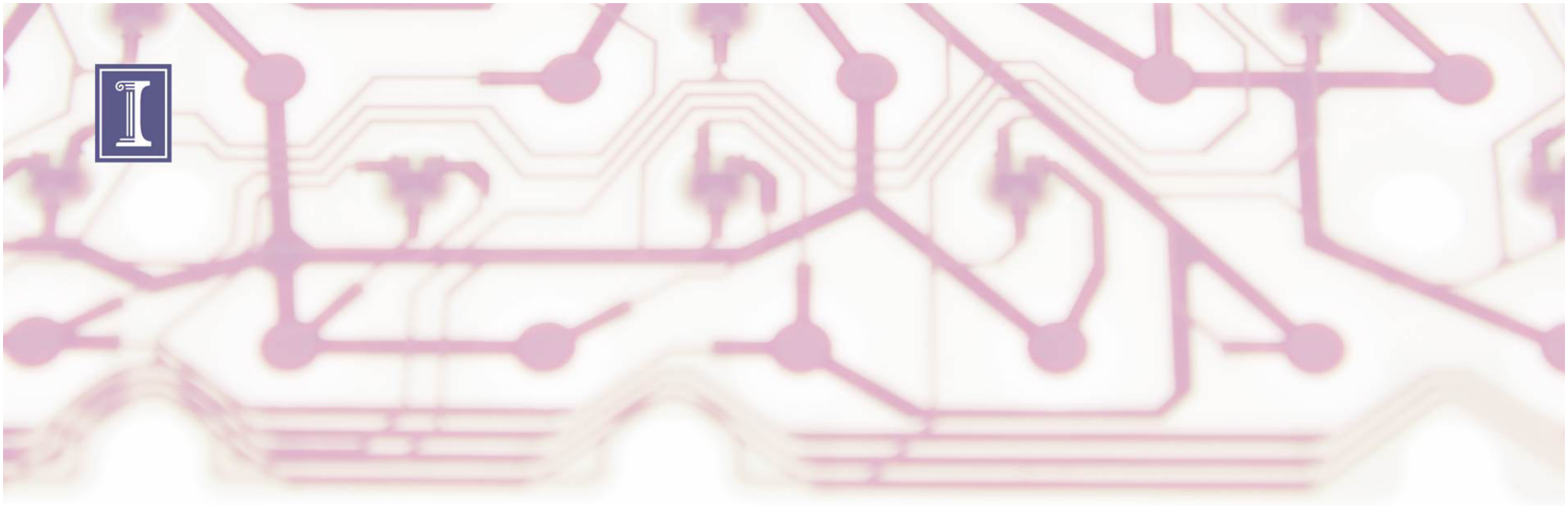


CLOUD COMPUTING APPLICATIONS

Infrastructure as a Service: Regions and Zones

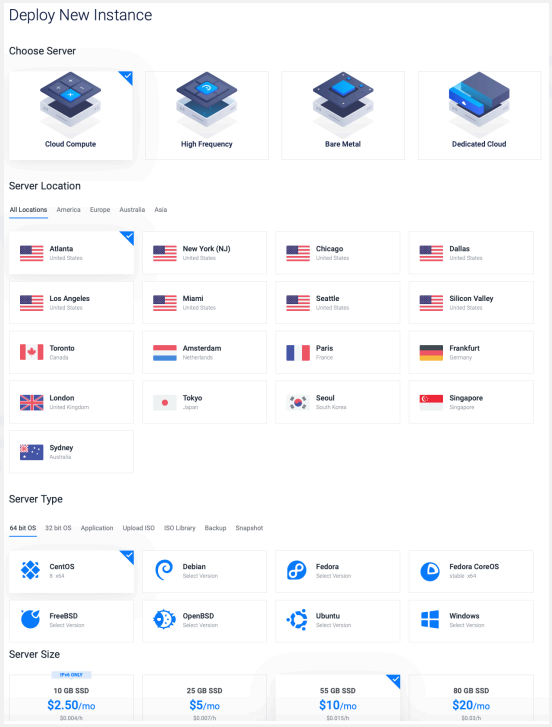
Reza Farivar

Virtual Machine Instance Location

- The cloud provider has multiple physical data centers, all over the globe
- Where does your virtual machine reside?
- Regions
- Availability Zones / Zones

