TECHNICAL VALIDATION

Dell NativeEdge – Edge Operations Software Platform

Simplify, Optimize, and Protect Edge Computing

By Craig Ledo, Senior IT Validation Analyst, and Tony Palmer, Practice Director
Enterprise Strategy Group

February 2025

Contents

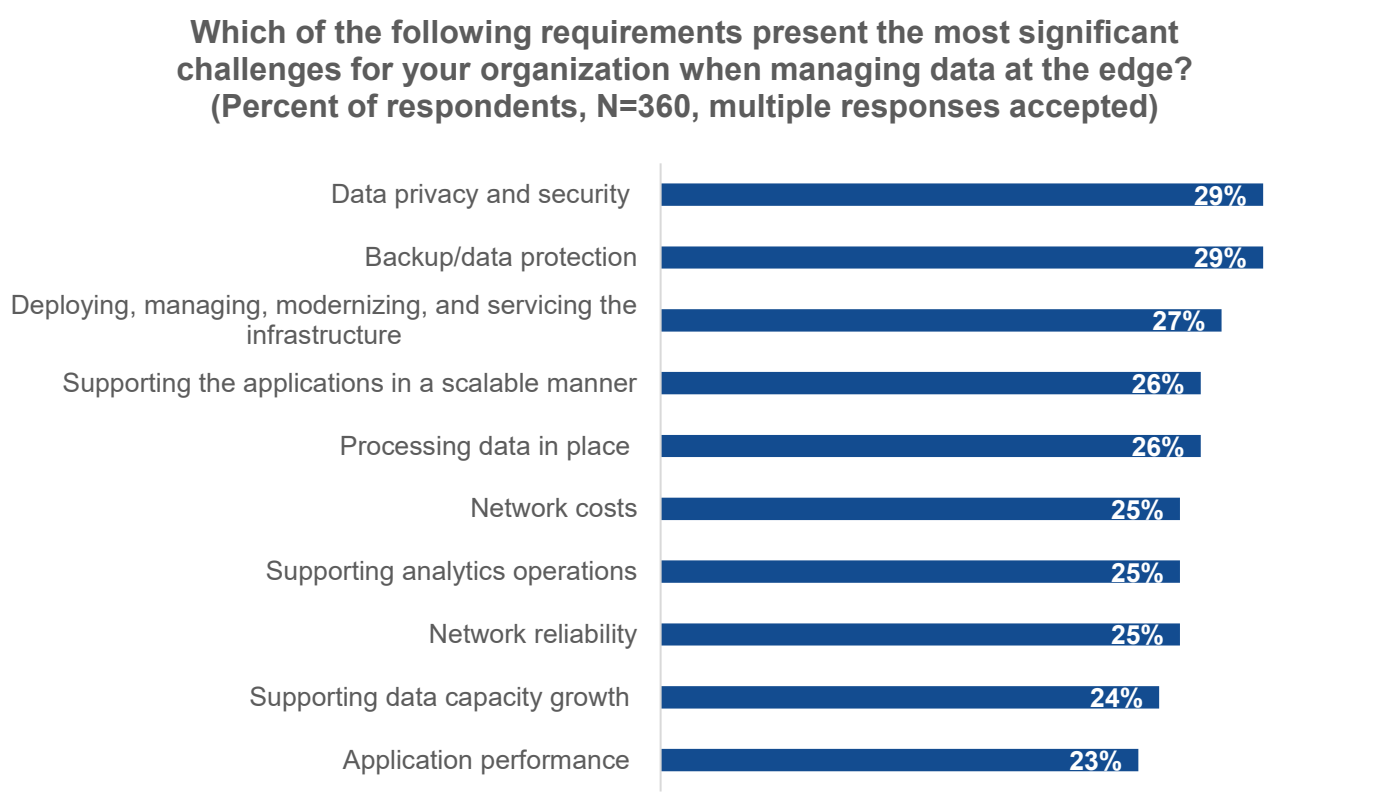
Introduction

This Technical Validation from Informa TechTarget's Enterprise Strategy Group documents the detailed evaluation of Dell NativeEdge, an edge operations software platform, including how the platform centralizes and automates end-to-end deployment, ongoing operations, and management of distributed edge infrastructure and applications.

Background

Enterprise Strategy Group research shows that edge computing (computing outside the data center or cloud) locations are increasingly important and often mission-critical sites for business operations. Reflecting the value of edge deployments to overall business strategies, organizations are managing and securing edge applications, data, and infrastructure across distributed environments, and generating value from data generated at the edge can be complex. However, while edge locations hold plenty of data at any given time, that data doesn't stick around long. The generally short edge retention policies, combined with the large amounts of data typically stored, tend to present numerous challenges for organizations with ongoing edge initiatives. Chief among these challenges is data privacy and security, identified by 29% of organizations as a significant challenge when managing data at the edge, followed by backup and data protection (29%), infrastructure deployment and management (27%), scalable application support (26%), and processing data in place (26%, see Figure 1).[1]

Figure 1. Security, Protection, and Infrastructure Management Are Top Edge Data Challenges



Source: Enterprise Strategy Group, a division of TechTarget, Inc.

[1] Source: Enterprise Strategy Group Research Report, *Unleashing the Edge: Use Cases, Challenges, and Requirements in Edge Infrastructure and Environments*, March 2024. All Enterprise Strategy Group research references and charts in this technical validation are from this research report.

In addition, compute at the edge has a unique set of challenges that demand a new architecture. The edge can be anywhere, and environmental and hardware diversity makes testing, validating, integrating, deploying, and managing the hardware and associated software a critical path. Maintaining such a complex ecosystem of hardware and software with diverse form factors, network connections, ruggedization requirements, and configurations is a significant challenge that must be addressed for large-scale edge deployments.

