WHITE PAPER

Converged Systems Support Datacenter Transformation

Sponsored by: EMC and Cisco

Ashish Nadkarni Jean S. Bozman

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EXECUTIVE SUMMARY

Today, a process of continual transformation is taking place in the datacenter. Many of the most widely used workloads — applications and databases — are moving to x86-based architectures because of the standardization of physical infrastructure and the drive for IT flexibility and business agility. This allows resources to be adapted to changing business conditions so that workloads can be expanded, or reduced, based on actual end-user demand.

Many organizations realize that they need to control costs in the datacenter. They must reduce operational costs associated with IT staff, applications, and infrastructure. They also must improve efficiencies associated with routine IT maintenance tasks and plan for major infrastructure upgrades or migrations. This path to cost savings applies to on-premises IT installations and to off-premises hosting and cloud services solutions based on standardized and virtualized infrastructure.

To save time and money, many business organizations are looking to buy preconfigured infrastructure, in which the hardware components and software components have been tested to work together and are shipped from the factory for immediate installation. This approach eliminates the need for onsite setup time and custom systems integration and speeds time to business solution.

IDC expects to see a mix of x86 servers and non-x86 servers continue in the enterprise datacenter, reflecting the history of corporate acquisition of IT over many years. But an increasing number of workloads are moving to x86-based server/storage platforms running virtualization software and supporting a mix of Linux and Windows operating systems.

This paper looks at the Cisco Unified Computing System (Cisco UCS) product line, which is co-installed with the EMC VMAX, VNX, and Atmos storage product lines. Both servers and storage are optimized to work together in virtualized x86 server environments based on VMware virtualization and management software. Since forming the VCE Alliance with VMware in 2009, Cisco and EMC have worked together to design and produce converged infrastructure solutions that address both physical and virtual servers and storage. When combined with system software and management software, the Cisco/EMC/VCE solutions enable IT organizations to deploy a highly virtualized, highly efficient computing infrastructure that can support both cloud computing and enterprise workloads.

Global Headquarters: 5 Speen Street Framingham, MA 01701 USA P.508.872.8200 F.508.935.4015 www.idc.com

SITUATION OVERVIEW

Transformation in the Datacenter

The Evolving Datacenter

The datacenter is changing, adopting standards in hardware and software that will allow the entire infrastructure to be operated and managed more easily. Decisions about standards — and which technologies are identified as standards to be adopted enterprisewide — may vary from organization to organization. Some may start with development tools, while others may focus on hardware building blocks. But, ultimately, there is a drive to simplify the infrastructure by reducing the number of one-off, custom infrastructure elements so that the same software stack can be leveraged across the entire datacenter. This eases system administration tasks and makes training of IT staff easier and faster than before.

Economics, Standardization, and Customer Pain Points

If projects for standardization, flexibility, and simplification are not already top priorities for a given organization, then complexity and inefficiencies emerge as chief drivers of operational costs. That's because complexity drives up costs, and reducing complexity can produce dramatic savings in operational costs. Today, IT organizations recognize that a customized IT infrastructure approach — once viewed as competitive advantage — will no longer result in business benefits.

Instead, each element of infrastructure should be evaluated with respect to its widespread utility throughout the organization. That way, components that work well together can be identified and leveraged across the datacenter and throughout multiple datacenters in very large organizations. Similarly, service providers find economic advantages in simplifying infrastructure for reuse across workloads. The goal is to create an environment in which computing, networking, and storage access resources are part of an elastic, scalable, and flexible infrastructure that can dynamically meet the changing demands of the business. In this way, IT flexibility leads to greater business agility, as aging standalone systems are replaced by scale-out infrastructure where capacity can be added, as needed.

Nowhere is this felt more than in the datacenter, where deriving economic value is often looked at only from a technical perspective. In reality, however, standardization of equipment, common management interfaces, and end-to-end provisioning capabilities and other efforts in this direction have a noticeable impact on resource utilization. This in turn translates into minimization of customer pain points and, therefore, better economics for IT.

Platform Migration, Widespread Adoption of x86 Servers

Across the enterprise, there is ample evidence of platform migration, as aging servers — ranging from five to seven years old, or more — are increasingly being displaced by x86 servers, including bladed servers and rack-optimized servers.

