



REAL-TIME VISIBILITY FOR THE LOGISTICS INDUSTRY

Leveraging real-time visibility and predictive intelligence to gain a competitive advantage

Think about Amazon, Uber, Deliveroo, or Postmates and the first thing that comes to mind is the real-time visibility of orders for consumers (ranging from 'food deliveries from local restaurants' to 'grocery deliveries to home'). In a way, these digital native companies have set standards for B2C order delivery in terms of optimizing delivery routes, improving fleet visibility, providing up-to-the-minute visibility on orders and, importantly, allowing customers to modify delivery location to redirect parcel deliveries. While this shift started with last-mile delivery, it is now beginning to shake up the customer expectation (for real-time visibility) on the commercial side (B2B transactions both domestic and

international and across single or multi-mode). This need is reflected in a 2017 survey by Gartner on Supply Chain Technology User Wants and Needs where visibility ranks as the highest priority initiative in the supply chain.

In the past, shippers, logistics service providers (LSPs), and beneficial cargo owners (BCOs) struggled with visibility issues once the shipment left the factories or warehouses of suppliers. This created huge inefficiencies in operations across the value chain (from first mile to last mile, and across port terminals to intermodal hubs to warehouses) and

also led to an increase in transportation costs (due to increased dwell times, demurrage or detention, penalties for 'on-time, in-full', or OTIF).

- This move toward real time visibility, coming at a time when the logistics industry faces numerous challenges including tariff wars, rate fluctuations, rising costs of operations, mandate to meet fuel emission regulations and flat demand, is a blessing in disguise for shippers, carriers, or LSPs. Enterprises are using the opportunity (leveraging real-time visibility) to increase efficiencies and overcome challenges to become a trusted and preferred partner for their customers.

With healthy early indicators, we believe that real-time visibility platforms have the potential to transform and create a new normal – shift from a slow and reactive logistics chain to a very agile, responsive, and dynamic one. Such a multi-modal, multi-nodal platform, one that is mobile-native, cloud-first, leverages edge computing, and is well connected (with various domestic and international carriers – network of networks) and also comes integrated with the existing ecosystem of enterprise business systems (transportation management, warehouse management, yard management) can enable this transformation and help carriers, LSPs, and BCOs gain visibility and ETAs and making by-the-minute decisions. In this point of view, we explore the various facets of real -time visibility including:

- What is real-time visibility?
- What it means to various players in the logistics chain (capture various perspectives)
- Who is most suited to deliver such a platform?
- The construct of such a real-time visibility platform



What is real-time visibility?

Historically, beneficial cargo owners, commercial customers, and shippers relied on electronic data interchange (EDI) for visibility. But EDI was mostly post-facto, not real-time, and essentially served to track various milestones.

Partly driven by safety and operational considerations and partly by mandates (e.g. electronic logging devices for motor carriers mandated by the Federal Motor Carrier Safety Administration in 2017) – telematics is becoming pervasive across various modes of transportation (ocean, intermodal rail, domestic trucking). The aviation industry leads in terms of real-time visibility, telematics, standardization, continuous training, and safety. Other modes of transport can learn from aviation.

But things are changing and at a rapid clip. Take the example of the shipping industry where the introduction of Automated Identification Systems (AIS), Global Satellite Navigation (GNSS), Global Positioning

Systems (GPS) and other sensors used to monitor temperature, ambient pressure setting of various containers in ships is making real-time visibility possible. In addition, telematics enabled by sensors provides real-time visibility for LTL, FTL, and TCL moves. Clearly BCOs, LSPs, and carriers are interested in providing real-time visibility. While these technologies help locate and track shipments to the minute, does it necessarily mean real-time visibility? Not necessarily.

To understand this, we need to ask the question;

- As a shipper, is it sufficient to know only where my shipment is currently?
- As a carrier, is it sufficient to know only where my vessel or truck is currently?

The answer is that the above information is necessary but not sufficient. Taking an analogy from our digital landscape, imagine we are on a road trip from Queens, New York

to Boston, Massachusetts. As we start the trip, we want to find the best route for the trip. What if Google Maps told you where you are along with simple directions to get to Boston, without considering the traffic conditions, road closure information, toll-free routes and, more importantly does not give an expected time of arrival (ETA). This scenario mirrors a situation when shippers know only where their shipment or container is (high seas or highway) but without any visibility into when it will arrive at their warehouse or distribution center (DC).

