The essential guide to implementing edge computing in Asia-Pacific

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CHAPTER 1

Introduction

Understand edge computing trends
and applications in Asia-Pacific.
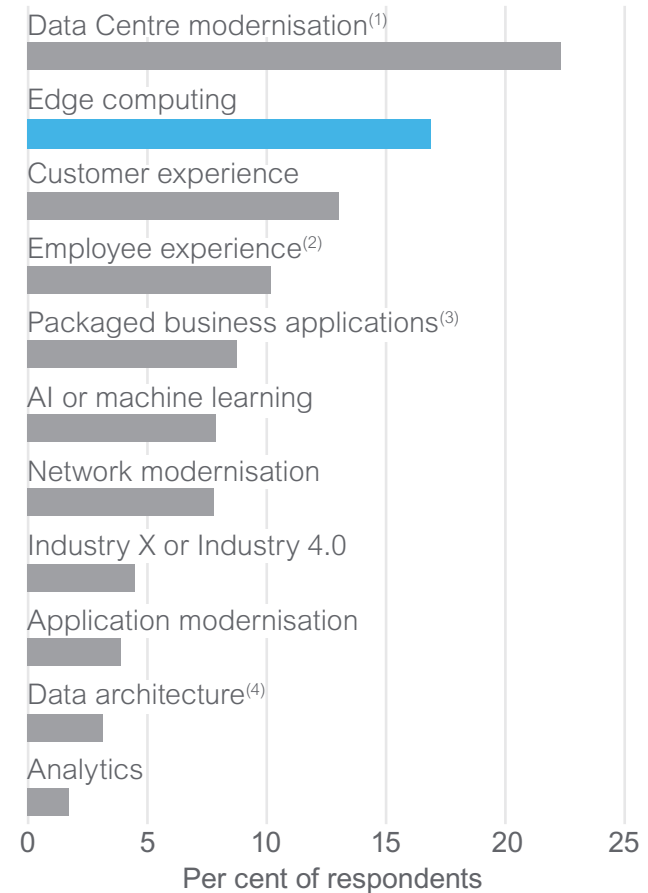
Introduction

Industries across the Asia-Pacific region are accelerating their drive towards improved operational efficiencies, more interactive and digitised customer experiences, Industry 4.0, and a pandemic-influenced increase in work place remote access. A key solution enabling this digitization is edge computing, which is becoming an important component in an organisation's next-generation hybrid IT infrastructure. Edge computing is an IT deployment designed to put applications and data as close as possible to the users or things that need them.

A recent Tech Research Asia (TRA) survey indicates that **51 per cent** of IT professionals in the Asia-Pacific region have already begun embracing a hybrid IT approach, mixing edge computing, public cloud, and on-premises infrastructure. In addition, most countries are taking a workload-by-workload approach to hybrid IT. This means applications are evaluated to determine which aspect of the hybrid model is the best fit to address business needs.

- Traditional on-premises data centres

- Cloud computing, characterised by outsourced off-premises massive compute and storage that provides access to big data

- Distributed edge data centres, with smaller compute and storage assets located near to where the data is being consumed to help overcome latency delays

These new hybrid IT architecture environments require that end users understand hardware and software aspects of their technology implementations and that they select and assemble the right ecosystem of partners for both designing, deploying, and supporting the hybrid solutions.

Most urgent projects next 12 months

Data Centre modernisation[1]

Edge computing

Customer experience

Employee experience[2]

Packaged business applications[3]

AI or machine learning

Network modernisation

Industry X or Industry 4.0

Application modernisation

Data architecture[4]

Analytics

0   5   10   15   20   25

Per cent of respondents

(1) Or cloud computing   (3) Examples: ERP, CRM, HR, etc.
(2) Or workplace strategy   (4) Or data management

Understanding edge computing

In the Asia-Pacific region, **28 per cent** of IT professionals have already deployed multiple edge sites and an additional **38 per cent** are planning to implement edge projects soon. Because edge computing environments are more diverse than traditional IT systems, they require a subset of ecosystems to support the hybrid architecture.

Traditionally, diverse pockets of network closets hosted communications switches in office buildings. These early versions of distributed edge systems have now evolved into powerful but compact micro data centres. These systems have moved beyond office buildings and are now found in retail locations, manufacturing sites, warehouses, and healthcare clinics. For end users, these new edge computing solutions address the need for critical computing in remote locations, higher degrees of physical security, and space savings in facilities already crowded with either devices, people, or business supplies.

What is your organisations' current approach to edge computing?

- ■ We have multiple edge computing sites deployed already and are familiar with this approach
- ■ We are new to edge computing and understand the concept
- ■ We are familiar with edge computing but it doesn't apply to our organisation
- ■ We know what it is, but haven't evaluated it yet
- ■ We have heard of it but are unsure how it relates to us
- ■ We haven't heard of it
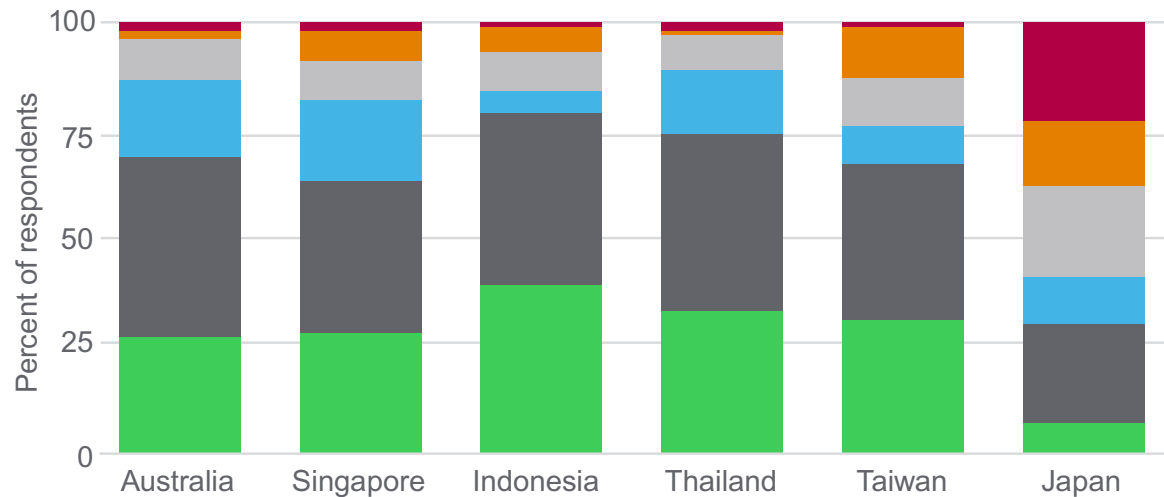
CHAPTER 2

Requirements evaluation

Evaluate edge computing systems for specific business needs and applications.

Diverse edge application environments require due diligence

Edge systems can address a wide swath of both traditional and new application areas that can include connected cars, augmented reality, video analytics, machine learning, and an almost infinite variety of Internet of Things (IoT)-related processes. Common elements among all of these is the need for a solution that can limit latency and that can reduce data transfer bandwidth costs.