Drivers for platform migration include workload consolidation, software licensing costs, recurring maintenance costs on aging systems, the need to simplify infrastructure to

reduce management costs, and a push to build virtualized x86-based server infrastructure across the enterprise. This strategy allows key workloads to be moved to available resources, as business conditions and IT requirements change, over time.

IDC conducted international platform migration studies in 2010 and 2012 and found that more than 50% of all sites (400 sites in the Americas, EMEA, and Asia/Pacific) were actively working on platform migration and that each migration targeted 40% or more of legacy systems. The drive to consolidate workloads and to reduce operational costs accelerated in 2010, following the onset of the economic downturn that began in 2008/2009.

In 2010, IDC saw an acceleration in platform migration activities. The pace of migration slowed a bit in 2011–2012, following that initial acceleration in 2010, but then continued strongly.

Virtualization and Cloud Computing

Virtualization of the infrastructure is a step toward greater operational efficiency through IT flexibility that allows workloads to move seamlessly to the computing resources they need. No longer confined to the technology "silos" of traditional datacenters, these workloads can be provisioned and then sent to available compute and storage resources. Virtualization ensures a more efficient use of computing resources. The use of virtual machines (VMs) isolates workloads so that they do not interfere with one another, although multiple VMs are housed on the same physical server.

After virtualization improves resource utilization, it is often leveraged as an enabler of cloud computing — typically in the private cloud space, within customers' datacenters, and behind firewalls. This approach responds to changes in user demand, supporting IT flexibility by adding or subtracting resources as needed. In turn, the increased IT flexibility translates into business agility because the business can adjust IT capabilities to match changing business conditions. For example, if a consolidation project is already underway, many applications can be gathered together to run on the same physical server, reducing operational costs associated with IT staff time, maintenance, and power/cooling.

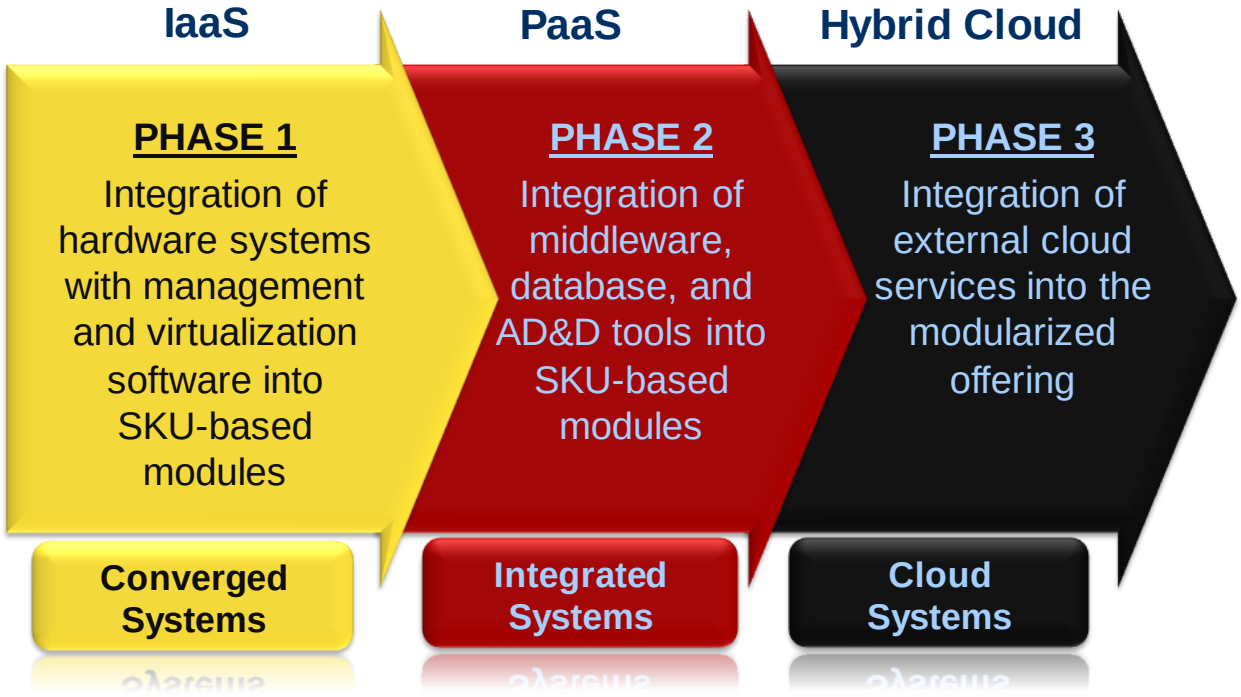
A Brief History of Virtualization Adoption

In the history of virtualization for x86 servers (see Figure 1), Phase 1 began in the mid-2000s, with a focus on improving resource utilization, which was achieved when physical servers were able to support multiple VMs running side by side.

