



Velocity and Volume (or Speed Wins)

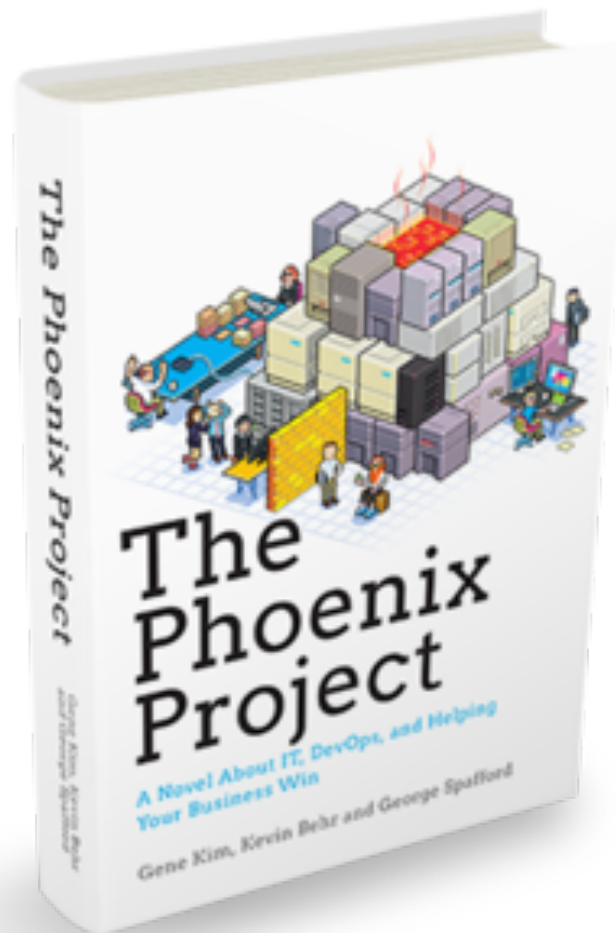
Flowcon November 2013

Adrian Cockcroft

@adriano @NetflixOSS

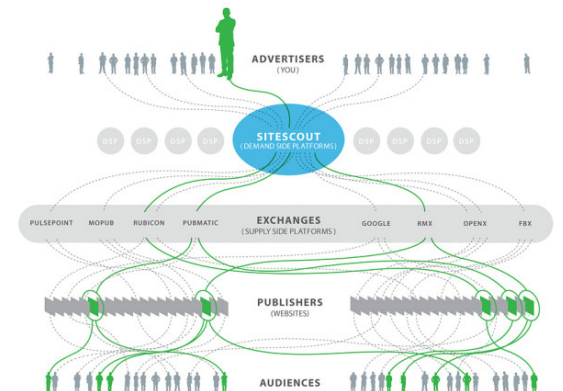
<http://www.linkedin.com/in/adriancockcroft>

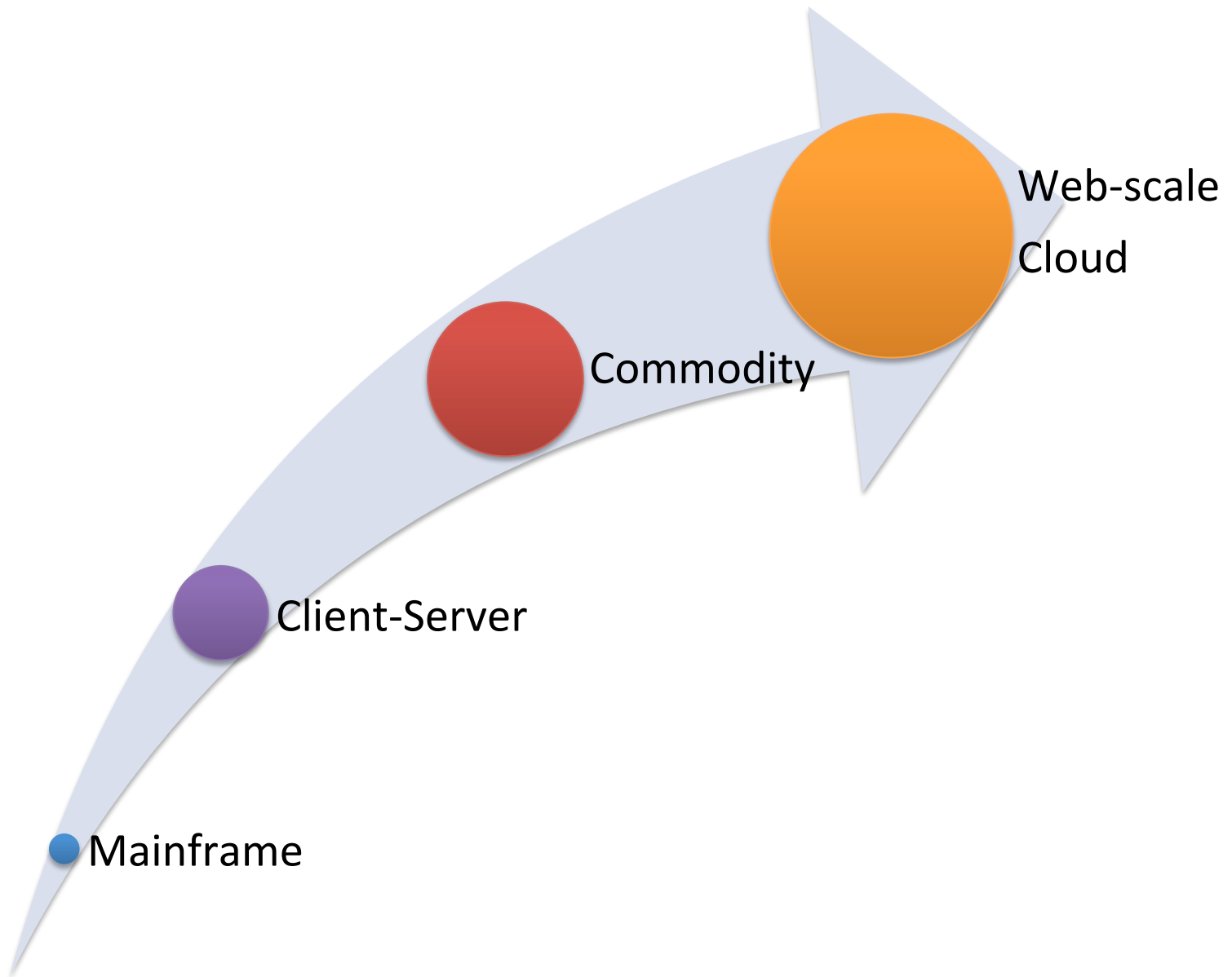
"This is the IT swamp draining manual for anyone who is neck deep in alligators."
- **Adrian Cockcroft, Cloud Architect at Netflix**