Operational technology (OT)—the category of hardware and software that monitors and controls how physical devices perform—needs to support both legacy and next-generation workloads deployed in various forms, such as VMs, containers, and serverless designs. The technological underpinnings must be stable, secure, and highly available to meet the needs of these edge-native applications.

Security, support, and efficient distributed systems operations are key business-level concerns for distributed edge deployments like retail outlets and distribution centers. Physical and logical security are crucial as the attack surface of an organization massively expands. Zero-trust security concepts should be applied across the entire supply chain, from the partner network to the production floor. Supporting and managing these distributed systems in locations without technical personnel must be simple, scalable, and easily repairable. Systems must be fundamentally zero-touch once plugged in and powered on.

The ability to deploy and secure workloads anywhere and to centrally monitor and report on technical and business-level changes are other critical concerns at the edge. Application orchestration solutions designed for edge deployments must be able to securely deploy these operations workloads to the cloud of their choice.

Attempts to solve edge challenges with use-case-specific custom solutions can result in technology silos that can increase complexity and inhibit scalability as use cases and workloads increase over time.

These challenges are driving business and technology requirements that demand a new approach. **Centralized management platforms can be the key to unlocking the edge's potential, streamlining operations and securing a distributed landscape.**

Dell NativeEdge Overview

As shown in Figure 2, Dell NativeEdge is an edge operations platform designed to simplify, optimize, and protect edge computing operations across the entire infrastructure lifecycle. The solution offers fleet management and application orchestration to the edge, core data centers, and cloud.

Organizations need to deploy and manage their edge computing operations with efficiency, agility, and reliability. Dell NativeEdge handles the deployment and ongoing management of both infrastructure and applications, while providing the following key capabilities to assist with simplifying edge computing operations:

- Delivers a centralized view that lets organizations view and manage their endpoints and applications consistently across locations, without the need for local IT experts.
- Automates zero-touch provisioning and secure device onboarding, along with lifecycle management, for NativeEdge Endpoints—i.e., edge infrastructure from Dell's portfolio that are specifically optimized and enabled with zero trust for NativeEdge—at the edge.
- Automates deployment and lifecycle management of applications on NativeEdge Endpoints as well as on non-NativeEdge endpoints, spanning from edge to multicloud environments.
- Empowers organizations to scale their edge management consistently across different geographic locations, data centers, clouds, colocation facilities, or edge locations.
- Simplifies orchestration of applications and infrastructure as code with REST APIs and DevOps tools.

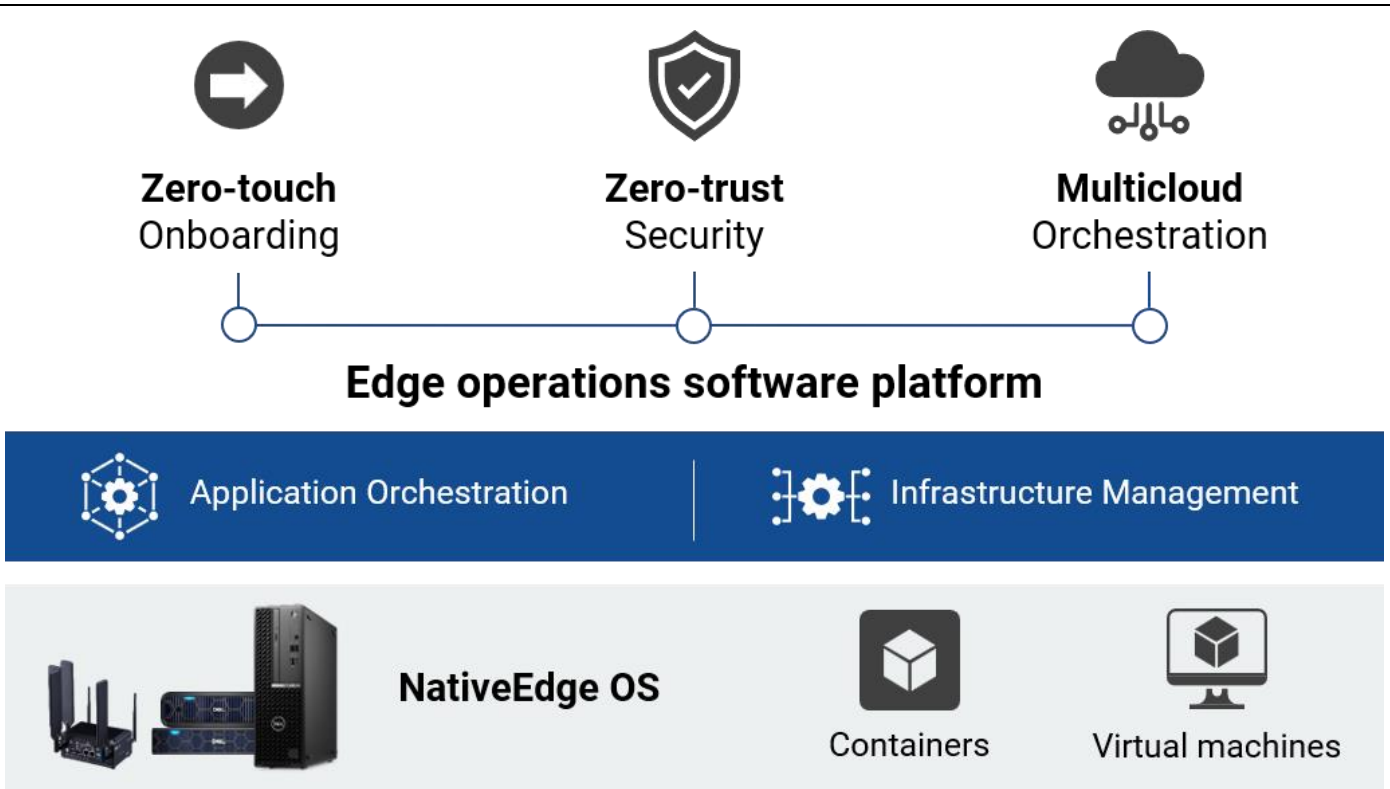
Organizations also need to consolidate their existing and new edge use cases using an open design that works with their choice of software applications, IoT frameworks, OT vendor solutions, and multicloud environments. Dell NativeEdge offers the following capabilities to optimize edge computing operations:

- Consolidates siloed AI and edge solutions onto a unified platform architecture for scalable and efficient utilization of infrastructure resources.
- Manages edge devices and application workloads in a consistent way.
- Optimizes orchestration and management of AI/ML applications with NativeEdge integration for NVIDIA AI (i.e., Metropolis, Riva, NIM) and Intel AI (i.e., Geti, OpenVINO), ensuring flexibility and choice.
- Develops and deploys AI solutions faster and easier using NVIDIA or Intel deployment blueprints.

Finally, organizations need to ensure zero trust that protects data, application, and infrastructure layers to ensure integrity and safety of the enterprise. NativeEdge security capabilities:

- Ensure the integrity of the edge hardware and software with centralized security controls that IT teams can manage from a single pane of glass.
- Leverage tamper-proof edge hardware that ensures the integrity from design to deployment and along the supply chain to protect applications and data.
- Enable a secure operating environment, ensuring applications are run in secure VMs or containers where information stays protected.

Figure 2. Dell NativeEdge Overview



Source: Dell and Enterprise Strategy Group, a division of TechTarget, Inc.

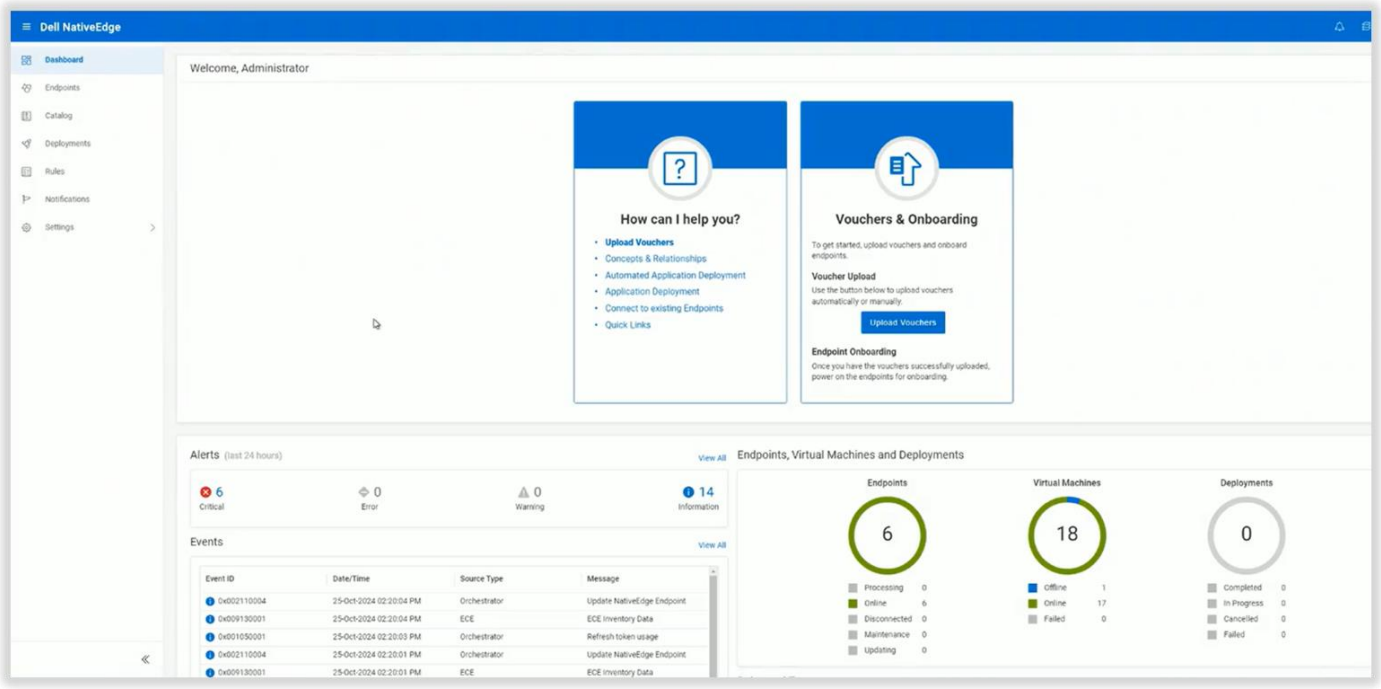
Enterprise Strategy Group Technical Validation

Enterprise Strategy Group validated how Dell NativeEdge simplifies edge deployments with zero-touch onboarding, optimizes operations with multicloud orchestration, and ensures a zero-trust chain of custody.

Simplified Edge Computing Operations

Enterprise Strategy Group reviewed how Dell NativeEdge provides simplified edge computing operations. Figure 3 shows the Dell NativeEdge dashboard, which includes a help section, a vouchers section, and an onboarding section. The dashboard also includes alerts, events, endpoints, virtual machines, and deployments.

Figure 3. Dell NativeEdge Dashboard



Source: Dell and Enterprise Strategy Group, a division of TechTarget, Inc.

NativeEdge enables organizations to scale, monitor, and manage with zero-touch onboarding and deployment, centralized management, application orchestration with a blueprint catalog, simplicity for edge deployment, and AI solution deployment.

Enterprise Strategy Group Analysis

An organization's edge operations software needs to scale to hundreds—and in many cases thousands—of devices. From managing disparate hardware, software, and the volume of data collected from sensors to providing maintenance and ensuring security, this can be a real challenge from a management perspective.

