The Cloud Effect on Data Center Networking

Enterprise IT departments are seeking high-performance connections to data centers for mission-critical, cloud-based applications.

Enterprises have turned to cloud-based applications hosted in remote data centers to increase productivity, manage spending, and drive competitive advantage. And enterprises aren't alone—businesses of all sizes are now running a wide range of applications in the cloud, including accounting, HR, and salesforce and customer relationship management (CRM).

With business applications moving to the cloud, most companies now provide employee access to their enterprise software applications via the Internet and through mobile devices. But concerns about security, reliability, performance, and control are driving enterprise IT departments to evaluate the network infrastructure and services that connect their company locations to data centers.

Whether enterprises connect to their cloud-based resources in data centers via the Internet, with private connections, or by combining these two approaches, one thing is clear: Organizations are searching for the best method to maintain high reliability and up-time while achieving low latency and high response time. These factors provide the key to leveraging the full potential of customized and mission-critical applications hosted in dedicated, private cloud data centers.

This is one of the key findings in "The State of Data ▶▶

An Exclusive Research Report

The movement to cloud computing and cloud-based enterprise applications seems unstoppable. Cloud apps are now available for every business type and size, regardless of industry, number of employees, or location.

In fact, 62% of the 336 enterprise IT decision makers who participated in the UBM Tech "The State of Data Center Networking" survey, sponsored by Comcast, said their companies currently use cloud-based applications. Many of these enterprises have turned to cloud-based resources hosted in remote data centers to manage spending, increase productivity, and drive competitive advantage.

But respondents to the survey cited significant challenges that have prevented them from using off-site, third-party, hosted applications. Among the 24% of respondents who don't use or plan to use cloud services, top concerns include security and loss of control.
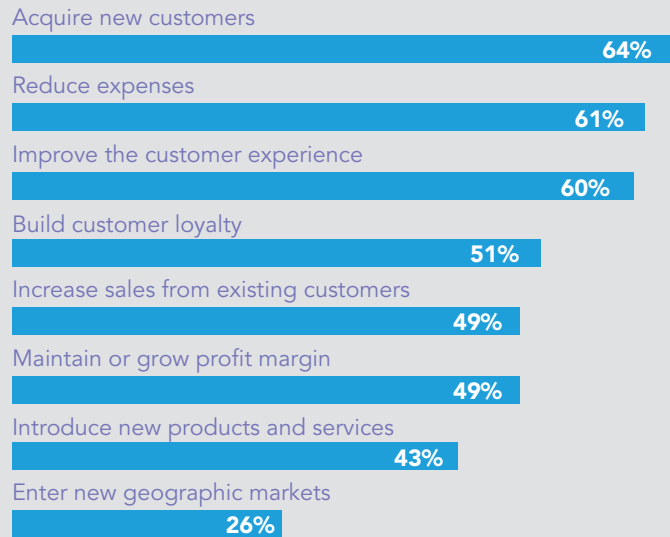
Although many companies are satisfied with their current mode of data center connectivity, their desire for reliability, security, and speed may cause them to outgrow or rethink their approach.

Figure 1. Does your company currently use cloud-based application?
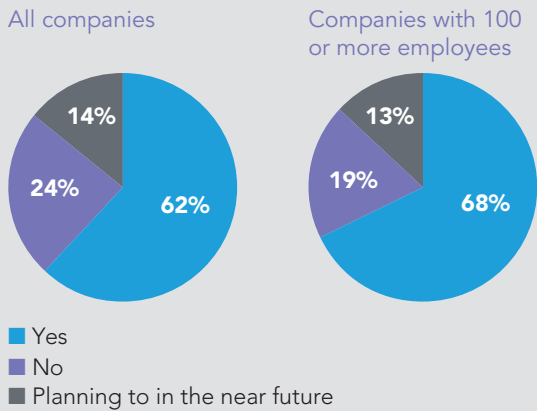
All companies

Companies with 100 or more employees

14%
24%
62%

13%
19%
68%

■ Yes
■ No
■ Planning to in the near future

BASE: 336 respondents at all companies; 167 respondents at companies with 100+ employees
DATA: UBM Tech survey of 336 business technology managers involved in purchasing data center networking services or technologies, March 2014

Figure 2. What are your key business objectives at this time?

