

5G

HEADWAY
REPORT



TOWARD A MORE SECURE 5G WORLD

MOBILE OPERATORS MOVE RAPIDLY
TOWARD COMMERCIALIZATION

REPORT | MAY 2020



A10



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INTRODUCTION

Next-generation 5G networks are widely seen as one of the most fundamental technology developments of our current century. Much has been written about the potential of these ultra-high-speed, low-latency networks to drive a new era of digital innovation, breakthrough applications, and revenue growth for mobile operators and the economy as a whole.

Over the coming years, 5G is expected to create the wireless network capacity, performance and flexibility to support an explosive increase in connected devices, along with exciting new use cases, that transmit exponentially greater amounts of data at exponentially higher speeds. From self-driving cars and smart infrastructure to virtual reality and remote robotic surgery, 5G networks seem poised to change the world.

5G Will Support Explosive Growth In Connected Devices, Data And New Use Cases

The first phase of 5G build-out is now well underway in major markets around the world. Increasingly, the big operators and some new entrants as well are in the midst of their first network deployments or will begin them this year. However, the journey toward ubiquitous network availability, complete realization of 5G functionality, and the widespread economic impact of new 5G applications, will certainly not happen overnight.

While mobile operators see the potential for next-generation networks to drive new revenues and business models, they remain concerned about the heavy costs of building out 5G and the uncertainties of sufficient and timely payback.

Last year, in partnership with A10 Networks, a provider of secure application services for mobile operators worldwide, the Business Performance Innovation (BPI) Network, conducted a global survey of communications service providers and others in mobile networking to explore industry intentions, priorities and concerns about 5G, including 5G security. To understand how the industry has progressed over the past 12 months, we have now completed a second study review.



KEY FINDINGS

PROGRESS TOWARD 5G COMMERCIALIZATION

The new findings indicate the industry is indeed making significant progress on the first phase of 5G implementation. When the survey was first conducted a year ago, 26 percent of respondents said they were “moving rapidly toward commercial deployment.” This year, 45 percent say they are at that point. Three quarters of all respondents now say their companies are at least in pilot testing. Seventy-one percent say they will begin commercial deployments in the next 18 months, including 16 percent who say they have already begun and 16 percent who will start network build-outs in 2020.

Many More Survey Respondents Now Say Their Companies Are Moving Rapidly Toward Commercialization

Are mobile operators on schedule with 5G? Most respondents believe the industry is moving forward with 5G at a fast pace or at least in line with original expectations. Some 52 percent characterize that progress as “moving ahead rapidly in major markets,” with another 4 percent indicating rapid progress is global. Another 25 percent say the pace of 5G is “in line with expectations.” Just 19 percent say progress is “somewhat slower” than expected.

Most early adopters are concentrating first on implementing the already approved non-standalone 5G (NSA) standard. Nevertheless, some are planning to move directly to standalone 5G (SA), and many (35 percent of respondents) are already proactively planning for SA. Indeed, Dish Network, which will be a new entrant in the mobile market, says it plans to use a standalone approach for the 5G network it intends to build. In addition, other major carriers, including T-Mobile, AT&T and Verizon, are reportedly also planning to deploy standalone 5G in the next year or so.

Non-standalone 5G, of course, shares existing core network infrastructure with 4G, while SA will require a whole new network core that fully utilizes a cloud-native, service-based architecture, with virtualized network functions and cloud-based, software-defined networking. Standalone 5G and full cloudification of the network core will bring significant advantages in terms of lower latency, faster delivery of new services, and flexibility through network slicing that will be important to many next-generation use cases and applications.

Many Mobile Operators are Actively Planning to Build Standalone 5G Networks

The BPI Network developed and began fielding its latest 5G survey before the COVID-19 virus became globally known and understood, and we did not ask questions specific the impact of the virus on 5G progress. However, anecdotal evidence suggests the pandemic, while potentially causing some short-term delays for network implementation, is also underscoring the need and desire for higher speed mobile connectivity and related applications.

China Unicom, for example, in its latest earnings discussion, said COVID-19 has caused some short-term delays in its 5G build-out, but it also has increased demand for digitization, which represents an opportunity for 5G. GlobalData, in an April 20 press statement, said that, while the virus has resulted in revenue declines due to slower sales and reduced consumer demand, most major carriers report they still have the cashflow they need to move forward with their deployments.

Wireless industry analyst, Jeff Kagan, and Will Townsend, a senior networking analyst at Moor Insights & Strategy, both concur that COVID-19 will cause only relatively minor delays in 5G deployments, while increasing recognition of the need for next-generation 5G networks.

PROGRESS TOWARD NETWORK CLOUDIFICATION

Many of the key advances under 5G, including ultra-reliable, low-latency communications, network slicing, edge services, and others, will require the adoption of cloud-native architectures, including virtualization and container technologies. So where are providers in this journey?

There is a significant consensus that cloudification and adoption of these technologies are critical to operators' 5G plans. Some 81 percent of respondents cite faster deployment of network services as a top benefit of virtualization and containers, followed by scalability (77 percent) and application portability (52 percent).

Operators Say They Are Making Significant Progress Toward Network Virtualization

The move toward virtualizing networks appears to be well underway. Some 95 percent of survey respondents believe virtualizing network functions is either very important (59 percent) or important (36 percent) to their plans for 5G. Three-quarters say they are either well on their way or making good progress toward virtualization. Still, one quarter of our survey participants have either not started or are very early in implementation.

Operators also believe the use of containers will be important to building out 5G. Fifty-two percent say containers are very important, and 41 percent say they are important to 5G. However, mobile operators are still very early in the use of containers. Only 7 percent of respondents say their companies are moving rapidly toward full-scale adoption of containers, while another 12 percent say they are making significant use of containers in specific areas. Far more (52 percent) say they are only in early use and trials.

“Based on what I hear from wireless networks like AT&T Mobility, Verizon Wireless and T-Mobile and companies that build and upgrade 5G wireless networks like Qualcomm, Huawei, Ericsson, Intel and others, COVID-19 is not slowing down the rapid move to 5G,” Kagan told the BPI Network. “Networks are not slowing down their demand for upgrade services. They are concerned if they slow down, competitors will move ahead of them. So, every wireless network is still on a rapid upgrade, and I don’t see it slowing down. If there is a slowdown of any kind, it would be a minor slowdown of months, not years.”

Said Townsend, “some operators report minor delays, but the need to support work from home should provide urgency to deploy networks even faster.”

The impact of COVID-19 has demonstrated the value and need for denser, higher speed 5G services in industries like health care, education and a variety of service-oriented industries, both Kagan and Townsend told the BPI Network. TeleMedicine and TeleHealth services, for example, should become priorities in a post-pandemic world. These sorts of uses cases will require 5G security and speeds and the types of equipment that utilize ultra-high-speed networking.

There has been significant media attention paid to incidents of sabotage to 5G towers, particularly in the United Kingdom and Europe, due to conspiracy theories about 5G and COVID-19. Of course, both Townsend and Kagan, along with virtually all experts, say there is no link between 5G and the virus. They also do not believe these fears will cause any meaningful delays in 5G deployments.

PROSPECTS FOR NEW USE CASES

A major concern for operators is, of course, realizing a return on their heavy investments in next-generation networks. The high cost of network build-outs is cited by survey respondents as the number-one challenge for 5G. Uncertainty about new use cases and investment payback is cited as a concern far less often, but 20 percent of respondents point to payback and new uses cases as one of the top-three challenges of 5G.

During the first phase of 5G rollout, operators believe enhanced mobile broadband, i.e. high-speed connectivity and better mobile connections, will be the main revenue driver and service offering for 5G. Asked what will be the key drivers for 5G over the next two years, respondents overwhelmingly point to ultra-high-speed connectivity. Nevertheless, Internet of Things (IoT) use cases like industrial automation and smart cities are also seen as opportunities for early 5G deployments. IoT use cases and devices are indeed growing rapidly. According to Gartner, enterprise and automotive IoT will grow to 5.8 billion endpoints in 2020, a 21 percent increase from 2019.

In Five Years, Operators Say, Smart Infrastructure, High-Speed Connectivity and Self-Driving Cars will all be Prevalent 5G Use Cases

Looking further into the future, respondents see a variety of use cases becoming equal drivers for 5G. In fact, respondents predict that, in five to six years, smart cities, connected vehicles and high-speed connectivity will be virtually tied as the main use cases driving 5G revenues and usage. Smart manufacturing will also continue to be a major driver of 5G usage, respondents believe.



Operators are also preparing to move forward with plans to deliver mobile edge clouds (MEC) on their 5G networks to bring compute and storage closer to customers and enable new services and revenue opportunities. MEC – described as mobile edge compute, mobile edge computing, multi-access edge compute, or mobile edge cloud – is a network architecture that brings real-time, high-bandwidth, low-latency access to radio network information, allowing operators to open their networks to a new ecosystem and value chain. For example, AT&T and Google Cloud have announced plans to collaborate on mobile edge clouds. All of the big cloud vendors, Amazon, Google, and Microsoft, have strategies in place to take their services to the edge.

Virtually all respondents (99 percent) say mobile edge clouds will be either very important (38 percent) or important (61 percent) to realizing the promise of 5G. In fact, some 65 percent of survey respondents say their companies plan to deploy mobile edge clouds on their networks within 18 months.

Most Operators Say They Will Deploy Mobile Edge Cloud Computing On Their 5G Networks Within 18 Months

Private 5G networks pose both a competitive challenge and a business opportunity for established mobile operators. Numerous global corporations, such as BMW, Volkswagen and BASF in Germany, are planning to set up private 5G networks to ensure security, privacy and flexibility. In some cases, mobile operators may be involved in building and operating these networks. For example, Walmart in the United States reportedly may work with Verizon to provide 5G for Walmart's digital health services. In fact, some 55 percent of respondents expect to deploy private 5G networks in the next 18 months.

