AI, HPDA and HPC Hybrid Cloud
Get flexible capacity to make advanced computing projects real
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Multi-cloud advanced analytics for everyone

High Performance Computing (HPC) has long delivered breakthrough power for modeling and simulation, data analytics, visualization and prediction. Recently, the ability to build powerful yet affordable HPC systems has made advanced analytics more accessible than ever. No longer the exclusive domain of specialists with access to expensive, complicated and proprietary equipment, new teams are seeking to power data-intensive, performance-hungry workloads such as artificial intelligence (AI) and high-performance data analytics (HPDA) for new and innovative use cases. This is driving the convergence of HPC, AI and data analytics on smaller, less complex systems. And as organizations increasingly adopt hybrid cloud operating environments, their opportunities to leverage HPC, AI and data analytics are expanding as well.

The ability to pay-per-use for HPC resources in the cloud makes its strategic advantages affordable for almost any organization, including enterprise lines of business. And while some organizations may not be comfortable with every type of cloud computing, sharing HPC compute and storage resources over a network is hardly news to veteran IT shops. Large organizations have long shared HPC resources in various models — including infrastructure as a service (IaaS), platform as a service (PaaS) and software as a service (SaaS) — and continue to pioneer new ways to spread the HPC wealth while defraying the costs of running these advanced computing systems. As more and different types of users rush to leverage advanced computing resources, the hybrid cloud model continues to be ideally suited for HPC, AI and HPDA.

So whether you’re looking to expand your existing advanced computing capabilities, or are just getting started with your first project, the world of hybrid cloud HPC has plentiful options for getting the resources you need at a price point and commitment level that makes sense for your project. Dell Technologies is leading the way with a comprehensive range of flexible options for high performance computing on-premises and/or in multiple clouds.

The Dell Technologies approach to hybrid cloud HPC, AI and HPDA

Dell Technologies is helping expand the boundaries of this exciting new frontier with scalable, flexible hybrid cloud resources that can help you solve complex problems faster than ever. While AI might seem like the latest IT trend, Dell Technologies has been working with advanced analytics technologies for a long time. For more than a decade, Dell has been a leader in the HPC space, with proven products, solutions and expertise. Dell Technologies HPC and AI experts are active innovators and collaborators in the worldwide technical community dedicated to advancing HPC and AI.

Dell Technologies recognizes that no two organizations have the same needs and requirements. Our customized approach to hybrid cloud HPC, AI and HPDA puts you in the driver’s seat, giving you options to craft a solution and/or consumption model that fits your needs and budget.

Enterprises worldwide are already using Dell Technologies hybrid cloud offerings to harness breakthrough computational power while employing standards-based technologies that have been tested and validated for industry-specific workloads and applications. All of which helps today’s most visionary engineers, researchers and business executives do what they do best: make the discoveries that fundamentally change the world.
Increase agility

Reduce complexity

Grow affordably

The Dell Technologies advantage

Increase agility
With multiple choices for purchase, consumption, deployment and managed services allowing you to pick and choose the right set of capabilities for your needs. Options include using elastic or even occasional HPC resources so you can adapt quickly to changes in demand.

Reduce complexity
Focus on using HPC, not deploying and managing it, by leveraging Dell Technologies and partner deployment assistance and managed services or public cloud alternatives. Extend the data center without building new capacity by moving some HPC workloads into public and private clouds. Dell Technologies can help you protect intellectual property and maintain compliance with an on- or off-premises IT resources.

Grow affordably
Enforce policy-driven governance of HPC resources to avoid “sticker shock” from lines of business tapping public cloud HPC on an ad hoc basis. Increase cost efficiency by partnering with hosting providers that have lower energy and facilities costs. Enjoy flexible payment models that may allow you to shift some capital expenses (CapEx) to operational expenses (OpEx).
### Are you experiencing any of these challenges?

<table>
<thead>
<tr>
<th>Challenge</th>
<th>Solution: HPC, AI and HPDA hybrid cloud</th>
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| **1** Seasonal requirements overtax compute resources  
  - Poor customer experience due to slow response times  
  - Loss of business to competitors  
  - System downtime stresses IT personnel | **Respond flexibly to changes in demand**  
  - Scale capacity up or down rapidly  
  - Cut application-related OpEx  
  - Burst to public cloud for additional capacity when needed |
| **2** Lengthy time to provision HPC resources  
  - Slow application time to market reduces competitiveness  
  - Perceived IT inefficiencies  
  - High IT or public cloud costs | **Access HPC resources on demand**  
  - Automate key deployment tasks  
  - Enable self-service resource allocation by end users  
  - Cut application provisioning times |
| **3** Poor utilization of IT resources  
  - Suboptimal price/performance of compute  
  - Inflexible infrastructure requires over-provisioning to maintain consistency  
  - Feature limitations prohibit dynamic reallocation | **Optimize resource utilization**  
  - Minimize upfront investments  
  - Provide management and monitoring tools that automatically reassign server provisioning for optimal performance and utilization |
| **4** CapEx budget reductions or freezes  
  - On-premises HPC can be high maintenance and require large upfront CapEx  
  - Inability to procure new servers and storage to meet HPC demand  
  - Lack of funds to investigate HPC applications that could drive competitive advantage | **Transition IT costs from CapEx to OpEx**  
  - Get the benefits of powerful, fast computing with no upfront expenses  
  - Provide public cloud scale that releases data center capacity and/or facilitates disaster recovery  
  - Shift resources from “keeping lights on” to strategic  
  - Drive your green agenda for the data center |
## Multi-cloud choice

Dell Technologies provides flexibility for your hybrid cloud HPC, AI and HPDA deployments. Choose where to deploy your clouds and how you’d like to pay for them, then add deployment and management options to craft a solution that’s just right for you.

| Mix and match the options below to create a hybrid cloud HPC environment that best suits your needs |
|---|---|---|
| **Private on- or off-premises cloud** | **Purchase options** | **Deployment options** |
| Private on- or off-premises cloud | Buy or lease hybrid cloud solutions using Dell Technologies Financial Services | Use internal resources or Dell Deployment services for on-premises. Use Dell or hosting provider deployment services for off-premises. |
| | | Use internal resources or outsource with Dell or partner managed services. |
| **Public cloud** | **Deployment options** | **Management options** |
| Public cloud | Pay-per-use for HPC resources (IaaS or PaaS). | No deployment required. |
| | | Managed by the cloud provider. |
| **Hosted and managed public or private cloud** | **Management options** | **Deployment options** |
| Hosted and managed public or private cloud | Consume hosted and managed HPC services in a PaaS/HPCaaS model. | No deployment required for PaaS/HPCaaS. |
| | | Managed by the cloud provider. |
| **Public/private cloud partnerships** | **Management options** | **Deployment options** |
| Public/private cloud partnerships | Pay-per-use for supercomputing resources offered by academic institutions. | Typically, no deployment required. |
| | | Managed by the organization or institution. |

### 270% growth

In the number of enterprises implementing AI in the past four years

### 37% adoption

Of enterprise AI in some form

### 3X growth

In the number of enterprises implementing AI in the past year

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AI, HPDA, HPC hybrid cloud offerings

Dell Technologies can help you choose just the right combination of hybrid cloud infrastructure and services to meet your AI, HPDA and HPC needs. Choose from the offerings in this section or have a Dell Technologies expert craft a custom solution just for you.

