CUSTOMER SELF CARE MODERNIZATION AWS CLOUD ARCHITECTURE

Version 1.0

Prince Arora

AWS Certified Solution Architect

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Contents

1. Objective

- ✓ Modernize the legacy application for customer self-care, leveraging benefits of AWS.
- ✓ Quickly get the application up & running into production with minimal costs.
- ✓ Design a well architected cloud solution for adoption in a large Telecom enterprise.

2. Legacy System Architecture

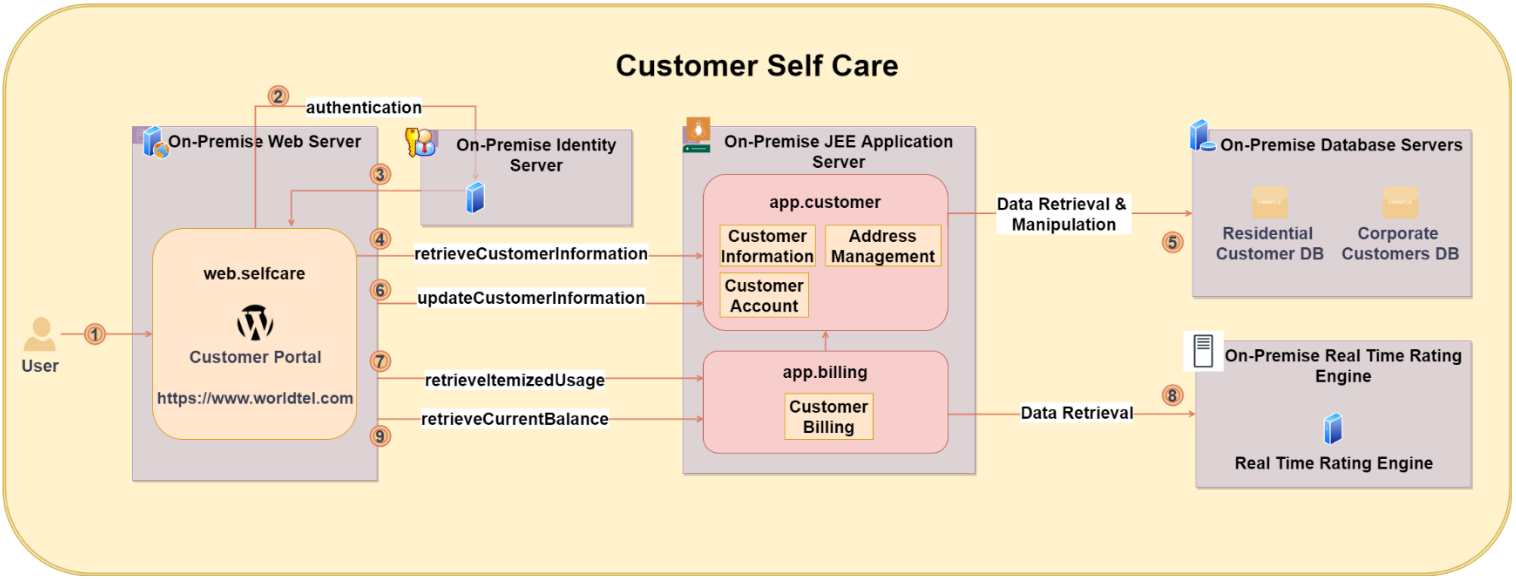

Diagram 1

[Link to as-is system flow sequence diagram]

3. Scope

3.1. Business Needs

Req #	Requirement
B1	Modernize the customer self-care web application. This is used by prepaid mobile users to check and update basic information. Also used to retrieve monthly usage and current balance.
B2	Provided following basic functionality to end users – authentication using social media platform, retrieve customer information, update customer information, retrieve current balance, retrieve itemized usage pdf, archive the itemized usage pdf.
B3	Real time rating engine and corporate customer information to remain on-premise
B4	Make the application more secured and minimize the costs.

3.2. Technical Requirements

Req #	Requirement
T1	Move following on Cloud - Customer self-care web portal, Customer Application, Billing Application, Residential customers DB.
T2	Following remains on-premise: Corporate customers DB, real time rating engine.
T3	Residential customers DB: This is an oracle DB. Hold millions of records for residential customers. This is to be moved to cloud
T4	Corporate customers DB: This is an oracle DB. Hold millions of records for corporate customers. This remains on-premise.
T5	Support authentication on customer self-care portal using social media IDP. E.g. facebook, etc
T6	RetrieveCustomerInformation API to retrieve basic customer information.
T7	UpdateCustomerInformation API to update basic customer information.
T8	RetrieveCurrentBalance API to retrieve current mobile balance.
T9	RetrieveItemizedUsage API to return monthly usage in pdf format.
T10	Archive the itemized usage pdf indefinitely.
T11	Security: Application, infrastructure & data security.
T12	Provision the required infrastructure quickly.
T13	Adapt to production scale with minimum effort.
T14	Use automation capabilities of the AWS for CI/CD.
T15	Enable better collaboration between remote development teams.