INDUSTRY CHALLENGES—THE CYBERSECURITY MANDATE

From huge upfront investments to major cybersecurity concerns, 5G networks present significant challenges and potential risks for operators and society as a whole. Respondents point to a wide range of 5G challenges. The top three are the heavy cost of network build-outs (59 percent), network security (57 percent), and the need to develop new technical skills (55 percent). Another frequently mentioned challenge is lack of 5G-enabled devices (42 percent).

Operators also have their eyes on other new networking technologies on the horizon that could compete with 5G in some use cases. With its increased data transmission speeds and greater device density, WiFi 6 will be competitive with 5G in some ways—and vice versa. Mobile operators, in fact, believe WiFi 6 will have a significant impact on 5G. Some 80 percent say the impact will be either very important (25 percent) or important (55 percent).

Network security clearly continues to be a major issue and requirement for 5G in the minds of respondents. Cybersecurity is a concern shared by many within and outside of the mobile telecommunication industry. The GSMA, which represents mobile operator and the broader mobile ecosystem worldwide, just issued a major new report on cybersecurity, entitled “Mobile

RECOMMENDATIONS FROM A10 NETWORKS

Here are five strategic investments that mobile operators should consider today. Each of these options has short-term payoffs while paving the way for a smooth transition to 5G.

UPGRADE NETWORK MANAGEMENT

- Immediate payoff – increases agility of the existing network
- Facilitates service rollout
- Gain operational experience with new MANO

CONSOLIDATE NETWORK FUNCTIONS

- Consolidate Gi-LAN functions into a single converged firewall
- Reduces latency and simplifies Gi-LAN management

BOOST SECURITY AT KEY PROTECTION POINTS

- Enhances 4G network security against rising threats from IoT, partner networks and RAN
- Future proofs the network for the journey to 5G
- Boost DDoS protection in MEC nodes

VIRTUALIZE NETWORK FUNCTIONS AS MUCH AS POSSIBLE

- Create a strategy for pervasive function virtualization that is achievable in multiple steps
- Determine best form factor for each function, slice or use case
- Mix and match form factors as needed for each function – physical, virtual or container
- Keep Gi-LAN functions as physical functions to interoperate with virtual network functions (VNFs) or containers in the same MANO

AUTOMATE MANUAL PROCESSES FOR CONFIGURATION, ROLL-OUT OF FUNCTIONS WITHIN MEC NODES

- As sites grow, manual processes are unwieldy
- Reduces security risks from configuration errors or inconsistent security updates

Telecommunications Security Landscape,” outlining mobile operator security challenges and improvements that will come the eventual adoption of the 5G standalone standard. Meanwhile, the U.S. administration in March issued a document entitled “National Strategy to Secure 5G,” which briefly outlines, among other issues, the critical importance of addressing any cybersecurity vulnerabilities in 5G networks.

Cybersecurity Tops The List Of 5G Concerns And Requirements

In our current survey, security is cited by respondents as a top requirement for 5G networks, nearly on a par with network reach and coverage and just ahead of capacity and throughput. Virtually all respondents (98%) expect growth in network traffic, connected devices, and mission-critical IoT uses cases to significantly increase security and reliability concerns for 5G mobile operators.

These security challenges will prompt significant changes in security technology investments. Some 52 percent of respondents say 5G security concerns are affecting their current investments in security technology; another 41 percent say they are reviewing how 5G will impact future security investments.



CONCLUSION

Mobile operators are moving aggressively to deploy the first generation of 5G networks in major markets, perhaps even ahead of earlier anticipated timelines. While the first networks will be non-standalone 5G implementations that share core network infrastructure with existing 4G networks, many operators are already actively planning standalone 5G deployments, even as the SA standard is still being finalized. Cloudification is the future of 5G networks and will require expansive virtualization and software-defined functionality, further enabling the next generation of applications and use cases, including widespread implementation of smart infrastructure, self-driving cars, TeleMedicine, and customized network services via network slicing. The industry says it is moving fairly rapidly toward the adoption of virtualization within its networks, while also indicating that much work still lies ahead. The use of software containers to speed the deployment and portability of new services, for example, is still in its early stages for mobile operators.

The industry has many concerns as it moves forward with 5G, but none are more top of mind and critical than cybersecurity. There is virtually unanimous consensus that 5G networks with their accompanying explosive growth in network traffic, connected devices, and mission-critical IoT uses cases, will make network security and reliability more essential than ever before. (Note: we may add additional commentary here based on A10's recommendations sidebar)

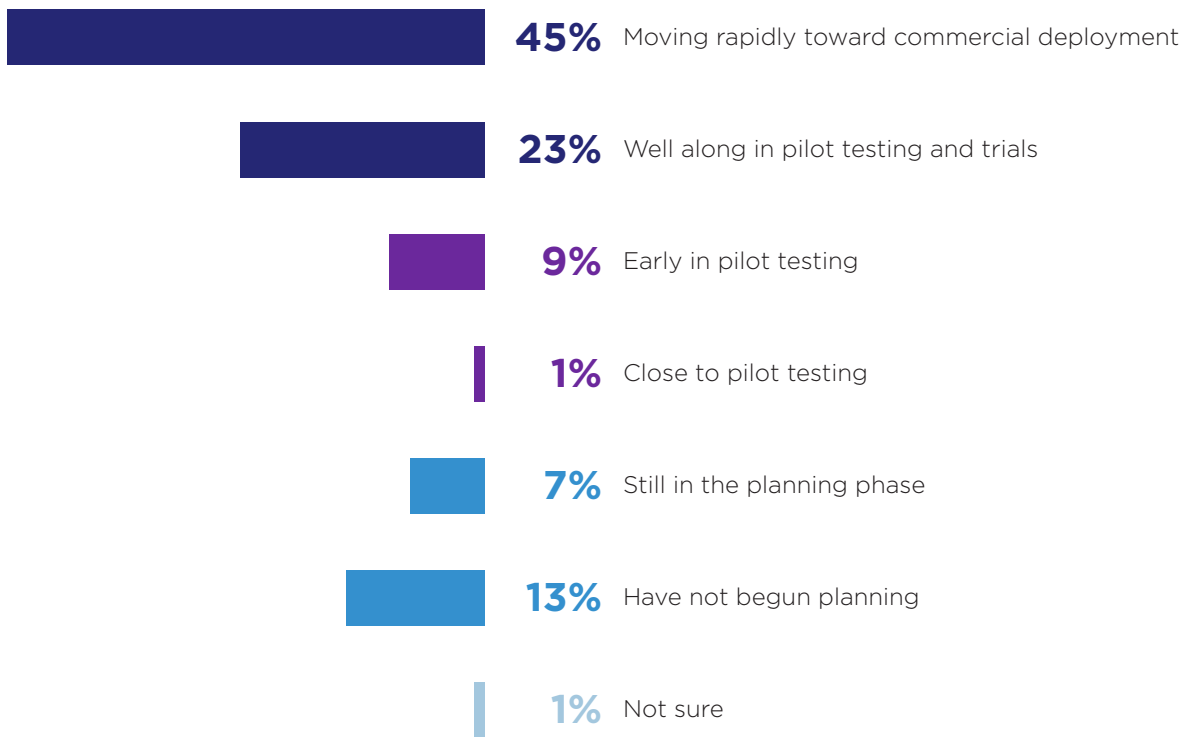


DETAILED FINDINGS

1. MOBILE OPERATORS ARE MAKING SIGNIFICANT PROGRESS TOWARD 5G COMMERCIALIZATION

Where is your company in its journey toward 5G deployment?

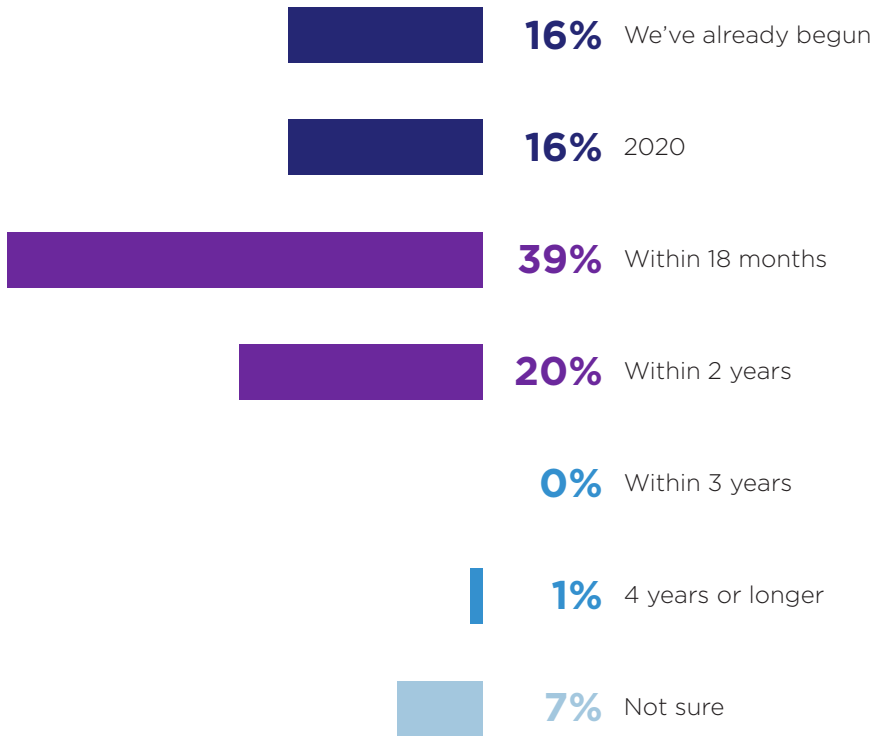
Some 45 percent of respondents now say their companies are making significant progress toward 5G network implementation. That compares to 26 percent in a survey the BPI Network conducted approximately one year earlier. Another 23 percent of respondents indicate they are well along in pilot testing and trials.





