



White Paper: Creating a Dynamic Information Infrastructure

Executive Summary

The term “information infrastructure” is over 40 years old, but its characteristics and requirements in today’s world are quite new indeed. Specifically, federating all storage enterprise wide, consolidating and standardizing onto virtualized, high-capacity media, and enabling dynamic, cloud-ready provisioning are among the major new IT challenges. Moreover, continued explosive storage growth demands that a systematic approach be crafted to address the full spectrum of current and future (information) compliance, availability, retention and security goals. For many customers, this transformation must occur amidst a storage growth rate of 50%-70% CAGR. Discussions with customers and research into vendor offerings are the basis of this white paper. It prescribes a customer transformation roadmap, profiles two customers’ information infrastructure journeys, and provides an analysis of IBM’s and EMC’s associated visions and strategies.

Customer Quote: “The value of information is directly proportional to the information infrastructure that provides it.”

The ability to store, manage, and deliver trusted information as a strategic asset has become a critical enabler to making customers smarter and increasingly more competitive. Despite today’s economic conditions, or perhaps because of them, building an effective information infrastructure is an imperative for most companies to contain and/or reduce incremental costs as the explosion in data growth continues. Recreating a production environment every time a new requirement surfaces, often resulting in piecemeal, add-on capacity for every new application, is simply too expensive and time consuming. To eliminate this cumbersome approach, storage must be unified within an information infrastructure that is intelligent, instrumented, and interconnected. Moreover, the infrastructure must be dynamic, scalable, and flexible enough to meet provisioning, service, and data access requirements. Ultimately, the infrastructure must consist of a set of standard, pattern-based configurations within a storage hierarchy that intelligently places data on the least-cost medium based on service requirements, and enables growth while maximizing utilization and performance. This is essentially the promise of cloud computing.

IBM’s Information Infrastructure focus is a core element and foundational pillar in its Dynamic Infrastructure and New Intelligence initiatives, both well defined and tightly coupled to an umbrella vision and strategy called “Smarter Planet.” It is also important to remember that IBM has its own vast, internal infrastructure, and is transforming it in the same manner prescribed to customers. IBM’s increased investment in solution centers and expertise to develop and test drive customer solutions demonstrates its resolve in this area. IBM is clearly putting its money where its strategy is, and has stepped up its efforts to roll out information solutions that blend hardware, software, new services and even financing. All of these initiatives have become the basis for how IBM operates, and how its new products and services are built and integrated into solutions that directly address customer needs.

In contrast, storage vendor EMC references information infrastructure as half of its bifurcated strategy,¹ with virtualization being the other half. The two are represented by slightly overlapping circles, and interestingly, these two circles essentially mirror the EMC organization. Virtualization represents the mostly separate, albeit significant efforts of the VMware Group on one side, and Information Infrastructure reflects the core disk organization on the other. Taking this one step further, EMC subdivides Information Infrastructure to include security and content management, which matches to its new business units formed based on acquisitions. Analysis of both the strategy and the organization indicates a continued strong product focus, a stark contrast to IBM’s strategy that puts solutions first and products second.

A system vendor like IBM must take a bigger view, and its information infrastructure strategy and solutions portfolio represent a significant shift in how customers are being serviced. The solution-centric view, combined with a complete array of technology and services to address all aspects of what a customer needs, gives IBM a strong advantage over its

¹ EMC Strategic Forum 2009.



competitors. And IBM's recently implemented solutions show that it truly understands "openness" and the need to provide whatever technology is necessary for the customer. The real issue, however, will be how quickly IBM and EMC can transform themselves into truly integrated companies that collectively care more about helping clients craft a modernized infrastructure at the right price vs. selling point products or services. This higher road is harder to attain, but nonetheless the right and needed path.