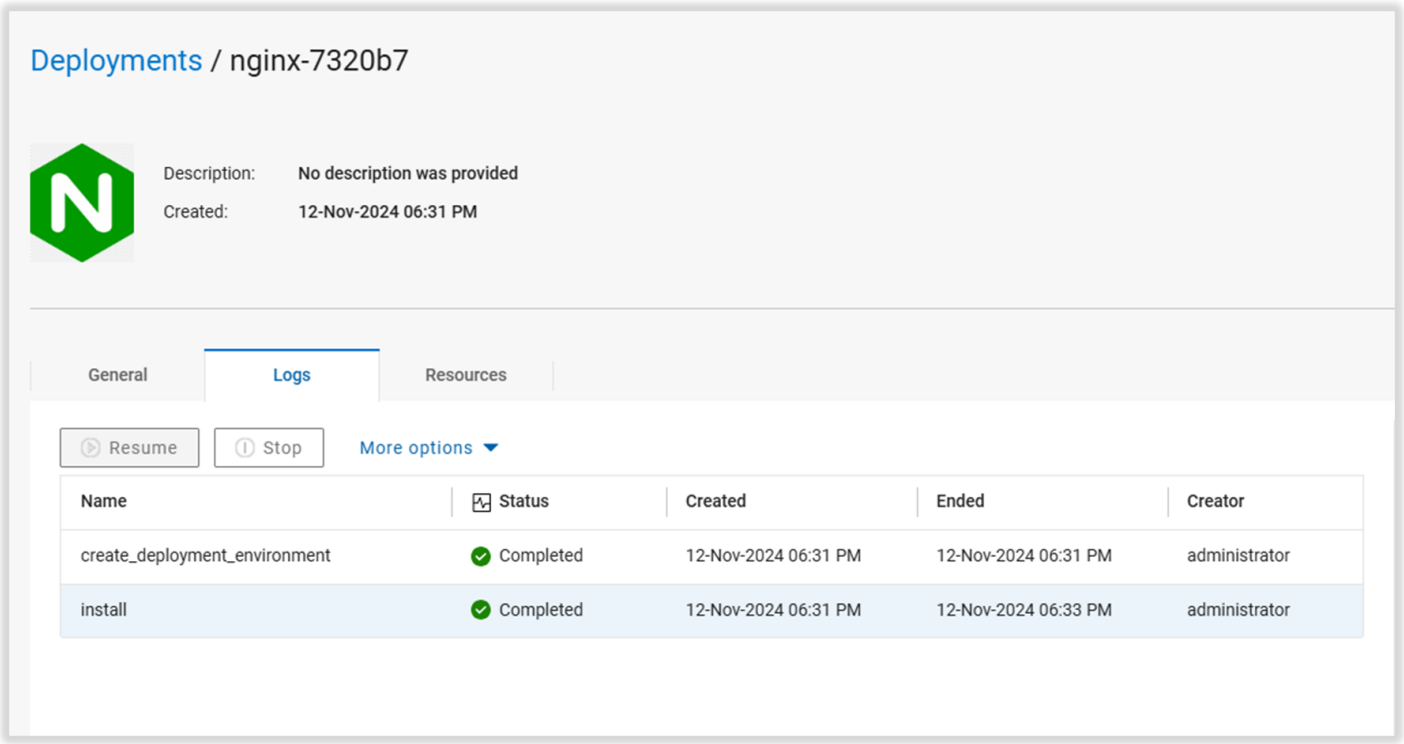
We tested a Dell Edge Gateway 3200 as a NativeEdge Endpoint. We plugged in the power cord and network cable and pressed the power button. The operating system and applications were deployed into the NativeEdge Gateway environment with no local interaction required in under one minute. The solution provides visibility to all the endpoints and applications across an entire organization from a centralized point of view. For organizations without Dell NativeEdge, the IT team would have to send an IT admin to the edge location to deploy the device and

applications manually, and return to the location for maintenance and support. In addition to personnel costs, this increases the time to deploy, incident response time, and potential downtime.

With NativeEdge, users can also update devices or look at what VMs and applications are running on these devices. For applications, Dell provides blueprints for various applications and frameworks. Users can also create custom blueprints and bring them to the NativeEdge catalog. These blueprints automate the workflow and capture the key information and defaults that should be selected when the application is provisioned. For example, users could have a blueprint that provisions both the edge application as well as the cloud service that the application will be connecting to. By using blueprints in the catalog, users can orchestrate and manage the applications across their entire environment, including core, edge, and multicloud.

Figure 4 shows a NativeEdge deployment, including the properties (i.e., blueprint name, blueprint description, and creator), tags (i.e., version, solution, vendor, and target environment), inputs (i.e., artifact, variant, DHCP, disk, DNS, gateway, and CPU passthrough), and capabilities (i.e., installed software, VM host, VM name, and VM username).

Figure 4. Dell NativeEdge Deployment



Source: Dell and Enterprise Strategy Group, a division of TechTarget, Inc.

Why This Matters

Complexity at the edge is the source of multiple challenges and pain points for organizations across disciplines, from deployment to management, maintenance, and security. A quarter of organizations report inadequate IT resources or skill sets as a top challenge for third-party owned or managed edge environments. Finding skilled professionals who understand the complexities of managing distributed edge environments can be difficult. Integrating edge systems with existing infrastructure creates challenges due to architectural differences and potential compatibility issues. Furthermore, managing remote deployments can stretch IT resources thin and add logistical hurdles. Centralized management platforms can be the key to unlocking the edge's potential, streamlining operations, and securing a distributed landscape. This complexity is compounded by manual processes and siloed solutions at edge locations.

Organizations need to make it easy to manage their edge locations, and Dell NativeEdge meets that need by enabling users to update devices and applications and leverage blueprints to automate the workflow when provisioning applications.