In Phase 2, more is being asked of virtualization technology, and expectations about high availability, service-level agreements (SLAs), and security have risen considerably because the applications and databases tend to be business critical or mission critical. Any interruption would stop business processes that are vital to the organization's ongoing work. The next step — Phase 3 — is to leverage fully virtualized environments to enable cloud computing. The VMs are, in effect, software stacks that can be provisioned to servers to meet user demand, as needed, to scale up business services.

FIGURE 1

Cloud IT Maturity Map



Source: IDC, 2013

Phase 3 is characterized by deployment of workloads onto virtualized infrastructure to support cloud services. Many of these services will run on private clouds within the firewalls of enterprise datacenters. However, many other applications will be hosted by third-party providers or will migrate to public cloud services on a pay-per-use basis. The details about the workloads will determine where they will run in the infrastructure and what the uptime, reliability, and security SLAs will be for business units.

Today, Phase 2 deployments are widespread and virtualization is taking on enterprise and mission-critical workloads, such as ERP, CRM, and commercial databases. At the same time, many customers are beginning to deploy more Phase 3 cloud computing workloads on their virtualized infrastructure as soon as they are comfortable with the levels of availability, manageability, and security being supported by the hardware, storage, and software technology.

A Changing Marketplace

Virtualization is transforming the worldwide server marketplace. IDC estimates that 35 million physical servers and an equal number of virtual servers are installed worldwide. Importantly, the 2009–2013 compound annual growth rate (CAGR) for virtual servers (31.5%) far outstrips that of physical servers (about 1%).

The reasons for this disparity are clear: A new virtual server is faster and easier to install, or to "spin up," than a physical server. A virtual server is also more flexible to deploy and easier to replace. Power/cooling costs for each VM are also lower than those for physical servers — and 6, 10, 20, or more VMs can co-reside on a single physical server.

There are challenges, however, including managing large numbers of VMs and monitoring the operations of so many workloads at once. As adoption of virtualization matures in a given site, the focus eventually shifts from provisioning VMs to setting up policies for automated management that reduces the work for IT system administrators.

Solutions and Benefits

New Infrastructure Requirements in the Datacenter

Datacenter infrastructure is changing dramatically, driven by new technologies that are "morphing" server designs. Today, the most widely used processors are multicore processors, making it possible to pack more processing capacity into smaller spaces. Accordingly, server vendors are adding more onboard memory and near-line storage devices to keep pace with the performance characteristics of multicore processors. With all of the hardware packed into increasingly dense form factors, the ability to cool the servers is top of mind for datacenter managers, making a new generation of power-efficient server designs a top priority.

Storage devices surrounding the processors are changing, too. Many new server designs incorporate SSDs in place of HDDs and put them close to the processors themselves to reduce latency as processors transfer data to the storage devices. Flash memory is also taking on a new role in these servers — as high-speed memory that can be leveraged for large data-intensive workloads such as analytics, business intelligence, and large data warehouses.

Converged Infrastructure

As servers and storage evolve, there is an undeniable trend to combine the elements of servers, storage, and networking into a new type of infrastructure called converged infrastructure. Converged designs reduce the complex, manual integration that would otherwise be required to bring together technology components. This is why unification simplifies IT deployments of server infrastructure and reduces operational costs associated with onsite, one-off systems integration.

Different vendors refer to their systems in different ways — some are marketed as converged systems or expert integrated systems. The variety of descriptions is a good match for any new wave of technology deployment in the industry. This phenomenon also occurred in the early days of cloud computing, as the industry came to terms with the capabilities being offered and the terminology used to describe those capabilities and products.

Ultimately, these systems, built from a range of server, storage (e.g., storage devices, flash and tiered storage), and networking components, will need to be managed in a unified way with increasing degrees of automation. Monitoring and managing the objects, while presenting administrators with a cohesive, simplified view, will be essential to advanced virtualization and cloud computing.

The VCE Alliance

VCE was created in 2009, when Cisco, EMC, and VMware formed a partnership to accelerate the time to market for a converged infrastructure solution supporting cloud computing solutions. They began to build an ecosystem for solutions, including hardware, software, and networking infrastructure that is enabled by virtualization and made ready for cloud computing.