When will your company begin its first commercial 5G deployments?

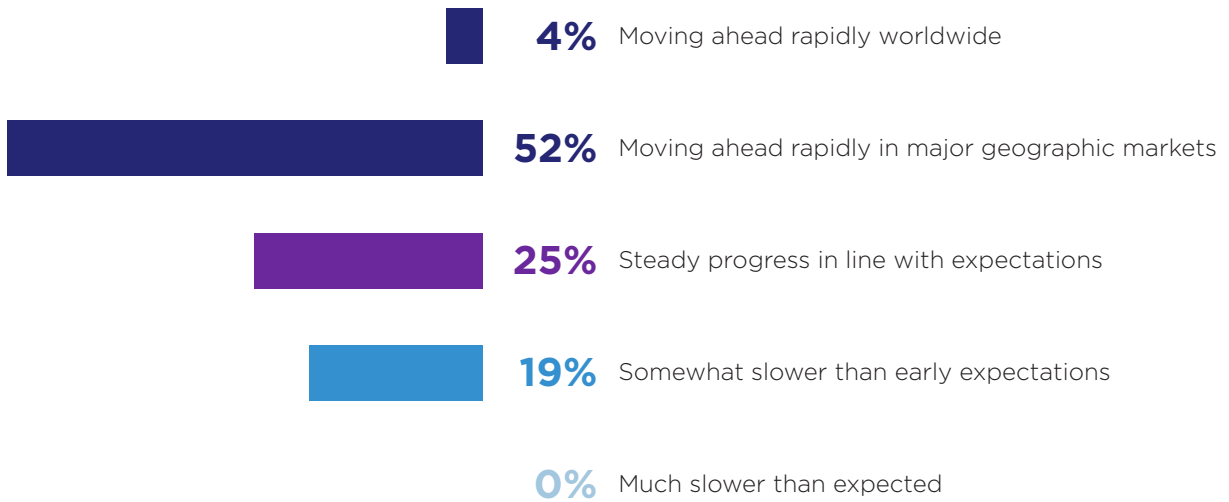
Some 30 percent of respondents in last year's survey anticipated beginning 5G network within a year. This year's survey finds that 32 percent of respondents say their companies have already started network deployments or will this year.





How would you describe the industry’s pace of 5G implementation globally?

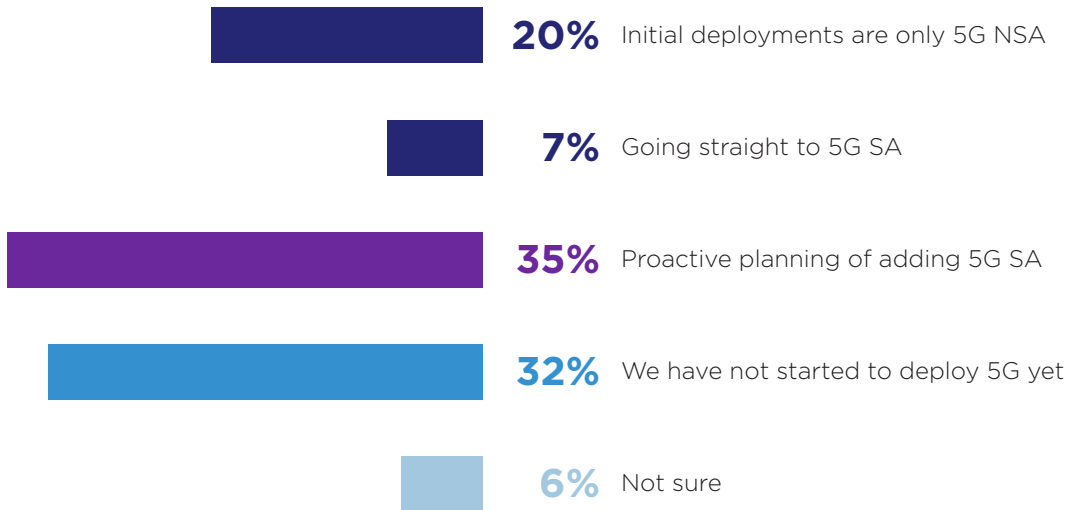
Most respondents believe the industry is moving forward with 5G at a rapid pace, or at least in line with expectations. Some 52 percent say 5G is moving ahead rapidly in major markets, with another 4 percent indicating rapid progress is global. Another 25 percent say the pace of 5G is “in line with expectations.” Just 19 percent say progress is “somewhat slower” than earlier expected.





Where is your company in its adoption of 5G Standalone (5G SA) and Non Standalone (5G NSA) technology?

With 3GPP still at least months away from setting a standard for standalone 5G, it's not surprising most early adopters are concentrating on implementing non-standalone 5G, which leverages 4G core network infrastructure. Yet our survey also finds a significant number of respondents working toward standalone 5G. Some 7 percent of respondents say they plan to move directly to standalone 5G, and another 35 percent say they are proactively planning for standalone.

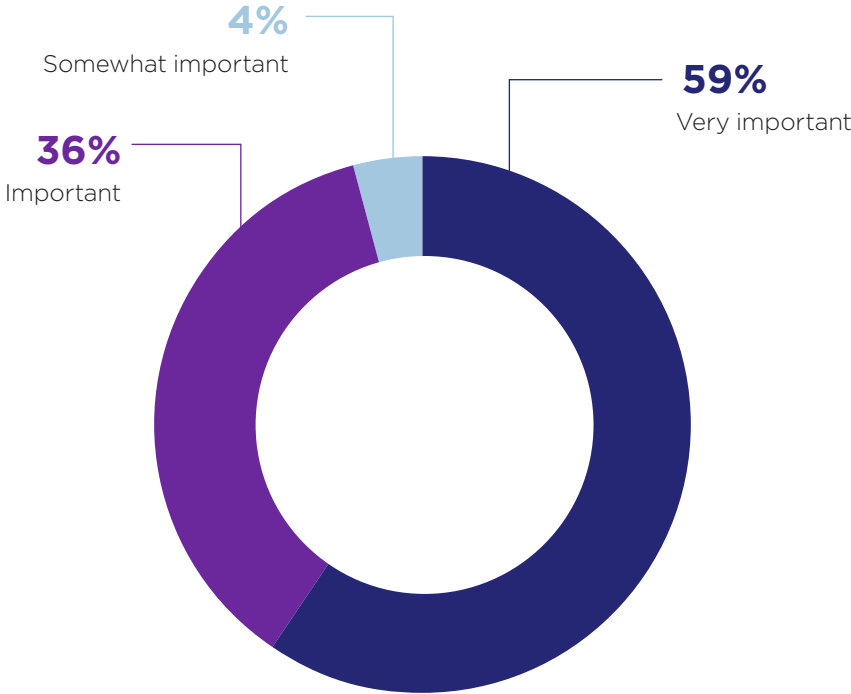




2. PROGRESS TOWARD NETWORK CLOUDIFICATION

Rate the importance of virtualizing network functions to the future of network operations and service delivery.

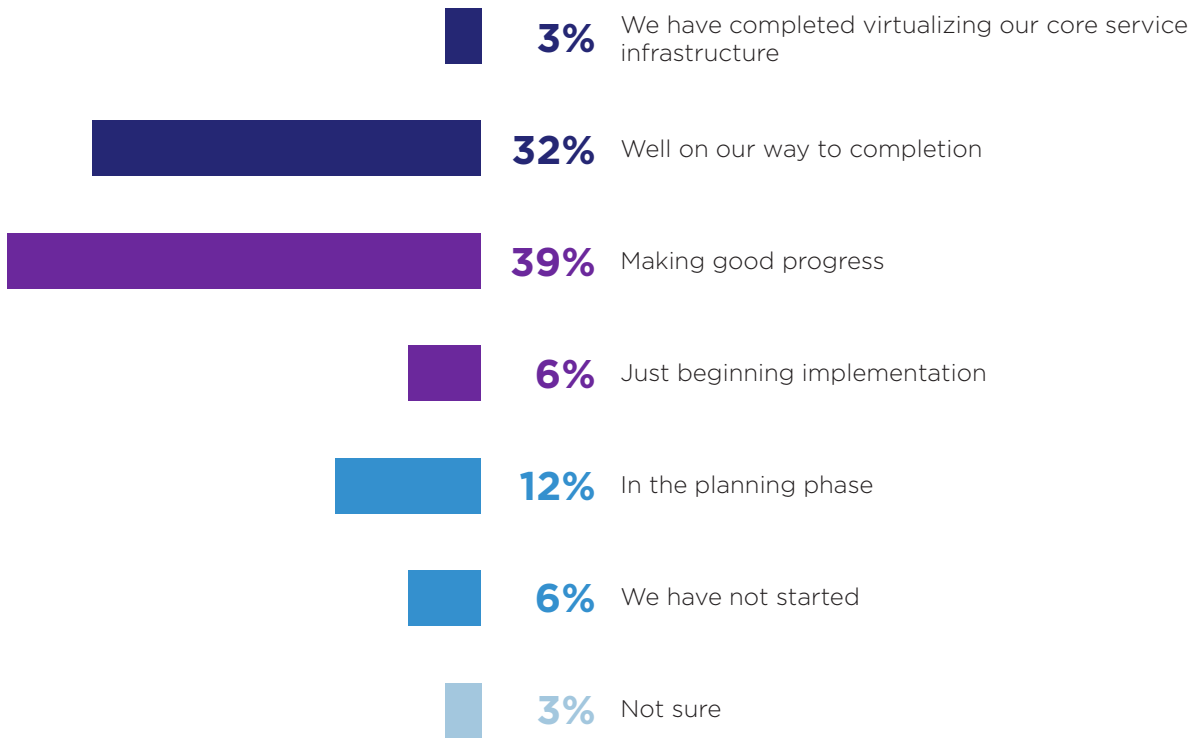
Mobile operators believe virtualization is essential to the success of 5G. Some 95 percent of survey respondents believe virtualizing network functions is either very important (59 percent) or important (36 percent) to their plans for 5G.