REAL-TIME BIDDING ESSENTIALS: HIGH LEVEL OVERVIEW OF RTB ECOSYSTEM





Goal of Traditional IT:
Reliable hardware
running stable software



adrian cockcroft @adrianco

10 Apr

Baffling-late-adopters as a Service

Retweeted by Andrew Clay Shafer

Expand

SCALE

Breaks hardware

...*SPEED*

Breaks software

SPEED at

SCALE

Breaks everything

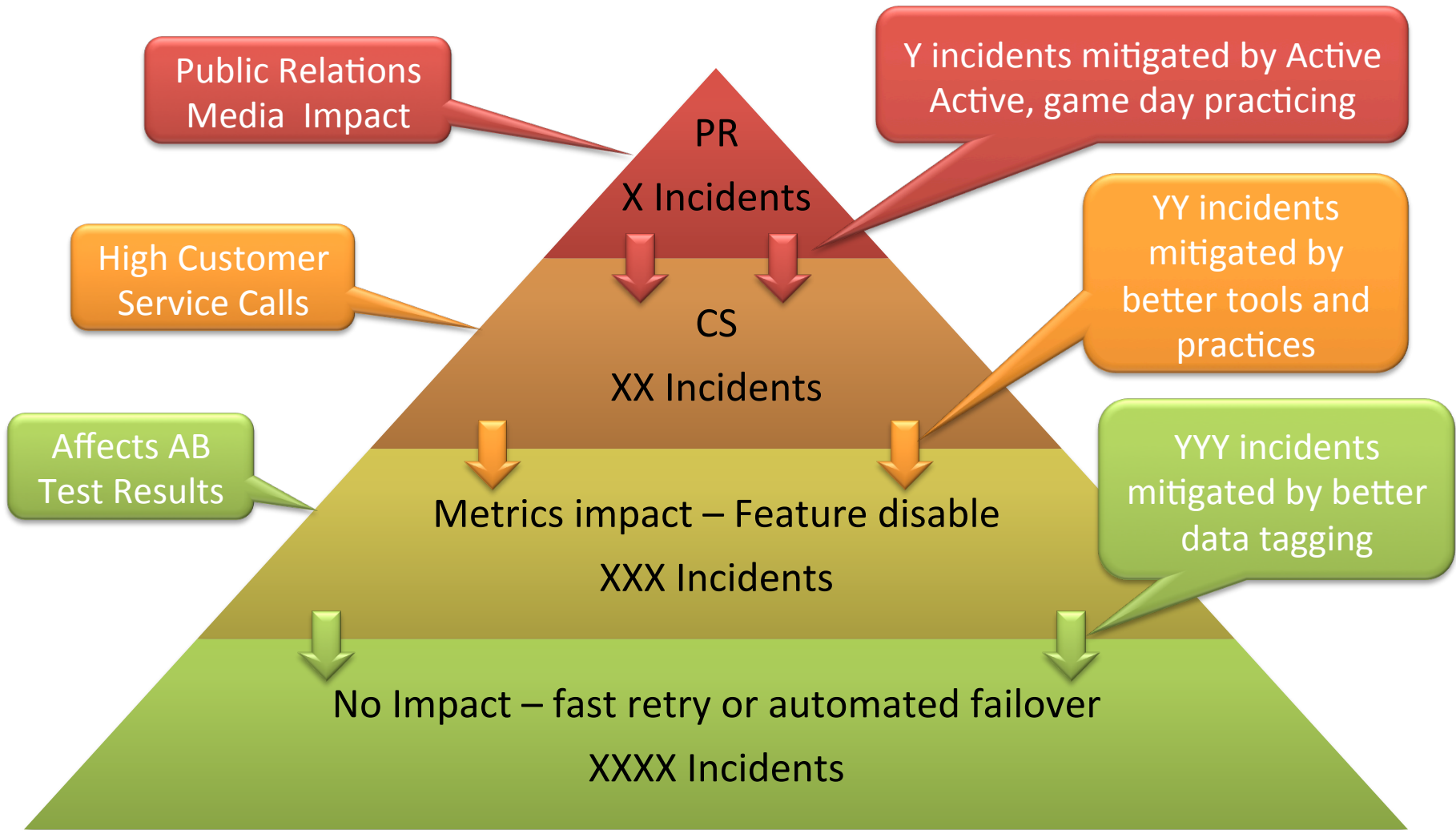
The STRANGE WORLD of the FUTURE

*STRANDED without video!
No way to fill their empty hours!
They were victims of...*

