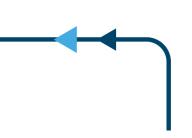




# adrian cockcroft @adrianco Baffling-late-adopters as a Service

Retweeted by Andrew Clay Shafer Expand

10 Apr



"You guys are crazy! Can't believe it"

"You guys are crazy! Can't believe it"

"What Netflix is doing won't work"

"You guys are crazy! Can't believe it"

"What Netflix is doing won't work"

It only works for 'Unicorns' like Netflix"

"You guys are crazy! Can't believe it"

"What Netflix is doing won't work"

- 2010

"We'd like to do that but can't"

It only works for 'Unicorns' like Netflix"

won't work"

"What Netflix is doing

"You guys are crazy! Can't believe it"

It only works for 'Unicorns' like Netflix"

"We'd like to do that but can't"

"We're on our way using Netflix OSS code"

- 2013

•Speed wins in the marketplace

- •Speed wins in the marketplace
- •Remove friction from product development

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- ·High trust, low process, no hand-offs between teams

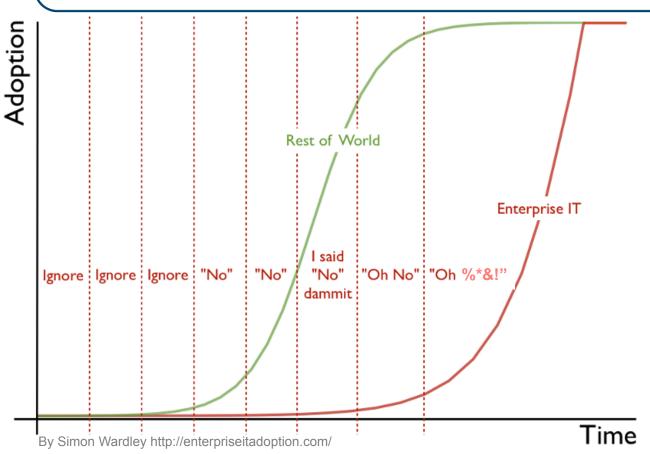
- •Speed wins in the marketplace
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- •Speed wins in the marketplace
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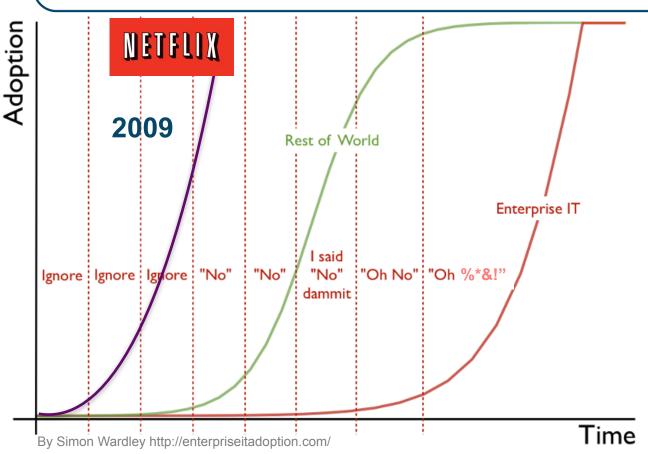
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- ·Self service cloud makes impossible things instant

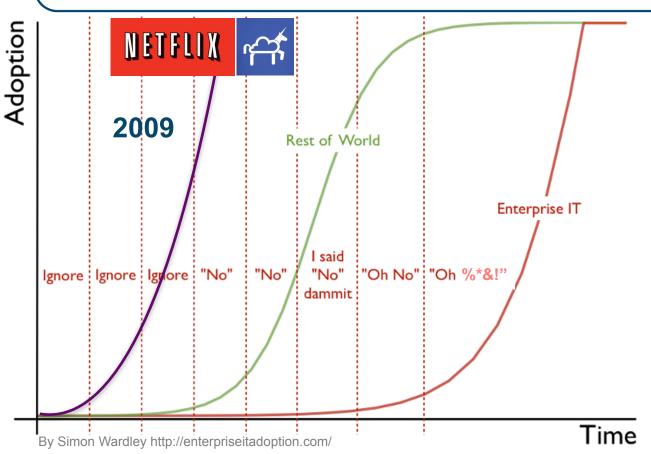




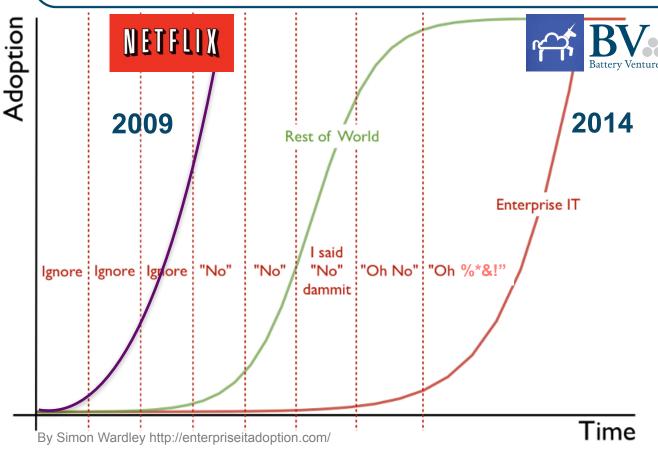






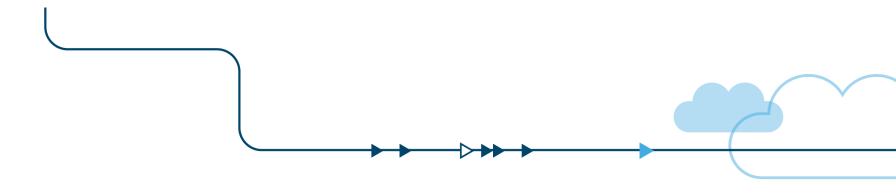






@adrianco's new job at the intersection of cloud and Enterprise IT

# This is the year that Enterprises finally embraced cloud.



"It isn't what we don't know that gives us trouble, it's what we know that ain't so."

Will Rogers

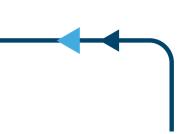
# What separates incumbents from disruptors?





# Assumptions

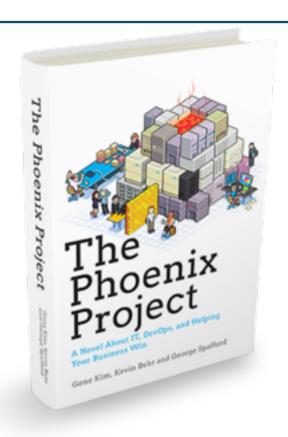
# Optimizations



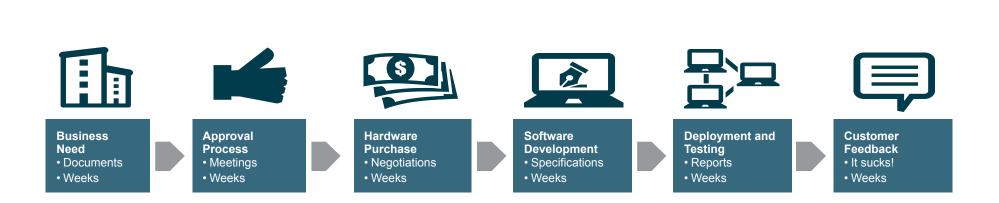
# Assumption: Process prevents problems

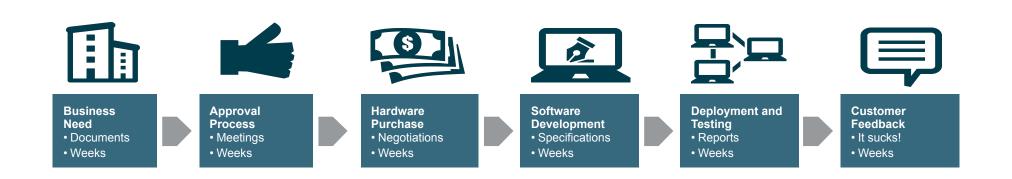
# Organizations build up slow complex "Scar tissue" processes

"This is the IT swamp draining manual for anyone who is neck deep in alligators."