Acquire new customers — 64%
Reduce expenses — 61%
Improve the customer experience — 60%
Build customer loyalty — 51%
Increase sales from existing customers — 49%
Maintain or grow profit margin — 49%
Introduce new products and services — 43%
Enter new geographic markets — 26%

NOTE: Multiple responses allowed.
DATA: UBM Tech survey of 336 business technology managers involved in purchasing data center networking services or technologies, March 2014

Center Networking," a comprehensive study by UBM Tech of more than 300 IT decision makers and senior executives from organizations across a wide range of organizations. The research reveals companies' requirements for connecting with mission-critical data centers today, how they are connecting, how well those solutions are working, and their plans to meet future requirements.

Cloud Soars

For customized and mission-critical applications, private cloud data center solutions deliver usage-based, dedicated cloud computing infrastructure and storage solutions, allowing enterprise IT to access virtualized servers on a pay-as-you-go basis for capacity to scale on demand as well as backup and disaster recovery. There's no doubt that cloud-based applications make business operations more efficient, provide flexibility and ease of use, reduce cost, and increase scalability. That's why 62% of respondents to the UBM Tech survey currently use cloud-based applications — a number that rises to 68% of those at companies with more than 100 employees. (See Figure 1.)

The popularity of cloud options is tied to the

business environment enterprises face. On the one hand, companies are driven to increase revenues by acquiring new customers, improving customer experience, building customer loyalty, increasing sales from existing customers, and introducing new products
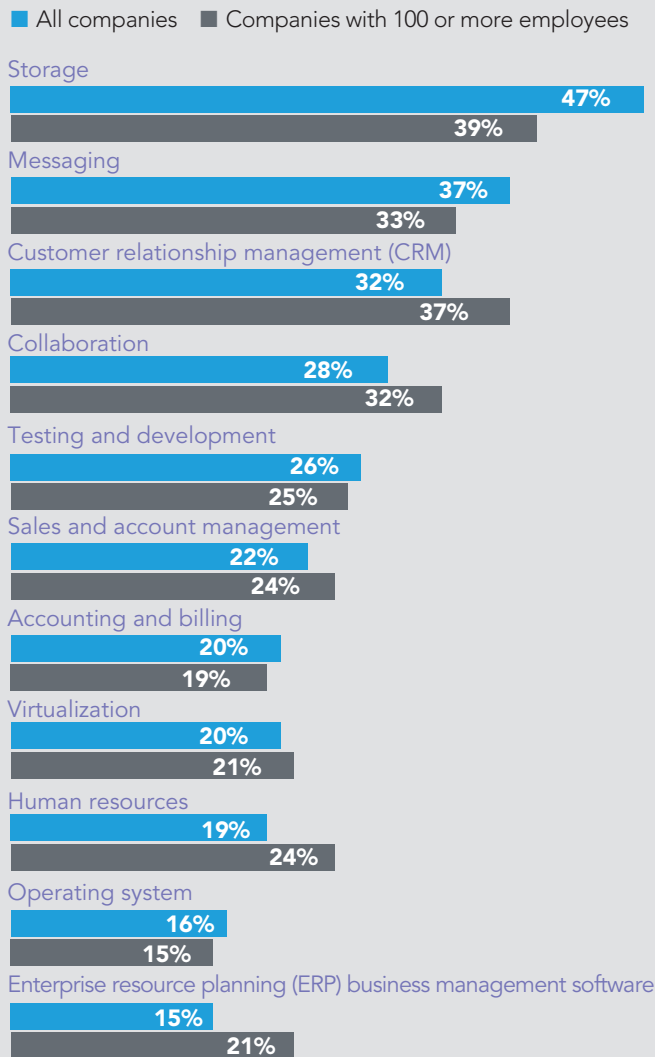
Survey Methodology

In March 2014 UBM Tech conducted an online survey on behalf of Comcast exploring the use of high-performance connections to data centers to support mission-critical, cloud-based applications.

