


# Powering Agency Transformation Through Innovation

Jason Dudash  
Chief Architect  
North America Public Sector

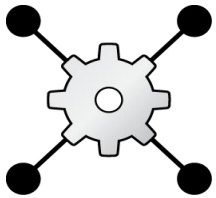
Follow on Twitter:  [@dudashtweets](#)  
[@redhatgov](#)



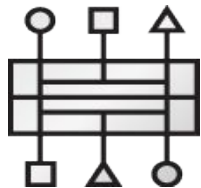
“Let's face it, all we are doing is writing tomorrow's legacy software today”

–Martin Fowler

## Service Endpoints



Web Services

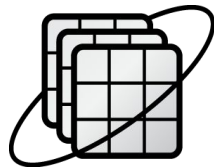


APIs

## Architecture

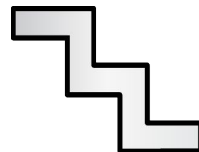


Monolith

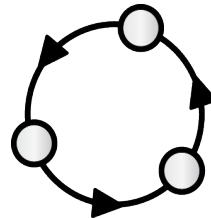


Microservices

## Development Process



Waterfall

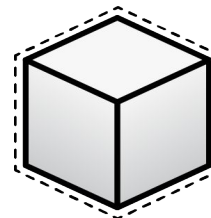


Agile + CI/CD

## Deployment

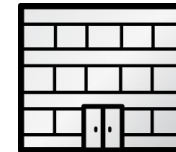


Server/VM



Container

## Infrastructure

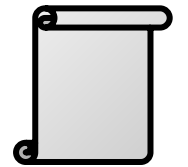


Data Center

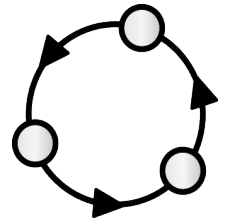


Cloud

## Security



Slow ATO



Security  
"Shift Left"

Cloud-native  
*/klood 'nādiv/*

Systems and processes that are designed to embrace rapid change, large scale, and resilience in dynamic environments such as public, private, and hybrid clouds

TRADITIONAL (LEGACY)

Server-centric	Container-centric
<b>Scale up vertically</b>	<b>Scale out horizontally</b>
Tightly coupled monolith	Loosely coupled and service-based
<b>Infrastructure-dependent</b>	<b>Portable across infrastructure</b>
Waterfall, semi-agile, and long delivery	Agile and continuous delivery
<b>Local IDEs &amp; developer tools</b>	<b>Cloud-based, intelligent tools</b>
Siloed dev from ops, QA, and security teams	DevSecOps, NoOps, and collaboration

CLOUD-NATIVE (MODERN)

