# ON THE MOVE:

# IT IN THE AUTOMOTIVE + TRANSPORTATION INDUSTRIES

US SIGNAL®

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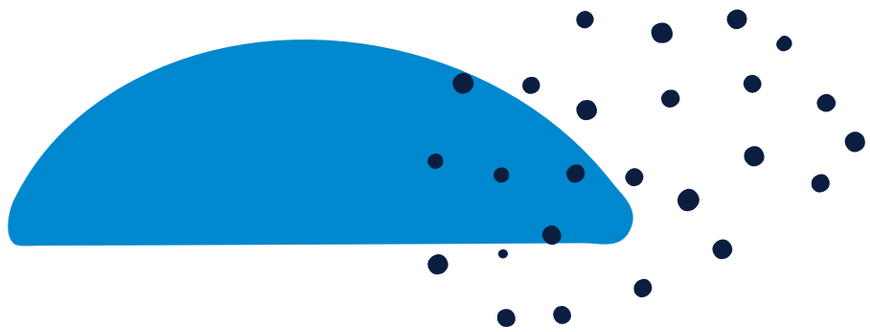


# PROGRESS IN MOTION

Automotive. Mobility. Aviation. Rail. Marine. Transportation infrastructure. Logistics. Shipping. They're all involved in moving people, products, supplies or other cargo. To a large extent, IT solutions play a role in that.

However, customer expectations and disruptive technologies — such as artificial intelligence, 3D printing, and advances in automation, robotics, and intelligent transportation systems — are changing things. Many traditional IT services and infrastructure, as well as legacy business models, are no longer sufficient. Some are more important than ever.

In this eBook, we look at what's changing in the various sectors that fall under the transportation umbrella — and what IT solutions and approaches to technology will be needed in order for companies across the transportation industry to survive and thrive.

**Digital transformation will touch $145.28 billion by 2025 in the transportation and logistics sector.**

***Adroit Market Research***

# WHAT'S NOW AND WHAT'S NEXT

Autonomous cars. Flying taxis. Delivery drones. Hyperloop high-speed transportation system. Multi-directional elevators. Transportation innovation may not be moving ahead at full speed but it's making progress — enough so that the  global smart transportation industry is expected to reach $251.0 billion by 2030, growing at a CAGR of 10.2% from 2021 to 2030.

More evidence of transportation innovation can be found on the internet. An online search shows that countless patents in the field of transportation have been registered in the last 10 years. Of course, most of them aren't sexy and won't grab too many headlines: i.e., a next-generation transportation crate for fine art or void-reducing asphalt membrane composition for use in roads.

Nonetheless, change is happening and transforming almost every aspect of getting from point A to point B. Here are just a few examples of what's new or coming soon:

+ **Maglev trains.** Instead of using fossil fuels, these high-speed trains use magnetic levitation from powerful electromagnets to travel high speeds with less noise and vibration than traditional trains. Maglev trains float on a cushion of air, eliminating friction. The lack of friction and the trains' aerodynamic designs allow them to reach ground speeds of more than 310 mph (500 kph), or twice as fast as Amtrak's fastest commuter train.

+ **Multi-directional elevator.** *Multi-directional elevators* allow elevator cars to move vertically and horizontally in a single shaft using a magnet-based drive system similar to that in Maglev trains. This eliminates the limitation caused by rope, which restrict building height and slow down the elevator car. It also allows multiple elevator cars to fit in a single  shaft and move throughout a building in a loop. This reduces wait time, optimizes floor space, and increases energy efficiency.

+ **Hyperloop.** With this super-speed, ground-level transportation system, people travel in a hovering pod inside a vacuum tube at speeds as high as 760 mph (1220 km/h). In 2020, ***Virgin Hyperloop*** became the first company in the world to successfully test hyperloop technology with passengers.

