

The Bose logo is displayed in a white, italicized, sans-serif font. It features a horizontal line extending from the left of the 'B' and a registered trademark symbol (®) at the end of the 'E'. The background consists of dark blue, wavy, horizontal lines that create a sense of motion and depth.

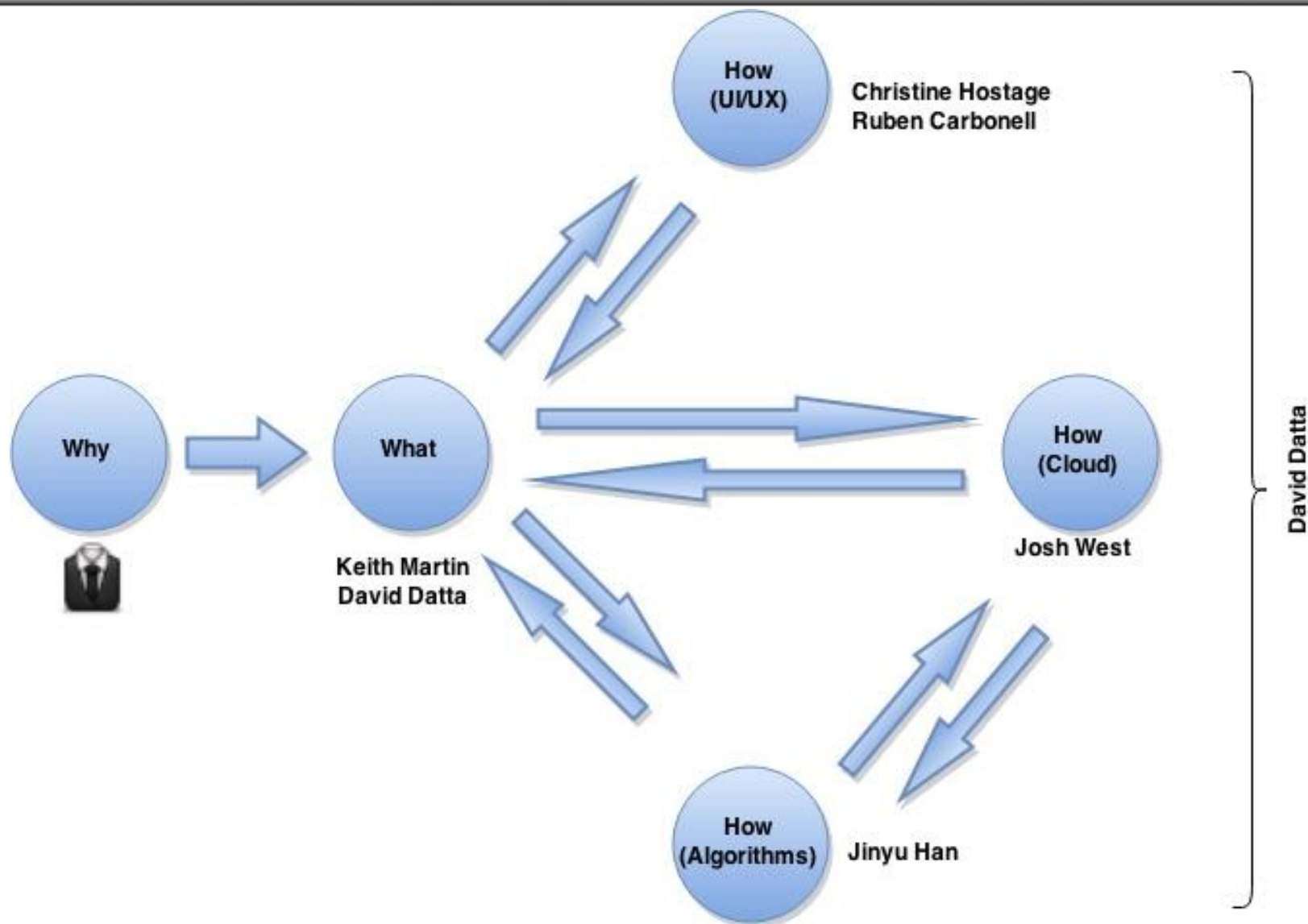
BOSE®

Bose Connected Music Cloud Infrastructure, Team, Strategy

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Cloud Architect
Home Entertainment Division

Bose Connected Music Project

- Home Entertainment Division
- Research and Advanced Development
- Product Owner & Manager: Keith Martin
- Algorithms and Cloud Experience



What are we doing?

- Collecting usage data from multiple sources.
- Processing data in [near] real time.
- Agnostic API platform for enhanced experience applications to build upon. Examples:
 - Context aware smart recommendation engine
 - Playlist generation
 - Music metadata search

What are we doing?

