



**▶ ACCELERATING
THE FUTURE OF
COMPUTING**

**BRIGHT COMPUTING AND DELL EMC
DELIVER UNIFIED SOLUTIONS FOR
HIGH-PERFORMANCE COMPUTING AND
ARTIFICIAL INTELLIGENCE**

▶ ACCELERATING THE FUTURE OF COMPUTING

▶ Bright Computing and Dell EMC—Accelerating HPC and AI for today's small and medium enterprises

Bright Cluster Manager provides infrastructure management technology for Dell EMC Ready Solutions for HPC and AI.

- **Dell EMC Ready Solutions for HPC** simplify design, configuration and ordering of clusters with standardized building blocks that are tested and tuned for specific vertical market applications.
- **Dell EMC Ready Solutions for AI** help make AI simpler with integrated systems enabling you to get faster, deeper insights delivered from a partner with proven AI expertise.

Bright Cluster Manager makes it possible to quickly deploy the infrastructure, identify potential problems before they impact end-users, and provide visibility into how end-users utilize system resources. Backed by Bright software, the Dell EMC Ready Solutions portfolio speeds deployment and simplifies operations and management of solutions for virtualization, OpenStack cloud, big data, analytics, HPC, and AI, and more—incorporating best-in-class building blocks from Dell EMC and its partners.

INTRODUCTION

IT teams tasked with implementing and supporting high-performance infrastructure that supports advanced applications such as artificial intelligence (AI) and machine learning (ML) face significant challenges:

- Quickly deploy these new technologies to accelerate the time to value
- Ensure the technologies are always available and performing as expected
- Assure the technologies are being used efficiently and effectively by end-users

For a growing number of organizations today, Bright Cluster Manager is the software of choice for helping to resolve all these challenges and many more. And now—with the partnership and integration between Dell EMC hardware and Bright software—fast technology deployment, problem identification and resolution, and efficient use of resources rise to a new level.

Organizations that deploy on Dell EMC hardware and manage with Bright software benefit from the close collaboration of the two companies during solution design, development, testing, and continuous improvement. Monitoring and management of the HPC/AI infrastructure are enhanced by Bright software's tight integrations with Dell EMC's iDRAC, BIOS, system management tools, and the ability to track system resources.

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"Dell EMC's expertise, technology, and partnerships deliver state-of-the-art HPC systems from the workgroup to the TOP500. With Bright Cluster Manager for HPC, our customers can quickly and easily install integrated systems, and both monitor and manage them across their lifecycles, allowing our customers to focus on innovation, as opposed to operations."

– Thierry Pellegrino, VP/GM High Performance Computing, Dell EMC

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▶ **Trusted HPC cluster management**

Electronics Research Institute (ERI) in Cairo, Egypt, chose the full suite of Bright technology—IaaS, PaaS, and SaaS—to manage its HPC, big data, and cloud infrastructure. With Bright-managed HPC infrastructure, scientists can now easily access high-performance infrastructure and completely customize their execution environment—creating the perfect setup for their experiments.

▶ **MAKING SMART CHOICES FOR TODAY AND TOMORROW**

For every organization entering or expanding operations in the HPC/AI arena, selecting the right software and hardware vendors is of critical importance. The chosen vendors must assume an extensible approach to leveraging new technologies—which, by definition, will build flexibility into a long-term HPC/AI infrastructure strategy.

Both Bright and Dell EMC epitomize flexibility in terms of offering support for a broad range of chip architectures, operating systems, accelerators, high-speed interconnects, and other components. In addition, both companies have demonstrated their ability to remain ahead of the curve in terms of delivering solutions for emerging workload types—including AI and edge computing.

Savvy organizations must look past vendor marketing, and instead evaluate actual offerings to determine if the vendors under consideration have the demonstrated track record to enable effective HPC and AI strategies both today and in the future.

▶ GETTING MORE FROM HPC AND AI

To help organizations capitalize on everything HPC and AI have to offer, Bright Computing and Dell EMC deliver a comprehensive portfolio of scalable, flexible solutions designed to help users solve complex problems faster than ever before. With Bright and Dell EMC, organizations receive optimized solutions that deliver game-changing results.

