



**DATA AGE
2025**

The Digitization of the World From Edge to Core

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November 2018

An IDC White Paper – #US44413318, Sponsored by  **SEAGATE**

 **IDC**
ANALYZE THE FUTURE

Executive Summary

> Mankind is on a quest to digitize the world

The focus of this digitization is anything and everything that intersects our business workflows and personal streams of life.

This process of digitization is often referred to as digital transformation, and it is profoundly changing the shape of business today, impacting companies in every industry and consumers around the world. Digital transformation is not about the evolution of devices (though they will evolve), it is about the integration of intelligent data into everything that we do.

The data-driven world will be always on, always tracking, always monitoring, always listening, and always watching – because it will be always learning. What we perceive to be randomness will be bounded into patterns of normality by sophisticated artificial intelligence algorithms that will deliver the future in new and personalized ways. Artificial intelligence

will drive even more automation into businesses and feed processes and engagements that will deliver new levels of efficiency and products that are tailored to business outcomes and individual customer preferences.

Traditional paradigms will be redefined (like vehicle or white goods ownership) and ethical, moral and societal norms will be challenged as genomics and advanced DNA profiling influence healthcare directives, insurance premiums, and spousal choices. Entertainment will literally be transformed before our eyes as virtual reality technologies transport us into new digital realities and augmented reality will dramatically change the service industry as we know it today.

The data-driven world will be **always on, always tracking, always monitoring, always listening** and **always watching – because it will be always learning.**

Data is at the heart of digital transformation, the lifeblood of this digitization process. Today, companies are leveraging data to improve customer experiences, open new markets, make employees and processes more productive, and create new sources of competitive advantage – working toward the future of tomorrow.

Global Datasphere expansion is never-ending

IDC has defined three primary locations where digitization is happening and where digital content is created: the core (traditional and cloud datacenters), the edge (enterprise-hardened infrastructure like cell towers and branch offices), and the endpoints (PCs, smart phones, and IoT devices). The summation of all this data, whether it is created, captured, or replicated, is called the Global Datasphere, and it is experiencing tremendous growth. **IDC predicts that the Global Datasphere will grow from 33 Zettabytes (ZB) in 2018 to 175 ZB by 2025.**

To keep up with the storage demands stemming from all this data creation, IDC forecasts that over 22 ZB of storage capacity must ship across all media types from 2018 to 2025, with nearly 59% of that capacity supplied from the HDD industry.

An enterprise renaissance is on the horizon

The enterprise is fast becoming the world's data steward...again. In the recent past,

consumers were responsible for much of their own data, but their reliance on and trust of today's cloud services, especially from connectivity, performance, and convenience perspectives, continues to increase while the need to store and manage data locally continues to decrease. Moreover, businesses are looking to centralize data management and delivery (e.g., online video streaming, data analytics, data security, and privacy) as well as to leverage data to control their businesses and the user experience (e.g., machine-to-machine communication, IoT, persistent personalization profiling). The responsibility to maintain and manage all this consumer and business data supports the growth in cloud provider datacenters. As a result, the enterprise's role as a data steward continues to grow, and consumers are not just allowing this, but expecting it. Beginning in 2019, more data will be stored in the enterprise core than in all the world's existing endpoints.

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Cloud is the new core

One of the key drivers of growth in the core is the shift to the cloud from traditional datacenters. As companies continue to pursue the cloud (both public and private) for data processing needs, cloud datacenters are becoming the new enterprise data repository. In essence, the cloud is becoming the new core. In 2025 IDC predicts that 49% of the world's stored data will reside in public cloud environments.

Introducing the world's first data readiness condition (DATCON) index

Not all industries are prepared for their digitally transformed future. So, to help companies understand their level of data readiness, IDC developed a DATCON (DATA readiness CONdition) index, designed to analyze various industries regarding their own Datasphere, level of data management, usage, leadership, and monetization capabilities. IDC examined four industries as part of its DATCON analysis: financial services, manufacturing, healthcare, and media and entertainment. Manufacturing's Datasphere is by far the largest given its maturity, investment in IoT, and 24x7 operations, and we found that

manufacturing and financial services are the leading industries in terms of maturity, with media and entertainment most in need of a jump start.

China's Datasphere on pace to becoming the largest in the world

Every geographic region has its own Datasphere size and trajectories that are impacted by population, digital transformation progress, IT spend and maturity, and many other metrics. For example, China's Datasphere is expected to grow 30% on average over the next 7 years and will be the largest Datasphere of all regions by 2025 (compared to EMEA, APJxC, U.S., and Rest of World) as its connected population grows and its video surveillance infrastructure proliferates. (APJxC includes Asia-Pacific countries, including Japan, but not China.)

Consumers are addicted to data, and more of it in real-time

As companies increase the digitization of their business and drive consistent and better customer experiences, consumers are embracing these personalized real-time

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engagements and resetting their expectations for data delivery. As their digital world overlaps with their physical realities, they expect to access products and services wherever they are, over whatever connection they have, and on any device. They want data in the moment, on the go, and personalized. This places greater demand on both the edge and the core to be able to produce the precise data consumers require, often in real-time. IDC predicts that due to the infusion of data into our business workflows and personal streams of life, that nearly 30% of the Global Datasphere will be real-time by 2025. Enterprises looking to provide superior customer experience and grow share must

have data infrastructures that can meet this growth in real-time data.

Today, more than 5 billion consumers interact with data every day – by 2025, that number will be 6 billion, or 75% of the world's population. In 2025, each connected person will have at least one data interaction every 18 seconds. Many of these interactions are because of the billions of IoT devices connected across the globe, which are expected to create over 90ZB of data in 2025.

About this study

This study is based on IDC's ongoing Global DataSphere research and market sizing models. Industry and specific geographic DataSphere research was conducted in September 2018 by IDC. In addition, 2,400 enterprise decision makers were surveyed, and in-depth interviews were conducted with senior IT executives at a variety of industries to inform this study. The survey was with decision makers who had responsibility for or knowledge of their organization's use, management, and storage of data leveraging advanced technologies including Internet of Things, real-time analytics, and AI/machine learning. The survey spanned several countries and regions including the United States, China, EMEA, APJxC, and others.



Global Datasphere Expansion is Never-ending

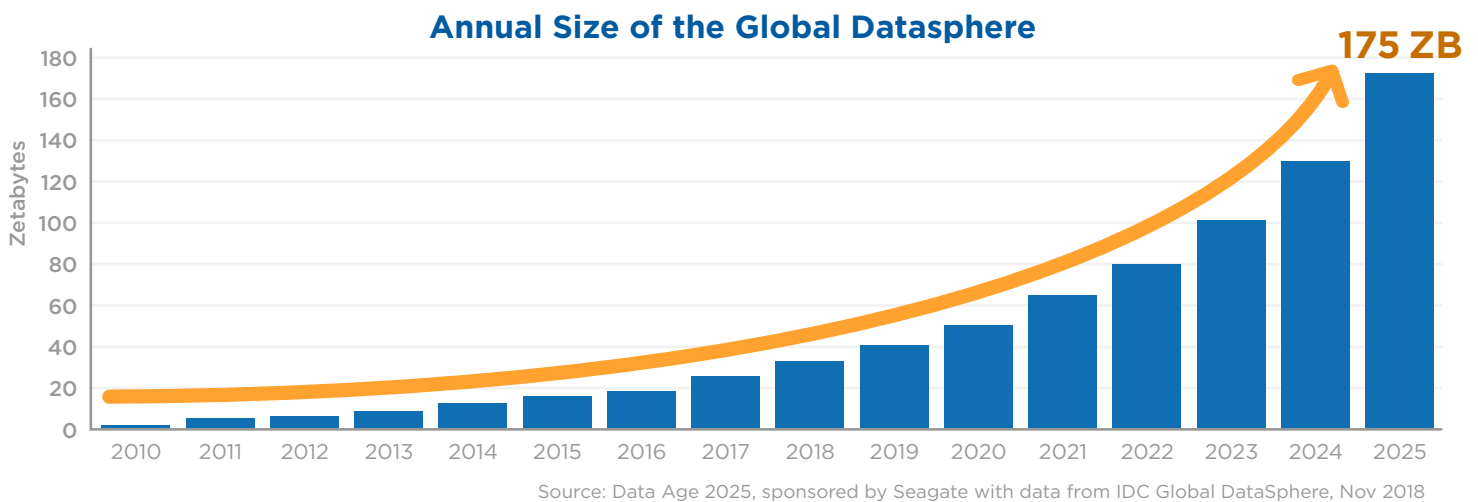
The use of data today is transforming the way we live, work, and play. Businesses in industries around the world are using data to transform themselves to become more agile, improve customer experience, introduce new business models, and develop new sources of competitive advantage. Consumers are living in an increasingly digital world, depending on online and mobile channels to connect with friends and family, access goods and services, and run nearly every aspect of their lives, even while asleep.

Much of today's economy relies on data, and this reliance will only increase in the future as

companies capture, catalog, and cash in on data in every step of their supply chain; enterprises collect vast sums of customer data to provide greater levels of personalization; and consumers integrate social media, entertainment, cloud storage, and real-time personalized services into their streams of life.

The consequence of this increasing reliance on data will be a never-ending expansion in the size of the Global Datasphere. **Estimated to be 33 ZB in 2018, IDC forecasts the Global Datasphere to grow to 175 ZB by 2025.** (Figure 1). See Appendix for methodology and data/device categories.

Figure 1 - Annual Size of the Global Datasphere



MRI image creation is driving storage requirements significantly. The trend is more images with thinner slices and 3D capability. We've gone from 2,000 images to over 20,000 for an MRI of a human head, and stronger magnets and higher resolution pictures means more data stored.

- Senior Director in IT, Major Healthcare Provider

How big is 175ZB?

Sometimes it can be difficult to get our minds around such a large number. Here are some illustrations of just how large 175ZB is.

- One zettabyte is equivalent to a trillion gigabytes
- If you were able to store the entire Global Datasphere on DVDs, then you would have a stack of DVDs that could get you to the moon 23 times or circle Earth 222 times.
- If you could download the entire 2025 Global Datasphere at an average of 25 Mb/s, today's average connection speed across the United States, then it would take one person 1.8 billion years to do it, or if every person in the world could help and never rest, then you could get it done in 81 days.

The Core is the Heart of the Datasphere

In this study we isolated three primary data location categories that make up the Datasphere:

1. Core

This consists of designated computing datacenters in the enterprise and cloud providers. It includes all varieties of cloud computing, including public, private, and hybrid cloud. It also includes enterprise operational datacenters, such as those running the electric grid and telephone networks.

