

Information Technology Trends for 2010

Executive Overview

Keystone Technology Consultants is proud to provide this white paper on technology trends for 2010. Executives are often busy with business strategy and leadership, and view Information Technology as an unknown black box. We know that technology can fall anywhere on the spectrum from being a noisy, distracting problem to being an asset that enables an organization to have a competitive advantage. We want to provide expertise and assistance in helping you understand the capabilities available to you, and how they can be implemented in a way that is aligned with your organizational goals to make a positive difference.

Below we outline various technologies written in a way to point out their advantages and where they will help you, the business leader. Technologies to be covered include:

- Microsoft Windows 7
- Terminal Services /Remote Desktop
- Virtualization
- Storage Area Networks
- Cloud Computing
- Data Backups in the Cloud
- Social Networking
- Everything as a Service

After describing these, we provide a quick reference table that shows where the effects and benefits are focused for each, so that you can begin to assemble your own strategy for Information Technology.

We wrap it up with a survey of CIOs to let you know what they view as important in terms of supporting the business in 2010.

Introduction

Keystone Technology Consultants is pleased to present our annual analysis of the Information Technology (IT) industry and how it affects organizations seeking to leverage IT. Because IT is an enabling function, creating an ability to perform functions across an organization, a high performance IT operation is essential to organizational success. When performing at its worst, users will experience frequent work stoppage and be prevented from delivering needed work on time and with accuracy. This increases costs throughout the organization. Because of this fact, an organization with solid leadership will invest in the IT that makes a difference, and ensure that not only is it supporting the business operations; it is actually a competitive advantage.

IT has an ability to be a competitive advantage for an organization in one of two primary ways.

IT differentiates by deliverables

It creates deliverables that are proprietary and allow an organization to differentiate itself. This would most apply to businesses that process information in a services based industry as their primary function, such as insurance, financial, information services, etc. These organizations take data as inputs, bundle it

with other services such as manipulation and categorization, and then sell it to customers. Companies such as Dun and Bradstreet, Charles Schwab, and Citibank would fall into this category.

Their ability to manipulate information can allow them to reduce costs, increase rates and profits, and provide unique information based products that distinguish them.

IT differentiates by reliability, low cost, and internal information management

For non-information processing organizations like those cited above, and who manufacture products or provide commodity services, the competitive advantage of IT will focus on its reliability, low cost, and internal information management capabilities. By this we mean that if IT is reliable and low cost, it frees up focus and capital for other functions that do create differentiation. Because it performs as expected, management and line employees can spend time on productive business functions instead of finding labor intensive and lower quality producing work-arounds. And because its cost is manageable and predictable, the organization will be able to safely allocate capital to other functions that make an impact.

Additionally, if IT can provide better internal data management systems, the business will have a greater understanding into what is happening, and the ability to quickly measure the impact of any changes. Examples of this include data warehouses that allow slicing and dicing of data, creating an ability to deeply understand the markets, process, products, financials, and employees. Dashboards can present an at a glance view for executives to see how the business is performing, and be alerted to problem areas so they can quickly be dealt with on an exception basis. Instead of poring through reams of data searching for problems, executives can glance, and then move on to real value added work such as organizational strategy and leadership development. By having access to this information, you have access to organizational management and improvement others will not have.

IT that makes a difference in 2010

The following items are trends that may make a difference in your organization. We say “may”, because it is often the case that the implementation characteristics will impact the level of success. A great technology implemented without sufficient consideration for how it will impact the organization will often fall short of the value it could have. For example, a rollout of a new operating system without user training will reduce the positive impact. This is known as *alignment*, and you need to ensure that you have the right people on your team to plan and implement the right pieces. Frequently, the cost of the hardware and software that may help is expensive, and may be wasted through a bad implementation, limiting your return on investment (ROI) for years.

Windows 7

Microsoft took its fair share of beatings for Windows Vista; that release was never really accepted by the business community, who demanded that Windows XP continue to be available. Many corporations never installed Vista. But Windows 7 has been met with a very different response, and although released in late 2009, it has enjoyed acceptance by the user community. As of early February 2010, after being released in late October, it already had a 10% market share. To put this in



perspective, the Apple Macintosh has 5.12% of the market, so in less than a month Windows 7 has basically doubled the Macintosh in use.

Windows 7 offers much better performance, closer to what Windows XP offered rather than Vista's perceived slowness. Its overall speed for things like startup and shutdown, opening applications, etc. is much faster for the user. Some of this is perception based on optimized loading sequences, but other functions are truly faster. And while Windows XP has been well supported, as time goes on new hardware devices including system boards will be released without Windows XP drivers. Hardware manufacturers will not be incited to support a shrinking market of people who have been resistant to change.