Accelerate time to value	A simplified design, configuration, and ordering process takes hours to complete instead of weeks.
Easily set up HPC clusters	Automatically setup, configure and provision a fully-functioning cluster from bare metal in minutes.
Maximize the uptime of HPC clusters	HPC and AI systems typically run 24x7 at greater than 90% utilization. In these critical environments, downtime can be catastrophic. Bright Cluster Manager monitors everything within the cluster and alerts administrators to problems before they impact users; or if configured, takes corrective action on behalf of the administrator.
Perform end-to-end cluster administration	Complete monitoring, health checking, and automated updates from a single pane of glass.
Add new or repurpose existing servers on the fly	No need to take down the cluster when adding capacity/ dynamically reassigning capacity to address fluctuating workload demand; Bright will detect and automatically set up each new or repurposed server appropriately.
Select from domain-specific designs	Choose from designs tuned for specific science, engineering, and analytics workloads using flexible, industry-standard building blocks.
Deploy tested and validated solutions	Trust proven solutions that also offer a single point of contact for services and support.
Increase price/performance	Select from an optimized portfolio of HPC and AI solutions.
Built-in flexibility and future-proofing	Be ready for whatever new technologies await with built-in flexibility and future-proofing that provides an extensible approach to leveraging new technologies over time.
Support hybrid clusters	Add virtual servers from a public or private cloud to an existing on-premises Bright physical cluster to create a seamless, flexible hybrid cluster that can leverage cloud resources on an on-going basis or during specific (peak) workload conditions.

▶ *Deploy with confidence*

Important offerings within the Bright and Dell EMC portfolio are Ready Solutions for HPC and Ready Solutions for AI. Providing tested and validated configurations, these turn-key systems are designed from the start to dynamically meet HPC and AI workload requirements.

Ready Solutions include all the servers, storage, networking, management, software, and service required for a fully functioning HPC/AI environment. These offerings are designed to reduce the skill level and effort required to deploy the HPC or AI infrastructure, while still providing the ability to scale out, as well as the flexibility to adopt new technologies and workloads in the future.

For small and medium enterprises, the combination of Dell EMC hardware and Bright software to create Ready Solutions makes strategic technology that would otherwise be out of reach, very attainable.

Dell EMC Ready Solutions support a wide—and growing—number of use cases.

Healthcare and life sciences

- Drug interaction/discovery
- Cancer detection
- Gene mutation

Financial services

- Fraud prevention
- Risk management
- Network security

Government security and defense

- Facial recognition
- Video surveillance
- Cybersecurity

Media and entertainment

- Video captioning
- Content-based search
- Real-time translation

Manufacturing

- Smart manufacturing systems
- Factory optimization
- Preventative maintenance

Energy

- Wind power generation
- Solar/weather forecasts
- Oil production optimization

Transportation

- Autonomous vehicles
- Pedestrian and object detection
- Lane tracking and traffic patterns

Retail

- Buying behavior predictions
- Upsell, cross-sell opportunities
- Customer and product movement tracking

▶ Enhancing the user experience

Bright Cluster Manager reduces the skill level and effort required to deploy and manage Dell EMC Ready Solutions by:

- Automating the process of building a cluster from bare metal, allowing organizations to deploy a fully functioning cluster for HPC and AI in an hour
- Providing the functionality to monitor everything within the cluster to ensure it continues to perform optimally
- Making it easy to update server software with patches when needed
- Monitoring resource utilization by user and job
- Extending to public clouds for additional resources when necessary
- Hosting new types of workloads when future needs arise

Rather than undertaking their own software development and maintenance efforts—including integrating individual open-source tools for provisioning, monitoring, and change management; developing scripts to automate administrative tasks; and building new features as necessary—today's small and mid-size enterprises can use Bright Cluster Manager to complete all those tasks. Instead of throttling innovation based on the limits of their infrastructure, organizations can use Bright to fuel innovation and drive better outcomes.

▶ *Built-in cluster management*

An advanced yet easy-to-use solution, Bright Cluster Manager enables administrators to deploy complete clusters over bare metal and manage them efficiently and effectively. Bright provides single-pane-of-glass management for everything in the cluster - including all hardware, networking, power, temperature, operating system, HPC workload managers, Kubernetes, users, jobs, and more.

With Bright Cluster Manager, system administrators can quickly get clusters up and running and keep them running reliably throughout their lifecycle—all with the ease and elegance of a full-featured, commercially supported, enterprise-grade cluster manager.

