DELL Technologies intel VansonBourne

The journey to the edge

It's closer than you think

Introduction

Where you find your edge depends on your perspective.

For retail, the edge is the point of transaction, whether that is the store or the mobile device where a customer creates an online order. In farming, it's the equipment deployed in your fields. If you're an auto manufacturer, it's the assembly line in your factories. If you're in healthcare, it's in the ambulance, examination room, and radiology lab.

The new, explosive growth of the edge is driven by the immediate, essential value that can be created; generating insights in near-real time to uncover solutions to problems that were previously not solvable. Edge solutions collect, process and generate data securely, reducing latency and empowering agility in ever-changing environments, providing seamless customer experiences.

A multitude of opportunities for organizations exist at the edge; advanced use cases for a variety of industry sectors from manufacturing to healthcare are in production, enabling organizations to unlock benefits unique to their industry and customer needs. As organizations' appetites for seizing opportunities at the edge grow, what do their journeys to the edge look like, what are they using it for, and how are they developing their edge deployments? Even better – what can we share that will help you move forward on the edge learning curve, benefiting from lessons already learned by others?

This eBook is based on a survey of 1,850 Operations and IT decision makers (Ops DMs and ITDMs) globally. It was commissioned by Dell Technologies, executed by Vanson Bourne, and will explore several areas, including:

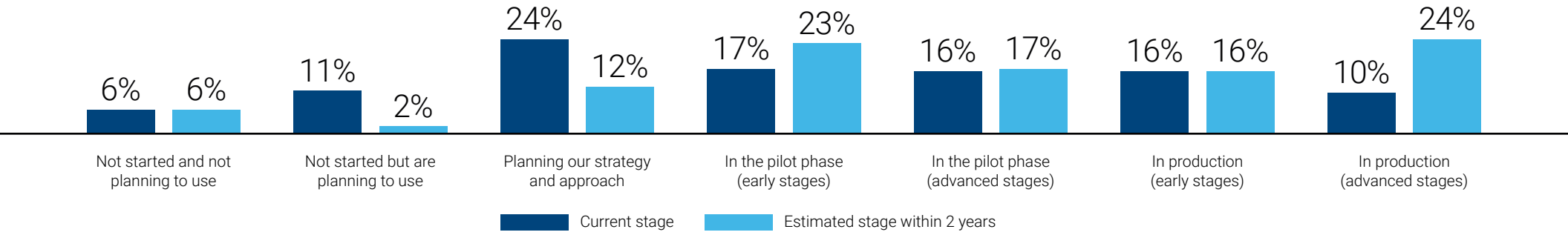
- Organizations' progress on their journey to the edge, and associated challenges
- Examples of edge solution use cases
- The path to procuring edge technology
- How data is used at the edge

Organizations' use of edge solutions

Edge technology certainly has its appeal and is in high demand for organizations in a variety of industry sectors, as explored in more detail later. And, according to the findings of this study, adoption and utilization is on the horizon for most, with the vast majority (94%) of surveyed respondents' organizations at least planning to use edge solutions in their operational activities. Yet, while the promise of edge benefits and use cases are something organizations are increasingly interested in, most organizations are still in the early stages of their journey, with only one in ten (10%) in the advanced stages of production.

This is, however, anticipated by many to change – most (87%) are expecting their organization to move to the next phase in their edge journey within the next two years; highlighting a considerable drive to make use, or even greater use, of edge solutions and technology in the not-too-distant future. This suggests that, within the next two years, the vast majority (80%) of organizations are expected to have edge deployments in at least the pilot stage, compared to 60% today. Additionally, it suggests that four in ten (40%) are expected to be in production, compared to 26% today – suggesting a rapid adoption curve for this technology.

