PETRA MIGRATION PROPOSAL

FishTank ltd - Case Study part 2
DE-2401-A

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Executive Summary

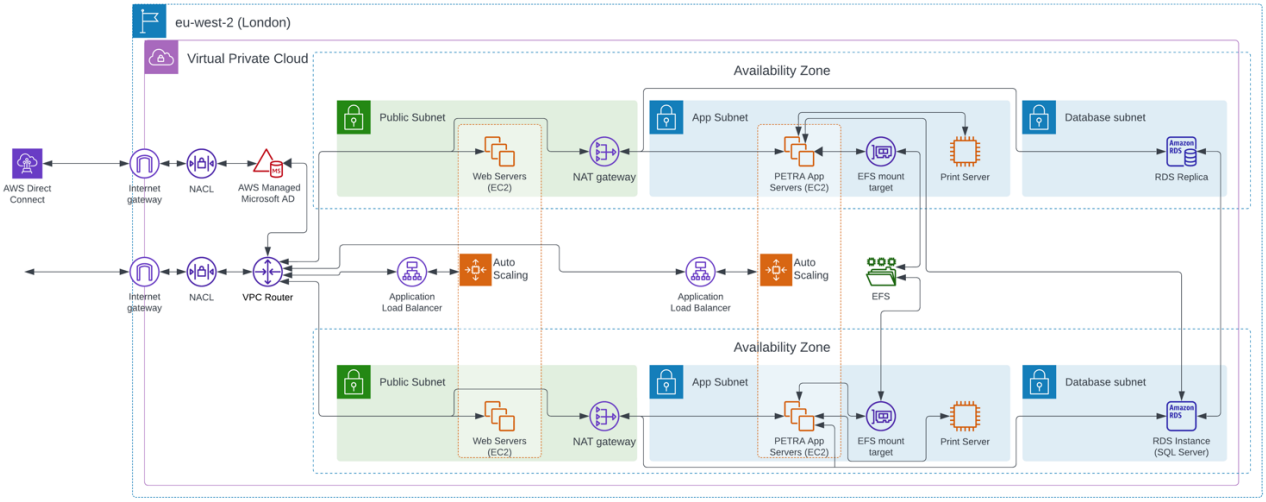
This document illustrates a full-scale vision for FishTank Ltd's cloud presence, with a visual diagram found in Appendix A. A fine-grained view of the recommended hardware is supplied, featuring the T2 family of chips for EC2 instances and a db.m5.2xlarge for databases. Furthermore, a tentative structure of the cloud security is outlined, showing recommendations for network filtering rules and possibly unconsidered aspects of the network. A full pricing of this migration is supplied, totalling approximately £107,674.92 for the migration month, then £26,963.66 monthly afterwards with dedicated support, and finally £10,463.66 monthly without dedicated support. Lastly, several possible improvements to the infrastructure post-migration are provided.

Introduction

FishTank Ltd (referred to as FishTank throughout the rest of this case study) is a business seeking to migrate their flagship CRM, PETRA to the cloud, namely AWS. This case study will explore a high-level overview of this migration, taking into account the potential structure of a cloud solution, hardware, migration strategy, network security, and pricing of the operation. Furthermore, some considerations will be presented for future use to improve the cost effectiveness and efficiency of FishTank's upcoming cloud service.

Overview

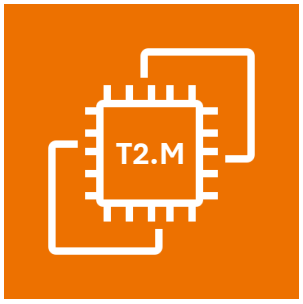
To migrate PETRA entirely to AWS, the following cloud structure has been produced (see Appendix A for a larger copy of the diagram).



This structure relies primarily on compute services to replace FishTank's server operations, some of these services are auto scaled to improve efficiency and cost. As well as that, RDS is used to host the Microsoft SQL Server instances. Finally, the whole structure is designed to be secure, providing a strong separation of concerns between its subnets, separate access points for admins and users, and traffic filtering through the two Network ACL's. It is essential that PETRA is run using Microsoft software due to its structure and underlying codebase, as such this structure will also ensure every aspect including FishTank's Active Directory stay intact in the cloud.

Hardware

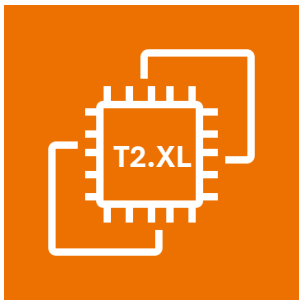
A breakdown of the recommended specifications (based on FishTank's existing infrastructure) for each relevant service can be seen below:



Web Servers

EC2 t2.medium
3.3 GHz Intel Xeon Scalable processor
vCPUs: Up to 2
Memory: 4GB
OS: Microsoft Windows Server 2022 Base

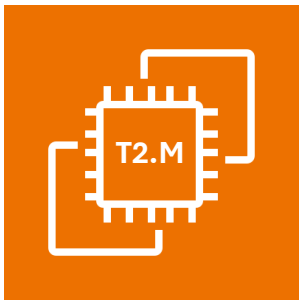
A well-balanced instance that closely mirrors the specs of FishTank's current web servers with many options above it for upgrades down the line.



