Project 2 – GoGreen Insurance Company

A Medical Company Startup

aws academy

Project 2 Overview

1.
   - Analyze needs and current architecture.
   - Design an AWS solution meeting the provided requirements.
2.
   - Determine solution details.
   - Create an architecture diagram illustrating the solution.
3.
   - Implement a solution in the lab sandbox based on requirements gathered.

Project Objectives

Upon completion of this project, you will be able to:

- Experience the communication challenges faced when attempting to apply technology as the solution to business problems.
- Translate customer requirements into a proposed technical solution.
- Create an architecture diagram of the proposed solution.
- Present the proposed solution to the customer for approval.
- Implement the solution approved by the customer.

Project Suggestions

Some thoughts on this project:

1. This project can be done individually or in in groups of 2-3 students.
2. The high level and detailed customer requirements should be reviewed.
3. A solution should be designed to address each of the requirements identified.
4. Worksheets have been included to guide the documentation process.
5. Architecture diagramming suggestions have been included.
6. Upon completion of solution design, a presentation of the results should be prepared and given to the class.
7. The class can be involved to evaluate the solution in terms of requirement fulfillment and solution accuracy.
8. It may be helpful to review the Academy Cloud Foundations service introduction slides as you work through the solution details.

Customer Introduction and Overview

GoGreen Insurance Company Background

Company:	**GoGreen Insurance Company**
Locations:	Europe, South America, Southern California (headquarters)
Application:	CRM web application allows sales personnel to input and edit customer data. The application stores customer data and documents and converts the documents into multiple formats, for example images for web and mobile formats.
Technical Details:	3-tier web app stores customer data and documents. Converts the documents into multiple formats (e.g. images for web/mobile)
Goal:	GoGreen's goal is to go "***paperless***" for all user data, documents, and pictures.

Company Background: GoGreen Insurance Company

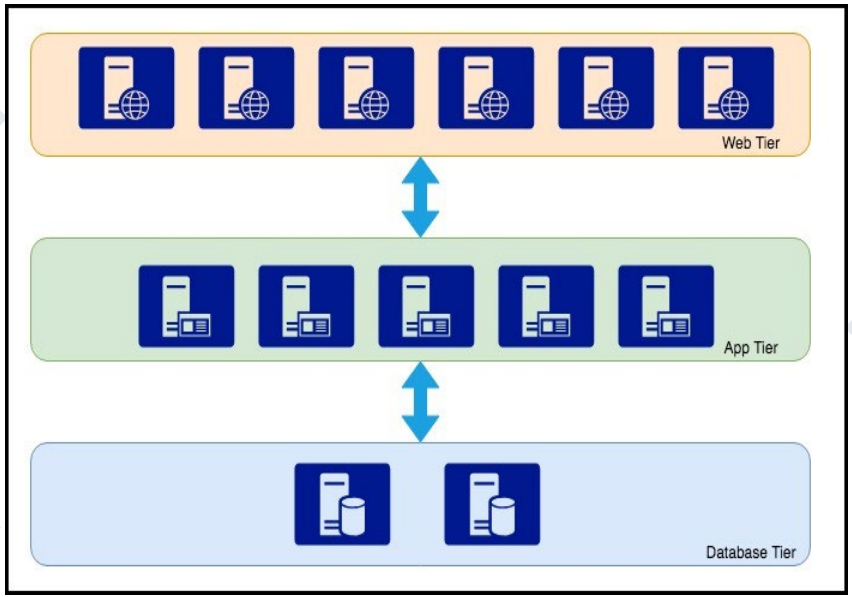
GoGreen Insurance Company has hired **you** to architect an infrastructure in AWS to meet their application needs.

In preparation for your meeting with them, they provided information about their current environment.

GoGreen Insurance: Current Environment

Web Tier:

- Six virtual machines (Two vCPUs / 4-GB memory)
- Red Hat Enterprise Linux 7.5
- Apache Tomcat web service
- PHP server and PHP files



Application Tier:

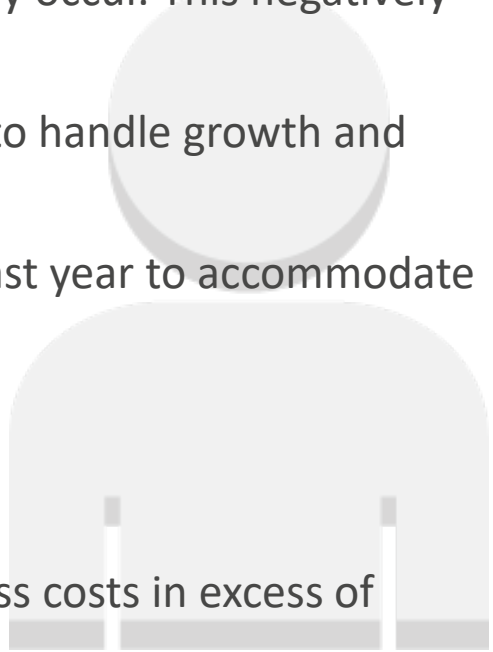
- Five virtual servers (Four vCPUs / 16-GB memory)
- Red Hat Enterprise Linux 7.5
- Java SRE 7/Java application files

Database Tier:

- Two virtual machines (Eight vCPUs / 32-GB memory / 5.5-TB storage)
- Red Hat Enterprise Linux 7.5
- MySQL 5.7.22 database cluster

GoGreen Current Solution Issues

- On-premises performance and reliability issues frequently occur. This negatively impacts the user experience.
- The architecture is continuously over-provisioned to try to handle growth and performance issues.
- The architecture has been upgraded three times in the last year to accommodate growth:
  - The procurement process takes 20 days.
  - Deployment takes a week.
- Growing the architecture is expensive -- the entire process costs in excess of $100,000.



Customer Requirements and Solution Design Worksheets

GoGreen Insurance Company Requirements

The environment requirements include:

1. **Infrastructure managed** by members of the new Cloud Team.
2. **Encryption** for data in transit and at rest.
3. **Secured access** and identity management.
4. **Stateless** web servers for user connections.
5. **Baseline** identified for the number and type of instances needed.
6. **Recovery Point Objective (RPO)** for the application is **four** hours.
7. **Scalability** that accommodates user base growth of **90%** in the next three years.
8. **Storage** for documents and pictures that must be kept **five years**. ***Note***: these files are rarely requested after three months but infrequent access is still required.
9. **Use of managed services** to enhance availability and lower costs.

GoGreen Insurance Company Project Objectives

1. **Determine** the region, VPCs, subnets, and Availability Zone requirements.
2. **Document** encryption and security details.
3. **Design** a plan for storage and backups.
4. Using what you learned in class, determine how to **resolve the issues** concerning the Web, App, and Database Tiers.
5. **Document** your implementation plan and an architecture diagram.
6. **Build** the infrastructure in the lab based on this document.

Design – Network

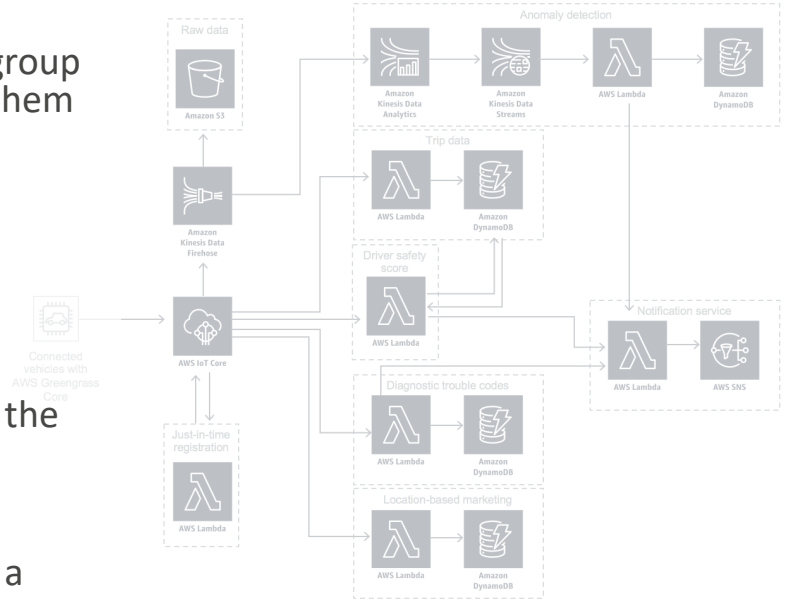
Document the VPC solution.