Dell Technologies Cloud with VMware

A consistent hybrid cloud approach reduces multi-cloud chaos

Dell Technologies Cloud with VMware combines the power of Dell EMC infrastructure and VMware software to improve your hybrid cloud experience with a consistent operating model and simplified management across private clouds, public clouds and edge locations. Together, Dell Technologies and VMware can help you achieve your goals faster, with greater agility and efficiency, while reducing complexity and operational costs.

Dell Technologies Cloud platform

Develop, test and run cloud-native applications alongside legacy applications on a single infrastructure with consistent operations and integrated lifecycle management. The VMware® Cloud Foundation™ on Dell EMC VxRail hyper-converged infrastructure (HCI) leverages the only HCI system jointly engineered with VMware that provides full-stack integration with automated deployment and strong lifecycle management.

Dell Technologies Cloud Validated Designs

Build your own hybrid cloud infrastructure to meet changing workload demands with independent scaling for storage and compute. Pretested configurations include industry-leading Dell EMC storage, compute and networking combined with VMware Cloud Foundation and delivered with deployment guidance. Choose from Validated Designs for Dell EMC Unity and PowerMax Storage, Validated Designs for PowerEdge MX Servers and Validated Designs for PowerOne.

Data Center as a Service

Combine hands-off operations with a cloud consumption model for a fully-managed service that provides consistency across your data center and edge locations. VMware Cloud on Dell is cloud infrastructure installed on-premises and consumed as a service. Simplify day-to-day tasks for both IT and developers by installing Dell Technologies cloud infrastructure in your data center as a direct extension of your public cloud.

Dell Technologies on Demand

Dell Technologies On Demand offers flexible payment options for an extensive range of technologies across the full infrastructure stack, including compute, storage, networking and virtualization. Software-defined and hybrid cloud solutions are available via Dell Technologies Cloud and VMware, along with modern data protection, PC and digital workspaces. Customers have the freedom to shift IT infrastructure spending from one-time capital expenses to ongoing operational expenses, predictably and sensibly.

Build or Scale Your Cloud

If you’re looking to build or scale your cloud, Dell Technologies has an extensive portfolio of software, servers, networking, storage, solutions, ReadyNodes, hyper-converged and converged systems, services and financing to help you achieve your goals. Collaborate with experts in one of the worldwide Customer Solution Centers, start a proof of concept and/or take a test drive.
Dell EMC Integrated System for Microsoft Azure Stack

The flexibility to run your HPC applications where you need them

Dell EMC Integrated System for Microsoft Azure Stack is a simple and fast path for implementing hybrid cloud to accelerate digital transformation with automated IT service delivery for traditional and cloud-native applications. This helps you better engage with customers, reduce time to market for new services and free up resources to focus on adding business value.

Dell EMC Integrated System for Microsoft Azure Stack combines Dell Technologies’ leadership in worldwide cloud infrastructure with its long history of partnering with Microsoft. The solution stack is engineered, tested, delivered, serviced and supported by Dell, enabling you to build modern applications across hybrid cloud environments for the right combination of flexibility and control. Benefits include:

• **Consistent experience for on-premises private and public cloud** — Speed application development and deployment by providing a consistent programming surface between Azure and Azure Stack. This helps you cost-effectively access, create and share traditional and cloud-native application services securely in Azure and Azure Stack to pursue business results without sacrificing security, protection, service quality and availability.

• **Best-in-class backup and encryption technologies from Dell** — Leverage a consistent means of protecting and securing data across Azure-based public and on-premises cloud environments.

• **Simplify deployment and management** — Integrated Dell Services are available for every step of the journey — from strategic planning through implementation, operations and ongoing support. Dell experts provide hands-on guidance to optimize and expand your hybrid cloud platform to meet business objectives. With hybrid cloud platforms backed by Dell Services, you can focus on delivering differentiated application services rather than building and managing infrastructure.

Dell Technologies Services for Microsoft Azure Stack

Dell Technologies Services professionals can help you develop and customize service catalogs, enabling identity and access management systems, and extending monitoring and metering systems to Azure Stack.

Dell provides support throughout the lifecycle of the platform with each component backed by automated proactive, predictive tools and a dedicated technical account manager with ProSupport Plus.

Dell EMC Ready Solutions for Red Hat OpenStack Platform

Rapid, automated deployment of an OpenStack private cloud for HPC

The Red Hat® OpenStack® Platform virtualizes HPC resources, organizes them into clouds, and manages them so users can access what they need, when they need it. But deploying OpenStack can be challenging due to the interdependency of OpenStack’s multiple projects and the rapid evolution in OpenStack components. Building a production-grade OpenStack environment typically requires significant staff resources with extensive OpenStack expertise to understand and integrate the many interdependent projects — something many enterprises don’t have.

Dell Technologies and Red Hat have solved this dilemma by co-engineering the Dell Red Hat OpenStack Platform. It combines a core validated architecture with selected extensions to create an adaptive infrastructure that integrates the best innovations from the OpenStack community with proven Dell EMC and Red Hat platforms. This complete, open, secure, reliable and supported architecture is built with validated, integrated components and features rapid, automated provisioning to simplify and speed deployment, so you can take advantage of cloud benefits sooner. Seamless integration among Dell, Red Hat OpenStack and Bright Computing® management software means you can manage the entire environment from a single pane of glass.
Flexible technical specifications
Red Hat OpenStack Platform delivers the Red Hat Enterprise Linux® operating system, OpenStack software and Red Hat OpenStack Director in a single, hardened software distribution. Dell Technologies and Red Hat put all configurations and deployment options through extensive validation and stress testing in Dell Technologies and Red Hat labs, so you can deploy with confidence.

