



Technical Coding Research Innovation, Navi Mumbai,
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Build out AWS service architecture for Enterprise retail store with following assumptions: 1. 100+ stores 2. Inventory Management 3. Analytics services to be run by the stores.

Assignment Submitted for the requirement of
Technical Coding Research Innovation

For the Internship Project work done during

CLOUD COMPUTING USING AWS INTERNSHIP PROGRAM

by

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1. PROBLEM STATEMENT

Enterprise retail stores must run on Retail inventory management for ensuring we have enough inventories to meet customer demand so that we don't end up with too little or too much merchandise. It's essential if we'd like to avoid situations where we run out of popular items or end up with excess items that nobody is buying. Inventory management helps companies identify which and how much stock to order at what time. It tracks inventory from purchase to the sale of goods. The practice identifies and responds to trends to ensure there's always enough stock to fulfill customer orders and proper warning of a shortage. Inventory Management in Enterprise retail stores is the process of ensuring you have enough inventory to meet customer demand so that you don't end up with too little or too much merchandise. It's essential if you'd like to avoid situations where you run out of popular items or end up with excess items that nobody is buying.

The manual inventory system involves a person manually maintaining and updating each record, increasing the risk of human error. Furthermore, this system is also susceptible to data loss because inventory sheets can get torn up over time, lost, or replaced. It's also very tough to figure out which products are selling fast, which product needs more stock, and that manual operation lacks the analytic report.

Here, we have a customer who has 100 plus stores across the city and wants to store the data to run their application. Therefore, we need an infrastructure to execute these applications. So, we have used AWS services which provide a very efficient and cost-effective way of building a robust service architecture. It provides EC2 instances like Lambda, S3 bucket etc. By using these services we have to build an architecture which explains this problem statement in a detailed form. So we are making a solution to this by taking the complete architecture on a cloud platform. We have used AWS as AWS (Amazon Web Services) provides a very efficient and cost-effective way of building scalable, reliable, and robust service architecture. It offers a wide range of powerful and easy-to-use services, like S3, SNS, SQS, Lambda, DynamoDB, etc.

2. SYSTEM ARCHITECTURE

To manage all the resource , we have designed system architecture for Enterprise retail store with following assumptions: 1. 100+ stores 2. Inventory Management 3. Analytics services to be run by the stores.

