKids/recentlyWatchedCharacter	1	test	*	API, java-1.7.0+groovy-2.3.6, com.netflix.api.endpoint.BaseEnd
/shakti/primer-ludo-no-remote/util/error	1	test	*	API, java-1.7.0+groovy-2.3.6, com.netflix.api.endpoint.BaseEnd
/shakti/primer-ludo-no-remote/pin/info	1	test	*	API, java-1.7.0+groovy-2.3.6, com.netflix.api.endpoint.BaseEnd
/atf/primer/FT/modify	1	*	*	API, java-1.7.0+groovy-2.3.6, com.netflix.api.endpoint.BaseEnd
/primer/shared_module/endpoint	1	test	*	API, java-1.7.0+groovy-2.3.6, com.netflix.api.endpoint.BaseEnd
/shakti/primer-ludo-no-remote/uberContext	1	test	*	API, java-1.7.0+groovy-2.3.6, com.netflix.api.endpoint.BaseEnd
/shakti/primer-ludo-no-remote/densityKids/character	1	test	*	API, java-1.7.0+groovy-2.3.6, com.netflix.api.endpoint.BaseEnd
/shakti/primer-ludo-no-remote/servicecode	1	test	*	API, java-1.7.0+groovy-2.3.6,



Spinnaker



Dist Job Sched

Deploy

CI Build/Test



AMI

Bakery

primerui

[PIPELINES](#)[CLUSTERS](#)[LOAD BALANCERS](#)[SECURITY GROUPS](#)[PROPERTIES](#)[TASKS](#)[CONFIG](#)

Group by Pipeline



Show 10 per group

Configure

▶ Start Manual Execution

▼ Bake & Titan Deploy

Trigger: Enabled

Configure

▶ Start Manual Execution

BAKE DETAILS

▼ BAKE IN US-WEST-1

Step	Started	Duration	Status
Bake in us-west-1	2015-11-03 12:13:48 PST	00:00	COMPLETED

Bake Config

Task Status

Provider Amazon
Image edge.primer-ui-server:master-201511022319-trusty 8f98f58
Region us-west-1
Package ssh://git@stash.corp.netflix.com:7999/edge/primer-ui-server.git
8f98f5875223b8
dc5630302c9d1b
e43c27a85a3d

Base OS trusty
VM Type PV
Store Type DOCKER
Label release

[View Bakery Details](#)[Source](#) | [Permalink](#)

BUILD #21

MANUAL START

dzapata@netflix.com
2015-11-03 12:07:38 PST

Status: CANCELED

Duration: 05:10

BUILD #21

MANUAL START

primerui

PIPELINES

CLUSTERS

LOAD BALANCERS

SECURITY GROUPS

PROPERTIES

TASKS

CONFIG



Group by Pipeline

Show 10 per group

Configure

▶ Start Manual Execution

▼ Bake & Titan Deploy

Trigger: Enabled

Configure

▶ Start Manual Execution

BUILD #21
MANUAL START
dzapata@netflix.com
2015-11-03 12:13:47 PST

Status: COMPLETED

Duration: 01:15

Bake

Deploy

Hide Details

DEPLOY DETAILS

✓ DEPLOY IN US-EAST-1

Step	Started	Duration	Status
Deploy in us-east-1	2015-11-03 12:13:48 PST	01:13	COMPLETED
Shrink Cluster	2015-11-03 12:15:02 PST	00:01	COMPLETED