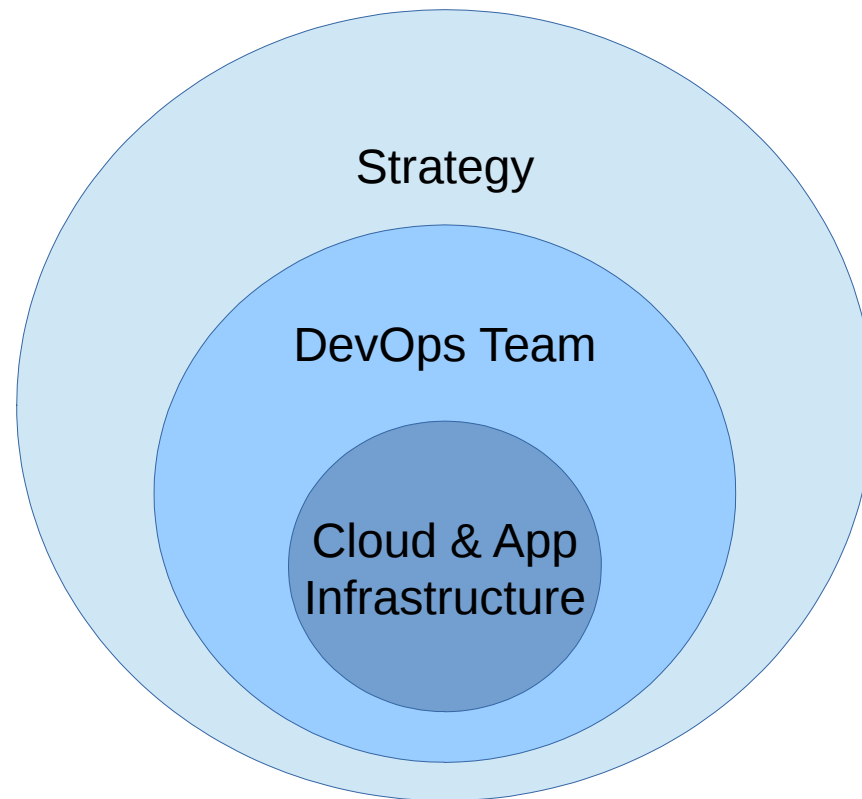
- Preparing for future applications of this system:
 - Connected Home
 - Connected Car
- Connected Experience. Connected Ecosystem.
- Learning about our customers
 - Market Analytics
 - Application Usage

What are we doing?

- **Theo:** Smart playlist generator (dial in variety)
- **Trio:** Lean back. Three choices for on-to-listen. Expected, recommended and wild card. Based on context and past behavior.
- **Kaboodle:** Party mode group playlist experience.
- **Web Dashboard:** Interact with your experience. Statistics, privacy, and tuning.

Improve the User Experience!

How: Cloud



How : Cloud : Infrastructure

- Introduction to Cloud Computing
- Infrastructure as a Service
- Amazon Web Services
 - Pioneered IaaS in 2006 (Xen)
- Multiple cloud providers available today:
 - Microsoft Azure
 - Google Compute Engine
 - Rackspace Cloud, HP Helion, etc....

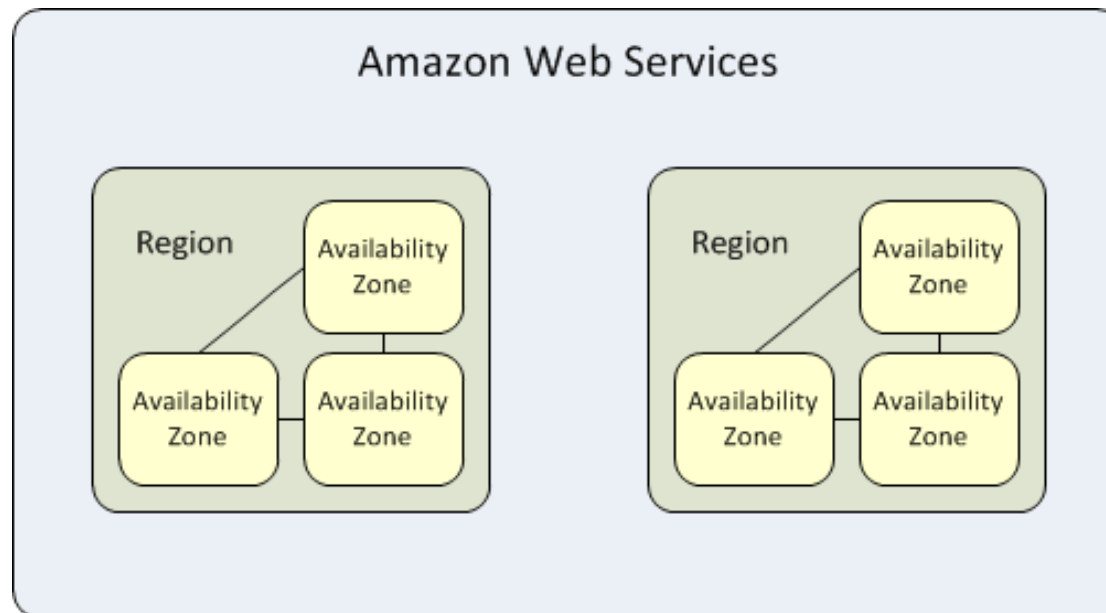
Jeff Bezos AWS Memo

- All teams will henceforth expose their data and functionality through service interfaces.
- Teams must communicate with each other through these interfaces.
- There will be no other form of inter-process communication allowed: no direct linking, no direct reads of another team's data store, no shared-memory model, no back-doors whatsoever. The only communication allowed is via service interface calls over the network.
- It doesn't matter what technology they use.
- All service interfaces, without exception, must be designed from the ground up to be externalizable. That is to say, the team must plan and design to be able to expose the interface to developers in the outside world. No exceptions.
- ***Anyone who doesn't do this will be fired. Thank you; have a nice day!***