At what stage is your company in virtualizing its core infrastructure to support 5G transformation?

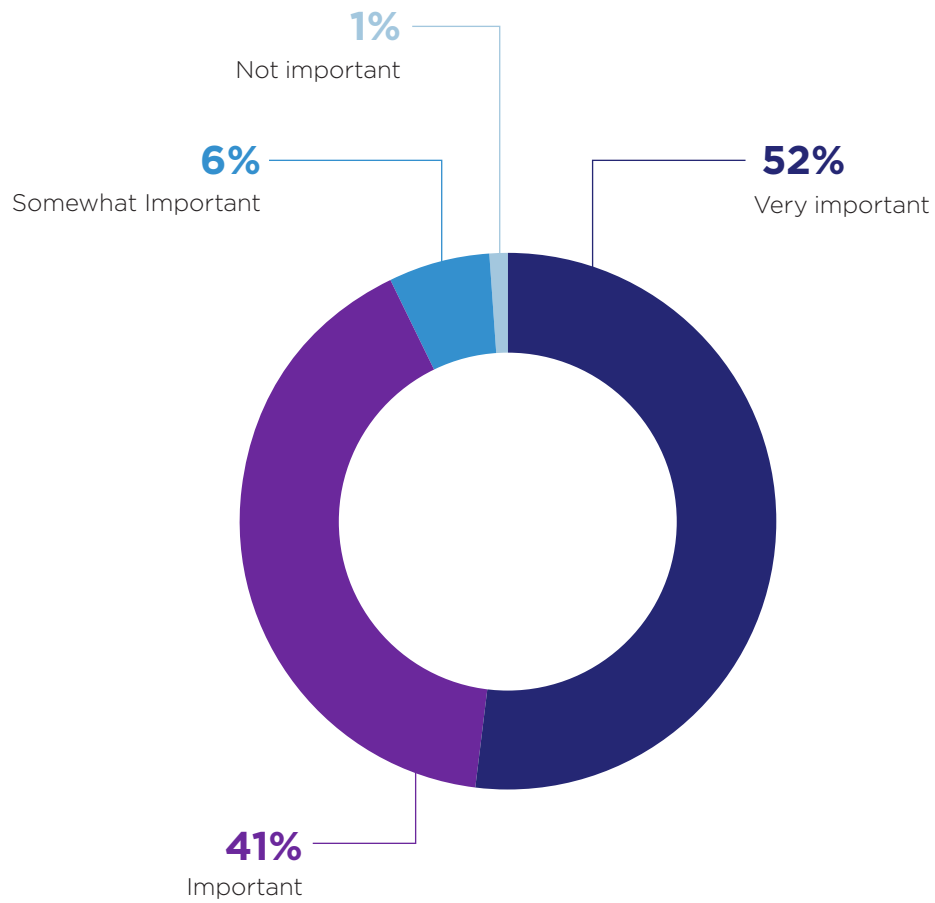
Indeed, the move toward virtualizing networks appears to be well underway. Some 74 percent of industry respondents say their companies are well on their way or making good progress in virtualization. Yet, almost one quarter of survey participants have just started implementation or have not yet gotten beyond the planning phase.





How important is the adoption of software containers and microservices to the future deployment of 5G networks and services?

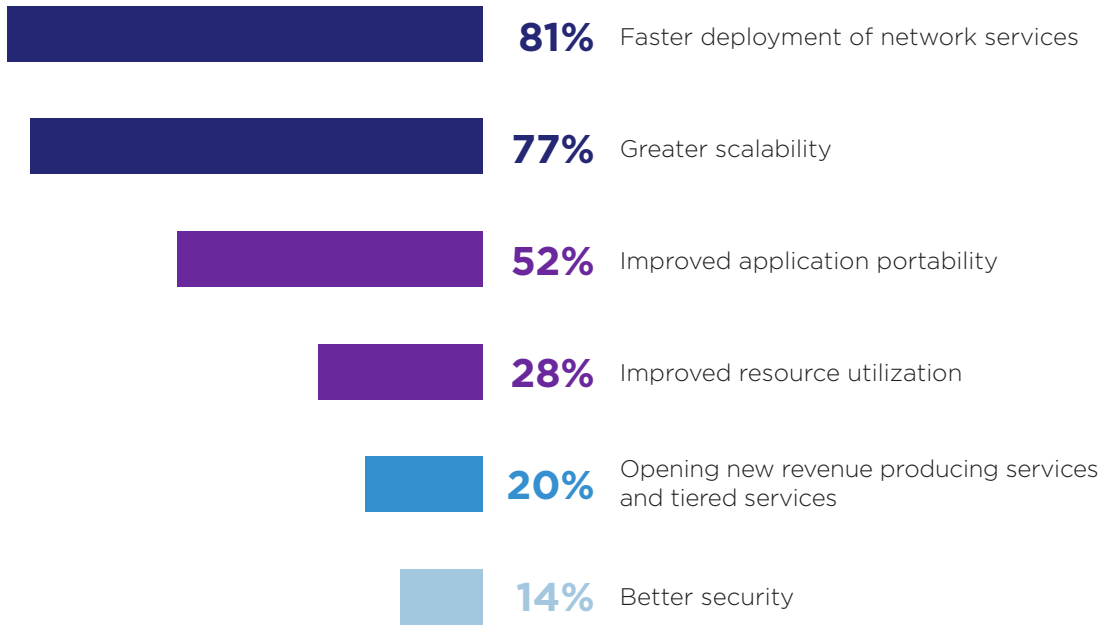
Container technology is being rapidly adopted by software developers around the world, and mobile operators understand the use of software containers will be critical to their ability to deliver new 5G services to customers. Fifty-two percent say containers and a microservices will be very important and 41 percent say they will be important to 5G networks and services.





What are the top benefits to your company in adopting virtualization and containers? (Choose top three)

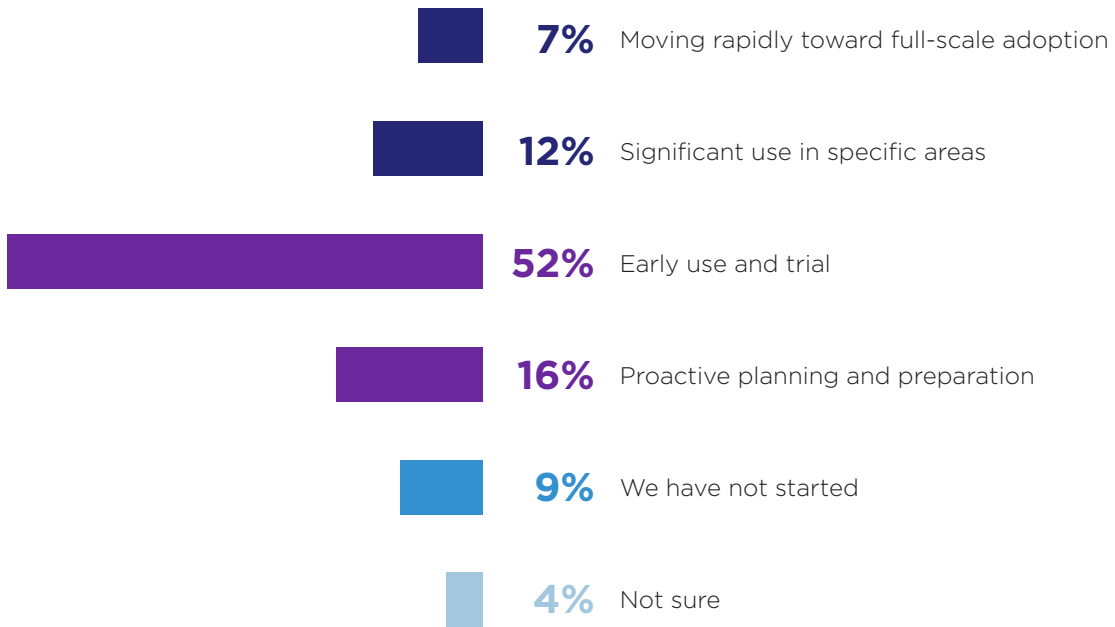
Why is the move to network cloudification important to operators and their customers? Some 81 percent of respondents cite faster deployment of network services as a top benefit of virtualization and containers, followed by scalability (77 percent) and application portability (52 percent).





Where is your company in its adoption and use of container technologies?

Mobile operators are still early in their adoption of containers. Only 7 percent of respondents say their companies are moving rapidly toward full-scale adoption of containers, while another 12 percent say they are making significant use of containers in specific areas. Far more (52 percent) say they are only in early use and trials.

