The Comstor Guide to Data Center Virtualization and Transformation

Comstor has identified and made investment in key areas in order to assist our partners in accelerating revenue in the data center marketplace.

First, we knew it was important for there to be real-life experience with and expertise on the Cisco data center solution. We have invested heavily to transform our own corporate IT function and to gain a solid understanding of how UCS works in a virtualized environment. As one of the first large corporations to migrate completely to this platform, we have learned a great deal, and have experienced dramatic success. We invite you to learn more about our journey by visiting comstor.com or by reading the case study at the beginning of this section.

Second, the data center solution can have a long sales cycle. It is complex, and requires a larger financial investment by end user customers. Comstor has developed a high-quality enablement program to provide our partners’ sales team with the tools and training to position their companies above the technology bits and bytes.

The Executive Relevance Selling (ERS) program teaches reseller sales associates how to discuss technology investments with business executives, create ROI models that are customized to a customer’s situation, and even provide demand generation activities to jump start the process.

Finally, the investment required for resellers to build demo facilities for customers can be very high when considering the breadth of Cisco data center components. Comstor is making substantial investments by building partner briefing centers around the world. The first one will open in Brussels this fall followed by Denver, Colorado, USA later in the fall.

Known as LEAP Centers (Learn, Experience, Architect, Plan), these leading-edge facilities will be a place for our partners and their customers to gain hands-on experience with UCS and other critical pieces of a data center solution. You can learn more about the Comstor LEAP Centers later in this section.

The Comstor Advantage

Comstor provides a roadmap in which data centers are defined not by computer architecture but around the network itself.

Our Cisco Data Center offering optimizes IT productivity and resource utilization by providing a platform for the secure deployment of a service oriented, on-demand model for compute, storage, network, and communications resources.

Comstor’s Data Center solutions provide you with a greater choice for scale-up and scale-out server and storage consolidation and virtualization strategies to meet your customers’ Service Oriented Architecture needs. Partners selling Cisco Data Center solutions can lower customer costs, reduce your operational costs and improve business agility through vendor consolidation and can deliver greater customer value and ‘up-sell’ to your end customers with a comprehensive selection of data center ecosystem products.

Comstor’s Data Center Virtualization Solutions:

- Are proven to reduce costs
- Often lead to higher attach rates
- Enables sales of your company’s services
- Provide a complete portfolio of end to end data center products and solutions

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With SOA (Service Oriented Architecture) and Data Center consolidation and virtualization top of mind for organizations today, understanding how these approaches can be brought together for the benefit of the entire enterprise can be a difficult task. CIOs are discovering that legacy security solutions for a physical datacenter impede adoption of these technologies because they are not virtualization or cloud-aware.

Datacenter consolidation and virtualization is one of the most challenging projects an IT organization will undertake. Many critical challenges associated with virtualizing the data center can be minimized or avoided through a thorough understanding of the challenges and solutions to address data center transformation.

Read this guide to learn how Comstor’s strategic next-generation approach to the SOA enabled data center is helping resellers gain a deeper understanding of virtualization, easily explain the benefits of the virtualized data center and simplify deploying virtualized data center solutions for their customers.

**The Data Center Environment**

As applications become more mission-critical, and as desktop servers move into formal data centers, the number of servers in a data center grows, making the job of managing this disparate environment increasingly complex.

Each new server adds complexity to their environments. In the distributed computing environment, it is common for applications to be developed following a one-application-to-one-server model. Each time an application is put into production, another server is added.

The challenges data center managers face today are in helping their organizations meet cost cutting requirements while delivering essential timely services with fewer staff and limited IT resources.

The main challenge is not to change the data center: it’s the opportunity to transform it. By leveraging next generation data center technologies and services that increase IT efficiency and maximize existing resources, they can effectively meet business process needs and customer expectation with less resources required.

**The Changing Face of the Data Center**

Data center consolidation and virtualization trends are accelerating in an effort to meet organizational needs to optimize resources and lower costs. While server virtualization greatly improves server resource utilization the increasing complexity and sophistication of SOA based data center applications demands new features in the data center network infrastructure. Increased traffic per port and performance demands tax traditional network infrastructure solutions beyond their capabilities.