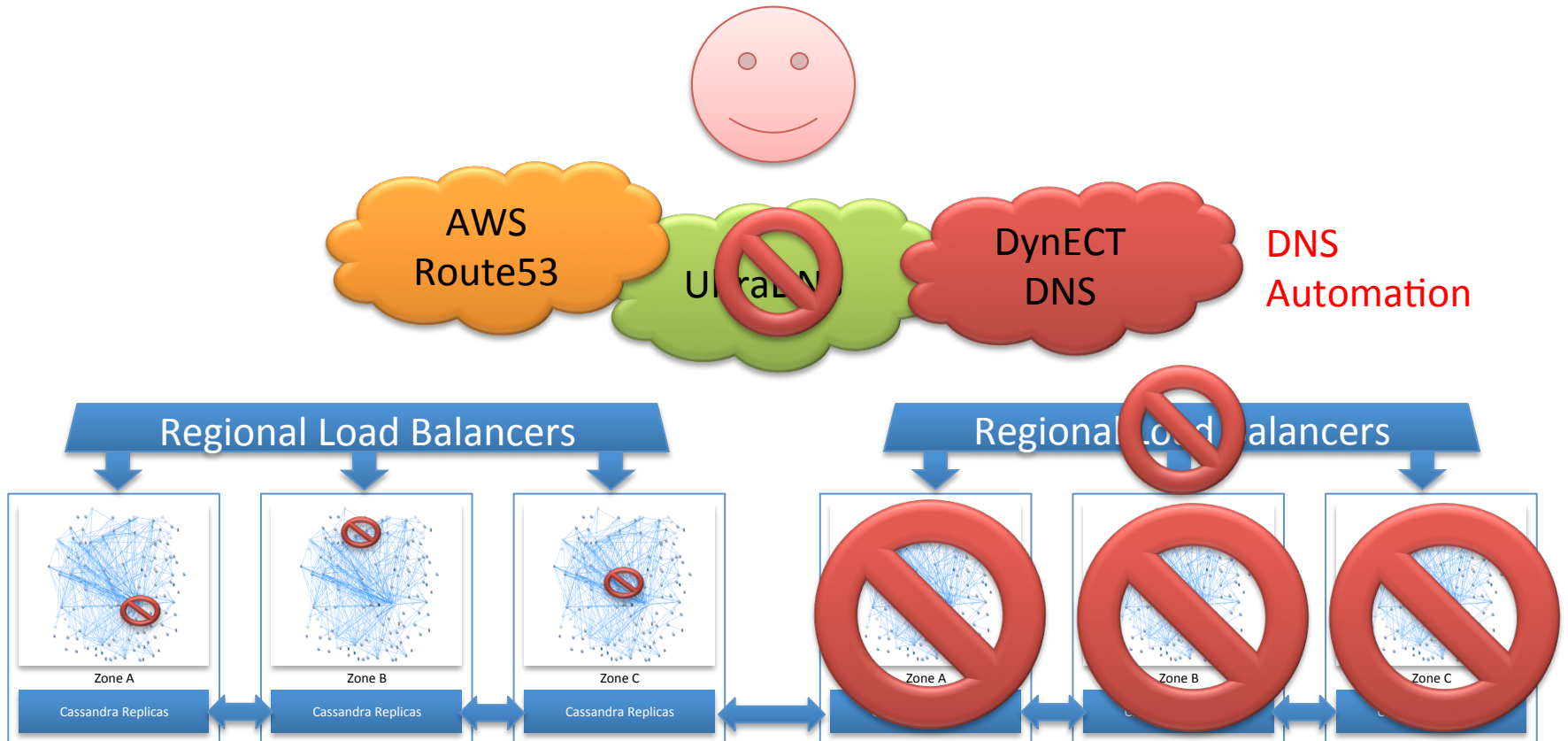
THE CLOUD OF BROKEN STREAMS

CREATED WITH PULP-O-MIZER COVER MAKER

Incidents – Impact and Mitigation



Web Scale Architecture

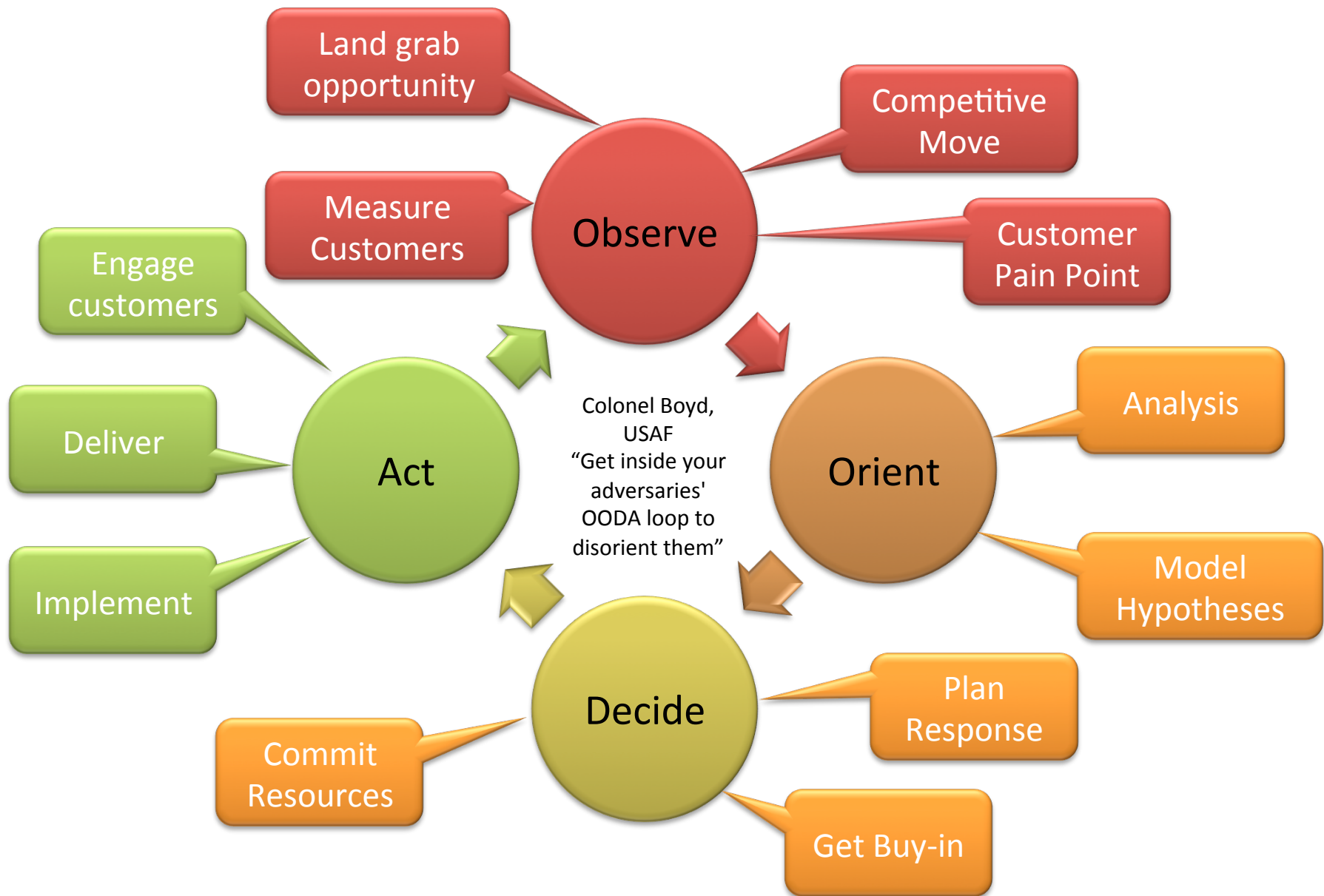


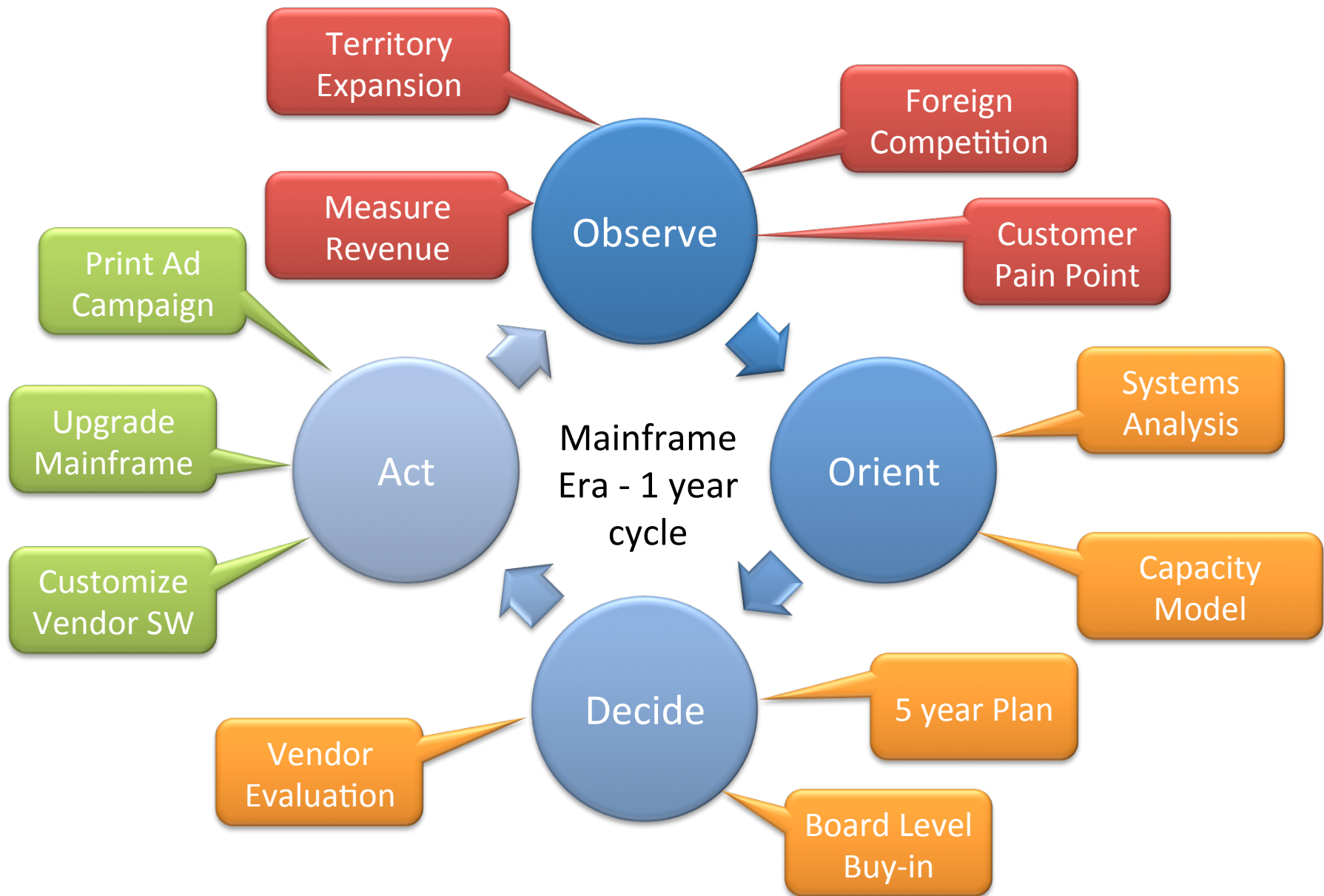
CIO Says Speed IT Up!



“Get inside your adversaries'
OODA loop to disorient them”