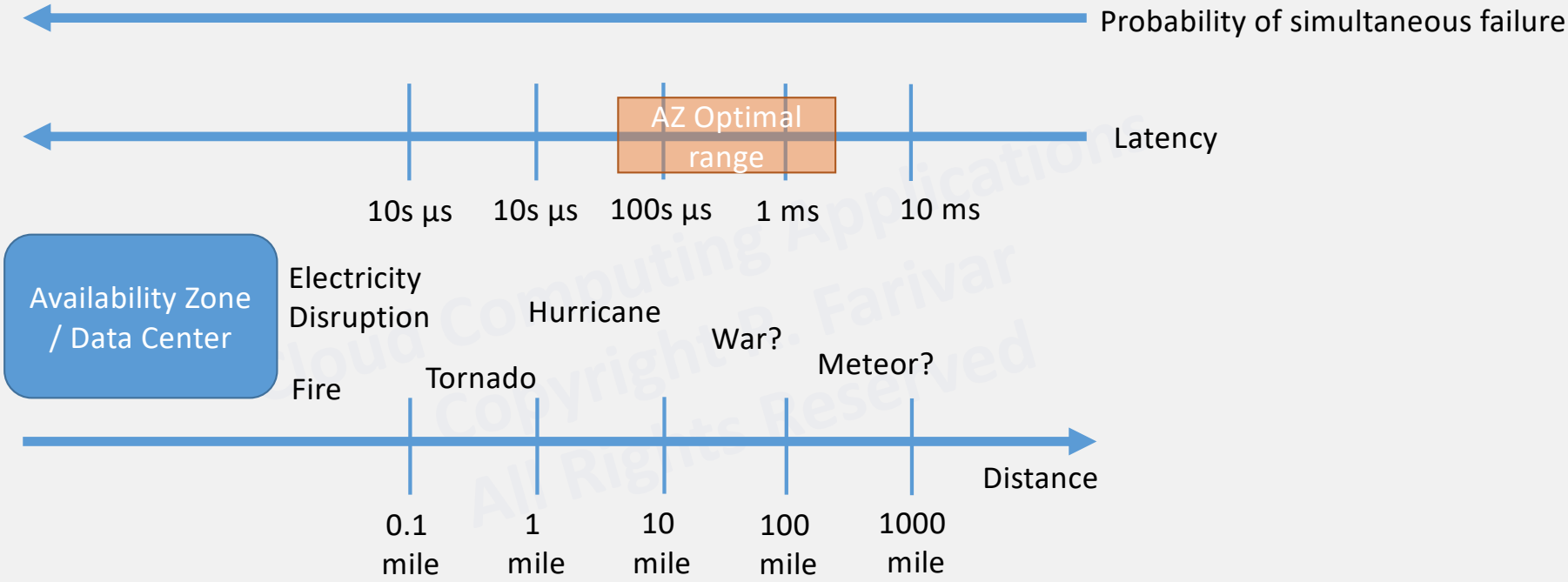
Data Center Location

- Some Cloud Providers simply let you choose the Data Center
- E.g. Vultr:



