DELLTechnologies

15-Minute Guide

Deliver real workforce transformation with VDI

Abstract

Today, the way we work — and especially where we work — is in a state of flux. Virtual desktop infrastructure (VDI) delivers the digital transformation you need to empower your remote workforce, enabling them to collaborate and innovate from nearly anywhere.

However, VDI solutions need to be carefully planned and executed to deliver high-quality user experiences that don't compromise on security or add to IT costs and complexity.

In this guide, we share the Dell Technologies approach to empowering your remote workforce with secure, high-quality end-user experiences while streamlining how you deliver, protect and manage your VDI environment from edge to core to cloud.

February 2023

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Remote Work Adds Value.

Innovation comes from more places.

Remote workers are **more productive**.

Organizations save significant costs.

Transform your workplace with VDI.

Streamline the design and implementation of digital workspaces optimized for performance, cost-effectiveness and security.

Remote work is not a new concept, but it is becoming increasingly pervasive. People in a wide range of roles and organizations are now operating remotely — and 78% of employees prefer a remote or hybrid work experience.[1] In fact, 66% of workers would immediately start looking for a new job if the ability to work from home was taken away.

Where people work in the future will become even more fluid as organizations seek to build on the advantages of enabling remote work, such as enhanced innovation, increased productivity and lower costs. Over the next several years, remote work will continue to expand, with an estimated 70% of mid-sized companies implementing flexible work policies long-term.[1]

Opportunities to innovate and collaborate

78%	66%	70%
of employees prefer a remote or hybrid work experience.[1]	of workers would immediately start looking for a new job if the ability to work from home was taken away.[1]	of mid-sized companies implementing flexible work policies long-term.[1]

However, reaping these benefits will require VDI solutions designed to support anytime, anywhere collaboration; maintain security; and increase efficiency while reducing costs.

Dell Technologies is committed to helping you successfully adapt to the new normal with solutions that deliver high-quality user experiences and simplify how you deliver, protect and manage VDI.

[1] Owl Labs, State of Remote Work 2022, 2022.

58%
of workers can work
from home at least
one day per week.[2]

2+
devices are used
for work by
most employees.[3]

78%
prefer a remote
or hybrid work
experience.[1]

Empower your remote workforce.

Provide exceptional experiences anywhere.
While VDI has long been used to provide the flexibility for remote work, the need to enable work-from-anywhere productivity has intensified. Workers are now choosing where to spend their time most productively, moving fluidly between the office and their preferred remote locations.

To stay productive, remote users need desktop-like experiences, no matter where they log on. A recent survey found that 58% of Americans have the opportunity to work from home at least one day a week,[2] and almost half use an average of 2.5 devices for work purposes, while nearly one-third use three or more.[3]

However, organizations looking to adopt or expand VDI have typically faced a number of hurdles. These include long planning and procurement cycles, significant upfront infrastructure investments, difficulty delivering a consistent user experience across locations and devices, and security concerns. These hurdles have hindered VDI adoption, despite its many advantages.

Dell Technologies offers a wide selection of validated and optimized VDI solutions that provide data and application security while allowing IT to get started quickly and optimize end-user performance.

Make a plan to transform with VDI.
Dell Technologies recommends the following steps to transformation:

1. **Pre-planning.** Build a broad timeline and identify key digital workplace goals and how they map to financial outcomes. Consider employee needs, stakeholder goals and change management plans.

2. **Modern management readiness assessment.** Make an honest assessment of your environment. Of the organizations surveyed, 51% are somewhere in between and utilize a mix of on-premises and cloud-based management.

3. **Infrastructure and business integration assessment.** Proper integration of IT capabilities and business needs is key to success. Organizations with a virtualization strategy in place can likely adopt the digital workplace quicker than those with no strategy.

4. **Roadmap development.** Based on the assessments above, develop a roadmap to determine immediate first steps as well as the biggest challenges and the time length for each phase of the roadmap.

