



EMC Ionix
From Physical to Virtual to Cloud
Next-Generation IT Management

EMC Ionix

From Physical to Virtual to Cloud

Next-Generation IT Management

Abstract

Virtualization is a key step toward a more flexible computing infrastructure approach that EMC and other industry leaders are calling “private cloud”. Many businesses are driving their IT infrastructure in the direction of virtualization and private cloud simultaneously as they pursue an IT Service Management (“ITSM”) approach to managing IT. As you undertake this journey, you will need to reconsider both your IT management processes and your IT management tool capabilities. This white paper discusses the challenges associated with managing a virtualized infrastructure to deliver IT services and describes how EMC® Ionix® enables you to overcome those obstacles.

Table of Contents

Introduction	4
Audience	4
ITSM and the emergence of virtualization	4
Virtualization is part of a journey	6
Dynamic insight	8
Collaborative IT	9
Model-based control	9
Conclusion	10
EMC Ionix	11
EMC Ionix for Service Management	11
EMC Ionix for Data Center Automation and Compliance	11
EMC Ionix for Service Discovery and Mapping	12
EMC Ionix for IT Operations Intelligence	12

Introduction

We are living in an extraordinary time for information technology. Corporations have never before had access to the proliferation of computing, storage, and network technologies that they do today. This availability of IT technologies has led companies to seek innovative ways to derive business value and competitive differentiation from IT. Traditional businesses are leveraging mobile network computing platforms such as cell phones and smart phones to keep their workforce connected. New companies have grown up around new business models enabled by nearly universal network connectivity. As an example of this shift, an IDC survey found that use of online video by Internet users had grown from 33 percent in September of 2006 to 54 percent in November of 2008.¹ While the degree of business innovation supported by IT has been phenomenal, the journey is far from over.

As IT technologies have become pervasive, businesses have been striving to use these resources as a “utility” that can be controlled and metered according to business demands. Virtualization has emerged as a key technology for enabling the delivery of IT as a utility or service. Virtualization enables the underlying physical IT infrastructure to be abstracted from the logical workloads that are using the resources. Virtualization enables applications to be rapidly deployed, scaled, optimized, and decommissioned. EMC has a vision of this virtualization extending from the corporate data center or “internal cloud” to external IT resource providers also known as external cloud providers. The combination of these two IT infrastructures federated through a common approach to virtualization, security, and management is what EMC has called “private cloud”.

Many IT organizations have recognized the potential of virtualization and have undertaken virtualization initiatives to modernize their IT infrastructure. And yet challenging economic conditions have pushed even the most progressive businesses to scrutinize their IT budgets. Business managers demand concrete justification for the investments that are being made. IT continues to find it difficult to demonstrate the business value of the investments they are making. Increasing government regulation places new demands on an already stressed organization and is complicating this situation.

In the face of these challenges, IT managers have been searching for ways to reconcile their increasingly complex data centers with the need for business value. How can they align their IT infrastructure and operations with the demands of the business? How can they respond quickly to changes in business requirements? How do they achieve efficiencies while minimizing the risk to the business? It is only through a new approach to IT management and a reconsideration of the supporting software and processes that IT organizations can succeed in leveraging virtualization to achieve their business objectives.

Audience

This document is intended for senior IT managers that are implementing virtualization as part of their journey toward a private cloud. IT managers that are looking to evolve their IT management maturity along with their IT infrastructure will gain a deeper understanding of EMC’s Lonix strategy and how it can help with these challenges.

¹U.S. online users using online video. Sources: U.S. Internet Video Usage 2006 Consumer Survey Results, IDC #204728; 2008 U.S. Consumer Online Behavior Survey Results: Part I: Stationary Internet Usage, IDC #219082

ITSM and the emergence of virtualization

Many IT organizations have started to implement principles of IT service management (ITSM) in an attempt to evolve how they deliver IT. Frequently, the IT Infrastructure Library (ITIL) guidelines are used as a model for how to manage the overall IT service lifecycle, control the interface between IT and the business, and achieve operational efficiency.