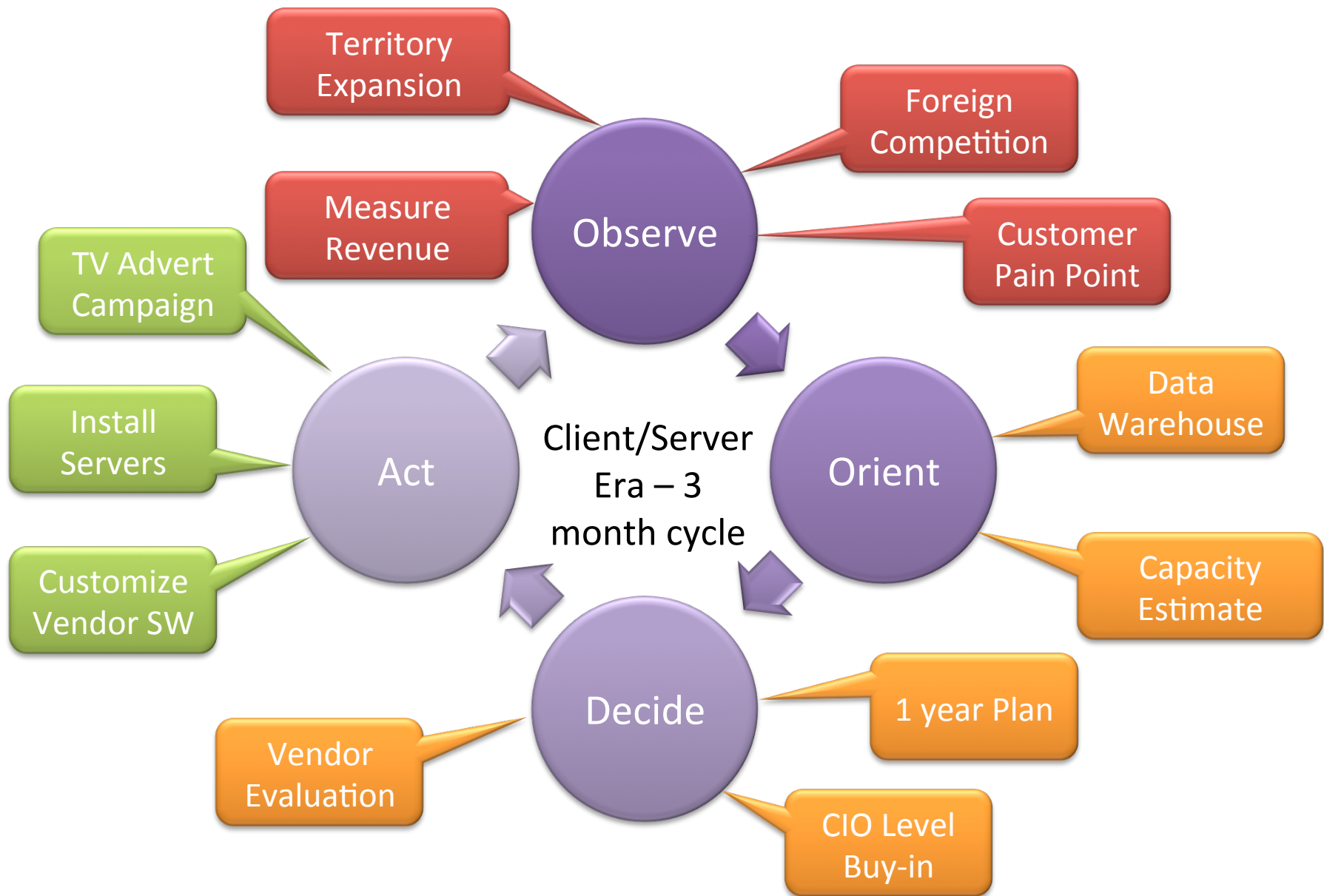
Colonel Boyd, USAF





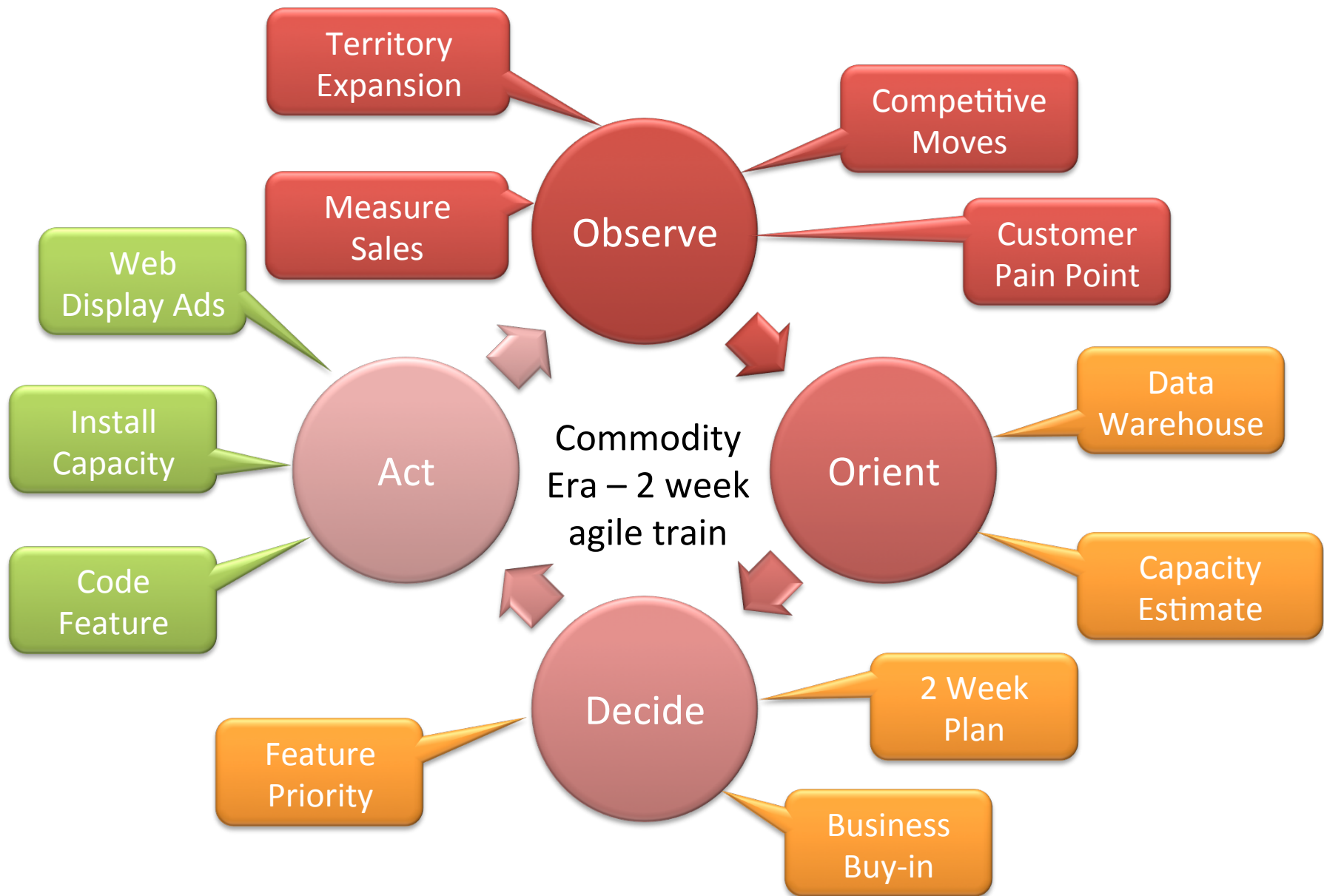
Mainframe Innovation Cycle

- Cost \$1M to \$100M
- Duration 1 to 5 years
- Bet the whole company
- Cost of failure – bankrupt or bought
- Cobol and DB2 on MVS



Client Server Innovation Cycle

- Cost \$100K to \$10M
- Duration 3 – 12 months
- Bet a product line or division
- Cost of failure – revenue hit, CIO's job
- C++ and Oracle on Solaris



Commodity Agile Innovation Cycle

- Cost \$10K to \$1M
- Duration 2 – 12 weeks
- Bet a product feature
- Cost of failure – product mgr reputation
- Java and MySQL on Linux