PETRA App Servers

EC2 t2.xlarge
3.0 GHz Intel Scalable Processor
vCPUs: Up to 4
Memory: 16GB
OS: Microsoft Windows Server 2022 Base

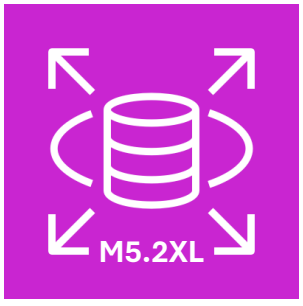
A powerful instance that can handle more resource intensive tasks, 4 cores allow it to manage more computationally heavy workloads, similar to the specifications of the current PETRA App Servers.



Print Servers

EC2 t2.medium
3.3 GHz Intel Xeon Scalable processor
vCPUs: Up to 2
Memory: 4GB
OS: Microsoft Windows Server 2022 Base

A well-balanced instance that closely mirrors the specs of FishTank's current print servers with many options above it for upgrades down the line.



Databases

RDS db.m5.2xlarge
2.5 GHz Intel Xeon Platinum Processor
vCPUs: 8
Memory: 32GB
Engine: Microsoft SQL Server

A processor with sizeable memory and a capable number of cores, can handle high throughput transactions and move quickly through multiple workloads, comparable to the current databases with room for upgrade.

Migration

It is recommended that FishTank uses Amazon Database Migration Service for a homogenous database migration. Depending on the size of FishTank's databases this could take a few days to several weeks. Whilst data is being migrated, it is recommended that FishTank begins replicating its server software on the relevant compute instances, this would be best done by creating AMI's for each server. As well as creating the compute instances, the NACLs, security groups, active directory, NAT gateways and routing should be configured. Once the migration is complete and all services have been tested, FishTank is free to make the live switch to cloud and discontinue their legacy infrastructure.

Security Groups and NACLs

A cursory example of how network security should be configured can be seen below, note that rules may need to change to accommodate changes FishTank's needs. (This has been created considering FishTank's current firewall rules)

User NACL (public use)

Port	Source	Destination	Comment
HTTPS (443 & 8443)	Web server	Internet	Necessary to visit the website through HTTPS
9000	Web server/Internet	App server	App server communicates over port 9000

Admin NACL (Active Directory)

Port	Source	Destination	Comment
All	All services	Active Directory	All servers need access to the company's Active Directory server on all ports.
3389	All services	Internet	Remote desktop protocol for applicable services

Web Server SG

Port	Source	Destination	Comment
HTTPS (443 & 8443)	Internet		Necessary to visit the website through HTTPS
9000		App server	App server communicates over port 9000

App Server SG

Port	Source	Destination	Comment
9000	Internet & Web Server		App server communicates over port 9000
Unknown		Print Server	Appropriate ports must be enabled for communication with the print server
1433		Database	Microsoft SQL server runs on port 1433 (unless otherwise configured)

Print Server SG

Port	Source	Destination	Comment
Unknown	App server		Appropriate ports must be enabled for communication with the print server

RDS SG

Port	Source	Destination	Comment
1433	App Server		Microsoft SQL server runs on port 1433 (unless otherwise configured)

Pricing

A price guide for the migration and further maintenance of the cloud infrastructure can be seen below (some figures are estimated based on reported use and company size and may be smaller or larger depending on a range of factors, these calculations serve as a rough estimate).

Migration Month

Service (Monthly)	Cost (GBP)	Running Total
AWS + database migration*	~ £10,874.92	£0
Cloud Consultant (22 working days)	£44,000	£10,874.92
Solution Architect (22 working days)	£22,000	£54,874.92
Server Migration Engineer (22 working days)	£14,300	£76,874.92
Database Migration Engineer (22 working days)	£16,500	£91,174.92
TOTAL		**£107,674.92**

Continued Maintenance (with dedicated support)

Service (Monthly)	Cost (GBP)	Running Total
AWS*	~ £10,463.66	£0
Third line Cloud support (22 working days)	£7,700	£10,463.66
Business Analyst (22 working days)	£8,800	£18,163.66
TOTAL		**£26,963.66**

Continued Maintenance

Service (Monthly)	Cost (GBP)	Running Total
AWS*	~ £10,463.66	£0
TOTAL		**£10,463.66**

*Both pricing reports for migration month and continued use of AWS have been attached with the email submission of this document

Recommendations

FishTank could improve the costs and efficiency of their proposed cloud network by considering a few potential improvements. Firstly, depending on how PETRA is used, it could be beneficial to add a caching layer to the database services, this will improve the speed of the application, FishTank could consider using a service such as AWS ElastiCache to achieve this. Another method of lowering costs would be to migrate PETRA away from Windows architecture and port it to Linux, this is a large task, however, AWS prices EC2 Linux instances significantly under identical Windows instances, this could reduce costs massively in the long term. FishTank could also consider using services such as spot pricing or reserved instances to get discounts on their compute instances/ Finally, where possible, FishTank could consider migrating some of their applicable app server responsibilities to AWS Lambda, which uses a much more cost-efficient usage-based pricing model and would also alleviate stress from the app server.

Conclusion

This case study illustrates the realities of FishTank's move to cloud and the continued support of it. Whilst costs have been projected, FishTank should consider looking into continued R&D in the space, starting by considering the recommendations we have supplied, by doing this FishTank will ensure their cloud infrastructure stays healthy and improves its cost efficiency and performance over time.

Appendix

Appendix A – AWS Structure Diagram