Time for Converged Infrastructure?

EXECUTIVES DISCUSS THE OPERATIONAL AND STRATEGIC OPPORTUNITIES

Executive Summary

Managing corporate information technology infrastructure has long centered on the challenge of getting the pieces—servers, storage, networks—to work together.

With converged infrastructure (CI), that work is done ahead of time and behind the scenes. So it can be easier to install, deploy, update, and manage infrastructure, as well as to optimize its performance, minimize its cost, and maximize its business value. IT organizations can rescue skilled staff from "keeping the lights on" and focus them on realizing new technology-enabled business opportunities.

CI is catching on fast. IDC expects adoption to reach 44% of corporate IT organizations in the next two years.

This guide explores the experience of three early adopters:
▶ Molina Healthcare enabled rapid business growth while reducing technology cost and data center footprint.
▶ Canadian Pacific improved customer service by bringing outsourced IT back in-house into high-performance data centers.

▶ Skyscape Cloud Services launched a new business and quickly gained U.K. government certification for secure and trusted cloud computing services.

The guide then details the benefits of CI, the success factors for implementation, and what senior business executives need to know to leverage CI's breakthrough capabilities in both business and technology strategies.

❱❱ Converged Infrastructure: What and Why

The evolution of corporate IT has a defining theme: Do less by way of commonplace or "commodity" activities and spend more time and energy enabling the business to capitalize on information systems. This shift happened in a big way in applications development with the availability of integrated software (from SAP, Oracle, and others) for common business functions. IT was able to get out of the commodity software development business and focus on smaller, specialized applications that differentiate the enterprise and its performance for customers.

Now it's infrastructure management's turn. Most technology vendors have been concentrating on their respective "stacks"—computing, storage, network—and on helping customers integrate across the stacks. However, until recently, no one was bundling the components into simplified and integrated solutions. No one was providing "infrastructure in a box."

That's really what converged infrastructure is. It's a disarmingly simple concept with very sophisticated engineering under the hood. CI packages the basic components—computing/servers, data storage, networking equipment, and the virtualization and other software for infrastructure management—into integrated and optimized units. CI arrives on-site already configured, tested, and certified, so CI solutions are easily installed and maintained. CI goes hand-in-hand with virtualization: Computing resources are pooled, shared by applications and other workloads, and optimized with the help of a hypervisor and other control software. That's the "what" part of the definition.

Here's the "why." CI enables IT to:
❱ Consolidate and standardize systems
❱ Deploy and scale infrastructure rapidly
❱ Increase utilization rates and lower costs
❱ Simplify infrastructure management
❱ Reduce business risk through improved reliability and integrated approaches to security and disaster recovery
❱ Enable business innovation and agility through faster time to market for new infrastructure and the applications that depend on it

THE NEW STACK
Converged Infrastructure

| Management |
| Virtualization |
| Storage |
| Network |
| Compute |
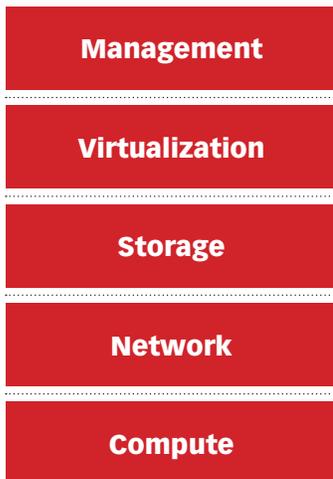
CI promises to do for infrastructure management what software suites did for applications development—lower total cost, raise operational performance, and enable IT to trade commodity work for more value-adding work. With CI, infrastructure is less a business constraint ("We haven't got the capacity") and more a business enabler ("When do you need us to spin up a new platform?").

It's no surprise that the CI market is growing fast. According to IDC[1], as of May 2012, more than one-fourth of surveyed organizations were using or planning to use CI (double the rate from a year earlier). IDC expects adoption to reach 44% by 2015. With a 40% compound annual growth rate, the CI market will grow from $4.6 billion in 2012 to $17.8 billion in 2016.

