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Intro to Cloud Computing HW:2

For this assignment I researched the cloud infrastructure for **AWS, Azure, and Google Cloud** in order to compare said infrastructures. These three providers for cloud resources offer similar services and use similar models for their global infrastructure.

Organization:
The organization for the infrastructure for each provider is similar to the others in the sense that they are broken up into regions made up of smaller zones. AWS and Google Cloud both use the term **Region** for a larger geographical area made up of smaller zones while Azure uses the term **Azure Region.** Both AWS and Azure call the smaller zones **Availability Zones** while Google Cloud refers to the smaller areas making up a region as **Zones.** The organization of these three infrastructures is also similar in that each Zone or Availability Zone is made up of individual data centers or **Clusters** as they are called by Google Cloud. Each Region also narrows down into edge locations also called **Points of Presence** by AWS, which are used to reduce latency by having data transfer occur with the shortest routes possible.

Distribution:
Each of these providers are similar in that they place their regions around highly populated or major cities and then they split these Regions into smaller Zones/Availability Zones in order to provide redundancy and low latency for the end users of the products made by their customers. This is why all three providers have their zones connected directly between their data centers with high capacity low-latency cables to provide the best application availability.

AWS Regional Map found at: https://aws.amazon.com/about-aws/global-infrastructure/

AWS currently has 24 launched Regions with 77 Availability Zones and over 220 Points of Presence distributed between them. This allows them to provide service to 245 countries and territories worldwide with minimal latency for a better experience.

Azure Regional Map found at:
https://azure.microsoft.com/en-us/global-infrastructure/geographies/

Microsoft's Azure currently has 54 Azure Regions available in 140 countries around the world. Each region has a minimum of 3 Availability Zones to provide reliability.Looking at the regional map we can see that Azure's main focus is in Europe and the United States with more coverage for these areas than anywhere else while still maintaining the same amount of coverage in the rest of the world as AWS and Google Cloud.

Google Cloud Regional Map found at: https://cloud.google.com/about/locations

Google Cloud's global infrastructure is more similar to that of AWS than Azure. They currently have 24 Regions active with 73 zones between them. Their infrastructure also has 144 edge locations. Google Cloud is also servicing over 200 countries.

Service Availability:

From the information I was able to find, AWS has the overall most widespread infrastructure with Azure coming in as a close second. While Google Cloud and AWS both officially service more countries than Azure it does reach a wider area than Google Cloud. However, all three service providers provide service in most parts of the world with few well developed areas being overlooked.

That being said, that doesn't mean that all services that the providers have to offer are available in all regions. AWS is the only provider that ensures all of their services are available for use in every Availability Zone within 12 months of the zone's activation. Both Azure and Google Cloud, while making most services available to every region, have certain services in each region that are unavailable to their customers. For example, Azure customers in the Central US region do not have access to several services like: Bing Speech, Custom Vision, or Speaker recognition, while Google Cloud customers in the us-west-3 region do not have access to services like: VMware Engine, or Cloud Data Catalogue. The amount of services missing from each region for Azure and Google Cloud is usually minimal and they are not usually crucial services, but it is interesting that there wasn't a single region for the two providers that had access to all services.

Reliability, Availability, and Durability of Data:
All three service providers focus on making sure that their customers have reliable access to their data and that their web applications stay active for the end user with minimal downtime during some kind of failure or disaster. All three providers made it a point of having multiple zones where customers can duplicate their data incase of a failure, ensuring stability and reliability. All data for each provider is stored in secure data centers to ensure the confidentiality of customer data as well as the integrity but having personnel available for ensuring that the storage is maintained.

There is plenty more information related to AWS, Azure, and Google Cloud. However the above seemed the most useful and pertinent information about the global infrastructure of these providers. It is apparent that the actual differences in services between each provider is minimal but the overall differences to be found lie in availability of said services. AWS was the only provider that had widespread access to their service as well as the capability of all Availability Zones to access any and all of their public services, allowing them to quickly pull ahead of Azure and Google Cloud for the time being.