Dell Technologies offers multiple architectural options. Configurations are built on Dell EMC PowerEdge servers and include infrastructure and extended support. Starting architectures consist of 10 nodes, have 10Gb networking and start in one rack with mix-and-match sizing that allows you to scale back to a half-rack or scale out to three racks.

Benefits include:

- **Responding faster to business and market demands** — Swiftly deploy and scale cloud infrastructure with a solution bundle that simplifies and speeds deployment with cutting-edge cloud services and automation.
- **Getting the stability and reliability your environment demands** — Dell Technologies and Red Hat have collaborated to address gaps in OpenStack and deliver a highly stable, reliable and supported cloud infrastructure.
- **Simplifying cloud management** — Dell Technologies collaborates with Red Hat to streamline and remove the complexities of OpenStack deployment and its operating environment with an easy-to-use management interface.

Red Hat OpenShift® Container Platform can help your organization develop, deploy, and manage existing and container-based apps seamlessly across physical, virtual, and public cloud infrastructures. Its built on proven open source technologies and helps application development and IT operations teams modernize applications, deliver new services, and accelerate development processes.

Customer successes

- **The University of Cambridge** uses OpenStack HPC to help solve some of today’s most demanding data-driven simulation and AI challenges.
- The **University of Kentucky** tailors HPC to research needs using OpenStack cloud.
- The **NASA Center for Climate Simulation** combines HPC and virtualization technologies in a private OpenStack cloud designed for large-scale data analytics.
- **Monash University** uses OpenStack cloud to power 21st century microscopes.
NVIDIA GPU Cloud

NVIDIA GPU Cloud (NGC) serves as a hub for GPU-optimized software. You can run software from NGC on-premises, in the cloud and edge, or using hybrid and multi-cloud deployments. NGC software can be deployed on bare metal servers or on virtualized environments, maximizing utilization of GPUs, portability and scalability of applications. This combination can reduce IT expenses while boosting efficiency and agility, and it’s available with the ease of Dell Technologies’ world-class infrastructure solutions, expertise and financing.

- **Simplify management** — Streamline GPU server management while retaining existing workflows and potentially lowering OpEx. NVIDIA vCS software is supported on major hypervisors, including VMware, so IT teams can use the same management tools for GPU clusters as for the rest of the data center.
- **Increase utilization and affordability** — Features like GPU sharing enable multiple VMs to be powered by a single GPU, and GPU aggregation, so multiple GPUs can be allocated to a single virtual machine.
- **Accelerate AI from concept to production** — NGC offers more than 150 containers, pre-trained models, training scripts and workflows. All of these can be deployed on virtualized environments like VMware vSphere with vCS.
- **Choose your best option** — Dell EMC NGC Ready Systems include the new Dell EMC DSS 8440 Server and the Dell EMC PowerEdge C4140 and R740 Servers. These systems have been jointly validated for functionality and deliver optimized performance of AI workloads so data scientists and developers can quickly build or scale solutions.
- **Reduce risks and improve productivity** — ProSupport Plus provides single-point-of-contact support for users and admins with direct access to NVIDIA’s experts for NGC software.

With Dell Technologies, VMware and NVIDIA, you can use VMware to manage more of your data center applications, including your HPC, AI and HPDA applications running on Dell EMC PowerEdge systems with NVIDIA GPU accelerators.

Bright Computing

Manage multiple clouds as one

**Bright Computing** has earned a stellar reputation serving hundreds of HPC customers around the world. As the use cases for HPC systems grow to include AI, big data and cloud, Bright stays true to their heritage of making HPC easy by extending products to automate deployment and management of Hadoop®, Spark®, OpenStack and dozens of machine learning (ML) and deep learning (DL) frameworks on Bright clusters.

**Bright Cluster Manager**® for HPC is a full-featured, enterprise-grade cluster manager that provides single-pane-of-glass management for Dell EMC PowerEdge servers, the OS, HPC software and users. System administrators can get clusters up and running quickly and keep them running reliably with ease.

The **Bright Cluster Manager for Data Science add-on** provides tools for accelerating data science projects in a simple, easy-to-deploy and manage solution that will get you up and running quickly and reliably.

**Bright OpenStack** makes it easy to deploy, provision and manage OpenStack-based clouds with headache-free deployment on bare metal, advanced monitoring and management tools, and dynamic health-checking — all in one powerful, intuitive package that’s certified by OpenStack.

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 Turbocharge HPC, AI and HPDA

Today, Moore’s law is reaching its practical limits, and CPU performance advances at an average of about 10 percent each year. But GPU technology is giving the industry new momentum. NVIDIA GPUs promise to deliver a 1,000x performance boost over CPUs by 2025.³ To learn more, read the Spiceworks eBook “Turbocharge Your Applications.”

Bright Computing software makes monitoring and managing your HPC clusters easy:

- **Easy to deploy** — Wizard-based deployment takes the pain out of deployment and allows you to deploy over bare metal with nothing to pre-install.
- **Easy to monitor** — Provides comprehensive metrics and alerts along with automatic health checks.
- **Easy to manage** — Powerful interfaces and included DL libraries and frameworks simplify management tasks and optimize.

**Dell Technologies partner cloud for HPC, AI and HPDA**

Strong industry partnerships enable you to enjoy a seamless hybrid cloud experience by extending into Microsoft® Azure®, Amazon Web Services® (AWS), Google® Cloud Platform™ and 4,200+ other cloud partners on a subscription, lease or pay-per-use basis.

**Azure Cloud Services from Dell EMC**

**Deployment, managed services and support for public cloud HPC**

Azure Cloud Services from Dell EMC enable hybrid cloud environments by extending data center capabilities with scalable IT services delivered from the Azure cloud and charged on a pay-as-you-go basis. Dell makes it easy and efficient to adopt Azure Cloud Services on your terms and within your timeframe with an accelerated provisioning process and single point of contact for support. Leverage Dell Technologies and Microsoft expertise to extend and enhance your cloud data center operations with trusted agile cloud services.

Azure offers several ways to design and implement HPC architectures, extending on-premises systems by enabling dynamic bursting to the cloud to complement on-premises capabilities. Azure gives you the power and capacity to run your workloads with maximum performance, scalability and cost efficiency. Example supported workloads include:

- **AI** — Get powerful remote workstations, run clusters with near-infinite scale and gain better insights with advanced analytics, ML and AI workloads on Azure.
- **Computer-aided engineering (CAE)** — Provide an HPCaaS platform for engineers and designers to rapidly iterate on product design to reduce time to market and improve product quality with scalable and highly secure, on-demand infrastructure.
- **Bioinformatics** — Accelerate insights in genomics, precision medicine and clinical trials with near-infinite high-performance bioinformatics infrastructure.
- **Seismic processing and reservoir simulation** — Optimize upstream oil and gas industry exploration, appraisal, completion and production.
- **Computational fluid dynamics (CFD)** — Enable researchers to execute CFD simulations on Azure.
- **3D video rendering on Azure** — Enable designers, artists and architects the ability to run native HPC rendering workloads in Azure using the Azure Batch Service.

