IDC InfoBrief
November 2021

The Business Value of Edge in a Digital-First World

IDC Doc. #AP241273IB

IDC

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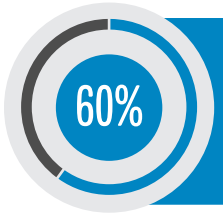
Edge-Based Innovation to Take Center Stage in Asia/Pacific

As we move towards an increasingly data-driven future, the edge has emerged as the new frontier of innovation, driven by an explosive growth of the Internet of Things (IoT), rapid technological evolution of edge infrastructure, enhanced security and analytics capabilities to unlock value from edge data, and an expanding range of edge-related services from IT and communication services providers.



IDC FutureScape Prediction: The number of new operational processes deployed on edge infrastructure will grow from less than 10% today to over **60%** in 2024 as digital engineering accelerates IT/operational technology (OT) convergence.[1]

IDC's research suggests that within the next couple of years, up to 30% of enterprise infrastructure deployment in Asia/Pacific is likely to happen at the edge[2] as enterprises look to realize a host of innovative use cases around enabling borderless hybrid work environments, securing far-flung peripheries of the enterprise, and supporting data-driven, intelligent decisioning at the edge. This IDC InfoBrief identifies the crucial role an edge-focused technology partner can play in helping enterprises successfully navigate this exciting journey and details:

- Major technology and business megatrends driving interest in edge computing
- The reality of edge adoption in Asia/Pacific
- Challenges encountered when implementing edge use cases
- How an integrated enterprise architecture can contribute to successful edge implementations
- What enterprises can do to maximize the value they realize from the edge

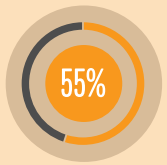
Source: [1] IDC FutureScape: Worldwide IT/OT Convergence 2021 Predictions - APEJ Implications 2021; [2] IDC's Asia/Pacific Cloud Pulse Survey, 1Q21, n = 1150. APEJ stands for Asia/Pacific excluding Japan.

Winds of Change: Global Megatrends Charting a Path to the Edge

Enterprises are looking at a reality in which the workplace has become hybrid, innovation is key to sustainable competitive differentiation, and secure data-driven decisions open new avenues for growth. The common denominator: edge-enabling technology is the strategic differentiator!

Borderless

Workforce@Edge:The future of work is now radically different from the past. For better business success, enterprises need to effectively enable their workforce to operate in this new hybrid work environment



By 2023, 55% of large enterprises will have committed to providing technical parity to a workforce that is hybrid by design rather than by circumstance, enabling them to work together separately and in real time.[1]

Innovative

Workloads@Edge: In the software-powered future, every enterprise will need to efficiently develop, deploy, and manage innovative software assets across the breadth of its operations in order to maintain competitive differentiation and leadership in its market

By 2024, over 30% of A2000 companies will run artificial intelligence (AI) workloads distributed more evenly from core to edge to cloud and will be managed by AI software platform providers, making the infrastructure invisible.[2]

Security-Centric

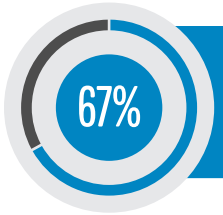
Security@Edge: As organizations race to unlock hidden value in different parts of their enterprise value chains in an increasingly digital world, there is an urgent need to secure these newly-digitalized environments

By 2024, recurring infrastructure failures inhibiting business resiliency and security across all locations will have driven 60% of enterprises to mandate using automated digital infrastructure.[3]

Source: [1] IDC FutureScape: Worldwide Future of Work 2021 Predictions — Asia/Pacific (Excluding Japan) Implications; [2] IDC FutureScape: Worldwide Artificial Intelligence 2021 Predictions: APEJ Implications; [3] IDC FutureScape: Worldwide Future of Digital Infrastructure 2021 Predictions — Asia/Pacific (Excluding Japan) Implications. A2000 refers to the 2000 largest Asia/Pacific enterprise.

Workforce@Edge: Enabling a Frictionless and Borderless Distributed Enterprise

Trend: The COVID-19 outbreak has fundamentally and permanently altered the enterprise workplace construct. A hybrid, distributed workplace in which the extended enterprise edge includes employees' remote work locations is the new reality for most enterprises.