VPC	Region	Purpose	Subnets	AZs	CIDR Range
1					
2					

Subnet Name	VPC	Subnet Type (Public/private)	AZ	Subnet Address

Creating an Architecture Diagram

- **Start with the structure**
  Determine where your diagram will be used. Websites and blogs will generally use a light background, whereas presentations tend to use a dark background. Locate the group type created for the appropriate background, then paste them onto your desired slide.
- **Add product and resource icons**
  Navigate to the category of your desired product icon or resource, then copy and paste it into your diagram.
- **Add other steps**
  Does your diagram include external users or devices? Use the illustrations to add depth or context to your diagram.
- **Connect the steps**
  Use the preset arrows to connect your steps and describe a workflow.



Proposed VPC Architecture Diagram

Construct a diagram of the proposed VPC architecture.

Design – Security

Document the security solution.

Security Group (SG)	SG Name	Rule	Source
ELB load balancer			
Web Tier			
App Tier			
Database Tier			

Other Security Options	Justification

Design – Encryption

Document the encryption options.

Requirement	Solution
Encryption option for **data at rest**	
Encryption option for **data in transit**	

Design – Instance Details

Describe the type, size, and justification for the instance you will use for each tier.

Tier	AMI	Tag	Type	Size	Justification	# of instances
Web		**Key: Name** **Value: app-tier**				
App		**Key: Name** **Value: web-tier**				
DB		**N/A**				

Design: Recovery Point Objective

Q. How would you achieve a Recovery Point Objective (RPO) of four hours?

A.

Design: Document Storage

Based on the requirements, describe the document storage solution.

Storage/Archive Option	Detail

GoGreen Web Tier Requirements

The Web Tier requirements include:

1. **Architecture** must be flexible and handle any peak in traffic or performance.
2. **Current Servers** at at 75% of memory capacity all the time. Memory capacity should be between 50% and 60%.
3. **Application administrators** want to be notified by email if there are more than 100 “400 HTTP errors” per minute in the application.
4. **Web Tier instances** should be tagged as “Key=Name” and “Value=web-tier”.

Design: Web Tier

Based on the requirements, describe the web tier solution.

Requirement	Solution
Architecture must be flexible and handle any peak in traffic or performance.	
The overall acceptable incoming network bandwidth is between 300 Mbps and 750 Mbps.	
Application administrators want to be notified by email if there are more than 100 “400 HTTP errors” per minute in the application.	

GoGreen Application Tier Requirements

The Application Tier requirements include:

1. **Architecture** must be flexible and handle any peak in performance.
2. **Servers** are currently at **90%** of memory and CPU capacity all the time. Server capacity should be between 50% and 60%.
3. **Memory and CPU utilization** should not go above 80% and 75% respectively, or below 30% for each.
4. **Internet access** for patching and updates must be available without exposing the servers.
5. **Application Tier** instances should be tagged as “Key=Name” and “Value=app-tier”.

Design: Application Tier

Based on the requirements, describe the application tier solution.

Requirement	Solution
Architecture must be flexible and handle any peak in traffic or performance.	
Overall memory and CPU utilization should not go above 80% and 75% respectively or below 30% for either.	
Internet access is required for patching and updates without exposing the servers.	

GoGreen Insurance Company Requirements

The Database Tier requirements include:

1. The **database** needs consistent storage performance at 21,000 IOPS.
2. **Ability** to patch and update must be available.
3. **High availability** is a requirement.
4. **Database schema** can not be changed at at this time.

Design: Database Tier

Based on the requirements, describe the database tier solution.

Requirement	Solution
Database needs consistent storage performance at 21,000 IOPS.	
High availability is a requirement.	
No change to the database schema can be made at this time.	

Design – Additional AWS Services

List any ADDITIONAL AWS services you would use for your solution and a justification for their use.

- ❑ _____
- ❑ _____
- ❑ _____
- ❑ _____
- ❑ _____
- ❑ _____
- ❑ _____
- ❑ _____

Proposed Architecture Diagram

Based on your solution, construct a diagram of the proposed architecture.

GoGreen Insurance Company Cost Considerations (Optional)

The proposed solution should use the most cost-conscious financial options. What are the cost considerations?

1.
2.
3.

Lab Objectives

Implement your proposed solution in the sandbox area. Your design should include designs to guide implementation of the following:

1. Create the users / groups needed for your application
2. Create an isolated virtual network and subnetting for your application
3. Create and configure the compute capacity needed
4. Make sure your compute capacity is auto scalable for web-tier
5. Make sure your application is highly available
6. Create a high performance database storage tier
7. Configure the object store for your application
8. Configure a lifecycle policy for data in object store

Thanks for participating!

aws academy