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PHEMESOFT Software That Matters

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University of Petroleum and Energy Studies

UPES UNIVERSITY OF TOMORROW

Internship - High Level Design

on

Host Dynamic Website on AWS

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1. Introduction

Back in the early days of the internet, websites were purely “static.” The content on each page was coded in HTML and did not change unless edited and published by the webmaster (who knew how to code in HTML).

There are still plenty of static websites today, but modern sites are typically built using a database-driven content management system (CMS) like WordPress. Sites built with a database allow pages to be generated dynamically [1]. Each time a visitor accesses a page within a dynamic site, the HTML is “pulled” from the database and sent to the user’s web browser, dynamically creating the page.
The benefit of having a Dynamic website is as a marketer you can easily update, create, and publish new content all the time without having to know how to code. This makes it much easier to keep your website fresh and engaging.

Amazon Web Services (AWS) provides a reliable, scalable, secure, and highly performing infrastructure for the most demanding web applications. This infrastructure matches IT costs with customer traffic patterns in real-time. This project describes the hosting websites dynamically using Amazon Web Services that can change the old path of deploying websites through servers and databases.

AWS service maintains all inactions that can start from deploying data in S3 Bucket and creating a computing device that can act as our virtual server and access from anywhere. We use an elastic Load Balancer (ELB) service that can help check the performance of the websites, whether the website is accessing slow or fast and whether the health of the website is also maintained. Virtual Private Cloud (VPC) service that prevents the website and provides security to the website and by that the perfect website hosting will be done by using the services of Amazon Web Services.

This project comprises of demonstration of how one can deploy a dynamic website with AWS by uploading your website content into an S3 bucket and creating an EC2 instance to host a web app on it as in this scenario EC2 acts like a public server for all people from the world can visit this server.

There are three main processes in this proposed system, which are designing a website and uploading/deploying the website into S3 Bucket and connecting the website instance with Elastic load balancer [2]. Then it will provide the website instances with a good storage capacity and maintains traffic load perfect with the best security approach using VPC.

1.1 Scope of the document

The Scope of the document is to develop a documentation with preliminary design (Or low level design) – thus termed “preliminary” – during the Initiation Process and will be reviewed and agreed upon in the Planning Process.

The document Scope Statement identifies the low level deliverables and requirements that must be met in order to deliver a desired end result (A dynamic website hosted on AWS) with the specified features and functions of the project.

1.2 Intended Audience

The dynamic website “Digio” provides a virtual platform for “Gym management” hence the target audience are the gym trainers with a basic requirement of laptop or any device with an access to internet .

1.3 System Overview

System Requirements

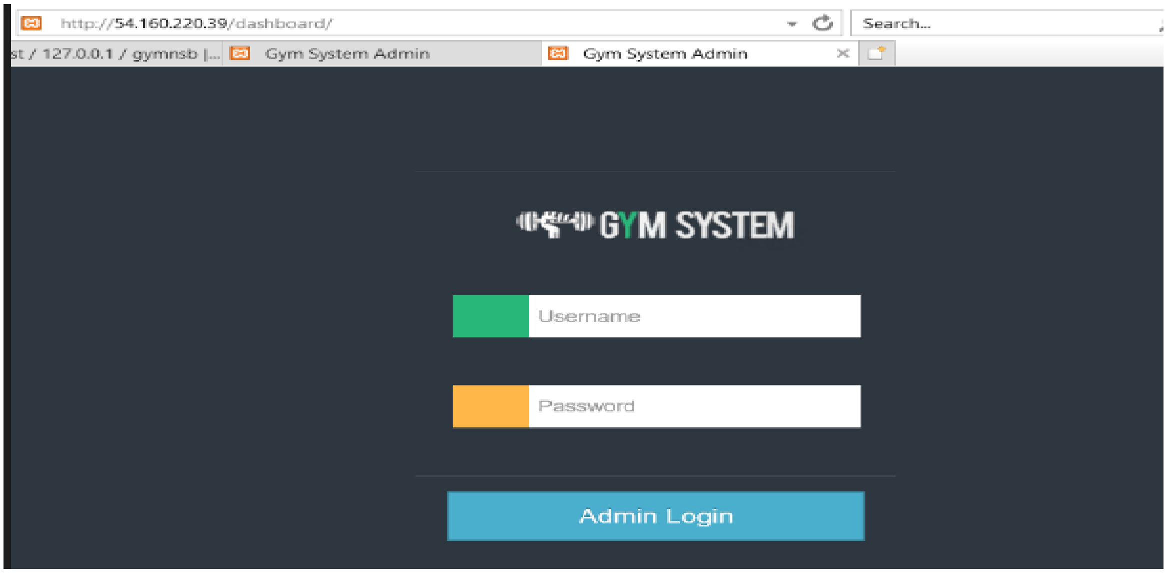
Recommended Operating Systems.
1. Windows 7 or later.
2. Linux
3. Mac-OS