Organizations moving at least one stage within two years in their journey to the edge

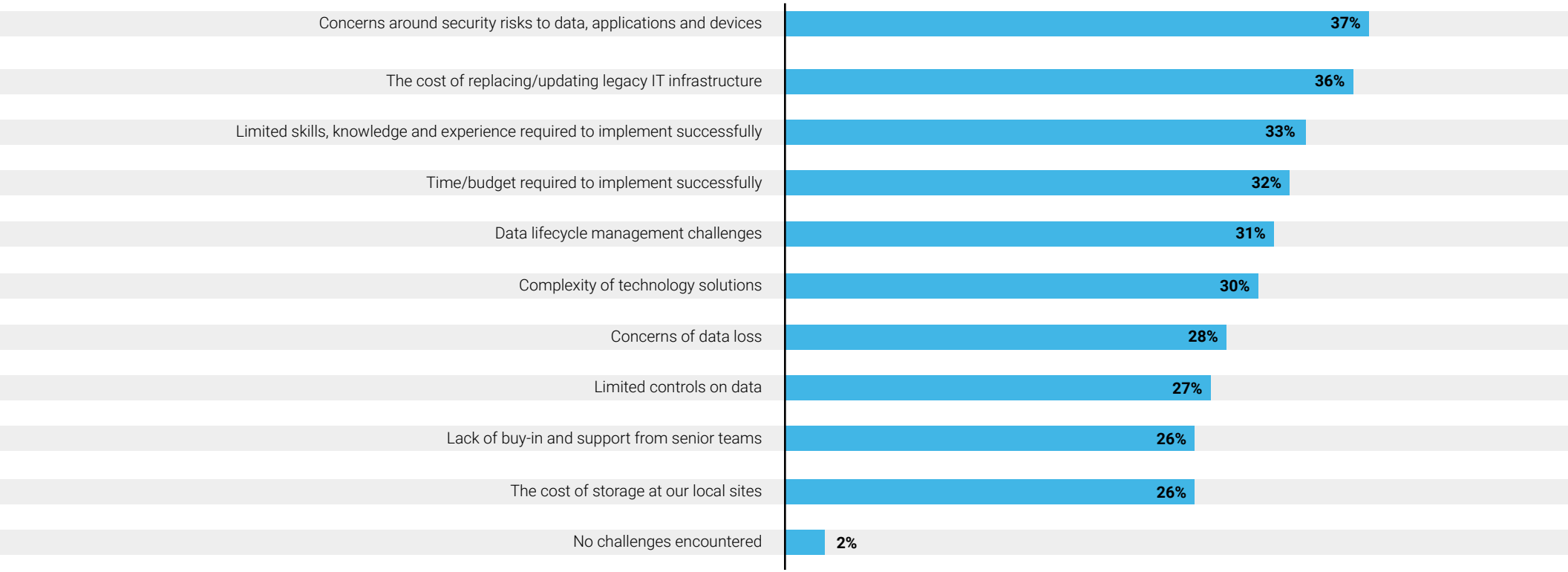


Of course, nuances in progress exist between industries, with some more advanced in their journey than others. For example, government organizations (51%) are least likely to be in pilot or production, while manufacturing (64%) and telecoms (64%) are the most. Further, financial services are most likely of all the industries surveyed to be in the early (24%) and advanced (17%) stages of production. There are considerable variations in customer expectation, suitability, specialization, systems, budget and infrastructure between these industries, it is therefore not particularly surprising that there are also differences in edge adoption patterns; along with the expectation that some industries are further along or lagging behind.

A challenge, yet clear appetite for edge technology

Challenges have certainly been encountered along the way, felt by almost all (98%) whose organizations are currently in the pilot or production phase of their journey. Concerns around security risks (37%), the cost of updating IT infrastructure (36%) and limited skills, knowledge and experience (33%) are most common. While these types of challenges may be unsurprising considering the technology's complex and costly nature, the lack of clearly identified leading challenges could offer telling insights into organizations' immaturity with the edge. Indeed, it could be suggested that organizations are still fairly early in the adoption process as they do not appear to agree on which challenges they consider to be 'primary'. Perhaps as organizations develop on their journey to the edge, more prominent challenges will emerge.

