WHITE PAPER

Managing Virtualization in 2009—
A Double-Edged Sword

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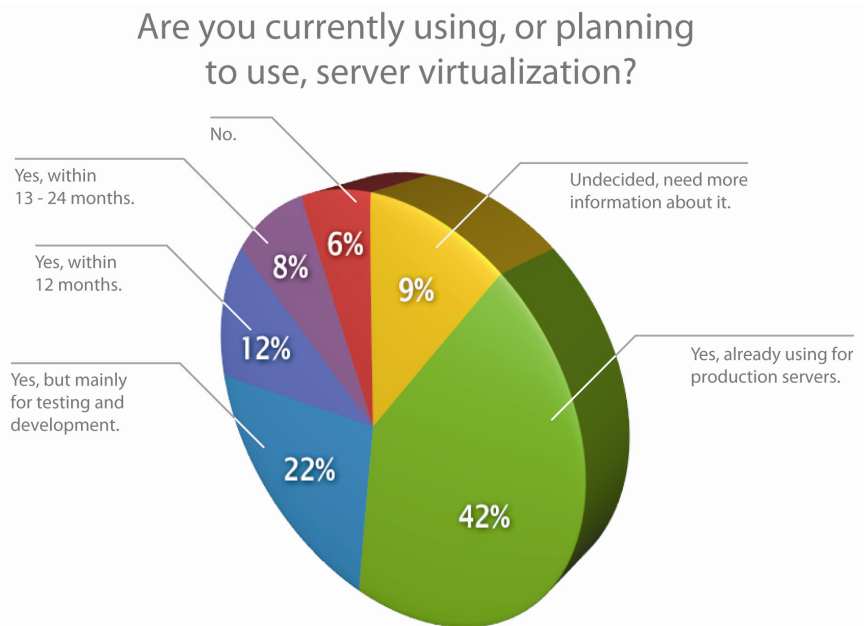
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Section I. Introduction

Enterprise IT has undergone significant transformation over the past decade. Ubiquitous, high speed connectivity has allowed organizations to build out corporate networks that allow workers, customers, vendors, partners and other constituents to access information instantly. To keep up with the growing demand for greater freedom, organizations are transitioning away from traditional companies to "virtual" enterprises where the users, data and even the infrastructure that powers the company can be located anywhere and just as quickly moved to another location. There are several trends that are the building blocks of the virtual enterprise and they are as follows:

- **Virtualization.** Virtualization has impacted IT more than any other trend over the past decade. It allows for the disaggregation of physical and logical resources meaning an application or data could be residing on a certain physical server at one moment and then instantly moved to another server. This provides the IT department a tremendous amount of flexibility and ability to maximize resource utilization but managing the assets becomes much more difficult which is why 42% of organizations recently surveyed indicated they have some level of virtualization in production.

Exhibit 1

Are you currently using, or planning to use, server virtualization?

No.

Yes, within 13 - 24 months.

Yes, within 12 months.

Yes, but mainly for testing and development.

Undecided, need more information about it.

Yes, already using for production servers.

8% 6% 9% 12% 22% 42%

- **Cloud computing.** This extends the value proposition by moving corporate IT assets into "the cloud" and makes them accessible in an on demand manner. This means that companies can augment their IT architectures with infrastructure and application components that may be located anywhere around the globe. Again, the flexibility and resource effectiveness this creates comes with a price. As applications move out of tight IT silos and become a collection of "mashupable," cloud based components, troubleshooting performance problems becomes very difficult.

- **Consumerization of the enterprise.** Many of the collaborative technologies used in corporations today were introduced through workers bringing personal technology into the workplace. Chat, social networking and mobile phones are examples of this. A recent survey of end users indicates that, on average, workers use four consumer tools or devices in the workplace daily. These consumer technologies allow users to be more productive by communicating with more people in more ways but are incredibly difficult for IT to support if they are not fully aware of them.

