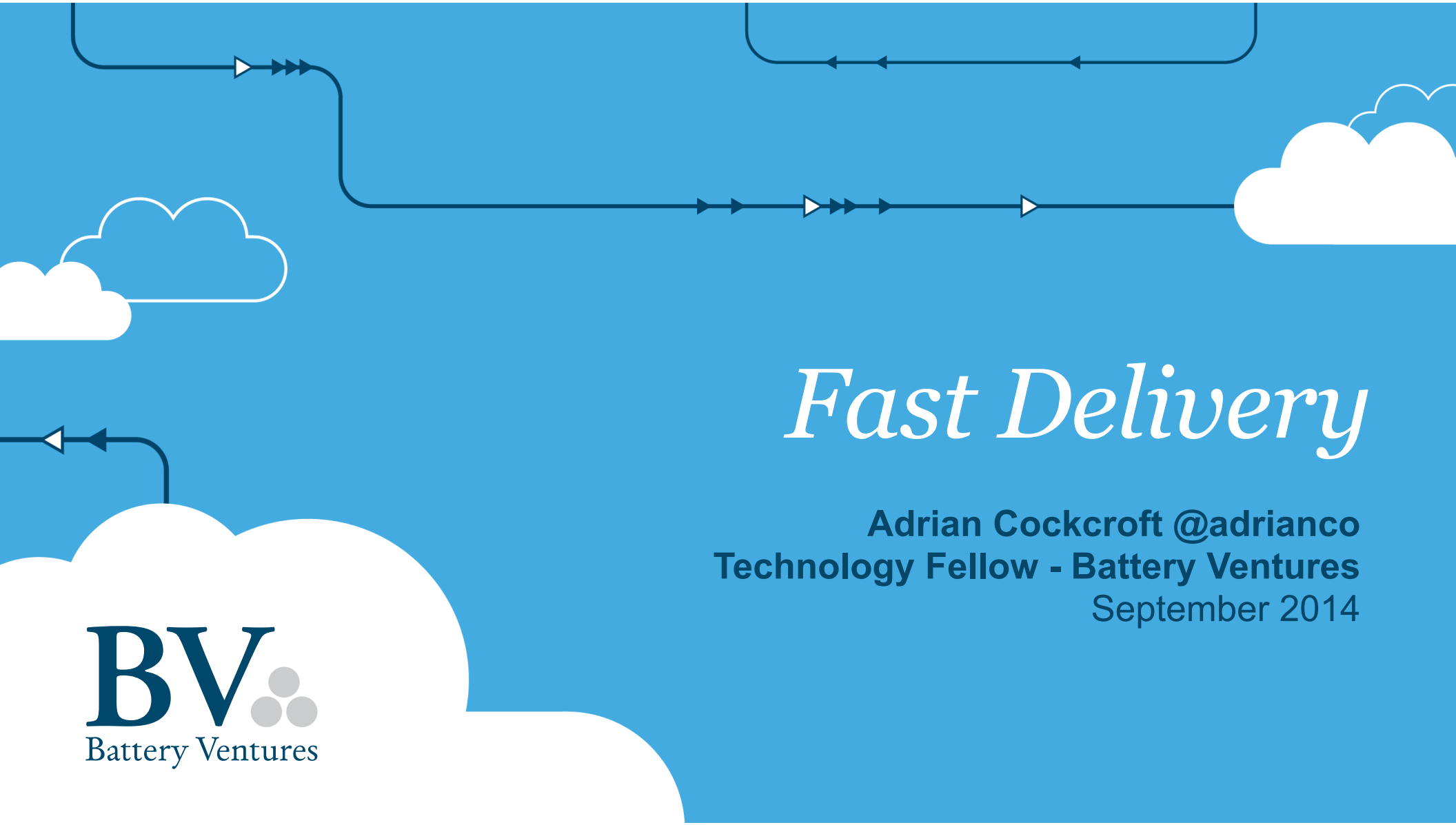
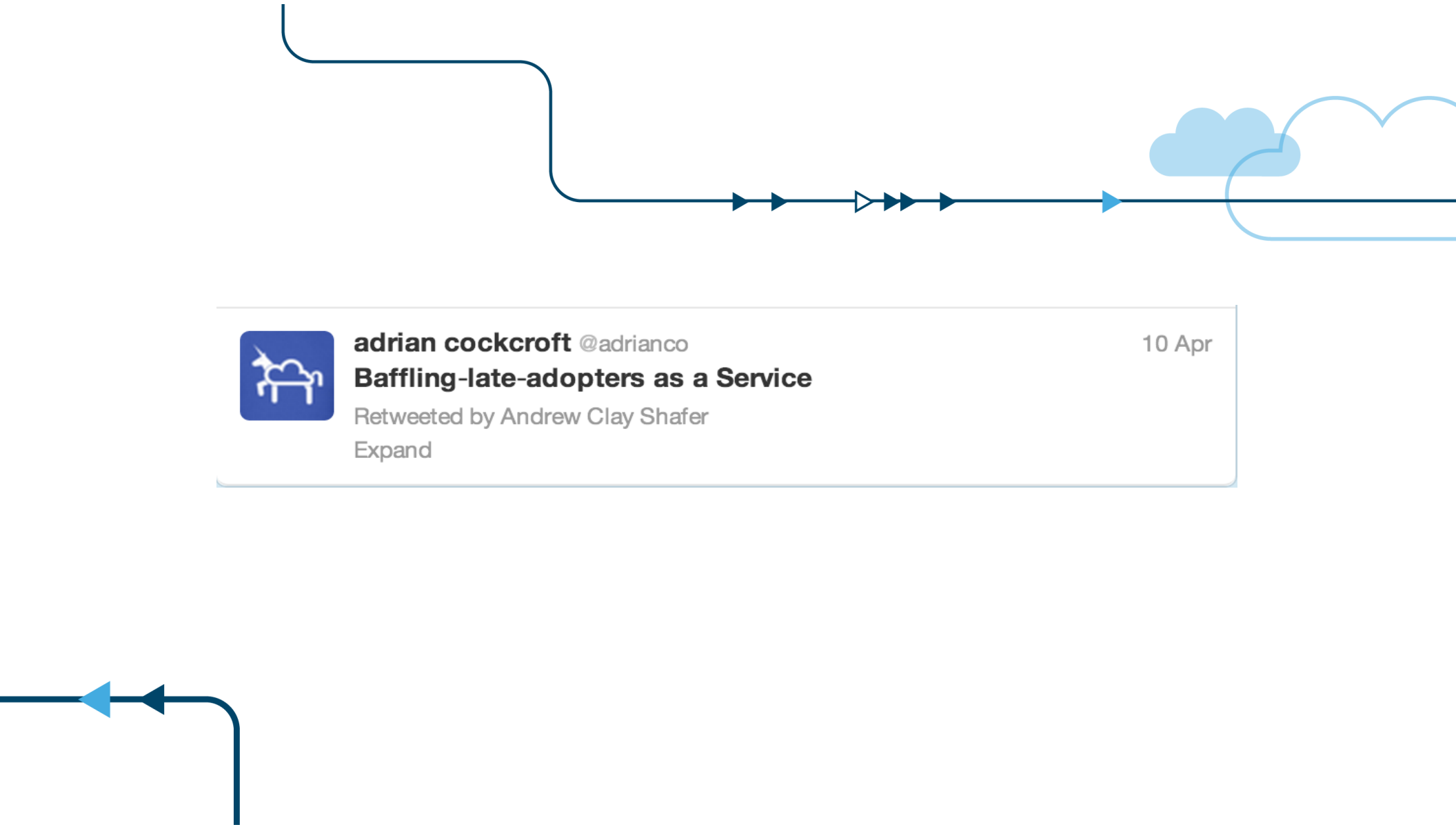


Fast Delivery

Adrian Cockcroft @adrianco
Technology Fellow - Battery Ventures
September 2014

BV
Battery Ventures


adrian cockcroft @adrianco
10 Apr
Baffling-late-adopters as a Service
Retweeted by Andrew Clay Shafer
Expand

Typical reactions to my Netflix talks…

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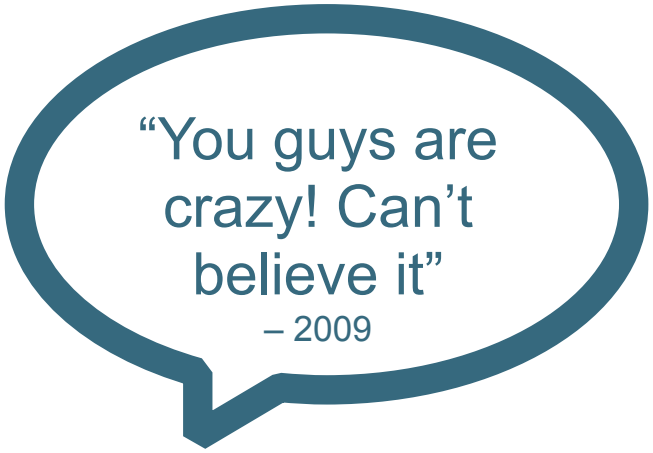

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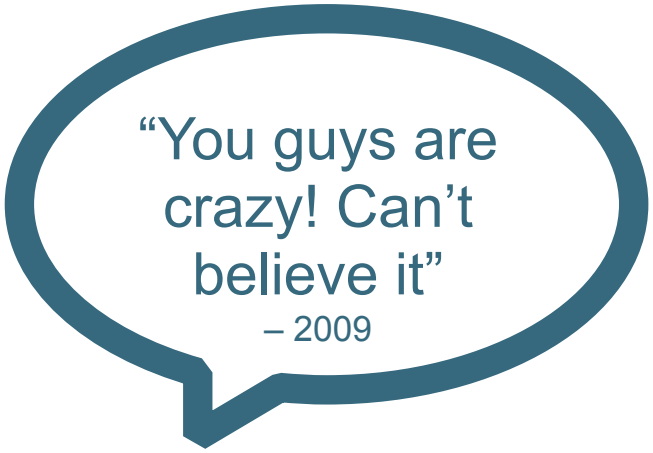

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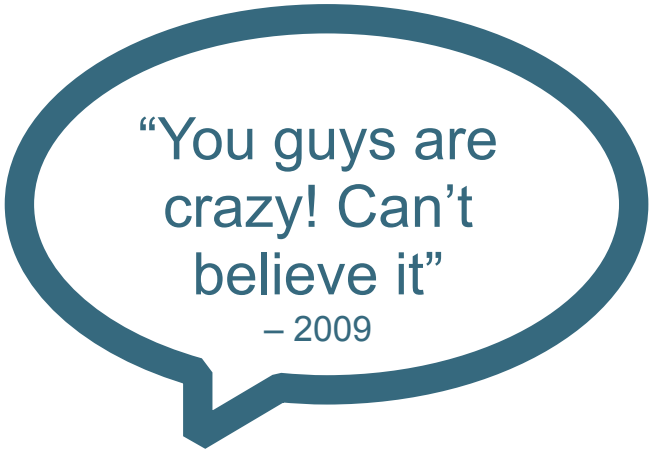

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What I learned from my time at Netflix

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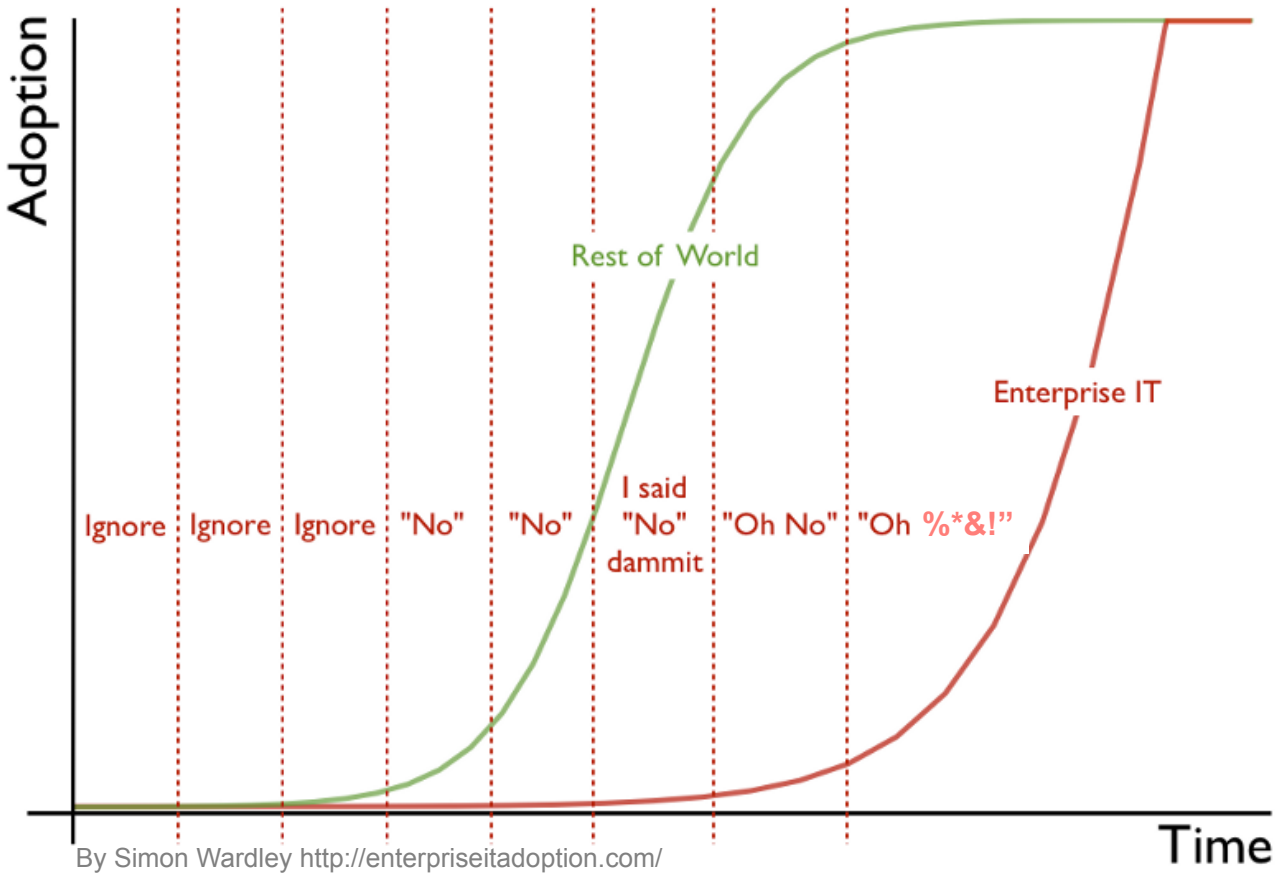
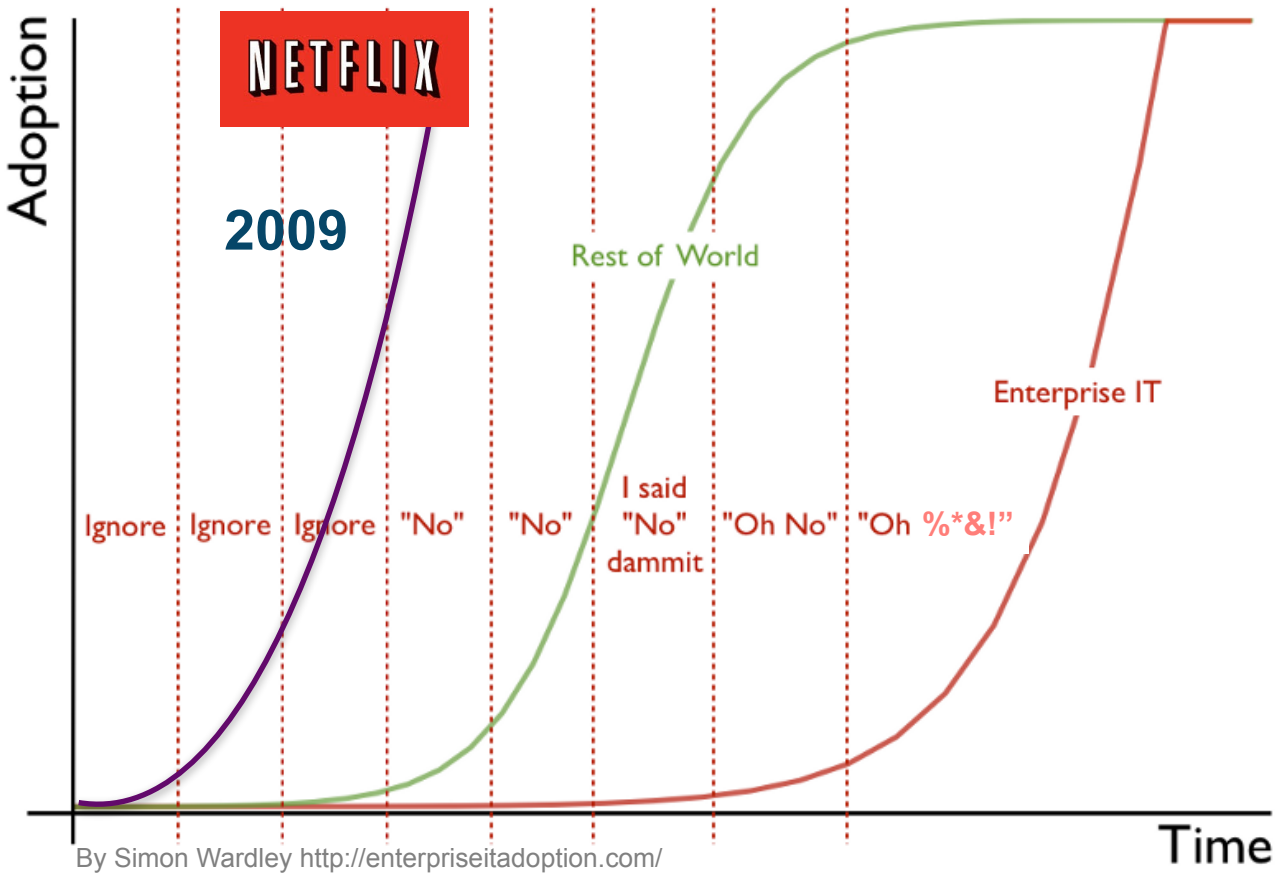
- *Self service cloud makes impossible things instant*

