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Proposal for the utilization of Microsoft Azure as the cloud platform of choice for Redback Operations

Cyber Security / All Projects

Redback Operations

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1.0	Joel Daniel		6 th Dec 2023	Initial Proposal
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1 Purpose and Scope of the Proposal

The purpose of this proposal is to recommend the company to convert their choice of cloud operations and platform from Google Cloud to Microsoft Azure. The proposal will cover only Azure and Google Cloud and not consider any other cloud platforms.

2 What is Microsoft Azure?

Microsoft Azure is a cloud services platform provided by Microsoft, which allows organizations to utilize services in the cloud to carry out a variety of organizational activities from custom activities such as specific machines for software development and research to even leveraging identity and access management services for carrying out active directory operations, whether it be fully in the cloud or hybrid or even through private on-site options.

3 What is Google Cloud?

Google Cloud is a cloud service platform provided by Google, which operates on providing customer friendly prices while also giving a plethora of services from compute capabilities to administrative and security capabilities.

4 Azure Virtual Machines vs Google Compute Instances

Both Azure and Google sport a large variety of predefined VMs for many operating systems, with their offerings categorized based on performance, machine specs and usage purpose, with billings being done on a pay-as-you-go basis. However Google Cloud does provide custom virtual machines (hardware specifics) to cater for extremely specific scenarios while maintaining very little pricing changes in comparison to Azure which lacks the flexibility (<https://cloud.google.com/compute/docs/instances/creating-instance-with-custom-machine-type>).

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5 Azure Cloud Regional Areas vs Google Cloud Zonal Areas

Azure and Google Cloud each sport various datacenters across the globe, with atleast one datacenter in New South Wales and Victoria. These allow for creating geographic zones, which ensure that the instances created are in the closest physical location hosting the cloud capabilities in order to ensure low latency and little to no delays for the customer.

- *Backups of the instances may be spread across globally based on Azure and Google Cloud backup policies or stored completely in a different region.*
- *Offerings of available resources on the cloud will vary from region to region.*

5.1. Azure Cloud Geographies

<https://azure.microsoft.com/en-gb/explore/global-infrastructure/geographies/#geographies>

[←](#)
[→](#)
[↺](#)
[🏠](#)

<https://azure.microsoft.com/en-gb/explore/global-infrastructure/geographies/#geographies>

Select a geography

Australia

☒ Show nearby geographies

Asia Pacific

Australia

China

India

Indonesia

Japan

Korea

Malaysia

New Zealand

Saudi Arabia

Taiwan

Regions	Australia Central	Australia East	Australia Southeast
	Start for free >	Start for free >	Start for free >
LOCATION	Canberra	New South Wales	Victoria
YEAR OPENED	2018	2014	2014
AVAILABILITY ZONES PRESENCE	Nearest region with zones available: Australia East	Available with 3 zones	Nearest region with zones available: Australia East
Compliance	Azure compliance offerings	Azure compliance offerings	Azure compliance offerings
DATA RESIDENCY	Stored at rest in Australia Learn more	Stored at rest in Australia Learn more	Stored at rest in Australia Learn more
DISASTER RECOVERY	Cross-region options: Azure Site Recovery	Cross-region options: Azure Site Recovery	Cross-region options: Azure Site Recovery

Figure 1: Australia Datacenter Locations for Microsoft Azure

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5.2. Google Cloud Locations

<https://cloud.google.com/about/locations#asia-pacific>

The screenshot shows the Google Cloud website with a table of product availability across four regions: Osaka (asia-northeast2), Sydney (australia-southeast1), Melbourne (australia-southeast2), and Seoul (asia-northeast3). The products listed are Compute Engine, App Engine, Google Kubernetes Engine, Cloud Functions, and Cloud Run. Availability is indicated by green dots.

Products	Osaka (asia-northeast2)	Sydney (australia-southeast1)	Melbourne (australia-southeast2)	Seoul (asia-northeast3)
COMPUTE				
Compute Engine ⁵	●	●	●	●
App Engine	●	●	●	●
Google Kubernetes Engine ⁵	●	●	●	●
Cloud Functions ³	●	●	●	●
Cloud Run	●	●	●	●

Figure 2: Australia Datacenter Locations for Google Cloud

Comparing Australian regions alongside regional offerings, the Sydney regions for both platforms offer the largest catalogue of products. Melbourne will be the recommended region as its offerings contain all the products required for Redback Operations.

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6 Pricing of Azure and Google Cloud

6.1. Pay-As-You-Go (PAYG)

Google Cloud was comparatively cheaper than Azure on almost all instance types. Azure generally offers a flat rate for PAYG billing, but Google Cloud utilizes a discount scaling method that increases the discount after a certain rate of usage, making Google Cloud an economical option for general purposes.