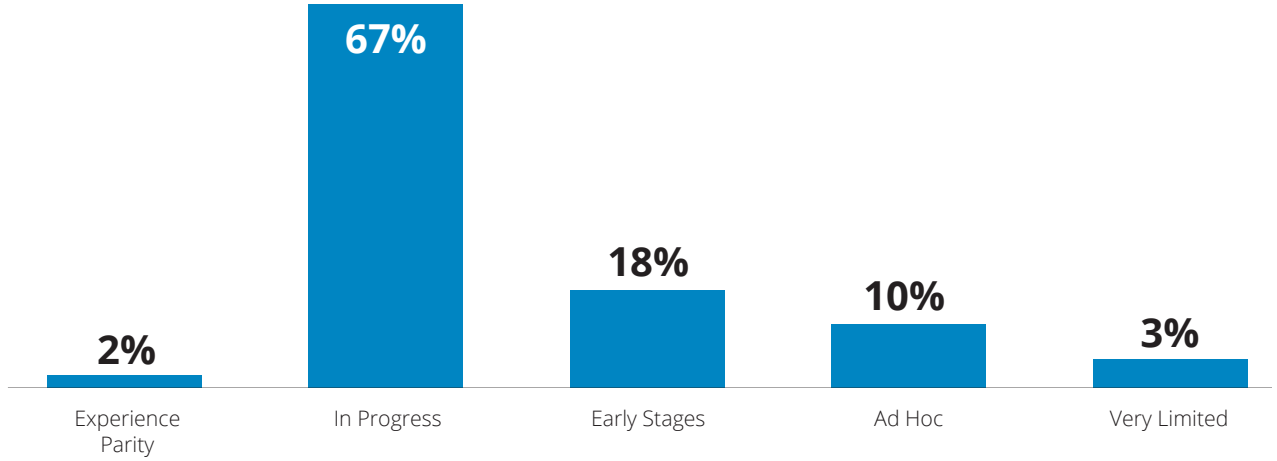
IDC's research suggests that **67%** of Asia/Pacific enterprises are currently investing in infrastructure that will provide experience parity to a hybrid workforce, across centralized workspaces and all manner of end-user edge locations.[1]

Challenge: As enterprises incorporate non-traditional work environments, they have to address challenges like enablement costs (MPLS costs, VPN licenses etc.*), sub-optimal user experience and security issues on account of limitations of consumer-grade end-user networks.

Edge-enabled Solution Benefits: SD-WAN edge devices/endpoints extend the capabilities of SD-WAN to the home office or any other conceivable remote work environment, federating security and policy administration, improving connectivity resilience and enhancing end-user experience.

Business Value & Outcome: A full-featured, seamless and secure hybrid workplace that provides full technical and experience parity across all manner of centralized and remote work environments.

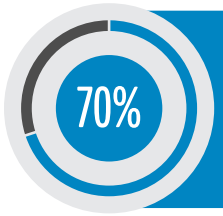
Q. Which best describes your organization's current approach to redesigning technology, policies, and processes for a hybrid workforce?



Source: IDC's Future Enterprise Resiliency and Spending Survey, Wave 6, July 2021. Asia/Pacific n=321
*MPLS stands for Multiprotocol Label Switching; VPN refers to virtual private network.

Workloads@Edge: Powering Innovation at the Edge

Trend: There is a momentous shift underway in the way enterprises leverage software in the digital world order. Across industries, enterprises are transitioning from being consumers of software to producing software themselves as they seek to drive competitive differentiation.



IDC FutureScape Prediction: By 2023, **70%** of industrial organizations will be running software-defined compute and network infrastructure to support information technology (IT), OT, and communication technology (CT) functions at the operational edge.[1]

To maximize the benefits from a software-led approach, it is essential for an enterprise to efficiently deploy and deliver software to the point of usage, no matter where it is in the enterprise's distributed estate.

Opportunity: Rapid acceleration in edge compute deployments enables a diversity of innovative use cases – dynamic workload placement, workload carbon footprint minimization, sensor data processing at edge, more efficient processing of hi-def video streams etc. But realizing these benefits is contingent on the availability of an efficient connectivity and data transport fabric, which content delivery networks (CDNs) are ideally positioned to provide through readily-available mechanisms.