Cloud Adoption

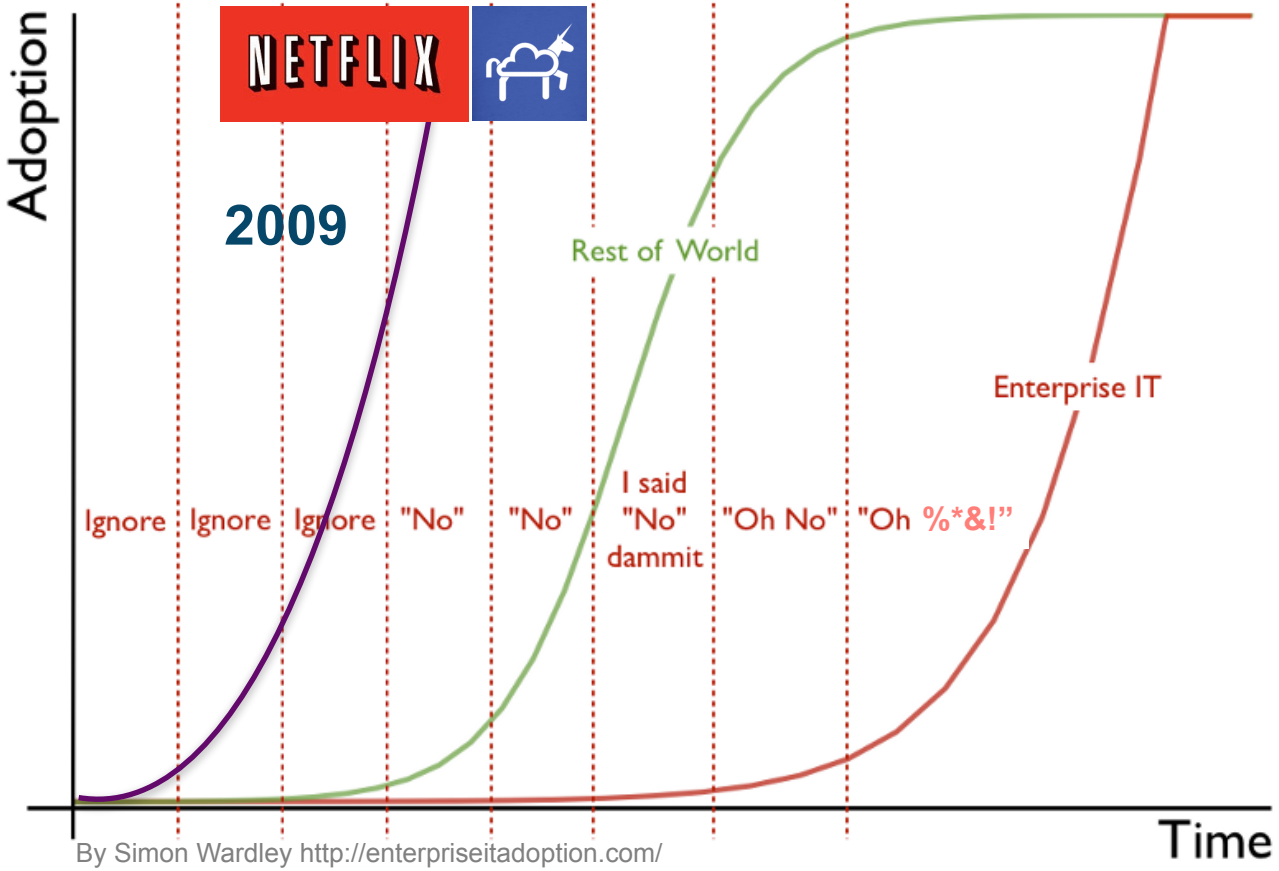


By Simon Wardley http://enterpriseitadoption.com/

Cloud Adoption



Cloud Adoption



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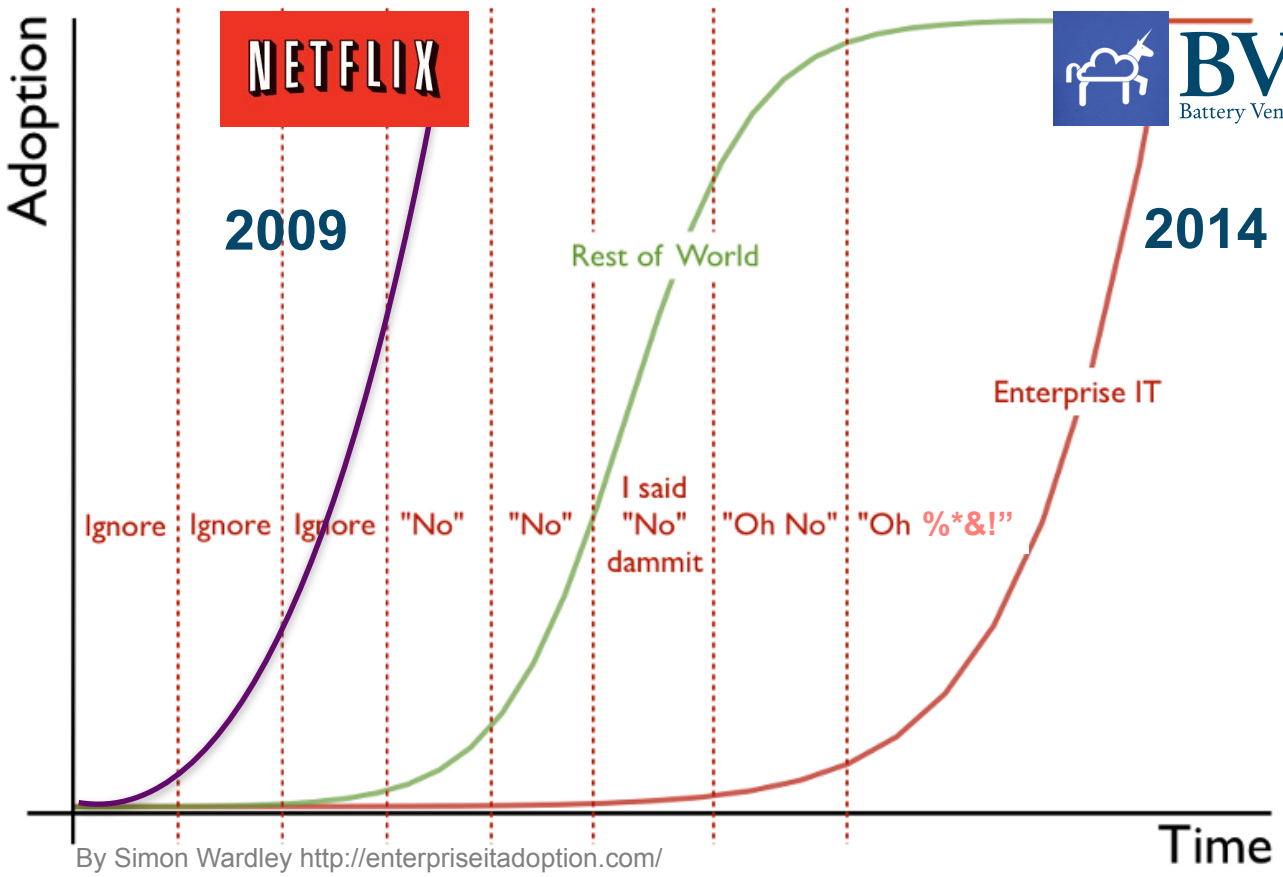
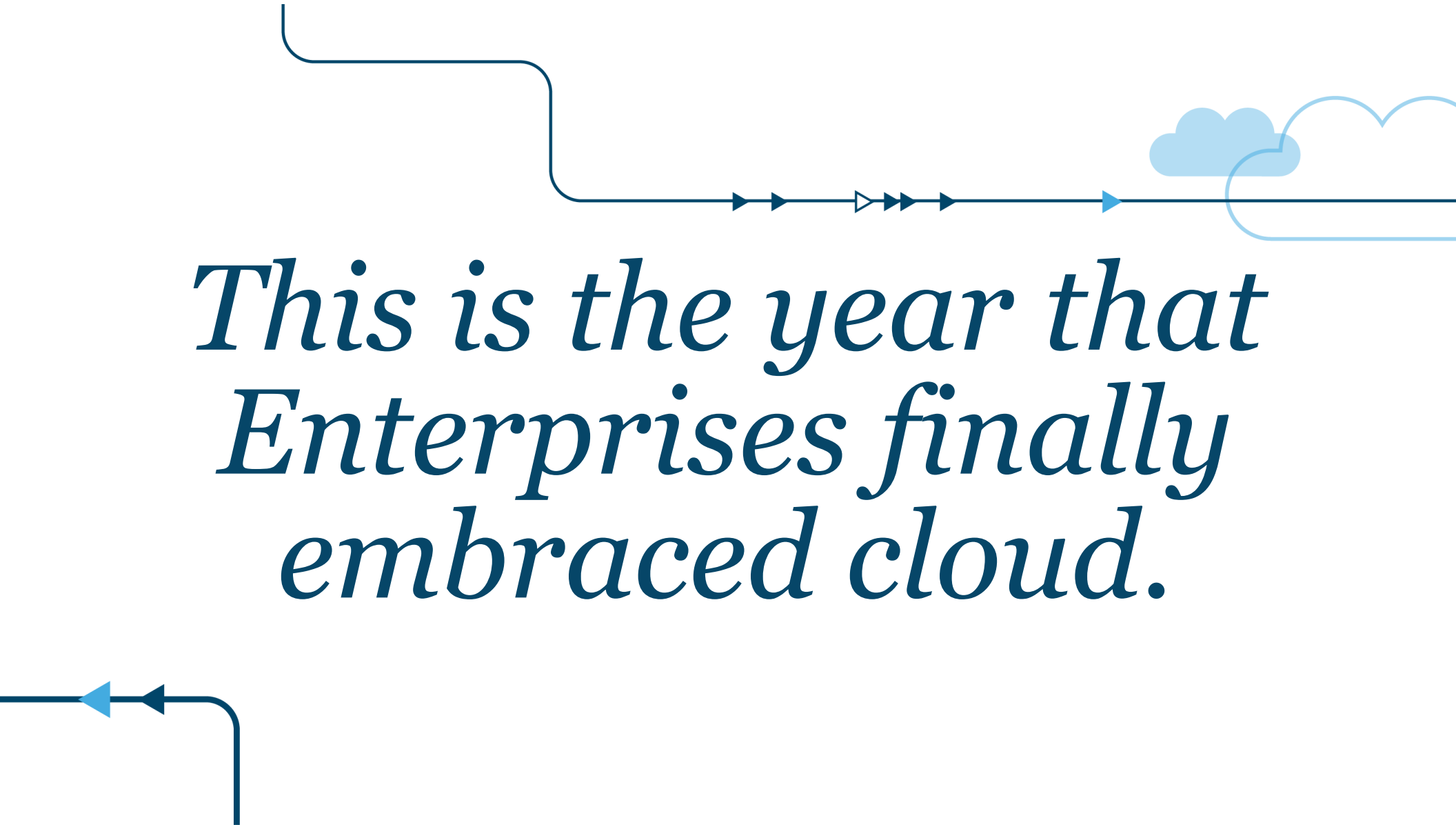
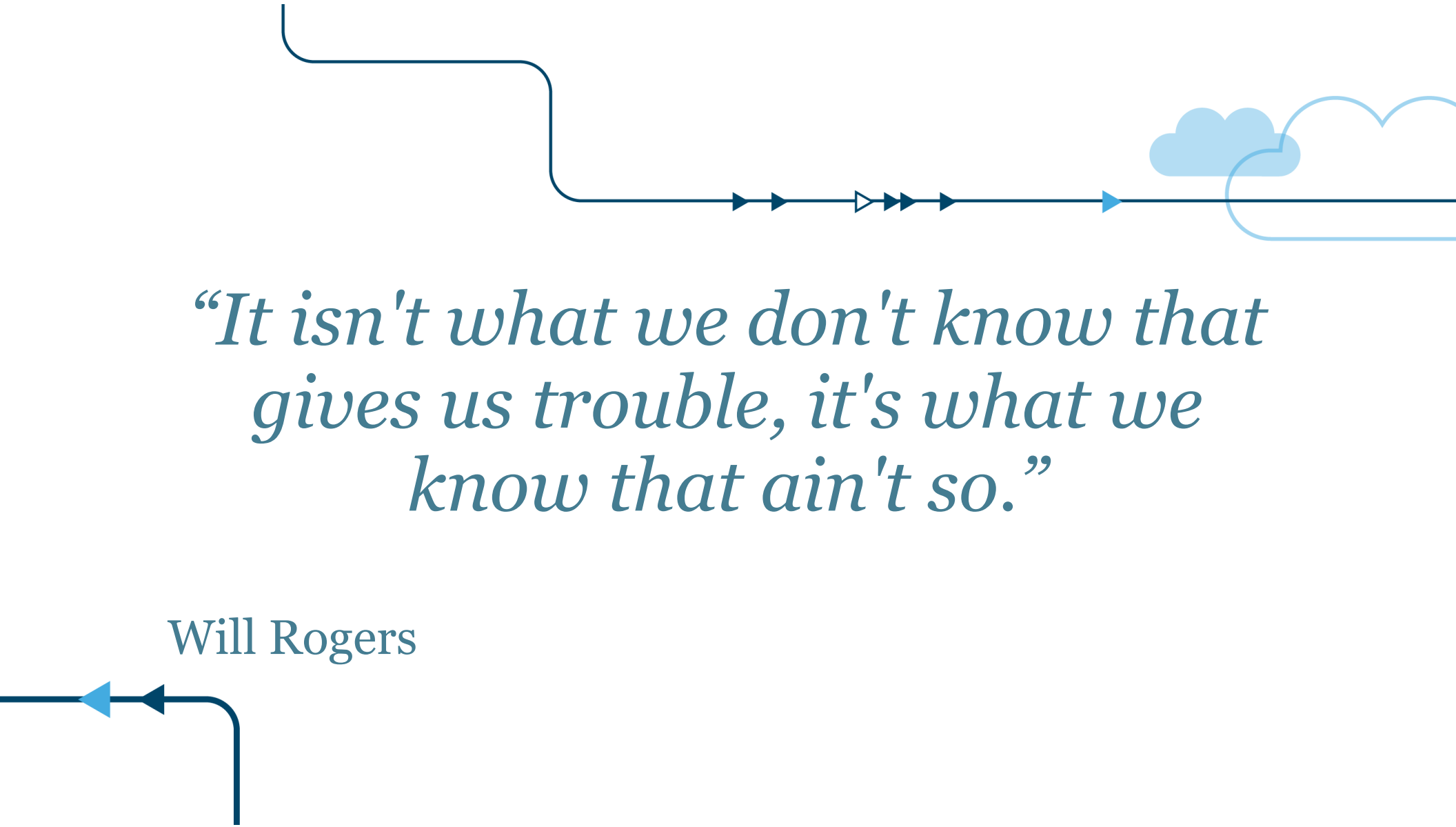


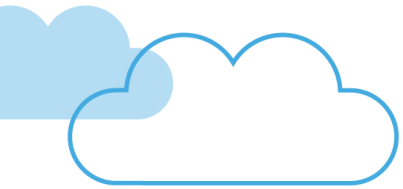
@adrianco's new job at the intersection of cloud and Enterprise IT


This is the year that Enterprises finally embraced cloud.

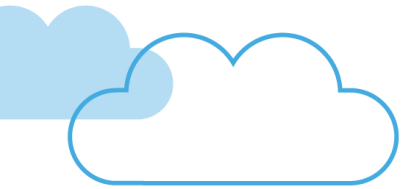


“It isn't what we don't know that gives us trouble, it's what we know that ain't so.”

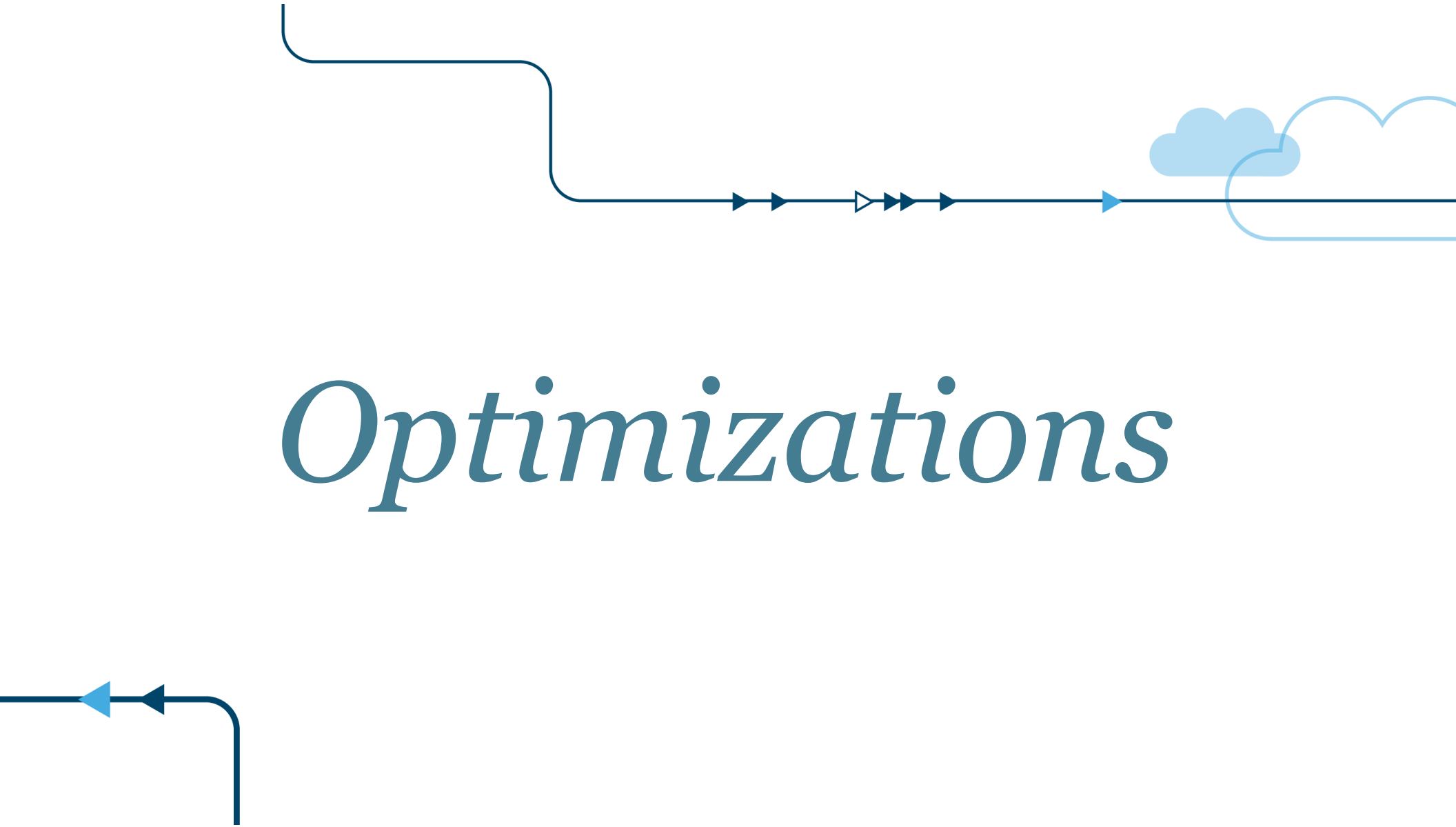
Will Rogers



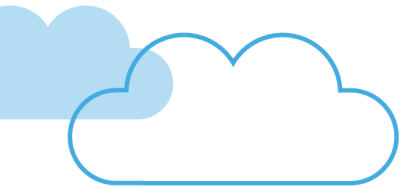

What separates incumbents from disruptors?



Assumptions



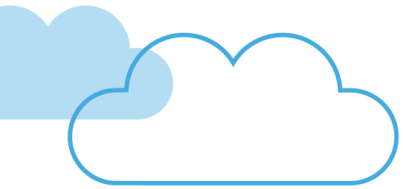
Optimizations




Assumption: Process prevents problems

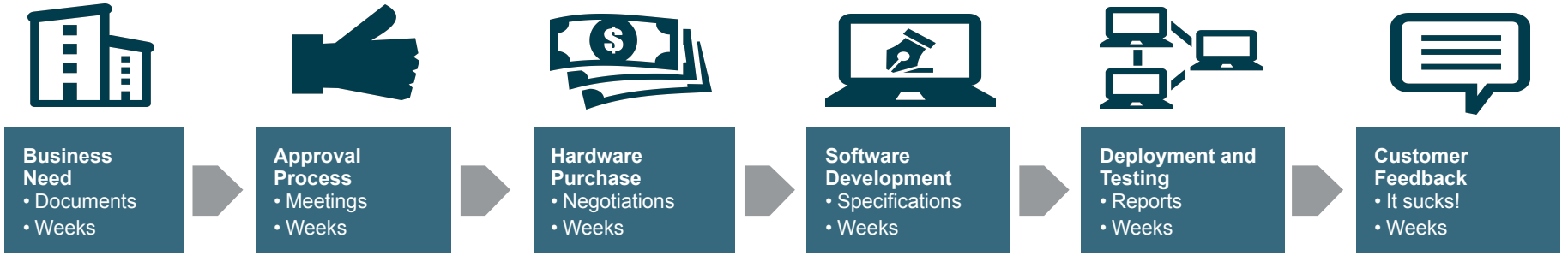
Organizations build up slow complex "Scar tissue" processes

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



Product Development Processes

Non-Cloud Product



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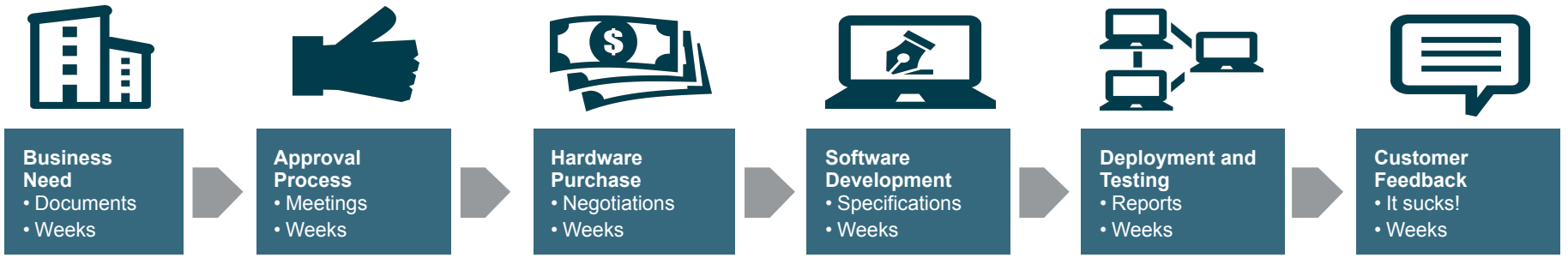
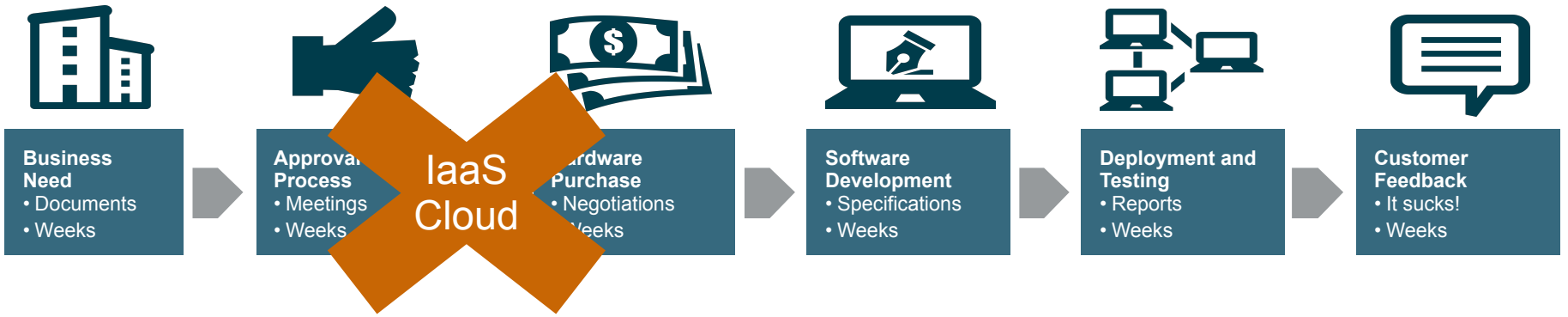


