Project Plan Presentation
AWSome Availability Zones

The Capstone Experience

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Functional Specifications

• Gather information on network latency between Availability Zones (i.e., data centers)
• Assist users with optimizing network latency in their applications by suggesting AZ pairs
• Interact with data through easy-to-use UI
• Filter through results based on region-based requirements (ex. no AZs in Europe, one must be in Western US, etc.)
Design Specifications

• User friendly + interactive map showing all Regions in the world. Each Region is clickable and will show more details about each Availability Zone it contains

• Filtering system where users can add, edit, and remove Region-based requirements for AZ placement

• Once a Region is selected, all other Regions are colored on main map webpage based on average network latency

• Statistics webpage for any pair of Availability Zones showing a graph of network latency tests and highlighting important features like average latency, 95th, 99th, and 99.9th percentiles
Screen Mockup: Interactive Map
Screen Mockup: Select Region
Screen Mockup: Regional AZ Matchups Page
Screen Mockup: Specific AZ Pair Statistics Page
Technical Specifications

• Front End
  ▪ QuickSight Dashboard
  ▪ GitHub Pages
  ▪ Angular web application

• Back End
  ▪ AZ Matching Algorithm
  ▪ ICMP vs. TCP
  ▪ High Precision Timer
  ▪ EC2 automatic deploy
System Architecture

Angular Website

QuickSight Dashboards

Latency Data

Interactive Map

Data Visualizations

EC2 Swarm

Ping

Commands

Latency Data

EC2 Swarm Conductor

Latency Data

RDS (Database)
System Components

• Hardware Platforms
  ▪ N/A

• Software Platforms / Technologies
  ▪ Front End
    o Angular, Angular Materials, GitHub Pages
    o AWS Services (IAM, Lambda, API Gateway, QuickSight)
  ▪ Back End
    o AWS CDK, CLI, SDK
    o Amazon TimeSync
    o Chrony, C, TCP, DNS, HR Timer, NTP
Risks

- **Back end/Front end Communication**
  - The back end database is likely to change over time, and these changes will affect the front end
  - API interface between front and back to control when communication happens

- **Timing methods and Precision**
  - Latency between AZs is naturally low, so timing latency needs to be precise and consistent
  - Timing using clock ticks for precision, and consistency achieved with time

- **IP Address Security**
  - Deployment of our detection method requires knowledge of IP addresses, which may be inconsistent and a security risk
  - Deploy Swarm Conductor first

- **Unknown QuickSight Functionalities**
  - QuickSight might have/lack functionalities that will interfere with our planned display
  - Use and experiment with embedded versions on Angular to create workarounds
Questions?