A total of 336 IT and business management professionals involved in purchasing data center networking services or technologies comprise the final data set. Just under half of respondents work at companies with 100 or more employees, and results analyzed in this report include the total base of respondents, as well as those from companies with 100 or more employees. Respondents were from a variety of vertical industries.
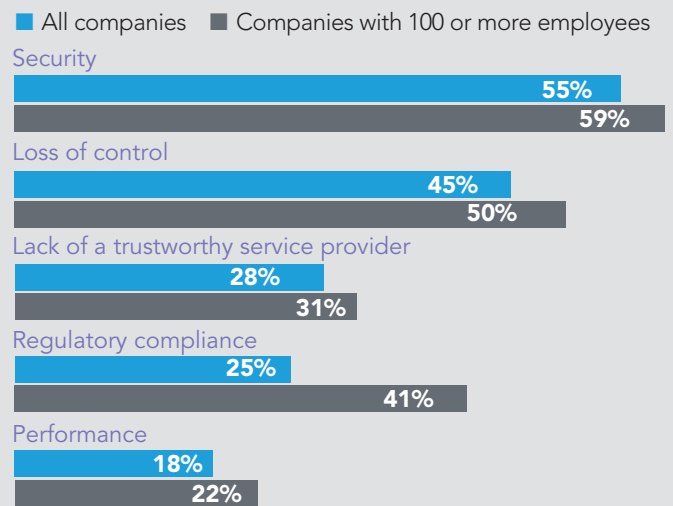
The greatest possible margin of error for the total respondent base (N=336) is +/- 5 percentage points. UBM Tech was responsible for all programming and data analysis. These procedures were carried out in strict accordance with standard market research practices.

Figure 3. **Which of the following enterprise applications is your company currently hosting in the public cloud?**
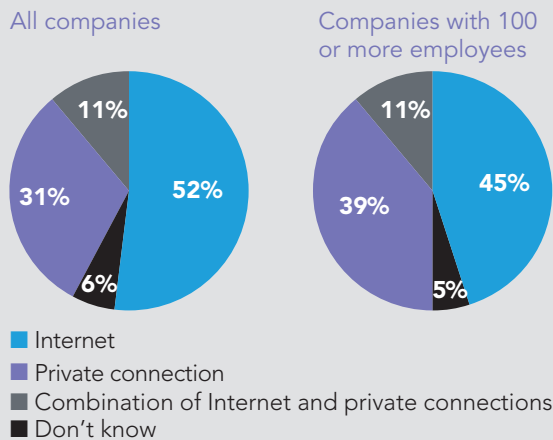
■ All companies ■ Companies with 100 or more employees

Storage
- 47%
- 39%

Messaging
- 37%
- 33%

Customer relationship management (CRM)
- 32%
- 37%

Collaboration
- 28%
- 32%

Testing and development
- 26%
- 25%

Sales and account management
- 22%
- 24%

Accounting and billing
- 20%
- 19%

Virtualization
- 20%
- 21%

Human resources
- 19%
- 24%

Operating system
- 16%
- 15%

Enterprise resource planning (ERP) business management software
- 15%
- 21%

NOTE: Multiple responses allowed.
BASE: 298 respondents at all companies; 150 respondents at companies with 100+ employees
DATA: UBM Tech survey of 336 business technology managers involved in purchasing data center networking services or technologies, March 2014

Figure 4. **What has prevented you from using off-site, third-party, hosted applications/resources?**

■ All companies ■ Companies with 100 or more employees

Security
- 55%
- 59%

Loss of control
- 45%
- 50%

Lack of a trustworthy service provider
- 28%
- 31%

Regulatory compliance
- 25%
- 41%

Performance
- 18%
- 22%

NOTE: Multiple responses allowed.
BASE: 80 respondents from all companies; 32 respondents from companies with 100+ employees who do not use cloud-based applications
DATA: UBM Tech survey of 336 business technology managers involved in purchasing data center networking services or technologies, March 2014

Figure 5. **How do you access those cloud-based resources/applications?**

All companies
- 11%
- 31%
- 6%
- 52%

Companies with 100 or more employees
- 11%
- 39%
- 5%
- 45%

■ Internet
■ Private connection
■ Combination of Internet and private connections
■ Don't know

BASE: 336 respondents at all companies; 167 respondents at companies with 100+ employees
DATA: UBM Tech survey of 336 business technology managers involved in purchasing data center networking services or technologies, March 2014

and services. At the same time, they're compelled to reduce expenses to maintain or grow their profit margins. (See Figure 2, page 2.)