Hardware provisioning is undifferentiated heavy lifting – replace it with IaaS

Non-Cloud Product



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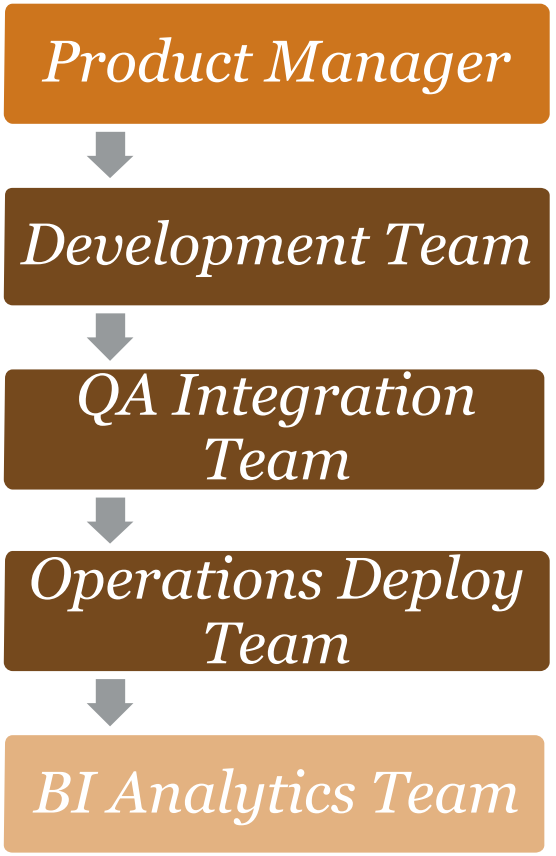
Non-Cloud Product

Hardware provisioning is undifferentiated heavy lifting – replace it with IaaS

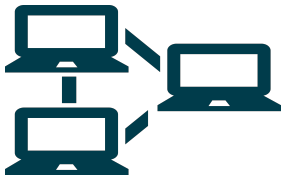
Process Hand-Off Steps for Product Development on IaaS



IaaS Based Product

Business Need
- Documents
- Weeks

Software Development
- Specifications
- Weeks



Deployment and Testing
- Reports
- Days

Customer Feedback
- It sucks!
- Days

IaaS Based Product

amazon web services™ | Windows Azure | SOFTLAYER an IBM Company | openstack CLOUD SOFTWARE | EUCALYPTUS | etc…

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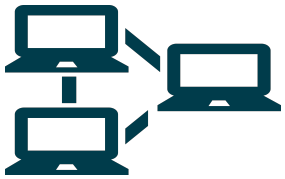

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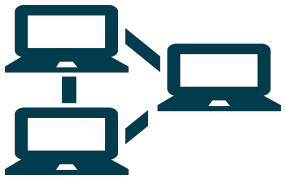

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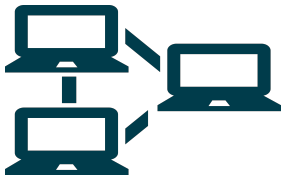

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Software provisioning is undifferentiated heavy lifting – replace it with PaaS

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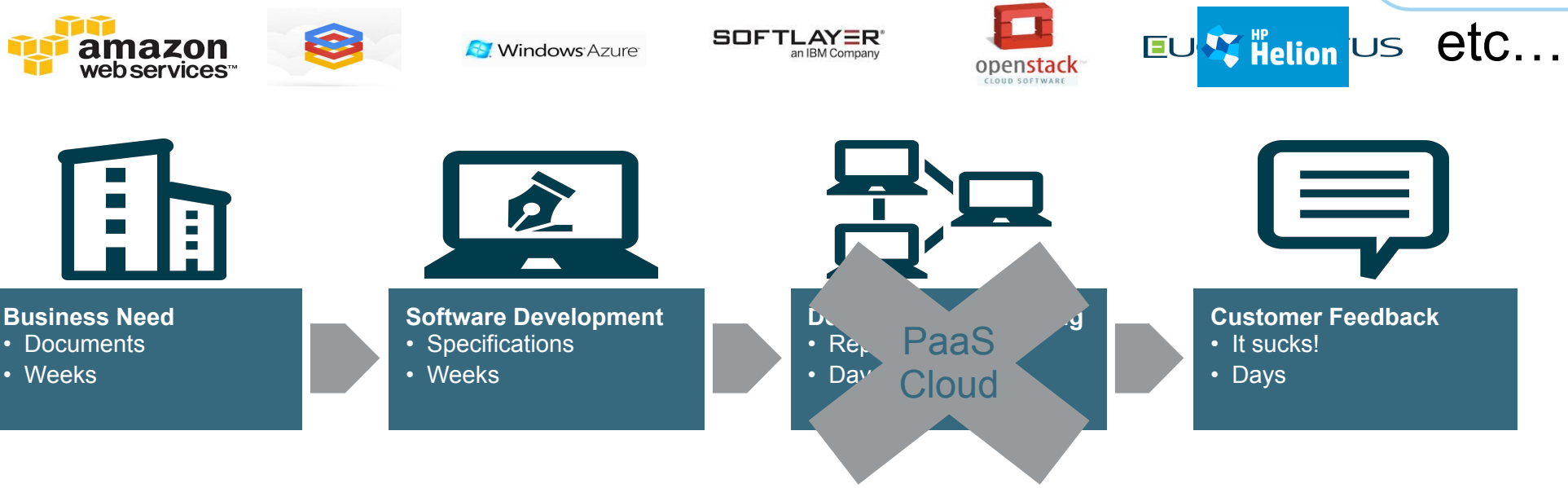

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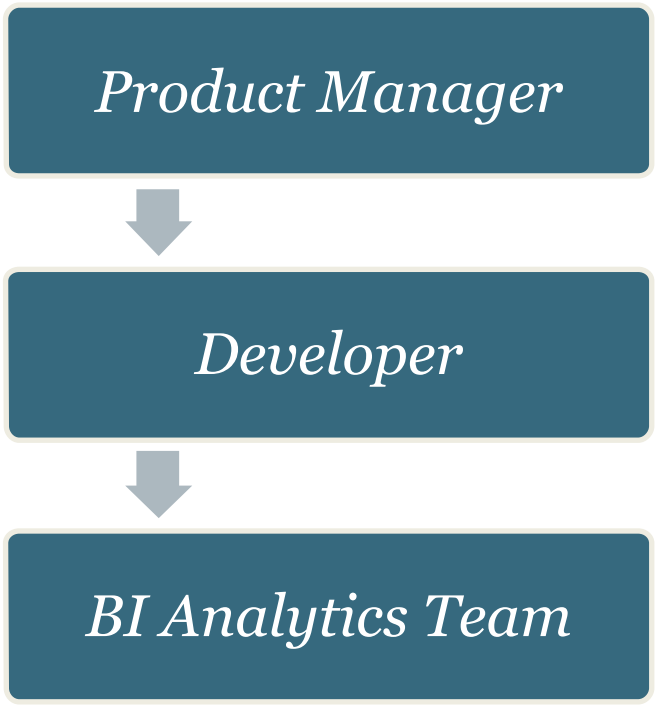

PaaS Based Product

heroku CLOUD FOUNDRY Google App Engine NETFLIX OSS apcera docker CONTINUITY etc…

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- Code
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Customer Feedback
- Fix this Bit!
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Building your own business apps is undifferentiated heavy lifting – use SaaS

PaaS Based Product

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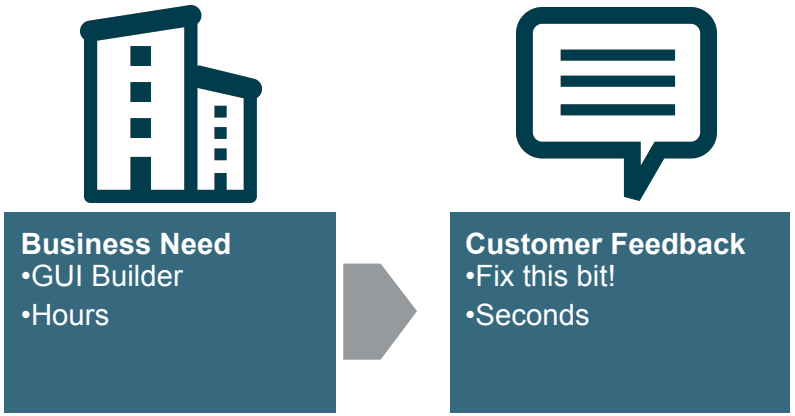
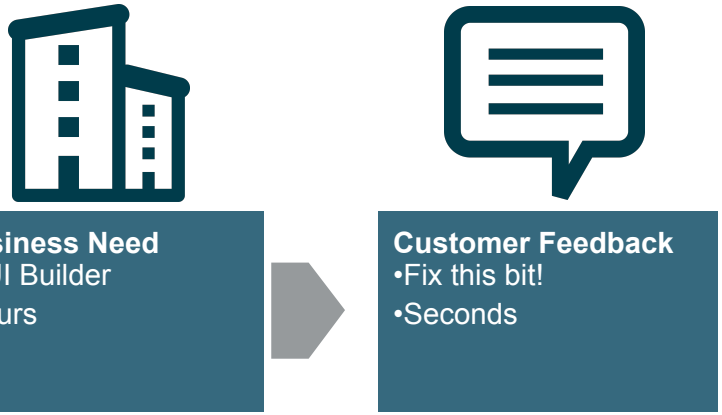
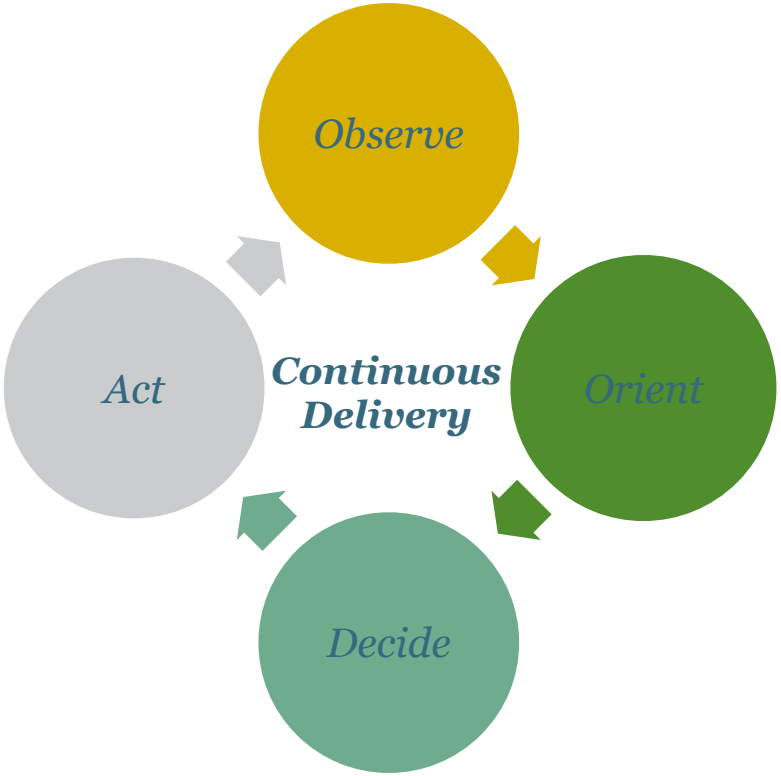
SaaS Based Business Application Development

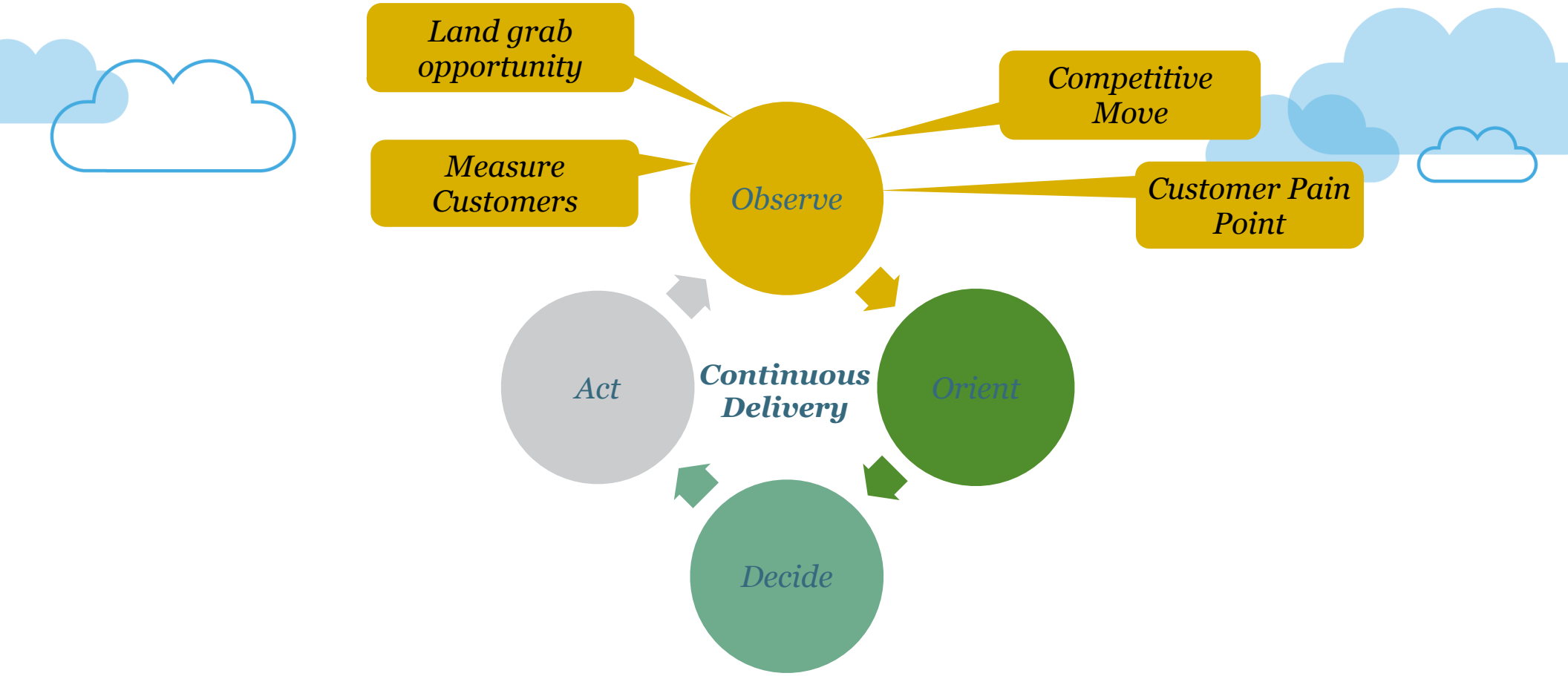


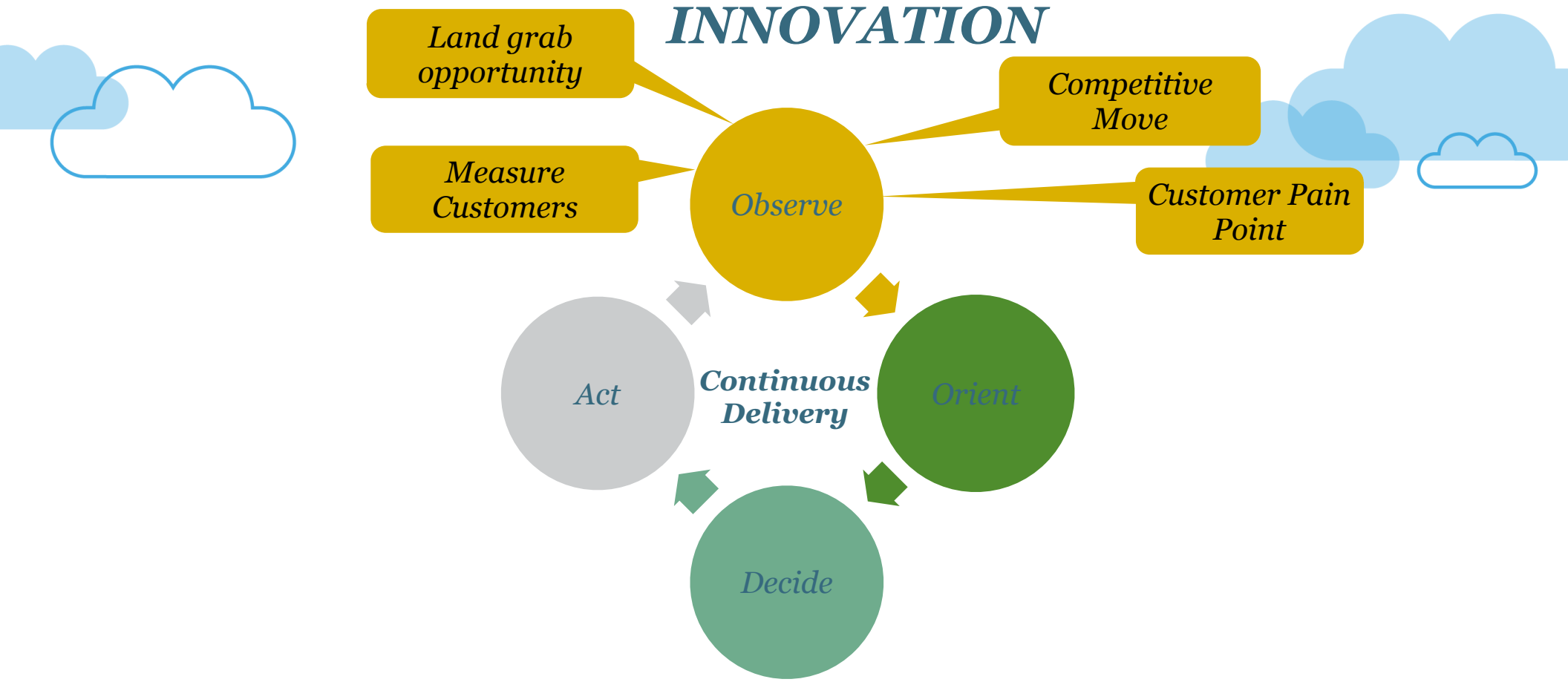
SaaS Based Business Application Development

and thousands more...