Enterprise Strategy Group testing validated that beyond powering up the Dell Edge Gateway 3200, the operating system, and applications were deployed into the NativeEdge Gateway environment **in less than one minute**. For organizations with a large number of edge locations, this would save them from sending an IT admin to all the remote sites, saving time and freeing up IT resources to work on more strategic initiatives.

Optimized Edge Computing Operations

NativeEdge provides organizations with a consolidated framework, including multi-node, high-availability clustering for NativeEdge Endpoints, such as Dell PowerEdge servers, Dell OptiPlex and Precision workstations, and Dell Gateways. The solution enables automated deployment of AI frameworks from NVIDIA and Intel as well as open source tools.

Enterprise Strategy Group Analysis

Enterprise Strategy Group looked at how NativeEdge optimizes edge operations, including AI at the edge. Organizations are working on implementing AI at the edge but are finding it difficult and time-consuming to deploy AI applications and solutions across hundreds, if not thousands, of edge locations due to the complexity of managing and scaling across numerous distributed locations, which requires significant resources and expertise.

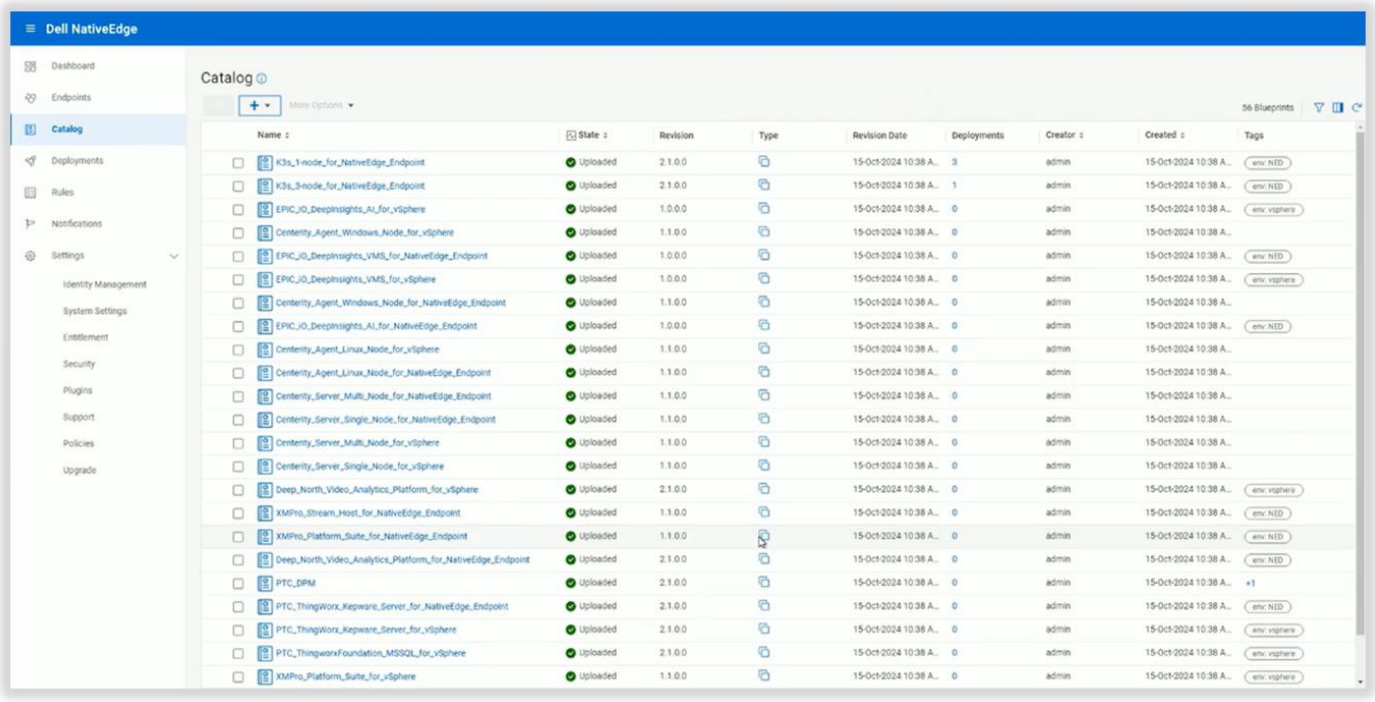
NativeEdge provides a secure, high-availability clustering capability for NativeEdge Endpoints to boost edge workload resiliency. The endpoints can be clustered or grouped together by NativeEdge software to act like a single system. This enables organizations to provide high-availability capabilities to maintain critical business processes and edge AI workloads, despite network disruptions or device failures. This includes increased reliability and continuous operations due to compute and storage failover capabilities.

In addition, NativeEdge easily adapts to changing workload demands across diverse environments, from retail stores to utility companies. The solution integrates NativeEdge Endpoints with external storage solutions, such as Dell PowerStore and PowerVault, to support the training and deployment of AI models with the versatility of single, two-tier, or three-tier solution architecture at the edge.

NativeEdge also provides a catalog of prebuilt blueprints that automate the deployment of an organization’s choice of edge and AI applications and frameworks. These blueprints offer users an easy way to assemble and deploy new use cases and AI capabilities at the edge, while reducing manual setup time and errors.

Figure 5 shows the NativeEdge Blueprint catalog where users have access to applications in a catalog, including AI-optimized solutions, off-the-shelf ISV applications, homegrown applications, or cloud-native runtimes. NativeEdge automation helps users get up and running right away and eliminates error-prone and time-consuming manual processes. In addition, users can adjust configurations and deployments remotely as their needs change over time.

Figure 5. Dell NativeEdge Blueprint Catalog



Source: Dell and Enterprise Strategy Group, a division of TechTarget, Inc.