Both larger and smaller companies are using a variety of enterprise applications in the public cloud, including storage, messaging, CRM, collaboration, sales, and account management. Less likely to be hosted in the public cloud were business-critical applications such as accounting, billing, and enterprise resource management (ERP). (See Figure 3.)
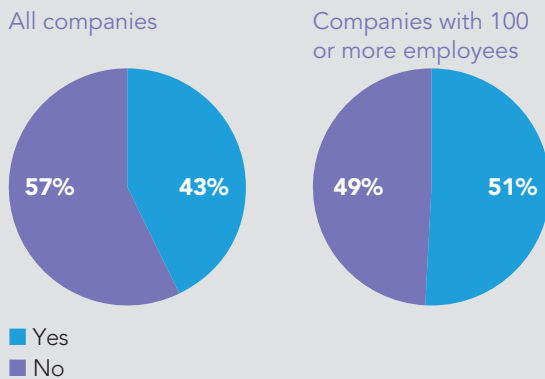
Questions Remain

But respondents to the UBM Tech survey identified significant challenges and stumbling blocks that

Figure 6. Do you know which data centers host your cloud-based services?
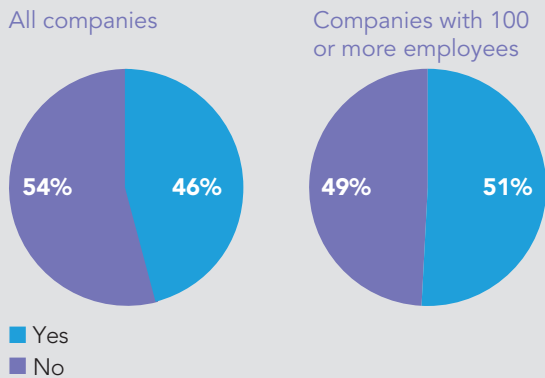
All companies

Companies with 100 or more employees

54% 46%

49% 51%

■ Yes
■ No

BASE: 336 respondents at all companies; 167 respondents at companies with 100+ employees
DATA: UBM Tech survey of 336 business technology managers involved in purchasing data center networking services or technologies, March 2014

Figure 7. Does your company currently host customized and mission critical applications in a dedicated, private cloud data center?

All companies

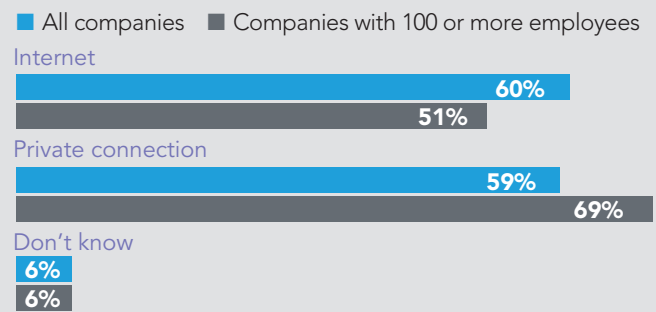Companies with 100 or more employees

57% 43%

49% 51%

■ Yes
■ No

BASE: 336 respondents at all companies; 167 respondents at companies with 100+ employees
DATA: UBM Tech survey of 336 business technology managers involved in purchasing data center networking services or technologies, March 2014

Figure 8. How do you connect your company to cloud computing resources?

■ All companies   ■ Companies with 100 or more employees

Internet

60%

51%

Private connection

59%

69%

Don't know

6%

6%

NOTE: Multiple responses allowed.
BASE: 145 respondents from all companies; 84 respondents from companies with 100+ employees that host mission-critical apps in a private cloud data center
DATA: UBM Tech survey of 336 business technology managers involved in purchasing data center networking services or technologies, March 2014

have prevented them from using off-site, third-party, hosted applications/resources. The 24% of respondents not using cloud-based applications reported that security and a loss of control are major concerns when it comes to cloud. A significant number (31%) of enterprises with more than 100 employees also cite concerns about finding trustworthy service providers. (See Figure 4, page 3.)

Approximately half of respondents reported the use of the Internet to access cloud-based applications and resources, while only 5% reported the use