2. Edge

Edge refers to enterprise-hardened servers and appliances that are not in core datacenters. This includes server rooms, servers in the field, cell towers, and smaller datacenters located regionally and remotely for faster response times.

3. Endpoint

Endpoints include all devices on the edge of the network, including PCs, phones, industrial sensors, connected cars, and wearables.

A key aspect characterizing the Datasphere today is the increasingly critical role of the endpoints and edge – which is where all the digital data about us or for us is delivered to us to help inform real-time decisions, personalized services, or other latency-sensitive actions. Data gathered from endpoints is collected at the edge, which is an important location for delivering the intelligence and analytics necessary to provide faster response and better end-user experience, as well as to accelerate and bring new levels of efficiency and quality to business.

Use cases at the edge and core that illustrate their criticality are growing aggressively, with entire categories yet to have even crossed our minds. One increasingly critical engagement between edge and endpoint is the connected car. Driven largely by the video captured and analyzed by numerous cameras integrated into the vehicle, IDC estimates that an autonomous vehicle can create over 3TB of data per hour, and this doesn't include infotainment and GPS data. This data creation will continue to increase as vehicle-to-vehicle communication becomes commonplace, and as machine learning and AI continuously update pattern recognition integrated into vehicles' intelligent driving algorithms.

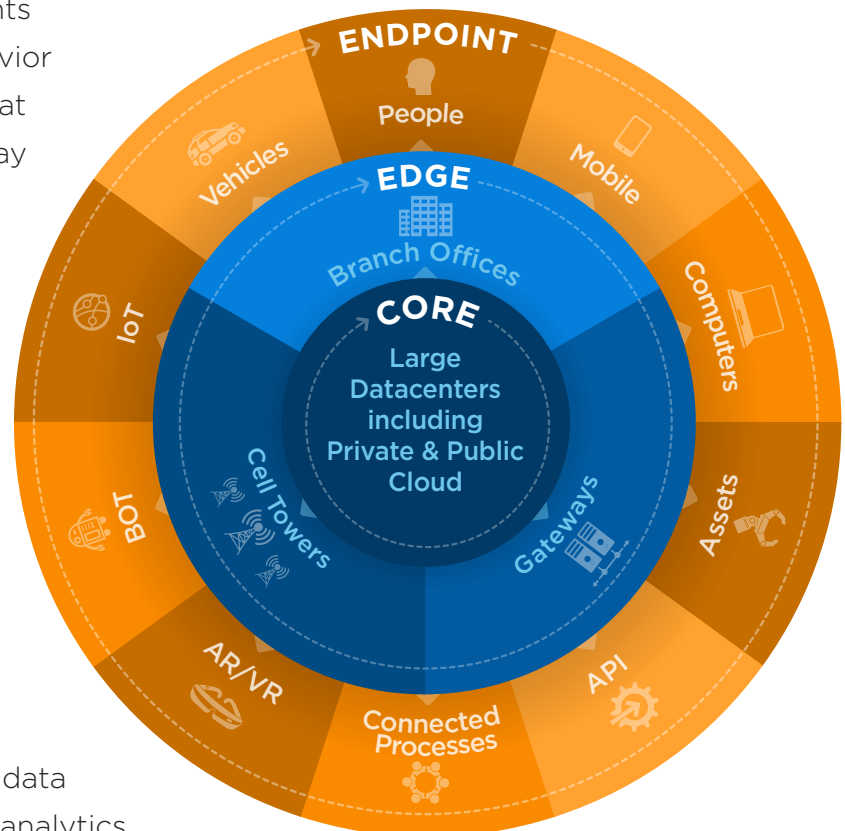
Manufacturers have long sensed and actuated on real-time data feeds within controlled manufacturing environments. This has led to better quality products at significantly lower prices. Companies are now looking to sense and actuate on data collected outside the factory walls, while products are being used.

Manufacturers can extend product life and reduce product failures by understanding product performance in random environments used by customers with a multitude of behavior profiles. This is now possible with sensors that are embedded and connected in the everyday products that we use.

But the heart of the Datasphere is the core. The core plays a critical role by providing centralized storage and archiving, service delivery, deeper-level analytics, command and control, and regulatory compliance. As a result, data flows in a constant stream from endpoints and the edge to the core and back out to the edge and endpoints, with each location playing an important part in the overall Datasphere. This propagation of data drives data growth in the core and has ramifications for analytics

and intelligence throughout the network, powering internal and external processes, as well as intelligent and predictive engagements between businesses and individuals across entire ecosystems (Figure 2). The net effect is the continued importance and growth in enterprise storage.

Figure 2
Data propagation from endpoints to core and back



Source: IDC's Data Age 2025 study, sponsored by Seagate



We'll have more intelligence and more activity at the edge on data coming from the generators that we build and the IoT devices we have deployed...raw data will be analyzed on the edge first, and then the results will be sent back to the core for deeper analysis.

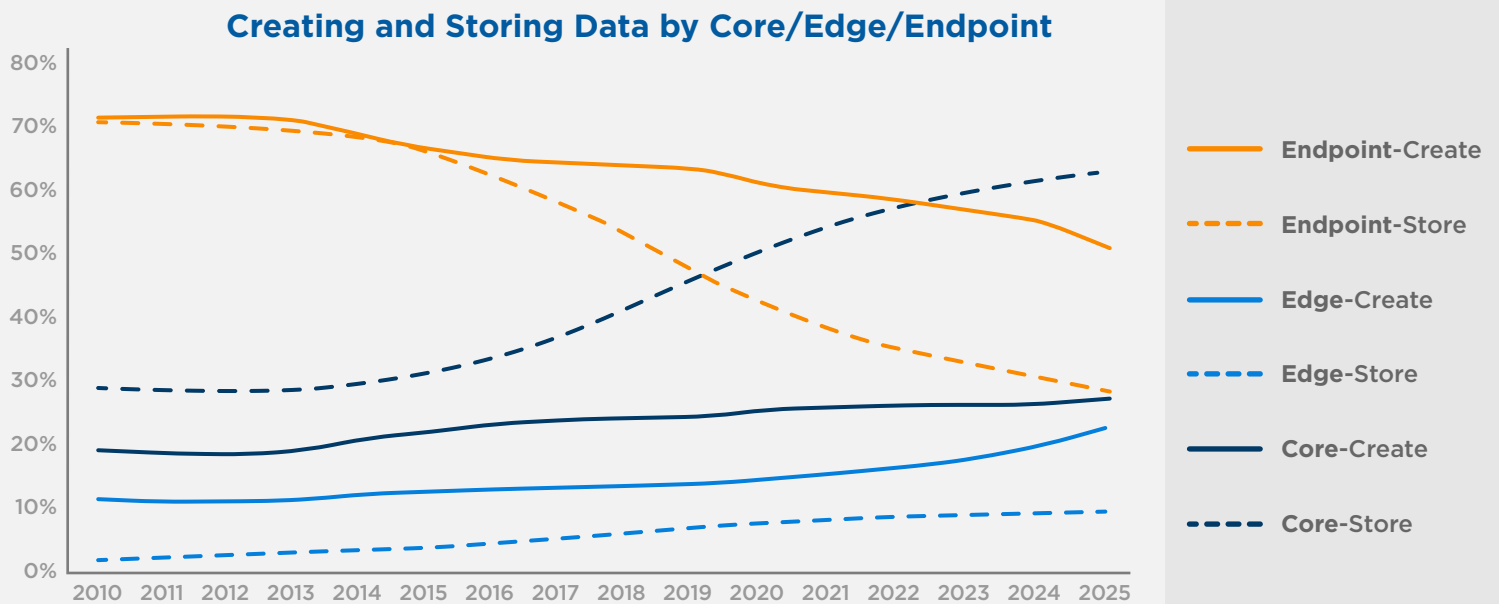
– CISO/CFO, Leading Manufacturing Firm

Data Created (Datasphere) is different than Data Stored

From a data creation perspective (solid lines in Figure 3), endpoints are declining as a percent while the core and edge continue to produce more. From a data storage perspective (dotted lines in Figure 3), the amount of data being stored in endpoints will plummet as the core becomes the repository of choice for data of all types. By 2024, we expect data stored in

the core to be more than double the data stored in the endpoint, completely reversing the dynamic from 2015. Edge storage will also see significant growth as latency-sensitive services and applications proliferate throughout our world.

Figure 3 – Where data is created and stored



Source: Data Age 2025, sponsored by Seagate with data from IDC Global DataSphere, Nov 2018



We are beginning to understand the value of data mining and being able to bring together disparate data and systems that create that data. We don't understand well enough how to do this in an efficient, cost-effective way. Right now, each system primarily creates its own data; each system manages its own data environment.

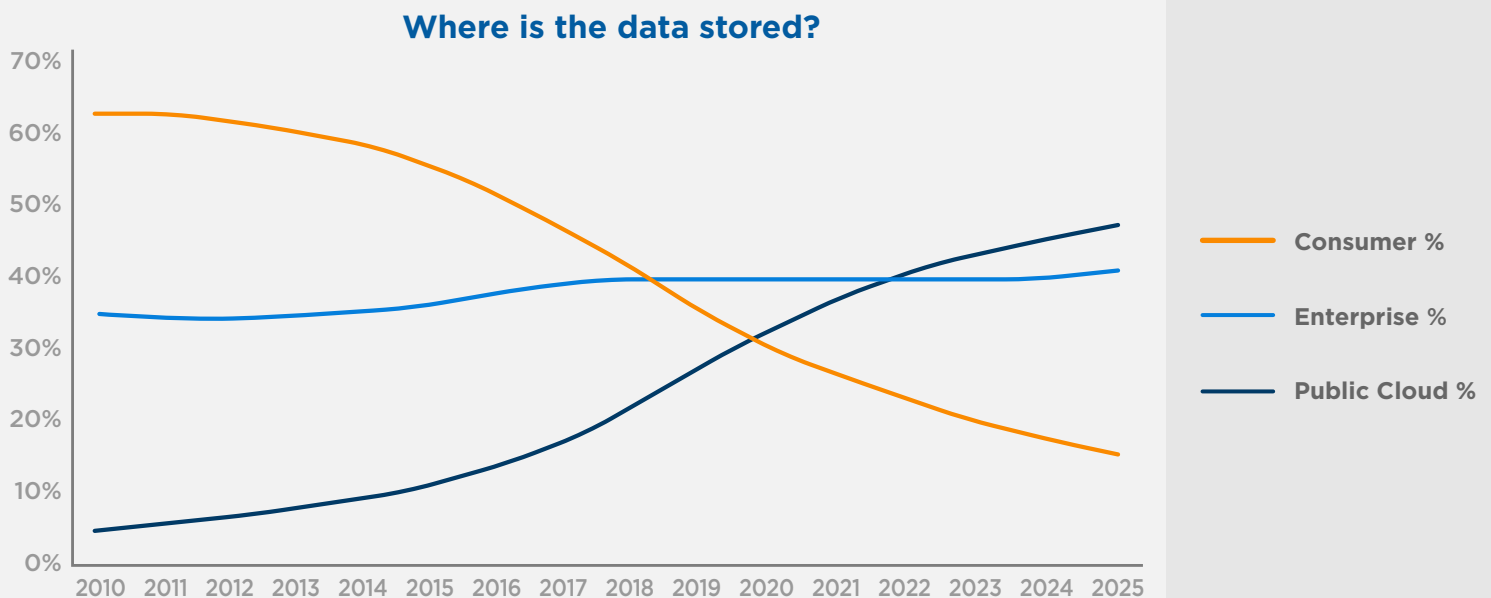
– CISO/CFO, Leading Manufacturing Firm

Cloud is the New Core...and Much of it is Additive

Today, as greater numbers of devices with greater levels of intelligence are connected to various networks, businesses and consumers are finding the cloud to be an increasingly attractive option that enables fast, ubiquitous access to their data. Increasingly, consumers are fine with lower storage capacity on endpoint devices in favor of using the cloud. By 2020, we believe that more

bytes will be stored in the public cloud than in consumer devices (Figure 4), and by 2021, there will be more data stored in the public cloud than in traditional datacenters (Figure 5).

