IBM Institute for Business Value

The IT infrastructure conversation

New content, new participants, new tone

Technology strategy

In the era of cloud, big data and analytics, mobile and social, the IT decisions you make matter. IBM can provide the foundation for your computing, network and storage infrastructure needs. We help clients create efficient and resilient IT environments with intelligent servers and storage systems that empower employees to share information, secure transactions and drive real-time insights.

By Nate Dyer, Pamela Hurwitch, Eric Lesser and Jacqueline Woods

While the topic of IT infrastructure continues to permeate conversations across industries, the content, participants and tone of those conversations are changing. As business leaders across the C-suite recognize the link between a strong IT infrastructure and the ability to drive competitive advantage, they also understand that this dependency will grow with continued advances in big data and analytics, cloud, social and mobile technologies.

While many companies are only beginning to leverage the power of a robust IT infrastructure, our recent survey identified a small group of forward-thinking IT leaders. Working to tackle next-generation IT infrastructure challenges, these organizations are leading the right conversations in their companies, elevating the importance of IT infrastructure, making the right investments for the future and, perhaps most important, collaborating and serving as advisors across the business.

71% **of organizations say IT infrastructure plays an important role** in enabling competitive advantage or optimizing revenue and profit.

<10% **of companies report that their IT infrastructure is fully prepared** to meet the demands of mobile technology, social media, big data and cloud computing.

30% **of IT executives believe they are effectively collaborating with the business** to provide IT infrastructure solutions.

39% **of IT executives identify creating new revenue streams** as the top opportunity for improving return on investment from IT infrastructure.

Today's conversations about IT infrastructure are changing. Specifically, the *content* is changing. Traditional issues of computing speed and reliability remain important. However, the continued advancements and integration of cloud technology, mobile devices, social media and business analytics are significantly reshaping the discussion.

As one insurance industry CIO told us, "We have to deal with many challenges such as growth and retention, risk and compliance, and efficiency and expense control. Our IT infrastructure helps us to deal with these issues with the help of mobile and social media, big data and cloud computing." Yet, less than 10 percent of companies surveyed indicate that their IT infrastructure is fully prepared to meet the demands of these new capabilities.

The *participants* in IT conversations are also changing. No longer is the discussion solely among IT architects and data center leaders. More and more, the business is taking a closer look at IT infrastructure—and whether it is able to keep up with a continuously changing and increasingly complex business environment.

Our data revealed that roughly 40 percent of companies indicate that non-IT functions will be involved in making infrastructure decisions in areas such as end-user devices, security and cloud computing. With the rapid rise of cloud computing, functional users such as sales, operations and others now have greater options to host critical applications outside the confines of internal IT platforms. However, less than one-third of IT executives say they are effectively collaborating with line-of-business leaders to provide IT infrastructure solutions to support their businesses.

Finally, the *tone* of conversations is changing. With information technology increasingly at the core of today's organization, system disruptions and security breaches become front-page headlines with implications for senior executives and shareholders alike. Almost half of the companies surveyed are concerned that their infrastructure could be compromised by insiders or through social media.

Much more than a dialogue about managing system costs or operating system choices, the conversation about IT now centers on success or failure in the marketplace. Over 70 percent of senior IT executives recognize IT infrastructure as essential in enabling competitive advantage or optimizing revenue and profit. A retail industry IT executive said, "IT infrastructure plays a vital role in our day-to-day activities and business. It increases the ability of our company to respond to a rapidly changing marketplace through flexibility, efficiency and speed."

To understand how this IT infrastructure conversation is changing, the IBM Institute for Business Value, in conjunction with Oxford Economics, surveyed 750 IT executives. We sought to determine how prepared their IT infrastructure is to meet the needs of today's changing business environment, as well as where they are looking to invest their resources. Further, our survey investigated the relationship between core business and IT parts of the organization in managing infrastructure issues.

Our study reveals that while the majority of companies are just starting to engage in this new set of conversations, a small number of leading organizations are already working in tandem with their line-of-business leaders to jointly take on the challenges of the next generation of IT infrastructure needs. These companies are developing strategies to address the entirety of their IT infrastructure and measuring the performance of their operations. They are also supporting cross-functional teams that work across traditional infrastructure silos.

But perhaps most important, they are collaborating with the business and serving as advisors to the business—not only on internal IT infrastructure services, but also the implications for using external providers. These visionary companies represent more than simply good practices: they also are more likely to outperform their peers across several business outcomes.