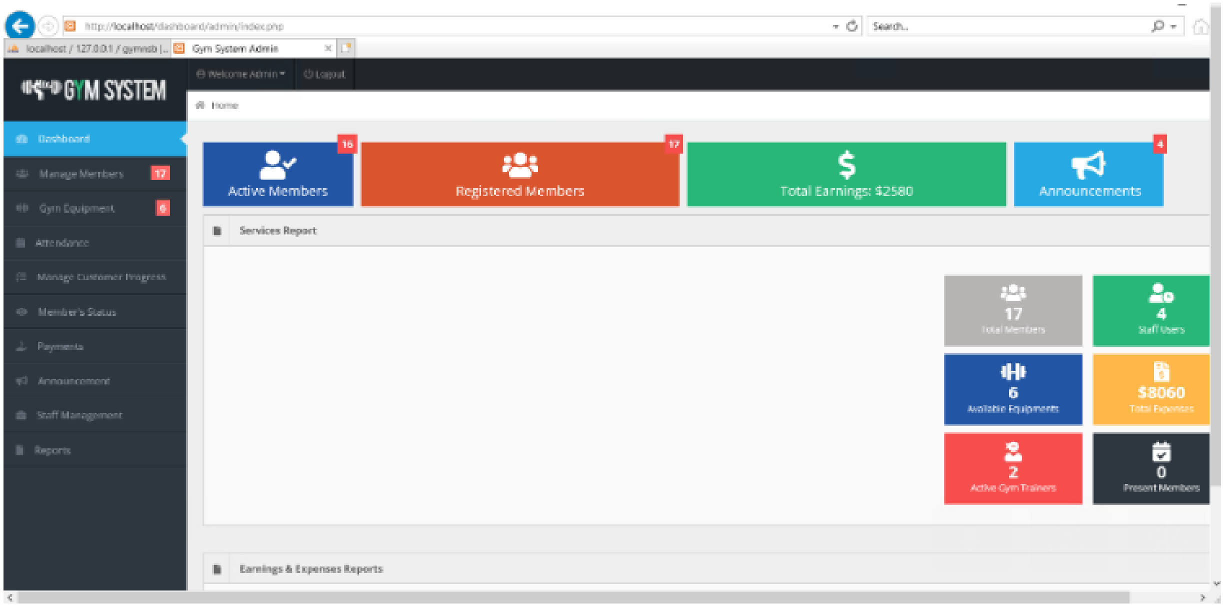
Recommended Browser
1. Chrome
2. Edge

Hardware Requirements
1. Processor: Minimum 1 GHz.
2. Memory (RAM): Minimum 2 GB.