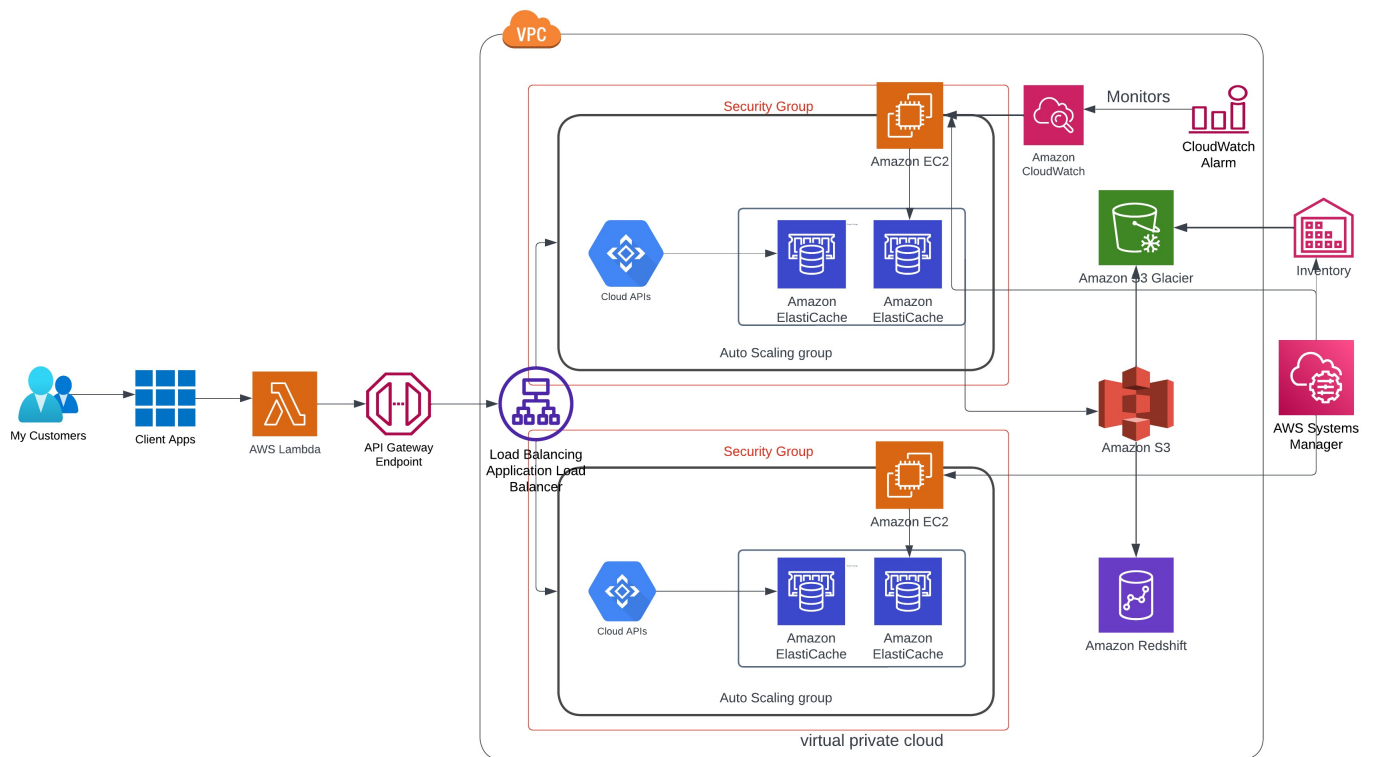


Figure 1 : System Architecture

3. DESIGN DETAILS

System architecture consist of following components :

1. Amazon EC2

Amazon Elastic Compute Cloud (Amazon EC2) is a web service with which you can run virtual server instances” in the cloud. Amazon EC2 instances can run the Windows, Linux, or MacOS operating systems. The EC2 simple web service interface allows you to obtain and configure capacity with minimal friction.

2. Amazon Simple Storage Service (S3) :

Amazon S3 is object storage built to store and retrieve any amount of data from anywhere – web sites and mobile apps, corporate applications, and data from IoT sensors or devices.

3. Amazon Virtual Private Cloud (VPC) :

A virtual private cloud (VPC) is a virtual network dedicated to your AWS account. Analogous to having your own DC inside AWS. Provides complete control over the virtual networking environment including selection of IP ranges, creation of subnets, and configuration of route tables and gateways.

4. Amazon RedShift

Amazon Redshift is a fast, fully managed data warehouse that makes it simple and cost-effective to analyze all your data using standard SQL and existing Business Intelligence (BI) tools. RedShift is a SQL based data warehouse used for analytics applications.

5. Amazon ElastiCache

ElastiCache is a web service that makes it easy to deploy and run Memcached or Redis protocol-compliant server nodes in the cloud.

6. Amazon CloudWatch :

Amazon CloudWatch is a monitoring service for AWS cloud resources and the applications you run on AWS. CloudWatch is for performance monitoring (CloudTrail is for auditing). Used to collect and track metrics, collect, and monitor log files, and set alarms.

7. AWS Lambda

AWS Lambda is a serverless computing technology that allows you to run code without provisioning or managing servers. AWS Lambda executes code only when needed and scales automatically.