**An advanced partnership**

At the beginning of 2011, when Dell added Bright software to its HPC product portfolio, Bright Cluster Manager was already being used to manage more than 50 Dell HPC installations worldwide, including three TOP500 supercomputing systems.

The latest manifestation of the partnership is designed to accelerate the adoption of AI. The Dell EMC Ready Solution for AI: Deep Learning with NVIDIA is built around Dell EMC PowerEdge servers with NVIDIA Tensor Core GPUs and managed by Bright Cluster Manager for Data Science.

Dell Technologies provides a streamlined on-boarding and setup process for Azure Cloud Services that gets you operational in a matter of hours. The Dell EMC Azure Control Portal provides a single point of monitoring and integrated billing with Azure Cloud Services, along with a single source of truth for consumption and usage so you can easily monitor and manage your Azure Cloud Services. Dell Technologies Services include:

- “White glove” rapid on-boarding and subscription setup.
- Single point of monitoring for usage and billing across your Microsoft Azure subscriptions.
- 24x7x365 support for billing/usage, technical issues and account setup and access.
- Basic and enhanced support plans with a variety of service level agreements (SLAs) and engagement points.
VMware Cloud on AWS

**Innovate faster, lower your risk and rapidly transition to the cloud**

VMware Cloud on AWS provides access to elastic and scalable resources to run HPC, AI and HPDA applications and workloads beyond the limitations of on-premises HPC systems. Simplify your hybrid IT operations by using the same VMware Cloud Foundation technologies including vSphere, vSAN™, NSX®, and vCenter Server® across both on-premises data center environments and the AWS Cloud. You can keep the same VMware provisioning, storage and lifecycle policies you use today. This means you can easily move applications between their on-premises environments and AWS without having to purchase any new hardware, rewrite applications or modify your operations. Near limitless scalability combined with access to a broad portfolio of cloud-based services like data analytics, AI and ML help you redefine traditional HPC workflows to innovate faster.

Benefits include:

- **Increase innovation** — Access 165+ AWS services including compute, database, analytics, Internet of Things (IoT), AI/ML, security and more. Latency-sensitive applications hosted in the VMware Cloud can directly access databases on Aurora, Dynamo or Redshift for petabyte-scale analysis, as well as direct and secure access to low-cost S3 buckets, objects and API functions.

- **Simplify operations** — Keep the same VMware provisioning, storage and lifecycle policies you use today. Easily move applications between on-premises and AWS environments without rewriting applications or modifying operations. You can use VMware’s management and policy tools across on-premises and VMware Cloud on AWS so you have a unified and operationally consistent experience.

- **Reduce costs** — Optimize costs with no need for hardware, and no need to modify applications to shift to a hybrid cloud model. Along with unified management, these capabilities let you leverage existing investments to save money.

- **Enhanced availability** — Accelerate migration of VMware vSphere-based workloads to the AWS Cloud. VMware-based workloads can be provisioned in a single-tenant, isolated Amazon virtual private cloud (VPC), allowing you to take immediate advantage of the scalability, availability, security and global reach of the AWS Cloud.

Google Cloud

**Move at the speed of inspiration**

Google Cloud accelerates your most complex HPC workloads with competitive pricing to help you stay within budget. Dell is a validated hardware provider for Google Cloud’s Anthos. If you’re using Dell EMC hyperconverged infrastructure (HCI) on-premises you can leverage it to seamlessly migrate to or from the cloud, while continuing to use Dell hardware, services and support. The Dell and Google Cloud partnership delivers a variety of benefits that help transform how you consume HPC resources:

- **Pay-per-use HPC** — Google Cloud offers on-demand access to custom machine configurations that are billed on a per-second basis with committed use discounts and sustained use discounts available.

- **Access HPC hardware and software on demand** — Accelerate insights with the power of Google Cloud, leveraging Dell compute, networking and storage infrastructure. Build your own supercomputer in the cloud using the latest Dell EMC PowerEdge servers, Intel® processors, NVIDIA GPUs, and Google Cloud Tensor Processing Unite (TPUs) with high-throughput, low-latency object and file storage.

- **Provide custom, scalable resources** — With Google Cloud, each team can have access to their own HPC system, relieving compute resource limitations, reducing wait times for large-batch workloads and helping teams solve problems faster.

- **Manage containerized workloads** — Batch on Anthos Google Kubernetes® Engine (Anthos GKE), a cloud-native solution for running batch workloads at scale. Batch frees applications from the limitations of fixed-sized clusters by dynamically allocating resources to meet application needs.

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“**We wanted to support a heterogenous [HPC] job mix. Now with cloud, we have greater experiment flexibility. We can help stand things up and provide researchers with an environment in the cloud.”**

—Cliff Addison, advanced research computing at the University of Liverpool

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Hosted public and private cloud for HPC, AI and HPDA

Dell Technologies partners with leading global cloud HPC providers to provide managed services, hosting, colocation services and on-demand resources for HPC.

**DXC Technology**

**Outsourced managed services and hosting for private cloud, and public cloud IaaS and PaaS**

DXC Technology enables a hybrid cloud model that delivers value to your business by enabling your digital transformation, giving it the best from the public cloud and on-premises infrastructure services, and transcending the corporate boundary — all while keeping you firmly in control.

**Benefits**

- Spans private and public clouds, allowing the selection of the right location for workloads.
- Provides a relevant set of IaaS and PaaS services under a hybrid cloud delivery model, to combat the challenges of shadow IT.
- Provides unified and granular visibility into resource consumption to help address governance, risk and compliance, and cost optimization.
- Offers as-a-service models that can be scaled to fit business needs on demand.
- Harmonizes service characteristics across public and private cloud to provide a consistent experience.
- Delivers the benefits of a managed service with the level of control your business needs.

**Verne Global**

**Industrial scale HPC cloud, colocation and hosting**

Verne Global delivers advanced data center solutions at industrial scale, allowing you to run HPC applications in an optimized environment, all provided via one of the world’s most reliable and lowest cost power grids — located in Iceland. With HPC capabilities focused on AI, earth sciences, engineering, financial services, life sciences and research applications, Verne Global enables many types of organizations to massively expand their HPC capabilities.