This report focuses on the changing nature of the conversation by looking at how companies view the importance of IT infrastructure, the investments they are making in this space, and how they can better prepare for the future. In a subsequent report, we will address the collaboration between the IT function and other parts of the organization to understand how these groups can work together to set the future IT infrastructure direction and use it to deliver value.

Methodology

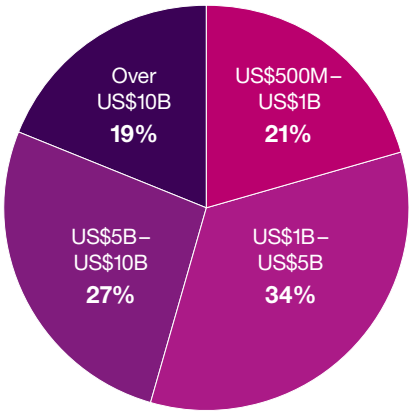
The data collected for this study is based on a survey of 750 senior IT executives hosted in conjunction with our research partner, Oxford Economics. To participate in the survey, participants identified themselves as being involved in decisions regarding their organizations' IT infrastructure strategy and practices. Respondents were located in 18 countries, with 66 percent from mature markets and 34 percent from growth markets. The respondents represent a wide variety of industries and company sizes (see Figure 1).

As part of our analysis, we evaluated the extent to which companies identified themselves as applying certain leading practices, including:

- Establishing a well-defined enterprise IT infrastructure strategy and roadmap
- Collaborating effectively with the business to provide IT infrastructure solutions to support business needs (such as improving one-to-one customer engagement)
- Using the IT function as a broker of technology services for the organization (for example, providing expertise to the business in selecting software-as-a-service and other cloud computing opportunities)
- Supporting cross-functional teams of infrastructure domain experts to identify, source and implement IT infrastructure solutions
- Collecting, analyzing and documenting performance measures.

On a scale of 1 to 5, companies that selected a "4" or "5" in three or more of these practices were identified as "Strategic IT Connector" organizations. Those that did not select a 4 or 5 on any of these practices were identified as "Siloed IT Operator" organizations. In our sample, 17 percent of companies fell into the Strategic IT Connector category, while 20 percent were identified as Siloed IT Operator companies.

Survey respondents by global revenue



Survey respondents by industry (>50)*

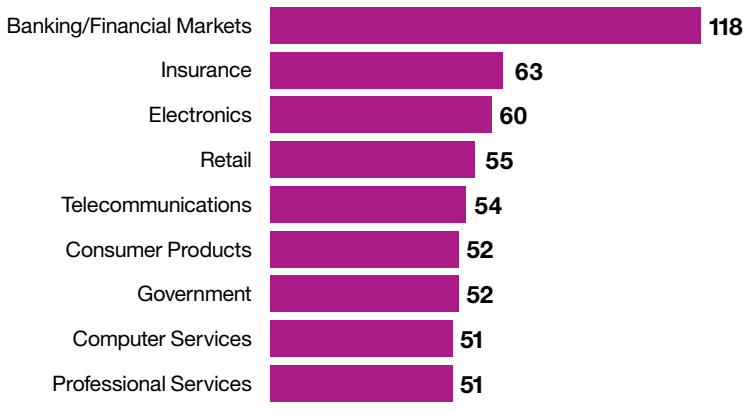


Figure 1: Industries and company sizes of study participants.

Source: IBM Institute for Business Value, IT Infrastructure Study. QS2. What is your organization's primary industry? (n=750); QS5. What was your organization's approximate global revenue last year in U.S. dollars? For public sector, what was your organization's approximate annual budget for the last fiscal year? (n=750).
*Note: Other Respondents: 194 (Aerospace and Defense, Automotive, Chemicals and Petroleum, Education, Healthcare (Provider), Industrial Products, Life Sciences and Pharmaceuticals, Media and Entertainment, Travel and Transportation, Utilities). Totals do not add to 100 percent due to rounding.

Overall, Strategic IT Connector companies were significantly more likely to identify themselves as outperforming their industry peers in terms of revenue growth (30 percent versus 10 percent of Siloed IT Operators) and profitability (45 percent versus 25 percent of Siloed IT Operators), and they were more likely to have a higher than average industry net profit margin compared to their industry peers (62 versus 26 percent of Siloed IT Operators).