When evaluating how edge systems can help address the needs of a particular application environment, the process should not only determine if the proposed system fulfills the core basic need of local compute power. It should also focus on important considerations such as security, systems availability, system performance, and manageability.
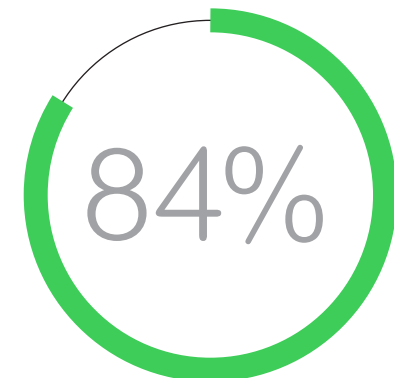
Internal IT teams and vendors need to perform due diligence and fully evaluate needs for the potential implementation of an edge system.

Requirements evaluation

Operational cost improvement

84%
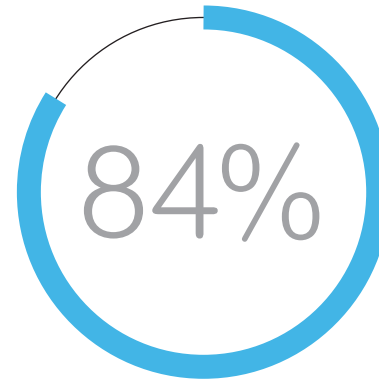
of survey respondents recorded improvements in reducing operational costs up to 25% (across all countries)

IT cost improvement

84%

of survey respondents recorded improvements in reducing IT costs up to 25% (across all countries)

The benefits of edge computing

The ultimate goal of deploying edge systems is to improve the user experience of both internal staff and of customers who choose to use digital tools to conduct business. In the Asia-Pacific region, bandwidth (**29 per cent**), cost performance (**28 per cent**), and latency (**17 per cent**) represent the top reasons for deploying edge systems. Learn how these major drivers represent business advantages.

- **Latency reduction** – The migration of IT systems to the edge requires a rethinking of the IT support infrastructure. The implication is that compute and storage is now found near a hospital bed, a jet engine, or on a factory floor. The edge becomes a place where real-time decisions are made, and, under such circumstances, latency is not tolerated.

- **Fewer bandwidth constraints** – Internet use is trending towards bandwidth-intensive content and an increasing number of attached smart devices. Edge computing brings bandwidth-intensive content and latency-sensitive applications closer to the user or data source.

- **Better cost control** – When deploying edge implementations, stakeholders can realize CAPEX efficiency gains on the front end. For instance, existing buildings often have spare power capacity to support edge micro data centres both from both a utility and emergency generator power perspective. In other words, micro data centres can use the "sunk costs" in facility power (e.g., switchgear), cooling (e.g., chillers), and core and shell construction, making it less capital intensive than a typical data centre. A lean design also lowers OPEX as the asset matures. In addition to lower bandwidth costs due to local data being processed on site, over the long term, edge systems are typically scalable. In addition to lower bandwidth costs because local data is processed on site, edge systems are typically scalable over the long term.

Requirements evaluation

Top 4 reasons for choosing edge computing
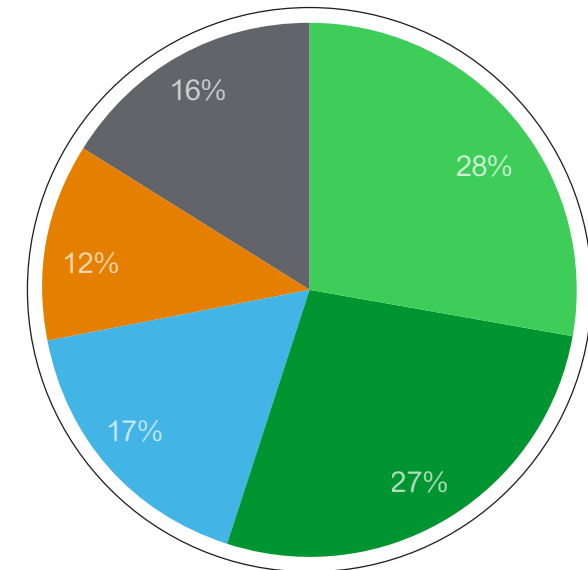
- Overcome bandwidth issues
- Less expensive approach
- Manage latency issues at site(s)
- To manage security issues
- Other issues

The benefits of edge computing

- **Robust security** – For an IT environment at the edge, it is recommended that the physical access to the IT system be limited to a minimal number of authorized personnel. These should be the people who are managing/working on the IT and physical infrastructure equipment within the room. Insufficient physical security can lead to increased cyber security risks as well.

- **Higher availability** – The "always on" mindset of the data centre is now migrating to edge environments. Predictive maintenance, analytics, and new levels of insight allow data centre and edge stakeholders to be more risk averse and to minimize the physical infrastructure required to support applications. If a battery or component within an Uninterruptible Power Supply (UPS) gets replaced before it fails, for example, multiple levels of redundancy may not need to be built in. New, more affordable software tools provide a solid backbone for higher availability at the edge.

- **Improved systems resilience** – Besides the ability to scale as needed and the reduction of computing latency, edge systems help to improve resiliency. Since computing power is spread out instead of residing in central location, the risk of all systems being affected by a single point of failure is greatly diminished.

Requirements evaluation

Top 10 questions for evaluating an edge computing system

1. Does our current application require a large volume and frequency of data transmission?

2. What are the real-time requirements of our application users?

3. What physical security precautions are needed to protect the system?

4. What physical form factor works best in our environment from a space savings perspective?

5. What sensors (e.g., temperature, humidity, vibration) will be required to assure maximum uptime?

6. What type of power protection will be required to assure systems resiliency?

7. Is precision temperature control required to maintain application uptime?

8. If we plan to roll out multiple edge deployments, do we have IT expertise on site to support those locations?

9. Will our edge system be placed in a harsh environment and require ruggedized components?

10. How can we check the status of all our remote critical infrastructure devices or sites?

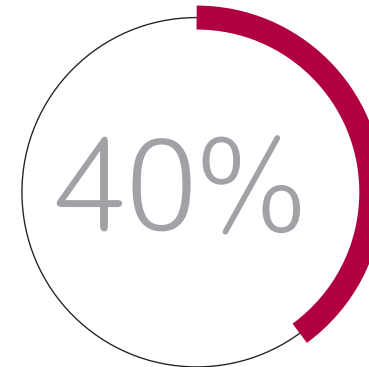# Analysing Asia-Pacific region edge activity

Schneider Electric [working with Tech Research Asia (TRA) analyst group] studied edge computing adoption rates across 10 countries in Asia-Pacific through a survey of over 1,100 organisations. The survey targeted five key industry segments (manufacturing, healthcare, retail, education, and finance and insurance) that are currently active in implementing both edge and cloud computing. Here is a sample of what was learned.

Japan

- Japanese respondents are the most conservative regarding edge computing. Significant work is required to educate and convince the market of edge computing viability.

- For those who use edge computing, the most popular use cases are improved employee experience (**40 per cent**), better customer experience (**30 per cent**), and remote monitoring (**7 per cent**).

