DHHS System Architecture

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Introduction

- Project Description and Goal
  - Montgomery County's Department of Health and Human Services doesn't have a standardized management system to store and review performance data
  - The project goal is to evaluate and assess an open-source, cloud-based data storage system for a future developer to implement
- Client: Noune Sekhpossian Noune.Sekhpossian@montgomerycountymd.gov

Team Roles

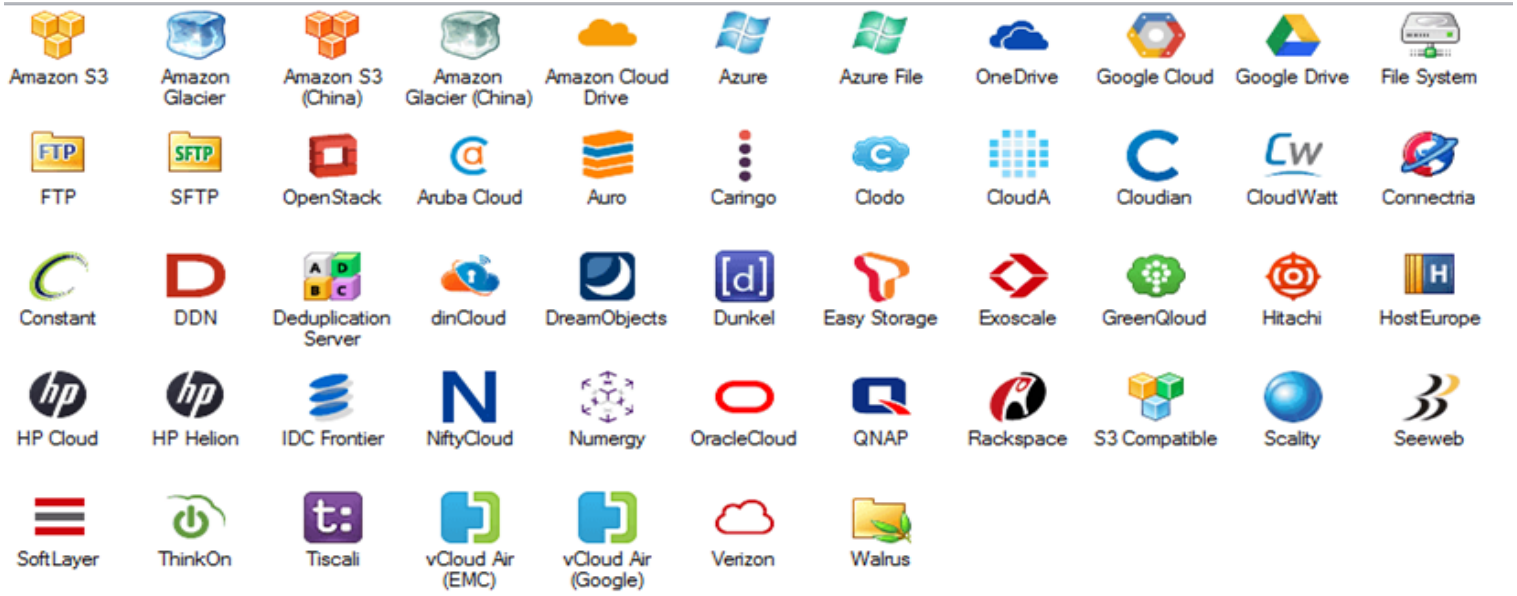
Azeez Saba	Project Manager: Coordinate with Noune and the other two teams to make sure Architecture team is in sync with the project progress
Waleed Falak	Analyst: Work with the UI/UX and metrics team to analyze data and how to make it accessible on cloud storage
Anna Mulli	Tester: Ensure project requirements are met and determine what needs to be changed or updated
Andrew Pham	Researcher: Explore available open-source, cloud-based data storage systems that meet a predetermined list of constraints

Project Context

- DHHS collects metrics from its 130+ programs and 700 service providers

- Interaction with the other teams
  - Metrics team: storing dataand table sizes
  - UI/UX team: login functionality that connects to the AWS API

Top 100 Cloud Database Providers



Process

- Two constraints:
  - database cost can;t exceed $5,000
  - memory to store at least 1TB

- First: find the right cloud service to provide memory at a reasonable price (many providers couldn’t hold the required amount of data)

- Second: narrowing the list based on pricing left three cloud database services—AWS, Microsoft Azure and Google Cloud

Cost Comparison

AWS vs. Azure vs. Google On-Demand Prices

Resource Type (us-east, Linux)	AWS Instance	Azure Instance	Google Instance	AWS OD Hourly	Azure OD Hourly	Google OD Hourly	AWS /GB RAM	Azure /GB RAM	Google /GB RAM
Standard 2 vCPU w SSD	m3.large	D2 v2	n1-standard-2	$0.133	$0.114	$0.212	$0.017	$0.016	$0.028
Highmem 2 vCPU w SSD	r3.large	D11 v2	n1-highmem-2	$0.166	$0.149	$0.238	$0.011	$0.011	$0.018
Highcpu 2 vCPU w SSD	c3.large	F2	n1-highcpu-2	$0.105	$0.099	$0.188	$0.028	$0.025	$0.104
Standard 2 vCPU no SSD	m4.large	D2 v2	n1-standard-2	$0.120	$0.114	$0.100	$0.015	$0.016	$0.013
Highmem 2 vCPU no SSD	r3.large	D11 v2	n1-highmem-2	$0.166	$0.149	$0.126	$0.011	$0.011	$0.010
Highcpu 2 vCPU no SSD	c4.large	F2	n1-highcpu-2	$0.105	$0.099	$0.076	$0.028	$0.025	$0.042

As of Oct 25, 2016

Source: RightScale

Lowest Highest

RIGHTSCALE

Amazon S3 Prices

UP to 50TB Storage

51-100TB Storage

500TB+ Storage

0.023 GB/month

0.022 GB/month

0.021 GB/month

Future Challenges and Problems

- Creating buckets for the data provided
- Creating permissions for buckets based on user interface requirements
- Choosing security for the provided data
- Deciding between lower cost or readily available data

Deliverables

- Evaluation of storage systems
  - narrowed options to final three
  - cost comparison to meet budget requirements

Concluding Thoughts