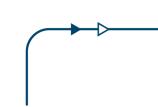


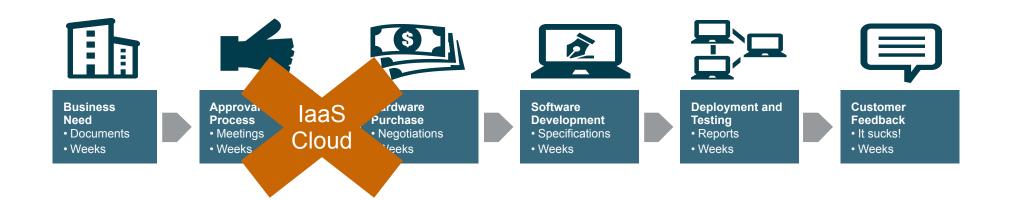




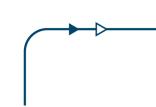


■ Hardware provisioning is undifferentiated heavy lifting – replace it with IaaS





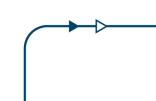
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■ Hardware provisioning is undifferentiated heavy lifting – replace it with IaaS



## Process Hand-Off Steps for Product Development on laaS



# **laaS Based Product**



### **Business Need**

- Documents
- Weeks



### **Software Development**

- Specifications
- Weeks



### **Deployment and Testing**

- Reports
- Days



### **Customer Feedback**

- It sucks!
- Days

# **laaS Based Product**















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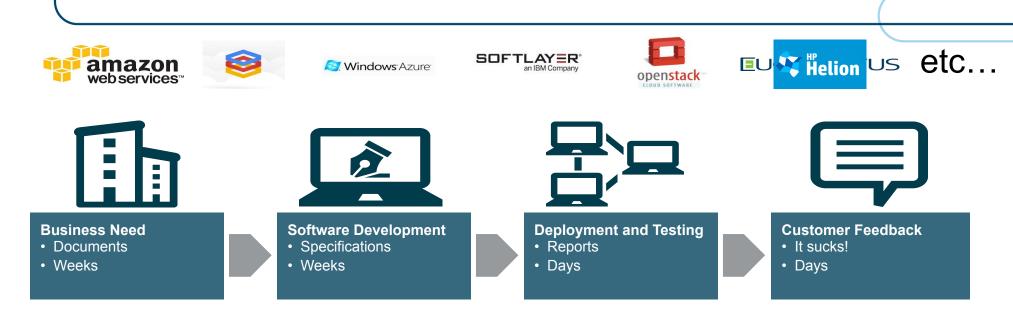
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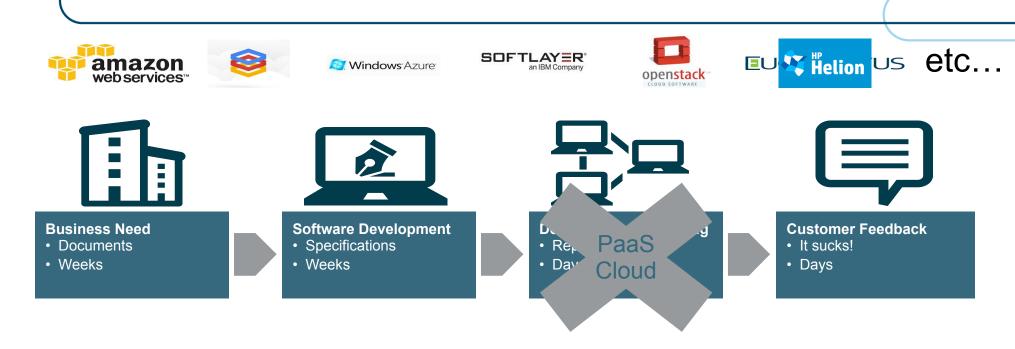


#### **Customer Feedback**

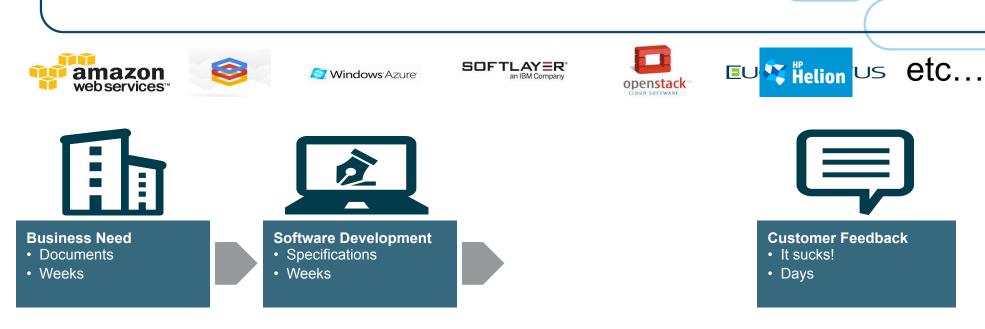
- It sucks!
- Days



Software provisioning is undifferentiated heavy lifting – replace it with PaaS

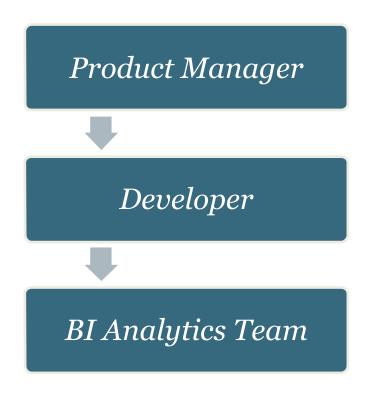


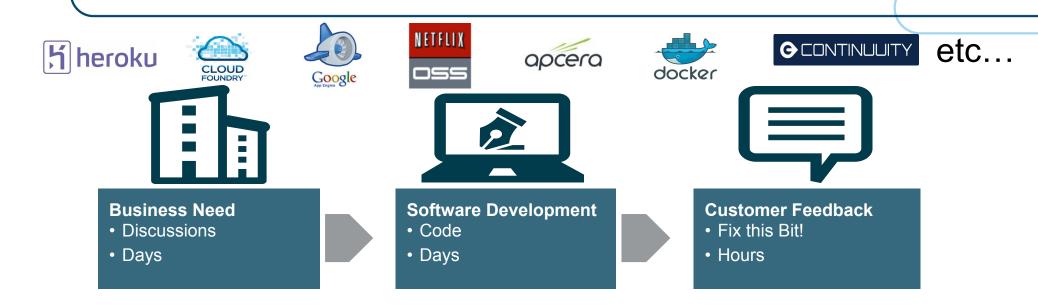
Software provisioning is undifferentiated heavy lifting – replace it with PaaS

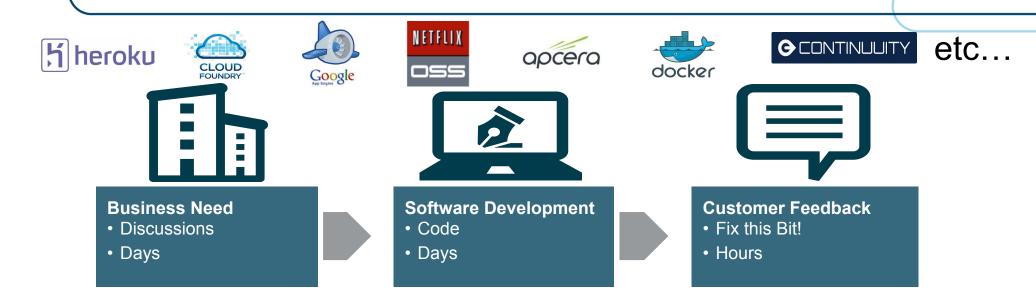


Software provisioning is undifferentiated heavy lifting – replace it with PaaS

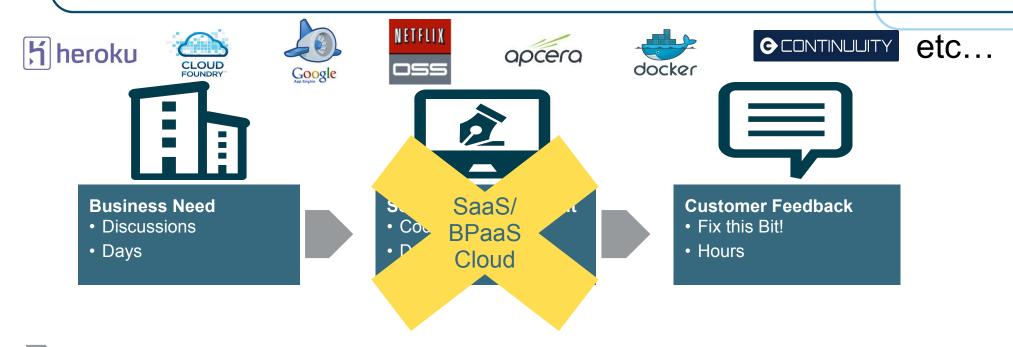
#### Process Hand-Off Steps for <u>Feature</u> Development on PaaS