Figure 4 - Where is the data stored?



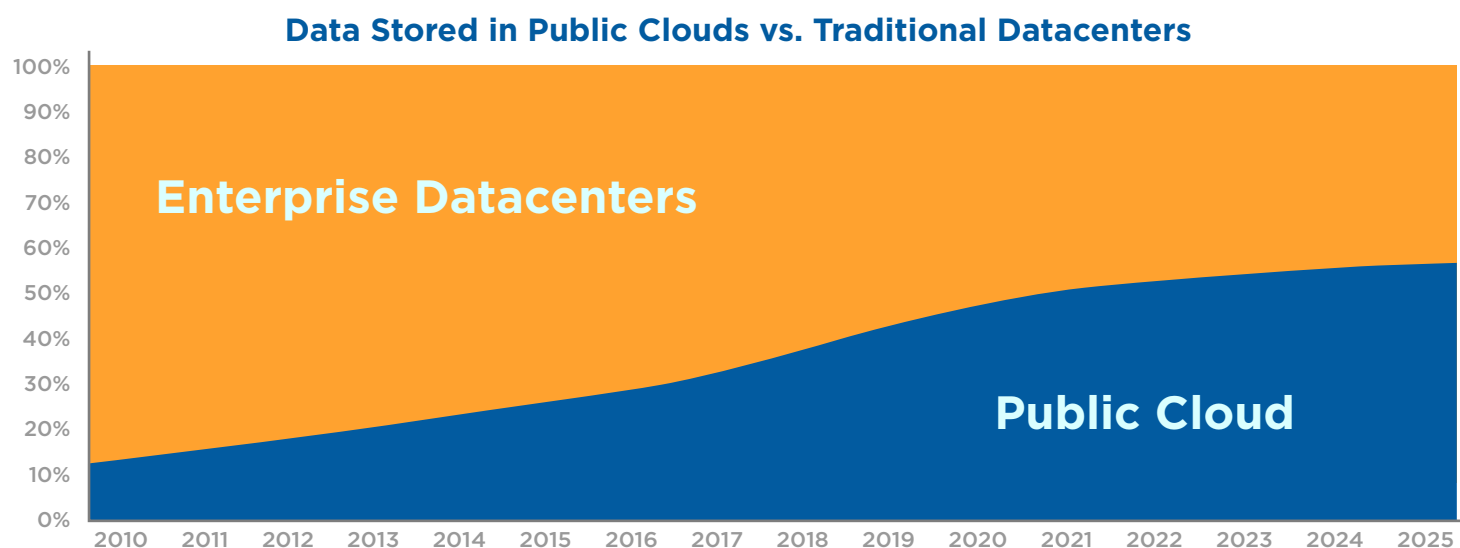
Source: Data Age 2025, sponsored by Seagate with data from IDC Global DataSphere, Nov 2018



There is definitely interest in an increase in utilization of public cloud for data stores as long as we're good with governance and identify suitable candidates. It's still not going to be customer data for the foreseeable future, but there are candidates...It's fair to say that public cloud utilization is going to double.

- VP of IT, Fortune 50 Financial Services Firm

Figure 5 – Data Stored in Public Clouds Versus Traditional Datacenters



Source: Data Age 2025, sponsored by Seagate with data from IDC Global DataSphere, Nov 2018

Business models and the location of data management may be changing, but the technical requirements and challenges remain. Data must be archived and stored in ways that provide appropriate levels of performance and enable analytics and intelligence to be applied to them, but it must be done cost-effectively and securely.

This is not necessarily an easy task given that some industries still have data in silos within the corporate walls, as well as outside the corporate walls residing in branch offices, contractor sites, or some other location where the data is not generally accessible.



There is a lot of data that has been done by third parties, and there's a lot of data we own but it sits out with other people. A big part is trying to figure out how we might bring back that data and store it. We may not even know what we need it for, but we need it stored in one place so that others, like data scientists, can have access.

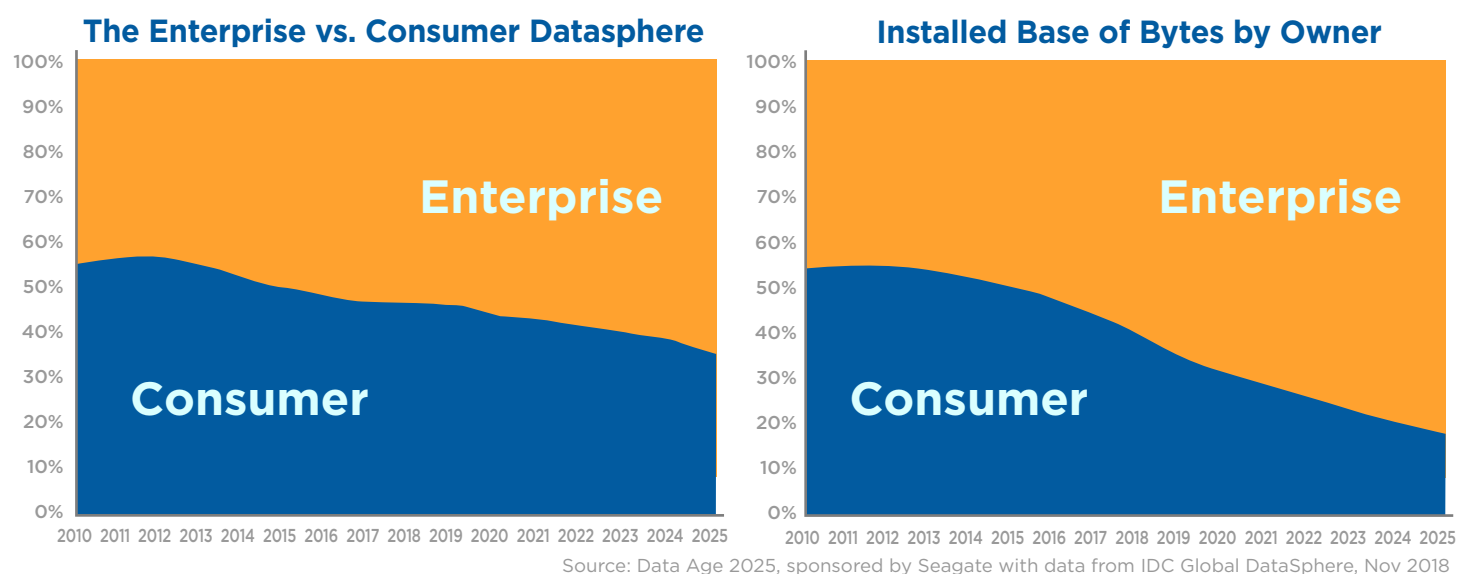
– CIO and SVP of Corporate IT, Major Media Firm

The Enterprise Datasphere and Stewardship is Vital to Our Future

The enterprise continues to see its share of Datasphere stewardship grow, with consumers' share of data generated dropping from 47% in 2017 to 36% by 2025. This shift is largely driven by the increasingly always-on and "sensorized" world that is capturing and analyzing our environments and creating data 24x7. In the past, consumers were responsible for much of their own data, but as data becomes

increasingly centralized across enterprise core and edge infrastructure, the responsibility to maintain and manage it is shifting to enterprise/cloud provider datacenters. The enterprise is already the primary source and steward of data creation and storage, and the trend continues to amplify these responsibilities (Figures 6 and 7).

Figure 6 and 7 – The Enterprise Datasphere Continues to Expand



The installed bytes across the enterprise is expected to **grow to 13.6ZB**, representing **over 80% of the worldwide installed bytes in 2025**.



We have initiatives partnering with facility management, micro payments, and car manufacturers. We currently have 25 properties, so we leverage IoT to have efficient optimization around datacenter and portfolio management. All of those are big sources of data ingest.