As designed by the VCE partners, the datacenter infrastructure is scalable, adding capacity by building out the infrastructure based on Vblock units that consist of Cisco UCS, EMC storage, and VMware virtualization and management software. As the Vblocks are added to one another, as needed, the VCE Alliance partners, many of them in the enterprise software world, test their applications and databases on Vblocks to ensure reliable and sustained performance over time.

Specifically, the Vblock units are based on x86 server technology running Linux and have been designed to provide compute density and IT efficiency. The EMC storage supports multi-tiered storage, combined with new flash technologies, to optimize performance for the purpose of supporting cloud computing workloads.

Because the individual components have been designed to work together, the Vblocks can be rapidly deployed, speeding time to solution for the businesses that adopt the VCE solutions and for hosters and service providers that support business services on behalf of their end customers.

Vblock Systems

VCE designs and delivers Vblock Systems, integrating the server, storage, and networking aspects of the converged infrastructure solution. Vblocks are the modular building blocks that are used to build out datacenter infrastructure, leading to scalability of the overall datacenter capacity. Because Vblocks are preconfigured and pretested, they support rapid deployment and allow IT organizations to install the technology without special training in IT skill sets related to onsite systems integration.

Value Proposition/Business Benefits

Key business benefits include the following:

- **Faster time to revenue or service.** Vblock Systems are preintegrated and pretested in a controlled factory environment across key applications from SAP, Oracle, and Microsoft (Exchange and SharePoint), allowing systems to be deployed and provisioned within days of arriving at the datacenter. Part of the value that the VCE Alliance provides to customers is its stated commitment to technology refresh as new components become available.

- **Enterprise-scale performance and data availability.** Mission-critical applications and data must be available at all times. The Vblock Systems are architected on EMC Symmetrix VMAX or EMC VNX unified storage arrays, Cisco UCS blades, Cisco MDS, Cisco Nexus networking switches, and a VMware vSphere virtualization platform. In this way, hundreds to thousands of VMs, made up of many Vblock Systems, can be supported across the datacenter infrastructure.

- **IT flexibility for business agility.** As business conditions change, Vblock Systems will be updated. Vblock Systems offer customizable compute, network, storage, virtualization, and management resources via multiple configuration choices that deliver a range of business services to meet a broad spectrum of needs.

- **Fast deployment and improved cost of ownership.** Although Vblock Systems are designed to handle the most demanding workloads, they can be deployed faster and more easily than multivendor solutions that are built on layered software that must be linked to create a unified system. Further, Vblock System components are continually optimized and balanced, and Vblocks can scale without disrupting datacenter operations.

EMC AND CISCO SOLUTIONS

Cisco's objective with Cisco UCS is to deliver a unified datacenter platform that combines industry-standard x86-architecture servers, networking, virtualization awareness, and embedded element management in a single system that unifies infrastructure and management. The technology solutions from Cisco and EMC are intended to improve the efficiency and effectiveness of business services that have been moved from other platforms to this x86-based infrastructure platform.

EMC offers a full array of solutions for capacity-optimized, performance-optimized, and I/O-intensive workloads. These solutions include block-based (e.g., VNX, VNXe, VMAX), file-based (VNX, VNXe, Isilon), and object-based (e.g., Atmos) solutions, many of which have shared management capabilities using platforms such as EMC Unisphere and ProSphere.

Through the VCE coalition, Cisco and EMC, working together with VMware, offer customers pretested, preconfigured platforms that include networking, server, storage, and hypervisor technologies. These technologies streamline initial customer deployments to x86, and future new applications can be deployed much faster and with less required infrastructure.

Through these offerings, EMC and Cisco together have assembled their respective portfolios to offer a converged infrastructure that enables businesses to embark on seamless application modernization. The following sections describe the server and converged infrastructure that makes up Cisco UCS and a host of EMC solutions.

Cisco Unified Computing System

The Cisco Unified Computing System (Cisco UCS) is a platform that unifies servers, storage, and networking to simplify system administration and improve system performance. Cisco has worked closely with EMC and VMware — its partners in the VCE Alliance — to converge IT infrastructure and pave the way for cloud computing.

Cisco is aiming to eliminate the manual, time-consuming, and error-prone assembly of components into systems. Cisco UCS is intelligent infrastructure that is self-aware and self-integrating. When new components are added to the system, they are automatically placed in resource pools, making deployment fast and easy.