Train Model Process Hand-Off Steps

Product Manager



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graph TD; PM[Product Manager] --> Dev[Developer]; Dev --> QA[QA Integration Team]; QA --> Ops[Operations Deploy Team]; Ops --> BI[BI Analytics Team]
```

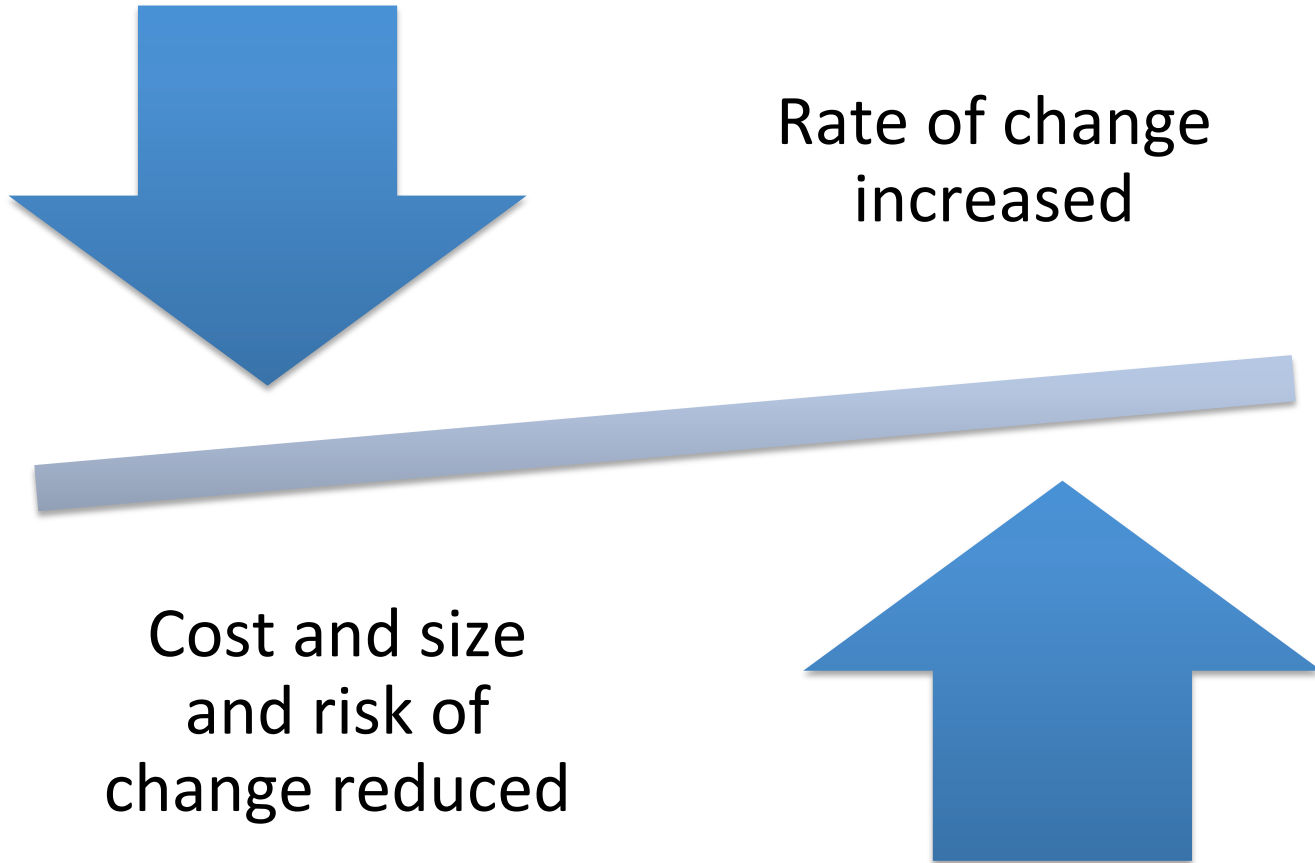
Developer

QA Integration Team

Operations Deploy Team

BI Analytics Team

What Happened?





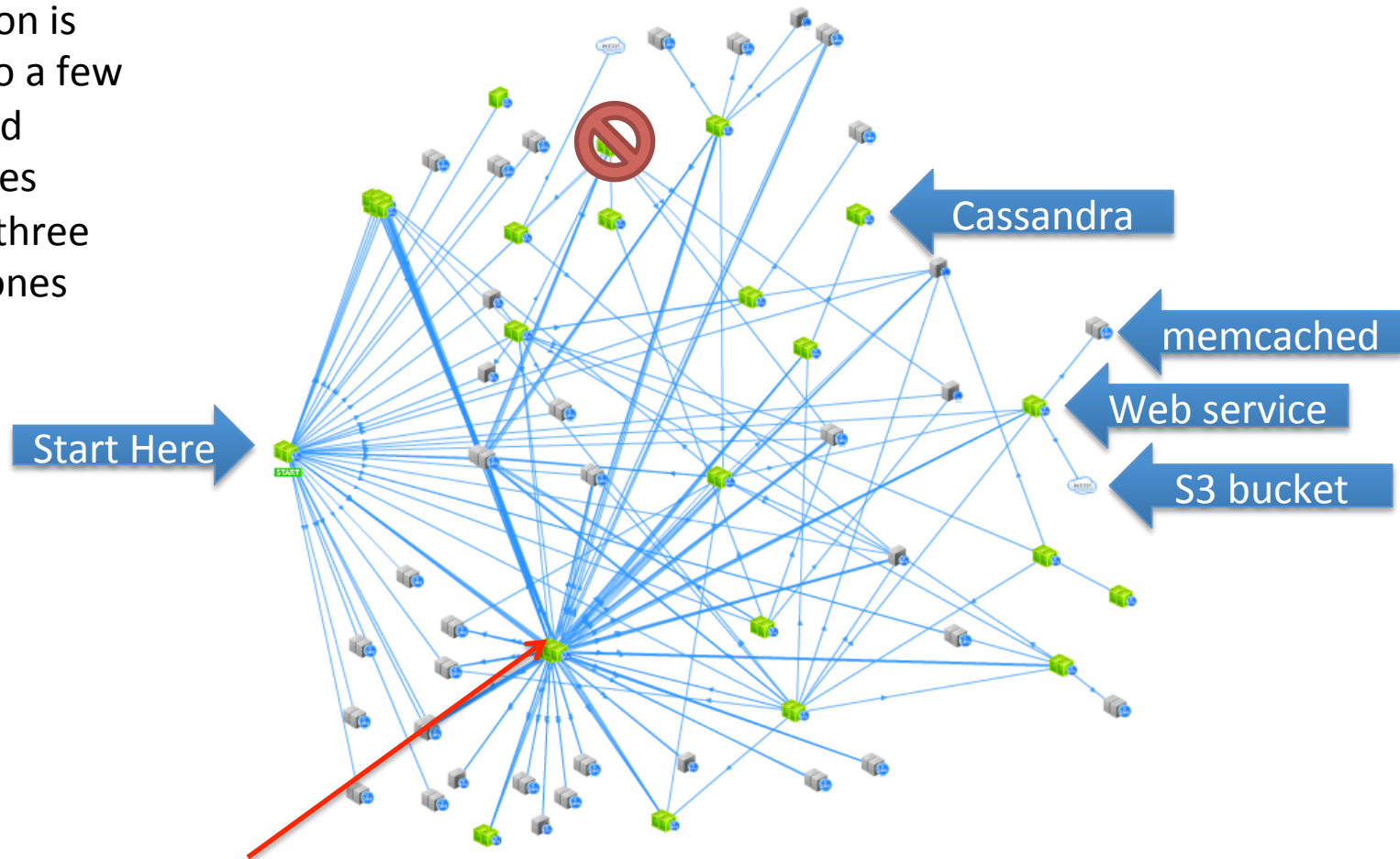
Cloud Native

Construct a highly agile and highly available service from ephemeral and assumed broken components

Real Web Server Dependencies Flow

(Netflix Home page business transaction as seen by AppDynamics)

Each icon is
three to a few
hundred
instances
across three
AWS zones



Personalization movie group choosers
(for US, Canada and Latam)



Continuous Deployment