NativeEdge can automate the delivery of NVIDIA AI Enterprise software. Looking at some real world use cases, a retail organization might want to use video analytics for loss prevention, speech and translation services for smart customer service chatbots, and optimized inferencing to edge devices for predictive maintenance, all using AI. Users can accelerate AI at the edge with NVIDIA frameworks, resulting in faster, easier deployment of AI inferencing solutions; zero-trust, zero-touch deployment of edge AI apps to endpoints; and easier edge AI solution lifecycle management. NativeEdge also has blueprints for open source tools.

We also reviewed how NativeEdge provides users with a standardized framework across a variety of devices (e.g., PCs, gateways, servers) as well as applications. Users can consolidate various edge applications on a common infrastructure, in a consistent way across all devices rather than having different management tools for different types of devices. Users can deploy any application framework or IoT framework with NativeEdge's open platform, which supports any IT/OT system.

For example, any application (e.g., homegrown) can be brought into NativeEdge's application catalog. This includes ISVs that can self-certify their applications, including industry-specific applications.

Enterprise Strategy Group performed an exercise to see how NativeEdge could optimize edge operations with its high-availability clustering capability for NativeEdge Endpoints. In a live demo environment, we walked through creating a cluster. In three clicks (or less than one minute), a cluster was created and brought online. We also added and removed nodes in one click (or less than 10 seconds).

Why This Matters

Edge computing is valuable to the business. Cutting costs and boosting operational efficiency are the main reasons organizations are turning to edge deployments. These environments also provide organizations with additional agility and control, with 91% seeking consistent management of applications and infrastructure. Edge computing is no longer just about saving money; it's about unlocking strategic growth, securing a competitive advantage, and providing exceptional customer experiences.

Enterprise Strategy Group validated the simplicity and speed for creating a cluster, **completing that task in three clicks**. Adding and removing nodes was accomplished **in seconds with a single click**. We also found it easy to move live VMs around the cluster without workload impact.

With the Dell NativeEdge platform, organizations can automate the delivery of infrastructure and applications, resulting in faster and easier deployment of AI-driven solutions to solve real world problems. In addition, organizations can enhance reliability and continuous operation of demanding workloads by leveraging the platform's high-availability clustering capability for NativeEdge Endpoints.

Protected Edge Computing Operations

As the number of remote sites in an organization increases, the attack surface of an organization expands in tandem, and ensuring the physical and logical security of devices, applications, and data becomes overwhelming. Legacy techniques and solutions like physical location passkeys, firewalls, and account-based security simply can't address these challenges. NativeEdge automation is designed to make implementing security simple and painless for customers.

NativeEdge provides a secure edge ecosystem using a zero-trust security framework, secure operating environment with advanced security controls, total control of edge devices from inception to retirement, and tamper-resistant edge hardware and software integrity.

Most importantly, organizations need to have zero-trust security, especially in edge environments, which are largely dispersed and equate to a larger attack surface. Users need to be able to validate that a device hasn't been tampered with before it gets provisioned inside the edge environment.

Enterprise Strategy Group Analysis

Enterprise Strategy Group reviewed NativeEdge zero-trust-enabling technologies across the ecosystem, including user, network, device, data and application trust, telemetry and analytics, and automation and orchestration.

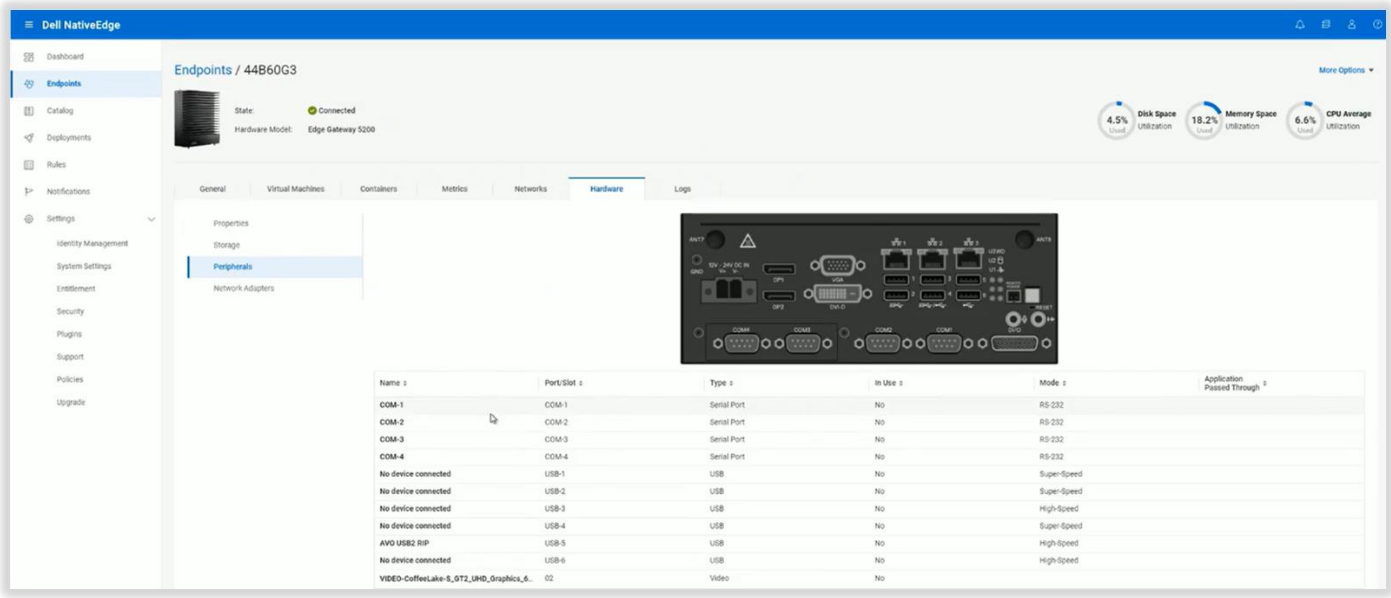
NativeEdge includes secured component verification, which ensures that the devices are delivered and ready for deployment exactly as they were built by Dell. The platform also secures the hardware with integrated cryptographic keys using a trusted platform module chip. This ensures that the connection to edge devices is highly secure and that they cannot be removed from the location or managed through any other means.

