Building a Connected Transportation Platform

Transforming to a Digital Enterprise
As with other industries, the travel and transportation sector is undergoing massive changes brought on by digitally enabled customers and advanced technology. Today’s transportation experience has moved well beyond getting passengers and freight from point A to point B. Now companies must manage multiple channels to deliver a richer, more satisfying experience. To do this, organizations must expand their strategy beyond optimizing runs to gaining a full 360-degree view of the journey. A connected transportation platform brings together all of the puzzle pieces with the overarching goal of delivering value to consumers, be they passengers or other businesses.
A fully visible journey

Travel and transportation are all about moving people and goods to their destinations as quickly and efficiently as possible.

Passenger transportation companies now find themselves in a challenging market where the focus is not only on the journey, but on the consumer experience. Customers are much more savvy at sourcing travel information and accessing data from many entry points, including a mobile device, a website, social media or the ticket counter. Transportation organizations must unify these channels to create a consistent and personalized passenger experience. At the same time, companies seek to capture and retain travelers by offering new and relevant opportunities.

On the cargo side, the same challenges apply. It’s now critical for organizations to have full visibility into the freight journey, as goods move from the distribution center, to a freight forwarder or third-party logistics company, to delivery. This is complicated by the transportation industry’s shift to an intermodal approach. Companies must now maintain visibility across all locations and modes of transport.

The need for full visibility has resulted in practices such as serialization. This approach effectively keeps tabs on cargo as it progresses through the journey, automating many of the operations once done by hand. Assigned a bar code that serves as a “license plate,” cargo carries its own description and data throughout the journey, making it easier for handlers to access and direct. In travel, visibility has the potential to improve “below-the-wing” services, including efficiency gains in cargo loading and unloading. Mobile tools, powered by data insights, make it easier than ever for flight crews and staff to engage with customers and manage inventory.
Security: Toeing the Line Between Physical Security and Cybersecurity

Many of us are familiar with the efforts taken by travel and transportation companies to keep people and products physically safe. But securing the cyberworld is just as important for this industry.

Transportation organizations are stewards of sensitive information, including customer data and the location and contents of cargo ships, which make them prime targets for hackers and other cybercriminals. And since information is the lifeblood of the modern travel and transportation enterprise, cybersecurity must be front and center.

A serious cybersecurity breach can have significant consequences, including the erosion of consumer trust. Organizations must develop strategies that address both physical and cybersecurity concerns, while incorporating the right mix of risk awareness and transparency.

Travel and transportation organizations should take these steps into consideration:

- **Extend Security Capabilities:** Transportation companies need to focus not only on border protection but also on peripheral protection. Expanded capabilities mean having a full view of travelers before they arrive at the gate, and seeing the full cargo journey, while securing each transaction along the way.

- **Integrate Security with Route Planning:** Companies should integrate security with route planning elements, such as risk-level assessments, travel times, scheduling and pricing. Also, companies should securely track discrete shipments to support enhanced compliance and more accurate management of customs and duty reporting.

- **Secure Global Supply Chains:** Since many global breaches originate from the suppliers that serve travel and transport firms, organizations must ensure the security of the global supply chain. This includes tracking the physical movement of cargo and deploying virtual operating centers to integrate and distribute real-time situational data.

- **Deploy an Executive Team Approach:** A formal data breach response plan — created with the involvement of an executive team — can help organizations monitor and detect threats, triage and respond to security events. By incorporating lessons learned, the plan can leverage proven incident-response cycles.

Security in the travel and transportation sector should be centered on specific, proactive steps to protect data, customers and cargo, in both the physical world and the cyberworld. It’s a challenge, given today’s risks, but it’s essential to business success.
In 2016, the travel and tourism sector generated $7.6 trillion (10.2% of global GDP) and 292 million jobs, equivalent to 1 in 10 jobs in the global economy. 
Source: World Travel & Tourism Council, Travel & Tourism Economic Impact 2017 World, 2017

Destination: digital transformation

The many challenges facing the travel and transportation industry require a new way of thinking, but the solutions are not far away. Other industries faced with similar challenges have already found a way forward using digital tools.

For instance, an exchange architecture — a common platform that exchanges data and allows value creation at points of interaction — is being used in other industries, including consumer and retail. Internet of things (IoT) devices, for example, now tell us when a refrigerator is shutting down at a grocery store, generating an automated service request for a technician to fix the problem.

That’s the direction the transportation industry needs to move toward. No longer will the monolithic siloed-data approach work. What’s needed now is a truly connected platform design made possible through digital transformation. With this approach, powered by the cloud, analytics and applications, organizations can harness the potential of mobility and IoT to improve customer service and boost operations.