This move toward IT service management, toward looking at IT as a set of services rather than a set of computers, networks, and storage, has aligned with the emergence of virtualization technologies which can fundamentally change the architecture of the IT infrastructure as well as the way that IT operates. With the emergence of virtualization technologies within every domain in the data center, and the ubiquity of connectivity, it has become possible for IT organizations to build modular, flexible infrastructures that can adapt to the changing needs of the business without costly down time. The two trends—toward virtualization / private cloud and toward ITSM are very closely related. In fact, virtualization often exposes deficiencies in an IT organization's processes and tools. Virtualization enables an IT service management approach while acting as a catalyst to drive ITSM adoption.

Figure 1. 2009 Priorities (n = 150)²

What is your organization's single biggest area of concern or focus for 2009?	Responses
Virtualization	16%
Server Consolidation	15%
Data Center Consolidation	14%
IT Operations	10%
Storage Management	10%
Facilities Management and Green IT	8%
IT Modernization	7%
ITIL	5%
Cloud Computing	3%
Other	11%

Source: Gartner (December 2008)

Unfortunately, IT organizations struggle to leverage virtualization as more than a consolidation tool. A single physical server can support dozens of applications all isolated within their own virtual machine. Network switches can be logically partitioned to carry multiple protocols. Storage can be over-provisioned and virtualized at the network and array level. But how can an IT organization use these capabilities to dynamically reallocate resources as application demands change? How can they respond to outages when an application is no longer tied to a specific physical server? A new approach to IT management is required to complement this new approach to IT architecture—to take advantage of virtualization's capabilities while helping to overcome the challenges they introduce.

²Survey Results for 2009 Infrastructure and Operations Spending Outlook, Mike Chuba, January 29, 2009, Gartner #G00164753

Figure 2: Do you have virtualization technologies in production, and did you modify ITCM policy?
n = 180³

