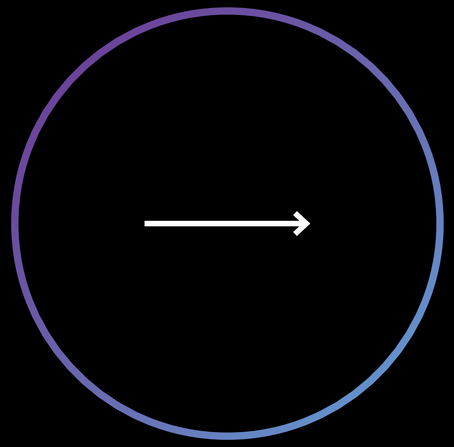
Edge Computing Simplified.

Building future-ready edge with a unified orchestration & management platform



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“Edge computing is skyrocketing in manufacturing and retail, thanks to its versatility and boost to operational efficiency. But there are challenges that must be addressed!”

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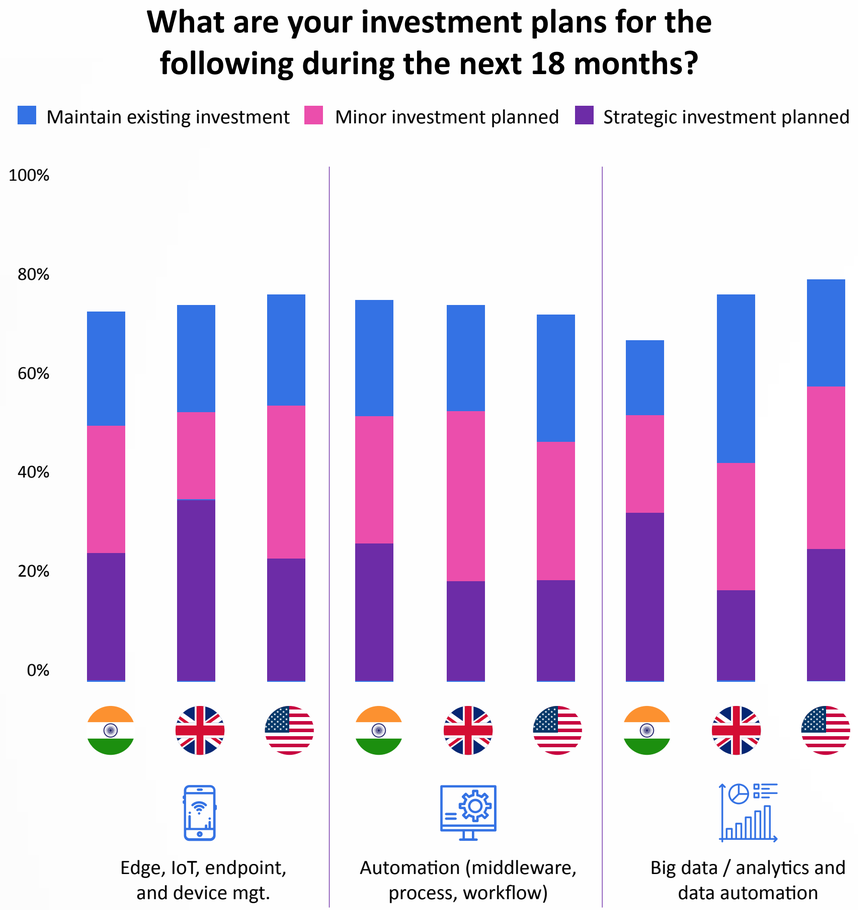
Edge computing and related areas of automation and analytics are all set for strategic investments by many large enterprises in the US, the UK and India



Notes: n=439
Source: Omdia

Large enterprises in the US, the UK and India are planning strategic investments into edge, automation, and analytics, but priorities vary.

- Omdia's 2025 Enterprise IT Survey finds that a staggering share (between one-in-three and one-in-five) of large enterprises in the US, the UK and India are about to invest big in these three IT categories.
- In the UK, edge computing, IoT and device management carries the biggest importance: nearly 40% of large enterprises are planning significant investments into this category.
- In India, there is a relatively equal distribution of priorities across the three categories, yet it stands out that one in every three large enterprises are planning for large scale investments into big data analytics and data automation.
- In the US, one in four large enterprises are considering strategic investments into edge computing, IoT / device management and data analytics and automation.

To implement these, orchestration and management of different devices, systems, datasets and connectivity environments will be needed.

- None of the technology categories listed above can be really handled in isolation. For instance, better management of end devices and adoption of edge computing is often a prerequisite to achieve automation and efficiency.
- These strategic investments, while certainly necessary, are also not trivial to execute. To succeed, enterprises will need to address the complexities of their processes, resolve the inefficiencies in their legacy infrastructures, break hardware and software silos, and simplify their approaches to heterogeneous device and connectivity settings.

