Competition Among Prevalent CId Service Vendors

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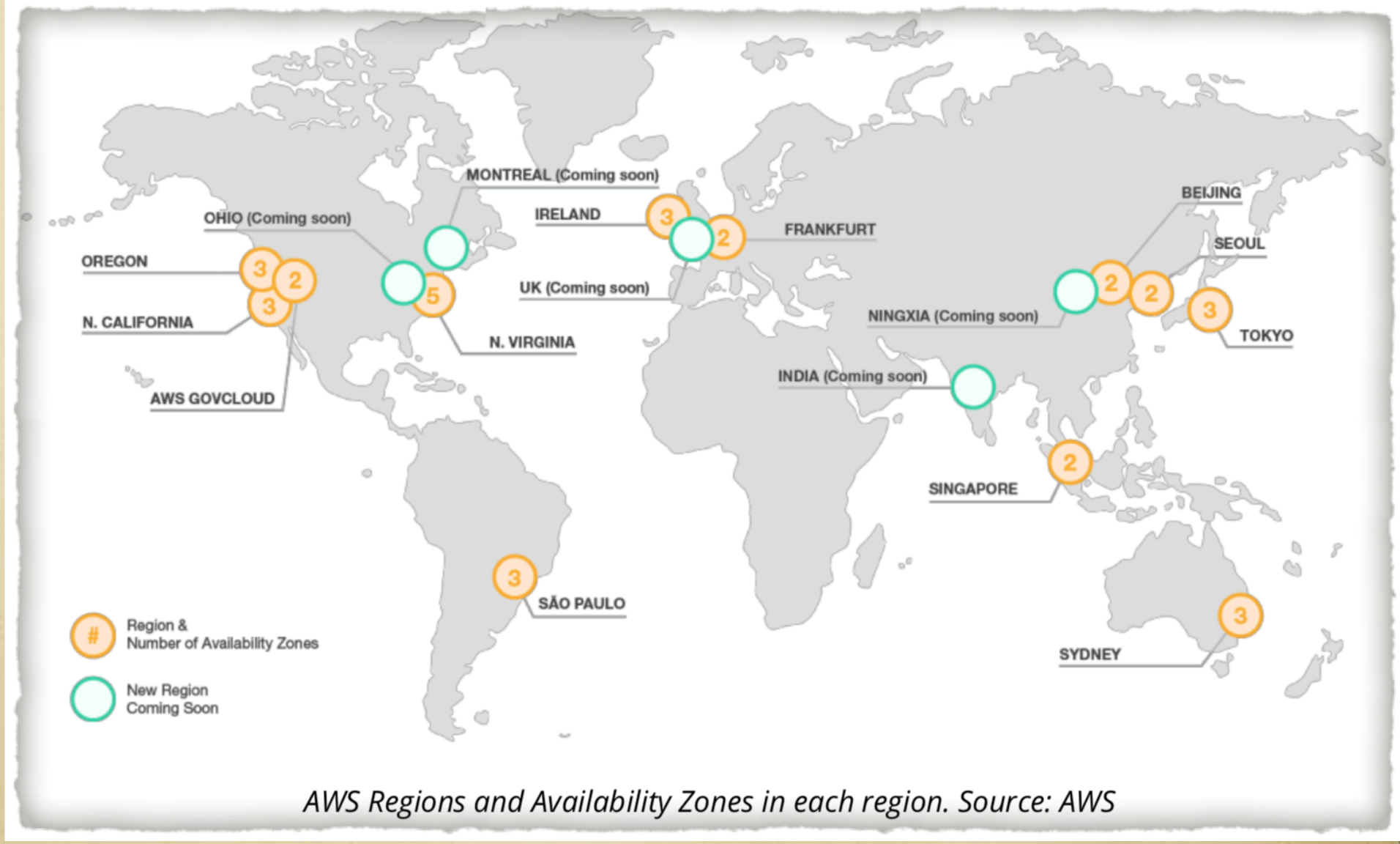
Global Infrastructure Deployment

Amazon
AZs: zero-latency connectivity around the world



AWS Regions and Availability Zones in each region. Source: AWS

Global Infrastructure Deployment

Microsoft:
Developing quickly
So far 22 region covered and 5 more in plan

MS Azure Regions. Source: Microsoft

Global Infrastructure Deployment

Google:
Fewest footprints on global maps
high-speed, low-latency service made up by
Widespread set network infrastructure

Computing Features

Amazon, with its Elastic Compute Cloud (EC2), has the largest flavor (server configuration) variety of all three providers. The families include general-purpose computing, CPU-optimized, RAM- optimized, storage-optimized and GPU-optimized families.

