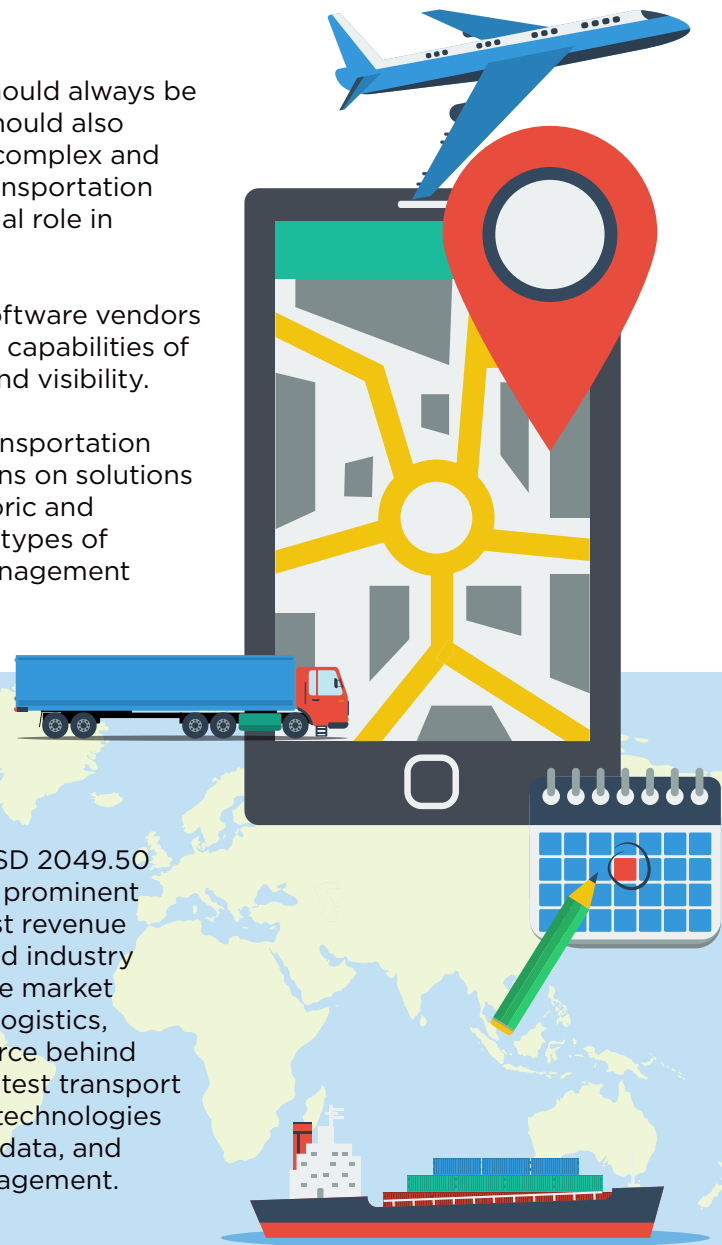# Forecasted Transport Planning

Abstract

Transportation, shipping, and logistics management should always be treated with priority in the supply chain process. We should also understand this can represent one of the most costly, complex and time-consuming pursuits in an organization. Hence, transportation planning and robust logistics management play a crucial role in executing deliveries on time.

In the world of supply chain today, there are leading software vendors that provide transportation management systems with capabilities of load optimization and real-time tracking with end-to-end visibility.

In this whitepaper, we will focus on how to conduct transportation management efficiently. We will talk about a few options on solutions that provide forecasted transit time updates from historic and real-time events. We will also understand the different types of offerings which can integrate with a transportation management system (TMS) to enhance the planning process.

Introduction

The global TMS market has the potential to grow by USD 2049.50 million during 2020-2024. North America is one of the prominent regions in TMS industry landscape, contributing highest revenue globally due to presence of large number of players and industry verticals. Some of Leading TMS software vendors in the market are Blueyonder, Oracle, SAP, Manhattan, Blue Jay, 3T Logistics, and others. Technology has always been the driving force behind the evolution of TMS and logistics management. The latest transport management systems are incorporating cutting-edge technologies such as mobile phones, GPS satellites, 3D printers, big data, and artificial intelligence (AI) to enable transportation management.