5. **Implementation and process automation.** Three key steps include modern management migration, process automation and digital workplace delivery and optimization. Then, you can begin to optimize the digital workplace with end-user experience management.

[2] McKinsey and Company, Americans are embracing flexible work — and they want more of it, June 2022.

[3] Cyber Security Intelligence, Remote Work: Three Top Trends in 2023, December 2022.

VDI for Schools

Granting all students equitable remote access to school resources and technology is a top challenge for schools in both K-12 and higher education. Dell Technologies VDI solutions deliver the right mix of flexibility and scalability needed to provide uninterrupted learning. Whether remote, hybrid or on campus, students gain anywhere, anytime access to vital applications and resources while educators are equipped with the tools needed to deliver new methods of teaching designed to maintain learning continuity and promote student success.

VDI use cases

How does your organization plan to leverage VDI? Dell Technologies has proven expertise in building, deploying and supporting VDI solutions across a number of verticals. The following are just a few examples.

Academic research

To make discoveries faster, academic and research institutions must move quickly from raw data to actionable insights, collecting and processing massive amounts of data to simulate complex systems. High performance computing (HPC) and artificial intelligence (AI), often accelerated with GPUs, are powerful tools for scientists, students and researchers, speeding workloads and improving time to results. When working offsite, these users need to be able to access their high-powered resources with onsite responsiveness and resolution to continue their groundbreaking work.

Typical research use cases include:

- Genomics
- Molecular dynamics
- Astronomy
- Climate and weather modeling
- Geosciences

Computer-aided engineering and simulations

Product designers and engineers rely on powerful systems that leverage GPUs to run computer-aided engineering (CAE) workloads such as structural analysis, computational fluid dynamics and other virtual testing faster and with fewer errors. This type of modeling and simulation enables early evaluation, fast testing of design modifications and more iterations on designs. VDI access to simulation and 3D modeling solutions enables greater design freedom and flexibility. Powerful HPC systems can be used to support remote visualization for multiple users on a single, virtualized server running a variety of CAE applications. However, security and fast system performance is critical to maintain productivity.

Typical CAE workloads include:

- Structural analysis
- Computational fluid dynamics (CFD)
- Noise, vibration and harshness (NVH)

Financial services

Financial services institutions (FSIs) are driven by intense competition to make smarter, faster decisions that reduce risks and increase rewards. However, FSIs face unique challenges when implementing VDI. Power traders and financial analysts rely on compute and graphics-intensive and network-heavy applications that often run across several monitors. Providing GPU-powered performance that can scale as needed for these power users is critical. In addition, FSIs are subject to stringent security and compliance requirements designed to protect sensitive financial information.

Typical FSI use cases include:

- Risk assessment
- Trading
- Pricing
- Fraud protection

"While growing
the number of
simultaneous users
above 670, we reduced
deskside support
staffing from two
to one."

*— Cofounder and Managing
Director, Hudson River
CIO Advisors*

"We saved $800,000
in recurring hardware-
refresh costs for our
police cars by making
our VMware® Horizon
VDI a mobile solution
supported by VxRail."

*— Richard Gagnon, CIO,
City of Amarillo, Texas*

Real-world VDI success

Dell Technologies is ready to enable your VDI use cases. Our portfolio of products and solutions is designed to fit the needs of businesses and institutions of all sizes so that more people can harness the power of data to make the world a better place.

McLaren® Racing enables 4,000 employees to work from anywhere.
When a world-class race team needs to connect and collaborate across the globe, they rely on Dell Technologies to power all 4,000 employees to work from anywhere with the right tools as they pursue their next victory. Watch the video.

Ebb³ redefines digital workplaces.
This provider of managed digital workplace and VDI solutions to automotive, construction, engineering, education and manufacturing companies partners with Dell Technologies, using HPC to deliver secure virtual desktops and high-performance applications to any location and any device. Read the case study.

