



# Microservices driven, real-time freight cargo and driver tracking system

## CASE STUDY

### Cloud Application Development (SaaS)

Multi-point micro-service based cloud application that facilitates richer insights with newest functionalities while delivering offline server management ecosystem.



### PROTECTED

Client: **Protected by NDA**

Country: **USA**

Industry: **Transportation and Logistics**

#### Overview

The client is one of the largest multi-modal transportation and logistics services provider in Europe since more than 80 years. With branches in more than 30 countries, team of more than 1000 people and a fleet of more than 850 vehicles, the client specializes not just in overland, ocean or air freight but moving heavy, specialized cargo across mountain terrain. As a corporate strategy the client has over the years continuously invested in development of digital solutions for corporate management, transportation, CRM and other applications through the entire logistics chain.

#### Challenges

- Need for a single, centralized platform that integrates with the legacy ERP, CRM, Transport Management System and the other applications on the back-end and provides a front-end interface for customers to track their cargo using live location, submit and track their service requests, view and process invoices, etc. The front-end should also provide an interface to the client's customer service teams for managing all cargo and transportation planning, vehicle scheduling and other administrative processes.
- The envisaged solution would have to be highly available and reliable such that a breakdown of one component of the solution does not disrupt other functionalities of the system.
- As a part of the overall solution, there was a need for an extended solution for vehicle driver management that offers live tracking and also supports offline operations.
- Major challenges identified were pertaining to integration of various legacy and disparate applications.

#### Approach

Our team of Azure Cloud architects, cloud developers and integration specialists conducted a detailed review of the legacy applications ecosystem, determined feasibility for integration and conceptualized a microservices based architecture that allows flexibility, scalability, speed and availability. The Azure Cloud solution was designed primarily focussing on providing functionalities for customer management and vehicle driver administration.

#### Quicks Insights



##### Challenges

- Large number of interconnected software applications
- Lack of single customer-facing application that encompasses, CRM, Customer Service, Real-Time Freight Tracking and Administration
- Live vehicle tracking system that works in both online and offline mode
- Ensuring zero downtime



##### Solution

- High availability customer facing portal
- Real-time visibility of freight cargo movement through a driver mobile app
- Highly scalable database management system
- Reduced Total Cost of Ownership
- Improved customer workflow with efficient time management

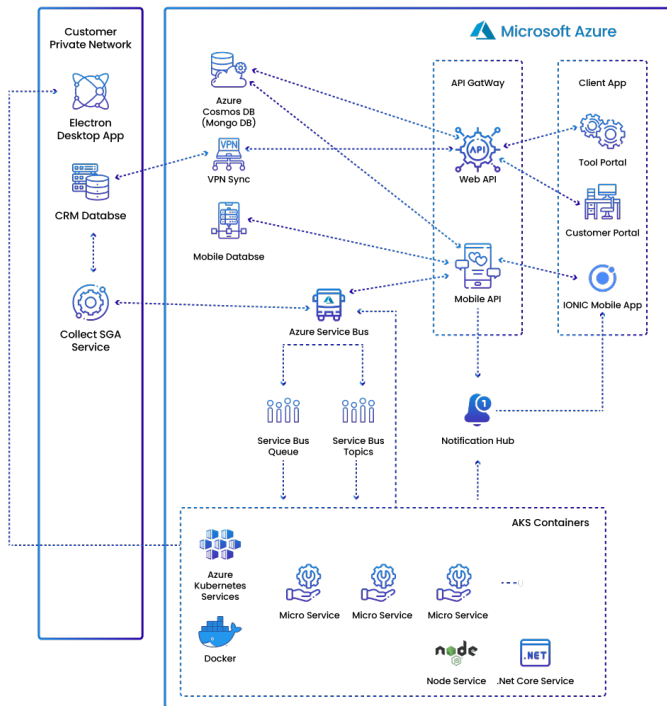


##### Results

- High availability customer facing portal
- Real-time visibility of freight cargo movement through a driver mobile app
- Highly scalable database management system
- Reduced Total Cost of Ownership
- Improved customer workflow with efficient time management

*Microsoft Azure Kubernetes Services (AKS) driven, containerized microservices based solution architecture .*

## Solution



- To address the disconnect between transport management and administration functions, two different applications were conceptualized, developed and implemented: a cloud portal offering access to the client's customer service team and separate access to the customers, and a mobile app for vehicle driver.
- Several custom microservices were developed and deployed which addressed the need for tracking the different events during the vehicle trip, synchronizing the data between ERP and other enterprise applications, sending alerts and notifications, deriving the reward points for drivers, etc.
- To establish and ensure continuous communication between every individual component of the microservices, Queue and Topic features of Azure Service Bus were implemented.

- A real-time notification system was developed and implemented on the Driver Mobile App that notifies the driver for events such as new cargo assignments and trip alerts using Azure Notification Hub service.
- To enhance the database management system and store trip-related documents, Azure Storage Account service was implemented in the solution.
- To support live geo-location-based tracking for trucks, intensive and reactive data storage solution was needed, our team developed a solution that processed and stored the data in MongoDB provided by Azure Cosmos DB service.
- To support offline operations in remote areas the Driver Mobile app was developed in a such a way that it captures data and GPS locations offline too and synchronizes the data with the cloud once the app is back online.
- Being a critical solution for the enterprise, the entire solution needed to be running 24\*7. To monitor the health of the entire solution, Azure App Insights service was implemented within the solution

## Outcomes

- The client's customers now have a better visibility of their cargo movement with access to real-time vehicle movement as well as analytics.
- Seamless engagement with customers enabled through a single platform for service requests, cargo tracking and updates, invoicing, administration, etc.
- Single window driver / vehicle monitoring and management for the entire fleet.
- Rich geo-location-based UI Dashboard that displays live location of all the vehicles on a big screen.

## Technologies

- Azure Cloud, Azure Kubernetes Services, Docker, Angular, Ionic, Web API, Microsoft .NET Core, Node.js, Windows Service
- Unit Testing Framework (.NET Unit Test Project, Mocha, Chai, Sinon)
- Microsoft SQL Server
- MongoDB

## About DEV IT

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