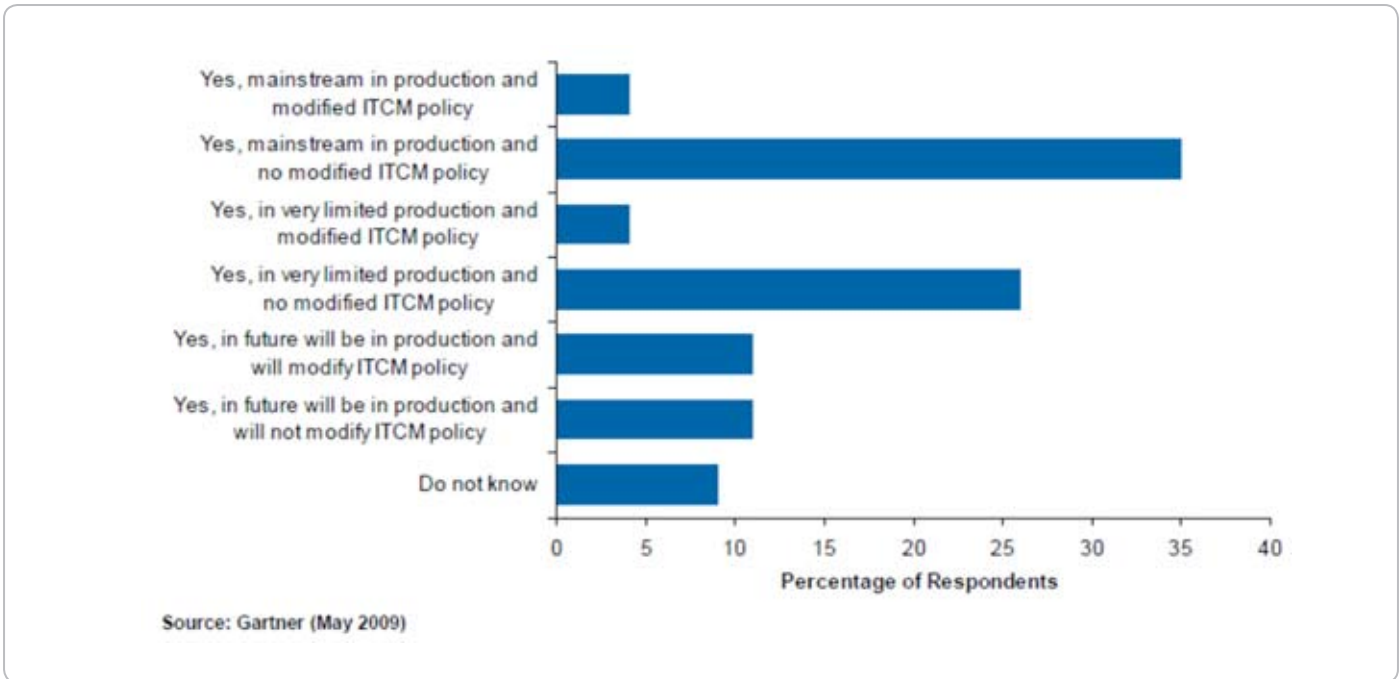
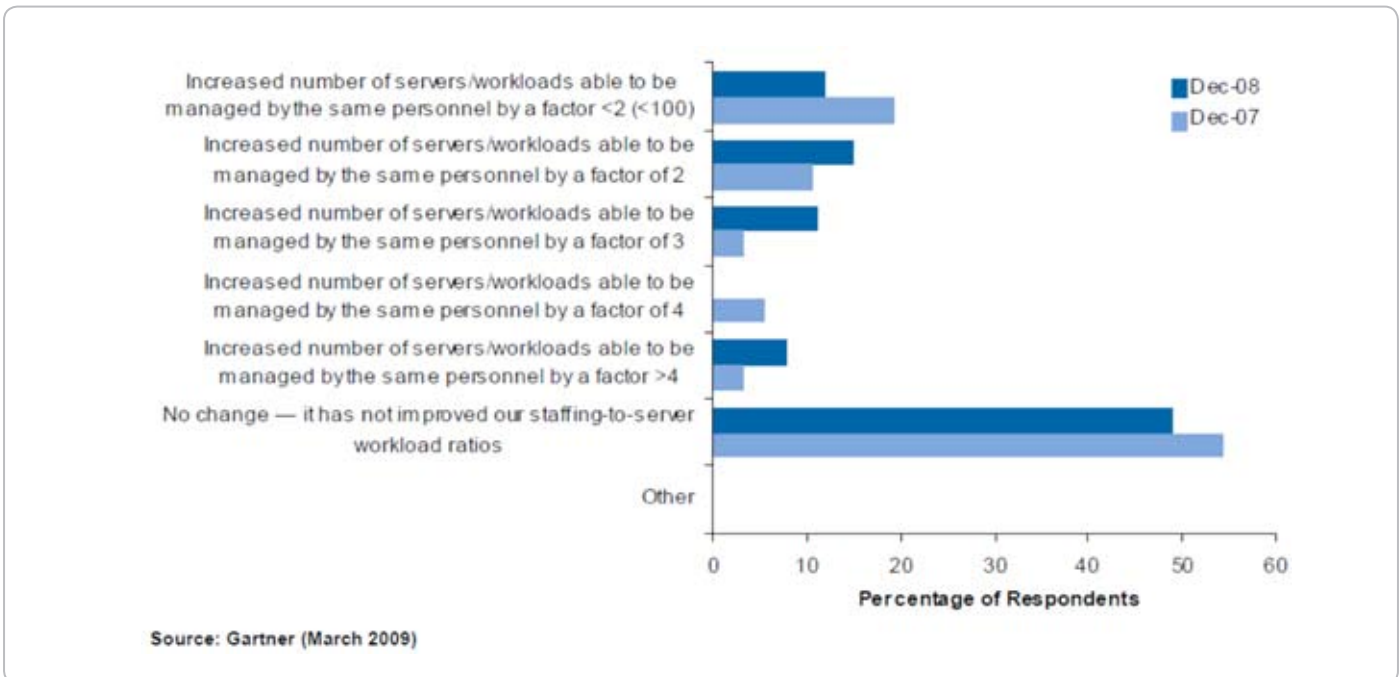


