Reaping the benefits of end-to-end desktop virtualization deployments

By Tom Small, Rafael Colorado, and Cortney Isunza

Flexible delivery models, together with expert consulting and support services for Dell Desktop Virtualization Solutions, help IT decision makers cut cost, complexity, and risk—accelerating enterprise-wide efficiency gains through tuned and tested deployments across a broad range of enterprise use cases.
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Executive summary

A desktop virtualization infrastructure can heighten business agility, IT efficiency, worker productivity, and management flexibility. But concerns about complexity and risk may cause some enterprises to think twice. Unlike server virtualization, which enables rapid and significant return on investment (ROI), desktop virtualization typically does not lead to an immediate return on the technology investment. In addition, significantly different backgrounds and skill sets are required to manage virtual server environments and virtual desktop environments.

Dell can help organizations transition successfully to a virtual desktop environment that is designed to achieve convincing cost-benefits and avoid potential pitfalls. To accomplish this, the Dell team provides flexible implementation models, an Integrated Solution Stack (ISS) that provides hardware and software bundles based on open architecture, an established process methodology, and managed services offerings.

To help simplify the delivery process, Dell Desktop Virtualization Solutions (DDVS) offer several alternatives to purchase, implement, and manage desktop virtualization environments—including virtual desktop as a service (vDaaS), hosted, and custom solutions. Because one size does not fit all, Dell also provides a range of flexible implementation models that are designed to work within each organization’s existing IT infrastructure.

Of course, achieving buy-in from financial leadership requires IT executives to demonstrate how the investment in desktop virtualization can advance strategic objectives. The DDVS process addresses this requirement by providing an analysis of an organization’s current desktop environment, a road map to virtual desktop implementation, and a comprehensive assessment of the total economic impact of making the transition to a virtual desktop environment.
For example, Dell offers tools to help customers project break-even points, ROI, and total cost of ownership (TCO) for planned desktop virtualization projects. During the customer engagement, Dell end-user virtualization specialists take initial high-level estimates further with a deep dive to assess the specific IT environment in light of business and organizational goals, which enables them to create a detailed and specific analysis of the potential financial returns for desktop virtualization.

The Dell methodology is divided into four phases:

1. **Discovery workshop.** A Dell virtualization specialist helps the organization explore whether desktop virtualization is an appropriate platform for its needs.

2. **Blueprint assessment.** Dell experts conduct a thorough audit of the organization’s existing IT operation and its plans for expansion, perform a software inventory, and create a snapshot of the existing security framework so they can map the integration of existing security policies into the virtual environment.

3. **Design and proposal.** The Dell team produces a detailed map of a right-sized configuration that helps ensure sufficient computing resources for each user, with allowances for future expansion.

4. **Implementation and operation.** Dell virtualization specialists can work with an organization’s IT department to guide them through the deployment process on a custom basis. Or Dell can completely manage the deployment as included with the Integrated Solution Stack.

Dell Desktop Virtualization Solutions offer a comprehensive approach that enables a versatile deployment process. By accelerating the adoption of desktop virtualization and helping to simplify desktop management systems, DDVS can help organizations reduce the time to business value and transition their IT cost structures to service-based (OpEx) expenditures. As a result, DDVS allow organizations to quickly and flexibly adapt to the changing dynamics of a virtual workplace—heightening mobility for an increasingly global and technologically savvy workforce.
Assessing benefits and risks of desktop virtualization

A desktop virtualization infrastructure offers considerable benefits, including heightened business agility, IT efficiency, worker productivity, and management flexibility. At the same time, concerns about complexity and risk may challenge deployment initiatives. And such concerns may be well founded—particularly when IT departments lack the in-house skill set to deploy a complex desktop virtualization environment and may have no desire to manage one on an ongoing basis. Uncertainty about how to address security and change management may also dampen desktop virtualization initiatives. In some cases, despite convincing operational cost-benefits, enterprises may be concerned about the potential disruption of making the transition to desktop virtualization.