- Key edge computing benefits were better customer experience (median of **10 per cent improvement**), reduced operational costs (median of **5 per cent improvement**), and reduced IT costs (median of **5 per cent improvement**).

Australia

- **27 per cent** of Australian respondents have already deployed multiple edge computing sites. However, while there is a hybrid IT push, the number of new edge computing sites will remain modest.

- Popular edge use cases include improved employee experience (**32.8 per cent**), enhanced customer experience (**27.7 per cent**), and asset monitoring, (**16.8 per cent**).

- Key edge computing benefits were reduced IT costs (median of **7 per cent improvement**), reduced operational costs (median of **10 per cent improvement**), and better customer experience (median of **9 per cent improvement**).

Requirements evaluation

40%

of Japanese respondents using edge computing say employee experience is their top use case.

33%
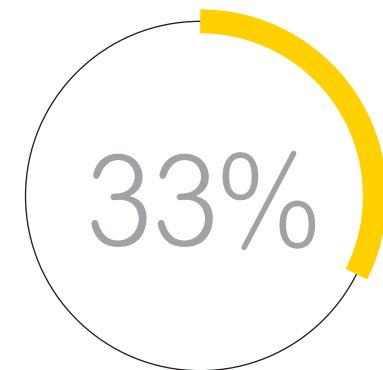
of Australian respondents using edge computing list enhanced customer experience as their top use case.

# Analysing Asia-Pacific region edge activity

Indonesia

- **50 per cent** of Indonesian organizations listed data centre modernisation and cloud computing as the highest priorities.

- Although edge computing is third on the priority list, **79 per cent** of organisations are already deploying edge solutions or understand edge computing concepts. The prevalence of legacy on-premises computing may be a factor. Many are pursuing modern projects with edge solutions.

- Popular edge computing use cases include better customer experience (**38 per cent**), improved employee experience (**12 per cent**), and CCTV monitoring (**8 per cent**) but monitoring is **9 per cent**.

- Benefits from edge deployments include reduced IT costs (median of **9 per cent improvement**), lower operational costs (median of **10 per cent**

improvement), and better customer experiences (median of **12 per cent improvement**).

Thailand

- Thai organisations expect an uptick in edge computing deployment over the next 24 months. Bandwidth challenges are driving edge computing approaches, especially for customer experience projects.

- Popular use cases are better customer experience (**48.1 per cent**) and improved employee experience (**15.2 per cent**). Monitoring and occupational health and safety round out the top uses (**5 per cent** for each).

- Benefits include reduced IT costs (median of **9 per cent improvement**), reduced operational costs (median of **8 per cent improvement**), and enhanced customer experience (median of **10 per cent improvement**).

In summary, rising edge adoption rates, innovative use cases, and growing recognition of edge computing benefits across the region are all resulting in a changing buyer's journey.

79%
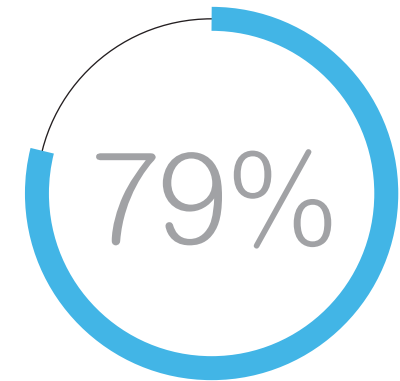
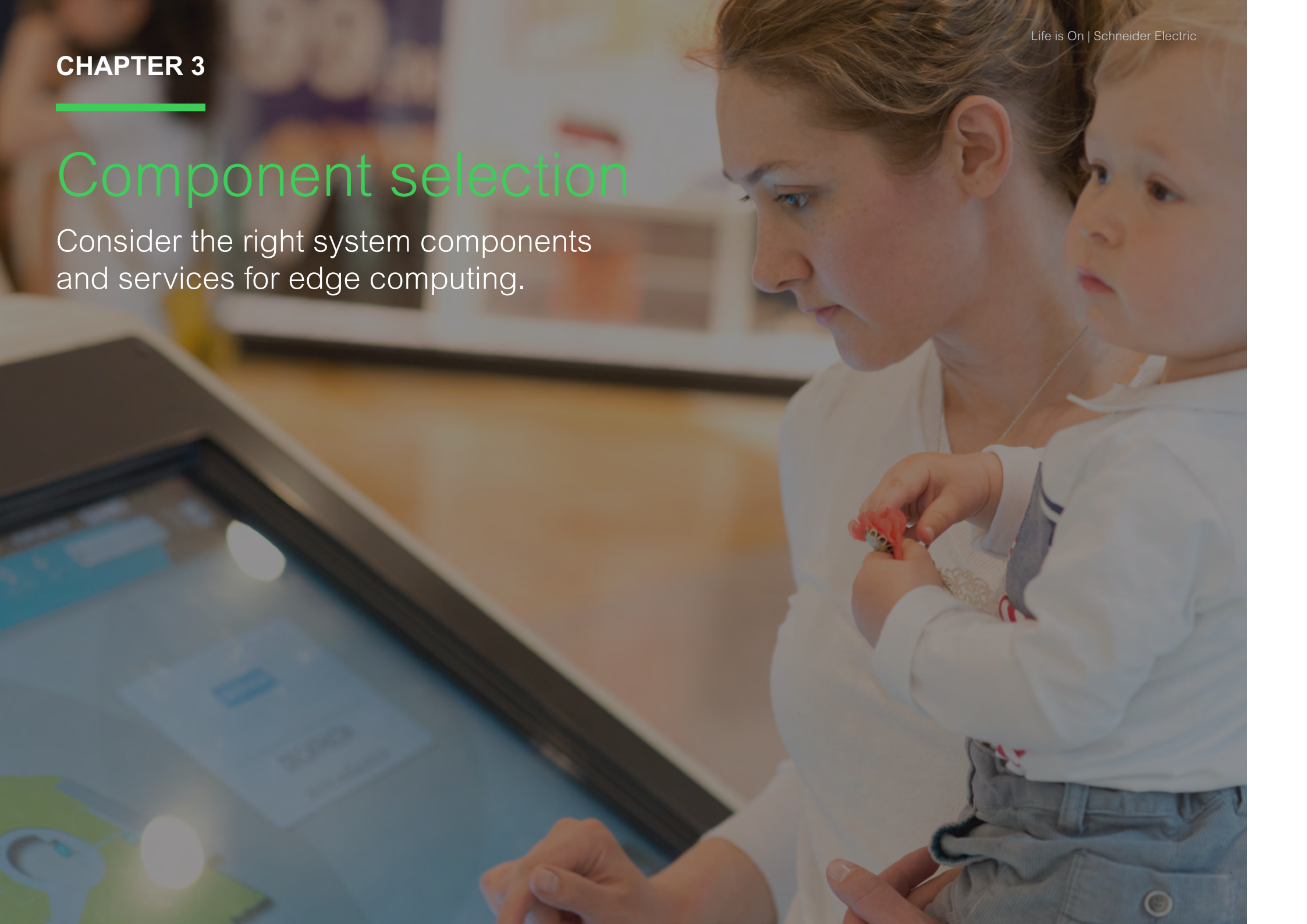of respondents in Indonesia are already deploying or understand edge solutions.