Figure 3: How has server virtualization technology improved staffing to server/workload ratios? (select one);
for 2007, n = 94; for 2008, n = 65⁴



³2008 Data Center Polling Shows Little Change Control for Emerging Technologies, Kris Brittain, May 4, 2009, Gartner #G00167377

⁴Data Center Conference Survey: How Virtualization Affects IT Operations, Cameron Haight, March 6, 2009, Gartner #G00165511

Virtualization is part of a journey

Virtualization is a key step toward a more flexible and service-driven computing infrastructure approach that EMC and other industry leaders are calling “private cloud”. The implementation of virtualization is a journey that requires careful thought and planning. Without thoughtfully considering how your processes will change to leverage virtualization and what tools will be required, you risk trading off IT process efficiency, control, and quality of service for hardware efficiency—not the goal you had in mind. At each stage of the journey, different disciplines will be required of your IT staff and different capabilities will be required of your management tools.

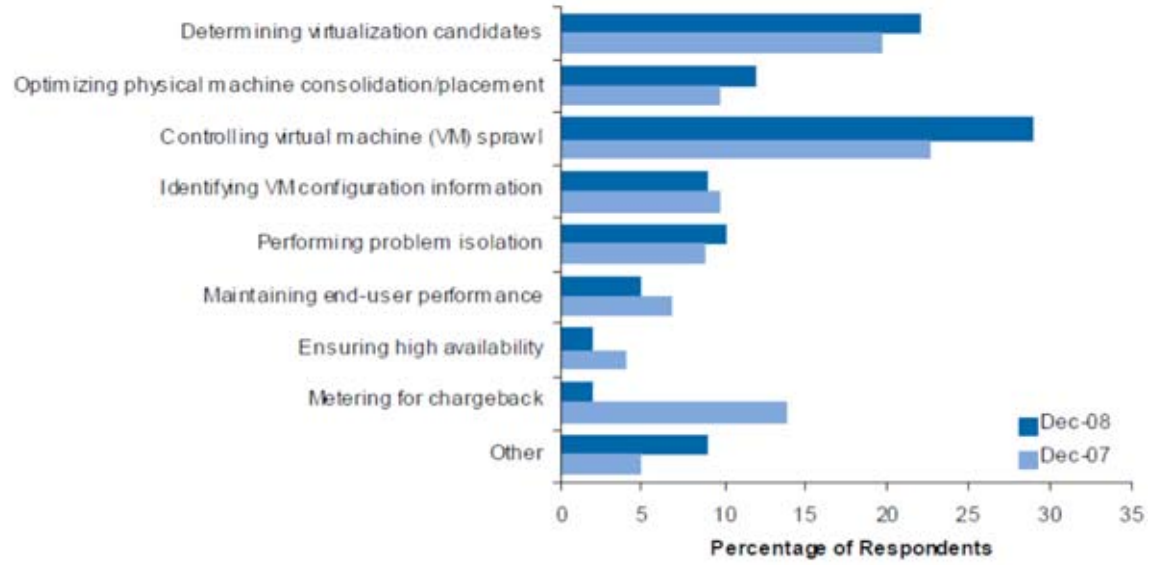
The first phase of the journey involves exploring the virtualization technologies, working with them in lab environments, and deciding on deployment strategies. In this phase, you need to establish a blueprint of your production environment to understand how it is configured today and how it should evolve in the future. Beyond knowing simply what applications you have and when you would like to migrate them to the new infrastructure, you need to understand the workload capacity, accessibility, availability, and disaster recovery requirements of each one. This is also a good point in time to evaluate your state of security and regulatory compliance. Although many of these activities are well understood, virtualization introduces a dynamic element to the environment that requires a new approach. Virtual machines (VMs) can, and do, move around between physical servers. Network topologies fluctuate as new VMs are provisioned and old VMs are decommissioned.