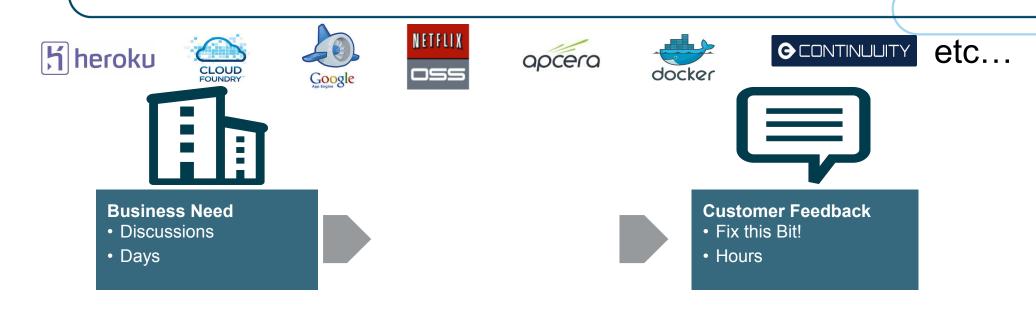




Building your own business apps is undifferentiated heavy lifting – use SaaS

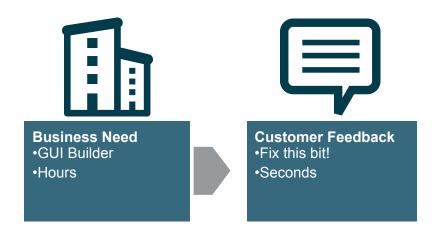


Building your own business apps is undifferentiated heavy lifting – use SaaS



■ Building your own business apps is undifferentiated heavy lifting – use SaaS

# SaaS Based Business Application Development



#### **SaaS Based Business Application Development**

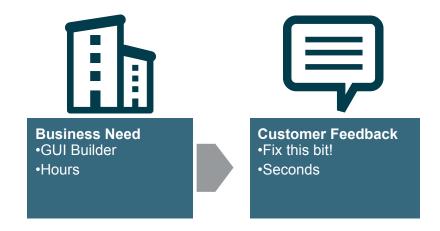


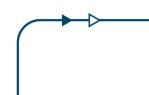




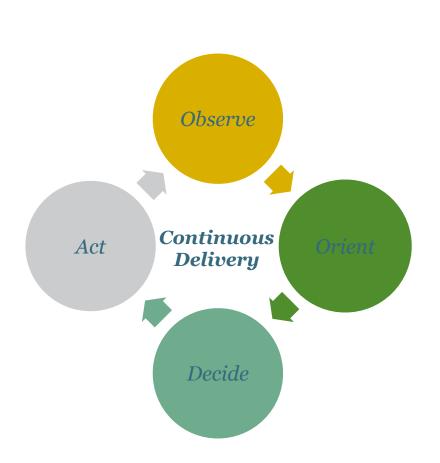


platfora and thousands more...