- **Web 2.0 and social media.** The use of social networks and Web 2.0 has enabled workers to create their own content and distribute it to a customized network of colleagues in and out of the organization. Because these systems are largely managed and utilized by the end user, this trend drives up the amount of content on the network and creates unpredictable traffic flows.
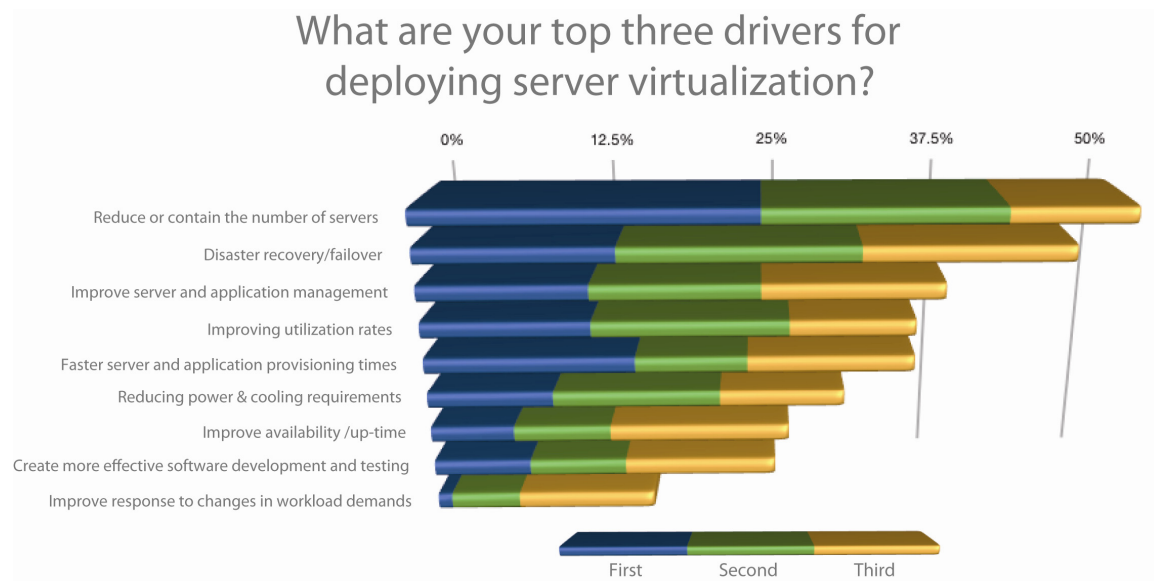

The modern day workplace and the way people work and live have been forever changed for the positive. Users can reach an ever expanding community of individuals that cross our professional and personal lives instantly over a myriad of devices in almost any location. However the IT infrastructure that's used to support corporations has become a complex, dynamic mesh of virtual technologies that can be located anywhere and be moved instantly. Unfortunately, traditional management systems that IT is relying on to manage this evolution is anchored in technology roots that harkens back to a more static age.

Section II: Legacy IT Management and the Virtual Enterprise

As stated previously, IT infrastructure has become a complex mesh of network elements, systems and applications, some of which are virtual, that need to interoperate as smoothly as if they were one homogenous entity to provide the best possible service to all users. Although, the virtual enterprise can make the organization much more fluid and nimble that doesn't necessarily mean that this also

reflects on the efficiency of IT operations. While things have gotten radically simpler on some fronts, e.g., converting multiple physical servers into one virtual server (see *Exhibit 2* for top drivers of virtualization), it has gotten harder in others. For instance, how do you ask your IT service desk to support applications that are not even on your network?

Exhibit 2

What are your top three drivers for deploying server virtualization?

Reduce or contain the number of servers
Disaster recovery/failover
Improve server and application management
Improving utilization rates
Faster server and application provisioning times
Reducing power & cooling requirements
Improve availability /up-time
Create more effective software development and testing
Improve response to changes in workload demands

First Second Third

The added layers of operational complexity make it harder for the IT infrastructure to perform like a utility similar to phone and power systems—always on, always available and always performing optimally. Any disruption is unacceptable and can ultimately cost the affected corporation revenues.

The dramatic increase in the complexity and mission critical role of IT infrastructure for the business has created new demands on technology management platforms. If IT must align with the business, then the IT management model must be driven from a business perspective. This new imperative requires a shift away from the bottom up approach of traditional management systems also known as 1.0 management solutions. In the bottom up approach, IT infrastructure elements are the managed assets: servers, routers, switches, firewalls, databases, applications, and storage. The 1.0 management systems use a mix of probes and agents to track the critical IT elements but were not extensible to the real-time understanding of each and every user's experience. This is only exacerbated by the fact that probes can't extend to every location that has direct Internet access for applications that are in cloud for

example. To underscore the challenges of the bottom up management approach, we highlight here an example of a portal server—whose application infrastructure is shown in *Exhibit 3*. This example highlights the inter-connectedness of all the building blocks of the portal server and that they must be managed in unison with the network and systems to provide a comprehensive view of the state of the application.