As you move from planning to actual production deployment, you must carefully examine your operational processes and tools. Many of these things will need to change to take advantage of the capabilities of virtualization. For example, virtualization adds a layer of abstraction between applications and the physical infrastructure. Without the appropriate tools to provide visibility through this layer, it will take longer to diagnose problems. This layer of abstraction also requires closer communication and coordination between the traditional domain management teams (server, network, storage, etc.). You will need to look at your change management process and supporting CMDB/CMS (Configuration Management Database/Change Management System) and make sure they are streamlined enough to implement the rapid change capabilities enabled by virtualization technologies such as VMware. You need to decide whether every VM migration needs to be approved by the CAB (Change Advisory Board), or whether you will manage change at a higher level—only applying change management processes to the VM migration policies that drive automated migrations.

Finally, you will need to consider how virtualization becomes an ongoing part of your IT operations. How will you optimize the infrastructure? How will you automate the repetitive tasks? How will you comply with SLAs? How will you develop a common view of the IT infrastructure and services across your IT organizations? Often times planning for this “what’s next” step is neglected and IT organizations fail to consider how their underlying operations will change as a new infrastructure paradigm becomes standardized. You need to think about continual service improvement. How will you measure the service you are providing? What are the processes you will put in place to improve the service? These questions were difficult enough when you were dealing with a static environment and applications that were rigidly tied to physical servers. Virtualization changes the nature of these questions dramatically.

There are many challenges that need to be considered as you look at the full scope of this journey. Instead of just trying to cope with the tactical challenges of virtualization, consider what capabilities will be needed for the long-term. When you look out over the entire journey, it becomes clear that certain capabilities are required through every stage of adoption. First, you need visibility—an understanding of how the infrastructure is put together and how IT is supporting the business. Second, you need the ability for your IT organization to work as a team with a common view of IT. Finally, you need the ability to control the IT service that is being delivered.

Figure 4. What is your biggest challenge with respect to managing server virtualization environments? (select one); for 2007, n = 102; for 2008, n = 86⁵



Source: Gartner (March 2009)

⁵Data Center Conference Survey: How Virtualization Affects IT Operations, Cameron Haight, March 6, 2009, Gartner #G00165511

Dynamic insight

Before you can undertake any changes to your environment, you need to first fully understand how your IT systems are configured and operating. For many IT organizations, this is a perpetual task of feeling around in the dark. Which businesses depend on an application component? Unplug the server running that component and see which end-users complain. How much storage capacity is consumed by a particular database and how is that storage protected against disaster? You probably don't want to know!

Once the journey toward virtualization begins, you will want to evaluate the impact of your changes. It is important to understand whether application performance improves or is degraded and whether your service desk is adequately supporting the IT end-users. The principles of continual service improvement require the ability to measure a metric before you can have any hope of controlling it. If you can establish this ability to measure, then you can make certain that you are moving in the right direction.

This visibility—both the ability to visualize and analyze—is also required to understand the impact of problems and changes. Whether you are trying to notify IT end users when an application is down due to a problem or will be down due to a planned change, you will need to know what the application dependencies are and what the business relationships are in order to trace the impact. These dependencies are also critical when planning changes to the storage infrastructure—which organizations will be impacted when a volume is migrated to a different tier of storage, etc.

In order to do any of this requires more than simple visibility into the configuration of discrete devices and applications. Your device management tools and simple reporting will only give you a superficial level of visibility. They will not enable you to pull together and combine information from across IT domains such as storage, networking, and applications. Deep analysis of this information can identify relationships and trends that otherwise would remain hidden. Only by having a strong foundation of discovered and monitored information that is updated in a timely fashion can you be assured that you are making decisions based on insight. Only through model-based analytics that help you make sense of the discovered relationships between applications and networks, servers, and business units can you quickly diagnose problems. Without this insight, virtualization will become one more technology that is well understood on its own, but confuses an already confusing world.