- **HPC Cloud and HPC Cloud on demand** — The hpcDIRECT platform gives you access to HPC IaaS or PaaS on an industry-leading, bare metal platform built on Dell EMC PowerEdge servers, storage and networking, and housed in Verne Global’s HPC-optimized, cost-effective Iceland data center. Verne Global hpcDIRECT is available with no upfront fees, and HPC resources can be provisioned to the required size and configuration as needed.
- **HPC Colocation** — The powerADVANCE solution provides the highest specification hosting on the same campus. powerDIRECT is engineered for industrial scale, ultra-high-density deployments.
- **DGX-Ready system hosting** — Verne Global was one of the first data centers to be certified by NVIDIA as part of their DGX-Ready Data Center Program. That means Verne Global is certified to host your NVIDIA DGX-1 system on Dell EMC PowerEdge servers, offering high performance for the most challenging AI workloads.
Dell Technologies HPC Cloud with R Systems service

Hosted and managed off-premises private cloud and public PaaS, IaaS and cloud bursting

If you want to host HPC with a cloud provider, you need architectural options that are not available from standard public or multitenant cloud services. Dell HPC Cloud with R Systems service provides a secure private cloud environment, hosted and managed by Dell Technologies and R Systems, an HPC Solutions Partner. R Systems® provides white-glove HPC services with custom HPC architectures in your choice of locations, including their company-owned data centers at the University of Illinois Research Park in Champlain, IL. R Systems offers Dell EMC HPC configurations based on Dell EMC servers, networking and storage, as well as custom engagements/configurations based on specific business needs.7

Dell Technologies HPC Cloud with R Systems service offers greater flexibility than public cloud by enhancing your ability to operate production workloads that might otherwise be limited to custom, on-site operations in a hosted private cloud.

Gain bursting ability
Public cloud resources can help you:
• Service intermittent processing spikes that surpass local capacity
• Use multiple operating systems and applications

Tap into professional hosting and management
Industry- and domain-specific hosting helps users who:
• Want their data, their collaborators’ data and reference data in one location for processing
• Want access to high-performance networks and files systems

Services
• Customizable burst or short-term HPC capacity served as an operating expense in 24-hour increments
• Large-scale core count clusters with the option of Mellanox® InfiniBand® interconnectivity
• High-memory configurations available for memory-intensive workloads
• User support for knowledge levels from novice to experienced
• Customizable security for public or private cloud
• Easy to set up access
• Support for Linux and Windows Server®
• In-depth experience with a wide variety of independent software vendors (ISVs), such as ANSYS®, CD-adapco®, Milliman® and SIMULIA®

Benefits
• Offers multiple hardware configurations
• Enables easy migration with a standards-based architecture
• Lowers technical barriers to HPC via burst models
• Empowers researchers and increases collaboration
• Increases institutional utilization of cloud resources
• Allows you to pay only for the resources you use through on-demand cloud computing
• Reduces CapEx and total cost of ownership (TCO)
• Leverages the agility and efficiencies of cloud
• Provides superior user support from highly experienced R Systems technicians.

Why Iceland is the perfect spot for off-premises HPC

Iceland is ideally located between Europe and North America and offers competitive data connections to major hubs on both sides of the Atlantic. Perhaps more importantly, Iceland offers low-cost, 100% renewable energy — and data center power requirements are much lower due to the year-round, free cooling of Iceland’s arctic climate. This all adds up to savings of more than 70% when compared to data centers in New York, London and Frankfurt.6

To learn more about R Systems, watch the Dell HPC Cloud with R Systems service video.

6 VerneGlobal.com/locations
7 Dell bare-metal service is available only in North America.
Virtustream Enterprise Cloud

Enterprise-class public, virtual and hybrid cloud services
Not all clouds are created equal. Unlike general-purpose public clouds that focus on best-effort delivery model, Virtustream® Enterprise Cloud is built to run complex, I/O-intensive, mission-critical enterprise applications. It offers guaranteed availability and performance backed by industry-leading SLAs, rigorous end-to-end security, and government- and industry-specific compliance solutions. In addition, Virtustream Enterprise Cloud includes a full suite of professional and managed services from the infrastructure up to the application layer, all while achieving superior economics to maximize your IT investments.

As the cloud services business of Dell Technologies, Virtustream leverages industry-leading Dell technology to support Virtustream Enterprise Cloud. Virtustream Enterprise Cloud delivers superior value to some of the world’s largest enterprises while reducing the complexities of their IT operations and the inherent business risk of operating mission-critical applications. For enterprises, service providers and government agencies, Virtustream meets the security, compliance, performance, efficiency and consumption-based billing requirements of complex production applications in clouds.

• Performance assurance — Performance-based SLAs mean mission-critical applications can access the data they need, when they need it, in a timely manner for their specific business requirements.
• Availability and resilience — High availability is built into every level of architecture, enabling applications to run without disruption from the infrastructure to the application layer.
• Security — With Virtustream Enterprise Cloud, you get a rigorous set of security features recognized by cloud industry experts as best-in-class.
• Compliance — Virtustream works closely with customers to ensure your enterprise-class workloads are hosted in the right environment based on your compliance needs.
• Consumption-based economics — You get a single, unified metric to measure your usage of cloud resources, so you only pay for the resources consumed, unlike the typical T-shirt-sized utility billing from the general-purpose public cloud providers.
• Cloud migration services — Virtustream assists with moving your most complex and demanding applications to the cloud quickly and efficiently.

X-ISS
Outsourced managed services for on- or off-premises private cloud
Managing HPC is much more complicated than managing a typical enterprise data center, and qualified HPC system administrators are hard to come by. Dell Technologies HPC Managed Services with X-ISS is a remote HPC administration and monitoring service designed for enterprises that lack the internal resources or expertise to manage HPC environments, or for large organizations with clusters located at multiple facilities. The service provides daily remote monitoring of customer-owned, on-premises or off-premises HPC systems.

How HPC Managed Services with X-ISS works
• Setup — X-ISS® sets the cluster system up for remote management and monitoring as well as for you to be able to call in and ask for help as needed. X-ISS proactively monitors your cluster to identify and resolve issues in a timely manner.
• Support — You have multiple channels for support. X-ISS sets up systems to be able to respond expeditiously to both system-generated events as well as user requests.
• Review — Ongoing assessment is critical to improvement; X-ISS provides regular performance reports and recommendations to help you identify trends and better plan for the future.
Services
• Provides outsourced HPC management expertise for secure remote monitoring, management and support.
• Offers services just for the duration of your project/lease/grant.
• Monitors and responds proactively to alerts.
• Triages and coordinates issue resolution between hardware, operating system and application vendors.
• Supports most applications, including those from ANSYS, Dassault Systèmes®, and Autodesk®.
• Provides quarterly management reports.

