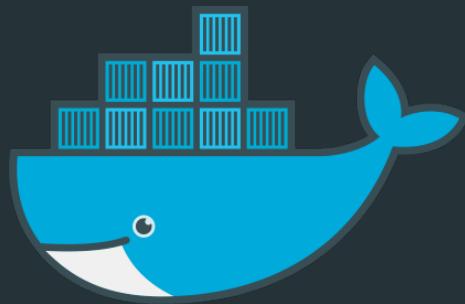
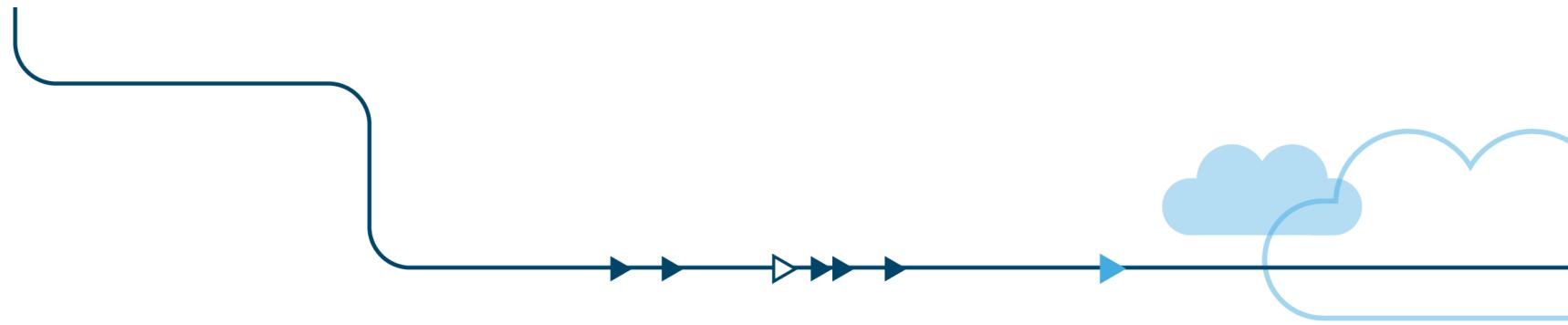


State of the Art in Microservices

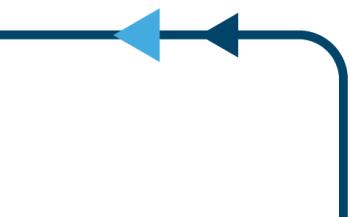


dockercon14 | eu



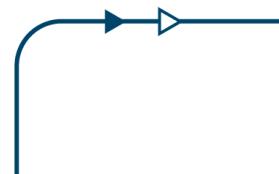
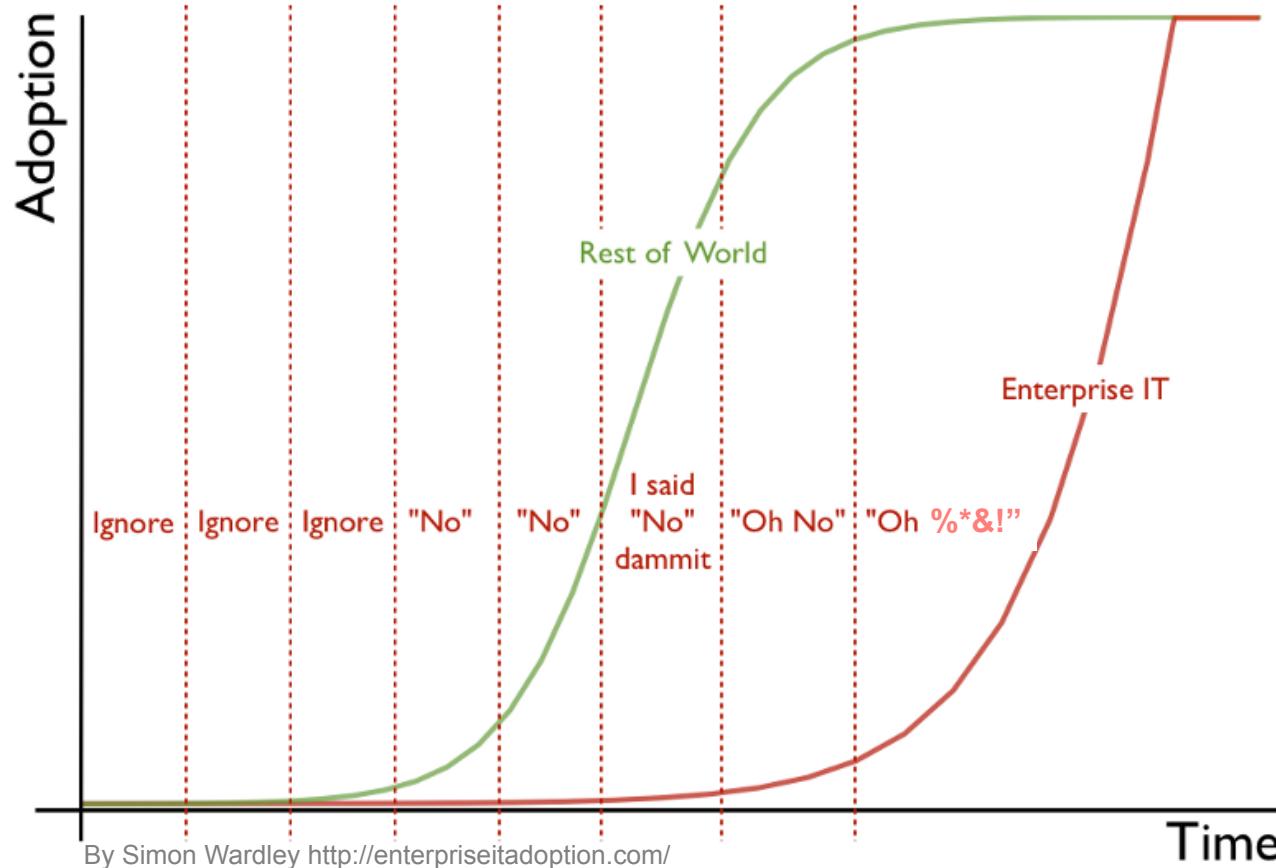
Adrian Cockcroft - Battery Ventures - @adrianco

Speeding up Development Microservice Architectures What's Next



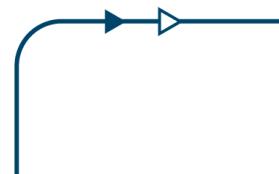
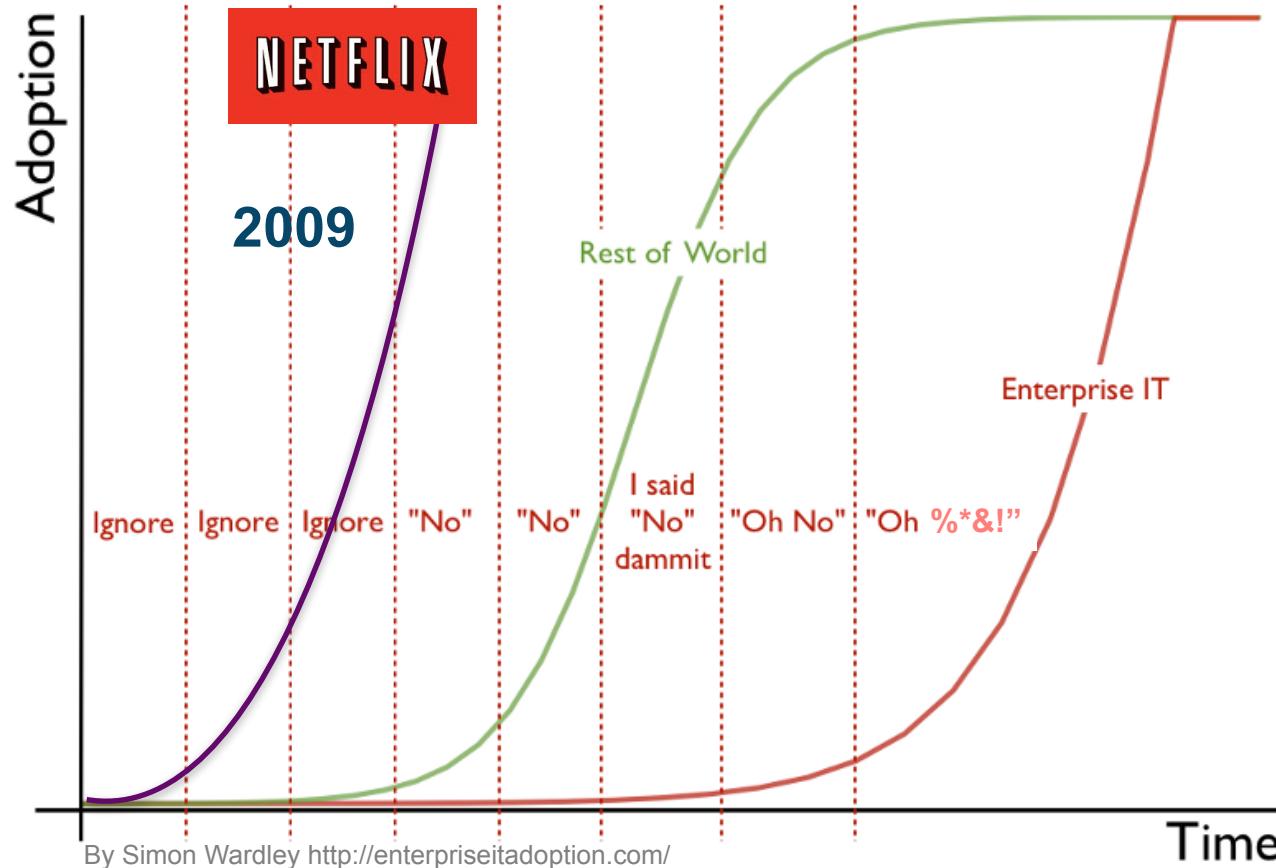


Cloud Adoption



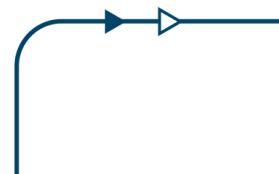
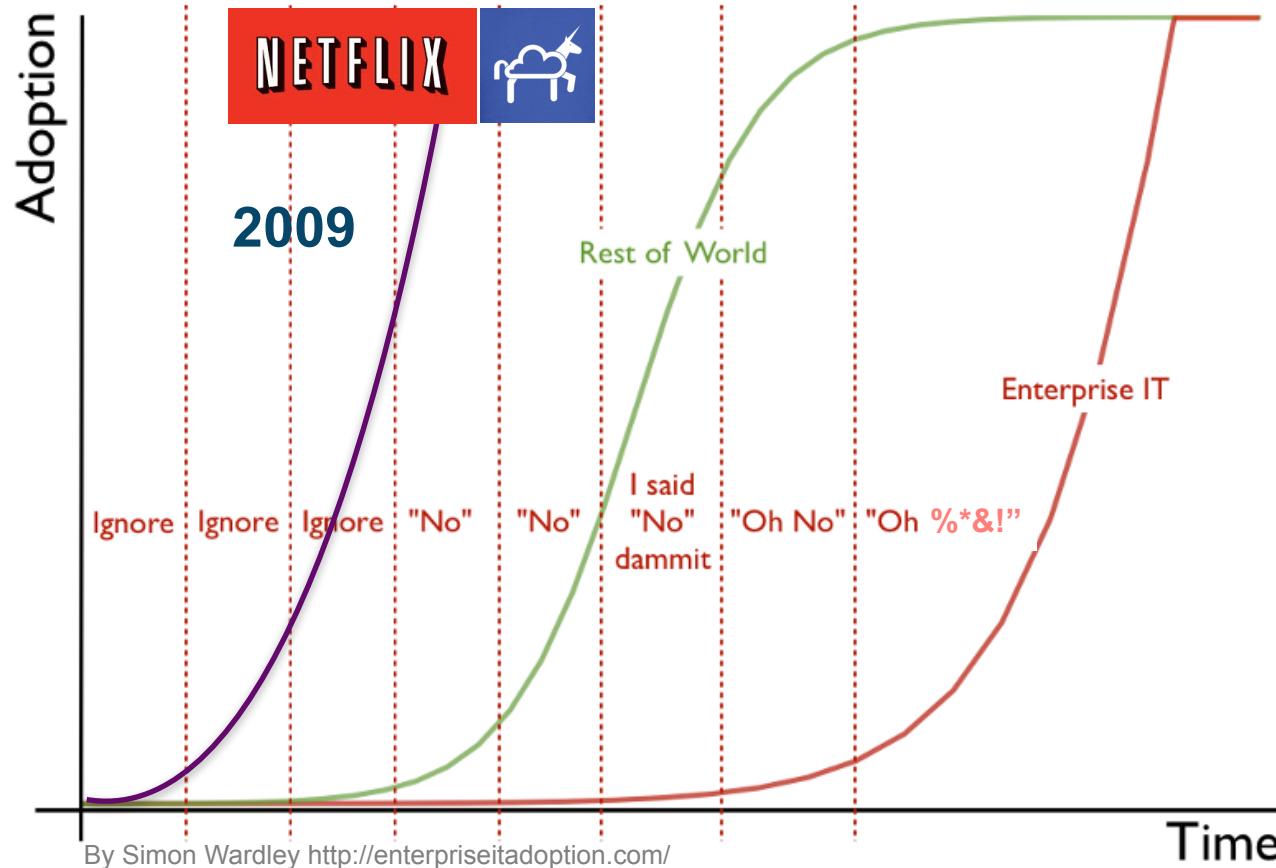