Unlike server virtualization, which enables rapid and significant ROI, desktop virtualization typically does not lead to immediate positive ROI (although it does save costs over time by streamlining operations and increasing productivity). Desktop virtualization technology is also relatively new compared to server virtualization, so IT decision makers do not have as many examples of successful desktop virtualization deployments to reference during the assessment process. In addition, virtual servers operate in a very different perspective than virtual desktops (see Figure 1). Desktop virtualization is inherently complex, requiring orchestration of multiple interconnected components spanning traditional IT domains—including virtual servers, storage systems, networks, enterprise software, management, operations, hypervisors, connection brokers, and client devices.

As a result, significantly different backgrounds and skill sets are required to manage virtual server environments and virtual desktop environments. While desktop virtualization offers compelling operational cost-benefits, many organizations are carefully investigating alternatives before making a decision about when, where, and how to employ it. For key questions to help make a suitable determination, see the sidebar, “Is desktop virtualization a smart move for your enterprise?”
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Dell can help organizations achieve the full benefits of virtual desktop deployments and avoid potential pitfalls by streamlining this transformation process in several ways:

- **Flexible implementation.** A range of deployment options allows organizations to leverage their in-house IT expertise and complement internal capabilities with assistance from Dell Services. Dell offers a comprehensive range of open, capable, and affordable delivery models including vDaaS as well as preconfigured and custom solutions that ease design and implementation complexities while addressing each organization’s specific business, end-user, and IT requirements.

- **Integrated Solution Stack (ISS).** Dell Desktop Virtualization Solutions offer preconfigured and pretested hardware and software bundles that include server, storage, and networking gear based on open architecture—enabling organizations to implement comprehensive desktop virtualization platforms with flexible options for future expansion.

- **Established methodology.** A repeatable process methodology helps enterprises reduce risks using an established approach for discovery of IT assets, design, rightsizing the desktop virtualization environment, and rollout of the infrastructure.

![Contrasting virtualization perspectives: Server virtualization versus hosted desktop virtualization](image)

Figure 1. Contrasting virtualization perspectives: Server virtualization versus hosted desktop virtualization
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- **Managed services offerings.** Organizations may opt to have Dell manage ongoing monitoring and maintenance of the virtual desktop infrastructure—whether it is hosted in an organization’s own data center, on a dedicated infrastructure in an off-site location, or on the global Dell Cloud Computing Solutions™ infrastructure.

- **Vertical solutions.** Dell offers segment-specific solutions that address customers’ unique needs. For example, Dell Mobile Clinical Computing uses desktop virtualization to provide quick and convenient access to patient records, enabling greater efficiency for medical professionals and ultimately giving them more time to dedicate to patient care. Dell Virtual Labs, a solution tailored to educational institutions, gives students greater and more flexible access to applications.

**Is desktop virtualization a smart move for your enterprise?**

Virtual desktop infrastructure (VDI) is one of several options for an overall end-user virtualization strategy that you should evaluate. Other options include application streaming, application virtualization, and client-hosted hypervisors. While VDI offers a robust virtualization solution, it requires preparation and analysis prior to implementation. Several key questions can help decision makers determine whether their IT organization is suitably equipped to implement and manage desktop virtualization:

- Does your staff have expertise in each of the following areas?
  - Provisioning virtual desktops
  - Assessing desktop resource utilization
  - Evaluating the impact of network and application latency
  - Delivering desktop operating systems
  - Recovering desktop and data center infrastructure
  - Building redundant, highly available infrastructure
  - Assessing network bandwidth and I/O utilization
  - Optimizing wide area networks (WANs)
  - Rightsizing storage
  - Packaging and virtualizing applications
  - Working with hypervisors
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- Is your staff capable of mapping all the hardware, software, end-user computing devices, networking, applications, and data throughout your IT infrastructure—to establish the best end-user candidates for desktop virtualization?
- Can your business-critical applications be virtualized? If not, are there provisions for handling applications that cannot be migrated to a virtual platform?
- Do your software licenses support virtual desktops? Would business-critical software licenses be cost-prohibitive for a virtual desktop deployment?
- Do you have tools like the Microsoft® Active Directory® directory service in place, comprehensive group policies, and experience in managing robust user profiles?
- Does your IT staff have WAN optimization experience to help ensure an acceptable quality of service for end users?
- Is incremental budget available to support this effort?
- Are you able to provide adequate resources for a new multifaceted project?
- Does your existing staff have sufficient bandwidth to proceed effectively with a new multifaceted project?
- Is your organization equipped to manage separate physical and virtual desktop environments and the associated policies and skill sets that go with them?
- Does your enterprise foster the culture to implement such dynamic change?