Texas city government saves $800,000 with VDI.
The City of Amarillo deployed Dell VxRail for VDI, improving departmental performance, employee productivity and citizen services delivery — and saving $800,000 in recurring hardware-refresh costs. Read the case study.

VDI allows research to continue despite campus closure.
Aalto University partnered with Dell Technologies to enable students and researchers to continue using specialist applications during the COVID-19 lockdown. Read the case study.

Food manufacturer and supplier reduces storage footprint.
Noble Foods reduced their storage footprint, compute costs and environmental cost with a VDI solution based on Dell VxRail. Read the case study.

Dental college revolutionizes medical education.
The Touro College of Dental Medicine relies on a Dell Technologies VDI solution to empower students to run 3D CAD/CAM modeling applications for more than 670 concurrent users. Read the case study.

The journey to VDI

Adopting or expanding VDI requires a commitment to ongoing digital transformation and the expert partnerships to help you get there.

Work and learn from anywhere.

Users have high expectations for performance and availability no matter where they're working. IT is challenged to make sure resources match increasing demands for fast delivery, predictable scale and high performance. However, dynamic and unpredictable resource demands make capacity planning and resource allocation difficult. Dell Technologies solutions for VDI allow you to scale cloud resources on-demand at the speed of your business. VDI users achieve 10X improvement in performance and response capabilities, while IT time dedicated to ongoing management was reduced by one third.[4]

Secure your environment.

Empowering your remote workforce means placing more devices and data out of direct IT control, increasing your vulnerability to data theft and cyberattacks. Dell Technologies solutions for VDI help you maintain security without sacrificing performance. VDI enhances security because files and data don't leave the data center and all communications between the client and infrastructure are encrypted. By centrally storing data and applications in the data center, users can remain productive while data and applications stay safely behind the corporate firewall. IT can maintain full autonomy over access and permissions and centrally deploy applications, patches, security updates and virus controls. As a result, desktops are up to date and patched while also appropriately configured to secure resources — wherever they are deployed. And cloud disaster recovery procedures and backup plans can be implemented in case of an emergency. In addition, Dell Technologies builds in security from the data center all the way to the endpoint and through the entire data lifecycle to protect you against cyberthreats.

Increase efficiency while reducing costs.

Workforce productivity increases when employees can securely access their desktops and applications from their preferred devices at the times and places they choose to work. However, IT is challenged to increase the speed and quality of service while reducing costs, including maintaining staffing levels. VDI solutions need to be simple to acquire, deploy and operate while demonstrating long-term cost-effectiveness. With flexible Dell Validated Designs for VDI, you can spend fewer resources procuring, deploying, testing and supporting your ever-changing VDI environment. The City of Amarillo saw $800,000 in hardware savings and 60% reduction in emergency response times.[5] Customers can also achieve 1.5X better performance per dollar and up to 2X better graphics performance per dollar.[6] And flexible Dell APEX consumption and payment options enable you to rapidly and affordably respond to varying infrastructure demands.

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[4] Forrester, The Total Economic Impact of Dell Validated Designs for VDI, September 2022.

[5] Dell Technologies case study, IT modernization sets up a data-driven future, January 2021.

[6] Compared to previous generation. Source: NVIDIA® solution overview, NVIDIA Virtual Workstation, September 2021.

Dell Technologies solutions strategy

Dell Technologies has what you need.

Expertise and guidance
The work-from-anywhere movement is evolving quickly, so your team may not have the resources to design, deploy and manage solutions optimized for VDI. While VDI is rapidly becoming mission-critical technology, Dell Technologies has been a leader in VDI for decades, with proven products, solutions and expertise. Dell Technologies has a team of VDI experts who are ready to help you keep pace with this constantly evolving landscape.

Dell Validated Designs for VDI
The advantage in today's marketplace goes to the enterprise with an empowered remote workforce. For many organizations, VDI is — or is becoming — an important means for driving workforce transformation by giving users high-quality experiences while streamlining IT resources and management, all without compromising security. Dell Validated Designs for VDI simplify design, configuration and ordering of solutions that are optimized for VDI.

