Five Years of Multi-Cloud at PagerDuty

A ROMANTIC AND COMPLICATED LOVE STORY
SRECON AMERICAS 2018

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Disclaimers and Context
What is PagerDuty?
I work with smart people
You are not PagerDuty

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We get this wrong sometimes
You will not get an easy answer
Not a vendor endorsement
Slides will be posted online afterward
Terminology
Multi-Cloud
Having Active or Passive Infrastructure in Multiple Cloud Providers
Having the same product or service spread across Multiple Cloud Provider

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What every Procurement Manager thinks they want
Active / Active
Running the same workload across multiple datacenters
“Distributed Systems”
Active / Passive
Running a workload in one datacenter with a standby datacenter

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History Lesson
PagerDuty Early 2012

- Cloud Native
- Used Failover for High Availability
  - MySQL Master/Slave Topology based on DRBD
  - Stateless Rails app behind Load Balancers
- AWS us-east-1 and failover site in New Jersey

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The Cloud: Risky, Unreliable, and Dumb

I'm not saying the cloud isn't viable. I just think it's risky, unreliable, and dumb for many uses.

By John C. Dvorak  May 16, 2011 5:10PM EST

51% Of People Think Stormy Weather Affects 'Cloud Computing'

Summary of the AWS Service Event in the US East Region

July 2, 2012

We’d like to share more about the service disruption which occurred last Friday night, June 29th, in one of our Availability Zones in the US East-1 Region. The event was triggered during a large scale electrical storm which swept through the Northern Virginia area. We regret the problems experienced by customers affected by the disruption and, in addition to giving more detail, also wanted to provide information on actions we’ll be taking to mitigate these issues in the future.

Our US East-1 Region consists of more than 10 datacenters structured into multiple Availability Zones. These Availability Zones are in distinct physical locations and are engineered to isolate failure from each other. Last Friday, due to weather warnings of the approaching storm, all change activity in the US East-1 Region had been cancelled and extra personnel had been called into the datacenters for the evening.
2012: Cloud is Unreliable
Minutes of downtime is unacceptable
Only way to achieve Reliability is through distinct Regions
PAGERDUTY LATE 2012

- Started teasing apart PagerDuty into separate Services
- Starting using Quorum based systems
  - Cassandra and Zookeeper
- Favored Durability over Performance
  - Still needed Regions or Datacenters within 50ms
- Tried AWS us-east-1, us-west-1, us-west-2

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Remember that 50ms requirement?
Had to go Multi-Cloud due to latency requirement
PagerDuty Early 2018

- Software deployed to AWS us-west-1, us-west-2 and Azure Fresno
- ~50 Services across ~10 Engineering teams
- Each team owns the entire vertical stack

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What went well
Reliability Benefits

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Summary of the Amazon S3 Service Disruption in the Northern Virginia (US-EAST-1) Region

Microsoft confirms Azure storage issues around the world (updated)

JORDAN NOVET    @JORDANNOVET    MARCH 15, 2017 5:18 PM

AWS suffers a five-hour outage in the US

21 September 2015    By Max Smolaks

Ten services hosted in the Northern Virginia data center experience disruption
Reliability: Hard to measure
Portability Benefits
Portability Benefits

- Everything is treated as Compute
- If there is a base Ubuntu image, we can secure and use it
- Actually helped in pricing

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Engineering Culture Benefits
Engineering Culture Benefits

- Teams built for Reliability early in the SDLC
- Teams had deep expertise in their technical stacks (double-edged sword)
- Failure Injection / Chaos Engineering
What did not go well
Right sizing is hard
Pinned to limiting system resource
AWS m3.large = Azure Standard F4
8GB / 2 Cores ≠ 8GB / 4 Cores
$112 ≠ $182
Deep Technical Expertise Required

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Deep Technical Expertise Required

- Forced to only use common Compute across providers
- Every engineer needs to know how to run their own:
  - Load Balancers
  - Databases
  - Applications
  - HA systems

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Complexity Overhead
Abstract away providers via Chef
Even Less Control Over Network
String of West Coast attacks on Internet fiber optic cables leads to FBI investigation

By Will Greenberg  July 2, 2015
The farther apart your datacenters, the less control you have
Cannot use hosted services
The Big Question
Should you go Multi-Cloud?
“It Depends”

-Arup on almost everything
What to consider

• Business requirements first, technical requirements second

• Company buy-in

• Engineering staff capabilities

• What do your customers care about?

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“Understand your customer’s problems better than they do”

-Andrew Miklas, PagerDuty Co-Founder
Thank You
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