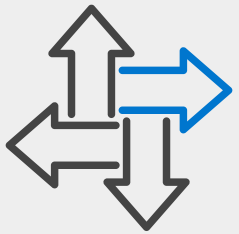
Biggest challenges organizations have encountered so far when moving their operational activities to the edge



In fact, when digging deeper into industry-level data, some interesting nuances do emerge, highlighting certain challenges that are specific to each industry. For example, in healthcare, data lifecycle management challenges are most likely (38%), while concerns around security (27%) – the top challenge for half of the industries surveyed – falls further down the list. This is accompanied by a ten-percentage point difference compared to the overall percentage of organizations holding concerns around security risks (37%). These results could indicate that as the healthcare industry grapples with challenges in resolving wider issues around their legacy and arguably disjointed data infrastructure, security concerns become a lower-priority challenge to master. Conversely, the telecommunications industry appears to face different challenges, with having limited skills, knowledge and experience (39%), and limited time or budget (39%) required to implement edge successfully, their largest. Organizations in this industry are also considerably more likely to struggle with a lack of buy-in and support from senior teams (32%), compared to those in the transport (21%) and government (23%) sectors.

The research finds that the challenges seen overall are similar issues that are also holding organizations back from deploying new edge-based infrastructure and software, alongside the fact that they have more pressing IT/OT priorities. This potentially suggests that this emerging technology is being overlooked in favor of more mature options with longer-term evidence of benefits and investment returns. While it is unfortunate that such challenges are relatively common, it does highlight areas where organizations may want to focus their attention when speaking to vendors about edge technologies.

Indeed, such support may be fundamental in satiating the clear appetite for the technology. Almost all (97%) of those already at least piloting edge deployments expect their organization would be negatively impacted if they did not move to the edge, with less effective use of data (43%), higher operational costs (43%) and falling behind competitors (41%) cited as most likely. Organizations with even the slightest curiosity to move to the edge should take note - impacts such as these may be pivotal to organizational growth.



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Edge use cases

77%

expect their organization's use of multiple edge use case deployments at any one time to grow either somewhat or considerably in the next 3-5 years

The uses of edge technology are far reaching, from improving healthcare by enabling analysis of patient data for real-time diagnoses to smart street lighting, increasing efficiencies and improving quality of life. Unsurprisingly, the appetite for edge technology is clearly justified. This is evidenced by the average number of different use cases that are reported as being in pilot or production stage at any one time at a typical edge location. According to respondents that average number is nine, which, although appearing high on face value, could suggest that experimentation with edge technology is afoot as organizations try to establish their preferred use cases for this new way of working.

And this is expected to increase, with more than three quarters (77%) reporting they expect their organization's use of multiple edge use case deployments at any one time to grow either somewhat or considerably in the next 3-5 years. Which, while exciting for the technology, may indicate imminent and further skillset challenges similar to what the industry is already experiencing in the AI and data management markets, accompanying potentially impending complexity.

Naturally, use cases vary by sector. The financial services industry is most likely to be using edge for digital security (55%) while government organizations most likely use it for monitoring water (39%) and telecoms for modernizing their networks (33%). In general, however, the types of cases currently being employed across all industries surveyed are typically for more fundamental uses such as monitoring and tracking in manufacturing, retail and government sectors. Looking to the future, this vision appears to turn increasingly sophisticated as the types of use cases organizations are looking to explore next are arguably more advanced, for example, using edge for predictive maintenance in manufacturing (28%) or telecoms (27%).