Observe
Orient
Decide
Act
Continuous Delivery


Land grab opportunity
Measure Customers
Observe
Competitive Move
Customer Pain Point
Act
Continuous Delivery
Orient
Decide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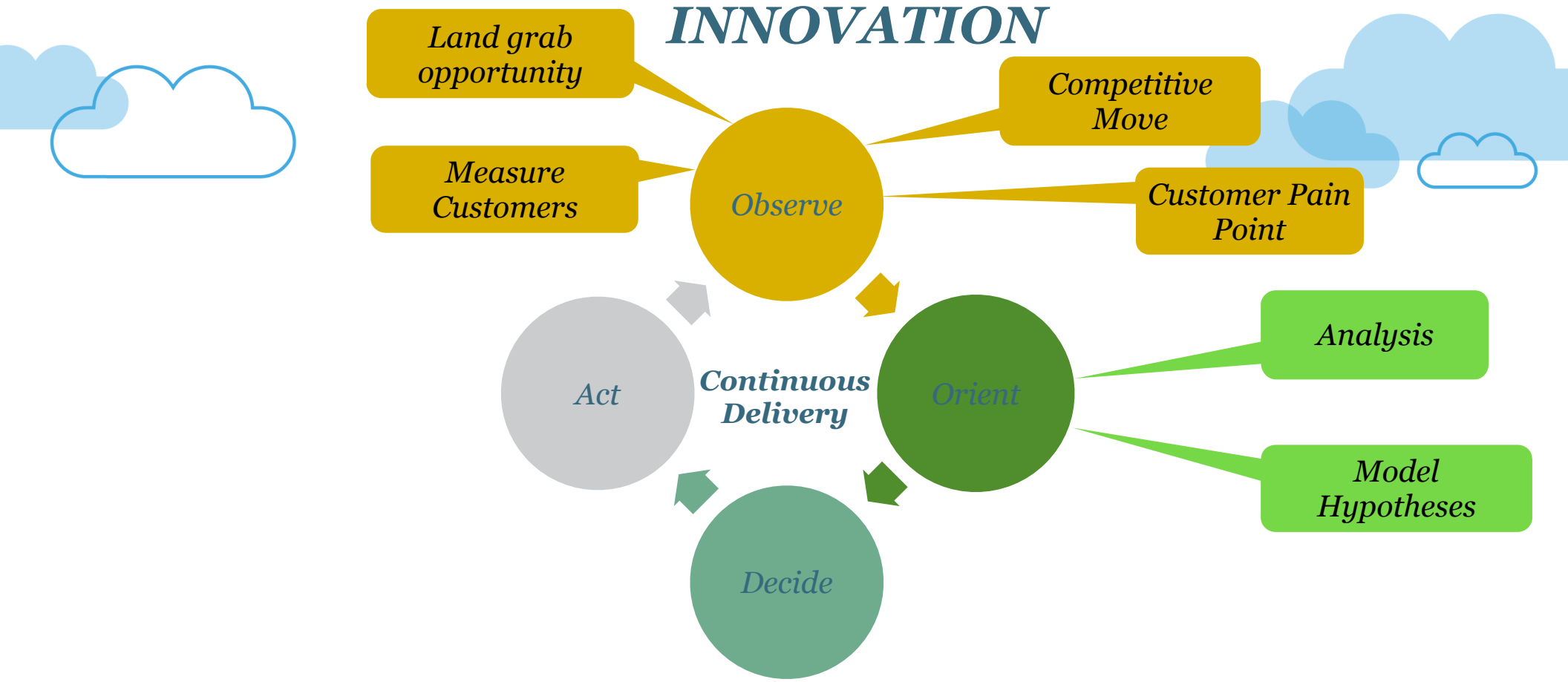
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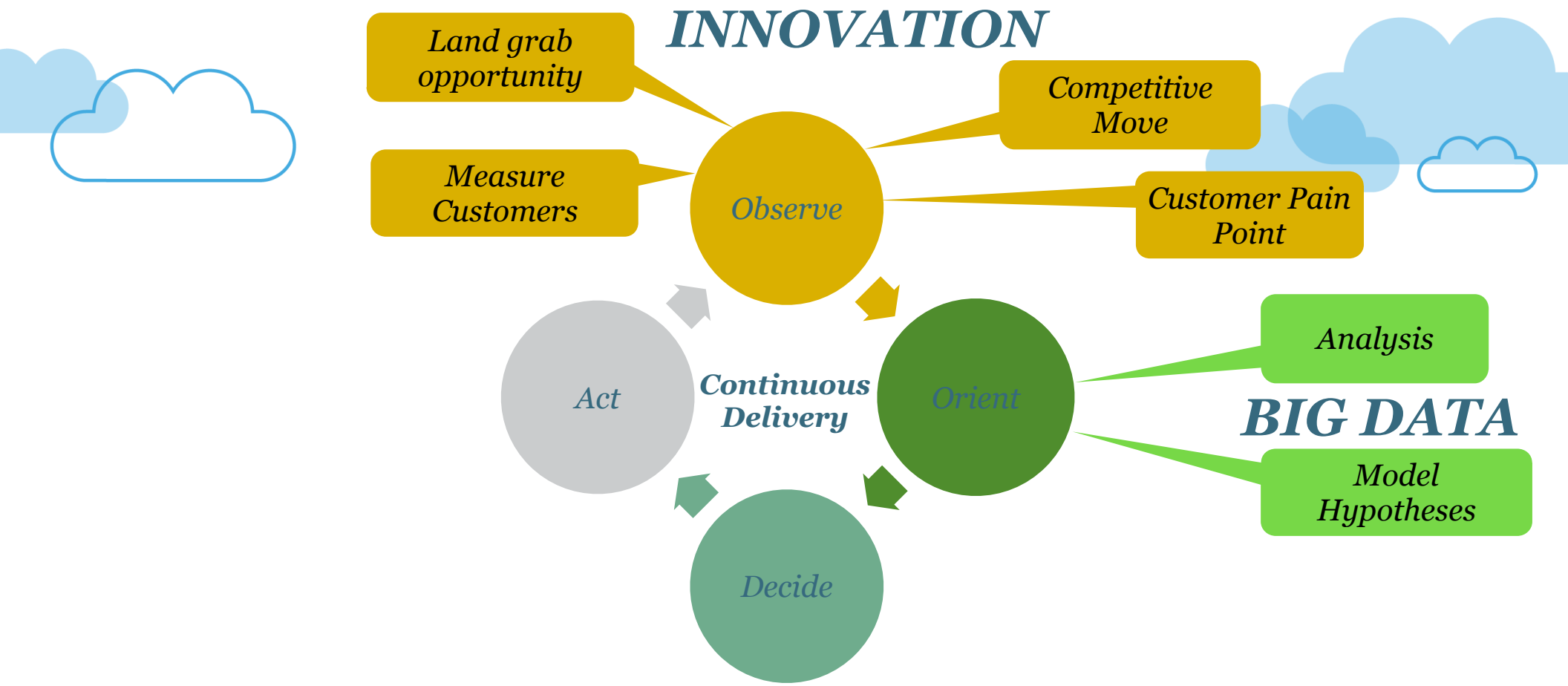
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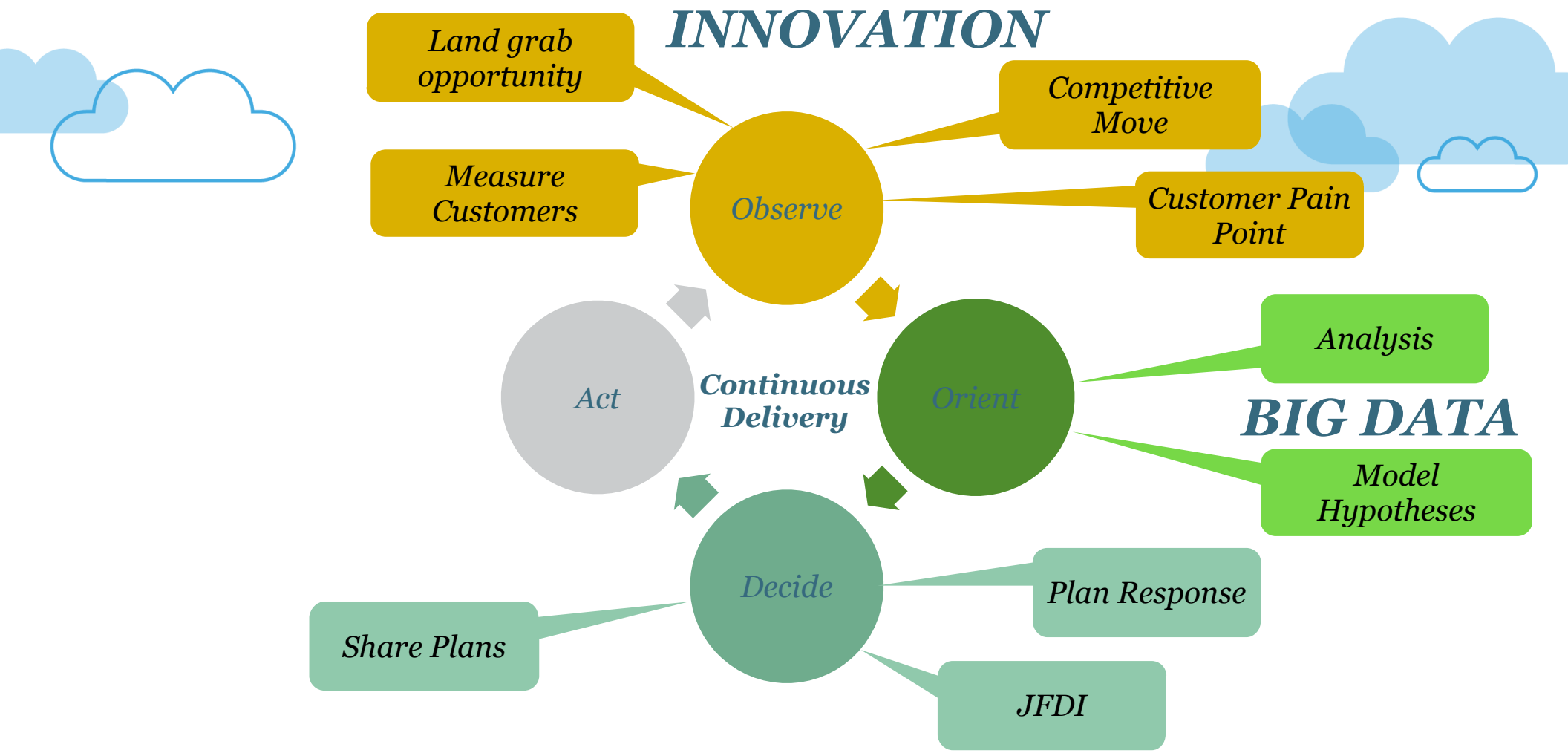
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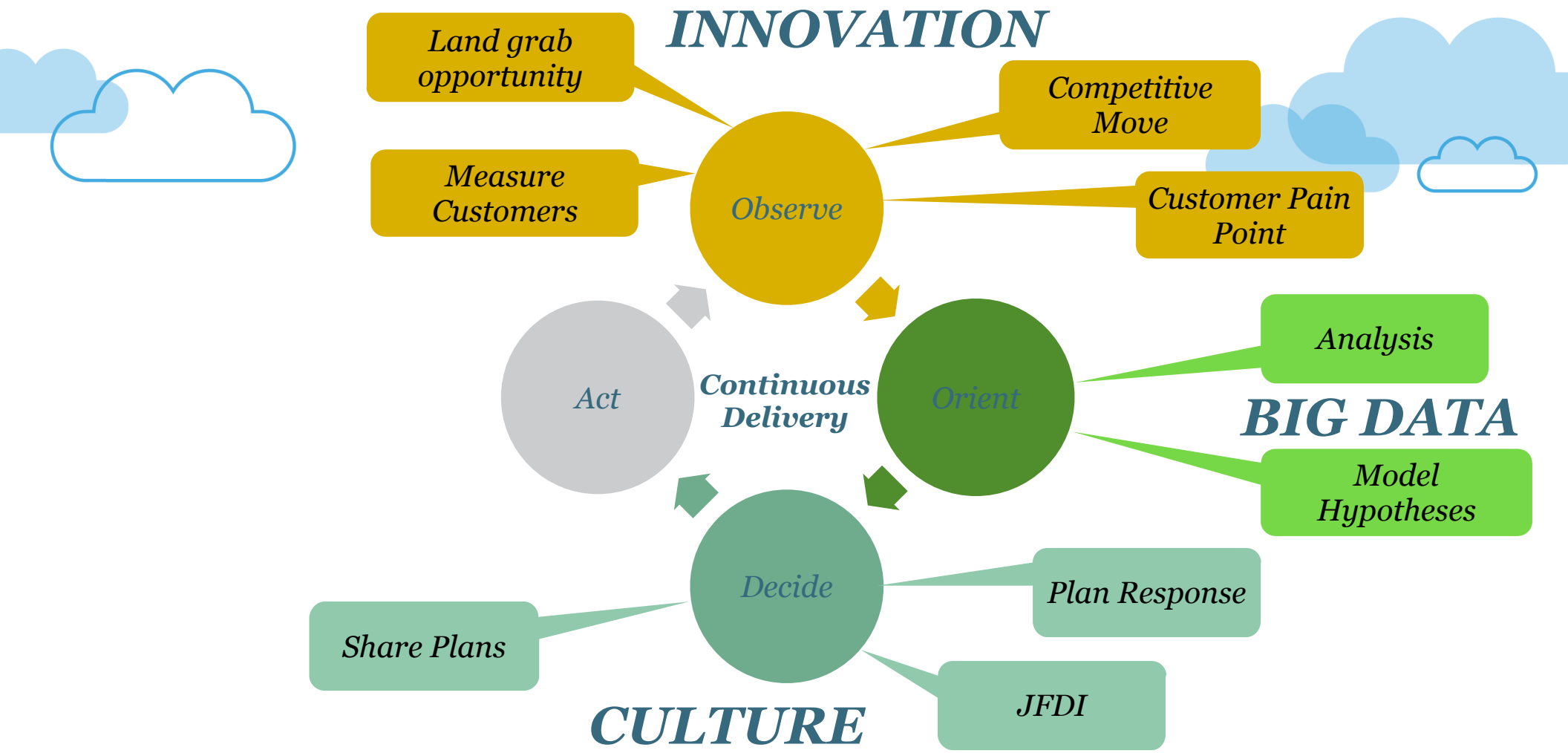
Share Plans
Plan Response
JFDI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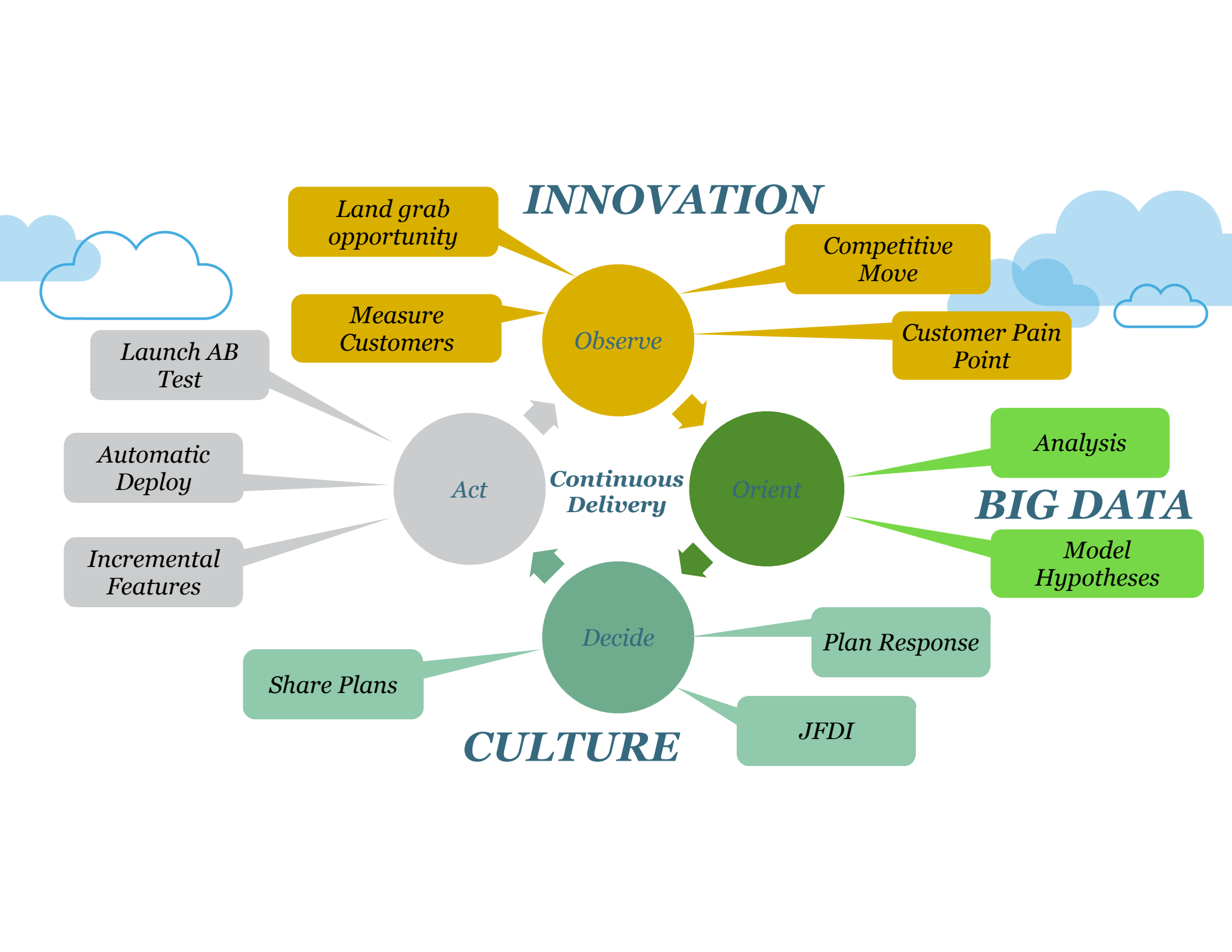
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Launch AB Test
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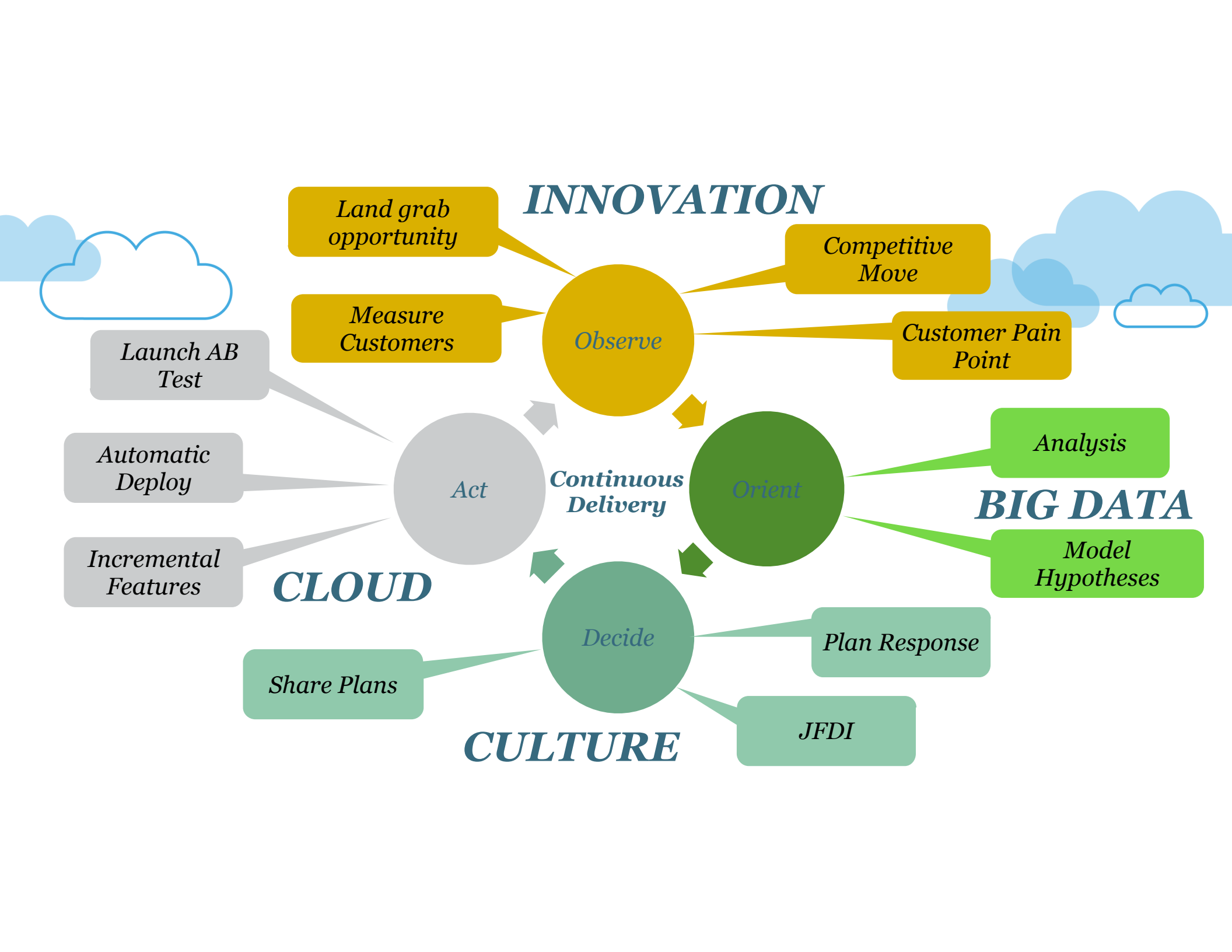
CULTURE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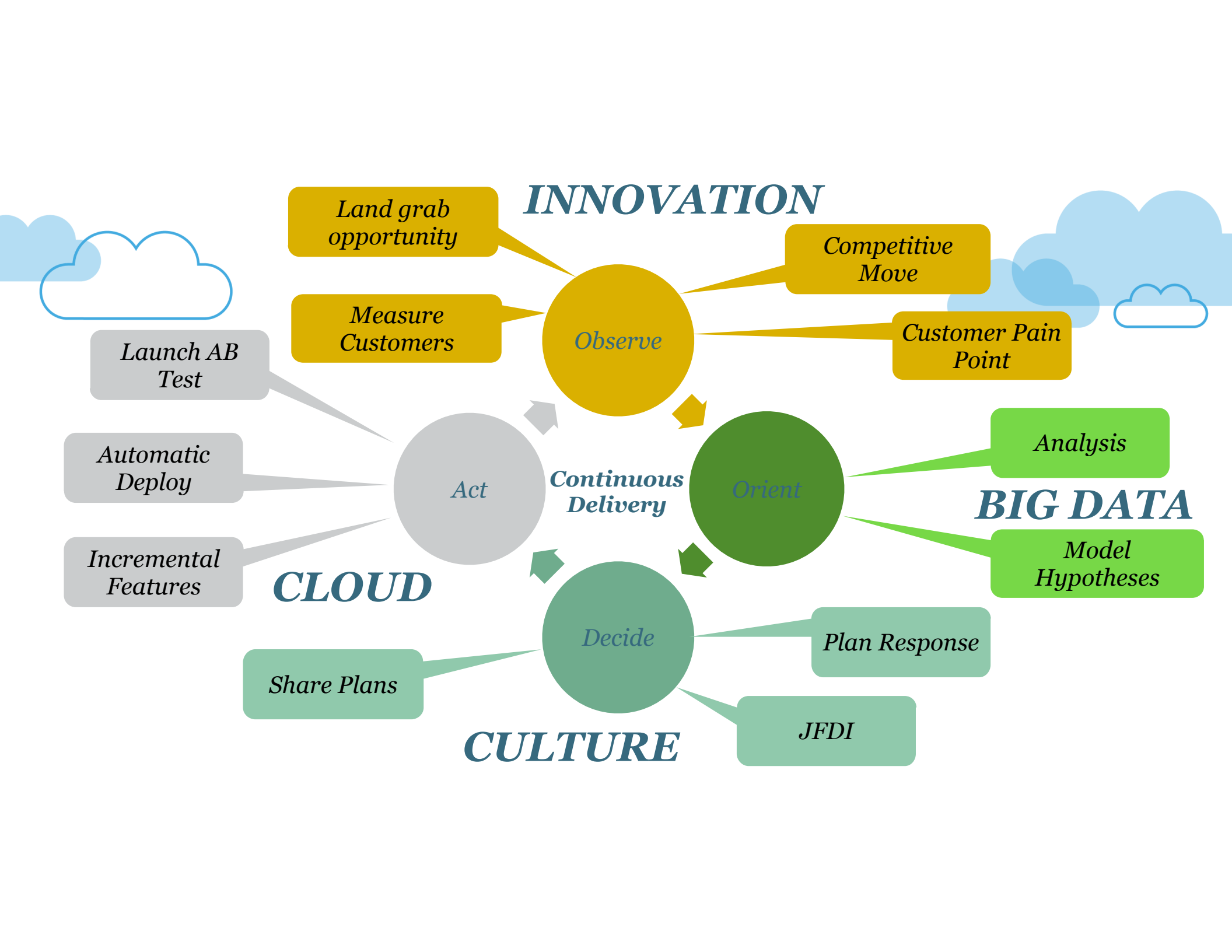
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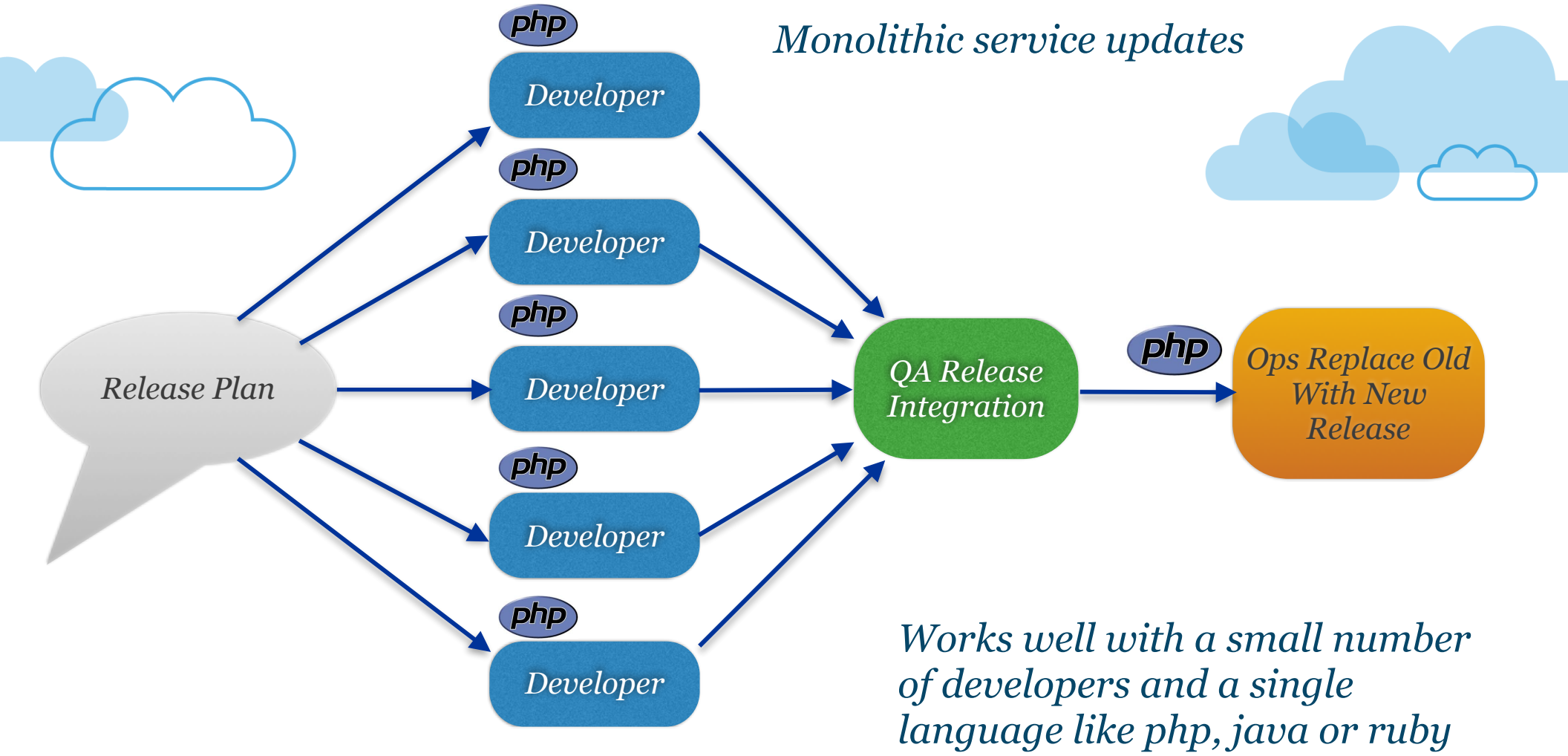
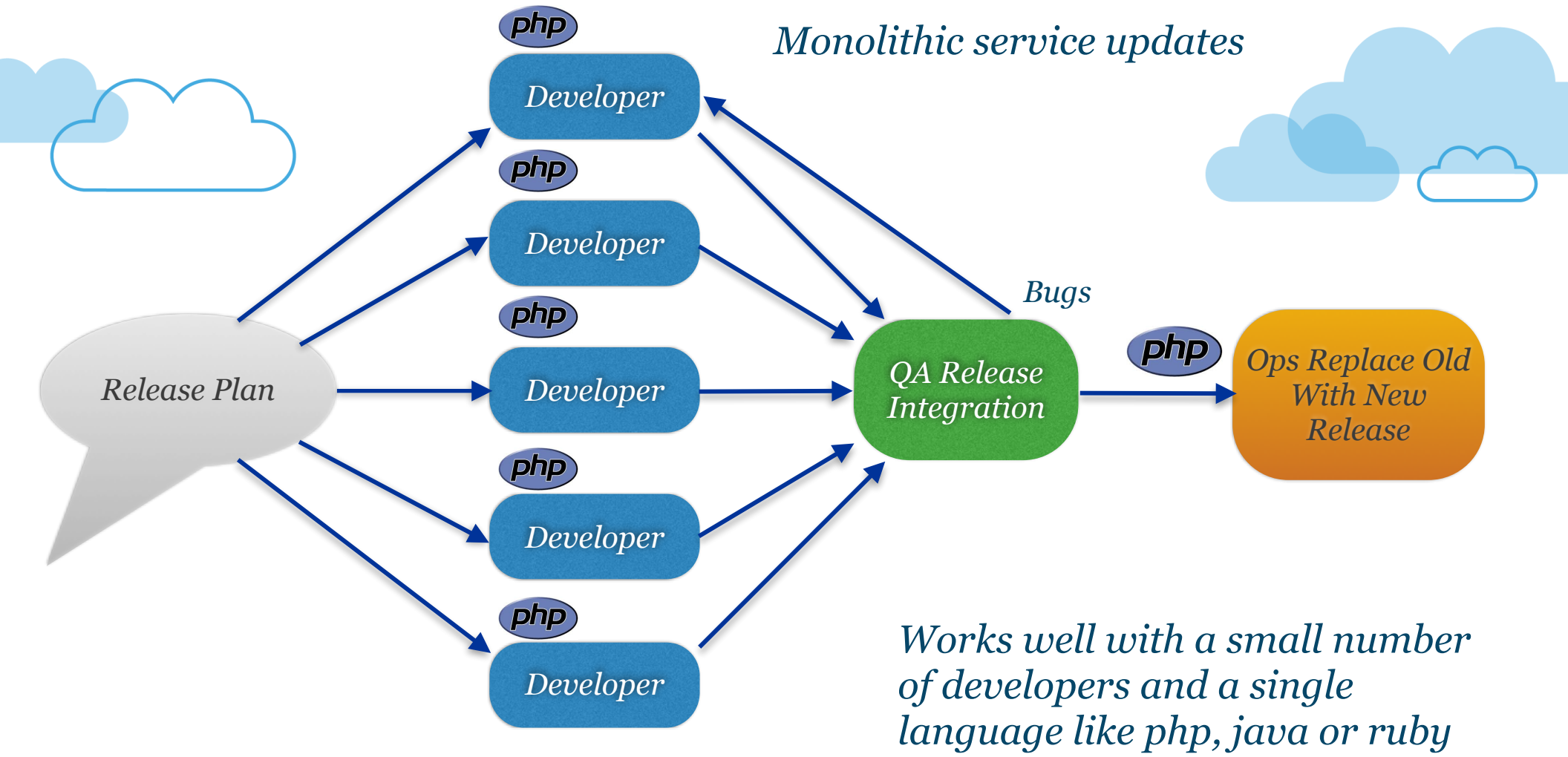