61%
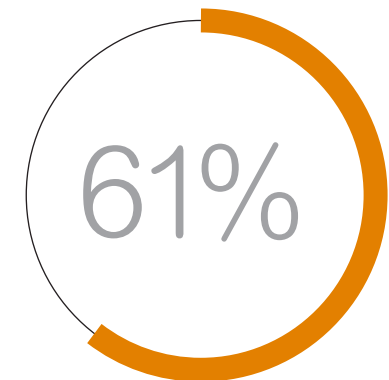
Thai respondents cite better customer experience as a top use case of edge computing.

CHAPTER 3

Component selection

Consider the right system components
and services for edge computing.

Selecting the proper system components

Whether point products, integrated appliances, or fully integrated and managed systems, Asia-Pacific organisations are deploying edge systems in different ways across countries and industries. **41 per cent** of implementations are one rack of IT equipment that is integrated either internally or by a business partner and **32 per cent** of implementations are a single appliance that has been pre-integrated to run in a server room. Here are some best practises regarding edge hardware, software, management services, and maintenance services components.

Management software – Most organisations lack the budget or bandwidth for onsite or internal staff to support single or multiple site edge systems. When evaluating and selecting remote management systems for edge environments, determine if the proposed system fulfills core basic needs and consider what might happen if you DON'T have a particular functionality, such as systems support, in place. When the management system enables remote monitoring, enlist third parties to cost effectively support multiple edge computing locations. Not all edge management solutions are created equal.

Certain characteristics make the management solution easier and less costly to implement. These include solutions that run in the cloud and that open the door to a range of edge system performance benefits. For instance, consistent cybersecurity patch updates, hassle-free maintenance, robust analytics, benchmarking, and systems infrastructure health assessments make a difference.

Micro data centres – Edge systems often use a mixture of various parts and pieces that can make it difficult for an end user to manage and support. Some solution providers integrate the systems prior to end-user delivery. In many cases, micro data centres come with pre-loaded management software and pre-configured, pretested, and integrated IT and power, cooling, and rack components. It is now possible to deliver a micro data centre to a site where no one has any IT experience and have it run by itself. The micro data centre arrives ready to go. The many hardware and software parts work together well, and any person working at the site simply pushes the "on" button.

Micro data centre

Selecting the proper system components

Maintenance support services – Minimizing downtime is critical in edge computing environments. If equipped with the proper software, you can monitor edge systems components for anomalies (such as excessive heat or humidity) and provide maintenance teams with early, predictive warnings of potential problems. Field service representatives and partners can be automatically dispatched if the need arises for repairs or scheduled maintenance. This permits fast proactive responses to issues and improves overall systems uptime. Schneider Electric with its own dedicated Network Operations Centres (NOCs) can remotely monitor edge micro data centres globally on a 24x7 basis.

Standardization during rollouts – For organisations that plan to launch edge technologies across multiple countries in the region, a standard solution will simplify the process of deployment. The edge solution vendors' supply chain must support consistency in technology rollouts. Delivering a consistent offering across geographies saves support costs while boosting uptime through fast problem resolution.

**Physical security** – When edge IT equipment is placed in a common space (i.e. a plant floor, a retail storefront, a hospital nursing station), protection is compromised in versus placement in a dedicated secure room. People can access and touch the IT equipment, leading to malicious or accidental downtime. It is crucial to lock the IT enclosure housing the equipment, limiting access. Place equipment in an inconspicuous location, with security camera coverage, even in the case of locked enclosures. Since the rack is now in a foreign environment, configure the enclosure with dry contacts so you are alerted whenever the doors open. A wall-mounted enclosure placed high on the wall adds a level of protection making it hard for a person with malicious intent to easily reach it.

Engaging the right partners

1. As vendors migrate from delivering dedicated system solutions to delivering converged end-to-end experiences required in edge environments, collaboration and partnership among multiple vendors emerges as a critical success factor. Edge system end users work with many partners who help users select, configure, deliver, install, and support these systems. Asia-Pacific users initially turn to digital transformation specialists (**26 per cent**), consulting companies (**18 per cent**) and cloud and infrastructure specialists (**16 per cent**) to launch edge computing projects.

2. Once a study of business and application requirements determine that an edge solution is suitable, the ecosystem of partners expands. These include converged IT hardware vendors, physical infrastructure vendors that provide racks, power and cooling, systems and application software vendors, and systems integrators that make it all work together. This collaboration certifies a targeted level of interoperability to reduce design, deployment, and management time. This allows for a broad solution that works and that can be brought to market faster. In edge implementations, you need expertise across a wide swath of disciplines including hardware, software, integration, installation, and support.

3. The ecosystem of partners extends to post-installation support in several ways. The right partners can provide a standardized approach for monitoring and maintaining the equipment across multiple sites. Support is designed in a way that assumes that no on-site technical assistance and support is available and ensures the right equipment is deployed, the right management tools exist, and the right operations/maintenance protocols are established.

