Make Edge Services An Integral Part Of Your Cloud Strategy

Edge Plays A Critical Role In Cloud Resiliency

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Executive Summary

In December 2017, the Oracle Dyn Global Business Unit (GBU) commissioned Forrester Consulting to evaluate factors driving demand for edge services, applications and services requiring edge and cloud infrastructure, and the key challenges firms face in managing cloud and edge infrastructure. Edge services is defined as a set of technologies used to control and optimize access to internet-facing assets. Edge services are a critical component of a cloud strategy, ensuring resilience through reliability, performance, and security. In short, to build a complete cloud footprint, both edge services and core cloud computing are necessary. Our study focused on the need for resiliency and the role that edge plays in a resilient cloud strategy.

Forrester conducted an online survey with 156 edge strategy decision makers at small and medium-size enterprises (SMEs) with between 100 and 999 employees to explore this topic. The study found that as firms struggle with frequent unplanned downtime or disruptions in their internet traffic, they need cloud infrastructure partners to provide consistent performance, reliability, security, and resiliency. In addition, while businesses of any size can benefit from edge services today, SMEs are in a strong position to reap key benefits; they are often more cloud-native and may lack a large, dedicated security operations center.

As firms extend corporate digital channel strategies, such as websites with video and social media capabilities, personalized content, and dynamic applications, they must align their cloud strategies and edge services requirements to enable a seamless experience. Poor resiliency can lead to inconsistent performance and a poor customer experience. Fickle users will abandon applications and websites that fail to perform to their increasing expectations.

KEY FINDINGS

› **Volatility is threatening user experience.** Forty-eight percent of companies experience unplanned downtime at least once a month; 26% experience unplanned downtime once a week. Empowered user tolerance for latency and downtime is practically nonexistent in today's expanding market of applications and websites.

› **Companies are not prepared for volatility.** Only 46% of firms have a technical continuity/security plan in place at the infrastructure level, leaving more than half of firms' infrastructures vulnerable to downtime. Thirty-one percent of companies plan to build a resilient infrastructure across the internet. Proven DNS infrastructures using edge services reduce those internal and external risks faced by companies.

› **Companies need edge services as part of a comprehensive resiliency strategy.** Companies can use edge services to help address customer expectations, minimize downtime, and ensure seamless performance. Edge services are critical to providing companies with the necessary performance and security for both internal-facing applications, such as CRMs or enterprise resource planning (ERP) systems, and customer-facing applications.
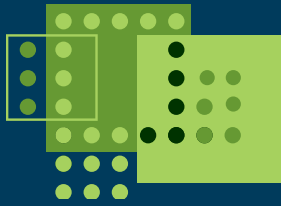
Twenty-six percent of firms experience unplanned downtime at least once a week.

Edge services is defined as a set of technologies used to control and optimize access to internet-facing assets.

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Edge Services Are Critical To Address Current Challenges

The inability to execute end-to-end application delivery can have negative effects customer experience. A comprehensive cloud strategy that includes edge services can combat this. What is end-to-end application delivery? It refers to managing the performance, resiliency, and security across the end-to-end connections between users and applications. Operational stakeholders are often responsible for application delivery initiatives; however, evolving DevOps processes increasingly place this burden on the shoulders of developers.

Firms are evolving their cloud infrastructure and footprint as their strategic initiatives expand. Many firms are building out web and cloud applications that are critical to their businesses and require resiliency and security. As a result, edge services are critical to providing firms with the necessary performance and security for both internal-facing applications, such as CRMs or ERP systems, and customer-facing applications. Edge services can help firms by providing consistent performance, global response, and high resiliency. In surveying 156 SME edge decision makers in North America and the United Kingdom, we found the following:

> **Applications and websites increase in scope and scale.** Sixty percent of websites use external services/objects as part of their load. In fact, almost three-quarters of websites and applications are loading over 50 objects, and 11% reportedly load more than 200, creating a great deal of complexity at the edge (see Figure 1). As applications utilize the internet as a digital supply chain, any component of their load that is not performing at peak efficiency can impact overall application and website performance. The need for fast application responses and optimized performance makes these apps and websites strong candidates for edge services. As businesses adopt new technologies to automate complex processes or create more interactive, immersive experiences for their customers, these systems will increasingly rely on technologies and data managed outside of traditional data center capacity.[1]