No time for handoff to IT



Developer Self Service

Freedom and Responsibility



Developers run what they wrote

Root access *and* pagerduty



IT is a Cloud API

DEVops automation

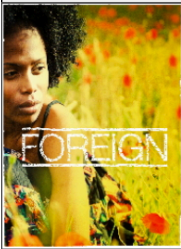


Github all the things!

Leverage social coding

Our Repositories  

Aminator



Archaius



Asgard



Astyanax



Blitz4j



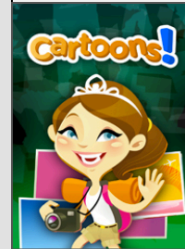
Brutal



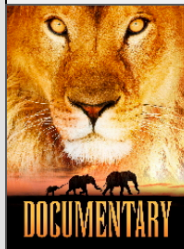
CassJMeter



Cloud-Prize



Curator



Denominator



Edda



Eureka



EVCache



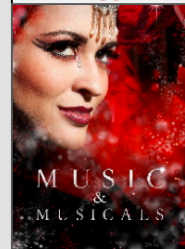
Exhibitor



Feign



Frigga



Gcviz



Genie



Glisten



Governator



Hystrix



Ice



Karyon



Lipstick



Netflix-Graph



NfWebCrypto



Priam



Pytheas



Recipes-Rss



Ribbon



RxJava



Servo



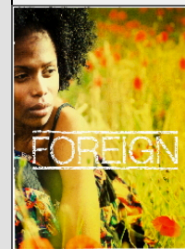