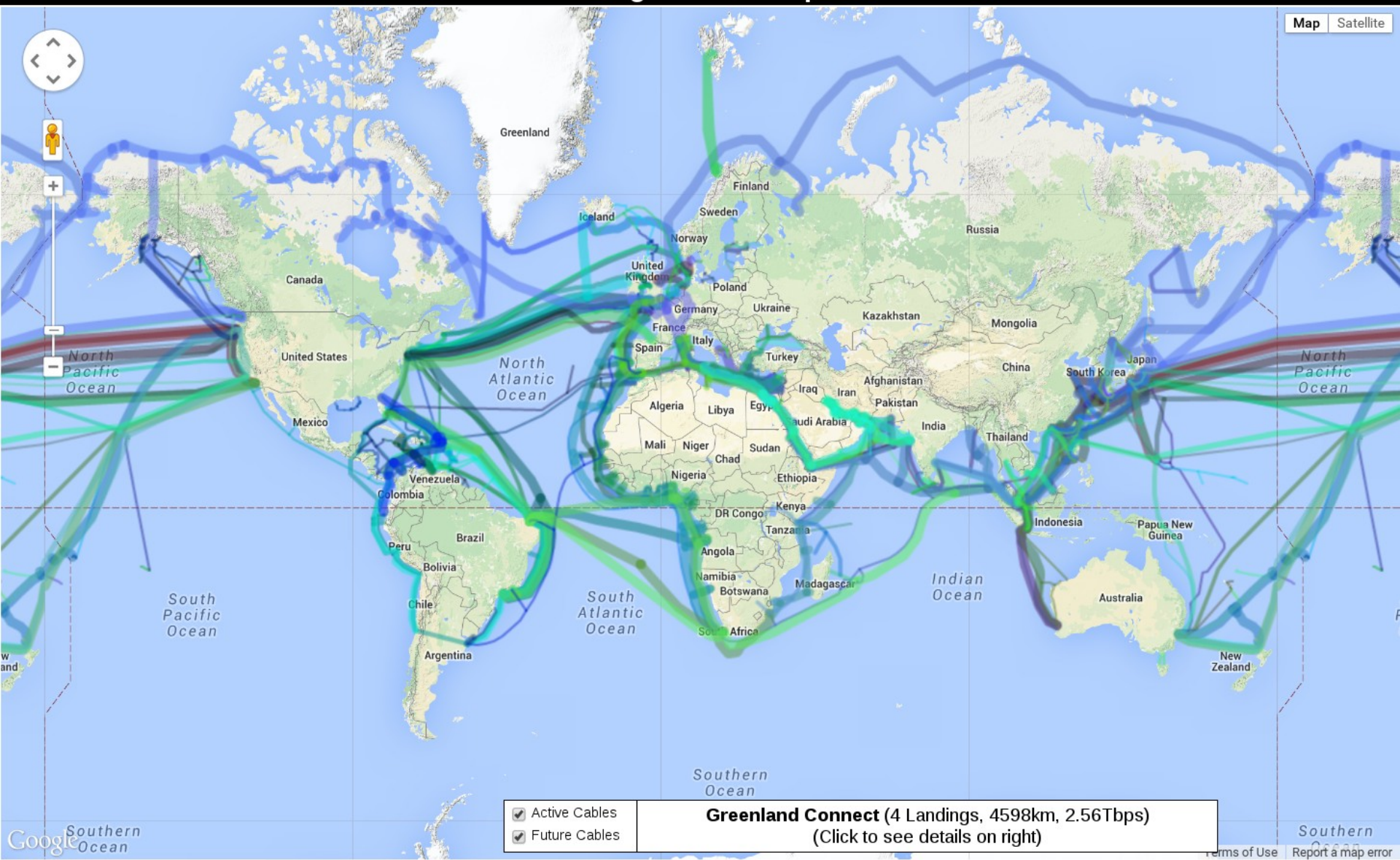
Amazon Web Services Concepts

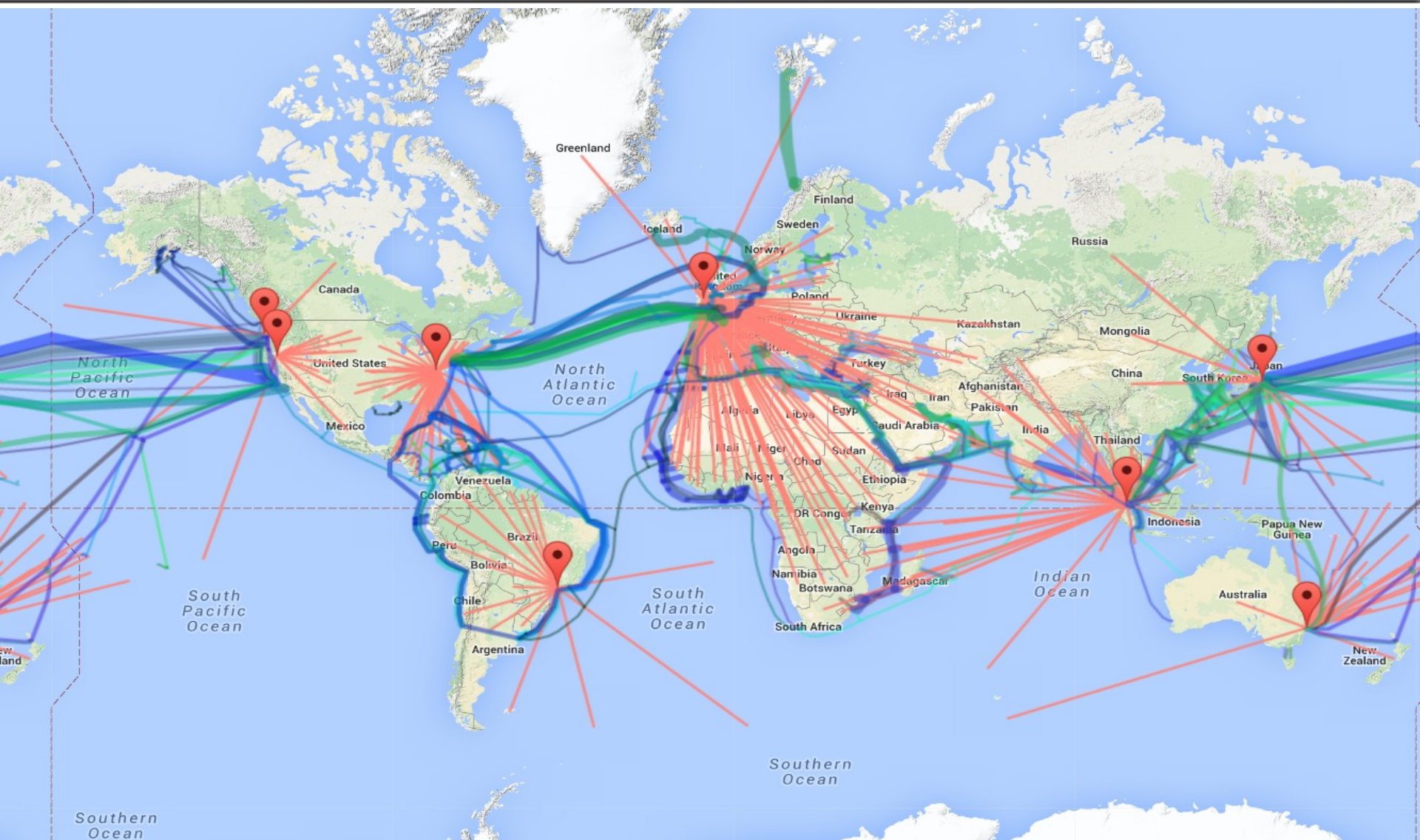
- **Instance:** virtual server
- **Region:** collection of datacenters proximally located
network is one fabric (connected)
- **Availability Zone:** datacenter with a region
- **Billing (usage):** cpu time, network traffic, storage, ...