EMC Ionix solutions are built on top of comprehensive discovery capabilities across all the technology domains in your environment. Not only does it provide visibility into the configuration of the individual components, but it also enables you to visualize and report on relationships. With deep insight into your infrastructure and processes, you can have confidence in the decisions you are making.

Collaborative IT

If there was a single skill-set required for every role within IT, hiring would be a lot simpler. It would also be a lot easier than it has been to source IT management resources from lower cost geographies. In fact, each role within IT requires unique skills and brings with it a unique perspective. With this in mind, it is not surprising that individual IT groups frequently source their own management tools rather than using a single tool throughout the IT organization.

As the IT infrastructure becomes more virtualized, modular, and interconnected, and as the business pushes IT to deliver a reliable committed service, it becomes increasingly necessary to drive toward a single source of information throughout the IT organization. Often IT will start with the service desk application as the focal point for driving consistent tracking and handling of incidents and problems. Other IT organizations have focused their attention on their monitoring framework to ensure that all technology silos are being adequately monitored by a centralized operations center.

Unfortunately, these standardization initiatives will often put the wrong type of interface in front of the wrong person. Other times, they consolidate data from various sources without providing useful information back to those organizations that contributed the raw data. A new approach to collaboration is needed, and IT organizations must recognize the unique organizational roles that have developed and the unique tools requirements that exist for those roles. What is needed is the right information at the right time analyzed and presented the right way for someone to use it efficiently and effectively. This “insight in context” enables your IT staff to make informed decisions and then execute those decisions.

For example, consider the situation where the network management team has deployed application dependency mapping technology in order to plan a core network switch upgrade. This dependency information is critically important to the service desk group that is responsible for keeping the IT end-users informed about outages. Giving this group access to the dependency mapping application is probably not the right approach. They will be exposed to more network topology detail than they need to know and they will not have immediate access to the up-to-date information at the time that they are logging an incident for an end-user. If the dependency data was federated into a CMDB and the CMDB relationships were shown in the service desk application the service desk officer would be well equipped to provide guidance to the IT end-user at the time the call was being logged.

EMC Ionix includes this concept of CMDB federation and process integration. Providing a service desk officer with a useful, current view of application dependencies displayed in a way that makes sense results in more effective service delivery. It promotes improved collaboration between the application management team and the service desk and between IT and the IT end-users. EMC has already started to extend beyond this CMDB and process integration to develop user interface components such as a dependency visualization map that can be “mashed up” into the applications that are familiar to specific IT management groups. Collaborative IT means that Ionix applications will not only share views and information, but also share requirements and capabilities. For example, this will enable a domain-specific compliance capability of one Ionix application to help contribute to a higher-level compliance analysis of the overall IT environment. It is through this type of collaboration that IT organizations will begin to streamline their operations and derive value from their IT management tools far beyond the small groups within IT that “own” them.

Model-based control

As IT infrastructures have grown more complex, IT managers have increasingly felt controlled by the “fire of the day” rather than feeling in control of their environment. Without having control, it is impossible to deliver a high-quality of service to the business. You spend too much time retroactively trying to understand your environment and fix problems with existing systems than you do building and delivering new services that contribute to your underlying business. As much flexibility as virtualization provides, it also makes the environment more dynamic and introduces a layer of opacity that can make this situation even more challenging.

To get back into the driver’s seat, you need automation to minimize the amount of human effort required for routine tasks. Without this automation, there is no way to achieve the operational efficiencies that are necessary to give you the time to focus on more proactive activities.

However, any automation will not suffice. Traditional forms of automation use scripting and complex rule sets that become brittle and sometimes require just as much manual effort to maintain as was previously required to do the tasks manually. By using automation that is policy driven and can accommodate a rapidly changing environment instead, you can fully take advantage of the flexibility virtualization provides. Policy can enable you to focus on enforcing configuration policies rather than scripting specific changes. With the additional layer of abstraction that virtualization introduces into the stack, model-based root-cause analysis is needed to enable you to rapidly troubleshoot problems regardless of whether they occur within the virtualized environment or within the physical environment.