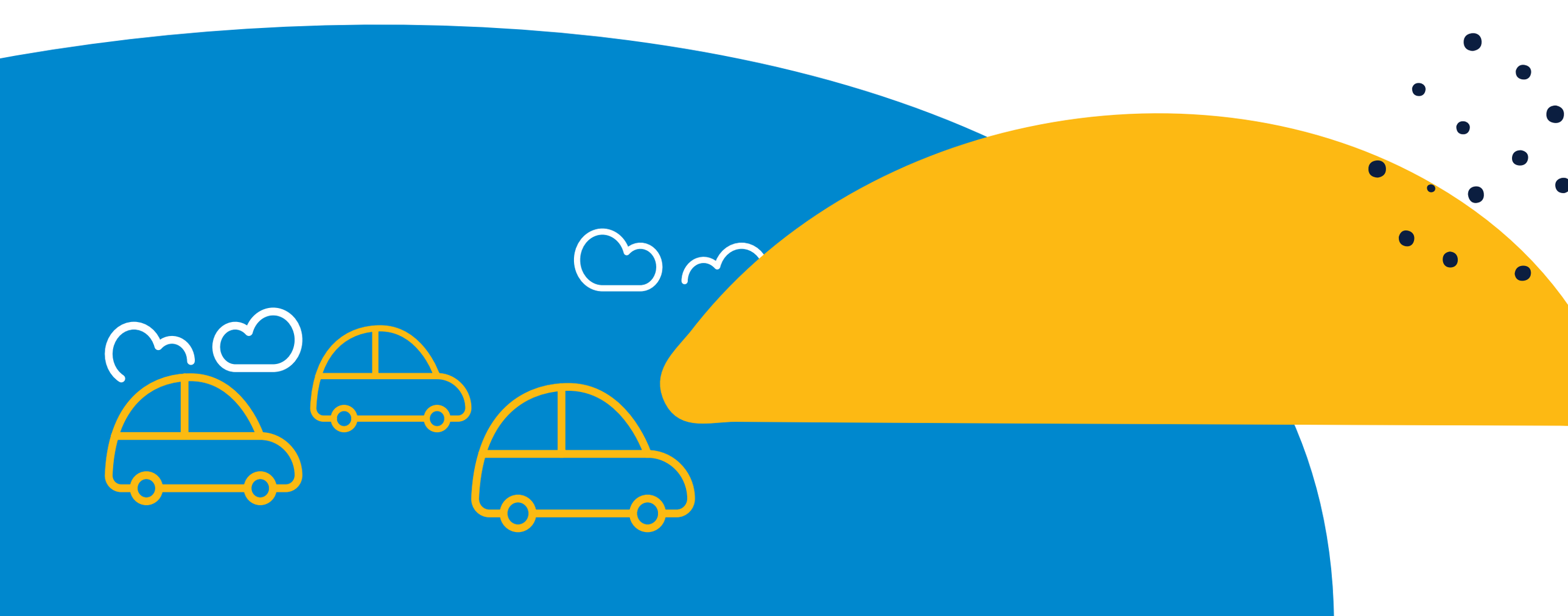
+ **Underground roads.** As envisioned by the idea originator, ***Elon Musk***, cars would be lowered underground by a metal elevator to a tunnel-enclosed road network. There, individual cars would be transported at high speeds on metal trolley-like platforms between destinations, eliminating traffic and associated collisions. The concept could also support freight and public transportation systems like hyperloop.

+ **Driverless cars.** The motivator here is to reduce distracted driving by using robots to operate vehicles. The cars would also be designed to take less risks and reduce speeding incidents. Early efforts have been dubious, and manufacturers must deal with the high price tags that will like accompany these cars, as well as ethical questions, legal ramifications, and more.

+ **Flying taxis.** ***Numerous companies*** are refining the technology behind electric vertical takeoff and landing aircraft (eVTOLs). They're battery-powered and could fly without a pilot—once regulations allow. Making them practical will require automotive-scale manufacturing, re-envisioned air traffic control, and cost-effective physical and charging infrastructure.

+ **Mobility as a Service (MaaS).** MaaS is a platform that offers a diverse range of transportation options — such as ride-hailing, e-bikes, and taxis — to meet a user's travel request. Users pay for the trip on the platform rather than dealing with multiple ticketing and payment operations. The MaaS market is expected to grow to ***over $100 billion by 2030***.

+ **Delivery drones.** Drones aren't just for fun, photography, and ***pizza*** delivery. Tech giants like Amazon and Alphabet consider unmanned aerial vehicles (UAVs) the future of e-commerce fulfillment and last-mile deliveries. They also hold great potential for delivering medications, building supplies, and more to remote areas and areas where traffic congestion is an issue.



