

The Evolution of Virtualized Desktops and Converged Infrastructure

August 2011

Adapted from *Worldwide Virtual Client Computing 2010–2014 Forecast: Coming of Age for Client Virtualization* by Ian Song and Brett Waldman, IDC #225363; *Market Analysis Perspective: Worldwide EVS, 2010 — Client Virtualization* by Ian Song, IDC #227494; and *Cisco, VMware, EMC Announce Virtual Computing Environment (VCE)* by Lucinda Borovick, Vernon Turner, et al., IDC #220734

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The virtual client computing (VCC) market has grown rapidly, despite the economic downturn over the past few years. The centralized virtual desktop (CVD, aka virtual desktop infrastructure or VDI) segment has led the way in facilitating this growth. IDC expects to see significant production deployments of centralized virtualized desktops in the near term and a continued strong adoption ramp through 2014. However, the traditional datacenter model is ill-suited to facilitate the growth of CVDs. Running virtualized desktop from the datacenter requires technologies that are optimized to handle the additional processing, bandwidth, and storage requirements that traditional datacenter model can't handle at scale. Additionally, implementing datacenter technologies that are optimized for CVD is exceedingly complex and cost prohibitive, stalling many on-premises CVD projects.

Another trend that has emerged in 2011 is desktop as a service (DaaS). This is where virtual desktops are hosted by managed service providers or cloud providers for customers that don't want to, or can't, implement desktop virtualizations by themselves. While DaaS can reduce customers' investment by requiring little, if any, onsite datacenter capacity, many hosters providing the DaaS solutions struggle with datacenters that aren't optimized for hosted CVD, the foundation for DaaS.

As the ecosystem for the CVD continues to mature, specialized solutions aimed at simplifying the implementation complexities and reducing the costs of CVD have begun to emerge. This Technology Spotlight discusses the benefits of implementing CVD converged infrastructure. In addition, this paper explores the role that the Virtual Computing Environment (VCE) Company, plays in the growing market for integrated virtualized solutions.

Introduction

Desktop virtualization — more specifically, the centralized virtual desktop (CVD, aka VDI) — is an evolutionary technology from the traditional server virtualization technologies. IDC defines server virtualization in the following three phases:

- Virtualization 1.0: Basic encapsulation and test and development use cases
- Virtualization 2.0: Production deployment and increased workload mobility
- Virtualization 3.0: Automating workloads, enabling streamlined management, transition server virtualization to cloud computing

Virtualization 3.0 will bring a service-oriented, fully virtualized datacenter (servers, storage, I/O, and network) to its customers and is the natural evolution of server virtualization.

The transition from 1.0 to 2.0 was fairly easy. Performance and reliability of hypervisors improved enough for customers to use them for production workloads. Organizations reaped immense capital expenditure (capex) savings from hardware consolidation, power and cooling, and real estate. The move from 2.0 to 3.0 will be much harder. The value proposition of Virtualization 3.0 will shift from capex to operational expenditure (opex), which isn't simply about a virtualized infrastructure. As datacenters evolve to the cloud, Virtualization 3.0 requires the implementation of a myriad of technologies both inside and outside virtualization that must all work together. IDC believes that Virtualization 3.0 is the foundation for a truly scalable and manageable CVD deployment. Because opex benefits are the core value of CVD, advanced management, workload automation, and the capabilities to handle staggering numbers of virtual machines (VMs) are rapidly becoming the basic requirements for CVD implementations.

Interest in CVD has been steadily mounting during recent years; however, it has not translated to a corresponding increase of scaled deployments. IDC believes that the underlying infrastructure complexity and high costs, as well as the time to evaluate, are the core issues preventing CVD from becoming more widespread. As customers and service providers embark on their journey to Virtualization 3.0, the CVD environment must become more powerful and, at the same time, cheaper to own and easier to manage.

Definitions

- **Converged infrastructure.** This is a datacenter computing model that treats server, storage, and network infrastructure resources as pools to be assigned as needed to deliver business services. The following are the three phases to achieving a converged infrastructure:
 - Integration of traditional hardware functionality such as combining servers and network equipment
 - Tight integration of systems management and control software into hardware functionality
 - Integration of a variety of IT services, including outsourcing, platform as a service, software as a service, and cloud computing, into a unified computing framework
- **Virtual client computing (VCC).** This is a client computing model that leverages a range of software and virtualization solutions to improve upon the limitations associated with the traditional distributed desktop environment. IDC breaks the VCC model into distinct categories including CVDs (aka VDI), virtual user session (VUS), distributed virtual desktops (DVDs), and application virtualization.
- **Centralized virtual desktop (CVD).** More commonly known as VDI, CVD is a form of server-based computing; it utilizes server hypervisors to host multiple unique and isolated client operating systems aboard a single server or group of servers in the datacenter. The virtual desktops are delivered to end users' devices via the network.