Solutions customized for your environment
Dell Technologies is uniquely positioned to provide complete edge-to-core-to-cloud VDI solutions from one vendor. With years of experience and an ecosystem of curated technology and service partners, Dell Technologies provides innovative solutions, workstations, servers, networking, storage and services that reduce complexity and enable your employees to work from virtually anywhere.

Understanding worker profiles
When a VDI solution is configured, delivering adequate performance for the work at hand is imperative. VDI solution performance is driven by RAM, CPU and storage sizing, which in turn is dependent on the types of workers who will be using the virtual desktop resources. Workers are generally categorized into three main types:

- **Task workers**, also called administrative workers, typically perform repetitive tasks within a small set of applications, which are not as CPU- and memory-intensive as the applications used by knowledge workers. Examples of task workers include call center representatives, healthcare administrators, retail employees and warehouse workers.

- **Knowledge workers** access the internet, use email and create complex documents such as presentations and spreadsheets on a daily basis. Knowledge workers can include accountants, sales managers and research analysts.

- **Power users** typically use two to four monitors for graphics-intensive applications. Examples of power users include engineers, application developers, motion picture artists and financial traders.

Solutions portfolio

Dell Validated Designs for VDI

Dell Technologies offers validated and optimized VDI solutions that provide data and application security while allowing IT to get started quickly and deliver optimized end-user performance. Dell Validated Designs for VDI provide a wide range of choices to meet a variety of needs and come with optional Dell Technologies endpoints and familiar management tools that allow you to get up and running faster and streamline your day-to-day operations.

Dell Validated Designs for VDI transform the workforce by enabling remote work, bring your own device (BYOD) and mobility to enhance user collaboration and productivity. In fact, a recent Forrester study showed that customers who leverage Dell Validated Designs for VDI saw a return on investment (ROI) of up to 124%.[4]

- Dell APEX for VDI provide access to applications anytime, anywhere using a cloud-like consumption model that puts user experiences first.
- NVIDIA vPC and NVIDIA vWS deliver real workforce transformation, enabling knowledge workers and power users to be productive on their own terms.
- PowerEdge servers certified for Citrix®, Microsoft® and VMware provide a scalable, validated and highly available supported infrastructure for VDI.
- PowerStore Storage combines block and file services into a scalable VDI platform with new levels of operational simplicity and performance.
- vSAN Ready Nodes are pre configured, tested and certified to run VMware vSAN™, enabling easy deployment fast scale to meet growing needs.
- VxRail simplifies infrastructure and eases scalability with a high-performing VDI solution that supports a wide range of GPU acceleration options.

Hyperconverged infrastructure

Dell Technologies HCI systems align to your preferred operating model, with flexible deployment options; simplified, powerful infrastructure; and leading support and services.

- Designed exclusively by Dell Technologies and VMware, Dell VxRail is the easiest and fastest way to implement a high-performance VDI solution. VxRail is ideal for a range of VDI environments, including those that start small and grow, or require GPU acceleration. Flexible configuration options include all-flash nodes that feature enterprise data efficiency services and nodes that deliver purpose-built GPU hardware for graphics-intensive virtual desktops. Powered by Dell PowerEdge servers, VxRail HCI systems simplify deployment of your software-defined data center, enhance the VDI user experience and reduce the cost of managing hardware.
- Built on Dell PowerEdge servers, Dell vSAN Ready Nodes enable easy deployment with factory installed, pre-configured and pre-tested configurations that can add up to a solution that scales quickly to meet growing needs. With more than 250 configurations available — spanning all-flash, hybrid rack and kinetic infrastructure models — modernize your infrastructure from the core to the edge to the cloud with maximum flexibility for VDI environments.

