

Dell Desktop Virtualization Solutions Simplified

All-in-one VDI appliance creates a new level of simplicity for desktop virtualization



Executive summary

Desktop virtualization is a proven method for delivering a rich computing experience from centralized data centers. In desktop virtualization, the desktop operating system, user applications, user preferences, and data are decoupled from client devices to simplify desktop management and make IT more efficient and flexible. This method of end-user computing streamlines the delivery of desktops to multiple devices, improves operational efficiency and security, and ultimately enhances end-user productivity.

However, for midsize organizations or those seeking to deploy simple virtual desktop infrastructure (VDI) to departmental or business-unit workgroups, the costs and complex IT requirements for enterprise-level VDI solutions have been barriers to adoption. The Dell™ Desktop Virtualization Solutions (DVS) Simplified VDI appliance is designed to remove these adoption barriers. DVS Simplified makes VDI cost-effective and easy to deploy for smaller, simpler implementations. DVS Simplified opens up the benefits of desktop virtualization to deployments with as few as 25 users.

This paper provides an overview of the DVS Simplified appliance solution, and outlines the simple steps involved to implement the solution and for creating and managing virtual desktops.

Introduction

Organizations do not have to be large enterprises to benefit from desktop virtualization. For many organizations, a simple, practical virtual desktop infrastructure (VDI) solution could help enable a number of compelling use cases. For example:

- A small manufacturing company might want to provide anytime, anywhere access to desktops for its mobile and remote sales force.
- The registration desk at a hospital might need to better safeguard the privacy of patient care information.
- A high school might want to simplify management of its student computer lab and support remote anytime access to the lab resources.
- The administrative office of a military air wing might need to enhance user efficiency while tightening security of its client computing system.
- A regional insurance brokerage might want to streamline support for PC operations and reduce costs for agents in branch offices while supporting access from home offices.

Each of these organizations could benefit from the centralized management, data protection, and flexible access enabled by desktop virtualization. But while the potential benefits of VDI are well

understood, some organizations have been prevented from moving forward with desktop virtualization due to the expense and complexity of designing, deploying, and managing a VDI solution.

Understanding the challenges of enterprise VDI deployment

Enterprise-class VDI is transforming desktop computing in positive ways for organizations that require a robust, powerful solution. However, a VDI deployment architected for production-level enterprise usage and high availability requires a variety of infrastructure components (see Figure 1). These components typically include:

- **Provisioning servers**—Two or more provisioning servers are usually required to control the dynamic provisioning and de-allocation of virtual desktops.
- **Delivery controllers/ connection brokers**—These servers manage and broker the end-user connections to the virtual desktops, and a minimum of two are required for high availability.
- **Virtual desktop hosts**—The host servers run the virtual desktop workloads, with the number of hosts depending on the capacity of the servers and the number of users.
- **Load balancers**—Two or more load balancers are usually placed in front of the delivery controllers to evenly distribute the desktop workload.

- **Storage area network (SAN)**— Shared storage is required to keep a central state of the running virtual desktops, so that if there is a server failure, a different host can pick up the desktop state from the SAN and run the desktops.
- **High-speed interconnects**— For performance reasons, high-speed interconnects are typically used among these components.

While this enterprise VDI architecture is cost-effective and highly appropriate for large-scale, robust, and highly redundant deployments, it requires a sizable investment that might not be efficient for small deployments.

Few midsize organizations, departments, or branch offices have the time, budget, or specialized IT staff to design and deploy an enterprise-level VDI infrastructure. To implement such an infrastructure, these organizations would require an in-depth consulting engagement with a dedicated, multifaceted team. These projects can take weeks or months to complete.

Overcoming complexity with Dell DVS Simplified

The Dell DVS Simplified appliance consolidates the various VDI software and infrastructure components—including connection-brokering, load-balancing, desktop-provisioning,

high-availability, and management functions—into a single package running on a powerful, energy-efficient Dell PowerEdge™ R710 server with local storage. This unique VDI appliance is designed to address the cost and complexity issues faced by organizations seeking to implement desktop virtualization for simple use cases in simple IT environments.