Edge-enabled Solution Benefits: CDNs can be easily configured to support containerized workloads at edge locations to reduce latency and enhance web application performance. But beyond this low-hanging fruit, increasing the programmability of CDN points of presence (POPs) through providing open APIs and software development kits (SDKs) can position the CDN as a preferred conduit to the world of edge computing across communication service providers (CSPs), managed services providers and hyperscalers.

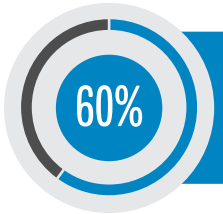
Business Value & Outcome: The enhanced ability to drive innovation through edge compute realization will enable enterprises to:

- Increase execution scale at the edge
- Empower developers
- Build new revenue streams
- Deliver richer customer experience

Source: [1] IDC FutureScape: Worldwide IT/OT Convergence 2021 Predictions - APEJ Implications 2021

Security@Edge: Protecting the Physical-Digital Intersection

Trend: Traditional "edge" environments – manufacturing settings, healthcare facilities, retail outlets, utility grids, hospitality venues, supply chains, cargo and transportation – have been the preserve of purpose-specific OT. The digital revolution, and the increasing digitalization of all aspects of an enterprise's infrastructure estate has progressively pushed IT capabilities to these edges. This has resulted in numerous benefits – remote monitoring and management, increased operational efficiencies, digital twins, advanced robotics, connected augmented workers etc. – to the world of OT-governed infrastructure and assets.



IDC's research finds that within the next couple of years, almost **60%** of Asia/Pacific enterprises will have fully integrated their diverse edge environments into their overall enterprise infrastructure and security management strategy.[1]

Challenge: IT/OT convergence has opened unprepared edge environments to a new set of threat actors that leverage IT enablement to attack OT capabilities, precipitating serious negative real-world outcomes. There has been an acceleration in the number and severity of attacks of this nature in the last couple of years, threatening the value promised by the digital revolution.

Edge-enabled Solution Benefits: Advances in compute capabilities have brought secure processing further into the edge. This can help bring the ability to run complex data analytics (of both IT and OT data streams), machine learning (ML) training and inferencing and intelligent automated decisioning much closer to the data sources, enabling better, faster and locally-secured processing of much more relevant edge data than would be possible otherwise.

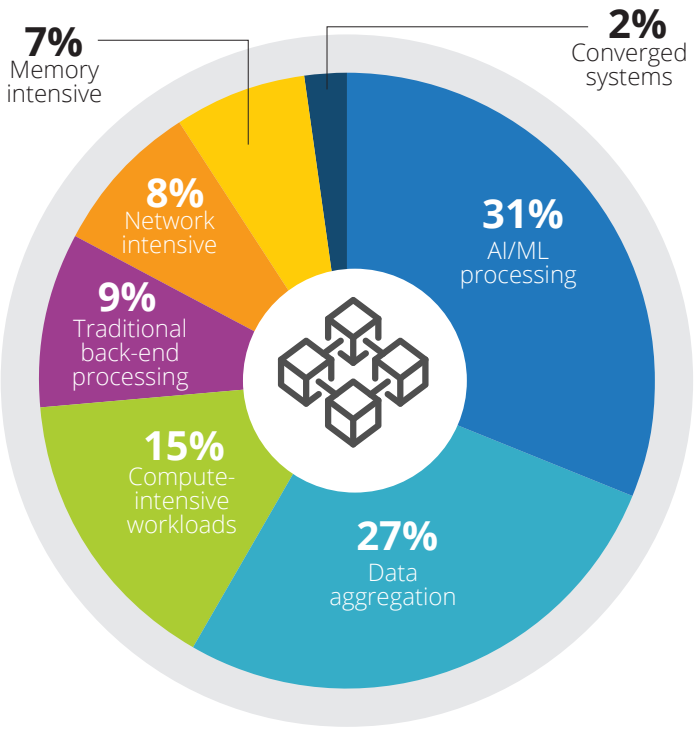
Business Value & Outcome: Edge-driven processing will, ultimately, create a more secure and intelligent edge environment that can deliver on the immense potential and possibilities of the IT/OT integration.