Implement a connected transportation platform

A connected transportation platform comprises elements such as enterprise services, a partner ecosystem, API gateways and infrastructure delivered by scalable hybrid cloud computing and storage. The platform should incorporate external data sources, such as IoT sensors and geolocation data. It should also allow third-party access via an API portal, with software distributed through an app store. The various elements of the platform should be connected by ubiquitous, software-defined, secure digital networks.

The key to success is in integrating information from a variety of data points. All modes of transport — be they rail, truck, air or maritime — should be included. In addition, as products and services interact, the interactions generate data, adding value.

By analyzing the data captured by the platform, companies can home in on specific use cases and business problems to solve. The better business outcomes that result from these insights can differentiate the company in the marketplace. Automation and machine learning architectures boost the possibilities in this space. And with cloud applications, organizations can make these insights available wherever and whenever needed — to both customers and employees.
Analytics: Improving the User Experience with Machine Learning

A piece of cargo may not have a user experience, but the customer expecting delivery certainly does. Machine learning can help detect and resolve problems before they occur.

Take, for example, the problem of getting products from warehouses to store locations to meet customer demand. Understanding what customers are buying — and why — can help companies manage the critical journey from the distribution center, to handing the cargo off to a third-party logistics company, to delivery. In this case, the “passenger experience” means protecting the enterprise and its customers against the risk of over- or understocking.

With industrial machine learning (IML), the DXC Technology Analytics group created algorithms that automate logistics planning, optimize stock inventory and adapt to changing demand. IML became a connected transportation platform, allowing us to integrate data from a variety of sources.

The result allows us to anticipate irregular buying patterns, adjust for regional variations and ensure that, despite disruption, cargo continuously travels to the places it is needed most.

Whether it’s rebooking tickets or making sure products reach customers, enterprises can deliver richer, more satisfying travel experiences by combining connected platforms with a strong Analytics IQ. When we apply the automation power of machine learning to connected transportation, not only can we deal with disruptions more efficiently, but we can continuously improve the passenger experience as well.

— Jerry Overton, Data Scientist, Senior Principal, DXC Technology

Use analytics and connected platforms to adapt to disruption and deliver cargo where it’s needed most.
For example, imagine an intelligent system that can automate the process of rebooking a passenger’s canceled flight. With a full view of the customer’s travel journey, the airline could automatically rebook the flight and any corresponding forms of transportation. This information could be directly communicated to the passenger’s mobile phone with the message, “We’ve already fixed this problem and, by the way, if you booked an Uber or a train ticket through us, we have adjusted those schedules as well.”

Part of the reason companies can’t implement new services like these is because they can’t access and leverage the necessary data. Silos still exist in many organizations, and mission-critical data often resides in legacy databases. A common platform, enabled by the cloud, allows these data sources to interact, and opens up the environment to third-party solutions. Thus, differentiation comes from bridging those silos and creating new value. That’s the true essence of a fully connected platform.

**Worldwide spending on IoT was $737 billion in 2016 and will reach $1.29 trillion in 2020. Industries making the largest IoT investments in 2016:**

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<th>Industry</th>
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The average person travels about 13,000 miles per year, and domestic businesses ship 56 tons of freight annually per person in the United States.

Embrace digital enablement

In the travel and transportation industry, value is often perceived to come at the end of a safe journey, rather than through the collaboration and interaction that can occur along the way.

Most transportation companies have mission-critical platforms that contain valuable data, but they also have a fear of bridging these siloed systems. They’re afraid of losing their value proposition, and they don’t want to bring partners into the business model. But, in developing a digital enablement strategy, organizations can navigate this challenge.

Digital enablement can run the gamut, from deploying mobile tracking solutions to using analytics to improve warehousing fulfillment and distribution. By digitizing essential functions within the value chain, companies can integrate data in a way that delivers value. This approach allows companies to separate out various operational pieces and adopt a strategy that embraces an outside-in approach to innovation. It enables agility and responsiveness to unforeseen occurrences, including new regulatory requirements — a necessity in today’s business environment.

Passenger transportation companies can tap into these same tools to find ways to extend their brands and expand into the multiple modes of transportation available to passengers. Digital enablement helps companies understand the full passenger journey and allows for a seamless approach, even if the company is not part of the entire chain of events.

In both freight and passenger organizations, the right technology investments can lead to back-office efficiencies. Business processes should be evaluated to the tune of “cheaper, better, faster.” Repetitive tasks should be considered for automation, and tools like artificial intelligence should be implemented to augment the workforce. By continually tweaking processes to improve efficiency and make room for innovation, companies can turn their back-office operations into a true differentiator.