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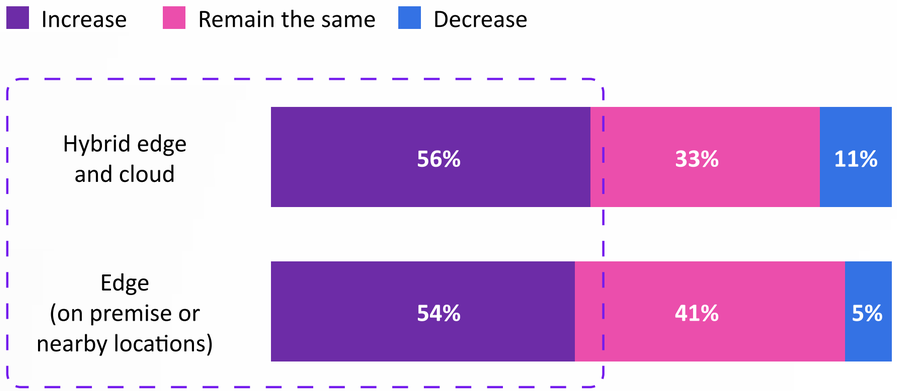
Edge computing usage is growing among large enterprises and deployments are often highly distributed across many locations



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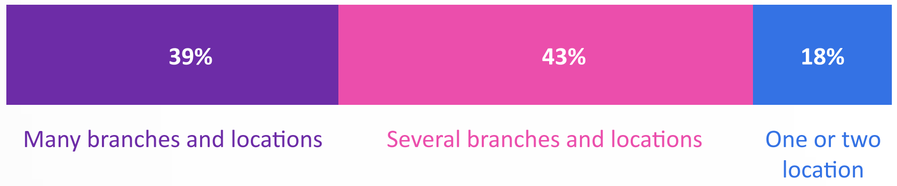
Source: Omdia



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Source: Omdia

Adoption of edge computing is strong among large enterprises.

- In the last several years, edge computing has seen widespread enterprise adoption, with the vision of bringing computing and storage closer to where data is generated.
- According to Omdia's Digital Enterprise Survey conducted in 2023, one in three large enterprises had already deployed edge computing and half of them were either in progress or planning to deploy within the next one to two years.
- Amid such strong adoption and potential for growth, Omdia conducted a new survey in the fall of 2024*, to better understand the motivations and challenges of enterprises (in retail and manufacturing) with existing, ongoing, or planned edge deployments.

Usage of edge computing is set to grow.

- Omdia's 2024 survey shows that usage for both edge and hybrid edge-cloud computing is set for rapid growth in the next three years (more than 50% for both).
- What is particularly promising is that edge computing is trickling down to the smaller segments of large enterprises**; these companies show even greater appetite to increase their edge usage (63% vs. the 54% average).

Edge computing promotes and is deployed as a highly distributed computing topology across many locations.

- Edge computing is no longer an experimental idea to be trialled at or limited to a single site; it spans vast operational footprints. In manufacturing, enterprises use edge capabilities at multiple plants, warehouses, or facilities, whereas in retail, edge computing is found in many store branches and service locations.
- According to Omdia's survey, 82% of large enterprises report having edge deployments at many or several locations, while only 18% have them in one or two locations.

* See sample details in Appendix ** Not shown on chart – smaller companies with annual revenue of <$250m

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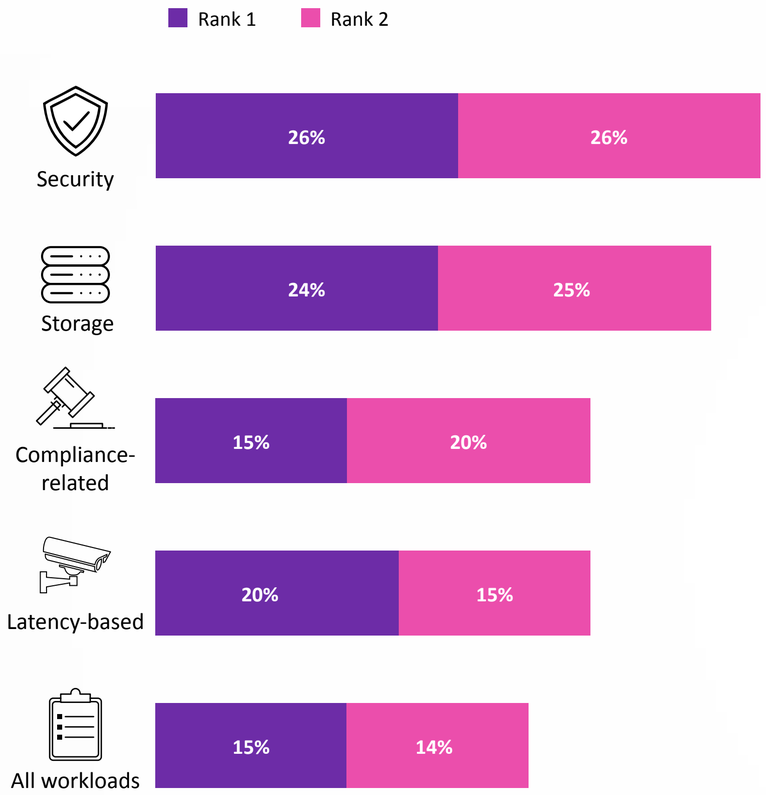
Enterprises recognize the value of edge computing for its versatility, using it for various purposes, with operational efficiency as the primary motivation



Respondents were asked to choose (and rank) two options.
Chart ordered by total responses.