Deployment Config

Task Status

Account **TITANDEVPC**
Region **primerui-titan**
Cluster

VPC [none]
Strategy **highlander**
Capacity **1**

Deployed: primerui-titan-v000

Source | Permalink

BUILD #21
MANUAL START
dzapata@netflix.com
2015-11-03 12:07:38 PST

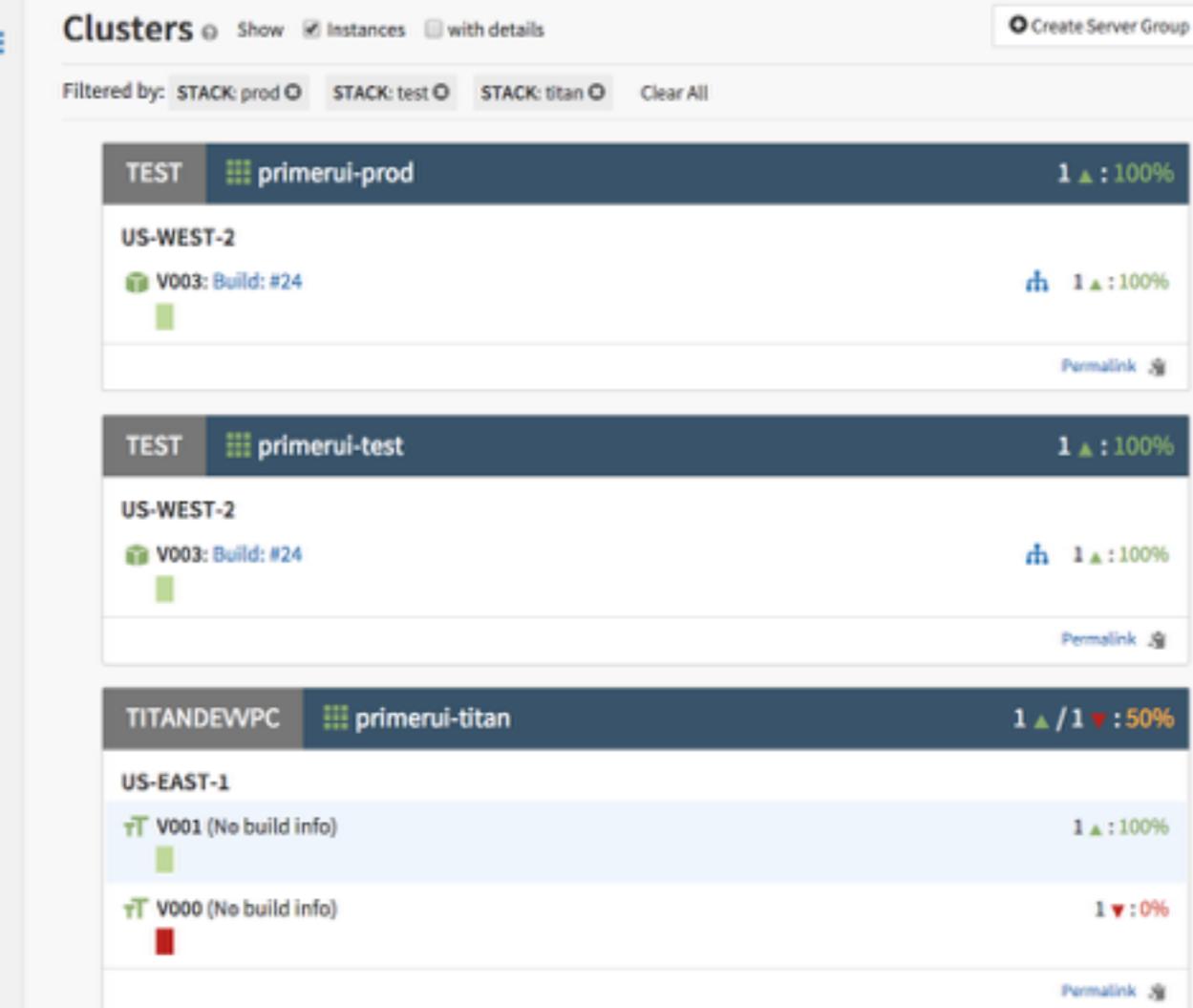
Status: CANCELED

Duration: 05:10

BUILD #21

primerui

PIPELINES CLUSTERS LOAD BALANCERS SECURITY GROUPS PROPERTIES TASKS CONFIG



primerui-titan-v001

Titan Job Actions

TITAN JOB INFORMATION

Id: 14761b70-83fc-11e5-a909-123020c47da1
Created: 2015-11-05 12:30:40 PST

PLACEMENT CONSTRAINTS

Account: titandevvpc
Region: us-east-1
Zones:

SIZE

Desired: 1
Current: 1

HEALTH

Tasks: 1 ▲ : 100%

DOCKER IMAGE

Image Name: edge-primerui-canary
Image Version: master-201511022319-trusty-8f98f58

PARAMETERS

jobName: primerui-titan-v001
application: primerui
source: spinnaker
region: us-east-1
account: titandevvpc