Many organizations are unprepared for new IT infrastructure challenges

In today's business climate, technology is increasingly important for a competitive edge, as illustrated by our research findings on Chief Executive Officers (CEOs). In 2012 and 2013, CEOs identified technology as the leading external force impacting the enterprise.[1] At the same time, our recent study reveals today's organizations do not believe that the IT infrastructure has kept pace with the increasing demands associated with technological advances, such as the proliferation of smart and mobile technologies, the greater use of collaboration and social media, the ability to analyze large volumes of structured and unstructured data, and cloud computing (see Figure 2). Only about one-third of companies in our survey reported that their IT infrastructure was prepared to address these new trends, with less than 10 percent stating they were fully prepared.

At the same time, a number of organizations have positioned themselves to more effectively address these trends (see Methodology sidebar). Those Strategic IT Connector organizations—which have been more active in developing strategies to address changing technological trends and have worked more closely with the business to meet their needs—identified themselves as significantly more prepared to address infrastructure requirements than their Siloed IT Operator peers. These requirements include greater preparedness in the areas of cloud (52 versus 10 percent), mobility (50 versus 34 percent), social and collaborative tools (36 versus 28 percent), and analytics and big data (44 versus 39 percent).

From a technology perspective, organizations see three major challenges associated with their IT infrastructure. Almost half (46 percent) consider the ability to efficiently and securely move large amounts of data from one geography to another as a current impediment within their existing infrastructure.

Level of preparation of existing IT infrastructure to address the following trends

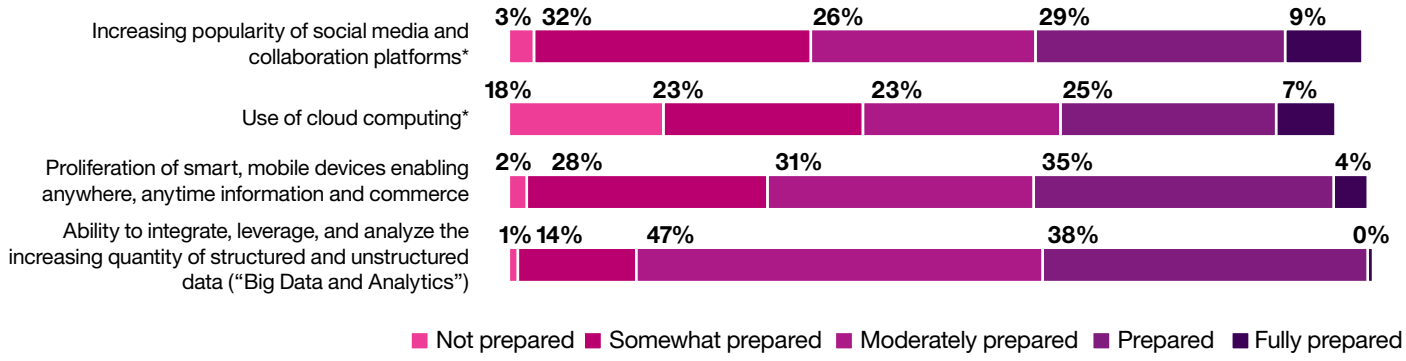


Figure 2: Less than 10 percent of surveyed organizations are fully prepared to address mobile, social, big data/analytics, and cloud trends.

Source: IBM Institute for Business Value, IT Infrastructure Study. Q2. How prepared is your existing IT infrastructure to address the following trends? (On a 1-5 scale, Not prepared represents a "1", Somewhat prepared a "2", Moderately prepared a "3", Prepared a "4", and Fully prepared a "5"), n=750; *Note: 1% of respondents answered "Don't Know" for Social and 4% answered "Don't Know" for Cloud.

Similarly, 43 percent believe they are hampered in their ability to reduce costs and improve efficiencies of a global storage environment. In a world where organizations are looking to produce new insights from transactional "systems of record" integrated with unstructured data coming from a variety of mobile and social sources, the ability to move data among locations and store vast quantities of data for future use represents an important capability (see Finanz Informatik case study on page 6).

Another area of concern organizations cited is the ability to develop and maintain a secure environment (43 percent). Given recent events, IT security has the attention of business and technology executives alike. Our findings show that companies are focused not only on attacks generated outside the organization, but also on the misuse of data from inside the firewall (see Figure 3). Almost half the companies in our sample said that being compromised by a rogue administrator or privileged insider is a significant security concern, followed closely by threats from social media activities.

Smaller companies (those under US$1 billion dollars in annual revenue) were more likely to be concerned with external threats, such as back-doors or hidden functions and advanced persistent threats, while the largest companies (US$10 billion and above) were more likely to be concerned with security challenges associated with cloud computing. For companies of all sizes though, one message remains clear: organizations must be prepared to react to both internal and external threats.