Exhibit 3: Portal server Infrastructure
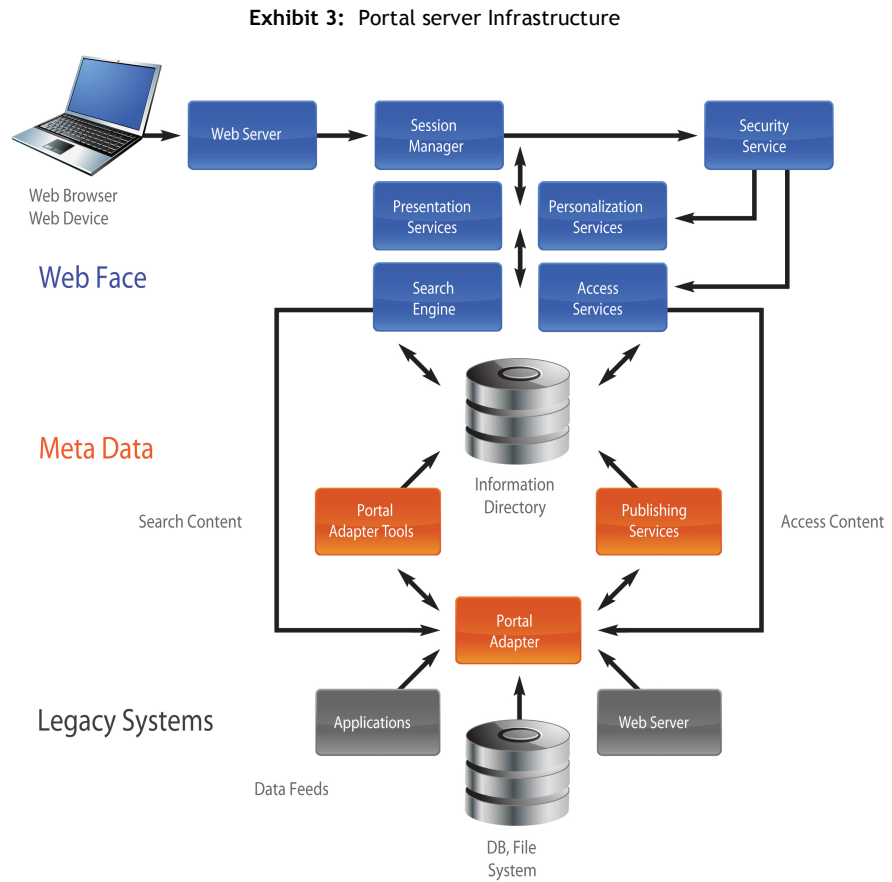
Yet, the traditional IT management systems, such as IBM Tivoli and HP OpenView are rooted in bottom up principles that can note that all elements within an application's ecosystem are functioning fine, when meanwhile the service desk's phones are ringing regularly about performance problems. What is missing is the knowledge of breakdowns in the inter-relationships of elements within an application's ecosystem. This is why almost 3/4 of trouble tickets are reported to the service desk by the end user and not detected by the management systems.

Additionally, these 1.0 management solutions will tout that they can consolidate alarms from different nodes/endpoints into a single console (*Exhibit 4*), but even then that does not help translate what is going on into what a problem might mean for the end-user's experience.