Assessing the Value of a Vendor Information Infrastructure

Any information infrastructure transformation effort should begin and end with a practical view and understanding of how well customer needs will be met. Specifically, the four primary drivers include information compliance (not just regulatory compliance), availability, retention, and security. To continuously address them requires that the necessary people, processes, facilities, services, and technologies come together, both from vendor and IT organizations, to maximize time to value and exploit business intelligence opportunities as they emerge. Additionally, this must occur with no negative impact on service as the infrastructure runs around the clock and is growing constantly.

Updating an information infrastructure, while it runs around the clock and is growing constantly, requires significant help from the vendor community, both in the contexts of technology and experiential knowledge. Customers in need of a more dynamic information infrastructure should perform a careful evaluation of each vendor's associated strategy and vision, both for customers and itself. Key success factors therefore include the quality and completeness of vendor offerings, both to transform current infrastructures and to manage them on an ongoing basis as needed. When assessing industry options, it is important to consider the importance of using a system vendor like IBM that has the full array of hardware (storage and servers), software (operating system, service and information management, and database), implementation services, and flexible financing. With integrated solutions the key, IBM has the full portfolio of what customers need.

IBM's Information Infrastructure strategy and portfolio takes a more holistic approach and appears to be shifting its own organizations and partners from pure product focus to a true solution orientation that more directly addresses customer needs. According to IBM, an information infrastructure is not just about storage, but instead combines software, servers, storage, and networks required to enable/deliver the layers of access, security, and ultimately new uses of data for business intelligence. IBM views these elements as integral to any information-led transformation, but its competitors fall well short in this arena.

IBM Quote: "It's not just about adding capacity to keep up with data volume; it's about dramatically increasing asset utilization, better managing information availability, security, regulatory and compliance requirements, and finding smarter ways to extract business value from your information resources — on a much tighter budget." – Susan Blocher, Vice President, IBM Information Infrastructure Solutions

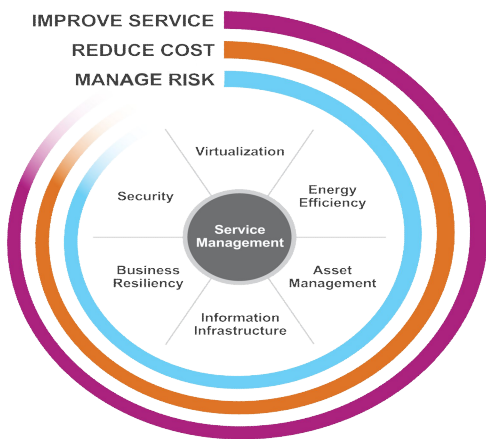
On the other hand, while EMC has clearly made major strides in providing world-class disk technology, its vision of information infrastructure (and moreover, its basic sales strategy) seems much more aimed at selling disk than providing a complete solution. EMC is, at its core, a disk provider, which means that providing solutions depends heavily upon its external partnerships (and acquisitions). Its corporate strategy combines information infrastructure and virtualization at the macro level, with information infrastructure broken down into three key elements – "store," "protect," and "+intelligence." This is a mirror of its internal organization – virtualization corresponds to the VMware group, and information infrastructure divides up into three parts corresponding to EMC's three business units: disk, security, and content management. This translates to more of a basic product focus versus a vision and strategy that ensures a macro-level approach to solving customers' business problems.

When it comes to the important services component, EMC does have its own Global Services organization primarily focused on EMC-specific storage, however most of EMC's core consulting is driven through systems integration partners. There is a clear difference between EMC and IBM regarding the depth and breadth of services that are offered. IBM's vast services organization includes business and industry-specific consulting from Global Business Services (GBS),



global IT services from Global Technology Services (GTS), product-oriented Lab Services, and certified Business Partners. IBM has redirected services efforts to come in line with its strategy and has made significant investments in industry-leading asset-based services providing clients with measurable, rapid ROI. Importantly, IBM continues to make investments in training to ensure that its business partners are in sync with its strategy. IBM also offers flexible client delivery options including project-based, managed, outsourced, and cloud.