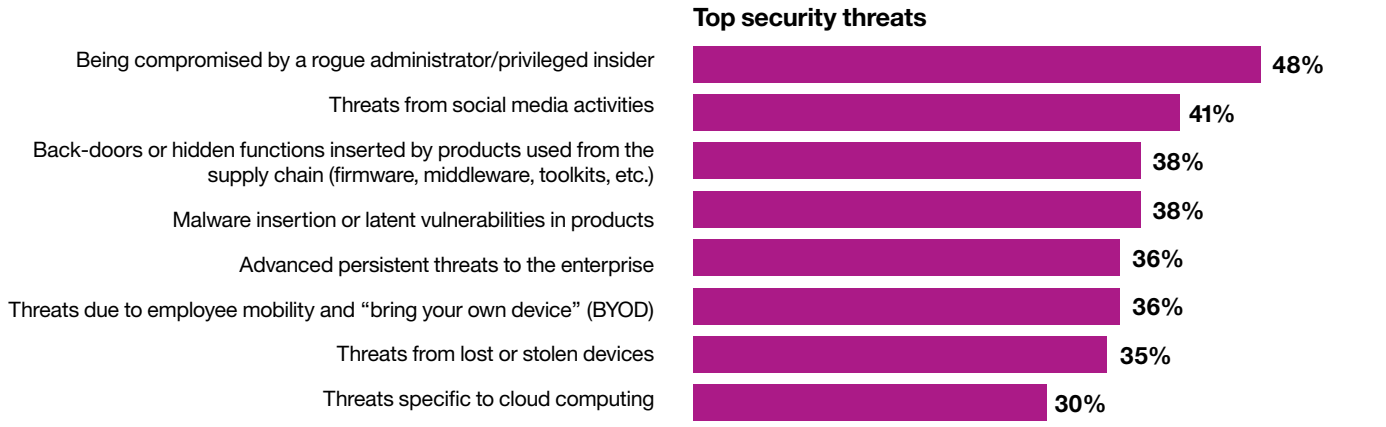


Figure 3: Almost half of surveyed organizations are concerned with security threats that involve the intersection of people and infrastructure.

Source: IBM Institute for Business Value, IT Infrastructure Study. Q7. How concerned are you about the following security threats? (percent indicating concerned or very concerned, n range=662-748, does not include "Don't Know").

Finanz Informatik: Addressing needs for system reliability, availability and security[2]

Finanz Informatik (FI), an IT service provider for the German Savings Banks Group (SFG), implemented technology solutions to address its growing customer base, service offerings and end-user mobility needs. FI needed its systems to provide the highest levels of availability, reliability and resiliency to deliver superior customer service. The company was challenged with providing more services, enabling new applications, supporting more devices and managing growing amounts of data while remaining cost effective.

In order to fulfill speed, security, system and compliance requirements, FI implemented a multi-platform optimized infrastructure environment consisting of high-end enterprise systems and x86 Linux and Windows systems based on workload attributes. The company provided secure, mobile access to core banking data by leveraging an open platform front end, cryptographic security built into the mainframe system and compliance management technologies on all platforms. Over the last 15 years, FI consolidated from nine to three regionally dispersed data center locations, each containing two sites for high availability and data recovery purposes.

FI has also been successful in developing a close partnership between IT and the business, which allows transparency in defining infrastructure strategy and new service offerings. Today, its IT executives recognize the need for a highly skilled IT staff that is not only up-to-date on the latest technology trends, but also understands the nuances of the banking business.

Investing in IT infrastructure—Meeting the changing demands

Despite the popular notion that IT infrastructure is rapidly commoditizing, our sample of IT executives paints a notably different picture. Today, over 70 percent of organizations recognize that IT infrastructure plays an important role in enabling competitive advantage or optimizing revenue and profit (see Figure 4). Our interviews with numerous executives reinforce this point. As the Chief Technology Officer from an industrial products company noted, "IT infrastructure is crucial for organizations as we are competing in an environment where faster time-to-market and expanded geographic reach are critical to success."