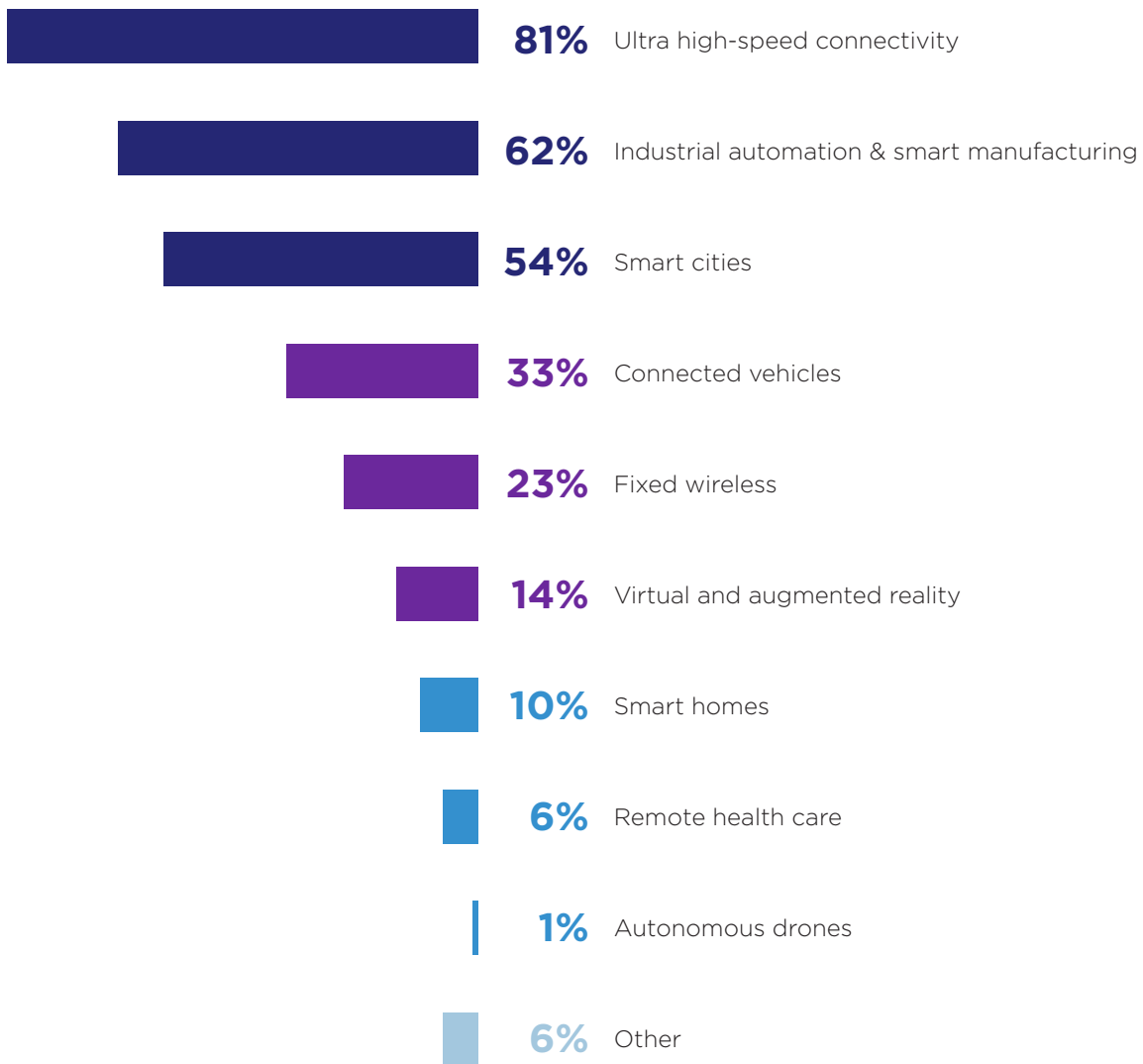




3. PROSPECTS FOR 5G USE CASES

What use cases will be the biggest drivers for 5G in the next two years? (Choose top 3)

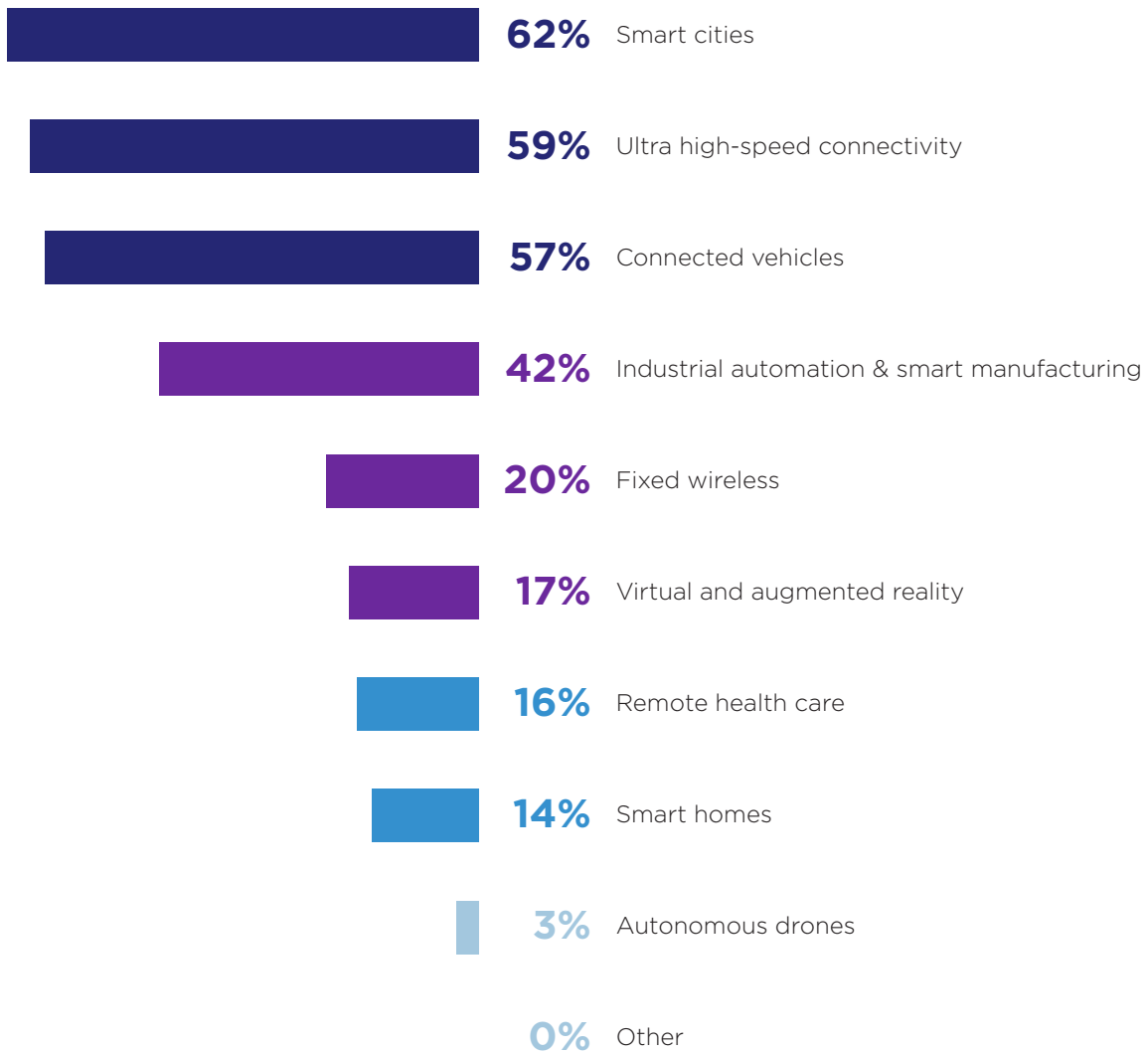
During the first phase of 5G rollout, operators believe enhanced mobile broadband, i.e. high speed connectivity and better mobile connections, will be the main revenue driver and service offering for 5G. Asked what will be the key drivers for 5G over the next two years, respondents overwhelmingly point to ultra-high-speed connectivity. Nevertheless, Internet of Things use cases like industrial automation and smart cities are also seen as opportunities for early 5G.





What use cases will be the biggest drivers for 5G in five to six years? (Choose top 3)

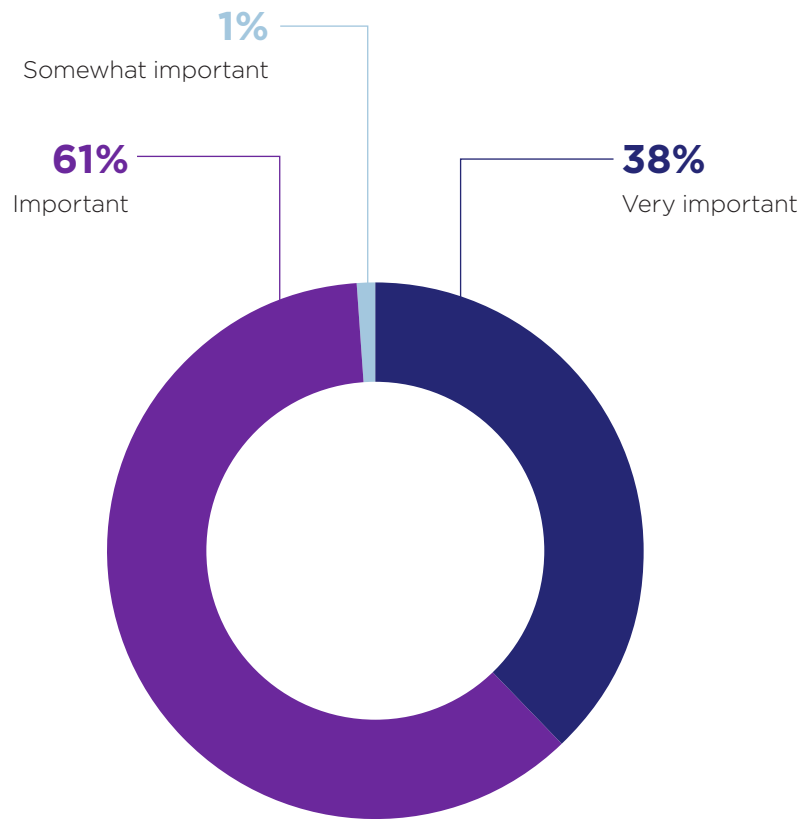
Looking further into the future, respondents see a wider variety of use cases becoming equal drivers for 5G. In fact, respondents predict that, in five to six years, smart cities, connected vehicles and high-speed connectivity will be virtually tied as the main use cases driving 5G revenues and usage.