Servers

[Dell PowerEdge servers](#) are engineered to deliver unmatched performance and versatile configurations, including flash storage, the latest processors, Boot Optimized Storage Solution (BOSS) option, greater memory bandwidth and flexible local storage — via new NVMe™ drives — to meet the demands of VDI.

- The [Dell PowerEdge R750](#), powered by Intel® Xeon® Scalable processors, is built for application performance and acceleration for a wide range of workloads including VDI, analytics, HPC and AI/ML environments that require performance, extensive storage and GPU support.
- The [Dell PowerEdge R750xa](#) is designed to address emerging and highly intensive GPU workloads, boosting acceleration performance across the widest range of needs. With one platform that supports all of the PCIe GPUs in the PowerEdge portfolio, the PowerEdge R750xa is an ideal server for VDI along with emerging workloads such as AI/ML/deep learning (DL) training and inferencing, HPC and virtualization.

GPUs

GPUs are designed to accelerate compute performance by offloading certain tasks from the CPU. Originally designed to quickly render high-resolution images and videos, GPUs are now commonly used for many parallel processing tasks, including MRI scans, seismic processing, data analysis and visualization, and modeling and simulation. GPUs play a leading role in VDI as well as HPC and AI. Read the [white paper](#).

Networking

[Dell Networking solutions](#) are future-ready and based on open standards to help you improve network performance, lower networking costs and remain flexible to adopt new innovations.

- [Dell Virtual Edge Platform](#) combines Dell Technologies network appliances with SD-WAN software and virtual network functions (VNF) to provide advanced adaptive networking features that can help reduce costs while improving application performance.

Storage

[Dell Storage solutions](#) from high-performance all-flash arrays to hybrid flash and scale-out network-attached storage (NAS) help you efficiently store, protect and manage information so you can do more, move faster and perform better.

- [Dell PowerStore](#) storage natively integrates into VMware management frameworks, making it easy for VMware and Horizon® administrators to manage desktops and storage while improving their efficiency.

Cloud

Dell APEX offer integrated compute, storage, networking and virtualization resources that enable consistent, secure infrastructure and operations for your workloads across public and private clouds. With a simple way to order and manage cloud resources, you can now easily build the cloud of your choice with solutions tailored for your most pressing business needs.

Dell APEX Custom Solutions let you create your own on-demand environment with infrastructure and services you customize to order. Dell APEX Flex on Demand allows you to pay only for the technology you need, with payments that adjust up or down to match usage. Dell APEX Data Center Utility is a highly customizable way to move data center operations into a pay-per-use model. It provides the Dell Technologies market-leading product portfolio coupled with professional services and support to fully manage your data center and its operations in a simple, single-invoice monthly payment based on your actual usage.

If you're looking for a more turnkey IaaS solution, Dell APEX Private and Hybrid Cloud for VDI streamlines and optimizes the implementation of VDI to enhance work and learn from anywhere initiatives on-premises — while providing the agility and scale of public cloud providers at a lower cost.

This way, you can leverage the benefits of cloud-based VDI — such as rapidly deploying virtual workspaces for employees in a remote environment or accommodating changes in seasonal demand spikes and personnel — while keeping data secure on-premises.

Either way, Dell APEX for VDI provides the path towards taking IT and workforce transformation to the next level.

> **Montage Health improves patient experiences**
> Montage Health wants to ensure they have a top-of-the-line infrastructure to run their VDI solution.
> So, they chose Dell APEX Private Cloud. Read the case study.

Software

Dell Technologies partners with leading software providers to create validated solutions for VDI.

- **Citrix® XenServer with Citrix Virtual Apps and Desktops™** addresses a broad range of use cases by delivering a full desktop or just applications based on an individual employee's role or device. A rich set of capabilities and a flexible design enable IT to be more agile in meeting the needs of a rapidly changing workplace.
- **Microsoft Azure® Virtual Desktop** provides the same experience of a local desktop or laptop—whether managing an inbox with Outlook®, sharing files in OneDrive®, or collaborating with colleagues on Microsoft Teams®.
- **VMware vSphere® with VMware Horizon and Horizon Apps** enable a digital workplace with the efficient delivery of virtual desktops and applications. VMware Horizon is based on VMware vSphere, with deep integration into the VMware technology ecosystem, offering an agile cloud-ready foundation, modern best-in-class management and end-to-end security.