Notes: n=2013
Source: Omdia

Enterprises use edge computing for all kinds of workloads…

- Enterprises see a wide range of workloads as ideal for edge environments. While lower latency is important, it is refreshing to see that edge computing is used for a lot more than that, including storage and security – mentioned most by the survey respondents.

… and report many different motivations to deploy edge computing

- For large enterprises, edge computing is very versatile because it serves different purposes depending on requirements; some use it to reduce latency, others to manage their IoT ecosystems, while others for security or compliance. The good news is that these benefits are highly complementary: achieving one does not come at the expense of another benefit, especially if a common edge platform is used across applications. This makes edge computing a powerful concept.
- Still, although enterprises report a relatively balanced view of many motivations, operational efficiency gains, cost savings on IT / OT infrastructures, and customer experience improvements are the strongest incentives.
- Edge computing offers enterprises efficiency gains by improving processes via the automation and transformation of IT / OT and IoT environments at local sites. Any gain in the production efficiency of a manufacturing plant, or any waiting time eliminated for customers at a retail location can be massive competitive advantages.
- Edge computing can also save costs on IT / OT infrastructures and networks. By having computing and storage on site, enterprises control their IT resources better, while saving on unpredictable data transfer and compute costs on public clouds.
- Also, enterprises that use edge computing to consolidate hardware and software environments can gain significant further savings by reducing operational complexity.

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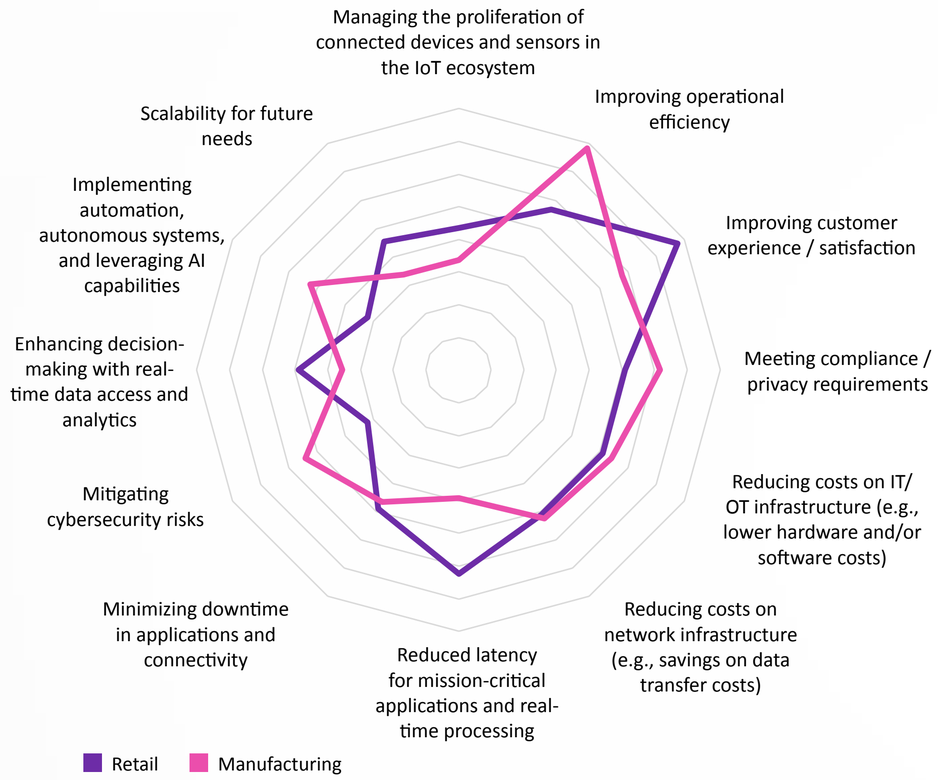
The motivations of retail and manufacturing enterprises vary slightly in unsurprising ways

What are the biggest incentives for your organization to deploy edge computing?



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Source: Omdia

While there are significant overlaps in the relative importance of the incentives to deploy edge computing across retail and manufacturing enterprises, some intuitive differences need to be highlighted.