This DVS Simplified appliance provides an all-in-one solution enabling smaller entities with limited budgets and IT staff to leverage the benefits of desktop virtualization (Figure 2). Architected to reflect the behavior of small, simple deployments,

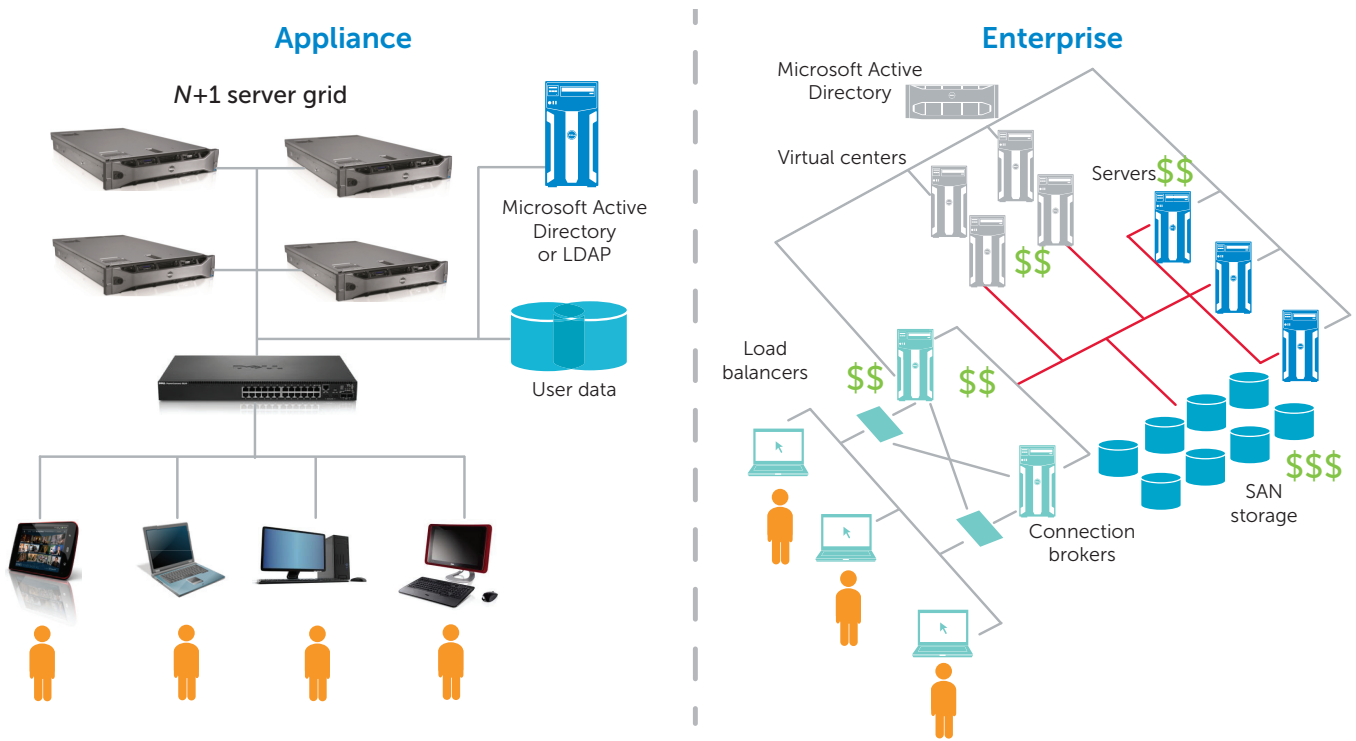


Figure 1. Appliance VDI versus Enterprise VDI topologies



DVS Simplified offers:

- A standards-based solution that provides preinstalled software, a preconfigured virtualization environment, and robust hardware
- An integrated appliance that is easy to deploy and manage—no specialized experience is required
- Citrix® VDI-in-a-Box all-in-one software that combines connection brokering, load balancing, provisioning, and user and image management functionality with a simple, intuitive management console
- Built-in Citrix HDX™ technology to deliver a rich user experience that looks and feels like a local desktop
- Rapid return on investment (ROI) for deployments of 25 or more desktops, making DVS Simplified a readily justifiable capital expense for midsize organizations or departmental-level deployments within larger organizations
- A solution designed for simple use cases that implements a simple to manage, practical server grid architecture

Organizations can get started easily with DVS Simplified and incrementally scale their deployment as their needs grow. A simple grid infrastructure provides linear and predictable expansion, with performance and storage scaling together as appliances are added to the group. The management system seamlessly integrates new servers into the grid architecture and load balances hosted desktops across the grid automatically. The solution uses cost-effective, server-based storage. SAN storage can be a costly component in an enterprise VDI deployment. The appliance arrives at the customer site with factory-installed software, hypervisor, and preconfigured hardware to streamline implementation.

Getting up and running quickly and easily

Implemented as an integrated appliance, DVS Simplified needs very little setup, reducing IT costs for deployment and speeding time to value. Three-step deployment and four-step configuration enable the solution to be implemented very quickly and put to use in a matter of hours—not days or weeks.

Three-step deployment

Deploying the DVS Simplified appliance is as simple as 1-2-3: racking it, connecting it to the network, and making a few easy-to-understand selections in the single management console.

To ensure ample processing power and memory for each

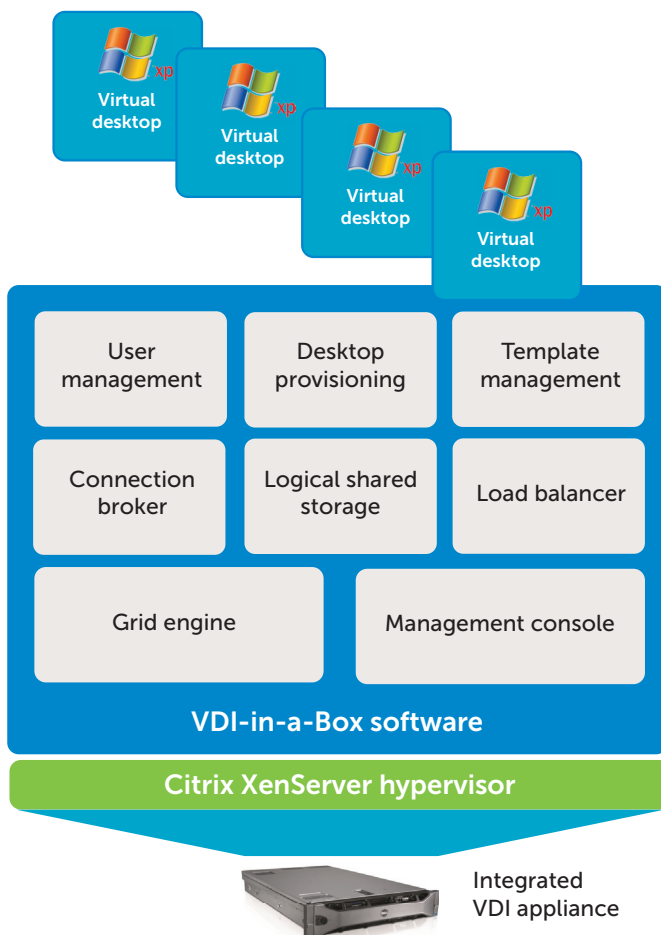


Figure 2: Desktop Virtualization Solutions Simplified—Integrated VDI appliance



user, Dell recommends deploying one appliance for approximately every 80 users.¹ This guideline is based on a workload characterization as documented by Dell in reference architectures that present and review detailed sizing recommendations for different types of user workloads (see the For more information section). The actual sizing characterization achieved may vary from Dell characterizations based on user characteristics and other system variables found in the organization where the appliance is deployed.