NativeEdge includes a secure operating environment, ensuring applications are run in a secure VM or container environment where the information can't be tampered with. This includes the ability to control devices, from onboarding to decommissioning or retiring, and to keep applications up to date.

Also, organizations need tamper-proof hardware and software at the edge, the same way organizations need security controls inside the data center. NativeEdge provides consistent management and control, along with the ability to keep edge infrastructure up to date and safe from cyberattacks.

Figure 6 shows the Dell Edge Gateway 5200—a NativeEdge Endpoint. This screen shows the endpoint's general information, virtual machines, containers, metrics, networks, hardware (i.e., properties, storage, peripherals, and network adapters), and logs. NativeEdge supports several Dell edge infrastructure products, such as Dell Precision and OptiPlex PCs, Dell Edge Gateways, and Dell PowerEdge servers, along with AI-optimized models including NVIDIA GPUs powered by the latest Intel technologies, as NativeEdge Endpoints.

Figure 6. Dell NativeEdge Endpoints



Source: Dell and Enterprise Strategy Group, a division of TechTarget, Inc.

We were walked through a demo example of delivering zero-trust capabilities with secure device onboarding, which starts at the time of order. When a device is selected (e.g., Dell Gateway), a user can select the option indicating that edge device will be managed by NativeEdge. This signals Dell Manufacturing that this will be a NativeEdge Endpoint, and then it will have an electronic voucher signed by Dell with a unique identifier on it. The voucher is sent separately with unique identifiers that say, "This edge device resides and belongs to you, Mr. Customer," in the NativeEdge Orchestrator itself, and it prompts customers to be on the lookout for a new edge device coming into the environment. When the device shows up at the edge location, the end user connects the device to the network and power source and then turns on the device. Next, the edge device and orchestrator start secure communication. Once the Orchestrator determines the authenticity and integrity of the new edge device through Secure Component Verification, it provisions the NativeEdge operating environment on top of the device.

Why This Matters

Edge locations generate, process, store, and destroy large quantities of data. Unlocking the value of this data requires robust data management platforms, especially for large organizations with enormous amounts of data. With increasing data usage, security and privacy concerns become paramount. The distributed nature and greater attack surface of edge computing can introduce new security challenges compared with centralized data processing. Data security is the top factor for decision-making around edge environments.

Enterprise Strategy Group validated the use case of delivering zero-trust capabilities with secure device onboarding at an edge location. **This process was automated and seamless, providing the security needed at edge locations.**

With the Dell NativeEdge platform, organizations can protect edge computing operations with zero-trust capabilities (e.g., user, network, device, data and application trust, telemetry and analytics, and automation and orchestration) to ensure security from the point of manufacture, along the supply chain, to the point of production.

Dell NativeEdge Business Value Analysis

Enterprise Strategy Group validated the time, effort, and cost to plan, deploy, and maintain edge infrastructure and applications to quantify the benefits Dell NativeEdge can provide for organizations managing numerous distributed edge locations over three years. We made a number of assumptions about the organization, using publicly available information, results of testing performed by Dell and Enterprise Strategy Group analysts, and implementation and maintenance data provided by Dell.

We considered a composite organization in the manufacturing industry for our analysis. The example organization has 10 edge locations in year one, adding 10 new locations in years two and three, for a total of 30 locations in year three. Each location was assumed to have 250 infrastructure assets under management. We assumed the organization would ramp up Dell NativeEdge coverage, starting at 30% of devices in year one, increasing to 80% coverage in year three.

We further assumed that the organization would need to employ skilled edge operations and DevOps personnel. Through online research, we determined an average fully burdened cost of $86.5K annually for edge ops admins and $125K for DevOps admins. We compared the time and cost of a manual approach to employing the Dell NativeEdge management platform for deployment and onboarding, orchestration and lifecycle management, and maintenance and updates. Our analysis covered Day 0 (the design phase), Day 1 (the deploy phase), and Day 2 (the operate phase).