Users have found the migration quite easy, because while the navigation, menu locations, and other central user interface elements remain the same, new features such as task bar previews, window management, and desktop accessibility have been improved in a very natural way that users will easily find and take advantage. We can personally attest to suddenly finding use for the "Windows" key (for items like "Windows+P"), and desktop widgets (since the desktop is easily gotten to by rolling your mouse to the lower right screen corner). These were always there, now they are more accessible and extend the user of other features.

Windows 7 also offers improvements in security, with upgraded versions of most components that was begun in Vista, like extending BitLocker to USB memory sticks. Microsoft has also improved management features to help the IT management staff, including better seamless application windows of deployed applications, offline file improvements, and AppLocker for better control over deployed software.

Between the improved performance and usability for users, security and manageability for the IT staff, and ongoing support for hardware drivers, Windows 7 deserves serious consideration.

Terminal Services/Remote Desktops



We are still surprised that more organizations do not sufficiently implement terminal services or Citrix. This technology has been around for almost a decade, and if you consider the mainframe paradigm established before that, the approach has been even longer. Terminal Services moves the entire user environment away from the desktop or notebook and places it on the server. The only portion still running at the desktop is the things the user cares about: the display, input devices like keyboard and mouse, and any other locally connected peripherals like DVD drives, memory sticks, and printers. This

provides numerous advantages:

- Reduces work needed at the desktop so IT staff can provide support at the server without expensive trips to a user location.
- Users can securely connect from almost any PC, including when out of the office. This improves flexibility, since they can start working on a document at home, disconnect and go to the office and then reconnect and the document is exactly where they last left it. In times of disaster workers can access needed applications and data from most anywhere in order to maintain some level of service.
- Improved security – instead of carrying sensitive data on a laptop and losing it, the data remains in the secure server environment. Also, users are less able to take data if they leave and misappropriate it.

For 2010, probably the most compelling reason to implement terminal services is cost savings. For those facing the prospect of replacing older PCs this technology can extend the life, potentially by years of these older machines. When deploying the remote desktop users can access it from any PC as stated before, or can use a “thin client” device that provides almost maintenance free desktop replacement. Because of this, if you have desktops that are reaching their life expectancy, and especially if you would like to deploy newer technology such as Windows 7, you can use these desktops as terminals for the remote desktop running under terminal services on the server. The existing PC, graphics card and monitor, small disk drive, etc. will support the remote desktop client, and the rest of the PC can be locked down to reduce maintenance and gain some of the security features we previously described. We did an analysis for one client last year that needed to replace or upgrade 60 PCs over the next 2 years, and their overall savings were \$55,000 by taking this approach. And those savings would be found again automatically with no effort in another three years when the next upgrade cycle was also avoided. When you have terminal services implemented, almost all of the upgrades happen on the server. Instead of going to each PC to upgrade Microsoft Office (or using expensive and difficult to use deployment tools), you simply upgrade the terminal server. If users are seeing slower performance or do not have enough space, a memory or disk upgrade at the server benefits the entire user population.

There are many reasons to implement this, but the cost savings combined with the rest of the benefits in 2010’s economy make this a “must consider” option.

We recommend Windows 2008 Server R2, its user interface is much like Windows 7, and it offers superior performance, reliability, and manageability. Additionally, the drivers for hardware, etc, are identical to Windows 7, making device support very good.

