Validated Designs for HPC Digital Manufacturing

Tap into the power of AI and HPC to speed design workloads

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93% of manufacturers

believe AI will be a "pivotal technology" for driving growth and innovation.[1]

Get to market faster

Technology has long been a major driver of competitiveness. For decades, engineers have been using technologies such as high-performance computing (HPC) to power the computer-aided engineering software that helps create innovative products and grow revenue while cutting costs. Now, manufacturing is undergoing a "fourth industrial revolution," powered by the rapid advancement of technologies that promise to reshape the industry.

Sensors and devices that make up the Industrial Internet of Things (IIoT) can provide important new data points that, when combined, create a clearer picture of the entire product lifecycle. Analytics and artificial intelligence (AI), underpinned by powerful HPC systems can be the key to unlocking the value of your data. And when harnessed, this intelligence can inform and drive decisions that impact success.

The engineering sector is already leading the way in the application of advanced computing. In particular, HPC-powered analytics and AI continue to revolutionize engineering to help speed time to market with more innovative and higher quality products. And Dell Technologies is helping push the boundaries of performance with scalable, flexible solutions designed to help bring products to market faster.

Dell Technologies has what you need

Expertise and guidance

The technology around analytics, HPC and AI is emerging quickly, so your team may not have had time to develop all of the skills required to design, deploy and manage solution stacks optimized for new workloads. While AI might seem like the latest IT trend, Dell Technologies has been a leader in the advanced computing space for over a decade, with proven products, solutions and expertise. Dell Technologies has a team of HPC and AI experts dedicated to staying on the cutting edge, testing new technologies and tuning solutions to your applications to help you keep pace with this constantly evolving landscape.

Dell Technologies Validated Designs for HPC

The advantage in today's marketplace goes to the data-driven enterprise. For many organizations, HPC is — or is becoming — an important source of competitive advantage. An optimized HPC solution delivers the compute, throughput and capacity needed to manage the rapid data growth and increased workload demands presented by advanced data analytics and other enterprise workloads. Validated Designs are workload-optimized rack-level systems with servers, software, networking, storage and services to scale faster with the confidence of an engineering-tested solution while enabling business without boundaries.

Solutions customized for your environment

Dell Technologies uniquely provides an extensive portfolio of technologies to deliver the advanced computing solutions that underpin successful data analytics, HPC and AI implementations. With an extensive portfolio, 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 you to capitalize on the promise of HPC and AI.

1000 data points/sec

streaming a McLaren race car[2]

every ~20 minutes

data-driven engineering changes to win[2]

Faster performance

Easier scaling

Reduced risk

Do any of these challenges sound familiar?

"We've outgrown our workstations."

Many struggle with insufficient scalability/performance of installed workstations to get the job done. These workstations are often running at maximum capacity and may not have the ability to handle today's peak computational workloads. A balanced and integrated HPC system can deliver the throughput and capacity needed to manage rapid data growth and increased workload demands. Dell Technologies makes it easy to customize an HPC solution to meet performance and global workforce requirements with a range of available options.

"We need to be able to build out engineering infrastructure more easily, with a shorter learning curve."

Advancements in computer-aided engineering software capabilities continue to push the limits of existing systems. To keep up, you need the power to scale quickly and easily. The modular, building-block design of Validated Designs makes it easy to manage and extend compute power, storage and networking on-premises so you can grow as needed to keep pace with demands and win against the competition.

"It's important for us to reduce risks for HPC investments."

HPC is an important source of competitive advantage, but deploying HPC systems for specific or multiple workloads can require significant investment of time and resources — and increases the chance for errors. Engineering-Validated Designs for HPC can reduce deployment risks and increase system reliability. Dell Technologies can also provide a single point of contact for services and support.

Validated Designs for HPC Digital Manufacturing

Dell Technologies has invested to create a portfolio of Validated Designs designed to scale faster with the confidence of engineering-tested solutions while saving valuable time and resources. They provide trusted designs that have been optimized, tested and tuned for key applications and use cases.

