DIGITAL SUPPLY CHAIN: THE NEXT BIG BREAKTHROUGH IN TRUCKING

UPNEXT

DRIVING TRANSPORTATION FORWARD

INTRODUCTION

The term “digital transformation” has echoed through every industry and major company in the last decade or so, usually with urgency. Every organization that wishes to remain relevant recognizes that the world is evolving, and the digitalization of commerce is inevitable. Those who don’t recognize these simple facts risk getting left behind by more agile competitors.

When we talk about the digitalization of trucking, this primarily revolves around the transport and logistics supply chain. The scope of such an effort is immense, and should be considered nothing less than the complete digital management of logistics. Existing and forthcoming technologies – cloud, big data, 5G, artificial intelligence – will all play their part.

SO, WHAT DOES ALL THIS MEAN FOR TRUCKING?

The good news is that the transformation to a fully integrated digital supply chain for the trucking industry could mean substantial benefits in:

EFFICIENCY

TRANSPARANCY

COST SAVINGS

Experts contend that within the next four years, moving toward a digital supply chain model in trucking (focused primarily on class 6 through 8 heavy trucks) **will save over $236 billion dollars in current inefficiencies**.

But whether trucking truly untaps the potential of a digital supply chain hinges on the approach. Moving toward a digital supply chain isn't just about making technology upgrades. It's about embracing a whole new way of thinking. The successful integration of digital supply chains industry-wide also relies heavily on collaboration and information sharing from many parties.

As a leader in the trucking industry, International Truck understands the questions and concerns of those invested in the future of the industry.

In this point-of-view (POV) document, we aim to elevate the discussion and make our distinct viewpoint clear and communicate our continuing journey toward digital transformation. In doing so, we want to do more than just demonstrate our continued commitment to innovation and leadership in trucking. We hope to move the conversation to focusing on unlocking the potential of digital supply chain in a strategic way that makes sense for all our customers, suppliers and stakeholders. And International Truck is in a unique position to help lead the industry in the digital age.

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01 DEFINING AND UNDERSTANDING THE DIGITAL SUPPLY CHAIN

The digital supply chain encompasses more than just the truck, but also the entire transport ecosystem. We've already begun to see a merging of different technologies to create intelligent, complex and highly flexible systems that will help accelerate trucking into the future.

So, how do we define the trucking digital supply chain exactly? At a high level, it is the use of data and network-based support systems for managing and optimizing trucking transport operations, using many forms of digital technologies.

At a process level, it's the full integration of connected trucks for real-time logistics data across the entire supply chain, from parts and materials suppliers to manufacturers to warehouses and distributors, ending with the end customer. The result is improvements in efficiency, transparency, flexibility, cost efficiencies, and productivity.

THE MANY DIFFERENT COMPONENTS AND TECHNOLOGIES THAT COMPRISE A DIGITAL SUPPLY CHAIN INFRASTRUCTURE COULD INCLUDE (BUT AREN'T LIMITED TO):

- CONNECTED VEHICLES
- CLOUD SERVICES
- BIG DATA
- NETWORKS (5G)
- SYSTEMS (SOFTWARE, HARDWARE, MECHANICS)
- ARTIFICIAL INTELLIGENCE (CURRENT AND FUTURE STATE)

And, unlike other technologies that are still being developed and tested on roadways, digital supply chain innovations are already being actively adopted. Fully digitalized trucking may be many years away, but there are pieces of it already being implemented.

Cloud computing and storage, along with sensors and automatic identification, are leading the way in use today at 50 percent and 49 percent adoption, respectively. Over the next two years, the adoption of those technologies is expected to grow to 73 percent and 70 percent, respectively.

The technology that most respondents said will be adopted the most within the next two years is inventory and network optimization, forecasted at a 75 percent adoption rate.

1 THE DISRUPTIVE EFFECTS ON OUR INDUSTRY AND REQUIRED MINDSET

There's no doubt that the impact of digitalization on the trucking industry will be extensive, profound, and ultimately disruptive. The digital supply chain has already begun to completely transform how freight is transported on the world's highways. Old business models are starting to become obsolete, and new ones are emerging.