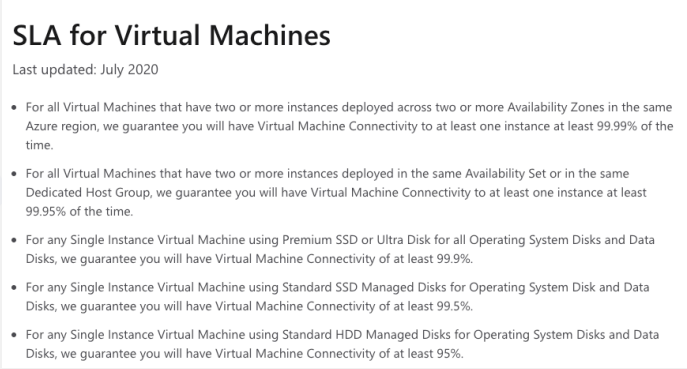
Availability Zones and Regions

Availability Zones Locations



Availability Zones and Regions

- Typically each user ID gets access to a handful of availability zones to launch VM instances per each region
  - AWS: us-east-1 ➔ us-east-1a, us-east-1b, …, us-east-1f
  - Azure: US East ➔ 1, 2, 3
  - GCP: us-east1 ➔ us-east1-b, us-east1-c, us-east1-c
- The availability zone “a” for user1 is NOT the same as availability zone “a” for user2



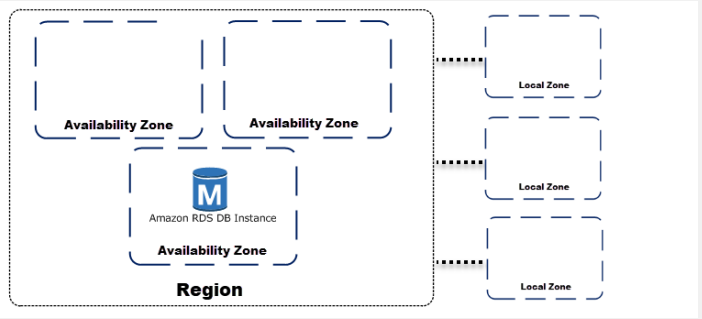
SLA for Virtual Machines

Last updated: July 2020

- For all Virtual Machines that have two or more instances deployed across two or more Availability Zones in the same Azure region, we guarantee you will have Virtual Machine Connectivity to at least one instance at least 99.99% of the time.
- For all Virtual Machines that have two or more instances deployed in the same Availability Set or in the same Dedicated Host Group, we guarantee you will have Virtual Machine Connectivity to at least one instance at least 99.95% of the time.
- For any Single Instance Virtual Machine using Premium SSD or Ultra Disk for all Operating System Disks and Data Disks, we guarantee you will have Virtual Machine Connectivity of at least 99.9%.
- For any Single Instance Virtual Machine using Standard SSD Managed Disks for Operating System Disk and Data Disks, we guarantee you will have Virtual Machine Connectivity of at least 99.5%.
- For any Single Instance Virtual Machine using Standard HDD Managed Disks for Operating System Disks and Data Disks, we guarantee you will have Virtual Machine Connectivity of at least 95%.

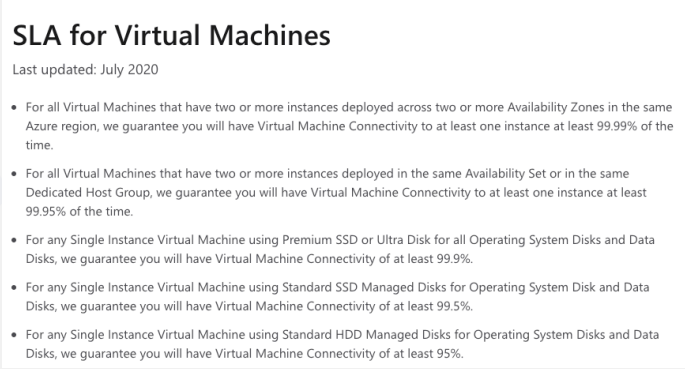
Availability Zones and Regions

- Each zone is made up of **one or more datacenters** equipped with independent power, cooling, and networking.
  - Chance of simultaneous failure in all the separate AZs in a region is extremely small
- *Local zones: A *Local Zone* is an extension of a Region that is geographically close to your users



Availability Zones and Regions

- For high availability, design your system to have instances running in multiple AZ in a region, and maybe even have more than one region
- Data traffic costs most from one region to another, then from one AZ to another in the same region, and it is cheapest (or free) in the same AZ



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