Service Oriented Architecture (SOA), cloud computing, desktop virtualization, and Software or Infrastructure as a service (SaaS/IaaS) exponentially multiplies the performance and bandwidth demands upon the data center network infrastructure. Interestingly, tens of milliseconds is the difference between a customer getting the results they are looking for and a potential customer getting frustrated and going to the competition.

CIOs are quickly discovering that these new services require a new architecture in the data center to meet new business demands. Today IT departments are rapidly migrating to virtualization, high-performance data center networking infrastructure, unified compute platforms and high density storage infrastructure to meet:

- SOA driven applications
- Eliminating data center sprawl/data center consolidation
- More predictable and manageable capital planning
- Space, power, and cooling requirements
- Heightened demand for IT responsiveness to business changes
- Broader and more complex deployments of server virtualization
Increased storage requirements
Archiving and backup requirements
Disaster recovery and business continuance applications; and
Regulatory compliance

By leveraging virtualization across this infrastructure, IT organizations can better protect information and applications, enhance data center service levels, improve storage and server utilization, manage physical and virtual environments, and drive down capital and operational costs.

What is Virtualization?
When most people talk about virtualization, they are usually referring to server virtualization. With server virtualization, you can run multiple operating systems and consequently applications, inside a single physical server. It can also include making multiple physical resources (such as storage devices or servers) appear as a single virtual resource.

Why Virtualize the Data Center?
- Server virtualization consolidation of the workloads of multiple underutilized servers onto a single physical server reduces environmental and labor costs
- Apply resources only where needed, based on application demand
- Migrate applications from one server to another without taking down applications
- Select the right operating system for your applications
- Leverage content management capabilities such as versioning, access control, workflow, lifecycle management, and other content services available throughout the system
- Use a uniform platform to configure applications once and roll out multiple times
- Simplified deployment and infrastructure management

Inside Virtualization
Virtualization makes it possible to deploy multiple virtual servers each running separate operating systems and applications on one physical server. Each system thinks it is running on its own hardware, with its own resources, yet it is actually running as a virtual server within a larger system.

Actual resources, such as storage, networking, and processors can be assigned and shared among the different systems.

- Hypervisor allows multiple operating systems to run concurrently on a host computer — a feature called virtualization
- Like a physical machine, a virtual machine is merely a platform for running an operating system environment and by itself does not contain application software
- A virtual appliance is a virtual machine image designed to run on a virtualization platform a software image containing a software stack designed to run inside a virtual machine

Server Virtualization
Server virtualization is the most visible segment of the data center transformation taking place today. Established companies such as VMware, Microsoft, and Citrix are leaders in server visualization today. With server virtualization one physical machine is divided into many virtual servers. At the core of such virtualization is the concept of a hypervisor (virtual machine monitor).

Application/Desktop Virtualization
Application virtualization is the practice of running software from a remote server rather than on the user’s computer. When applications are run from the server, computing resources are allocated based on changing requirements in real time providing: the ability to automatically handle a large and fluctuating work volume, and savings on hardware, software and OS licenses. Application virtualization is commonly seen today in diverse scenarios such as e-commerce, banking, stock trading, insurance administration, business simulations, supply chain management and other remotely accessed services.
Application virtualization with server virtualization benefits provide:

- Application isolation
- Improved provisioning
- Improved auditing
- Improved IT control
- Improved end user agility
- True portability
- Anywhere Access and hot-desking

**Storage Virtualization**

With storage virtualization, multiple storage devices form a common storage pool that is viewed as a single resource. Storage virtualization, adds a new layer between storage systems and servers, so that applications no longer need to know on which specific drives, partitions or storage subsystems their data resides thus storage resources can be updated on the fly without affecting application performance, thus reducing downtime.

Storage virtualization can enable customers to:

- Add a storage device without requiring server and network reconfiguration
- Remove and change storage-volume definition and assignment from one storage device to another
- Aggregate hard disk drives of different speeds and sizes, and from different vendors
- Dynamically reallocate storage space based on need.

**Network Virtualization**

Network virtualization is the process of combining hardware and software network resources and network functionality into a single, software-based administrative entity, a virtual network. Network virtualization involves platform virtualization, often combined with resource virtualization. The core parts of network virtualization are: access-control, path isolation, and service edge.
What are the inherent benefits of the virtualized data center?