As an example, consider the situation where you have implemented standard system configurations that are stored as VM images. This can make the process of deploying new systems very rapid and less prone to errors than traditional methods of ground-up installs or bare metal image restores. However, it also creates a situation where you can have VM sprawl and new images that are deployed are not necessarily pulled from the standard image library. If your server configuration tools focus on making specific changes to an assumed standard system image, they will run the risk of corrupting a system that does not conform to the standard configuration. On the other hand, if your server configuration product is driven by policy and is aware of the systems currently configured state, it will apply the correct changes and only the correct changes.

EMC Ionix supports this new approach to control. By taking compliance-policy-driven approaches to storage, application, server, and network configuration, you can be assured that your environment is really configured according to your policies rather than relying on best practices that may or may not be followed. The EMC Ionix products automate both the process workflows that drive people’s actions as well as the configuration change and validation that can make those actions more productive and accurate.

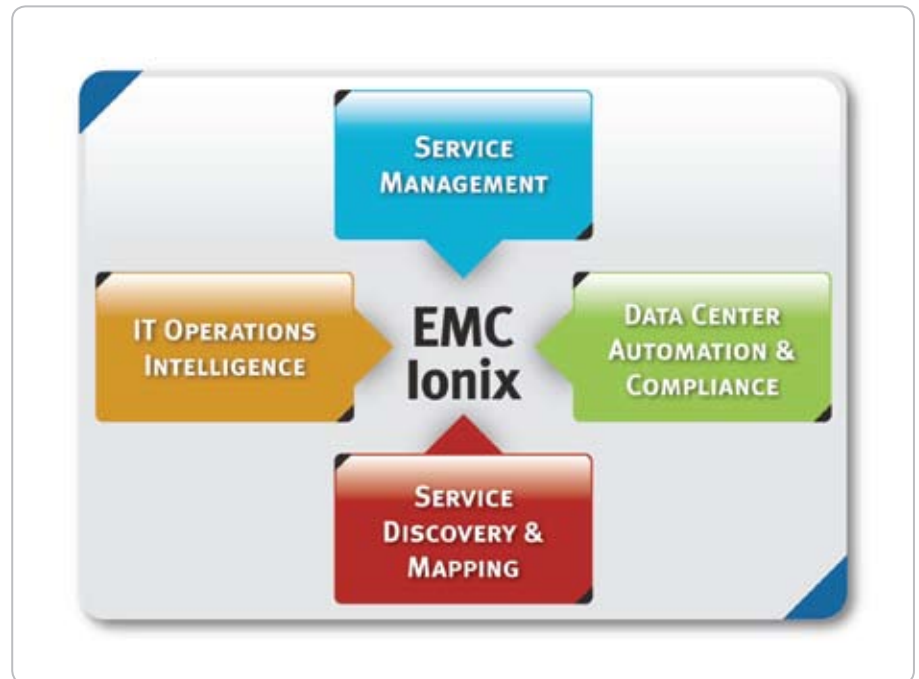
Conclusion

The journey toward a private cloud approach to computing has begun. Regardless of where you are in efforts to build a more flexible IT infrastructure or how mature your IT service management processes, virtualization is providing an opportunity to make changes to your management approach. With virtualization, you can rapidly provision new services. For example, a new data warehouse can be configured and populated within an existing VMware® server farm using spare capacity without going through any hardware procurement processes. You can enforce system consistency in ways that were not possible in the past. By deploying standard guest images pulled from a library, you no longer have to worry whether a server was configured correctly. And finally, you can control resource allocation in ways that have never before been possible. By spinning up additional instances of a server or dynamically moving VMs between physical machines and reallocating CPU, memory, network, and disk resources you can ensure that your business critical applications are not starved for resources.

These capabilities hold a lot of promise. However, they require a different approach to IT management. You cannot take advantage of a rapid server deployment capability if your change management process for deploying a new server takes two weeks. It is only by evaluating the reasons why you are deploying virtualization and planning out your journey toward a new architectural approach that you can make these changes to your management processes.