of private connections. Another 31% of respondents reported the use of a combination of Internet and private connections. (See Figure 5, page 3.)
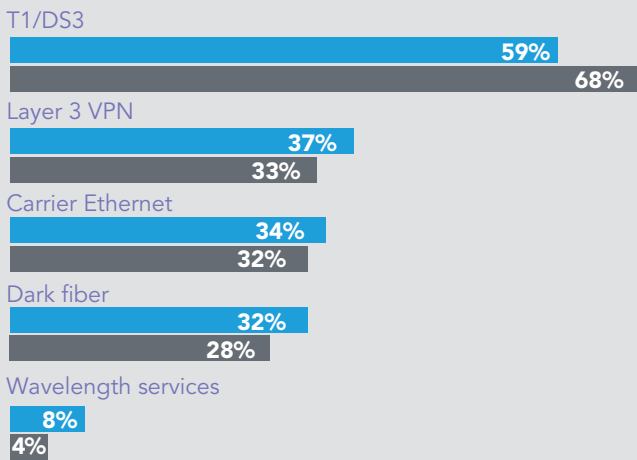
As Internet security and other concerns rise, organizations are likely to look for connectivity options that better align to their key selection criteria. And security isn't the only consideration: A recent study by the Equinix Solution Validation Center showed a 147% increase in throughput when enterprises directly connect to the cloud, eliminating the bottlenecks associated with traditional public Internet connections to cloud computing resources. With applications being virtualized among many data center platforms, 54% of all survey respondents reported that they do not know which data centers host their cloud-based services. This dropped slightly to 49% among respondents from larger enterprises. (See Figure 6.)

Private Cloud at Work

Only 43% of all respondents reported that their companies host customized and mission-critical applications in a dedicated, private cloud data center under the control of the IT department within the corporate firewall. This percentage increased slightly to 51% among respondents from larger and

Figure 9. **What kind of private connection?**

■ All companies   ■ Companies with 100 or more employees

T1/DS3
59%
68%

Layer 3 VPN
37%
33%

Carrier Ethernet
34%
32%

Dark fiber
32%
28%

Wavelength services
8%
4%
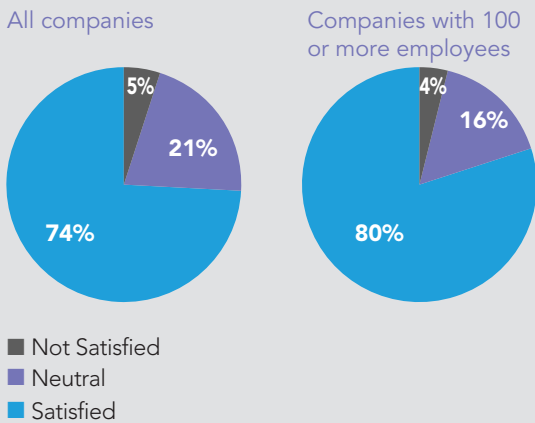
NOTE: Multiple responses allowed.
BASE: 85 respondents from all companies; 57 respondents from companies with 100+ employees that connect to cloud computing resources via a private connection
DATA: UBM Tech survey of 336 business technology managers involved in purchasing data center networking services or technologies, March 2014

Figure 10. **How satisfied are you with your current data center connectivity?**

All companies

Companies with 100 or more employees

5%
21%
74%

4%
16%
80%

■ Not Satisfied
■ Neutral
■ Satisfied

BASE: 336 respondents at all companies; 167 respondents at companies with 100+ employees
DATA: UBM Tech survey of 336 business technology managers involved in purchasing data center networking services or technologies, March 2014

midsized enterprises with more than 100 employees. (See Figure 7, page 4.)

Most survey respondents report that their companies use Internet (60%), private connections (59%), or a combination of both to connect with customized and mission-critical applications hosted in a dedicated, private cloud data center. The use of private connections increases slightly to 69% among respondents from larger and midsized enterprises with more than 100 employees. Although over-the-top (OTT) Internet connections offer the least expensive means for connecting companies to cloud computing data centers, the limitations are significant in terms of the uptime, reliability, latency, scalability, and security. (See Figure 8, page 4.)

Among those using private data center connections, the majority of respondents (59%) report that their companies still use legacy private lines, with 37% using Layer 3 VPN and only 34% using Carrier Ethernet services for private data center connections. The use of fiber-based Carrier Ethernet services is quite consistent among respondents from larger and midsized enterprises with more than 100 employees, and for connecting remote office locations and branches to cloud data centers. (See Figure 9.)

Gaps and Contradictions

The UBM Tech survey results point out several gaps and contradictions in the data center networking strategies of midsized enterprises.

One example is the perception of the adequacy of their current data center connectivity. A total of 74% of respondents to the UBM Tech survey are somewhat, quite, or very satisfied with their current mode of data center connectivity. Only 5% of respondents expressed any dissatisfaction with their current mode of data center connectivity. (See Figure 10.)

Yet survey respondents identified several major challenges for connecting to mission-critical, third-party, remote data centers, including maintaining high reliability and up-time, achieving low latency and high response time, and increasing capacity as usage grows.