Unified computing architectures and virtualization provide the ability to dramatically increase utilization of server investments, boost uptime, provide a more resilient and available infrastructure, and roll out new infrastructure and services more quickly by:

- Reducing the number of physical servers
- Reducing the infrastructure needed in the data center (power, cooling, battery backup, network switch ports, KVM ports and space)
- Reducing administrative overhead because servers can be administered from a single console
- Providing the ability to bring up new servers quickly, just a few minutes to create a new virtual server
- Reducing disaster recovery cost, complexity, and recovery time
- Providing a “greener” datacenter & server environment due to the consolidation
- Overall, lower TCO of servers, switches and storage

By leveraging various technologies and processes across this infrastructure, IT organizations can better protect information and applications, enhance data center service levels, improve storage and server utilization, manage physical and virtual environments, and drive down capital and operational costs.

The market forces driving the need for Data Center transformation

Data center transformation significantly reduces cost to an organization and helps them shift their spending away from management and maintenance and into business projects and priorities. Higher utilization translates into fewer servers, which means less money and reduced running costs (electricity, CO2, data center space, cooling, etc.).

Legacy data center infrastructures were not built to support the explosive need for compute, storage and service delivery capacity. Many data centers are highly distributed and fragmented. As a result they are limited in their ability to change quickly, provide support and scale to accommodate today’s highly dynamic business processes. In addition, because of unpredictable growth, very few companies are able to develop a three year growth and investment plan and go very far into it without dramatic change.

Service delivery has become a key driver for moving beyond today’s data center to a new unified architecture that is more efficient, service oriented and responsive to business needs and address today’s operational issues such as:

- **Service Oriented Architecture (SOA):** SOA is creating the need for highly virtualized resources to address server sprawl
- **Distributed resources:** Data that was typically contained in disconnected, heterogeneous sources and content silos creates increasing services delivery bottlenecks as more video, data, voice networks become one
Costs and service delivery: The daily expense of managing operations is increasing. IT system administration costs have grown exponentially and costs are constantly rising.

Bandwidth: Demands for new services and rich content along with increasing data volumes have resulted in network bandwidth consumption doubling every 9 months with devices accessing data over networks growing daily.

Business resiliency and security: Compliance is driving organizations to strengthen the security measures they put in place to protect critical information. At the same time, companies and customers are demanding that users have real-time access to this information, putting pressure on the enterprise to meet growing security and compliance guidelines for new cloud delivered services.

Storage: Data and content saturating storage causing the extreme demand for storage.

Energy requirements: Data center sprawl created the need for greater power and cooling capacities. In fact, energy costs related to server sprawl alone may rise from less than 10 percent to 30+ percent of IT budgets and is forcing IT managers to look for solutions to cut energy costs.

As the different areas evolve, the data center network needs to transform to support the changing requirements:

- Consolidation and virtualization of server and storage resources will increase the performance demands on the data center network.
- Centralized application delivery will increase the bandwidth demands on the wide area network.
- Remote and mobile application access will drive the need for heightened user and device security.
- Dynamic resource allocation (server, storage and data) will drive the need for dynamic network support.
- Unified management that includes the network to centrally provision the virtualized resources.

Is now the time to virtualize the data center?

A recent study noted that cloud computing is the number 2 priority for CIOs – trumped only by virtualization. There’s a huge drive now for improved enterprise data center performance. Data-center transformation helps enterprises implement a data center and infrastructure strategy that’s aligned to their goals and objectives.

Nearly all enterprises are involved nowadays with some level of data center transformation, either in the planning stages or in outright build-out. Organizations have been spending huge sums of money to consolidate data centers, servers and storage. While many companies have put their toe in the virtualization water, there are only about 20% that are heavily virtualized so far. This presents a significant opportunity for resellers.

- Virtualization investment plans and resulting savings will rise significantly between 2010 and 2014, according to a study of more than 700 CIOs worldwide.
- CIOs estimate virtualization is helping to achieve cost-savings of 16 per cent for the organization. They expect this to increase to nearly a third in 2014.
- 53 percent of enterprises and 54 percent of small and medium-sized businesses have either implemented server virtualization technology or will within the next 12 months.

By offering or expanding their Data Center solutions, VARs can increase their value by providing:

- Planning, Deployment & Hardware Support
- Hardware & Software Procurement
- Proactive Monitoring
- I.T. Education
- Virtualization Platform (software) Support

What are the elements required for virtualizing the data center and what value does it bring to an enterprise?

