



Energy

Securing the Future of the Energy Sector with AI and Edge Computing

Get started >

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Modernizing the Energy Sector for Efficiency and Resilience

The energy sector stands at a pivotal moment, navigating a complex and rapidly evolving landscape. With global energy demand continuing to grow significantly alongside customer demand for reliable, resilient and affordable energy, organizations across oil, gas and utilities are forging a new, transformative path. This journey requires a fundamental shift in strategy, where operational resilience and powerful digital innovation must unite to define the future of energy. Embracing this profound change is no longer just an option, it is an essential requirement for delivering reliable energy to power the lives of businesses and communities everywhere.



Redefining the Energy Value Chain

Every link in the modern energy value chain is undergoing significant transformation. Organizations are moving towards grid-interactive operations, integrating DERs, battery storage, EVs and advanced metering infrastructure for two-way intelligence and balancing. These changes are driven by new technologies like AI and the need to meet growing energy demands, while prioritizing efficiency. Massive volumes of data are now at the edge of our energy ecosystem,

from smart meters in households to offshore rigs in remote locations. This data holds immense potential for driving efficiencies, optimizing energy usage and enabling innovative solutions that support sustainable outcomes. As the energy sector continues to evolve, these advancements are shaping a future where energy systems are smarter, more connected and better equipped to meet the challenges of tomorrow.

Market Dynamics in the Energy Industry

Success in this new era requires energy organizations to reimagine operations.



Improved Operational Efficiency

Analytics and AI will fuel optimization and improve discovery, extraction and oil field operations. Utilities will have improved visibility and insights to demand potential downtime related events.



Technology Advancement

AI will power many use cases from computer vision and edge computing for observability to digital twins for predictive maintenance, all giving more insight to key decisions.



Application Modernization

Key applications require modern compute, storage and networking to take advantage of AI decision making, including enhancing Grid operations as utility companies increase capacity.



Cyber Resilience

Refineries, transmission assets and substations are prime targets for cyber and physical threats. As more data is utilized at the edge, ensuring OT security and zero trust across the environment is critical.



Sustainability and Lowering Emissions

Energy providers turn to renewables to meet demands, while AI data centers must enhance power, cooling efficiency and leverage AI for improved Grid-Aware operations across the energy continuum.

AI is Transforming How Energy Organizations Operate

AI is revolutionizing energy operations by using data to drive efficiency, improve grid reliability, advance sustainability efforts and reduce costs.

Here's how AI is making an impact:



Balancing Energy Supply and Demand

Real-time AI models predict and adapt to fluctuations, ensuring grid stability.



Improving Field Safety

Computer vision monitors hazards, automates asset inspection and enforces compliance with safety protocols, protecting workers.²



Predicting Equipment Failures

Advanced analytics foresee maintenance needs, reducing downtime and disruptions. Using AI, companies can see a 25% improvement in the productive life of oil & gas wells.



Pinpointing New Resources

Machine learning accelerates subsurface data analysis, cutting the time and cost of resource discovery.

76% of US utilities now use AI-enabled advanced distribution and outage modeling³

² Asimily, Reuters, "AI leading to faster, cheaper oil production, executives say", <https://www.reuters.com/business/energy/ceraweek-ai-leading-faster-cheaper-oil-production-executives-say-2025-03-13/>

³ Renewable Energy World, "What are the biggest challenges utilities are facing in 2024?", <https://www.renewableenergyworld.com/power-grid/what-are-the-biggest-challenges-utilities-are-facing-in-2024/>



Unlocking AI and Edge Computing's Strategic Potential

AI and edge computing together are transforming the energy industry, enabling organizations to innovate, collaborate and thrive in a rapidly evolving landscape.



Future-Proofing Infrastructure

AI-augmented edge computing helps to deliver resilient systems that adapt to changing energy demands, regulatory requirements and new technology capabilities.



Accelerating Innovation at the Edge

AI-optimized grid systems, microgrids and advanced energy storage systems all require real-time AI-augmented data analysis at the edge running a mixture of modern cloud-native containerized workloads and legacy virtualized OT applications.