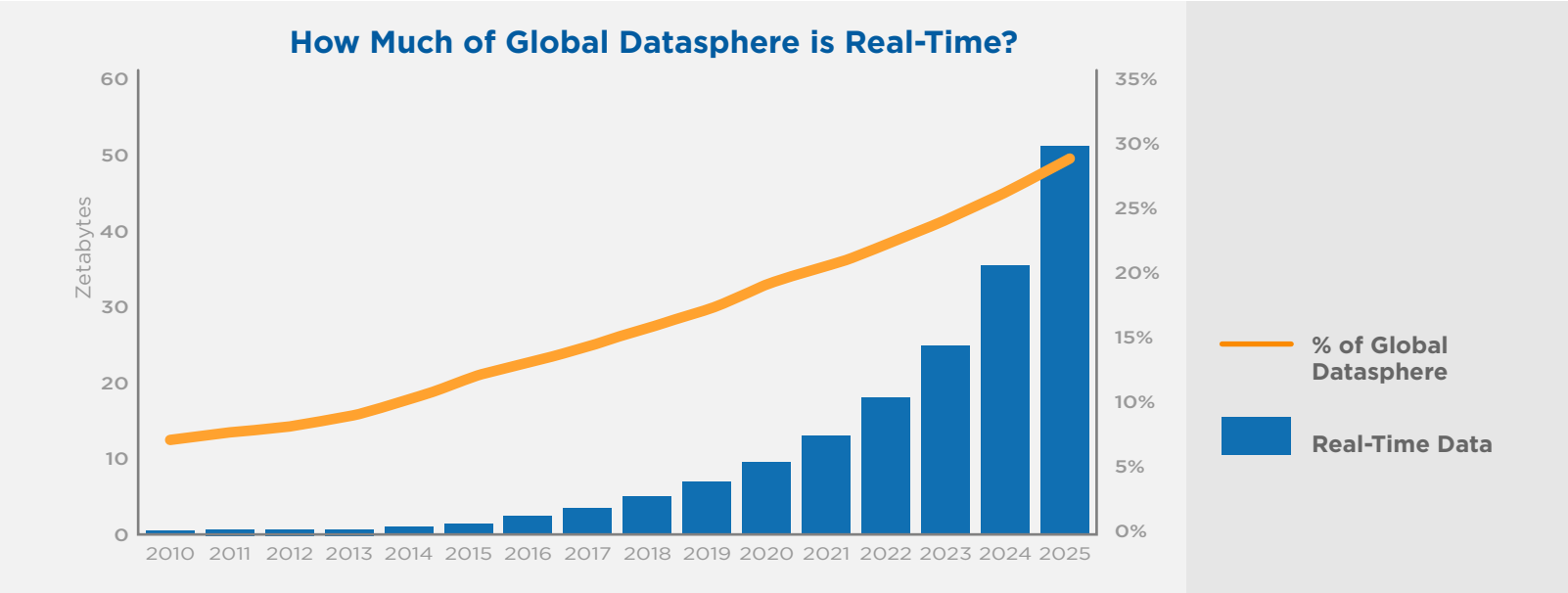
– VP of IT, Fortune 50 Financial Services Firm

Real-Time Data Demand is Driving the Edge

IDC forecasts that more than 150B devices will be connected across the globe by 2025, most of which will be creating data in real time. For example, automated machines on a

manufacturing floor rely on real-time data for process control and improvement. Real-time data represents 15% of the Datasphere in 2017, and nearly 30% by 2025 (Figure 8).

Figure 8 - Real-Time Data

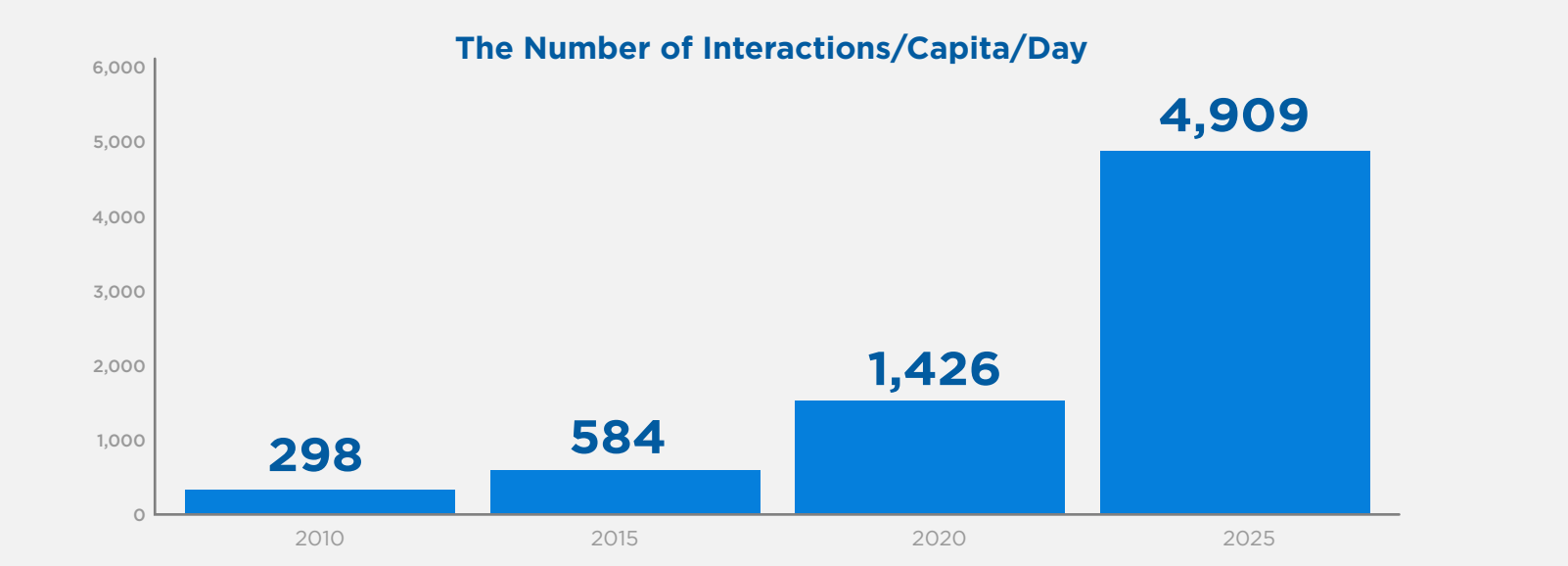


Source: Data Age 2025, sponsored by Seagate with data from IDC Global DataSphere, Nov 2018

But it's not just machines that are driving real-time data. IDC estimates that by 2025, every connected person in the world on

average will have a digital data engagement over 4,900 times per day – that's about 1 digital interaction every 18 seconds (Figure 9).

Figure 9 - Data Interactions per Connected Person Per Day



Source: Data Age 2025, sponsored by Seagate with data from IDC Global DataSphere, Nov 2018

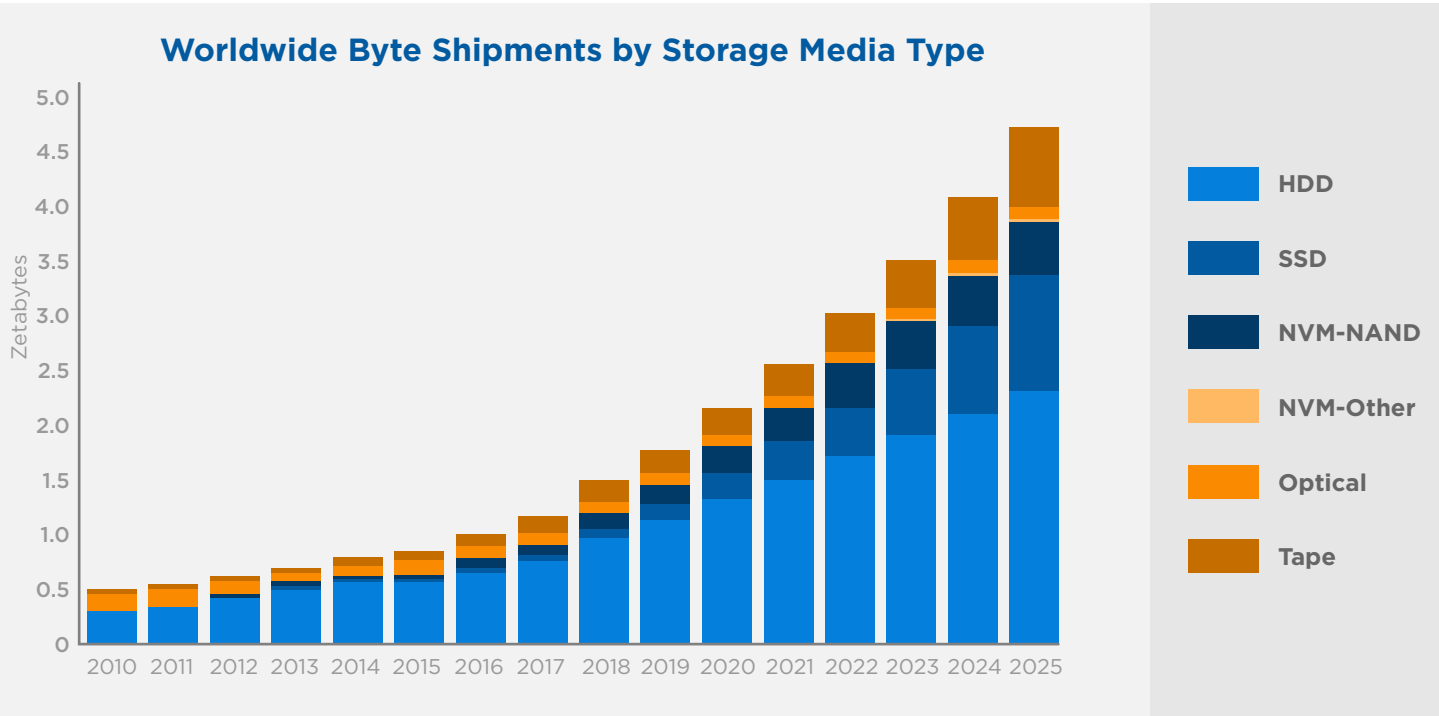
The Demand for Storage Remains Strong

The amount of data created in the Global Datasphere is, of course, the target for the storage industry. Even with the amount of data created that is discarded, overwritten, or sensed, but never stored longer than milliseconds, there still exists a growing demand for storage capacity across industries, governments, enterprises, and consumers.

To live in a digitized world where artificial intelligence drives business processes, customer engagements, and autonomous infrastructure or where consumers' lives are hyper-personalized in nearly every aspect of behavior – including what time we'll be awakened based on the previous day's activities, overnight sleep patterns, and the next day's calendar – will require creating and storing more data than ever before.

IDC currently calculates Data Age 2025 storage capacity shipments across all media types (HDD, SSD, NVM-flash/other, tape, and optical) over the next 4 years (2018–2021) will need to exceed the 6.9ZB shipped across all media types over the past 20 years. IDC forecasts that over 22ZB of storage capacity must ship across all media types from 2018 to 2025 to keep up with storage demands. Around 59% of the capacity will need to come from the HDD industry and 26% from flash technology over that same time frame, with optical storage the only medium to show signs of fatigue as consumers continue to abandon DVDs in favor of streaming video and audio (Figure 10).