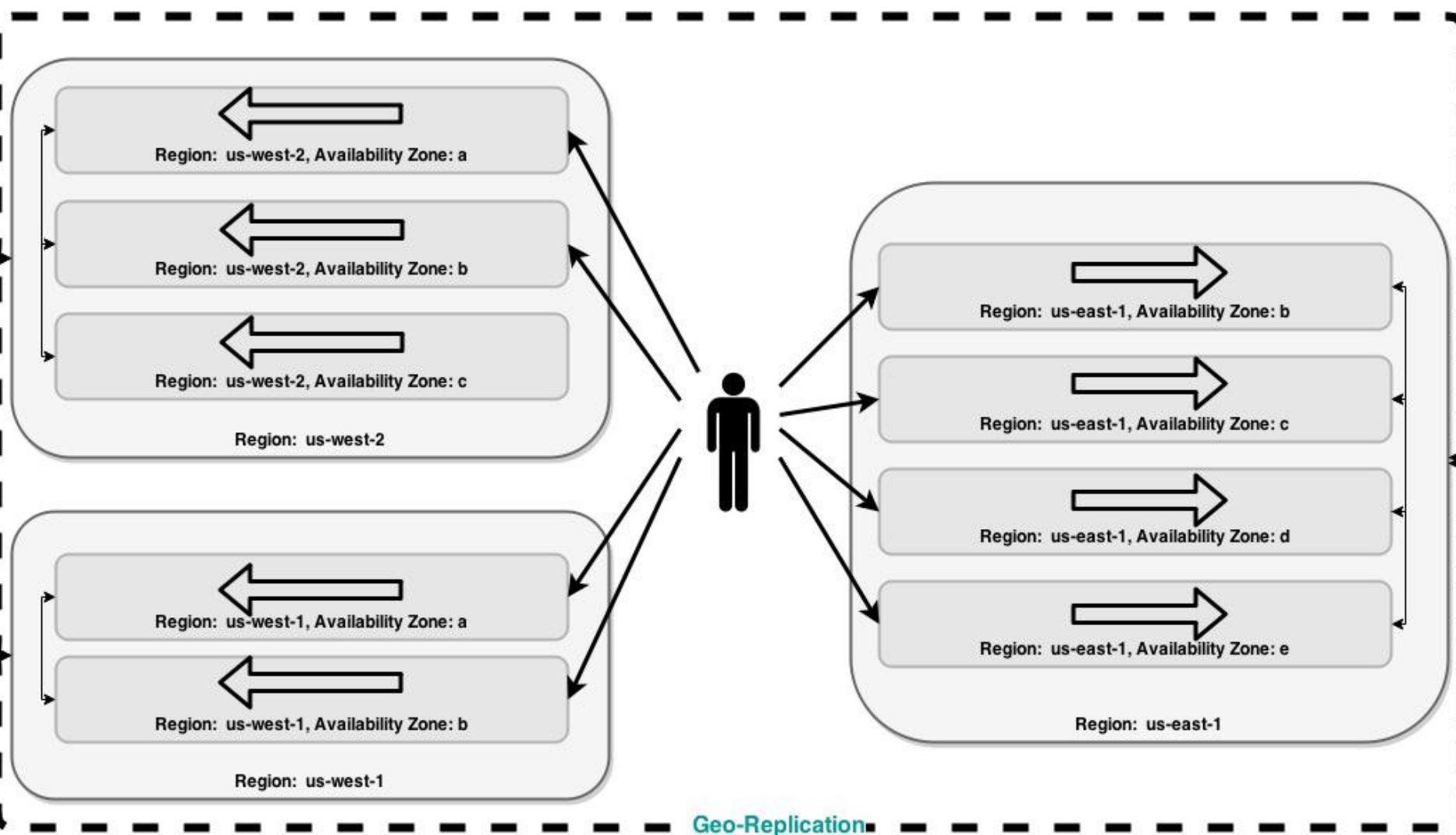
AWS Regions and Availability Zones



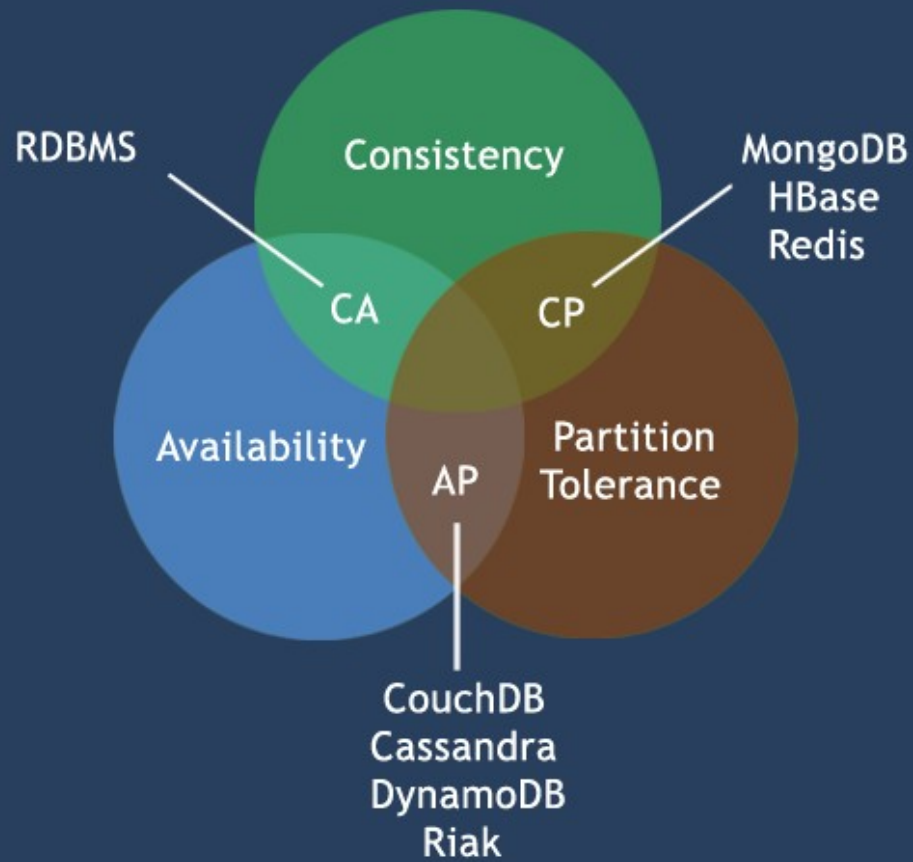
Greg's Cable Map

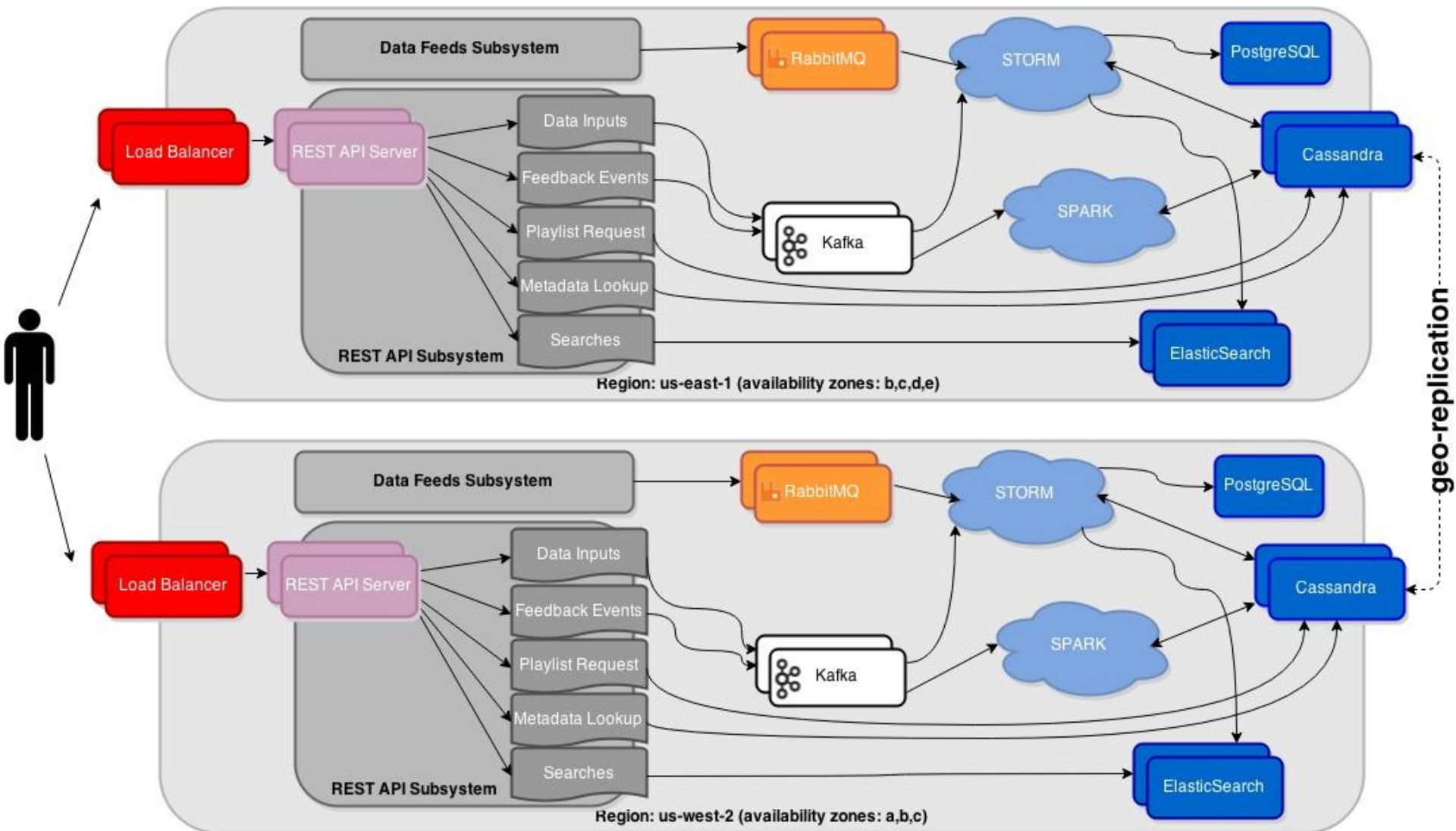