Benefits
• Saves the difficulty and expense of hiring hard-to-find HPC experts.
• Provides a fixed cost budget to maintain your HPC cluster or cloud.
• Assists your staff with job submission and monitoring.
• Keeps your HPC environment running at optimum uptime and performance.
• Supports your private HPC cluster or cloud in the most cost-effective manner.
• Allows researchers, engineers and developers focus on your core business and research initiatives.
• Helps you identify trends and better plan for the future via quarterly performance reports and recommendations.

Public/private HPC cloud partnerships

Many public universities engage with the private sector to provide HPC cloud resources.

San Diego Supercomputer Center

Affordable HPCaaS for campus and corporate users

For over 30 years, the San Diego Super Computer Center (SDSC) has led the way in deploying and supporting cutting-edge HPC systems for a wide range of users, from the campus to the national research community. In mid-2013 SDSC launched the Triton Shared Computing Cluster (TSCC) after recognizing that UC San Diego investigators could benefit from an HPC system dedicated to their needs and with near-immediate access and reasonable wait times instead of accessing a national system entailing competitive proposals and often longer wait times.

Following an extensive study of successful research computing programs across the country, SDSC selected the “condo computing” model as the main business model for TSCC. Condo computing is a shared ownership model in which researchers use equipment purchase funds from grants or other sources to purchase and contribute servers to the system. The result is a researcher-owned computing resource of medium to large proportions. Today, other users may also take advantage of TSCC “hotel” service for short, term, temporary or HPC bursting needs.

• Condo — The condo plan gives participants access to computing capability through the pooling of computing resources, offering participants significantly greater computational power and higher core counts than if limited to their own hardware or individual laboratory cluster. Researchers who contribute to the TSCC cluster have priority access to the nodes that they contribute. In addition, they can run jobs on any available nodes, including hotel and other condo nodes.

“By joining with Dell Technologies to integrate Dell EMC PowerEdge servers with 2nd generation AMD® EPYC™ processors into our most powerful supercomputer to date, we will be giving the community a powerful resource that will help advance research across a wide range of disciplines. Tens of thousands of researchers will be able to access vast amounts of memory, I/O, and cores in the system, expanding our understanding of astronomy, genomics, earth sciences, biology, and the social sciences, to name a few.”

—Michael Norman, SDSC Director, Principal Investigator (PI) for Expanse, and a computational astrophysicist
• This effectively increases their computing capability and flexibility, which can be extremely valuable during times of peak research needs.
• **Hotel** — Pay-as-you-go jobs run on 48 general computing nodes with 768 cores. Additional nodes may be added based on demand. Hotel nodes are configured with 64GB of memory and an InfiniBand interface. They’re allocated per-core, allowing up to 16 jobs to run on each node simultaneously. Hotel users purchase cycles that reflect the total cost of ownership, albeit leveraging the economies of scale afforded by TSCC.

### University of Florida HiPerGator

HiPerGator is the most powerful supercomputer in Florida, the most powerful university supercomputer in the Southern United States and the third-fastest university supercomputer in the country, according to the [TOP500](https://top500.org). Two years after the HiPerGator supercomputer was introduced at the University of Florida, it was expanded to add capacity and capabilities with 30,000 cores in approximately 1,000 nodes made by Dell. HiPerGator resources are available for academic users at the university as well as commercial enterprises. And Discounted commercial rates are available for University of Florida–supported startup companies, such as those associated with the University’s Innovation Hub.

### National Center for Supercomputing Applications

The National Center for Supercomputing Applications (NCSA) provides powerful computers and expert support that help scientists and engineers improve our world. Established in 1986 as one of the original sites of the National Science Foundation’s Supercomputer Centers Program, NCSA is supported by the state of Illinois, the University of Illinois, the National Science Foundation and grants from other federal agencies.

### NCSA Industry Program

The NCSA Industry Program offers partners globally recognized domain expertise, comprehensive infrastructure services and the ability to collaborate across the University of Illinois system with renowned faculty and motivated students. NCSA partners with government groups and global companies to tackle big questions and provide meaningful results in fields ranging from AI to genome mapping to autonomous transportation — all supported by an eight-time HPCWire Award-winning team of experts and delivered on advanced computing resources.

The NCSA Industry Program has aided many of the world’s largest companies in sectors including manufacturing, oil and gas, finance, retail/wholesale, bio/medical, life sciences, agriculture and technology. In fact, NCSA Industry has been advancing one third of the Fortune50® and nearly 60 percent of manufacturers in the Fortune100® for more than 30 years by bringing industry, researchers and students together to solve grand challenges at rapid speed and scale. Boeing®, Caterpillar, Deere®, Dow Jones®, GE®, P&G® and Rolls-Royce® are all members of the NCSA Industry Program.

The powerful [iForge cluster](https://www.ncsa.illinois.edu/services/infrastructure/iForge) was designed specifically for NCSA’s industry partners, featuring distinct Dell EMC high performance computing systems designed for differing computational needs. Using four generations of Dell EMC PowerEdge servers, iForge addresses the needs of power users so commercial clients can solve their most complex modeling and simulation challenges faster. A new GPU queue builds on this mission by offering fast new technology that’s already solving bigger problems in less time. With the latest NVIDIA V100 GPUs and NVLink interconnect, users can get more from their machine learning and engineering applications.

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Areas of expertise include:

- **HPC operations** — Building, optimizing, advancing and maintaining HPC systems for thousands of active users across the globe.
- **Data analytics and AI** — Data analysis, data management and ML at massive scale for HPC and cloud environments.
- **Software and applications** — Development of flexible, extensible software tools and frameworks for data analysis and management.
- **Bioinformatics and genomics** — Production workflows and optimization for genomics and computational biology analysis on HPC and cloud.
- **Modeling and simulation** — Consulting for domain-specific fluid dynamics and finite element analysis on HPC.
- **Visualization** — Exploration and application of representation techniques to maximize insight and understanding of complex data.

Digital Manufacturing and Design Innovation Institute

NCSA is deeply involved in the Chicago-based Digital Manufacturing and Design Innovation Institute (DMDII), an applied research institute whose focus is developing and commercializing digital manufacturing technologies for consumer products, heavy machinery and military equipment.