Monolithic service updates
php
Developer
php
Developer
php
Developer
php
Developer
php
Developer
Release Plan
QA Release Integration
php
Ops Replace Old With New Release
Works well with a small number of developers and a single language like php, java or ruby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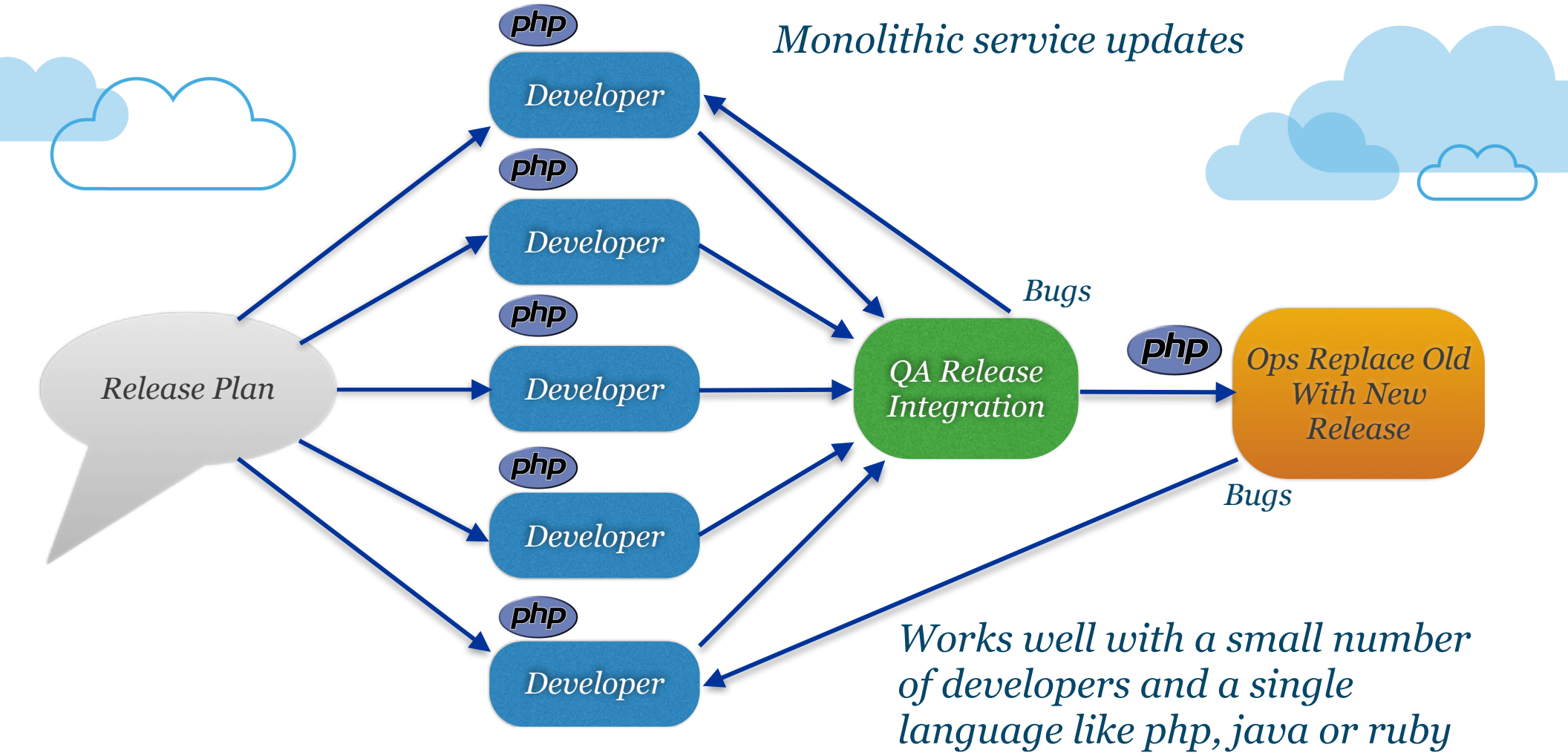
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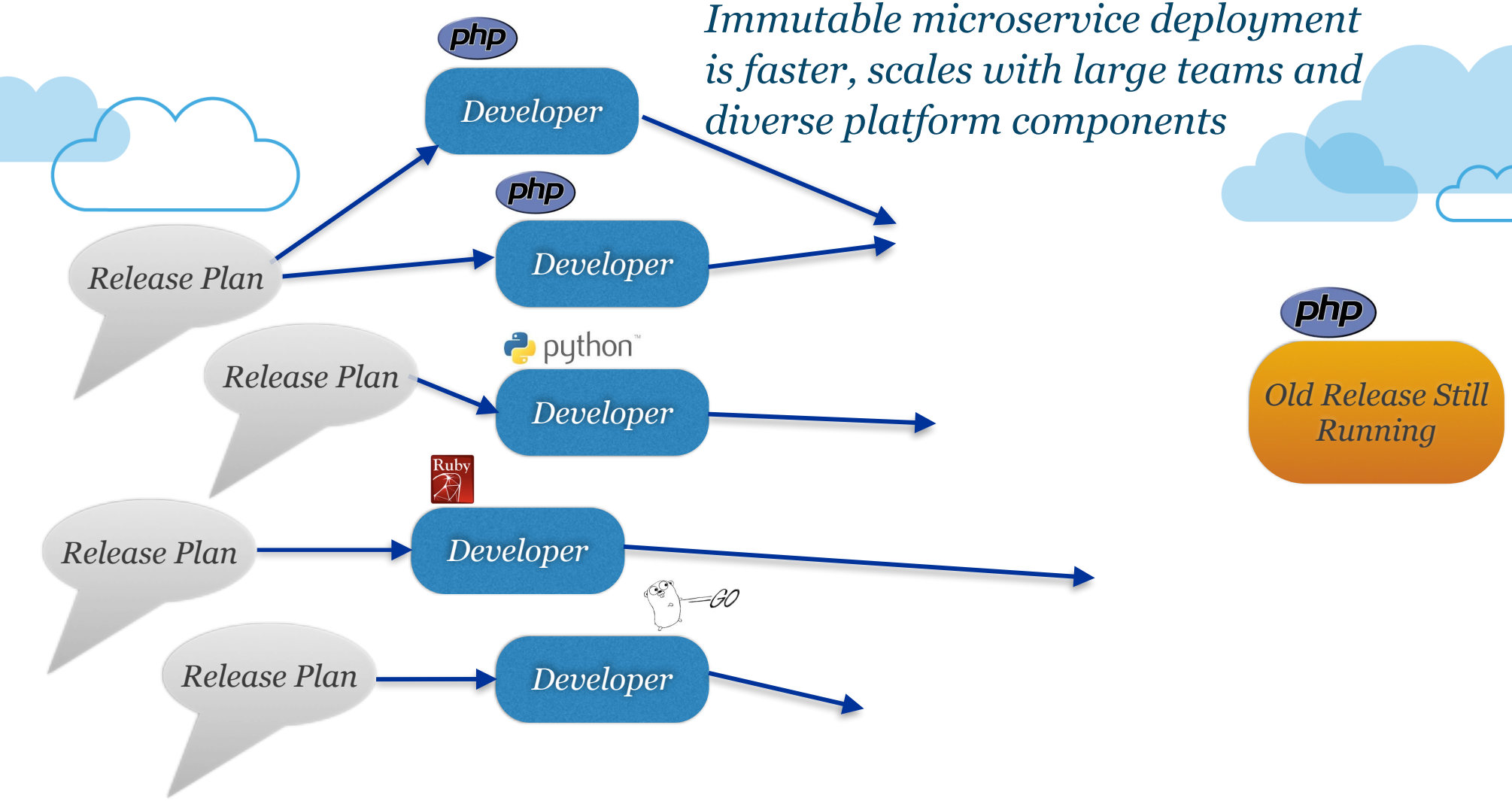
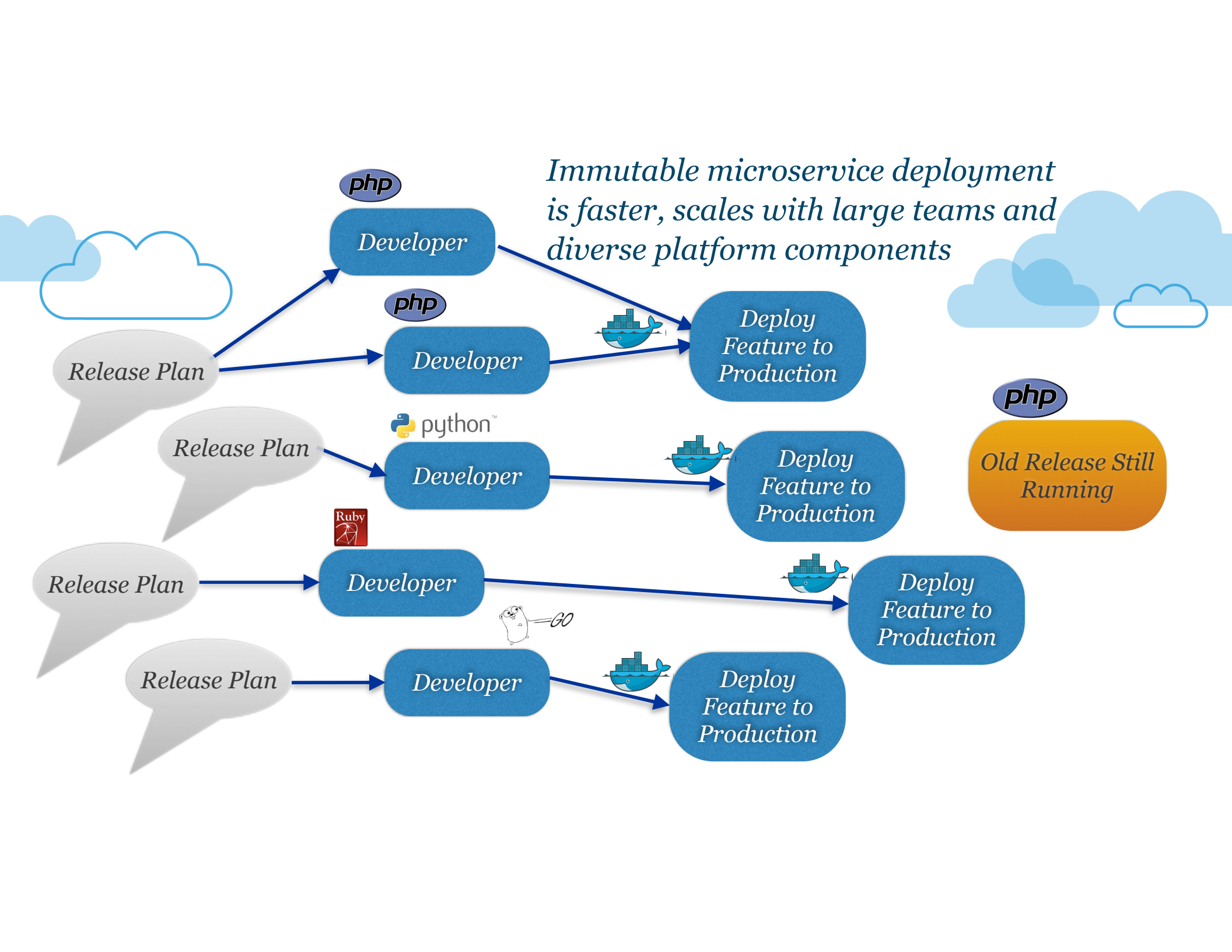