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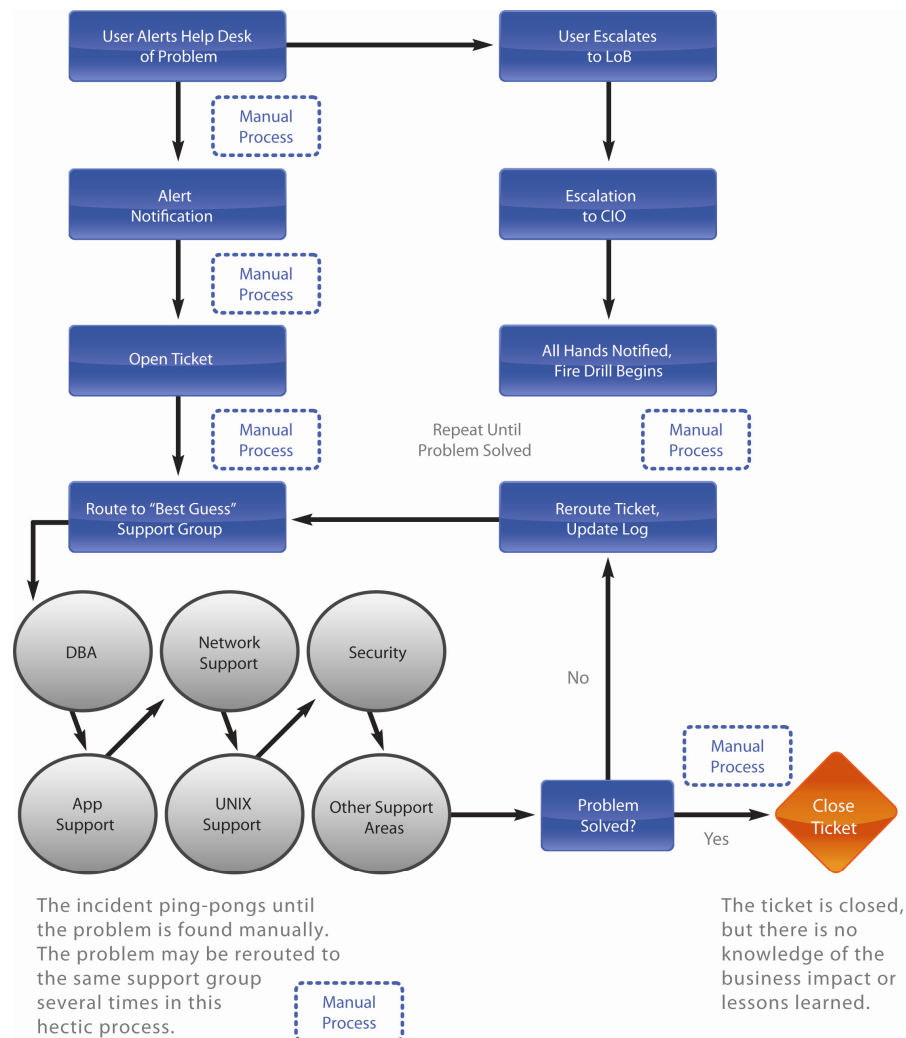
Exhibit 4: Bottom up approach to IT management

And finally, many of these legacy systems have a complicated rules based approach to performing root cause analysis but current research shows that these systems identify the right problem only 2/3 of the time.

The architectural constraints of the bottom-up approach mean that these solutions will put IT operations even further behind the rest of the organization in terms readiness for the virtual enterprise. Here are some other areas to watch out for when discussing requirements for managing virtualized architectures.

- In a 1.0 world, application management is heavily agent based. Deploying agents on every server and desktop will be cost prohibitive with some server agents costing $5K each. Additionally, the agent based approach does not migrate well from a world of physical to virtual servers—most of the time this would be a forklift upgrade.

- 1.0 management solutions are also very complex to deploy and are often highly dependent on the need for systems integration work. System integration can often add months to implementation and hidden costs that could likely equal the cost of the software itself.

- Long troubleshooting times. Statistically, the majority of troubleshooting time, almost 90% is used to simply identify the problem. Much of the lengthy troubleshooting time occurs in what is known as "resolution ping pong" (*Exhibit 5*) where the trouble ticket is passed between the different IT domains. This is why five or more service desk calls are required to identify the owner of the problem. This problem exists because the bottom up, legacy management approach does not provide any cross domain visibility.

Exhibit 5: Resolution ping pong

The incident ping-pongs until the problem is found manually. The problem may be rerouted to the same support group several times in this hectic process.

The ticket is closed, but there is no knowledge of the business impact or lessons learned.

- No ability to recreate the problem. Many service desk calls go unresolved since the IT department has no way of recreating many of the problems. With these types of issues, the user can have the same problem repeatedly and yet the problem never gets solved. Often the problem is closed and logged as "unresolved."

- Legacy systems cannot manage a virtual environment. Organizations are using SaaS, cloud computing and virtualization as a way of driving costs down and increasing efficiencies but operationally most organizations are at a loss on how to handle. Where do you put an agent if your application is not even your application? This is why 75% of virtualization technology is used for development environments only. A recent data center manager survey indicates that 52% of the respondents cite management as an inhibitor to deploying virtualization in production environments. As organizations further the vision of virtualization and migrate to cloud environments this problem becomes further exacerbated.

Section III: IT Management 2.0

The factors examined earlier, including the need to manage IT with end-user experience in mind, reduced budgets and virtualization all have lead to the need to evolve IT management.