> **Usage of cloud and hybrid infrastructures is expanding.** Key applications are relying on hybrid (as-a-service/on-premises) infrastructures for flexibility, resilience, and improved performance at the edge. Business intelligence and reporting apps, internet-of-things (IoT) apps, and marketing automation apps are among the applications most likely to use hybrid infrastructures. CRM apps, collaboration apps, and commerce applications rely on cloud infrastructures like software as a service (SaaS), platform as a service (PaaS), and infrastructure as a service (IaaS) more frequently (see Figure 2). For leading companies, infrastructures like SaaS are not just as a means of application modernization, but also to business innovation. That shift is, in part, evidenced by the proliferation of industry solutions built atop point horizontal solutions, such as those for HR and sales, that deliver a continuous stream of innovation.[2]
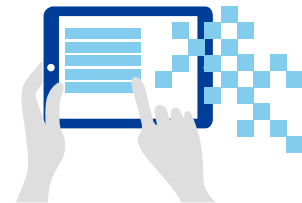
Most websites and applications are loading over 50 objects, some more than 200.

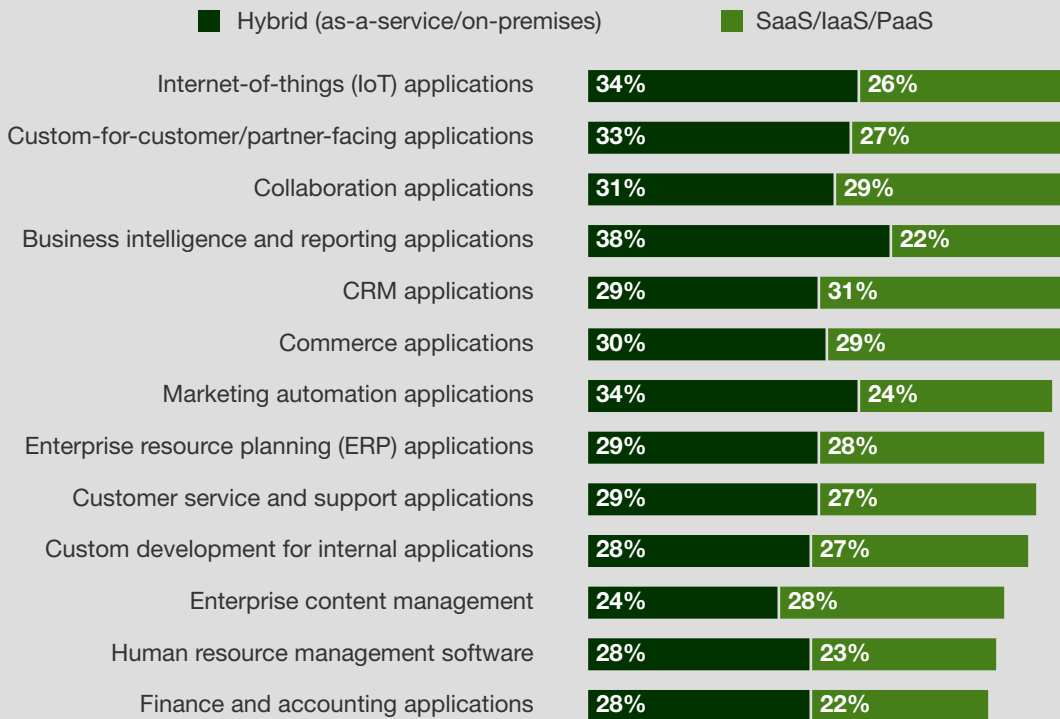**Figure 1: Websites And Applications Continue To Grow In Scale And Scope**