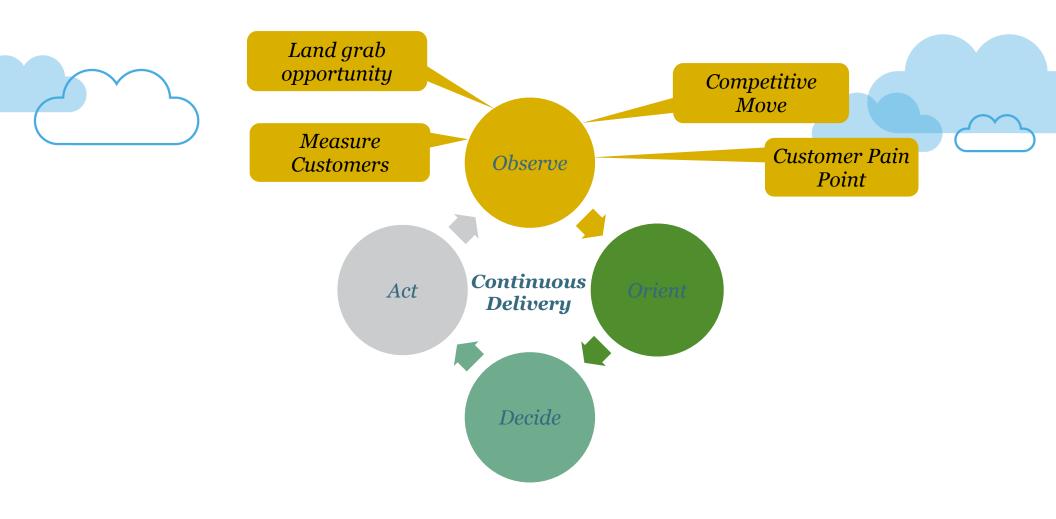


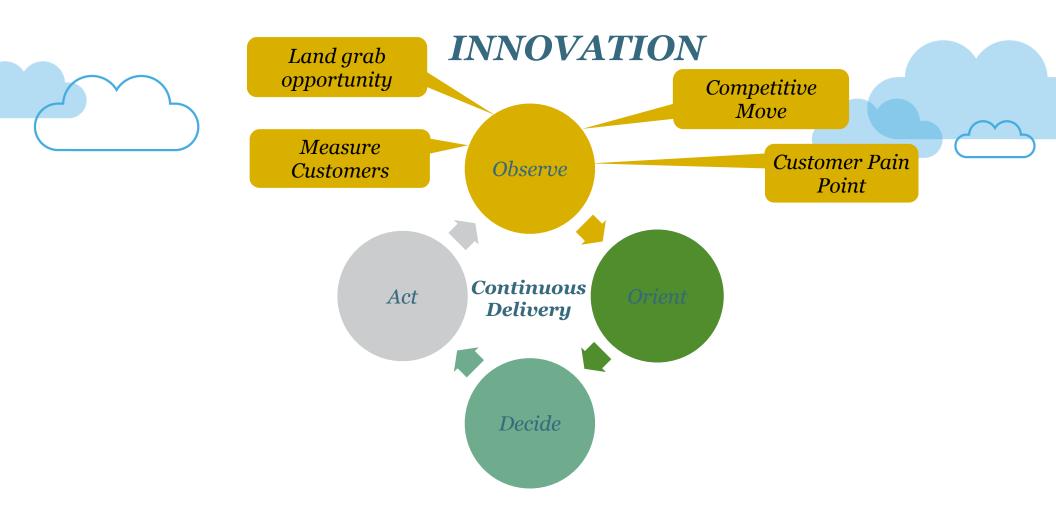


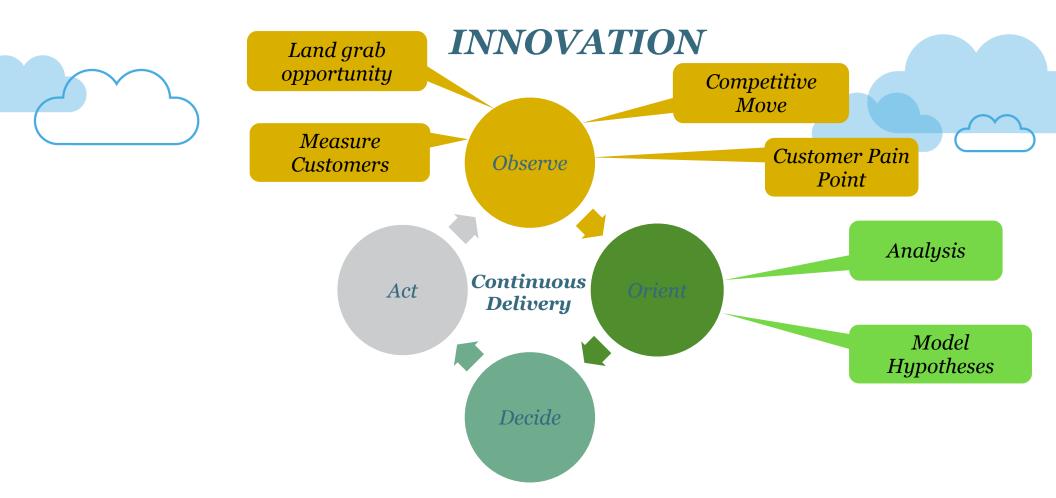


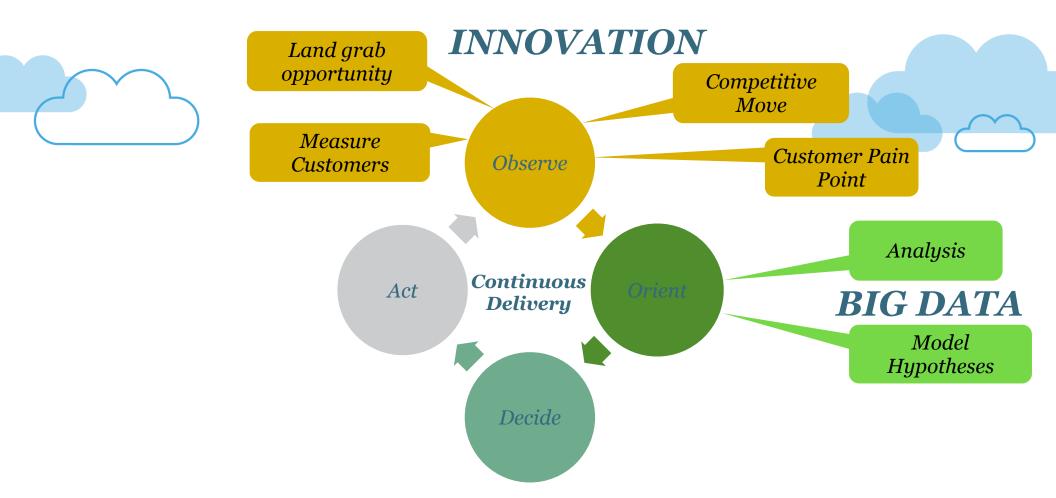


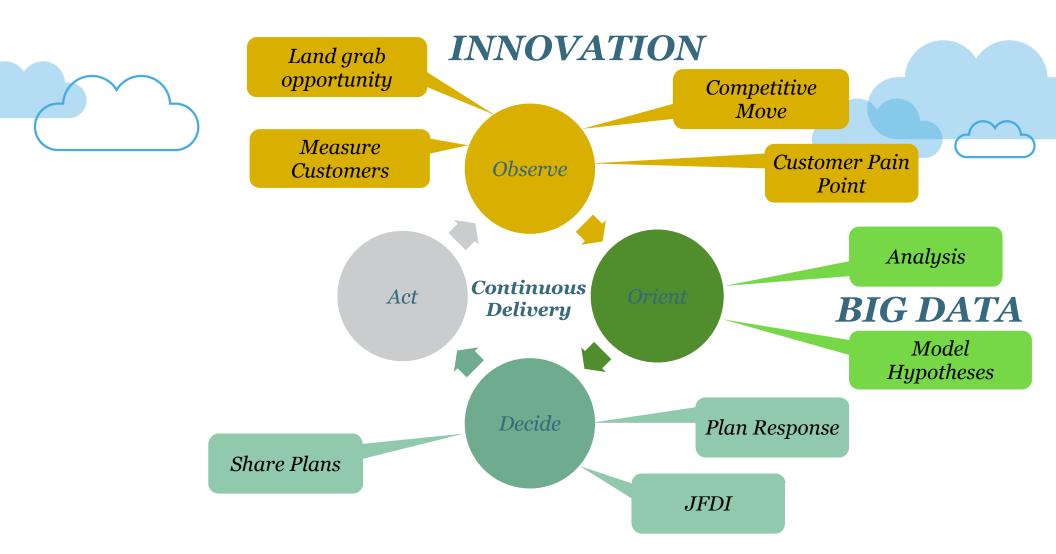


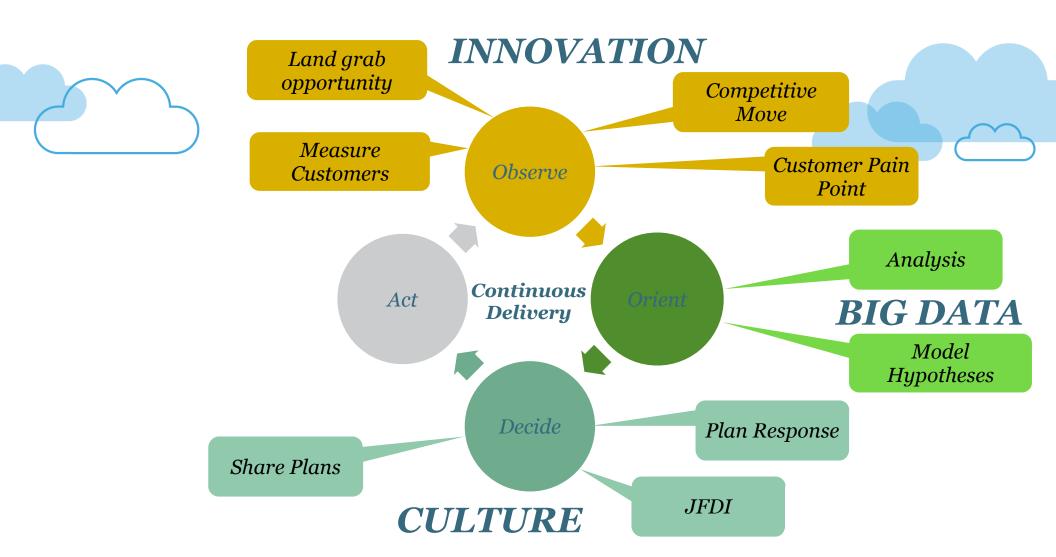


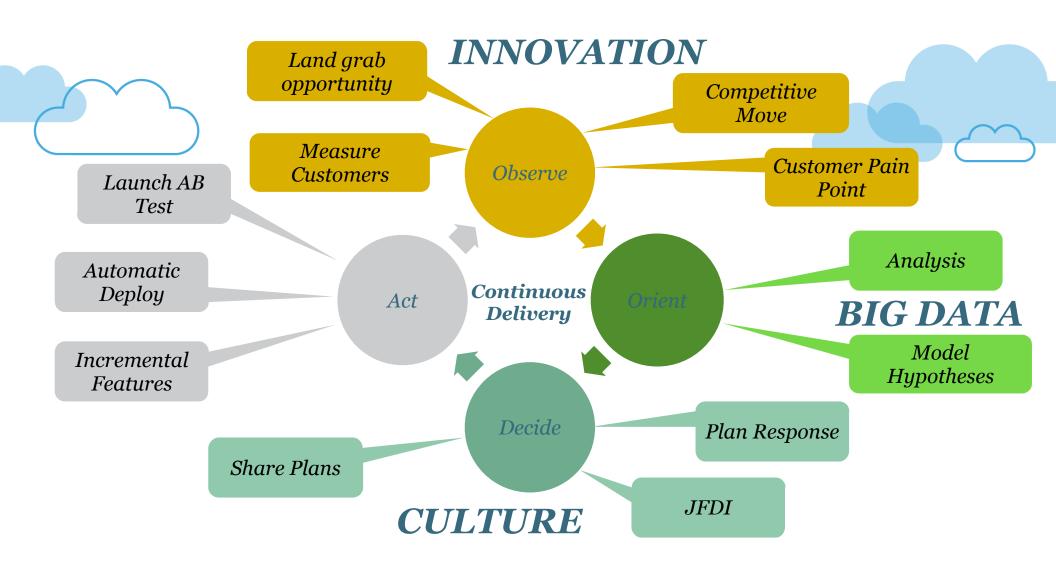


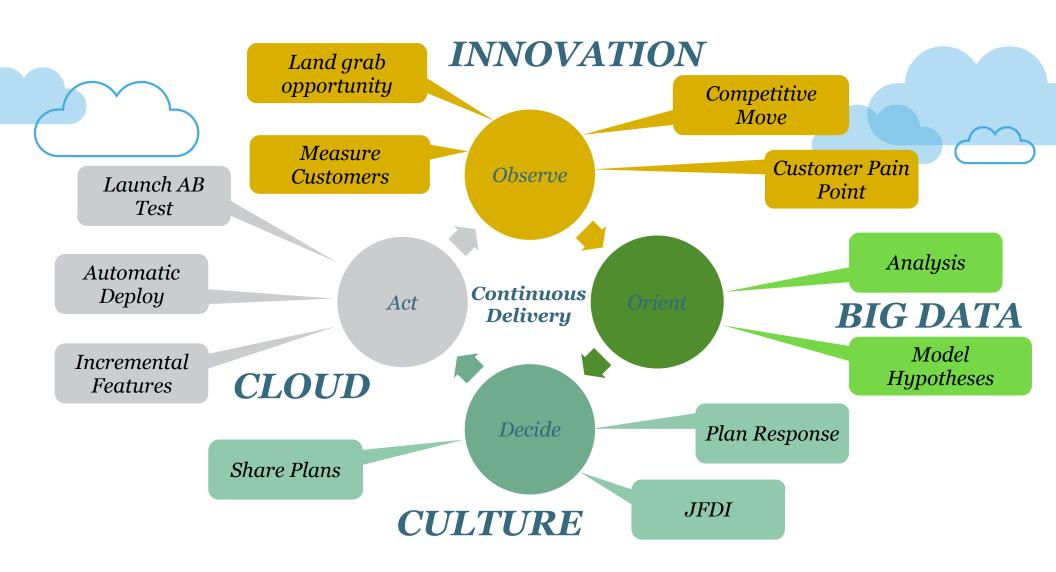


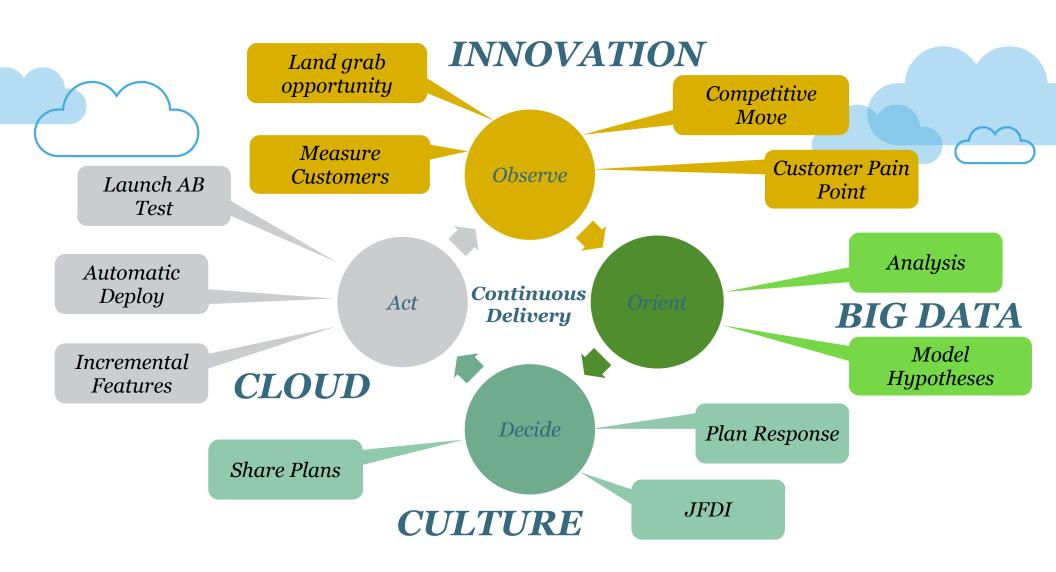


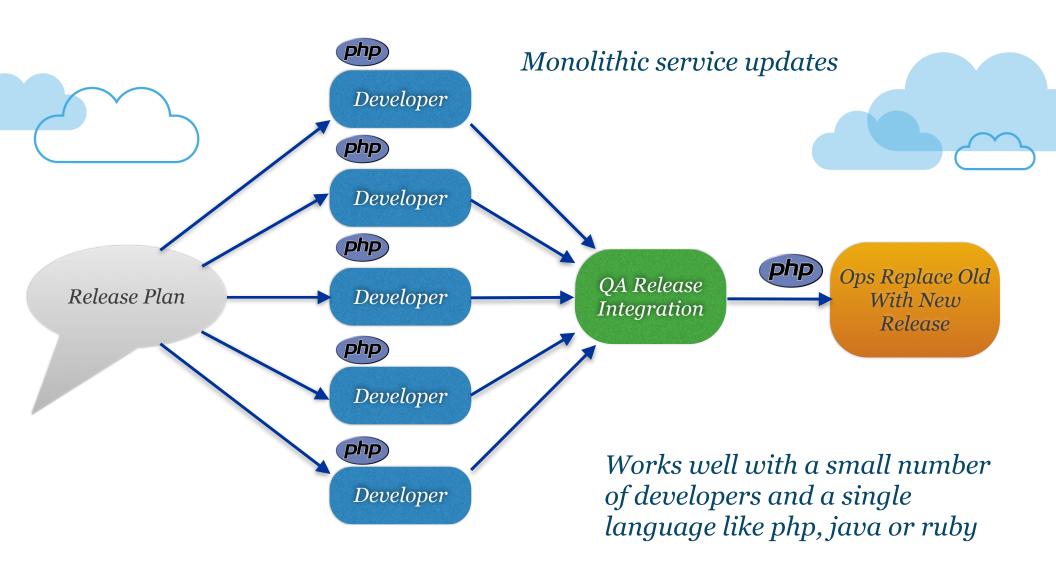


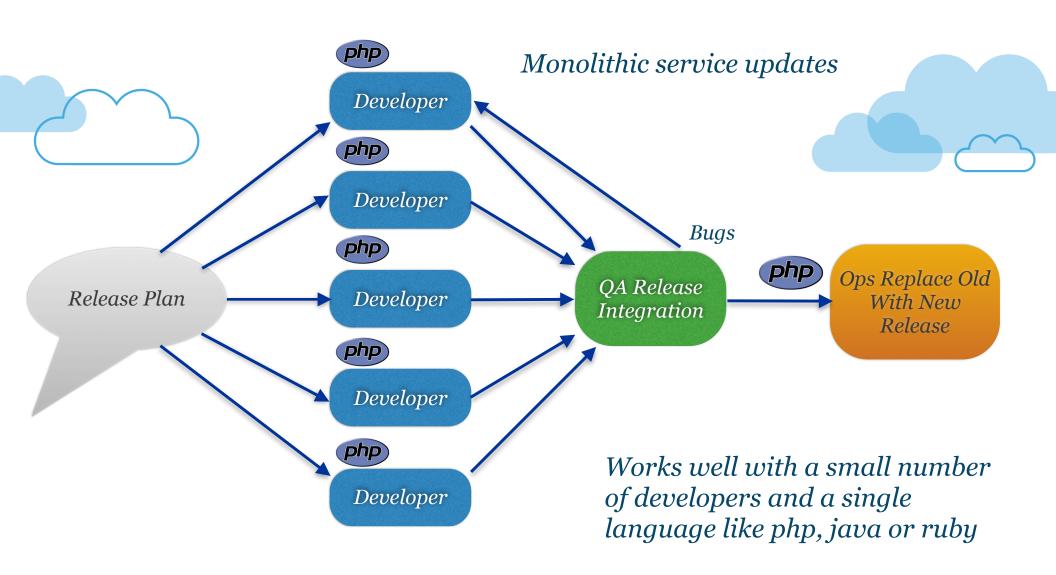


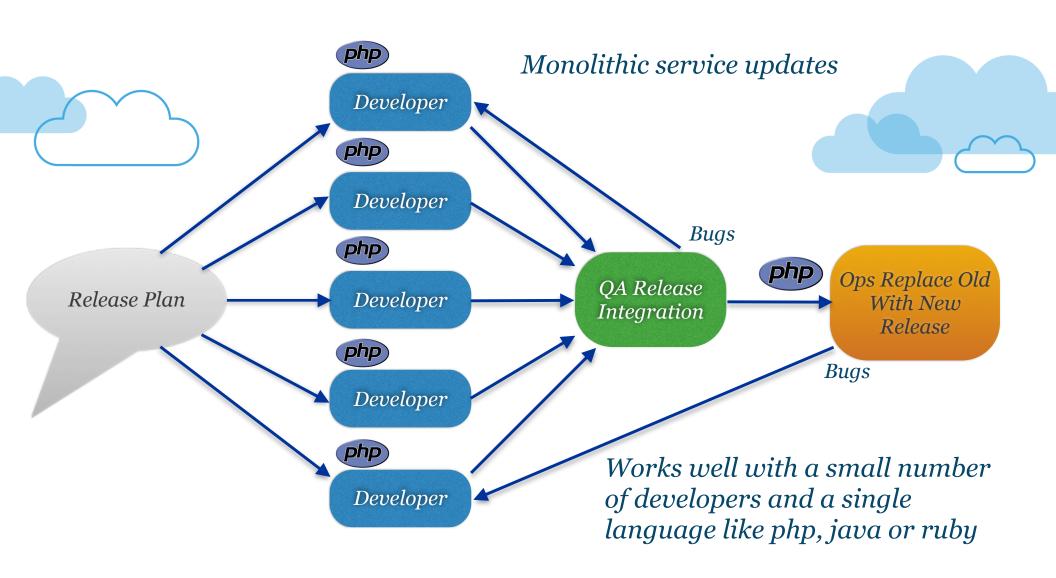


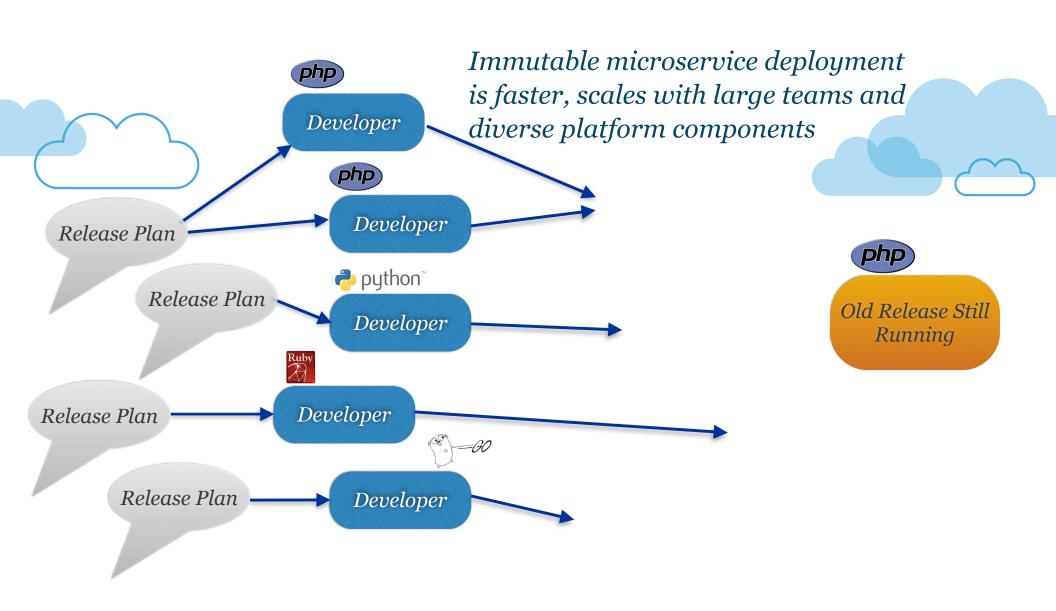


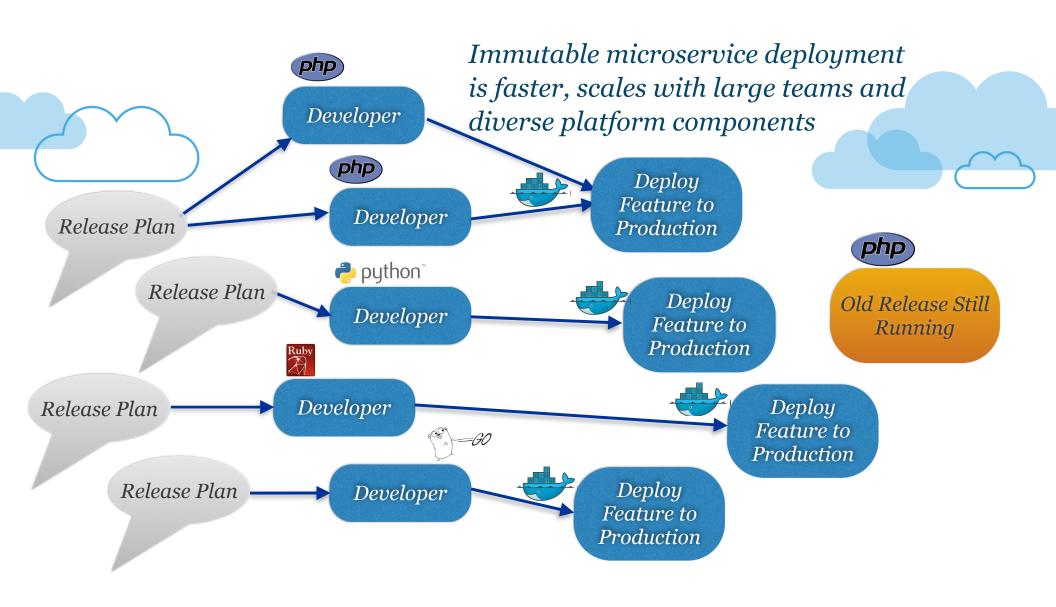


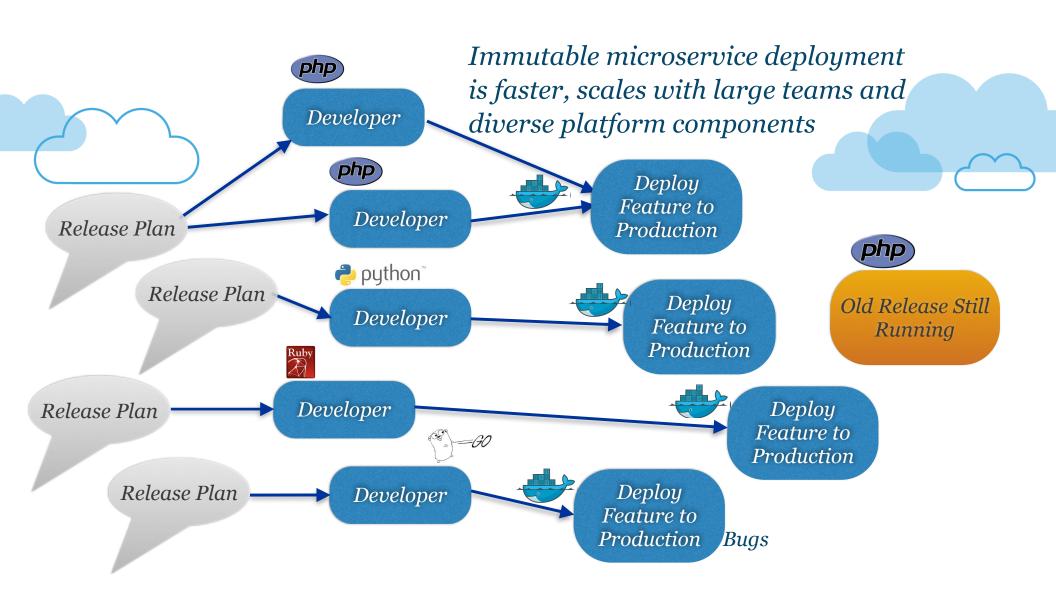


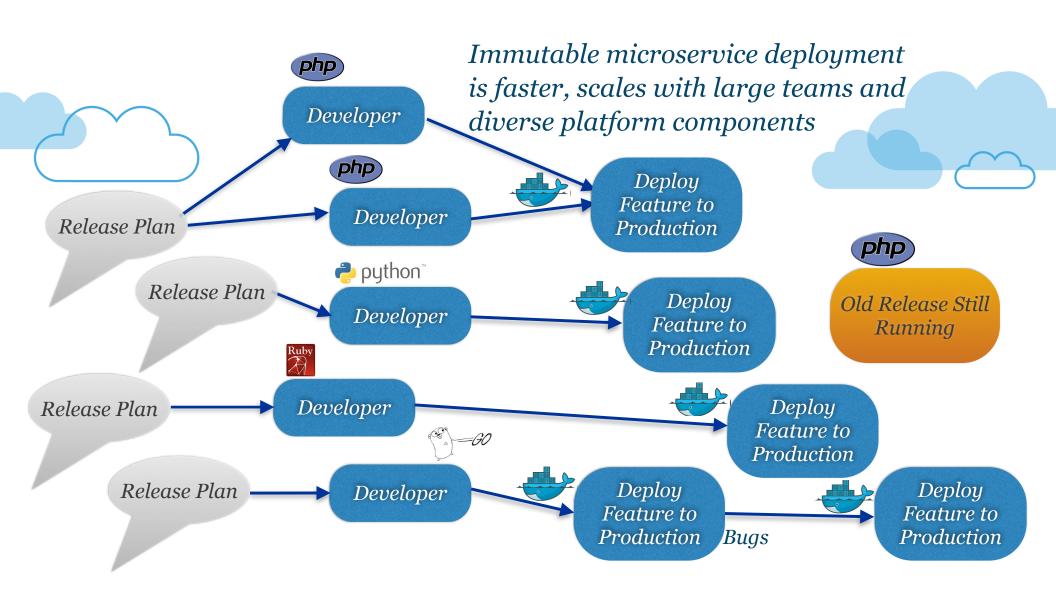












#### **Non-Destructive Production Updates**

- "Immutable Code" Service Pattern
  - Existing services are unchanged, old code remains in service
  - New code deploys as a new service group
  - *No impact to production until traffic routing changes*
- *A*|*B Tests, Feature Flags and Version Routing control traffic* 
  - First users in the test cell are the developer and test engineers