IT management 2.0 starts from the top, the end user and works its way down to IT infrastructure elements—a top-down approach. The top-down approach is the complete opposite of conventional management strategies that start at the lowest levels of IT infrastructure and tries to work its way up, usually unsuccessfully.

IT management 2.0 monitors the end-user experience and triggers a problem when there is a user experience problem. This is a marked difference than the bottom-up model where no individual node may be "down" but the user is still experiencing a performance problem. This provides the service desk a laser sharp view of the user experience and how the various objects across all IT domains support them. IT management 2.0 systems are able to identity the problem much faster than traditional systems. Rapid problem identification allows the service desk to focus the troubleshooting efforts at the actual problem rather than spending time simply trying to identify it.

IT management 2.0 is built on Web 2.0 principles such as collaboration, visual streaming and user-generated content to deliver new levels of manageability of all the end users and applications. IT management 2.0 starts with the worker and a given

device whether it's a desktop, laptop, smart phone or other device. Management 2.0 also provides real time mapping to specific application servers whether the server is a physical server, virtual server or based in the cloud.

IT management 2.0 is built as follows:

- Zero footprint deployment that uses standard network flows such as sFlow and NetFlow to have complete knowledge of an end-user's application activity on the network. This obviates the need for probes and agents.

- End-user experience is recorded to allow the service department to "play back" the problem. "DVR-like" capability is initiated when an end user, a server or an application's network activity differs significantly from their normal behavior. This provides the IT department with the ability to recreate the end-user problem without having to involve the actual user.

- Web 2.0 capabilities are incorporated into management 2.0. This allows end users to report a visual trouble ticket through a web interface, creating a "self service" model for users. The visual trouble ticket is simply an augmentation to an existing trouble ticket system like BMC's Remedy whereby the DVR recording is the appended visual "notes." Self service has been tremendously popular with many of the consumer service companies such as mobile phone operators, cable providers and Internet application providers.

- The end user is only contacted when the problem is resolved. This is a marked improvement over the five or more times the user is contacted today.

The top-down approach improves management in many ways. First, the troubleshooting of the end-user problem is initiated when the problem actually occurs rather than a delay while the service desk plays "ping pong" with the trouble ticket. Second, the zero footprint deployment allows the system to scale enterprise wide to all locations without the need of having the IT department visit each location. Lastly, all users include remote and VPN users are serviced the same. In the legacy environment, users connecting through VPNs are generally not helped until they are back in the local office.

The IT Management 2.0 process is significantly simpler than the workflow used with traditional systems. *Exhibit 6* shows the workflow for problem isolation and resolution using IT management 2.0. This is significantly simpler and faster than the workflow shown in *Exhibit 5*.

Exhibit 6: IT management 2.0 Workflow
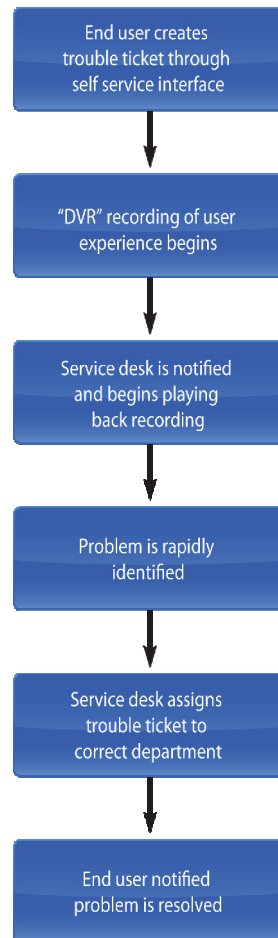
The entire workflow is generated by the end user. As soon as the end user encounters a problem, the user can go to a self service interface and initiate a call which kicks off the DVR recording. The service desk is then alerted there is a problem and access the recording from a centralized system. This lets the service desk view the actual problem the user faced rather than trying to recreate it. The service desk then rapidly identifies the problem using the to-the-second historical visibility and assembled the best team to solve the problem. The incident solving team works collaboratively with the end user and the visual tools to review the issue and solve the problem. The user then is able to return to a normal work environment much faster than with legacy tools.

