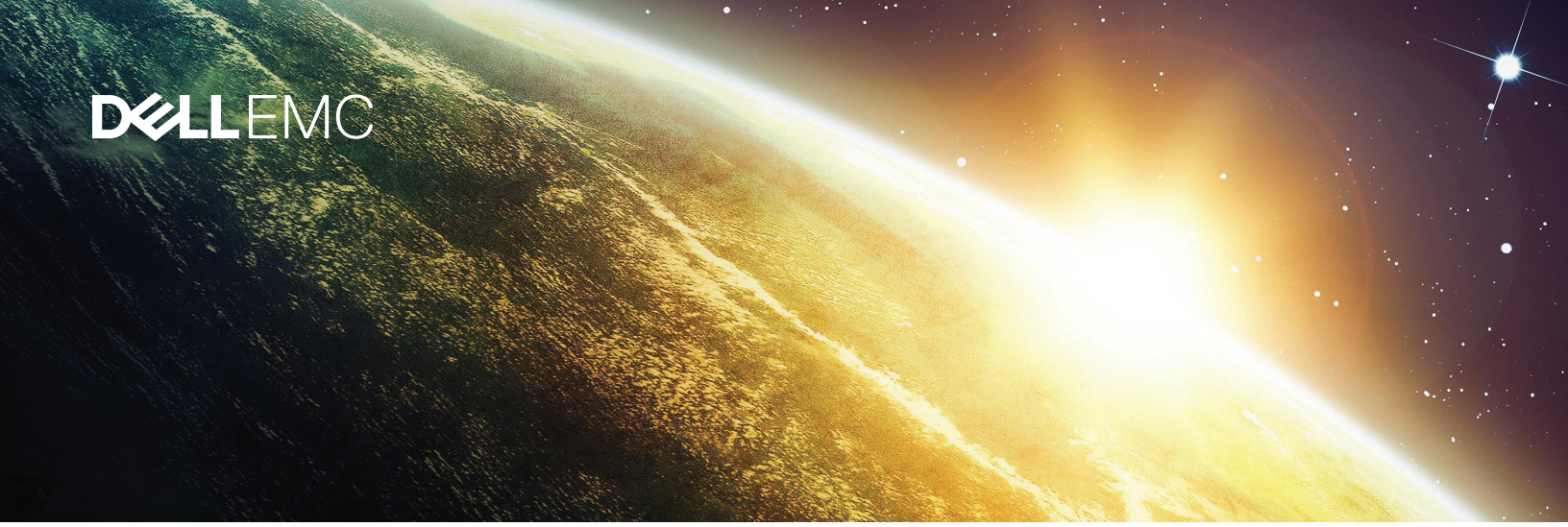

Dell EMC HPC Ready Bundle for HPC Research

HPC solutions that match the unique needs of your research workloads, more quickly and cost-effectively

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Make breakthroughs at a fast and furious pace

Many research organizations are in a race to address complex research challenges, such as handling massive amounts of simulation and machine-generated data from sensor systems and scientific instruments; dealing with complex algorithms for modeling, rendering and analysis; and managing the time-criticality of research projects. This makes high-performance computing (HPC) an important source of competitive advantage. A properly balanced and integrated solution will deliver the throughput and capacity needed to manage rapid data growth and increased workload demands.

With the Dell EMC Ready Bundle for HPC Research, you can quickly develop an HPC solution that matches the needs of complex research applications. You'll get the performance and throughput, large shared memories, and ultrafast interconnect fabrics you need to keep up with demanding research workloads.

Optimize investments

Dell EMC Ready Bundles for HPC Research are built on flexible, industry-standard building blocks of compute, storage, networking and software that are tested and validated by Dell EMC engineering. These purpose-built HPC building blocks are then tailored for your specific workloads to speed deployment, help eliminate potential software and hardware issues, and optimize performance. Dell EMC also provides comprehensive professional services and support to help you optimize solution productivity and efficiency without compromising on performance. By looking at the whole solution and these interconnections, Dell EMC's Ready Bundles for HPC deliver properly balanced HPC clusters that deliver an optimum price/performance balance.

Customize a solution

When speed to results matters, Dell EMC experts can help you build an HPC solution that addresses complex research and design challenges. Dell EMC Ready Bundles for HPC leverage a flexible building-block approach that helps you efficiently design, implement and scale HPC solutions. With proven success in thousands of implementations worldwide, you can be confident with Dell EMC as your partner.

