

Project Proposal

Transport Management System (TMS) for ITL Logistics Group

1. SOLUTION DIRECTION

1.1. Discussion regarding the chosen solution direction

The solution direction that I had chosen for the development of the Transport Management System for ITL Logistics Groups is **Web-based application hosted on Amazon Web Service (AWS)**.

KoST Analysis	Web-based application hosted on Amazon Web Service (AWS)
Knowledge	<u>Problem Domain:</u> Logistical Operations Management, Supply Chain Solution, Security and Compliance
	<u>Solution Domain:</u> Order and Inventory Management, Carrier and Shipment Management, Route Planning and Optimization, Billing and Invoicing, Efficiency Analysis and Reporting.
Skills	<u>Strengths:</u> Decent knowledge of cybersecurity implementation and development. Decent knowledge and experience with the deployment of application on cloud-based solution such as Amazon Web Service (AWS) Fundamental system architecture experience for cloud-based solution.
	<u>Weaknesses:</u> Lacks knowledge and experience regarding mobile application development. Lacks knowledge and experience regarding desktop application development. Lacks knowledge and experience regarding UI/UX using advanced front-end technologies.
Technology	The proposed approach involves leveraging Amazon Web Services (AWS) to develop the system. AWS Lambda can handle order management logic, AWS SNS can handle notifications, and AWS IoT can track

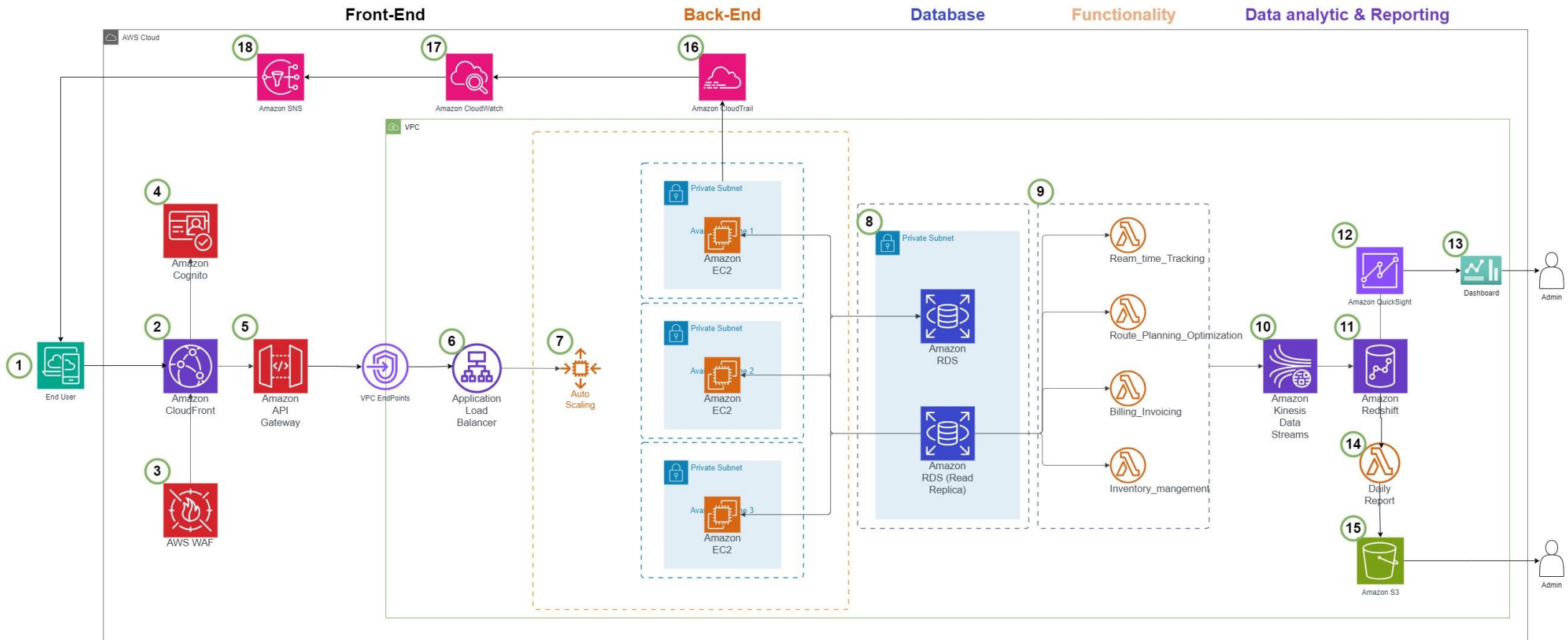
	shipments and carriers. For inventory management, AWS Lambda and DynamoDB can be used. AWS Location Service can optimize delivery routes, and AWS Lambda can handle route planning. Billing and invoicing can be implemented using AWS Lambda and DynamoDB. Analytics and reporting can be achieved using services like Amazon Redshift or Amazon Athena. AWS Cognito can manage user access. AWS services can ensure performance, scalability, security, integration, data backup, and user support.
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1.2. Rationale for the chosen solution