Figure 10 - Worldwide Byte Shipments by Storage Media Type

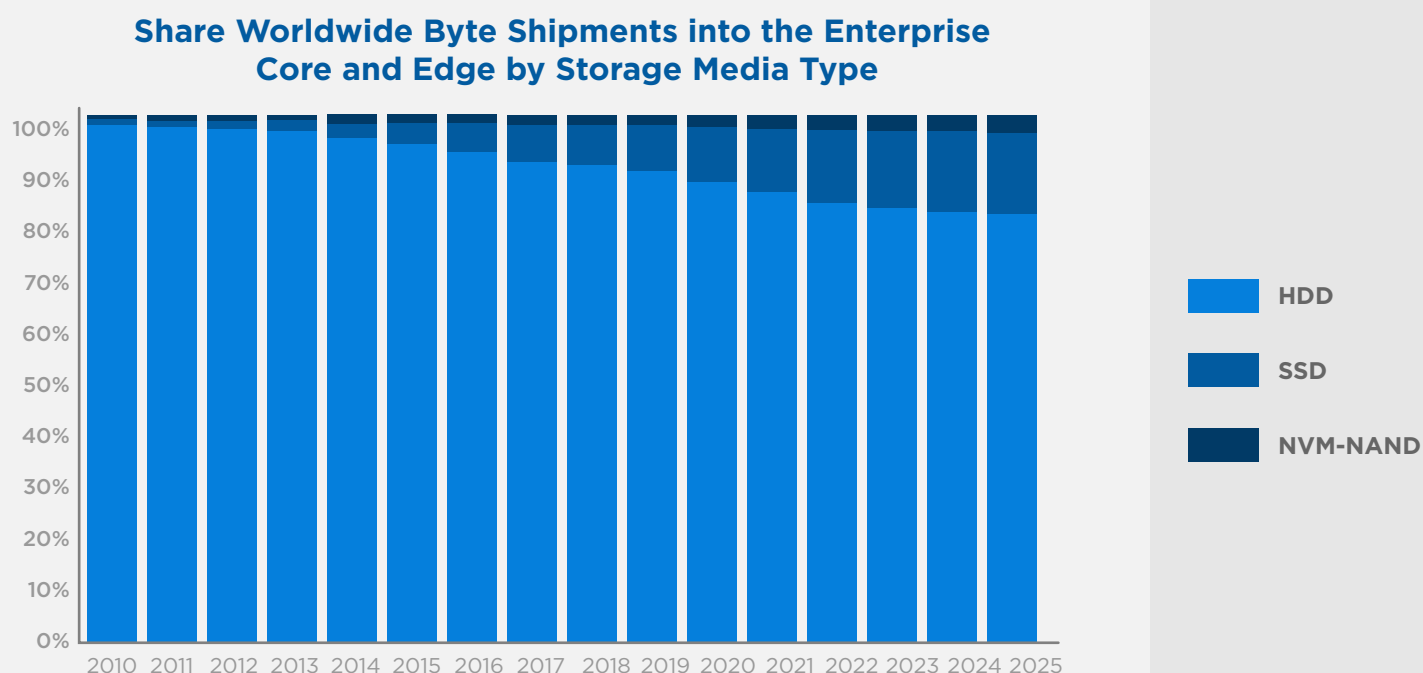


Source: Data Age 2025, sponsored by Seagate with data from IDC Global DataSphere, Nov 2018

The growth in endpoint and edge storage will favor solid state, while the core continues to have a voracious appetite for the economical bytes that hard disk drives and tape provide. Enterprises will use a mix of disk drives, SSDs, flash, and tape to satisfy the performance, management, and archive demands being

placed on them. By the end of 2025, over 80% of the enterprise bytes shipped into the core and edge will continue to be HDD bytes when compared to SSDs and other NVM technologies (Figure 11).

Figure 11 - Share Worldwide Byte Shipments into the Enterprise Core and Edge by Storage Media Type



Source: Data Age 2025, sponsored by Seagate with data from IDC Global DataSphere, Nov 2018

By the end of 2025, over **80%** of the enterprise bytes shipped into the core and edge will continue to be HDD bytes.

Regional Dataspheres have their own unique growth profile

Whether population driven, application driven (e.g., video surveillance), or digital transformation maturity driven, any given country or region will have a different Datasphere growth profile. Note that the calculations in regional Dataspheres are based on where the devices are located from a regional perspective, as opposed to who may actually own them. For example, if providers in the U.S. own and operate datacenters in EMEA, the data created and stored are part of the EMEA Datasphere.



China

China has the fastest growing Datasphere of all the regions forecast in this study. The rapid deployment of video surveillance in China has catapulted the country's use of enterprise storage, as well as a large share of endpoint data creation. China is also one of the fastest growing regions when it comes to the deployment of cloud.

EMEA

Much of the growth in the EMEA Datasphere is a result of a massive population with associated endpoint devices used to create and consume massive amounts of data, an already established base of video surveillance infrastructure, and the initial impact of General Data Protection Regulation (GDPR) legislation that likely will result in a temporary increase of data until formal data management practices are implemented fully.

U.S.A.

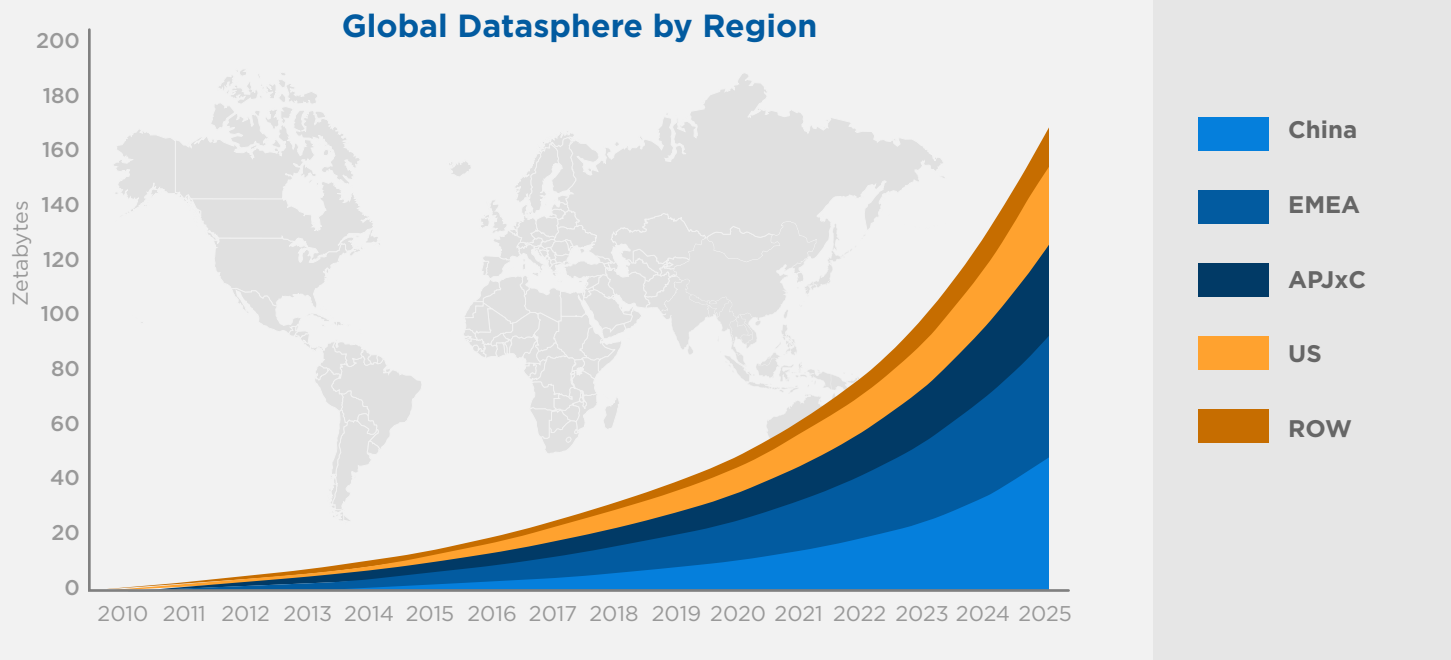
While the U.S. Datasphere continues to grow, it cedes share to the other regions due to its more mature state in cloud infrastructure and highly penetrated population from an endpoint perspective.

APJxC

The Asia-Pacific region including Japan, but excluding China, has the second strongest Datasphere growth with respect to geographies analyzed in this study. Countries like Japan are spending aggressively on smart city initiatives, which are data-creation intense.

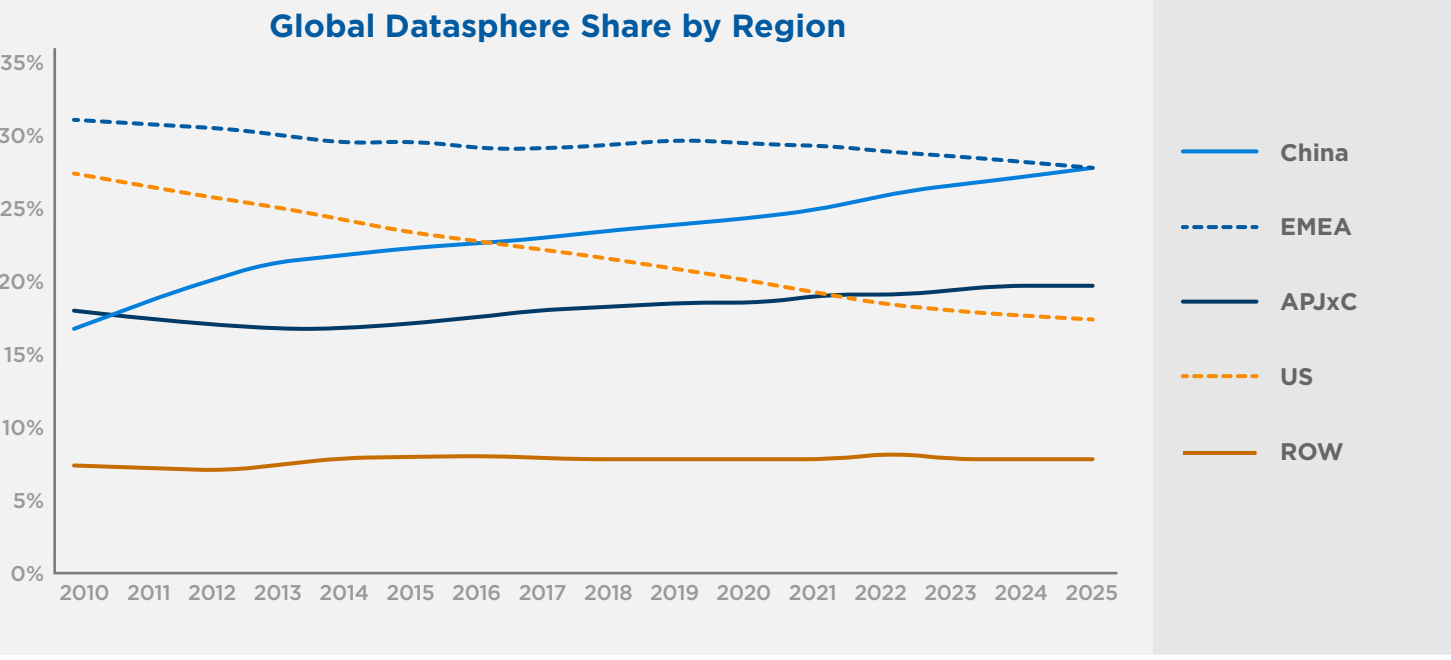
Figure 12 looks at the absolute size of each regional Datasphere while Figure 13 represents the Datasphere share of the U.S., EMEA, APJxC, China, and ROW in terms of the share of bytes generated.