Only knowing where my shipment or container (say through a pin on a map) is not real-time visibility. It is about using the current location information and combining that in purposeful ways with various other information such as geo-political events that could disrupt goods movement, traffic data, congestion data from ports and terminals, and weather data to predict ETA and generate exceptions for late arrivals along with alternatives for expediting shipments.



Key Elements to achieve Real Time Visibility



What does real-time visibility mean to constituents in the logistics chain?

Beneficial cargo owners & commercial customers

- For a BCO or commercial customer such as a retailer or electronics goods company, improved visibility into in-transit goods helps meet commitments made to their end customers. Real-time visibility combined with predictive analytics provides an opportunity to be aware of delays and future disruptions, thereby providing flexibility to shippers and consignees to fast track or re-route the shipment and meet their commitments.
- Today's digitally connected retail customer expects a complex mix of products to be available for consumption at short notice – necessitating the need for a highly agile and responsive logistics chain built on real-time visibility to provide actionable insights for quick decision making for re-routing and scheduling accuracy.
- Further, this helps reduce inventory through reduction in safety stock as BCOs have greater visibility, exhibit higher confidence on delivery times, and therefore treat in-transit inventory as available inventory. It provides an opportunity for commercial customers to improve their customer service levels in an optimal manner.

Carriers – motor carriers, railroads, ocean liners

- From railroads to truckers, leveraging predictive ETAs provided by real-time visibility can go a long way in ensuring the right type of equipment and infrastructure is available to handle demand. For example: planning placement of locomotives and rotating them across the network has been a critical business problem that Class 1 railroads are trying to solve. Proper insights from real-time location and predictive ETAs could just be the missing component which will help them solve it.
- Similarly, motor carriers can effectively reduce transit time buffers and ensure pre-planned allocation of chassis and containers without having to do an

empty run to get them to the port or pickup locations.

- Of late, railroad efficiency claims are more directly related to what has come to be known as 'precision dispatching', where a series of factors, like train priorities, type of cargo, crew availability, and optimized schedules are analyzed by complex algorithms to improve the velocity of the railroad network. Real-time visibility information analyzed by big data algorithms is key to such transformative scheduling and dispatching techniques.

Ports and terminal operators

- Traditionally, port calling and berth changes have been done manually (emails or calls) leading to huge inefficiencies and often high operational costs for vessels due to missed schedules. Real-time visibility provides a unique opportunity for various stakeholders involved i.e. terminals, carriers, local agencies and port authorities to collaborate and work as one unit, increasing service quality and reducing dwell times (through port call optimization and berth window management), managing congestion better, and ensuring optimal use of berth space resulting in lower operational costs.
- Port and terminal operations can work out a dynamic resource model and provide that as an enhanced value-added service to ships coming to berth in a port during peak times (if vessels are too late or too early). For example: if a vessel is predicted to be a day or two ahead of schedule, the port operator could propose alternative plans for handling the cargo with alternative docking location, handling charges giving the LSP options to accelerate the clearance process from the port. On the other hand, the LSP could leverage this information from the port operator to re-plan their intermodal operation plans with railroad or motor carriers, thus handling the early arrival scenario to their advantage at better dray movement rates than a last-minute change would warrant.

Logistics service providers and freight forwarders:

- Large LSPs orchestrate the end-to-end movement of raw materials, merchandise and other bulk loads for suppliers, manufactures and retailers. They stand to benefit the most from real-time visibility and predictive Intelligence solutions which consider historical, operational, and transient data to identify decision-making nodes where corrective action can be taken to ensure event-free movement of goods. Visibility could also extend to include asset visibility at ports or intermodal hubs, which provides clarity on what equipment is used for the move and hence correct and efficient use of leased assets to improve such as containers and chassis while avoiding issues like excess charges and double billing.
- Predictive analytics data can enrich demand and supply forecasting models to provide unique insights into how fleet leasing and capacity procurement can be timed to make the most of future client shipping needs. Historical movement data on the busiest lanes and shipping routes can be used to optimize routing algorithms, and the LSP can leverage this information to discover new shipping partners who can move goods faster and cheaper.

Warehouse / DC management

- Predictive ETAs can drastically improve warehouse operations in terms of improved dock operations and labor productivity. Proactive alerts on delays can give receiving warehouses enough lead time to react - change dock assignments, ensure presence of workers for unloading, and readiness of special equipment to manage oversized or temperature- and pressure-sensitive cargo. Such flexibility will also help reduce overall costs, thereby making warehouse operations more competitive.

Who is best suited to provide real-time visibility and decision making?