"On average, to the best of your knowledge, how many objects load as part of your website or application?"
(Objects are shown)
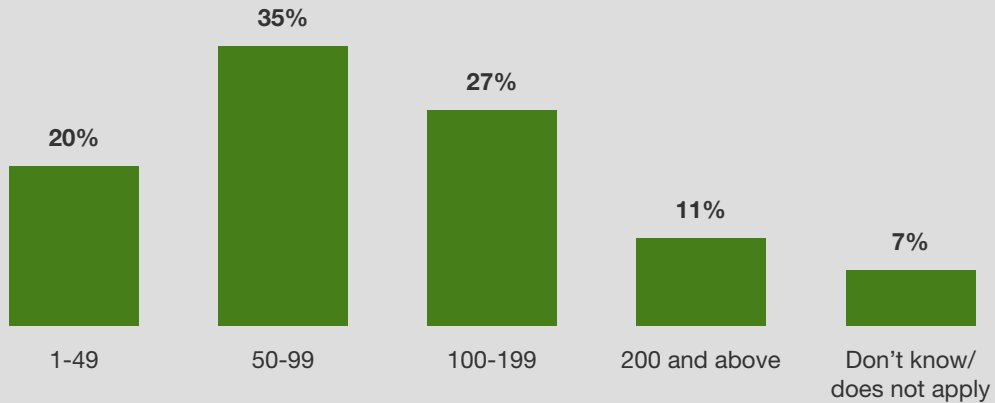
Category	Value
1-49	20%
50-99	35%
100-199	27%
200 and above	11%
Don't know/ does not apply	7%

Base: 156 edge strategy decision makers in the US, the UK, and Canada
Source: A commissioned study conducted by Forrester Consulting on behalf of Oracle, December 2017

Figure 2: Firms Prefer A Hybrid Infrastructure For Many Types Of Applications

"For each of these types of applications, what type of infrastructure technology are you currently using?"
(On-premises" not shown)

Legend: ■ Hybrid (as-a-service/on-premises)   ■ SaaS/IaaS/PaaS

Application	Hybrid (as-a-service/on-premises)	SaaS/IaaS/PaaS
Internet-of-things (IoT) applications	34%	26%
Custom-for-customer/partner-facing applications	33%	27%
Collaboration applications	31%	29%
Business intelligence and reporting applications	38%	22%
CRM applications	29%	31%
Commerce applications	30%	29%
Marketing automation applications	34%	24%
Enterprise resource planning (ERP) applications	29%	28%
Customer service and support applications	29%	27%
Custom development for internal applications	28%	27%
Enterprise content management	24%	28%
Human resource management software	28%	23%
Finance and accounting applications	28%	22%

Base: 156 edge strategy decision makers in the US, the UK, and Canada
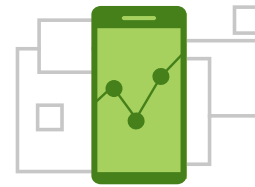Source: A commissioned study conducted by Forrester Consulting on behalf of Oracle, December 2017

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› **A lack of technical continuity planning leaves firms open to disruption and downtime.** Technical continuity refers to the policies, standards, procedures, and tools used to improve resilience, reduce loss during outages, and protect against critical systems and services failure. More than two-thirds of firms recognize that a breakdown in the availability and security of their infrastructure has a considerable or catastrophic impact on their business. Yet, surprisingly only 46% of firms surveyed have a technical continuity plan in place at the infrastructure level. Without this type of planning in place, more than half of firms are leaving themselves vulnerable to catastrophic outages, downtime, and loss of customers.

The Changing Cloud Landscape Is Driving Rapid Infrastructure Innovation

Technology infrastructure is hypercritical to the operations of any business, and downtime costs dearly. Rapid innovation in cloud infrastructures has left some firms struggling to keep pace. Firms that fail to keep up with and meet their customers' expectations will feel the cost of losing valuable customers.

Our study found these key changes in the cloud landscape:

› **The volume and types of customer- and employee-facing apps are increasing.** Customers are more connected than ever: The average US online adult uses more than four connected devices.[3] Forrester research shows that employees who use six to 10 company-specific mobile applications are happier and more productive, serve happier customers, and feel better about their company.[4] Firms surveyed are supporting applications that range from marketing automation to human resource management to IoT application. Customers demand an increasingly personalized experience from these applications.