Driving that disruptive change are greater expectations from customers for real-time information and order delivery. These factors and more are reshaping the supply chain in trucking and transport. Plus, there's the ever-present need to reduce unplanned down time, increase driver safety, and maximizing asset utilization.

In addition, the digital transformation of the industry creates an opportunity for "breakaway" business models and offerings we've never seen before or had the chance to benefit from. This process also requires a different way of thinking and acting. For example, in the future, connected trucks will be considered more of an integration hub than a vehicle. As connected trucks and infrastructure systems interface and process valuable information, the actionable and insightful data that comes out of this flow will be the driving force behind operations.

THE GREATEST IMPACT OF THE DIGITAL SUPPLY CHAIN IN TRUCKING CAN BE BROKEN DOWN INTO THREE AREAS:

OPERATIONS

Major variables positively impacted by efficiency improvement include core processes, fuel consumption, insurance costs, and asset utilization.

DRIVER

Performance gains and reduction in turnover will result in cost savings.

NETWORK

Deadhead, driver utilization, trailer and load capacity, and unplanned downtime are all areas positively impacted by a digital supply chain.

2 THE TWO MAJOR DIGITAL SUPPLY CHAIN TECHNOLOGIES IN TRUCKING

Although a digital supply chain pervades nearly every aspect of trucking operations, two technologies are at the forefront of digitalization. These technologies are telematics (or connectivity) and load matching.

TELEMATICS & CONNECTIVITY

Telematics is the force helping the industry become connected. From connected trucks to similarly connected infrastructure, systems, and partners, this constant stream of data is the basis for so much of trucking's current and future potential.

In fact, the current industry environment presents multiple structural challenges that are driving telematics to a "must-have" status for every entity that touches trucking. Growth in the truck connectivity market is being fueled by government regulations, efforts to increase efficiencies, and concerns about driver and vehicle performance.

In addition, telematics and connectivity can help large fleet owners with heavy truck fleets cut costs significantly.

TRUCKING'S STRUCTURAL CHALLENGES AIDED BY TELEMATICS AND CONNECTIVITY

REGULATION

- New federal and state demands
- Growing desire for oversight of trucking (ELD, CSA, etc.)

FUEL SUPPLY

- Concerns regarding supply
- Worries around pricing volatility

CONGESTION AND TRAFFIC SAFETY

- An estimated $10 billion is associated with congestion
- Traffic is only going to get worse

DRIVER SHORTAGE

- Supply of drivers projected to be 174k short of demand by 2024

DRIVER HEALTH AND WELLNESS

- Increasing concerns over driver distractions
- Danger of texting and smartphone use while driving

TRUCK AND ECONOMICS

- Rising pressure on trucking profitability
- Increasing cost due to competition and commoditization

TELEMATICS' IMPACT TO TOTAL COST OF OWNERSHIP

($/YR. TCO – LARGE FLEET OPERATOR, CLASS 7-8 TRUCKS)[2]

	SAVINGS ASSUMPTION	ANNUAL SAVINGS PER TRUCK
FUEL	1%	$560
UNPLANNED DOWNTIME[1]	1 day in downtime (down 13%)	$2,000
MAINTENANCE[2]	1 event per year (down 5%)	$750
INSURANCE	10% in insurance premium (UBI, CPAP)	$660
TOTAL SAVINGS	$3970 PER TRUCK	
COST OF SAVINGS	$440 PER TRUCK (HW AND SUBSCRIPTION)	
ROI	9X	

LOAD MATCHING: BOARDS MEET THEIR MATCH

Although contracts are still responsible for more than half of all freight movement, spot markets currently comprise up to 40 percent of hauled loads.[3] Most spot market freight is handled by load boards with interactions – often by phone – happening between shippers, brokers, carriers and owner operators, all hurriedly competing for business on dozens of boards. Traditionally, this process has been fragmented, tedious, and slow. The result is not always ideal. There are plenty of instances of missed opportunities and shippers still left in need of capacity.