Cloud Adoption



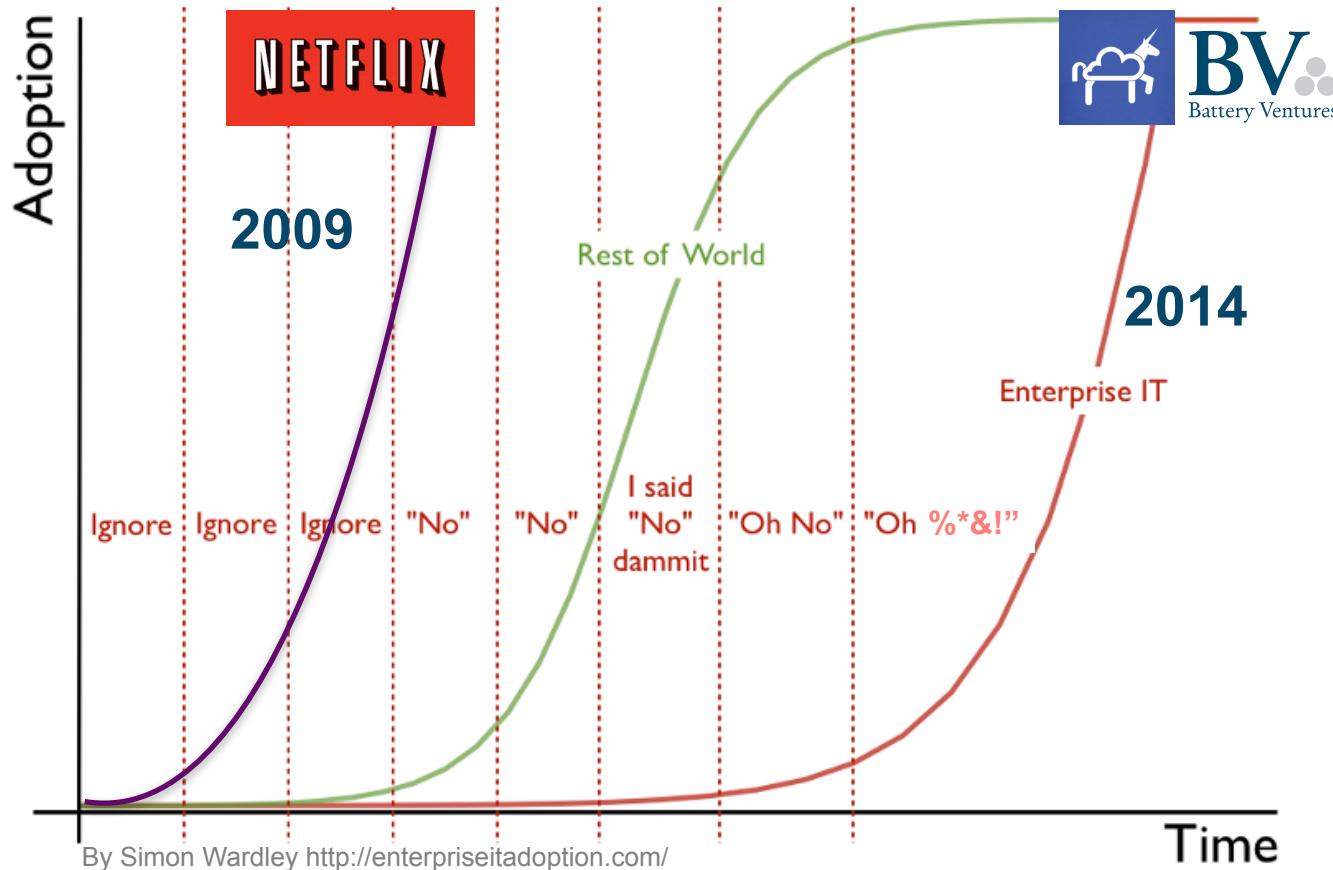


Cloud Adoption

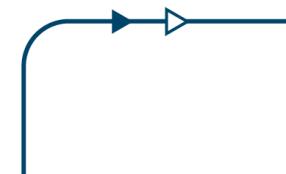




Cloud Adoption

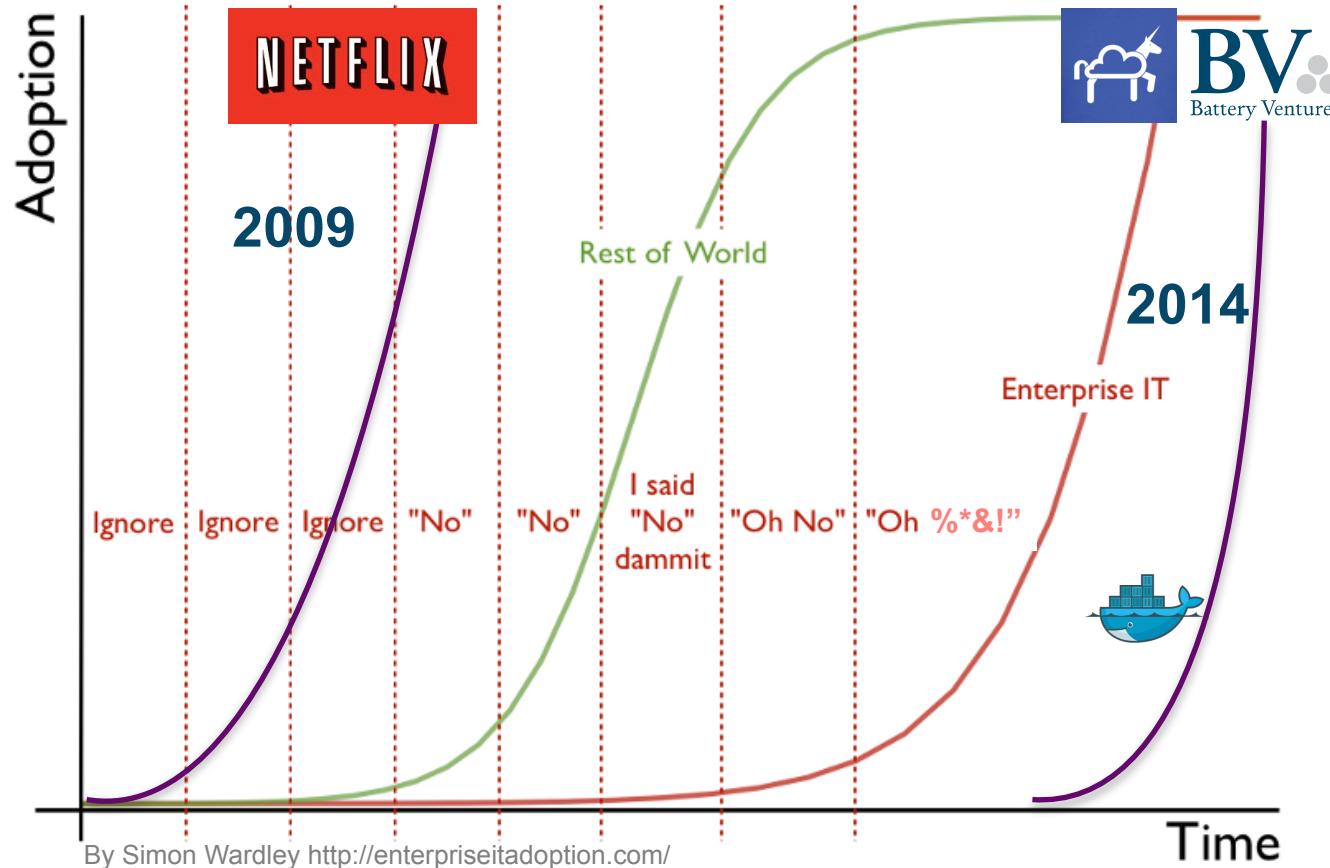


@adrianco's job at the intersection of cloud and Enterprise IT





Cloud Adoption

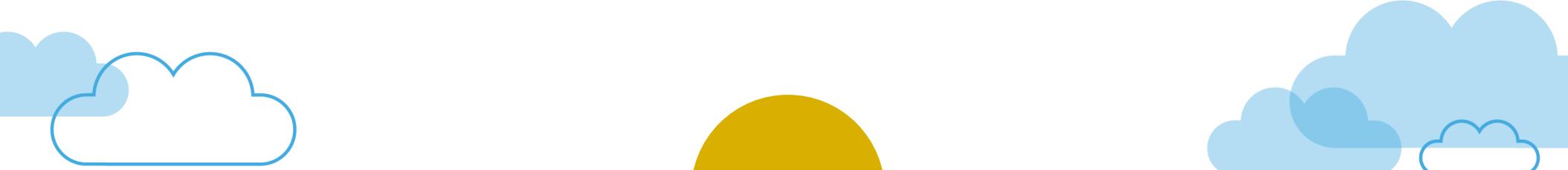
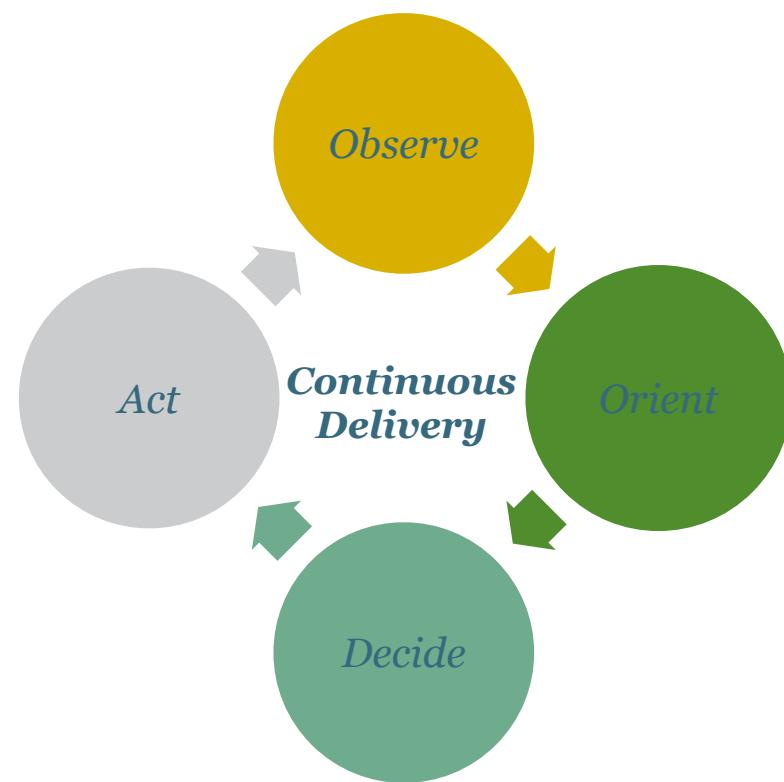


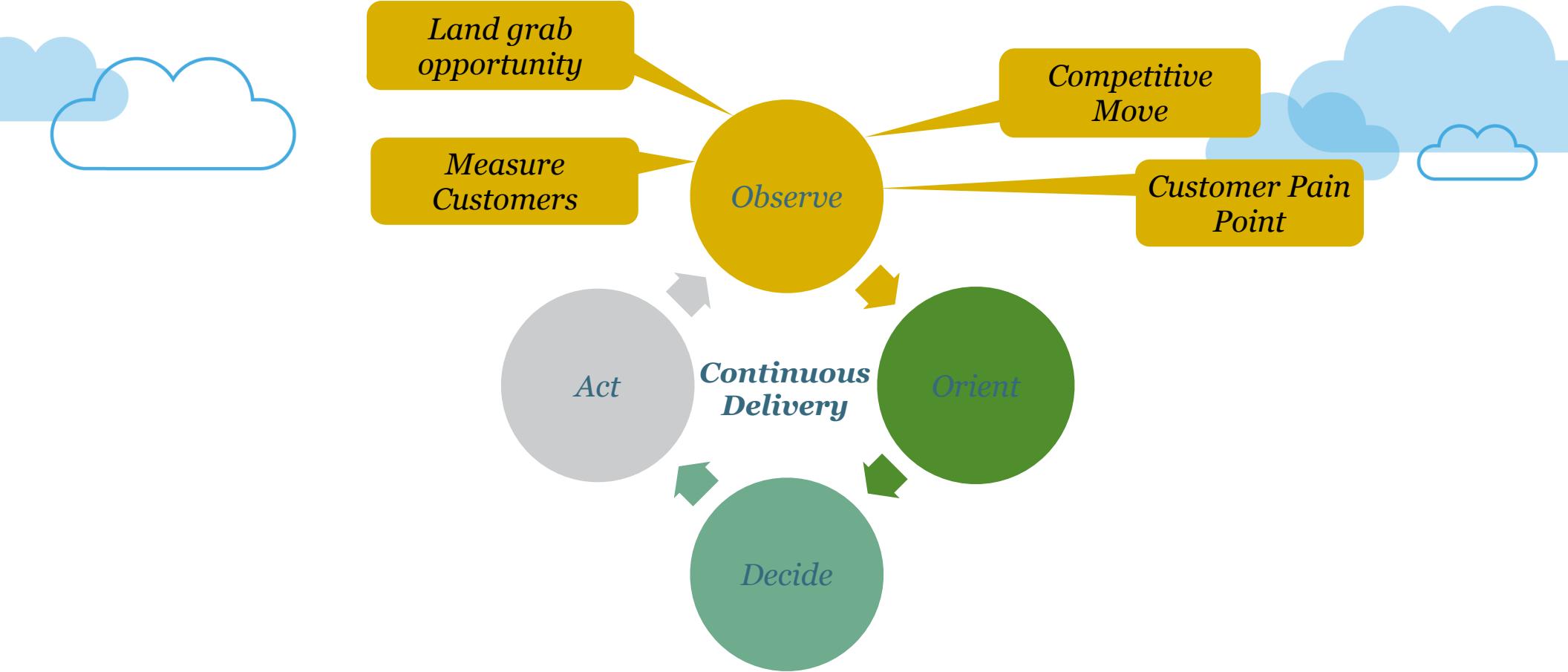
@adrianco's job at the intersection of cloud and Enterprise IT

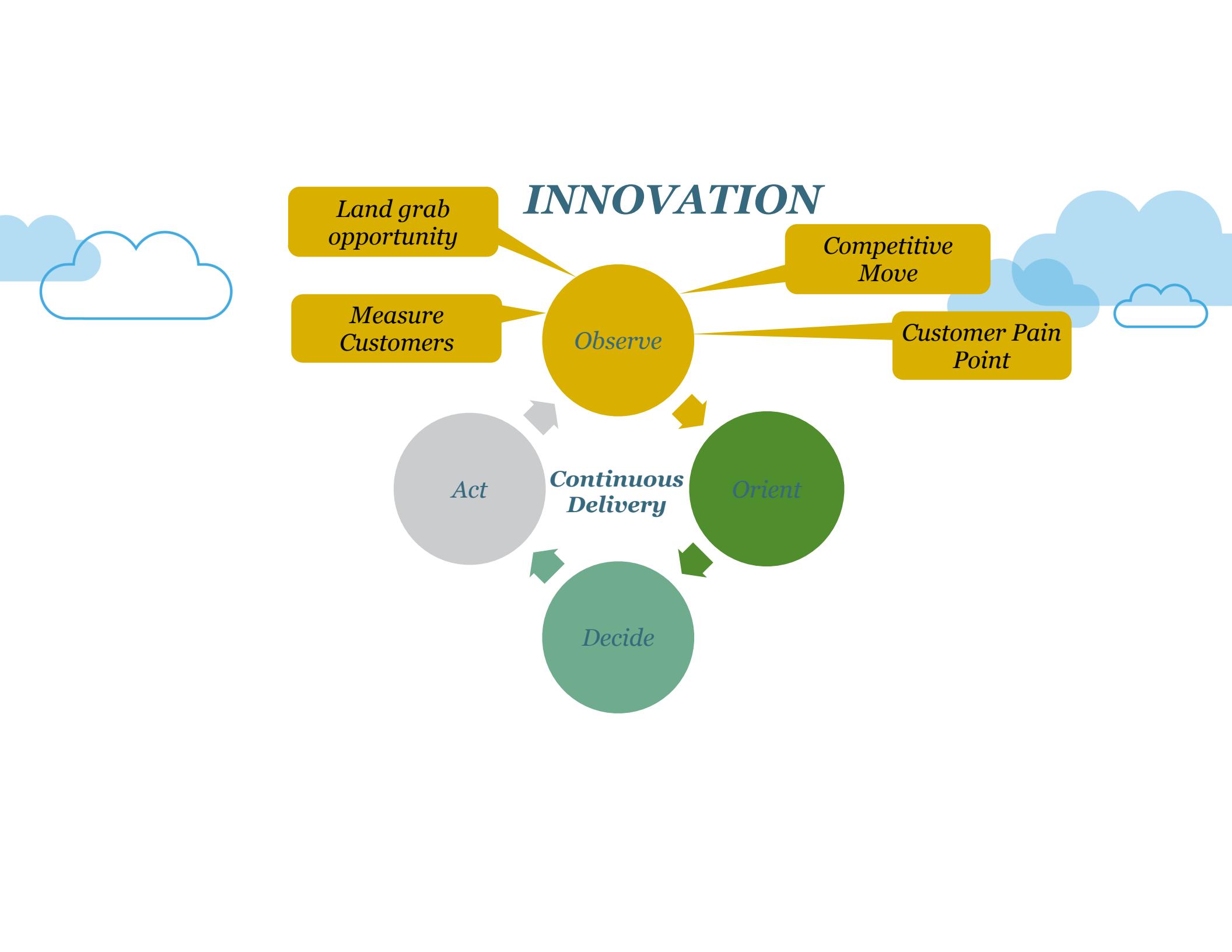
Docker wasn't on anyone's roadmap for 2014. It's on everyone's roadmap for 2015.