With introductions courtesy of the market leader, VCE, IT executives whose organizations have significant CI implementations shared their experience. Here are profiles of three of these organizations, followed by lessons learned from them and others about the operational and strategic potential of CI, as well as the benefits and challenges of CI adoption.

❱❱ Molina Healthcare Enables Business Growth

Rapid business growth led Molina Healthcare to implement a strategy of virtualization and CI. Molina coordinates health services and provides health information management solutions to 4.3 million individuals and families in 15 states who receive care through Medicaid, Medicare, and other government-funded programs. Fast-growing volume in these programs was increasing claims processing and other transaction loads. That in turn caused rapid growth in Molina's infrastructure, to the point where there was a concern that the company would run out of space in its main data center in Albuquerque if it did not implement a new strategy.

Virtualization and consolidation enabled the company to reverse the tide. The data center footprint has decreased by around 60%, with associated reductions in energy and cooling costs, and the business now has plenty of room to grow in a scalable fashion. Molina knew it was on to something when proof-of-concept deployment of CI technology took only three days and the initial applications migration only five.

The foundational benefit of CI at Molina is improved total cost of ownership of infrastructure. CIO Rick Hopfer lists many others: Application performance and availability have improved. With infrastructure provisioned rapidly, applications development teams can get their work done faster. Disaster recovery has been simplified and improved, and highly reliable operations enable Molina

to handle spikes in transaction volume and meet its all-important service-level agreements with state agencies. And the transition to CI was accomplished with no disruption to the business at all.

CI also provides the "glue" that enables Molina IT to operate as "one shop" and move toward an IT-as-a-service delivery model. With the technology piece in place, Hopfer is focusing on this organizational transition. Structures and skills had been siloed, and CI presents the opportunity to "rebuild from the top down—processes, structure, competencies, careers." For example, managing the new infrastructure requires fewer senior engineers and architects, but they must be more versatile. Some of the best candidates are experienced people who have moved into management. So IT is creating a professional career track to parallel the management track and facilitate the movement of managers to senior engineers. Molina IT is also taking the opportunity to ask, "Who are the real managers?" and slot people accordingly. And IT is actively working with technology and research services partners to learn and adopt best practices in CI management.

❱❱ Canadian Pacific Focuses on the Customer

Business strategy and customer commitment drive the migration to CI at Canadian Pacific (CP). The railroad serves customers in more than 1,000 communities in six provinces and 13 states. When E. Hunter Harrison joined as CEO in 2012, he quickly focused on accountability for services across the corporation. IT, which had been largely outsourced, reexamined its costs to serve and concluded that, to exercise true accountability to customers, it had to bring its infrastructure back in-house.

Given the opportunity to make a fresh start, the company decided to build out its two new data centers with CI. Mike Redeker, the CIO, explains the rationale: "The goals were to cut cost and improve service. What are the alternatives? Relying heavily on a large pool of contractors wasn't sustainable financially, and it didn't provide us a path to more holistic management of the infrastructure. We're going to make the change to more converged infrastructure at some point. We might as well make it now."

CP is about halfway through the process of migrating all workloads from the older mainframe, servers, and storage devices onto its new CI. Among the first major applications migrated was the core SAP system, one of the largest in the transportation industry. The technological transition should be completed in December 2013, and CP plans to be self-reliant and free of contractors by mid-2014.

The railroad anticipates—and has started to demonstrate—a reduction of 30% in infrastructure spend and an equivalent level of staff productivity improvement. IT also looks to the backup, recovery, and business continuity benefits of dual and coordinated data centers. Thus far, reliability has been flawless.

Redeker describes his No. 1 challenge as the skills transition. People with CI experience are in growing demand, and there are not yet enough to go around. So CP relies on knowledge transfer from the vendor through both education and on-the-job training. The progression is: "Run it for us, run it with us, then we run it."