How do you view mobile edge clouds for more localized data hosting and processing to realize the promise of 5G?

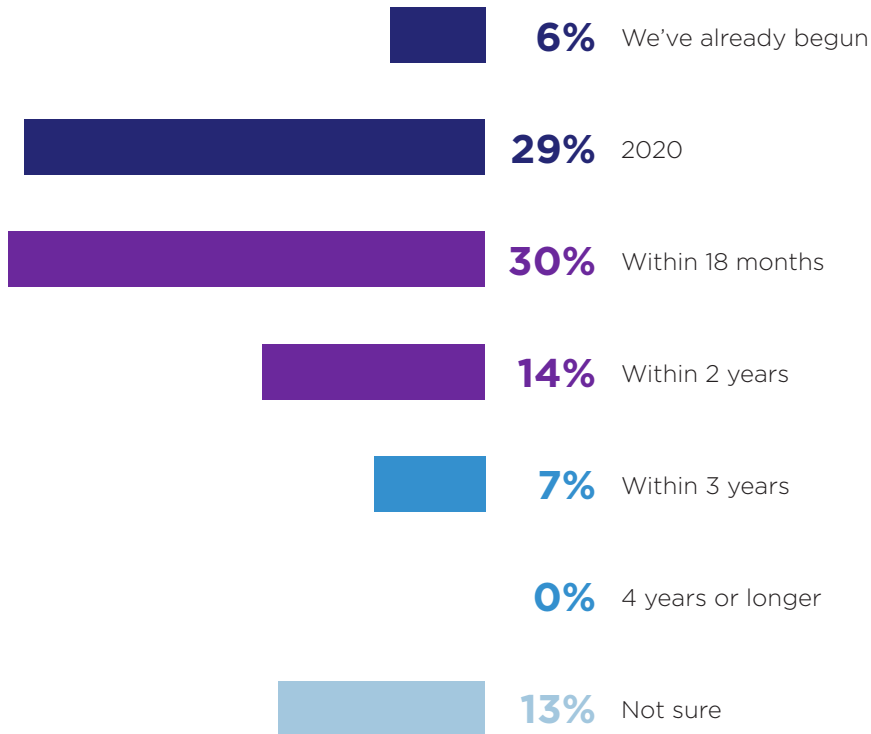
Operators are preparing to move forward with plans to deliver mobile edge clouds on their 5G networks to bring compute and storage closer to customers and enable new services and revenue opportunities. Virtually all respondents (99 percent) say mobile edge clouds will be either very important or important to realizing the promise of 5G.





When do you expect your company to begin mobile edge cloud deployments?

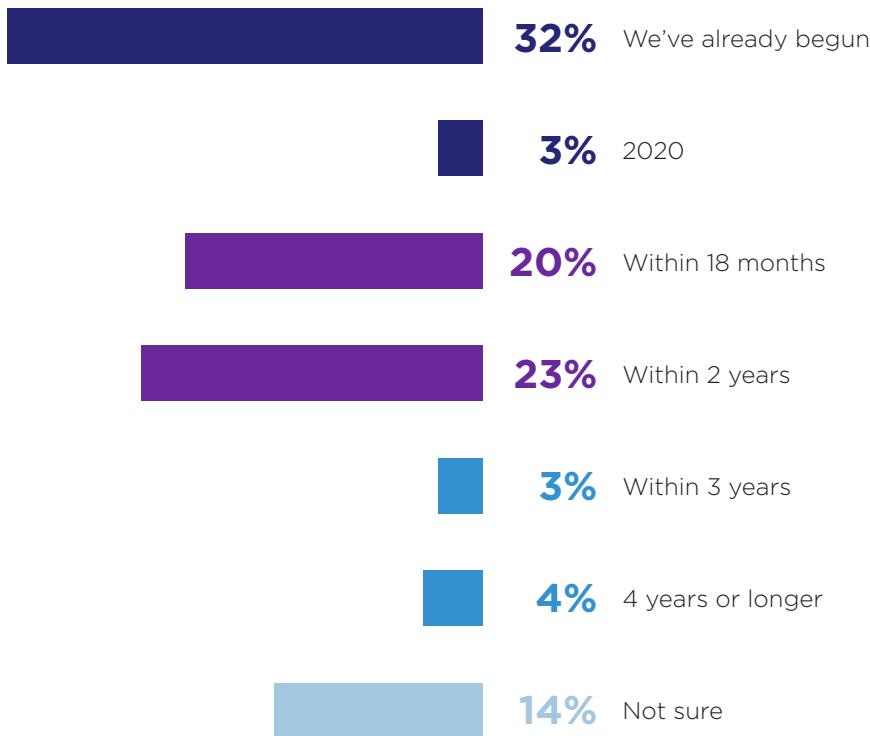
Mobile edge clouds are coming soon to a 5G network near you. Some 65 percent of survey respondents say they're companies plan to deploy mobile edge clouds on their networks within the next 18 months.





Do you expect your company to deploy a 5G Private Network to provide better security, privacy and flexibility? If yes, when?

Private 5G networks pose both a competitive challenge and a business opportunity for established mobile operators. Numerous global corporations, such as BMW, Volkswagen and BASF in Germany, are planning to set up private 5G networks to ensure security, privacy and flexibility. In some cases, mobile operators may be involved in building and operating these networks. For example, Walmart in the United States reportedly may work with Verizon to provide 5G for Walmart's digital health services. In fact, some 55 percent of respondents expect to deploy private 5G networks in the next 18 months.

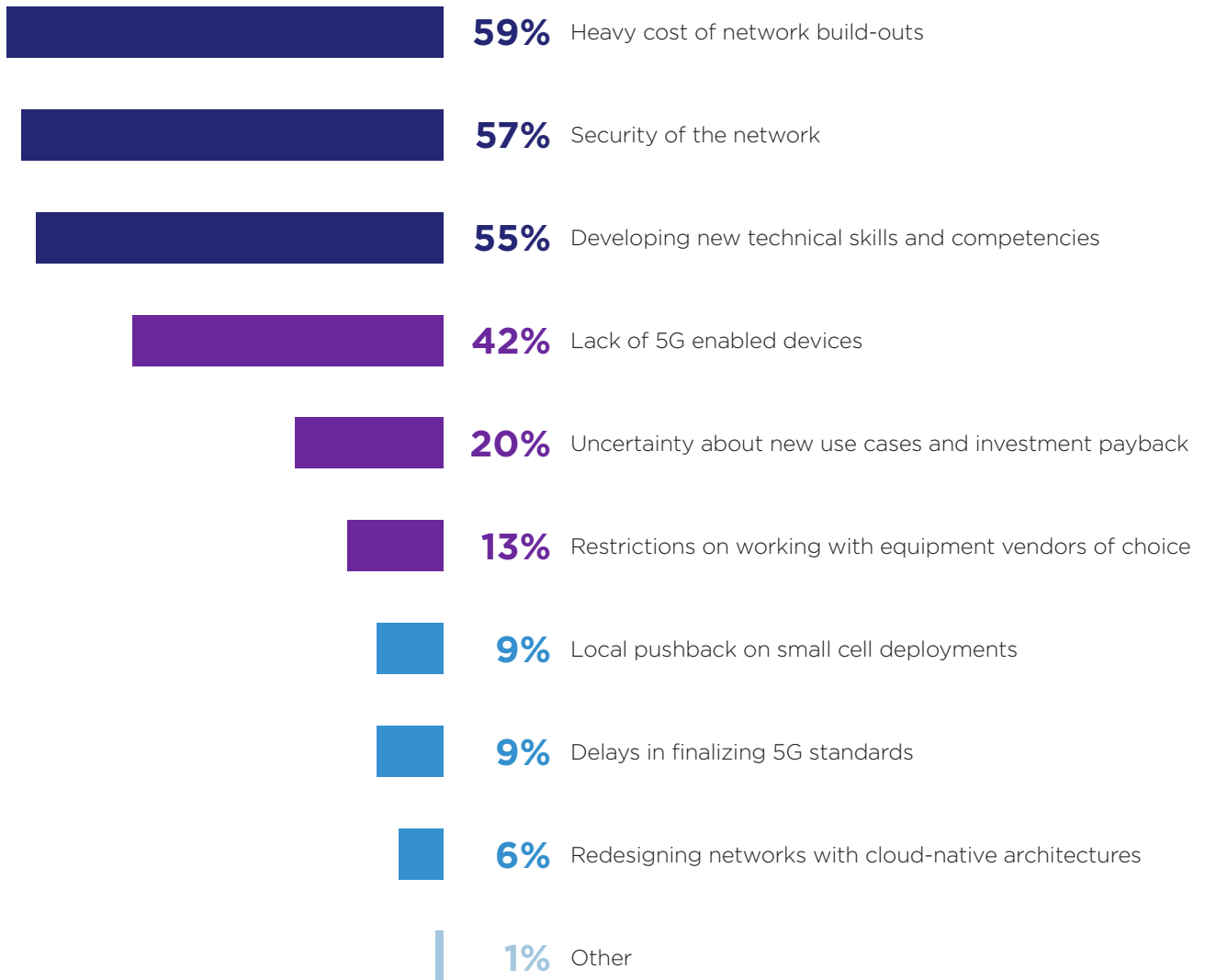




4. INDUSTRY CHALLENGES — THE SECURITY MANDATE

What are the immediate challenges service providers face in 5G rollouts? (Choose Top Three)