Immutable microservice deployment is faster, scales with large teams and diverse platform components
php
Developer
Release Plan
php
Developer
Release Plan
python
Developer
Ruby
Release Plan
Developer
GO
Release Plan
Developer
php
Old Release Still Running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Old Release Still Running
Ruby
Release Plan
Developer
Deploy Feature to Production
GO
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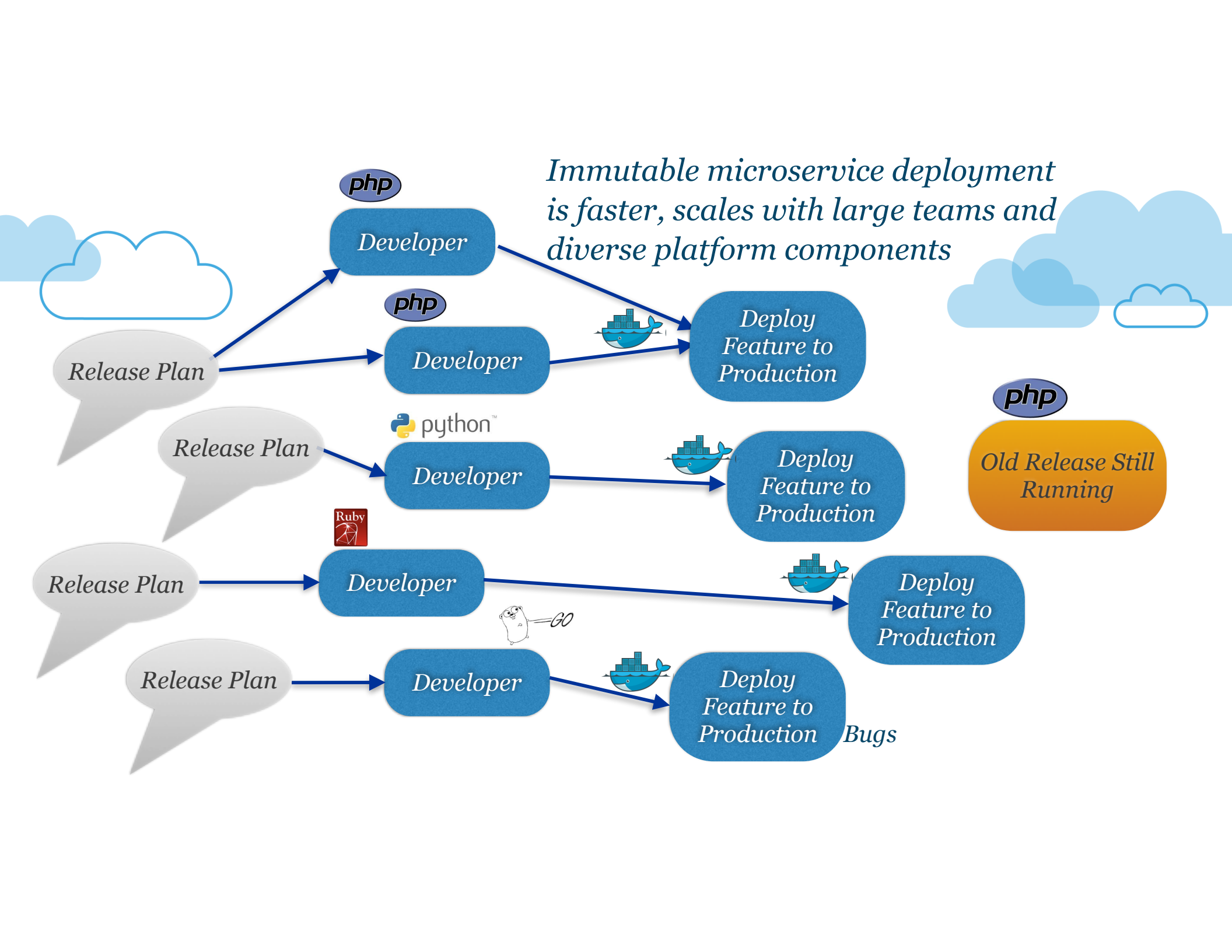
Deploy Feature to Production


Immutable microservice deployment is faster, scales with large teams and diverse platform components
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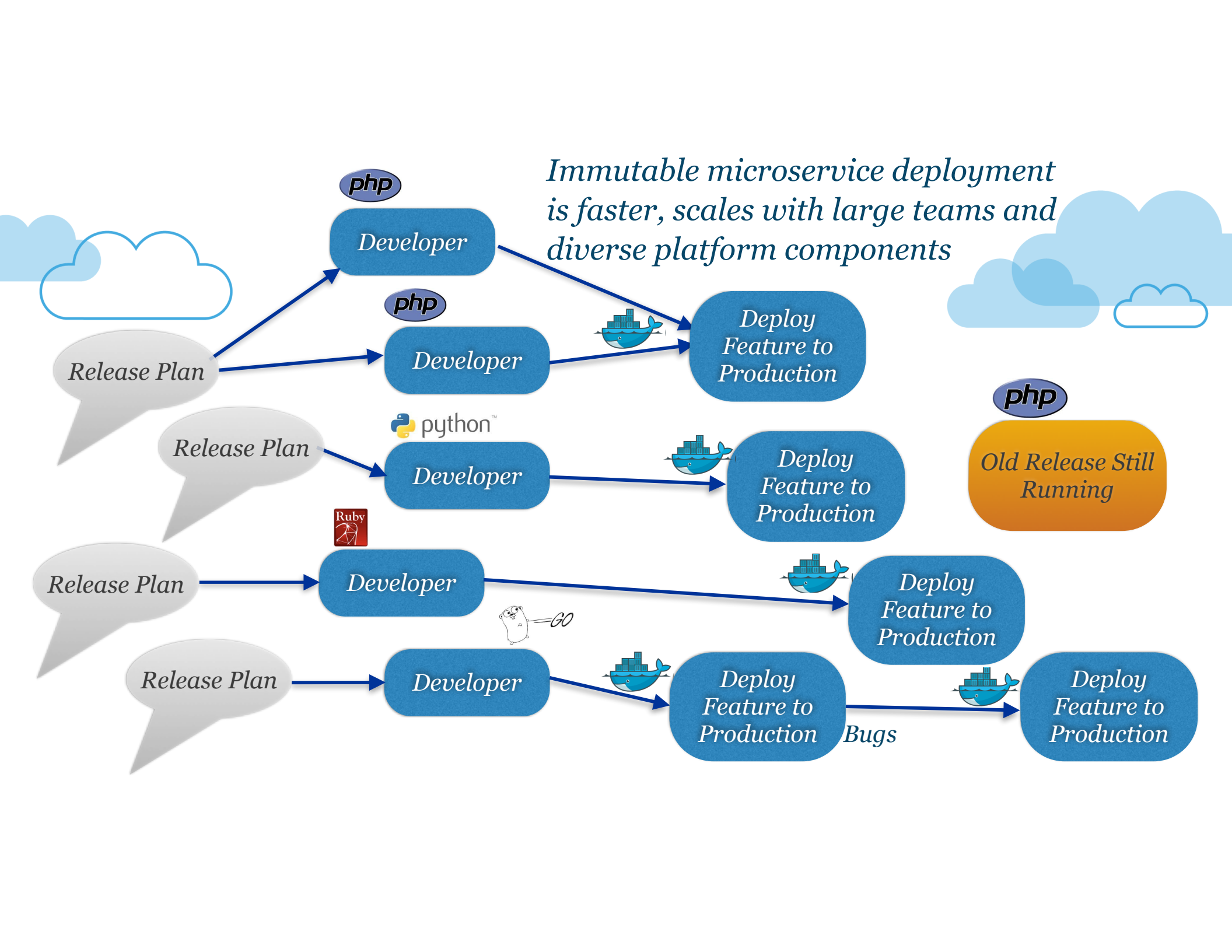
Bugs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GO
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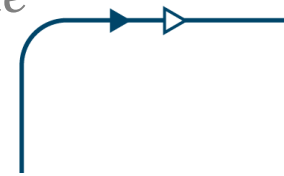
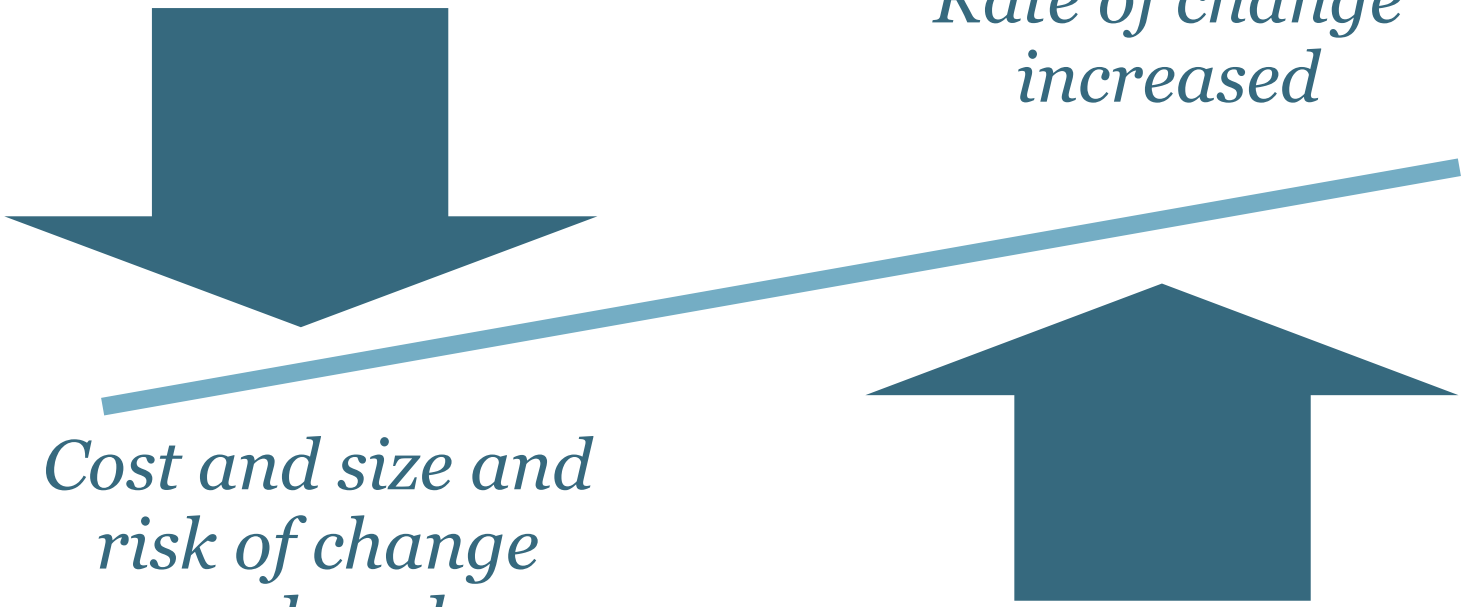
Deploy Feature to Production
Bugs
Deploy Feature to Production

Non-Destructive Production Updates

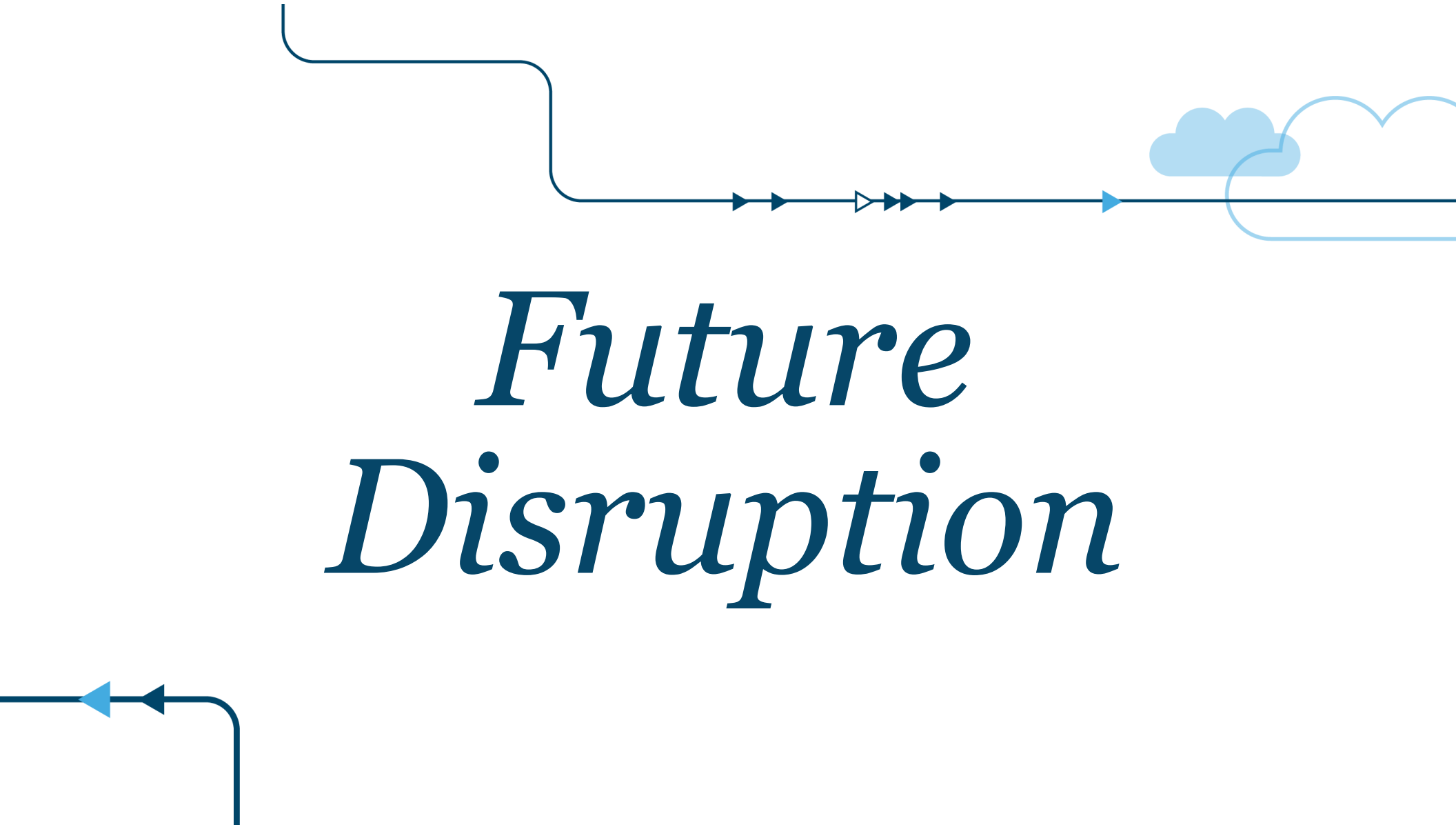
- *"Immutable Code" Service Pattern*
  - *Existing services are unchanged, old code remains in service*
  - *New code deploys as a new service group*
  - *No impact to production until traffic routing changes*
- *A|B Tests, Feature Flags and Version Routing control traffic*
  - *First users in the test 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*



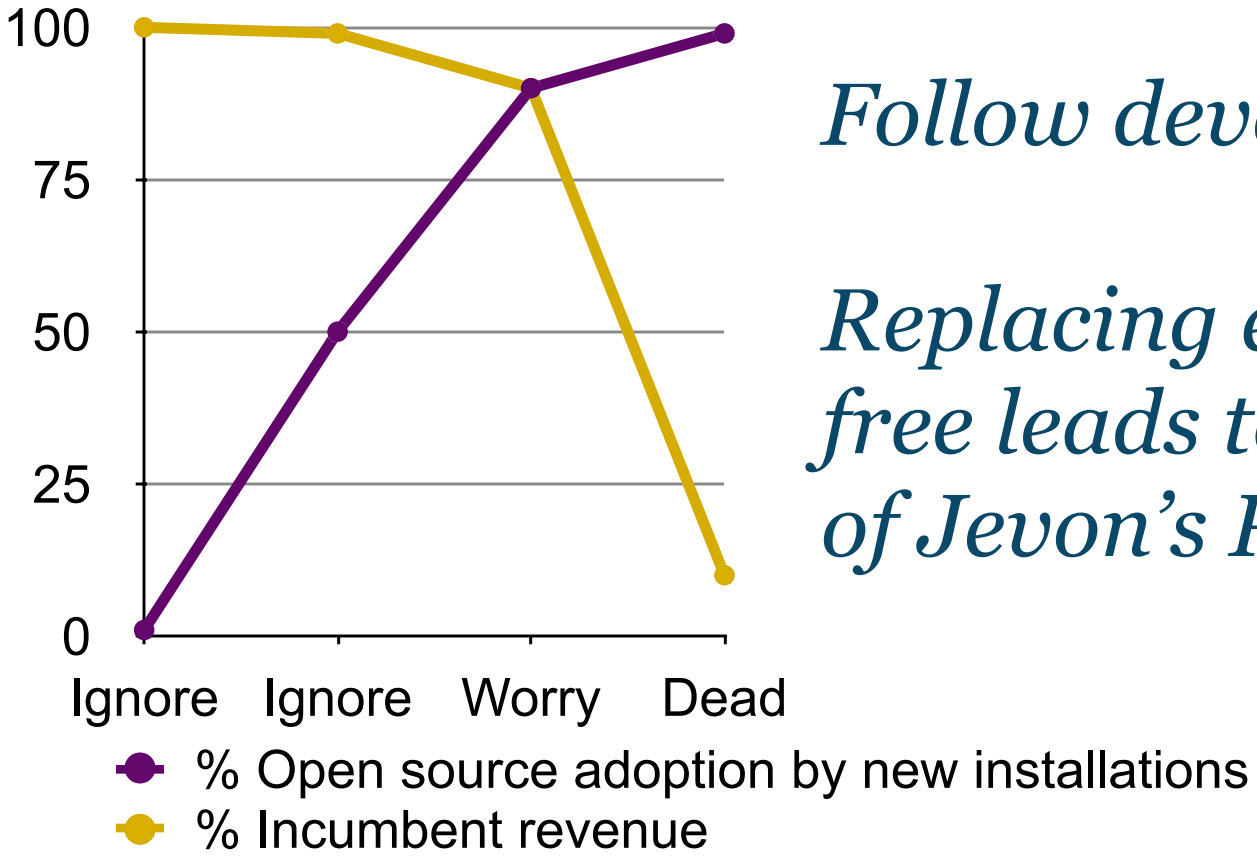
What Happened?