Fostering Industry Collaboration

Edge platforms connect stakeholders across the energy value chain. By bridging the gap between upstream exploration, midstream transport and downstream delivery alongside power generators, grid operators and consumers, it enables seamless data and joint innovation.



Driving Competitive Advantage

Organizations leveraging AI and edge computing can operationalize new technologies quickly and efficiently to drive down costs and accelerate time to value.

By combining the power of AI and edge computing, energy organizations can unlock new levels of efficiency, innovation and collaboration, paving the way for a smarter, more sustainable future.



Evolving Regulations and Reporting Requirements



Customer appetite as well as evolving global regulations and reporting requirements are also driving change. Future mandates are expected to require enterprises to integrate operational, emissions and supply chain data into unified, auditable reports.

Simultaneously, the rapid expansion of data centers supporting AI workloads is expected to quadruple AI data center electricity consumption by 2030.⁴ By 2030, global data center usage will more than double, reaching approximately 945 TWh worldwide, driven primarily by AI and digital workloads.⁵ These trends highlight the urgent need for energy-efficient solutions across sectors.

The introduction of the EU CSRD, with its requirement to report over 1,000 ESG data points⁶ is amplifying regulatory pressure, but the real acceleration in sustainability efforts comes from broader market forces. Enterprises and their energy customers are now judged and are choosing partners based on measurable efficiency, carbon reduction and resilience. In an era of rising energy costs, carbon pricing and stakeholder expectations, aligning operations with genuine sustainability outcomes has shifted from compliance obligation to competitive necessity, making energy-efficient, AI-enabled edge solutions essential for both regulatory adherence and long-term business success.

⁴ Asimily, "IEA, "AI is set to drive surging electricity demand from data centres while offering the potential to transform how the energy sector works": <https://www.iea.org/news/ai-is-set-to-drive-surging-electricity-demand-from-data-centres-while-offering-the-potential-to-transform-how-the-energy-sector-works>

⁵ IEA, "Energy and AI": <https://www.iea.org/reports/energy-and-ai>

⁶ Goodlab, "Decoding the EU's ESG Regulations: What U.S. Companies Need to Know": <https://getgoodlab.com/resources/the-eu-esg-regulatory-landscape/>

Breaking Barriers: Tackling Modernization Challenges

AI offers immense promise, but implementation at scale brings obstacles:



Data Intricacy

Most energy companies have unified their data, yet rising volumes, new use cases and inflexible legacy architectures prevent them from delivering the real-time, customized outcomes that the business now demands. More critically, proprietary exploration data, grid optimization models, and operational intelligence represent billions in competitive IP—data that cloud-based AI solutions expose to third-party infrastructure and potential regulatory risk.



Attracting the Right Skills and Talent

The energy industry is now recognizing the importance of attracting the best software talent. As regulations modernize and companies embrace more agile investment approaches, a new generation of digital-native platforms is emerging, designed for both the reliability that customers expect and the speed that innovation demands. To help scale the required innovation requires new talent, significant capital and deep operational transformation.



Security

Blended digital and legacy OT systems based on old (often unpatched) systems create vulnerabilities, especially as cyberattacks on critical energy infrastructure have risen 70% year-over-year, with the energy sector now facing 39% of all global critical infrastructure attacks. Beyond cyber threats, energy organizations face regulatory mandates (NERC CIP, CFATS) requiring data sovereignty, plus competitive imperatives to protect proprietary seismic data, reservoir models, and grid intelligence from exposure through third-party cloud services.⁷



Edge Complexity

In the energy industry, spanning remote oil rigs, smart grids, wind farms and EV charging networks, operators face escalating complexity from deploying thousands of IoT sensors and devices across vast, edge locations, often lacking robust real-time analytics. Sending this edge-generated data to cloud providers for AI processing introduces latency, unpredictable costs per inference call, and exposes operational patterns that competitors could access. On-premises AI infrastructure keeps intelligence local, reduces ongoing cloud fees, and ensures millisecond response times for critical grid and field operations.

Overcoming these hurdles demands resilient, future-ready infrastructure and strategic partnership.