Once the decision has been made to roll out a desktop virtualization environment, IT decision makers need to identify applications that will be included in the project and any foundational work that must be completed before the project commences. In addition, organizations migrating to a new desktop OS need to decide whether to perform that migration before or after deploying the desktop virtualization environment. Other important planning considerations include how to transition from the test phase to production, and how to ease the impact of that transition on end users. If a bring-your-own-device (BYOD) environment is desirable, how would that impact overall endpoint support requirements?
Streamlining deployment with flexible delivery models

To help simplify the delivery process, DDVS offer several alternatives to purchase, implement, and manage desktop virtualization environments, including vDaaS, hosted, and custom solutions. The Dell methodology encompasses both people and processes, leveraging decades of experience addressing end-user computing requirements in diverse enterprise usage scenarios.

Of course, one type of desktop virtualization deployment may not be suitable for every department or work group within a particular organization—so the first step is to evaluate the variety of users and computing needs within the organization. Using pre-integrated hardware and software bundles that have been extensively tested to help ensure interoperability and simplify virtualized desktop image deployment, the Dell approach maps an organization’s end-user needs to an optimized combination of data center resources (including CPU, RAM, storage, and I/O bandwidth). While DDVS work with a variety of computing devices and operating systems from multiple vendors, Dell offers a rich portfolio of devices ranging from desktops, laptops, and netbooks to tablet PCs and smartphones to enhance the end-user experience.

Because one size does not fit all, Dell provides flexible implementation models that are designed to work within an organization’s existing IT infrastructure. These models offer a range of options regarding terms of services, ownership, and financial criteria:

- **vDaaS.** This model employs a consumption-based subscription service to help organizations avoid the commitment of capital purchases, hardware depreciation, and hardware refresh. Dell implements, operates, and manages virtual desktops from the Dell Cloud, leveraging its expertise to meet requirements specified in service-level agreements (SLAs) for availability and ongoing operations. Dell offers several data centers strategically located throughout the world.
• **Managed services offerings.** In this approach, Dell implements and manages the customer-purchased ISS. This model is designed to provide a secure, reliable SLA-class experience, giving organizations the flexibility to host the deployment on their own premises or in a dedicated Dell data center configuration.

• **Customer-managed solutions.** In this case, Dell implements the customer-purchased ISS on the organization’s own premises. When the deployment is completed, Dell turns over management of operations, monitoring, and incident resolution to the customer. This approach comes with Dell ProSupport™, which offers a single support line for both hardware break-fix and solution troubleshooting, inclusive of the software stack.

• **Custom solutions.** For this approach, Dell provides best-of-breed components, as well as the consulting design and build services for a customized solution.

### Calculating the total economic impact of virtual desktops

Traditional ROI calculations include both the up-front costs of deploying a virtual desktop infrastructure and the ongoing operational costs to manage it. However, when assessing the return on investment for a virtual desktop deployment, it is also critical to factor in potential revenue gains that may be achieved by enhancing end-user productivity and overall business agility.

For these reasons, calculating the financial return of a desktop virtualization project goes beyond a typical ROI or TCO computation. To establish a strong business case for executive buy-in, a total economic impact analysis is warranted.