Validated Designs include the servers, storage, networking, software and services that have been proven in our labs and in customer deployments to meet workload requirements and customer outcomes. The modular building blocks provide a customizable yet engineering-validated approach for customers deploying new clusters, scaling or upgrading existing environments.

Validated Designs for HPC Digital Manufacturing are designed to deliver faster performance with purpose-built solutions and easier scaling with modular building blocks while reducing risk.

Faster performance

Dell Technologies is committed to helping more people make more innovations and discoveries than any other HPC solutions vendor in the world. To that end, Dell Technologies engineers and industry experts have worked in collaboration with Dell Technologies customers and partners to design these solutions specifically for digital manufacturing workloads. The Dell Technologies HPC & AI Innovation Lab works closely with customers and partners to optimize these solutions, with a focus on performance, efficiency and reliability.

Easier scaling

Validated Designs for HPC help customers get the optimal IT infrastructure for today — and tomorrow. That means creating solutions with scalable building blocks to meet evolving needs over time. Validated Designs for HPC are built with modular building blocks that enable you to scale easily to meet new capacity and performance demands. Dell Technologies' extensive track record with servers, storage, networking and services means we can implement holistic solutions that work from day one, with an eye toward the future.

Reduced risk

Dell Technologies engineering architects Validated Designs for HPC Digial Manufacturing to reduce risk while it making it easier to take advantage of HPC for workloads such as structural analysis; computational fluid dynamics; noise; vibration and harshness (NVH); engineering; analysis; and design. Dell Technologies Services — ranging from consulting and education to deployment and support — are available when and where you need them. With proven success in thousands of implementations worldwide, you can be confident that you can rely on Dell Technologies.

Customer success stories

Mecury Marine marine propulsion systems

| **100 design iterations** vs. 1 physical iteration | **2 hours** from 48 hours in-house hydrodynamic simulations | **Reduced development cost**, better time to market |

See Cloud bursting for engine speed.

PING sporting goods

| **4.5x** faster simulation | **Slash design cycles** | **Improve quality** |

Read Driving golf forward with iron-clad digital tools.

McLaren

| **10k** data points/second | **~20 minutes** data-driven engineering changes | **Double-digit** performance improvements |

Read Data-driven innovation starts at racing's edge to improve race car aerodynamics — and speed and McLaren Racing Delivers Double-Digit Performance Improvements.

See more customer stories.

"Each car transmits key telemetry data in real time, and our trackside IT infrastructure from Dell Technologies relays it to our headquarters engineers, who use our HPC and advanced simulations to find ways to boost performance even more. It's closed-loop innovation supported by Dell Technologies that helps keep McLaren Racing ahead of the pack."[2]

—Edward Green
Principal Digital Architect
McLaren Racing

Technical specifications

The options below serve as a starting point for a customizable, yet validated solution. An HPC specialist can assist you with designing an HPC solution for your specific needs and environment. See performance tests results on the Dell Technologies InfoHub.

HPC Digital Manufacturing

Specifications	
PowerEdge Servers	
AMD© EPYC™	R6525, R7525, C6525
Intel© Xeon™ Scalable	R650, R750, C6520
Adapter	NVIDIA® ConnectX-6 HDR
NICs	1, 10, 25, 40, 100GbE
Switches	
Top of rack	NVIDIA Quantum™ QM8700 series HDR
Management	PowerSwitch S, N and Z series Ethernet
Software (optional, tested, recommended)	
Operating system	Red Hat® Enterprise Linux®
Cluster management	Bright Cluster Manager®
Server management	iDRAC Enterprise
Storage	
Validated Designs for HPC NFS, BeeGFS® or PixStor™ Storage Dell PowerScale Family with OneFS	
Services	
Consulting, education, hardware deployment and support, remote management, cloud options, financing	

Explore Virtual Rack at
http://esgvr.dell.com/

Solution highlights

- Dell PowerEdge servers enhance performance across the widest range of applications with highly scalable architectures and flexible internal storage.
- Validated Designs for HPC Storage include designs for NFS, PixStor or BeeGFS, all created to speed deployment of HPC storage systems with confidence while saving resources.
- Bright Cluster Manager enables the deployment of clusters over bare metal with a management view that spans the hardware, operating system, software and users.