How to develop edge utilization

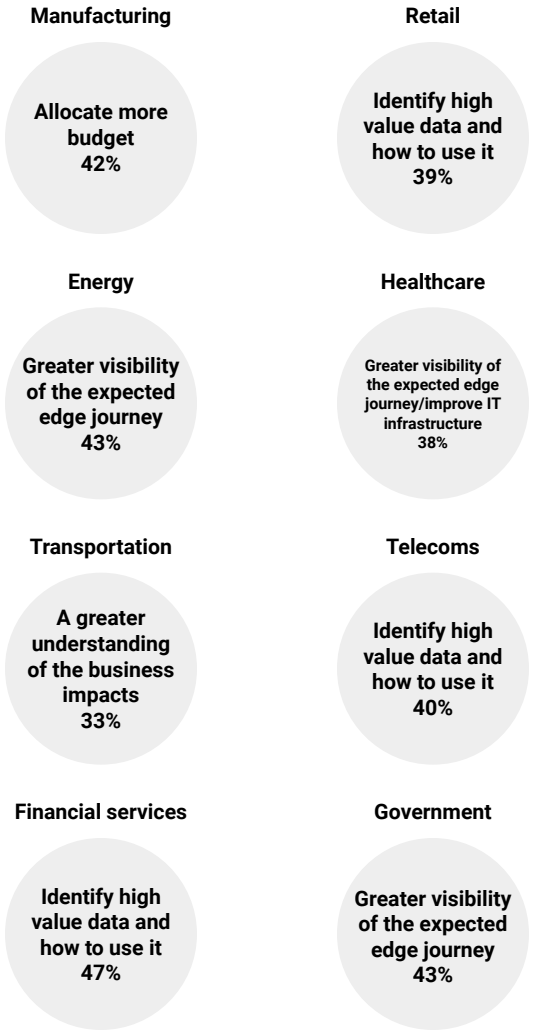
So, what do respondents think is needed to accelerate their use of edge computing and help them move to the next stages on their journey? Unfortunately, at an overall level there is no silver bullet – the findings indicate there are many ways that are of relatively equal importance in this quest, from identifying high value data (38%) to improving IT infrastructure (35%). Taking a more detailed look across the different industries, however, may shine a light on industry-specific opportunities to help target and alleviate pain points experienced at this level. For example, the need to have greater visibility of the expected edge journey is of most importance within energy, healthcare and government sectors.

In fact, regardless of what route organizations take on their journey to the edge, for organizations to adopt and work with vendors' edge solutions more easily, there is a view that vendors need to improve across the board. Improvement areas range from easier integration with other systems, fully integrated solution availability, edge-as-a-service availability to simpler implementation – all considered as needing at least some level of improvement by the vast majority of respondents. While organizations are exploring this technology, support from vendors to aid understanding in this evolving space would be beneficial.

Although organizations are looking to vendors for improvements, they also recognize the need to look to themselves, citing edge computing (46%) as the most likely area in need of considerable investment or improvement. Not too far behind but least likely (coming in behind responses for 5G, AI, streaming data analytics, cybersecurity and blockchain) is data management (40%), which is somewhat surprising and potentially suggests that there's a lack of appreciation around how significant a role data management will play in the context of edge – which is quite feasible given how many organizations are still in the early stages of their edge journey.

What will help accelerate the use of Edge computing and move to the next stage?

Most common answer by sector



Procurement of edge technology

How are organizations typically budgeting for and deploying this emerging technology? There appears no standout preference. Separate funding for new innovations or transformational initiatives (36%) is the most likely budgeting option for edge-based solutions, however existing IT budgets (34%) and existing operational budgets (30%) follow closely behind in terms of likelihood. This may indicate that the amount of effort needed to secure additional edge investment varies drastically from one organization to the next – it is possible that some will still see this as "nice to have" if existing budgets will allow. A similar picture exists for deployments, with the likelihood of edge-based solutions being part of innovation or transformational initiatives (34%), ongoing modernization of operational initiatives (34%) or routine IT infrastructure upgrades (32%) showing no clear leader.

The operating environments currently most preferred for deployment are private and public cloud, alongside service provider networks; and this doesn't look set to change greatly in the future. However, when comparing preferences between respondents from different organization sizes, interesting conversation points emerge. The findings suggest that smaller companies (45%) – those with 1,000-2,999 employees – prefer deploying edge technology use cases in the public cloud, compared to larger enterprises (37%) – those with 5,000 or more employees. Conversely, large enterprises (38%) are more likely to favor on-premises deployment environments compared to smaller companies (32%), possibly indicating that larger organizations have more on-premises capabilities, budget and security concerns by comparison.

Overall, there is also a greater preference for buying tech stacks when procuring new technologies, processes and skills in relation to edge, ahead of organizations building solutions themselves. However, an amalgamation of the two is most preferred – buying integrated tech stacks and building workloads or services on top – reported by more than half (54%) of respondents. Although it is possible that any "build" elements required may be hampered by the previously cited lack of knowledge and skills in relation to edge technology. While there are subtle nuances in preferences by geography, vertical and respondent type, these tend to be minimal.