Virtualization

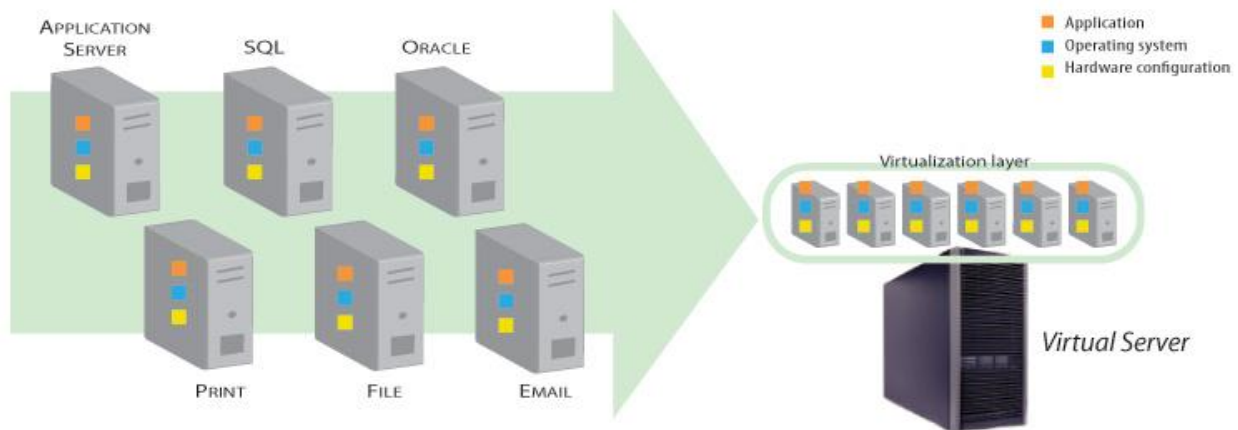
Virtualization is the concept of running many logical (or virtual) machines on one physical machine. Traditionally computers ran one copy of an operating system such as Windows Server with a set of applications. You could look at a rack of five physical servers and safely assume they each represented one server, with names like “WebServer”, “FileAndPrint”, “Database”, “Accounting”, etc. The problem with this traditional approach is that it is cost prohibitive and inflexible.

It is expensive in that it means new functions may require new hardware. Every new initiative an organization seeks to pursue has added costs, increasing risks and making ROI take longer. Additionally, even after purchase and setup, the utilization on the server is often very low. For example, a web server is a requirement for a small business seeking to have an ordering portal for its customers to access, but even if one hundred orders per day are placed that take five minutes each, that still represents only one-third of the day’s time. And in all likelihood, when processing the orders, the machine itself is only taxed a very small percentage of the capacity it offers, often less than 10%. This means your initial outlay is higher, and the ongoing costs are higher as you pay for excess capacity.

It is also less flexible, because the 1:1 relationship in the traditional model means the operating system is tightly coupled to the hardware. Since operating systems need drivers to support the hardware, and licensing validation methods are often tied to the hardware, any change in hardware due to failing equipment, upgrades, migration, etc. may require a corresponding change in the software that runs on it. This is a time consuming process and makes potential changes less likely to be pursued except when

absolutely required, and often at times such as disaster recovery points when flexibility and speed are most needed.

Virtualization overcomes these limitations by creating a base that looks like real hardware to the operating system and applications, but is in fact only “virtual”. The way a network engineer would use it is similar to how they use a physical server. They configure the virtual machine by checking options for video, memory, disk space, network cards and other devices. They then insert a DVD with the operating system to install, and start the new previously unused virtual machine. On the monitor they will see a boot-up sequence, and be able to boot from the DVD. They install the operating system and then the applications such as we web server, File and Print, etc. They then add authorized users and allow access, who can access it the same way they do any other server, physical or virtual. The virtualization is invisible to the users, and even the engineers for many functions. The graphic below provides a picture of what happens.



Through virtualization the limitations of the physical environment have been overcome on both fronts:

- Costs – The expensive, physical server now runs several functions instead of one, and can make use of the processing power available to a higher degree. To see an analogy in human terms: instead having a ten person department that normally only has two people producing, it is now much closer to the maximum productivity with all ten producing.
- Flexibility – Since another machine can be built easily with the virtualization layer, it becomes easy to move virtual servers from one machine to another; the physical differences are hidden from it. This greatly improves disaster recovery, system upgrades and migration, and functions like archiving or testing.

Storage Area Networking

Storage Area Network (SAN) has been around for over a decade, and like virtualization marks a change in how hardware interacts with the operating system and other hardware. Traditionally, a single server had its own internal storage, dedicated to its needs. Each server may have an array of disks providing the space needed. The problem is once again one of flexibility, and to a lesser extent cost.

The flexibility issue goes to how much space is installed, and once installed is not easily moved, reduced, or increased. Because the drives installed are so much a part of the running server, adding or modifying space requires careful planning and execution to minimize down time. This means that as the

organization grows and needs more space, the cost of adding and managing it become more expensive, and can limit the options.

SANs provide a central device with a large amount of disk space, which is then provisioned and assigned to servers as needed. Network engineers can now modify disk space easily, and do it all on the fly with no interruption in service. This is much more flexible.

Additionally, the cost to manage this also reflects a reduction over traditional methods as each project is much less risk and takes less time.

When combined with virtualization, SANs really shine to create a flexible, high performance environment with long term cost management, and much greater disaster recovery capabilities.

