**Digital Futures Data Engineering Academy: Case Study Part 2**

**Proposal for Migrating PETRA to AWS Cloud for FishTank Ltd**

**Prepared by Huma Nazneen**

**Date: 01/02/2024**

Table of Contents

[**1** Introduction 3](#_Toc157705512)

[**2** Migration Process 3](#_Toc157705513)

[**2.1** Existing Infrastructure on premise 3](#_Toc157705514)

[**2.2** Cloud Infrastructure 3](#_Toc157705515)

[**2.3** Migration steps 4](#_Toc157705516)

[**3** Pricing 5](#_Toc157705517)

[**4** Conclusion 6](#_Toc157705518)

# Introduction

In response to FishTank Ltd's strategic decision to migrate their pivotal application, PETRA, to Amazon Web Services (AWS), this document presents a thorough plan encircling a detailed migration process, schematic diagram, pricing breakdown, and network design. PETRA, a highly tailored Customer Relationship Manager (CRM) application built on the Microsoft Dynamics CRM platform, plays a critical role in supporting over 5,000 users across the UK. The migration of PETRA to AWS represents a transformative step for FishTank Ltd, leveraging cloud infrastructure to enhance scalability, performance, and security. Our proposal aims to provide a complete understanding of the migration journey, ensuring a seamless transition while maximizing the benefits of AWS's robust ecosystem.

# Migration Process

The initiation of the application migration involves a comprehensive evaluation of the PETRA infrastructure and its dependencies to gain a complete understanding of requirements and limitations.

## Existing Infrastructure on premise

Figure 1 represent the existing infrastructure of the PETRA application which consists of three-layer application comprising Web, Application, and Database layers. Currently running on Microsoft Windows Server 2008 and Microsoft SQL Server 2012 , the application's dependencies include DNS and Active Directory.

A diagram of a computer server

Description automatically generated

Figure 1: On-Premises Data Centre Architecture

## Cloud Infrastructure

The proposed server migration sequence, illustrated in Figure 2, has been determined by considering the interdependencies among the servers. This sequential approach is designed to facilitate a gradual migration process, minimizing potential disruptions, and allowing for thorough testing at each stage. To get PETRA ready for the move to Amazon Web Services (AWS), we'll start by making a space for it in AWS. This involves creating new accounts and setting up important things like Virtual Private Cloud (VPC), Subnets, and Security Groups to keep everything secure. Then, we'll make room for PETRA by setting up virtual servers called EC2 instances based on the PETRA asset list. And to handle the migration of PETRA's database, we'll use Amazon RDS, a service that makes managing databases easier. This step ensures a smooth transition of PETRA to AWS, making it all work seamlessly in the new cloud environment.

A screenshot of a computer

Description automatically generated

Figure 2: Proposed Architecture on AWS

## Migration steps

The migration process involves the following steps in a sequential manner:

1. Setting up AWS Account: Creation of a root user and IAM user with associated roles and policies.

2. Creating AWS Active Directory: Utilizing AWS Directory Service to establish Active Directory in the AWS environment.

3. Replicating Network Infrastructure: Leveraging AWS Managed Firewall and Amazon VPC to mirror on-premises network setup. Includes the creation of internet gateways, NACL, NAT gateway, and three subnets for Web-server layer, application layer, and Database layer.

4. Auto-Scaling Group for Servers: Creation of auto-scaling groups for both web servers and application servers.

5. Load Balancer Setup: Establishing load balancers for both the network layer and application layer.

6. Elastic Block Service Setup: Configuring Elastic Block Service for storage and linking it to the auto-scaling group of application servers.

7. Deploying AWS RDS: Setting up AWS RDS for SQL Server along with its read replica in different availability zones.

8. Amazon WorkDocs Subnet: Creating a subnet for Amazon WorkDocs to support on-premises printer server functionality.

9. EC2 Instance for Hosting: Setting up EC2 instances for hosting web and application services.

10. Data Migration: Executing data migration to transfer data from on-premises to Amazon RDS service using amazon data migration service.

# Pricing

This section provides a detailed breakdown of costs, including EC2 instance pricing, RDS costs, data transfer fees, and any other services expenses including the manpower cost required for this migration. Use the provided day rates for job roles. The cost can be divided into two, firstly, one-time TCO – total cost of ownership, secondly monthly operation cost. The roles Business Analyst, Cloud Consultant, and Solution Architect are required through out the migration process. The expected migration process will take around 8 weeks which includes migration and testing after migration. The roles required after migration are First/Second line Cloud support, Third line Cloud support to monitor the cloud architecture, while Business Analyst and Cloud Consultant roles are required for further development and optimization. However, migration engineers are required for one weeks only for migration of application and data.

1. Business Analyst £400
2. Cloud Consultant £2000
3. Solution Architect £1000
4. Server Migration Engineer £650
5. Database Migration Engineer £750
6. First/Second line Cloud support £250
7. Third line Cloud support £350

|  |  |  |  |
| --- | --- | --- | --- |
| Role | Rate(£/day) | duration(weeks) | Total cost |
| BusinessAnalyst | 400 | 8 | 16000 |
| CloudConsultant | 2000 | 8 | 80000 |
| SolutionArchitect | 1000 | 8 | 40000 |
| ServerMigrationEngineer | 650 | 2 | 6500 |
| DatabaseMigrationEngineer | 750 | 2 | 7500 |
| Total TCO estimated |  |  | 150000 |

Table 1: Total Initial cost estimation breakdown

The TCO will be estimated as 150000, which excludes the extra training cost required for training the existing employee of FishTank Ltd.

Operation cost will include the monthly service charge for each service and roles required for support and further development. To keep the operation cost of EC2 instances minimal, shared and on-demand instances are chosen to keep the flexibility to enhance the architecture and cost optimise in future.

|  |  |  |
| --- | --- | --- |
| Resource | Quantity | Monthly price |
| EC2 (t3.medium)(web server instance) | 4 | 1.75 |
| EC2 (c6a.xlarge)(app server instance) | 4 | 9.84 |
| EBS for web server | 4 | 35.56 |
| EBS for app server | 4 | 77.96 |
| NAT Gateway usage and data processing cost | 4 | 65.70 |
| Application Load Balancer | 1 | 16.43 |
| Network Load Balancers | 1 | 16.43 |
| RDS for SQL server cost : 13,643.70  Monthly Cost for RDS Proxy: 175.20  Storage pricing : 471.04 | 1 | 14,289.94 |
| AWS Managed Microsoft AD cost | 1 | 292.00 |
| First/Second line Cloud support £250 | 2 | 11000 |
| Third line Cloud support £350 | 2 | 15400 |
| BusinessAnalyst 400 | 1 | 8800 |
| CloudConsultant 2000 | 1 | 44000 |
| Total Monthly cost estimated |  | 94005.61 |

Table 2: Total Monthly cost estimated.

The estimated operational cost that will be occurring every month after cloud migration is 94000 dollars, this expense can be further reduced by analysing the utilization pattern and trend of all services and applying the configuration accordingly.

# Conclusion

This proposal lays out a detailed plan for moving PETRA to the AWS cloud. Our is confident about making the transition smooth using AWS's strong infrastructure. The pricing is competitive, and our team eagerly look forward to helping FishTank Ltd with this important migration.