Microsoft, less variety in VM families compared to AWS, but much more flexibility with regards to machine size. Its families include general-purpose, optimized machines (better CPU, more RAM and more SSD storage), performance-optimized (even more than “optimized”) and network-optimized (32Gbps Infiniband networking).

Google, Google Compute Engine (GCE) . The three families are general- purpose, CPU-optimized and RAM-optimized, with 5-6 sizes within each family. However, with their “custom machines” offering, VMs management becomes more detailed and more complex.

Computing Features

general-purpose computing, CPU-optimized, RAM- optimized, storage-optimized and GPU-optimized families

Microsoft
general-purpose, optimized machines, performance-optimized and network-optimized

Google
general- purpose, CPU-optimized and RAM-optimized

Network

When you want to have your VPN in an isolated place for your team only ...

The AWS offering here is quite good. You can use the Virtual Private Cloud to create your VPN and set your network topology, create subnets, route tables, even private IP address ranges, and network gateways. On top of that, you can use Route 53 to have your DNS web service.

Microsoft Azure also has a solid private networking offer. Its Virtual Network (VNET) allows you to set your VPN, have public IP if you want, and use a hybrid cloud, firewall, or DNS.

Google Cloud Platform's offering is not as extensive. It has the Cloud Virtual Network, and supports subnet, Public IP, firewall protection, and DNS.

Subnet

§AWS: Subnets may be configured to group related EC2 instances within a VPC. Traffic between instances and subnets is governed by route tables that define the set of rules according to info flow. (200 limit in default)

§AZURE: Network resources can be grouped by subnet for organization and security

§GCE: Unlike AWS and Azure, Google do not constrain the private IP address ranges of subnets to the address space of the parent network

DNS

§AWS: Route 53 is a DNS service that resolves user requests and ensures they are directed to the correct infrastructure.

§Azure: Azure DNS is an authoritative DNS service that allows users to manage their public DNS names.

§GCE: Like AWS and Azure, Cloud DNS allow organizations to manage their DNS and associated records along with the rest of their cloud services

Security(AWS vs GCE)

§As AWS instances are now provisioned within VPCs, Amazon provides the benefit of both Security Groups and Network ACLs. With Security Groups – working as whitelists – you control incoming and outgoing traffic at the instance level. Network ACLs, on the other hand, work at subnet level, and allow or deny specific IP addresses or networks.

§Similarly, Google Compute Engine firewalls regulate outgoing traffic from instances using iptables. Google's Firewall is also a whitelist service.

Security(AWS vs Azure)

AWS Security Groups

- Can secure EC2, RDS, ELB
- Security Groups are applied to the primary Elastic Network Interface(ENI) by default
- multiple security groups APPLIED to an instance
- White list only – only allow rules (inbound/outbound)

Azure Network Security Groups (NSGs)

- Can secure VMs and Subnets
- Applied to primary NIC on servers, or all VMs in subnet
- Both Allow & Deny rules. For more detail on how NSGs work, visit this blog post
- Can't attach multiple NSGs to a VM or Subnet. The difference is only from the administrative perspective – you can easily get out of control with multiple security groups on instances. This NSG structure dictates better user habit.
- All rules are stateful