SimianArmy



Turbine

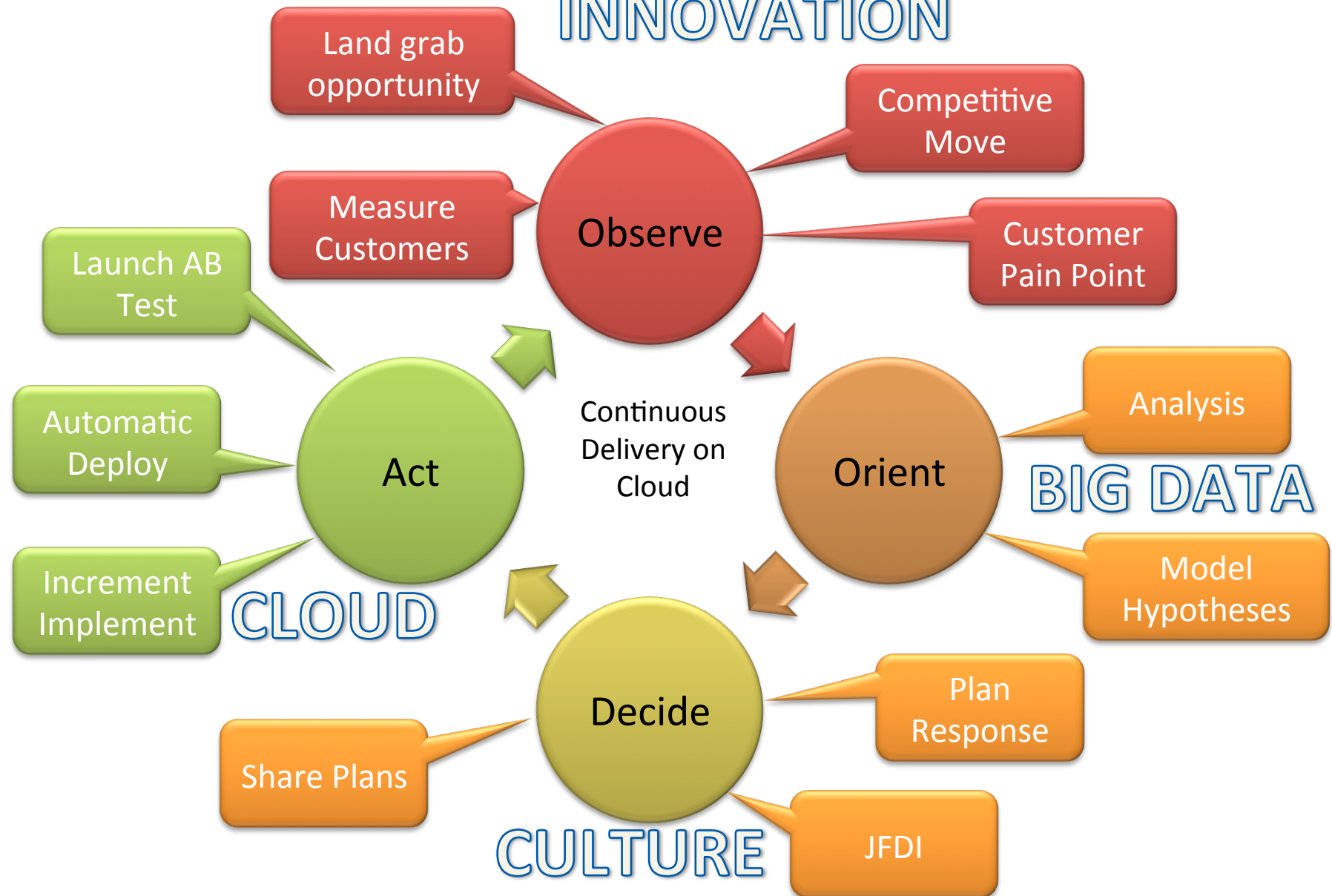


Zuul



Putting it all together...

INNOVATION



Continuous Innovation Cycle

- Cost near zero, variable expense
- Duration hours to days
- Bet a decoupled microservice code push
- Cost of failure – near zero, instant rollback
- Clojure/Scala/Python on NoSQL on Cloud

Continuous Deploy Hand-Off Steps

Product Manager

A/B test setup and enable

Self service hypothesis test results



Developer

Automated test

Self service deploy, on call

Self service analytics

Continuous Deploy Automation

Check in code, Jenkins build



Bake AMI, launch in test env



Functional and performance test



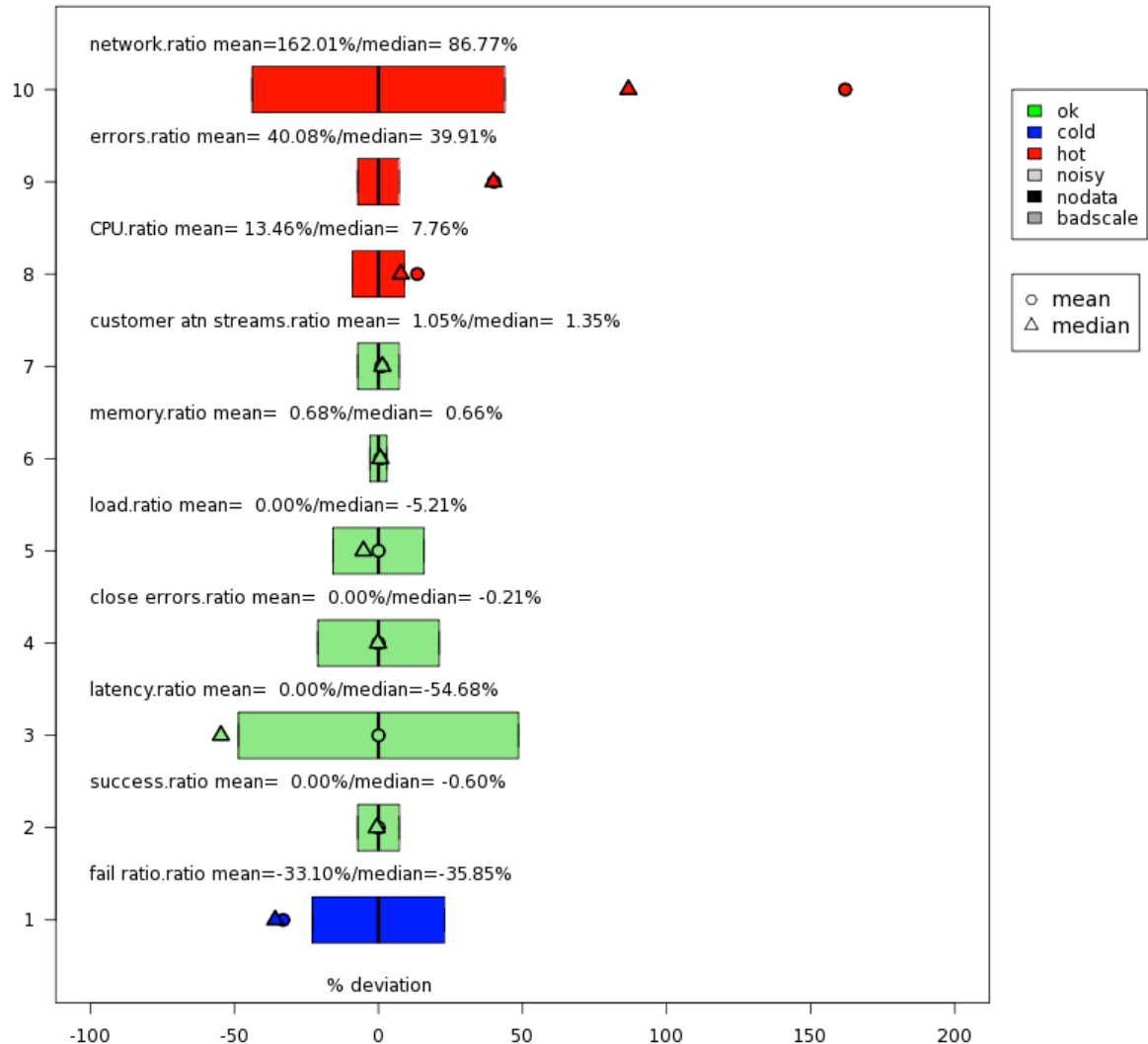
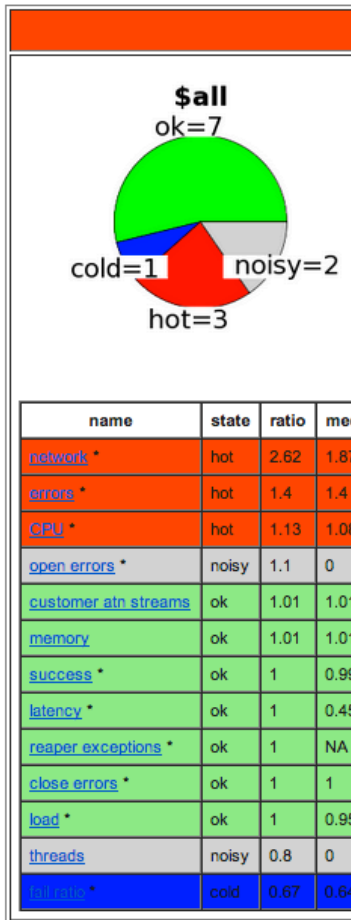
Production canary test



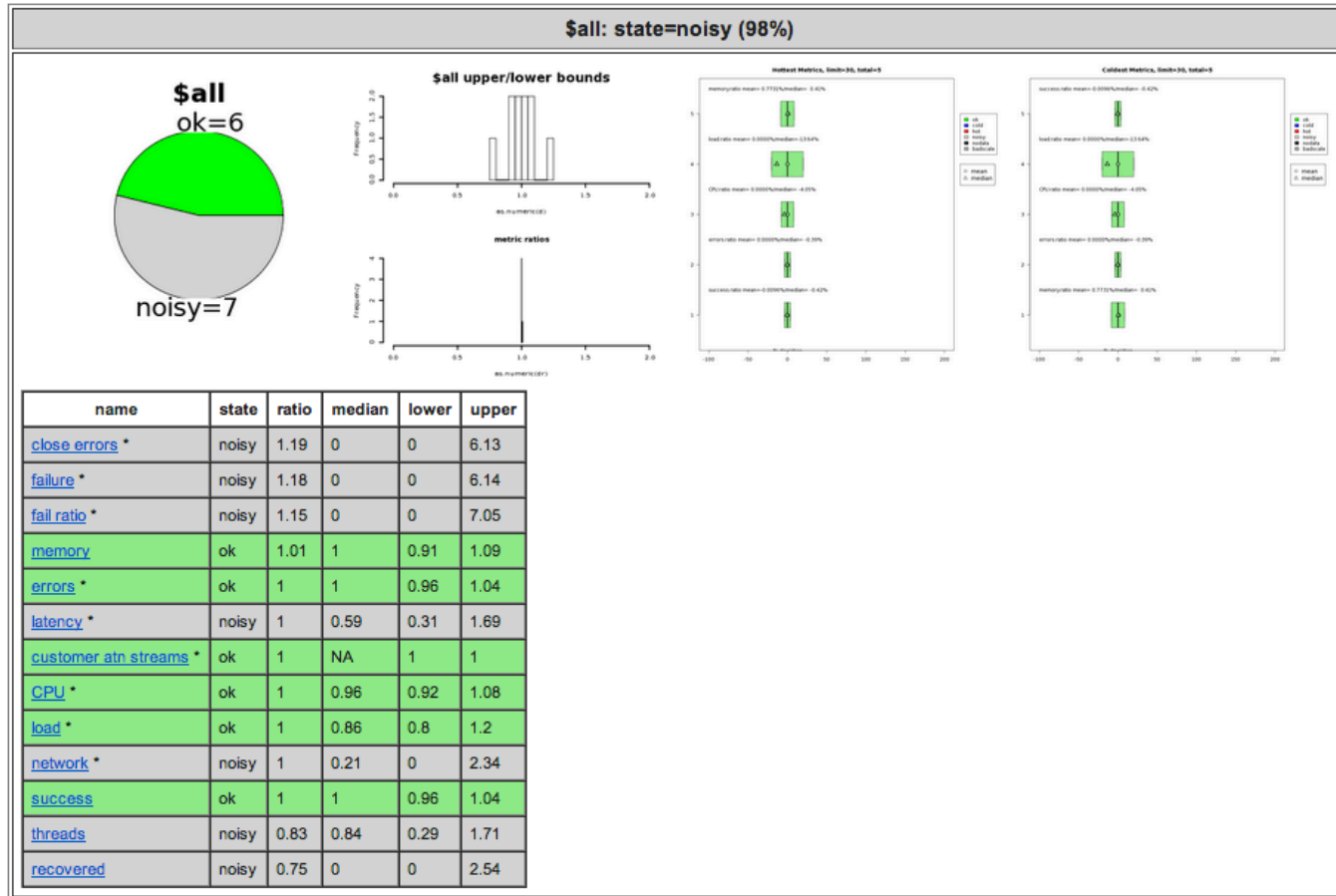