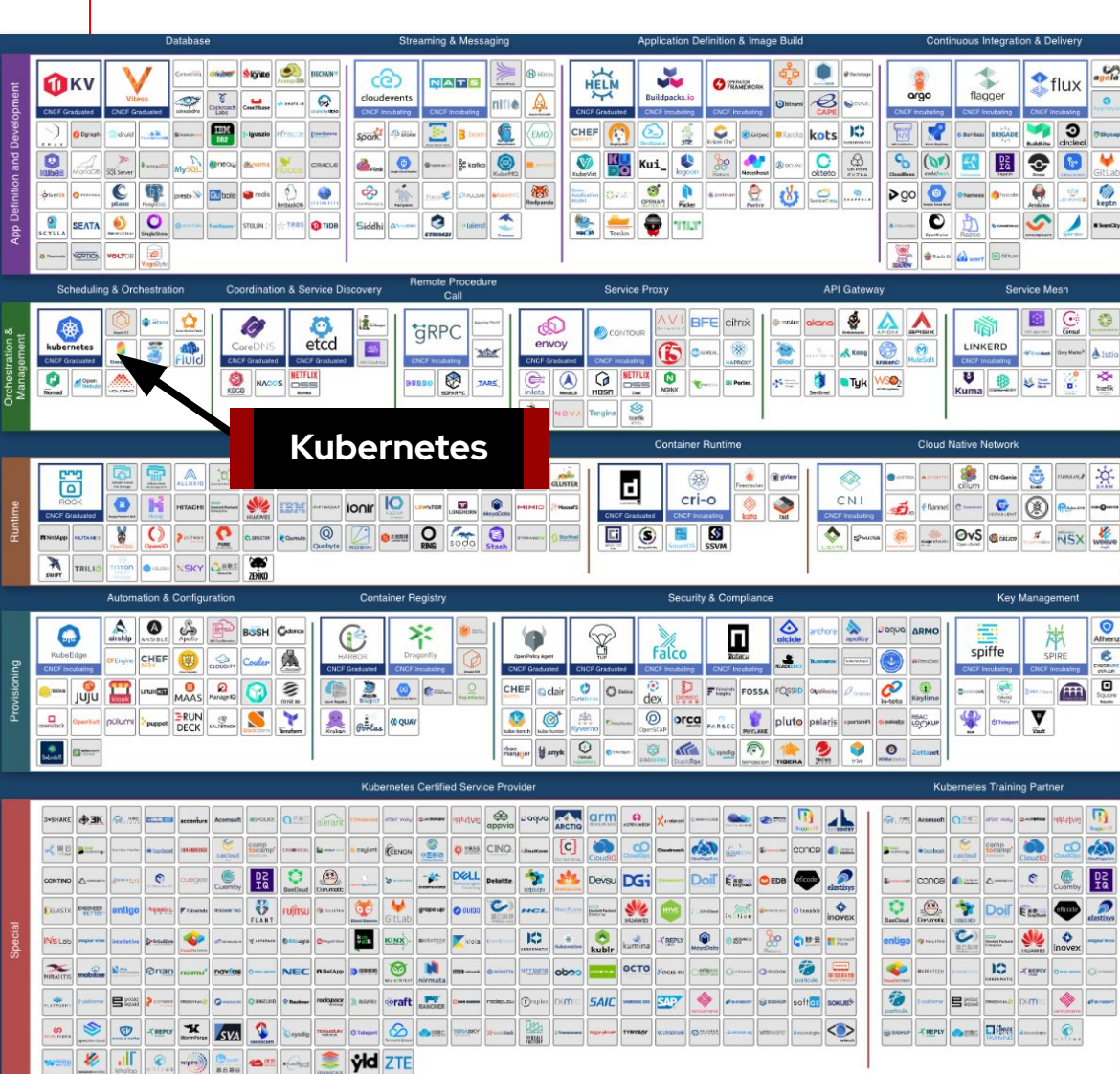


By many measures, the most popular and innovative open source cloud technology is Kubernetes



Kubernetes is not enough && Kubernetes is hard

## INCIDENT #1: AWS ALB 502



Kubernetes

Technical problem occurred: [org.zalando.riptide.NoRouteException: Unable to dispatch response: 502 - Bad Gateway [Server=[awselb/2.0], Date=[Tue, 09 Apr 2019 11:35:29 GMT],

```
de.zalando.order.domain.logic.CatchAllLogger.log (line 24)
org.zalando.riptide.NoRouteException: Unable to dispatch
[Server=[awselb/2.0], Date=[Tue, 09 Apr 2019 11:35:29 GMT]
<html>
<head><title>502 Bad Gateway</title></head>
<body bgcolor="white">
<center><h1>502 Bad Gateway</h1></center>
</body>
</html>

at org.zalando.riptide.Requester$ResponseDispatch
at org.zalando.fauxpas.ThrowingFunction.apply(T
at java.util.concurrent.CompletableFuture.uniAp
at java.util.concurrent.CompletableFuture.uniAp
at java.util.concurrent.CompletableFuture.thenA
at org.zalando.riptide.Requester$ResponseDispatch
at org.zalando.riptide.OriginalStackTracePlugin.lambda$prepare$1(OriginalStackTracePlugin.java:16)
at org.zalando.riptide.Requester$ResponseDispatcher.call(Requester.java:107)
at org.zalando.riptide.Dispatcher.dispatch(Dispatcher.java:20)
at org.zalando.riptide.Dispatcher.dispatch(Dispatcher.java:16)
at org.zalando.riptide.Dispatcher.dispatch(Dispatcher.java:12)
```