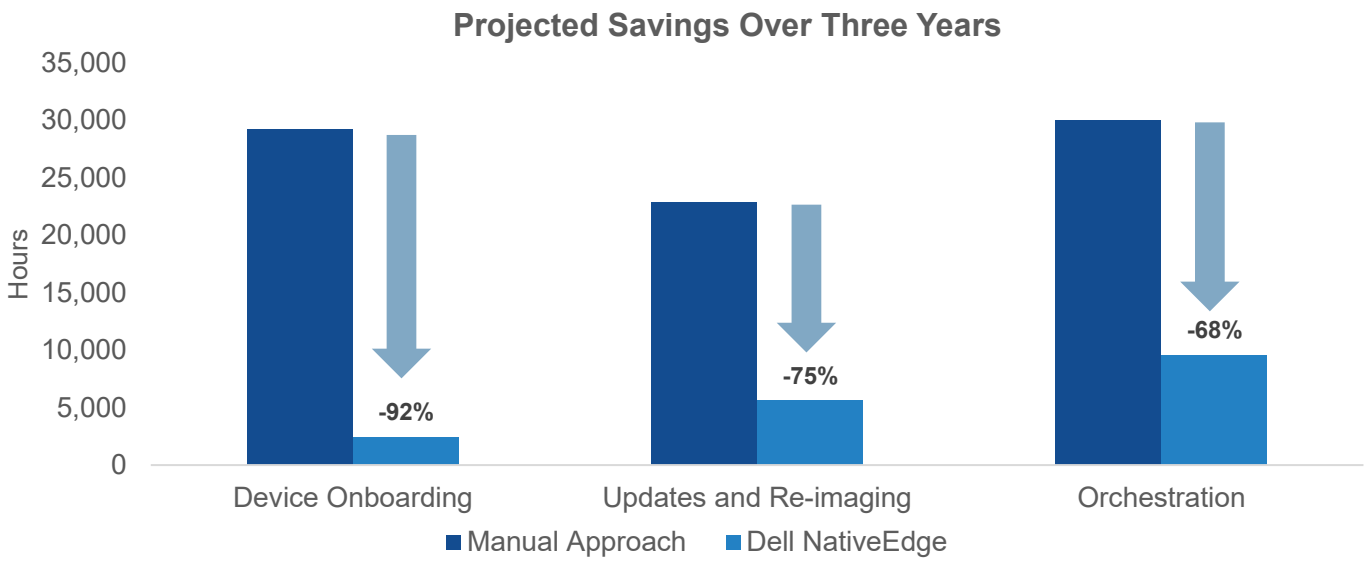
At Day 0, the design phase, organizations need to gather requirements; define access control policies; manage user moves, adds, connects, and disconnects; prepare security hardened golden images; research technology integrations; and configure single sign-on.

At Day 1, the deploy phase, organizations deploy into various edge locations. With NativeEdge centralized lifecycle management, users can deploy infrastructure and applications with zero touch. Organizations do not need highly skilled IT administrators on-site to onboard new edge hardware, update software, or deploy operating system patches across multiple sites, saving time and cost.

At Day 2, the operate phase, organizations need to focus on what happens once everything is deployed, including how to maintain and scale the infrastructure, onboard new users, ensure the health of applications, and more. In addition, organizations at this phase need to consider governance needs, visibility across deployments, utilization, monitoring across clusters, upgrades, security, configuration drift, backups, restores, etc.

We calculated the time saved in person-hours over three years due to Dell NativeEdge zero-touch secure device onboarding, automation of updates and re-imaging, and automation of application orchestration and lifecycle management (see Figure 7).

Figure 7. Dell NativeEdge Time Savings Over Three Years



Source: Enterprise Strategy Group, a division of TechTarget, Inc.

In total, our calculations showed that Dell NativeEdge was able to drastically reduce the time organizations need to spend deploying, maintaining, and managing edge infrastructure. In aggregate, a reduction of 79% (more than 64,000 hours) was calculated, representing projected savings of more than $3.3 million dollars for our composite organization over three years.

Why This Matters

Enterprise Strategy Group research reveals that the cost of managing and maintaining the infrastructure at remote sites (31%) and the cost of deploying physical infrastructure at remote sites (28%) are among the top factors influencing edge computing environment decisions. In addition, 30% of organizations identified a lack of skills to deploy, secure, and manage container-based and serverless applications at their edge locations as one of their most significant challenges.

Enterprise Strategy Group calculated that organizations could **reduce the time and effort needed to deploy, maintain, and manage edge infrastructure and applications by 79% over three years** by utilizing the Dell NativeEdge platform to centralize management and automate complex, error-prone manual tasks. This helps to reduce risk while optimizing time and costs.

Conclusion

To support business and operational goals, the name of the game with edge locations is careful planning. When it comes to storing, processing, and managing data, organizations must carefully consider their needs when purchasing supporting infrastructure. Against a backdrop of what Enterprise Strategy Group research found to be a data deluge at these sites, organizations in certain industries should especially consider the mounting requirements for even more data to feed hungry AI, generative AI, and large language model initiatives. Vendors supporting firms with edge footprints should help these burdened sites and their supporting teams with solutions to their biggest challenges when managing data in these locations, such as data security capabilities.

Enterprise Strategy Group validated how the Dell NativeEdge edge operations software platform provides simplified, optimized, and protected edge computing operations.

Specifically, we validated that by simply powering up the Dell Edge Gateway 3200, the operating system and applications were deployed into the NativeEdge Gateway environment. Then we validated how simple and fast it is to create a cluster in just three clicks, in addition to adding and removing nodes in just one click. We also found it easy to move live VMs around the cluster without workload impact. Additionally, we validated how delivering zero-trust capabilities with secure device onboarding at an edge location is an automated and seamless process that ensures security from the point of manufacture, along the supply chain, to the point of production.

We calculated the time, effort, and costs required to plan, deploy, and maintain multiple edge environments for a manufacturing organization to quantify the benefits Dell NativeEdge could provide for organizations deploying thousands of assets and applications in dozens of edge locations. Our analysis revealed that NativeEdge reduces time, effort, and cost across the entire edge ecosystem compared with a manual approach.

- **Zero-touch/secure device onboarding:** Up to 92% less time and effort than traditional manual approaches.
- **Automated updates and re-imaging:** Up to 75% less time and effort compared with traditional manual approaches.
- **Automated application orchestration and lifecycle management:** Up to 68% less time and effort for edge DevOps management tasks.
- **Three-year projected savings:** In aggregate, a reduction of 79% (more than 64,000 hours) was calculated, representing projected savings of more than $3.3 million for our composite organization over three years.

If your organization is looking to modernize its edge operations environment, you should consider the Dell NativeEdge platform to help simplify, optimize, and protect edge computing operations.

For more information on the Dell NativeEdge platform, please visit: Dell.com/NativeEdge.

About Enterprise Strategy Group
TechTarget's Enterprise Strategy Group provides focused and actionable market intelligence, demand-side research, analyst advisory services, GTM strategy guidance, solution validations, and custom content supporting enterprise technology buying and selling.

contact@esg-global.com
www.esg-global.com