Azure Container Orchestration

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Introduction

Cloud providers are increasing their serverless offerings surrounding container orchestration, all aimed at focusing on accelerating the development of applications and shifting focus away from infrastructure management and complexities.
These CaaS offerings are still relatively new to the market, Azure Container Apps was only released in May 2022 and Google Cloud Run in Nov 2019.
This research project aims to give developers or software architects the necessary information to be able to make informed decisions in choosing which of the Azure container management offerings, ACA or AKS, is most suitable for a particular application and how much complexity has actually been taken away. Additionally it aims to assist in determining what types of resources would be required in a team and the level of upskilling that may be required within an existing team.

Research Questions

1. Does the introduction of additional abstraction have an impact when compared to running AKS in terms of performance ?
2. Does the additional abstraction provided by the CaaS solution, Azure Container Apps, result in a measurable reduction in complexity from the developer perspective ?

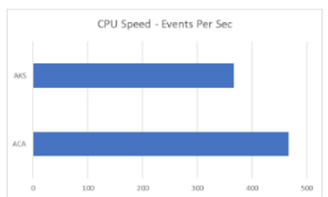
Infrastructure Specification

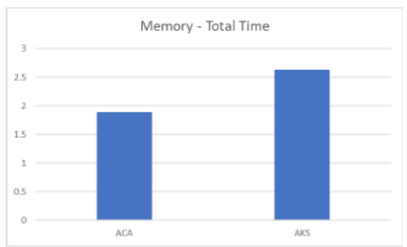
Orch. Tool	**Instance**	**CPU**	***Memory***
ACA	N/A	1	2GB
AKS	D2Ids v5	1	2GB

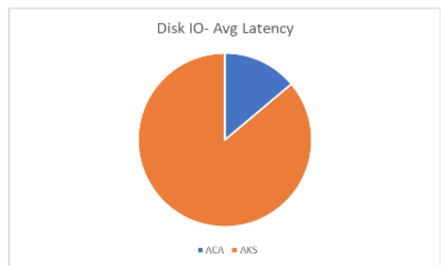
Workload Definition & Results

1. Infrastructure Performance Evaluation:

Utilize performance testing tool sysbench to ascertain variances in performance of the underlying infrastructure.**Findings:** Results were better overall on the azure container app infrastructure across each of the areas tested CPU, Memory and Disk IO

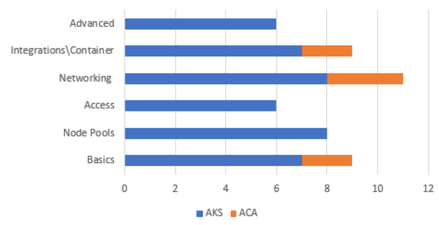






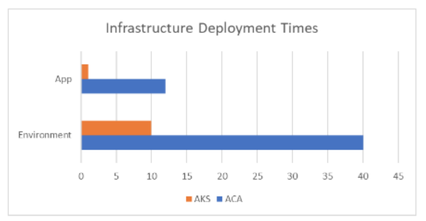
2. Ease of configuration:

Capture the perceived level of difficulty configuring the service. Taking into account the volume of options presented to the user. One of the key areas examined was the ease of scaling configuration, JMeter was utilised to send load and trigger scaling up and down of nodes. **Findings:** The learning curve is significantly reduced and ACA allows a much easier entry point to utilizing container solutions for an organization.



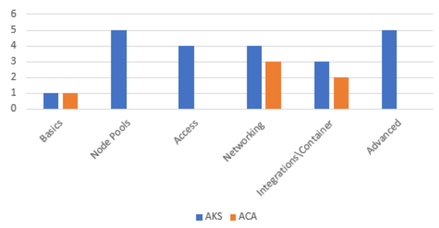
3. Deployment time:

Capture the amount of time taken to deploy the ACA and AKS Environments and applications following configuration.**Findings:** Considerable time was recorded for deployment of the Azure container Environment, which is a secure boundary around groups of container apps that share the same virtual network and logs, taking approx 40 minutes for deployment of the resource.



4. Upskill time required:

Record the amount of time spent upskilling in order to have sufficient knowledge to carry out the deployment of the service and record this against the experience level of the person carrying out the deployment.**Findings:** A knowledge of containers and container registries was sufficient to complete deployment of the application within an azure container app environment.



5. Configuration Limitations:

Determine what are the use cases where a particular offering will not meet the requirements and force the user to use a service that allows more in detail configuration. **Findings:** ACA Limitations that would render the service unsuitable are container support, limited network configuration, scale triggers. operating system and the inability to run privileged containers.

Conclusions and Future Work

Based on the researchers experience the learning curve is significantly reduced by using Azure Container Apps over Azure Kubernetes Service. This finding was based on a scoring system that was used across a range of areas to compare the differences in complexity across both services.
Utilizing benchmarking tool sysbench findings showed results were better overall on the ACA infrastructure across each of the areas tested via sysbench tool testing on CPU, Memory and Disk IO, leaving scope for future research into why this was the case.

QR Code for Recording