The Cisco UCS offering includes B-Series x86 Blade Servers, 5100 Series Chassis, 6200 Series Fabric Interconnects, 2200 Series Fabric Extenders, and C-Series Rack Servers. Design is the key to differentiation for UCS.

The system is built from the foundation so that every aspect of server identity, personality, and connectivity is abstracted and can be applied through software. The result is a secure, flexible, and agile platform that delivers reduced staff costs with increased uptime through automation and more rapid return on investment.

Specific components of the Cisco UCS solution are as follows:

- **Cisco UCS B-Series Blade Servers and Chassis** feature a unified fabric that reduces the number of adapters, cables, and access-layer switches needed to connect multiple Cisco UCS servers in a LAN or WAN networked environment.
- **Cisco UCS Manager** leverages systems management software to orchestrate workloads as they traverse the Cisco UCS bladed servers and rack servers. UCS Manager provides a unified view, via a single console, of all the Cisco UCS components, and it also integrates with third-party system management software to give system administrators a single view of all managed objects (physical servers and virtual servers).
- **Cisco UCS 5100 Blade Server Chassis** supports up to eight half-width B-Series Blade Servers, or up to four full-width B-Series Blade Servers. These bladed servers are housed within an industry-standard 19in. rack, leveraging front-to-back cooling.
- **Cisco UCS C-Series Rack Servers**, which are now included in the product portfolio, can balance performance and density, enabling production-level virtualization, Web infrastructure, and datacenter workloads. Cisco Unified Computing is now extended to both blades and racks, bringing operational benefits to rackmounted servers.
- **6296UP Fabric Interconnect** is a core element of Cisco UCS that links I/O modules to LAN/SAN environments. The newest generation of Fabric Interconnects doubles the switching capacity to 2Tbps.
- **I/O module 2204XP** for the chassis provides 80Gbps and 160Gbps with load-balancing capabilities across ports to improve connection resiliency.

Overall, IDC expects blades to remain a focal point for Cisco, which is a top 5 provider of blades worldwide. But IDC also notes that specific elements of the Cisco UCS offering are significant for rack servers, including the expanded capabilities of Cisco UCS Manager.

Workloads: Applications and Databases

Following the 2009 debut of Cisco UCS, Cisco has expanded the range of software products that are certified to run on the platform.

Products include Oracle Database 10g and 11g, a range of Oracle enterprise applications, a range of SAP applications, the SAP HANA data analysis appliance, Microsoft Exchange, the Microsoft SQL Server database, and VMware's vSphere virtualization software and vCenter management software. In traditional datacenters, IT staff spent long periods of time preparing software to run on servers and storage devices. This onsite systems integration and testing typically required weeks or even months to complete.

Management

Cisco UCS Manager provides unified, embedded management of all software and hardware components of the Cisco Unified Computing System across multiple chassis, rack servers, and thousands of virtual machines. Cisco UCS Manager provides a unified management platform for both blades and racks, which brings capabilities that were previously exclusive to Cisco UCS blades to rack servers and allows customers more choice in selecting the right form factor for applications and databases — in short, their business services, many of which will ultimately be hosted on private clouds and public clouds (via SaaS offerings from cloud service providers).

Cisco UCS Manager generates service profiles for both racks and blades; the server characteristics are abstracted from the physical hardware and reside in Cisco UCS Manager. System management and changes are simplified with predefined, preprovisioned server identities and predefined LAN/SAN settings. In 2012, the Cisco UCS management functionality was extended to manage thousands of servers, a dramatic increase from the first generation of Cisco UCS deployments.

Investment Protection

Cisco has more than 20,000 customers for its Cisco UCS product portfolio and has protected the initial investments that its customers made in earlier Cisco UCS systems installed since 2009. Now, the value proposition extends to both racks and blades, broadening the IT reach of the Cisco UCS management software and simplifying the task of managing end-to-end workloads that span multiple computing tiers.

Business Benefits

From a business perspective, the Cisco UCS solution provides a platform that can consolidate workloads that formerly ran across a number of disparate server systems. This consolidation onto a unified, virtualized infrastructure allows business units to be more efficient, reducing management and maintenance costs and focusing on the business services being supported on the Cisco UCS platform.