# PRIORITIZE DIGITAL TRANSFORMATION

The on-the-boards developments in the transportation industry are exciting, but driving innovation requires more than the "big ideas." A variety of technologies, tools, and processes, as well as changes in mindset and culture, are required to take them from the proverbial drawing board to everyday use. At the top of the let's-make-it-happen list: digital transformation (DX).

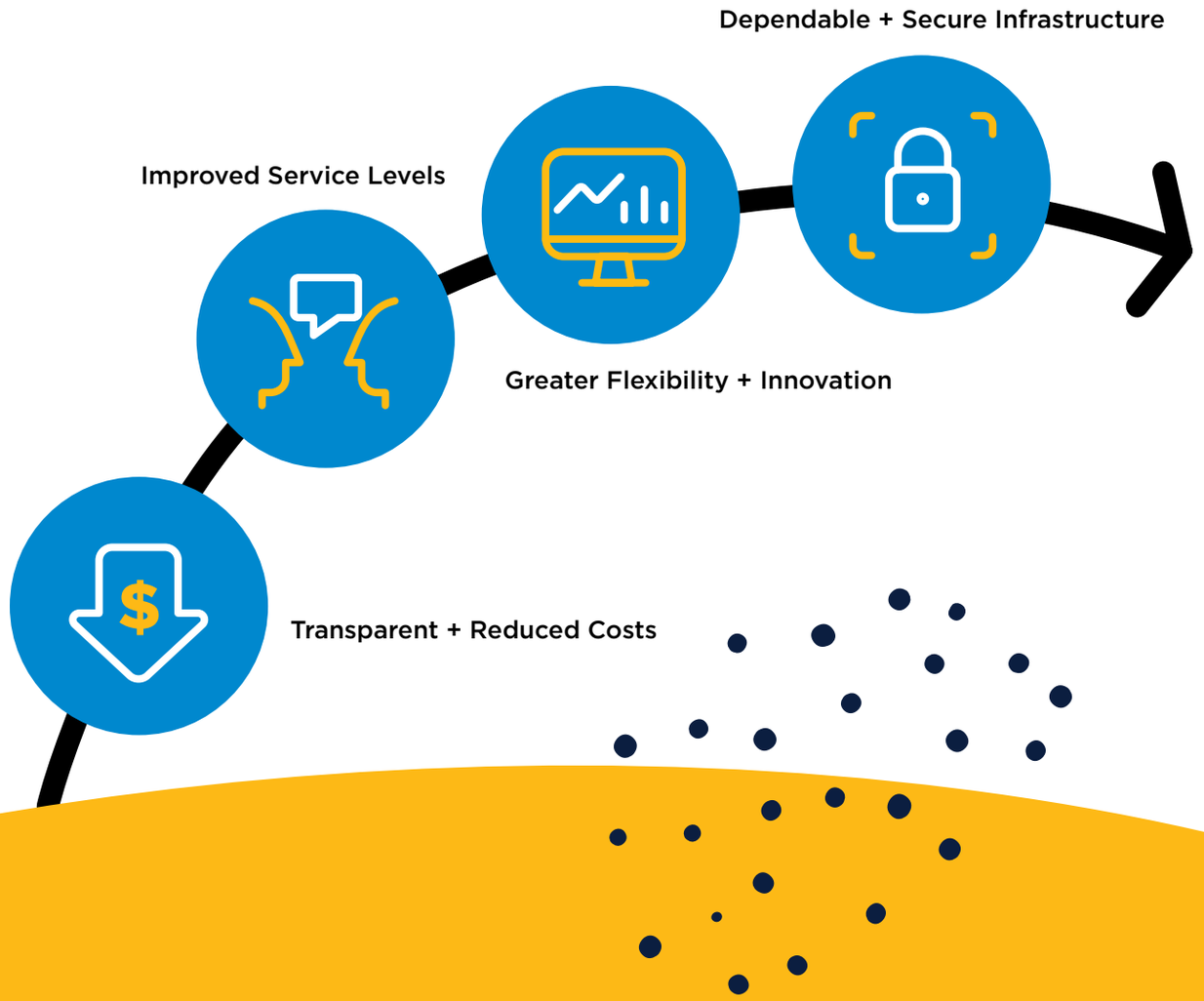
DX is about integrating digital technology into all areas of a business to satisfy the critical needs of the industry, such as optimization, connectivity, automation, efficiency, and visibility. It's also about changing "business as usual" to deliver the value customers want and expect.

