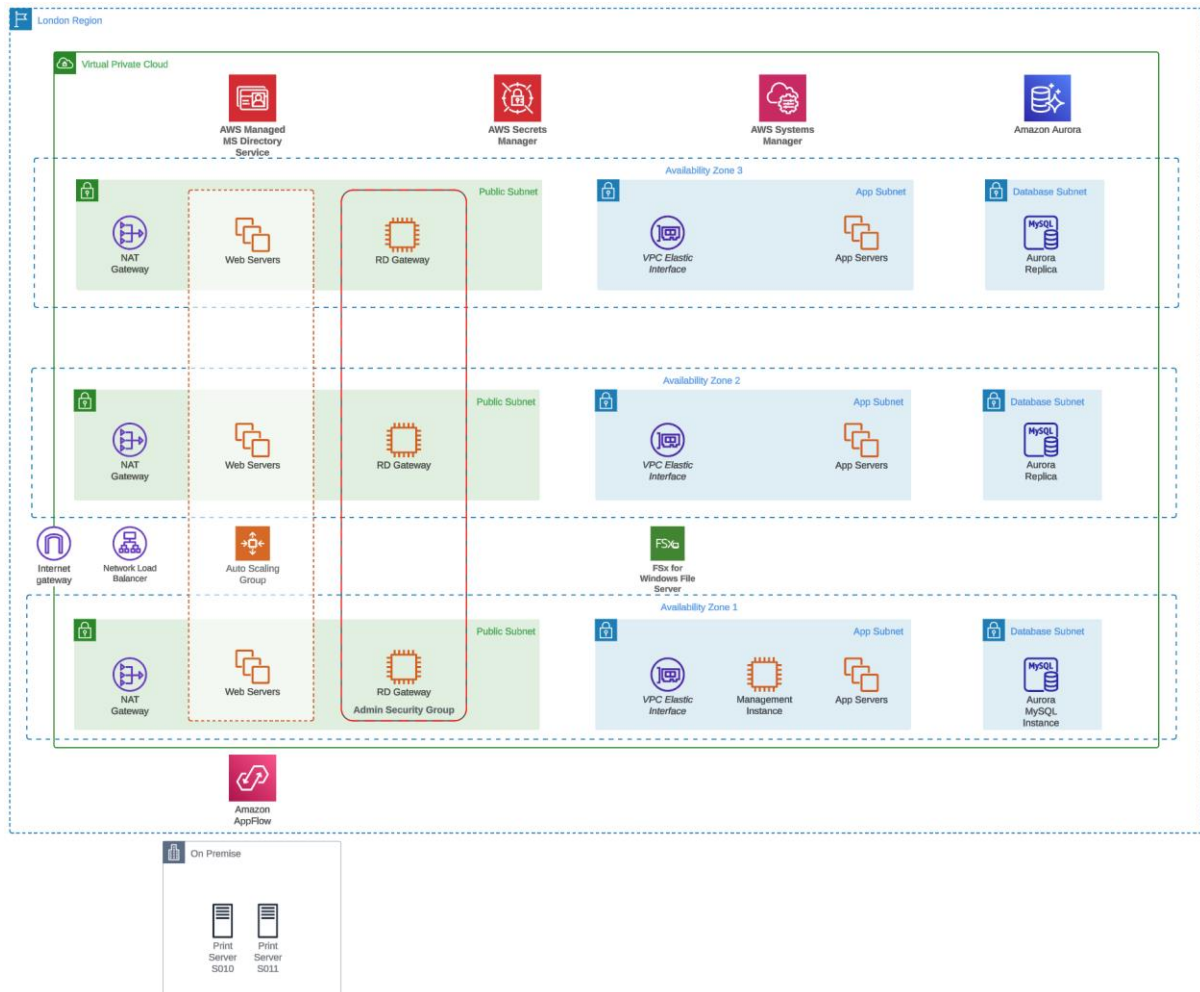# Fishtank RFP – PETRA Migration

Proposed Architecture

Migration Process

Preparation

We have been notified of the following dependencies:

- Dependency: DNS - Solution: As part of the setup of the VPC, DNS is also set up – therefore this should not be an issue
- Dependency: Active Directory – Solution: We recommend utilising the AWS Directory Service, which lets you run Microsoft Active Directory as a managed service. By default, each AWS Managed Microsoft AD has a minimum of two domain controllers, each deployed in a separate Availability Zone (AZ) for resiliency and fault tolerance. All domain controllers are exclusively yours with nothing shared with any other AWS customer. AWS provides operational management to monitor, update, backup, and recover domain controller instances. You administer users, groups, computer and group policies using standard Active Directory tools from a Windows computer joined to the AWS Managed Microsoft AD domain.
- Firewall Dependencies:

Port	Source	Destination	Comment	Solution
HTTPS	WebServers	Internet	Webservers use HTTPS to the internet	The internet gateway and NAT Gateway will be a priority to set up, to allow for an internet connection
9000	WebServers	AppServers	PETRAweb talks to PETRAapp over port 9000	Once subnets and instances are set up, an elastic network interface will be set up to allow for communication between the servers
Unknown	AppServers	Database		We recommend utilising the Amazon Aurora Service, as it will manage the connections for the user and therefore the onus for port usage is not placed on the user
3389	WebServers	Internet	RDP port, for admin use	A Remote Desktop Interface will be set up in each of the public subnets we intend to launch which will allow for interactions with the required instances. AWS Secrets Manager will also be set up to ensure the security of these Admin roles in conjunction with AWS IAM (Identity Access Management) service
3389	AppServers	Internet	RDP port, for admin use	
3389	Database	Internet	RDP port, for admin use	
All	All servers	Active Directory	All servers need access to the companies AD server on all ports	The AWS Managed MS Directory Service will be a priority for migration, this should also address the issue with the legacy

Strategy- Replatforming

For this application we recommend a "Replatform" migration approach for this application, as AWS offers MySQL and Windows compatible services. This will significantly reduce the complexity of the migration and reduce the time to deployment. Further optimizations where the PETRA app requires refactoring can occur in the future, and after migration these optimizations will be easier to assess and implement.

NOTE: We recommend retaining the printer servers on premise and utilising the Amazon Appflow service, which will allow you to issue workflows to the servers from your VPC, ensuring a smooth integration

Step 1 – Set up VPC Infrastructure
1. Create a VPC
2. Set up a public subnet to host your web servers, and the appropriate security group that allows for HTTPS traffic
3. Set up a private subnet to host your app servers
4. Set up a separate private subnet to host your Aurora databases

5. Create a public security group
6. Create publicly accessible EC2 instance with appropriate IAM roles and key pair
7. Create NAT gateway
8. Create Route table for the private subnet
9. Create a private security group for the app subnet and another security group for the database subnet
10. Launch the private EC2 instances for the app server
11. Launch the AWS Managed MS Directory Service
12. Set up Route 53 Resolver
13. Launch the aurora service
14. Launch the Amazon FSx for Windows File Server

Step 2 – Development/Testing

Before Migrating your production environment to the cloud, it would be appropriate to undergo some Testing to ensure connections are in place and the VPC was set up correctly, once verification of connections and services has been complete – we can proceed with the migration of the production environments

Step 3 – Migration of Existing Architecture

This will be a homogenous database migration therefore no schema conversion is necessary, and the databases can be migrated using the native tools. Amazon provides an AWS Database Migration Service which can facilitate this migration with ease.

Step 4 - Refine/Optimize

Once migration is complete, utilize AWS' various tools for optimizing your cloud set up, the AWS Cost Optimizer is a tool which will generate recommendations based on your usage over time, allowing you to further improve performance and reduce the costs of your cloud deployments.

Pricing

Cloud Costs

Service/Resource	Monthly Cost (USD)
Business Support Plan	601.75
Amazon Aurora MySQL - Compatible	510.53
AWS Directory Service	93.36
AWS Secrets Manager	1.20
AWS Systems Manager	51.16
Amazon FSx for Windows File Server	366.92
Amazon Virtual Private Cloud (VPC)[3]	3,653.22
Amazon EC2 – App Servers	772.20
Amazon EC2 – Web Servers	471.61
Amazon Elastic IP	20.60
Amazon AppFlow	72.71
AWS Application Migration Service	0.00
Total Cloud Monthly Cost [1,2]	**6,619.26**

[1] For further cost breakdown please navigate to
https://calculator.aws/#/estimate?id=7ccb4f6efad109ab7049bdb2b80a287896e40fd1

[2] This quoted price could decrease significantly; we have overestimated the initial resources your enterprise would require ensuring no service loss. The CPU usage will be monitored over time and AWS Cost Optimizer will provide recommendations on how to further reduce your cloud spend.

[3] The VPC will only need to be built once and will serve any future migrations – therefore future migrations will be significantly cheaper as the VPC is already set up.

[4] This pricing method has utilised a "Reserved Instance" model which saves up to 72% in costs, this requires a 1-year commitment. One strategy we would recommend is that you could use the on-demand instance model for a much shorter period, which will allow diagnostic data to be acquired through AWS monitoring – this could result in a more cost-efficient solution, rather than overpaying for a year. This would mean the first month is significantly more expensive but result in overall net reduction in cost for the year.

Human Resource Costs

Role	Daily Rate ($)	# of resources recommended	Number of days required	Total Cost ($)
Business Analyst	508.89	1	7	3562.23
Cloud Consultant	2544.45	1	7	17811.15
Solution Architect	1272.22	1		8905.54
Server Migration Engineer	826.95	1	30	24808.50
Database Migration Engineer	954.17	1	30	28625.10
First/Second line Cloud Support	318.06	1	90 days	28625.40
Total Cost				112337.90

Final Cost for the Year

$112337.90 + ($6,619.26 x 12) = $191769.00*

*Please note that the final total could vary, once data gathering can begin upon a successful migration – as the resources will be optimized for lower spending/higher performance.