502 Bad Gateway  
Server: awselb/2.0

16

github.com/zalando/riptide

zalando

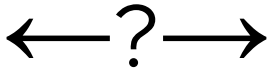
## Broken runtime #1 : Zombies

```
root 8502 0.7 0.0 11032 6200 ? S1 16:39 0:01 \ containerd-shim -namespace k8s.io -workdir
/var/lib/containerd/io.containerd.runtime.v1.linux/k8s.io/8eacd7463b319a9f8423f927
root 8520 0.4 0.0 46396 5768 ? Ss1 16:39 0:00 \ redis-server *:6379
root 10791 0.0 0.0 0 0 ? Z 16:39 0:00 \ [server_readiness] <defunct>
root 11632 0.0 0.0 0 0 ? Z 16:40 0:00 \ [redis-cli] <defunct>
root 12222 0.0 0.0 0 0 ? Z 16:40 0:00 \ [server_readiness] <defunct>
root 13102 0.0 0.0 0 0 ? Z 16:40 0:00 \ [redis-cli] <defunct>
root 14115 0.0 0.0 0 0 ? Z 16:40 0:00 \ [redis-cli] <defunct>
root 14500 0.0 0.0 0 0 ? Z 16:40 0:00 \ [redis-cli] <defunct>
root 14893 0.0 0.0 0 0 ? Z 16:40 0:00 \ [server_readiness] <defunct>
root 15309 0.0 0.0 0 0 ? Z 16:40 0:00 \ [redis-cli] <defunct>
root 16232 0.0 0.0 0 0 ? Z 16:41 0:00 \ [server_readiness] <defunct>
root 16895 0.0 0.0 0 0 ? Z 16:41 0:00 \ [redis-cli] <defunct>
root 17248 0.0 0.0 0 0 ? Z 16:41 0:00 \ [server_readiness] <defunct>
root 17876 0.0 0.0 0 0 ? Z 16:41 0:00 \ [server_readiness] <defunct>
root 18512 0.0 0.0 0 0 ? Z 16:41 0:00 \ [server_readiness] <defunct>
root 21932 0.0 0.0 0 0 ? Z 16:42 0:00 \ [server_readiness] <defunct>
root 22648 8.5 0.0 22320 5756 ? Rs 16:42 0:00 \ /bin/bash /usr/local/bin/server_readiness_probe.sh
```

ps auxf | grep -c defunct  
16018

readinessProbe:  
exec:  
command: [server\_readiness\_probe.sh]  
timeoutSeconds: 1

Are you a mechanic or a driver?