IBM's Dynamic Infrastructure model consists of seven key elements (see Figure below), with Information Infrastructure a foundational component among them. Collectively, these seven elements come together as part of a greater ecosystem, and vendors must deliver solutions that consistently include them.



Information Infrastructure encompasses all information compliance, availability, retention, and security (CARS) goals and challenges for both IT and business.

Source: IBM

Customer Experiences in Developing Information Infrastructures

Many customers have already experienced the value of a dynamic information infrastructure, mostly because it was imperative that they address the related requirements in a very short time. These customers are now positioned to meet both current and future demands in an expeditious and cost-effective manner. Following are some good examples of how customers have sought IBM's help.

Virginia Commonwealth University Health Systems (VCUHS)

The Virginia Commonwealth University Medical Center is one of the country's leading academic medical centers offering state-of-the-art care in more than 200 specialty areas. Consisting of the VCU Health System and the five health sciences schools of VCU, as well as Massey Cancer Center, it stands alone as the most comprehensive academic medical center in Central Virginia. At VCUHS, with two data centers and a hodgepodge of technology, the installation, management, quality assurance, and change management processes were cumbersome and problem prone. Power, space, and cooling needs were expanding past the capacity of the two data centers, a critical issue that could cost millions unless something was done to reduce requirements. The technology was outdated, and the increasing demand for more and better service drove VCUHS to make some significant changes.

Service, especially in the medical and health systems, is critical to the point of risking human life if a failure occurs. There is also strong awareness of the lost business opportunities that occur when data is unavailable for analytics and business intelligence. The growth rate is projected at 57% CAGR through 2010 (with a base of >200TB), and much of the new data is unstructured, driven by a variety of emerging business requirements.



New business demands for VCUHS include:

- Medical imaging
- Digital simulations in pharmaceuticals, automotive, and aerospace
- Content records for insurance, construction, and realty
- Video content for security, process management, and education
- Content distribution in media and entertainment
- Numerous Web 2.0 and Social Networking endeavors
- Analytics in financial services

With very low staffing levels and a need for proven expertise and results, VCUHS sought the help of IBM to effect an overall technology transformation. IBM services and expertise were particularly important with regard to addressing information infrastructure specific needs. Here, the goal was to use newer technology and processes that rendered the ongoing support responsibility “manageable” internally.

Solutions that were most important for VCUHS include:

- Standardization of technology, with emphasis on increased virtualization
- Engineering out single points of failure
- “Built-in” business continuity as part of the primary design
- Proactive and easy to use monitoring and alert systems to avoid outages
- Elimination of unreliable tape-based backup systems
- Elimination of low utilization on both storage and server devices
- A dynamically configurable storage environment to support growth
- Optimization of technology, processes, and overall storage configurations
- Use of technology that lowers power consumption and provides greater capacity in a significantly smaller footprint

With IBM’s help, all of VCUHS’ goals and objectives were met. While VCUHS acquired various IBM technologies, it was clear that IBM was able to provide a vision, strategy, and tactical approach to address the goals regardless of the technology chosen by VCUHS. In some cases, IBM suggested third-party technologies that offered a better fit for VCUHS. Technology choices included IBM’s XIV Storage Array™, SAN Volume Controllers™, and new storage management tools. IBM was also able to identify several design points that were crucial to meet the high-availability requirements, such as POWER™ server technology. Finally, IBM both redesigned and simplified the complex network requirements between the two data centers and within the campus itself, an important factor in making data more accessible on a timely basis.

The total solution that IBM helped to provide now positions VCUHS to comfortably meet its huge growth requirements with a small internal IT staff, as well as providing improved data access to address an important but subtle requirement of faster decision-making driven by analytics and business intelligence applications. To improve efficiency, simplify systems management, and streamline backup/recovery processes, VCUHS used IBM Tivoli Storage Manager™ (TSM) and TotalStorage Productivity Center™ (TPC) in conjunction with VTL technology to eliminate tape. When completed, the temperature in the data center dropped 6 degrees Fahrenheit, a stark illustration of the solution’s increased efficiency.