Innovation isn't the only driver for DX, however. In today's competitive, always-changing business landscape, failure to leverage the latest technologies and business models can affect efficiency, productivity, and market growth. That makes it all the more imperative for companies across the transportation industry to embrace technological change — and whatever it takes to make that happen.

**According to a Forbes Insights survey, 65% of logistics, supply chain, and transportation executives noted the need to revamp existing models and add flexibility to business operations in order to reduce costs, ensure omnichannel delivery, and meet ever-shifting consumer demands.**

# DX-ENABLING IT INFRASTRUCTURE

DX encompasses and is enabled by technologies such as artificial intelligence (AI), cognitive computing, the Internet of Things (IoT), robotic process automation (RPA), and big data analytics. But implementing those technologies isn't just a matter of purchasing software.




It requires IT resources and infrastructure that can power the technologies. Among them:

+ High performance computing resources that can handle the huge number of calculations, multiple large data sets, and other requirements associated with advanced technologies

+ Scalable storage capacity, storage technology options, and choices in storage systems architecture to accommodate increasing data volumes, address cost issues, and meet data privacy, security, access and retention requirements

+ Scalable, high-bandwidth, low-latency networks that offer uptime, reliability, high-level security, and access to connectivity-rich data centers and diverse peering partners with redundant paths to the public Internet

+ End-to-end, multi-layered security

For companies that don't already have the essential resources in place, successful DX could require significant investments could mean purchasing new equipment, i.e., NVMe or NVMe-over-fabrics. It could require modernizing mainframes or other on-premises data center equipment.

However, there is an option that avoids capital investment and ongoing maintenance, upgrades and labor costs. That's going to the cloud.

# THE POWER OF THE CLOUD

The cloud delivers the compute, storage and networking resources that are required for powering big data analytics, cognitive computing, AI, IoT, and other advanced technologies and emerging trends. The resources are on-demand and scalable, offering maximum flexibility.

They're also offered on a pay-as-you-go or know-what-you're-getting subscription basis. No infrastructure purchases or maintenance are required. Cloud services, at least those delivered by reputable cloud services providers (CSPs), employ multiple security technologies and processes to ensure greater security and customer peace of mind. CSPs count on their customers' satisfaction for their own success, so they invest in, deploy and monitor the latest and most advanced security technologies. Many also offer managed security services to supplement what their cloud services already provide.

As companies in the transportation industry expand, so can their cloud-based systems. Done right, cloud services can also help with regulatory compliance requirements and much more.

Another advantage the cloud provides is a framework that allows for expandability using APIs. For example, if a company finds a third-party solution that can provide better workflows and doesn't require proprietary components, the company can quickly update that workflow into their SaaS applications using APIs.

# THE CLOUD IN ACTION

The cloud is already proving its usefulness to companies across the transportation industry. For example:

+ Public transportation systems around the world are using cloud services to monitor and forecast traffic to make transit easier for everyone involved.

+ A combination of cloud services and GPS technology allows fleet managers to get real-time information on every truck in transit to facilitate scheduling and customer communications.

+ Towing operations are using cloud-based software to provide real-time traffic updates and best available route to drivers, and collect data on unnecessary halts, vehicle performance, breakdowns and fuel waste to the back-office managers.

+ Railroads and airlines use cloud technologies to inform travelers of delays and available seats using real-time data.

+ Cloud-based companies like Uber, Lyft, Scoop, Wingz, Via, Arro, and Bridj have proven their value as options for requesting rides, finding a carpool, or hailing taxis.

## CLOUD BENEFITS

**Operational innovation + Revenue model innovation + Business model innovation**

# DOWNTIME MITIGATION

Unplanned downtime is always a bad thing, whether it's a matter of downed IT systems that halt manufacturing operations or mechanical issues that put a truck out of commission. Downtime mitigation is another area where the cloud can help.

In terms of downtime that affects IT systems, cloud-based disaster recovery — in the form of a Disaster Recovery as a Service (DRaaS) solution — can mitigate the effects and help keep companies up and running. A third-party provider handles the replication and hosting of physical or virtual servers to provide business continuity in the event of any kind of disaster. DRaaS offers quick, SLA-backed recovery time objective (RTO) and recovery point objective (RPO) in minutes, seconds, or even near-zero seconds.