› **Organizations are more comfortable at the edge.** Teams have continued to grow their skills in deploying and supporting various edge services. While few consider their teams experts, the majority consider themselves competent to advanced. As the usage of digital channels increases and the complexity of site/application workloads grows, firms need skilled employees who can drive innovation at the edge. Fast and easy accessibility, elastic scalability, and pay-per-use pricing models make cloud computing attractive for application development and delivery (AD&D) professionals looking to create a cloud testing strategy to deliver applications better and faster. Many firms can already make quality at speed a reality by leveraging cloud.[5] However, the role of cloud is changing: Storage is still the dominant use for cloud services, with 76% of companies using cloud services for this purpose. The market is seeing a shift in cloud functionality: Many SMEs are extending their use of cloud services to include other functions such as network services (46%), messaging (37%), compute (35%), development (32%), and analytics (26%).

Thirty-three percent of companies' application enviroments are IaaS/PaaS.

Thirty-five percent of firms use cloud for compute functions.
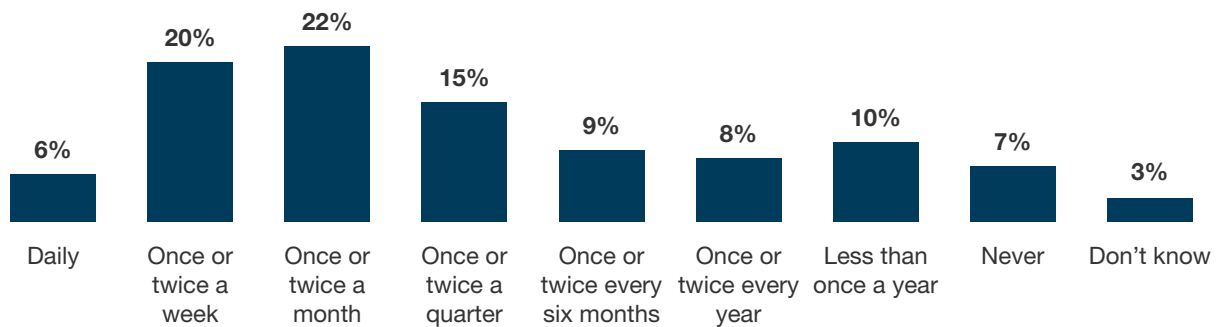
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› **Unplanned internet downtime disrupts business and costs money.** In the age of the customer, users' tolerance for latency and downtime is practically nonexistent. Highly resilient sites/applications with reliable performance will delight customers and reduce the impact of downtime. However, 90% of firms experience unplanned internet downtime — and half said they experience unplanned internet downtime at least monthly (see Figure 3). This unplanned downtime is detrimental to business operations: Firms report loss of productivity, lost business opportunities, and a drop in employee morale.[6] Edge services can considerably reduce outages and downtime by monitoring the path between users and resources and adjusting in real time.

The age of the customer is a 20-year business cycle in which the most successful enterprises will reinvent themselves to systematically understand and serve increasingly powerful customers

Figure 3: Downtime Happens With Alarming Frequency

"To your best estimate, how frequently does your organization experience unplanned internet traffic downtime or business disruptions?"

Daily	Once or twice a week	Once or twice a month	Once or twice a quarter	Once or twice every six months	Once or twice every year	Less than once a year	Never	Don't know
6%	20%	22%	15%	9%	8%	10%	7%	3%

Base: 156 edge strategy decision makers in the US, the UK, and Canada
Source: A commissioned study conducted by Forrester Consulting on behalf of Oracle, December 2017

Incorporate Edge And Core Computing Into A Comprehensive Cloud Strategy

Firms can no longer afford to delay creating their comprehensive cloud strategies. A complete cloud strategy that includes edge services and core computing can provide much needed resilience. One of the biggest detriments to mission-critical business operations is unplanned internet downtime. The majority of firms also report they do not have appropriate continuity plans in place to combat this problem. Downtime can have catastrophic impact on customer experience, so firms must keep customer experience (CX) at the forefront of all strategic changes. Infrastructure and operations professionals leading their firms' technical continuity (TC) efforts need to calculate the cost of downtime to help them make a business case and secure investments for a resilient infrastructure that delivers continuous operations.[7]

