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WHITE PAPER

# A New Era of Automation in Supply Chain & Logistics

Today, when most people think logistics automation, they think devices. Robots, drones, and autonomous trucking dominate the conversation. Videos of fully automated warehouses go viral and news anchors wring their hands about jobs. The hype is an incomplete picture that misses opportunities for companies in supply chain and logistics.

## In this paper

Physical automation, transportation, and warehouse technology are a big part of the supply chain story. But it doesn't stop there. The flow of information and data is almost as important as the movement of goods and containers. Information movement is in the opposite direction of goods/material movement. Real-time end-to-end SCV (supply chain visibility) is the heart of any successful logistics operation.

For example, warehousing can be thought of as a data exercise. The only way to know where an item is among hundreds of racks and shelves is a data point. Technology forms the core arterial system that determines that goods continue moving on time, regardless of disruptions. Goods and material movement in one direction drives the information flow in the opposite direction. In other words, as the material moves from bins & shelves to warehouses, harbors, containers, and delivery transport, the information flows backwards.

Progress in several technology categories such as cloud based services, integration and automation have significant implications for the future of transportation and logistics. As organizations push towards real-time visibility and advanced track & trace programs, these developments will only grow in importance. At the same time, pressure is increasing on supply chain and logistics technologists with new scrutiny on the role of the supply chain in the new global economy.

## The new supply chain management priorities

The logistics industry has undergone steady evolution over a century, from railways in the 1800s to planes, trains, and cranes in the modern era. But the short period from 2020-2022 saw accelerated evolution prompted by the global pandemic.

Prior to the pandemic, paper was central in the logistics information flow. From packing slips to shipping labels, bills of lading and beyond, paper changing hands was the norm. Eventual transition to digital was seen as inevitable, but a lack of a pressing driver kept progress slow. Companies were inclined to say "It just works," especially when facing stiff competition and thin margins that put customer relationships at risk.

When the pandemic struck, logistics took a turn that no one expected. Paper suddenly went out of fashion. At the same time, the ecommerce rise and pandemic-related supply squeeze pushed supply chains and the just-in-time manufacturing approach to the breaking point. In addition, the legacy technologies that have been the backbone of logistics are also looking toward the future—for example, EDI has been the hallmark for a long period of time, and while it's still significant even now, the future is trending toward API-ification of various services.

Logistics efficiencies shaped the priorities prior to the pandemic, but today, resiliency and a drive towards real-time track and trace visibility are added to the mix. This new reality is a paradox: an efficient process and a resilient process are difficult to hold in balance. Remaining paper trail processes, or CSV-based processes are no longer sufficient.

## Change is underway

As a result of the forces driving these changes, HFS research notes that logistics are among the top industries scaling up investments in process automation. It's a step towards cloudification of the industry, consistent with the adoption of solutions such as cloud-based logistics platforms, terminal interfaces, and digital bill of lading (BOL)/documentation tools.

Other related trends are the Internet of Things (IoT) and blockchain technology. Many expect the proliferation of connected devices to push to the very edge of logistics, from containers and beyond. Solutions like Hapag-Lloyd's 2022 announcement of a major investment in GPS tracking for their container fleet, or Maersk's TradeLens product demonstrate exciting new frontiers in the space.

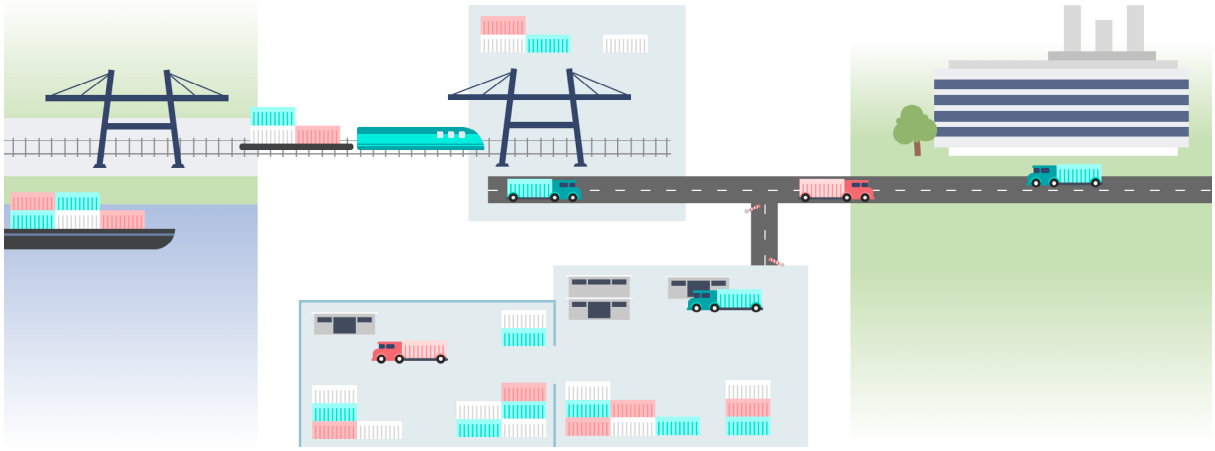
New innovators are finding ways to tie modes of transportation to modern manufacturing in very exciting ways. Many companies, such as car manufacturers, are looking to bring the fabrication of basic components like batteries or injection molding in house, creating new challenges and opportunities for the logistics industry to modernize and work with customers who historically would have been indirect consumers of supply chain services.