Further, the highly virtualized Cisco UCS systems support traditional applications and databases as well as cloud computing. This move to cloud allows businesses to choose which services to keep inside the enterprise (on-premises) and which services can be supported by service providers and hosting companies (off-premises). This strategy focuses in-house IT investments on the services that are

closest — and most specific — to the business. Typically, these workloads require the highest levels of security and availability because they support mission-critical business services.

EMC's Storage Portfolio for a Converged Infrastructure

An important catalyst for EMC's growth in the marketplace has been its work with Cisco to deliver converged infrastructure solutions. EMC's wide array of storage hardware and software solutions offers a full suite of complementary file, block, and object storage solutions. These products are part of an expansive portfolio, which also includes storage and data management solutions and server-side accelerators for the Cisco UCS platform.

EMC's storage solutions for the converged infrastructure include the following:

- **VNX.** The VNX platform is a unified storage platform that has been optimized for virtual applications. With the VNX Series, businesses can leverage a single platform for file and block data services with centralized management using Unisphere across the entire environment. VNX appliances include a slew of data efficiency services, such as FAST (Fully Automated Storage Tiering), FAST VP (Fully Automated Storage Tiering for Virtual Pools), compression, and deduplication, that EMC claims reduce average capacity requirements by up to 50%. The VNX platform supports flash as a tier and flash as a cache in addition to SAS and ATA drives. It also supports both VMware and Microsoft hypervisor platforms for desktop and server virtualization.

- **VMAX.** The Symmetrix VMAX is EMC's tier 1 "scale-out" multicontroller storage platform that is designed to aggregate high-capacity, high-performance, and mixed workloads onto a single solution. Like the VNX platform, the VMAX platform supports many data efficiency and optimization features, including flash-enabled technologies.

- **XtremSW Cache.** XtremSW Cache is a server flash-caching solution that is designed to dramatically improve application performance by reducing latency and increasing throughput. It includes not only PCIe flash hardware placed inside the server but also an intelligent software layer that is installed on the host operating system. XtremSW Cache is especially effective in boosting the performance of read-intensive, high-throughput applications that reduce response times to end-user requests. When used in conjunction with EMC storage arrays, such as VNX and VMAX, XtremSW Cache can extend EMC FAST algorithms into the server with a single, intelligent I/O path from the application to the data store. The automated intelligence in the software layer puts the hottest data on the server for optimal application efficiency. XtremSW Cache also features write-through caching that enables persistence to the back-end storage array. This ensures high availability, end-to-end data integrity, data reliability, and disaster recovery.

- **Avamar.** EMC Avamar backup software has always had a portfolio of application-specific plug-ins or modules to work with business-critical applications such as Oracle, Microsoft, and SAP for both physical and virtual implementations of these application servers. By leveraging an application-specific plug-in architecture, the Avamar backup software is able to address many of the key challenges associated with application backups, including providing online backups, application consistency, and granular levels of both backup and recovery.

- **Data Domain Boost.** EMC Data Domain Boost software supports end-to-end integration from backup storage to backup software, touching the applications themselves. Data Domain Boost distributes parts of the deduplication process from Data Domain systems to the backup server or application client. Data Domain Boost software links Data Domain with the Avamar application clients. This technology dramatically reduces backup times and speeds up recoveries in virtual environments. At the same time, Data Domain Boost reduces the amount of storage required by 10–30% and dramatically reduces the amount of time spent on system administration because it offers unified control and visibility.

- **RecoverPoint.** RecoverPoint is an appliance that works in conjunction with host- or array-side data splitters to provide continuous data protection, or replication, with multiple recovery point capabilities to restore applications to a specific point in time, locally or geographically. Key features of RecoverPoint are that it provides bidirectional synchronous and asynchronous replication as well as roll-back/roll-forward capabilities in physical, virtual, and cloud environments. RecoverPoint makes efficient use of bandwidth by leveraging compression and deduplication. Off-host and offsite processing capabilities allow disaster recovery testing to be streamlined.

- **VPLEX.** VPLEX is a storage virtualization solution that allows for the federation of various EMC and non-EMC storage systems into a single resource. Federation enables data to be shared, accessed, and moved within, across, and between datacenters. VPLEX allows simultaneous access to storage systems at geographically separate sites, which enables businesses to achieve transparent workload mobility and availability, both locally and over distance. VPLEX is a hardware and software platform that resides in the SAN, between hosts and storage, and extends data over distance. The solution dissolves the distance between sites and delivers dynamic data mobility and the ability to move applications and data in real time, with no interruption in service. VPLEX supports RecoverPoint splitters natively and can be managed via Unisphere. The VPLEX family includes three models: Local, Metro, and Geo.