As a commercially developed piece of software, Bright Cluster Manager is always a step ahead and enabling your business for what comes next. The latest release of Bright Cluster Manager includes:

- Bright Edge automates the process of securely imaging and managing servers that provide compute in remote locations (e.g., for IoT).
- A five-fold reduction in the amount of inter-node traffic generated for management—freeing up more bandwidth for job-related communications and improving the overall performance footprint of the entire cluster.
- The Bright User Portal now provides each user with relevant information about job metrics, as well as accounting and reporting information about their jobs.
- PythonCM makes it easy to integrate Bright Cluster Manager into Python-based automation scripts.

In addition, Bright Cluster Manager for Data Science helps deliver resource management to the Dell EMC Ready Solutions for AI, Deep Learning with NVIDIA® solution. This add-on to Bright Cluster Manager enables administration of data science clusters as a single entity—provisioning the hardware, operating system, Kubernetes and software for data analytics and deep learning from a single interface. This approach makes it easier to build and manage a reliable, clustered data science infrastructure. Once the system is up and running, Bright monitors every aspect of every node, and reports any problems (or potential problems) it detects, so administrators can take appropriate action.

▶ HPC and AI—by the numbers

Together, Bright Computing and Dell EMC deliver foundational solutions for HPC and AI—rated “critically important technology” by a growing number of organizations.

\$718.9B
global HPC
market by
2026¹

25.2%
CAGR
2019-2016²

2,314
exabytes of
medical data
predicted by
2020³

99%
accuracy
identifying
tropical cyclones
and weather
fronts using AI
and HPC⁴

69.2%
of CFOs surveyed
said AI is critically
important or very
important to their
business⁵

93%
of manufacturers
classify AI as
highly important
or absolutely
critical to success

4.4PB
of data
generated by
autonomous
driving
software

>30B
requests for
global weather
information
every day

▶ PROVIDING FLEXIBILITY, EXTENSIBILITY

Avoiding vendor lock-in is a top-of-mind concern for many organizations today. More specifically, organizations need to determine the degree of “technology independence” (i.e., flexibility and extensibility) they want for their business and their HPC/AI infrastructure.

The combination of Dell EMC hardware and Bright software goes a long way toward providing the requisite independence and flexibility that organizations need. Bright software is inherently platform and vendor-independent, enabling organizations to mix and match hardware from different vendors in the same cluster. Bright also supports mixing and matching Linux® operating system types, HPC workload managers, accelerators, storage, and networking technologies. Dell EMC adds to this flexibility by supporting different chip architectures, Linux operating systems, accelerators, workload managers, and more.

LONG-STANDING PARTNERSHIP

For more than eight years, Dell EMC and Bright Computing have enjoyed a successful collaborative partnership. During that time, the two companies have designed dozens of joint solutions, completed hundreds of joint engagements, and offered unique benefits to joint customers in terms of both product and service:

Product

- Bright is integrated with Dell EMC iDRAC, BIOS, and system management tools.
- Bright is used in Dell’s Innovation Labs globally.
- Bright is embedded in Dell EMC Ready Solutions.
- Dell EMC and Bright provide each other with early access and training for new products.

Service

- The Dell EMC team has developed deep expertise with Bright software.
- The maturity of the Bright/Dell EMC partnership provides for seamless cooperation between the companies on behalf of joint customers.

CONCLUSION

Once restricted to scientific research, HPC and AI technologies are now used across industries to support a growing number of workloads. To make HPC and AI widely available to small and medium enterprises, Bright Computing and Dell EMC deliver a portfolio of solutions designed to reduce the skill level and effort required to deploy fully functioning HPC or AI infrastructure.

With Bright and Dell EMC, organizations can confidently deploy validated HPC and AI solutions that drive business outcomes that count:

- Accelerated time to value
- Maximized uptime of HPC clusters
- Simplified systems management and administration
- Built-in flexibility, scalability, and future-proofing
- Support for hybrid clusters that leverage on-premises and cloud-based resources

LEARN MORE

For more information, please visit:

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¹ Acumen Research and Consulting, "High-Performance Computing Market is anticipated to grow with 25.2% CAGR during the forecast time period 2018-2026," December 2018.

² Acumen Research and Consulting, "High-Performance Computing Market is anticipated to grow with 25.2% CAGR during the forecast time period 2018-2026," December 2018.

³ Dell EMC ebook, "Making digital transformation in healthcare a reality," February 2018.

⁴ Earth Institute at Columbia University, "Artificial Intelligence—A Game Changer for Climate Change and the Environment," June 2018.

⁵ CNBC.com, "One-quarter of CFO Council members say A.I. is 'critical' to their companies," June 2017.