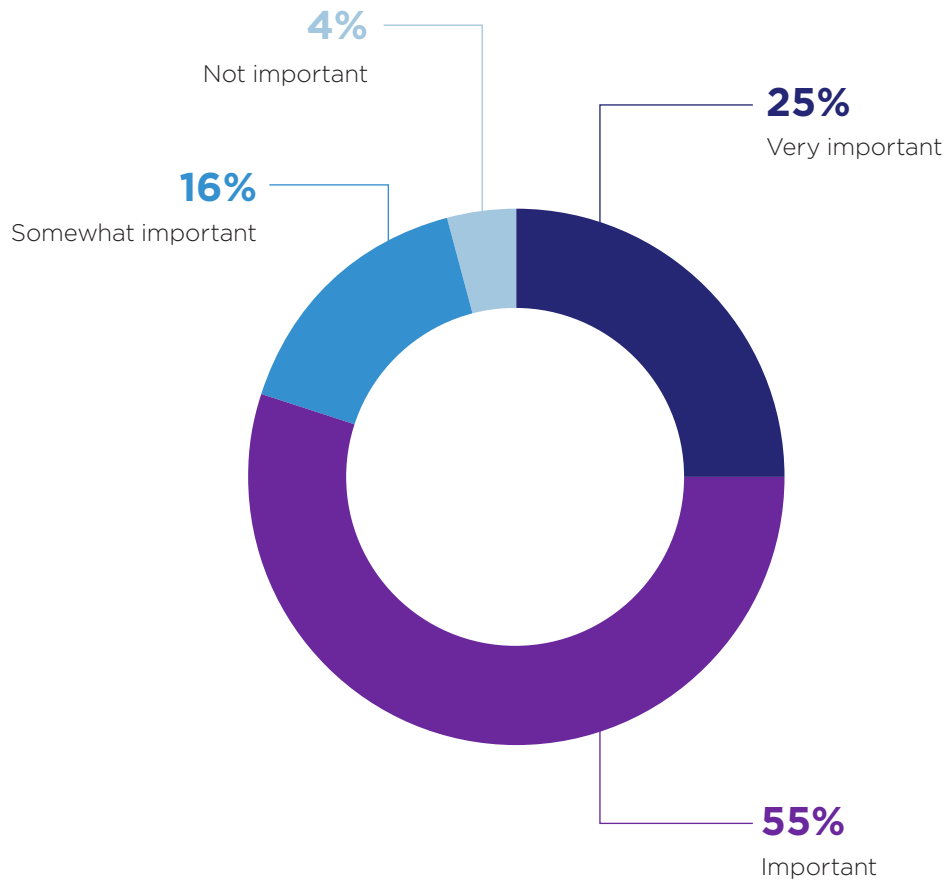
From huge upfront investments to major security concerns, 5G presents significant challenges and potential risks for operators and society as a whole. Respondents point to a wide range of 5G challenges. The top three are the heavy cost of network buildouts (59 percent), network security (57 percent), the need to develop new technical skills (55 percent). Another frequently mentioned challenge is lack of 5G-enabled devices (42 percent).





How do you view Wifi 6 and the impact on 5G deployments in the enterprise?

Operators also have their eyes on other new networking technologies on the horizon that could compete with 5G in some use cases. With its increased data transmission speeds and greater device density, WiFi 6 will be competitive with 5G in some ways—and vice versa. Mobile operators, in fact, believe WiFi 6 will have a significant impact on 5G. Some 80 percent say the impact will be either very important (25 percent) or important (55 percent).





Please rate the importance of the following requirements in your current 5G planning and considerations.

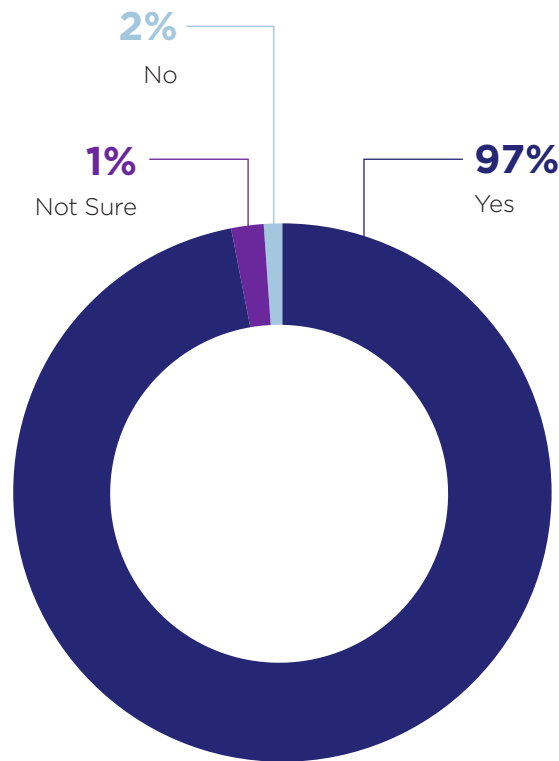
Network security continues to be viewed as a major issue and technical challenge for 5G in the minds of respondents. Indeed, security is cited by respondents as the top requirement in designing and planning 5G networks, nearly on a par with network reach and coverage and slightly ahead of capacity and throughput.

	Very Important	Important	Somewhat Important	Not Important
Network Capacity and Throughput	51%	46%	3%	0%
Network Reach and Coverage	61%	35%	4%	0%
Automated Management and Configuration	28%	65%	7%	0%
Security	54%	45%	1%	0%
Virtualized Network Functions	41%	54%	4%	1%
Edge Cloud Deployments	22%	71%	7%	0%



Do you expect growth in network traffic, connected devices, and mission-critical IoT uses cases to significantly increase security and reliability concerns for 5G mobile operators?

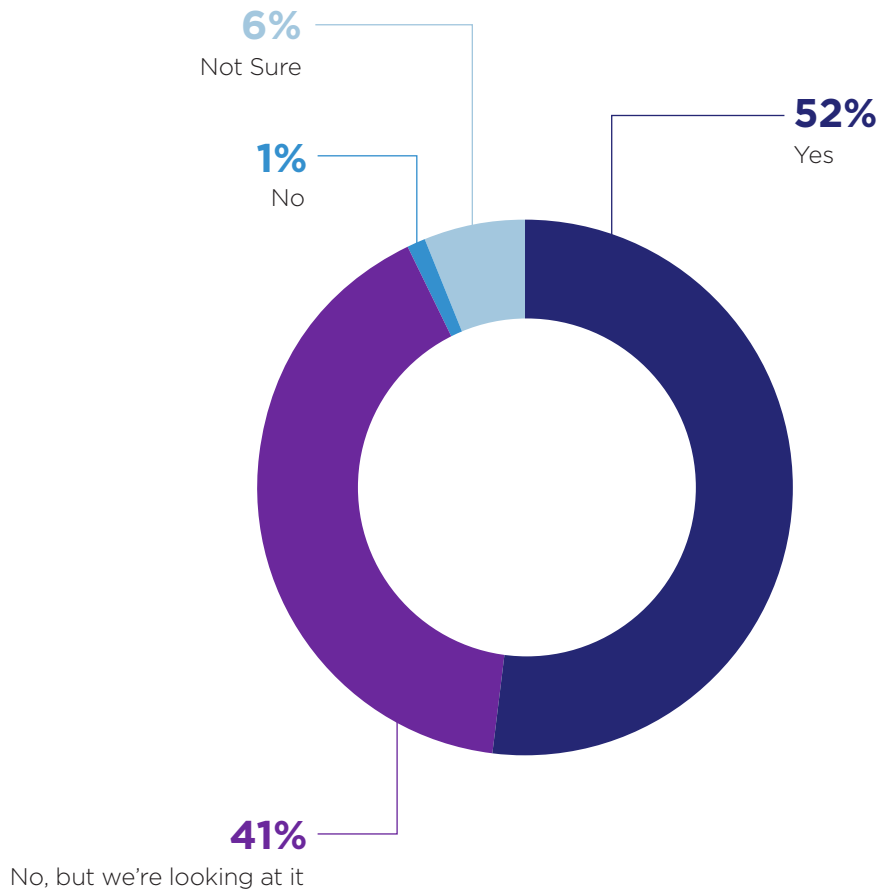
There is industry-wide consensus that security challenges will increase with 5G networks. The increased criticality, complexity and traffic throughput of 5G networks will make increased security and reliability a major requirement. Only one percent of all mobile carrier respondents say increased traffic, connected devices and mission-critical uses case will not increase the need for greater network security and reliability. These results mirror the findings of our industry survey last year.





Is your company taking 5G requirements into consideration with your current security investments?