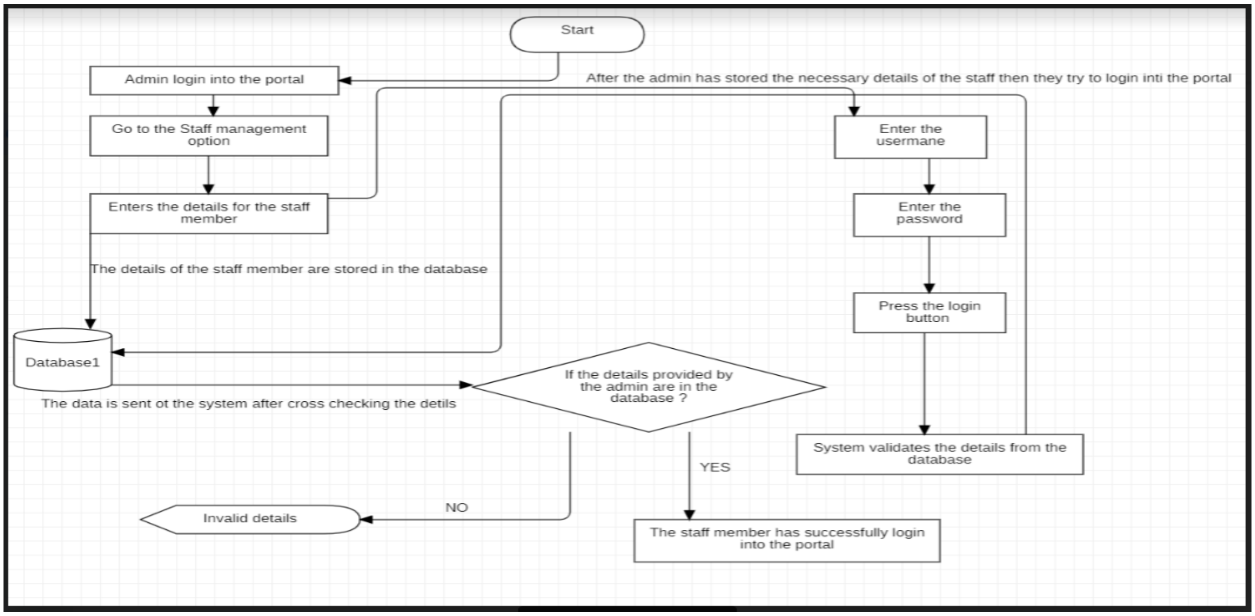
2. System Design

2.1 Application Design

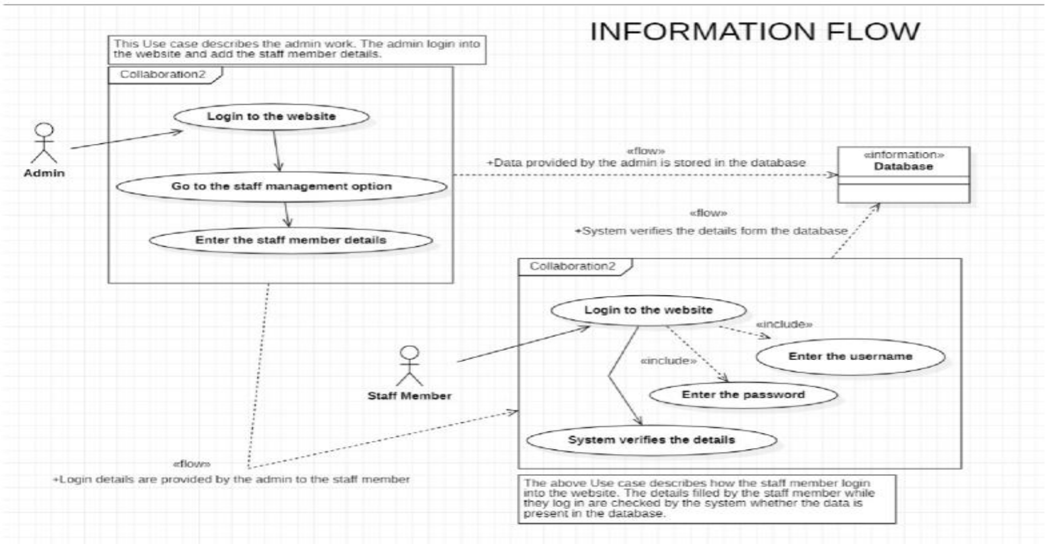




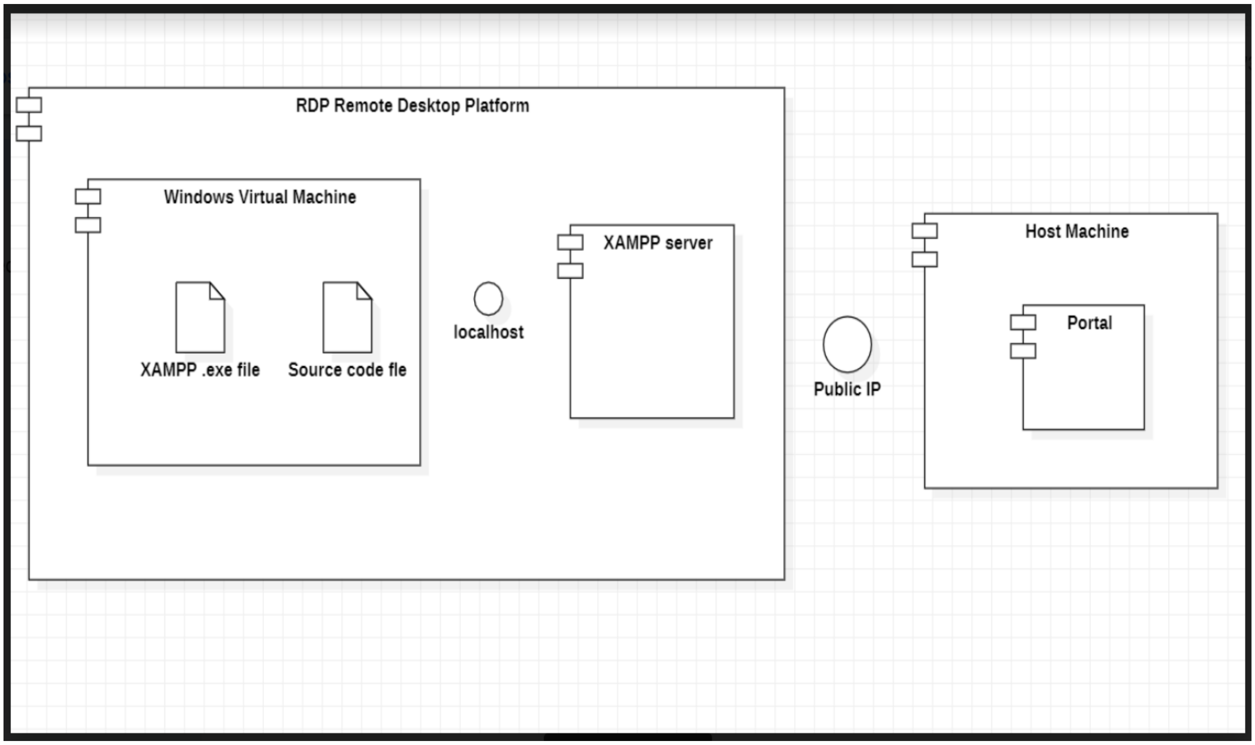
2.2 Process Flow


Start
Admin login into the portal
After the admin has stored the necessary details of the staff then they try to login inti the portal
Go to the Staff management option
Enter the usermane
Enters the details for the staff member
Enter the password
The details of the staff member are stored in the database
Press the login button
Database1
If the details provided by the admin are in the database ?
The data is sent ot the system after cross checking the detils
System validates the details from the database
YES
NO
Invalid details
The staff member has successfully login into the portal

2.3 Information Flow


INFORMATION FLOW
This Use case describes the admin work. The admin login into the website and add the staff member details.
Collaboration2
Login to the website
Admin
Go to the staff management option
Enter the staff member details
«flow»
+Data provided by the admin is stored in the database
«information»
Database
«flow»
+System verifies the details form the database
Collaboration2
Login to the website
«include»
Enter the username
«include»
Staff Member
Enter the password
System verifies the details
«flow»
+Login details are provided by the admin to the staff member
The above Use case describes how the staff member login into the website. The details filled by the staff member while they log in are checked by the system whether the data is present in the database.