Source: [1] IDC's Asia/Pacific Cloud Pulse Survey 1Q21, n=1150

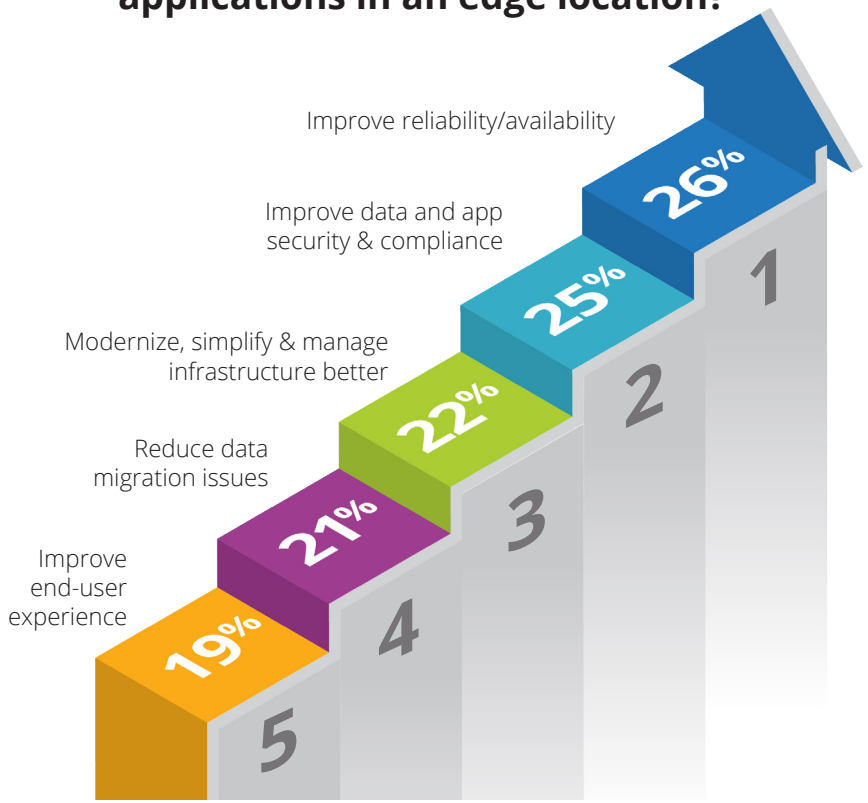
Computing at the Edge Brings Business Value

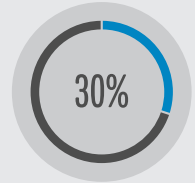
Enterprises in Asia/Pacific are moving a wide range of compute-intensive requirements - AI/ML workloads in particular – to the edge in line with prevailing megatrends, and seeing significant returns on their investment. It is a virtuous cycle: as they trial different workloads and learn more about the edge, the advantages they reap are only encouraging them to look further into edge computing. Those who have yet to prepare for edge computing in the form of hybrid work, edge-related innovative workloads or edge-friendly security will lag significantly behind their peers who are already thinking about the edge in the next 2 years.

Q. Which best describes the workloads deployed in your organization's edge locations?[1]

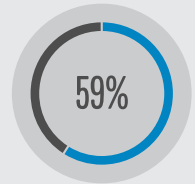


Q. What are the top drivers for placing applications in an edge location?[1]





Within 2 years, over 30% of enterprise IT infrastructure assets are expected to be at edge locations[2]