Four-step configuration

Once the appliance is physically deployed, organizations can configure the platform for their specific IT environment and user needs with an intuitive, four-step, wizard-driven configuration process with the following steps.

- 1. Hypervisor configuration**—To configure the appliance, the administrator answers a few simple questions: What is your hypervisor IP address? Where do you plan to store your virtual machines? What network do you want to use for your virtual desktops?
- 2. Grid configuration**—If the organization has multiple DVS Simplified appliances, the servers must communicate to share images and balance the load. With just a few clicks, the administrator can link them together by placing them on the same DVS Simplified grid.

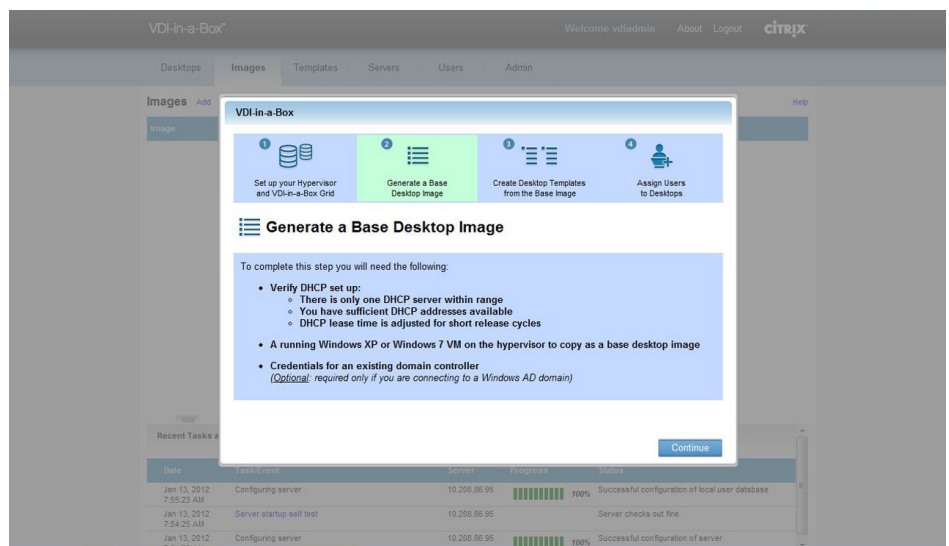


Figure 3: Intuitive, wizard-supported, four-step configuration

- 3. Import and generate a base desktop image**—The wizard-supported configuration guides the administrator through the process for importing and establishing a base desktop image. The wizard also guides the user to add the desktop agent to the base image and to test the base image to validate that it is properly prepared for use.
- 4. Assign users and groups to templates**—As a final step, the organization will need accounts for its users. If a corporate user directory already exists, such as a Microsoft® Active Directory® server, the administrator can direct DVS Simplified to those accounts. This approach leverages the user credentials that an existing user directory has already set up. Alternatively, the administrator can set up a DVS Simplified directory using Microsoft Windows® Workgroups.

Simplifying virtual desktop creation and management

Using the DVS Simplified management software, administrators can import one or more “golden” images and edit these images as needed to support various user requirements—for example, the organization might want to have one image for staff in the finance department and another for workers in sales management positions (Figure 3). The administrator can clone one or more golden images to provide as many copies as needed for the users to be supported.

DVS Simplified uses a template model to assign attributes to base images to tailor them to the needs of users. For example, administrators can define how much memory should be allocated to the desktop, how many virtual desktops are prestarted, and when virtual desktops are reinitialized.

¹ Workload characterizations presented are provided as guidelines only. Please consult Dell Reference Architectures for complete details. Workload scaling will vary based on variables and factors specific to a customer’s actual deployment. See www.dell.com/virtualdesktops.