3.3. Users

User	Description
Self-Care Portal End Users	End users accessing the self-care web application.
Development & Support Team	Production support team accessing the webapp.

4. AWS Cloud Application Architecture

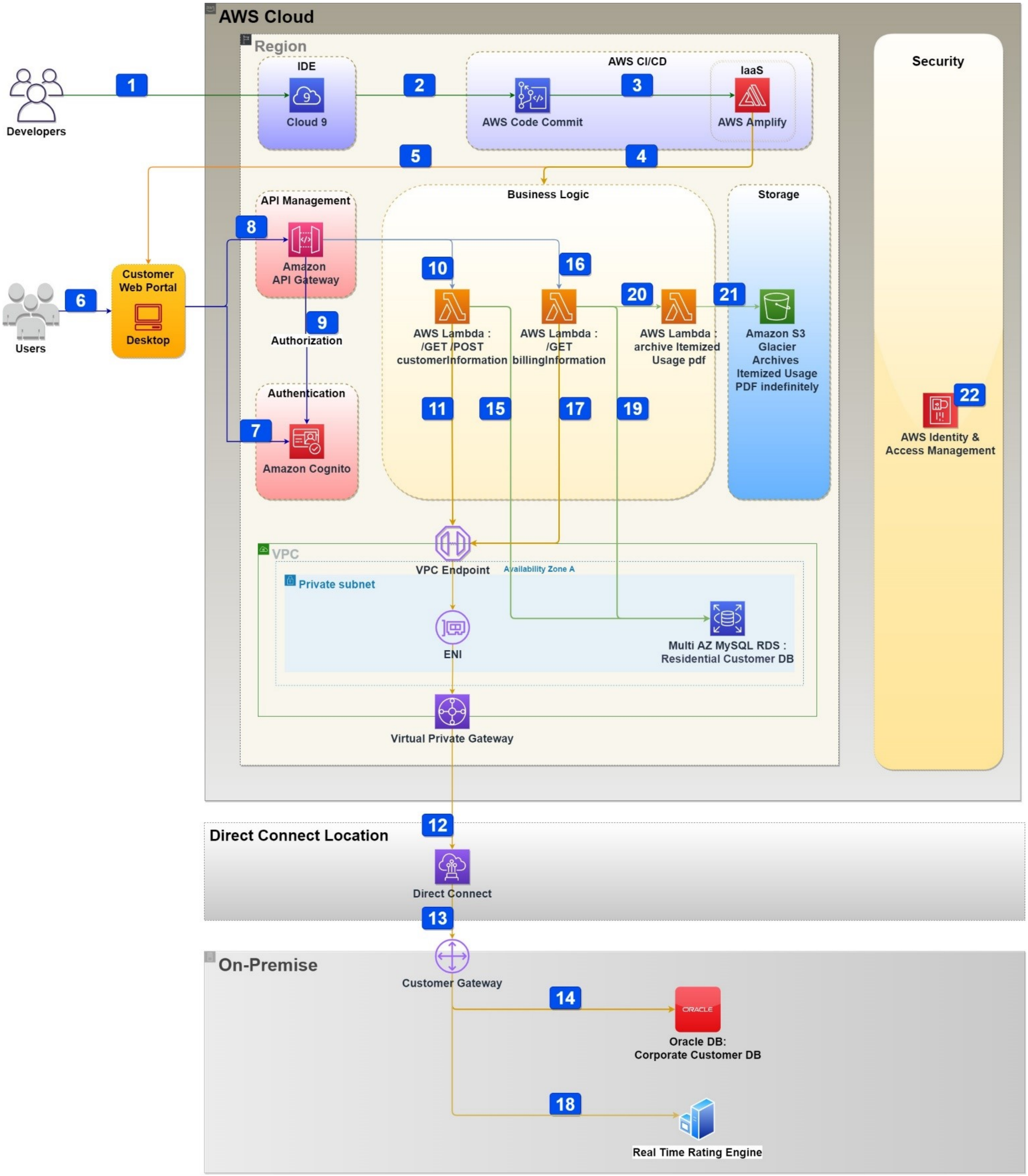

Diagram 2

Author : Prince Arora - https://www.linkedin.com/in/princearora01/

4.1. Architecture Description

1	Cloud9 is a browser-based IDE, preconfigured with development environment, AWS CLI, SDK and libraries, enables developers to collaborate in real time. Makes it easy to write, run and debug serverless applications.
2	Developers commit the code to AWS code commit, a highly secured and scalable private Git repository.
3	AWS Amplify offers a fully managed service for hosting and deploying static websites. It is connected to the source code repository. It triggers automated build and deployments as soon the code is pushed to the Git repo. It is capable to create new development environments.
4	AWS amplify build and deploys the lambda functions.
5	AWS amplify build and deploys the single page web applications.
6	End user trigger a request for retrieving the reward statements or user data insertion / updation / deletion via mobile app / web application interface.
7	Amazon Cognito handles the authentication and enables the users to sign-in using with social media identify providers like Facebook, twitter.
8	The user obtains the access token from Amazon Cognito and invokes the API exposed on API Gateway using this token. API gateway is an API management service, enables to create and secure the APIs..
9	API Gateway verifies the token received with Amazon Cognito for authorization and verification.
10	If user requested update of customer information (email, mobile, etc), the API Gateway triggers the AWS Lambda function corresponding to customerInformation API. AWS Lambda is a serverless compute service that lets you run the code without provisioning / managing application servers.
11	CustomerInformation lambda function checks customer segment. If the user is a corporate customer, then updates are done in the oracle database on-premise. **(Steps 12, 13 ,14)**
12	The connectivity from AWS Cloud to on-premise oracle DB / RTRE is achieved through Amazon Direct Connect (**Steps 12-14**). Direct connect establishes dedicated connection from premises to AWS cloud through private network.
15	If the user is a residential customer, then updates are done in the Amazon Relational Database Service (RDS) MySQL DB database.
16	In case the user requested to retrieveBalance or retrieveItemizedUsage, API Gateway routes the request to billing information lambda function.
17	BillingInformation lambda function checks customer segment. If the user is a corporate customer, then gets the details from Oracle DB and RTRE engine on-premise. **(Steps 12, 13 ,14, 18)**
19	If the user is a residential customer, then BillingInformation lambda function retrieves the required billing id details from Amazon RDS MYSQL database. And then retrieves the required balance / itemized usage pdf from the RTRE engine on-premise.