In retail, operational efficiency is boosted by enhancing the customer experience through rapid operations and standout response times

- Retail enterprises use edge computing in their individual stores and branches, which can also be customer-facing locations, such as supermarkets, restaurant chains and department stores. Even in cases where these are mainly online businesses, the ability to respond and deliver to customer orders rapidly plays a critical role in success.
- By having compute and storage resources at the edge, these locations benefit from improved customer experience, related to reduced latency in operations and real-time decision-making and analytics capabilities (e.g., rapid inventory checks, shelving updates, point-of-sales interactions, queue management, quicker service responses)

In manufacturing, operational efficiency and automation capabilities step up in importance

- In manufacturing, operational efficiency and automation are more salient reasons for edge deployments.
- This is not surprising given the complexity of many interdependencies across operational technologies that can benefit from automation. In manufacturing, a minor gain in production efficiency can translate to major gains in the marketplace due to the importance of economies of scale as a source of competitive advantage.

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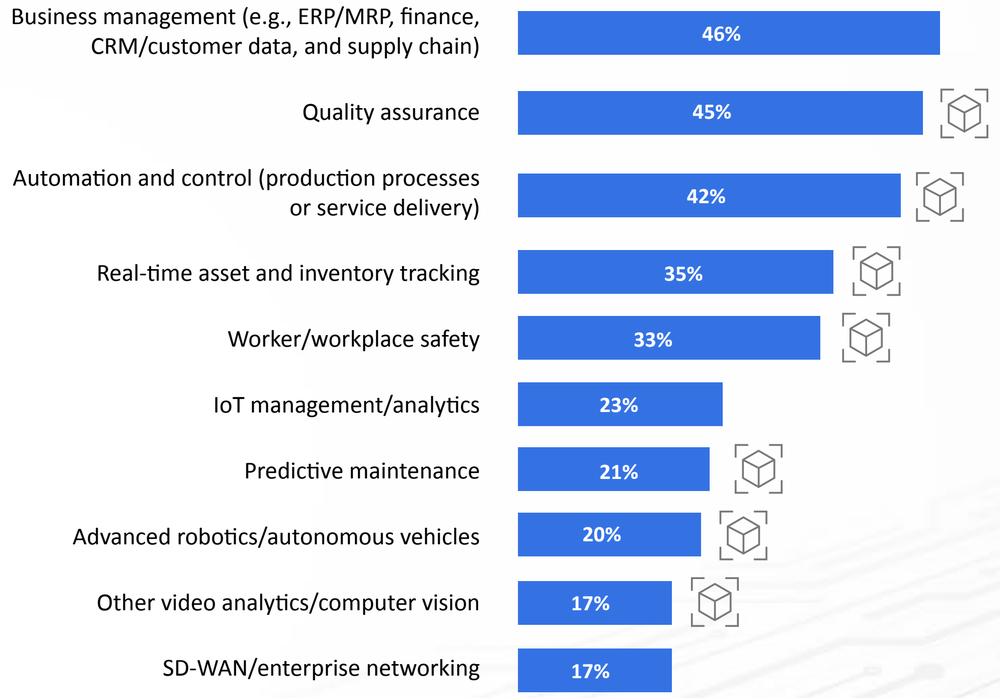
Production and service delivery processes are tracked and automated, but also linked to business applications at the edge

Edge computing improves and links the production and service processes with business logic at local sites

- The most popular edge applications in manufacturing and retail are those that relate directly to the ‘conveyor belts’ of product or service delivery. Edge computing digitizes and optimizes these processes with automation and management of the IoT devices, while supervising quality assurance and tracking assets and inventory.
- **Most of the applications mentioned by the respondents have some relationship to computer vision, and video / image analytics for object detection.** For instance, in modern facilities, quality assurance and automation are often helped by computer vision tracking of production processes and final products. In worker safety, video analytics recognize hazards and observe ‘digital fences’, while detecting the use of protective equipment. In predictive maintenance, minor changes in equipment states are captured by image or video recognition systems to trigger alerts and actions.
- **Large enterprises are also keeping their business logic and customer data close to where the production and service delivery is.** For instance, ERP / MRP systems linked to inventories, supply chains, and production processes are running at the edge, rather than solely at centralized locations. At retail locations, customer-facing systems (e.g., points of sale, checkouts) and operational systems (e.g., inventory, finance) work in tandem at the edge.
- Edge computing’s underutilization for enterprise networking is an area of future opportunities for enterprises: some cloud native edge platforms provide shared hardware and software infrastructures for virtualized / containerized network and business applications – enabling a fusion of connectivity and computing.