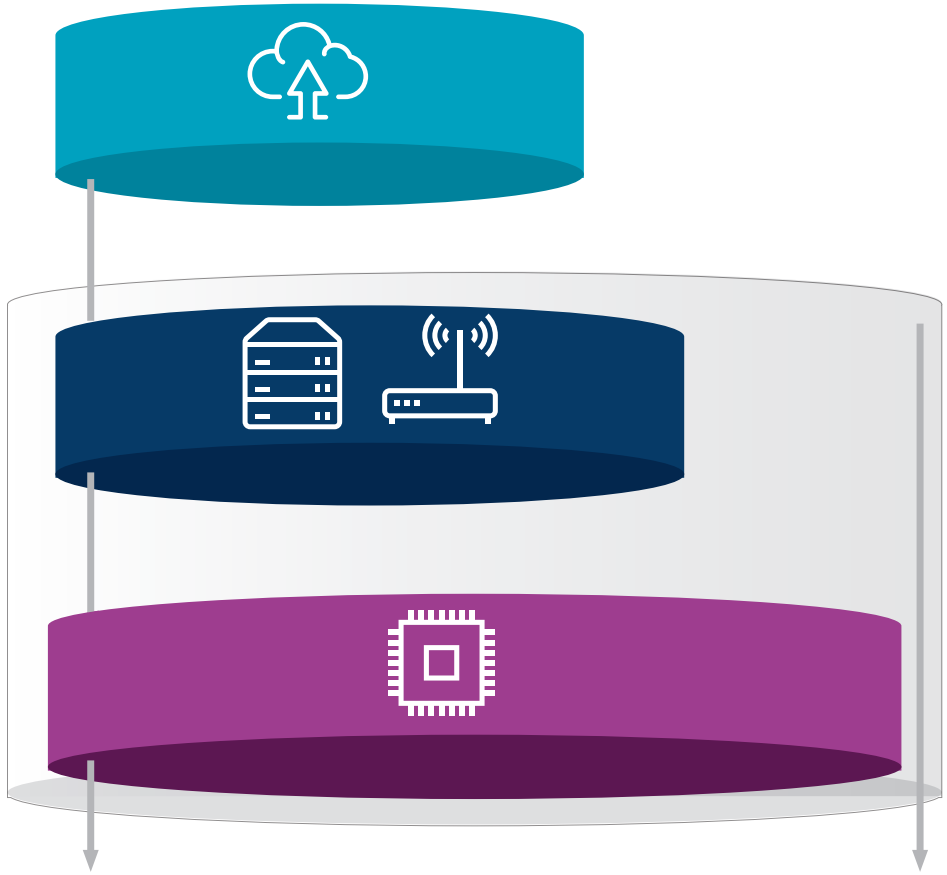


Nearly 6 in 10 (59%) of enterprises in Asia/Pacific plan to integrate edge fully into their cloud infrastructure and management strategy[2]

Source: [1] IDC's Asia/Pacific Cloud Pulse Survey, 1Q21, n=1067; [2] IDC's Asia/Pacific Cloud Pulse Survey, 1Q21, n=1150.

An Architecture Model to Guide Edge Implementation

There is a strong need for an integrated enterprise architecture model to guide enterprises towards realizing the full promise of edge processing. IDC's common enterprise architecture model provides the necessary support for cost, capability, scalability and resilience to tackle common challenges such as the lack of an integrated security and governance framework, or data management issues in a distributed environment.



End-to-end connectivity

INTELLIGENT EDGE

DISTRIBUTED CORE:
Geographically-distributed datacenter facilities, directly linked to on-premises datacenters and to the cloud

DISTRIBUTED EDGE:
Low-power computing platforms with specialized functions such as data acquisition with basic analytics, as well as integrated computing platforms. Some edge computing capabilities are embedded in the endpoint

DISCRETE ENDPOINTS:
Captures data and initiates other actions as a result. Advanced edge computing capabilities are embedded in the endpoint, creating an intelligent edge

IDC's conceptual model for the edge distributes enterprise infrastructure into three distinct tiers – Distributed Core, Distributed Edge and Discrete Endpoints – based on a combination of location, intent and capability.

Enterprises need to plan their edge use case realization by efficiently architecting across the different layers to optimally balance constraints and needs regarding intelligence, connectivity, data volume, security, and latency.

Source: IDC's Worldwide Core and Edge Computing Platforms Taxonomy, 2020, Doc #US46054020, March 2020

Challenges to Overcome When Devising an Edge Strategy

While there is strong enterprise momentum and interest in leveraging the edge to drive a transformational agenda and competitive differentiation, there are challenges to address whether they are looking to succeed at Workforce@Edge, Workloads@Edge, or Security@Edge.

Q. What are the top challenges your organization needs to overcome to enable efficient remote monitoring of your distributed operations?

- Lack of an integrated security and governance framework
- Data management and data quality issues across a distributed environment
- Lack of the necessary technology infrastructure at the edge
- Siloed operations that inhibit seamless integration and automation
- Cost management and financial constraints

Source: IDC's Asia/Pacific Cloud Pulse Survey, 1Q21, n=1067

Easing into the Edge: A Roadmap

Enterprises can start their edge journey with small steps. They can begin by leveraging the edge implementations for basic data aggregation for simple analyses, graduating progressively to increasingly complex edge computing capabilities as their maturity increases. Demands for capability convergence, infrastructure agility and performance grow with each step, as do the progressive value and benefits realized.