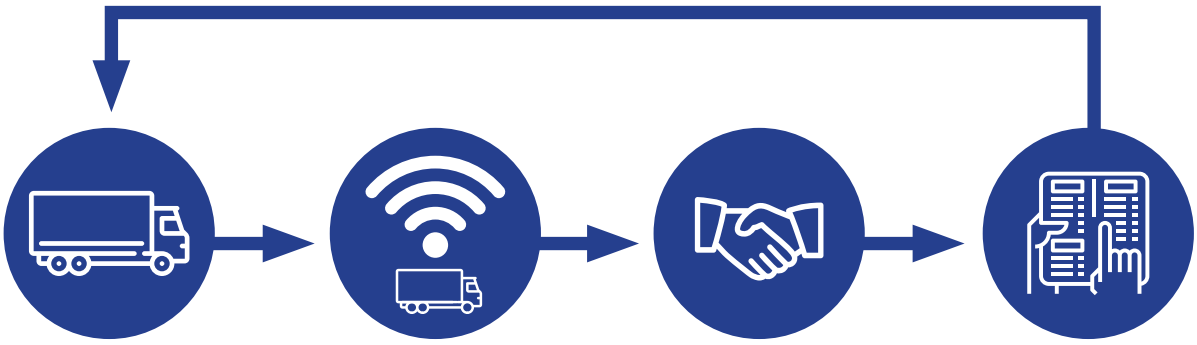
Technology is starting to catch up with this cumbersome load board process, and digital innovations offer a better, much more efficient way. A major driver for a fully integrated digital supply chain is the network of connected vehicles and the information gathered from them. The world of connected trucks offers greatly increased availability of data, which can enable digital load matching and load maximization.

Online and cloud-based load matching, specialized software, and mobile apps have made it possible in recent years for trucks seeking freight and freight-seeking trucks to be matched nearly instantly. A fully integrated digital supply chain takes the concept of digitalized load matching a few steps further.

A FULLY INTEGRATED DIGITAL SUPPLY CHAIN CAN:

- Make it possible to significantly speed up shipper-carrier transactions by increasing the ease of finding, booking, and shipping freight.
- Leverage real-time data from connected trucks for total visibility into shipment status.
- Quickly and very efficiently locate capacity for loads.
- Use emerging technology, such as machine learning, to streamline bidding and negotiate pricing.

FREIGHT-MATCHING INFORMATION FLOW



1. Sensor-based automatic tracking of available load area: trailer recognizes loading status and truck assesses current loading weight and available capacity.

2. Truck communicates information to digital freight-matching platform.

3. Fleet management is notified of available freight-sharing opportunities. Agreement is struck between freight owner/forwarder and fleet management.

4. Truck and driver are notified of new freight pickup and delivery schedule.

International Truck's OnCommand® Connection (OCC) technology enables us to be a leader in helping match carriers with shippers and assisting our partners with load matching. The open architecture approach to OCC positions us as a leading connectivity provider with technology that can be considered the digital backbone of load matching.

3 WHY OPEN ARCHITECTURE?

At International Truck, we believe in an open architecture approach to our OCC platform, which is a key differentiator from other OEMs in the industry. In our view, an open architecture encourages collaboration and information-sharing by all stakeholders working toward common and interrelated goals. An open platform also makes it simpler for various business systems to work together within a fleet operation.

As importantly to our customers and shareholders, an open architecture platform puts International Truck in a unique position to become the backbone and digital partner of choice for load matching, which is one of today's strongest trends.

02 THE INTERNATIONAL TRUCK POV ON THE DIGITAL SUPPLY CHAIN

At International Truck, we embrace digital supply chain technology and are continuing to develop it through OCC, helping to lead the trucking industry into the digital and connected future. In fact, we view digital transformation as a process of reinventing ourselves with a marketplace strategy and connected services built to serve all brands in a connected world.