2.4 Component Design



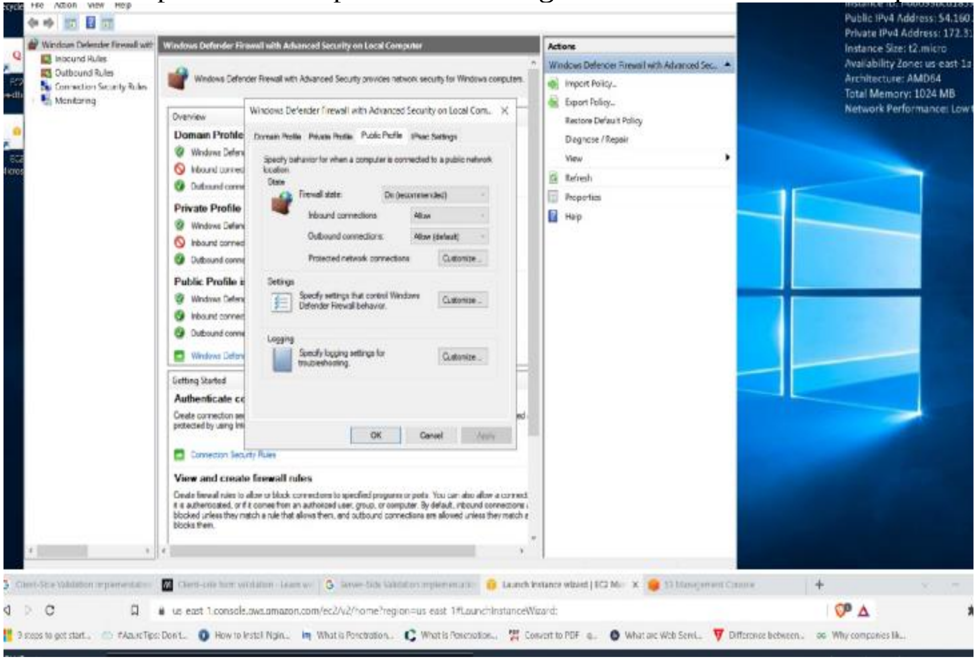
2.5 Key Design Consideration

1. While creating the aws ec2-instance always check whether the ami is free-tier eligible or not.
2. For the security group of the rdp client add http and https rules and set them for anywhere(IPV4 and IPV6).

3. Set rdp at My-IP to avoid any security flag raised by aws while creating the aws instance.

4. Dynamic website is written using PHP, write the code without using codeigniter syntax otherwise while deploying it and accessing using the Public-IP address of the instance will be problematic. (To access the website using Public-IP the file is renamed as dashboard then it can be accessed using public-ip but if the code is written using codeigniter it does not allow the deployment of the website swiftly and the website cannot be accessed using public-Ip.)

5. Make sure the port 3389 is open for accessing the website Outside the rdp environment.



Windows Defender Firewall with Advanced Security on Local Computer

Windows Defender Firewall with Advanced Security provides network security for Windows computers.

Windows Defender Firewall with Advanced Security on Local Com...

Domain Profile | Private Profile | Public Profile | IPsec Settings

Specify behavior for when a computer is connected to a public network location.

State

Firewall state: On (recommended)

Inbound connections: Allow

Outbound connections: Allow (default)

Protected network connections: Customize...

Settings

Specify settings that control Windows Defender Firewall behavior. Customize...

Logging

Specify logging settings for troubleshooting. Customize...

OK | Cancel | Apply

View and create firewall rules

Create firewall rules to allow or block connections to specified programs or ports. You can also allow a connect... it is authenticated, or if it comes from an authorized user, group, or computer. By default, inbound connections ... blocked unless they match a rule that allows them, and outbound connections are allowed unless they match a... blocks them.

Public IPv4 Address: 54.160...
Private IPv4 Address: 172.31...
Instance Size: t2.micro
Availability Zone: us-east-1a
Architecture: AMD64
Total Memory: 1024 MB
Network Performance: Low...

us-east-1.console.aws.amazon.com/ec2/v2/home?region=us-east-1#LaunchInstanceWizard:

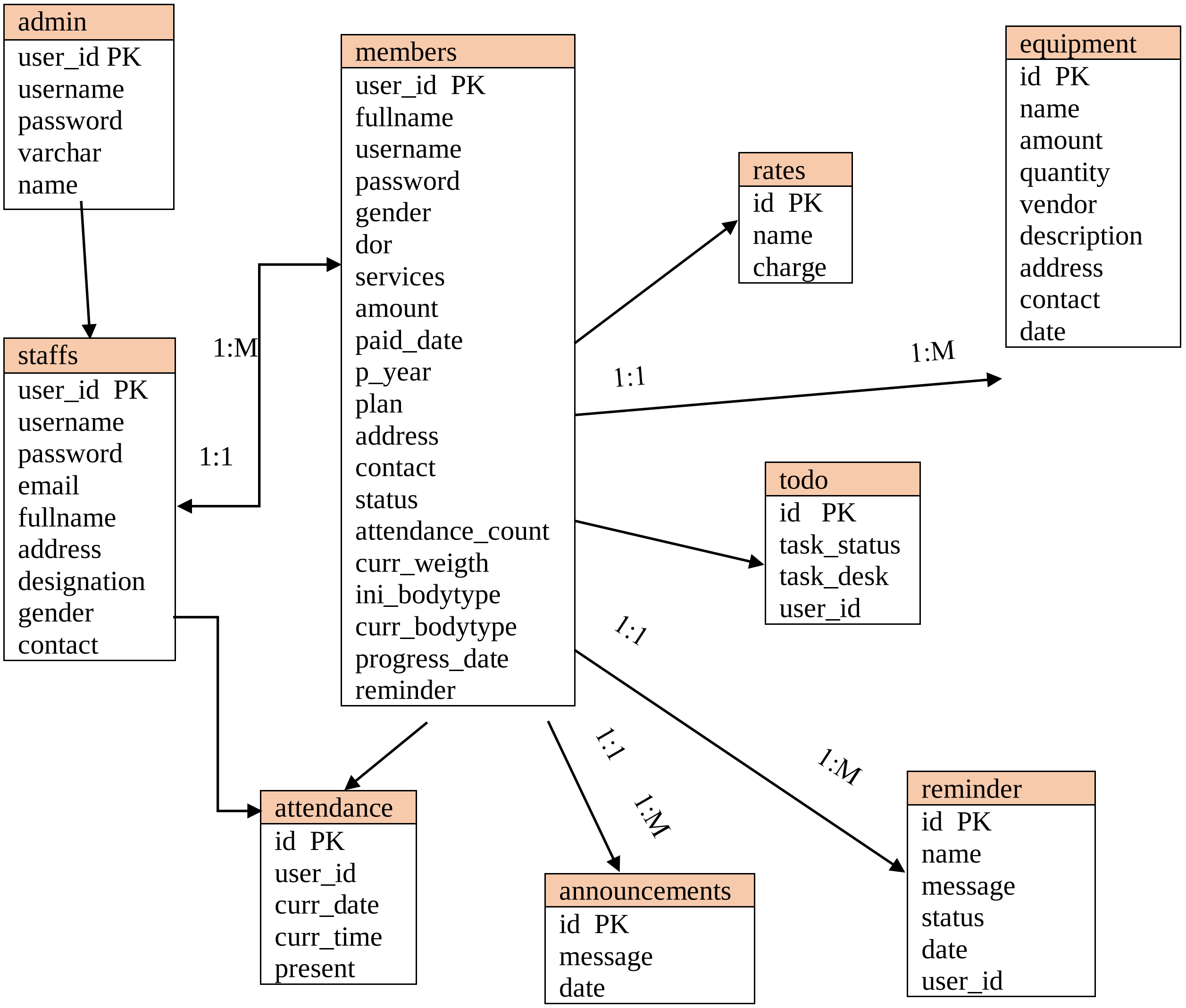
Key considerations when using AWS for web hosting

There are some key differences between the AWS Cloud and a traditional web application hosting model. The previous section highlighted many of the key areas that you should consider when deploying a web application to the cloud. This section points out some of the key architectural shifts that you need to consider when you bring any application into the cloud. You cannot deploy physical network appliances in AWS. For example, firewalls, routers, and load balancers for your AWS applications can no longer reside on physical devices, but must be replaced with software solutions.

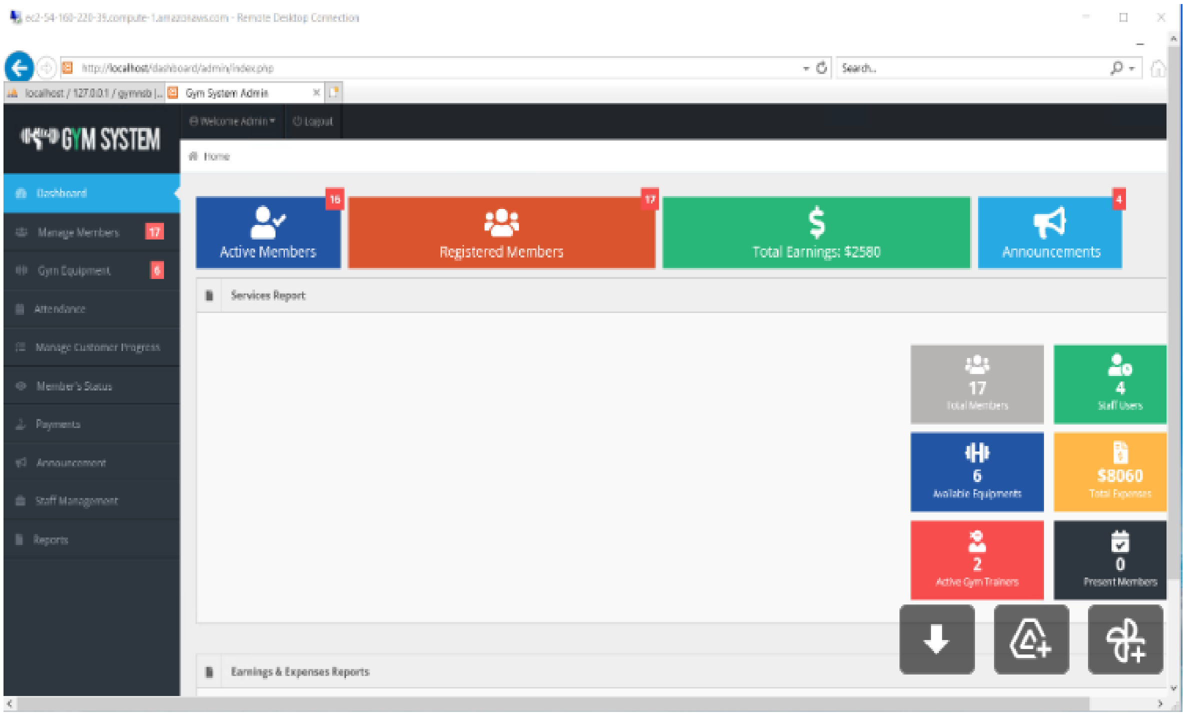
There is a wide variety of enterprise-quality software solutions, whether for load balancing or establishing a VPN connection. This is not a limitation of what can be run on the AWS Cloud, but it is an architectural change to your application if you use these devices today. Probably the most important shift in how you might architect your AWS application is that Amazon EC2 hosts should be considered ephemeral and dynamic.