Descriptive

- Data processing in cloud and corporate datacenters
- Basic data analysis (uptime, heartbeat etc.)
- Edge functionality limited to data collection, filtering
- Value: low

Reactive

- Data processing in cloud and corporate datacenters
- More advanced data analysis that triggers actions based on a finite number of pre-determined scenarios to promote desirable outcomes
- Basic data analytics, pre-programmed reactions at edge
- Value: medium

Proactive

- Data processing in cloud, corporate datacenters, and at the edge
- Complex analysis: AI/ML technology analyzes data in real time and responds proactively to optimize pre-determined business outcomes
- Significant AI/ML inferencing executed at the edge
- Value: high

Predictive

- Data processing in cloud, corporate datacenters, and at the edge
- Very complex data analysis: AI/ML technology analyzes data in real time and automatically regulates actions on-premises, in the cloud, and at the edge 24 x 7 to optimize business outcomes
- Full AI/ML inferencing executed at the edge
- Value: ultimate

Key Considerations for an Edge Transformation Journey

IDC has the following recommendations for enterprises embarking on or enhancing their edge transformation journey:

1. Envision

Envision your edge-powered future as defined by your technological, organizational and market context

Key Considerations:

- Relevant tech and market megatrends
- Decide on use cases leveraging the megatrends
- Desired edge capabilities to realize these use cases

2. Evaluate

Evaluate architectural constructs, technology choices and vendor options that best support your vision for the future

Key Considerations:

- Enterprise architecture models incorporating edge
- Edge technologies that fit into your preferred architecture
- Edge-focused tech partner that can effectively guide and execute your edge vision

3. Establish

Work with your edge tech partner to establish comprehensive business, operational and technology objectives to guide your edge journey

Key Considerations:

- Crystallize edge innovation vision and roadmap
- Define key business and financial success metrics
- Identify key operational parameters and SLAs to track progress

4. Evolve

Continually evolve your edge compute capabilities to derive progressively greater value at the edge

Key Considerations:

- Edge platform evolution and enhancement
- Reallocation of capabilities across the edge stack
- Edge ecosystem strengthening

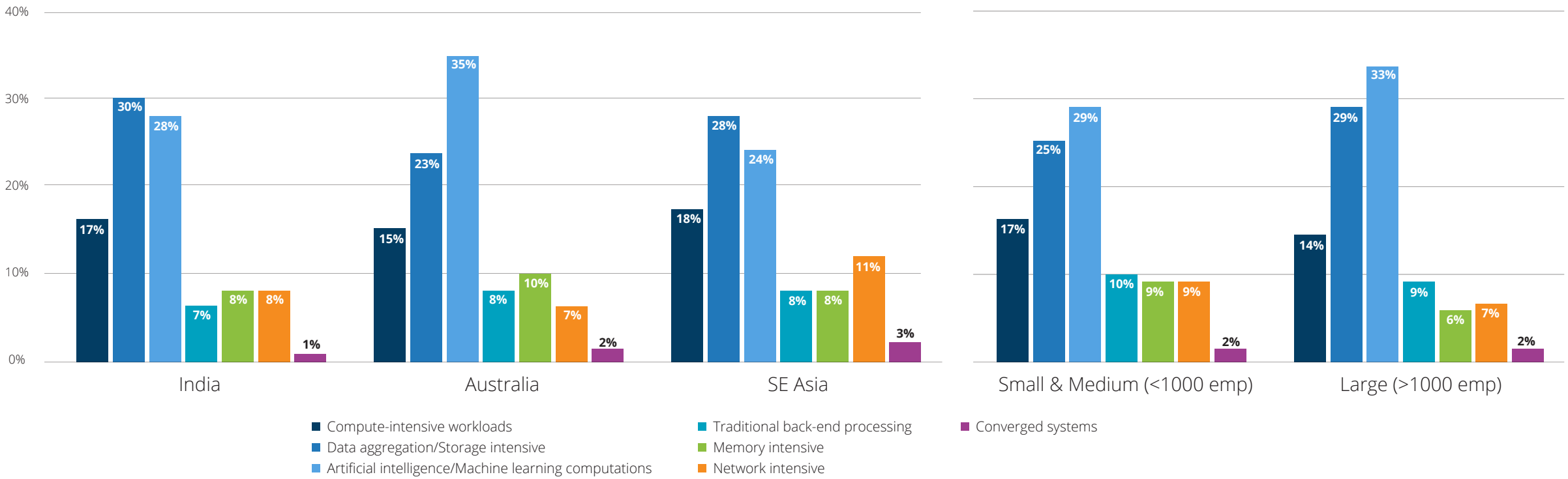
Edge Compute Adoption Trends by Country and Enterprise Size

AI/ML computations are among the most popular workloads deployed at the edge, across countries and enterprise size segments.