Which type of providers are you engaging for your edge computing approach?
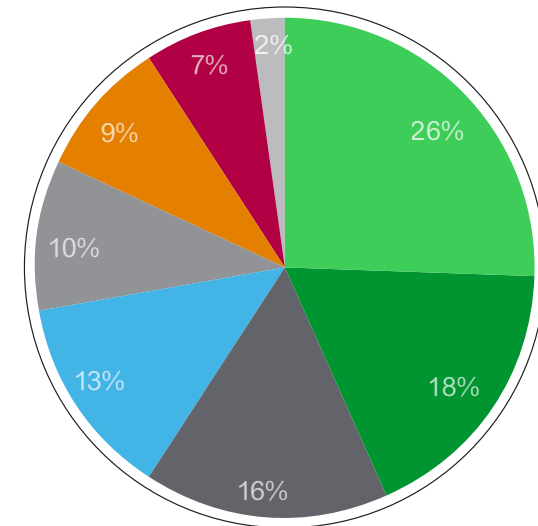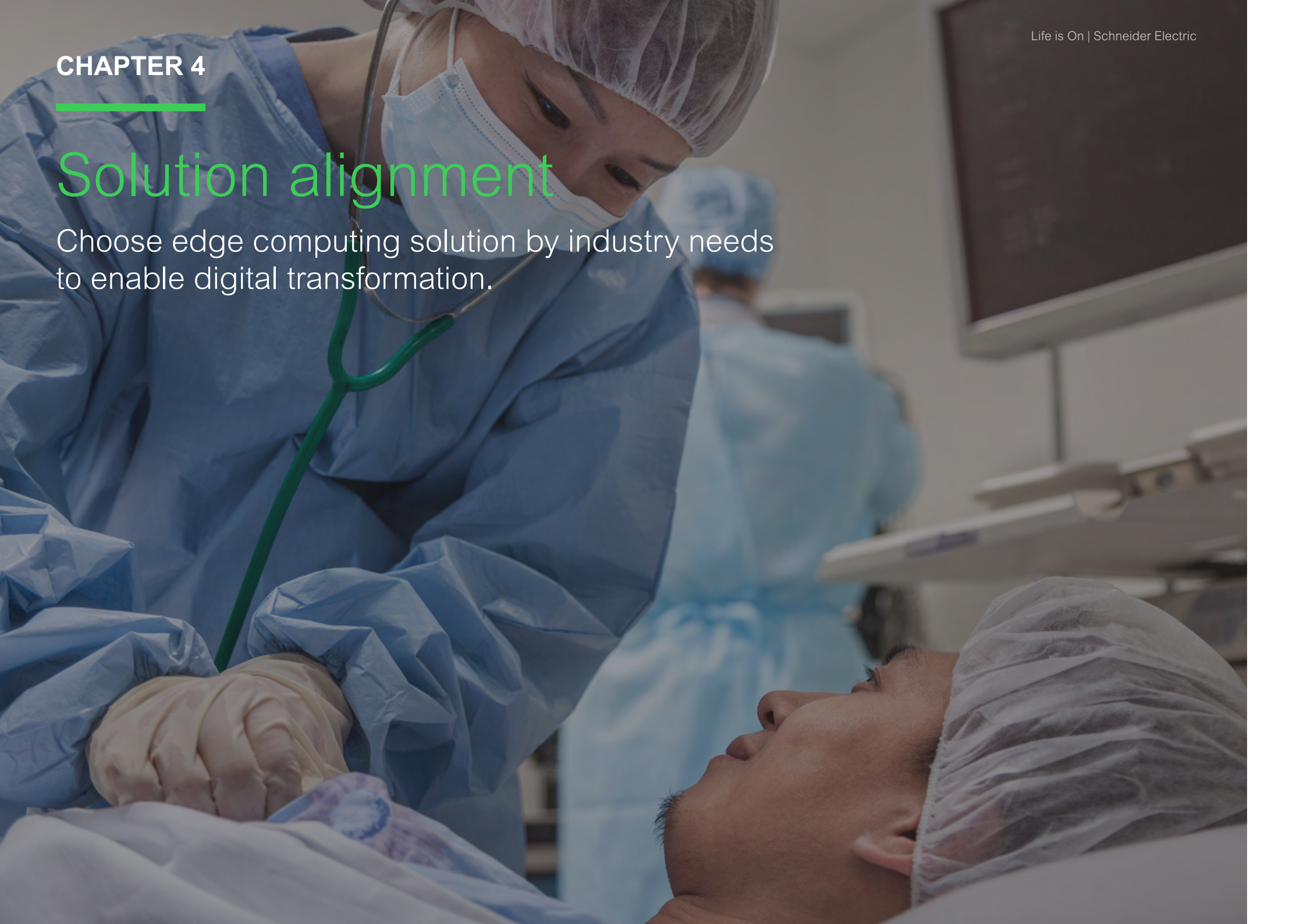

- A digital transformation specialist
- A consulting company
- Cloud and infrastructure specialists
- An 'IoT' specialist
- An existing system integrator or reseller
- Vendors
- New system integrators or resellers
- We don't. We do it ourselves

CHAPTER 4

Solution alignment

Choose edge computing solution by industry needs
to enable digital transformation.

Aligning edge solutions to unique business needs

Organisations in virtually every industry segment are undergoing a digital transformation to either protect their marketplace position or to expand their markets and create a competitive advantage. Hybrid IT environments that revisit the distribution of on-premises, cloud, and edge IT assets play an important role in expanding the flexibility of resources so that overall customer experience can be simplified and amplified. Learn how edge IT assets are being deployed to support key industry segments.

Water corporation in Australia
Helping water stakeholders to manage their operational uptime needs efficiently with edge power protection and digital remote monitoring tools is a great step towards ensuring water supply quality and safety. When an audit of water treatment plants, pumping stations, desalination plants, and office edge computing sites revealed power-related operational continuity risks, both centralized and distributed network uninterruptible power supplies (UPS) with communication cards were brought in to provide power protection. These connectivity-enabled devices also allow remote power network monitoring and reporting to identify potential issues before they presented an underlying risk to the operation. After a series of successful initial pilot sites, the organisation expanded the hardware upgrades statewide in order to allow further remote monitoring of operations.

Aligning edge solutions to unique business needs

Transport in Taiwan

Overseers of a major highway system in Taiwan decided to implement edge computing solutions in order to better support citizens and tourists traveling the highway. Their solution consisted of 10 prefab computing stations spread along the highway. These systems link with telecom fibre connections and other subsystems for the purposes of light control, emergency rescue, and security. These distributed edge stations enhance the resiliency of the systems that support the highway by avoiding a single point of failure scenario should an emergency occur. The distributed edge systems also respond more quickly to traffic control issues than the traditional centrally-based control system. The edge systems are installed and maintained via a third-party partner in order to better control costs and to accelerate issue response.

Aligning edge solutions to unique business needs

Aged care in New Zealand

As a result of the COVID-19 pandemic, forward-looking healthcare organisations, as part of their resilience strategy, have shifted to edge solutions to help them rapidly adapt to remote management requirements of staff and patients.