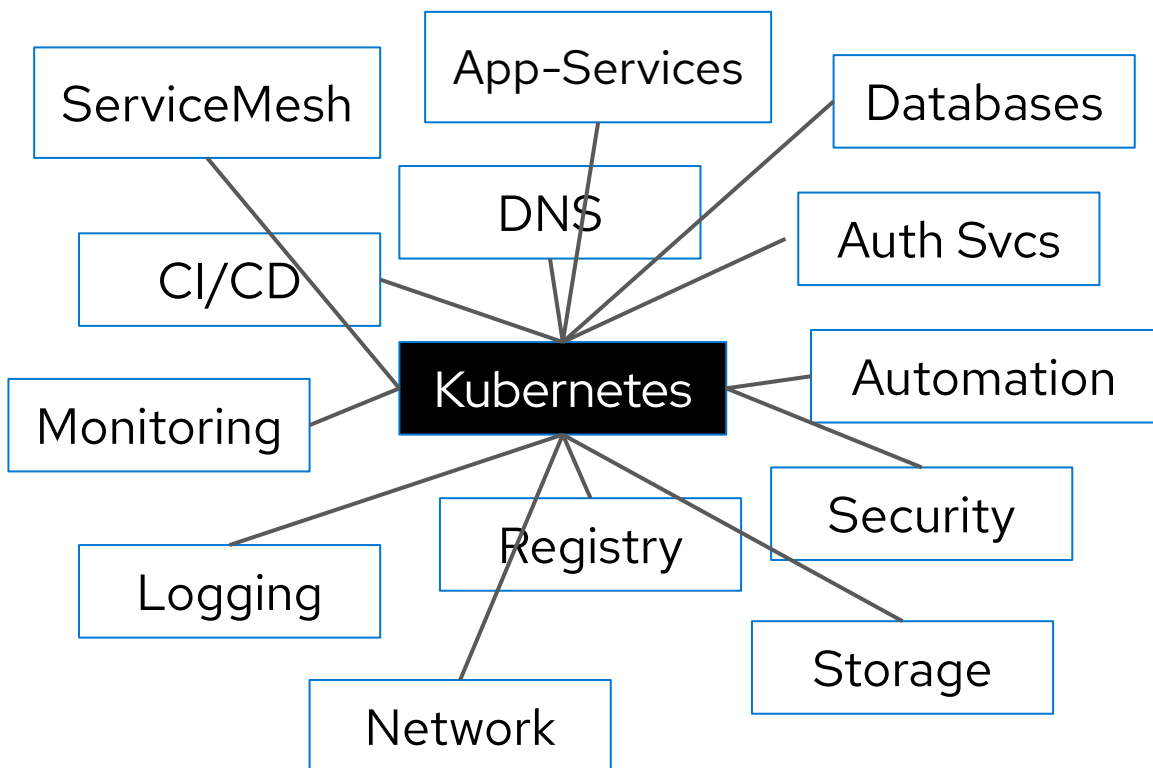
# Projects vs. Product?



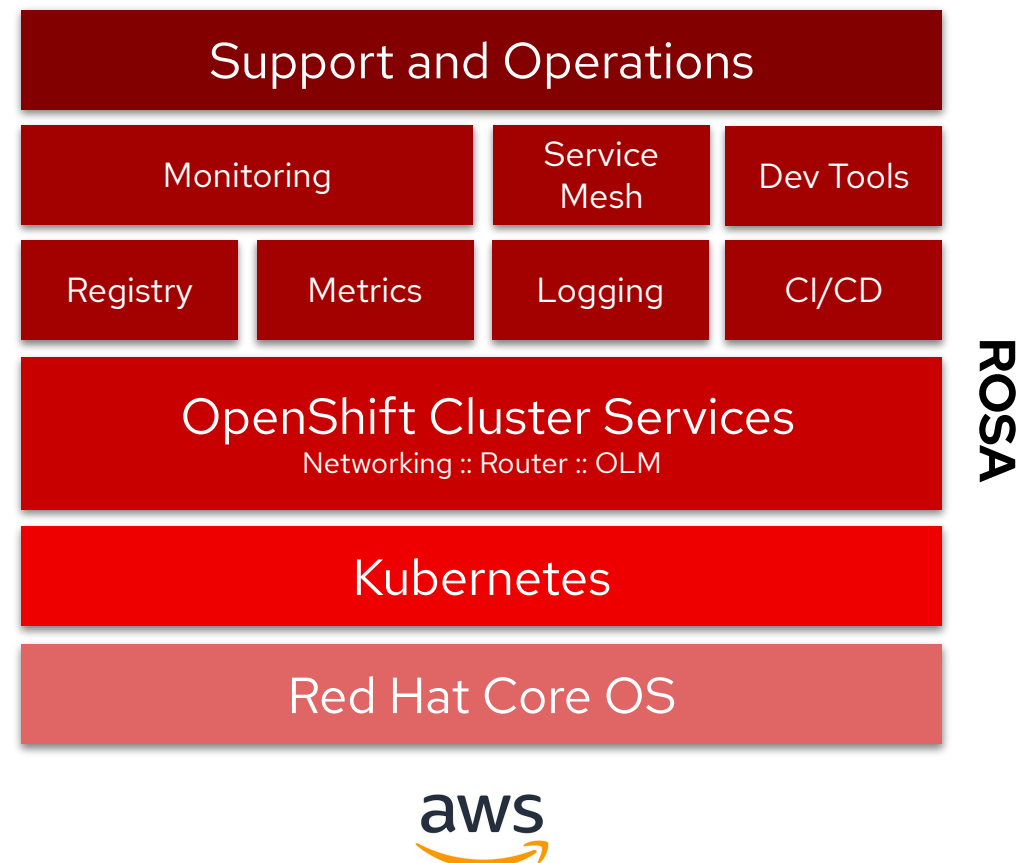
“Given two technologies, the one that’s easier to obtain, configure, and use will usually be the one that wins”