Storage

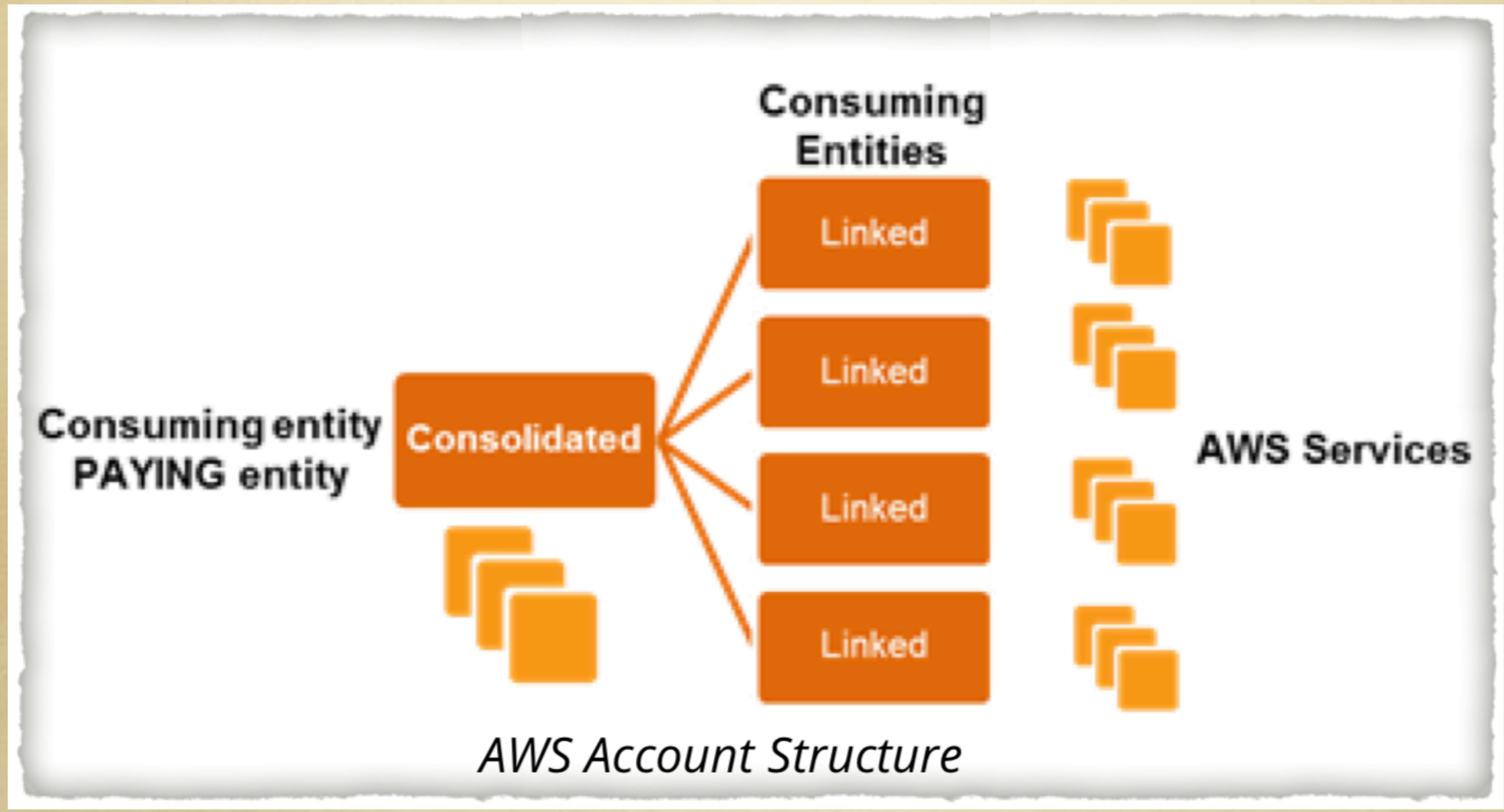
	Amazon	Microsoft	Google
Block Storage	“Elastic Block Storage” (EBS) and supports Magnetic, SSD and SSD with provisioned IOPS. (1TB – 16TB)	Page Blobs and Disks are Azure’s block storage service. It can be sourced as standard (magnetic) or as Premium (SSD), with volumes of up to 1TB.	an add-on to instances within GCE. There are two options for either magnetic or SSD volumes; however the IOPS count is fixed (compared to provisioned IOPS with AWS).
Object Storage	“Simple Storage Service” (S3), with four different SLAs: standard, standard - infrequent access, reduced redundancy and Glacier (for archiving).	Block Blobs, four different SLA levels: Locally redundant storage (LRS) zone redundant storage(ZRS) geographically redundant storage (GRS)	Object storage is called Google Storage, and divided into three classes: Standard, Durable Reduced Availability for less critical data (similar to RRS in S3) and nearline .

RL/NRL Database

Relational Database Management Service	Amazon Aurora; Amazon RDS	Azure SQL Database; SQL Server; Stretch Database; Azure CosmosDB; Azure Database for MySQL; Azure Database for PostgresSQL	Cloud SQL; Cloud Spanner
Non Relational Database Management Service	Amazon dynamoDB; Amazon DynamoDB; Accelerator (DAX)	Azure CosmosDB; Azure Time Series Insights	Cloud Datastore; Cloud BigTable
In-Memory Data Store	Amazon ElastiCache	Azure RedisCache	**N/A**
Data Warehousing	Amazon Redshift	Azure SQL Datawarehouse	Big Query

Account and Billing Structure

One of the accounts is designated as consolidated account and all other accounts are linked to it, hence linked accounts.