For organizations with traditional desktop infrastructures in place, replacing the current PCs with thin clients and investing in the supporting back-end data center infrastructure may represent a significant up-front cost. However, a financial advantage can be
realized over time from reduced turnover for PC hardware by deploying thin clients that require less frequent upgrades than traditional thick clients. In addition, desktop virtualization offers significant operational cost savings in the form of minimized IT administration overhead and enhanced management flexibility. In particular, savings can be achieved in areas such as scheduled software maintenance, patch management, imaging, and OS/break-fix support.

During the customer engagement, Dell end-user virtualization specialists take these estimates further with a deep dive into specific organizational and business objectives. This enables them to create a detailed analysis of the potential financial returns on the desktop virtualization investment. The total economic impact tool uses extensive data about an organization’s existing infrastructure and planned deployment to comprehensively model the financial impact of the project. For example, it provides a side-by-side comparison of current and projected capital and operational expenditures for a traditional desktop computing environment versus a desktop virtualization environment, including the projected cost of downtime and environmental optimization through power and cooling.

Dell calculates the cost-benefits of desktop virtualization by quantifying ROI in several key areas (see Figure 2):

- **Infrastructure.** By replacing relatively expensive PCs with thin clients that require less frequent upgrades, companies can save on hardware. Improved software license management and minimized software procurement overages help IT departments reduce software costs.
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- **Administration.** Significant operational costs savings can be achieved by managing virtual desktops centrally from the data center rather than requiring deskside support for traditional desktop PCs. This model also helps reduce costs for scheduled software maintenance, patch management, hardware break-fix, and OS support.

- **Data security.** A traditional client/server infrastructure can create tens of thousands of access points into the network—any of which may be used by hackers as a path to the organization’s servers. A virtualized desktop scenario is designed to prevent unauthorized access by immediately rendering a lost or stolen endpoint device useless. If the theft goes unreported, the client device can still access only the data necessary to perform the legitimate user’s appropriate tasks.

- **User experience.** Standardized desktop configurations help limit user-installed software and minimize desktop support and downtime.

- **Operational continuity.** When downtime does occur in a desktop virtualization model, it can often be remedied quickly by centralized management in the data center without requiring a deskside support visit. For enterprises in which compliance is a concern, standardized desktop configurations with centralized management and storage can also help lower the cost of compliance.

- **Environmental optimization.** By consolidating desktop management and storage within the data center, desktop virtualization can help reduce power and cooling requirements for the overall IT infrastructure.
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Figure 2. Assessing TCO: Traditional desktop management versus hosted desktop virtualization
Enabling a near plug-and-play model with the Integrated Solution Stack

The Dell Integrated Solution Stack (ISS) leverages enterprise-class servers, storage, networking, hypervisor and desktop virtualization software, and implementation and deployment services to speed time to production. It includes Dell EqualLogic™ PS Series three-tier storage, Dell PowerConnect™ J-Series switches, and optional firewalls, branch repeaters, and load balancers.

The ISS is internally tested and optimized to deliver an exceptional IT management and end-user experience. Each ISS unit is configured with the required hardware and software resources and sized to support the appropriate number of users based on organizational requirements.

The diligence that Dell has put into the integration and engineering of the ISS helps organizations create predictable outcomes and mitigate risk. As a result, the ISS helps simplify virtual desktop deployments—offering an approach that is designed to come very close to a plug-and-play model. Dell also helps simplify ongoing support through a single hotline for all of the components in the solution stack.

Dell has partnered with two key desktop virtualization vendors for DDVS software components. Dell has comprehensively tested and integrated both Citrix® XenDesktop® and VMware View™ virtualization software into its ISS bundles.
Citrix XenDesktop provides easy-to-use management tools, rich feature sets, scalability, and support for an extensive range of end-user devices. It is also compatible with a range of hypervisors and offers flexibility for delivering different kinds of desktops, from streamed to shared and server- or client-hosted with Citrix FlexCast™ delivery technology. It supports an advanced end-user experience over many types of networks with Citrix High Definition User Experience or HDX™ technology. In addition, Citrix XenDesktop leverages an open architecture enabling desktop virtualization to complement many existing data center virtualization initiatives.