Test and tune

Dell EMC is committed to helping more people make more innovations and discoveries than any other HPC vendor in the world. That's why Dell EMC engineers and industry experts work in collaboration with Dell EMC customers and partners to design and tune HPC solutions for specific research workloads. The Dell EMC HPC Innovation Lab works to optimize, integrate and test these solutions. The Dell EMC engineering team then devotes hours to rigorously tuning the solutions for your specific applications and workloads, with a focus on efficiency, performance and reliability.

Do any of these challenges sound familiar?

"We need to be sure we're getting the best possible performance from our budget."
Budgets tend to be tighter for academic and research institutions than for commercial enterprises. To optimize the budget, it's critical to match HPC system resources to user requirements to avoid costly overprovisioning. You need a solution stack tailored for your own unique requirements — one that is based on performance, efficiency or a balance of both. Dell EMC solutions help you optimize investments on limited budgets with the ability to tune solutions for specific workloads.

"We have trouble providing the immense computational power and storage capacity required for research."
Researchers need fast, accurate results to investigate increasingly complex phenomena. A properly balanced and integrated system can deliver the throughput and capacity needed to manage rapid data growth and increased workload demands. Dell EMC makes it easy to customize a solution to meet performance requirements with a range of available options.

"Performing design, deployment, integration and performance tuning is complex."
Deploying a fast, reliable HPC solution can be a massive investment of time and IT resources, with a chance for errors. All aspects of HPC solutions are interconnected and impact the overall success, performance and productivity of the system: high performance, high reliability, access protocols, scalability, ease of management, price, power and more. Dell EMC allows you to test and tune solutions prior to purchase, including test-driving cutting-edge HPC technologies at worldwide Dell EMC HPC Innovation Centers.

Customer success stories

University of Kentucky

60% lower licensing fees	**US$ millions avoided** in infrastructure costs	**30 days → 12 hours** faster cycle times

Read the case study: HPC tailored to research needs with OpenStack® cloud

Texas Advanced Computing Center (TACC)

20X analytics acceleration	**99%** reduction in I/O latencies	**100%** workload acceleration

Read the case study: HPC big data analytics, a potent research tool

Lincoln Laboratory at MIT TX-Green System

1+ PFLOPS total peak performance	**4X** capacity boost

View the case study video: MIT Lincoln Laboratory supercomputing center unveils new TOP500 system

Dell EMC Ready Bundle for HPC Research

The base configuration shown in the following table serves as a starting point for your solution, which will then be customized, configured, tested and tuned by Dell EMC HPC experts.

Technical specifications

Servers / processors	Head / master nodes	**Choice of:** PowerEdge R440*, R430 PowerEdge R640, R630 PowerEdge R740, R730 PowerEdge R740xd, R730xd	 PowerEdge R6415* PowerEdge R7425*, R7415* PowerEdge M640*, M630 M1000e, M630 VRTX
	Compute nodes	**Choice of:** PowerEdge R440*, R430 PowerEdge R640, R630 PowerEdge R740, R730 PowerEdge R740xd, R730xd PowerEdge R940, R930 PowerEdge R6415* PowerEdge R7425*, R7415* PowerEdge M640*, M630 M1000e, M630 VRTX	 PowerEdge M830 PowerEdge C4140*, C4130 PowerEdge C6420, C6320 PowerEdge C6320p PowerEdge FC430 PowerEdge FC640*, FC630 PowerEdge FC830
	Processors	Intel Xeon Scalable Processors	
	Accelerator nodes	**Choice of:** PowerEdge C4140*, C4130 (up to 4 double-width GPUs) PowerEdge R740 (up to 3 double-width GPUs)	**Choice of Accelerators:** NVIDIA® Tesla® V100 (SMX2 and PCIe), P100 (SMX2 and PCIe), P40, P4, K80
Operating systems	Head nodes	Red Hat® Enterprise Linux® (RHEL) 7.4 (2 or 4 socket)	
	Compute nodes	RHEL 7.4 for HPC Compute Node (2 or 4 socket)	
Cluster management		Bright Cluster Manager®	
Networking		Dell EMC Networking H-Series Edge Switches based on the Intel® Omni-Path Architecture InfiniBand® interconnect and FDR and EDR switches Ethernet adapters and switches	
External storage	NFS	Dell EMC Ready Bundle for HPC NFS Storage	
	Lustre®	Dell EMC Ready Bundle for HPC Lustre Storage	
	Isilon	Dell EMC Isilon Scale-out NAS Storage	
Systems management		Dell EMC Deployment Toolkit (DTK) 6.1 (for 14G servers and 13G servers — sustaining only)	
		Dell EMC OpenManage (OM) 9.1 (for 14G servers and 13G servers)	

*Available Q1 CY18

Winner of the coveted HPCwire Editor's Choice Award for Best use of High Performance Data Analytics.[11]

Dell EMC PowerEdge Servers Enhance performance across the widest range of applications with highly scalable architectures and flexible internal storage.