IT is building new support organizations from the ground up. It can act like a start-up, which has its advantages. Existing staff can step up to new responsibilities, and IT can "hire to a future direction." IT professionals, including very skilled candidates from around the world, want to come work for a company that is at the leading edge technologically.

❱❱ Skyscape Cloud Services Builds a Business

If you're starting a new business, especially a technology services business, you should start with CI. That was the strategy of Skyscape Cloud Services and its CTO Simon Hansford two years ago when the company was founded. Hansford says, "We made a bit of a bet," because CI technology was less mature then, "but it was a good bet, and it paid off handsomely."

Hansford knew from experience that CI was the only way to provide the quality of cloud services—thoroughly reliable and trusted, highly automated, cost competitive—that Skyscape offers to its U.K. public sector customers. That experience came from his previous job running IT for a large U.K. managed services provider, where the provider had to converge the infrastructure on its own. Even when done extremely well, the work was unending—patches, upgrades, testing—and the components were never completely in sync due to human or automation error.

At that company, Hansford had a team of 20 working to converge the traditional stacks in order to provide integrated services. At Skyscape, two people manage the infrastructure. The key difference is that with CI "everything is pre-engineered, integrated, tested, and certified. Staff focus on optimizing the resources, not integrating them, and upgrades aren't disruptive," says Hansford.

The savings in operating and staff costs are significant, and capacity management is simplified: "We understand the install times and can deploy just-in-time capacity aligned with our sales forecast," says Hansford. But he is perhaps most enthusiastic about the reliability of CI. The company has experienced no customer-visible downtime whatsoever: "We keep our promise to customers of 100% availability."

With a reliable and scalable platform in place, Skyscape concentrates on ensuring that it is easy to adopt and use, centered around a customer portal for dynamic provisioning, monitoring, management, and pay-by-use billing of cloud services. Customers see extraordinary performance—new services can be up and running in a matter of minutes.

CI has been key to Skyscape's strategy and growth. The company was one of the first to gain "pan-government certification" for cloud services from the U.K.'s national security agency. That's essential in the eyes of security-conscious and sometimes risk-averse public sector agencies, and the customer list has grown to include Government Digital Services (to help consolidate government websites), the Ministry of Defence, and various police forces.

Hansford summarizes his stance: "As it should be, computing is becoming a utility, increasingly in the cloud. We should be getting better at abstracting from the technology and focusing on how it serves the business. We should be getting business value faster. CI helps that happen." Skyscape can focus on its customers and selling its services rather than configuring its underlying infrastructure.

〉〉 Benefits of Converged Infrastructure

As you can see from these case studies, the potential benefits of CI are many and interrelated. To appreciate the variety, and to anticipate what benefit streams your organization most wants to capture, look at the benefits through nine lenses:

Simplicity. In many business endeavors, from customer relationships to product offerings to technology management, IT can be challenged with runaway complexity. That's when simplification can be transformative. Many of the benefits of CI stem from the simplicity and standardization of working with an integrated platform rather than multiple technology stacks. The entire process of deploying infrastructure is simpler and

easier: planning, purchasing, installation, upgrades, troubleshooting, performance management, and vendor management. So, too, are the business-critical processes around security and continuity.

Performance. CI can dramatically improve both utilization and reliability of infrastructure. In a highly virtualized environment, server utilization may already be high. CI extends this efficiency to storage and network port utilization and enables better performance optimization of the overall infrastructure.

Availability. Greater (sometimes near-perfect) reliability means higher availability of infrastructure, applications, and services. CI enables IT to meet its service-level agreements and the business to meet its performance promises to customers. CI has helped organizations make the leap to 24/7 business operation.

Speed. Infrastructure can be deployed in record time. An IDC study found that CI cut the time to market for new services in half. If the new infrastructure is for applications development (DevOps), it can be "spun up" almost instantaneously, which means that developers can do their jobs faster. IT can respond to business requests with, "You can have it now," rather than, "You can have it in a few months." And the business can accelerate time to market of technology-based offerings.