Capacity on demand was a desirable option, but limited due to capital constraints. IBM’s XIV Storage Array, however, does offer built-in capacity on demand since it comes fully configured and requires only licensing to gain access to unused capacity. While not a priority in this effort, VCUHS will be exploring de-duplication technologies to reduce storage requirements and growth rate. The Director and CTO – IT Technology and Engineering Services, Mr. Greg Johnson, commented that working with IBM was refreshing in the sense that there was a clear and consistent focus on understanding and addressing VCUHS’ overall challenges, not just selling products.



INTTRA – Transportation Industry

Headquartered in New Jersey, INTTRA is the largest multi-carrier e-commerce platform for the ocean shipping industry. The company has over 200 professionals located in eleven countries. INTTRA enables shippers, freight forwarders, third-party logistics providers, brokers and importers to electronically plan, process and manage their shipments fast and efficiently, replacing the traditional use of faxes and phone calls.

To address compliance and availability goals, INTTRA decided to use Sungard for co-location of a second high availability data center. This created new requirements for replication across disparate technology and better access and management of geographically dispersed data. And at the most basic level, existing technology was outdated, inefficiently managed, and disconnected. Without the transformation, storage growth rates were projected at 80%-90% CAGR, mostly due to the inability to share resources and more fully utilize total capacity. Indeed, average device utilization, both for servers and storage, was in the 30%-40% range. To transform the information infrastructure so that it addressed all of its new requirements (including the ability to address its historical 100% annual business growth rate), INTTRA sought the help of IBM and IBM Premier Business Partner, VSS.

The technology choices that were included in this overhaul effort included:

- IBM DS8000™ first-tier storage with Flash Copy™ and IBM Global Mirror™ for fast multi-site replication
- IBM SAN Volume Controller™ (SVC)
- IBM Tivoli Storage Manager™ (TSM)
- IBM Tape Technology
- IBM TotalStorage Productivity Center Standard Edition™ (TPC)
- IBM Blade Technology with VMWare

From an IT strategy perspective, INTTRA wanted to create a private cloud that could be coupled with public clouds for additional services and resources as required in the future. From a business standpoint, the key strategy was to position for rapid growth and make data more accessible and shareable. Underlying both strategies were the same goals that IBM emphasizes in its Dynamic Infrastructure strategy and vision – simplification, maximum sharing, and the ability to dynamically change as business needs dictate.

The overall results of this effort exceeded INTTRA's expectations, both in terms of time to value and quality of results. And clearly, virtualization was the most significant factor in achieving INTTRA's technology and business goals. Once again, SVC's cross-platform virtualization capability was critical to unify the storage infrastructure, complemented by tools like TPC to better manage and monitor storage using a "single pane of glass." Simplified operations, better manageability, higher reliability, reduced costs, and an ability to support rapid growth and change were key benefits.

The ability to transform rapidly is a less quantifiable but nonetheless valuable part of the new information infrastructure that INTTRA has created. With its high projected growth rate and potential for radical change, INTTRA is positioned to react quickly with a scale-out architecture that can grow as business needs dictate. Concurrently, the ability to use 90%+ of server and storage capacity (versus the original 40% level) dramatically reduced storage and server growth rates. For example, the original projected storage growth rate of 80%-100% CAGR was reduced to 15%-18% in incremental raw capacity by unlocking the captive storage from previously dedicated (underutilized) devices. The obvious benefit here is a substantial reduction in storage acquisition costs.

INTTRA is committed to the IBM/Tivoli management suite, and subscribes to the Information Technology Infrastructure Library (ITIL) guidelines for defining processes and services. Increased sharing of resources demands a better cost accounting approach, in addition to a better representation of how IT services contribute to business success. In this regard, INTTRA is using the ITIL model to build a stronger service catalog, an integral requirement for cloud computing.