This public-private effort is made possible by $70 million from the U.S. Department of Defense and more than $250 million from industry, academic, government and community partners. Many of the industry partners have strong ties with NCSA, such as Boeing, Caterpillar, Deere, Dow, GE, P&G and Rolls-Royce — all of which are members of the NCSA Industry Program. These partners collaborate with NCSA and its hardware and software partners to address digital challenges, such as:

- Finite element analysis
- Computational fluid dynamics (CFD)
- Extreme scaling of commercial and home-grown codes
- Multi-physics modeling
- Remote visualization

Supercomputing Wales gives Norson Design the power to make the world’s fastest boats

When the engineers at Norson Design set out to design a new high-speed boat, they needed access to HPC systems of the caliber used to design planes, trains and automobiles in order to run their CFD programs. They found this HPC power via a collaboration with Supercomputing Wales and a team of researchers at Swansea University.

With the support of Supercomputing Wales HPC, Norson Design was able to use state-of-the-art shape optimization and AI techniques to generate aerodynamic and hydrodynamic profiles for high-speed vessels. With these models capturing the interactions, the team was able to generate high-resolution details of the flow under the hull, which they correlated against models and full-size boats.

Ultimately, the collaboration resulted in a new range of customized, multi-sized, high-performance rigid-inflatable boats capable of moving at speeds in excess of 70 knots, while maintaining good stability, cornering, riding comfort and overall seakeeping performance.

Read the story: [Launching New Boats into the Water with the Power of HPC.](#)
Hybrid cloud security

Secureworks

Protect your HPC clouds
As enterprises move quickly to leverage multiple public and private clouds to enable digital transformation goals, security teams need to rethink their program strategy and enhance their operations. Secureworks, a Dell Technologies company, enriches existing defenses with intelligence from up to 290-billion cyber events observed each day, across 4,300 clients in more than 50+ countries. By investing in supervised machine learning and analytics, as well as the brightest minds in the industry, Secureworks has successfully automated and accelerated event detection, correlation and contextualization. The Secureworks team can help you:

• Define your strategy — Visualize how HPC cloud adoption will affect your security program and prepare the security requirements for a successful cloud migration.
• Monitor your clouds — Detect anomalies in high volumes of cloud log data and separate routine events from security incidents worth investigation.
• Manage vulnerabilities — Incorporate cloud asset discovery and cloud vulnerability scan data into your security program.
• Strengthen your security posture with adversarial testing — Discover if your controls can withstand a cloud-focused hack from Secureworks.

Secureworks solutions are backed by over 20 years of security expertise, our proprietary processes and technologies, and the use of cloud security best practices and industry benchmarks to provide the peace of mind knowing your cloud environment is safe.

Boomi AtomSphere
For any cloud service, security must be carefully scrutinized. The Boomi AtomSphere platform addresses security at three distinct points: the network and facilities infrastructure, the application and platform layer and at the data level. This three-tiered security approach prevents your data from being exposed to unauthorized parties, keeps it safe in transit between applications and lets you access your data any time from any location.

The Boomi AtomSphere integration platform as a service (iPaaS) provides:

• Network and facilities infrastructure security — Support application integration processes between cloud platforms, SaaS applications and on-premises systems. Enjoy online access to a powerful range of integration and data management capabilities.
• Application and platform security — The Boomi Atom resides on your network, in our data center on-premises or in the cloud, hosted by Boomi or a third party. During deployment, the data center verifies and authenticates the Atom and its contents before activation.
• On-premises data communication security — Inbound firewall ports don’t need to be open for the Atom to communicate with the data center. The Atom initiates the connection, using an SSL handshake to authenticate the data center before transmitting data.
• Data communication security standards — Communication from an Atom to the data center uses SSL 256-bit encryption and occurs via HTTPS, port 443.

58% growth
In the number of enterprises with a hybrid cloud strategy

38% of workloads
Run in public cloud

Services for HPC, AI and HPDA hybrid clouds

Consulting, deployment, management and support
From consulting, education, design and implementation to support and systems management, Dell Technologies offers a comprehensive services portfolio for HPC systems including on-premises and managed systems, as well as those in the cloud. With thousands of successful implementations, direct access to Dell Technologies engineers, our HPC & AI Innovation Lab, and our partners’ latest code, Dell Technologies is perfectly positioned to enable your success.

Deploy: ProDeploy for HPC
HPC deployments require specialists who understand that “cutting edge” is yesterday’s news. Dell Technologies’ HPC deployment model provides comprehensive, proven system implementation at the right price. Dell deploys the world’s fastest systems and understands the nuances that make them perform. Dell Technologies ProDeploy provides the following standard services:
- Rack and stack remotely or build a cluster on-site
- Install and configure cluster management software
- Configure HPC nodes and switches
- Validate the implemented design
- Provide product orientation
- Perform cluster benchmarking
- Upload all deployment and benchmark data to Dell Technologies Support tools

You can then add installation services in any combination to fit your exact system requirements.

Support: ProSupport Add-on for HPC
Dell Technologies delivers a true end-to-end support experience across the HPC environment. Our goal is to handle all support needs — one contact, one handshake, one single source of accountability — to get you back up and running quickly when issues arise. Start with either Dell Technologies ProSupport or ProSupport Plus, then select the ProSupport Add-on for HPC, which provides:
- Access to senior HPC experts
- Advanced HPC cluster assistance: performance, interoperability, configuration
- Enhanced HPC solution-level support
- Remote pre-support engagement with HPC specialists during ProDeploy implementation

HPC add-on: Individual nodes
- Install individual server nodes
- Professionally label cabling
- Configure BIOS for HPC
- Install the OS

HPC add-On: MX
- Install fully populated MX (chassis and sleds)
- Professionally label cabling
- Configure the network

HPC add-on: Storage
- Install Dell EMC Ready Solutions for HPC Storage
Manage: Dell Technologies Remote Cluster Management

With Dell Technologies Remote Cluster Management (RCM) service, you don’t have to worry about staffing qualified cluster administrators. Dell Technologies RCM service provides highly skilled experts to proactively manage and maintain HPC clusters and applications, so you can focus on the core business. Realize the full potential of your HPC solution regardless of your in-house expertise with Dell Technologies managed services.

Learn more: Remote Cluster Management Services Datasheet.

Dell Technologies HPC Consulting capabilities

- Code migration and optimization
- Cluster optimization and tuning
- Development: Debug, compile, test
- Cluster management: Bright Computing, Slurm® Workload Manager, and more
- Networking fabrics: InfiniBand, Intel Omni-Path Architecture (OPA), RoCE, Ethernet, fabric management
- x86 storage servers: selection of Linux, OpenFabrics
- File systems: Lustre®, NFS, IBM® Spectrum Scale™, Oracle® ZFS®, BeeGFS®, plug-ins
- HPC cluster management processes and other consulting requests

For more information on Dell Technologies Services for HPC Cloud, visit delltechnologies.com/services.