Explicit finite element analysis (FEA) solver	Typical use	SIMULIA® Abaqus®–explicit, LS-DYNA®, PAM-CRASH®, Altair® RADIOSS™
	Typical simulation types	Crash, stamping, safety, impact analysis
	Typical run environment	Message passing interface (MPI) parallel jobs run across 4–12 server nodes in a cluster with a high-speed EDR network; minimal I/O to local disks during jobs
	Recommended	PowerEdge C6520 (4 in 2U)
Implicit FEA solver	Typical use	ANSYS® Mechanical™, Abaqus-Standard, MSC® Nastran®, Siemens® NX® Nastran, Altair OptiStruct®
	Typical simulation types	NVH, structural integrity (linear and non–linear), assembly
	Typical run environment	Most jobs run on a single server node and tend to require large memory to improve overall performance; scratch I/O to array of local disks typically preferred over shared file system
	Recommended	PowerEdge R650 (1U)
Computational fluid dynamics (CFD) solver	Typical use	ANSYS® Fluent®, CFX®, CD-adaptico® STAR-CD®, STAR-CCM+®, OpenFOAM®, Exa® PowerFLOW®, AcuSolve®
	Typical simulation types	Fluid flow, pump design, combustion, aerodynamics, acoustics
	Typical run environment	MPI parallel jobs run arcross 4–12 server nodes in a cluster with a high speed EDR network; minimal I/O to local disks during job
	Recommended	PowerEdge C6520 (4 in 2U)
Management	Management software	Bright Cluster Manager (optional) IPMI based cluster management tools Remote Cluster Management Services (optional)
	Management server building blocks	Cluster management: 1 for modest clusters; 2 for larger clusters Cluster administration (queues): 1–2 for each specific task Login: Typically 1 for each 30–100 users
	Recommended	PowerEdge R650

Building blocks

Easily grow capabilities and scale your environment with these building blocks. They are designed and tested for a variety of digital manufacturing workloads, with recommendations below based on application needs.

Basic building block	Typical use	Windows®-based customers looking for a modest cluster to improve single job capacity and overall volume of jobs
		Stepping stone from Windows workstation usage to full Linux-based HPC cluster environment
	Typical simulation types	Crash, stamping, safety, impact analysis, fluid flow, pump design, combustion, aerodynamics, acoustics
	Typical run environment	SMP parallel jobs on a single node and MPI parallel jobs run across two-node 10GE switchless "couplet"
	Recommended	PowerEdge R840
Visual building block	Typical use	Pre/post processing software on data in HPC environment for remote desktop use
	Typical software	VNC®, NICE®, VMware® Horizon®
	Recommended	PowerEdge R750
Storage building block	Typical use	Customers looking for a cost-effective solution to maintain HPC storage near HPC cluster
	Characteristics	Up to 10TB of raw storage (RAID-6) >1.3GB/s read/write performance Suitable for using IP over IB on existing EDR HPC network
	Recommended	PowerEdge R740xd

Solver building blocks for digital manufacturing workloads

Solver building blocks are designed and tested for a variety of computer-aided engineering workloads. Options are available to mix and match server processor, memory and storage, with recommendations below.

Solver building block	Base simulation compute resource
Form factor	PowerEdge R650 (1U) or C6520 (4 in 2U) based on rack density requirements
Processor	Intel Xeon 6242 (16-core) or Intel 6252 (24-core) based on overall workload
Memory	192GB memory or 384GB memory based on problem size
Storage	800GB NVMe scratch or 1600GB NVMe scratch based on problem size
Network	EDR

SIMULIA Abaqus

Leveraging robust simulation software vastly reduces physical testing requirements, helping reduce product costs and enhance quality while speeding time to market. The system design for SIMULIA Abaqus revolutionizes FEA to help speed time to market with higher quality products. It uses a flexible approach to HPC system design, with individual building blocks that can be combined to build HPC systems optimized specifically for SIMULIA Abaqus software from Dassault Systèmes®.