The VMware ESX hypervisor is pervasive in customer data centers that have a virtual server deployment. As a result, IT departments are familiar with and usually possess a knowledge base and support for VMware virtualization. Joint Dell and VMware integration and engineering allow Dell EqualLogic PS Series Internet SCSI (iSCSI) storage area network (SAN) arrays to be managed from within VMware® vCenter™ Server virtualization management software.

Dell Desktop Virtualization Solutions with VMware View provide comprehensive desktop virtualization designed to centralize the management of client assets. VMware View integrates online/offline support, combined with hardware and software support for PC over IP (PCoIP), to enable high performance for rich desktops even over slow or intermittent local area network (LAN)/wide area network (WAN) connections.
The ISS is available in Enterprise and Enterprise Plus versions. The Enterprise version consists of Dell PowerEdge™ rack-mount servers with optimized redundancy and comprehensive recoverability through EqualLogic PS Series storage arrays. The Enterprise Plus version offers high data-center density by leveraging Dell PowerEdge blade servers as well as live migration capabilities and high-availability features native to Dell’s enterprise SAN iSCSI storage. (See Figure 3.)

<table>
<thead>
<tr>
<th>Feature</th>
<th>Enterprise</th>
<th>Enterprise Plus</th>
</tr>
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<tbody>
<tr>
<td>Basic virtual PC</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Redundancy</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Recoverability</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>High data-center density</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Dynamic motion</td>
<td>No</td>
<td>Yes</td>
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- All-inclusive, enterprise-class hardware, software, and services
- Built on robust, industry-standard components
- Scalable from 500–5,000 users
- High data-center density design helps reduce rack space
- Blade architecture is efficient and easy to maintain
- Shared storage enhances image management efficiency and enables timesaving features such as VMware vMotion® for live migration of virtual machines from one physical server to another

Figure 3. Comparing Integrated Solution Stack capabilities: Enterprise and Enterprise Plus versions
Leveraging industry vertical and purpose-built solutions

Organizations in certain industry verticals expect their end users to perform highly specialized tasks that require purpose-built architectures. To help address these requirements, Dell provides vertical-specific desktop virtualization platforms that are tuned and tested specifically for health care and higher education environments as well as for remote workers. These platforms are designed to increase end-user productivity, enhance management flexibility, and heighten data center efficiency by aligning core business objectives with end-user technology requirements. Each vertical-specific platform includes pretesting and integration of specific user applications designed to reduce deployment risk and accelerate implementation of virtual desktops, enabling accelerated deployment compared to traditional computing models.

In the health care arena, Dell Mobile Clinical Computing provides IT with the ability to securely centralize control of all end-user data and images while preserving flexibility for end users. By enabling a digital identity with client virtualization, clinicians can access their information from any Internet-connected computing device—freeing up more time to deliver enhanced patient care. Dynamic provisioning of user applications and data helps simplify deployment and provisioning of user desktops, and centralized control of virtual images helps simplify application upgrades and ongoing maintenance.

Dell Virtual Labs—the Dell vertical-specific platform designed for higher education use—allows students to access lab applications and files from their own computing devices, regardless of which PC they are using. The platform helps educational institutions avoid the complexity of supporting a wide range of computing devices by making applications OS- and device-agnostic. In addition, a single point of contact to support hardware, software, and networking in the virtual desktop infrastructure helps to simplify troubleshooting in the data center.
Employing a methodology for expert assessment, planning, design, and delivery

Before developing a desktop virtualization strategy, organizations benefit from a sound assessment of their current desktop environment to help ensure predictable deployment, cost, and performance. The DDVS process provides an analysis of the organization’s desktop delivery environment, a road map to implementation, and a full assessment of potential returns on the technology investment.

The Dell methodology is divided into four phases: discovery workshop, blueprint assessment, design and proposal, and implementation and operation.