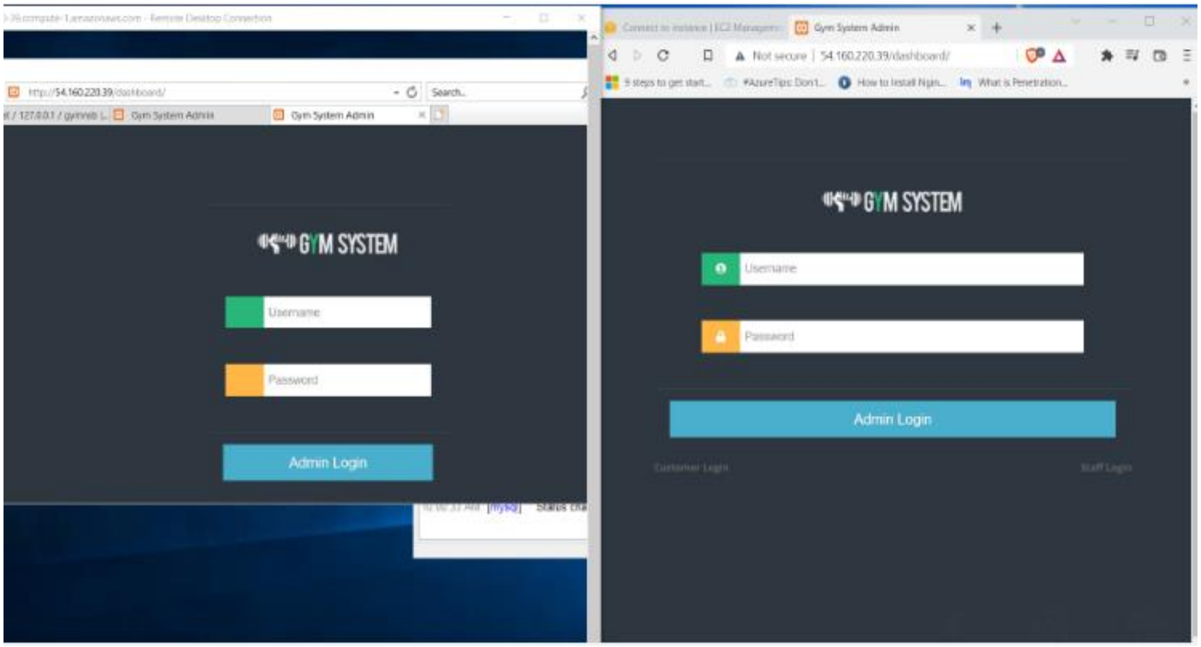
Any application built for the AWS Cloud should not assume that a host will always be available and should be designed with the knowledge that any data in the EC2 instant stores will be lost if an EC2 instance fails.When a new host is brought up, you shouldn't make assumptions about the IP address or location within an Availability Zone of the host.

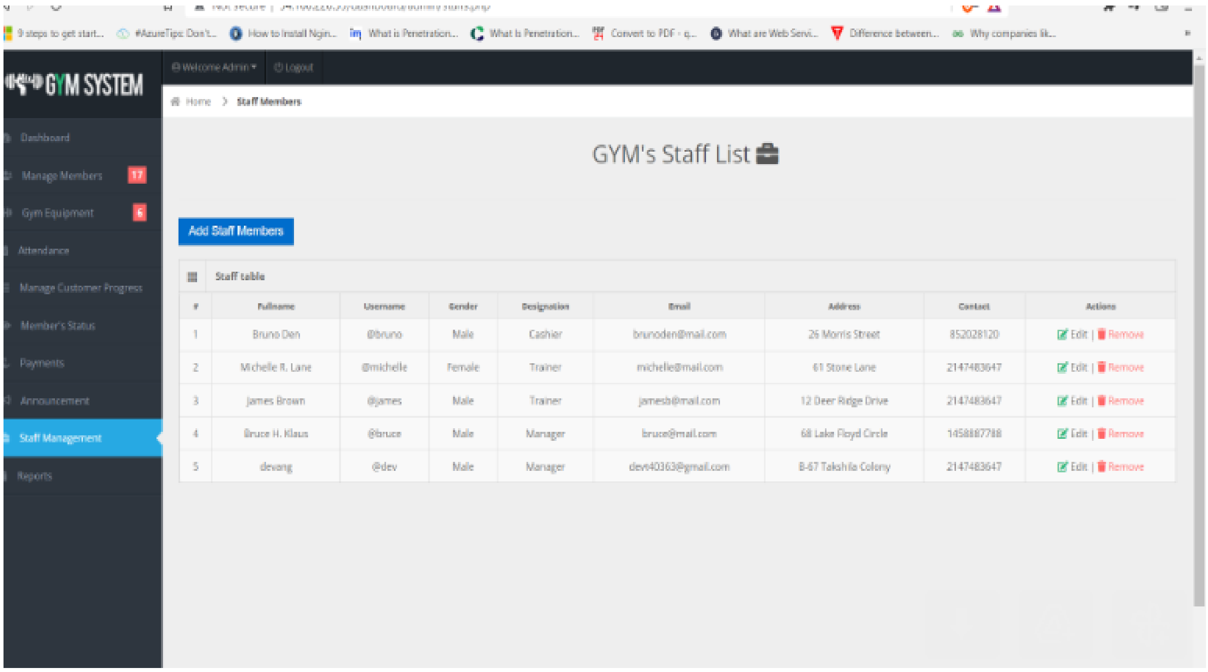
3. Data Design



4. Interfaces




Remote Desktop Connection
http://54.160.220.39/dashboard/
Gym System Admin
GYM SYSTEM
Username
Password
Admin Login
Not secure | 54.160.220.39/dashboard/
Customer Login
Staff Login