For logistics companies who are looking to implement their own transformation harnessing these technologies, where to start can be a daunting task. To understand this better, let's take a look at the challenges.

## A volatile end-to-end process

Supply chain and logistics is what IT leaders call an "end-to-end process." In the realm of business processes, a supply chain is one of the largest end-to-end processes, made up of many smaller processes that span multiple countries and international waters. In some cases, it's possibly one of the most complex and volatile.

The illustration below can provide some insight into the different elements that are involved in the latter portion of the process, once a container is unloaded from the ship and delivered to its recipient:



These processes span multiple companies, from sea to rail to crane to truck. Harbors, stations, depots, container and transportation vendors all must be orchestrated in harmony. Each player in the process is at various stages of digital transformation—meaning we must be prepared to work with any and all degrees of automation maturity, from green screens to APIs. Partners and customers are very important, as the process is deeply intertwined between partners and the provider. As a result, the process is subject to rapid change. A new provider, a new customer, a new partner can all have a significant effect on the entire process.


A recent article in the New Yorker detailed a 1997 container spill that saw over 5 million Lego dragons lost in the ocean, only to turn up on beaches around Europe over the following 30 years. This is just one of the many examples of process interruptions that plague logistics. Lost containers, weather challenges, accidents, and breakdowns mean that the supply chain is subject to constant disruption and reworking. At times, it makes global headline news. In 2021, the Suez Canal was completely blocked by the container ship Ever Given, when it became grounded for over 2 weeks.

IT departments in this space are often overwhelmed and understaffed. Many follow traditional models designed in legacy eras, where the requests and needs from around the organization become backlogged in long queues. Working with custom interfaces and less-than-ideal situations is common.

For technology leaders in logistics, this chaos can either present headaches or be seen as an opportunity. Dealing with disruption is just part of the job, but new technologies are enabling exciting new approaches. With the supply chain disruption of the last two years, taking a fresh approach is imperative. The business case must be compelling, fast, cost-effective, and better than past approaches.

## The opportunity: enterprise automation

Recent research published by Morgan Stanley notes "a once siloed collection of technologies is coming together with a new category of infrastructure software to create end-to-end enterprise automation platforms." The research observes that enterprise automation is one of the fastest-growing segments in enterprise software, and goes on to say "Now, the push for organizational resilience and real-time decision-making is further advancing automation initiatives. The next step: standardizing automation and moving toward enterprise-wide projects."

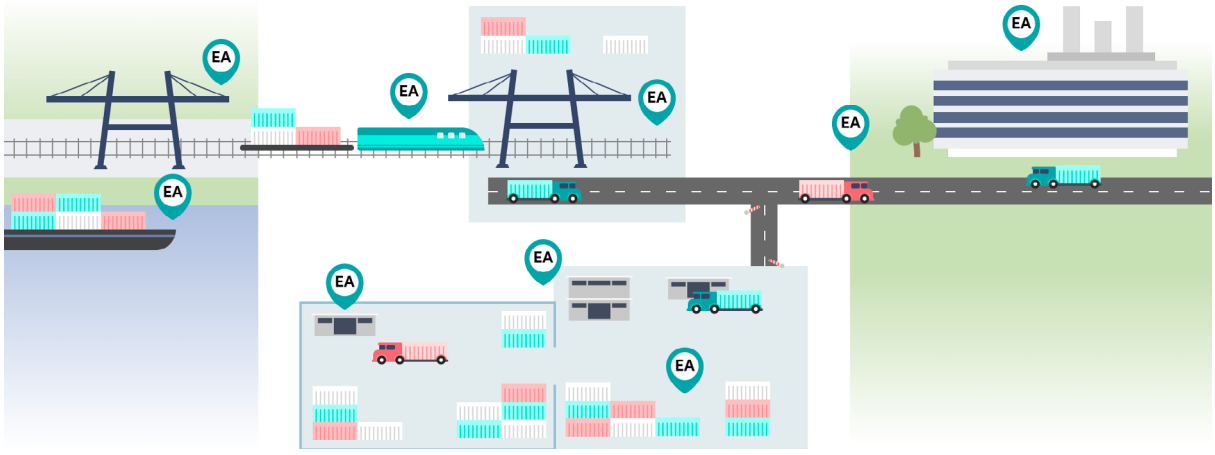
Enterprise automation is a huge opportunity for those of us in supply chain and logistics. While automation solutions of the past required expensive technical expertise and a collection of tools for automating tasks, enterprise automation offers advantages that are distinct for our industry:

- Dynamism and scale to adapt to the ever-changing environment
- A unified approach to orchestrate across various interfaces: API, web portal, on-prem or cloud
- A foundation of integration
- A low-code approach that can fit the existing technical skill in the organization
- Support for the necessary governance models to automate end-to-end processes safely

At TFG, we underwent rigorous review and POC processes to vet out the new approaches to automation as we underwent our own transformation. We found that enterprise automation is uniquely valuable for the supply chain in logistics. It overcomes many of the hurdles that we have discussed so far in this paper, and presents tremendous upside for organizations that embrace it completely.

Once these hurdles are put behind us, the picture becomes clear that supply chain & logistics is a first class citizen when it comes to enterprise automation. A quick glance at the list of average projects for an organization in our space would reveal that many processes are actually ripe for automation that were previously not thought possible.

If we look at our previous illustration and pinpoint some of the integration and automation points along the journey, we can see that there are ample opportunities for a transportation logistics provider to engage in enterprise automation:




While in the past, each of these highlighted areas represented a challenge. With enterprise automation, they represent opportunities for constant improvement. These parts of the journey become integrated into an orchestrated whole, and present the opportunity to improve them and make the processes smarter. If done right, you can balance the need for improvement with the constant volatility and ensuing reworking and rebuilding of the process.

All of this speed and flexibility originates with the No-Code/Low-Code approach. Constant improvement is the goal at this point, rather than a static transformation. It's important to keep in mind that digital transformation shouldn't be seen as a plateau to be reached or some kind of end state. Rather, it's a state of transformation. This philosophy is a better corollary to the rapid change of pace that we face in supply chain work. In this new era of global unpredictability, the ability to evolve and react quickly in the face of change is paramount. Providing customers with the services they expect while juggling volatility is what sets the winners apart.

Lastly, some of the most exciting areas for constant improvement involve folding AI and machine learning (ML) into the process. Enterprise automation—with its integration-led approach—makes it easy to bring AI and machine learning models into the process. With that in mind, let's take a look at the ideal approach.

## Enterprise Automation in Logistics

When we make technology decisions in this approach, our goal is to create a virtuous cycle that we can use to capture valuable data, turn it into insight, and constantly improve. To accomplish this, we bring together a collection of tools that are common in enterprises today, including low-code application development, a data warehouse, and AI. Let's look at each step in greater detail:

**Step 1:** We collect data from various SaaS systems, and if the only interface available is a website or green screen, then we use bots to scrape the data.

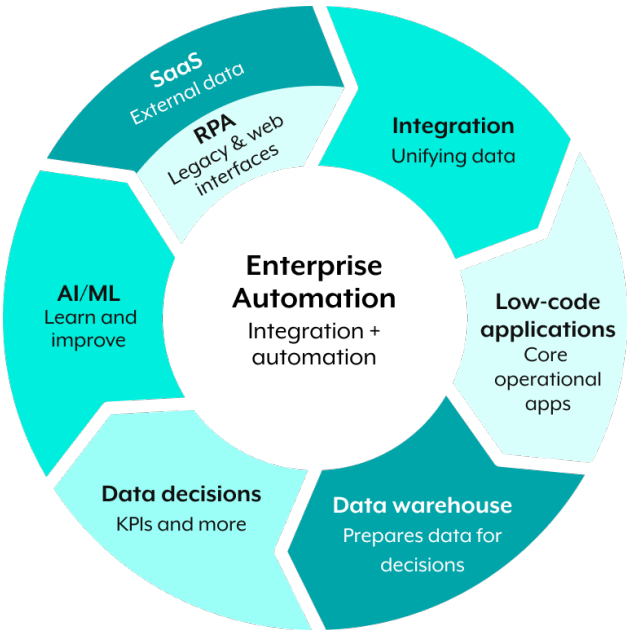
**Step 2:** We need to integrate this data