Today’s data center needs to provide a resilient infrastructure that consistently protects diverse applications and services against disruptions and security attacks. A properly planned data center network protects application and data integrity, optimizes application availability and performance, and enables responsiveness to ever-changing market conditions, business priorities, and technology advances. These solutions include network, compute, storage, security, and Layer 4-7 application services across the enterprise.
Unified Compute
- Integrates computing, network, storage access, and virtualization
- Scales service delivery to increase business agility
- Radically reduces the number of devices requiring setup, management, power, cooling, and cabling

Data Center Switching
- Rapidly responds to business demands through dynamic infrastructure providing virtual machine mobility support, management, and operations tools for a virtualized environment
- Increases business agility with pervasive data center virtualization
- Enhances business resilience and application availability

Storage Networking Solutions
- Multi-protocol storage networking provides flexibility and options: FC, FICON, FCoE, iSCSI, and FCIP
- Increases storage connectivity to support significantly higher virtualized workloads, availability, scalability, and performance
- Delivers Services Oriented storage to extend services to any device regardless of protocol, speed, vendor, or location

Application Networking/Delivery Solutions
- Protects critical applications, infrastructure, and data
- Accelerates, secures and provides increased availability of both application traffic and computing resources
- Minimizes cost and complexity

Data Center Security
- Secures critical virtualized servers & applications, infrastructure, and data.
- Enhances data privacy
- Improves compliance while minimizing cost and complexity
- Provides physical security to critical data center assets

Power & Cooling
- Addresses virtualization power demands with the necessary power, cooling, and monitoring
- Ensures services are unaffected by power and environmental issues
- Reduces hot spots and lowers overall cooling costs

Virtualization Platforms (Software)
- Reduces total number of servers by migrating multiple environments on different physical machines to individual virtual machines hosted on a single server
- Effectively takes advantage of multicore processors
- Lowers costs from utilizing less hardware (servers) and fewer energy resources to cool multiple servers

What are the risks and security requirements of virtualized data centers?
Virtual platforms add an additional layer of security requirements. Virtualization security can be broken down into three categories:
1. Security risks added to the data center when new virtualization technologies are introduced, such as the security risks of running multiple VMs on a single hypervisor
2. Security of virtual machine images and guest operating systems
3. Virtual instances of physical security devices, such as going from a physical firewall and IPS to a virtual image running the same services
There is an assumption that the security used in legacy systems provides the same protection in a virtualized environment. Because the entire architecture has changed, a virtual environment is even more vulnerable to attacks.

To defend this new virtualized environment, vendors have developed a new class of virtual security products. There is also a strong connection between compliance and virtualization. In some cases, organizations will not deploy virtualization because of compliance concerns.

**The growing need for Virtualized Security**

- Today’s legacy security provides a strong defense at the perimeter of the network. This leads security practitioners to either route all traffic on the virtual infrastructure to the edges (which sub-optimizes the value of a virtualized environment), where the physical control points remain or hope that no threats are realized when moving data and computing across a private or public cloud.

- VirtSec places virtual security controls throughout the virtual infrastructure to restore the desired levels of depth (trust)

- Virtualization security addresses multiple areas: infrastructure, security, and management.

- Security is required at different parts of the virtualized infrastructure: at the perimeter, at the core, as a service, and any other part of the network.

- A virtualized security solution must be able to integrate with various areas of the virtualized network without imposing connectivity restrictions or difficult changes.

- Security technologies need to be capable of being applied dynamically to support virtual server mobility.

- Compliance is the new security. In 2009, 80% of the security practitioners say compliance is the only justification for security spending - There’s a clear connection between compliance and virtualization - compliance regulations and legislation affect virtualization initiatives.

It is possible to implement a successful virtual infrastructure migration if these virtualization technologies are factored into the security plan before, during, and after the virtualization roll-out or migration.
Seize the opportunities from data center consolidation & virtualization

Start with a solid understanding of the key technologies shaping the data center today: servers, storage, virtualization, application delivery, virtualized security, data center switching and power & cooling. Understanding professional and managed IT services, as well as systems integration, is also key to effectively sell data center transformation. These are new and complex technologies that require skill and experience to properly deploy and manage. Solutions providers will need to:

- Understand the strategy that is driving changes to the data center
- Determine the networking requirements
- Compare the current networking environment and support structure to the new requirements
- Develop a data center network architecture and design to meet business and functional requirements
- Select vendors and components and prepare a detailed design
- Create a roadmap for migration
- Carry out procurement, logistics and site preparation
- Configure, install and test the solution
- Provide on-going maintenance support

Which customer segments should you target?