Instance Type	Azure VM	Azure Price (per hour)	Compute Engine	Google Price (per hour)
General Purpose	B4MS	\$0.166	n1-standard-4	\$0.150
Compute Optimized	F4	\$0.199	c2-standard-4	\$0.167
Memory Optimized	E4 v3	\$0.252	n1-highmem-4	\$0.166
GPU	NC6	\$0.9	NVIDIA® Tesla® T4	\$1.40

Figure 3: Azure vs Google Cloud Pay-As-You-Go Pricing

6.2. Reserved Instances/Committed Use

Both platforms also offer alternatives called 'Reserved Instances' and 'Committed Use' by Azure and Google Cloud respectively. For long term or dedicated cloud usage, these alternatives are far cheaper since a fixed resource is set (regardless of how much of the resource is used, while allowing for consumption beyond the fixed resource), further ensuring that scaling lag or minute slowdowns/delays are not experienced. In these alternatives, Azure was cheaper across all instance types against Google Cloud.

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Instance Type	Azure VM	Azure Price (per hour)	Compute Engine	Google Price (per hour)
General Purpose	B4MS	\$0.0974	n1-standard-4	\$0.1280
Compute Optimized	F4	\$0.1248	c2-standard-4	\$0.1407
Memory Optimized	E4 v3	\$0.1564	n1-highmem-4	\$0.1594
GPU	NC6	\$0.5733	NVIDIA® Tesla® T4	\$0.88

Figure 4: Azure Reserved Instances vs Google Cloud Committed Use Pricing

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7 Recommendation

As seen in Trimester 3 2023, access for Google Cloud was vital for several projects, especially ones relying on data analytics and big data. While the projects were able to temporarily pivot and carry out their activities on local machines, the lack of Google Cloud access prevented projects from continuing (and possibly completing) activities planned in T2 2023. Deakin's IT infrastructure together with identity management allowing for ease of access to Azure will make it easier for the company leadership responsible for access to grant it per project (via resource groups) to students.

7.1. Pros

- Students can simply sign in to Azure using their Deakin IDs in comparison to Google Cloud which requires students to create a google cloud (using the Deakin ID).
- Company board can own a tenant and split members into their relevant project user groups (assigned membership), which can then be assigned their very own resource groups to control resource creation and billing at a granular level.
 - *Since Deakin already owns the Deakin University tenant, it can be requested to create a specified group (or a separate tenant for Redback Operations if feasible) for the company with the company board having user administrator/group administrator permissions.*
- Created resources (including instances with inbuilt software for projects) can be saved as templates for later use over trimesters.

7.2. Cons

- Due to the nature of the trimester activities and the companies, the Pay-As-You-Go model will have to be implemented over the Reserved Instances, in which Azure costs slightly more than Google Cloud (taking standard compute instances).

7.3. Rough Estimate of cost company will use

- Assuming five instances (one per current project) with 100GB of persistent disk storage, we get an approximate cost of 1150 AUD per month on Google Cloud.

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Estimate		AUD	1,149.86 / mo	
Compute Engine				
5 x Gen Purpose				
Region: Melbourne				
3,650 total hours per month				
Provisioning model: Regular				
Instance type: e2-standard-4		AUD 1,047.95		
Operating System / Software: Free				
Estimated Component Cost: AUD 1,047.95 per 1 month				
Persistent Disk (Accompanying)				
5 x boot disk				
Product accompanying: Compute Engine				
Zonal balanced PD: 100 GiB		AUD 20.38		
AUD 101.91				
Total Estimated Cost: AUD 1,149.86 per 1 month				

Figure 5: Pricing Calculation for Google Cloud

- Assuming the same with Azure (alongside a 1-year discount plan of 20%), we get an approximate cost of 1204 AUD per month.

Azure Contact Sales Free account

Virtual Machines 5 D4a v4 (4 vCPUs, 16 GB RAM) (1 year savings plan... Upfront: \$0.00 Monthly: \$1,203.93

Virtual Machines

Get \$200 credit plus free monthly amounts of popular services for 12 months—including Virtual Machines. [See free amounts](#)

Region: Australia Southeast Operating system: Linux Type: Ubuntu Tier: Standard

Category: General purpose Instance Series: All INSTANCE: [\(Need help finding the right VM?\)](#) D4a v4: 4 vCPUs, 16 GB RAM, 100 GB Temporary storage, \$0.303/hour

5 Virtual machines

Figure 6: Pricing Calculation for Microsoft Azure

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Despite the slight cost increase Azure will have over Google Cloud, the increase justifies the various efficiencies and ease of use the company will get from quick sign ins to access provisioning and resource control, which would make Azure a far more viable option than Google Cloud.

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