Building out the pieces

Gradle docker plugin to generate Dockerfile

Spinnaker CloudProvider provides abstraction

Bakery support for image generation

Docker registry for internal images

libnetwork plugin for addressable IP

Dev Ex Wins

Faster dev iterations

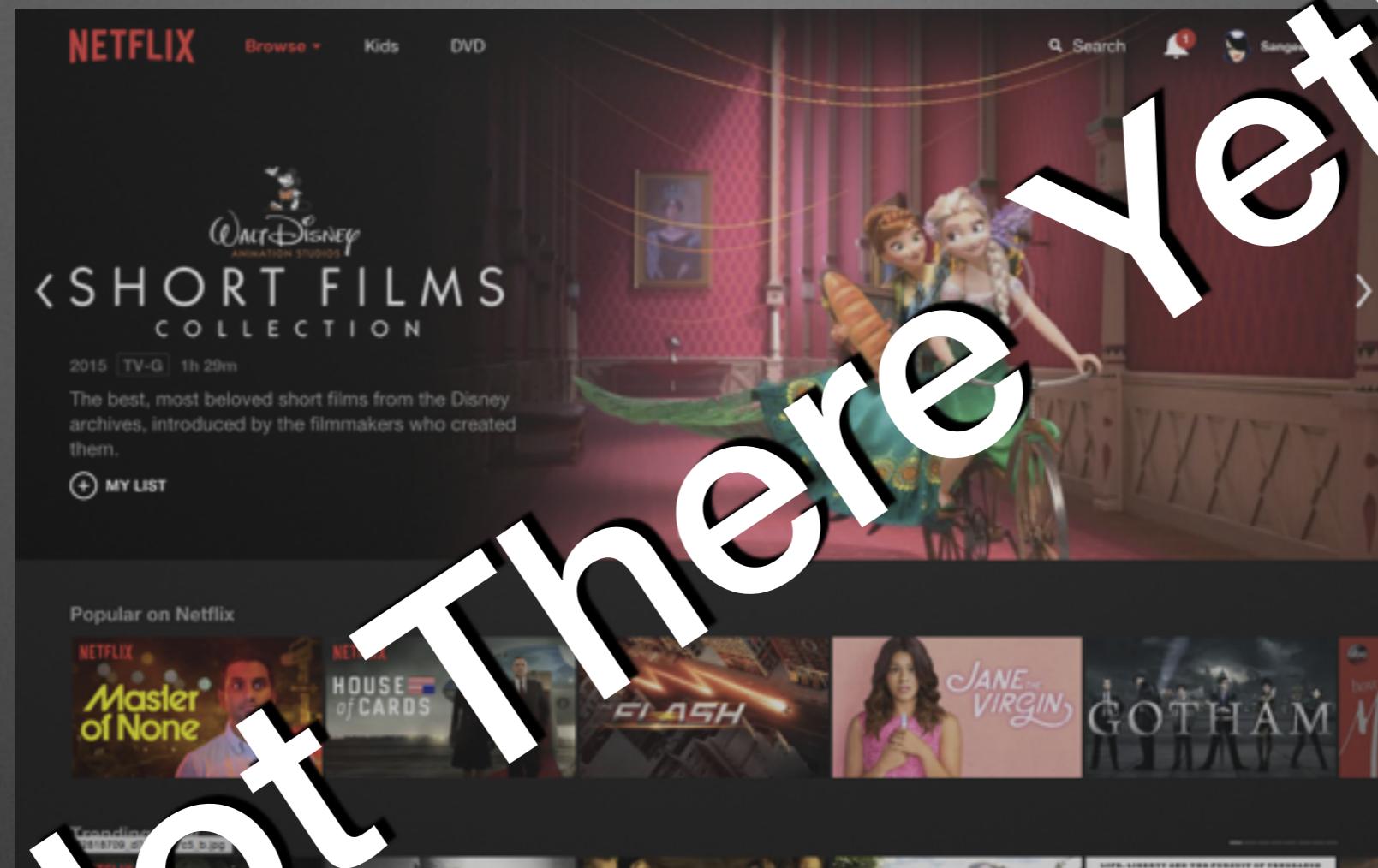
Run prod image locally; attach debugger

Multiple branch/config variations

Hot reloading of files

‘Roman Riding’ with AMIs

Not There Yet!



ON





'PaaS-like' Dev Experience

Production scale/Operational readiness

Optimized resource utilization

Dev Ex



Polyglot env, Packaging



Infrastructure Abstraction



Production ready Online Services







Thank You
@sangeetan **NETFLIX**

Acknowledgements

The Netflix Algorithms Engineering & Data Pipeline teams

Photo Credits

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<https://goo.gl/R08GPQ>

<http://tastyk.deviantart.com/art/Evolution-149719618>

<https://goo.gl/W2UKv0>

<https://goo.gl/fRcpPN>

<https://goo.gl/tF199H>

<https://goo.gl/K1OH9T> wildflowers

<https://goo.gl/KSaL5s> roadmap

<https://goo.gl/8JCDQy> odometer

<https://goo.gl/c4RuSR> takeaway box