–Stephen O’Grady, The New Kingmakers





Kubernetes + components needed to run production workloads + SRE team + support



**Run** | Modernized traditional



**Grow**



**Transform** | New cloud-native



Build and Deploy Innovative Applications

## Managed OpenShift Application Platform

### Architecture



- "Fast-moving monolith"
- Microservices
- Serverless

### Agile integration



- API First
- Event Driven Architecture
- Hybrid old/new

### Streamline app life cycle



- Accelerate TTM
- CI/CD
- Automation

### Continuous innovation



- DevSecOps Factories
- Collaboration
- AI/ML & Data Services

“Creating short-term wins is different from hoping for short-term wins.”

-John Kotter, Leading Change

## GOALS

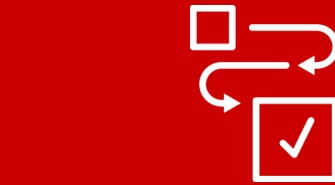
"Modernization"

"Develop Faster"

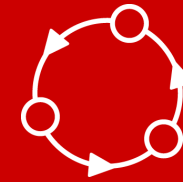
"Improve Delivery"

"Innovate"

## MEASURABLE RESULTS



LEAD TIME FOR  
CHANGE



DEPLOYMENT  
FREQUENCY



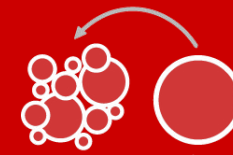
MEAN TIME TO  
RECOVERY (MTTR)



CHANGE  
FAILURE RATE\*

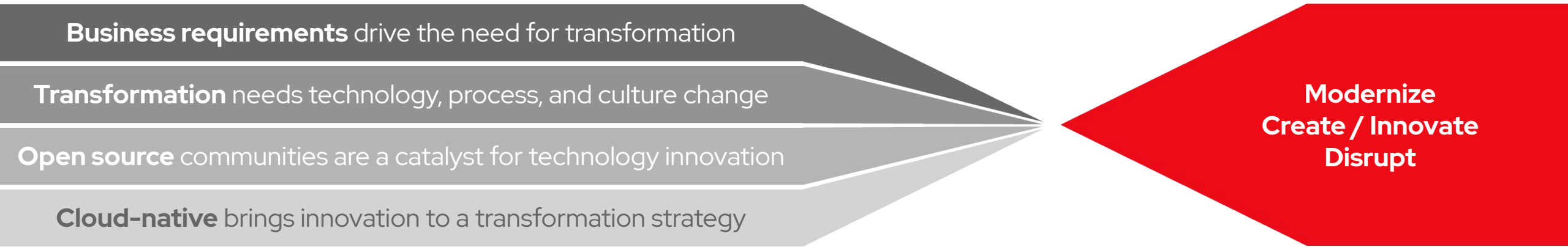
AGILITY

RELIABILITY





Transformation should bring modernization and innovation



If you don't need to focus on the platform you can focus on your goals

“I’m starting to associate the smell of pizza with the futility of a death march”

-Gene Kim, The Phoenix Project

# Thank you

Red Hat is the world's leading provider of enterprise open source software solutions. Award-winning support, training, and consulting services make Red Hat a trusted adviser to the Fortune 500.

Follow on Twitter:  [@dudashtweets](#)  
[@redhatgov](#)



[linkedin.com/company/red-hat](https://linkedin.com/company/red-hat)



[youtube.com/user/RedHatVideos](https://youtube.com/user/RedHatVideos)



[facebook.com/redhatinc](https://facebook.com/redhatinc)



[twitter.com/RedHat](https://twitter.com/RedHat)