Phase 1: Discovery workshop

At the beginning of the project, a Dell virtualization specialist helps the organization explore whether desktop virtualization is an appropriate platform for its needs, determine the feasibility of deploying the infrastructure, and understand the potential for enhancing enterprise efficiency.

At the conclusion of the discovery workshop, the organization can expect to gain an understanding of its current IT strengths and exposures. That information provides the basis for the next step of the process.
Phase 2: Blueprint assessment

When determining the best end-user candidates for desktop virtualization, IT organizations must be able to collect and interpret application and computing usage patterns so they can build accurate user profiles and optimize the virtual computing environment. During the blueprint assessment, Dell experts conduct a thorough audit of the organization’s existing IT operation and its plans for expansion—including detailed data from every desktop targeted for virtualization, current capacity, end-user requirements, and opportunities to improve desktop IT operations.

After this audit is complete, the Dell team creates a thorough software inventory that shows which users are using which applications, how often, and the associated computing resources being consumed.

Next, Dell specialists create a snapshot of the existing security framework and map the integration of existing security policies into the virtual environment. Resource consumption and application, data migration, and processing interdependencies are analyzed to help determine potential ROI and TCO, and then to create a road map for future scaling. This comprehensive process enables IT organizations to provision an optimized solution for desktop virtualization. It can also help them make informed decisions about how to successfully prioritize users based on their resource usage and requirements (“digital footprint”), as well as any foundational changes they may need to make before proceeding with the desktop virtualization implementation.
Dell uses the output from the blueprint assessment as input for the Dell Economic Impact Assessment (EIA). This report can help IT decision makers learn more about the potential cost-efficiencies together with business and organizational benefits of desktop virtualization, including helping to:

- Minimize outside threats from theft or malware
- Avoid risks to business continuity
- Simplify adherence to compliance requirements
- Enhance flexibility for distributed, remote, and mobile workers to get their work done
- Streamline image and application deployment as well as patching and management processes
- Boost productivity by helping to eliminate downtime and service calls
- Free resources to focus on innovative projects that advance strategic objectives

The EIA leads to a set of recommendations based upon the enterprise’s business and technical requirements. Dell specialists conduct an executive briefing to help IT decision makers determine next steps. If desktop virtualization is a good fit for the organization, the Dell and customer leads can then move to the next phase to design a detailed implementation plan.

The blueprint assessment also helps organizations determine whether a cloud-based approach is viable for hosting their virtual desktop environment. For example, organizations may opt to forgo making capital investments in their infrastructures and instead host the virtual desktop environment from a Dell Cloud Computing Solutions infrastructure. This approach enables organizations to pay only for the computing resources they use and to scale that usage based on actual monthly demands. Either way—whether IT decision makers elect a vDaaS or customer-managed approach—they can leverage a single support line for their virtual desktop implementations.
Phase 3: Design and proposal

During this phase, Dell specialists help lay the foundation for successful design and deployment by working with organizations to create a fully integrated and validated platform design—before any of the components are deployed in the environment. The Dell team produces a detailed map of a rightsized configuration that helps ensure sufficient computing resources for each user, with allowances for future expansion. A comprehensive design proposal includes:

- Infrastructure, build, and configuration requirements
- Implementation planning
- Application sequencing
- Virtual desktop provisioning
- User migration schedules and time scales
- An assembly and configuration guide

This phase may include an optional trial period that is designed to give IT organizations an opportunity to test the platform in their production environments. Testing can include hardware, software, and engineering resources as well as documentation of the success criteria.

Phase 4: Implementation and operation

Dell Services leverages years of experience and purpose-built tools to accelerate the deployment of desktop virtualization, with a tested implementation methodology designed to significantly reduce deployment time.