Recommended configurations			
Infrastructure server	Compute	PowerEdge R650	R6515
	Processors	Dual Intel Xeon Silver 4314	AMD EPYC™ 7402P
	Memory	256 GB of RAM (16 x 16 GB 3200MTps DIMM	128 GB of RAM (8 x 16 GB 3200 MTps DIMMs)
	Storage	2 x 480 GB Mixed-Use SATA SSD RAID	
	Networking	NVIDIA ConnectX-6 InfiniBand HCA (optional)	
Compute building block	Compute options	• PowerEdge C6520, C6525 with iDRAC Express • PowerEdge R650, R6525 with iDRAC Enterprise • PowerEdge R750, R7525 with iDRAC Enterprise	
	Processor options	Dual Intel Xeon Gold processors: • 6334 (8 cores per socket) • 6346 (16 cores per socket) • 6342 (24 cores per socket) • 8358 (32 cores per socket)	Dual AMD EPYC • 7532 (32 cores per socket) • 7543 (32 cores per socket) • 7573X (32 cores per socket)
	Memory options	• 256 GB (16 x 16 GB 3200 MTps DIMMs) • 512 GB (16 x 32 GB 3200 MTps DIMMs) • 1024 GB (16 x 64 GB 3200 MTps DIMMs)	
	Storage options	• PERC H345, H745, or H755 RAID controller • 2 x 480 GB Mixed-use SATA SSD RAID 0 • 4 x 480 GB Mixed-use SATA SSD RAID 0	
	Networking	• NVIDIA® ConnectX®-6 HDR100 InfiniBand® adapter • NVIDIA ConnectX-6 HDR InfiniBand adapter	
System networking		PowerSwitch N3248TE-ON Ethernet NVIDIA QM8790 EDR InfiniBand	
Cluster management software		Bright Cluster Manager (recommended)	

Storage	Scratch	Local storage
	Operational	1–30 users • PowerEdge R740xd • Intel Xeon Silver dual-core 4210 processors • 96 GB of memory, 12 x 8 GB 2666 MTps DIMMS • PERC H740P RAID controller • 2 x 480 GB Mixed-use SATA SSD in RAID 1 (for operating system) • 12 x 12 TB 3.5: NLSAS HDDs in RAID 6 (for data) • Dell iDRAC9 Express • 2 x 750 W power supply units (PSUs) • ConnectX-6 HDR100 InfiniBand Adapter • Site specific high-speed Ethernet adapter (optional) 25–100 users • PowerScale A300 or F600 scale-out NAS storage • Validated Design for HPC BeeGFS Storage , high performance configuration
Services		Consulting, education, hardware deployment and support, remote management, cloud options, financing

Altair HyperWorks

Manufacturers lead the way in the application of advanced computing, using HPC powered analytics and AI to revolutionize computer-aided engineering (CAE), speeding time to market with higher quality products. The system design for Altair HyperWorks enables CAE ranging from model based systems design and early geometry ideation to detailed multiphysics simulation and optimization. The solution uses a flexible building block approach to HPC system design, where individual building blocks can be combined to build HPC systems that are optimized specifically for Altair HyperWorks® workloads and use cases.