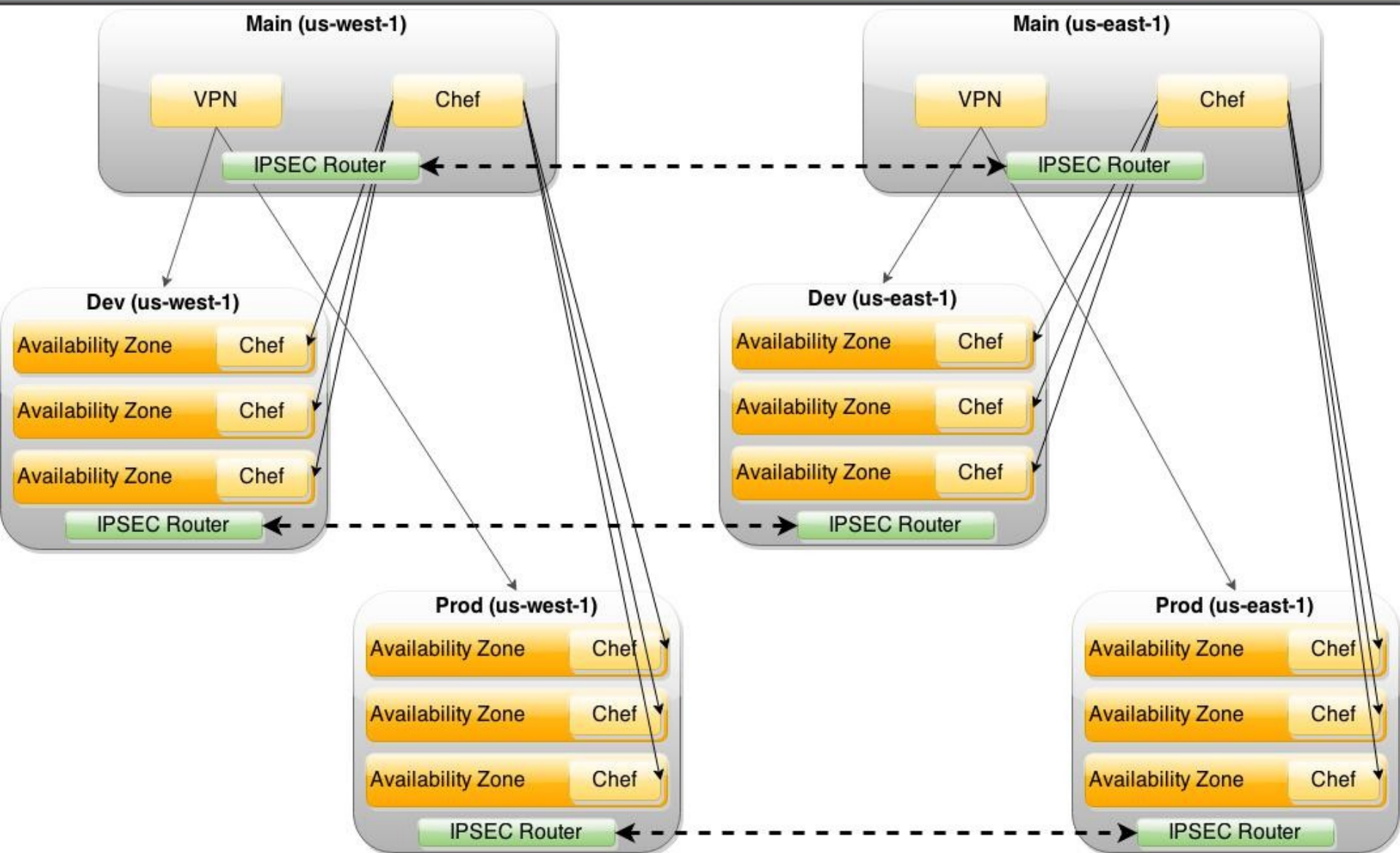
CAP Theorem



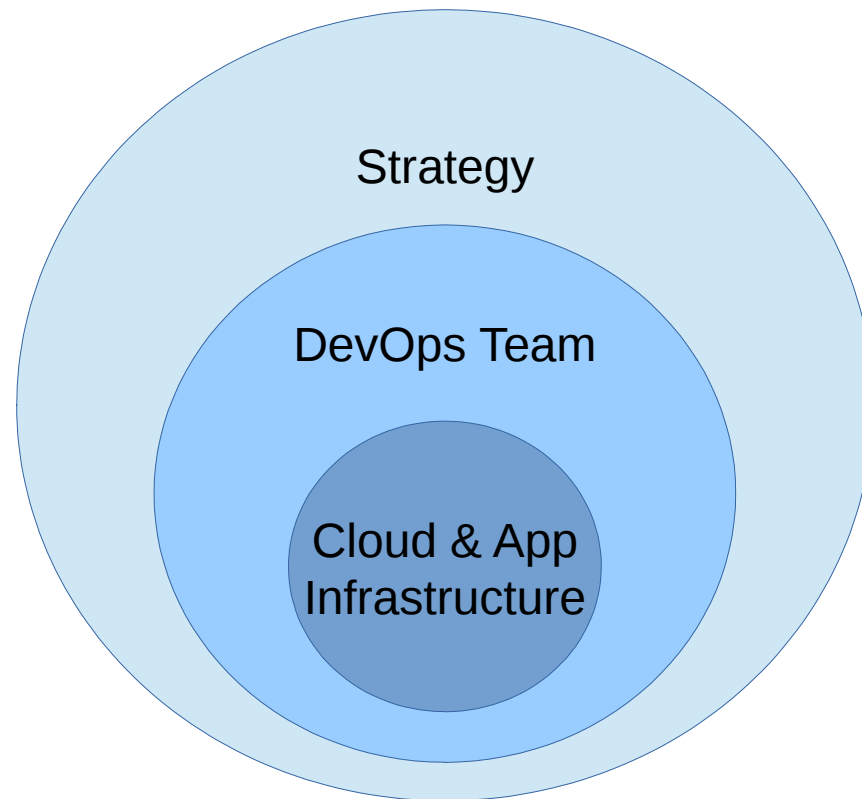


Cloud Environments

- Development
- Testing