(Respondents asked to select three options)



Application areas with close links to computer vision, image and video recognition and object detection

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Source: Omdia

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In edge, the biggest challenges are skill gaps, cybersecurity, and opex; device heterogeneity and legacy infrastructures also present technical challenges

In-house skills are missing in edge computing deployments, while cybersecurity is also a concern due to larger potential attack surfaces

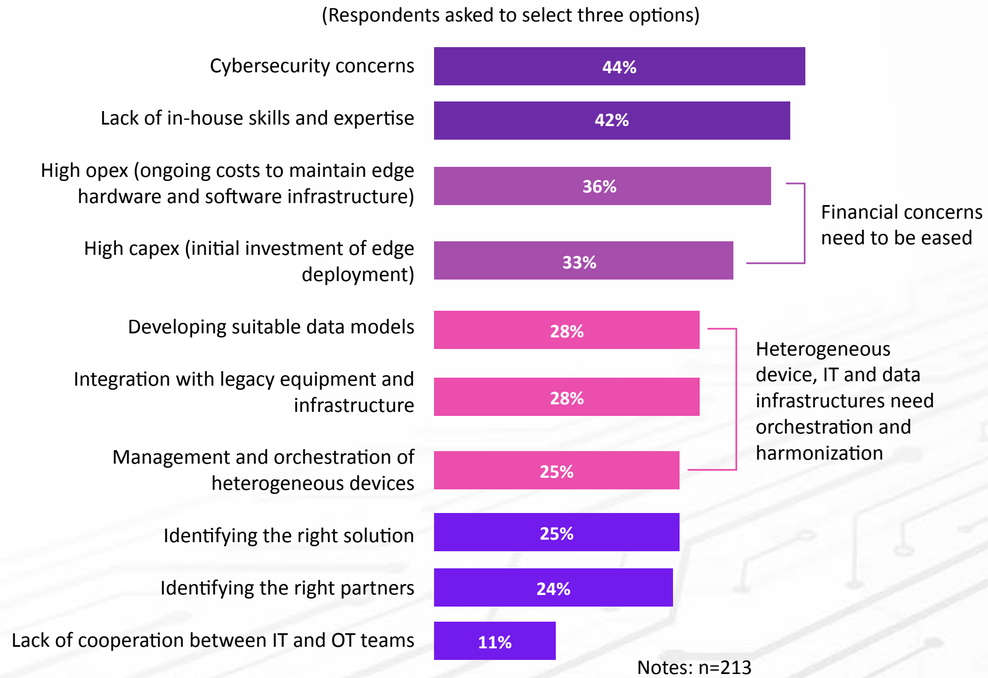
- Digital transformation in manufacturing and retail is not always easy due to a presence of many legacy systems and equipment, based on which enterprises have built in-house skills. Such skills do not always align with edge computing, which can trigger a paradigm shift in organizations. The lack of in-house skills (42%) is a gap that can be filled with managed services, trusted partners, and easy-to-deploy edge platforms.
- Cybersecurity is a natural worry (46%): the surface of potential attacks expands with distributed computing. However, this can also go in the opposite direction, as evidenced in responses that show “mitigating cybersecurity” as an incentive for edge computing. Enterprises with multiple facilities can prefer running cybersecurity applications at local sites due to quicker responses where the attack is happening.

Costs can be high, especially if edge deployments are highly customized

- Respondents mention opex after deployment to be a potential concern, which often depends on how custom the implemented solutions are.
- As will be shown later, most enterprises ‘stitch’ custom edge solutions for different use cases and applications. With such an approach, the amount of hardware and software owned and used can grow substantially.

Orchestration of heterogeneous devices, integration with legacy systems, and data harmonization are key technical challenges

- Periods of digital transformation, which often involve edge rollouts, pose challenges of swapping or integrating legacy systems with new infrastructures. Moreover, many different devices require orchestration and management at the edge. Overall, the technical challenges of edge computing relate to the growing pains of breaking down siloes of hardware, software, and data.



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Source: Omdia

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“The inability to move beyond legacy systems often leads to inefficiencies. Although customization, decentralized IT management, and hardware silos may tailor to local needs, it often compromises overall effectiveness.”

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Enterprises must assess how they approach three key areas of their deployments to maximise the benefits and minimise the challenges of edge computing

Interrelated decisions to be made holistically

Degree of customization vs. standardization of solutions for different use cases and applications

- Customized solutions may aim to combine ‘best of breed’ software and hardware for each use case, but this may cause interoperability and integration complexities, limit adaptability to changes, and increase costs
- Sometimes solutions are “custom” because they ‘stitched together’ various components to create workarounds with suboptimal outcomes. Such solutions are often highly inefficient and unscalable.

Degree of centralization of management of highly distributed computing environments

- If not orchestrated and managed adequately, highly distributed computing environments duplicate efforts, increase complexity, and drive costs up
- Costs and efforts can increase exponentially if there are different hardware, software elements to manage at, and IT personnel attached to, each of many edge sites

Degree of hardware consolidation to break down potential siloes and benefit from scale

- Presence of many hardware siloes is a problem; innovative edge infrastructures aim to consolidate computing on shared hardware to achieve simplicity, scale, and scope
- Hardware siloes also mean larger cyberattack surfaces, data misalignments and possible duplications across various ‘islands’, consume significant power