One New Zealand residential aged care provider, in an effort to modernize its network of uninterruptible power supply (UPS) systems, added network cards to these distributed systems that were located across their various retirement village sites. By adding these network cards, resident record data, including clinical information which is now digital, is nowpower protected in each of the remote server rooms. In addition, cloud-based software provides management and monitoring capabilities, enabling generation of pro-active alerts whenever any issues pertaining to UPS performance, battery life,or room temperature control arise.
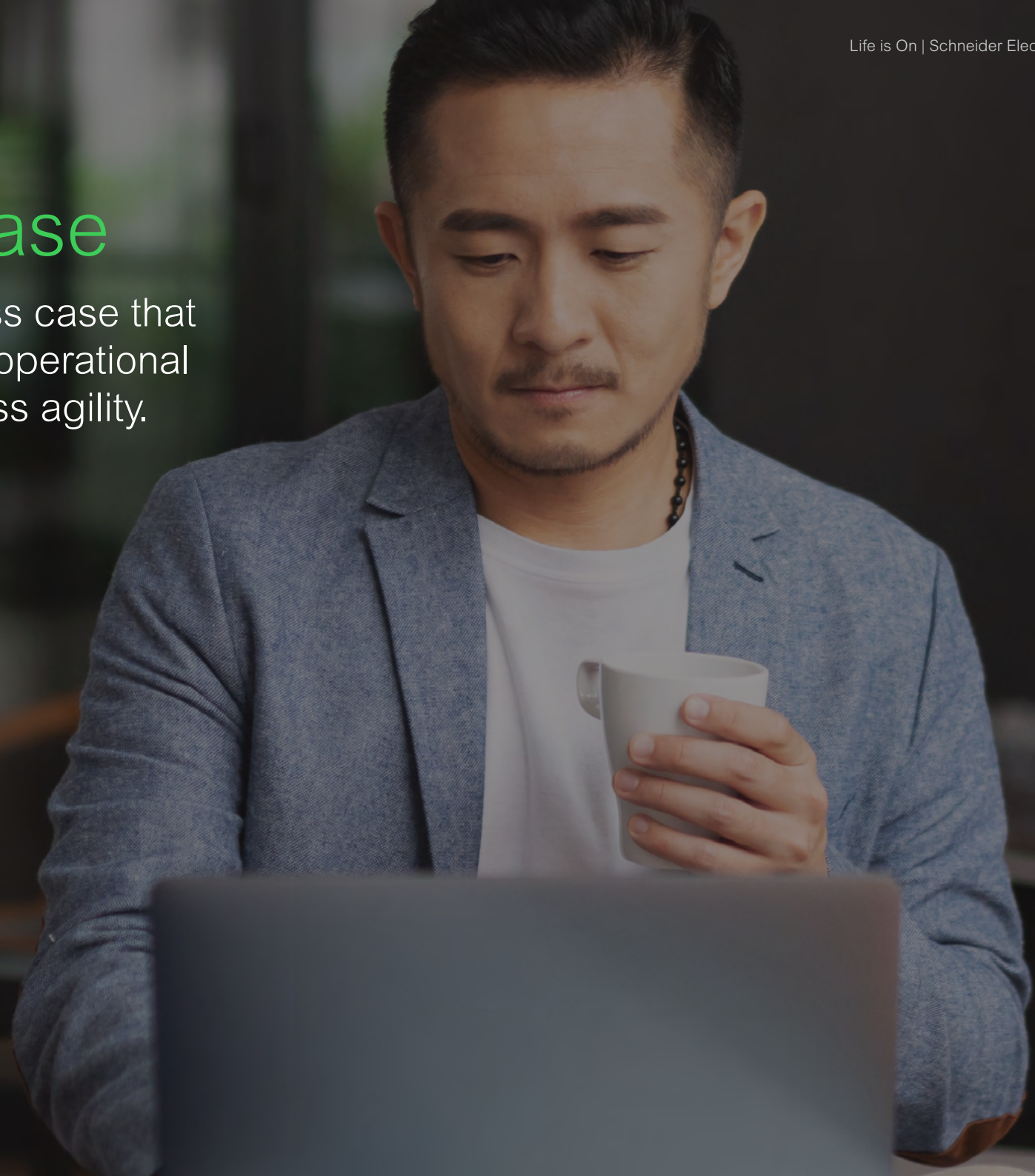
Not only has the solution delivered better uptime and highly reliable power protection, it has improved the comfort and care of residents by managing heating and improving the efficiency and reliability of the nurse call system.
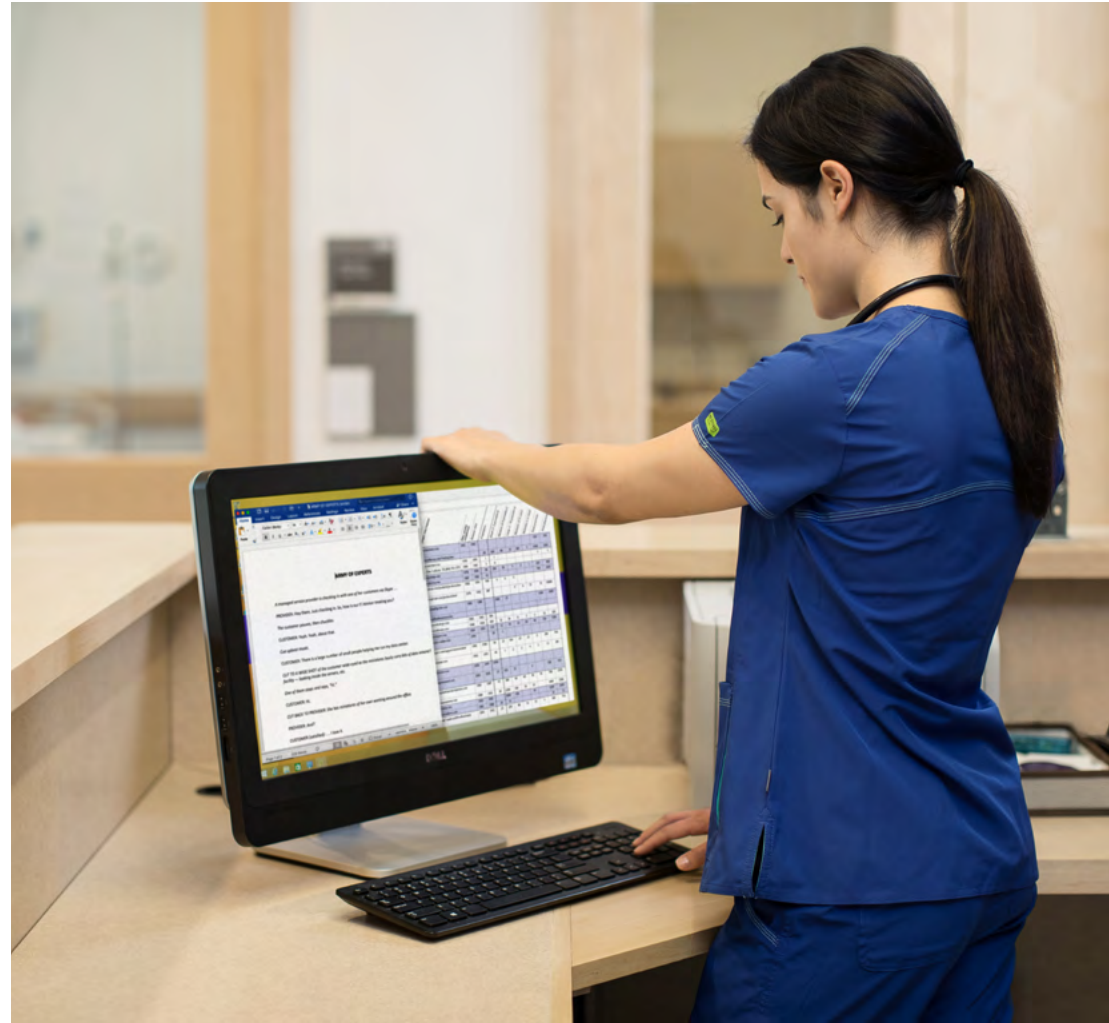
CHAPTER 5

Business case

Build a strong business case that emphasizes benefits, operational efficiency, and business agility.

Business case

Building a proper business case

A critical success factor for gaining support of funding for edge computing projects is the ability of IT personnel to communicate the functions of new technologies into terms that reflect business value. Improved edge operational efficiency, capacity, and connectivity have to translate into a language that reflects cost reduction, faster turnover, and higher return on investment.

When selling edge computing innovation to business executives, emphasise three key points.

1. Highlight the practical business benefits of the technology or process improvement being proposed. For example, in a healthcare scenario, benefits such as improved reliability, traceability, and risk reduction will emerge as key hot buttons.

2. In the case of physical infrastructure systems such as power and cooling, and the ability to remotely manage these systems, explain the side benefits of how innovations that improve operational efficiency also drive sustainability.

When management systems control the amount of power consumed, for example, costs are reduced, and CO_2 emissions go down, thereby enhancing competitive advantage and boosting public image.

3. Emphasise that deploying innovation is not a one-time, one project benefit and discuss future improvement potential. That is, discuss the long-term benefits of scalable edge architectures that offer the agility to quickly grow when fast-moving business expansion opportunities present themselves.