Our mission is to provide our customer a better-connected experience through universal hardware. The goal is a higher resolution and frequency of data – greater than ever before – with the ability to choose providers on demand, and applications a la cart via the OnCommand® Connection Marketplace. This open-architecture, cloud-based technology platform offers complete telematics services and a broad range of related driver support tools.

The OCC Marketplace is just one example of how we are using digital technology to help our customers become more efficient and profitable. Marketplace gives drivers and fleet managers centralized and easy access to information and resources that can make their daily operation more productive.

1 THE DIGITAL SUPPLY CHAIN AND UPTIME

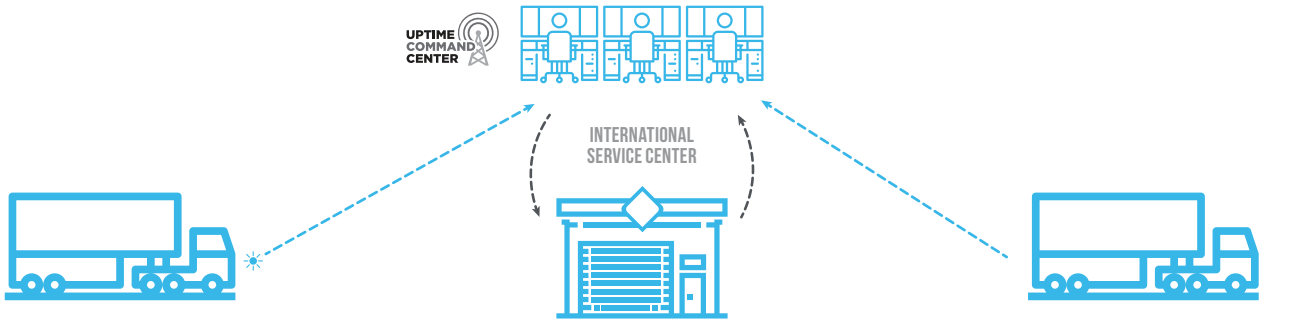
We also understand that uptime and improved total cost of ownership are top industry priorities. Our vision is to continue to advance our leading vehicle telematics hardware, connectivity technology, and data cloud platforms while partnering and collaborating with trucking service providers.

Our OCC open-architecture platform is already driving improved uptime for more than 350,000 vehicles. In fact, this platform has evolved from a remote diagnostics tool to a unique data and solutions backbone. By integrating and interpreting vehicle health information from multiple telematics providers in a customer-friendly format, OCC enables users to achieve more efficient repairs and maintenance, better lifecycle value, and a lower total cost of ownership. The increased visibility into maintenance and repair needs offer greater control of their business as well.

Our recent introduction of our Uptime Command Center, designed to lead the industry in driving customer uptime, leverages OCC for maintenance alerts, diagnostics, and 24/7 support, with the goal of getting vehicles back on the road as quickly as possible.

For example, when a fault code is received from one of our connected vehicles, our OCC Advanced Remote Diagnostics feature gathers vehicle health reports and location data in real time for a full diagnosis. Our team can then identify the closest dealer with an open service bay, determine the parts that are needed, confirm their availability, and route them there. That's solid proof that a digital supply chain can improve uptime.