Migration Services Strategy Overview

Because many varieties of RISC/Unix systems are installed in enterprise infrastructure, there is no single blueprint for migrating workloads from those aging platforms to Cisco UCS and EMC storage solutions. Instead, Cisco and EMC have built customer experience–based migration services that expedite and ease migration to the UCS platforms running Red Hat Enterprise Linux (RHEL) with EMC storage infrastructure. These migration services build on Cisco's and EMC's long-term relationships with enterprise independent software vendors (ISVs), including VMware, Oracle, and SAP.

Using well-tested migration methodologies, in-depth analysis tools, a robust planning process, and design and implementation services, Cisco and EMC provide a comprehensive, cost-effective approach to customer migration initiatives. In doing so, they leverage decades of experience working with customers to migrate both off-the-shelf applications and custom applications from one platform to another. Customer engagements are characterized by initial discussions about the customer's application portfolio and the SLAs that must be met and then development of a high-level migration road map and a detailed migration plan.

Migration Examples: Customer Snapshots*

- **Avago Technologies.** Avago, based in Singapore and San Jose, California, started in the late 1990s as the semiconductor portion of Agilent Technologies. It manufactures a wide range of electronics, including RF and microwave components, ASICs, LEDs, and fiber optics. After installing Cisco UCS and EMC converged infrastructure, the company reported that batch processing was 40% faster than before deployment.
- **Credit Acceptance Corporation (CAC).** Founded in 1972 and based in Southfield, Michigan, CAC is an automobile services firm that provides dealers with financial and servicing solutions. The company provides car buyers with advances on automobile loans, and it also provides collection services to auto dealers. CAC reports to the three national credit-reporting agencies and offers its services to car buyers through a nationwide network of automobile dealers. It benefits customers who could not otherwise obtain financing. Following installation of Cisco UCS and EMC storage for Vblock, CAC claimed a nearly 30% improvement in the performance of its Oracle applications. Using Oracle Virtual Machines (OVM), the company deployed Oracle virtual servers in less than an hour — about half the time it had taken for deployment on freshly provisioned physical servers.
- **EMC.** EMC reported that for an internal installation, OLTP transactional workloads ran 10 times faster with UCS. Processor utilization was 85%, up from 10–15%. Batch performance increased 20x. Total savings for capex and opex was $7 million.

CHALLENGES AND OPPORTUNITIES

As in every technology space, many IT vendors are competing for market share and to gain adoption in customers' datacenters. Although the opportunity is widely understood across the industry, each vendor chooses its own path to market and the specific technology approaches that will meet the emerging business and IT requirements of customers in the age of cloud computing.

Cisco, EMC, and VMware have chosen to work together to develop and to bring to market a preconfigured, pretested virtualized infrastructure that enables cloud computing. The three vendors, through the VCE Alliance, are broadening their total available market (TAM) in the converged infrastructure marketplace, bringing their expertise to bear in different focus areas: servers (Cisco), storage (EMC), and virtualization and management software (VMware).

* Reference materials were provided by EMC and Cisco. IDC has not validated these reports.

By cooperating to develop Vblock Systems, the companies have the opportunity to accelerate their time to market, as each focuses on specific technologies. By design, their technologies fit together in a unified converged infrastructure solution, which has the effect of speeding time to market while ensuring continual technology refreshes that will match the accelerating pace of evolving datacenter requirements for virtualized and flexible infrastructure.

CONCLUSION

Datacenter transformation is well underway, but the route to updating server and storage infrastructure is not easy. Often, the legacy of earlier IT decisions, which were made over decades, hampers the process, and for economic reasons, many customers cannot carry out a rip-and-replace strategy or build a "greenfield" datacenter from the ground up. Rather, they tend to add new technology for new projects and to build on that new infrastructure over time.

This means that new, efficient infrastructure must be introduced as building blocks that can be added to a datacenter as part of a wider strategy to improve operational efficiency over time. Identifying which applications and databases will benefit most from improved infrastructure will be critical to successful projects. If correctly identified and efficiently deployed, infrastructure for virtualized x86 server environments is a foundation that can reduce IT staff costs, maintenance and management costs, and power/cooling costs in line with the goals of efficient datacenter infrastructure.