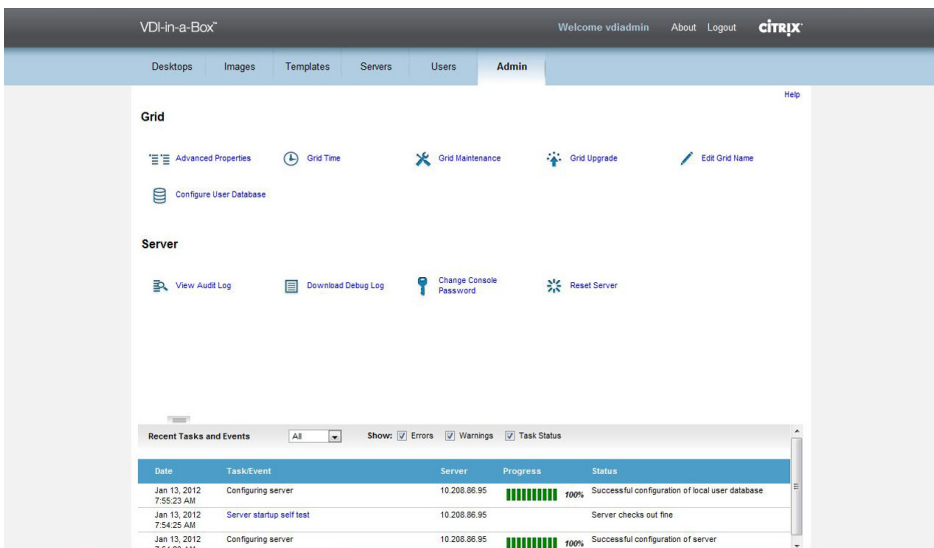


Figure 4: Overview of administrative functions provided in DVS Simplified

DVS Simplified automatically ensures that virtual desktops are correlated to the correct template and application set; a software agent installed into each virtual desktop allows it to be centrally managed in the VDI-in-a-Box VDI Manager software.

All of these steps are easily executed with the practical management console. This graphical user interface (GUI) tool provides a central source for managing all of the virtual desktops, images, and servers on the grid (Figure 4). For example, a convenient capacity bar provides a view of the grid's utilization and is calculated based on the available CPU and memory resources across the grid. Administrators can also use the console to automate the distribution of patches and licenses to all the servers in the grid.

Adopting best practices for a successful deployment

DVS Simplified is a tested and validated solution, and is fully supported by Dell. Based on the validation and configuration testing conducted for DVS Simplified, Dell recommends the following best practices.

Availability

Dell suggests deploying an $N+1$ grid architecture consisting of the required quantity of appliances (N) to accommodate all the required user desktops, plus one additional server ($+1$) that is equal in capacity to the largest server in the grid. With this $N+1$ architecture, DVS Simplified provides redundancy without requiring complex and relatively expensive shared storage. The $N+1$ grid architecture establishes fault tolerance so that if any server on the grid fails, the "spare" server automatically creates new desktops to accommodate the users previously hosted on the failed server.

Regardless of deployment size, only one extra server is required for failover. To avoid data loss as a result of a server failure, network file sharing is also recommended.

Scaling

IT administrators start by creating the DVS Simplified grid and then scaling the number of appliances one by one. Dell recommends starting with a single server, creating one image, and testing it by generating desktops and having users log in. Once the first server is deployed, the administrator can then expand the deployment simply by adding more servers—as each server is added, the DVS Simplified software will automatically load balance the organization's virtual desktops across the grid.

Storage

Storage plays an important part in any successful VDI solution. Storage capacity, storage type, and read/write performance (measured in I/Os per second [IOPS]) can create performance constraints that can impact user density and VM performance. DVS Simplified uses linked clone technology to reduce the amount of storage required. The virtual desktop is a copy of the golden image, and in turn shares virtual disks of the golden image. As a result, the storage required per virtual desktop is approximately 15 percent of the size of the golden image instead of 100 percent.

DVS Simplified leverages local storage—specifically, eight

Providing a range of desktop virtualization solutions

Dell desktop virtualization solutions are designed to meet the unique needs of different sizes and types of organizations and user profiles.