Altair Hyperworks Unlimited makes this solution available as a managed service

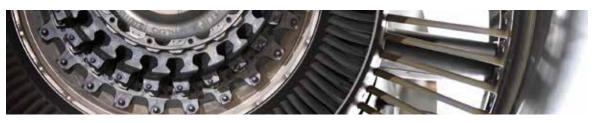| Recommended configurations		
Infrastructure server	Compute	PowerEdge R650 with iDRAC9 Enterprise
	Processors	Dual Intel Xeon Silver 4314 processors
	Memory	256 GB of RAM (16 x 16GB 3200 MTps DIMMs)
	Storage	PERC H345 RAID controller 2x 480GB mixed-use SATA SSD RAID 1
	Networking	NVIDIA EDR InfiniBand (optional)
Compute building block	Compute options	• PowerEdge R750 with iDRAC Enterprise • PowerEdge R650 with iDRAC Enterprise • PowerEdge C6520 with iDRAC Express
	Processor options	Dual Intel Xeon Gold processors: • 6346 (16 cores per socket) • 6342 (24 cores per socket) • 6338 (32 cores per socket) • 8358 (32 cores per socket)
	Memory options	• 256 GB (16 x 16GB 3200 MTps DIMMs) • 512 GB (16 x 32GB 3200 MTps DIMMs) • 1024 GB (16 x 64GB 3200 MTps DIMMs)
	Storage options	PERC H345, H745 or H755 RAID controller with: • 2x 480GB mixed-use SATA SSD RAID 0 • 4x 480GB mixed-use SATA SSD RAID 0
	Networking	NVIDIA ConnectX-6 InfiniBand® adapter

System networking	PowerSwitch S3048-ON Ethernet switch NVIDIA QM8790 HDR InfiniBand
Cluster management software	Bright Cluster Manager (recommended)
Storage	**Scratch**	Local storage
	Operational	1–30 users • PowerEdge R740xd • Intel Xeon Bronze dual-core 4110 processors • 96GB of memory, 12x 8GB 2667 MT/s DIMMS • PERC H730P RAID controller • 2x 250GB mixed-use SATA SSD in RAID-1 (for OS) • 12x 12TB 3.5: nlSAS HDDs in RAID-6 (for data) • Dell iDRAC9 Express • 2x 750W PSUs • NVIDIA EDR InfiniBand adapter • Site specific high-speed Ethernet adapter (optional) 25–100 users • PowerScale A200 scale-out NAS • Validated Designs for HPC PixStor Storage
Services		Consulting, education, hardware deployment and support, remote management, cloud options, financing

ANSYS

Many manufacturers use ANSYS software for CFD simulations and FEA workloads. That's why Dell Technologies expanded its Validated Designs for HPC Digital Manufacturing with an engineering-Validated Design for ANSYS software, including ANSYS CFX, Fluent and Mechanical. Standardized building blocks simplify design, speed configuration and ordering of clusters that have been rigorously tested and tuned. The modular designs include servers, storage, networking, software and services in engineering-tested — yet customizable — configurations to deliver faster deployment, better performance and easier scaling while reducing risk.

Recommended configurations			
Infrastructure server	Compute	PowerEdge R650 with iDRAC Enterprise	R6515 with iDRAC Enterprise
	Processors	Dual Intel Xeon Silver 4314	AMD EPYC 7402P
	Memory	256GB of RAM (16x 16GB 3200 MTps DIMMs)	128 GB of RAM (8 x 16 GB 3200 MTps DIMMs)
	Storage	PERC H345 RAID controller 2x 480GB mixed-use SATA SSD RAID 1	PERC H330 RAID controller 2x 480GB mixed-use SATA SSD RAID 1
	Networking	NVIDIA ConnectX-6 InfiniBand HCA (optional)	