Current deployment environment preference, by organization size

	Total	1,000-2,999 employees	3,000-4,999 employees	5,000 or more employees
Private cloud	44%	44%	45%	43%
Public cloud	43%	45%	46%	37%
Service provider networks	42%	44%	43%	37%
Content delivery network (CDN)	37%	36%	36%	38%
On-premises	34%	32%	35%	38%
Co-location	32%	28%	34%	34%

Benefits of edge data usage

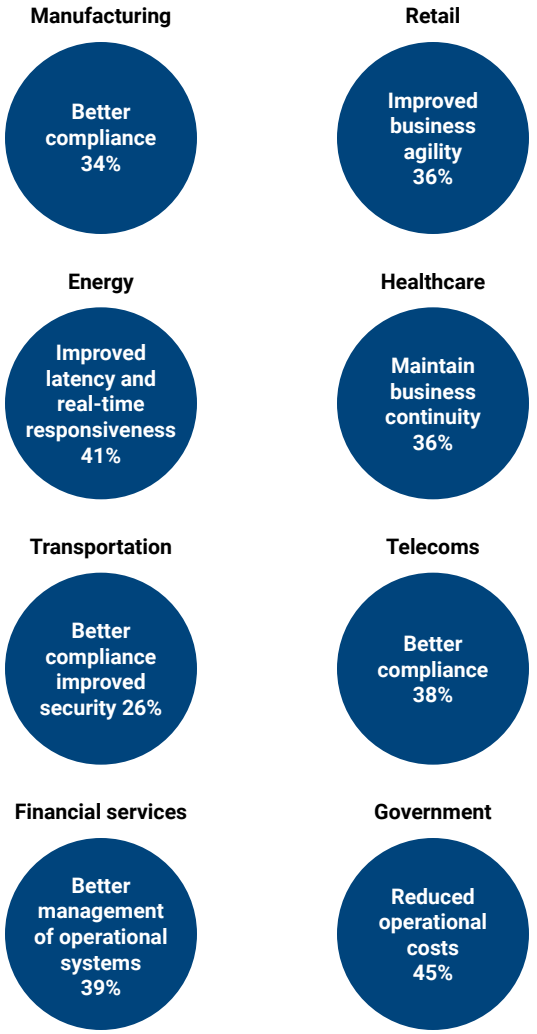
Despite the challenges encountered, benefits resulting from using edge-based data are already being widely realized by organizations. Most likely cited are better compliance (33%), improved business agility (30%), enhanced data processing speed (30%) and improved latency and real-time responsiveness (30%), among many other benefits. And organizations are anticipating more of the same in the future, which bodes well for continual growth of this emerging technology.

Interestingly, industries differ in what their most likely achievements are by using data at the edge. Government organizations are most likely to report reduced operational costs (45%), while energy and utilities are most likely to cite improved latency and real-time responsiveness (41%) as their most likely achievements. Additionally, manufacturing (34%), telecoms (38%) and transportation (26%) sectors share better compliance as their most likely achievement.

Data produced at the edge is varied and holds unique value for organizations, with certain nuances existing between industries. Most often, system and operational data (e.g. equipment performance data, etc.) is considered to be of greatest value by a quarter (25%) of respondents, followed by user data (e.g. behavioral data, etc.) (20%). This is largely echoed between industries, with the findings highlighting that respondents from manufacturing, retail, energy, telecoms and government sectors place the most value on system or operational data, while those from transportation, telecoms and financial services consider this to be user data. This may suggest that organizations are currently finding their feet with edge data, obtaining and using the most fundamental data first and discovering the most value in this. Potentially more advanced uses such as identifying exceptions and outliers using AI and analytics and generating insights from AI and analytics, may follow-on once the more fundamental data has been mastered.

What benefits are resulting from using edge-based data ?