Regarding the criteria for selecting a solution for private data center connections, respondents identified reliability, security, high speed, low cost, low latency, capacity, and scalability as very important

Connectivity Options

Several service providers are currently jockeying for a leadership position in data center networking and cloud connectivity to help enterprise customers unlock the full potential of enterprise cloud computing. Making the right choice involves understanding the tradeoffs of the available options for robust, reliable, scalable, and secure networking.

Public Internet connections. Some smaller enterprises rely on public Internet connections to their cloud-based applications in remote data centers. Although economical, this approach is not scalable, reliable, or secure and is generally not suited for today's highly distributed cloud networks.

Traditional T1 and DS3 private line connections. Legacy private lines from traditional telcos offer more security than public Internet connections, but they aren't scalable, and dedicated point-to-point circuits are not flexible enough for rapidly growing cloud services traffic.

Layer 3 VPN. Traditional VPNs use the public Internet with additional IPsec or SSL security, relying on network authentication and encryption provisions to deliver secure, value-added network services. But VPN-based data center connections that use the public Internet may experience issues regarding the consistency and reliability of network throughput. Layer 3 VPNs use a more scalable and secure, peer-to-peer model over any existing network infrastructure such as IP, Multiprotocol Label Switching (MPLS), Frame Relay, or Ethernet to offer value-added services like Quality of Service (QoS).

Dark fiber. Local exchange carriers (LECs) provide these services to allow their largest enterprise customers to provision ultra-high bandwidth optical transmission capacity between their locations and remote data centers. Dark fiber's low cost is very appealing, but it's only one component of a total service. Customers are responsible for maintaining equipment on the ends, including trouble shooting and repair. So, dark fiber isn't a good option for companies that aren't prepared to be their own service providers.

Carrier Ethernet. Simple, reliable, efficient, scalable, and flexible enhanced fiber optic services that provide high-bandwidth dedicated Internet, point-to-point, and multipoint private line connectivity, carrier Ethernet is best suited for mid-market organizations (or larger) that require high-performance connectivity to remote data centers for latency-intolerant, mission-critical cloud applications.

criteria in selecting a solution for data center networking. (See Figure 11, page 7.)

Yet the majority of respondents report that their companies still use dedicated point-to-point circuits and legacy private lines from traditional telcos, even though they are not scalable or flexible enough for connecting to remote data centers hosting mission-critical, cloud-based enterprise applications.

Selecting a Data Center Networking Provider

Despite their apparent satisfaction with the connectivity status quo, enterprise IT decision makers must soon seek solutions for data center networking connectivity that will help their companies unlock the full potential of cloud computing applications. This requires a careful examination of the trade-offs between available data center connectivity options to support robust, reliable, scalable, and secure networking designed to keep cloud users connected and business applications running smoothly.
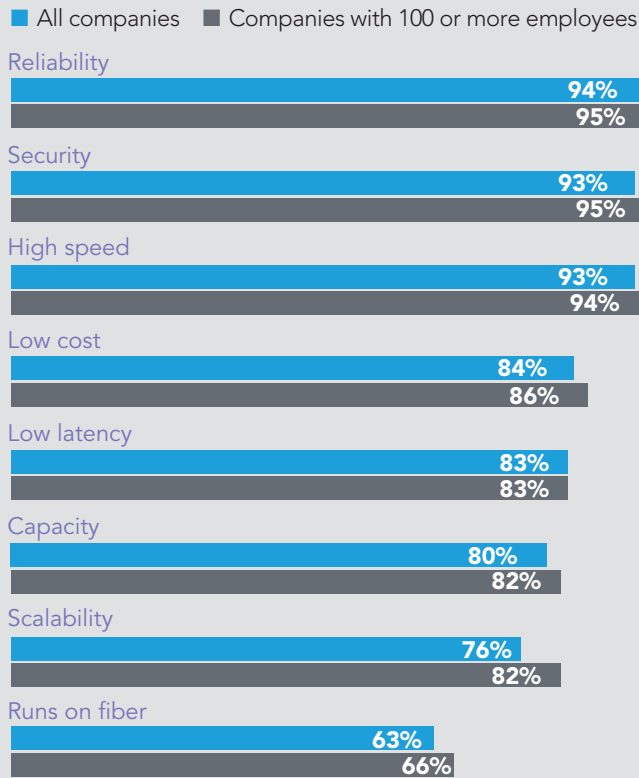
Respondents recognize several companies as leaders in connecting enterprises with mission-critical data centers. Among these are the leading telcos and Internet service providers, as well as cable broadband providers such as Comcast Business. (See Figure 12, page 7.)

