

Workload Improvement on EC2 and DB

Executive Summary

Qualitypost through a package tracking web application connected to a database, offers a solution for tracking shipments to its customers.

Due to the problems presented by the lack of robust mechanisms for scaling and high availability in its web application, it was decided to migrate the information contained in its main database to a new database cluster, separating the infrastructure through two nodes, one for reading and the other for writing, as well as the updating of the corresponding endpoints within the web application, with which the workloads generated by the application towards the database will be managed in a better way, all this using the best AWS Practices. Additionally, maintain all the required services updated in another region, having a disaster recovery strategy.

The Challenge

It was necessary to create a highly available, robust, and secure solution that could handle any type of event. Some critical solutions that needed to be implemented in the new architecture were:

- High availability of the services provided by the database that helps always to have the information available.
- Maintain a high availability and autoscaling environment for the tracking application.
- Keeping up-to-date backups to restore in another region in case of an outage.

Why AWS

AWS is a cloud platform with all the necessary services to create a robust, fault-tolerant, highly available, highly scalable and secure infrastructure for cloud solutions.

About Costumer



QualityPost is a specialized messaging and shipping company committed to build innovative solutions according to client's needs. Their Human culture has allowed them to be one of the best places to work.

“Resilient Infrastructure”

- Migrating from Aurora Serverless to an Amazon Aurora DB cluster will also help reduce database costs, which is a substantial improvement for the customer.
- Server Workloads for the tracking app in different availability zones to provide HA.
- Bastion Host to provide a single-entry point for management & troubleshooting.

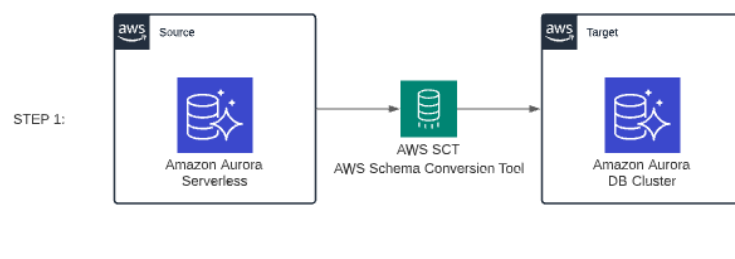
The Solution

3 Layer Security Architecture

- **The First layer** hosts the Database workloads in its own private subnet.
- **The Second layer** hosts the Application Workloads also in their own private subnet. Only the Application Workloads are able to access the Database layer through their security groups.
- **The Third layer** is for public access, hosts the Web Application Firewall and only accesses the application layer through its security group.
- A Bastion Host is in place to provide access to Qualitypost IT Staff.

Database

- The homogeneous data migration service was implemented to achieve a transparent transition between the source database, which is in Aurora MySQL serverless, and the destination database, which will be generated on an Amazon Aurora DB cluster with MySQL database engine.
- In this case, the schema structure, data types, source code, and target code of the databases may be quite similar, but a proper transformation of the schema and code is still required before the migration begins. That makes seamless migrations a two-step process:
 - First, use the **AWS Schema Conversion Tool** to convert the source schema and code to match that of the target database.
 - Second, the **AWS Database Migration Service** is used to migrate data from the source database to the destination database.



Aurora DB cluster features

- Amazon Aurora in a 2-node cluster (Master & Read Replica) to provide for high availability and failover.
- High Performance
- Automated Autoscaling
- Best security practices

AWS Backups for workload protection

- Central backup console
- Backup compliance improvement

3. Application

- Workload Phoenix initially was setup on a single EC2 which could cause availability issues in case of a disaster or corruption, it had no backup policy defined.
- It was decided that workload **Phoenix** be improved with a highly available configuration, so it was setup over two availability zones to reduce downtime in case of an issue with an availability zone.
- A daily backup policy was setup to protect it from accidental deletion or doing rollbacks in case of a bad installation from a hotfix, service pack, etc.

4. Seamless access from On Premises to Cloud Infrastructure

- The customer needed to have access to cloud resources from its On Premises infrastructure, so a Site-to-site VPN was setup.

5. Bastion Host

- Their support personnel needed to perform troubleshooting & maintenance, so a bastion host was setup to allow only a single machine to touch cloud infrastructure externally.

Results and Benefits

Database

- DB was greatly improved by transitioning it to a Highly available configuration with a two-node cluster setup (Writer and Reader nodes), each in an availability zone which provided QualityPost with failover capabilities in case of a disaster. If needed, the customer can easily roll the database up and down from smaller to larger instance types as needs change. Also, it automatically grows storage as needed.