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

Ecosystem Transitions

Languages are the foundations of ecosystems

Ecosystem Transitions

1990's

Languages are the foundations of ecosystems

Ecosystem Transitions

1990's

C# *2000's*

Languages are the foundations of ecosystems

Ecosystem Transitions

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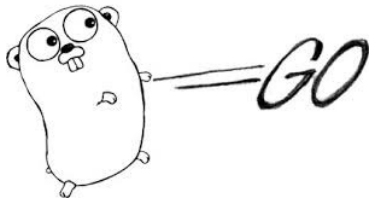
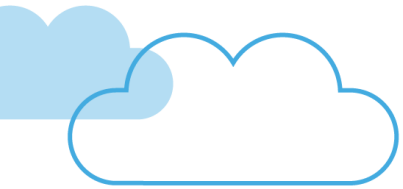


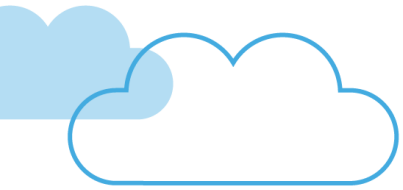
2010's

Evolution of Deployment Tools

Evolution of Deployment Tools



Evolution of Deployment Tools



C++

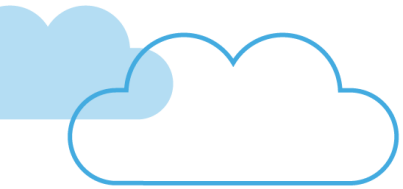
CFEngine®

Ruby

puppet labs

Chef

Evolution of Deployment Tools



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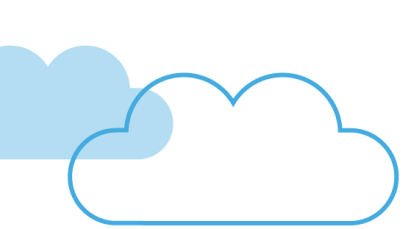
ANSIBLE

SALTSTACK

Evolution of Deployment Tools



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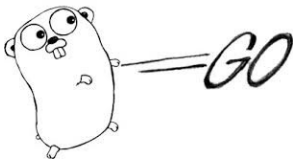
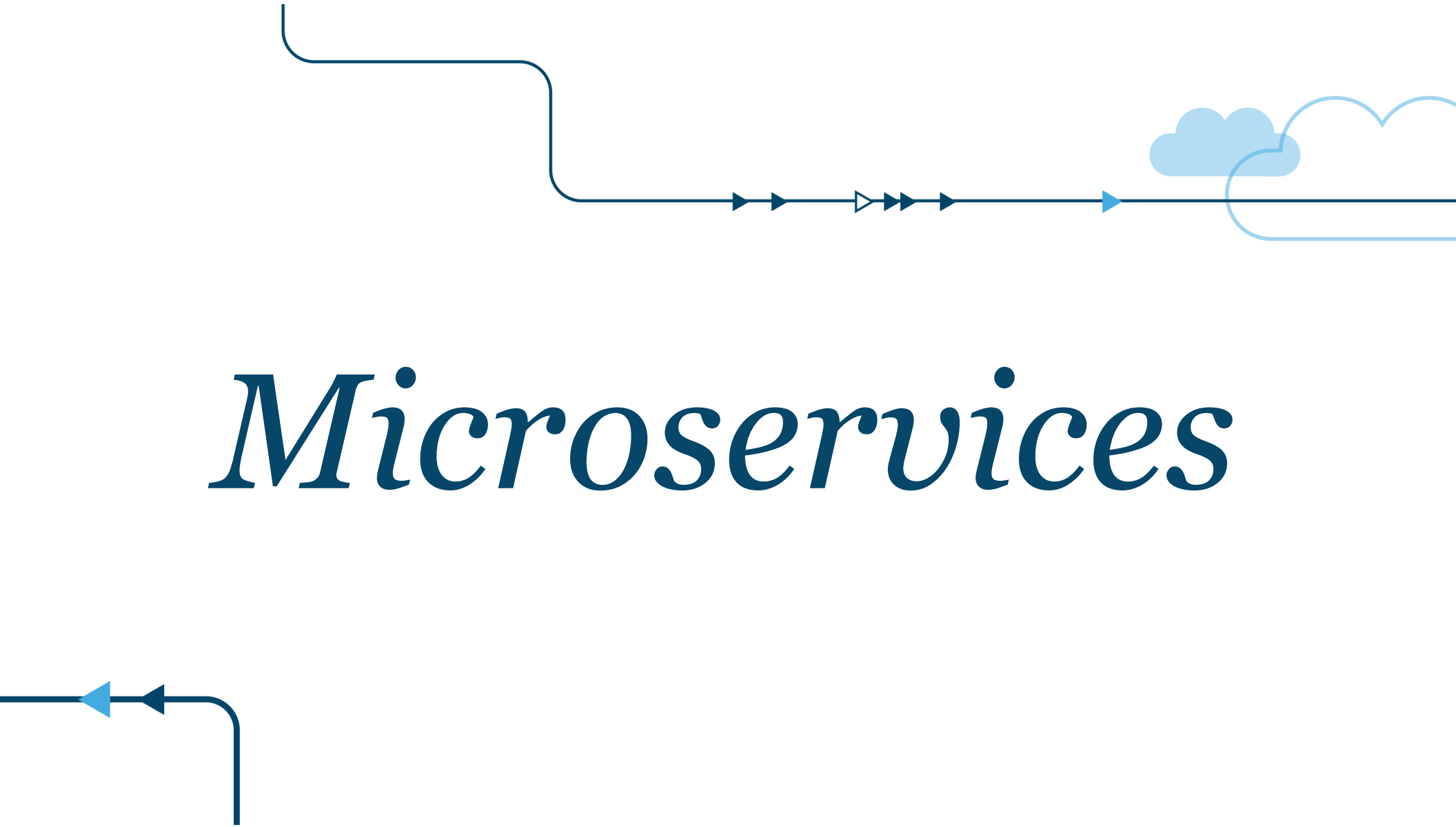
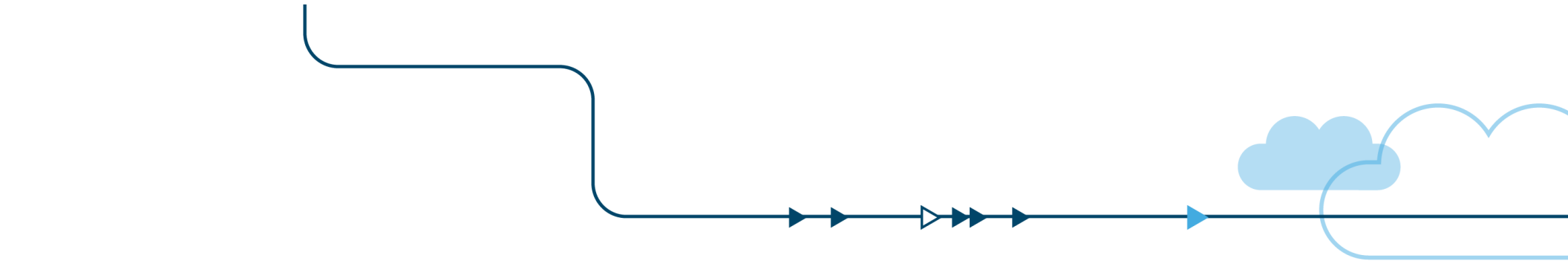


docker

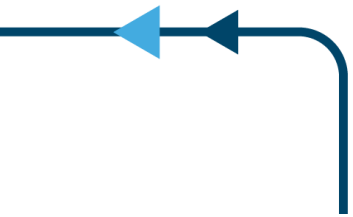


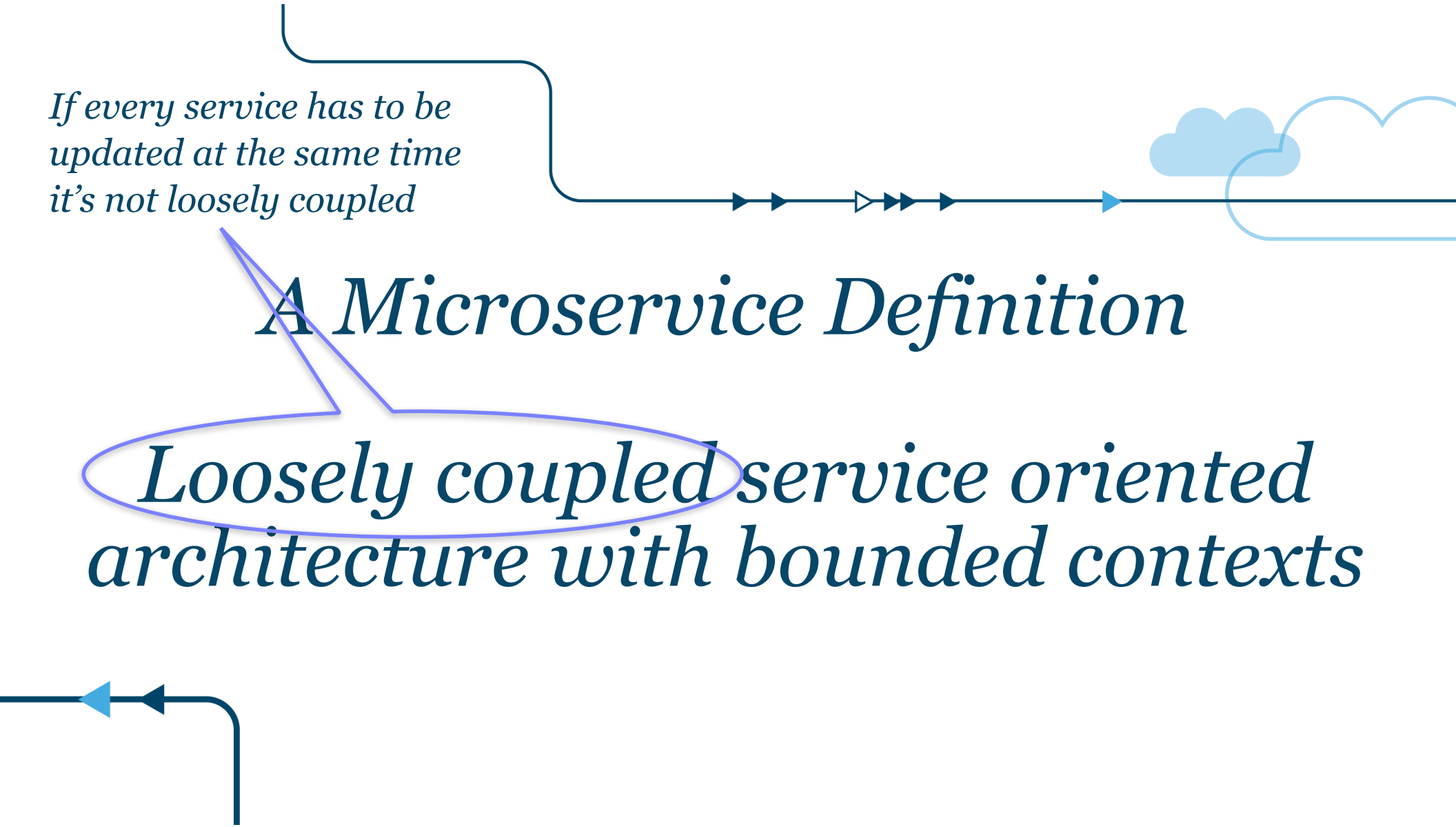
Microservices

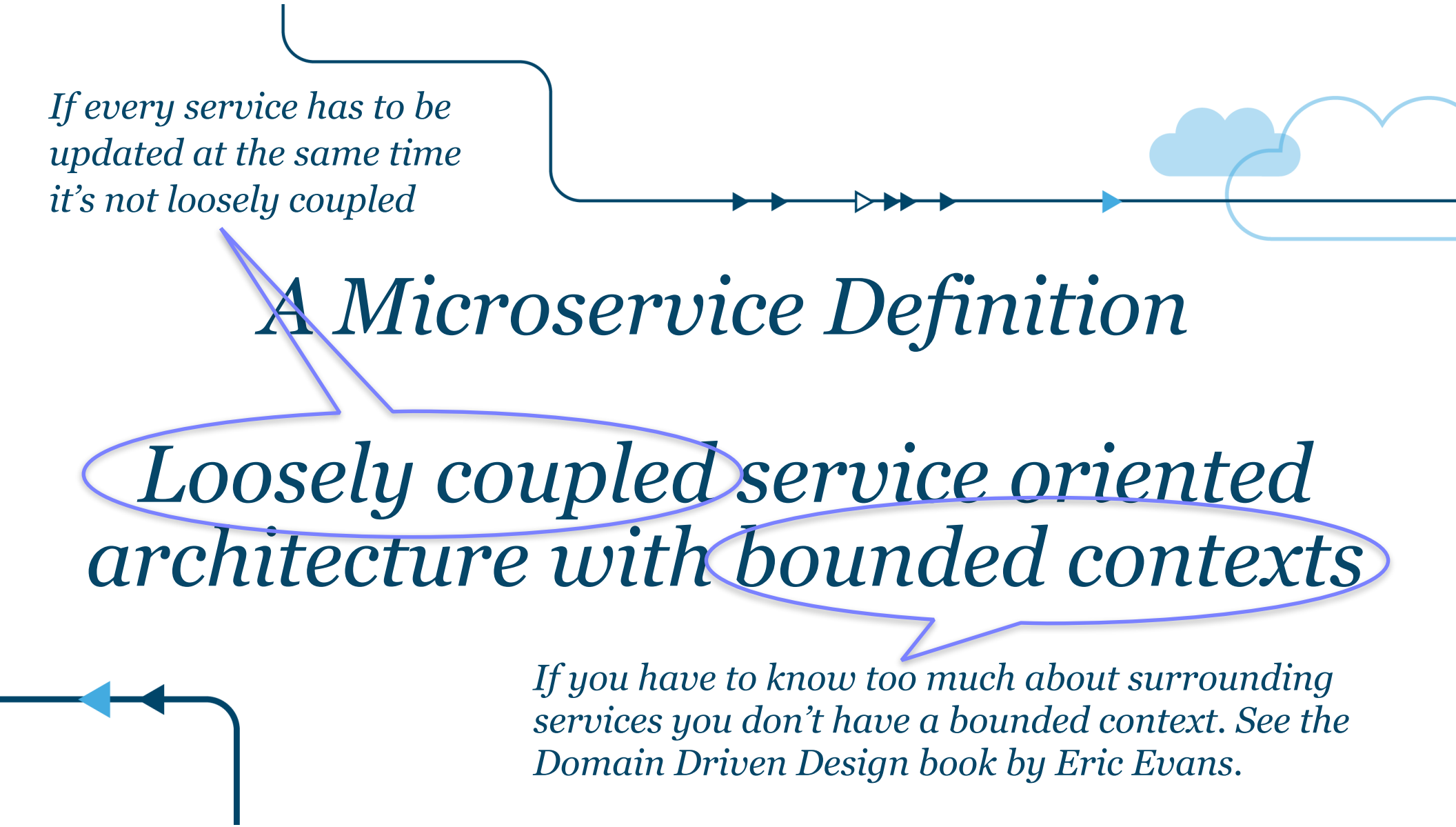


A Microservice Definition

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.

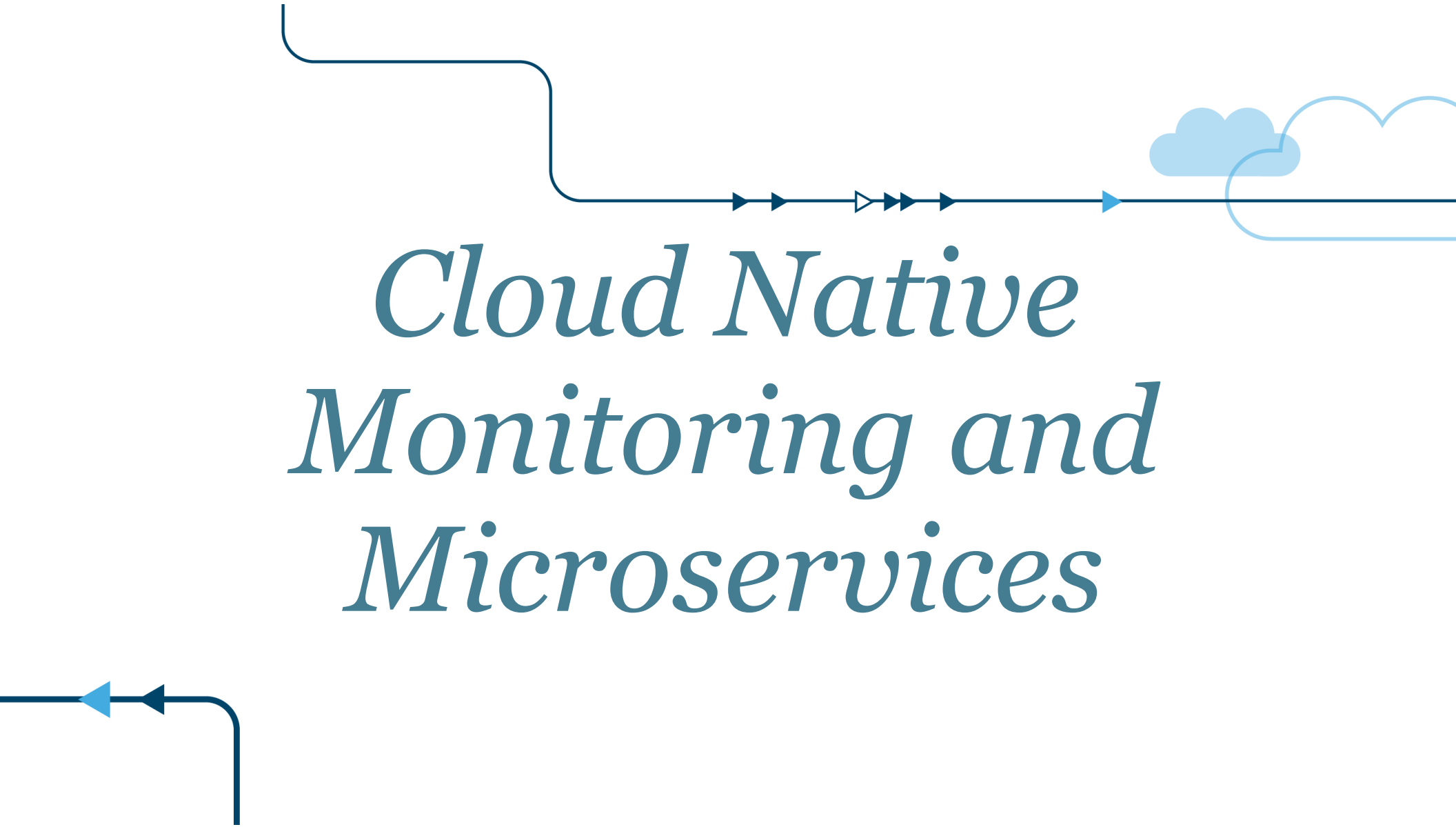
Separate Concerns with Microservices

- *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*

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

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 netflix.github.com*
- *Get "Technical Indigestion" trying to keep up with techblog.netflix.com*

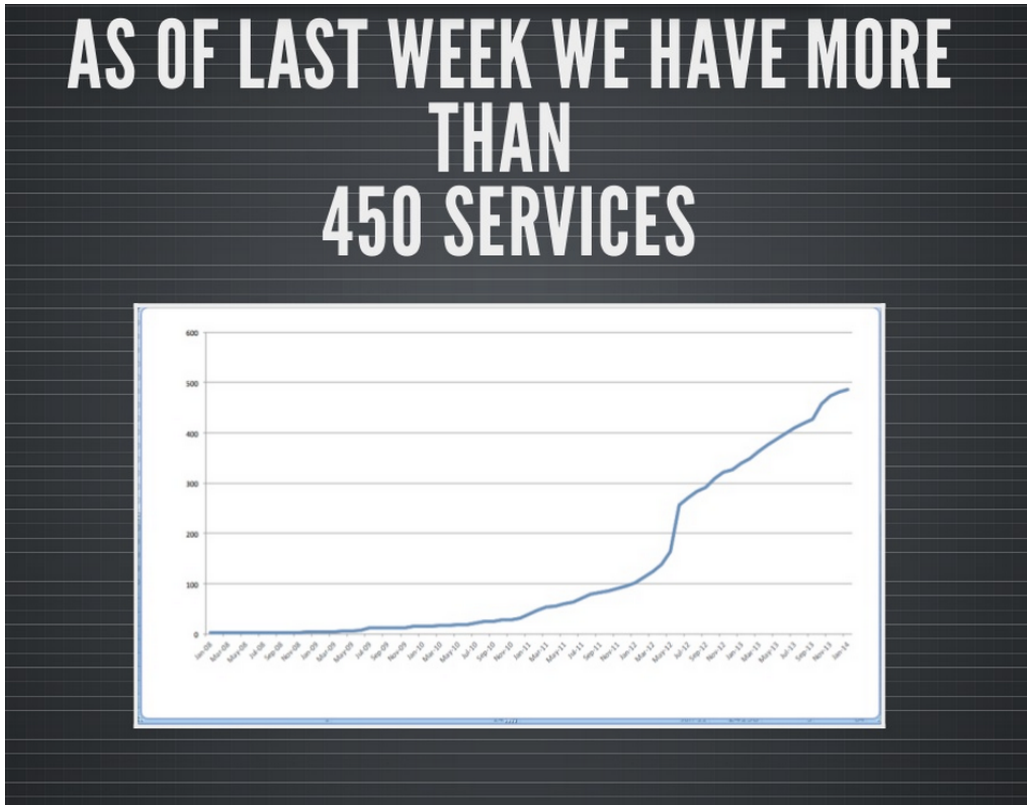


Cloud Native Monitoring and Microservices

Cloud Native

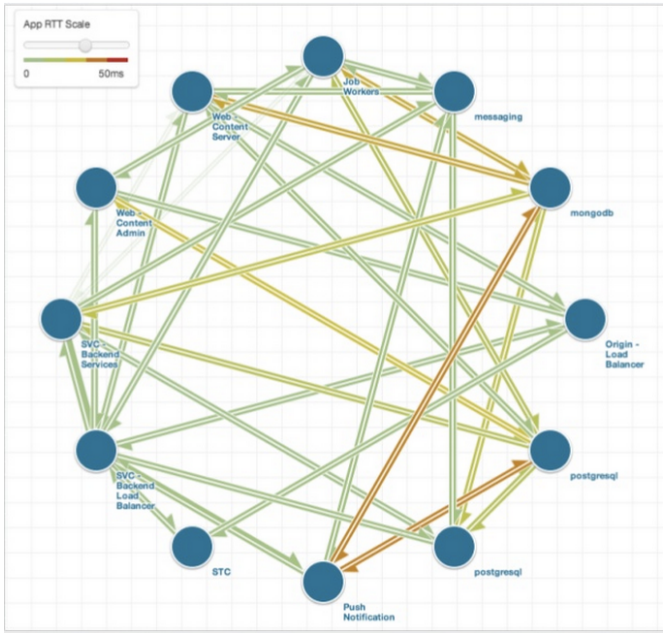
- *High rate of change*
  - *Code pushes can cause floods of new instances and metrics*
  - *Short baseline for alert threshold analysis – everything looks unusual*
- *Ephemeral Configurations*
  - *Short lifetimes make it hard to aggregate historical views*
  - *Hand tweaked monitoring tools take too 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