The Benefits of Converged Infrastructure

Utilizing converged infrastructure to host centralized virtual desktops can yield significant benefits, including the following:

- **Cost savings due primarily to reduced operating expenses.** Because the underlying hardware pieces (server, storage, and network) are designed and optimized to work with each other, IT labor can be reduced due to the built-in interoperability between each component.

- **Simplified management.** Most converged infrastructure solutions can be managed by a single console to streamline hardware management and automate workloads, further reducing IT operation complexity and, thus, the opex.
- **Improved availability.** In the converged infrastructure model, high availability and automatic failover capabilities are improved due to the built-in interoperability on the hardware layer.
- **Increased flexibility/utilization.** Adding more capacity will be easier in the converged model than in the traditional model; higher utilization of hardware resources can also be achieved.

CVD can fully utilize the benefits offered on converged infrastructure. Enterprises have quickly discovered that the use of virtualization to support desktop workloads on converged infrastructure creates significant benefits, including improved IT management efficiency, improved price efficiencies, and improved capabilities. IDC defines these benefits in one of the following three buckets:

- **Quantifiable benefits.** Virtual machines rely less on the horsepower of the endpoint devices themselves, thus creating an opportunity for IT to significantly drive down the cost of endpoint hardware by extending the life span of existing PCs, by repurposing PCs as CVD endpoints, or by replacing PCs with a thin-client device. The simplified management model of CVD can further drive down the total IT costs by enabling IT to work more efficiently. Additionally, CVD can make users more productive by improving the desktop reliability, lessening the need to contact support.
- **Functional benefits.** Certain key functions of desktop management can be improved with CVD. The ability to move data from the edge of the IT environment into the datacenter inherently reduces the security risks to an IT organization. Data backup is improved because CVDs reside entirely within the datacenter. These security and backup improvements make it easier to ensure full compliance. Disaster recovery is significantly simplified because central IT staff can effortlessly revert virtual desktops back to their last known good states.
- **Organizational benefits.** Traditional tension between IT and the rest of the organization can be lessened with CVDs. Because virtual desktops are easier to manage and secure than traditional desktops, IT can provide end users more freedom and promote goodwill. CVDs can also improve the user experience, especially compared with an aging physical PC. Additionally, CVDs can allow users ubiquitous access to their virtual desktops on any device, which can improve overall user satisfaction.

Key Trends

The virtual client computing industry has been rapidly evolving over the past few years. The technology will become increasingly mature over the next 12–24 months. IDC believes that the success stories and use cases from the early adopters, as well as the maturing technology, will facilitate wider adoption of client virtualization technologies and drive more scaled implementations in the next 12–24 months. The use of virtualization software within desktop environments is growing among many IT organizations. In a recent survey by IDC, slightly more than 52% of respondents said they implemented or plan to implement CVD. IDC expects the use of CVD to gain momentum as the available CVD products and platforms mature and as more IT managers become familiar with the platform's capabilities.

IDC anticipates that the use of desktop virtualization on converged infrastructure will continue to rise as customers begin to grasp the value proposition of CVD in terms of opex reduction, shorter time to deploy, and reduced risk. As converged infrastructure solutions continue to expand and become increasingly relevant for customers of all sizes and types, they will become the solution of choice for customers that seek value, manageability, and scalability for their CVD implementations.

IDC also sees the growth in capabilities of virtual desktop platforms as a two-tier model, evolution and revolution, with growth coming through evolutionary improvements in CVD platforms such as VMware View and revolutionary improvements taking the form of localized hypervisors becoming available for desktop PCs to host virtual desktops at the edge.

The Evolution of Virtual Desktops

Early adopters of CVD technology will continue to provide a proving ground for software vendors that will be investing heavily in what they perceive to be a very high-growth market. An increasing number of CVD platforms will become available within the market, driving competition in pricing as well as products and features. Additionally, smaller vendors that have developed niche products to address certain problems with server-based computing and consolidated image management will continue to be acquired and their products will be integrated into existing CVD platforms, creating more seamless, simple, and comprehensive platforms.