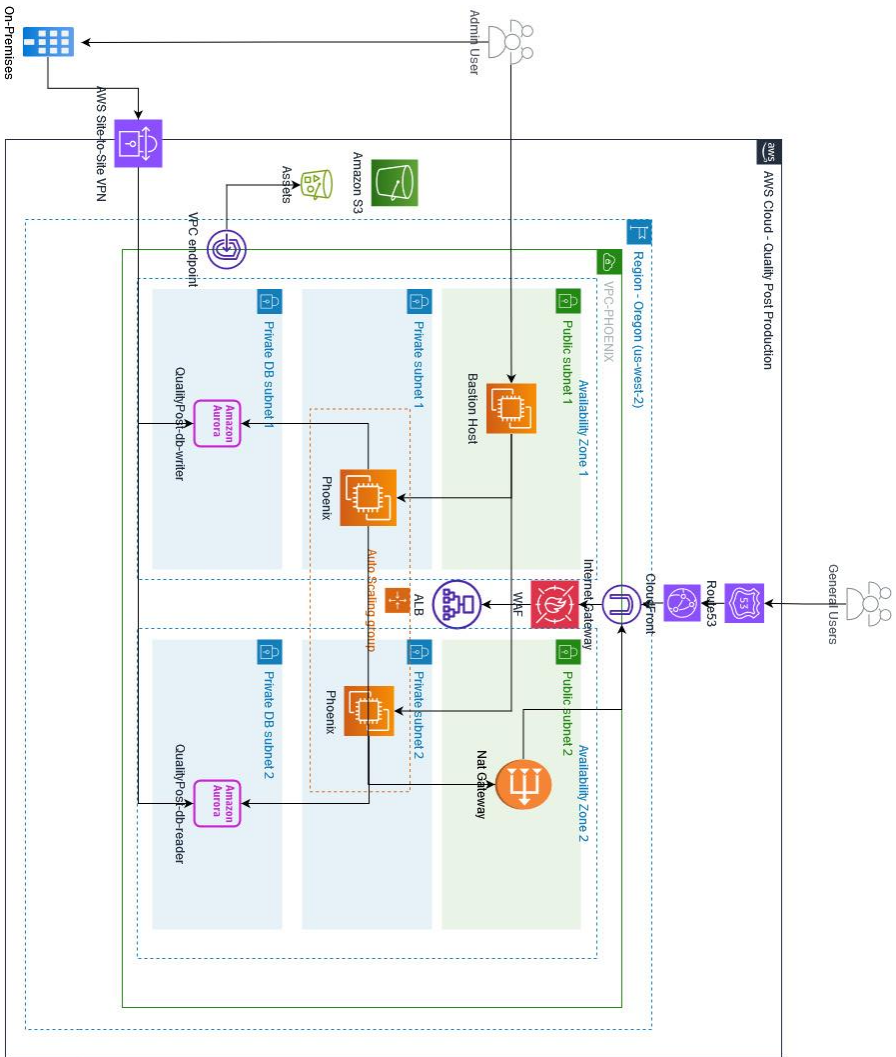
Application

- The Application's workload called Phoenix was improved with high availability over two zones in the same region.
- A web application firewall was also setup to help protect the web applications or APIs against common web exploits and bots that may affect availability, compromise security, or consume excessive resources. Qualitypost WAF implementation gives them control over how traffic reaches their applications by enabling them to create security rules that control bot traffic and block common attack patterns.

Automated Backups

- Daily backups were configured on workloads to be protected in case of accidental deletion, corruption, damage and to do rollbacks.

Quality Post Solution Diagram



Next Steps

Now that the main database has been migrated, our next goal is to update the endpoints in the web application to point to their respective node within the DB cluster.

AWS offers the possibility of carrying out this migration without affecting the operation of the company following the pattern of reference architectures, standards and implementation conventions following AWS best practices.

Reduce their On-premises footprint overtime.

Remove dependencies from physical old hardware.

Superior Performance

This infrastructure provides a fast, resilient, and high availability environment for the application.

LOW TCO

Save money by replacing physical hardware with expensive license fees, with AWS you pay for what you use.

Fully Managed

With fully managed resource provisioning, maintenance, and backup, you no longer must worry.

About IO Connect Services

IO Connect Services is a company specializing in Information Technology Consultancy Services. All our team members have one thing in common: our enthusiasm for technology and our passion for customer service excellence. We provide services in all North America, LATAM and Europe. Our headquarters are located in the NYC metropolitan area, and we also have offices in Guadalajara and Madrid.