Scalability. With CI, it's also easier to expand or shrink available resources with changing workloads and the peaks and valleys of business transaction volume. If your organization wants to leverage the resources of what IDC calls the "third platform"—Internet, cloud, mobility, social media, and big data—then scalability is a business necessity.

Staffing. CI requires less IT staff to operate and manage it. You can capture that benefit as labor cost savings. You can capture it as cost avoidance through the ability to support business and infrastructure growth without adding staff. Or you can capture it as an opportunity to redeploy IT resources. If IT professionals spend less time on the mechanics of infrastructure integration and management, they have additional time for more value-adding activities, and they can be increasingly customer-facing and responsive. If your IT organization still spends 75% of its energy and budget maintaining the legacy and "keeping the lights on," CI can help change the proportion and give IT more time to innovate and help grow the business.
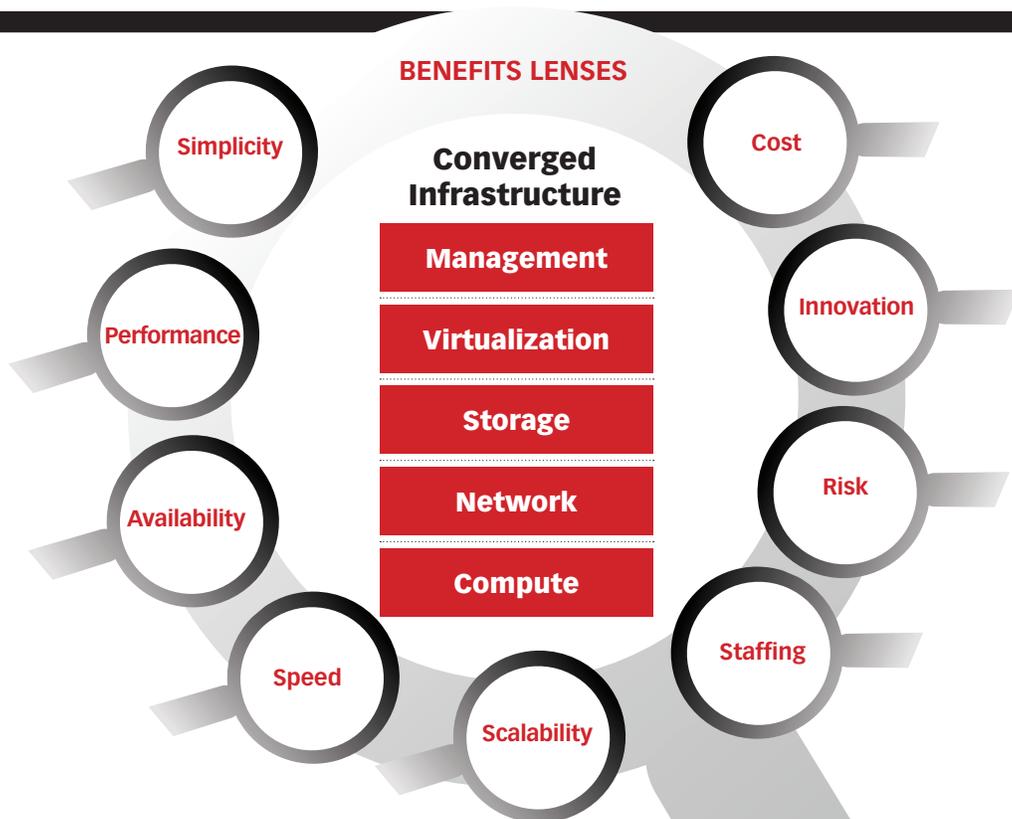
Risk. CI reduces infrastructure supply chain risk through procurement control, the testing and certification of equipment, and the fact that the vendor has a lot of "skin in the game." CI reduces operational risk through robust and comprehensive tools for infrastructure control, including security, plus automation to minimize human error. CI also reduces risk to business continuity through high availability and reliability, less disruptive upgrades, and a solid platform for disaster recovery.