Service providers have a significant opportunity to gain market share by linking the benefits of their connectivity solutions to the most important criteria identified by survey respondents in selecting a data center networking provider.

As midsized enterprises become aware of the associated cost efficiency and improved network performance, look for more to select Ethernet connectivity. Compared to other options, Ethernet connectivity provides low latency and flexible, reliable,
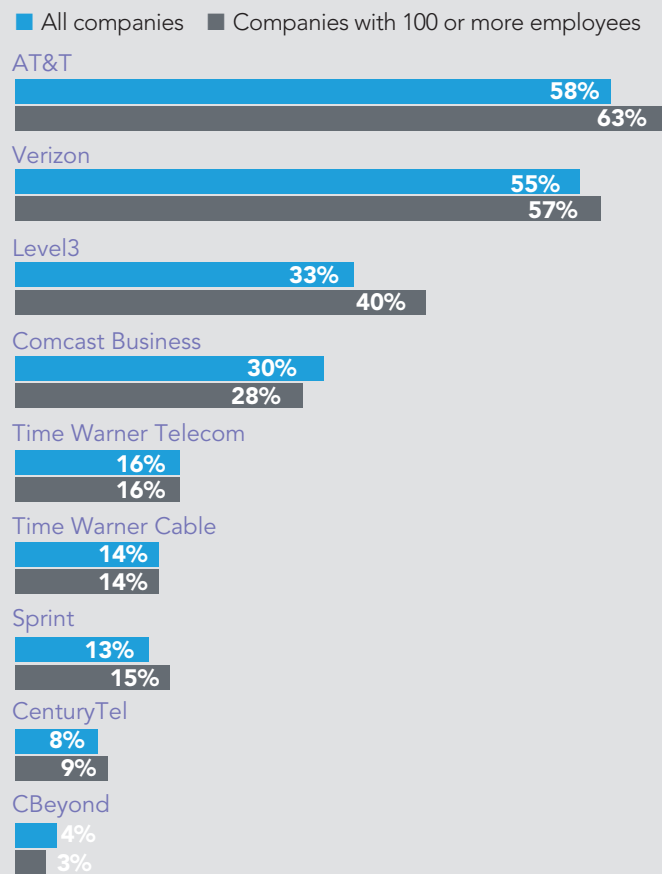
Figure 11. How important are the following criteria in selecting a solution for data center networking to ensure optimal performance of your most mission critical cloud-based enterprise applications?

■ All companies ■ Companies with 100 or more employees

Reliability
- 94%
- 95%

Security
- 93%
- 95%

High speed
- 93%
- 94%

Low cost
- 84%
- 86%

Low latency
- 83%
- 83%

Capacity
- 80%
- 82%

Scalability
- 76%
- 82%

Runs on fiber
- 63%
- 66%

NOTE: Percentages reflect top scores of "important" or "very important" on a 7-point scale
BASE: 336 respondents from all companies; 167 respondents from companies with 100+ employees that connect to cloud computing resources via a private connection
DATA: UBM Tech survey of 336 business technology managers involved in purchasing data center networking services or technologies, March 2014

Figure 12. Which of the following companies do you consider to be leaders in connecting enterprises with mission critical data centers?

■ All companies ■ Companies with 100 or more employees

AT&T
- 58%
- 63%

Verizon
- 55%
- 57%

Level3
- 33%
- 40%

Comcast Business
- 30%
- 28%

Time Warner Telecom
- 16%
- 16%

Time Warner Cable
- 14%
- 14%

Sprint
- 13%
- 15%

CenturyTel
- 8%
- 9%

CBeyond
- 4%
- 3%

NOTE: Multiple responses allowed
BASE: 336 respondents at all companies; 167 respondents at companies with 100+ employees
DATA: UBM Tech survey of 336 business technology managers involved in purchasing data center networking services or technologies, March 2014

secure, and cost-effective alternatives to private lines or Layer 3 VPN for Internet access and virtual point-to-point and multipoint connections to multiple data centers. (See text box, page 6.) The scalable bandwidth it supplies can be deployed quickly and added to keep pace with the growth of the business. ●

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