4 . SOLUTION

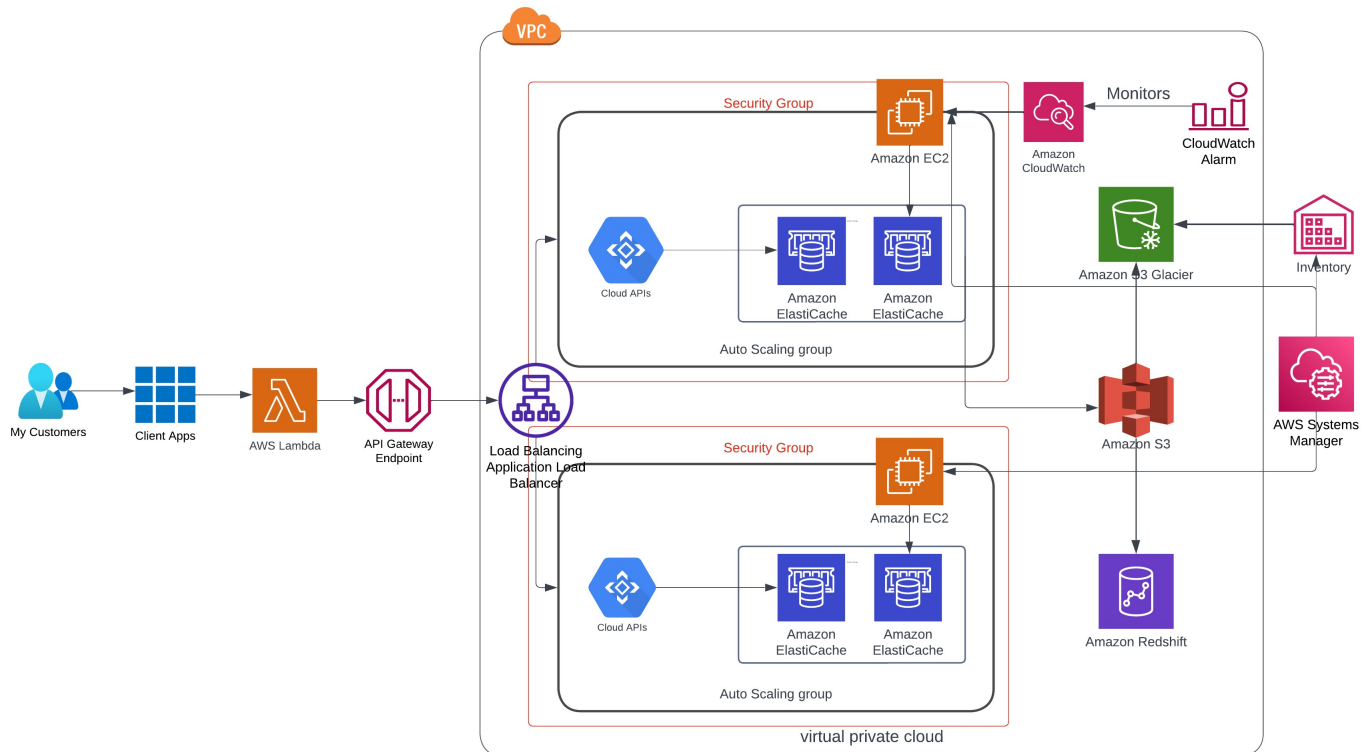


Figure 2 : System Flow

Now we have the solution for our problem statement, which we have represented as an architecture. Here we have to build an architecture for enterprise retail stores for 100+ stores. We have setup API Gateways so that whenever the API wants to communicate with the EC2 instance for storing data or pulling data or other tasks it goes via gateway. The application of client will get connected to the API gateway and the API gateway will connect to the cloud APIs and then finally the cloud API will get executed in the EC2 instance.

After that we have also implemented in security group and added the Application load balancers followed by Implementing Lambda which is connected with the end point gateway and the end point gateway is connected to the EC2 instance which is then connected with the S3 bucket.

5. OUTCOMES

1. API Gateway : Allowing all the API requests would be dangerous as it might cause issue in security factor and Gateway provides a unified entry point across internal APIs. It allows us to control user access. And it enables security measures, like rate limiting, and applies security policies, like OAuth or JWT. An API gateway is especially important for securing micro services.

2. Load Balancing : The load balancer is making use of the two different EC2 instances with two different security groups which distributes the network or application traffic across a number of servers which is increasing the capacity (concurrent users) and reliability of the applications which ensures that no one server is overworked, which could degrade the performance.

3. Serverless Computing : The lambda is a server less, event-driven compute service that letting us run code for virtually any type of application or backend service without provisioning or managing servers. We can trigger Lambda from over 200 AWS services and software as a service (SaaS) applications. And only pay for what we use which is reducing the cost and also it's allowing developers to build and run services without having to manage the underlying infrastructure.

6. CONCLSION

1. To conclude the AWS service architecture for enterprise retail store will help in growth and tracking of the entire retail system. Since migrating to a server less architecture built on AWS—and with fully automated scaling—there's a huge cut in its infrastructure costs and improved customers' ticket-purchasing experience and also helped to innovate faster.
2. We are using 100 plus stores where we assume 500 users or admins who work on business transactions (employees) will be working for all these 100 plus stores. The calculation we do here is 2 folks per store. So here we have 500 users working for 100 plus stores , for example if we have a store of 10 users the calculation will be 100×10 . So there will be 100 people working but not everyone will be working on inventory management, their jobs will be distributed amongst them .
3. It will also track all the purchases and sells which will make it easier to stock the most sold goods and other analytical calculations while keeping security in mind and prioritizing it, we have also implemented highest security on the entire architecture.

7. REFERENCES

1. Lucid Chart : https://lucid.app/lucidchart/c761c121-02cb-4057-afbd-3f3bdb0c48da/edit?page=0_0#
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