Dell EMC Ready Bundle for HPC NFS Storage is reliable, easy to administer and has very good performance within certain boundaries.

Dell EMC Ready Bundle for HPC Lustre Storage allows you to tap into the power and scalability of Lustre with simplified installation, configuration and management features.

Bright Cluster Manager for HPC lets you deploy clusters over bare metal with a management view that spans the hardware, operating system, software and users.

Why Dell EMC?

The combination of Dell and EMC brings together two industry-leading companies with strong reputations for value and innovation. Dell EMC 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 — Dell EMC.

- #1 fastest growing provider of Intel® Enterprise Edition for Lustre® deployments[1]
- #1 in both number and size of XSEDE HPC systems for U.S. open science[2]
- #1 fastest supercomputer on the African continent[3]
- #1 converged infrastructure[4]
- #1 in traditional and all-flash storage[5]
- #1 virtualized data center infrastructure[6]
- #1 cloud IT infrastructure[7]
- #1 server virtualization and cloud systems management software (VMware®)[8]
- #1 in data protection[9]
- #1 in software-defined storage[10]

World-Class Dell EMC HPC Innovation Centers

Leverage these invaluable assets

You can work directly with Dell EMC HPC experts to test and tune solutions prior to purchase at worldwide Dell EMC HPC Innovation Centers.

- Dell EMC HPC Innovation Lab
- Cambridge Solution Centre
- University of Pisa
- San Diego Supercomputer Center
- Texas Advanced Computing Center
- Centre for High Performance Computing, South Africa

[1] Dell EMC press release, "Dell Innovation to Democratize High Performance Computing and Accelerate Mainstream Adoption," November 2015.

[2] Dell EMC has the largest number of systems in XSEDE, including the largest system. Systems include SDSC Comet, SDSC, TACC Jetstream, TACC Stampede, LSU SuperMIC and TACC Wrangler. TACC Stampede is the largest system in XSEDE. See "XSEDE High Performance Computing."

[3] The Next Platform, "South African Lengau System Leaps Towards Petaflops," June 2016.

[4] IDC WW Quarterly Converged Systems Tracker, Q1 2017, June 2017, Vendor Revenue.

[5] IDC WW Quarterly Enterprise Storage Systems Tracker, September 2017, Vendor Revenue — EMC Q2 2017.

[6] Dell EMC Annual Report, 2015.

[7] IDC WW Quarterly Cloud IT Infrastructure Tracker, April 2017, Vendor Revenue — EMC Q4 2016.

[8] IDC WW Virtual Machine and Cloud System Market Shares 2016, July 2017.

[9] Dell EMC Pulse, "Gartner Recognizes EMC as a Leader in the 2016 Data Center Backup and Recovery Software Magic Quadrant," June 2016.

[10] IDC WW Semiannual Software Tracker, 2H2016, April 2017.

[11] HPCwire, "HPCwire Reveals Winners of the 2016 Readers' and Editors' Choice Awards at SC16 Conference in Salt Lake City," November 2016.

Services and financing

Dell EMC Professional Services

Solutions customized for your customers' needs

Leverage onsite integration or application implementation with Dell EMC Professional Services.

Support is always on for you

Enjoy unlimited access to 24x7 chat, email and phone support services with how-to assistance and disaster recovery from Dell EMC ProSupport. For example, Remote HPC Cluster Management keeps Dell EMC Ready Bundles for HPC running smoothly, with proactive monitoring and management.

Deployment assistance when you need it

You can trust Dell EMC to deploy the racked configuration in your data center, including network cabling, operating system, firmware and hypervisor with Dell EMC ProDeploy. For example, Dell EMC has a list of service offerings that make cluster installation deployment easier, including Rack Integration, Data Center Deployment and HPC Cloud Bursting.

Dell EMC Financial Services

- Leasing and financing solutions are available throughout the U.S., Canada and Europe.
- Dell EMC Financial Services can finance the total technology solution.
- Electronic quoting and online contracts offer an efficient purchase experience.

Learn more about Dell EMC Financial Services.

Take the next step, today

Don't wait to find out how Dell EMC can simplify and speed your adoption of tested, validated solutions for research applications and workloads. Contact your Dell EMC or authorized channel partner representative for more details right away.

Contact us

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