



# SERVICE-ORIENTED ARCHITECTURE

Powered by Amazon Web Services



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## CHECKOP SERVICE ARCHITECTURE

The current architecture shown in the following diagram is designed for the CheckOP platform's production environment, as it is intended to serve a diverse user base across various access points, where data traffic will spike at certain times. This is where AWS, with the services it provides, will help scale quickly to meet the demand for requests and respond immediately, preventing system downtime as well as delays in information delivery and other issues that have occurred in the past.

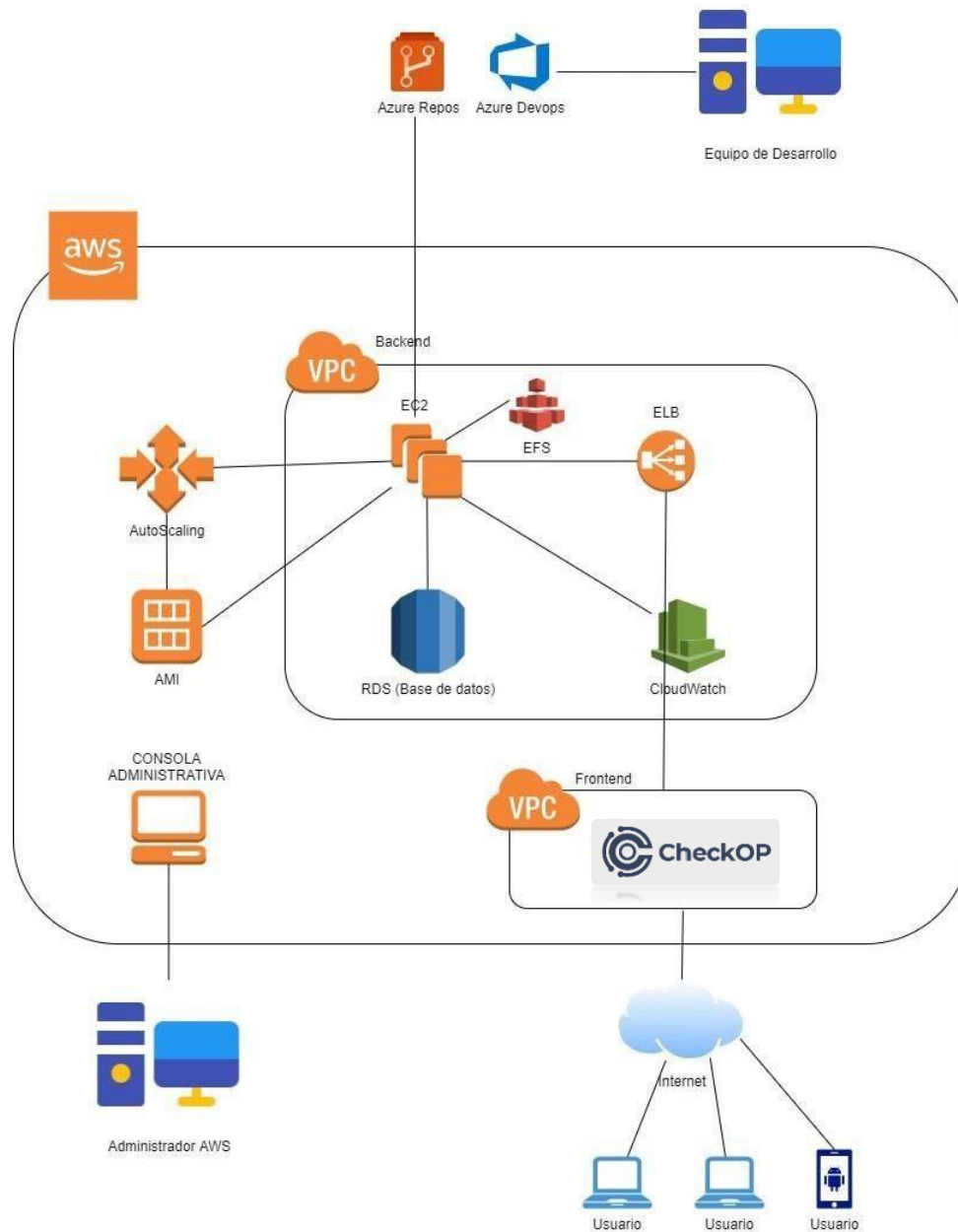


Figure 1: Backend Architecture of the CheckOP Platform



The following describes the quantity, specifications, and conditions of the cloud infrastructure and/or servers required for CheckOP to operate:

## Instances EC2

### Description:

Amazon Elastic Compute Cloud is a central component of Amazon.com’s cloud computing platform, known as Amazon Web Services. EC2 is the service that allows users to rent virtual machines on which the platform runs.

T3-family EC2 instances have been provisioned to deploy CheckOP.