- Load Testing
- EFE Dedicated?
- Production
- Main
- Analytics



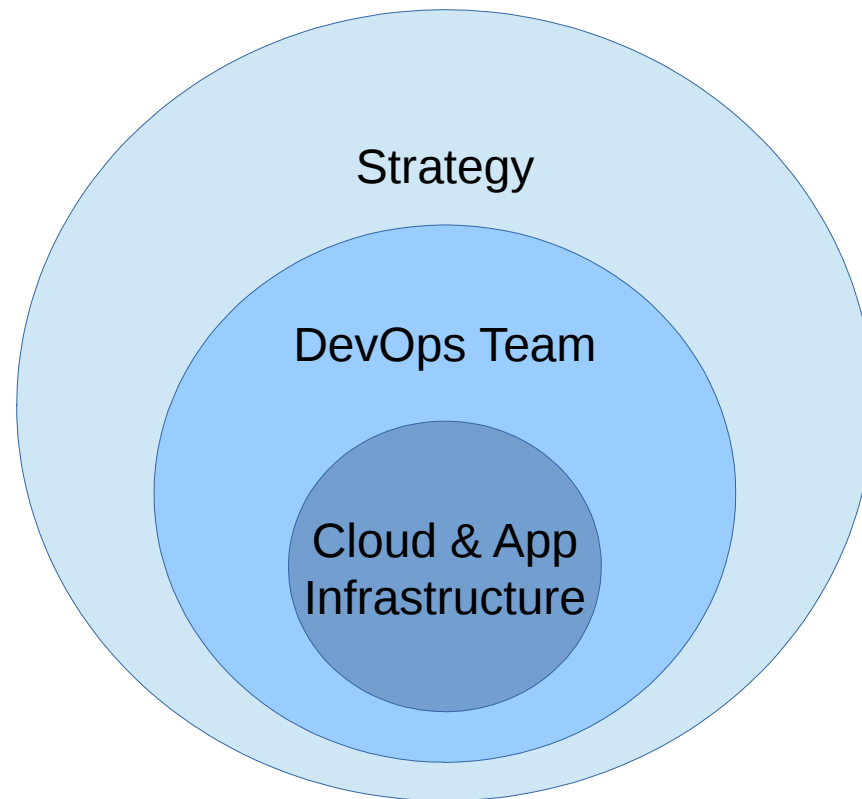
How: Cloud



How : Cloud : Team

- **People!**
- **We are hiring!**
 - 6+ open positions for this year
 - Machine Learning Experts
 - Cloud Engineering, Big Data, High Availability Rockstars
 - Consulting firms and experts.