Your old management tools were designed for a different IT environment. Will they be able to adapt to your new requirements? Do they give you the insight, control and collaboration you need to make this journey? EMC Ionix provides several unique capabilities that offer unparalleled insight into the configuration of your environment—how the elements are connected to each other, how the resources are being used, and what problems are occurring. Ionix also gives you control—model-based analysis and automation driven by compliance policies. Finally, Ionix enables collaboration between organizations by giving you the right information at the right time available through interfaces familiar to the people accessing the information.

EMC Ionix



EMC Ionix for Service Management

EMC Ionix for Service Management (formerly Infra) helps you automate ITSM and align it with process frameworks and best practices (such as ITIL). This fully integrated, web-based solution encompasses all key ITIL processes and functions, including the critical, often-challenging areas of incident, problem, change, release, and service-level management. It also includes a service desk capability, a fully integrated service catalog, a knowledge base, an easy-to-use, drag-and-drop-style workflow engine, and a purpose-driven CMDB. With this solution, you gain the ability to:

- Implement ITIL fast—and start delivering results—in weeks, not months
- Ensure consistent, intelligent process delivery—with a full audit trail
- Integrate and federate the purpose-driven CMDB with accurate CI and dependency data
- Accelerate deployment of ITIL best-practice service management by 75 percent
- Increase SLA compliance by up to 40 percent

EMC Ionix for Data Center Automation and Compliance

EMC Ionix for Data Center Automation and Compliance manages across servers, networks, storage systems, and applications to help you ensure configuration, best-practices, and governance and regulatory compliance for the full data center. This solution enables you to:

- Automate manual, error-prone, time-consuming configuration, change, and compliance processes, and reduce the time needed for many of these tasks by 90 percent
- Manage more than three times as many servers, network devices, and storage devices without adding headcount
- Remediate compliance violations at any level—virtual or physical
- Predict accurately how proposed changes would impact other systems and applications

EMC Ionix for Service Discovery and Mapping

EMC Ionix for Service Discovery and Mapping provides accurate, current, and deep discovery of your IT data center's physical and virtual infrastructure, as well as application dependencies and interrelationships. Using a passive, agentless approach, this solution enables you to:

- Blueprint your data center for a clear and accurate understanding of what you have and your application dependencies
- Unify multiple discovery sources into one definitive source
- Support and enable CMDB/CMS population, change management, and application troubleshooting
- Get clear and accurate line of sight into complex application relationships and physical-to-virtual dependencies
- Be confident that your site recovery, disaster recovery, and business-continuity plans will succeed all the way down to the application level

EMC Ionix for IT Operations Intelligence

EMC Ionix for IT Operations Intelligence (formerly Smarts) automates service and infrastructure monitoring, analysis, and reporting. When issues arise, automated, model-based analytics enable you to put the right person on the right problem right away. That gives you the ability to restore impacted services and business processes faster than ever before, while also helping you increase operational efficiency—which decreases costs on an ongoing basis. With this solution, you gain the ability to:

- Automate root-cause analysis and business-impact assessment
- Unify and consolidate monitoring and management—for application, service, and infrastructure availability, and performance—into one system
- Extend integrated management insight and analysis to VMware environments
- Lower IT monitoring costs by as much as 70 percent

EMC believes the information in this publication is accurate as of its publication date. The information is subject to change without notice.

THE INFORMATION IN THIS PUBLICATION IS PROVIDED "AS IS." EMC CORPORATION MAKES NO REPRESENTATIONS OR WARRANTIES OF ANY KIND WITH RESPECT TO THE INFORMATION IN THIS PUBLICATION, AND SPECIFICALLY DISCLAIMS IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

Use, copying, and distribution of any EMC software described in this publication requires an applicable software license.



EMC Corporation
Hopkinton
Massachusetts
01748-9103
1-508-435-1000
In North America 1-866-464-7381
www.EMC.com