UPTIME COMMAND CENTER AT WORK

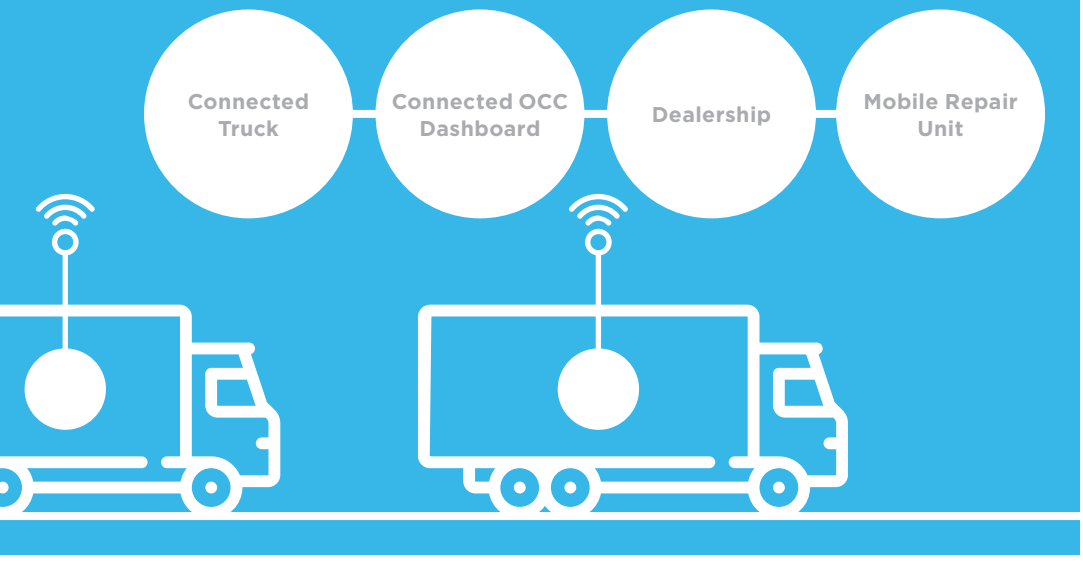


- Fault code sent. OnCommand relays issue to Command Center
- Alerts International Service Center. If not already in stock, part ordered and may even be delivered before truck arrives

- Live tracking of repair
- Assists in trouble shooting
- All parties focused on quick, successful turn-around

- **Mission**: **80%** of repairs completed within **24 hours**
- Data from repair analyzed to proactively address potential issue in other trucks

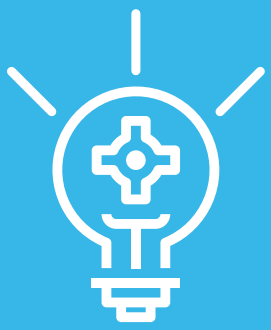
HOW REMOTE DIAGNOSTICS WILL IMPROVE TRUCK UTILIZATION



We've also recently introduced OnCommand Connection Telematics, a solution that includes hardware and applications in support of all makes and all models of Class 6 through 8 vehicles equipped with compatible diagnostic ports. This allows International Truck to continue to expand our reach while offering customers the tools and data they need to optimize vehicle uptime and boost driver productivity.