According to Anthony Costa, Managing Director, Infrastructure and Corporate Systems, IBM and its partners consistently focused on the overall business problem and how to solve it. He further commented on the high level of experience and professionalism among all IBM partner staff that he worked with. Innovation is a key factor in building customer-specific solutions, and in INTTRA's case, IBM and VSS crafted one of the first implementations of Global Mirror at the SVC level. Product sales focus was secondary to crafting a solution to address INTTRA's needs.

There are many other live customer examples of how upgrading information infrastructures can yield significant results. Two examples are:

- Implementation of an IBM Grid Medical Archive Solution storing 30TB of PACS images and clinic files annually yielded:
 - Improved image access time by 70%
 - Enabled full sharing of data between hospitals
 - Eliminated traditional back-up and restoration window
 - Reduced data management costs by 90%
- Consolidation of a storage environment yielded:
 - Reduced recovery time from 24-48 hours down to 1-2 hours
 - Improved availability by using non-disruptive back-up processes
 - Eliminated potential fines by implementing drive-level encryption

Discussions with customers indicate that the most common approach to transformation efforts has included much more help from vendors in getting to the desired state, such that the ongoing management is simplified and well instrumented for subsequent internal management. Of course, there are many companies that have consistently relied upon external services to support IT requirements, and those companies must look at the value of updated designs to capitalize on their benefits, including cloud readiness. While many vendors talk about cloud computing, IBM has uniquely defined the characteristics necessary to become cloud ready. These include:

- Instrumented, interconnected, and intelligent
- Open
- Standards-based
- Service-oriented
- Advanced virtualization
- Automated management and highly self-healing
- Common components and processes
- Advanced security and resiliency
- Easy-to-use service catalog
- Energy efficient

IBM already offers a number of solutions "on the IBM cloud", designed around its Cloud Manifesto, such as Continuous Data Protection and Remote Managed Infrastructure Services. IBM offers professional services and critical technology to help clients deploy their own public and private cloud computing solutions more effectively.

In addition, energy conservation and intelligent management of facilities has become paramount, making it an important part of the overall strategy. IBM's Smarter Planet agenda is the umbrella for all of its efforts, and energy savings improve dramatically with every technology release. In addition, systems management tools are a critical part of the overall solution bundle to simplify and unify management processes. For example, the IBM TotalStorage Productivity Center Standard Edition™ (TPC) tool has been upgraded with performance management to help shift workloads away from hot spots and balance storage utilization across IBM and non-IBM environments. TPC is now integrated with IBM Novus Storage Enterprise Resource Planner, to provide carbon footprint reporting and a comprehensive dashboard for streamlining the entire storage environment.



All of the examples represent a partnership with vendors, using a combination of services, technology, and innovation to transform the information infrastructure. They all demonstrate that, for a variety of business and technology reasons, there is tremendous value in making a concerted effort to modernize, virtualize, simplify, unify, and otherwise connect the entire information infrastructure, whether for cloud computing or other purposes. So when embarking on such an effort, choosing a vendor with a clear vision and strategy to guide customers in building a dynamic information infrastructure is critically important to ensuring successful results.

The Intrinsic Value of System Vendors vs. Storage Vendors

As a system vendor, IBM clearly has a more in-depth set of offerings and a more elegant strategy and vision for providing a dynamic information environment than its competitors. None of the other system vendors have made the strides, or the investments, that IBM has. IBM has a wealth of intellectual capital and a proven track record for transforming infrastructures and managing them once the desired state has been achieved. If a customer lacks the resources and expertise to perform the necessary work, use of transformation services often can both address short-term needs and ultimately lower ongoing resource requirements (and costs) for day-to-day management, as was the case for VCUHS. In cases where some business units use external services in lieu of internal IT, upgrading the corporate information infrastructure creates key advantages. One customer was able to convince three of its business units to consolidate centrally, netting a savings of over three million dollars per year with improved service as a byproduct. IBM provides clients with flexible options to leverage managed, outsourced, or cloud delivery methods to further augment existing in-house operations, providing clients with the ability to focus on core competencies and the ability to meet dynamic business requirements in a cost effective and efficient manner.