Our study found:

› **Firms see performance and resilience at the edge and from partners.** SMEs know they cannot go it alone, so they rely on third parties with solutions that address monitoring and ensure the secure delivery of web content, apps, and services over the cloud infrastructure. To proactively identify issues and address customer expectations, many SMEs benefit from receiving alerts of service downtime and assistance with managing their infrastructure assets. Edge services enable companies to quickly deploy strategic initiatives while improving security, resiliency, and reducing risk and volatility.

› **Firms plan improvements to infrastructure resiliency in the next year.** In the coming year, firms are prioritizing key services that improve and address resilience, such as managing traffic across hybrid cloud environments, expanding global networks presence, and investing in managed domain name system (DNS) solutions (see Figure 4). Embracing these edge services and driving improved infrastructure resilience is an important step to meet expanding CX demands and delight customers with fast, reliable service at the edge.

› **Build out your continuity plan/resilient infrastructure.** Edge services can considerably reduce outages and downtime by monitoring the path between users and resources and adjusting in real time. Since 54% of companies surveyed do not have a technical continuity (TC) plan in place, they have left the door open to the potentially catastrophic impact of an infrastructure breakdown. A TC plan will put the policies, standards, procedures, and tools in place to prevent and/or immediately address internet and infrastructure downtime. Firms must look at their TC strategies from three angles: They must determine their process to build a TC plan, evaluate their staff skill sets, and deploy initiatives that drive innovation at the edge.

Fifty-nine percent of firms want third-party partners that offer network reliability.
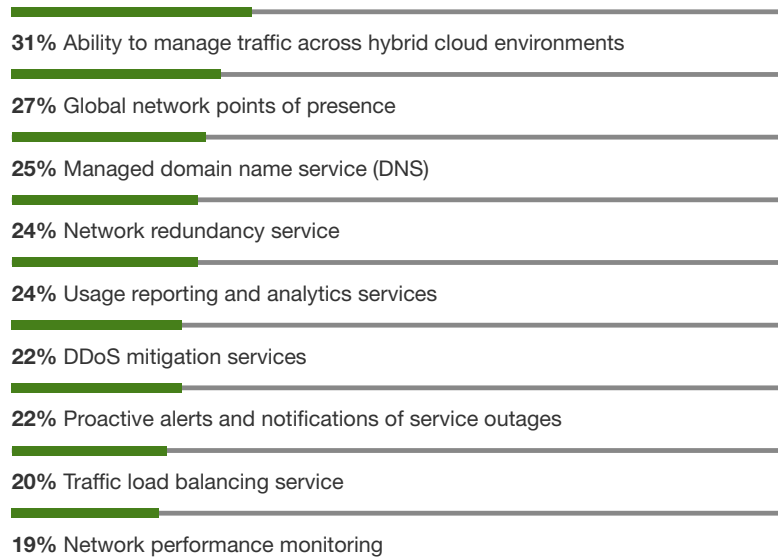
Fifty-four percent of SMEs believe that partners with security expertise are most helpful in ensuring the secure delivery of web content, apps, and services over cloud infrastructure.

Figure 4: Firms Have Big Plans To Increase Infrastructure Resilience In The Next Year

"What is your organization's timeline for deploying the following types of services?"
(Planning to deploy within the next 12 months)

31% Ability to manage traffic across hybrid cloud environments

27% Global network points of presence

25% Managed domain name service (DNS)

24% Network redundancy service

24% Usage reporting and analytics services

22% DDoS mitigation services

22% Proactive alerts and notifications of service outages

20% Traffic load balancing service

19% Network performance monitoring

Base: 156 edge strategy decision makers in the US, the UK, and Canada
Source: A commissioned study conducted by Forrester Consulting on behalf of Oracle, December 2017

Key Recommendations

Evolving business demands are shaping the future of enterprise infrastructure. SMEs are deploying cloud and edge infrastructure to enable their digital channel strategies and address customers' high expectations for performance and quality of experience provided through their preferred digital channels. To address these internal and external digital transformation initiatives, SMEs will increasingly rely on distributed infrastructure and edge solutions.