⁷ Asimily, "Top Utilities Cyberattacks of 2025 and Their Devastating Impact on Critical Infrastructure": <https://asimily.com/blog/top-utilities-cyberattacks-of-2025/>



Laying the Digital Foundation for Energy's Future



As AI adoption accelerates across the energy sector, organizations are encountering significant challenges in establishing a digital foundation strong enough to support and drive future innovation. The demands of modern AI require more than just powerful processors; they need an integrated ecosystem of hardware and software designed to handle complex workloads and vast amounts of data. This is precisely where many energy companies find themselves struggling, balancing the need for cutting-edge technology with the realities of existing infrastructure and budget constraints —while simultaneously deciding whether to rent AI capabilities from cloud providers (exposing proprietary data and paying perpetual fees) or build their own Intelligence Factory that transforms unique energy data into lasting competitive advantage under their complete control.

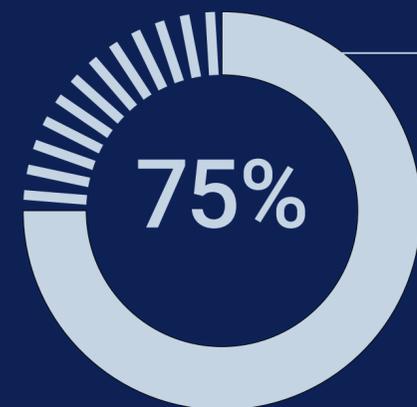


Unlike cloud-based AI that exposes your subsurface models, grid intelligence, and operational insights to third-party infrastructure, Dell AI Factory keeps your competitive IP within your controlled environment—ensuring data sovereignty compliance, eliminating unpredictable cloud inference costs, and maintaining the low-latency performance critical for real-time energy operations. By building on this powerful base, you can unlock new possibilities, drive operational efficiency and deliver transformative results that will define the future of energy. By building on this powerful base, you can unlock new possibilities, drive operational efficiency and deliver transformative results that will define the future of energy.