Figure 12 - Size and Growth of the Global Datasphere by Region



Source: IDC's Data Age 2025 study, sponsored by Seagate

Figure 13 - Global Datasphere Share by Region



Source: IDC's Data Age 2025 study, sponsored by Seagate

Cloud Growth Explodes Outside the United States

As the headquarters region for the leading global cloud providers, the United States has traditionally had the lion's share of cloud storage, followed by EMEA and APJxC. And while cloud storage in the United States will continue to grow, cloud storage in other regions will grow even faster, fueled both by the desire to reduce latency by locating data closer to the end consumer, as well as corporate and regulatory mandates requiring data to be housed locally within different regions. The U.S. share of public cloud storage will drop precipitously from 51% in 2017 to 31% by 2025, while China's share will more than double from 6% to 13% (Figure 14).

The U.S. share of public cloud storage will drop precipitously

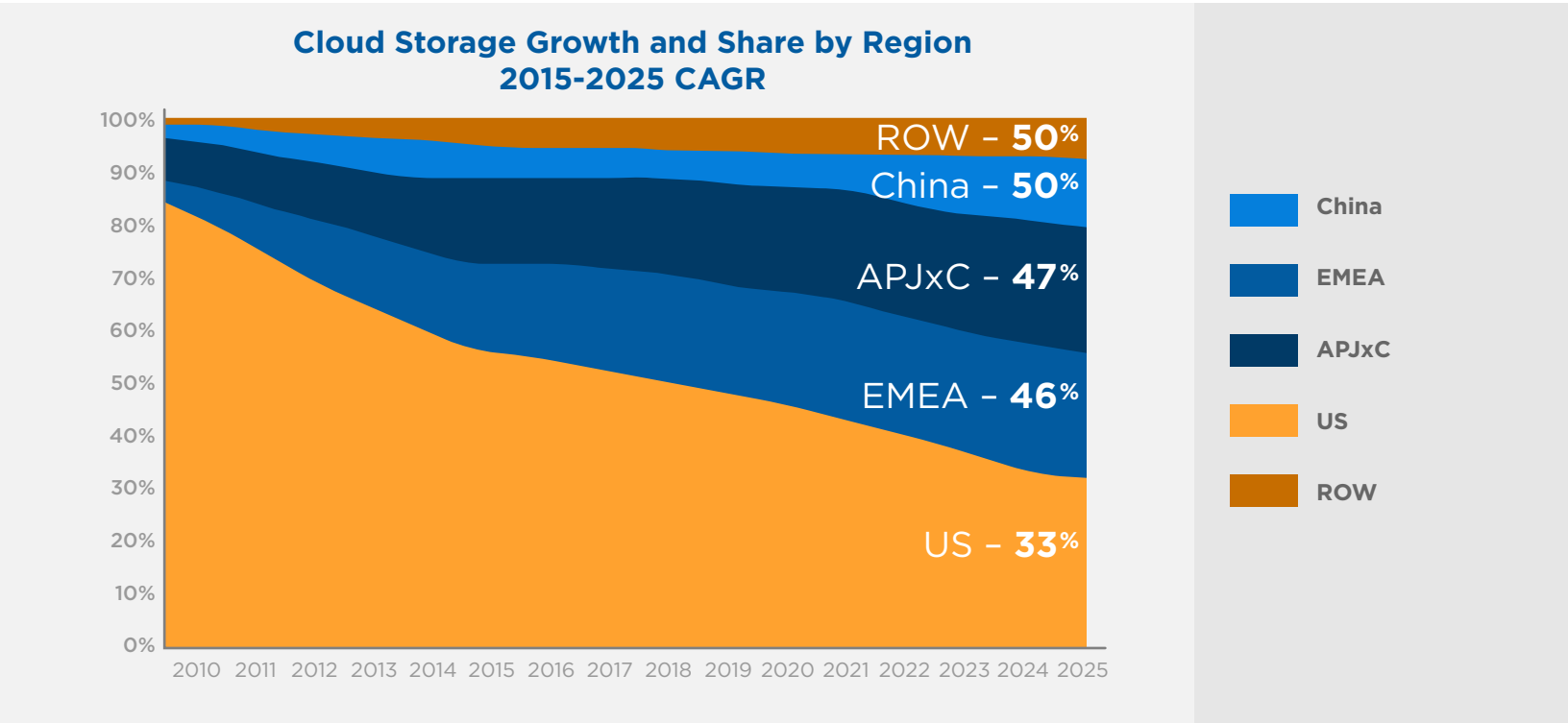
51% in 2017

31% in 2025

while China's share will more than double

6% to 13%

Figure 14 - Cloud Storage Growth and Share by Region



Source: IDC's Data Age 2025 study, sponsored by Seagate

China and Asia Pacific/Japan Have Edge in Data Maturity

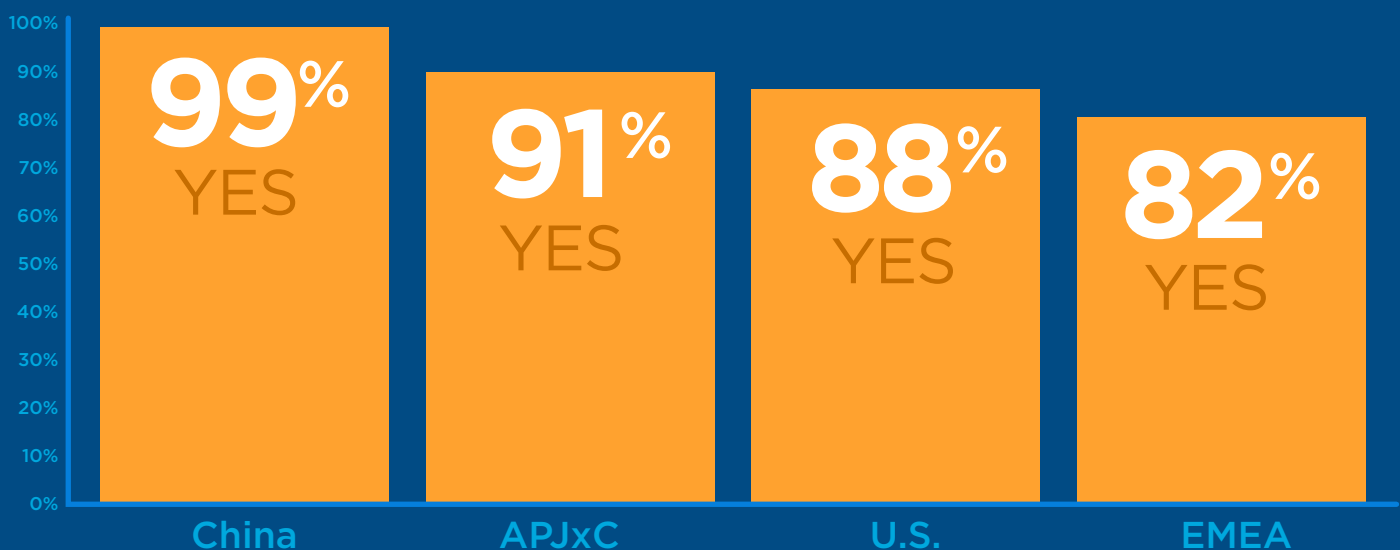
IDC's global survey in support of this project indicates that other regions are beginning to eclipse the U.S. in certain measures of data maturity. In particular, China and APJ show better metrics in several areas.

China and APJ are more likely to have corporate-driven digital transformation initiatives, to be able to quantify the value of their data, and to increase their usage of edge computing (Figure 15). This is helped in emerging markets by a lower level of investment in older legacy IT.

Question

Do you expect your organization's utilization of edge computing to increase in the next 2 years?

Figure 15 - Increased Use of Edge Computing



Source: IDC's Data Age 2025 study, sponsored by Seagate, n=959

Digital transformation and the resulting growth in data

Growth in data is happening across all industries and geographies, but not all businesses are impacted in the same way. Some rely more on the cloud, while others continue to rely more on their

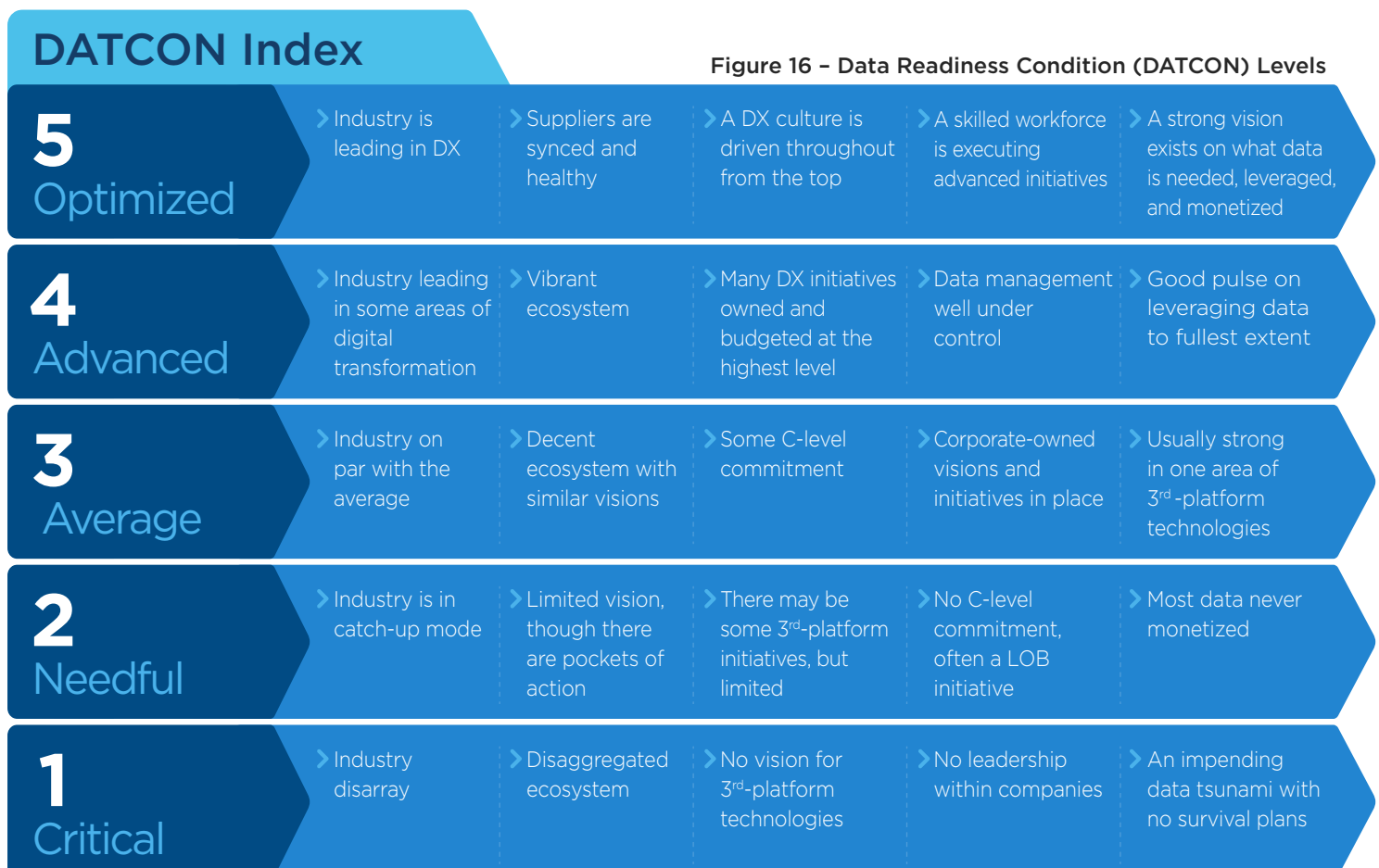
own datacenters, sometimes very massive ones. Industries are in various states of readiness and need to take action to prepare for and capitalize on a new era of data growth.