Compute servers	Compute	PowerEdge C6520, R650 or R750	C6525, R6525, R7525
	Processors	• Dual Intel Xeon Gold 6346 (16 cores per socket) • Dual Intel Xeon Gold 6342 (24 coresper socket) • Dual Intel Xeon Gold 6338 (32 cores per socket) • Dual Intel Xeon Gold 8358 (32 cores per socket)	• Dual AMD EPYC 7532 (32 cores per socket) • Dual AMD EPYC 7543 (32 cores per socket) • Dual AMD EPYC 7573X (32 cores per socket)
	Memory	256 GB (16 x 16GB 3200 MTps DIMMs) 512 GB (16 x 32GB 3200 MTps DIMMs) 1024 GB (16 x 64GB 3200 MTps DIMMs)	
	Storage	PERC H345, H745 or H755 RAID controller • 2 x 480GB Mixed-Use SATA SSD RAID 0 • 4 x 480GB Mixed-Use SATA SSD RAID 0	PERC H330 or H740p RAID controller • 2 x 480 GB Mixed-Use SATA SSD RAID 0 • 4 x 480 GB Mixed-Use SATA SSD RAID 0
	Networking	NVIDIA ConnectX-6 HDR InfiniBand (optional)	
	Software	iDRAC Enterprise (R650, R6525, R750, R7525) iDRAC Express (C6520, C6525)	
System networking		PowerSwitch N3248TE-ON Ethernet NVIDIA QM8790 HDR InfiniBand	
Cluster management software		Bright Cluster Manager (recommended)	
Storage	Scratch	Local server storage	
	Operational	1–30 users PowerEdge R740xd • Intel Xeon Silver dual-core 4210 processors • 96GB of memory, 12x 8GB 2666 MT/s DIMMS • PERC H740P RAID controller • 2x 480GB mixed-use SATA SSD in RAID-1 (for OS) • 12x 12TB 3.5: NLSAS HDDs in RAID-6 (for data) • Dell iDRAC9 Express • 2x 750W PSUs • NVIDIA ConnectX-6 InfiniBand adapter • Site specific high-speed Ethernet adapter (optional) 25–100 users • PowerScale A300 or F600 scale-out NAS or • Validated Designs for HPC BeeGFS Storage high-performance configuration, or HPC PixStor Storage	
Services		Consulting, education, hardware deployment and support, remote management, cloud options, financing	

LSTC LS-DYNA

Growing consumer expectations and intense global competition are driving manufacturers to find new ways to produce more sophisticated products faster and with lower costs. HPC-powered LS DYNA from Livermore Software Technology Corporation (LSTC) is an advanced general purpose FEA program capable of simulating complex real world problems. Manufacturers in the automotive, aerospace, construction and other industries use LS DYNA to perform complex FEA workloads. Building on decades of experience with HPC, Dell Technologies worked to enhance simulation performance with a scalable, flexible system for LSTC LS-DYNA.

Recommended configurations		
Infrastructure server	Compute	PowerEdge R640 with iDRAC9 Enterprise
	Processors	Dual Intel Xeon Bronze 3106 processors
	Memory	192GB of RAM (12x 16GB 2667 MTps DIMMs)
	Storage	PERC H330 RAID controller 2x 480GB mixed-use SATA SSD RAID 1
	Networking	NVIDIA EDR InfiniBand (optional)
Compute building block	Compute options	• PowerEdge R640 with iDRAC9 Enterprise • PowerEdge C6420 with iDRAC9 Express
	Processor options	Dual Intel Xeon Gold processors: • 6242, 16 cores per socket • 6248, 20 cores per socket • 6252, 24 cores per socket
	Memory options	• 192GB (12x 16GB 2933 MTps DIMMs) • 384GB (12x 32GB 2933 MTps DIMMs) • 768GB (24x 32GB 2933 MTps DIMMs, R640 only)
	Storage options	PERC H330, H730P or H740P RAID controller with: • 2x 480GB mixed-use SATA SSD RAID 0 • 4x 480GB mixed-use SATA SSD RAID 0
	Networking	NVIDIA ConnectX-5 EDR InfiniBand adapter
Basic building block	Compute	PowerEdge R840 with iDRAC9 Enterprise
	Processors	Quad Intel Xeon Gold 6142 processors
	Memory	384GB of RAM (24x 16GB 2666 MTps DIMMS)
	Storage	PERC H740P RAID controller • 2x 240GB read-intensive SATA SSD RAID 1 (OS) • 4x 480GB mixed-use SATA SSD RAID 0 (scratch)
	Networking	NVIDIA ConnectX-5 EDR InfiniBand (optional) NVIDIA 25GbE (optional)
System networking		PowerSwitch S3048-ON Ethernet switch NVIDIA SB7890 36-port EDR InfiniBand switches
Cluster management software		Bright Cluster Manager (recommended)