Can carriers provide real-time visibility for shippers?

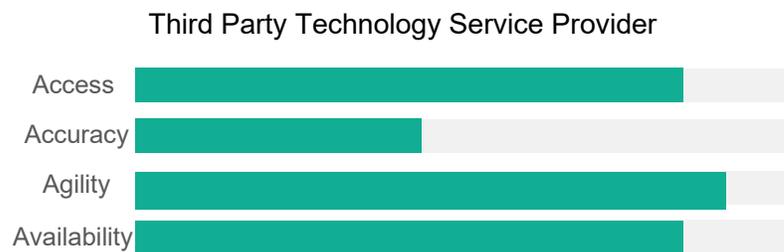
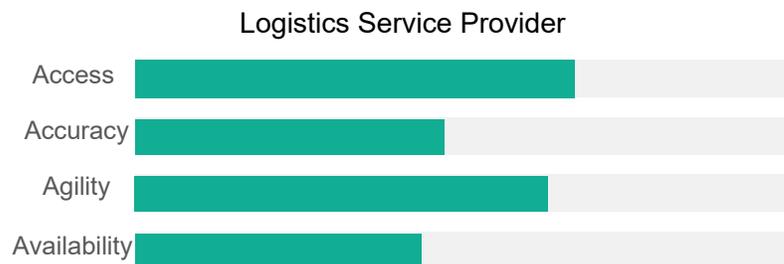
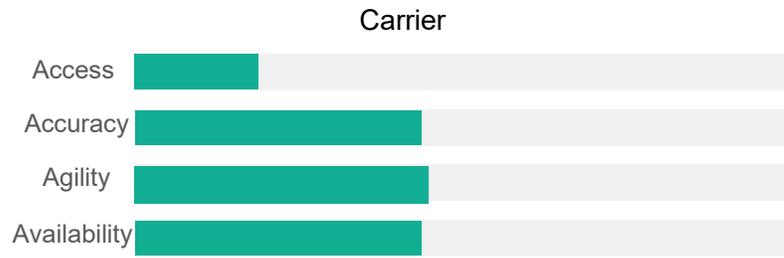
Probably yes, if the scope of the visibility is limited to trucks and if we are talking about domestic shipments. But we are dealing with goods flow across a global multi-node and multi-mode network, in which case the answer would turn from a Yes to Not sure. Let's explore various candidates that can provide real-time visibility through a prism of 4A's (**Access-Accuracy-Agility and Availability**).

1. Asset owners / carriers: Carriers (ocean or railroad) are unpredictable in arriving on time, slow in digitizing, and below par at providing accurate data about the status of a container. Also, the ability of a particular carrier to create an ecosystem and provide a host of external data is very limited. Carriers excel in accuracy (of their own data) but underperform on access (due to limited network access owing to conflict of interest and other competitive reasons), agility, and availability (as they are slow adopters of digitization). So, should they be entrusted with the responsibility of driving such a mega change at scale in an agile way?

2. Logistics service providers / freight forwarders: Kuehne + Nagel has done reasonably well in adopting digitization, more so out of necessity, and are moving ahead with innovative digital models. LSPs rank high on access, are relatively more agile but moderate when it comes to accuracy and availability (as they do not own the data).

3. Third-party technology service providers: Finally, let us evaluate a set of new age, digitally native, inherently agile companies driven by technology with vastly improved customer experience. These third-party technology companies or startups are re-writing rules and creating new business models. Third-party service technology providers outperform in access, agility, and availability (as they are digitally native, have product mindset, cloud-native, mobile-first, focused on customer experience) and moderate on accuracy (as they do not own the underlying data).

- **Access** –the ability to access real-time data across constituents in the logistics chain
- **Accuracy** –the ability to ensure that the ingested data is accurate, is de-duped and consolidated
- **Agility** –the ability to leverage the real-time data and quickly scale and build a fit-for-purpose platform
- **Availability** –the ability to share real-time visibility data, ETA, and predictive insights to various shippers



In summary, third-party technology service providers are well-suited to create a common thread across various nodes and modes, build a partner ecosystem with various carriers and consortia, play the aggregator role and help provide the much needed real-time visibility through a platform that would ingest data (volume, variety, and velocity) from various sources and partners (e.g: carriers and industry consortia) in the logistics ecosystem while

covering shipper (schedules, demand data, seasonality, inventory) and external (port data, weather data, and geopolitical data) perspectives as well. These companies have a technology product mindset that leverages service-oriented architecture to integrate a myriad of ecosystem players and helps ingest, transform, and provide the elixir of real-time visibility and predictive insights (ETA, delay alerts) for shipments.