Introducing the DATa Readiness CONdition Index

To characterize differences by different industries, IDC created the DATCON (DATa Readiness CONdition) index, the first index of its kind to evaluate how prepared various industries are for managing, analyzing, and storing data. It also identifies gaps that need to be addressed and the most pressing

initiatives businesses must consider. The DATCON index is a scale from 1 to 5, where 5 represents an industry that is completely optimized and where 1 represents an industry in critical condition with respect to its readiness to manage and fully monetize the data it creates, captures, stores, and analyzes.

Figure 16 illustrates the **1 to 5 DATCON index** with descriptions that provide further characterization of each level.



Source: IDC's Data Age 2025 study, sponsored by Seagate

The DATCON index is a calculated score that is synthesized across six assessment vectors and numerous associated metrics informed

through global surveys, ongoing IDC research, expert analysis, and proprietary modeling techniques.

These assessment vectors include:

- Data growth and investment
- Digital transformation competency
- IT structural assessment
- C-level involvement
- Data value competency
- Leadership self-score

For this study, IDC focused on four industries to develop the DATCON index:

- Financial services
- Healthcare
- Manufacturing
- Media and entertainment

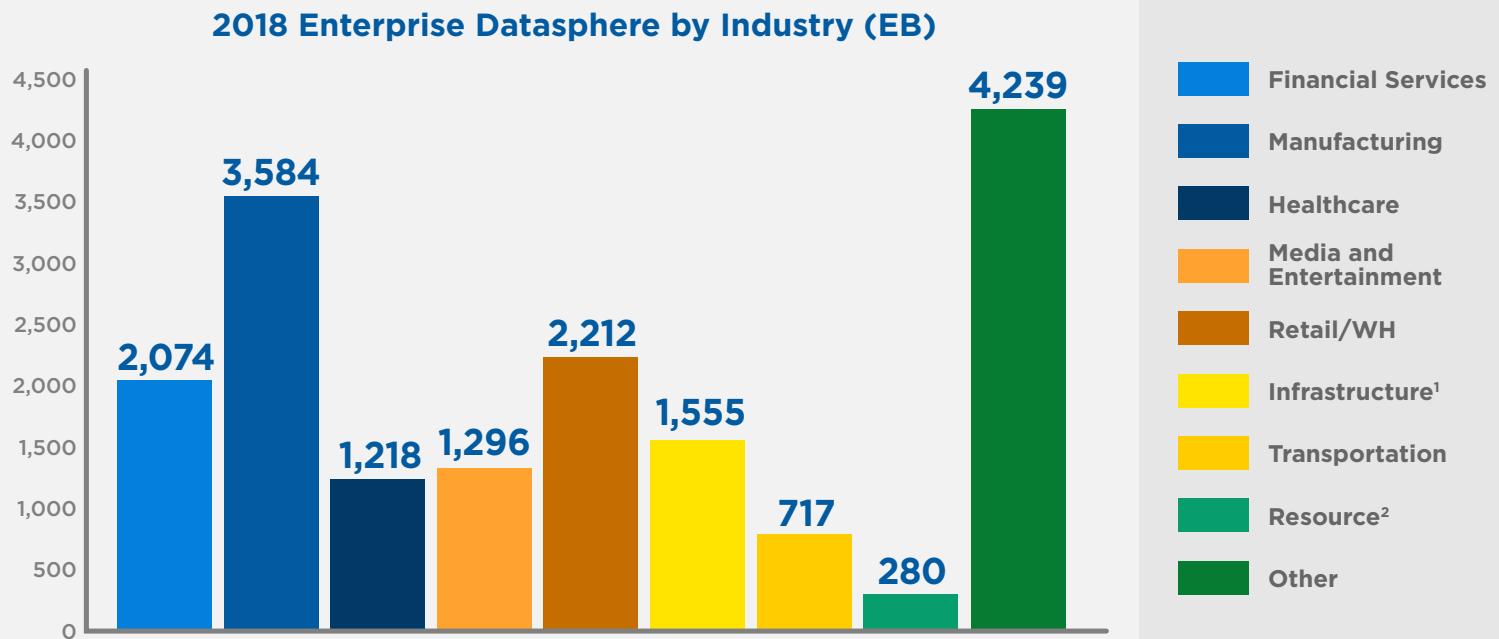
For additional information about the DATCON index methodology and detailed findings by industry, [Click here](#)

DATCON Industries Comprise Nearly Half of the Enterprise Datasphere

The four DATCON industries chosen in this study (financial services, manufacturing, healthcare, and media and entertainment) comprise 48% of the Enterprise Datasphere, with manufacturing responsible for the largest share of data, followed by financial services and media and entertainment (Figure 17).



Figure 17 - 2018 Enterprise Datasphere by Industry



¹ Infrastructure includes Utilities, Telecommunications

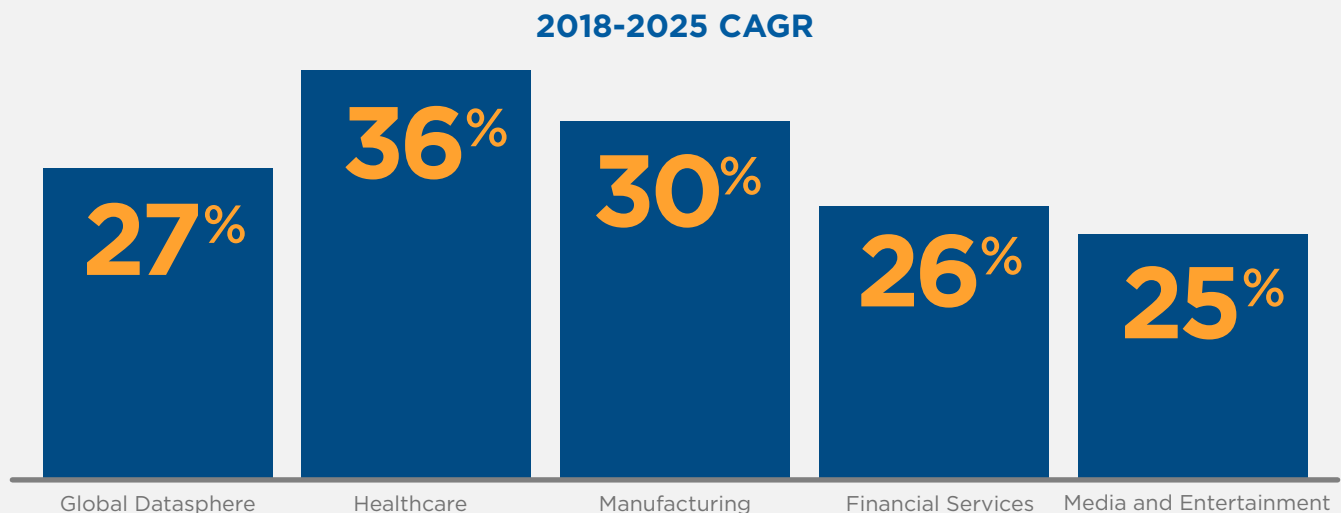
² Resource includes Oil and Gas (Mining), Transportation of oil & gas through pipelines or shipping, Resource industries, Petroleum and coal manufacturing/refining

Source: IDC's Data Age 2025 study, sponsored by Seagate

While healthcare is the smallest of the four industry Dataspheres in this study, it is primed to grow faster than the rest given the advancements in healthcare analytics, increasing frequency and resolution of MRIs,

and other image and video-related data being captured in today's advanced modes of medical care. IDC compares growth of various industry Dataspheres to the overall Global Datasphere growth through 2025 in Figure 18.