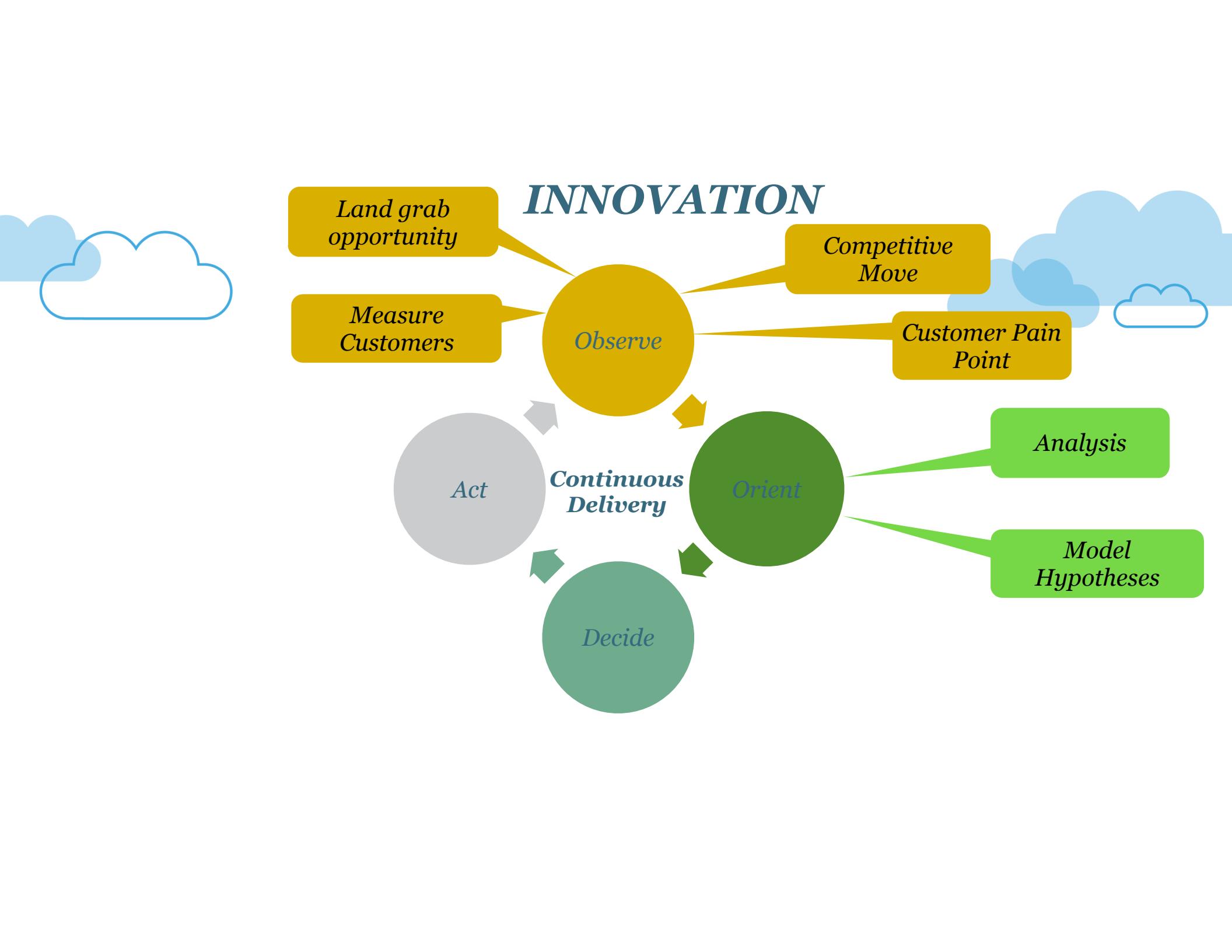


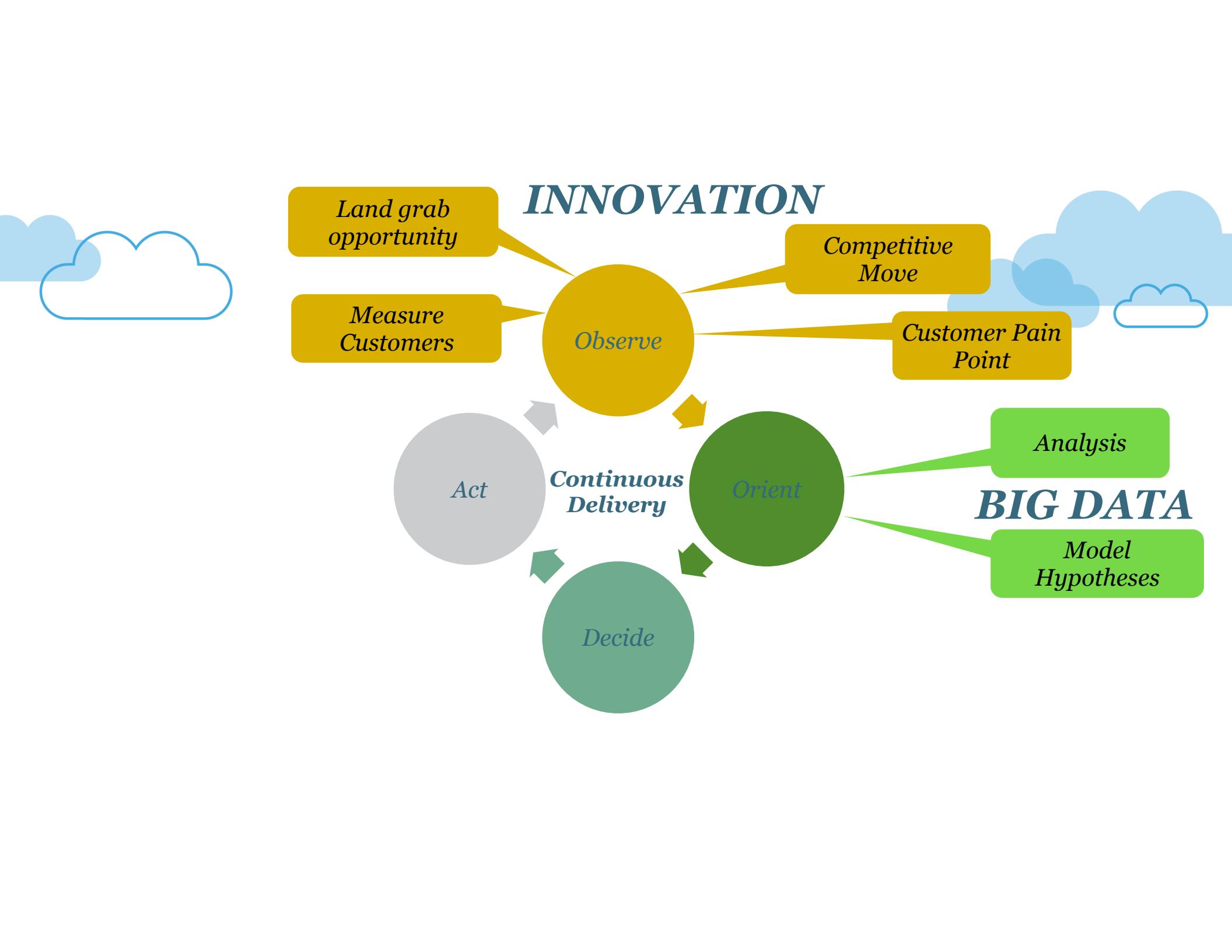
Product Development Processes

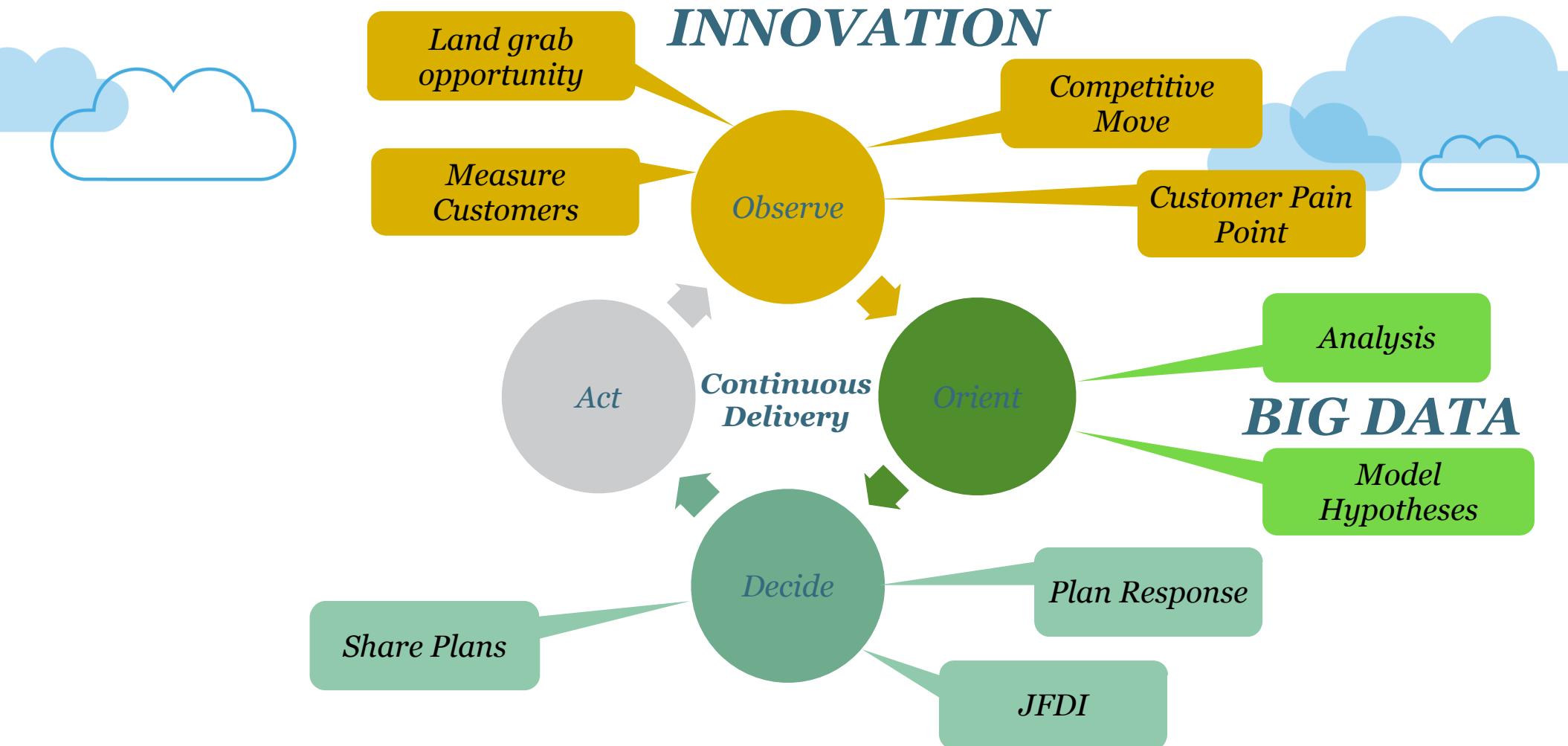


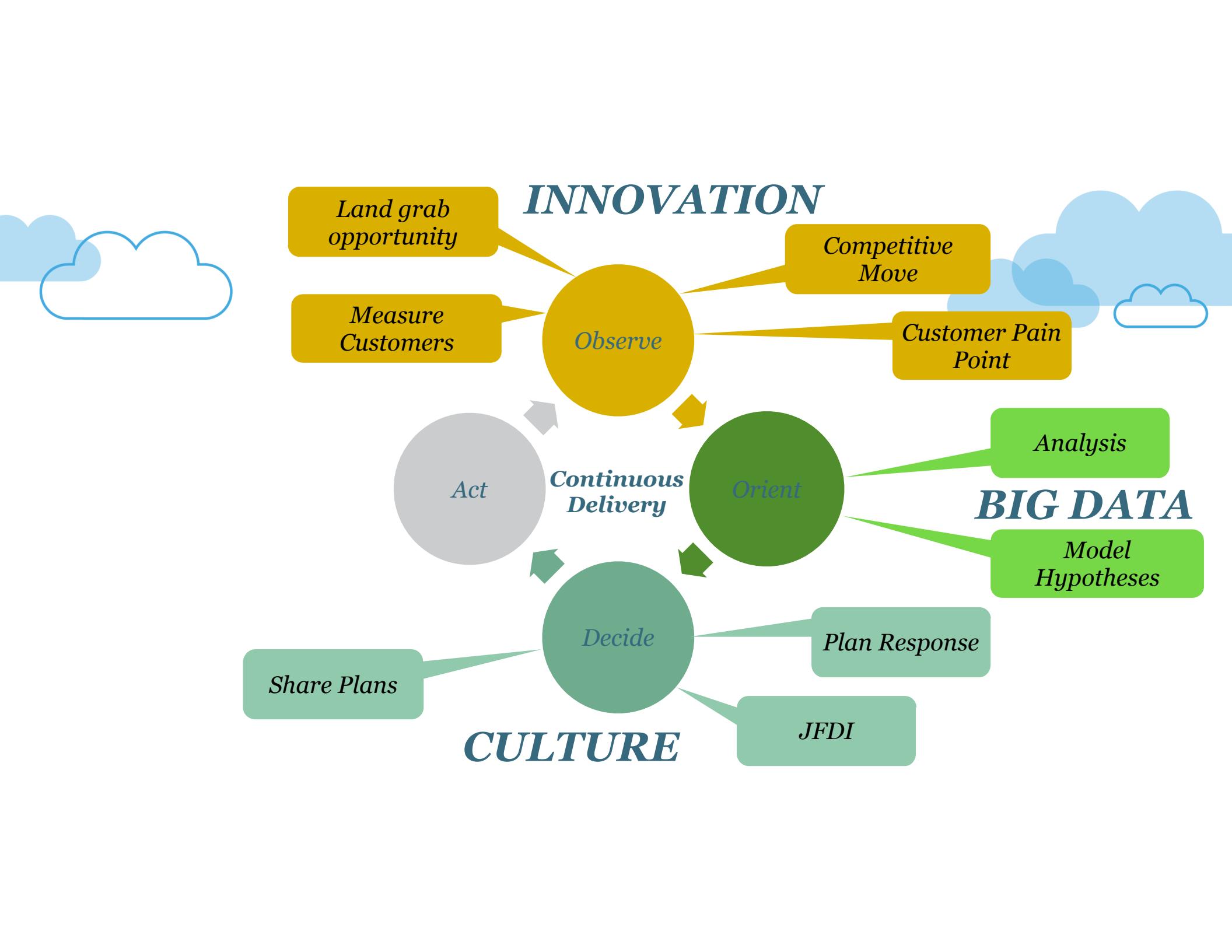


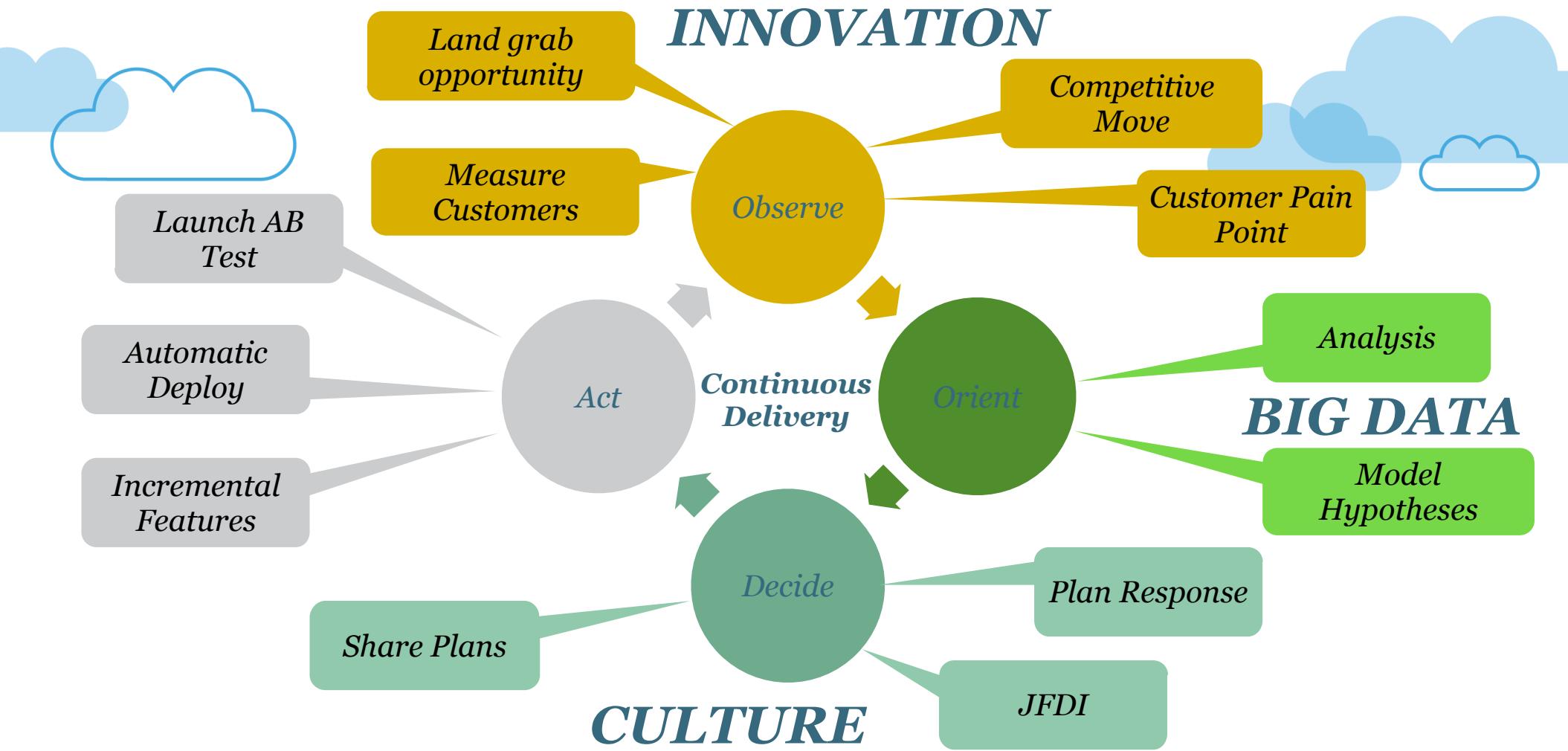


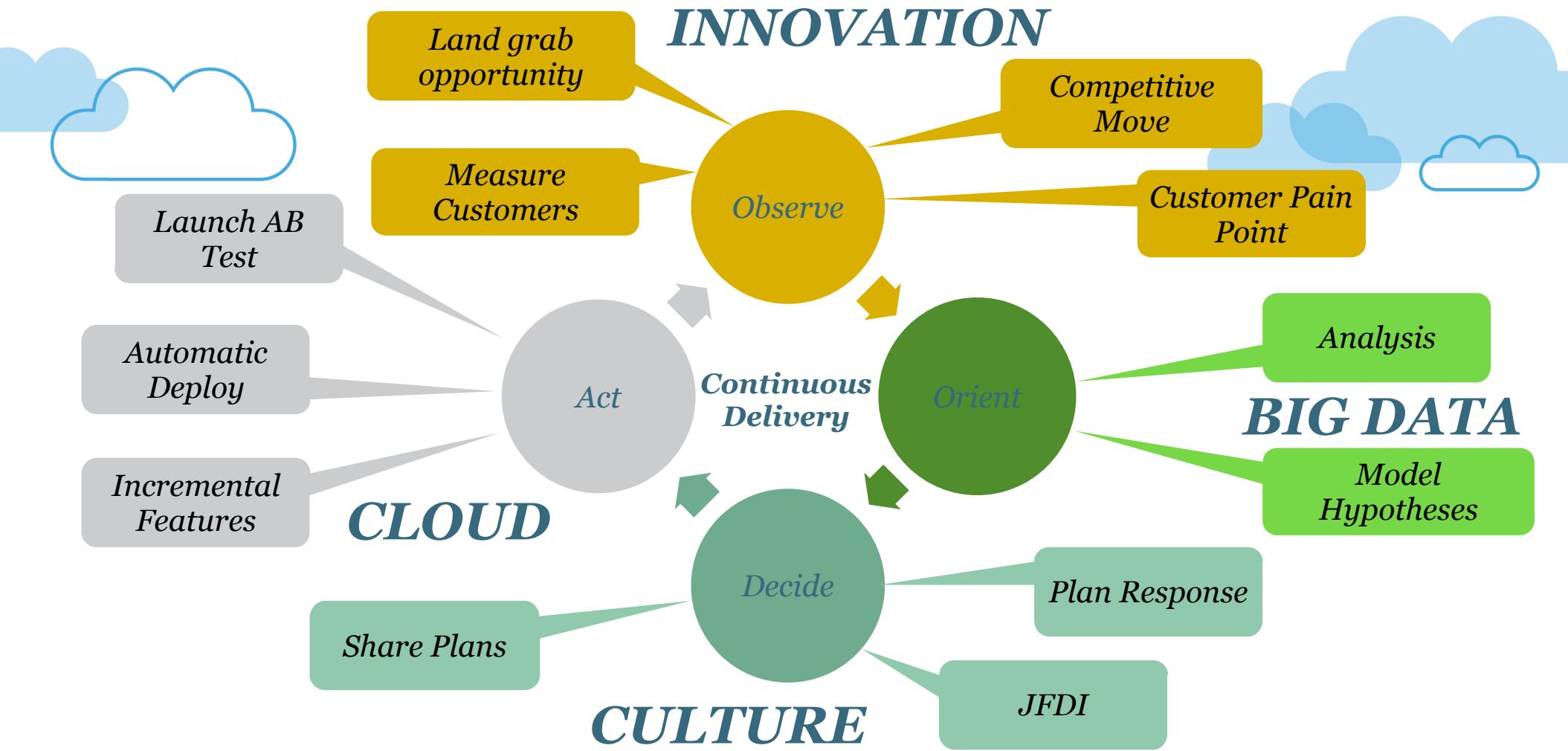


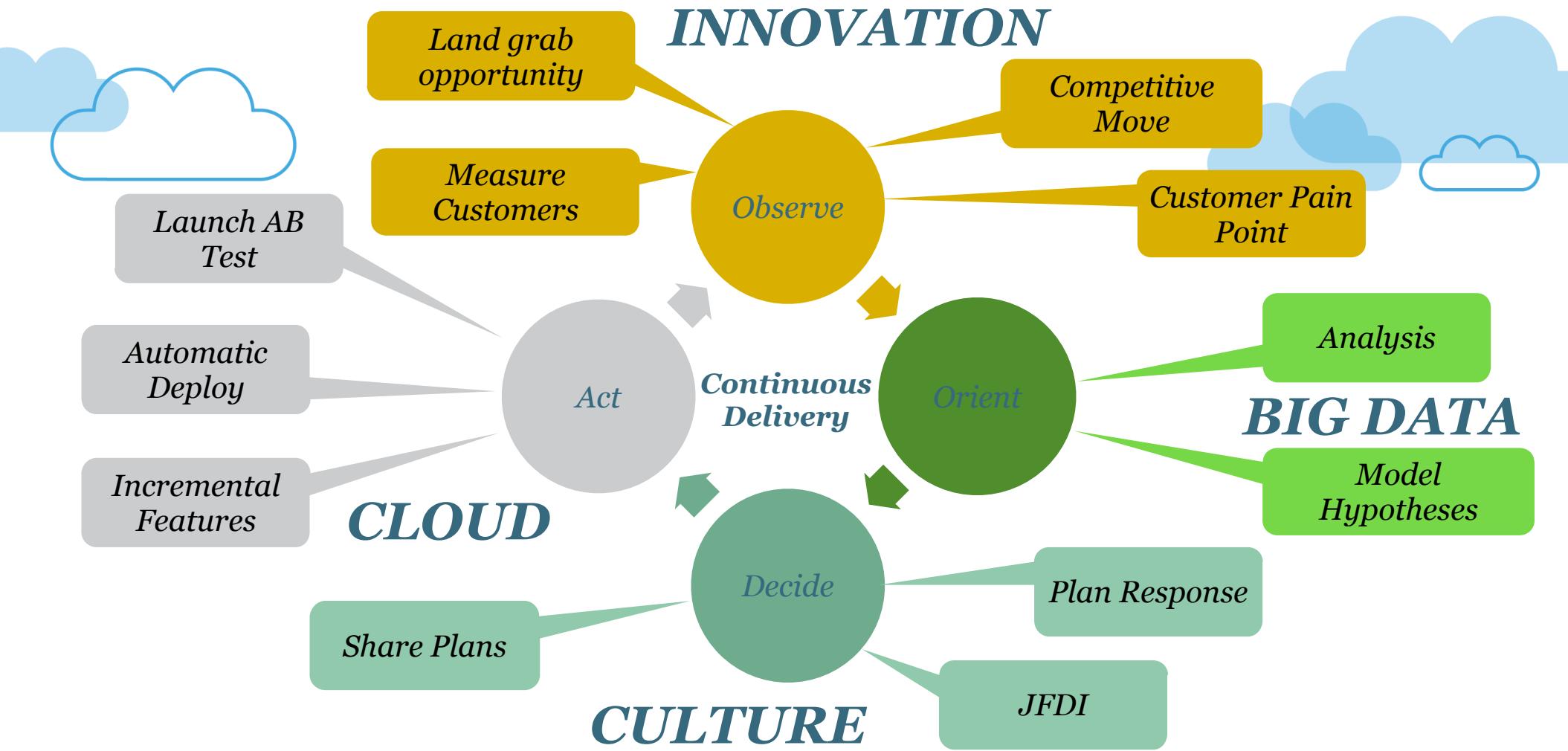


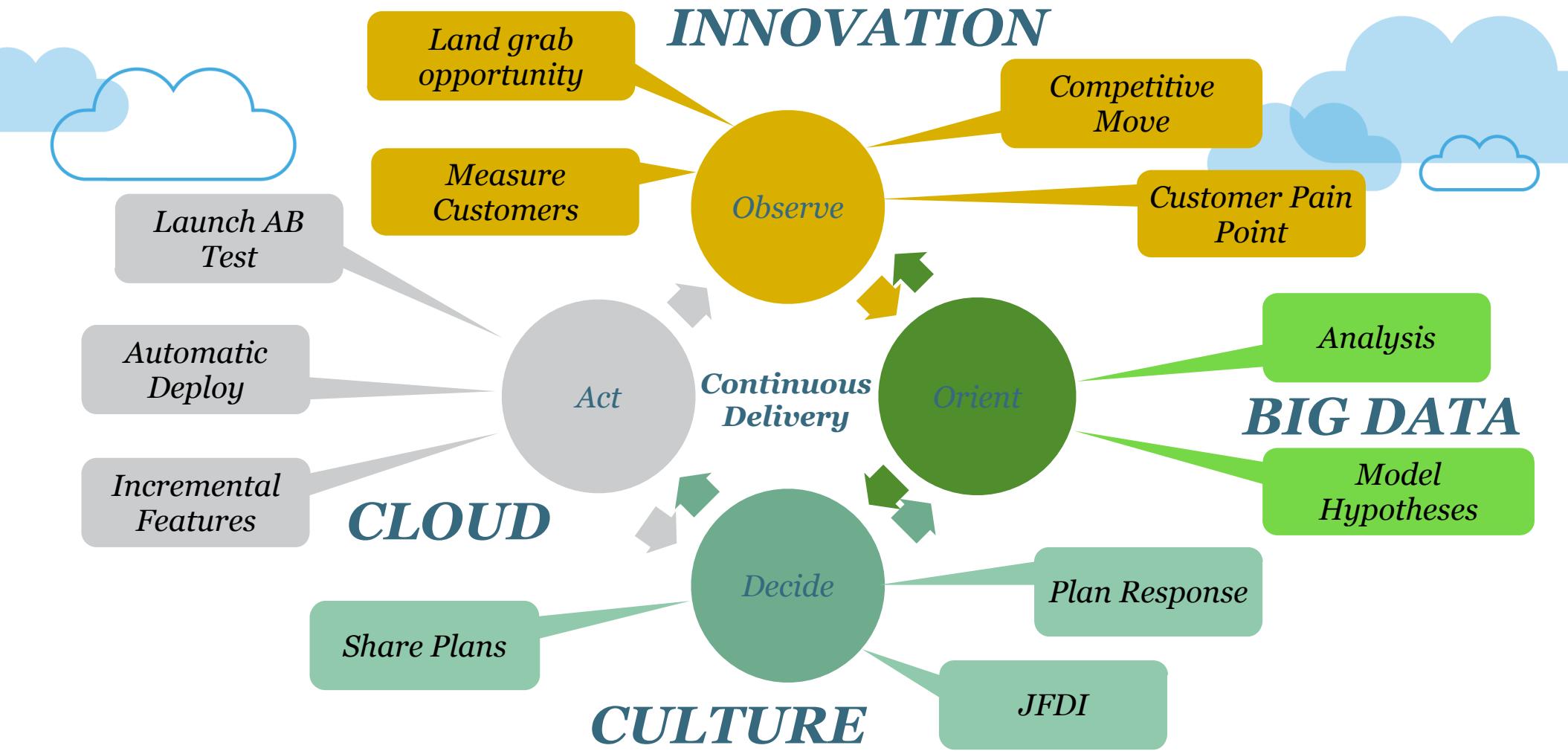




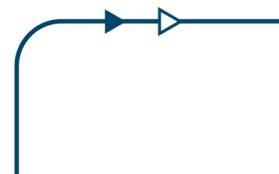








Breaking Down the SILOs



Breaking Down the SILOs

*Prod
Mgr*