What is the construct of such a real-time visibility platform?

In our perspective, third-party technology service providers are better suited to provide real-time visibility through a platform offering but for BCOs, LSPs, and carriers to make a final decision on how to go about this journey, they need to understand the construct of such a platform. They need to answer key questions:

What are the sources that can provide visibility information?

There are a wide range of sources which can be tapped to extract the raw data required for real-time visibility and predictive analytics. This includes real-time location information from cell phone triangulation, check-ins on a smartphone app, telematics / GPS transmitters; latent location information from EDI, API; historical information about shipment schedules, booking data, route or shipping lane performance, port and terminal congestion, on-time performance reports, transaction handoffs between logistics partners, traffic and weather patterns, operational information from order, transportation and warehouse management systems which need to be analyzed and brought into perspective by big data analytical systems.

In what formats do these sources provide the visibility information?

The visibility data can be received in many formats - it can be non-standardized data such as emails, screen capture of shipping / railroad schedules; more standardized data like shipment event statuses from EDI, API, mode-based business intelligence reports; advanced data such as sensory information from telematics / IoT devices.

What is the platform functionality required?

Real-time visibility platforms should support several capabilities:

- Capture and process order booking, appointment scheduling and dispatching
- Edge computing capability to connect to a myriad of sensors, IoT devices, electronic logging devices (in-cabin or in tractor or trailer devices), AIS, GPS, and GNSS to capture telematics data
- Integration with a host of carrier, port, terminal and weather systems (through EDI or APIs) to access network data on visibility, congestion, traffic, weather and geo-political news alerts
- Data ingestion and data quality capability to consume telemetry data, map, standardize, de-dupe and bring all raw data into an easy to consume format
- Tracking, monitoring, and ETA – Provide real-time tracking information and also a predictive estimate of arrival times of shipments at a warehouse (without any course correction) considering current location, delays due to traffic, congestion or weather to shippers / BCOs
- Analytics, dashboard and what-if scenario engine: Provide a capability for shippers and BCOs to visualize shipment status and review delays. Leverage what-if scenario engine to evaluate various scenarios, understand tradeoffs (e.g. cost vs SLA) associated with a decision and finalize action. The what-if scenario engine can crunch enormous amounts of availability,

dispatching, routing and hindrance patterns to perform dynamic what-if scenario analysis - to deliver predictive analytics and link up decision points to impact key financials, inventory levels. It enables faster decision making at each node of the logistics chain. Imagine a future scenario, where a shipper or BCO would be able to dynamically break a bulk shipment shipped through ocean freight while at a node, and send part of the shipment through air freight to speed up delivery and meet customer expectations. The BCO or shipper makes the decision based on the tradeoff

- additional cost of shipping through air vs the penalty to be paid to customer for delays in making the delivery

What are the various integrations with existing systems needed?

The real-time visibility platform should be capable of integrating with enterprise planning and operational systems like transportation management system (TMS), order management system (OMS), warehouse management system (WMS), yard management and financial systems to orchestrate dynamic decision-making capabilities and provide connected experiences. It should be capable of integrating with middleware for receiving information from chatbots, email servers, EDI / API interfaces, RSS data feeds, IoT devices, and other enterprise-level communication systems. It should also connect with big data DB such as Mongo to support the data algorithms driving predictive intelligence.

Shipper, BCO, Carrier, LSP



CHANNELS & TOUCH POINTS



DATA SOURCES



FUNCTIONAL MODULES



ENTERPRISE INTEGRATION LAYER

ENTERPRISE, FINANCIAL, AND OPERATIONAL SYSTEMS



About the Experts



Sathyanarayanan Varadan

Sr. Principal, Retail, Consumer Goods & Logistics Practice

Sathya is a senior principal in our Retail, CPG and Logistics Practice, with more than 15 years of advisory experience. He has developed omni-channel strategies and managed large transformation programs for global clients. Sathya has worked across a diverse set of roles, including functional lead, product manager, business architect, and program management.



Karthik Ravichandran

Senior Consultant, Retail, Consumer Goods & Logistics Practice

Karthik is a senior consultant with more than 13 years of experience in technology, functional, product management, and advisory roles. He has played key roles in many critical engagements within our industry practice, and has specialized experience in transportation management systems, railroad operations, route optimization, asset utilization, and digital commerce.

For more information, contact askus@infosys.com



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