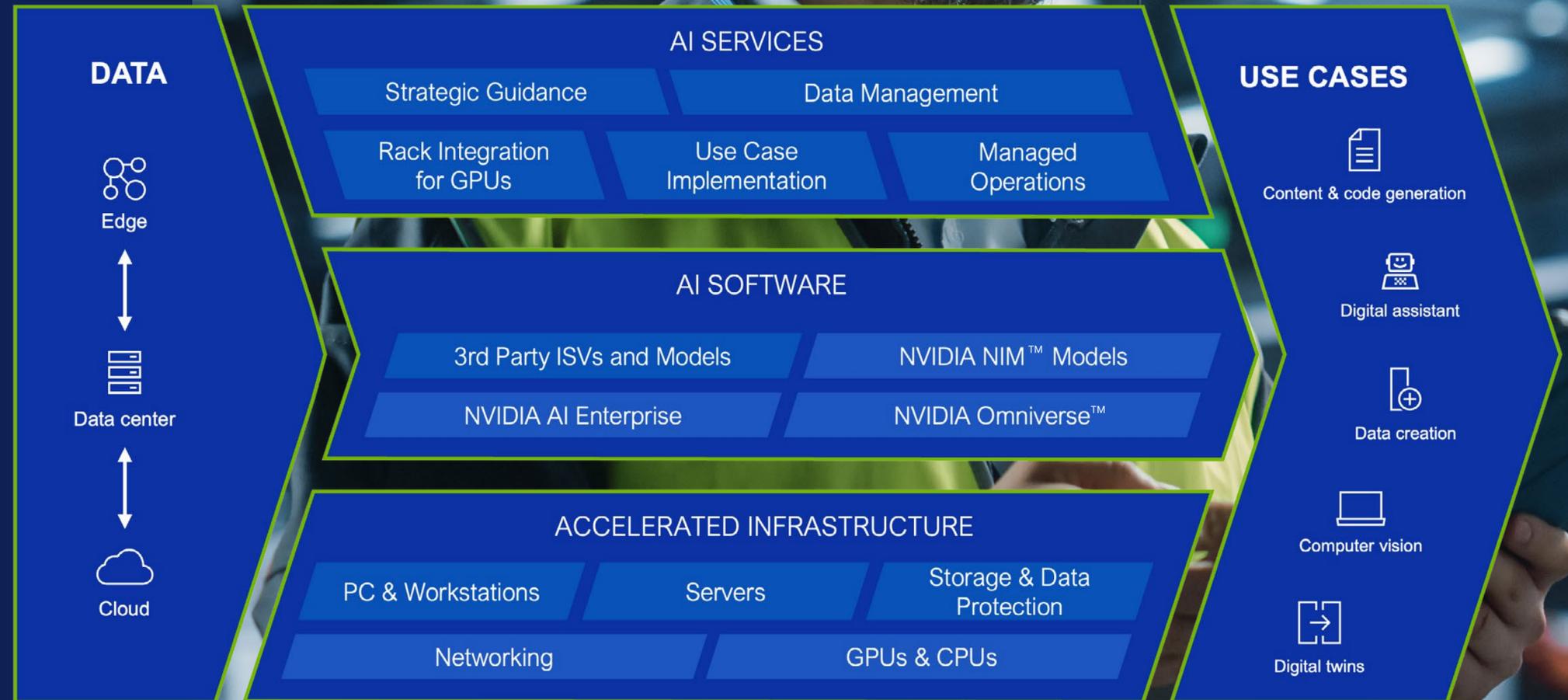


The Dell AI Factory with NVIDIA Accelerates AI Innovation

The Dell AI Factory with NVIDIA is a robust, end-to-end foundation for enterprise AI in energy, empowering you to maximize the full value of your data, wherever it's generated –while maintaining complete control over your intellectual property, regulatory compliance, and total cost of ownership. Build your own Intelligence Factory where proprietary exploration data, grid optimization algorithms, and operational insights remain secure within your infrastructure, not exposed through third-party cloud platforms



Gartner predicts 75% of enterprise-managed data will be created and processed outside of core data centers or cloud.⁸



⁸ <https://www.datacenterfrontier.com/sponsored/article/55089717/involta-the-competitive-edge-of-enterprise-edge>

Accelerate AI Innovation at the Edge

From wind turbines on remote hillsides to sensors on offshore platforms, the edge is where modern energy is generated and distributed. With edge computing, critical data doesn't need to travel to a centralized location for processing. AI at the edge enables data to be analyzed and acted upon where it originates. By automating decisions and processes directly at the edge, this delivers significantly reduced latency, faster real-time insights and more reliable operations, empowering energy companies to meet demand efficiently and safely.

87%

of the Fortune 100
use Dell Technologies
edge solutions⁹

#1

Dell Technologies is the
global leader in edge storage
and edge servers¹⁰

⁹Dell Technologies internal analysis of US Fortune 100, February 2025

¹⁰ IDC Worldwide Quarterly Enterprise Infrastructure Tracker: Buyer and Cloud Deployment, Q3 2024, January 2025. Based on revenue. Edge storage and edge servers refer to the heavy edge category, which IDC defines as the physical equipment that serves as the foundational infrastructure for edge.



Dell NativeEdge extends the capabilities of the Dell AI Factory with NVIDIA to the edge, helping energy organizations securely expand their infrastructure and manage AI applications from anywhere. It offers seamless support for virtualized and containerized environments, while NativeEdge Blueprints automate the deployment of frameworks and applications to accelerate AI innovation.

-  Lower operational costs with zero-touch deployment and automated application orchestration.
-  Streamline operations and free up valuable time by centrally managing a wide range of devices and edge AI applications.
-  Innovate faster by easily deploying new AI use cases, powered by Dell and NVIDIA, to maintain your competitive edge.