When downtime is a matter of equipment malfunction or similar causes, the cloud can provide the resources need to facilitate the use of IoT devices and the data they provide. By combining sensors, machine learning, and analytics, IoT embedded in trucks and other vehicles can generate data to help predict when equipment may fail so preventive maintenance can be done and downtime avoided.

For example, by analyzing the data collected by telematics programs — in addition to historical work-order information and even with something as simple as oil samples — truck fleets get advanced failure warnings, allowing for proactive maintenance and less downtime.

**IT leaders estimate downtime costs $1,467 per minute ($88K per hour).**

***Veeam 2022 Data Protection Report***

# THE CHALLENGES OF LEGACY SYSTEMS

As much as many transportation companies want to move forward with new technologies, including the cloud, they often find it difficult to do so. Much it is due to existing investments in on-premises data centers that support mainframe-based systems running legacy applications built using monolithic architectures.

These facilities can be expensive with costs for labor; utilities and environmental controls; equipment purchases, upgrades and maintenance; and more. The same applies to the mainframes. And although they can be modernized, it's not cheap or easy.

In addition, mainframes typically don't integrate easily into the agile development processes that are essential for quicker time to market and innovation acceleration. Further complicating things, legacy apps are usually monoliths. Their user interfaces and data access codes are combined into a single program from a single platform, making them difficult to maintain and risky to update.

Monoliths tend to be unstable due to compatibility issues with newer operating systems, browsers, and infrastructure. They may no longer be supported by the companies that created them, and it's getting harder to find employees skilled in legacy languages like COBOL to deal with them.

Many legacy systems and applications have also been repeatedly modified over the years. They don't integrate well with or support more advanced technologies. This can prevent companies from adopting technologies such as IoT and AI to drive innovation, streamline processes, and more.

There's more.  Legacy systems that can't power real-time information flows and lack advanced analytics systems can't facilitate quick decision-making -- a critical requirement in today's world.

In addition, downtime, customized proprietary software, incompatibility with other systems, and obsolescence make technology updates challenging.

# HYBRID IT TO THE RESCUE

The good news for companies in the transportation industry is that they don't have to move everything to the cloud to take advantage of the cloud's benefits. That's the beauty of a hybrid IT strategy.

Hybrid IT entails using different IT environments. That could include an on-premises private cloud, a hosted private cloud, a public cloud, an off-site colocation facility or, more than likely, a mix of on-premises data center and cloud environments. Workloads are matched to the environments where they will perform best. With multiple IT environments to choose from, companies are better equipped to handle changing business needs.

Workload optimization is a key benefit, but there are others as well. For example, a hybrid IT strategy enables companies to add the cloud to their IT services portfolio without having to move everything or carve out a large budget for a cloud migration. It also provides them time to determine how best to address legacy apps — retain them, refactor them, rehost them, rebuild them, replace them, retire them, etc.

**The Global Hybrid Cloud Market is expected to reach USD 173.33 billion with a CAGR of 22.25% from 2019–2025. It's estimated that 94% of enterprises already use a cloud service.**