Forrester's in-depth survey of 156 edge strategy decision makers at SME organizations yielded several important recommendations for firms addressing emerging employee, customer and SME stakeholder requirements.

Consider the edge as part of your overall cloud and web application infrastructure. Evaluate your firm's overall network architecture to determine edge and cloud service strategy requirements. Edge-based solutions provide firms with reduced latency and improved resiliency, while cloud solutions can help firms enhance application and service delivery as well as improve and differentiate end-user experiences. Firms can make hybrid cloud and edge solutions a reality by enabling secure orchestration of services between cloud and edge applications, services, and devices. The edge applications can act locally, based on data generated, as well as take advantage of the cloud for secure, scalable deployment and management.

Pay attention to the user edge-to-application journey. It is important for firms to provide end users with a high-quality application and service experience. To address this requirement, firms need to direct users to the most appropriate network and infrastructure resources, to enable them to traverse the internet and connect to various types of services. These edge solutions have a critical impact on the resiliency, security, performance, and the end user's overall experience.

Move your point of control closer to the user via edge services. Firms are using edge services to put their applications, data, and services at the points where they are most needed to address the needs of customers and partners. These edge services can be deployed at a remote location or at a location where the company wants to use particular public or private resources to address customer requirements. These edge solutions can also be used to ensure alignment with regulatory or industry privacy specifications.
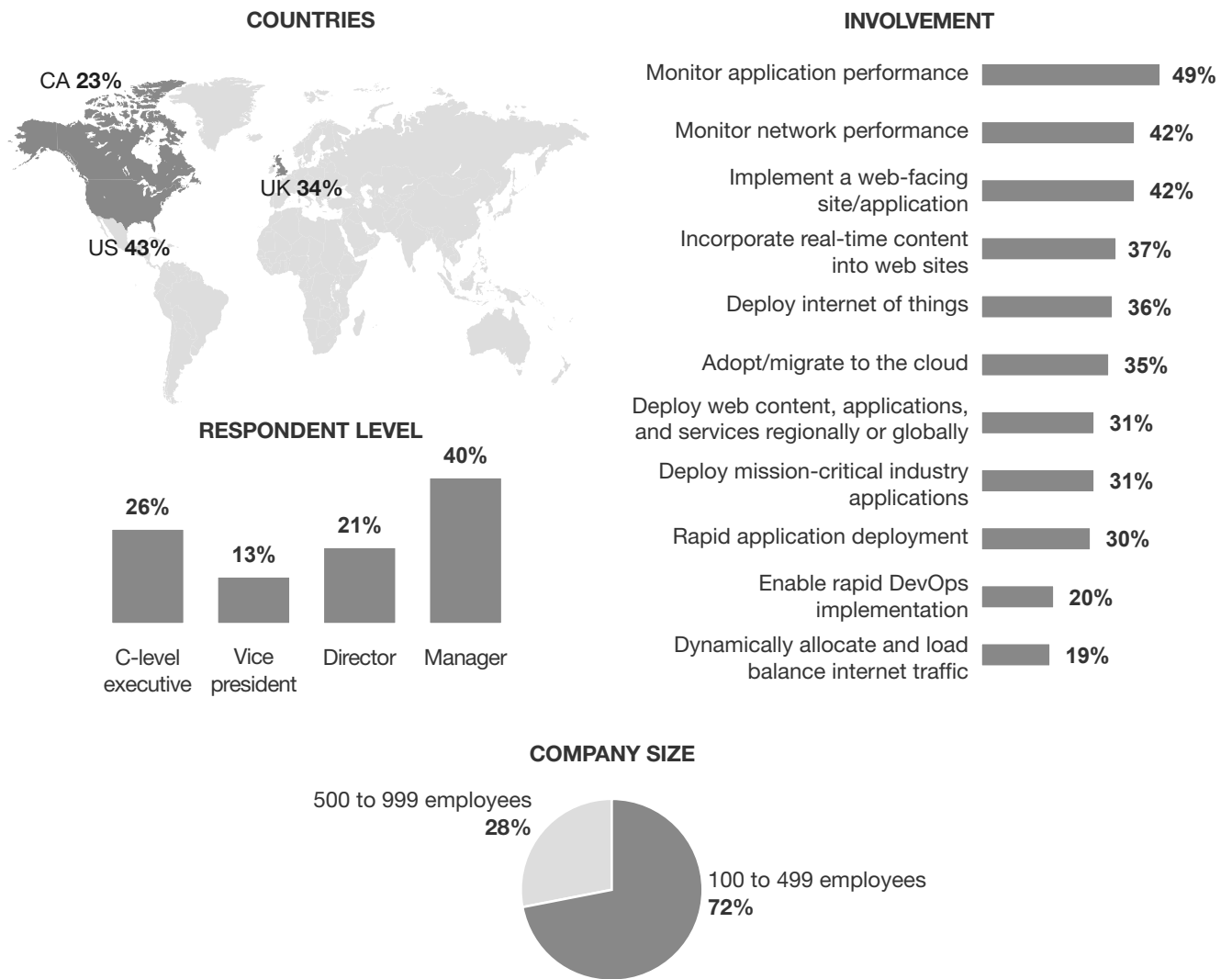
Establish redundancy and failover via multi/hybrid and hybrid cloud. Availability is critical for personalized websites and to support mission-critical enterprise applications for finance, accounting, and enterprise content management services. SME stakeholders must ensure the resiliency of their network architecture. Firms can achieve resiliency by using multicloud and hybrid cloud solutions to distribute implementations of redundant apps and services at different physical locations within the same cloud or across multiple clouds. Incorporate continuous error detection, correction, and recovery, along with problem resolution, into your contingency planning solutions.