Benefits of Dell NativeEdge

The world's most **adaptable and open** edge operations ecosystem¹¹

Up to **68% time savings** by automating edge application orchestration¹²

Less than 1 minute to deploy infrastructure and applications¹³

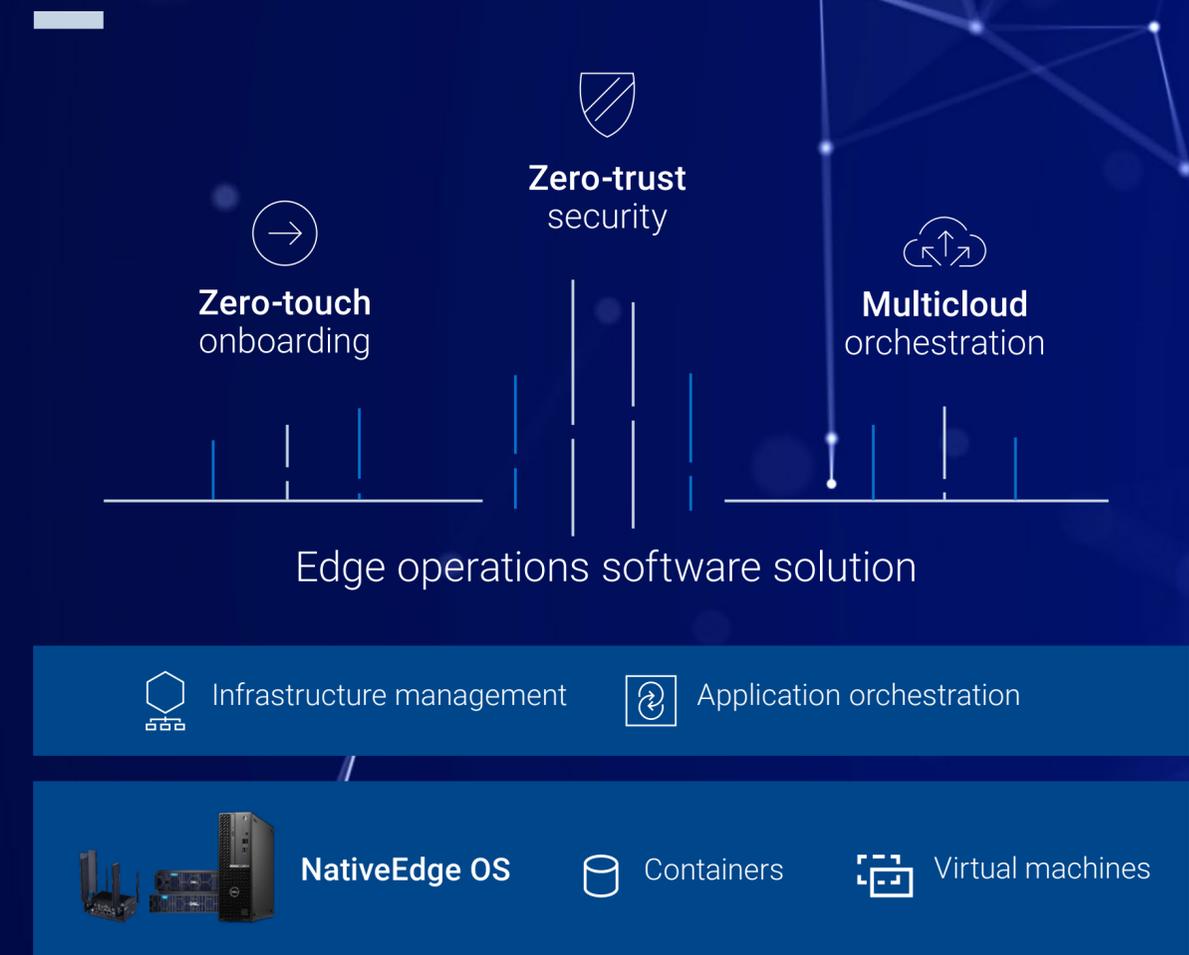
¹¹ Based on Dell Technologies internal analysis, February 2025

¹² Enterprise Strategy Group by TechTarget Technical Validation commissioned by Dell Technologies, "Dell NativeEdge - Edge Operations Software Platform," February 2025.

¹³ Enterprise Strategy Group by TechTarget Technical Validation commissioned by Dell Technologies, "Dell NativeEdge - Edge Operations Software Platform," February 2025.



Dell NativeEdge: Driving AI Innovation Where it Matters Most



Why Dell NativeEdge and NVIDIA for Energy

Dell NativeEdge is the first edge orchestration solution that automates the delivery of NVIDIA AI Enterprise software, bringing NVIDIA frameworks for video analytics, speech and translation and optimized inferencing to your edge devices. This keeps your proprietary operational data—from seismic analysis to grid intelligence—processing locally within your controlled infrastructure, not exposed through third-party cloud services.