Figure 18 - Comparing Industry Datasphere Growth Rates



Source: Data Age 2025, sponsored by Seagate, Nov 2018

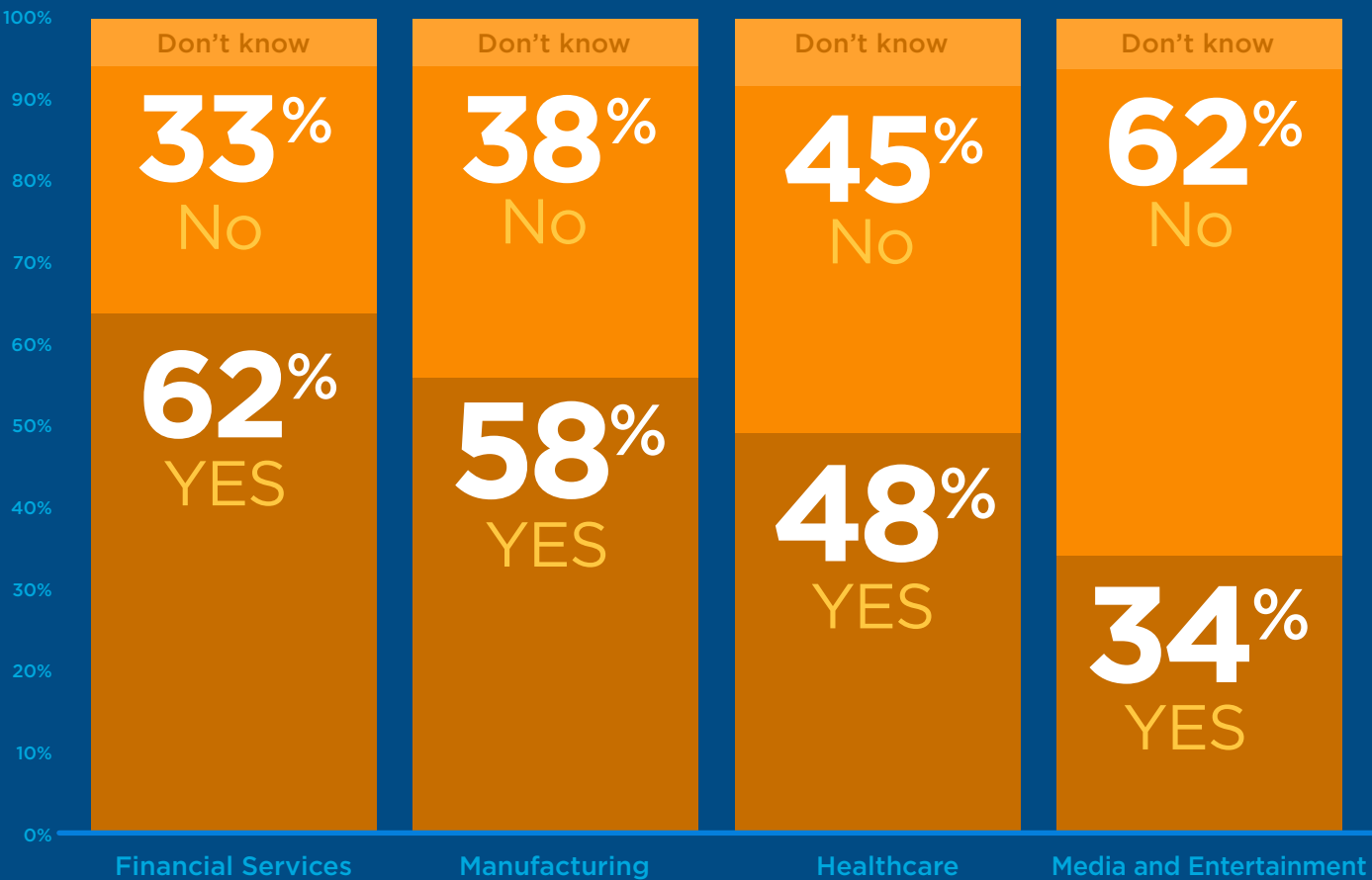
The Interplay Between Core, Edge, and Endpoint is Key in All Industries

While all industries have examples of waves of data traversing the core, edge, and endpoints, in which data collected at the endpoints is processed at the edge, propagated at the core,

then distributed back out to the endpoints, the greatest use of edge computing in the four industries in the DATCON index is found in manufacturing and financial services (Figure 19).

Question
Does your organization utilize edge computing?

Figure 19 – Use of Edge Computing



Source: Data Age 2025, sponsored by Seagate, Nov 2018, n=1,081

IDC came across multiple examples of this data flow across the core, edge, and endpoints in its interviews for this project. Some of them include the following:

➤ Manufacturing

Manufacturers have multiple use cases such as factory automation and control, but a particularly notable one mentioned by a manufacturer had to do with IoT data from engines it builds and sells. It collects telemetry and other operating data which it then pulls back into the core to perform advanced analytics to tweak manufacturing processes, but which it also shares with its dealers and distributors, so they can be more responsive to customers' needs.

➤ Financial Services

Firms circulate data between core, edge, and endpoint for a variety of use cases including analytics and branch operations. Fraud detection on the edge is a growing use case for banks and other financial firms given its immediate impact on the balance sheet. ATM machines are being outfitted with analytics engines to authenticate would-be ATM customers looking to withdraw funds. Complex algorithms that capture various forms of personal biometric data and behavior are coalesced into a unique identifier that authenticates identity as customers approach the ATM – all the while creating data at the edge.

➤ Healthcare

Providers are taking advantage of greater intelligence being built into diagnostic equipment and patient devices that can collect patient data, upload it to the cloud or a centralized datacenter for analysis or diagnosis, and then receive instructions or recommendations based on the patient's specific needs. In the future, in-home robotic healthcare assistants will monitor elderly patients and provide notification if an individual requires assistance, ensure medication is taken, and even perform simple tasks.

➤ Media and Entertainment

Companies interviewed by IDC spoke of ongoing efforts to repatriate data, pulling digitized data from marketing groups, third parties, and other sources back to the core where it can be repurposed, re-used, and analyzed. Based on the results of that analysis the appropriate data is then repropagated back to the end users and devices that require it. In the future, entertainment content might be tailored in real time based on a consumer's responses and biometric reactions. Intensity of effects could be increased or decreased appropriately to ensure the best experience in augmented or virtual realities.

For additional information on each the four industries profiled in the DATCON index, [Click here](#)

IDC Guidance

➤ **Enterprises must rise to the data guardianship challenge**

As data is shifting from a consumer-centric model to an enterprise-centric model, this increases the burden on enterprises to provide an excellent experience. Enterprises are responsible for providing correct insights and excellent customer experience, even storing customers' digital lives. Ensure your data model provides secure, ubiquitous, real-time access to services and data. As consumers become more demanding of the experience in their digital lives, companies must ensure that they are providing data and services that are real-time, on the go via any network, and are personalized.

➤ **Cloud migration is strategic**

Cloud providers have emerged as a serious contender for enterprise data storage and services. The largest providers have resources, scale, security, and performance that few enterprises can match. Their global reach enables businesses to provide services to global geographies, and their centralized access enables company resources to tap into all of a company's data to drive analytics today and artificial intelligence in the future.

➤ **Take a global approach to your data**

It is increasingly important for companies to take a global approach to their data to provide low-latency, better customer experience and to address regulatory and compliance pressures requiring operators to locate data in regions in which customers are located. Whether in their own datacenters or via cloud providers, companies need to consider which data needs to be located as close as possible to their customers and where in the network it should be located (core vs. edge, cloud vs. own datacenters).

➤ **Invest in the edge**

Intelligent data is being sought to drive our businesses and lives in real time and on-the-go. Many times, data has no time to travel from an endpoint to the core and back when informing real-time decisions. The enterprise edge helps to bridge this gap. Whether taking on data analytics or simply storing analyzed and intelligent data, the edge will play an increasing role in enabling a real-time world.

➤ **Ensure your organization is data-ready**

IDC developed the DATCON index to characterize the readiness level of different industries, and to enable individual companies to assess their level of readiness across a number of metrics. When it comes to improving data readiness, it is important for executives to lead corporate initiatives, make certain that budgets exist, and ensure that data-savvy workers are hired and empowered to execute.

➤ **Ready your IT organization for digital transformation**

Organizations born of the days when IT departments dealt with back office file-and-record processing are now facing a deluge of real-time, interrupt-driven bits and bytes from field organizations. Many IT organizations are finding themselves being given responsibility for physical security as well as data security, for operational data that was once sequestered on the factory floor, the grid, or the operating room, and for integrating data repositories previously kept in separate silos. Dealing with digital transformation will require not just new technology, but also new skills, political savvy, and relationships with top management.

Data is Changing the World

As consumers, data is helping us build more and deeper connections, and to access products and services more quickly and easily, at the time and place of our choosing. We can now walk into a store and walk out with our purchases, leaving our transaction record (and perhaps facial image) as a digital trail, but never having to pull out a credit card or cash.

As businesses, data is helping us reach new markets, better serve existing customers, streamline operations, and monetize raw and analyzed data. If reported global intangible assets of companies are more than \$200 trillion dollars*, what must – and will – the value of unreported data assets be? Data is an intangible asset and underpins most other intangible assets like patents and goodwill. Bytes can be made more valuable by surrounding them with security, leveraging them in AI, or using them to cure diseases. Nevertheless, there is a cost associated with data: purchasing, maintaining, and protecting storage, as well as the cost of losing data or having sensitive data fall into the hands of a competitor or hacker. The real value of data is out there, and companies are just finding out that data has real worth. Those businesses first through the gateway of digital transformation will be the first to find out just how valuable their data is.

The Global Datasphere is large and complex, with key interdependencies between core, edge, and endpoints. While the edge and endpoints will continue to play a critical role as the place

where the Datasphere meets the physical world, the core remains the heart of the Datasphere gathering data from the edges and endpoints, processing and archiving it, and promulgating it back for consumption by end users, including machines and things – and the cloud is a vital part of this core.

Companies looking to be relevant between now and 2025 will need to understand the role data plays in their organization and how the Datasphere will evolve during that period. They will need to embrace their role as data guardians, leverage the cloud, and take a global approach to their data. Different industries have different levels of data maturity, so companies should review the IDC DATCON index reports to learn where they stand relative to their industry index and what they need to do to not just survive – but more importantly to thrive – in their own Datasphere.

Data is
helping us reach
new markets, **better**
serve existing customers,
streamline operations, and
monetize raw and
analyzed data.

* Source: IDC's Intangible Asset Market Value Study, 2018

> The Measure of the Global Datasphere

The Global Datasphere is a measure of all **new** data that is captured, created, and replicated in any given year across the globe.

An installed base of over 70 categories of content creation/capture devices, including embedded systems in devices like automobiles, gasoline pumps, vending machines, and kiosks, were sized by

geography and industry. Content creation and capture and replication and consumption calculations were applied to this installed base of devices.

The aggregation of all these calculations is called **our Global Datasphere.**

The broad category of devices includes:

- 1 Non-entertainment imaging**
e.g., medical imaging, MFPs, surveillance cameras, etc.
- 2 Entertainment**
e.g., digital TV/radio, movies, video games, etc.
- 3 Productivity**
e.g. PCs, servers, supercomputers, metadata, embedded systems
- 4 Voice**
e.g. mobile phones, VoIP, etc.

About IDC

International Data Corporation (IDC) is the premier global provider of market intelligence, advisory services, and events for the information technology, telecommunications and consumer technology markets. IDC helps IT professionals, business executives, and the investment community make fact-based decisions on technology purchases and business strategy. More than 1,100 IDC analysts provide global, regional, and local expertise on

technology and industry opportunities and trends in over 110 countries worldwide. For 50 years, IDC has provided strategic insights to help our clients achieve their key business objectives. IDC is a subsidiary of IDG, the world's leading technology media, research, and events company.

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