20	Billing information lambda function invokes another lambda function for archival of usage pdfs.
21	Archival AWS Lambda function persists the retrieved itemized usage pdf for indefinite archival to Amazon S3 object storage. Amazon S3 provides the cheapest object storage option S3 Glacier Deep Archive for archiving the files for a very long period. Policies can be configured in S3 to automatically move the files to this storage class after a configurable period
22	Identity & Access Management service enables centralized way to manage & govern the access to all the AWS services and resources securely. It enables governance of users, groups roles, permissions and policies. This service is free of cost.

5. Business Value Delivered By Cloud Adoption

Sr No	Customer Challenges	Business Value Delivered By AWS Cloud
1	Quick environment procurement	✓ Real time on demand provisioning of required IT resources.
2	Minimize costs and agile development	✓ Huge costs savings for procuring, maintaining hardware and real estate. ✓ Pay as you go model. ✓ Ease of releasing the resources at any point & upgrade the hardware/ software to support new needs. ✓ No long-term commitments. ✓ Focus on the core business needs instead of IT ✓ Quick time to market from ideation to production
4	Boost customer satisfaction	✓ Applications achieve high availability, scalability, resilience. ✓ Improved user experience on high speed private network.
5	Enable better collaboration between remote development teams.	✓ Use of cloud-based IDEs (e.g Cloud9) enable better collaboration between team members working remotely. ✓ Not required to invest on hardware upgrades for the development team laptops to support CPU & memory intensive applications.
6	Use automation capabilities of the AWS for CI/CD.	✓ Automated DevOps supported by cloud managed services (e.g. Amazon Amplify). ✓ No downtime for deploying to production. ✓ Quickly release changes to production in an automated and agile manner.
7	Application security	✓ Provides most comprehensive security and compliance controls. Examples: ❖ Data encrypted at rest and in transit. ❖ Identity and access management for users and applications. ❖ Tracks user activity on cloud. ❖ DDoS protection. ❖ Key storage and management. ❖ Threat detection.

6. Assumptions

Sr No	Assumptions
1	The revamped customer web portal is a Single Page Application.
2	Maximum 10,000 requests per second to be supported per API.

7. References

Sr No	Reference	Link
1	Modern Serverless Mobile/Web Application Architecture Integrated with CI/CD and Analytics Use Case	https://d1.awsstatic.com/architecture-diagrams/ArchitectureDiagrams/mobile-web-serverless-RA.pdf
2	Links to various AWS services used in the solution are referenced in the architecture description on page 4	AWS Services Used In The Solution

8. Document Version History

Sr No	Version Number	Date	Author	Remarks
1	1.0	01-Oct-2021	Prince Arora	First Version Released