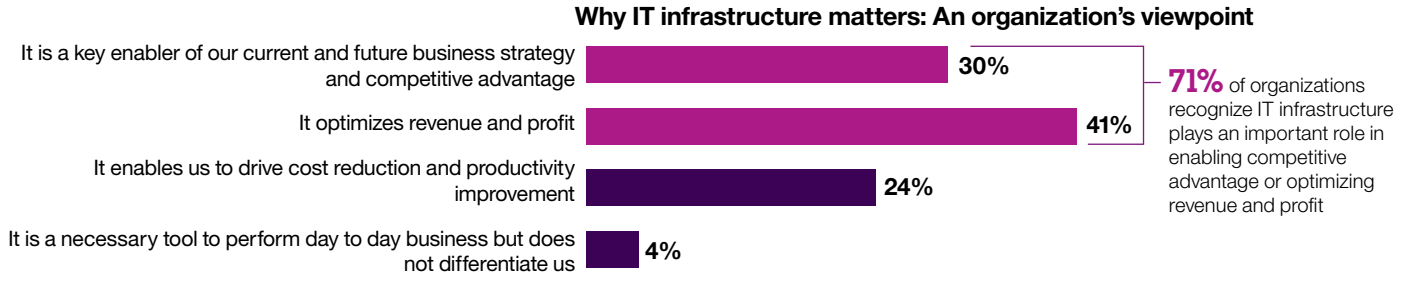


Figure 4: Seven out of ten organizations believe that IT infrastructure enables business results.

Source: IBM Institute for Business Value, IT Infrastructure Study. Q22. Please select the statement that best describes how your organization views IT infrastructure. Select one. (n=750, 1 percent said they "Don't Know").

Further, not only do companies deem IT infrastructure as important, but two-thirds are increasing their spending on IT infrastructure over the next several years (see Figure 5). Of particular note are the Strategic IT Connectors, which are significantly more likely to increase infrastructure spending by more than 10 percent (21 percent versus 5 percent of Siloed IT Operators).

In an era of tighter budgets and constrained resources, why are IT organizations looking to invest in their infrastructure? Reducing overall infrastructure costs was the leading response, with 33 percent looking to spend resources today to reduce future operating costs. However, cost was by no means the only major driver. Running a close second to cost was faster application development/deployment at 29 percent, followed by new or enhanced revenue opportunities and more effective disaster recovery both at 28 percent. Approximately a quarter of participants cited flexible pricing; the ability to provide mobile capabilities; achieving greater competitive differentiation; and achieving greater standardization of processes, services and interfaces. As an automotive IT executive said, "Rapid innovation in the field of IT has made a variety of traditionally separate information services increasingly related and helped increase efficiency levels and company revenues."

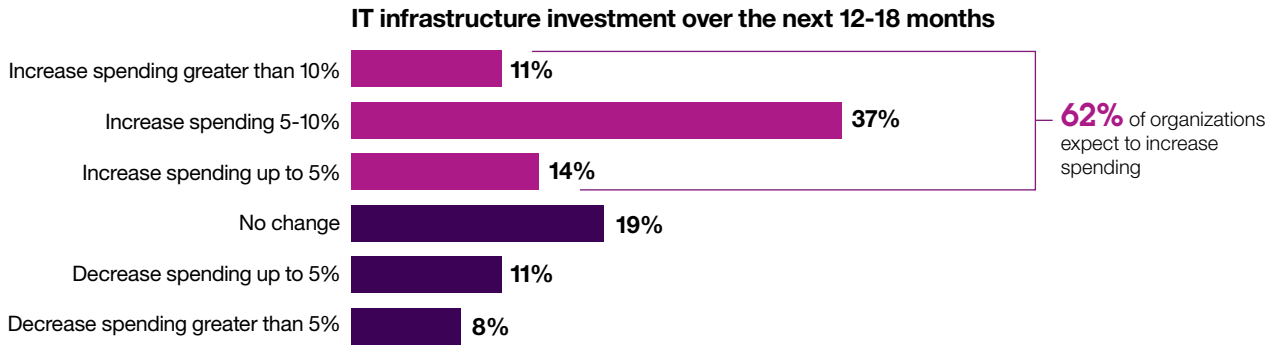


Figure 5: Over 60 percent of organizations plan to increase their IT infrastructure investment over the next 12-18 months.

Source: IBM Institute for Business Value, IT Infrastructure Study. Q19. In the next 12-18 months, does your organization expect to increase/decrease its spending on IT infrastructure? (n=750).

Perhaps most interesting though, is examining the drivers of investment through the lenses of our Strategic IT Connectors and Siloed IT Operators (see Figure 6). While cost reduction was common across both types of firms, the relative order of priorities quickly diverges. For the Strategic IT Connector companies, achieving competitive differentiation was tied for first with cost reduction, followed by more effective disaster recovery. A telecommunications IT executive noted, "IT infrastructure fosters the attainment of sustainable competitive advantage as it enables rapid new implementation of innovations and cost effective modifications of existing applications." One example of a company using its infrastructure to rapidly innovate is Infiniti Red Bull Racing (see case study on page 9).