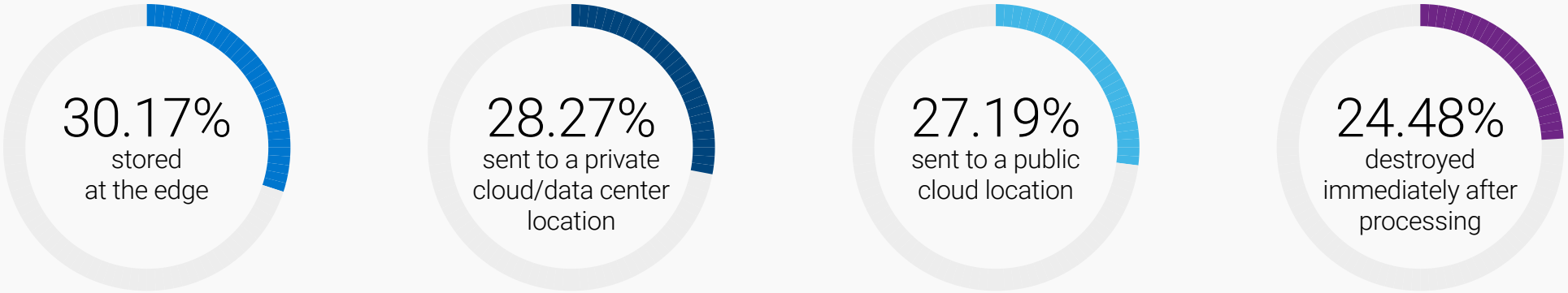
Most common answer by sector



Handling edge-created data

So, what happens to the data that is being created as a result of edge deployments? The most likely outcome is to store it at the edge, with an average of 30.17% of edge data stored here. Similarly estimated proportions are sent either to a private cloud or data center location (28.27%), or a public cloud location (27.19%). While, on average, around a quarter (24.28%) of edge data is reportedly destroyed immediately after processing. There are likely to be several variables that impact what organizations are doing with their edge-created data, with regulatory factors as well as security concerns playing an important role.

What happens to the data that exists as a result of edge deployments?



Given the massive growth that is expected in the number of devices, type and volume of data, and the potential value of that data, the question of how edge data is handled is likely to continue to evolve rapidly. According to a recent IDC study, the volume of data at the edge is anticipated to triple in just the next four years. And the edge is the new source of business innovation, both evolutionary and revolutionary. Because of this, we suggest that the topic of edge data storage is something organizations will need to give considerable thought to as they progress on their edge journey.

Conclusion

As an emerging technology, edge is clearly generating organizational interest. With the myriad of capabilities including more effective data utilization, enhanced customer experience, and consequential opportunities for growth and competitive advantage that can be enabled by deploying edge solutions, it is not a surprise that many organizations are planning to utilize the technology in the not-too-distant future.

However, with all emerging technologies come challenges that hold organizations back from adopting and working with them, at least until they are better understood and adopted into mainstream practice. Edge is no different and it is evident that such challenges hinder organizations' attempts to move to the next phase in their edge journey. Notably, buried within these challenges lie opportunities for customers to partner with trusted vendors to help facilitate the adoption of and operationalize edge solutions more easily. Yet, this is not the full picture – organizations also recognize that they need to look within themselves in order to maximize their success at the edge.

How organizations prefer to invest in and deploy edge solutions varies widely, suggesting that there is no clear preference overall thus far. This highlights that there is no 'one-size-fits-all' for this technology, but it may also indicate that the market hasn't yet found consistent long-term and broad-scale knowledge of edge operations. Similarly, while the benefits of using edge-based data are extensive and widely recognized, what happens to this data also varies.

Looking to the future, 'edge-curious' organizations that collaborate with trusted partners such as Dell Technologies and Intel through their journey to the edge stand to reap considerable benefits as they gain early-mover advantages through large-scale sophisticated deployments. However, to achieve success, organizations must focus on reducing complexities at the edge. When organizations focus on simplifying their edge operations, they in turn solve for critical pain points – speed, scale and security. By solving these pain points, organizations unlock the ability to generate insights where needed, scale as they expand and bring modern security to the edge. This then unlocks the door to innovation. To learn more about how to get started simplifying your edge operations and solving for these pain points, watch the videos below:

Generate Insights Where You Need Them
Consolidate As You Expand
Bring Intrinsic Security to the Edge

Or visit dell.com/edge

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About the research

Dell Technologies commissioned independent market research agency Vanson Bourne to conduct research into how organizations are progressing along the journey to using edge technology and their experience of this journey. The study surveyed 1,850 Operations and IT decision makers in August and September 2022 across the Americas, Europe and APAC regions. Respondents were from organizations with 1,000 or more employees across manufacturing, retail, energy and utilities, healthcare, transportation, telecoms, financial services and government sectors.