In general, large enterprises have more ambitious compute and data processing requirements at the edge

Australia is furthest along in the Asia/Pacific region in terms of compute-intensive workload deployments at the edge

Q. Which best describes the workloads deployed in your organization's edge locations?

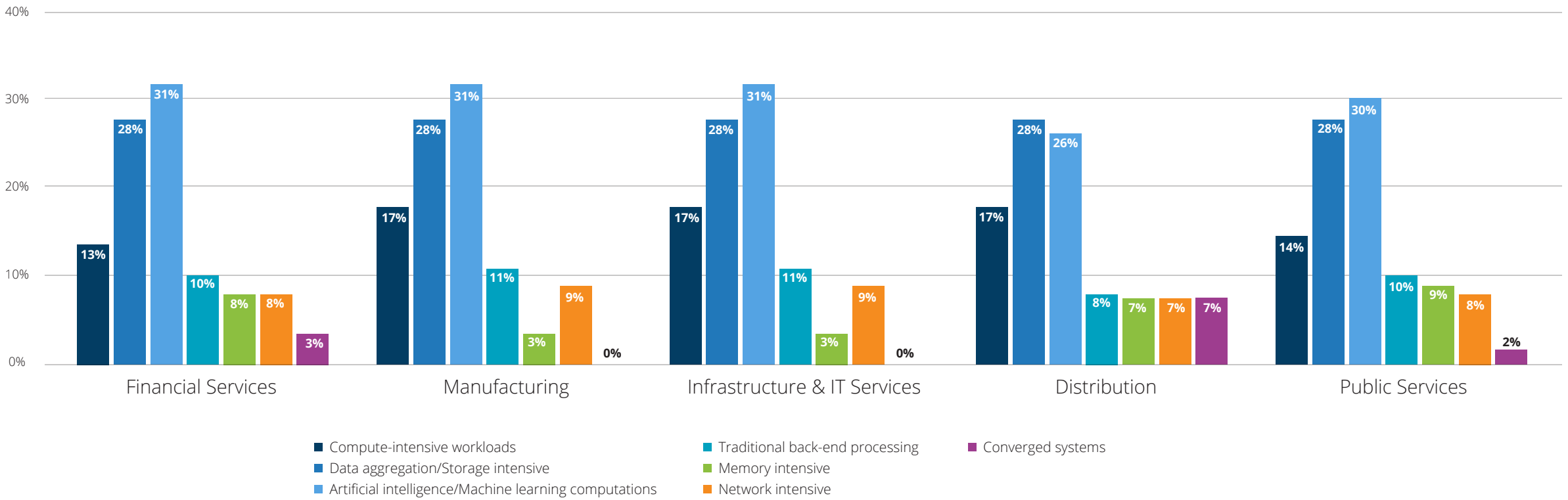


Source: IDC's Asia/Pacific Cloud Pulse Survey, 1Q21, n = 1067

Edge Compute Adoption Trends by Industry

There is very strong momentum towards compute and data processing-centric edge workloads across industries, with interest strongest in Financial Services, Manufacturing, and Infrastructure & IT Services verticals. AI/ML workloads are expected to be almost universally the most popular workloads at the edge within the next two years across industries.

Q. Which best describes the workloads deployed in your organization's edge locations?



Source: IDC's Asia/Pacific Cloud Pulse Survey, 1Q21, n = 1067

Message from the Sponsor

Extending reach to the edge for a digital-first world

The digital boom has resulted in organizations across industries in the Asia Pacific region adopting edge-enabled technology. This has helped improve reliability, drive innovation, build new revenue streams, and bring business value in this digital-first world.

Akamai, a leader in securing and delivering digital experiences to the most innovative companies worldwide, commissioned IDC, a global market intelligence firm, to identify the value of an edge architecture and the benefits that computing at the edge can bring to businesses. To learn more about how Akamai partners with global brands to power and protect life online, visit **www.akamai.com**, **blogs.akamai.com**, or follow Akamai on Twitter and LinkedIn.

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