In contrast, Siloed IT Operators are primarily focused on improving operational efficiencies and developing flexible pricing models. With less connection to the lines of business, they appear to focus on delivering a lower cost service, rather than developing a source of competitive differentiation.

To achieve competitive advantage, NTT Data is investing in an IT infrastructure that provides unique cloud services to a rapidly growing customer base. The global systems integrator serves customers that have a diverse, unfulfilled set of requirements including application support, industry-specific regulations and service delivery options. To achieve this level of flexibility, the company has deployed a "fit for purpose" infrastructure consisting of systems based on POWER and x86 architectures to optimize performance, integration, security and costs. NTT Data's choice of IT infrastructure helped it drive cost efficiencies in scale and software licensing, ensure high service levels while maintaining growth, and support a wide variety of industry applications across the world.[3]

Business drivers for upgrading and/or investing in new IT infrastructure (top 8 of 13)

Siloed IT Operators		Strategic IT Connectors	
Reduced infrastructure costs	1	1	Reduced infrastructure costs
Improved operational efficiencies	1	1	**Achieving greater competitive differentiation**
Flexible pricing model (e.g., dynamic pricing)	3	3	More effective disaster recovery
New or enhanced revenue opportunities	4	4	New or enhanced revenue opportunities
Achieving greater standardization of processes, services and interfaces	4	5	Faster application development/deployment
More effective disaster recovery	6	6	Flexible pricing model (e.g., dynamic pricing)
Faster application development/deployment	7	6	Achieving greater standardization of processes, services and interfaces
Achieving greater competitive differentiation	8	6	Improved services levels

Figure 6: Achieving greater competitive differentiation is a top business driver for Strategic IT Connectors but it ranked much lower for Siloed IT Operators.

Source: IBM Institute for Business Value, IT Infrastructure Study. Q15. How important are the following business drivers for upgrading and/or investing in new IT infrastructure? Select up to 5. Repeated numbers indicate ties. (Strategic IT Connectors, n=124, Siloed IT Operators, n=148).

Our study also provides insight into the future of IT infrastructure investments for organizations. Looking across various dimensions, there was no single area of infrastructure where organizations overwhelmingly planned to invest. Topping the list were security solutions, and servers and storage for big data/distributed analytics processing—roughly one-third of companies expected to invest more in each. Given the general lack of preparedness associated with analytics and the concerns companies face with security issues, both investment areas seem well-founded and logical.

Organizations are also looking to invest in open standards and open source-based architecture. According to Fred Ke, Executive Vice President of Products and R&D at Silk Road Telecommunications, a public cloud service provider in China, "Open source technologies not only help keep costs down, they also provide the necessary customization required for our business. We have over 200 R&D engineers developing open source platforms to optimize our solutions and enable our corporate strategy."

Strategic IT Connectors are more likely to invest in software-defined infrastructure, such as programmable resources managed by application requirements (30 percent of Strategic IT Connectors versus 22 percent of Siloed IT Operators). Siloed IT Operators are more likely to invest in virtualization technologies (25 percent of Siloed IT Operators versus 14 percent of Strategic IT Connectors). Given that virtualization is considered to be a more mature technology, it is perhaps not surprising that Siloed IT Operators are looking to "catch up" in this area.

Infiniti Red Bull Racing: Winning with real-time analytics and virtual simulations[4]

Infiniti Red Bull Racing, an Austrian Formula One automobile racing team, recognized the need for increased automation and real-time data to meet business demands for simulations and data analytics. By implementing high performance computing (HPC) solutions, the company provided its team the underlying infrastructure and advanced software tools to design, develop and operate its cars at a faster rate. Its sophisticated environment runs over 200 applications and makes heavy use of fluid dynamics simulations to optimize car design. The team also leverages near real-time race analytics to make the right decisions during race events.

Infiniti Red Bull Racing has not only invested in HPC power, but also made efficient use of that power given Formula One Teams Association and Fédération Internationale de l'Automobile (FIA) restrictions on the amount of computing resources allowed. Al Peasland, Head of Technical Partnerships said, "Year on year, the FIA regulations become more stringent and put more challenges on us: restricting the amount of IT resources, the size of high-performance computers we use and wind tunnel testing time. Another big challenge in recent years is the reduction of on-track test time."