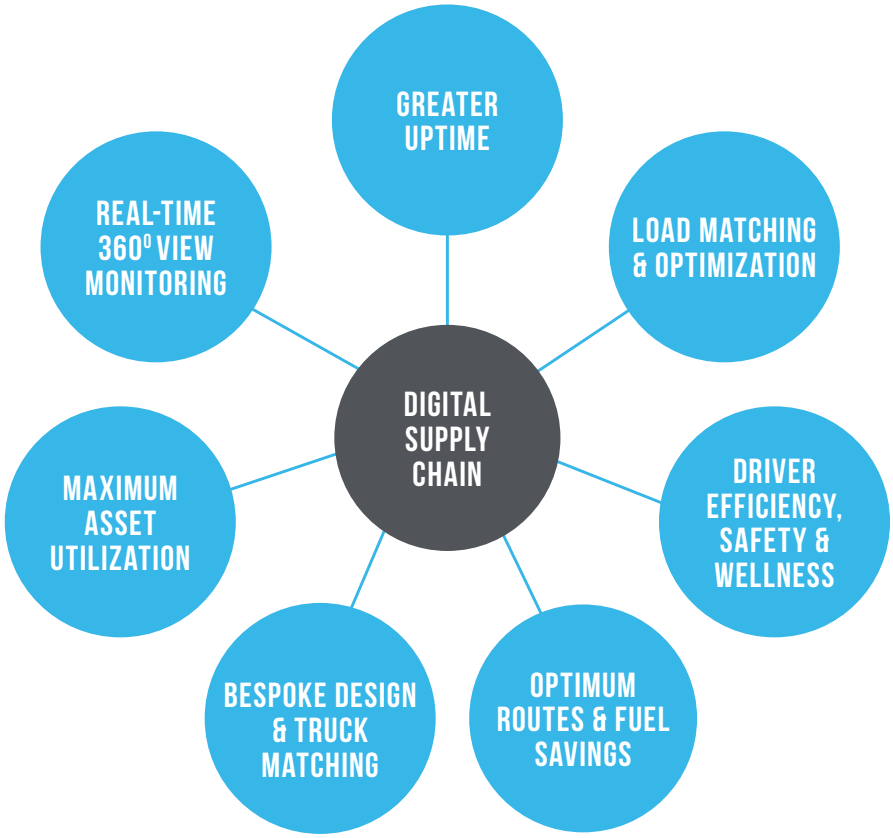
2 WHERE WE SEE THE GREATEST POTENTIAL

Besides greater uptime for vehicles, we see tremendous potential with a digital supply chain in many major areas of trucking. Some of these improvements and efficiencies are obvious, while others require further explanation.



FOR EXAMPLE, data can be used in many innovative ways, such as designing and matching a truck according to what's actually needed by a particular fleet owner. Data from connected trucks gives us many insights, including how exactly trucks are used and opportunities for improvement. That's valuable and actionable data that can be used for both design and fleet buying decisions.

Bespoke design in the context of trucks means being able to learn from data to design trucks based on common needs throughout the industry. As importantly, past vehicle usage data offers the ability to fit the right truck to the right fleet owner.



Besides many areas that can drive overall efficiency and profitability, the digital supply chain can have positive implications on the driver experience. It can make a tough job a whole lot easier with on-demand inspection reports, real-time service support, streamlined logging, safety assistance, and even sending electronic coupons good at a driver's favorite truck stop.

3 WHAT MUST HAPPEN FOR TRUCKING TO TRANSFORM TO A DIGITAL SUPPLY CHAIN?

There's no doubt that the combined power of connected trucks and the digital supply chain will have a huge impact on the industry. But there's still a lot that must happen to make it a reality.

Of course, those players in the trucking industry that don't move now to begin building the capabilities and business models needed to win in this new digital world will be left behind. New and emerging technologies will need to be embraced and adopted. And for many, a new mindset has to be developed.

INDUSTRY STAKEHOLDERS NEED TO CONSIDER OTHER ACTION STEPS TO FORGE AHEAD WITH AN INTEGRATED DIGITAL SUPPLY CHAIN:

- Recognition of value of the data and flow of information from connected trucks
- Awareness of the positive impact a digital supply chain can have on regulatory requirements (through better oversight tools and data)
- Preparation for the move to a 5G network – this will accelerate the power of the digital supply chain, but will also bring with it new compatibility and integration challenges
- Rapid investments in infrastructure, digital assets, and new technologies – sensors, cloud computing, networks, data analytics, artificial intelligence, and more
- Collaborative partnerships with digital supply chain suppliers and IT providers

03 THE INTERNATIONAL TRUCK DIGITAL SUPPLY CHAIN JOURNEY

At International Truck, we firmly believe we are in an ideal position to lead the industry's journey into its digital transformation. As a digital pioneer in the industry, with our open architecture OCC technology, we'll continue to build upon our leading advantage to help our customers and stakeholders benefit fully from digitalization. We will work to develop and defend our strong position with OCC, integrate and broker new sources of data, and create "breakthrough" services that no competitor can match. In fact, within the next two years, we aim to introduce several innovations with our partners in key areas related to digital supply chain technology.

THESE INCLUDE:

- Load matching
- Truck-as-a-service
- Platooning
- Driver behavior analytics
- Advanced DVIR
- Fleet maintenance tracking
- Fuel cards
- A certified driver community
- Trailer tracking

1 OUR STRATEGIC ROLE

To ensure we stay on track and at the forefront of innovation, our digital roadmap features a three-pronged role strategy that holds constant, but requires us to rethink our offerings to operate at the speed of the industry transformation. It also allows us to build a portfolio of products designed to serve all segments and players – from large to small fleet owners, owner operators, and other stakeholders, even industry disrupters.