By 2019, 30% of urban consumers will use bots or intelligent assistants for multimodal route and journey planning using personal preferences like cost, carbon impact, traveling with children, etc.

Technology Platforms: The LEF Perspective

The cloud is a platform that is continually unlocking new areas of value for business. With the emergence of machine intelligence, the internet of things (IoT) and 5G networking — collectively what we call the “Matrix” — the amount of data to move, store and process can only be managed effectively on a cloud platform. That’s why the Leading Edge Forum (LEF), the independent research and advisory arm of DXC Technology, is adamant that all businesses need to be well on their way to adopting cloud-based technologies, as this is just the first step in a long journey that will enable them to unlock the value the Matrix offers.

Just as the cloud itself can be seen as a platform, 21st century organizations are learning how they themselves can become a platform business. They are taking an outside-in approach to their business and technology architecture, embracing ecosystems, becoming important players in external value chains and finding new opportunities to monetize existing assets, while finding new areas where their businesses can play and add value. This all comes with the complexity of having to evolve to new operating models, embrace new technology and create new relationships, all while ensuring that the business is secure and protected and keeping up with compliance and regulatory issues.

Adopting the cloud is hard and requires investment, as does any large organizational shift, but it should not be ignored. The value it is unlocking today is well documented, and we believe the future value it will unlock will make what we’ve already seen look like the tip of the iceberg. Choosing not to embrace it and invest in the change will not only leave you behind in exploring new avenues of value, but also leave you less able to protect your business. Bad actors are already embracing the cloud to find new and novel ways to exploit your business. Without the power the Matrix offers, you will be hard-pressed to defend yourself when the time comes.
Building a Connected Transportation Platform

Approximately 25% of global transportation/logistics companies have a digital strategy, while 34% of all industries do.

Source: Harvey Nash/KPMG CIO Survey, 2016

Move beyond “optimizing runs”

For many organizations in the travel and transportation industry, success is all about “optimizing runs.” Top-of-mind considerations, such as getting passengers and cargo from point A to point B more quickly and with less fuel, focus on two primary factors: efficiency and routing. Whether in the air or on the ground, it’s all about moving passengers and goods at the lowest operational cost.

That’s why an intermodal perspective is so important. Today, cargo tends to travel from truck to train, to ship, to train to truck — or some combination thereof. People tend to go from car to train to bus to airport, or follow some similar path. Intermodal integration and a full view of the supply chain are essential to today’s travel landscape, and companies must adopt a strategy that embraces this intermodal view.

This may mean partnering with a third-party provider to gain a wider perspective. For example, companies can put IoT devices on train tracks and use drones to inspect runways in support of flight operations. It may also mean considering the use of automation and robotics, instead of people, to analyze physical objects in the field and assist with functions such as predictive maintenance.

Moving beyond optimization means placing a stronger focus on the overall user experience. This goes back to taking a holistic view of the customer’s journey and leveraging capabilities such as mobile enablement to deliver a satisfying user experience. Again, all of the channels must be unified and consistent — and the focus must shift from the act of transporting to satisfying the many needs of the passenger.

Manage disruption efficiently

Just as transportation companies must navigate the digital disruption, they must also learn how to efficiently manage common disruptions, from weather delays and emergency situations to maintenance and repair issues. To handle these challenges, they need a system that alerts them when a disruption occurs, tells them what it affects and suggests how it can be quickly resolved in a way that meets original commitments.
Agile Applications: The LEF Perspective

While many digital trends and technologies are exciting, there is a deeper, underlying need to reimagine our travel and transportation businesses — to make them viable, to help them evolve and thrive, and to inspire them to win in the 21st century.

At the same time, there is an increasingly rich “matrix” of capabilities outside the enterprise — service organizations we can easily tap into to make this happen. LEF’s David Moschella, who coined the term “Matrix” a couple years ago, points out that what are typically thought of as cloud-based services (IaaS, PaaS, SaaS) are only the tip of the iceberg.

For example, digerati such as Google, Amazon and Microsoft are offering powerful machine intelligence as a service. This has a number of implications and presents many opportunities. But travel and transportation companies must shift their thinking to allow for an outside-in architecture that invites innovation, avoiding the “not-invented-here” bias and trap.

Successful 21st century organizations focus on the right assets and capabilities and ensure that they are nurturing them appropriately. They often seek outside-in access to these services, not always insisting on ownership.

Success also depends on data. We have gone from viewing information as a necessary by product or lubricator of applications and transactions to seeing it as an asset that has value in and of itself. Architecturally, this means making sure that information isn’t imprisoned in a transactional system, but instead is available for other forms of exploitation and monetization.