T3 instances feature first- or second-generation Intel Xeon Platinum 8000 series processors (Skylake-SP or Cascade Lake) with a sustained single-core Turbo CPU clock speed of up to 3.1 GHz.

By default, there is an instance named CheckOP, which serves as the hub for pulling all updates regarding fixes, new features, and improvements to the platform. This updated machine serves as the base and template for generating the instances deployed to end users.

Given the above, two to four machines are deployed across different availability zones (copies of the base instance) using vertical scaling via the **Elastic Load Balancing** service to handle the concurrent user traffic accessing the tool. Currently, a maximum of two instances are deployed.

The following describes the technical characteristics of the instances currently running

Recurso	Nombre	Tipo	S.O	CPU (Cores)	RAM (GB)	Disco (GB)	Region
Instance EC2	AUTOChOp	t3.xlarge	Centos 7	4	16	50	us-east-1d
Instance EC2	AUTOChOp	t3.xlarge	Centos 7	4	16	50	us-east-1a
Instance EC2	Base ChOp	t3.xlarge	Centos 7	4	16	50	us-east-1a

## Elastic Load Balancing

### Description:

Elastic Load Balancing automatically distributes incoming application traffic across multiple targets, such as Amazon EC2 instances, containers, IP addresses, and Lambda functions. This service manages the fluctuating traffic load of the CheckOP platform within a single availability zone or across multiple availability zones. The classic load balancer provides Basic load balancing across multiple Amazon EC2 instances, operating at both the request level and the connection level.



The technical features of the service are described below:

Name	DNS Name	State	Availables Zones	Type
Progresus-ELB	Progresus-ELB-195469790.us-east-1.elb.amazonaws.com	active	us-east-1a, us-east-1d	application

## Elastic IP Addresses

### Description:

An elastic IP address is a public IPv4 address that can be accessed from the Internet. For example, this allows end users to connect to the instance from their computers or devices.

Note: For each EC2 instance mentioned above, a public IP address is assigned for internet access.

## Amazon Route 53

### Description:

Amazon Route 53 is a scalable, highly available cloud-based DNS (Domain Name System) service. It is used to redirect end users to CheckOP's web applications by translating human-readable names such as checkop.co

Domain name	Type	Number of record sets
Checkop.co	Pública	8

## Elastic File System (EFS)

### Description:

Amazon Elastic File System (Amazon EFS) provides a simple, scalable, elastic, and fully managed NFS file system for use with AWS cloud services and on-premises resources. It is designed to scale up to petabytes as needed, without disrupting application operations, by automatically increasing and decreasing its capacity as you add or remove files. This eliminates the need to provision and manage capacity to accommodate growth.

Resource	Name	Size
EFS	ChOp-Temp	200 GB



This service is used in CheckOP to store the following groups of files:

### *ChOp-Temp*

**Uploaded XLS files:** These are XLS files uploaded by users to import transactions, reconcile payments, perform bulk reassignments, or import or deactivate technical users in bulk.

**Processed XLS files:** These are XLS files generated by the system for later download, created when requesting Excel reports for service orders, transactions, user lists, or user activity reports.

**Individual photo files:** Each time a photo download is requested—whether for operations or service orders—the photos are retrieved from Google Cloud and pre-stored before being compressed, so they can be renamed for subsequent compression based on the type of download.

**.zip files:** These are the compressed files generated when requesting the download of photographic evidence for operations as well as complete service orders. (These are the files that take up the most space.)

## Relational Database Service (Amazon RDS)

With Amazon Relational Database Service (Amazon RDS), CheckOP can configure, use, and scale its relational database in the cloud. The service provides cost-effective and scalable capacity while automating tedious administrative tasks, such as hardware provisioning, database configuration, patching, and backup creation.

The technical features of the service are described below:

DB identifier	Role	Engine	Region	Size	CPU Virtual	RAM	Allocated Storage	Storage Autoscaling	Maximum Storage
<a href="#">dbprogressu</a> <a href="#">s</a>	Instance	MySQL Community	useast1a	db.r5.xlarge	4 Núcleos	32 GB	217 GB	Yes	1000 GB

## Amazon Machine Image (AMI)

### Description:

Amazon Machine Images (AMIs) are used to support the scalability of EC2 services; they create an AMI (an exact copy) of the entire EC2 configuration so that it is ready when scaling is required. When scaling, the AMI is activated, generating new EC2 instances with the configuration previously saved in the image; thus, their creation is automatic and does not require administrator intervention. This service goes hand in hand with and is a prerequisite for the auto-scaling feature provided by the service. [Elastic Load Balancing](#)



## Amazon CloudWatch

### Description:

This service monitors and manages CheckOP application resources on AWS, allowing developers or site administrators to keep track of everything happening in the cloud through logs. If a failure occurs, it identifies the location and addresses it. Amazon CloudWatch collects monitoring data, providing an overview of the performance of all resources and applications in the project, such as Amazon EC2 instances, the Amazon RDS database, and Amazon ELB.