Cloud Computing

The concept of cloud computing has been around for a long time. If you have had a Hotmail, Yahoo, or Google email account for a few years, your email has been “in the cloud”. But over the last 2-3 years the term has been applied wildly and reached genuine buzzword status. It is vague, and because it is marketing terminology as much as technical description, you may be confused, and would not be alone in that. In an effort to bring some order to this here are some helpful descriptions of what it is.



- Software as a Service (SAAS): this is the most common application of cloud computing, in which the software a user accesses is installed on a central server that can be connected to from the user’s environment. The aforementioned Hotmail is an example of this; users open a website in their browser and can access their email, they do not need Outlook or some other client, and the program and data is never stored on their local machine. This is now being extended beyond email services to other applications such as ERP, CRM, or document creation (Google Docs). It is not inconceivable that a person’s entire set of software except for some small local OS and client access tools (a browser or remote desktop client) may be in the cloud at some point. One key aspect of SAAS is Service Oriented Architecture (SOA), which provides for some level of openness and possible integration between systems located elsewhere and those installed locally. For example, your ERP vendor may be a cloud based application, but your analytical reporting system is a local database and report tool that gets its data nightly via the calls it makes to the SOA enabled ERP system.
- Utility Computing (or platform as a service): this is the equipment and services needed to host the software. This extends flexibility and may smooth costs especially in times of expansion or

contraction. Examples includes Amazon's S3 storage services, in which an organization can rent disk space on Amazon's servers and use it as needed as an extension of their own data center. Amazon and others also offer complete Windows or Linux server's rented by the hour, ready to install your websites, apps, data, etc. This can be very attractive for times of spikes in demand; for example a marketing campaign that will suddenly increase website traffic for the next two weeks and then expect a trail off may be best handled by renting space temporarily, instead of permanently buying and deploying more servers.

- Web Services – these are pieces of software that perform some function, such as telling a local program the current regional temperature, current price of gold, the credit rating of a prospect, if a credit card can be authorized, etc. They can be used by your development team to extend their capabilities with both additional information and calculation capabilities. This can breed the best of all worlds for you.
- Managed Service Providers (MSP) – this is not applied so much to your users as it is to your data center and client devices and IT team. The average IT support team spends a lot of time just watching servers and other devices to make sure nothing is wrong; that the disks are not running low of space, there are no email errors, no imminent failures, etc. MSPs are companies that have invested in expensive monitoring tools the average company cannot afford, and they provide remote monitoring by exception on hundreds, even thousands of specific measurements. Your IT Team can stop watching and start proactively fixing to avoid down time. Some companies even contract with the MSP to automatically escalate any issues for resolution because of the time of day, issue type, etc. Services in this space include systems and application monitoring, anti-spam and anti-virus, and patch management.
- Service Commerce Platforms: These have actually been around for a long time in various offerings, dating back to EDI transactions. They offer centralized place to post and exchange information with suppliers and customers, such as a purchase orders and Order acknowledgement. Examples include Ariba and Rearden Commerce. They offer the advantage of reduced integration development with partners, and a central place for all organizations interested in a function or industry to congregate in one place and use one language to describe transactions.

The benefits of cloud computing are primarily in the lack of need to establish and maintain a data center for these functions. If you have a few users, or even many, it may be more economical to use a hosted set of services instead of building your own. The cost to establish a modern data center can be prohibitive and the need to maintain all of the skills and pieces to maintain it in a ready state are very high. Cloud computing usually allows you to get up and running very quickly, for many applications immediately, and reduces your exposure to risk and cost. It is also more flexible for an organization that needs variable usage. Consider the cost of an ERP system for a large greenhouse; they may need 500 licenses at peak in season, and a low of 100 during some winter months. Rather than build and maintain a data center for 12 months a year, and buy 500 user licenses for only a few months of use, they can use a hosted SAAS solution of the same application, and ramp up or down throughout the year as needed, saving money.

Most people's concept of cloud computing would assume that all of these functions are "public" in the sense that vendors offer the services to anybody who agrees to the terms and pays any needed fees. But the concept of a private cloud should also be considered, where one company or a group of companies builds a system for limited access. This removes the real benefits of cloud computing (reduced long term cost, flexibility, and quicker start up time), but may allow some in the business to be more confident because their data is still under their control. This is one of the biggest inhibitors to the

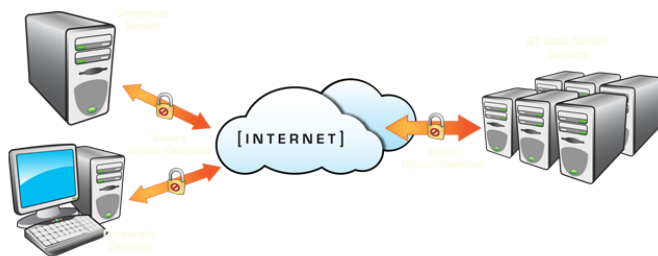
adoption of cloud computing: the control and reliability of the systems, which can be addressed by a private cloud.