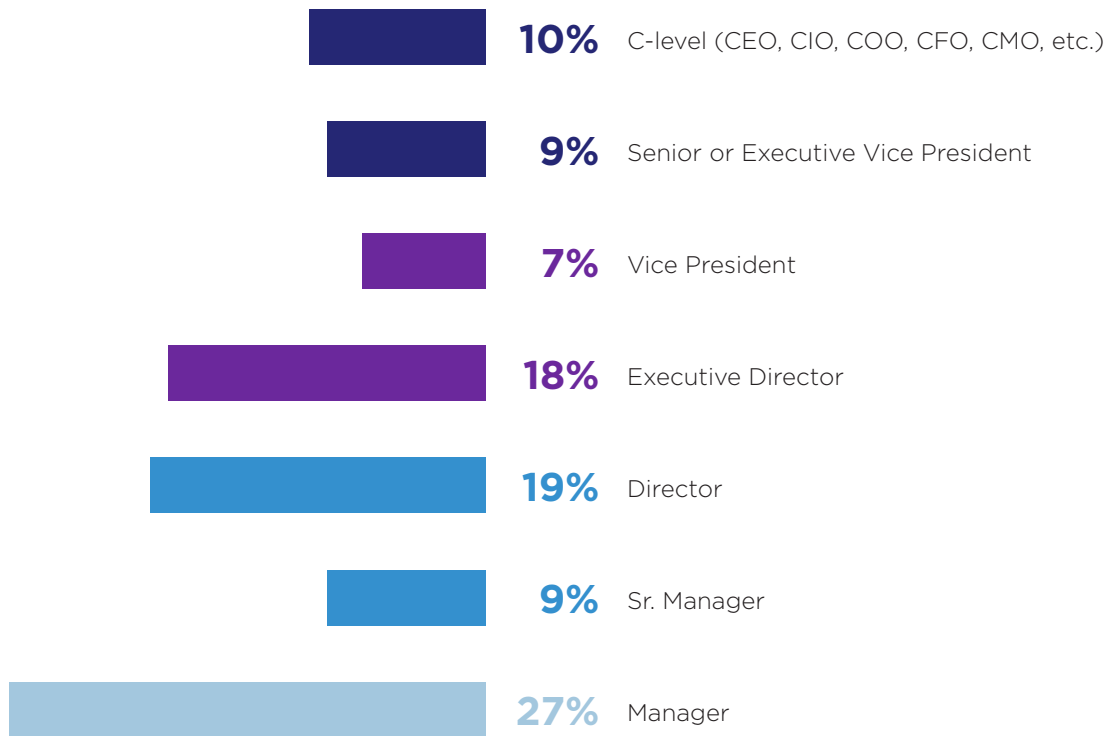
5G will have a large impact on security technology investments among mobile operators. Some 52 percent say 5G considerations are already reshaping their security investment, and another 41 percent are actively looking at this issue.





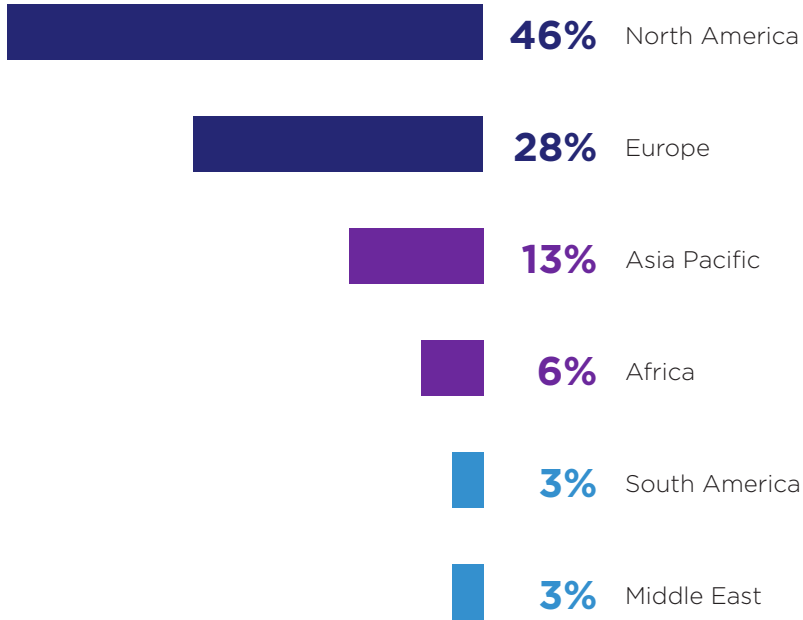
DEMOGRAPHICS

What is your title?



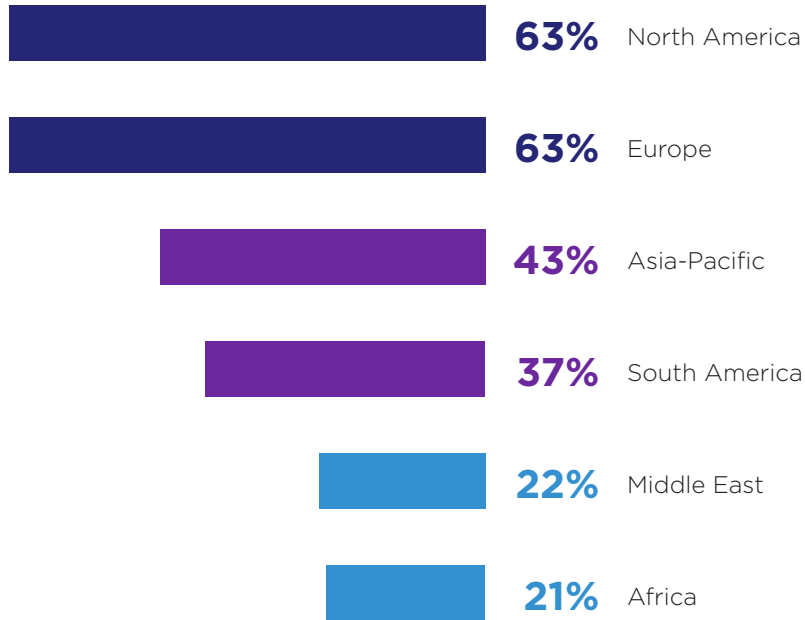


In which region is your company headquartered? (Select one)



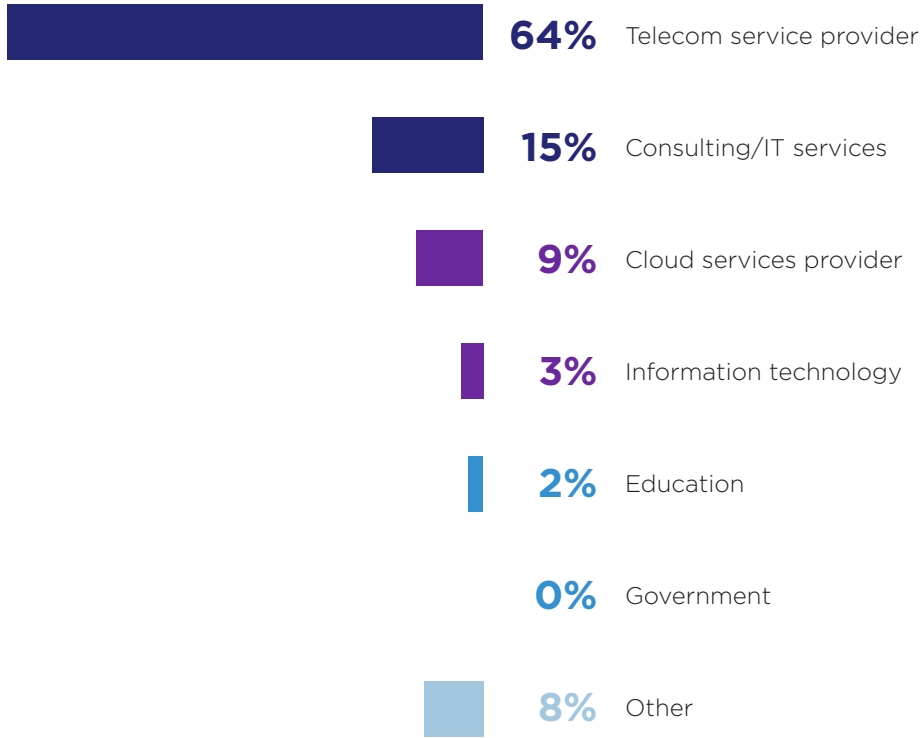


In which region(s) does your company operate? (Select all that apply)





What best describes your company's industry sector? (Select one)





A10

ABOUT A10 NETWORKS

A10 Networks (NYSE: ATEN) provides secure application services for on-premises, multi-cloud and edge-cloud environments at hyperscale. Our mission is to enable service providers and enterprises to deliver business-critical applications that are secure, available and efficient for multi-cloud transformation and 5G readiness. We deliver better business outcomes that support investment protection, new business models and help future-proof infrastructures, empowering our customers to provide the most secure and available digital experience. Founded in 2004, A10 Networks is based in San Jose, Calif. and serves customers globally. For more information, visit www.a10networks.com and follow us @A10Networks.



ABOUT BPI NETWORK

The Business Performance Innovation (BPI) Network is a peer-driven thought leadership and professional networking organization reaching some 50,000 heads IT transformation, change management, business re-engineering, process improvement, and strategic planning. It is dedicated to advancing the emerging roles of the Chief Innovation Officer and Innovation Strategist within today's enterprise. The BPI Network brings together global executives who are champions of change within their organizations through ongoing research, authoritative content and peer-to-peer conversations. These functional area heads (operations, IT, finance, procurement, sales, marketing, product development, etc.) and line-of-business leaders are advocates for Innovation as a fundamental discipline and function within 21st Century organizations. They seek to demonstrate where and how new inventive solutions and approaches can advance business value, gratify customers, ensure sustainability and create competitive advantage for companies worldwide. For more information, visit www.bpinetwork.org.



PARTNERS & AFFILIATES



QUALTRICS

Qualtrics is a leading global provider of enterprise data collection and analysis products for market research, voice of customer, employee performance, and academic research. Through an intuitive, easy-to-use interface and award-winning services and support, Qualtrics products enable both professional and DIY researchers to conduct quantitative research at a lower cost and in less time than competing alternatives. Founded in 2002, Qualtrics has more than 5,000 clients worldwide, including half of the Fortune 100, more than 1,300 colleges and universities, and 95 of the top 100 business schools. For more information and a free trial, visit www.qualtrics.com.



ADESTRA

Adestra is a trusted provider of First-Person Marketing solutions for global and growing brands. The company's industry-leading email platform provides a powerful infrastructure for one-to-one, contextual messaging and marketing automation, helping marketers communicate more effectively with their customers and subscribers. Robust reporting features allow marketers to efficiently evaluate and optimize their campaign results. The flexible structure and open integration architecture allow businesses to connect disparate technology platforms to create a seamless customer journey. Along with a best-of-breed platform that drives customer engagement and boosts ROI, Adestra was founded on the principle that marketing success takes more than technology, which is why customer service is at the heart of its business. For more information visit www.adestra.com.