Decision Analysis Report - Cloud Hosting

Project Name: Tresearch
Application Type: Web Application

Trial By Fire
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Purpose

The following is the Decision Analysis and Resolution to analyze which technologies would be the most applicable towards the development of the product. We are making consideration on which cloud platform to use to host our web application. The purpose of using a cloud platform as a host saves us the work and money of having to set up a server that we have to maintain. Additionally, the cloud provides infrastructure for deploying our application, IP assignment, domain names, security, and load balancing traffic coming in and out of our application.

Technologies

- Microsoft Azure
  - Cloud computing service operated by Microsoft for application management via Microsoft-managed data centers
- Amazon AWS
  - Subsidiary of Amazon providing on-demand cloud computing platforms and APIs to individuals, companies, and governments, on a metered pay-as-you-go basis.
- Google Cloud Platform
  - Suite of cloud computing services that runs on the same infrastructure that Google uses internally for its end-user products, such as Google Search, Gmail, Google Drive, and YouTube

Preface

In this DAR we will compare Microsoft Azure, Amazon AWS, and Google Cloud's platform to find out which platform best suits our needs in terms of free usage. As college students, we are looking for the most economical choice to host our application, and whichever platform provides the most bang for our buck (free credits) will be prioritized. We will be primarily focusing on virtual machine capabilities such as processing power and memory (CPU and RAM respectively), as well as web server compatibility, domain name assignment, ip assignment, and network security metrics.

Metrics

- <u>Virtual Machine</u> **(1)**
    - The VM instance that the cloud provides on which we will be deploying and hosting our application.
- <u>Processing Power (CPU)</u> **(0.9)**
    - The processing power(CPU) of VM instances in gigahertz.
- <u>Memory (RAM)</u> **(0.8)**
    - The memory(RAM) size of chosen VM
- <u>Network Security</u> **(0.7)**
    - The types of network security that the clouds provide, in terms of firewalls and DDoS protection
- <u>Web Server Compatibility</u> **(0.6)**
    - Which supported softwares is supported by the cloud provider, to perform more in line with our tech stack.
- <u>IP Address Assignment</u> **(0.5)**
    - The method in how our IP address(s) is assigned to us by the provider
- <u>Domain Name Assignment</u> **(0.3)**
    - The method and cost of how each cloud provider assigns us our domain name

DAR

Recommendation

	Microsoft Azure	Amazon AWS	Google Cloud Platform
Virtual Machine **(1)**	Azure Virtual Machine B1S: •750 hours free per month(Can create multiple instances ex. 5 instances with 150 hours) **(0.7)**	Amazon AWS EC2 t2.Micro Instances: •750 hours free per month **(0.7)**	GCP Compute Engine 1 e2-micro VM • 28 free hours of F-instances(Front end instances, automatic scaling) per day • 9 free hours of B-instances(Back end instances, manual and basic scaling) per day 840 hours of F-instance + 270 hours of B-instance **(0.9)**
Processing Power(CPU) **(0.9)**	• 1 vCPU (Intel® Haswell **2.4 GHz** E5-2673 v3) **(0.7)**	•**3.3 GHz** Intel Scalable Processor **(0.8)**	•Intel Xeon Scalable Processor (Skylake) 1st Generation **Base: 2.0 GHz All core turbo: 2.7 GHz Single core max turbo frequency: 3.5** **(0.9)**
Memory **(0.8)**	• 1GiB Ram **(0.9)**	• 1GiB Ram **(0.9)**	•1 GiB Ram **(0.9)**
Network Security **(0.7)**	**Free**: •Layer-4 security NSG - https://docs.microsoft.com/en-us/azure/virtual-network/network-security-groups-overview **(0.8)**	**Free:** •Security Groups - https://docs.aws.amazon.com/vpc/latest/userguide/VPC_SecurityGroups.html **(0.7)**	**Free:** •VPC(Virtual Private Cloud) Firewall Rules - https://cloud.google.com/vpc/docs/firewalls **(0.5)**
Web Server Compatibility **(0.6)**	**Supported:** •.NET •Active Directory •Microsoft SQL Server 2019 •Microsoft Windows Server 2003 and later are supported for deployment **(0.9)**	**Supported:** •**.NET** •**Active Directory** •**Microsoft SQL Server 2019** •**Microsoft Windows Server (2003 R2, 2008, 2008 R2, 2012 and 2012 R2, 2016 and 2019)** **(.9)**	**Supported:** •**(Bring Your Own License, includes cost of the license with the cost of the instance)** - Microsoft Windows Server (2003, 2003 R2, 2008 R1, 2008 R2, 2012, 2012 R2, 2016, 2019) **(0.2)**

IP Assignment (.5)	**Free:** Each cloud service gets a free public VIP (virtual ip). Dynamic addresses are assigned after public IP is associated to Azure resource and started for the first time. **Paid:** All instance level public IP addresses (ILPIP) and **additional VIPs** charged at $0.004/hour **(0.8)**	**Free:** Public IP assigned to instance is dynamic IPv4 IP address. Instance retains its private IPv4 address and any IPv6 addresses when stopped and started. The public IPv4 address is released and a new one is assigned when the instance is started. **Paid:** Not using a reserved Elastic IP will cost $0.005/hr. Also will be charged if remapping EIP more than 100 times a month. **(0.6)**	**Free:** No charge for static or ephemeral in-use internal IP address until used number of hours equal to total number of hours in current month. **Paid:** Static and ephemeral external IP is charged at $0.004/hour when in use, and $0.010 when assigned/reserved but not in use. **(0.4)**
Domain Assignment (.3)	Provided, (choose anything that is available) followed by .azurewebsites.net **(0.9)**	Amazon Route 53 - Need to pay for each domain name (0.50 a month) **(0.5)**	Google Domains - Need to pay for domain name, different price depending on domain name ending (.org, .academy, .com, etc.) **(0.4)**
Total:	**3.87**	**3.62**	**3.22**

Based on the total scores from the DAR, we see that Microsoft Azure comes out on top. While GCP was ranked first out of our highly valued metrics of virtual machine hours, processing power, and memory, its biggest downfall was the *bring your own license* metric for web server capability. The license for a web server can be very costly, so we gave it a relatively high metric score. We also had some equal values, specifically the virtual machine hours between Azure and AWS, as well as the memory size for all three platforms. Onto the less valued features, domain is provided, and we prioritize IP assignment and network security, since those can be quite costly features of a cloud service. AWS comes in at a close second, but their restrictions on the paid model are a bit more costly, and their security groups are not as robust as Azures'. GCP comes in last due to the fact that you have to pay for almost every service, and that they don't have security groups, but just firewall rules instead. With this DAR, we see that Microsoft Azure Cloud comes most aligned with our business goals.