It may be best to start with some applications that are not critical, and only used by some; examples may include expense tracking, CRM, and shipping charge calculators. When those with concerns see the way they integrate it will help to move to larger and more central applications.

Data Backups in the Cloud

The cloud functions we outlined above were focused on the numerous tasks that are advantageous to the users and information technology team. But one use in particular deserves its own focus.

Backups have often been one of the least appreciated, and most problematic of the functions in IT. Devices like tapes and USB drives are prone to failure, and we often see errors on 20% of the jobs that run. Problems continue with storage and security. Many organizations store backup tapes in the same area as the servers; meaning that a fire or flood will completely destroy all traces of the organization's records. Others have the "IT Guy" take the tapes off site in their car, where they can be stolen or lost with customer data, credit cards, financial records, employee information all exposed and potentially very damaging to the organization's reputation. These situations are potentially disastrous.



New technologies exist that can allow backups to be sent offsite to a storage facility in the cloud. This disk storage can be rented on an as needed basis, and agents running locally on machines can send all changes to the cloud based storage so that there is a scheduled or even almost live backup being maintained. This addresses the issues of security and reliability, and also reduces the

oversight needed in the IT department.

But even more ideal, when combined with technologies like SANs and virtualization, it creates a very fast disaster recovery configuration. Because the virtual machines are being backed up off site, it is possible to start them as live machines with some configuration changes, and be running again with very low downtime.

This is a must consider item.

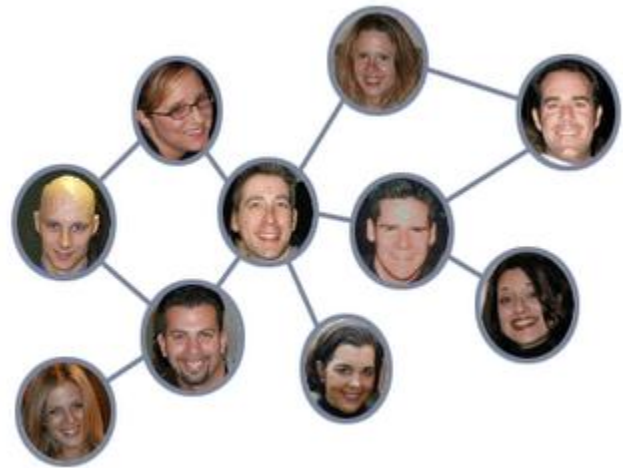
Social Networking

Social networks are an integral part of our lives, and as we consider the fact that our organizations, and those of our customers and suppliers are also people, we must consider the value of the social networking tools.

I spoke with a company recently that launched a new product with a brand new domain name (website). They have traditionally manufactured and sold through big box retailers, and had very little brand recognition or relationship with the consumers who ultimately bought the products; this was an attempt

to change that. They quickly found that they were having 35,000 hits per month on their website, driven by a rabid fan base in the social networking sphere. These fans were actively promoting the product through Facebook, Twitter, and other outlets. The company benefiting from this recognized it, and started a network of fans on Facebook, with particularly active fans who tell others receiving perks like free products, special access, and other benefits.

In a connected world, one that relationships are often limited to online interactions, and in which people get most of their information they use to form opinions, organizations must be present. They can find new customers and employees, update each other, and share information easily across traditional company boundaries.



This should be done with care for various reasons; among these are:

- Viruses and malware can be injected via these tools, causing loss of data or access.
- Employees may post errant or offensive posts that affect the reputation of the company.
- These sites can add value, but can also be time wasters. And while the line between personal and professional time has been blurred, productivity must be maintained. Many users may not be aware of how much time they use browsing profiles or reading tweets, but it should be understood.

Social networking may be limited to some degree, but we recommend considering its use for the following functions:

- Marketing: Especially for consumer related products or services, the use of Facebook fan pages, Twitter, and blogs are a great way to provide information where the consumers congregate. Even a B2B company we work with is using for a pre-conference PR blitz.
- Recruiting – LinkedIn is a great way to find new employees. We used it to help find a developer for a client and had a much more helpful response than we saw with traditional methods like newspapers or career boards.
- Product Updates and PR – The use of Twitter is an easy way to let customers and other interested parties know about release dates, upcoming events, and other company news.