UX

Dev

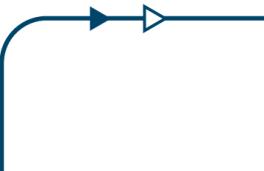
QA

DBA

*Sys
Adm*

*Net
Adm*

*SAN
Adm*



Breaking Down the SILOs



Product Team Using Monolithic Delivery

Product Team Using Monolithic Delivery

*Prod
Mgr*

UX

Dev

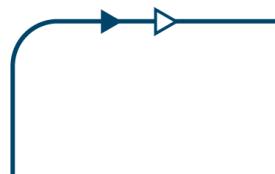
QA

DBA

*Sys
Adm*

*Net
Adm*

*SAN
Adm*



Breaking Down the SILOs



Product Team Using Monolithic Delivery

Product Team Using Monolithic Delivery

*Prod
Mgr*

UX

Dev

QA

DBA

*Sys
Adm*

*Net
Adm*

*SAN
Adm*

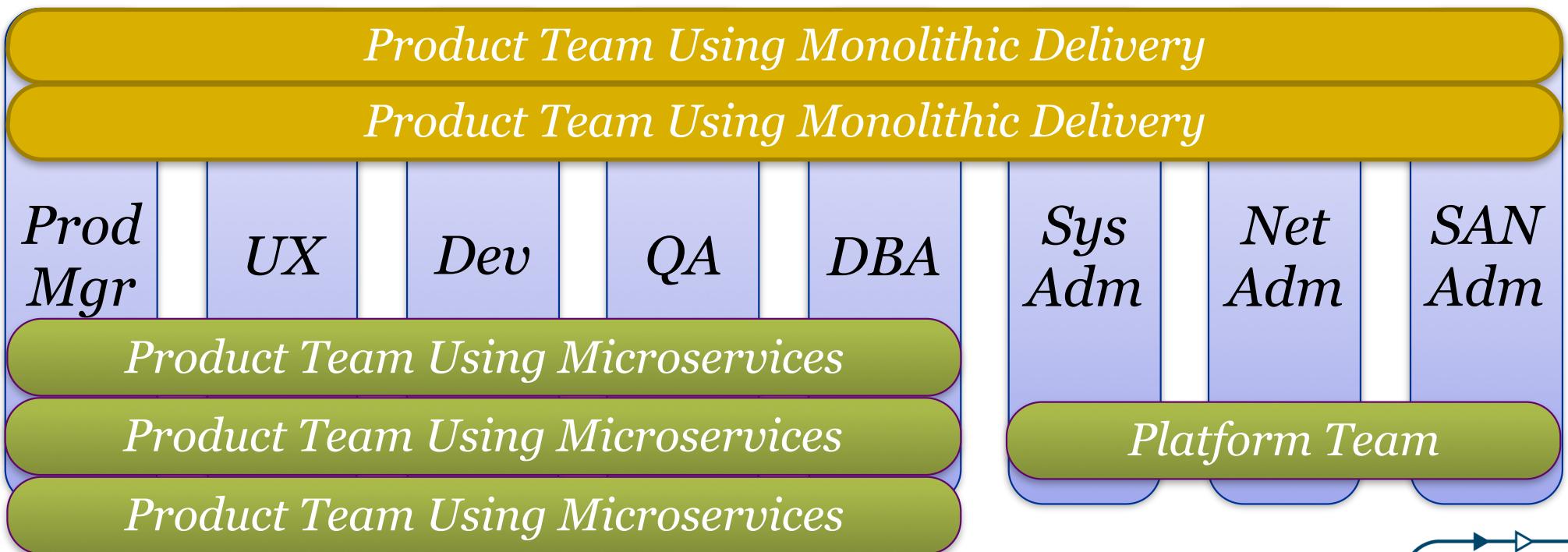
Product Team Using Microservices

Product Team Using Microservices

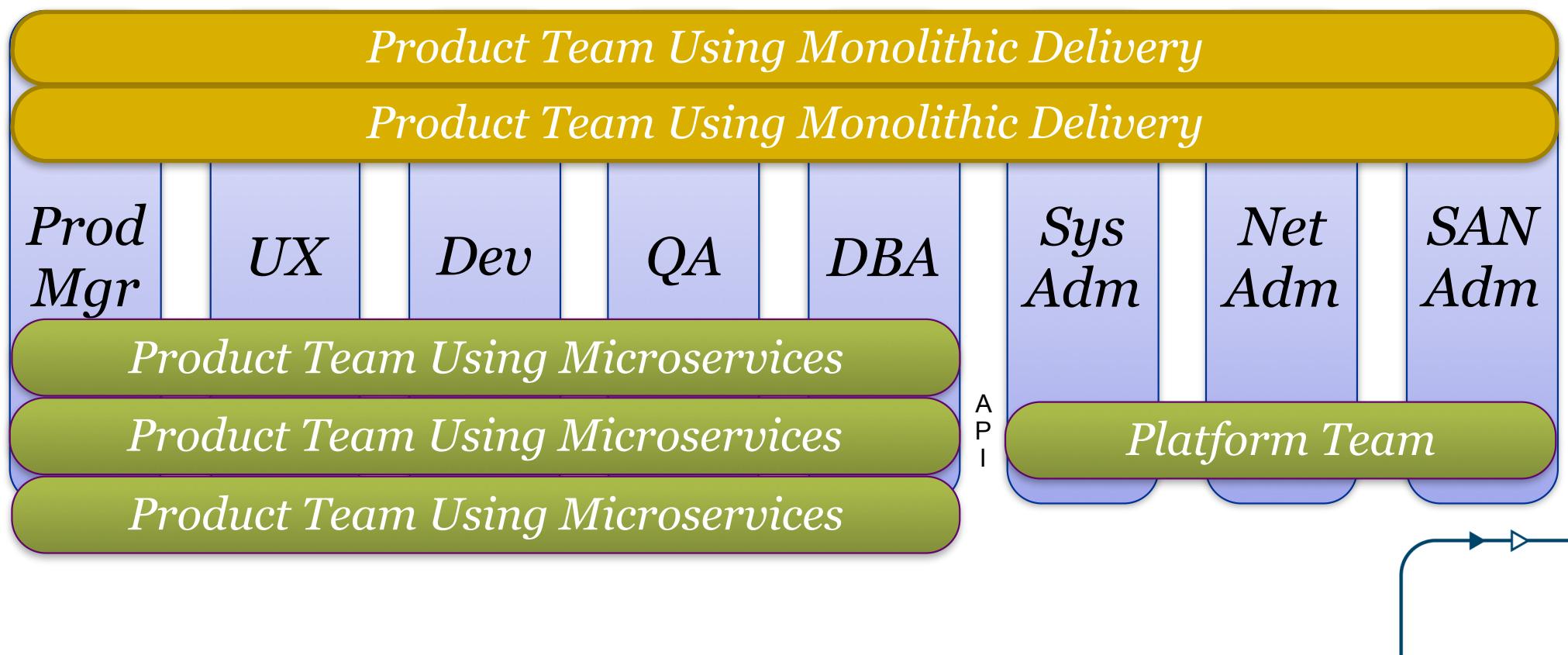
Product Team Using Microservices



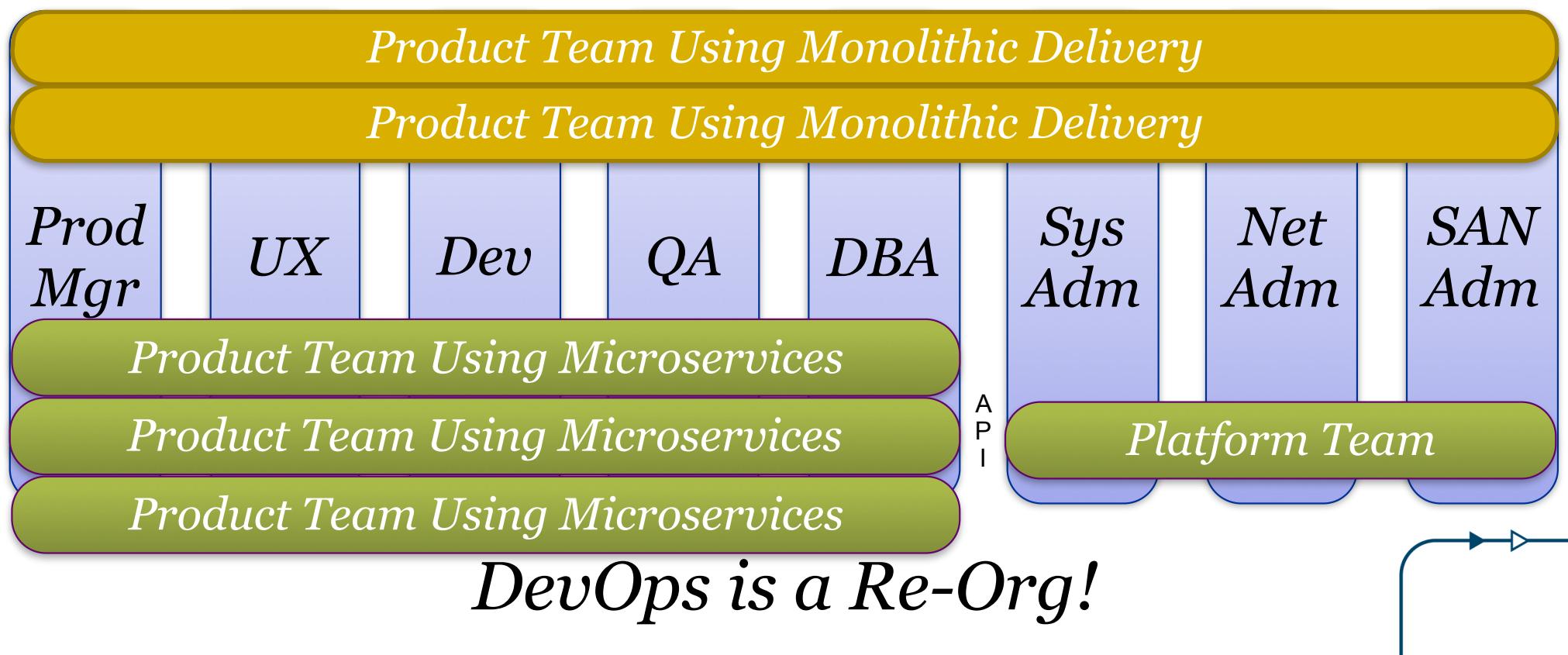
Breaking Down the SILOs

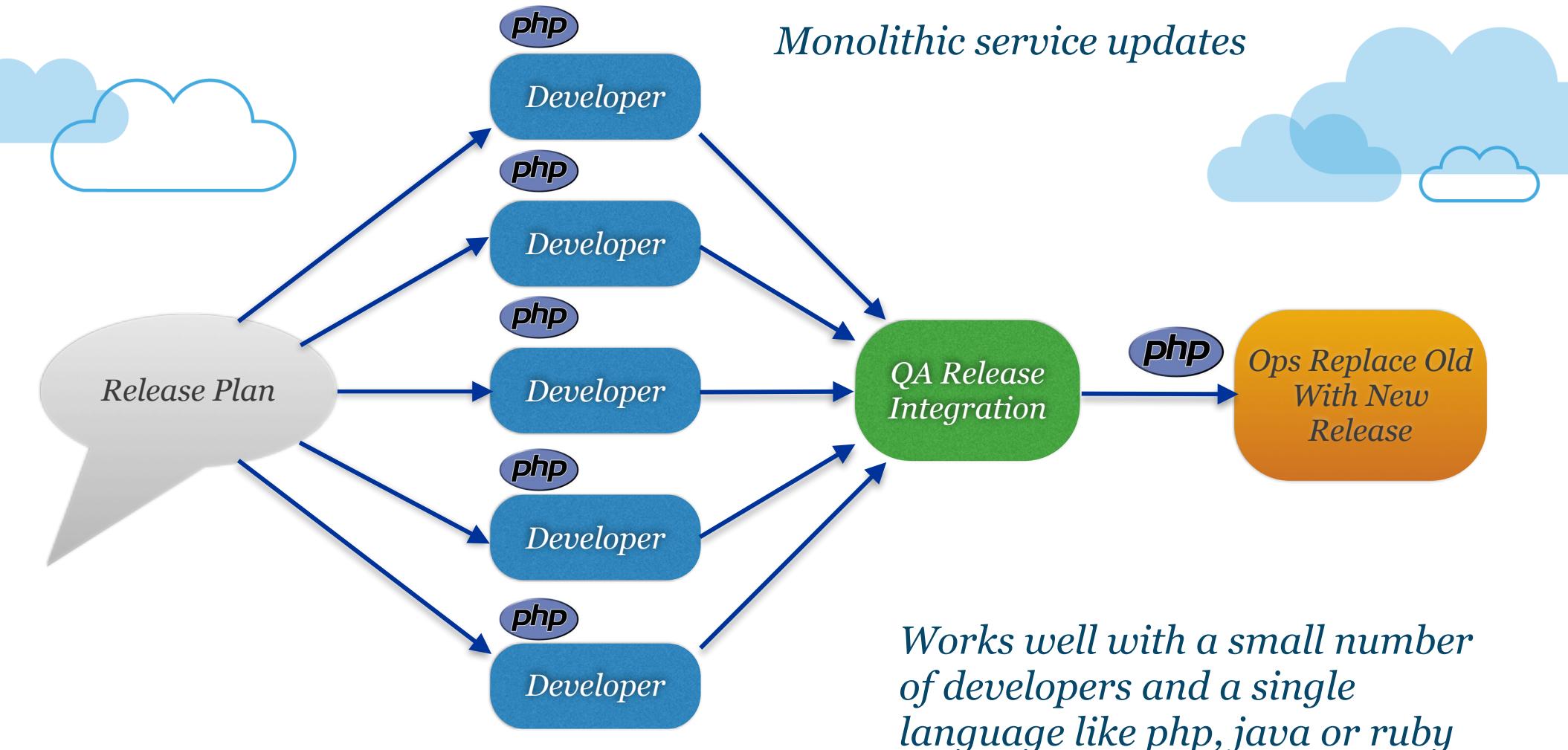


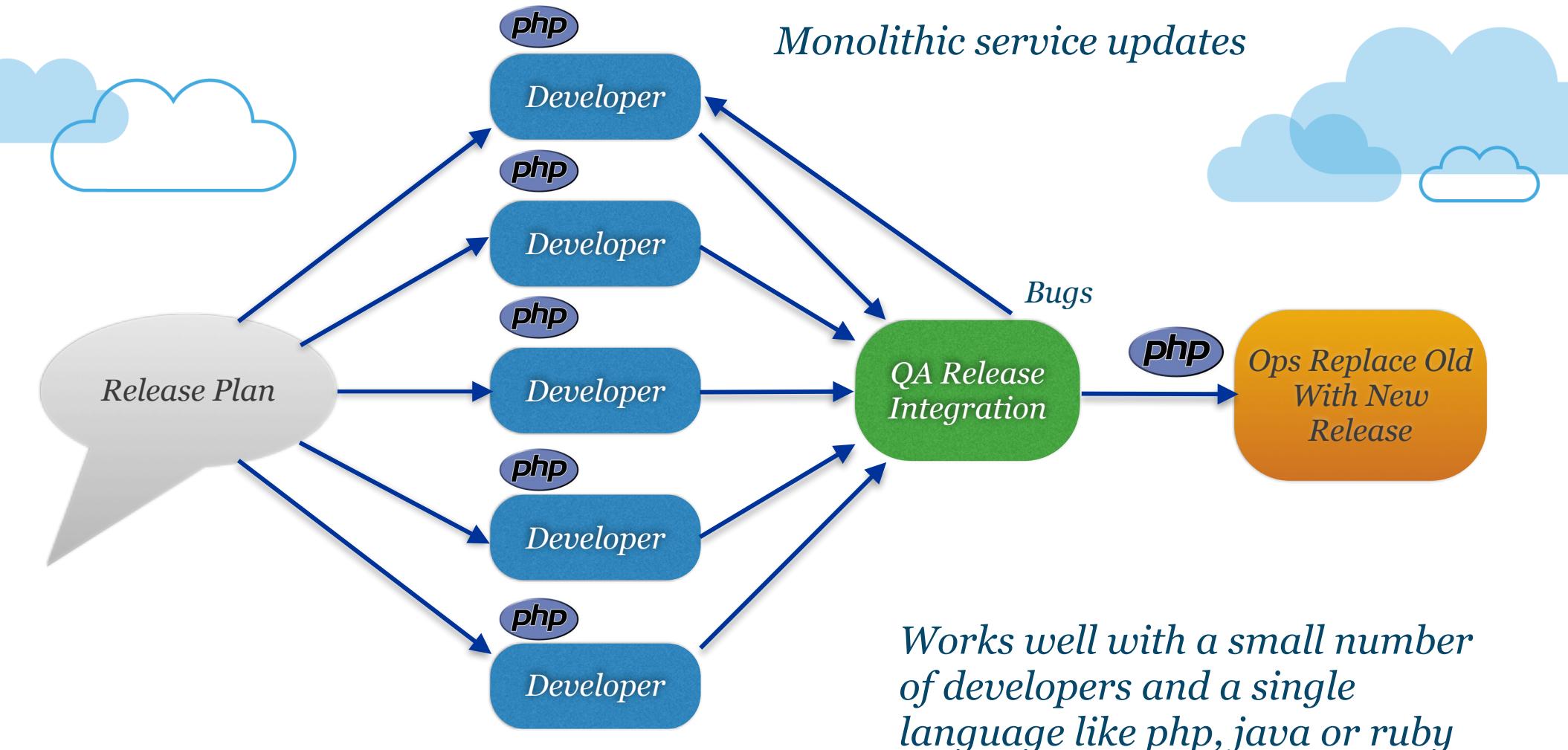
Breaking Down the SILOs

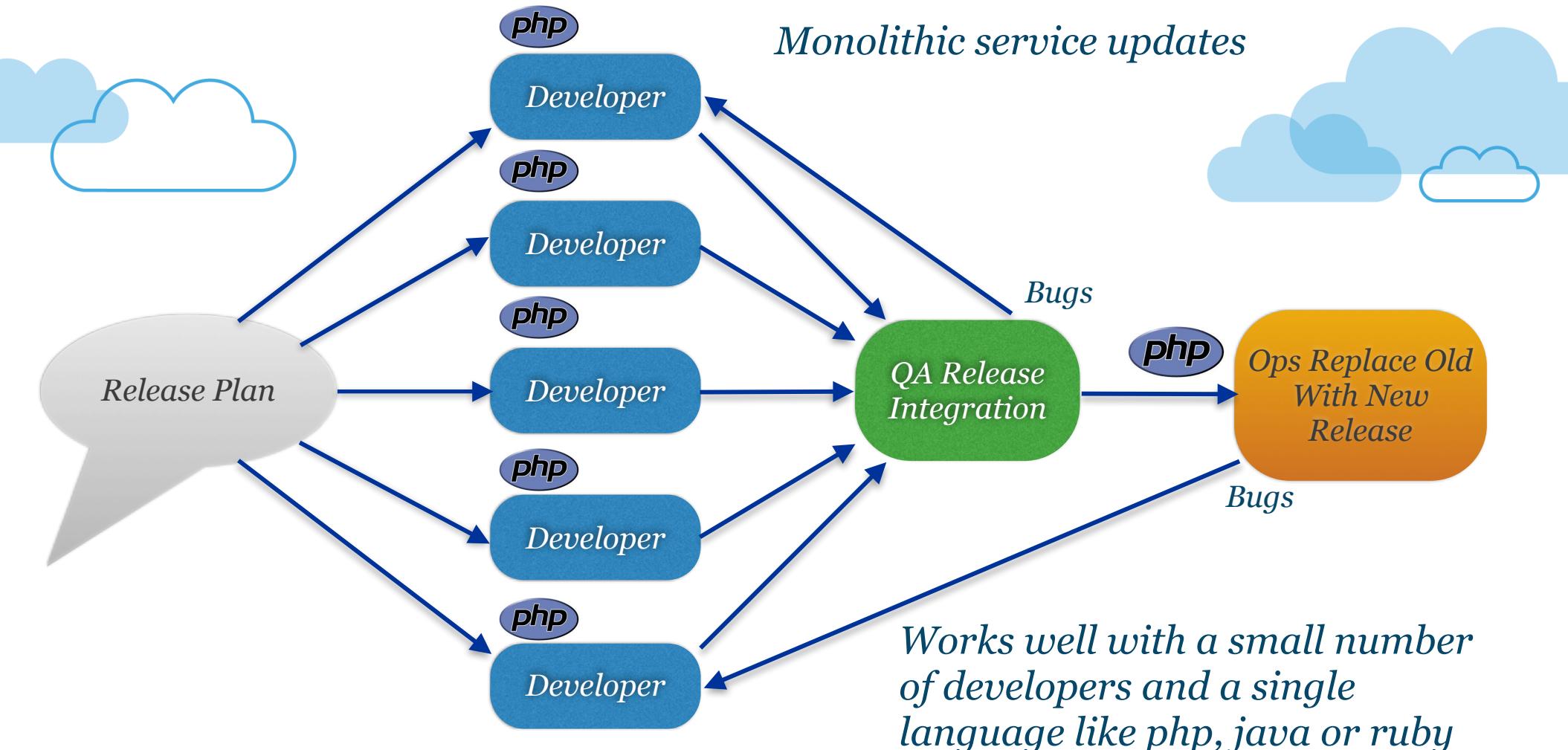


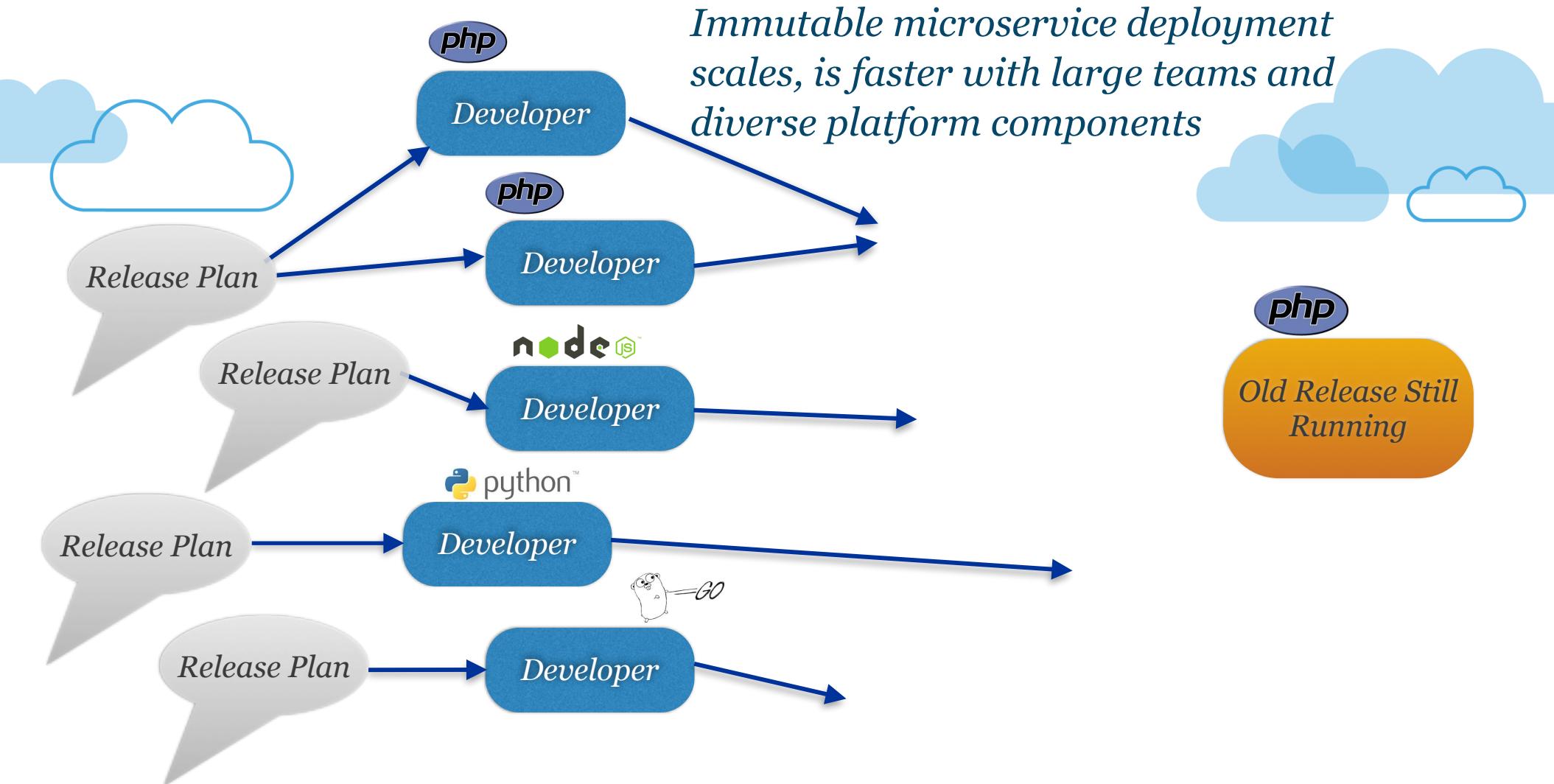
Breaking Down the SILOs

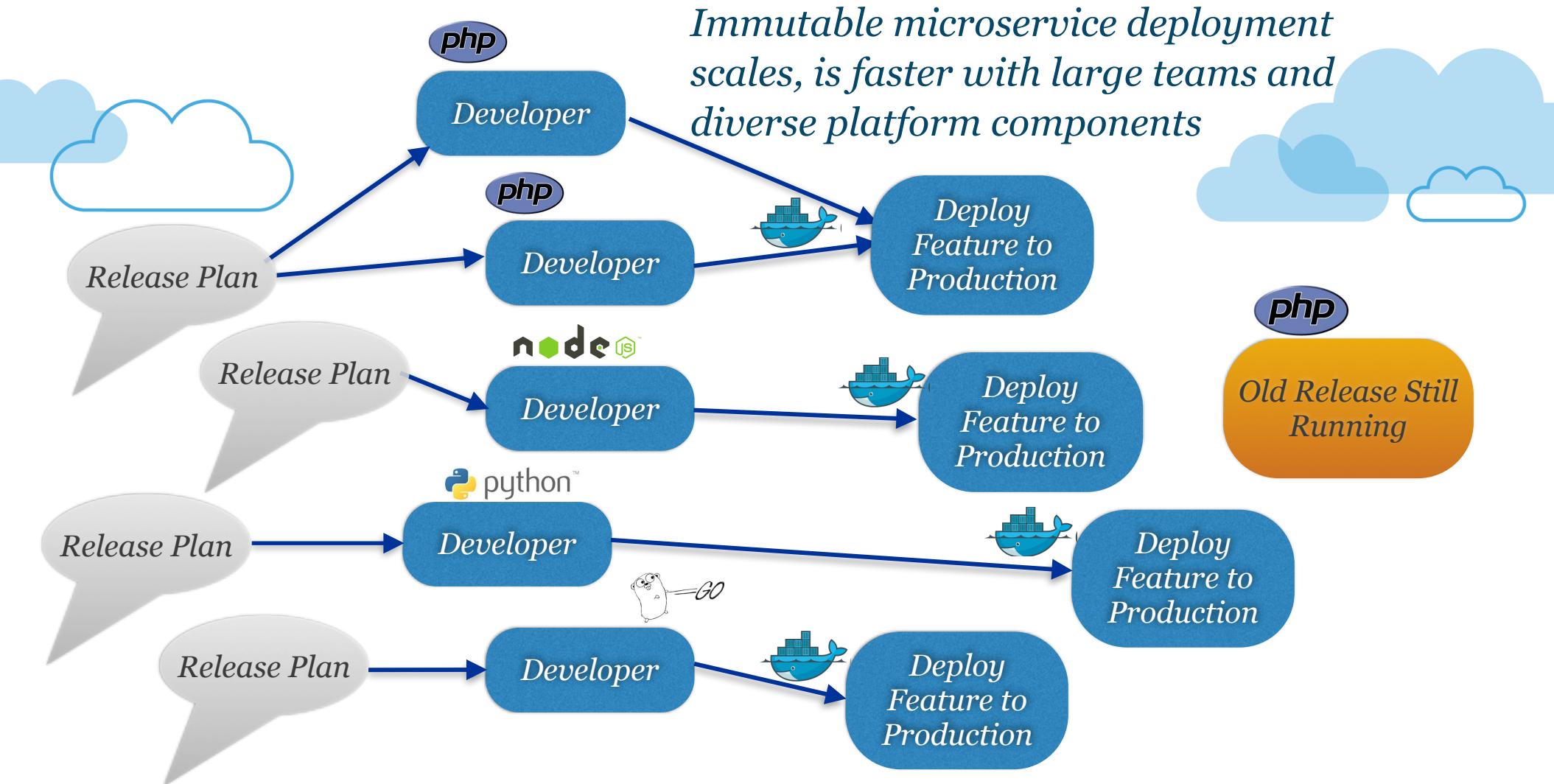