Amazon CloudWatch is linked to a console administrator (an individual or team) who is directly responsible for monitoring this service and AWS resources. The administrator logs in using their AWS credentials; through that interface, they monitor the service and view the logs generated by the backend system, such as debug, error, warning, and other logs.

## PERIMETER SECURITY

Since CheckOP is a solution deployed and running on AWS infrastructure, it leverages the options provided by the cloud provider to enhance perimeter and networking security. Among these, it uses the Virtual Private Cloud (VPC) service, which allows for the reservation of a private address space that can be freely utilized in network designs, enabling this space to be segmented into different subnets with specific connectivity and routing profiles. Within this Virtual Private Cloud (VPC) service, two different layers are available to define access permissions between the various elements deployed in the environment (described above), as well as to and from the outside: *security groups and access lists*.

### SECURITY GROUPS

They act as a virtual firewall that allows you to define access rules between different AWS components. They operate in a reactive manner, allowing traffic return associated with a trusted source.

### ACCESS CONTROL LIST (ACL)

Within the VPC, you can configure classic ACLs based on CIDR addresses, which allow you to specify which traffic is allowed and denied, both inbound and outbound. ACLs do not operate in a default manner; you must explicitly specify the traffic you want to allow.

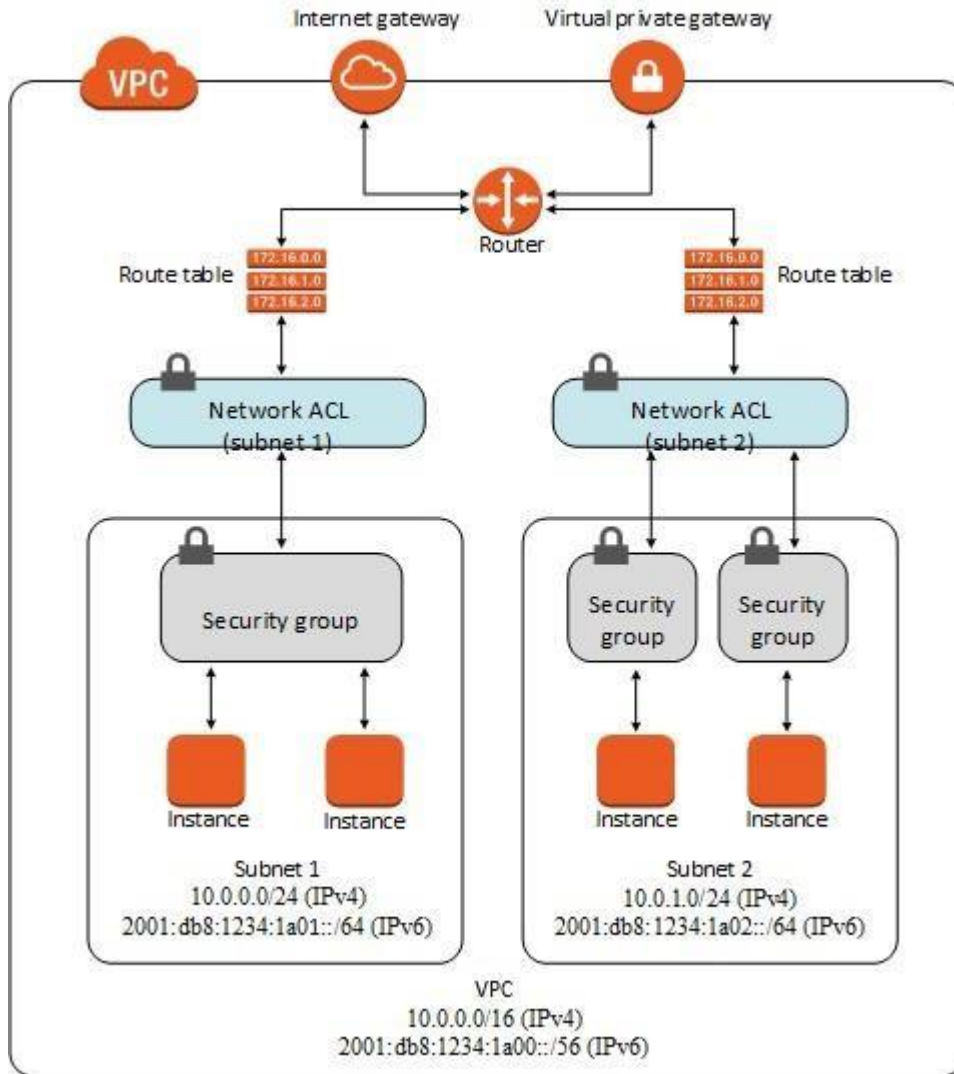


Figure 2: Perimeter Security Diagram with AWS