- DVS Enterprise is a comprehensive, enterprise-capable desktop virtualization solution designed with purpose-built hardware, software, and services. The solution offers enterprise-class capabilities for performance, redundancy, and scalability in an architecture that maximizes IT control while enhancing the end-user experience. DVS Enterprise is fully supported with robust multiphase design, implementation, and support services from Dell.
- Dell Virtual Desktop-as-a-Service is an end-to-end, VDI-as-a-utility solution with configurable hardware, software, and services. Dell implements, owns, operates, and hosts the solution by leveraging the Dell Services cloud infrastructure for customers seeking a convenient pay-as-you-go solution that is completely managed and operated by Dell.
- DVS Simplified offers an easy-to-deploy, easy-to-configure, easy-to-manage desktop virtualization solution for simple IT environments. This integrated VDI appliance solution simplifies VDI deployments with preconfigured hardware and factory-installed software and infrastructure components.

The Dell solutions approach integrates purpose-built hardware, software, and services to deliver integrated and validated offerings with best-practice-based implementation methodologies. These solutions help guide customers along a clear and predictable path for making the right business, technical, and implementation decisions for adopting desktop virtualization. Dell desktop virtualization solutions are designed to ease design and implementation complexities and to flexibly address each organization's unique requirements, accelerating adoption so organizations can adapt to the global dynamics of today's business environment.

146 GB 15,000 rpm Serial Attached SCSI (SAS) drives—configured in RAID-10. These drives are installed locally in the Dell PowerEdge R710 server and are capable of supporting up to 80 users per server. This sizing guideline also accounts for several golden base images that will be stored and used by DVS Simplified as templates to create virtual desktops. Validation testing performed by Dell shows that eight 15,000 rpm SAS drives support the average IOPS requirements for a typical desktop workload.

Networking

The best practice is to keep both management and virtual desktop traffic on the same network. This combined network enables the grid architecture and provides the ability to copy golden images across servers, load balance virtual desktops across servers, and redistribute desktops among servers if a host fails. Dell recommends that both the DVS Simplified grid and the managed switch used to integrate the Dell PowerEdge R710 servers into an existing environment be at least 1 Gb.

Server configuration

The Dell PowerEdge R710 server platform for DVS Simplified is configured as follows:

- Dual 6-core Intel® Xeon® processor X5675 @ 3.06 GHz
- 96 GB of Double Data Rate 3 (DDR3) RAM
- Eight 146 GB, 15,000 rpm SAS hot-plug drives, configured in a RAID-10 array
- Integrated RAID controller
- One quad-port 1 GbE network interface card

- Two redundant, high-output power supplies
- Integrated Dell Remote Access Controller (iDRAC6) Enterprise systems management
- Citrix XenServer® hypervisor 5.6 SP2

Additionally, the Dell PowerEdge R710 server provides built-in redundancy features for high availability.

Custom sizing considerations

Dell provides reference architectures that present suggested guidelines for workload sizing. Ultimately, workload sizing will vary depending on each organization's unique business requirements, intensity of workloads, user characteristics, host operating systems, and individual feature preferences. Please consult the DVS Simplified reference architecture white papers for additional details regarding Dell sizing recommendations (see the For more information section).

DVS Simplified makes it easier to realize virtual desktop benefits

Small-to-midsized organizations and departments within larger enterprises are no longer shut out of the efficiency, security, and user productivity benefits of desktop virtualization. The Dell DVS Simplified appliance makes it easy for organizations with smaller, simpler deployment needs or limited budgets to realize the business benefits of virtual desktops with minimal up-front investment, while providing a high-quality, local desktop-like experience for users.

Simplicity is achieved by integrating multiple components required for successful VDI deployment into a self-contained, purpose-built, integrated appliance. DVS Simplified can be quickly dropped into an organization's existing IT infrastructure and managed by IT professionals without requiring detailed training or experience. The result is desktop virtualization without all the cost and complexity, and a more empowered, productive workforce.

For more information

Contact your Dell sales representative or visit www.dell.com/dvssimplified

Download a complete reference architecture for DVS Simplified at www.dell.com/dvssimplified

