PETRA PART 2

TECHNICAL DESIGN

CHARLIE MARTIN

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# Diagram

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# Description

Firstly, the diagram outlines 3 key layers to the architecture, the AWS cloud (where everything is contained), the region within the cloud, and the VPC (virtual private cloud). This VPC resembles a traditional network in a data centre, allowing for AWS resources to be hosted in an isolated environment and connect to other networks appropriately. At the top of the VPC the internet gateway and route 53 icons are outlined. This allows the VPC, and everything within it, to connect to the internet via HTTPS port and DNS services. For this diagram, the VPC spans across two availability zones (AZs), which must be from the same region.

Each AZ contains three layers of architecture, based in different subnets. These subnets are duplicated across two different AZs to add redundancy to the architecture. This means that should one AZ have any difficulties, such as a lack of resources or power outages, the architecture is still available and ready to use in another AZ with zero downtime, making the architecture highly available.

The first layer is the public subnets which contain EC2 (elastic compute) instances. These will run the web applications. The public subnets allow for internet traffic to access the web application. The second layer contains private subnets which contain EC2 instances that will run the application services. The private subnet secures the application preventing direct access to public internet. The third layer contains private subnets containing the database. In this case, AWS RDS (relational database) was used for its compatibility with Microsoft SQL databases. The databases are connected to S3 storage, which will securely store backups, and AWS ElastiCache. ElastiCache is a caching service which will cache data that is slow or expensive to query, or frequently accessed, to significantly boost performance.

Between the first two layers of subnets there is an application load balancer alongside a an EC2 autoscaling service. The load balancer primarily distributes traffic across multiple targets, ie the two AZ’s to provide high availability and increase efficiency. The autoscaling service will help control the EC2 instances available to handle the load, with options to set minimum and maximum capacity for instances alongside conditions to create new or stop instances.

At the bottom of the diagram is the AWS CloudWatch service. This collects near real time metrics and logs from all the above services, allowing for monitoring data to be accessed from one place. This service also provides the option to set alarms, should any metrics fall out of a desired range.

Each layer is also within its own security group. These are virtual firewalls that control incoming and outgoing traffic based on explicity, customisable rules. This will allow for any appropriate port access to be accepted for any application.

# Pricing

Firstly, the general role day rates. It is estimated that this should take approximately 1 week (5 working days) to get operational, and the following day rates will be incurred:

* 5x Cloud consultant (£10000)
* 5x solutions architect (£5000)
* 5x server migration engineer (£3250)
* 5x database migration engineer (£3750)
  + TOTAL = **£22000**

Alongside this, AWS has costs associated with each service and migration service used. In this case, the AWS storage gateway, database migration and application migration services are used, with a total monthly cost of **$1071.86**.

The total cost of all the services used in the architecture comes to **$9389.64**, bringing the total monthly cost including the migration services to **$10461.50**.

Please find the detailed summary of pricing from AWS calculator in the appendix below.

# Appendix

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A screenshot of a computer application

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