Using workload-management software solutions, the team can intelligently schedule workloads and dynamically allocate hardware and software license resources to perform work according to business priorities, policies and restrictions. This allows the team to implement more design changes, and efficiently and effectively manage application workloads across its high-performance computing environment.

Infiniti Red Bull Racing's unparalleled success—winning four consecutive World Constructors' and Drivers' Championships in 2010-2013—is directly related to its infrastructure improvement efforts. Chief Information Officer Matt Cadieux said, "Our most compelling example was in 2012 when Sebastian Vettel was involved in an accident during his last race of the Drivers' Championship. With the real-time feeds, we were able to look at the general statistics and instruct Sebastian how to nurse the car and finish the competition."

The implementation of high performance computing software led to an immediate 20 to 30 percent improvement in workload efficiency. With these results, the team can produce winning new car designs up to twice as quickly. The software reduced the need for rework or redesign with the manufacturer during production because the proposed parts had already been analyzed in detail through the simulation process. As business models shift and demands of the environment change, the company's underlying infrastructure provides the necessary flexibility and speed.

Clarifying the cloud

Perhaps one of the most discussed topics in the IT world has been the migration of applications to a cloud environment. Hailed as a potentially groundbreaking force, cloud technologies offer significant benefits for companies, allowing access to vast amounts of computing power and innovation without the capital expense associated with infrastructure improvements. (see Visa Inc. case study on page 11). "With the low-cost bandwidth and the limitless nature of the cloud, tremendous computing power is possible," said a telecommunications IT executive.

Our study shows that companies recognize the potential for cloud, but are also uncertain about which form of cloud computing can service their needs and how cloud-based approaches can be integrated/reconciled with the existing IT infrastructure that currently runs the majority of their IT efforts.

Study participants report that roughly 80 percent of their current workloads run on existing IT infrastructure platforms and 20 percent run on cloud platforms. For companies with greater than US$10 billion in revenue, the percentage of cloud-based applications rises to 30 percent of total workloads. This suggests that cloud-based technologies have begun to move from pilot efforts to the mainstream of technological choices.

However, when asked about their planned new workloads over the next three to five years, more than half of surveyed organizations (56 percent) said they "don't know." Further, when asked about the broad direction of their future investments in areas such as private cloud and hybrid cloud technologies, roughly half of companies were uncertain of their plans. This suggests that companies are still evaluating their options and do not have a clear roadmap for full adoption of cloud-based technologies.

For those companies that know their direction for their usage of cloud capabilities, momentum is apparent. Fifty-four percent aim to increase their investments in private cloud versus only 11 percent looking to decrease it. Similarly, 51 percent are expecting to increase their investments in hybrid cloud technologies versus 10 percent looking to spend less. These numbers are further amplified for larger companies, which expect to increase investments in private and hybrid cloud 73 and 59 percent, respectively.

Understanding the impact on cloud capabilities is a central question for those addressing IT infrastructure. The use of private and hybrid cloud capabilities requires IT executives to rethink their overall IT infrastructure plans—as these approaches impact everything from the hardware requirements to the way users procure infrastructure services.

Even the use of public cloud technology requires organizations to address how external platforms will integrate with existing systems, and how external providers can maintain the same levels of reliability and security that is expected from internally hosted applications. An IT executive from the professional services industry said, "With the appropriate IT infrastructure and cloud computing, firms can grow quickly to meet the market demands and trends. Cloud computing allows you to cut down on the costs, but at the same time increase efficiency."

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Visa: Perfecting a platform for commerce[5]

Visa Inc., a global payments technology company and the largest retail electronic payments network enabling commerce, remains at the forefront of the digital payment revolution. As more devices get connected, Visa wants to extend its secure, convenient and reliable payments across all digital channels, focusing on mobile commerce as a key component of its strategy. Across the world, electronic payments equate to about 40 percent of consumer spending. To enable continued access to the convenience of e-payments for consumers in more places, Visa built its cloud-based mobile payment service into its network VisaNet with mainframe at its core.

Its support for cloud-based payments offers financial institutions a new option to securely deploy mobile payments and enable consumers to pay with smartphones. In addition to storing Visa account information on secure chips in smartphones, financial institutions now have the option to host that information in a secure, virtual cloud. The mainframe is a critical component of VisaNet, enabling security, scalability and availability so Visa can provide outstanding levels of service and reliability. Visa has been a forward thinker in using infrastructure to improve its customer experience and business outcomes with mainframe as the backbone.