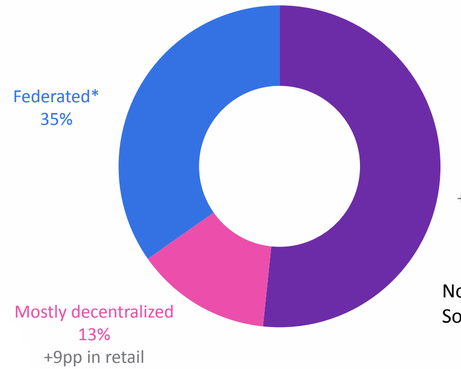
Managing many local edge sites is not easy: different configurations, devices, lifecycles and vendors at each site also lead to higher IT personnel costs

Enterprises manage their many edge locations centrally, however, by itself, does not solve their challenges

- Many enterprises adopt either a centralized (52%) or federated (35%) approach to managing their various edge locations. However, this does not solve the problems related to operating many unique environments at different sites.
- The biggest concern for enterprises (67%) is to manage multi-vendor hardware and software infrastructures, all with different configurations, lifecycles and networking needs for different use cases.
- Wide range of devices (49%) and software platforms (67%) for different use cases at different sites translate to inconsistent environments targeting similar applications.
- All potential inconsistencies and complexities that come with multi-vendor, multi-platform, and multi-device contexts mean that enterprises often need to ensure that some IT personnel with specialized expertise kept on each site (60%). This adds to the already high costs of multiple IT / OT infrastructures.

In fact, trying to centrally orchestrate highly disparate operations at local sites can add another layer of complexity

- While a centralized approach makes sense to manage many edge locations, it should not be force fit to disparate IT / OT environments. Without sufficient standardization across sites, it can backfire and add to operational complexity.
- However, an edge platform that can host and run the variety of applications consistently across sites can be a massive win for efficiency, faster time-to-market and better customer experience.



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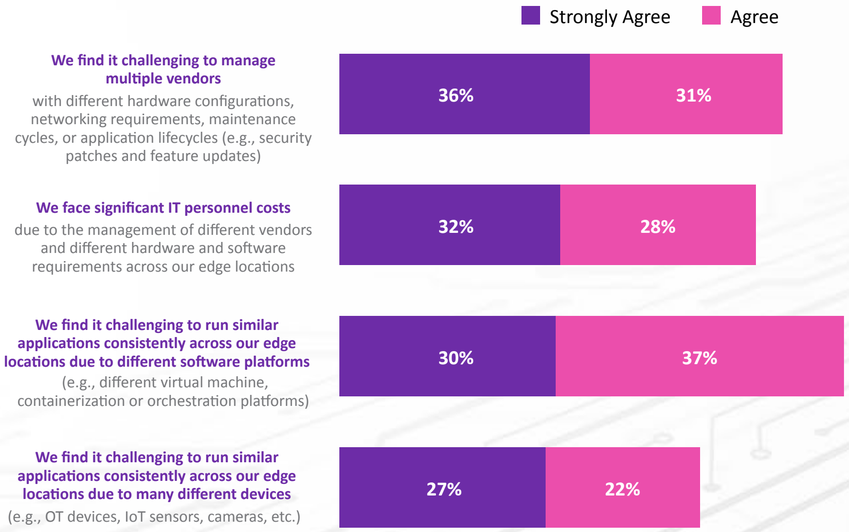

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Source: Omdia

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Standardizing infrastructures across edge locations is highly desired, and there is strong appetite for integrated platforms that can assist this

TODAY: HIGH DEGREES OF EDGE CUSTOMIZATION

87%

of enterprises

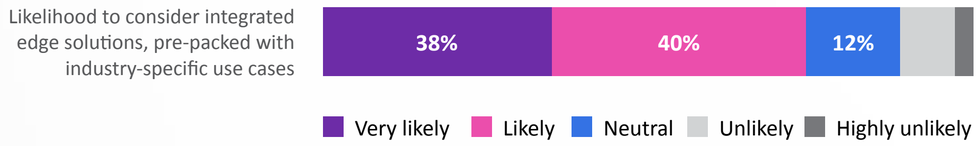
Have highly or somewhat customized edge hardware / software configurations for different use cases and applications

TOMORROW: MORE HOMOGENEOUS EDGE INFRASTRUCTURES

91%

of enterprises

Are working to standardize / homogenize* their edge infrastructures across use cases and locations



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Source: Omdia

Standardizing edge infrastructures across many sites is key to achieving the promised benefits of edge computing

- Many surveyed enterprises in the manufacturing and retail industries report having deployed customized configurations for their edge use cases at different locations. Only 13% mention using common platforms that can cut across multiple applications.
- There will be a path toward standardization, though. A staggering 91% of enterprises see this as a priority or an important area of consideration.