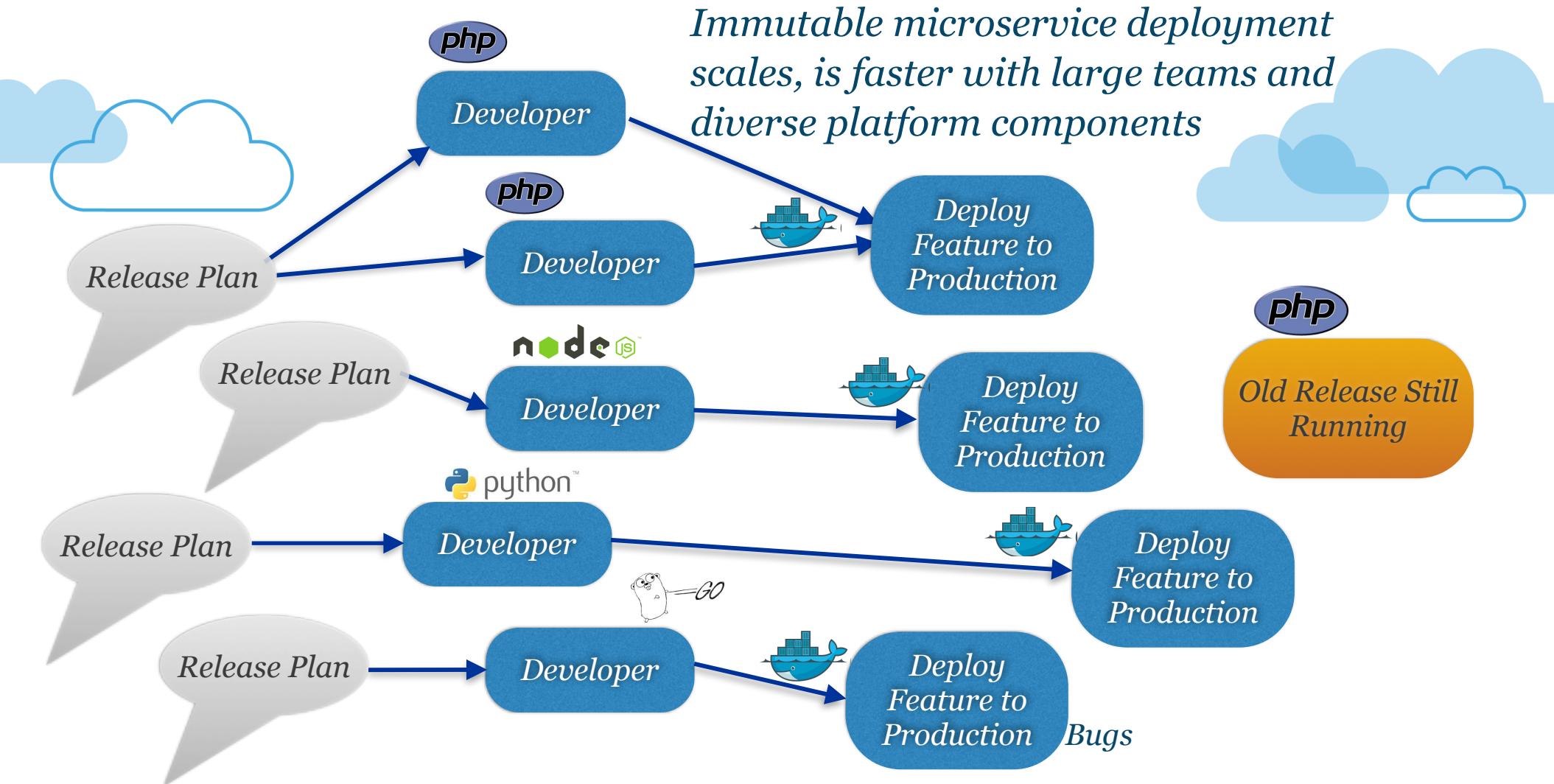


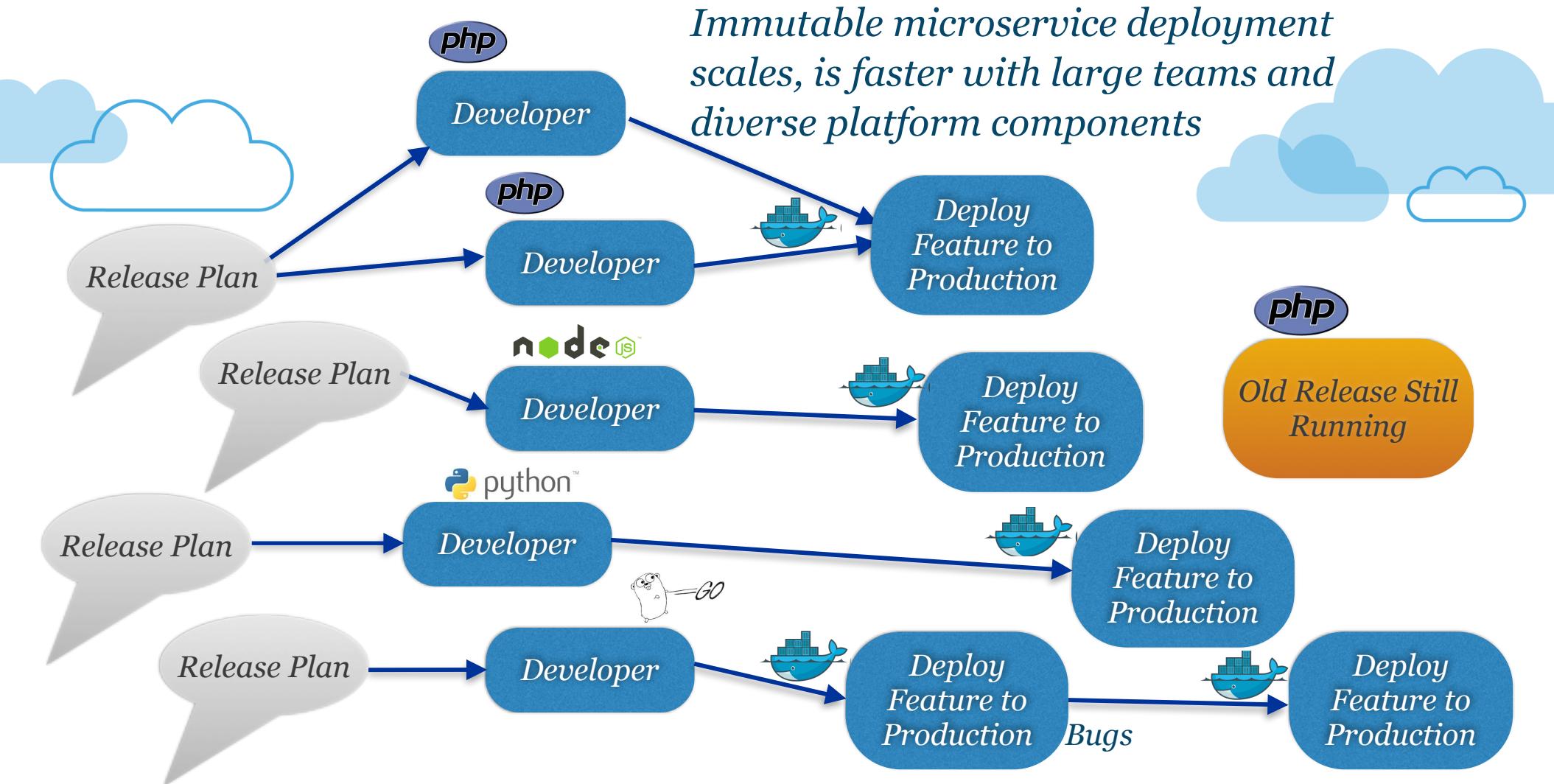


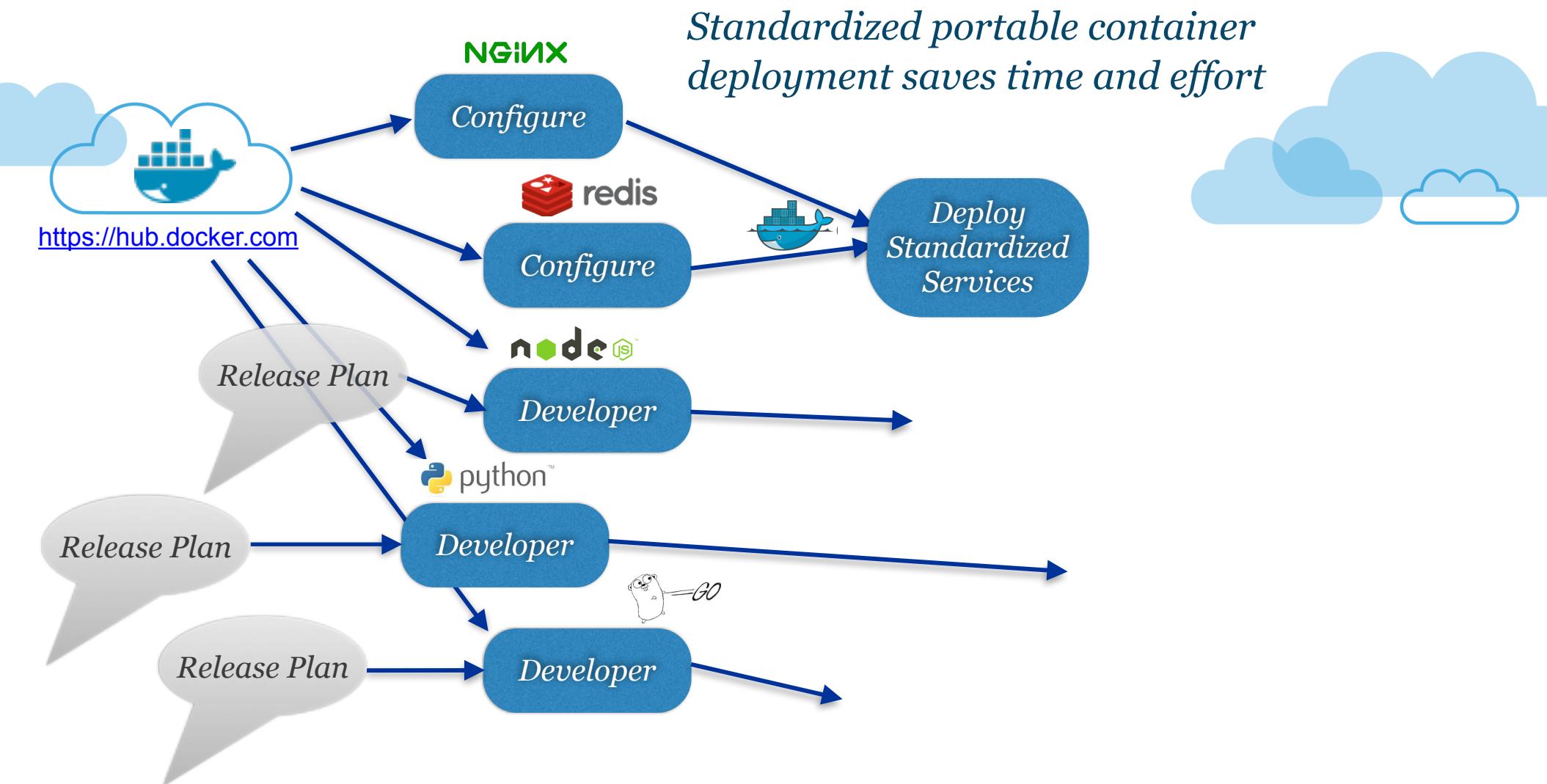


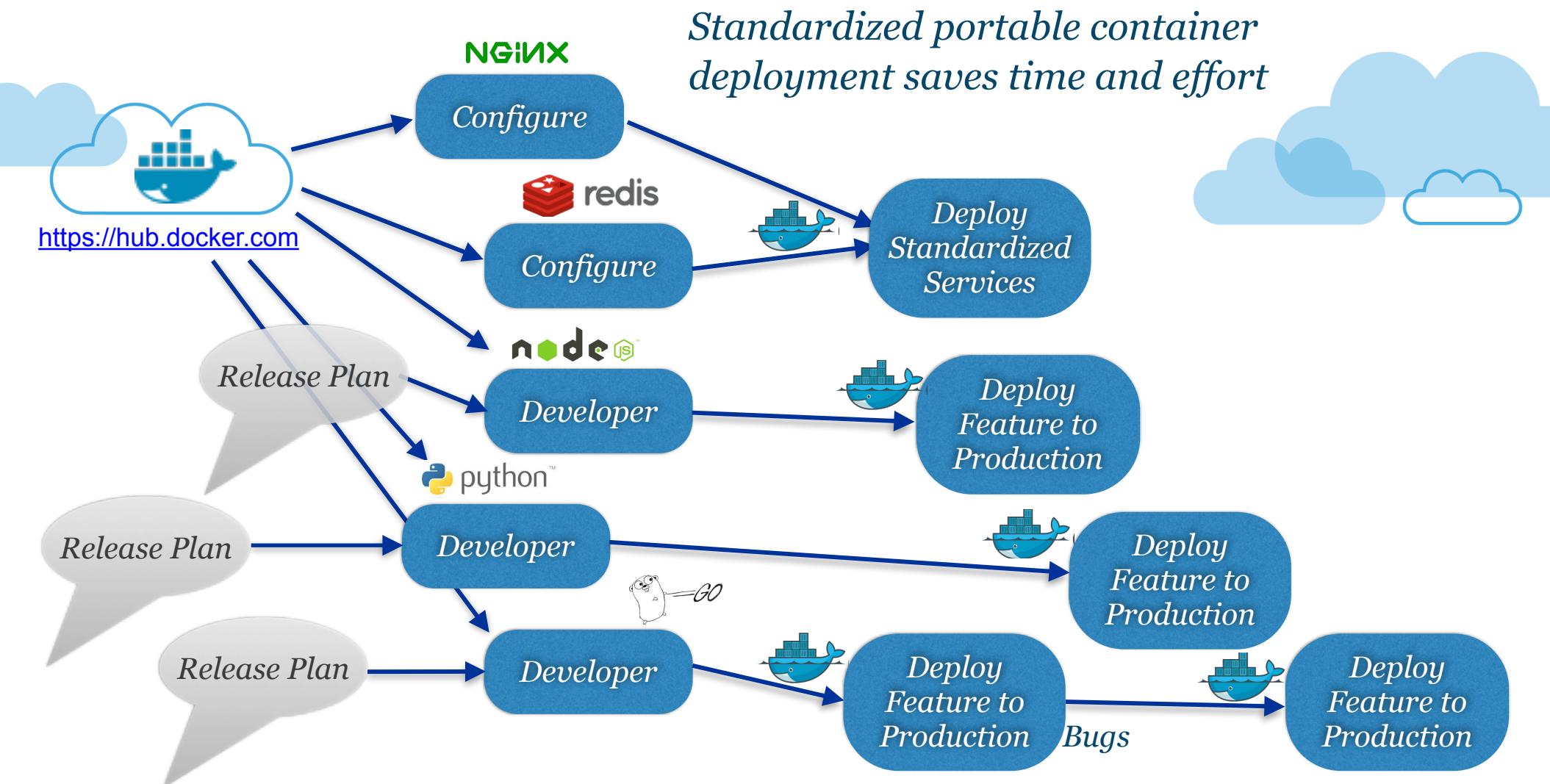












Developing at the Speed of Docker



Developing at the Speed of Docker

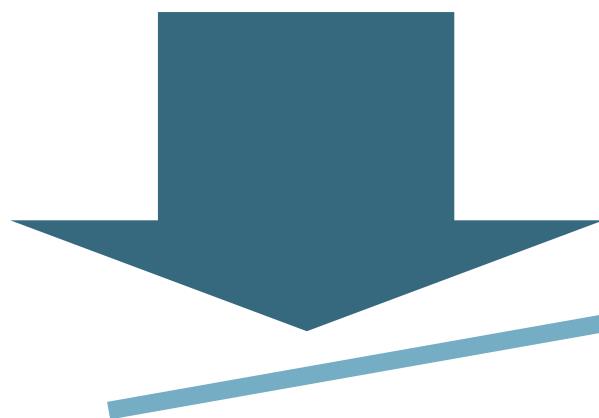


► *Speed is addictive, hard to go back to taking much longer to get things done*

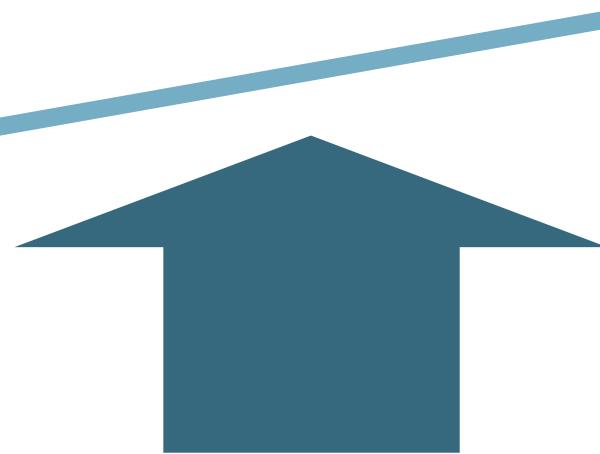


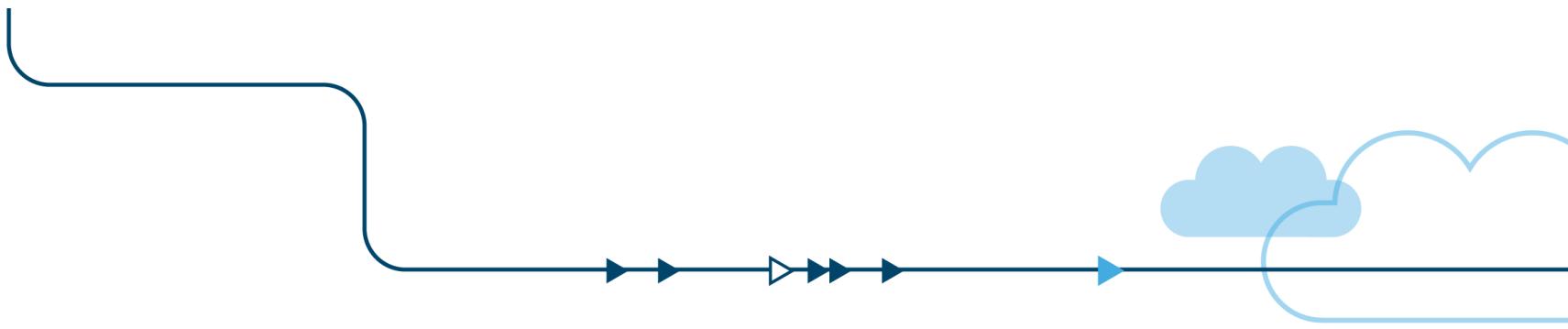
What Happened?

