Petra Migration Proposal

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This document outlines the steps and costs of migrating your PETRA web application to the AWS Cloud. We believe that migration of this application can be achieved in a cost-effective and timely manner without the need for down time of services.

Migration plan

Migration will begin with a period of discovery to determine how your service is currently being utilised and how to best optimise your new cloud resources for reliable operation while minimising cost. There are several AWS tools available to aid in migration, making it as smooth as possible and enabling the easy upgrading of OS systems. We have mentioned these in the relevant sections below.

After discovery, our team of engineers will tackle the various parts of app migration. We recommend migrating into the London AWS Region ss PETRA users are in the UK. Following migration our Cloud support will provide further support to ensure any issues arising are solved swiftly.

Server migration

AWS offers auto-scaling of virtual machines to optimise resource use based on demand. On this basis, we recommend combining web servers and app servers to optimise costs and resource use, with a minimum of two cloud app servers per region each in a separate availability zone to ensure availability and reliability. The AWS Application Migration service will aid us in migrating your application over to the cloud.

Using the AWS RiverMeadow cloud Migration Platform will enable us to move from your Windows Server 2008 OS to the most up to date Windows Server OS. We also recommend starting with on demand pricing for the initial migration. Once migration is complete there is potential for further cost savings with reserved instances or saving plans.

Your printer servers can be migrated to the cloud with AWS with print server on Windows 2019, purchased through AWS marketplace.

Database migration

We plan to migrate your database servers using the Database Migration Service. This service allows us to migrate from Microsoft 2012 database servers to any of the available AWS database services. To make sure that all aspects of your database are migrated, we will use the AWS Schema Conversion Tool.

We recommend deploying two database instances, a primary write database and a secondary read-only database. We will set these up so that each database is in a different availability zone to ensure that your databases are always up and running.

During database migration we recommend replicating the existing database and replicating ongoing changes throughout the migration. This option allows us to avoid any downtime of your databases during the migration, while ensuring that the most current data is migrated to the cloud.

Storage migration

We propose replacing your HP MSA storage EFS for shared files access, while the storage attached to web and app server will be replaced with EBS storage, 1 per each cloud app server instance.

Data can be easily migrated to the cloud with AWS Data Sync. This service securely transfers data via the internet via a locally installed agent which requires no down time and ensures cloud data is kept up to date.

Network setup

Your firewall, domain controller and network switches can all be replaced by cloud network services. Below is a schematic to demonstrate how we will arrange your new AWS services in the cloud and the connections between your resources.
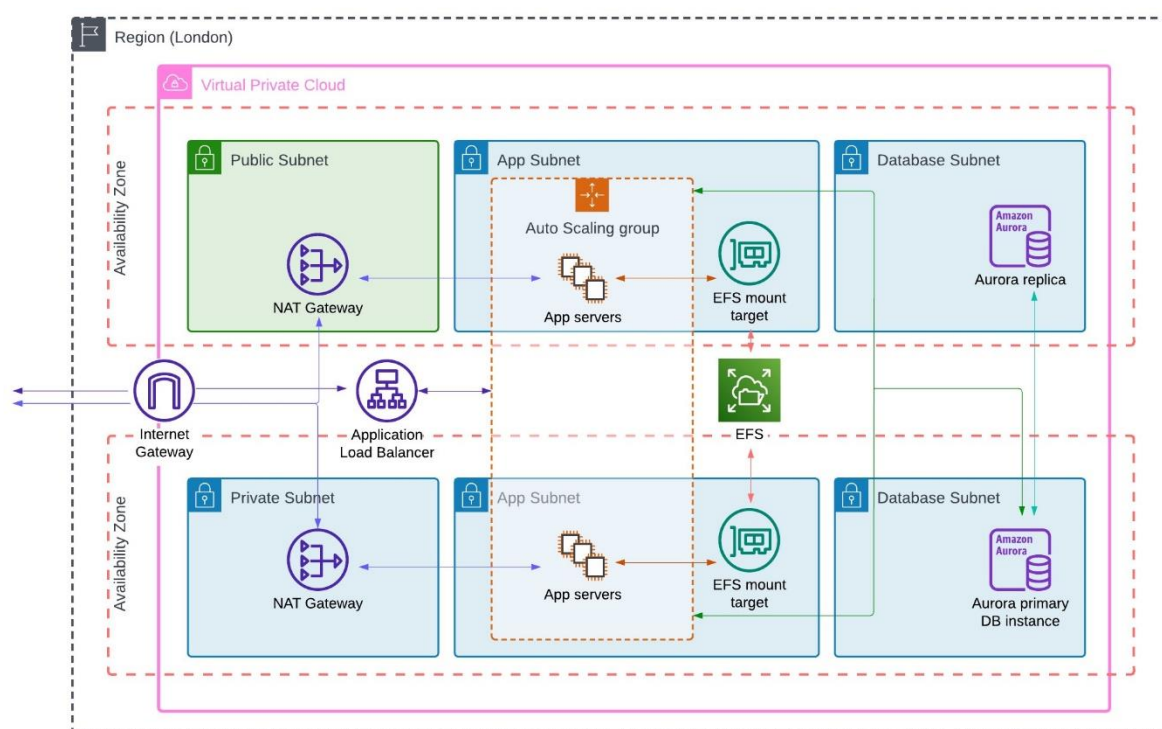
We will set up a firewall at the internet gateway level to filter incoming traffic. We will then also have NACLs at the subnet level to further filter traffic to specific resources. We will use a load balancer and NAT gateways to manage network to and from the autoscaling group and and the variable number of instances within.