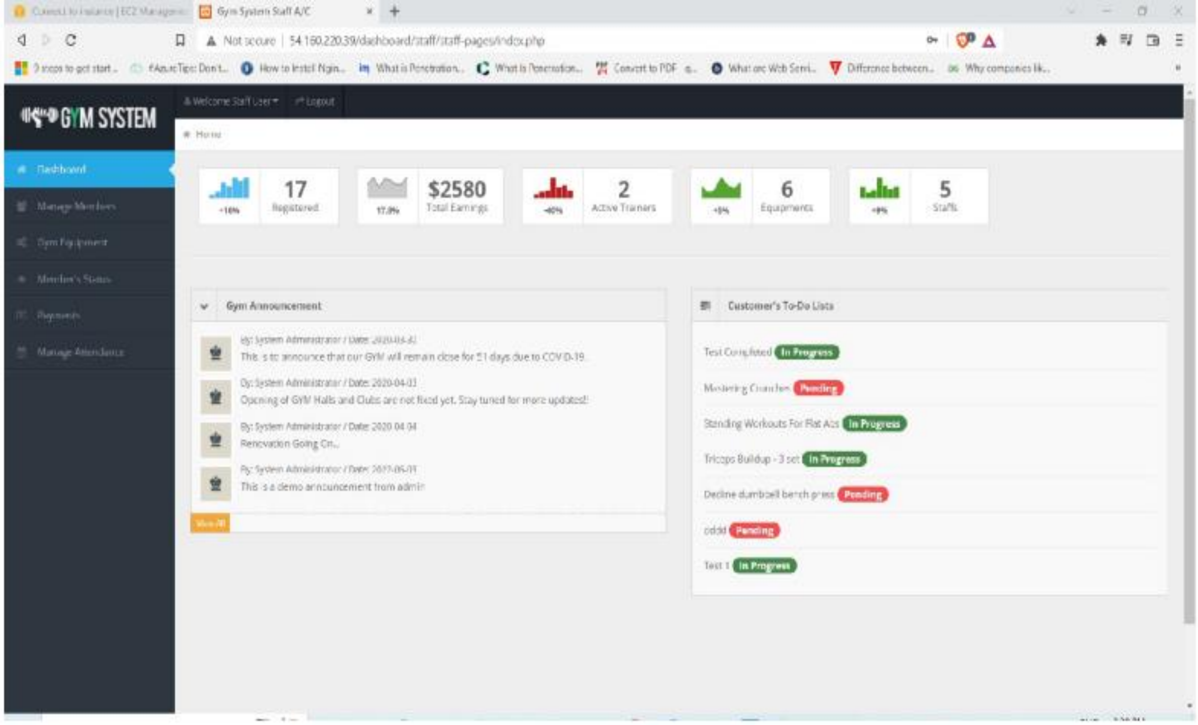


GYM's Staff List

Add Staff Members

Staff table

#	Fullname	Username	Gender	Designation	Email	Address	Contact	Actions
1	Bruno Den	@bruno	Male	Cashier	brunoden@mail.com	26 Morris Street	852028120	Edit | Remove
2	Michelle R. Lane	@michelle	Female	Trainer	michelle@mail.com	61 Stone Lane	2147483647	Edit | Remove
3	James Brown	@james	Male	Trainer	jamesb@mail.com	12 Deer Ridge Drive	2147483647	Edit | Remove
4	Bruce H. Klaus	@bruce	Male	Manager	bruce@mail.com	68 Lake Floyd Circle	1458887788	Edit | Remove
5	devang	@dev	Male	Manager	devi40363@gmail.com	B-67 Takshila Colony	2147483647	Edit | Remove



17 Registered

$2580 Total Earnings

2 Active Trainers

6 Equipments

5 Staffs

Gym Announcement

By: System Administrator / Date: 2020-03-21
This is to announce that our GYM will remain close for 21 days due to COVID-19.

By: System Administrator / Date: 2020-04-03
Opening of GYM Halls and Clubs are not fixed yet. Stay tuned for more updates!

By: System Administrator / Date: 2020-04-04
Renovation Going On...

By: System Administrator / Date: 2022-06-03
This is a demo announcement from admin