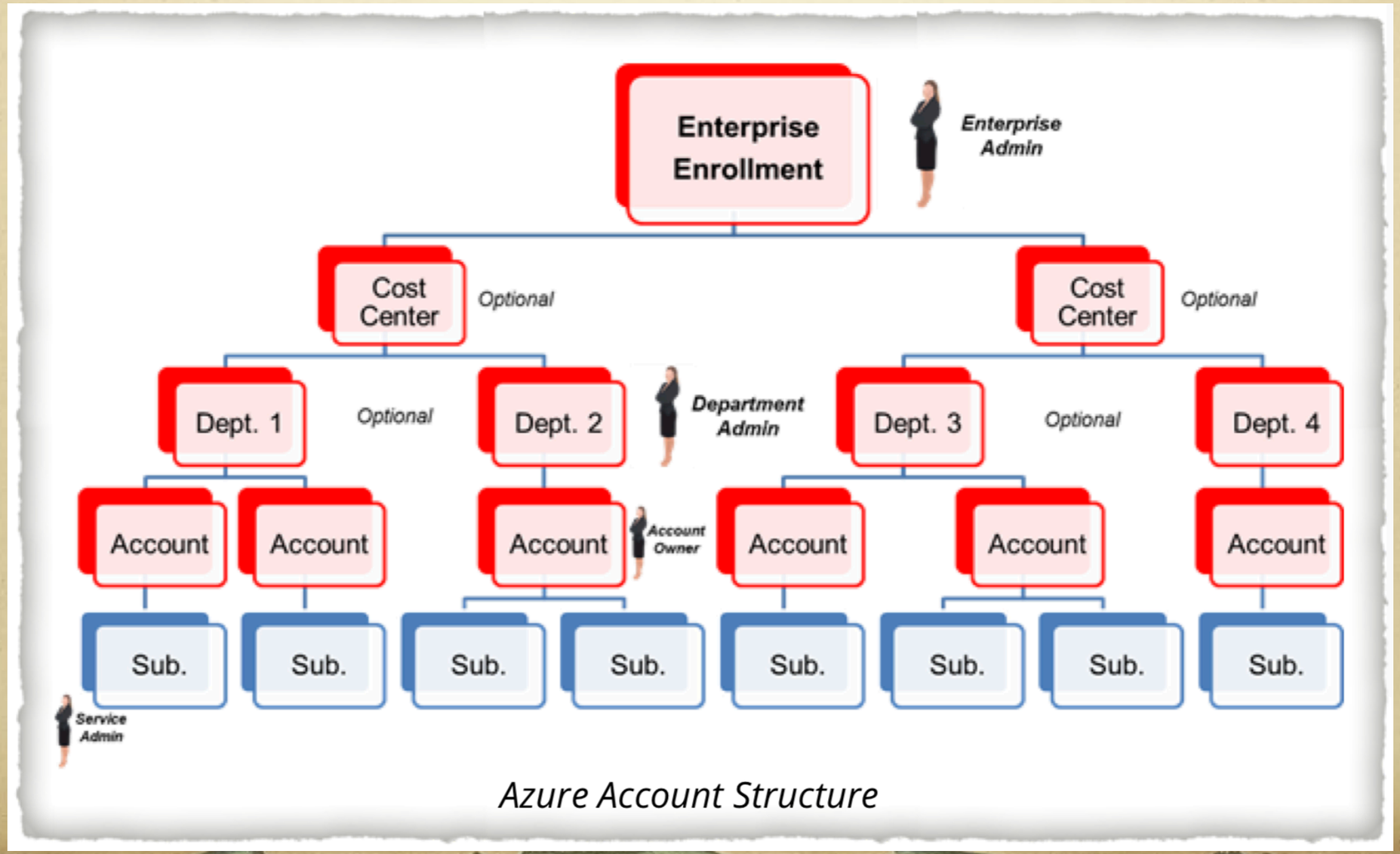


AWS Account Structure

Sequence Diagram

The subscription is the lowest in the hierarchy, and the only one, which actually provisions and consumes resources.

Azure accounts are management entities and don't actually consume resources themselves.



Azure Account Structure

Account and Billing Structure

§Google employs a flat hierarchy. The different resources are grouped under “Projects” (which are similar to AWS accounts or Azure subscriptions). There is no higher entity than projects, however multiple projects can be grouped under a “consolidated billing account”, similar to AWS consolidated billing. This billing account is not a consuming entity though, and cannot provision services, similar to Azure’s accounts.

Deployment Tools(AWS)

Elastic beanstalk:For all intents and purposes, all you need to do is provide your application code created in one of a dozen or so platforms (Ruby, PHP, Node.js, Docker, etc.) and Beanstalk will pretty much invisibly build the necessary AWS infrastructure around it.
Greatest strength:Simplicity.
CloudFormation:CloudFormation is all about JSON formatted templates. AWS describes it as a “building block service that enables customers to provision and manage almost any AWS resource.”
Greatest Strength: scripting(template)
OpsWorks:OpsWorks built-in layers, which on their own are somewhat narrow in scope, can be customized using chef recipes...but that could add a significant learning curve to the mix.It’s built on a framework of stacks and layers. The project, at the top level, is defined by its stack which, in turn, is made up of layers.
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Thank you for listening!