Complete your solution with Wyse thin clients.

Purpose-built for VDI environments to provide optimum security and performance, Wyse thin clients integrate easily into any virtualized or web-based infrastructure and deliver a high-quality computing experience.

3000 series	**5000 series**	**All-in-one thin clients**
For task workers and knowledge workers running a broad variety of business applications	For knowledge workers and power users requiring access to a wide variety of applications, including 3D graphics and HD multimedia	Secure all-in-one with an excellent virtual desktop experience with extreme ease of use and management

Wyse thin and zero clients maximize security and optimize management and efficiency by centralizing data, applications and resources. Designed to deliver flexible access to virtual desktops and virtualized applications, Wyse thin clients provide instant functionality and performance to meet the demands of processing-intensive applications.

Delivering premier desktop security, manageability and reliability, Wyse thin and zero clients are tested and validated to work with Citrix, Microsoft and VMware and allow increased productivity with a broad range of highly secure endpoints designed for both stationary and mobile users, from task workers to the most demanding power users.

Learn more about Wyse thin clients.

VDI experience and capabilities

Dell Technologies offers a range of opportunities for you to engage with our experts to start empowering your remote workforce.

Services and financing for VDI

Dell Technologies is with you every step of the way, linking people, processes and technology to accelerate innovation and enable optimal business outcomes.

VDI Services provide a complete solution for your virtual desktop migration. From assessment, system design and application delivery to desktop deployment, integration, security and systems management, our expertise helps you achieve success the first time.

Deployment Services help you streamline complexity and bring new IT investments online as quickly as possible. Leverage our 30-plus years of experience for efficient and reliable solution deployment to accelerate adoption and return on investment while freeing IT staff for more strategic work.

Support Services driven by AI and DL will change the way you think about support with smart, groundbreaking technology backed by experts to help you maximize productivity, uptime and convenience. Experience more than fast problem resolution — our AI engine proactively detects and prevents issues before they impact performance.

Payment Solutions from Dell Financial Services help you maximize your IT budget and get the technology you need today. Our portfolio includes traditional leasing and financing options, as well as advanced flexible consumption products.

Managed Services can help reduce the cost, complexity and risk of managing IT so you can focus your resources on digital innovation and transformation while our experts help optimize your IT operations and investment.

Residency Services provide the expertise needed to drive effective IT transformation and keep IT infrastructure running at its peak. Resident experts work tirelessly to address challenges and requirements, with the ability to adjust as priorities shift.

Additional Resources and Information

Visit our solutions page:
Dell.com/VDI.

Technical documents:
Visit the Infohub.

Why Dell Technologies for VDI

We're committed to helping you succeed with VDI, and we've dedicated a great deal of resources toward that goal.

- Schedule an executive briefing and collaborate on ways to reach your business goals.
- We are committed to providing you with choice. We want you to get what you need and have a great experience working with us. If we don't have what you need, we'll tell you who does.
- Dell Technologies offers VDI solutions that reach from the data center to the endpoint, with specialized teams of experts focusing on desktop virtualization solutions.
- Because Dell Technologies offers such a wide selection of solutions, we can act as your trusted advisor without trying to sell you a one-size-fits-all approach to your problem. That range of solutions has also given us the expertise to understand a broad spectrum of challenges and how to address them.

Taking the next step

Don't wait to enable digital workplace transformation with optimized solutions designed from the ground up to enhance productivity with secure VDI solutions that are quick and easy to implement. Contact your Dell Technologies representative to find out more today.

D&LL Technologies