Business sponsors will be looking for information that communicates how business risks (like downtime) can be reduced. They are also eager to size the number of resources required to support the new technology and are interested in any metrics that can show return on investment. Tools such as Schneider Electric's edge fleet management comparison calculator help to support of such cost justification exercises.

Improved edge operational efficiency, capacity, and connectivity have to translate into a language that reflects cost reduction, faster turnover, and higher return on investment.

Business case

Overcoming barriers to implementation

In the Asia-Pacific region, there are numerous potential barriers that served to slow down edge deployments. The top three reasons for delaying edge implementation included too many resources consumed in the task of moving apps and data to the cloud (**22 per cent**), no current need for edge technology (**17 per cent**), and perceived high expense (**15 per cent**).
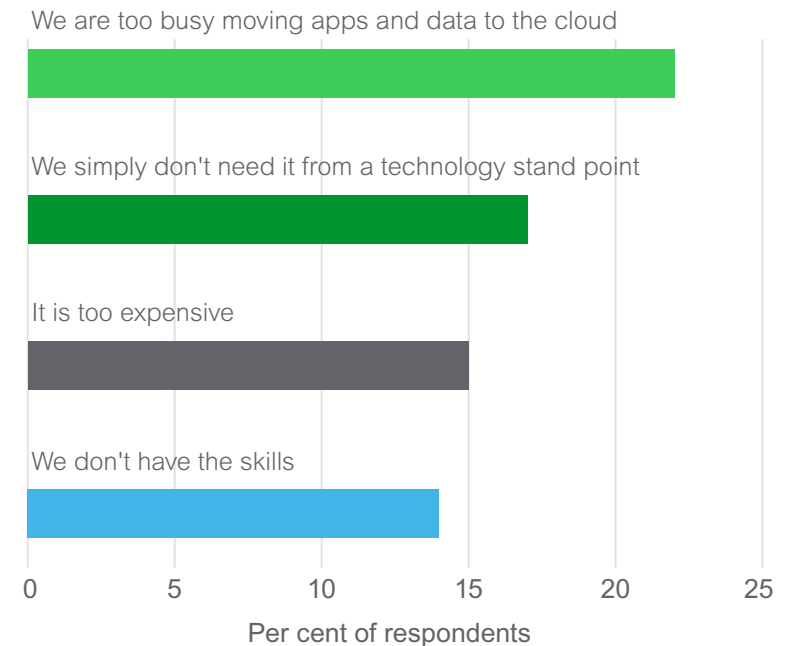
Other barriers included lack of skills, complexity in networking the new edge solutions, a need to identify appropriate applications, security challenges, management challenges, and questions surrounding whether appropriate facilities were available to implement edge.

Over recent years, Schneider Electric has established a comprehensive and successful track record of helping end users overcome these barriers and deploying edge solutions in different environments across both industries and regions.

Read the key best practices for overcoming some common edge system deployment issues.

• **Lack of available IT staff to support remote locations** – As companies undergo digitisation, some are deploying more technology with the same resources and the bandwidth for edge system support is severely limited. Therefore, viable edge solutions should be remotely managed.

What are your barriers in pursuing an edge computing project?

We are too busy moving apps and data to the cloud

We simply don't need it from a technology stand point

It is too expensive

We don't have the skills

Per cent of respondents

Business case

Overcoming barriers to implementation

- **Limiting maintenance costs of systems in the field** – Since most edge systems will be installed in remote locations, the cost of sending maintenance personnel to assure systems availability could be quite high. However, modern remote management tools can identify any devices that require fixing or adjustment before any downtime occurs. This capability greatly reduces the number of required maintenance interventions and speeds up resolution time when there is a failure.

- **Flexible, agile system interfaces** – Appropriate edge management solutions should allow for edge system access via multiple devices, including laptops, tablets, and smart phones. This makes it much easier for either internal resources or third-party service providers to monitor and adjust edge systems at any time, from any location.

- **Systems that don't require on-site support** – With micro data centres, the core system elements are designed to work together. Therefore, edge environment end users who are unfamiliar with how IT works, gain peace of mind knowing that these systems operate on their own and do not require local support. Additional devices such as racks with card key access and server room cameras could easily be added to the micro data centre configuration to enhance local physical security.