  - A cohort of users is added looking for measurable improvement
  - Finally make default for everyone, keeping old code for a while

# What Happened?



Cost and size and risk of change reduced

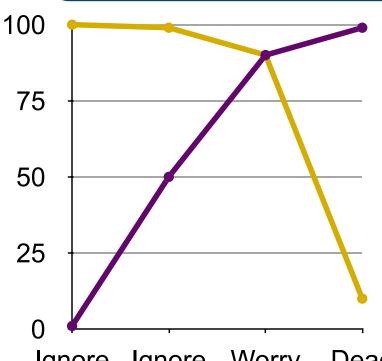
Rate of change increased



# Disruptor Continuous Delivery

# Future Disruption

### **Open Source Disruption**



Follow developers not dollars

Replacing expensive with free leads to an extreme case of Jevon's Paradox

Worry Ignore Ignore Dead

- W Open source adoption by new installations
- % Incumbent revenue

### **Ecosystem Transitions**



## **Ecosystem Transitions**



Languages are the foundations of ecosystems



#### **Ecosystem Transitions**







C# 2000's

Languages are the foundations of ecosystems



#### **Ecosystem Transitions**





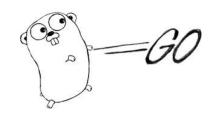


C# 2000's









2010's







































































# Microservices

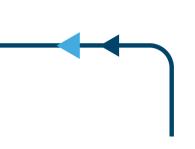