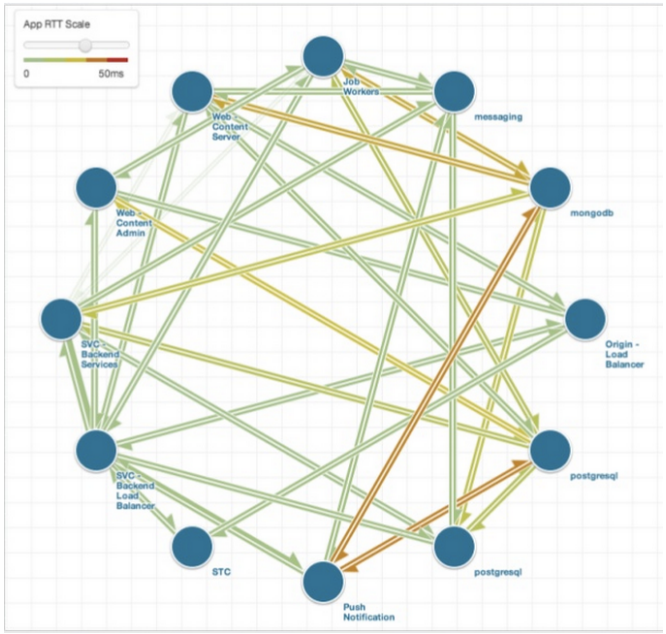
“Death Star” Architecture Diagrams



As visualized by Appdynamics, Boundary.com and Twitter internal tools

“Death Star” Architecture Diagrams

Netflix



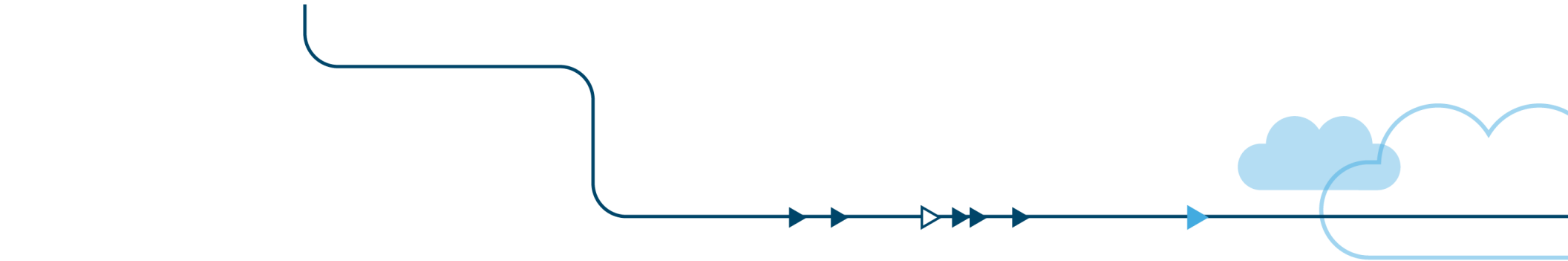
Gilt Groupe (12 of 450)

Twitter

As visualized by Appdynamics, Boundary.com and Twitter internal tools

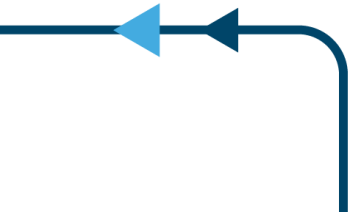
Continuous Delivery and DevOps

- *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*

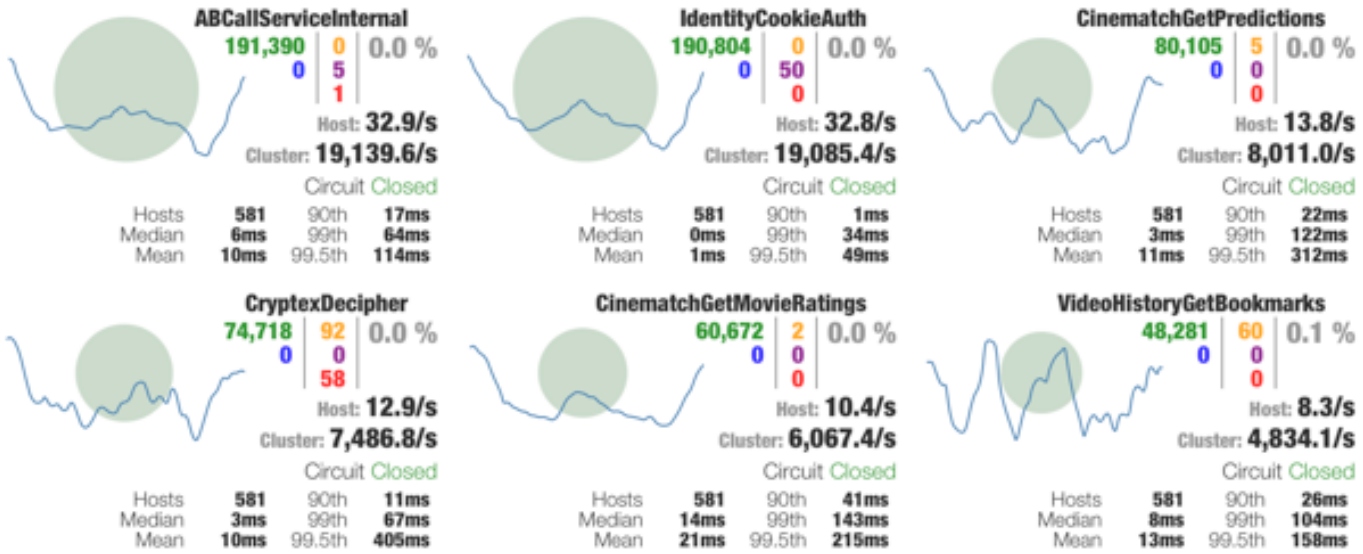


Whoops! I didn't mean that! Reverting…

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

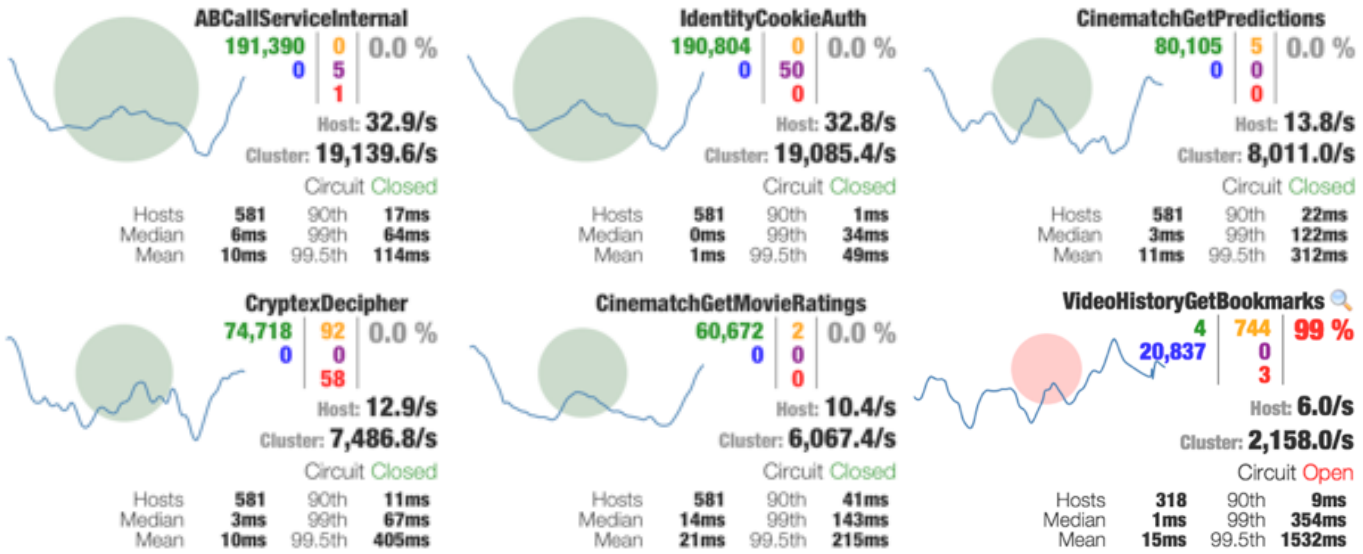


NetflixOSS Hystrix/Turbine Circuit Breaker



http://techblog.netflix.com/2012/12/hystrix-dashboard-and-turbine.html

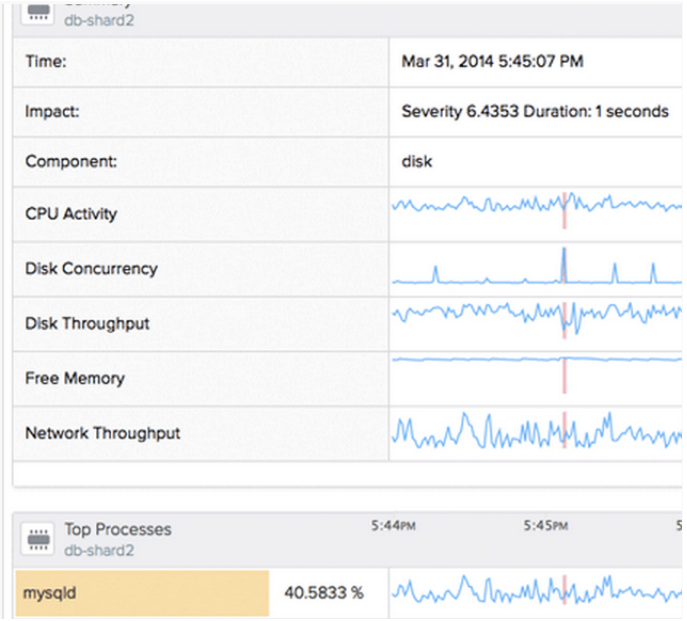
NetflixOSS Hystrix/Turbine Circuit Breaker



http://techblog.netflix.com/2012/12/hystrix-dashboard-and-turbine.html

Low Latency SaaS Based Monitors

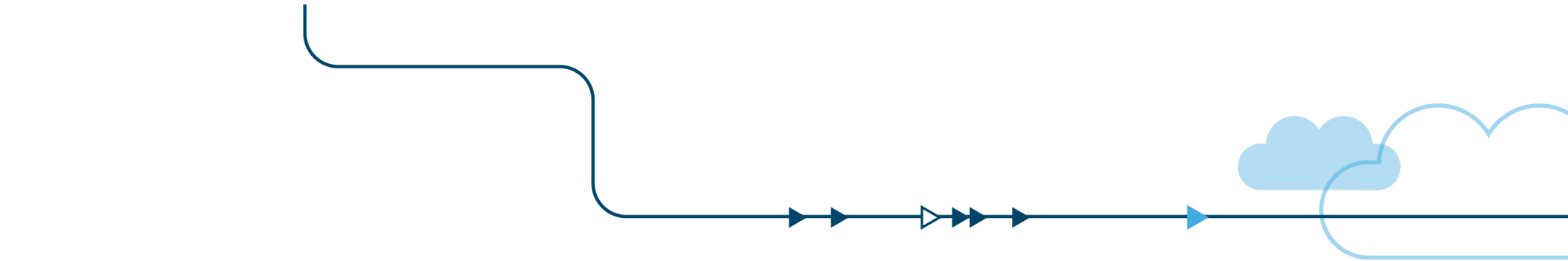
VividCortex



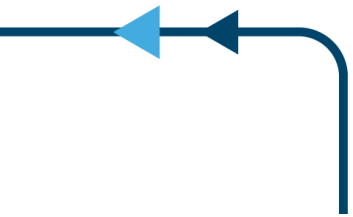
boundary

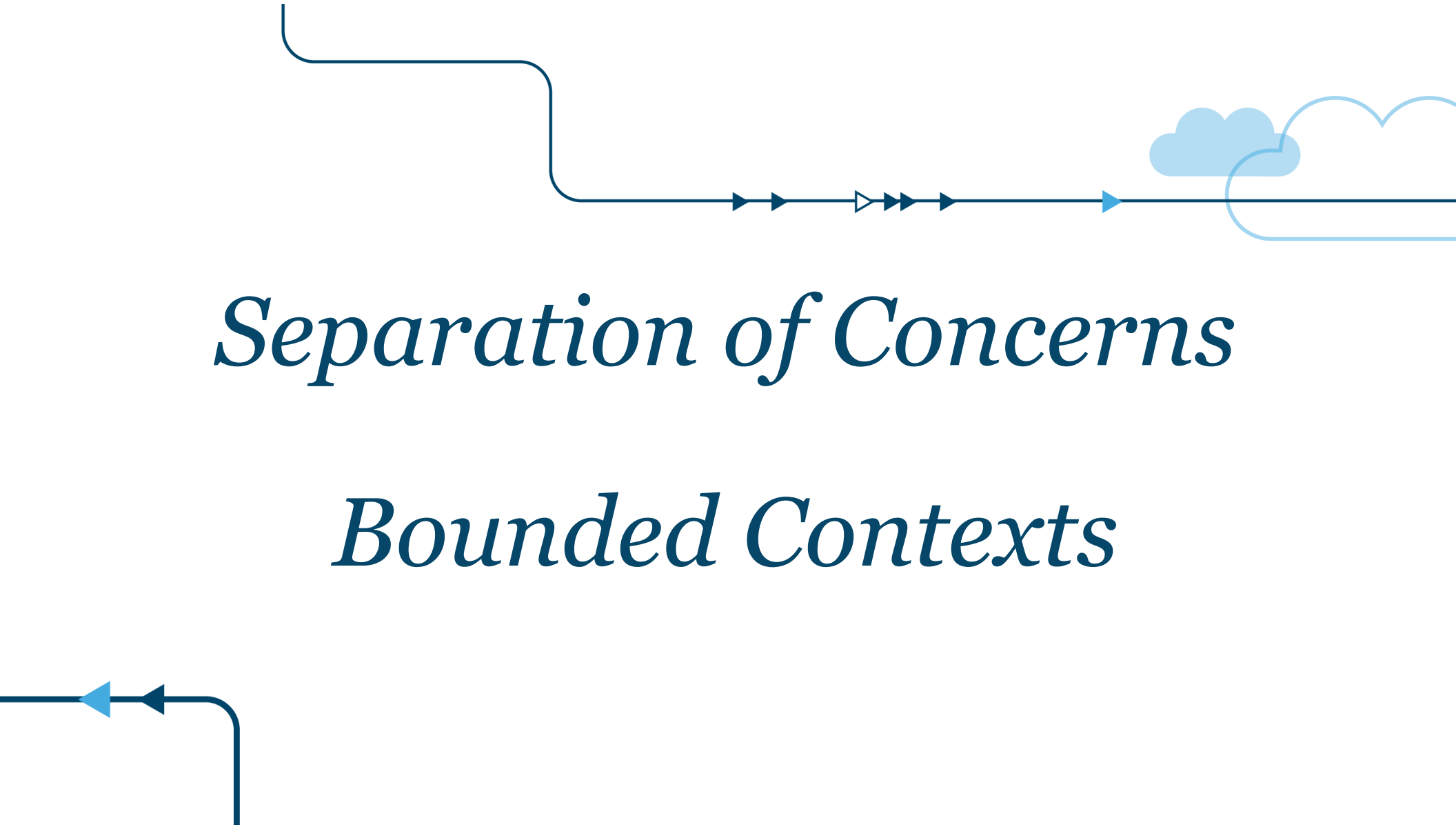
1-second data collection and real-time streaming processing on all components of the application stack

www.vividcortex.com and www.boundary.com



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



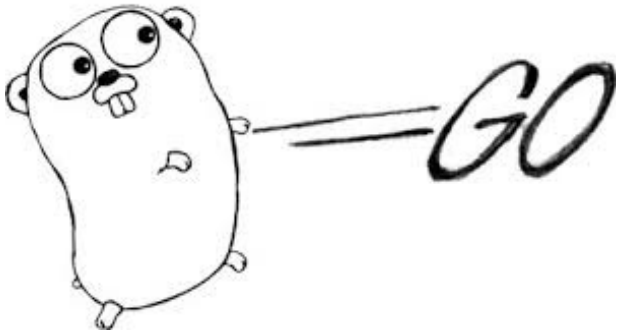


Separation of Concerns

Bounded Contexts

Forward Thinking

Forward Thinking



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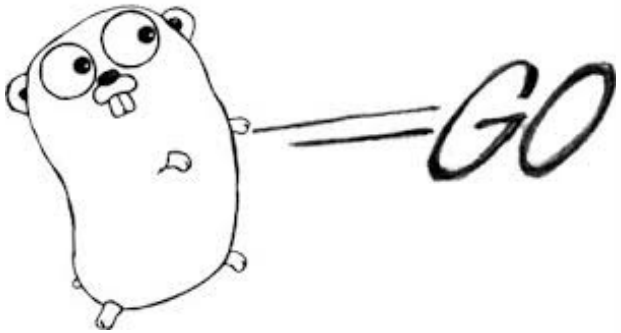

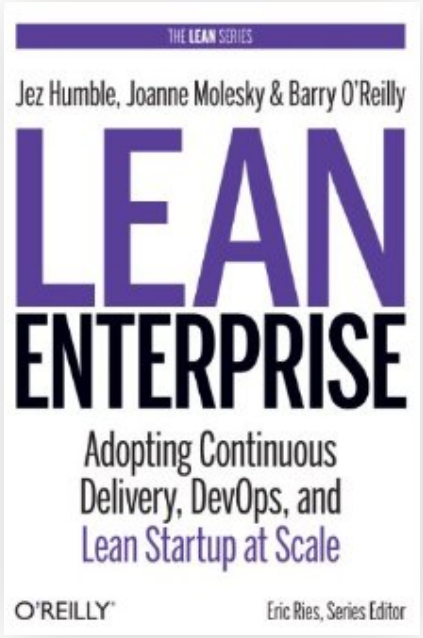

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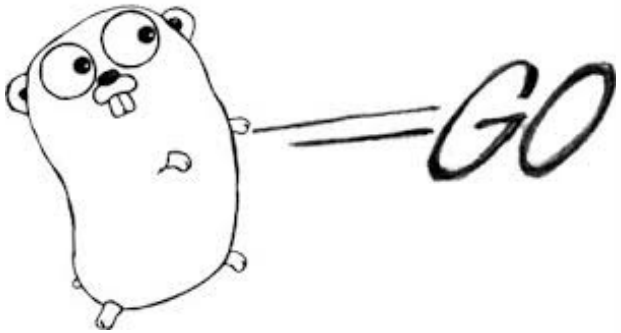

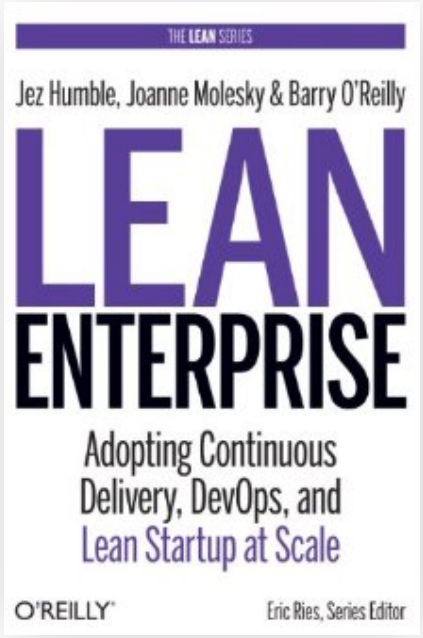

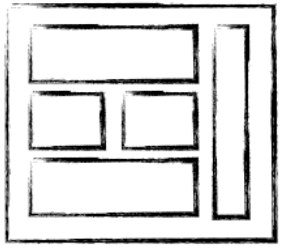

MONOLITHIC/LAYERED

MICRO SERVICES

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

Any Questions?

- *Battery Ventures* *http://www.battery.com*
- *Adrian's 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*
- *Qcon New York – Speed and Scale - June 11th, 2014 - Video available*
- *Structure - Cloud Trends June 19th, 2014 - Video available*
- *GOTO Copenhagen/Aarhus – Denmark – Sept 25th, 2014*
- *DevOps Enterprise Summit - San Francisco - Oct 21-23rd, 2014*
- *GOTO Berlin - Germany - Nov 6th, 2014*
- *AWS Re:Invent - Las Vegas - November 14th, 2014*

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