Business case

CHAPTER 6

Action plan

Identify key applications for edge computing solutions that will drive business innovation.
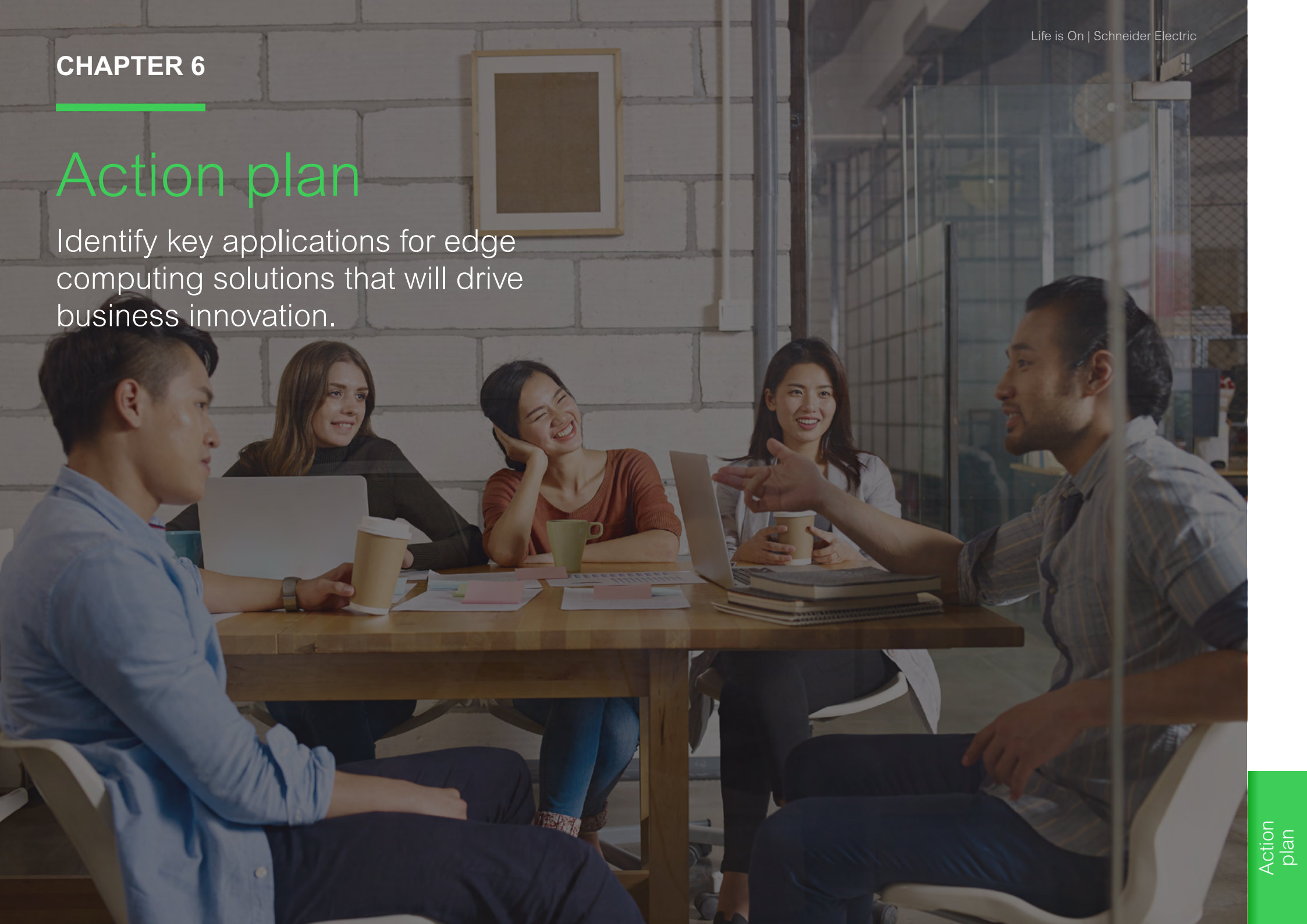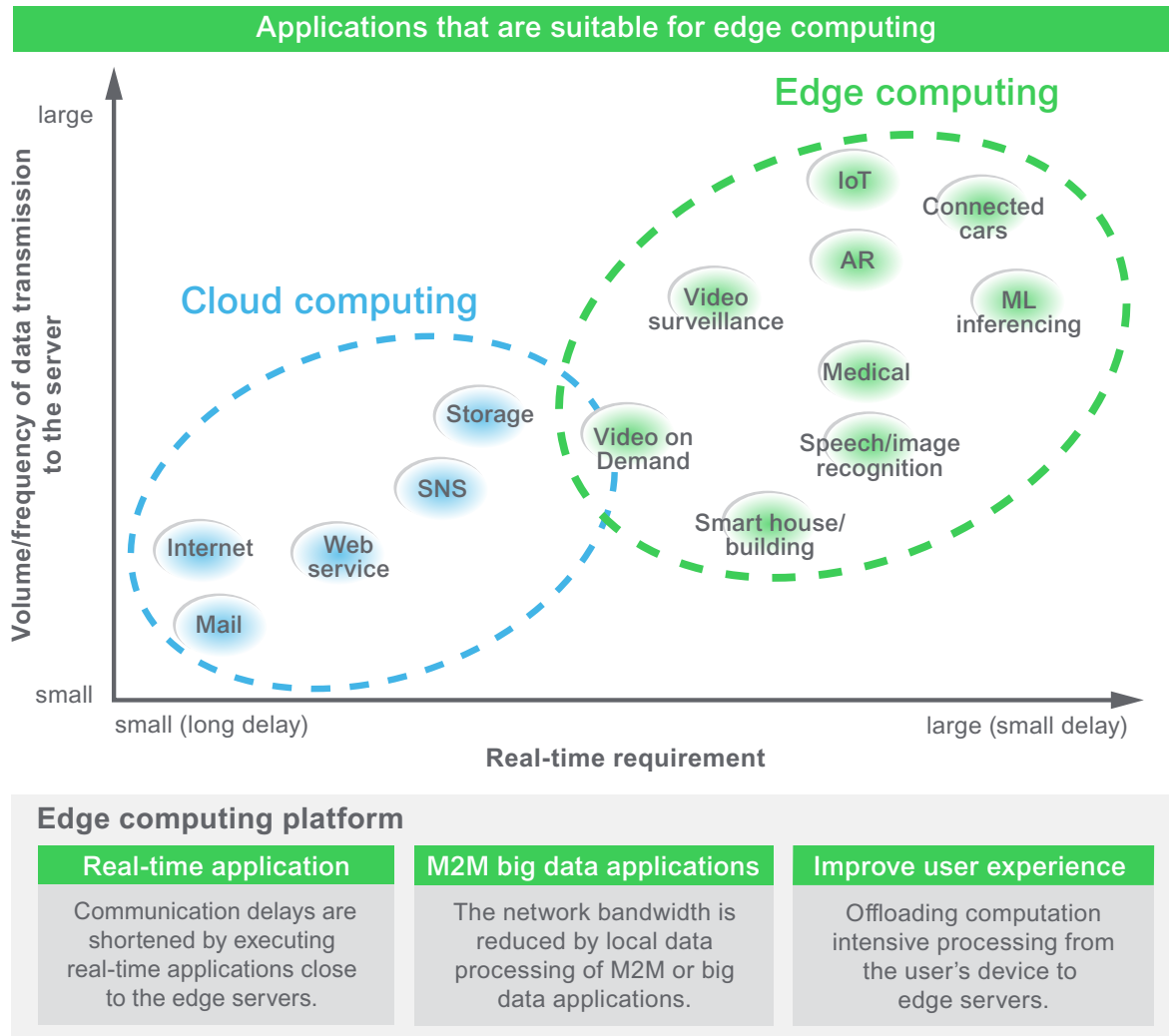
Tips for getting started

Organisations choose to deploy edge systems to drive more business value from their key applications. They either want to improve customer and employee experience or drive increased IT asset efficiencies. In a world where hybrid IT necessitates decisions on whether it makes more sense to run applications in the cloud, on premises, or on the edge, it becomes critically important to map applications according to their size and to their real-time data requirements.

Edge computing also offers companies the opportunity to further digitise their operations and to introduce innovative ways of doing business. A footwear retailer, for example, may choose edge systems to leverage digitalisation to produce a highly customized pair of shoes, created right in the store by the customer. Two hours after the customer has configured his shoes on an in-store screen, he can pick up the shoes. During that time, a 3-D printer reproduced the virtual model of the shoe. To justify a move towards such innovative business models, stakeholders must identify the current process costs and forecast what that process will cost in the future. Then a cash flow statement can be produced that will reflect cost over several years and estimate the payback periods.

Key applications of edge computing, APAC

Applications that are suitable for edge computing

Edge computing

Cloud computing

Volume/frequency of data transmission to the server (large / small)

Real-time requirement (small (long delay) / large (small delay))

IoT, Connected cars, AR, ML inferencing, Video surveillance, Medical, Video on Demand, Speech/image recognition, Smart house/building, Storage, SNS, Internet, Web service, Mail

Edge computing platform

Real-time application	M2M big data applications	Improve user experience
Communication delays are shortened by executing real-time applications close to the edge servers.	The network bandwidth is reduced by local data processing of M2M or big data applications.	Offloading computation intensive processing from the user's device to edge servers.

Source: Frost & Sullivan

Action plan

Determining your next steps

If you are ready to undertake the journey of edge system deployment, consider these short-term actions.

- **Within the next month** – Identify initial areas within the enterprise that can benefit from edge computing solutions. Seek out vendors that have emerged as leaders in edge computing.

- **Within the next 6 months** – Secure funding for those projects that represent low risk and high return. During this time, assemble a team of interested stakeholders.

- **Within the next year** – Implement your first edge computing solution. Track expenses and quantify benefits during the pilot and test period. Leverage vendors to fill in knowledge gaps where required.

To learn how Schneider Electric edge computing tools, architectures, and products can optimise edge system performance, visit our edge computing solutions page.

Action plan

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