Multi-cloud infrastructure and operating model services

Dell Technologies Consulting Services can help you define your cloud strategy, develop a holistic roadmap and business case, build a multi-cloud operating model, implement Dell Technologies Cloud Platforms and modernize your network. By rapidly adopting your hybrid or multi-cloud environment, you can focus on driving IT and business innovation faster.

Jumpstart your transformation to multi-cloud

Proconsult Advisory for Multi-Cloud helps you understand the impact of your cloud transformation and develop a plan to move forward. Dell Technologies consultants will work with you to assess your current state and define a target state, create a customized roadmap to get there, and determine the cost savings and benefits of your plan.

Realize the benefits of hybrid cloud platforms

Cloud Infrastructure Platform Services are designed to help you implement and integrate Dell Technologies Cloud Platforms and underlying Dell EMC converged and hyperconverged infrastructure into your environment. We can help you build a foundation for flexible cloud operations with multi-cloud IaaS and PaaS platforms that support VMware, Pivotal® and Microsoft Azure environments.

Deliver traditional IT and cloud-native services faster

Cloud Operating Model Services help you create a service-based operating model that supports both current IT and new cloud-native operations. Dell experts can help you automate IT processes, organize around service delivery and integrate IT operations and cloud-native development.
Extend your Microsoft Azure cloud to on-premises
Innovate and thrive with Dell Technologies Consulting Services for Microsoft Azure Stack. Our experts help identify the right path for your business, make sure you’re prepared for your cloud, and add value to your cloud so you can deliver modern, portable applications faster.

Modernize your network
Dell Technologies Networking Services help you upgrade your network with efficient, agile and innovative service delivery models. Transform your network to meet today’s growing demands, accelerate new service delivery to market and overcome complexities of implementing NFV and SD-WAN.

For more information on Dell Technologies Services for HPC Cloud, visit delltechnologies.com/services.

Flexible financing options
Whether you’re a global organization needing pay-per-use technology in your data center or a rapidly growing company with technology needs that outpace your current budget, the Dell Technologies Financial Services (DFS) portfolio of payment solutions can help you meet business challenges.

• Lower your costs — Lower costs and avoid technology obsolescence with our innovative leasing and financing solutions.
• Free up budget — Reduce CapEx and free up funds for digital transformation with flexible leasing and financing solutions.
• Do more with less — Take advantage of financing and lease opportunities across the full Dell Technologies portfolio.

Flexible consumption models
• Transform how you pay — Consumption-based financial solutions are specifically engineered to more closely align your technology expenses with actual usage. Simply pay for what you need, when you need it, with little to no obligation.
• Adapt to change — Flexible consumption models offer greater predictability as your organization undergoes transformation. Dell offers a broad range of financial solutions to address your specific requirements as needs evolve.
• Adopt a better solution, sooner — Solutions for flexible consumption help reduce the financial risk associated with new technology adoption. Plus, deploying a better long-term business solution today can reduce potential costs in the future. Flex consumption can be ideal as a temporary infrastructure for non-permanent workloads, ideal for cloud service providers, as well as businesses with custom asks.

Dell Technologies Flex On Demand
Today’s dynamic business environment drives the need for immediate access to available capacity, whenever it’s required. Flex On Demand from DFS allows you to pay only for the technology you need — while providing access to ready buffer capacity — with payments that adjust up or down to match usage. Flex On Demand is available on Dell EMC storage solutions as well as Dell EMC PowerEdge servers, select hyperconverged solutions and PowerOne CI solutions.
Flex On Demand, together with Dell Technologies Cloud Platform, improves cloud economics via a consistent hybrid cloud that delivers public cloud agility on-premises, optimizes cloud utilization and is tailored to suit your business priorities.

- **Deploy with confidence** — We work with you to establish your projected baseline capacity requirements and the buffer capacity needed to cover peak use. All technology is preconfigured and available on day one.
- **Pay flexibly** — Each payment includes the fixed cost of your committed capacity plus the variable cost of buffer capacity, which is measured on a regular basis using automated tools.
- **Adapt on demand** — If usage consistently consumes most of the installed buffer capacity — or none at all — simply amend your committed capacity threshold up or down.

Guidance and best practices for hybrid cloud HPC, AI and HPDA

**Customer Solution Centers**
Our global network of dedicated Dell Technologies Customer Solution Centers are trusted environments where world-class IT experts collaborate with you to share best practices, facilitate in-depth discussions of effective business strategies and help your business become more successful and competitive. Dell Customer Solution Centers help reduce the risks associated with new technology investments and can help improve speed and ease of implementation.

**HPC & AI Innovation Lab**
The HPC & AI Innovation Lab in Austin, Texas, is our flagship innovation center. Housed in a 13,000-square-foot data center, it gives you access to thousands of Dell EMC servers, two powerful HPC clusters, and sophisticated storage and network systems. It’s staffed by a dedicated group of computer scientists, engineers and subject matter experts who actively partner and collaborate with customers and other members of the HPC community. The team engineers HPC and AI solutions, tests new and emerging technologies, and shares expertise, including performance results and best practices.

**Dell Technologies HPC & AI Centers of Excellence**
As HPC, AI and HPDA converge and the technology evolves, Dell’s worldwide Centers of Excellence provide thought leadership, test new technologies and share best practices. They maintain local industry partnerships and have direct access to Dell and other technology creators to incorporate you feedback and needs into their roadmaps. Through collaboration, Dell Technologies Centers of Excellence provide a network of resources based on the wide-ranging know-how and experience in the community.

“The HPC & AI Innovation Lab gives our customers access to cutting-edge technology from Dell, Intel, AMD, Mellanox, NVIDIA, Bright Computing and more. Customers can bring us their workloads and we can help them tune a solution before the technology is readily available.”

– Garima Kochhar, Distinguished Engineer
Why Dell Technologies?

Dell Technologies holds leadership positions in some of the biggest and largest growth categories in the IT infrastructure business, and that means you can confidently source your IT needs from one provider.

- #1 in servers\textsuperscript{11}
- #1 in converged and hyper-converged infrastructure\textsuperscript{12}
- #1 in storage\textsuperscript{13}
- #1 in cloud IT infrastructure\textsuperscript{14}

See Dell Technologies Key Facts.