# Loosely coupled service oriented architecture with bounded contexts

A Microservice Definition

If every service has to be updated at the same time it's not loosely coupled

## A Microservice Definition

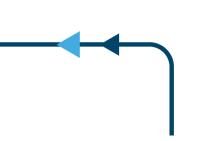
Loosely coupled service oriented architecture with bounded contexts



If every service has to be updated at the same time it's not loosely coupled

## A Microservice Definition

# Loosely coupled service oriented architecture with bounded contexts



If you have to know too much about surrounding services you don't have a bounded context. See the Domain Driven Design book by Eric Evans.

#### **Separate Concerns with Microservices**

- Invert Conway's Law teams own service groups and backend stores
- One "verb" per single function micro-service, size doesn't matter
- One developer independently produces a micro-service
- Each micro-service is it's own build, avoids trunk conflicts
- Deploy in a container: Tomcat, AMI or Docker, whatever...
- Stateless business logic. Cattle, not pets.
- Stateful cached data access layer using replicated ephemeral instances

#### **NetflixOSS - High Availability Patterns**

- Business logic isolation in stateless micro-services
- *Immutable code with instant rollback*
- *Auto-scaled capacity and deployment updates*
- Distributed across availability zones and regions
- De-normalized single function NoSQL data stores
- See over 40 NetflixOSS projects at <u>netflix.github.com</u>
- Get "Technical Indigestion" trying to keep up with <u>techblog.netflix.com</u>







# Cloud Native Monitoring and Microservices

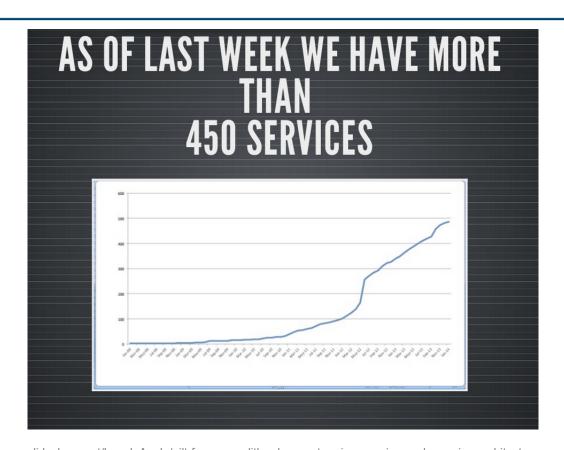
#### **Cloud Native**

- High rate of change
   Code pushes can cause floods of new instances and metrics
   Short baseline for alert threshold analysis everything looks unusual
- Ephemeral Configurations

  Short lifetimes make it hard to aggregate historical views

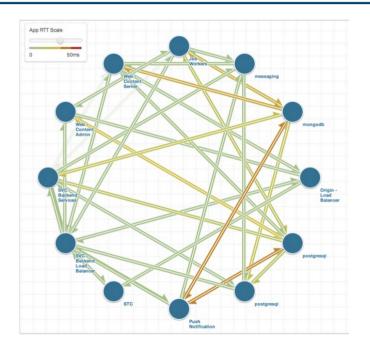
  Hand tweaked monitoring tools take too much work to keep running
- Microservices with complex calling patterns
  End-to-end request flow measurements are very important
  Request flow visualizations get overwhelmed