According to Jim McCarthy, Senior Vice President, Innovation and Strategic Partnerships, Visa, "I view VisaNet as a cloud service. When a transaction hits the edge of our network, we route it across the network. It throws off a ton of data that we use to take risk and fraud out of the system, providing it to issuers and acquirers so they can help their merchants grow their business. We're doing it today in real time because the actual capabilities of the mainframe have advanced so far to keep up with the changes."

VisaNet connects over two billion consumers to 36 million merchants in over 200 countries, providing the critical foundation for innovative payment methods that represent US$7 trillion dollars in total payment volume. The real-time cloud solution is capable of processing more than 47,000 transaction messages per second, and is fully operational a remarkable 99.999 percent of the time.

Provide the platform for a customer-activated agenda

The 2013 IBM Global C-suite Study presents insights into how senior executives are preparing for the future.[6] In short, the C-suite must be open to greater customer influence and meld digital and physical environments into engaging customer experiences. An organization's IT infrastructure must be prepared not only to support, but to provide the platform on which an organization can build new and differentiating capabilities. One major requirement is for companies to be able to connect their back-end transactional systems with front end "systems of engagement" that capture and process data about customers and their interactions from social and mobile environments.

While demands on the IT architecture continue to increase, often resources are not increased in lockstep. Though we see rising investments in IT infrastructure, managing costs is still an important driver of those investments. Be conscious of the costs associated with building and operating an increasingly complex environment. The integration of systems places significant demands on both the systems and the architects who must design and maintain them. Automate manual processes such as workload deployment and tuning, and use repeatable best practices to help raise infrastructure agility and reduce administrative costs. Tap into open source technologies and open standards to help increase infrastructure flexibility by opening up hardware choices, improving economics and reducing innovation cycles.

Prepare for the unusual (or worse)

Not only does an organization's IT infrastructure need to adapt to changing technologies and business requirements, it must be prepared to address the numerous disruptions that can bring a digital enterprise to a halt. Security is one area that is clearly on the minds of both IT and business executives, as it impacts ongoing operations as well as future customer trust and loyalty. Given the concerns for both internal misuse and external attacks, the use of predictive analytics in security efforts can proactively identify areas of weakness or concern before breaches actually occur. Further, analytics can also help to whittle down the volume of possible security issues to identify those with the greatest potential for harm.

Malfeasance is only one type of negative impact on system availability and reliability. Poor upgrade management, systems maintenance and even physical disasters can cause disruptions ranging from annoying to catastrophic. First, understand the availability requirements of different workloads and identify those applications that need to be housed on IT infrastructure that is geared toward mission-critical uptime. In addition, assess the costs associated with downtime and develop holistic disaster recovery plans that mitigate these risks.

Remove the haze around the cloud

From our survey participants, one message is clear: while directionally, they will be moving toward the use of cloud technologies, organizations are still not exactly sure *how* these investments will play out in the near future. This remains an area where IT executives can provide significant value to the rest of the business. Educate the business about the business opportunities that are being made available via cloud technologies. Explain the technological and cultural realities of managing applications across a wide variety of private, public, hybrid or community environments. In many firms, this requires a shift in mindset regarding the IT organization from a provider of in-house services to a strategic partner on technology issues.

At the same time, build flexibility into the IT infrastructure to accommodate the need to move applications and data between on/off premise locations as needed. Given rapidly changing priorities and the fact that today's experiments may be tomorrow's mission-critical applications, verify that your organization has the increasingly important ability to move among public, hybrid and private environments.

Key questions

For companies considering how IT infrastructure can improve their ability to compete in today's environment, the following questions can serve as an important guide:

- In what ways can your organization use IT infrastructure as a tool to achieve competitive differentiation in the marketplace? What examples show that this is already happening to some degree?
- To what extent is your IT infrastructure equipped to handle new workloads associated with mobile, social and analytic applications?
- To what extent are your infrastructure choices determined by line of business requirements?
- How will you prepare your existing IT infrastructure to address emerging security issues and disaster recovery scenarios?
- What is your organization's strategy for incorporating various forms of cloud technology (for example, private, hybrid, public) into the larger, existing IT infrastructure? What challenges has this posed for the IT organization?

Conclusion

The conversation about IT infrastructure keeps changing—it is more than just the latest hardware capabilities and the location of data centers. What's underway is a fundamental reframing of the discussion about the IT backbone necessary to drive competitive differentiation of today's enterprise. The increased reliance on data as a natural resource coupled with changing expectations of today's customers are forcing companies to seek new and innovative ways to use hardware, software, networking and storage.

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