Integrated edge platforms with pre-packed industry solutions can accelerate the path toward standardization

- One way to move away from “solution stitching” toward standardization is to consider common edge platforms that can handle applications across domains of IT, OT and networking.
- For most use cases, there are ‘pre-packed solutions’ with proven applications that large enterprises can easily adopt and adapt to their own operations. These can range from ready-to-use point of sales systems, warehouse logistics, asset tracking, site security, and worker safety to quality assurance, robotics and automation, and pre-trained AI/ML models for various tasks that require little customization.

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Breaking down hardware siloes is a part of the broader journey to standardization and a big priority for enterprises

Siloed hardware environments are common in manufacturing and retail, but consolidation is on the way

- 56% of manufacturing and retail enterprises surveyed still rely on multiple hardware siloes to run their operations.
- This can be due to the ongoing reliance on legacy systems that continue to ‘get the job done’ despite being inefficient compared to modern alternatives, or as suboptimal outcomes of digital transformation projects that have not achieved desired levels of harmonization and integration across these islands of hardware.
- However, many enterprises take the elimination of these siloes very seriously and view hardware consolidation as a priority (95%), as can be seen in the survey results.

TODAY: SILOED IT / OT HARDWARE ENVIRONMENTS

56%
of enterprises

Have highly or somewhat siloed IT / OT hardware environments (only 27% consolidated)

TOMORROW: MORE HARDWARE CONSOLIDATION

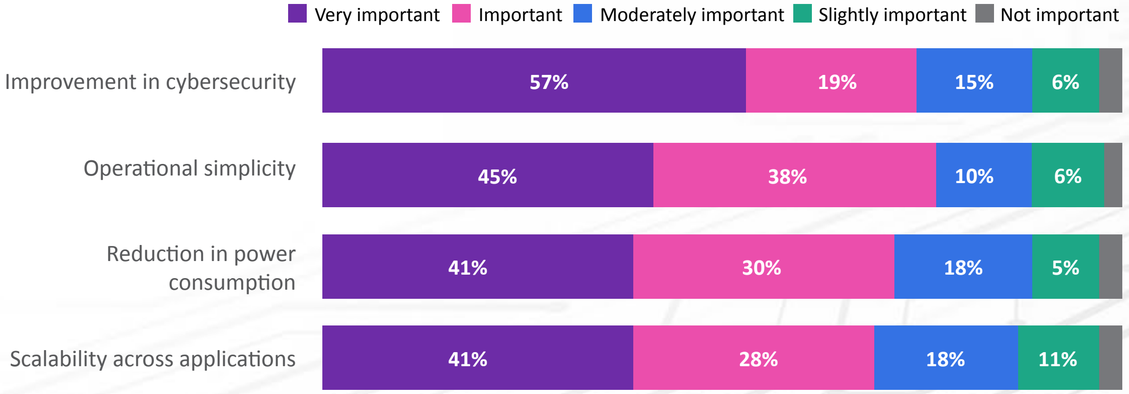
95%
of enterprises

Are working to* consolidate their hardware to break down siloed infrastructures and processes

* 54% view it as a “big priority” and actively working on it; 41% find it important and are considering it

Hardware consolidation offers many benefits

- Hardware consolidation is desired largely for the same reasons that drive the need for standardization in general. However, there are nuances.
- For instance, energy consumption becomes a more recognizable concern as it is often the quantity and quality of hardware that determine the sizes of power bills.
- Scalability is another benefit that enterprises with existing edge deployments already recognize. Once deployed, a common edge hardware platform can scale depending on workloads and across many applications – rather than remaining inefficiently idle. In our survey, 84% of respondents already reported doing this.
- Hardware consolidation can enhance operational simplicity. Siloing hardware often means siloing processes, which, in turn, requires individual attention to be paid to monitor and optimize each of them separately. This prevents a holistic view of operations and misaligns with the many interdependencies that comprise large manufacturing and retail processes.



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Source: Omdia

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“Simplify your enterprise edge deployments to achieve the operational efficiency you desire. Tata Communications Vayu Edge is a multi-access edge orchestration and management platform designed to empower future-ready enterprises to thrive in a data-driven world.”

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Carve out the “Edge of Tomorrow” with Tata Communications Vayu Edge

The growth of edge computing will continue, as more industries embrace it

- The future of data generation undeniably lies at the edge. More than half of enterprises are growing their investments in edge computing to reap the operational and financial benefits of processing data where it matters the most, and to untap the potentials of the most innovative applications. Industries are actively embracing this transformative technology, fueled by the ever-increasing volume of data generated at the network’s periphery by vast ecosystems of end devices.

Tata Communications Vayu Edge stands at the forefront of this revolution, offering businesses a robust platform to harness the full potential of edge computing

- Tata Communications Vayu Edge is an infrastructure and cloud-agnostic, multi-access edge platform tailored for driving industry-leading business use cases. It’s an expertly managed platform that gives you the flexibility of securely deploying and managing any application anywhere at scale. It provides seamless edge orchestration and management across diverse hardware and locations, delivering operational efficiency
- It’s ‘solution-in-a-box’ capability provides edge infrastructure, platform, network and managed services, all bundled into a unified offering designed to cater to specific industry and business needs. Tata Communications Vayu Edge stands as a groundbreaking edge solution meticulously designed to address the stringent demands of industries that require real-time data processing, low latency, operational efficiency, robust security, and compliance.
- It enables businesses to seamlessly optimize their existing environment with a centralized orchestration platform

TATA COMMUNICATIONS vayu | Edge

Know more about Tata Communications Vayu Edge, click here or contact us for an expert consultation.