*Rate of change
increased*

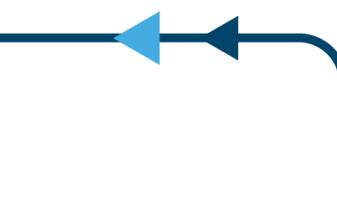


*Cost and size and
risk of change
reduced*

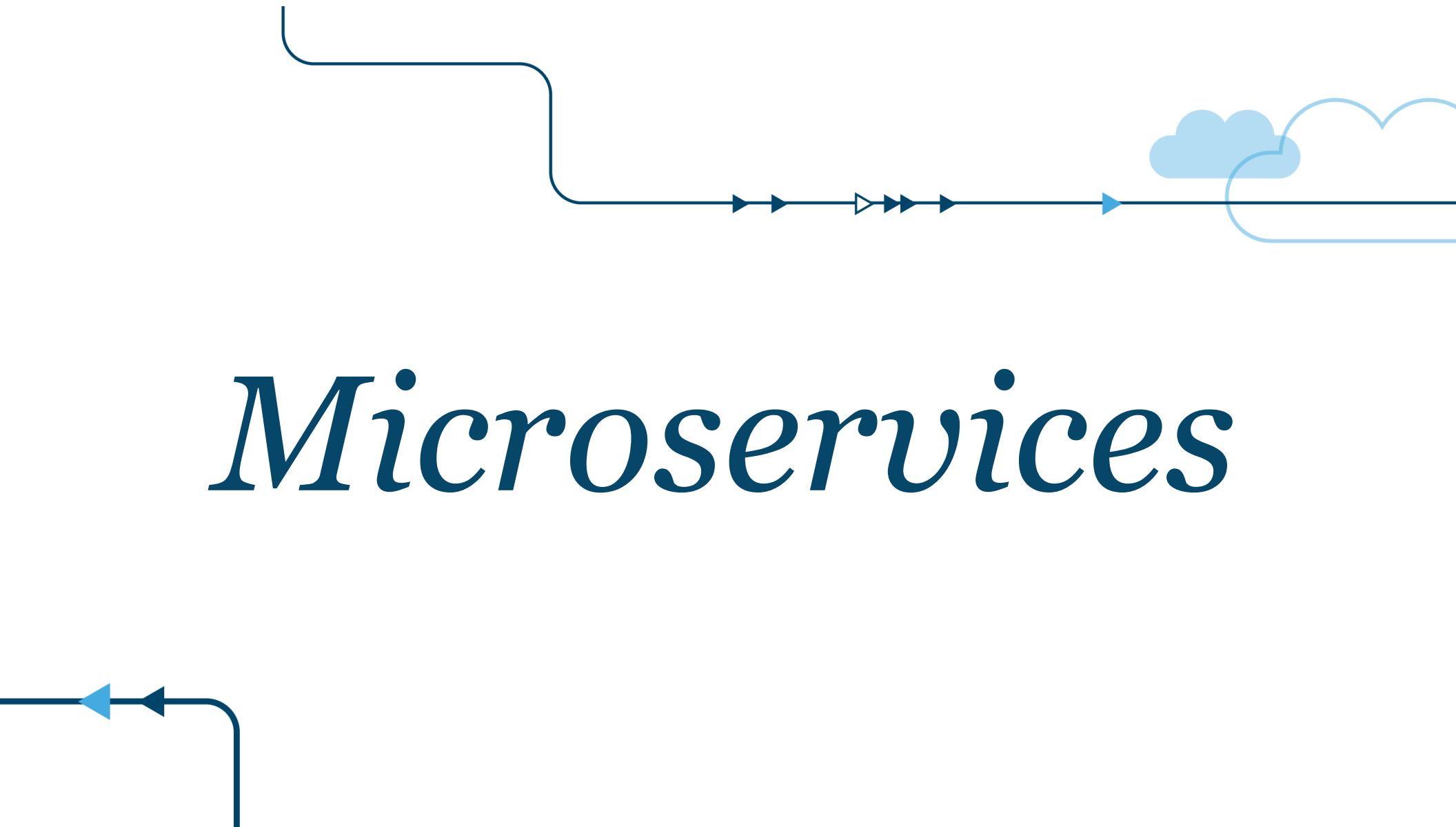


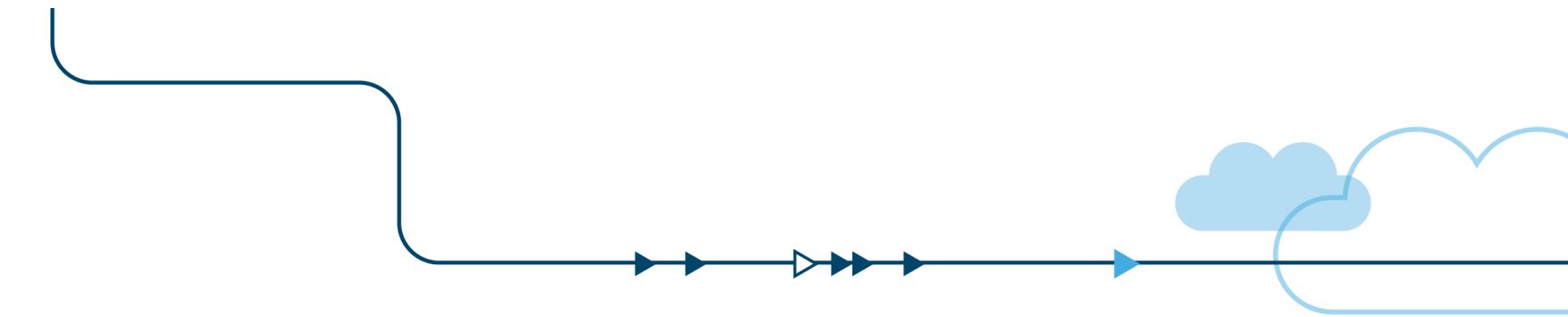


Disruptor: Continuous Delivery with Containerized Microservices



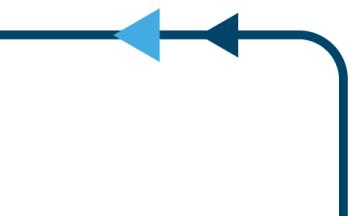
Microservices





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 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

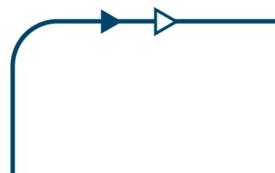
If you have to know too much about surrounding services you don't have a bounded context. See the Domain Driven Design book by Eric Evans.

Coupling Concerns



- *Conway's Law - organizational coupling*
- *Centralized Database Schemas*
- *Enterprise Service Bus - centralized message queues*
- *Inflexible Protocol Versioning*

http://en.wikipedia.org/wiki/Conway's_law

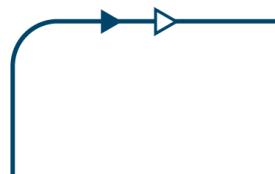


Speeding Up The Platform

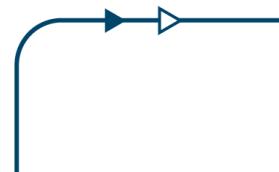
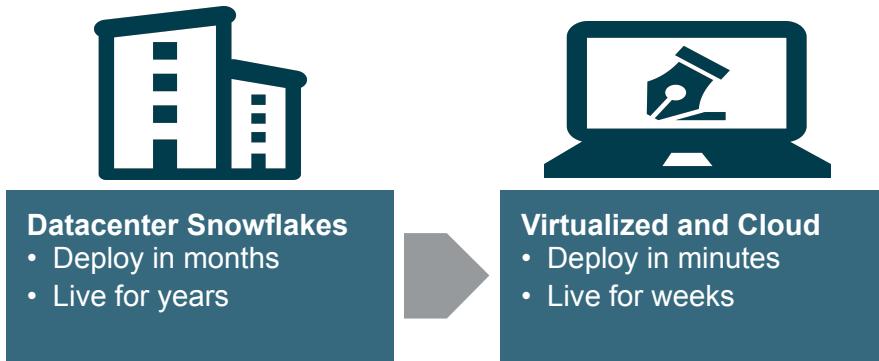


Datacenter Snowflakes

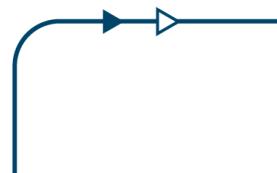
- Deploy in months
- Live for years



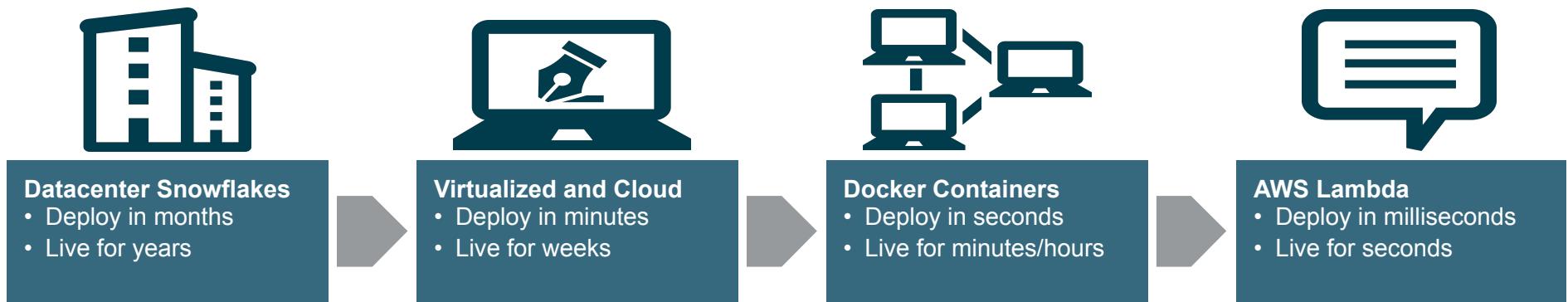
Speeding Up The Platform



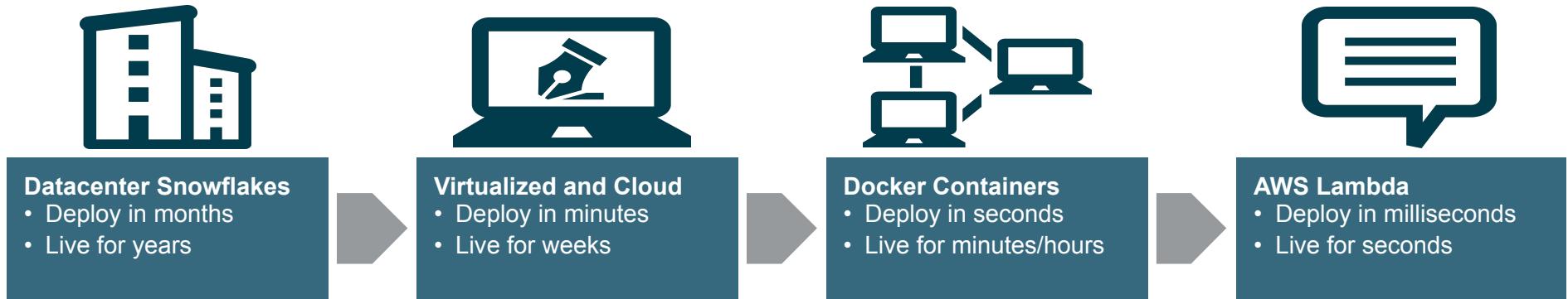
Speeding Up The Platform



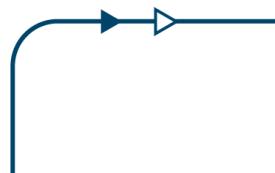
Speeding Up The Platform

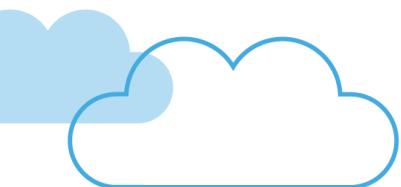


Speeding Up The Platform



► *Speed enables and encourages new microservice architectures*





State of the Art in Web Scale Microservice Architectures



AWS Re:Invent : Asgard to Zuul <https://www.youtube.com/watch?v=p7ysHhs5hl0>
Resiliency at Massive Scale https://www.youtube.com/watch?v=ZfYJHtVL1_w
Microservice Architecture <https://www.youtube.com/watch?v=CriDUYtfrij>

<http://www.infoq.com/presentations/scale-gilt>



<http://www.infoq.com/presentations/Twitter-Timeline-Scalability>
<http://www.infoq.com/presentations/twitter-soa>
<http://www.infoq.com/presentations/Zipkin>



<http://www.slideshare.net/mcculloughsean/itier-breaking-up-the-monolith-philly-ete>



<https://speakerdeck.com/mattheath/scaling-micro-services-in-go-highload-plus-plus-2014>

Microservice Concerns

Tooling

Configuration

Discovery

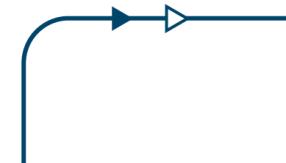
Routing

Observability

Datastores

Operational: Orchestration and Deployment Infrastructure

Development: Languages and Container



NETFLIX

OSS

Microservices



Asgard
Aminator
Tooling

Edda
Archaius
Configuration

Eureka
Prana
Discovery

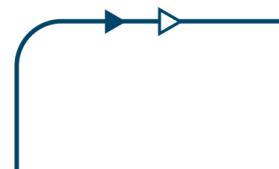
Denominator
Zuul, Netty
Ribbon 2.0
Routing

Hystrix
Pytheus
SALP
Observability

Ephemeral datastores using Dynomite, Memcached, Astyanax, Staash, Priam, Cassandra

Manual Orchestration with Asgard and deployment on AWS or Eucalyptus

Java, Groovy, Scala, Clojure, Python, Node.js with AMI and Docker Containers



NETFLIX

OSS

Microservices



Asgard
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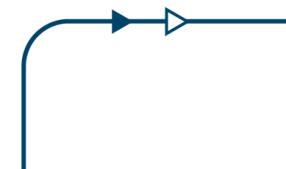
Hystrix
Pytheus
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Observability

Ephemeral datastores using Dynomite, Memcached, Astyanax, Staash, Priam, Cassandra

Manual Orchestration with Asgard and deployment on AWS or Eucalyptus

Java, Groovy, Scala, Clojure, Python, Node.js with AMI and Docker Containers

Focus on global distribution, high scale and availability





Netflix Open Source Software Center

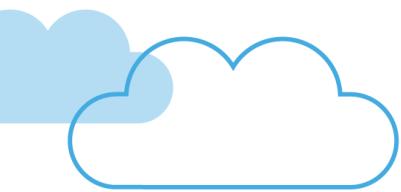
Repositories

Powered By NetflixOSS

These companies are using and contributing to Netflix OSS Components

Email netflixoss@netflix.com to have your logo here.