Customer's To-Do Lists

Test Completed In Progress

Mastering Crunches Pending

Standing Workouts For Flat Abs In Progress

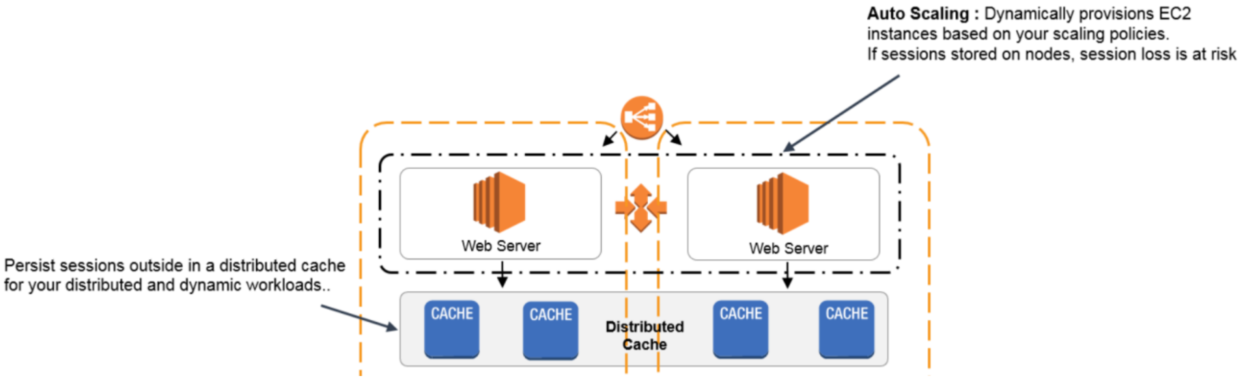
Triceps Buildup - 3 set In Progress

Decline dumbbell bench press Pending

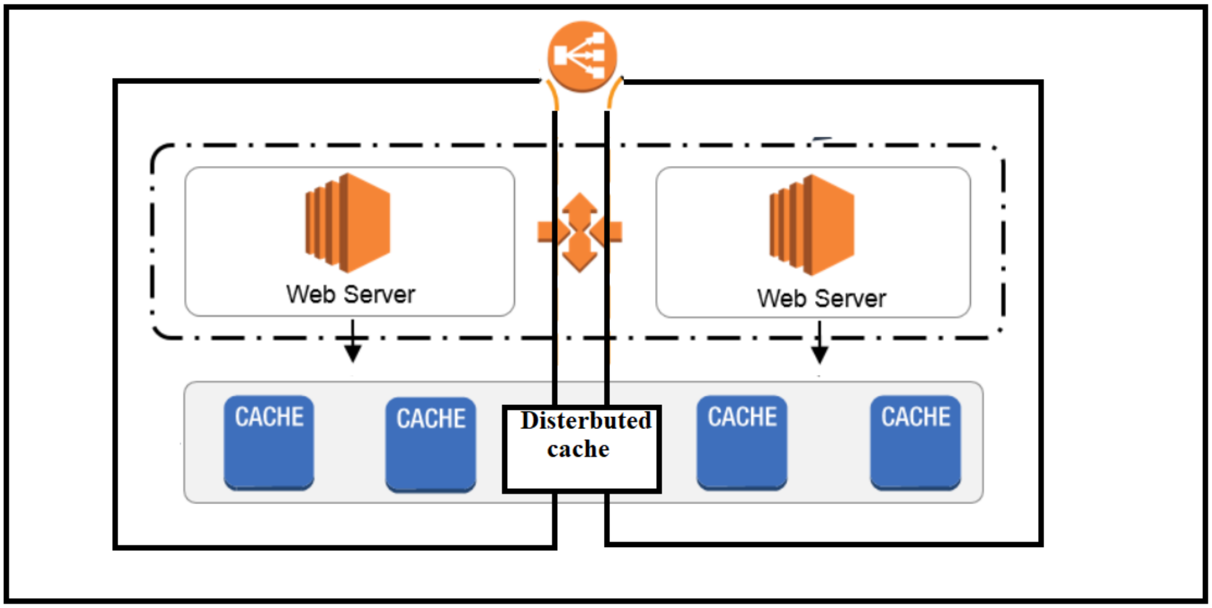
dddd Pending

Test 1 In Progress

5. State Session Management


Auto Scaling : Dynamically provisions EC2 instances based on your scaling policies.
If sessions stored on nodes, session loss is at risk
Web Server
Web Server
Persist sessions outside in a distributed cache for your distributed and dynamic workloads..
CACHE
CACHE
Distributed Cache
CACHE
CACHE

6. Caching



7. Non- functional Requirements:

7.1 Security Aspects:

- Security Policies:

  Aspects of data security in cloud computing knows no bounds. Security policies are applied throughout the complete cloud infrastructure. For better cloud security, there must be a proper configuration of security settings through strict security policies. When a company does not take its security policies seriously then they end up going through data breaches.

- Backup Plans:

  Data security also asks for backup plans so that not a single bit of data is inside the realm of risk. To avoid any kind of data loss, data should be backed either on-premises or on any other cloud. There should be always a plan B to cover any losses that may occur during data loss. To be surer about data security, cloud technology has come up with multi-cloud and hybrid cloud infrastructure.

7.2 Performance Aspects:

- Fault Tolerance:

  If the data center is in deficient and is able to provide minimum services, this can increase the performance.

- Availability:

  With easy access to cloud services and the services are always available, performance will increase.

- Number of Users:

  Increase in the number of users will reduce the performance of services.

- Location:

  If the data center is too distant from the user's location this may reduce the performance.

8. References

[1]. Sam Alapati, Darl Kuhn, Arup Nanda AWS Certified Sys-Ops Administrator Associate www.authorityofaws.com [online], July 2019.
[2]. John Paul Mueller, Luca Massaron AWS For Admins for Dummies https://www.amazon.com/Admins-Dummies-John-PaulMueller, March 2016.
[3]. Raoul Alongi [online] The Most Complete Guide to Amazon Web Services from Beginner to Advanced Level, May 2019.
[4]. Julian Hunt, Amazon Web Services Beginners User Guide. The Ultimate Tutorial, July 2018.
[5]. Kent Erickson, Pat Voulter, Henry-World, Guide for Beginner's. AWS Tutorial https://www.amazon.com/dp/, Jan 2019.