Because of its size and breadth, IBM uniquely has all of the pieces, and also has a vast information infrastructure of its own to build and manage. IBM often uses its internal systems to showcase new capabilities, as shown in these examples:

- In an early cloud computing production pilot, IBM was able to reduce costs by managing more than 92,000 worldwide users with one storage cloud and one delivery team. Lessons learned from this deployment helped IBM establish cloud computing requirements for today's products and services.
- In 2009, IBM deployed a unified, centralized customer support portal for all technical support tools and information. The portal unifies all IBM systems, software, and services support sites, including those from recent acquisitions. By leveraging its own portal, database, and storage technology, IBM was able to consolidate multiple support sites into a single portal. The new portal dramatically simplifies the user experience for clients with multiple IBM products, while helping IBM control infrastructure costs.

It should be clear that a unified information infrastructure is most valuable for its ability to bring information together for customers to exploit opportunities gained via business intelligence and combinatory, on-demand access. This is an area where IBM is rich with offerings derived from its Information on Demand evolution that are unmatched by any of its competition. These efforts have been united with Dynamic Infrastructure through the New Intelligence initiative. Overall, IBM has put much more detail around its strategy and vision than its competitors, providing enough specificity for customers to clearly understand, evaluate, and implement where it makes sense.

A subtle but important point when embarking on such a transformation effort is that reliance on a particular vendor for help does not imply a lock-in to that vendor's technology. The "glue" that binds such efforts comes from the talent, experience, and depth of services that vendors offer, and this is where IBM has a clear lead on its competitors. Technology is important as well, especially with regard to virtualization and intelligent management, but these are only pieces of the bigger picture. Few companies will put all of their eggs in one information infrastructure provider's basket, and rightly so. However, a key difference between IBM and EMC is IBM's orientation to total-solution provisioning, not just for one application at a time, but for the entire set of infrastructure needs that customers have. To ensure this, a clearly articulated strategy and vision keeps IBM's focus on the bigger picture as it addresses each customer's requirements.



Future Vendor Challenges in Building Information Infrastructures

To provide a simplified, shared, and dynamic information infrastructure solution requires a technology-agnostic approach from vendors, with constant focus on “the greater good” for each customer. To accomplish this from a sales perspective, product focus must be replaced by solution focus. Some vendors tout solutions focus, but are indeed letting product revenue goals continue to supersede “doing what’s best for the customer” goals. To refocus from products to solutions, product groups must be tightly coupled with customer solution centers, realizing and acknowledging when their product is not the best fit for the customer. From an executive management perspective, vendor revenue and compensation goals need to drive a stronger “integrated solution” mentality. This, in conjunction with providing solutions centers and interactive tools such as the IBM Support Portal, is helping IBM to reach its goals.

Efforts tied to cloud computing have helped vendor organizations to work together better toward composite and integrated solutions, but the vague specifications and lack of immediate revenue keep most vendor sales organizations focused on their respective products. The only other way to address the challenges of integrating people and technology as described above is to put a clear strategy in place with specific tactical goals and objectives. This is where IBM leads the industry in making demonstrable progress in building solutions that achieve the goals of its dynamic infrastructure model and strategy. By formalizing efforts to transform itself away from a product focus, IBM has essentially promised its customers that their needs supersede those of IBM. To pull this off as a company, IBM must accelerate the transformation by updating associated internal policies and compensation programs. But for vendors that do not have a complete technology solution that includes servers and OS platforms (e.g., EMC), the problem is not just internal and requires that the integration of technology and strategy are done cooperatively across an array of external partnerships and alliances.