#### **Microservice Based Architectures**

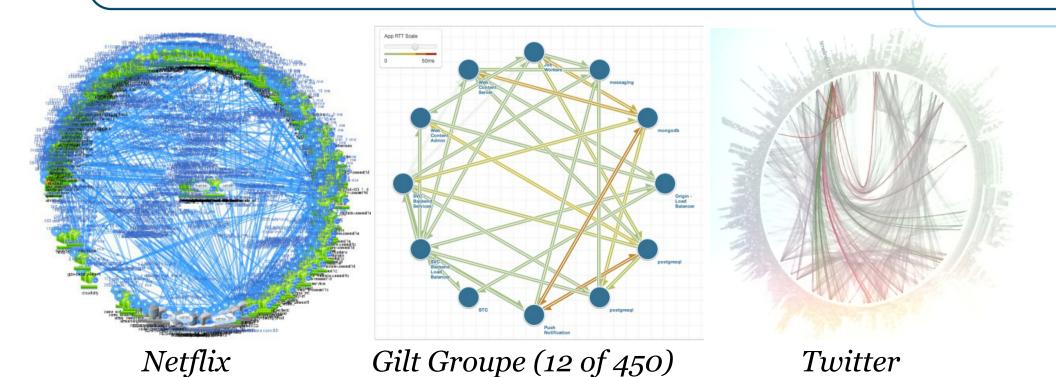


See http://www.slideshare.net/LappleApple/gilt-from-monolith-ruby-app-to-micro-service-scala-service-architecture

#### "Death Star" Architecture Diagrams



#### "Death Star" Architecture Diagrams

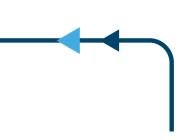


#### **Continuous Delivery and DevOps**

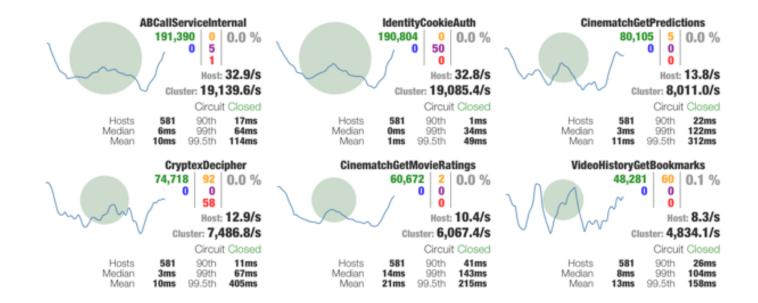
- Changes are smaller but more frequent
- Individual changes are more likely to be broken
- Changes are normally deployed by developers
- Feature flags are used to enable new code
- Instant detection and rollback matters much more

# Whoops! I didn't mean that! Reverting...

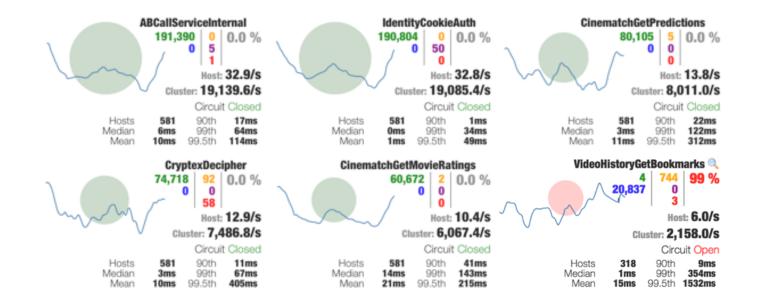
Not cool if it takes 5 minutes to see it failed and 5 more to see a fix No-one notices if it only takes 5 seconds to detect and 5 to see a fix



#### NetflixOSS Hystrix/Turbine Circuit Breaker

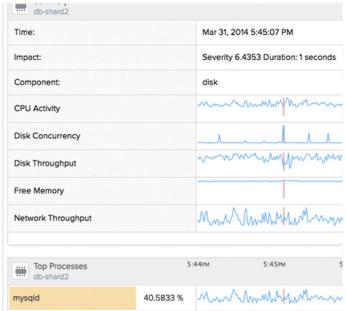


#### NetflixOSS Hystrix/Turbine Circuit Breaker

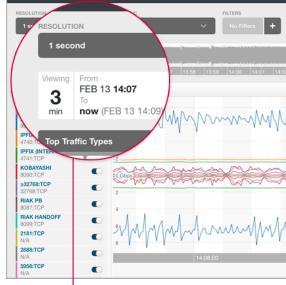


#### **Low Latency SaaS Based Monitors**

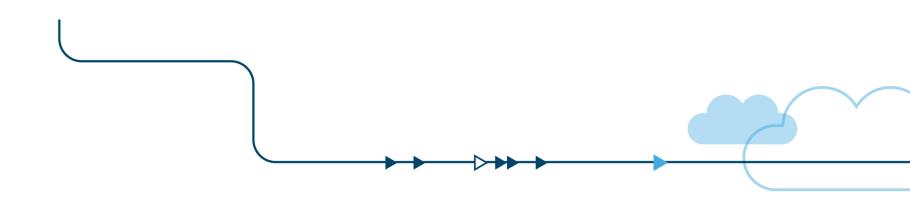




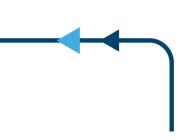




1-second data collection and real-time streaming processing on all components of the application stack



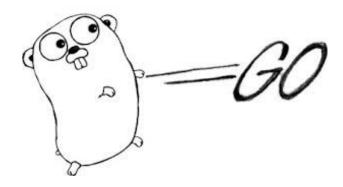
# Metric to display latency needs to be less than human attention span (~10s)

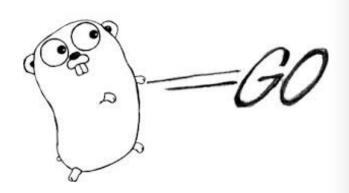


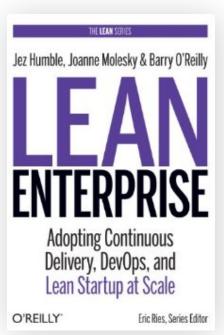
## Separation of Concerns

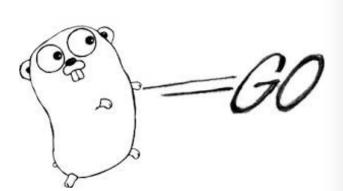
Bounded Contexts

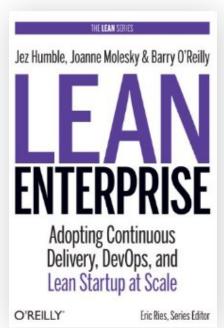


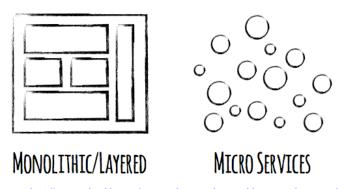












http://eugenedvorkin.com/seven-micro-services-architecture-advantages/

#### **Any Questions?**

- Battery Ventures http://www.battery.com
- Adrian's Blog <a href="http://perfcap.blogspot.com">http://perfcap.blogspot.com</a>
- Slideshare <a href="http://slideshare.com/adriancockcroft">http://slideshare.com/adriancockcroft</a>
- ullet Monitorama Opening Keynote Portland OR May  $7^{th}$ , 2014 Video available
- GOTO Chicago Opening Keynote May 20<sup>th</sup>, 2014
- Qcon New York Speed and Scale June 11<sup>th</sup>, 2014 Video available
- Structure Cloud Trends June 19th, 2014 Video available
- GOTO Copenhagen/Aarhus Denmark Sept 25<sup>th</sup>, 2014
- DevOps Enterprise Summit San Francisco Oct 21-23rd, 2014
- GOTO Berlin Germany Nov 6th, 2014
- AWS Re:Invent Las Vegas November 14th, 2014