Innovation. With CI, a company enjoys technological innovation as the vendor builds in technology advances and keeps the platform up to date. More important, CI facilitates business innovation in two powerful ways: One, it provides a simplified path to the cloud, where a business can experiment with and use a vast and growing array of innovative and specialized software and services. Two, when software developers have computing environments on demand, they can experiment more, prototype more, iterate with their business partners, and discover superior business solutions.

Cost. The cost advantages of CI can be sliced and diced many ways, but you should expect to realize and measure savings in four basic areas (again, not mutually exclusive):

- *Procurement.* With technology bundled, you should enjoy more scale and leverage with the vendor and pay less to buy or lease than you would with traditional technology stacks.
- *Physical operations.* Higher utilization translates into lower unit cost. You should also see significant drops in power and cooling costs, and a smaller footprint can mean lower facility costs.
- *Infrastructure management.* The processes for deploying and managing infrastructure will be more efficient. This includes both periodic activities such as capacity planning and installing upgrades, and continuous activities such as monitoring and optimizing infrastructure performance.
- *Staff.* The cost of labor needed to manage the infrastructure should decline, and the productivity of infrastructure staff should rise.

The bottom line? Most organizations can achieve savings of 25% or more in the total cost of ownership of infrastructure. IDC research found some measures to range much higher, including average annual data center cost reduction of 68% per 100 users. That may make for an attractive payback period. But keep in mind that infrastructure cost may not be the biggest financial advantage of CI.

BENEFITS LENSES

Simplicity

Cost

Converged Infrastructure

Performance

Innovation

Management

Virtualization

Storage

Network

Compute

Availability

Risk

Speed

Staffing

Scalability

If you review all the other benefits from a financial perspective, you find that CI can drive down business cost as well as infrastructure cost. For example, it will be harder to measure, but put some round numbers on the revenue opportunity and cost avoidance associated with better business continuity, as well as the value of expanded innovation capacity and faster time to market of systems-based products and services. If you look at the benefits of speed, scalability, staff redeployment, and innovation capacity together, you will find in CI a superior platform for *business agility.*

» When to Look at Converged Infrastructure

There are three broad circumstances under which an organization should seriously consider CI:

▶ **When you make a fresh start.** At Skyscape, it's a new business entirely. At Canadian Pacific, it's new data centers needed to bring outsourced IT back in-house. At Apollo Group, it's a new platform to enable new products and services. When you start fresh, you gain the added advantage of thorough convergence and consistency.

▶ **When business growth demands rapid infrastructure growth**. At Molina, transaction volume would soon be stressing data center capacity. At Kimpton Hotels & Restaurants, plans to double the size of the business called for not only more computing capacity, but also the ability to scale up quickly with each newly acquired or opened property.

▶ **When infrastructure is running out of steam.** This may be due to technology obsolescence or the inability to continue driving down unit costs. Interestingly, IDC found that infrastructures with high levels of server virtualization can still see their costs creep up as the difficulty of overall integration and administration grows. The countermeasure can be deploying CI.

These are all driving circumstances. Other organizations will evaluate CI as part of their ongoing initiatives to keep their infrastructures healthy and high performing. Several IT executives interviewed say CI is the natural next step in the evolution of infrastructure architecture and management—it's just a question of when and why you make the move. Redeker

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Whenever significant change is on the horizon, the status quo asserts itself in the form of reasons "not to." Here are some of the common concerns raised with regard to CI, together with responses from IT executives and industry analysts.