Storage	Scratch	Local storage	
	Operational	1–30 users • PowerEdge R740xd • Intel Xeon Bronze dual-core 4110 processors • 96GB of memory, 12x 8GB 2667 MT/s DIMMS • PERC H730P RAID controller • 2x 250GB mixed-use SATA SSD in RAID-1 (for OS) • 12x 12TB 3.5: nlSAS HDDs in RAID-6 (for data) • Dell iDRAC9 Express • 2x 750W PSUs • NVIDIA EDR InfiniBand adapter • Site specific high-speed Ethernet adapter (optional) 25–100 users • Validated Designs for HPC NFS Storage	
Services		Consulting, education, hardware deployment and support, remote management, cloud options, financing	

Siemens Simcenter STAR-CCM+

Digital manufacturing software, like Siemens Simcenter™ STAR CCM+, is commonly used across a wide range of CFD and multiphysics applications. It's capable of capturing the physics that will influence product performance, enabling engineers to predict performance changes in response to multiple parametric design changes. The Validated Design for Simcenter STAR CCM+ uses a flexible approach to HPC system design, using modular building blocks that can be combined to build HPC systems optimized for Simcenter STAR CCM+ workloads and use cases.

Recommended configurations			
Infrastructure server	Compute	PowerEdge R650	R6515
	Processors	Dual Intel Xeon Silver 4314	AMD EPYC 7313P
	Memory	256GB of RAM (16x 16GB 3200 MTps DIMMs)	128GB of RAM (8x 16GB 3200 MTps DIMMs)
	Storage	PERC H345 RAID controller 2x 480GB mixed-use SATA SSD RAID 1	
	Networking	NVIDIA ConnectX-6 HDR InfiniBand HCA (optional)	
Compute building block	Compute options	Intel: PowerEdge C6520, R650, R750	R6525, C6525
	Processor options	Dual Intel Xeon Gold 6346, 6342, 6338 or 8358	Dual AMD EPYC 7443, 7513, 7543, 7643, 7713
	Memory options	• 256GB (16x 16GB 3200 MTps DIMMs) • 512GB (16x 32GB 3200 MTps DIMMs) • 1024GB (16x 64GB 3200 MTps DIMMs)	
	Storage options	PERC H345, H745 or H755 RAID controller with: • 1-2x 480GB mixed-use SATA SSD RAID 0 • 4x 480GB mixed-use SATA SSD RAID 0	
	Networking	NVIDIA ConnectX-6 HDR InfiniBand adapter	
System networking		PowerSwitch S3048-ON Ethernet NVIDIA QM8790 HDR100 InfiniBand	
Cluster management software		Bright Cluster Manager (recommended)	

Storage	Scratch	Local storage
	Operational	1–30 users • PowerEdge R740xd with 144TB of raw storage • Intel Xeon Silver 4210 processors • 96GB of memory, 12x 8GB 2666 MT/s DIMMS • PERC H740P RAID controller • 2x 480GB mixed-use SATA SSD in RAID-1 for OS • 12x 12TB 3.5: NLSAS HDDs in RAID-6 for data • Dell iDRAC9 Express • 2x 750W power supplies • NVIDIA ConnectX-6 HDR100 InfiniBand adapter • High-speed Ethernet adapter (optional) • PowerEdge R7515 with 144TB of raw storage • AMD EPYC 7313P processor • 128GB of memory, 8x 16GB 3200 MTps DIMMs • PERC H745 RAID controller • 2x 240GB mixed-use SATA SSD in RAID-1 for OS • 12 x 12TB 3.5" NLSAS HDDs in RAID-6 for data • Dell iDRAC9 Enterprise • 2x 750W power supplies • NVIDIA ConnectX-6 HDR100 InfiniBand HCA (optional) • High-speed Ethernet adapter (optional) 25–100 users • Dell PowerScale A200 scale-out NAS • Or for shared high-performance parallel file system, Validated Designs for PixStor Storage
Services		Consulting, education, hardware deployment and support, remote management, cloud options, financing

Services and financing

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

- Consulting Services are delivered by certified experts to help you get the business value of advanced computing. The services include an assessment, workshop, testing, proofs of concept and production implementation. These experts help determine where advanced computing is a good fit for your organization. They also help you build your own internal team of experts through knowledge transfer at each step.