OUR STRATEGIC VISION IN THE DIGITAL TRUCKING AGE

OPEN PLATFORM EFFICIENCY ENABLER

- Help large fleets make big gains in operational efficiency
- Aim for zero unplanned maintenance
- Achieve low driver churn

TELEMATICS PARTNER OF CHOICE

- Help SMBs and owner operators with more efficient trucks and lower TCO
- Help SMBs achieve higher utilization
- Aid owner operators with access to loads

INTEGRATED TELEMATICS BACKBONE PROVIDER

- Help digital disrupters like load matching offer access to trucks and prime customers
- Lower costs with economies of scale
- On-time asset readiness, automated exchanges

2 THE VOLKSWAGEN TRUCK AND BUS ALLIANCE AND RIO

In 2017, Navistar finalized a strategic alliance with Volkswagen Truck and Bus to allow us to move much more quickly into several disruptive industry areas, including electric propulsion, autonomous vehicles and digital supply chain technology. The agreement included Volkswagen Truck and Bus's acquisition of a 16.6 percent stake in Navistar.

The Volkswagen Truck and Bus Alliance helps us to leverage their substantial technology innovations and components in segments of the market where International Truck is already a leader. In addition, it helps us increase our global scale, strengthen our competitiveness, and provide our customers with expanded access to cutting-edge product, technology, and services.

The technology-sharing element of the alliance will help us move forward faster with commercial vehicle development, including areas related to the digital supply chain. In fact, one of Volkswagen Truck and Bus's strongest technologies in the digital supply chain space is its RIO platform. This is an open, cloud-based technology, often described as the "operating system" for the entire transportation industry.

Sharing our open architecture philosophy, the RIO platform offers benefit to all players in the supply chain — shippers, dispatchers, carriers, drivers and recipients — facilitating a connection with a uniform information and application system that includes forecasting and many other powerful features.

International Truck and Volkswagen Truck and Bus will work toward converging OCC and RIO to achieve an unparalleled global connected vehicle platform with the potential to cover more than 650,000 vehicles worldwide. Our mutual goal is to work together in leveraging the best of each platform to make it the world's largest global ecosystem for connected commercial vehicles, solidifying us as the digital transformation leader in trucking.

04 CONCLUSION

Like two other mega trends in trucking – electric and autonomous trucks – the digital supply chain will have a disruptive impact on our industry. But, within a very short timeframe, all these trends will bring significant benefits. In fact, it's estimated that within just the next four years these three trends combined will result in substantial efficiencies for an estimated cost savings of $236 billion.

However, the digital supply chain distinguishes itself as perhaps the most visible disrupter today, with existing technologies, like OnCommand Connection, already well-adopted and making a positive difference in the livelihood of truck drivers, fleet owners, and other stakeholders. And, as more and more trucking entities integrate and use digital technologies to boost the efficiency of their operations, we at International Truck believe this will inevitably result in a cumulative effect – close to full resource optimization, maximum asset allocations, and ultra-operational efficiencies at levels never before reached.

That's why we believe the digital supply chain will be the next big breakthrough for the trucking industry.

Yes, we fully recognize the enormous potential of the digital supply chain. And the good news is that with our ever-advancing OnCommand Connection platform, a rapidly growing global network of connected trucks, and our mutually beneficial and strategic partnership with Volkswagen Truck and Bus, we are on a path toward digital transformation that will help lead the entire industry into a new sweet spot of operational efficiency.

SOURCES

1) http://www.fleetowner.com/blog/supply-chain-going-digital-trucking-ready-follow

2) Based on 7.7 days unscheduled maintenance per year, $2,000 per day (penalty vehicle replacement); a typical truck having 1.5 service event per month (18 events per year). Sources: American Transportation Research Institute, Frost & Sullivan, JD Power, Fleet Equipment Magazine, A.T. Kearney

3) Source: Heavy Duty Trucking

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