Technically, it means using information standards and all forms of big data technology. But in terms of leadership, it means viewing data as an asset that generates value. In the spirit of outside-in, this also means looking to information generated outside the organization, possibly outside the ecosystem.

Do you consider your travel and transportation ecosystem (suppliers, partners, regulators and others) as an asset, and do you plan to nurture it? Or do you think of it as a supply chain that you use, and periodically negotiate with, to get a better deal? When is the last time bilateral data rights were included in your contracts?
For example, if an emergency occurs at an airport, companies should know immediately how many flights are impacted, how many passengers are affected and which cargo needs to be rerouted. At the same time, passenger communications should be coordinated with operations. When a passenger is disrupted, for whatever reason, companies should solve the problem with the service today’s customers expect, preserving the relationship — and the brand’s reputation. The same applies to shipping operations.

By linking an MRO (maintenance, repair and operations) strategy and other pieces of the puzzle, organizations can get operations back to normal as quickly as possible. Further efficiencies can be gained by incorporating IoT and “smart” vehicles that “know” how to save fuel, minimize wear and tear and report back when maintenance is needed. Clear visibility into the entire landscape enables enterprises to deal with irregular operations more effectively. Be it rebooking tickets or putting cargo on different planes, dealing with disruptions becomes much easier. And because data has been collected and integrated, enterprises can analyze that information to spot trouble ahead and deal with it in a proactive way.

**The connected transportation platform**

A connected transportation platform brings together a wide array of resources in a way that supports new revenue models and value-creation streams. In the best-case scenario, tactical and operational information from external and internal sources is ingested, cleaned and validated, and then analyzed to deliver actionable business intelligence.

Results include better customer service, increased productivity and an improved flow of information to enhance user experience. Using IoT beacons and other geolocation-based technologies to augment the data feed and expand analytics capabilities, companies can branch beyond optimization to understand phenomena such as crowd movement, bottlenecks and impending equipment failures.
Building the 21st century enterprise

If you want your travel and transportation business to be a 21st century company, you need to pursue the route you would take if you were launching your organization today. It’s about embarking on a digital journey that will get you to your destination on time and nonstop.

When deploying a connected transportation platform, the conversation must start with cloud, security and network connectivity. These elements work together to support analytics, apps, IoT and other emerging technologies. The approach leads to improved information-sharing and more efficient operations for employees, customers, partners and the future.

No journey is free, of course. With a full review of budget spend and investment goals, you can empower your chosen business outcome, transform and grow your business. And remember, the efficiencies you drive in business operations will pay off in the long run. There are ways to reduce costs and find savings, such as moving noncritical, monolithic architectures into the cloud. To fill in the gaps, consider working with a partner that can help guide the journey and provide the experience and tools needed to achieve transformational success.

Remember, differentiation and industry leadership go hand in hand. Don’t be afraid to take advantage of all that today’s technology has to offer. Stay ahead of the competition by knowing how to use advanced technology and tap into your greatest resource — your data. With this approach, you can move from chasing customers to leading the industry, with customers and competition chasing you.

By 2020, 30% of global line-haul freight vehicles will utilize semiautonomous fleet platooning for the delivery of goods.

DXC’s Solutions Combine Experience with Expertise

With more than 40 years of experience serving the transportation industry, DXC Technology provides mission-critical systems for top airline, consumer travel, freight and logistics, and railway firms. As the travel and transportation industry undergoes a digital disruption, DXC offers customized solutions for modernizing aging infrastructure and helping IT adapt to industry consolidation and commoditization, as well as to the always-on consumer.

DXC’s Connected Transportation Solutions support rail, air, truck and maritime operations and include services such as fleet management, geolocation awareness and maintenance solutions. As the world’s leading airline IT services provider, DXC helps airlines bring new revenue streams to market, drive efficiency and reduce costs. Also, we help freight and logistics companies achieve end-to-end visibility into the supply chain.

DXC’s Flight Operations is a suite of applications that efficiently integrate flight operations-related systems and help improve employee decision making. Real-time flight, aircraft and station information increases productivity, generates cost savings and provides updates that improve operational awareness. In addition, DXC’s Irregular Operations (IROPS) lets airlines manage travel disruptions with the automatic generation of recovery solutions.

The DXC Connected Traveler solution interacts with passengers to influence passenger movement, improve retail interactions through contextual analytics, and improve efficiency during moments of engagement between airport operations, airlines and passengers.

DXC delivers innovative business and technology solutions that enable digital transformation. With our integration-focused solutions, organizations can achieve enhanced efficiency, new services, additional revenue sources and improved traveler experiences.
Authors

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DXC Technology’s ResearchNetwork contributed to this paper.
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