The proposed approach utilizes Amazon Web Services (AWS) to develop a solution for logistical operations management and supply chain. It aligns with the problem domain of order and inventory management, carrier and shipment management, route planning and optimization, billing and invoicing, and efficiency analysis and reporting. The strengths in cybersecurity implementation, cloud-based solution deployment, and system architecture experience are leveraged. However, the weaknesses in mobile and desktop application development, as well as UI/UX with advanced front-end technologies, need to be addressed through collaboration with specialists in those areas.

2. SOLUTION DESIGN

2.1. Architectural Diagram



2.2. Flow description.

Front End:

1. End users can access the TMS through mobile devices or personal computers.
2. Application is served with Amazon CloudFront as a Content Delivery Network (CDN) to enhance its performance.
3. AWS WAF is a protective solution that works in conjunction with CloudFront to identify and prevent harmful traffic by using adaptable regulations. By employing this service, the application is shielded from prevalent internet-based assaults such as SQL injection, cross-site scripting (XSS), and others.
4. TMS's log in portal is connected with Amazon Cognito to handle authentication and authorization tasks.
 - Cognito offers multiple authentication methods, including username/passwords and social identity providers like Google and Facebook.
 - For authorization, Cognito utilizes user pools and identity pools to store user profiles and credentials. When users provide correct login details, Cognito Identity pools will provide temporary access to the application.

Back End:

5. TMS front end will utilize API calls to interact with backend services that are managed by AWS API Gateway.
6. API Gateway handles client requests and directs the traffic to the Application Load Balancer, which in turn routes it to the appropriate backend services for processing.
7. The backend services are deployed using Amazon Elastic Compute Cloud (EC2) service. They are combined with an Auto Scaling group to ensure high availability and the ability to handle fluctuations in usage. The Auto Scaling group automatically

creates additional EC2 instances during periods of high usage and stops instances during low usage to optimize resource utilization.

8. Processing data will be stored in Amazon Relational Database Services (RDS) for long-term storage, RDS is replicated with an additional read replica for better performances, additional cache system can also be deployed if necessary.
9. Data stored in RDS can then be retrieved to perform additional processing and batch jobs, AWS Lambda is the services responsible for processing RDS data based on business requirements.

Data Analytic & Reporting:

10. Processed data by AWS Lambda is then pushed into AWS Kinesis Data Stream, allowing real-time data to be updated and captured in Amazon Redshift.
11. Amazon Redshift is a fully managed data warehousing service designed for analysing large volumes of data quickly and cost-effectively.
12. After creating result datasets in Redshift, they can be utilized to develop personalized visualizations and dashboards using Amazon QuickSight.
13. These dashboards can provide IT administrators and executives with insights on the performance of the company.
14. AWS Lambda is used again to perform calculations, transformations, and generate customized reports to admin's requirements.
15. Reports created by AWS Lambda is stored on AWS S3 for long-term storage and retrieval.

Application Monitoring Components:

16. CloudTrail: AWS CloudTrail is a service that provides comprehensive logging and auditing of API activity in AWS account, enabling real-time data of system usage to be recorded and stored for further analysis.

17. CloudWatch: AWS CloudWatch is a service for monitoring and observing your AWS environment. It offers real-time insights into resource utilization, application performance, and operational health. With CloudWatch, you can collect, analyse, and visualize logs, metrics, and events across your AWS infrastructure. This enables efficient operation and proactive management to ensure that your system is running smoothly.
18. AWS Simple Notification Service is a fully managed messaging service enabling the delivery of messages to a variety of endpoints such as email, SMS, mobile notification, and more. This service is used to perform notification based on predefined metric from our system to the end user.