Validated Designs for HPC Solution Brief

Dell Validated Design for Government HPC, AI and Data Analytics

Customer results

Up to

80%

reduced bandwidth requirements[1]

500 GB/sec

storage system transfer speeds[2]

3.8 petaflops

of supercomputing performance[2]

Across local, state and federal government agencies, both military and civilian, organizations are leveraging advanced computing workloads, including modeling and simulation, artificial intelligence (AI) and analytics, to solve complex problems.

Traditional high performance computing (HPC) workloads for modeling and simulation may be enhanced with AI and analytics, yet there are variances among the workloads that require different techniques. Workloads may be run in separate environments, yet a single environment may be preferable to handle the convergence of workloads. Dell Technologies can design unified architectures with multipurpose balanced nodes to support various workloads on a single system.

To optimize budgets along with performance, it's critical to match advanced computing resources to requirements. System configuration can be a complex task, requiring a balance between workload requirements, performance targets, data center constraints and pricing. Many teams require resources to research, optimize and deploy advanced computing systems to deliver required outcomes.

With the Dell Validated Design for Government HPC, AI and Data Analytics, Dell Technologies engineers have done the heavy lifting, so you can quickly design and deploy a solution matching the needs of your organization. Dell Technologies can help you optimize investments based on your budget, with the ability to tune solutions for specific workloads and scale as needed with modular building blocks.

Systems for HPC, AI, and Analytics

Dell Validated Designs are workload-optimized rack-level systems including servers, software, networking, and storage to scale faster with the confidence of an engineered solution while saving valuable time and resources. The Validated Design for Government HPC, AI and Data Analytics has been optimized, tested and tuned for a variety of applications on the Kubernetes® stack, with ongoing testing and validation to expand the list of validated options. Solutions may be designed to run HPC, AI and analytics workloads on the same system or distinct systems to meet your needs, while simplifying deployment and management.

Flexible workload management enables dynamic movement of jobs between Slurm® and Kubernetes based on user demand, with a scalable shared file system to support both. Bright Cluster Manager® provides a single-pane-of-glass management experience for Dell hardware, Slurm and Kubernetes.

[1] Dell case study, The Next Level of Knowledge, December 2020.

[2] Dell case study, Accelerating Scientific Discovery, March 2020.

Learn More

- Dell.com/HPC
- Dell Technologies HPC & AI Innovation Lab
- Dell HPC Community: dellhpc.org

The Validated Design comes with a best practices guide and toolkit to help you take systems from factory-installed operating system to a full Kubernetes cluster with a repository on GitHub®. With Bright Cluster Manager software, system administrators can quickly get clusters up and running and keep them running reliably throughout their lifecycle.

Since the optimum solution configuration depends on the specific mix of applications and types of analytics, AI and other advanced computing workloads, recommended configurations and options are provided.

As always, Dell Technologies experts are available to assist you design a solution to meet your specific needs. And Dell Technologies Services — ranging from consulting and education to deployment and support — are available when and where you need them. Dell Technologies also offers a broad range of financial options, including flexible consumption models to evolve with your needs over time.

Technical resources

- Performance testing and engineering documentation for PowerEdge 15G with NVIDIA Mellanox
- Performance testing and engineering documentation for PowerEdge 15G with Cornelis Networks
- Performance testing and engineering documentation for PowerEdge 16G with NVIDIA Mellanox