NETFLIX



Twitter Microservices



Tooling

Decider
Configuration

Finagle
Zookeeper
Discovery

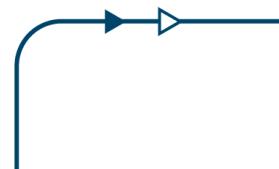
Finagle
Netty
Routing

Zipkin
Observability

Custom Cassandra-like datastore: Manhattan

Orchestration using Aurora deployment in datacenters using Mesos

Scala with JVM Container



Twitter Microservices



Tooling

Decider
Configuration

Finagle
Zookeeper
Discovery

Finagle
Netty
Routing

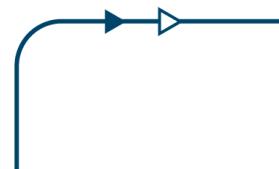
Zipkin
Observability

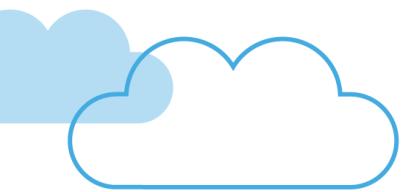
Custom Cassandra-like datastore: Manhattan

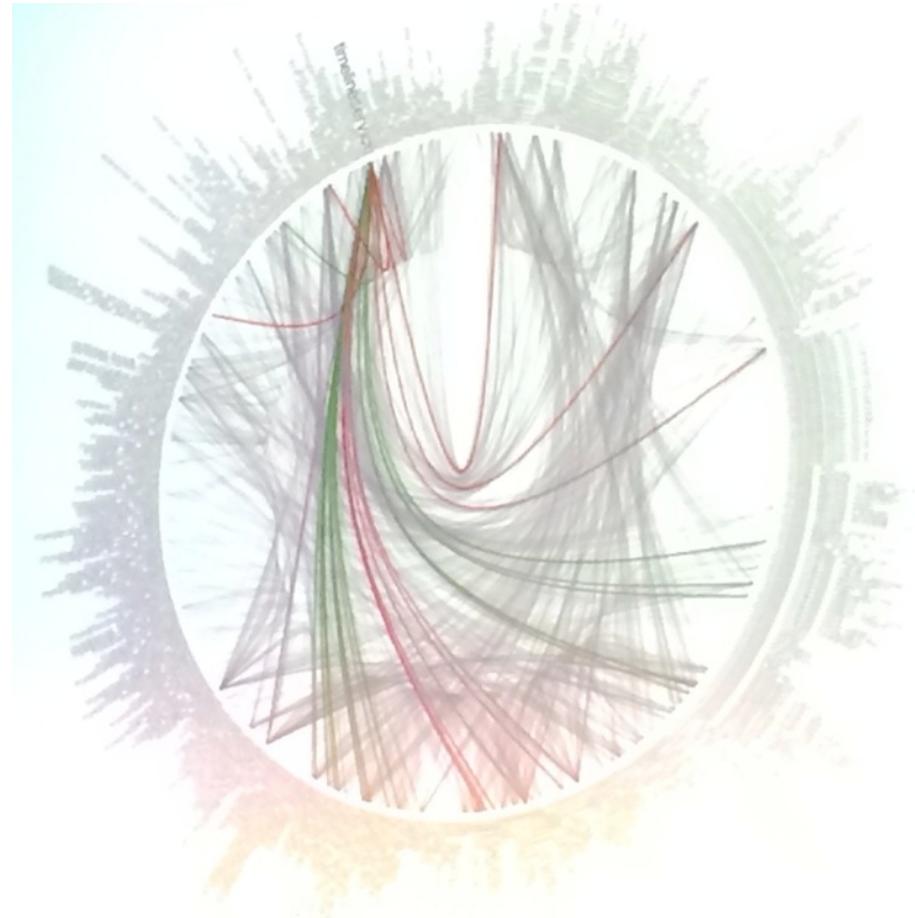
Orchestration using Aurora deployment in datacenters using Mesos

Scala with JVM Container

Focus on efficient datacenter deployment at scale







Gilt Microservices



Ion Cannon
SBT
Rake
Tooling

Decider
Configuration

Finagle
Zookeeper
Discovery

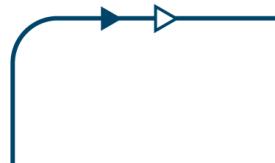
Akka
Finagle
Netty
Routing

Zipkin
Observability

Datastores per Microservice using MongoDB, Postgres, Voldemort

Deployment on AWS

Scala and Ruby with Docker Containers



Gilt Microservices



Ion Cannon
SBT
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Tooling

Decider
Configuration

Finagle
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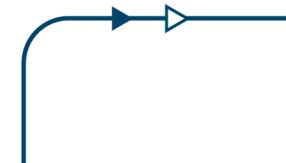
Zipkin
Observability

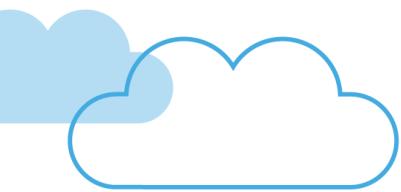
Datastores per Microservice using MongoDB, Postgres, Voldemort

Deployment on AWS

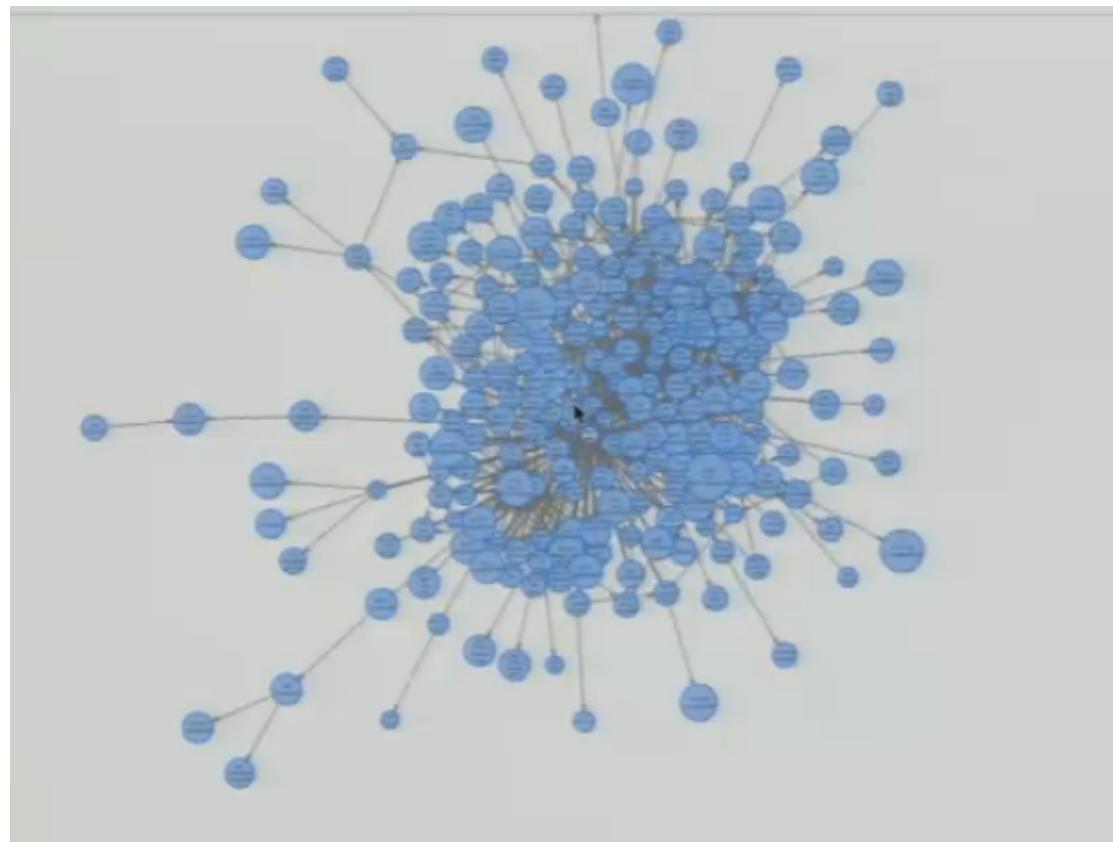
Scala and Ruby with Docker Containers

Focus on fast development with Scala and Docker





GILT



Hailo Microservices



Hubot
Janky
Jenkins
Tooling

Configuration

go-platform
Discovery

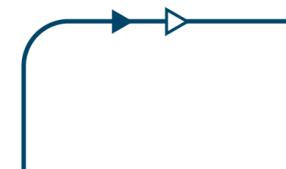
go-platform
RabbitMQ
Routing

Request trace
Observability

Datastore based on Cassandra

Deployment on AWS

Go using Docker



Hailo Microservices



Hubot
Janky
Jenkins
Tooling

Configuration

go-platform
Discovery

go-platform
RabbitMQ
Routing

Request trace
Observability

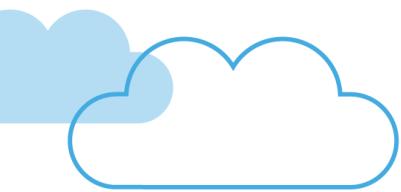
Datastore based on Cassandra

Deployment on AWS

Go using Docker

Focus on fast development at scale using Go





Node.js Microservices

GROUPON

@WalmartLabs



<http://senecaajs.org/>



<http://aws.amazon.com/lambda/>

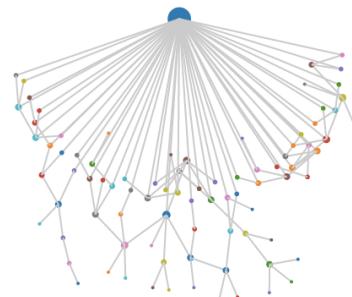
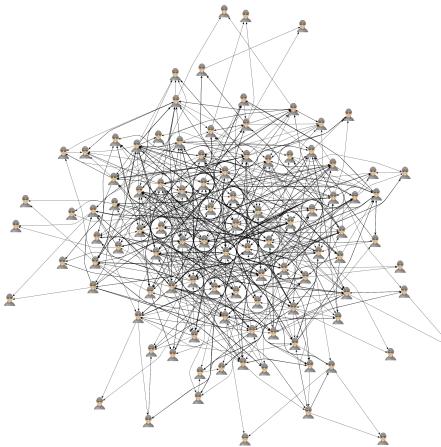
Several different approaches

Mostly small simple microservices

Focus on easy interface with presentation code in javascript

AWS Lambda - preview only

Adrian's Prototypes



*Model and visualize microservices
Simulate interesting architectures*

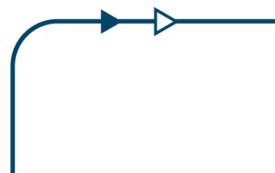
*See github.com/adrianco/spigo
Simulate Protocol Interactions in Go*

*See github.com/adrianco/d3grow
Dynamic visualization*

Web Scale Characteristics



- *Brand new Microservices are deployed infrequently*
- *New versions deployed automatically/frequently*
- *No real need for general purpose orchestration*
- *Architectures use hundreds of microservices*
- *Each deployment is heavily customized*



The image features two sets of stylized blue cloud icons. On the left side, there are three clouds of varying sizes, with the largest one in the center. On the right side, there are also three clouds, with a large cluster of three medium-sized clouds on the far right.

What's Next?

Orchestration for Applications



- *Standard portable microservice based applications*
- *New versions deployed automatically/frequently*
- *Orchestration automated and standardized*
- *Architectures likely based on tens of microservices*
- *Opportunity: Docker Hub as the enterprise app store*



Next Generation Applications



?

Tooling

?

Configuration

?

Discovery

?

Routing

?

Observability

Datastores: Ephemeral, Orchestrated or DBaaS

Operational: Many orchestration choices across public and private clouds

Development: Components assembled from Docker Hub as a composable “app store”



Next Generation Applications



?

Tooling

?

Configuration

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?

Routing

?

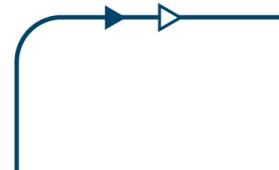
Observability

Datastores: Ephemeral, Orchestrated or DBaaS

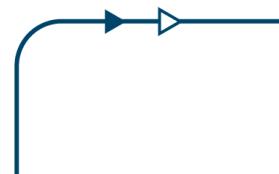
Operational: Many orchestration choices across public and private clouds

Development: Components assembled from Docker Hub as a composable “app store”

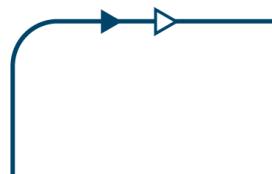
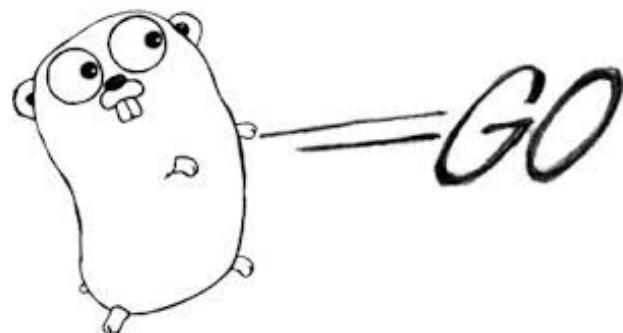
Fill in the gaps, rapidly evolving ecosystem choices



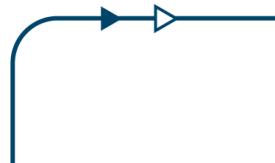
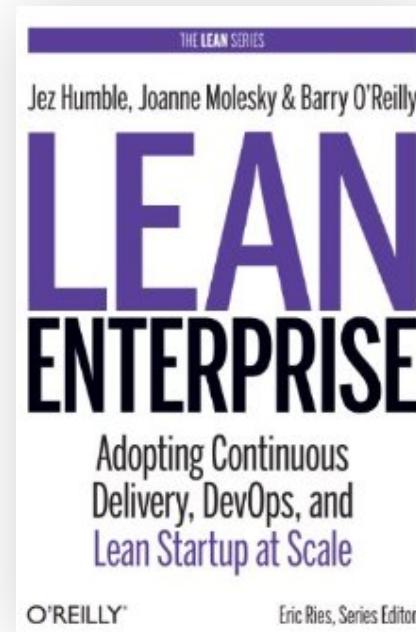
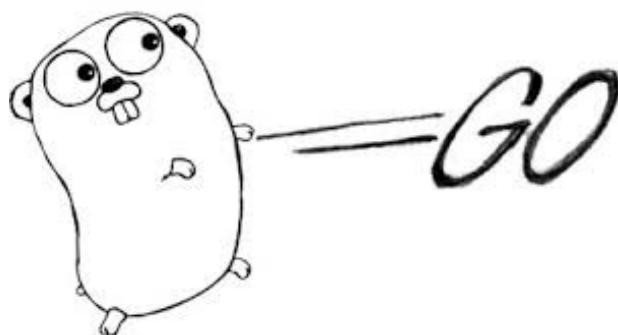
Forward Thinking



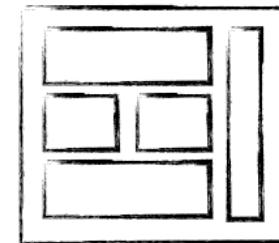
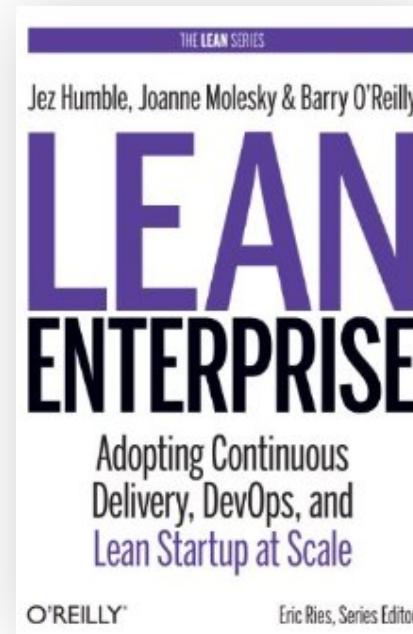
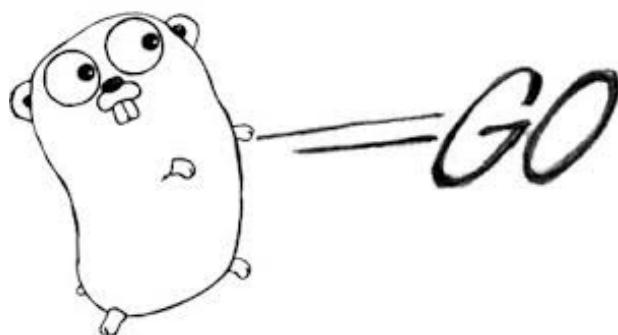
Forward Thinking



Forward Thinking



Forward Thinking



MONOLITHIC/LAYERED



MICRO SERVICES

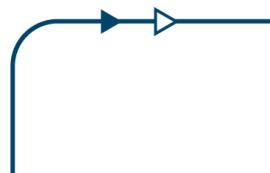
<http://eugenivedorkin.com/seven-micro-services-architecture-advantages/>

Any Questions?

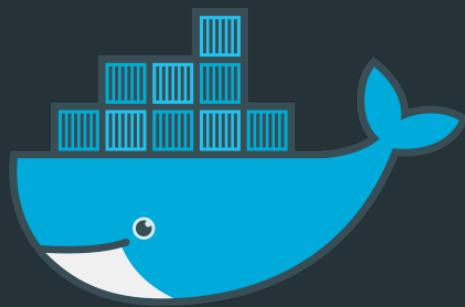


- *Battery Ventures* <http://www.battery.com>
- *Adrian's Tweets @adrianco and Blog* <http://perfcap.blogspot.com>
- *Slideshare* <http://slideshare.com/adriancockcroft>
- *Monitorama Opening Keynote Portland OR - May 7th, 2014 - Video available*
- *GOTO Chicago Opening Keynote May 20th, 2014 - Video available*
- *Qcon New York – Speed and Scale - June 11th, 2014 - Video available*
- *Structure - Cloud Trends - San Francisco - June 19th, 2014 - Video available*
- *GOTO Copenhagen/Aarhus – Fast Delivery - Denmark – Sept 25th, 2014*
- *DevOps Enterprise Summit - San Francisco - Oct 21-23rd, 2014 #DOES14 - Videos available*
- *GOTO Berlin - Migrating to Microservices - Germany - Nov 6th, 2014*
- *AWS Re:Invent - Cloud Native Cost Optimization - Las Vegas - November 14th, 2014*

Disclosure: some of the companies mentioned may be Battery Ventures Portfolio Companies
See www.battery.com for a list of portfolio investments



Thank You.



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