Production red/black push

Bad Canary Signature

Hottest Metrics, limit=30, total=10

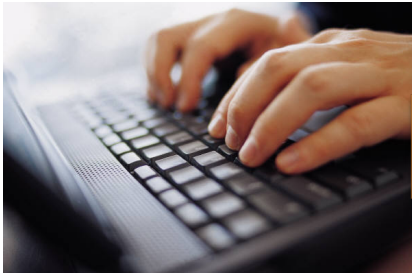


Happy Canary Signature



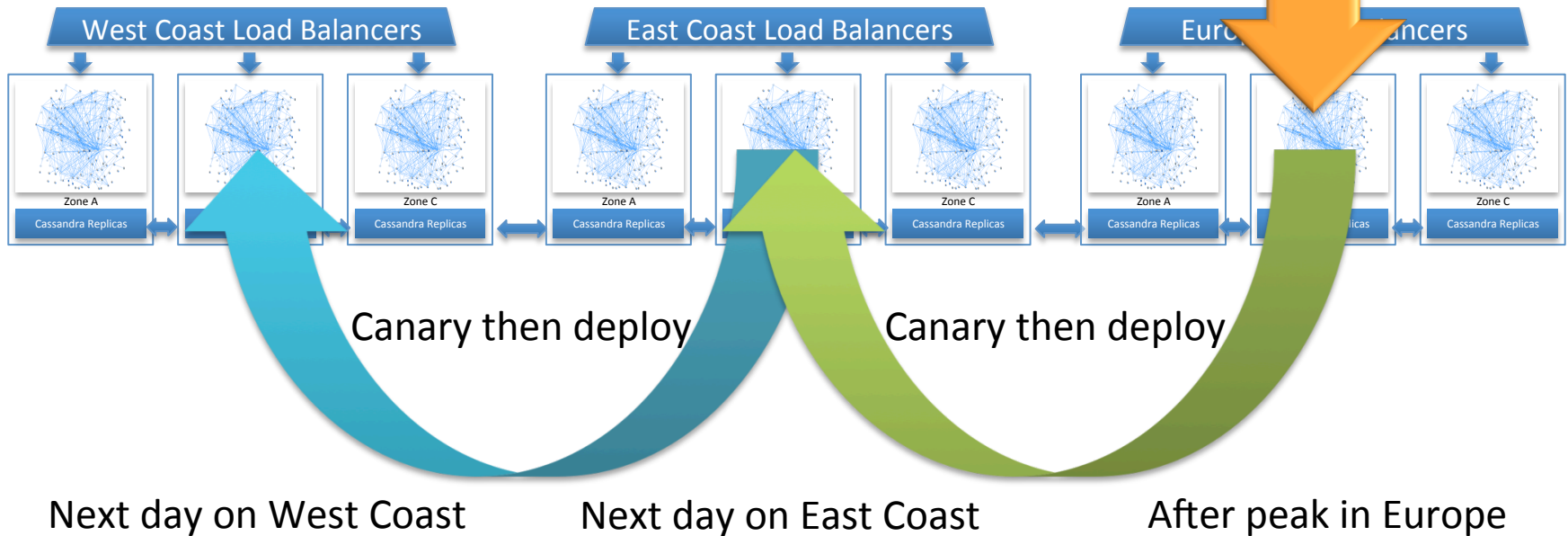
Global Deploy Automation

Afternoon in California

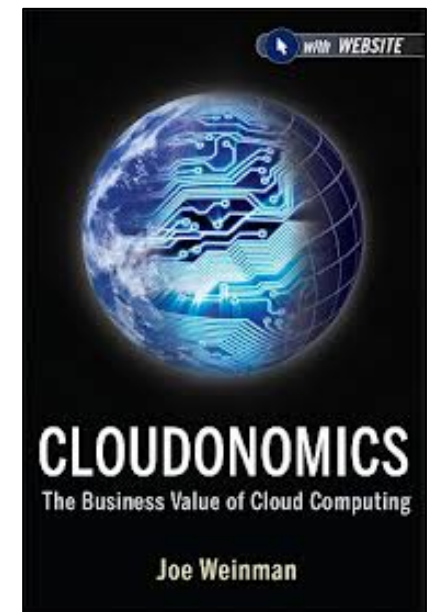
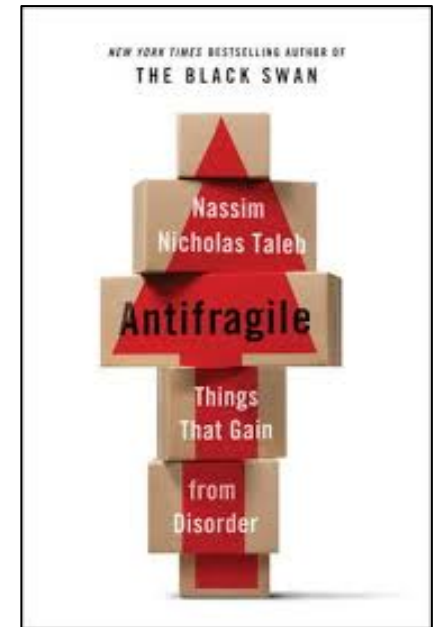
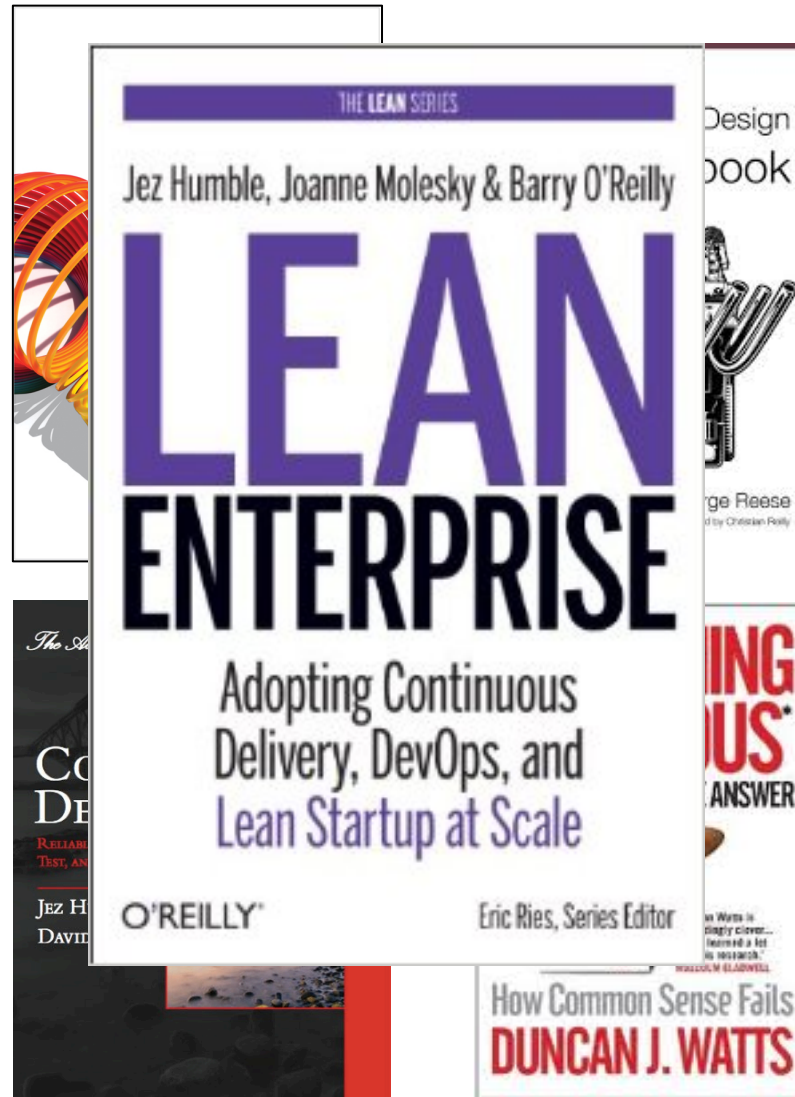
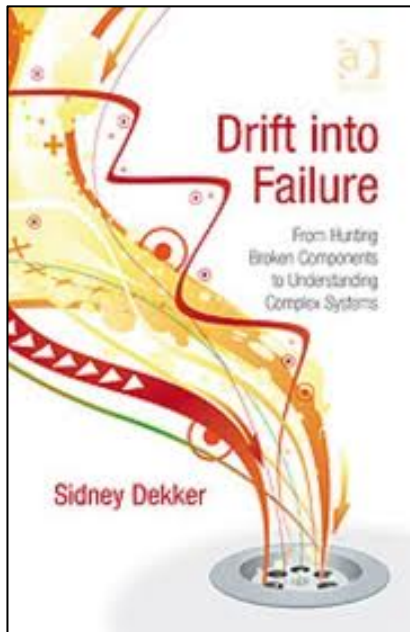
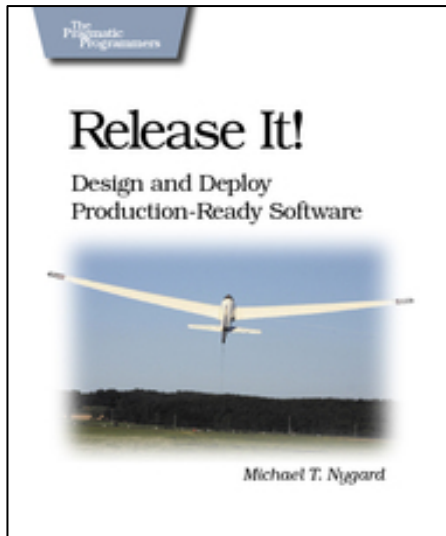


Night-time in Europe

If passes test suite, canary then deploy



Inspiration





Takeaway

Speed Wins

Assume Broken

Cloud Native Automation

Github is your “app store” and resumé

@adrianco @NetflixOSS

<http://netflix.github.com>

A/B Test Hypothesis

You would prefer the Halloween
Scooby Doo Ending

I'd have got away with it if it wasn't for
you meddling kids!