The Revolution of Virtual Desktops

Desktop virtualization has enabled the following innovations that can fundamentally change the way enterprises approach IT:

- **Client hypervisor.** Like VMware with its offline desktop mode, ISVs have begun to offer client-side hypervisors in both type 1– and type 2–based solutions. Regardless of the technology, client-side hypervisors can host VMs without network connectivity, effectively addressing the notebook market and bringing it into the desktop virtualization discussion. In addition, the client hypervisor is the catalyst for the "bring your own computer" (BYOC) model, where a secure and managed corporate image lives side by side with an unlocked personal image.
- **DaaS.** For many organizations, resources and expertise aren't available to implement client-side virtualization. This is where virtual desktops hosted by managed service providers or cloud providers become a viable solution. DaaS can reduce the initial investment by requiring little, if any, onsite datacenter capacity (therefore lowering the investments). At the same time, DaaS can be deployed quickly, and end-user management can be outsourced to the hosting provider. However, the user experience with DaaS may not be as good as the user experience with onsite CVD solutions because of WAN bandwidth limitations, although WAN optimization can remedy this situation. The actual Windows licensing for DaaS at this moment is also a bit hazy.
- **Consumerization of IT.** Personal and nonstandard devices have been making inroads to the enterprise lately. Managing nonstandard devices has been a pain point of IT, which spends much time either keeping the devices out or supporting them. Desktop virtualization has created a platform where any device (mobile, personal, nonstandard) can access the same data and desktop environment while ensuring security. Considering that many enterprise leaders are now some of the most vocal advocates of nonstandard devices, IT will have a hard time supporting the influx of devices without virtualization.

Considering VCE

VCE, the Virtual Computing Environment Company was formed by Cisco and EMC, with investments from Intel and VMware to provide solutions that enable the transition to private cloud infrastructures. The goal of VCE is to accelerate customers' ability to increase business agility through greater IT infrastructure flexibility and lower IT, energy, and real estate costs through pervasive datacenter virtualization and a transition to private cloud infrastructures. Importantly, one driver is to provide a single point of contact — the proverbial "one throat to choke" — to prevent finger-pointing when problem-solving a multi-vendor solution at customer accounts, especially large deployments that have many hardware and software components contributing to the total solution.

VCE has corporate headquarters in Richardson, Texas. VCE offers the Vblock Infrastructure Platforms, an integrated IT offering with end-to-end vendor accountability. VCE prepackaged solutions are available through an extensive partner network and cover horizontal applications, vertical industry offerings, and application development environments, allowing customers to focus on business innovation instead of integrating, validating, and managing IT infrastructure.

Today, the VCE Company includes investments from Intel and VMware and has corporate headquarters in Richardson, Texas. VCE offers the Vblock Infrastructure Platforms, an integrated IT offering with end-to-end vendor accountability. VCE's prepackaged solutions are available through an extensive partner network and cover horizontal applications, vertical industry offerings, and application development environments, allowing customers to focus on business innovation instead of integrating, validating, and managing IT infrastructure.

According to the company, Vblock Infrastructure Platforms combine best-in-class virtualization, networking, computing, storage, security, and management technologies with end-to-end vendor accountability. The integrated units of infrastructure enable rapid virtualization deployment, designed to allow customers to realize a quick return on investment. Vblock Infrastructure Platforms offer storage capacities and processing/network performance and support such incremental capabilities as enhanced security and business continuity.

According to VCE, organizations that deploy Vblock Infrastructure Platforms can achieve the following benefits:

- **Rapid Deployment.** Factory integrated components and validated solutions, along with on-site installation, configuration, and performance tuning, speed time to value. IT no longer has to spend time integrating and testing products from multiple vendors in order to stand up new capability. Vblock Platforms are designed, tested, and validated as units of infrastructure. Vblock platforms are complemented by on-site installation, configuration, and performance tuning services to ensure successful and rapid deployment. IT administrators can very quickly and easily deploy or migrate new business applications, operating systems, and technology updates, speeding time to value.
- **Shared infrastructure.** Standardized infrastructure for application mobility, IT simplicity, and lower CAPEX and OPEX. IT no longer has to manage complex application silos. Vblock platforms can serve as a standardized infrastructure for a vast array of business critical applications. Vblock Infrastructure Platforms deliver enterprise level functionality to address the needs of business critical applications. The ability to migrate applications and workloads enhances business continuity. And shared infrastructure simplifies IT staffing and training.
- **ITIL-based management.** VCE and partner management tools tuned for virtualization environments offer service catalogues, workload mobility, and trusted multi-tenancy to increase IT agility. Vblock platforms enable a unified approach to infrastructure management. IT administrators can provision compute, network, and storage resources with just a few clicks. And open APIs enable integration with management software platforms from ISVs.
- **End-to-end accountability.** Extensive collaboration throughout the channel ensures a seamless engagement, provides seamless support across the infrastructure, and lowers risk. VCE provides a single point of contact through support engineers who are experts in the entire infrastructure, utilize advanced collaboration capabilities, and have direct access into engineering resources at Cisco, EMC, and VMware. VCE implements a unique approach to release and configuration management to further simplify IT operations. VCE makes available on formal release schedules

validated and fully regressed software releases and firmware upgrades that cover the entire platform.

- **Security, compliance, and business continuity.** Solution performance is enhanced by industry leading technologies (e.g., EMC FAST, Fast Cache, and deduplication, VMware vShield, etc) to provide needed security, compliance, and business continuity. Vblock Solutions integrate compute, network, storage, virtualization, and management technology to improve application performance, security, dynamic scaling, and disaster recovery. Vblock solutions cover horizontal applications, vertical industry offerings, and application development environments, allowing customers to focus on business innovation instead of integrating, validating and managing IT infrastructure. VCE provides open APIs on which major infrastructure management vendors build capability to support ITIL best practices. These capabilities enable IT to build service catalogues with tiered SLAs and to offer chargeback and metering in a multi-tenancy environment so that IT customers pay only for what they use.

VCE recently announced Vblock FastPath Desktop Virtualization Platform, which is a purpose-built desktop virtualization solution that helps IT organizations deliver virtual desktops as a managed service. The automated solution is built on VCE's Vblock Infrastructure Platform and can deliver the following benefits:

- **Integrated platform.** Everything needed to deploy desktop virtualization is included and orderable as a unit, including compute, storage, VMware View, and provisioning and management software.
- **Modular virtual desktop growth.** IT managers can support thousands of users on a platform and easily add more virtual desktops by increasing capacity or adding Vblock Infrastructure Platforms.
- **Rapid provisioning and decommissioning of desktops.** Virtual desktops can be deployed and decommissioned much faster than traditional CVD environments with simplified management.
- **Resilient and validated architecture.** The solution accommodates unplanned events such as spikes and boot storms to ensure a consistent high-performance virtual desktop user experience.
- **Support.** A single support contact is provided for the entire solution with 24 x 7 availability of subject matter experts included for the desktop virtualization environment.

Challenges

According to IDC research, organizations believe that they face barriers to implementing a converged infrastructure for their CVD environment due to lack of internal skills, costs of implementation, and difficulty of integration with existing infrastructure. Additionally, many organizations fail to realize the need to leverage tools such as workload automation and streamlined management to further drive down opex. VCE, as well as other vendors, must overcome these inhibitors.

Vendors in the VCC space must deliver the message that desktop virtualization is fundamentally different from server virtualization, and organizations should not expect an immediate ROI. While short-term, tactical adoption of client virtualization could prove useful in gaining management buy-in, a successful desktop virtualization implementation is a journey of continuous optimization and process improvements. Any expectation of quick-and-dirty cost reduction through desktop virtualization is likely unrealistic.

Conclusion

IDC expects that desktop virtualization will experience continuous growth through 2014. Total customer count is expected to continue to rise well into the second half of the decade. As the solution matures, it will become increasingly applicable to greater portions of organizations and a greater breadth of industry verticals beyond the typical healthcare, finance, government, and education segments that dominate the market today.

The expected growth of desktop virtualization will create a golden opportunity for ecosystem partners, especially for vendors that can deliver a converged infrastructure platform that allows customer to maximize their investments and opex savings. At the same time, converged infrastructure can also address the needs of managed service providers, where emergence of DaaS will force the service provider to look into more efficient, cost-effective datacenter platforms.

IDC believes that VCE's existing portfolio of solutions is a good fit to address current market needs. Looking forward, VCE has to bring its Vblock solutions to support customers of different sizes, continue to reduce the time and cost of deployment, and deliver the right message to its customers to ensure its continued success.

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