You don’t need to learn how to build a data center from scratch. Use our Cisco Data Center specific solutions to make it easier for you to address your customer’s business challenges across a wide array of markets.

Consolidation

Cisco infrastructure consolidation solutions help organizations simplify, standardize, and reduce server, network, and storage infrastructure providing complete decentralization, virtualization, and dynamic provisioning.

These solutions include:

- Server consolidation: simplifies server connectivity, cabling, data center infrastructure, administration, and management
- Storage consolidation: increases flexibility, simplifies network and storage management, and ensures consistent data life cycle management
- Branch IT consolidation: reduces cost of remote IT, improves remote employee productivity, and accelerates data protection by centralizing IT resources

Virtualization/Cloud

The Cisco Unified Computing System unites network, compute, and virtualization resources into a single seamless system that provides the infrastructure needed for today’s business needs.

Cisco’s virtualization strategy focuses on three main criteria:

- Capacity
- Business continuance
- Business Transformation

Virtualized Unified Communications

Deploying Cisco Unified Communications on the Cisco UCS allows organizations to extend the benefits of their virtualization and storage data center investments to Cisco Unified Communications. The benefits of virtualizing Cisco UC are the same as virtualizing data servers. Server consolidation provides significant cost savings across hardware, rack space, maintenance, cabling, network ports, power and cooling. But it also enables unified communications to leverage the continuity capabilities of VMware rather than requiring redundant hardware and application level failover and disaster recovery capabilities.

The Value of Unified Communications on UCS:

- Consolidate servers – potentially 50-75% reduction in server count
Simplify Infrastructure – unified fabric, shared SAN, and reduced cables/power/cooling/space simplifies UC and Data Center infrastructure significantly

Offer Business Agility – deploy UC applications faster, use familiar/consistent management for UC servers, realize benefits from virtualization

**Green Data Centers**
Cisco’s UCS virtualization and data center solutions empower IT professionals to reduce server sprawl and vastly improve the utilization of energy resources. Comstor help its resellers deploy more efficient data center infrastructure effectively providing green rewards for their customers.

The Green Premium:
- Reduces infrastructure complexity and sprawl
- Can reduce the need to build a new facility or reduce the overall power requirements
- Provides more compute & storage capabilities for less power consumption
- Lowers operational costs by aligning power consumption with workload requirements

**Virtual Desktop Infrastructure**
VDI solutions have one thing in common: all applications and data now reside on servers in the data center. The Cisco Unified Computing System is designed to meet the unique requirements of VDI deployments by increase VDI adoption without expensive WAN bandwidth upgrades. It also provides industry leading virtualization performance and improved business agility by automating just-in-time provisioning.

The Cisco Unified Computing System is well-suited to meet VDI deployments, thanks to the following innovations:
- Simplified desktop management/service profiles
- Reduced total cost of ownership (TCO)
- Improved data security and compliance
- Extended desktop hardware lifecycles
- Extended business continuity and disaster recovery to enterprise desktops

**Security & Compliance**
Cisco Data Center Security solutions enable organizations to provide security and compliance when deploying virtualized data center infrastructures. Comstor provides industry leading multi-tiered security solutions that enable resellers to rapidly deploy data center solutions and cloud computing without compromising on the ability to provide compliance, identify and respond to evolving threats, protect critical assets, and enforce business policies.

These solutions include:
- Security solutions that include physical security, cybersecurity, compliance, intrusion detection and prevention, data center security, and security management
- VMware security appliances
- Security for the cloud & SaaS delivered security solutions

**Conclusion**
The legacy approach of deploying multiple networks, switching domains, and tiers to handle an exponentially increasing array of technologies no longer work. Data Center and virtualization solution decisions are often more complex investment/evaluation efforts requiring involvement from a broader set of business executives and a deeper financial analysis than for other equipment transactions.

**Contact**
For more information, please contact your local Comstor Account Manager.