Financial issues have plagued both vendor and customer efforts to transform information infrastructures, but it is likely that financial constraints will always be a factor due to the “more for less” mentality that business imposes on IT groups. From a budgeting point of view, investments in vague efforts to create a “dynamic infrastructure” are often rejected during budget planning. In reality, the increasingly stringent “green” requirements, coupled with the four key ongoing data requirements of (information) compliance, availability, retention, and security, will force the majority of Global 2000 companies to undertake transformation efforts during the next couple of years regardless of cost. Moreover, technology (especially virtualization) advances will increasingly make it cost-effective to implement most of the tenets of a dynamic information infrastructure and with the advent of enterprise class cloud services from IBM, to do so now with a transaction pricing model option.

To offer products that fit into the solutions mosaic is not enough for vendors that want to play in the information infrastructure solutions space. Offering robust services that can address the plan, build, and/or run aspects provides the proof that a vendor can deliver a total solution that works. Without question, IBM has a vast and experienced services organization, and IBM’s ongoing announcements increasingly include a blend of technology and services to provide customers with an alternative to speed up implementation and leverage the experience of services personnel that have already done the work many times over. The bottom line for many customers is a big improvement in “mean time to value” for new technology adoption.

Over time, it is clear that today’s infrastructure will need to evolve and become a “knowledge-based” infrastructure; the latter distinguished by the intelligent use of data in various new views and combinations to increase competitive edge. In a mature environment, data is consolidated, managed, and migrated to new technologies with little operator intervention, and business intelligence (BI) tools that are rich with functionality will be widely used to uncover new business opportunities. To get there, vendors must integrate hardware and software to perform these operations with policy-driven tools and a modicum of human intervention. To integrate hardware and software, product groups must have a common set of information infrastructure goals.

Conclusions and Recommendations

From a strategy perspective, information infrastructures must include a variety of technology options as part of a blended, tiered storage hierarchy that matches levels of service to cost. The key goals from a vision standpoint include the ability to



deploy new applications in a shared, scalable storage environment that maximizes reuse and data access, as well as using massive (virtualized) capacity that can be managed centrally. And finally, from a design standpoint, the technology must include all of the necessary hardware, software, networking, and services to address optimization, security, de-duplication, service management, backup, archive, and compression of corporate data.

Customers like VCUHS and INTTRA made revolutionary changes to their infrastructure environment, and both agree that the results are both cost-effective and critically important for the future. Rapid growth, increased growth in new types, access points, and uses of data, and the importance of being instrumented, interconnected, and intelligent will drive such efforts among most companies during the next 2-3 years. Based on the experiences of several clients that have made significant strides toward unifying and transforming their information infrastructure, there appears to be a basic roadmap that is common to all:

- Create a formal strategy, treating all storage and data as a single, service delivery asset
- Pursue standardization, especially for management, security, and configurations
- Establish a clear information governance structure and hierarchy, addressing the smallest (e.g., field-level) to largest (all data) control and ownership roles.
- Assess the value (cost reduction and capacity exploitation) of consolidation (...ongoing)
- Determine future shared data access needs driven by Enterprise Application Integration, BI, and Data Warehousing
- Establish a project for linking data management and control together with common tools and policies
- Determine advantages of high-capacity, highly virtualized storage to simplify, unify, and centralize
- Exploit SANs as a way to link processes and data together
- Define specific steps necessary to become cloud-ready (with a specific value proposition for each step)
- Determine fit of internal strategy with that of key information infrastructure vendor(s)

In conclusion, data growth continues despite the economic malaise, and providing an updated and dynamic information infrastructure is both an opportunity and a near-in requirement for most companies, large and small. With IBM sinking large investments into its own internal efforts, rapidly providing “solutions” interfaces like the IBM Support Portal and multiple solutions centers, and constantly enriching its full-solution capability for customers (including third-party products as appropriate to solve the business problem/need), there is clearly value in leveraging those capabilities to accelerate business and IT composite results. And clearly, IBM is in a unique position to deliver and support the full information infrastructure “stack” and address all of its clients’ information-centric challenges. The combination of IBM’s storage technology, information management products, aggressive financing, and best-of-breed integrated services supported by world-class expertise and proven experience, provide the building blocks for the world’s strongest information infrastructure portfolio.

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