CONCERN	RESPONSE
"We're afraid of vendor lock-in."	Weigh this risk against the supply chain risk of multiple vendors. Many companies are already consolidating around fewer vendors. With a CI strategy, you forge closer relationships and exert more influence over vendors.
"We're 80% virtualized—what have we got to gain?"	You've captured much of one benefit stream—which others would you like to capture? Keep in mind that virtualization facilitates migration to CI.
"We want best-of-breed components."	As IDC explains, with CI you "trade choice for both ease of installation and simplicity of management." Assembling best-of-breed components doesn't necessarily yield a best overall solution.
"We're heavily outsourced and can't change things."	Many companies are weighing the option of bringing infrastructure back in-house. At a minimum, know your vendor's CI plans, benchmark price/performance against a CI alternative, and negotiate accordingly.
"Our staff and skills are too siloed."	You'll have to face this issue sooner or later, and you can turn CI into an opportunity to refresh and energize your IT organization.
"It will cause too much disruption."	You must plan workload migration carefully, but CI should be engineered to minimize disruption, both now (initial migration) and in the future (simplified upgrades).
"If it ain't broke, don't fix it."	"Fix it before it breaks." Technology infrastructure is always partly broken—aging, incompletely integrated, challenging to maintain. The question is whether you want to wait until things break, or anticipate how to deliver maximum value.

of Canadian Pacific takes a pragmatic stance: "You may choose to look at alternatives, but you have to take a look at converged infrastructure because the value is there."

The benefits accrue fastest when you can make a fresh start or migrate a significant portion of your infrastructure. However, CI is not an all-or-nothing proposition. Many organizations prove the concept and its value by starting with small DevOps platforms. Others begin with a major application (e.g., SAP) that already runs on dedicated servers and storage, and that can immediately benefit from improved scalability and resource optimization.

›› Challenges of Converged Infrastructure Implementation

Interviewed IT executives are unanimous in declaring that CI technology installation was the "easy part" (as is usually the case with new and well-engineered technology). Much more effort goes into migrating applications and other workloads onto the new infrastructure, including first virtualizing them as needed. Migration is typically done in phases, with workloads running in parallel on old and new hardware until a cutover point. And migration must be planned in detail, especially when the process is the business equivalent of "changing the wheels while the car is in motion."

The more fundamental challenge with new technology, of course, lies in getting people to use it in new ways, to work differently and realize the technology's added value. The basic operational processes of infrastructure management will change—planning, installing, maintaining, upgrading, deploying, monitoring, and optimizing. And with CI, people stop doing some familiar things (patches, forms of testing) while learning new methods.

The financial management processes for infrastructure must usually be revamped. Budget categories and allocations can be simplified, and investments can be closer to just in time. Kimpton Hotels & Restaurants was following a multiyear investment plan for refreshing infrastructure and improving its management. When the company completed its plan for CI adoption, it found that it no longer needed to do many of the things in the plan, including expanding the data center.

Among the big three—people, process, technology—the No. 1 challenge is usually the people issues: staff, skills, and structure. Specialty silos need to merge to form integrated infrastructure services organizations. Fewer staff are needed, but they need to be more versatile. There's less need for "inside the box" break/

fix type work, but there is still important work for business-focused architects and engineers to do. And IT staff can be shifted to other important initiatives.

When adoption of a new technology category is ramping up, there never seem to be enough experienced practitioners to meet demand. So you have to develop them and their skills. It helps if architects and engineers are familiar with the CI platform's component technologies (e.g., VCE's Vblock offering incorporates EMC storage, Cisco networking, and VMware virtualization). But the key to success is knowledge and experience transfer from the vendor's staff to yours. Recall

"You know it's converged when . . ."

As a new technology category emerges and gains momentum in the marketplace, established vendors improve and polish their offerings. And new entrants jump in, often with less-than-complete offerings, or even old products relabeled. Regardless of what players you're evaluating, pay close attention to how converged the infrastructure offering really is. Here are some simple "litmus tests" to tell you if it's really converged:

❱ You can get it up fast—not only the initial installation, but any deployment of new infrastructure. Configuration work on-site should be minimal.