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Appendix

Enterprise Edge Survey 2024 | Methodology and sample details

- The Enterprise Edge Survey 2024 was fielded and analyzed in the fall of 2024 by Omdia, covering large enterprises in manufacturing and retail industries in the US, the UK and India. The survey was commissioned by Tata Communications.
- A total sample of 213 enterprises was almost evenly split across countries, industries, and annual revenue.
- The respondents had to be immediately relevant to the company's edge computing strategy and operations either by being (a) directly involved in decision-making, (b) directly involved in technical design or operations, (c) influential in the organization's edge strategy, or (d) familiar with the organization's edge strategy

Sample by country
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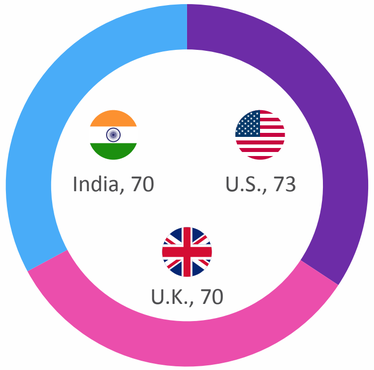

Sample by industry
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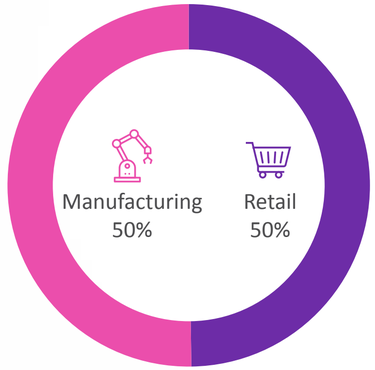

Sample by annual revenue
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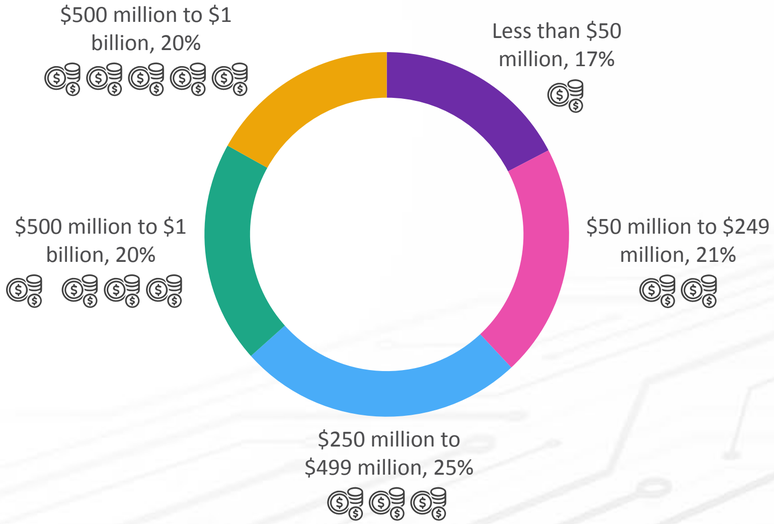

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Appendix

Omdia Consulting

We hope that this analysis will help you make informed and imaginative business decisions. If you have further requirements, Omdia's consulting team may be able to help you. For more information about Omdia's consulting capabilities, please contact us directly at consulting@omdia.com.

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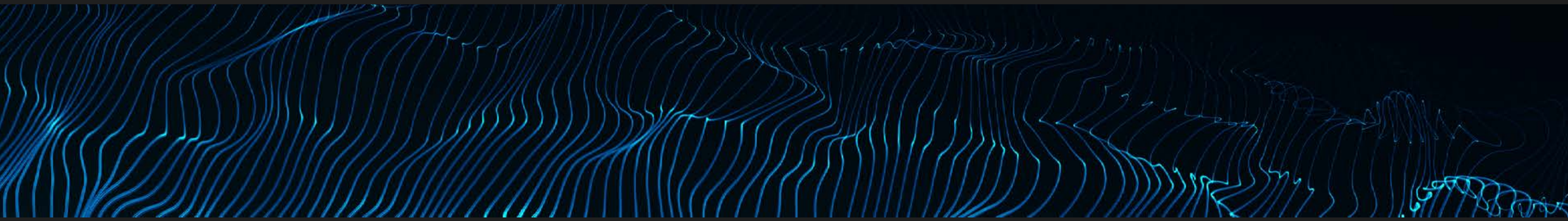

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