How: Cloud

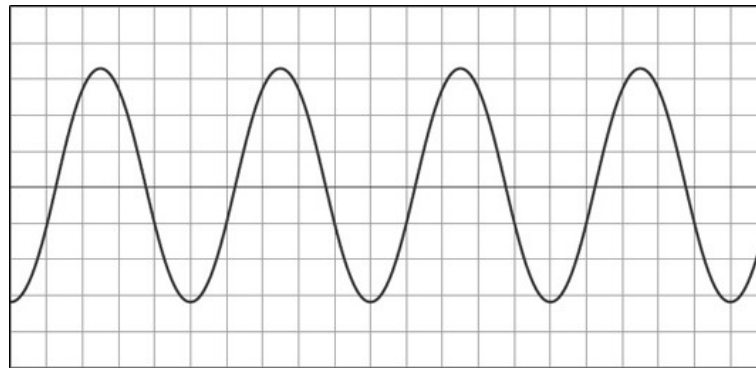


Cloud Strategy

- Enable us to lower risk, tolerate failures
- Enable us to be cost/budget sensitive
- Enable us to be flexible and portable
- Let us build for global scale (and domination)
- Open to the future; open to constant change
- Strike balance between Not/Invented Here Syndrome

(Not) Invented Here Syndrome

- With invent of {I,P,M,S}aaS, now seeing IHS
 - Vendor and solution lock-in
 - Great for start-ups (few people, no time)
 - We are not a start-up (well, sorta).
 - We have the expertise to “Do It Right”™



Strategy: Horizontal Scaling



Strategy: Infrastructure as Code



TERRAFORM



CHEF™



Fabric

*Cloud Provisioning and
Configuration*

*Server and Service
Configuration*

*Data Loads and
Sysadmin Tasks*

Strategy: Expect Failure!



Strategy: Security



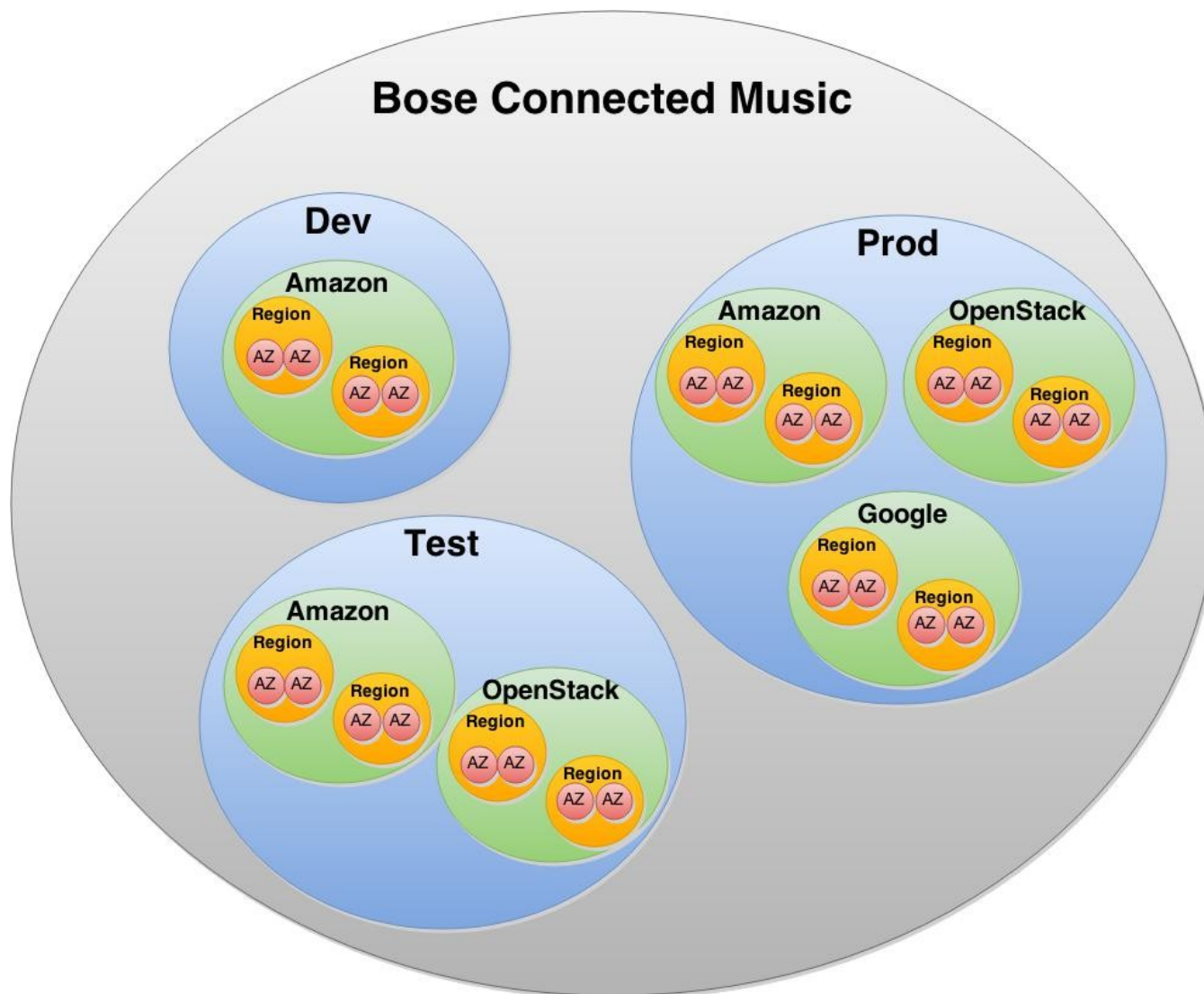
Strategy: Cross Cloud Provider (Hybrid)



Google Compute Engine



Bose Connected Music





Questions?