❱ Upgrades are simple, infrequent, and nondisruptive. The vendor has tested, certified, and automated the upgrades.

❱ You can manage and optimize the CI as a whole. The combination of automation and control software should provide unprecedented visibility and performance.

❱ You spend less across the board. CI should help eliminate trade-offs (e.g., between speed and quality) without introducing new ones.

❱ You can have the architecture you want—virtualized, private or hybrid cloud, compatible with backup/recovery services. You shouldn't have to do extraordinary work at the perimeter.

❱ It's an operational solution, not just a reference architecture. Providing instructions and even tools for integrating infrastructure remains a far cry from providing a converged solution.

the Canadian Pacific formula: "Run it for us, run it with us, then we run it." When evaluating vendors, look beyond the technology and its ongoing support. What are their capabilities and commitment when it comes to skills transfer?

While organizational change can be unsettling, the good news is that your best staff will want to learn the new technology. If management communicates the objectives well, the IT organization at large will be energized by the direction you're taking. And skilled candidates will be drawn to your organization to work with its leading-edge technology. CI adoption can provide the opportunity to rethink and rebuild the infrastructure services organization, with less attention to shoring up weaknesses and more attention to meeting future business needs.

❱❱ What Business Executives Need to Know

Infrastructure services normally operate behind the scenes. They can be taken for granted by the business, noticed only when they're not working. The migration to CI should also be behind the scenes. The business needn't care about technology configurations as long as everything works, and a goal of CI implementation is to avoid business disruption altogether.

However, the decision to adopt CI should be made by the executive team, including the CEO, CIO, and CFO. The CFO, of course, has special interest in the cost advantages and the necessary changes to the IT budget. The CIO and CFO can work together to help the executive team at large understand the basic expectations and benefits:

❱ **CI lowers cost.** Better utilization of resources lowers the unit cost of infrastructure, and simplification lowers the labor and process costs of infrastructure management.

❱ **CI raises performance.** Improved availability, reliability, and speed of infrastructure deployment boost service levels and business performance.

❱ **CI lowers business risk.** Greater reliability means less business downtime. Standard and integrated infrastructure simplifies security and business continuity processes.

❱ **CI raises business agility.** Rapid deployment and scalability of infrastructure enable responsiveness and faster time to market. With computing on demand, business and IT people can experiment more, prototype more, and innovate faster.

Understanding the what and why of CI will help the executive team address three strategic questions about how the enterprise uses information technology:

❱ **What should we standardize and how do we innovate?** CI represents a commitment to simplify and standardize core infrastructure, while being able to "spin out" small-scale computing environments for business experiments.

❱ **What business should our IT organization be in?** The traditional business of building and maintaining technical products, or the business of providing easily consumed business services? CI can be a platform for providing infrastructure as an on-demand service, and for enabling IT to spend more of its time creating new value.

❱ **How will we operate when we have fewer technological constraints?** With greater technological capability, businesses can do more, do things differently, do different things, and make better decisions. CI helps remove infrastructure availability and capacity as business constraints.

That last question goes to the heart of what's happening with information technology today: *The constraints are disappearing fast*. The combination of scalable infrastructure plus cloud computing for the "overflow" means that computing capacity need not be a business limitation. And just in time, given the explosion of information available both within enterprises and via the Web. That information is unconstrained as well. With the technologies for filtering and analyzing big data, you no longer have to define all your data in advance or structure it in conventional ways.

Today's business constraints have less to do with technology and everything to do with imagination. Enterprises that ask new questions, that experiment and innovate relentlessly, that put new information to new uses, and that shed the old constraints without being paralyzed by the new freedoms—they are going to thrive. CIOs and IT organizations can maximize their value by enabling their businesses to turn this corner.

Converged infrastructure can meet pragmatic objectives around cost, performance, risk, and agility. It can also shape how your enterprise operates and innovates in a world with fewer technological constraints. ∎