- Education Services offers courses and certifications in data science and advanced analytics through
self-paced online labs and instructor-led workshops.

- Deployment experts have the experience, expertise and best practices to enhance your success with data analytics, HPC and AI solutions. With a proven track record of success in thousands of engagements worldwide, you can rely on Dell Technologies as your partner.

- Support experts can provide comprehensive hardware and collaborative software support 24x7 for optimal system performance and minimized downtime. ProSupport includes next-business-day on-site service with four- and eight-hour parts-and-labor response options, and escalation management with customer-defined severity levels. You can also opt for ProSupport Plus to get a technology service manager, who serves as a single point of contact for your support needs.

- Once the HPC cluster is deployed, Remote HPC Cluster Management services help keep it running smoothly with proactive monitoring and management of the entire HPC solution.

- Financial Services offers a wealth of leasing and financing options to help you find opportunities when your organization faces decisions regarding capital expenditures, operating expenditures and cash flow.

Why choose Dell Technologies

We're committed to advancing data analytics, HPC and AI, and we've dedicated a great deal of resources toward that goal.

- Come in for an executive briefing and collaborate on ways to reach your business goals.

- Dell Technologies Customer Solution Centers are staffed with computer scientists, engineers and subject matter experts in a variety of disciplines.

- 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. We believe in being open, and we publish our performance results.

- Dell Technologies is the only tier 1 company in the world with a portfolio that spans from workstations to supercomputers, including servers, networking, storage, software and services.

- 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.

>35,000

full-time Services and
Support employees[3]

>2,500

service centers[3]

25%

fewer prototypes[4]

15X

faster run times[4]

10x cost savings

with an on-premises solution[5]

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 Technologies Customer Solution Centers reduce the risks associated with new technology investments and can help improve speed of implementation.

AI Experience Zones

Curious about AI and what it can do for your business? Run demos, try proofs of concept and pilot software in Singapore, Seoul, Sydney and Bangalore in other Dell Technologies Customer Solution Centers. Dell Technologies experts are available to collaborate and share best practices as you can explore the latest technology, and get the information and hands-on experience you need for your advanced computing workloads.

HPC & AI Innovation Lab

The Dell Technologies HPC & AI Innovation Lab in Austin, Texas, is the flagship innovation center. Housed in a 13,000-square-foot data center, it gives you access to thousands of Dell servers, two powerful HPC clusters, and sophisticated storage and network systems. It's staffed by a dedicated group of computer scientists, engineers and Ph.D. 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.

HPC & AI Centers of Excellence

As data analytics, HPC and AI converge and the technology evolves, Dell Technologies worldwide HPC & AI 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 your feedback and needs into their roadmaps. Through collaboration, Dell Technologies HPC & AI Centers of Excellence provide a network of resources based on the wide-ranging know-how and experience in the community.

Proven results

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 Dell Technologies.

- #1 in servers[6]
- #1 in converged and hyper converged infrastructure (HCI)[7]
- #1 in storage[8]
- #1 cloud IT infrastructure[9]

See Dell Technologies Key Facts.

Take the next step, today

Don't wait to find out how Dell Technologies can simplify design, configuration and ordering — so you can leverage the advantages of HPC sooner and with less risk. Contact your Dell Technologies or authorized channel partner representative for more details right away.

Contact us

To learn more, visit delltechnologies.com/hpc or contact your local representative or authorized reseller.

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