This capability is powered by NativeEdge Blueprints, which act like a recipe, detailing the ingredients and steps for automated deployment. This includes application settings, infrastructure resources, network configurations and custom workflows.

This purpose-built architecture of Dell NativeEdge and NVIDIA delivers:



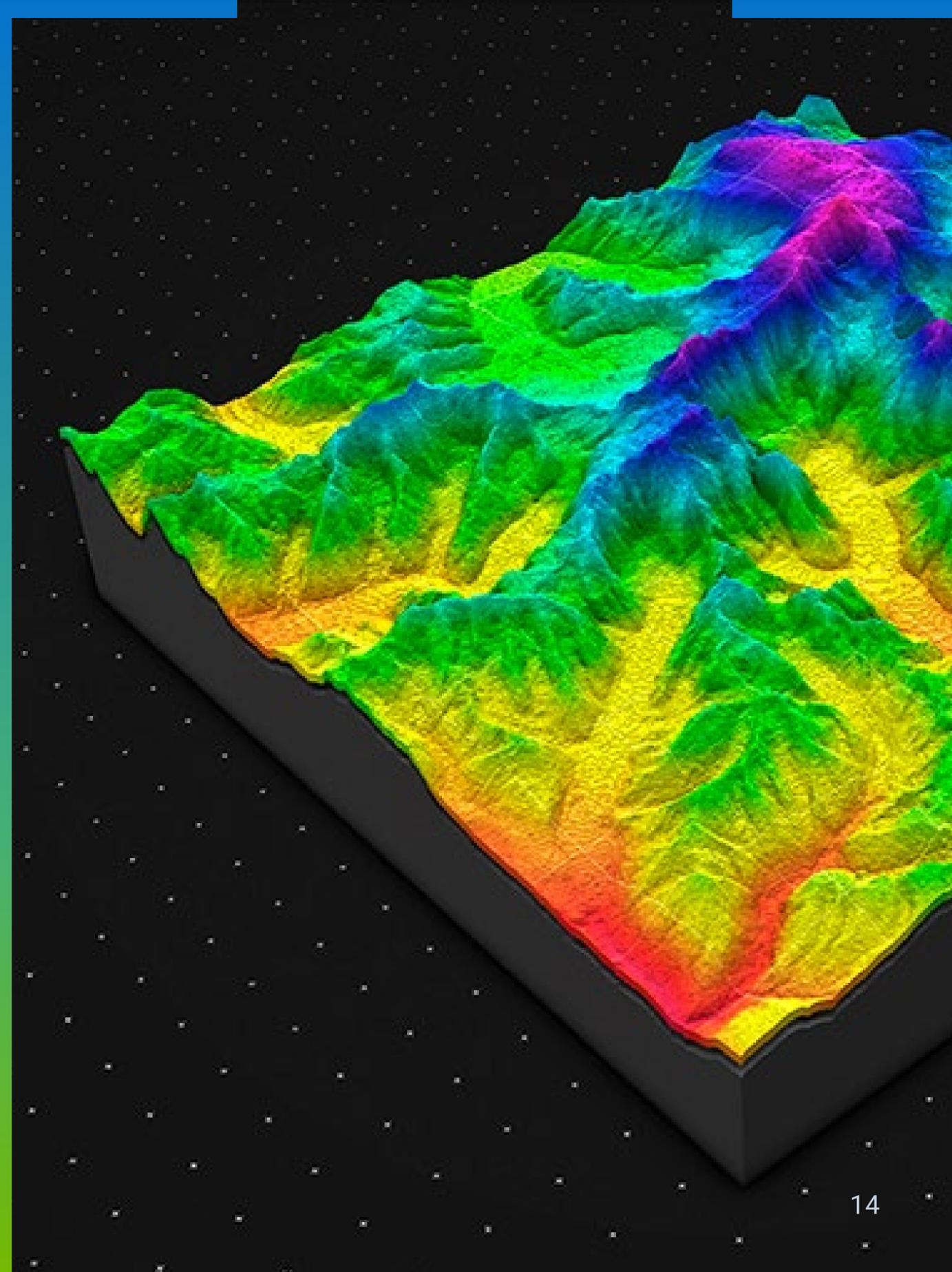
Faster, easier deployment to distributed edge locations