Section IV: Benefits of IT Management 2.0

There are many benefits to IT management 2.0 that fall into two categories—benefits to the IT department as well as benefits to the actual end user. By evolving the

management infrastructure to management 2.0, organizations will realize the following benefits:

Benefits to IT operations

- Increased use of virtualization and cloud computing. IT management 2.0 puts a management framework in place that allows organizations to accelerate virtualization and cloud computing. Virtualization has tremendous capex benefits for organizations. It's common for organizations to reduce the amount of physical infrastructure by over 60% when migrating to virtualization which reduces not only the cost of the hardware but saves money on power and cooling which contributes to green initiatives. A management 2.0 strategy needs to be in place for companies to use virtualization in production environments.

- Faster mean time to repair. Organizations that adopt a management 2.0 strategy will trouble shoot problems at least 50% faster. This allows IT to focus more time on strategic initiatives rather than fighting fires.

- Scales without the use of agents and probes. Traditional management relies heavily on agents and probes. This is adequate for static environments where the IT department can deploy the probe or agent once and then use them to help problem solve. However, in this dynamic, virtual world, the management of the agents and probes would be so arduous that all the benefits of them would be neutralized.

- Rapid implementation that does not require costly system integration work. The routers and switches simply need to be configured to push "flow data" to the application management solution which when set-up will provide comprehensive and extensible information for the entire organization.

- Better visibility into infrastructure and historical trends to help identify problems. IT departments are often problem solving "blind" where the troubleshooting is being done based on a phone conversation with the end user. This causes a lot of ad hoc troubleshooting methods and, in some cases, guessing by the IT department. The enhanced visibility will allow the service desk to focus on where the problem actually is.

Benefits for the end user

- Eliminates frustration with service desk. It's common for an end user to be frustrated with the corporate service desk. Part of the problem is that end users are not nearly as technical as the service department so the user's ability to describe

the actual problem is limited. Also, if a critical system is down the user may become additionally frustrated as valuable time is being lost.

- Self service puts control in the hands of the end user. Like in the consumer world, users can log trouble calls immediately with no hold times. This means the user will get service faster. The reporting portal should also be able to display the "status" of the trouble ticket so the worker can check the status whenever the user desires.

- Enhanced training. By reviewing the problems with user, the IT department can help ensure that problems that are user generated do not recur. This will ultimately increase worker satisfaction and reduce the number of trouble tickets opened.

Section V: Conclusions and Recommendations

Virtualization, cloud computing, Web 2.0 and consumerization are radically changing the face of IT. Any information can now be delivered to any user at any time over multiple networks and devices. This puts an even bigger strain on the IT department's ability to manage the underlying technology. Today, an IT department spends more than 80% of its annual budget to simply "keep the lights" on which limits the organizations ability to innovate. To reduce this percentage, the management of the IT infrastructure needs to undergo a major transformation as the legacy management tools and strategies will no longer be sufficient.

IT management 2.0, built on Web 2.0 principles, will empower the IT department to manage the infrastructure through the "eyes of the end user." Additionally, the management 2.0 principles allow users to self generate trouble tickets and kick off the problem solving workflow immediately. Problems will now be solved faster as the service desk will have better information at their disposal. To get started, we make the following recommendations:

- Stop the spend on management 1.0 tools. Despite the fact that many organizations have spent millions on traditional management tools, continuing to do so is simply throwing good money after bad. Cease the investment on 1.0 tools and invest in management tools that are built for a virtual environment.

- Embrace consumerization and use it to help with management tasks. Web 2.0 tools, self service front ends and collaboration technologies can all be used to augment the way users are supported. Fighting this trend and sticking with traditional management methods is a losing battle.

- Put the management 2.0 systems in place prior to wide scale deployments of virtualization. Don't minimize the impact that virtualization can have on the organization by not having the correct management tools in place.

Traditional management systems also known as 1.0 management were built for a different era of IT. An era where the infrastructure was static, users were located in corporate offices and virtualization did not exist. The infrastructure has evolved and the management tools *must* keep pace.

About Xangati

Xangati is the provider of the industry's first Application Management 2.0 solution for both service providers and IT organizations that want a highly-developed solution for managing the dynamic and unpredictable nature of applications. Xangati has integrated prominent Web 2.0 concepts like streaming, collaboration and user-generated content into a comprehensive system for managing networked application environments.

Xangati has received the following awards:

- 2008 InfoWorld Top Tech Startup
- 2008 Network World IT Management Software to Watch
- 2009 ABA Finalist New Product of the Year, Telecommunications
- 2009 Yankee Group Startup to Watch
- 2009 Gartner Cool Vendor

For more information, visit the company website or register to watch the accompanying webinar.