Problem Statement

Most of the leading TMS software providers have really focused on providing real-time transportation visibility for shippers, third party logistics players, and their customers. The TMS software integrates with real-time visibility software such as Four Kites, project44, TransVoyant, IntelliTrans etc., in providing real-time tracking of the shipment. Although visibility is high in demand and a key priority, companies still struggle in making proper transportation planning which is one step ahead of shipment optimization and visibility. This often results in a lack of understanding of the quantitative benefits. The transit time of the shipment can vary due to various reasons such as weather, traffic, events, and equipment types etc. Such inaccuracy in transit times leads to :

Inefficient transportation planning	Increased warehouse turnover time	Further issues in downstream processes or secondary shipment legs

These transit time variations can sometimes show a trend in delays and it could be between a specific origin and destination or for a specific vehicle type movement or for a specific period.

Levels of transportation planning

Strategic:

Plan your transportation networks based on current and future requirements.

Tactical:

Plan shipments, routes, and optimize fleet assets.

Dynamic:

Adjust shipments and routes on short notice.

Recent rapid development of crowdsourced big data and big data tools provide an alternative source of travel time information from various sources.

Many internet companies now gather historic and real-time data through transportation networks like proprietary probe-vehicle networks. Few companies which provide such online sources are :
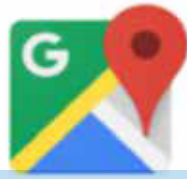
Google: Google Application Programming Interface (API)

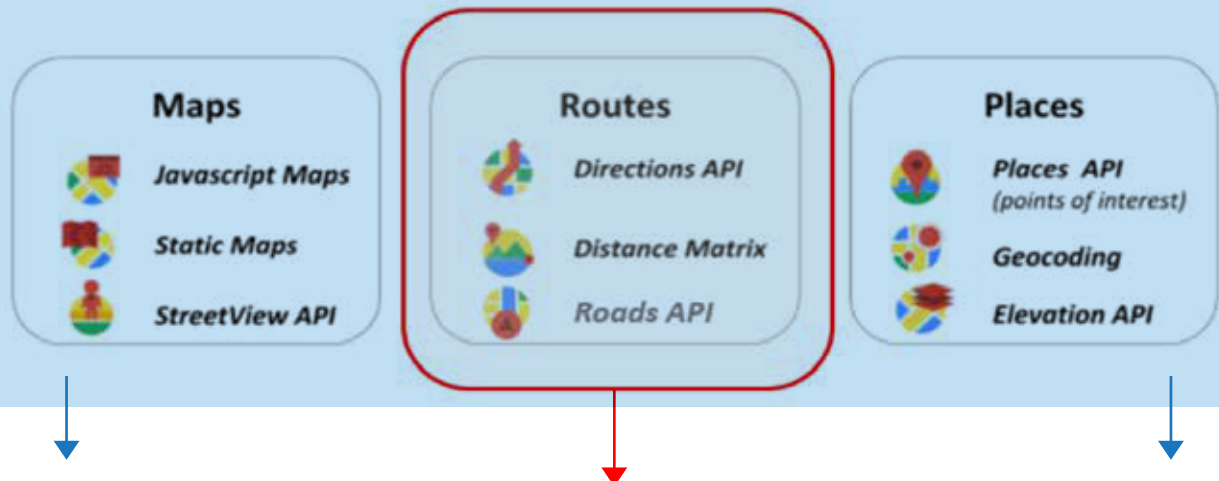**Waze: Waze Transport Software Development Kit (SDK)**

Uber: Uber Movement

••• Solution Details

In this section, we will get to know more about Google platform integration using Google Maps services.

The integration provides strategic, tactical, and dynamic updates for transportation planning.

Google Maps Platform

Maps
- Javascript Maps
- Static Maps
- StreetView API

Routes
- Directions API
- Distance Matrix
- Roads API

Places
- Places API (points of interest)
- Geocoding
- Elevation API

The Google maps brings the real world to users with static and dynamic maps and Street View imagery with customized and agile experience.

This provides best available routes between locations A to Z with comprehensive data and real-time traffic.

Provide details around the world for over 100 million points of interest on places using addresses, phone numbers and real time signals. Let's focus on the Routes API and then we shall highlight "Directions API " and "Distance Matrix API.