Using route tables and security groups within AWS we can enable access between the subnets and resources. We will have a public security group for the public subnet which will have HTTPS internet access via a public NAT gateway, providing a single public IP. This will be connected directly to the app servers in the same availability group, as well as those in a second availability group (via a NAT gateway within the second availability group), providing secure internet access to your cloud app servers. These app servers will exist in a private security group ensuring no direct internet access. Your admins will have access to these

resources via their AWS user profiles without requiring direct public internet access to the resource making these resources more secure than in your current data centre.

Public security group			
Port	**Source**	**Destination**	
HTTPS	0.0.0.0/0	Internet gateway	Public internet connection
ALL	NAT gateway IP	10.0.0.0/16	Connect to app subnet in same AZ
ALL	NAT gateway IP	NAT gateway	Connect to App subnet in second AZ

NACLs at the second NAT gateway will only allow traffic from the private IP of the public NAT gateway. NACLs at the app servers will allow traffic from the private IPs of their respective NAT gateway as well as the load balancer IP. NACLs will explicitly deny any access across all ports from any other IP addresses.

Private NAT gateway security group			
Port	**Source**	**Destination**	
ALL	NAT gateway IP	10.0.0.0/16	Connect to app subnet in same AZ
ALL	10.0.0.0/16	10.0.0.0/16	Allow local connections

Private APP server security group			
Port	**Source**	**Destination**	
ALL	NAT gateway IP	10.0.0.0/16	Connect to app subnet in same AZ
ALL	Load balancer IP	10.0.0.0/16	Connect to App subnet in second AZ
ALL	10.0.0.0/16	10.0.0.0/16	Allow local connections

Costs

Migration costs

The migration discovery period will be carried out by out solution architect and cloud consultant. Our database migration engineer will set up your cloud resources and migrate your databases. Once they have ensured data has been correctly migrated, they will support your company in moving user database access from your data centres to the cloud. Our server migration engineer will set up your EC2 server instances, EBS and S3 storage, configure your network and ten migrate your application and data across to the cloud. While our cloud support will be available throughout the migration to aid both the server and database migration engineers, as well as for a month following migration to assist should any problems arise after migration.

	Day rate	Number of days	Total cost
Solution Architect	£1000	7	£7000
Cloud consultant	£2000	7	£14000
Server migration engineer	£650	20	£13000
Database migration engineer	£750	7	£5250
Cloud support	£250	40	£10000
		Total cost:	£59250

Data migration will incur a one-off fee:

Service	Details	Cost	Number
DataSync	Moving 4TB data in a single month	$50	1

Running costs (first month)

Below are the costs of migration if we were to match the capacity of your current hardware. It is highly likely that you have more capacity than you are using in your data centres. Prior to migration we will be able to right size your cloud services for your actual usage. Thus, the below costs are likely high estimates compare to what you will actually pay.

Service	Details	Cost	Number
Database migration service – each database	CPU: 8, memory 16GB, 1TB EBS storage	$1263.42	2
EC2 (cloud app server) – each instance	M7g.large; CPU: 4, memory 8GB, attached 100GB EBS storage	$230.42	3
Print Server on Windows 2019	CPU: 2, memory 4GB	$4.97	1
	Total cost:	$3223.07	

For the EC2 app server costing we assumed a daily spike load, Monday to Friday, with a minimum of 2 instances and a maximum of 8 instances (per region), with an average of 3 instances per day for total costs.

Total cost

Taking together the upfront costs and the running costs for a month we expect the migration will cost around £61,834 (given USD to GBP exchange rate on 01/02/2024).