***Market Research Future***

# THE COLOCATION OPTION

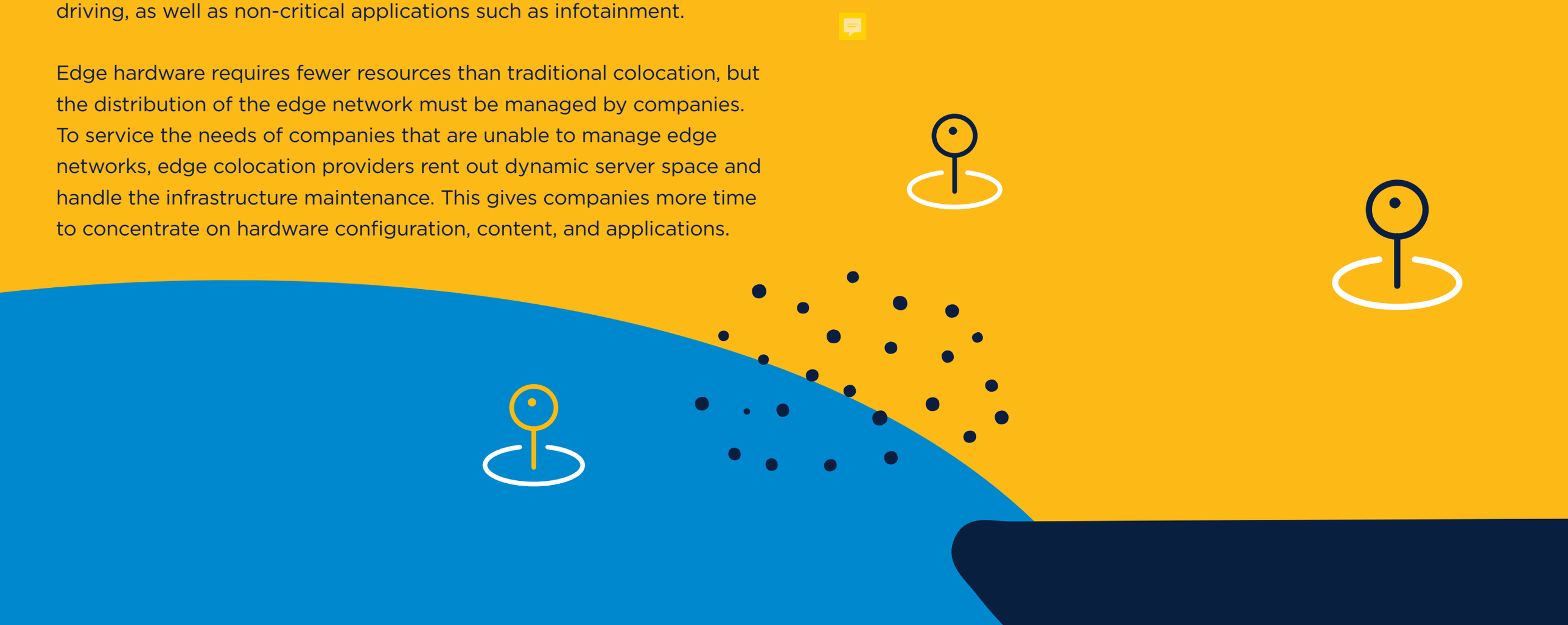
The cloud may power DX, but there's still room for colocation — particularly as part of a hybrid IT solution that incorporates edge data centers.

Edge data centers are smaller facilities that extend the edge of the network to deliver cloud resources closer to data-generating sources such as those in automotive manufacturing facilities, IoT devices, and IoV (where a vehicle is an IoT node connected to the outside world with V2X communication, where X may stand for Vehicle, Pedestrian, Infrastructure, or Network.) This reduces latency and data transfer costs, benefiting mission-critical applications such as autonomous driving, as well as non-critical applications such as infotainment.

Edge hardware requires fewer resources than traditional colocation, but the distribution of the edge network must be managed by companies. To service the needs of companies that are unable to manage edge networks, edge colocation providers rent out dynamic server space and handle the infrastructure maintenance. This gives companies more time to concentrate on hardware configuration, content, and applications.

Plus, there are all the benefits of traditional colocation to consider. Colocation provides a predictable OpEx model. It frees up staff to focus on other endeavors instead of maintaining equipment. Colocation facilities often provide access to a more robust power-per-square foot ratio than is commonly available in on-premises data centers. They also typically offer multiple high-quality networking options.

Yet another advantage is that selected workloads can be outsourced to a colocation facility. Companies maintain ownership of them but don't have to invest in the facilities and labor to keep them in-house.



# MAKE YOUR MOVE

To be competitive in an always-changing world, companies must increase their agility to adapt to new market conditions and trends. They must drive greater efficiency and reduce errors throughout all aspects of their operations. They must accelerate innovation and get to market faster. They must be increasingly responsive to their customers' demands and provide "great customer experiences" that will encourage loyalty.

DX, particularly in the form of cloud services and the technologies they enable, can help make that all happen. So can US Signal.

US Signal has extensive experience in working with companies across the transportation industry, including those involved in logistics, mobility, vehicle manufacturing, public transportation, and more. We understand the IT challenges and needs  associated with these industries, and can help develop and implement solutions to overcome them.

Learn how we can help your organization implement the IT solutions and strategies needed for success.

**Call 866.2.SIGNAL, email info@ussignal.com, or visit ussignal.com**