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Appendix A: Methodology

In this study, Forrester conducted an online survey of 156 respondents in the United States, the United Kingdom, and Canada to evaluate cloud edge strategies. Survey participants included decision makers in IT and network operations. Questions provided to the participants asked about their current use of the edge, challenges experienced, and benefits perceived. Respondents were offered an incentive as a thank you for time spent on the survey. The study was completed in December 2017.

Appendix B: Demographics/Data

COUNTRIES

CA **23%**
UK **34%**
US **43%**

RESPONDENT LEVEL

- C-level executive: 26%
- Vice president: 13%
- Director: 21%
- Manager: 40%

INVOLVEMENT

Monitor application performance	49%
Monitor network performance	42%
Implement a web-facing site/application	42%
Incorporate real-time content into web sites	37%
Deploy internet of things	36%
Adopt/migrate to the cloud	35%
Deploy web content, applications, and services regionally or globally	31%
Deploy mission-critical industry applications	31%
Rapid application deployment	30%
Enable rapid DevOps implementation	20%
Dynamically allocate and load balance internet traffic	19%

COMPANY SIZE

- 500 to 999 employees **28%**
- 100 to 499 employees **72%**

Base: 156 edge strategy decision makers in the US, the UK, and Canada
Source: A commissioned study conducted by Forrester Consulting on behalf of Oracle, December 2017

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Appendix C: Endnotes

[1] Source: "Edge Computing: IoT Will Spawn A New Infrastructure Market," Forrester Research, Inc., March 1, 2017.

[2] Source: "Three Trends Shape Digital Services Engagements," Forrester Research, Inc., February 9, 2018.

[3] Source: "Engage Customers Through Mobile," Forrester Research, Inc., October 27, 2017.

[4] Source: "Navigate The Future Of Mobile Security," Forrester Research, Inc., February 6, 2017.

[5] Source: "Improve Quality And Speed With Application Testing In The Cloud," Forrester Research, Inc., January 28, 2016.

[6] Source: "The State Of Business Technology Resiliency, Q2 2014," Forrester Research, Inc., May 12, 2014.

[7] Source: "Identify And Estimate The Costs Of Downtime On Your Business," Forrester Research, Inc., October 12, 2017.

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