**Step 3:** We need to surface this data for monitoring and real-time track & trace

**Step 4:** We need to store this data long-term for analysis

**Step 5:** We need to make decisions on the data and benchmark against our KPIs

**Step 6:** We need to harness AI/ML to identify ways that we can improve that humans might not spot or realize




At the heart of this approach is enterprise automation—it is the central nervous system connecting all of these systems together, from the RPA bots to the AI/ML models that analyze what lives in the data warehouse. To build this, we need to define a series of steps to get there. It will not happen overnight. Additionally, several tools are necessary to put this into place:

1. The SaaS platforms that we already use
2. If we have legacy systems that do not have APIs or website interfaces then we need RPA bots to scrape the screens
3. We need an iPaaS
4. We need a low code application development platform that allows us to create web interfaces or surface information in the form of a chatbot into a collaboration platform like Slack or Teams
5. We need a data warehouse
6. We need some form of AI or ML platform

## Getting started

We've talked at length about the value of low-code no-code solutions. Understandably, some may express reservations. We had reservations at first too, but we were able to overcome them in two ways.

First, we assessed our internal capabilities. It is likely that most logistics firms are in a similar situation: many people with rich process knowledge but low to no code knowledge. Second, we engaged in a rigorous proof of concept process to determine if the solutions would really meet the vendor claims in every category.

For this assessment, we've compiled a few areas of early prioritization that IT leaders in the space can use to guide their decision making:

**Define success early:** Scoping your success-critical use cases will help determine where to focus limited resources early on. It should limit time invested on low-yield projects and pay off in the form of marquee outcomes once they are successfully automated.

**Perform a proof of concept:** A hands-on test with a new mission-critical platform may seem like a no-brainer, but it can be surprising how many skip this step. Spending the time putting the platform(s) through their paces is time well spent.

**Assess your internal capabilities:** Most logistics companies don't have enough technical expertise in house to build a top of the line solution with code. Additionally, many people in our companies have rich process knowledge built over years (and sometimes decades) of experience, but have limited code knowledge. To capture their process knowledge, keeping the path from idea to automation as short as possible is a best practice.

**Consider the operating model:** The kind of implementation we choose determines the stack that we implement. Will we be cloud-only? On-prem? Hybrid?

**Spend time listening:** Capturing functional requirements is 70% of the work, and it's worth getting it right. If the functional requirements aren't effectively captured, you'll run into some unanticipated headaches down the road. The same way a few small course corrections in the early moments of a rocket launch can have big implications later on, doing the hard work early in an IT transformation will pay dividends over the years.

**Set your timeline:** Once all of the key considerations are in place, set some goals around the time it takes to get the work done.

These handful of steps are just the beginning. As the projects take shape, key values become clear, such as short development phases (we would advise 14 day sprints), collaboration with stakeholders, and testing early and often. A transparent, agile approach that focuses on building early acceptance of the work being done is crucial. The success or failure of the program rests on the shoulders of colleagues, so training and development, user stories, and other elements are almost as important as the technology itself.

Modernizing and improving the technology posture of a key player in the supply chain is an important journey. It can be underappreciated work. The progress that happens in a supply chain modernization are not only valuable at the ground level, but have serious implications for millions of people. The supply chain supports economic growth, goods, services, and careers for millions of people down the line. The hard work, challenges, and unexpected surprises are all worthwhile. Now, more than ever, people are depending on improvements in the supply chain. It's up to us—and enterprise automation—to make them happen.

# About the authors

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Bharath Yadla is a serial entrepreneur, Forbes council member and seasoned executive with 20+ years of experience in new market establishments, GTM strategy, business development, product strategy, disruptive products, and digital solutions. His areas of expertise include Transformation advisory for CxOs, RPA, intelligent automation, big data analytics, AI, bots, and integration. Formerly of Cast Iron Systems, HCL, and Aerospike, he now serves as a VP at Workato.

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Guido Niermann has been working in information technology for over 25 years. After taking on projects for various IT consultancies, he joined the global IT organization of IKEA in 2003. There he was responsible for various software development organizations in the areas of Finance, HR, Risk, Warehouse & Transport, and for two years he led the Business Intelligence department in Helsingborg, Sweden. In 2011, he moved to Dataforce GmbH where, as Head of IT, he was responsible for developing a business analytics platform for the automotive sector, among other things. In 2015, he was responsible for the area of Infrastructure and Applications at Hyundai Motor Deutschland GmbH, managing a network of 540 dealers. Today, he manages the IT of DB Intermodal Services GmbH as well as TFG Transfracht GmbH, both 100% subsidiaries of DB Cargo.