Directions API:

Calculates current or future travel times based on real-time traffic:

- Returns directions for travelling via public transport, road, etc.
- Returns directions through a series of specified through points.
- Can take text strings as inputs for through points (e.g. "Chicago, IL" or "Darwin, NT, Australia"), as place IDs, or as latitude/ longitude coordinates.
- **Pricing:** Directions API- $5 (per 1000 request) and Directions Advance- $10 (per 1000 requests)

Distance Matrix API:

Delivers travel times and distances for one or more locations :

- The API returns information based on the recommended route between the start & end points
- Destination and through points are used to calculate the travel time and distance. The above mentioned formats can be used to mention the through points and end points.
- Specifies the mode of transport to use when calculating distance
- Language selection option to return results in preferred language and there is a list of supported languages
- The region code, specified as a ccTLD (country code top-level domain)
- **Pricing:** Distance Matrix- $5 (per 1000 elements) and Distance Matrix Advance- $10 (per 1000 elements)
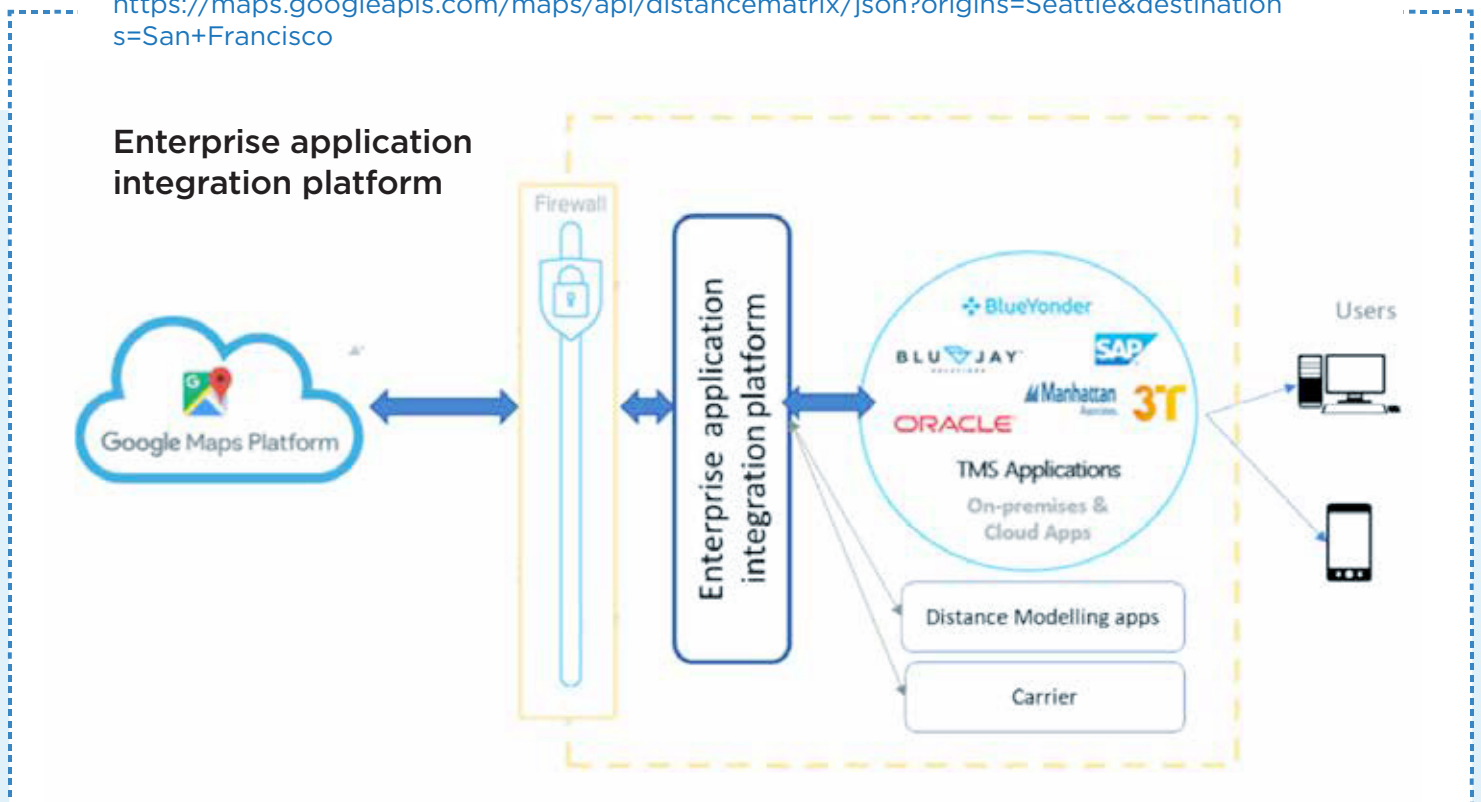
The Directions API is a web service that uses an HTTP request to return JSON or XML-formatted directions between locations. You can receive directions for several modes of transportation, such as transit, driving, walking, or cycling.For direction calculations to respond in real time you can use the Directions API or, the Maps JavaScript API.