Your marketing department (or firm) should be advising you in these, but we recommend your IT group also be closely involved.

Everything as a Service

This final item is really a combination of many of the previous technologies we have listed. For some organizations, they may consider using an assembly of these, such as:

- Terminal services for internal applications and file access
- Cloud computing for expensive systems like ERP that require special skills to maintain
- Storage area networking for flexibility in the data center, and better support for disaster recovery when combined with data backups in the cloud.

Your overall strategy should consider all of these, and be encompassing enough to take advantage of the combined strengths.

Benefits Focus of each Technology Presented

Like any set of products or services a company may consider, the ones we present have varying effects and benefits that you can expect. You may seek to save costs, create revenues, or be in compliance with required regulations or best practice scenarios. That is what we provide in the table below, so that you can quickly zero in on what you should consider in this list.

We are keeping it simple, as the expected benefits may vary, and we would work with you to assemble these when considering each against the specifics of your organization.

Technology	Increase Revenues	Decrease Costs	Compliance
Microsoft Windows 7	○	◉	◉
Terminal Services /Remote Desktop	◉ (Note 1)	●	●
Virtualization	◉	●	●
Storage Area Networks	○	◉	◉
Cloud Computing	◉ (Note 2)	◉	◉
Data Backups in the Cloud	○	◉	◉
Social Networking	◉	○	○
Everything as a Service	◉	◉	◉

Key:

- No impact
- ◉ Minor Impact
- ◉ Moderate Impact
- Significant Impact

Notes:

1. When used to extend an organization virtually or geographically into new areas.
2. When used to reach new markets via add on tools in apps like Salesforce.com for demographics, SEO, etc.

IT Management Trends

You may be an organization large enough to have a Chief Technology Officer (CTO) or Chief Information Officer (CIO), or you may be relying on outside personnel to help you with defining a strategy that aligns the technology available to you with the goals you are setting for the business.

Regardless of where you are, it may be helpful to know how other IT leaders are viewing 2010. Below we reprint the results of a survey of CIOs from a [CIO Insight](http://www.cioinsight.com); the original appeared at:

<http://www.cioinsight.com/c/a/Research/CIO-Priorities-for-2010-196566/>

1. The sour economy will still play a role in IT decision-making in 2010. The top priority for CIOs: **business productivity and cost reduction**.
2. Even as organizations continue to look for cuts, they need to keep supporting the business. The second priority cited was **IT and business alignment**.
3. As CIOs look across the business in anticipation of economic recovery, **business agility and speed to market** ranked as the third priority.
4. Organizations need to make reduced budgets work, so **business process reengineering** made it to number four.
5. Sensing a familiar theme? The fifth ranked priority was **IT cost reduction**.
6. CIOs voted **IT reliability and efficiency** as the sixth highest priority.
7. Just focusing on tactical and operational concerns will hobble IT departments as they try to keep up with business needs. Thus CIOs voted **IT strategic planning** number seven.
8. IT doesn't have to be just a cost center. CIOs say coming up with **revenue-generating IT innovations** is their number eight top priority.
9. Security breaches can put a major dent in the bottom line, and also in the company's brand. CIOs say **security and privacy** concerns are their ninth most important priority.
10. Where does the CIO stand within the grand scheme of the organization? Many executives wonder, placing the **CIO leadership** role in the number 10 slot.

Summary of the Survey:

The survey shows that CIOs understand the economy and its impact on business. There are repeating patterns of realigning the various parts for reduced costs and better flexibility, with a longer term view of being ready for a better market where technology can help them quickly take advantage of new opportunities.

There was one item we did not see that we expected: consolidation of business units and functions. It is implied in item 4, business process reengineering, but is not clear. Many organizations have downsized and consolidated business functions or units, and technology can greatly assist with that, both in terms of helping it to be redefined, and supporting it after the transition period.

We highly encourage business leaders to work with the technology leaders to review the organization, its business processes and future strategy to shape an organization that produces the greatest value and manages the risk.

Keystone Technology Consultants, founded in 1993, provides information technology support, network management, hosted solutions, and high level technology strategy to small and medium sized businesses throughout the north-eastern Ohio area. As a Microsoft Gold Certified Partner, Keystone possesses numerous certifications and skills, and specializes in reducing the cost of information

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