Zero-touch, zero-trust delivery that protects competitive IP



Full scalability, supporting everything from solar panels to national grids



Infrastructure is the Foundation of the Dell AI Factory with NVIDIA

The Dell AI Factory with NVIDIA brings together Dell AI Infrastructure for powerful computing and networking, enhanced by enhanced by NVIDIA accelerated computing, NVIDIA AI Enterprise software and Dell Professional Services, to form a seamless, all-in-one solution for businesses ready to unlock the power of AI. Our edge-optimized platforms for AI provide a wide range of capabilities, such as:

- Ruggedized platforms
- GPU-enabled systems
- Small form-factor products
- Long life systems
- Industry certifications
- OEM-Ready solutions (de-branded, re-brand ready)
- Customization capabilities



PowerEdge Servers

Fast-track your edge AI goals using PowerEdge servers with superior acceleration, diverse NVIDIA Data Center GPU options and rugged, small footprint and industry certified platforms.



Dell Laptops and Workstations

Allow AI processing locally on the device. Our broad portfolio of portfolio of NVIDIA RTX PRO™ AI Workstations provide the necessary hardware and software infrastructure to enable AI inferencing at the edge, empowering organizations to leverage the power of AI in real-time.



Dell Streaming Data Platform (SDP)

Ingest, store and analyze streaming data at the edge and core, critical for real-time analytics and edge inferencing pipelines.



Cyber Resiliency for AI/Edge

Recover clean data after cyberattacks using PowerProtect Cyber Recovery with CyberSense, an air-gapped vault with immutable copies and ML-based integrity validation.



Storage and Data Protection

Unlock the value of edge data and secure AI workloads against data loss and cyber threats with modern, simple and resilient storage and data protection solutions.



Disaggregated Infrastructure

Benefit from the breadth of the Dell Technologies portfolio that helps to transform energy IT environments into open ecosystems with dynamic scaling of compute, networking and storage as shared resource pools.



Networking

Enable simplified design, management and monitoring of powerful Ethernet fabrics to handle modern workloads like generative AI and edge AI inferencing.



Data Management

Empower your customers to access data across edge, core and multi-cloud to power analytics workloads for faster model tuning and business insight.



Enabling Edge AI Innovation with Advanced Server Hardware

As energy companies embrace a digital-first approach, the need for secure, high-performance infrastructure has never been greater. Dell PowerEdge XR servers, powered by Powered by NVIDIA accelerated computing, are designed to tackle these challenges, delivering scalable, high-powered solutions for AI applications at the edge. With real-time data analysis capabilities, these servers ensure low latency and high performance beyond traditional facilities, even in remote or extreme environments.

Built to Withstand the Toughest Environments:

- Extreme heat and cold
- Dust
- Shock and vibration of factory floors
- Construction sites
- Mobile command centers
- Other extreme environments

Dell's XR family of rugged edge servers is IEC-validated for use in substations and other industrial edge environments, delivering reliable performance in demanding conditions.



Take the Next Step

The Dell Accelerator Workshop is a great first step for energy companies looking to begin their AI and edge journey. This half-day program focuses on the activities required to achieve your desired end state, concluding with next steps to further advance your business and IT strategies. Your team will work with Dell experts to develop a point of view on important gen AI questions and create a vision for your future state. Utilizing our “AS-IS” / “TO-BE” methodology, we’ll conduct interviews and review your existing environment to identify challenges, opportunities and drive consensus for gen AI, synthesized in an Executive Overview. Interested in validating the capabilities of NativeEdge in your edge environment? Contact your Dell sales representative to discuss the possibility of deploying an onsite proof-of-concept experience for Dell NativeEdge.

Accelerate and Simplify your AI Journey with Professional Services



Develop a generative AI strategy and roadmap tailored to your organization



Prepare your data for generative AI integration, inferencing and model customization



Build your generative AI operations with training and infrastructure management expertise



Harness the power of data generated at the edge to meet the evolving and rigorous requirements of the energy industry with the Dell AI Factory with NVIDIA and Dell NativeEdge.



Dell AI Factory

WITH NVIDIA



[Learn more about the Dell AI Factory with NVIDIA >](#)

[Learn more about Dell NativeEdge >](#)