https://maps.googleapis.com/maps/api/directions/json?origin=Disneyland&destination=Universal+Studios+Hollywood

The Distance API also uses an HTTP request to return JSON or XML output with information based on the recommended route between start and end points, as calculated by the Google Maps API, and consists values of duration and distance for each pair.

https://maps.googleapis.com/maps/api/distancematrix/json?origins=Seattle&destinations=San+Francisco

Google provides the API's Discovery Document which describes the surface of the API, how to access the API and how API requests and responses are structured. For example, the Route API has detailed information of a particular route or distance between an origin and destination. Based on the application requirement, we can map data to, and retrieve required details for, transportation planning.

Why the need for Forecasted Transit Time ?

The process of generating forecasted transit times can serve as a simulation for future transportation needs for an organization and enable them to analyze their transportation strategy proactively to increase efficiency

For example, let's assume there is a multi-pick scenario where your TMS had used its optimizing strategy to provide a pick-stop sequence based on the location proximity. At the same time, there is an event which happens every month on a particular day, en route to your pick stops A and B, or bad weather which causes tough roads may result in traffic delays. Integrating with such a Google Distance API provides the forecasted transit time between stops much before planning. This can also be sent as an input to the TMS' optimizing engine to provide an appropriate pick stop sequence.

Forecasting transit times allows organizations to optimize the strategic transportation decisions and serve as a crystal ball for future transportation decisions. This process can add a lot of value to the logistics management and provide the fastest and most efficient route to move products.

Why use the Google Maps Platform?

There are many Internet companies which gather historic and real-time data and make it available online. Below listed are key benefits integrating with Google platforms:

Google Platform gives access to all our core APIs

API structure is simple and easy to understand

Single pricing plan for all (No standard and premium plans), which is a pay-as-you go pricing plan

Set max budget on API usage and services, which triggers alerts

Option to use services like optimization while using directions services

Pass restrictions like avoid Toll, Highway, etc.

Set unit of measures and preferred language

Case Study

Tiramizoo offers a SaaS platform for apps used by retailers, logistics companies, and smart cities. Its TMS uses tiramizoo's proprietary algorithm to calculate more efficient and cost-effective routes throughout cities. The Tiramizoo app provides value to clients by automating as much of the logistics management as possible after integrating with their online stores. When orders come in, the app determines the delivery address with Places Geocoding API. From here, Tiramizoo uses the Google Routes API such as Distance Matrix API to calculate the appropriate distances and to assign the plans to available drivers.

Reduces delivery times by 20% with Google Maps platform

Since implementing Google Maps Platform, Tiramizoo has delivered more than a million packages over a distance of more than 10 million kilometres. The company's delivery service has seen remarkable improvements, with 30% more packages delivered per hour, 20% less time needed for deliveries, and 30% fewer vehicles. Perhaps the biggest impact has been with the introduction of the app, which has allowed Tiramizoo to expand its business to 160 cities across Europe and, more recently, into Asia

> We work with Tiramizoo to get the most out of Google Cloud and Google Maps Platform for its cutting-edge same-day delivery solution
>
> - Google Cloud Consultant

Conclusion

In the current world of uncertinity, it is important to have a proper transportation plan and its not just enough to have an efficient optimization of shipments or having real-time tracking capabilities but also to consider the environmental conditions, events, traffic, and other reasons, which can impact the shipment delivery. Its data, which is already available from historic events or real-time updates which can be utilized using service providers like the Google Maps Platform. In the above section, we have identified key APIs from Google which can be integrated with your ERP application as well as your Android and iOS devices, to provide updates for making an efficient transportation plan.

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