In this final stage, Dell virtualization specialists either work with the organization’s IT department to guide them through the deployment process on a custom basis or completely manage the deployment as included with the ISS or vDaaS guidelines. A single Dell project expert acts as the point of contact throughout the implementation process to help speed deployment and simplify problem resolution.
Dell can build and install the complete desktop virtualization infrastructure, including hardware, software, and services. This can encompass the image and OS build, application packaging, data migration, implementation and on-boarding iterations, services management configuration, and end-state success validation.

Dell can also help simplify ongoing monitoring and management of a desktop virtualization deployment through outsourced management services. IT decision makers can determine how much or how little virtual desktop infrastructure they want their IT organization to manage, and Dell can create a services plan that best suits their computing environment.

Providing support and training for IT staff

Dell Education Services provide several training courses that are designed to help maximize return on IT investment in Dell Desktop Virtualization Solutions. These programs—which include several Citrix- and VMware-certified training courses—offer professional-level instruction related to servers, storage, virtualization, and infrastructure software. Find out more about Citrix and VMware training offered by Dell Education Services under Virtualization at LearnDell.com.

Dell Desktop Virtualization Solutions are also backed by Dell ProSupport, which gives customers the option of a single point of contact to help ensure smooth solution management, troubleshooting, and issue resolution. Each aspect of the validated infrastructure—from the top-of-rack switch to the servers, storage, and software components—is consolidated into one support service call. A single toll-free telephone number provides access to comprehensive support, whether the virtual desktop infrastructure is hosted in the Dell Cloud Computing Solutions infrastructure or on the customer’s premises.
Facilitating infrastructure maintenance with management and billing options

Dell offers several managed services and billing options to help streamline ongoing maintenance of a virtual desktop infrastructure.

Option 1: Dell manages and delivers virtual desktops from the Dell Cloud.

Virtual desktop as a service relieves IT organizations of the management, monitoring, and reporting burden, so they can focus on value-added initiatives. In this model, customers pay a single monthly fee that includes hosting, management, and support of the virtual desktops. Because no up-front capital expenditures are required to implement the virtual desktop infrastructure, end-user computing costs can be scaled accordingly.

Option 2: The enterprise hosts virtual desktops within its own data centers, leveraging its own ISS. Dell handles the ongoing management and monitoring as a service.

Dell remotely manages the virtual desktop environment while freeing up in-house IT resources to focus on activities that advance strategic business and organizational goals.

Option 3: The enterprise assumes all management responsibility after the Dell team involved in the implementation performs knowledge transfer.

Dell Desktop Virtualization Solutions are backed by Dell ProSupport, which provides a single point of ownership to help ensure smooth solution management, troubleshooting, and issue resolution. Each component of the integrated infrastructure, from the top-of-rack switch to the servers, storage, and software components, is covered by one support service call to a single toll-free telephone number.
Advancing overall enterprise efficiency

Dell Desktop Virtualization Solutions offer a comprehensive approach that enables a versatile deployment process, allowing organizations to customize their virtualized desktop infrastructure for specific user scenarios. DDVS advance overall enterprise efficiency with flexible management options designed to strike the right balance across IT operational efficiency, end-user productivity, and business agility.

Delivered as a preconfigured, pretested bundle, DDVS provide a simple solution that can help enterprises accelerate time to value in a predictable and cost-efficient manner. Dell expertise in managing computer environments and a tested implementation methodology help ensure that the solution is reliable. And with a range of virtual desktop delivery alternatives, DDVS can provide a complete, end-to-end package.

By accelerating the adoption of desktop virtualization and helping to simplify the supporting management and storage systems, DDVS can also be instrumental in helping organizations transition their IT cost structures to service-based (OpEx) expenditures. As a result, DDVS allow organizations to quickly and flexibly adapt to the changing dynamics of a virtual workplace—heightening mobility for an increasingly global and technologically savvy workforce.
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**Learn more**

Ready for the next step? Contact your Dell sales representative to discuss how our comprehensive, tuned and tested Dell Desktop Virtualization Solutions can deliver convincing cost-benefits in your organization.

Or to have a Dell representative contact you directly, please visit marketing.dell.com/virtual-client

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