DELLTechnologies

NVIDIA

EDGEAI

Retail Services

Transforming Retail
with AI and Edge Computing

Get started >

Contents

The Future of Retail is Intelligent

Retail is evolving at an unprecedented pace. Consumers demand faster service, personalized experiences, and a seamless connection between online and in-store channels. Technology has become the enabler of this transformation, unlocking opportunities to streamline operations, delight customers, and respond dynamically to shifting market needs.

At the Heart of this Transformation Lies a Data Explosion

Artificial Intelligence (AI) and edge computing are redefining the possibilities for retailers, creating smarter stores, enhancing supply chains, and empowering employees to elevate the shopping experience. With AI and edge computing retailers can turn challenges into opportunities, driving innovation and growth to shape the store of the future.

Market Dynamics in the Retail Industry

Success in this new era requires retailers to reimagine operations
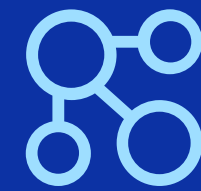
Personalized Experiences

AI is transforming how retailers understand and interact with customers. By analyzing customer behaviors and preferences in real-time, AI enables hyper-personalized marketing and product recommendations. Retailers can now tailor offers, suggest **complementary products**, and create **in-store digital assistants** to guide customers, making every interaction relevant and engaging.

Operational Efficiency

Efficiency is critical in today's competitive retail environment. Edge computing plays a central role by enabling real-time decision-making where data is generated. Whether redirecting staff for efficient customer assistance, or enabling fast, reliable self-checkout experiences, edge computing helps retailers reduce latency, automate tasks, and improve resource utilization to deliver a seamless, efficient in-store experience for both customers and employees.

Omnichannel Evolution

Consumers no longer distinguish between online and in-store experiences; they expect seamless integration. The shopper journey can begin and end anywhere. Omnichannel commerce is no longer optional but essential to remain competitive. AI-powered tools such as shopping assistants, virtual try-on, dynamic pricing engines, and real-time inventory updates are connecting the dots between digital and physical retail environments, ensuring customers can shop when, where and how they prefer.

Sustainable Computing

Modern consumers increasingly prioritize sustainability in their purchasing decisions. AI and edge technologies are helping retailers reduce waste, optimize energy use, and implement circular supply chain practices. From eco-friendly logistics to AI-driven packaging solutions, these advancements reflect a broader retail commitment to both profitability and environmental stewardship.

Inventory Management

Enabling smarter, data-driven decision making with predictive algorithms helps retailers forecast demand, reduce overstock or understock issues, and balance supply chain dynamics.

AI is Transforming How Retailers Operate

AI and edge computing are empowering retailers to reimagine operations and customer engagement. By processing data closer to its source, these technologies enable sharper decision-making, increased security, and seamless customer experiences.

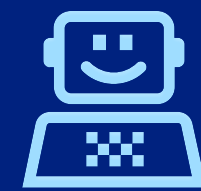Innovations that are reshaping retail:

Improved Customer Experiences

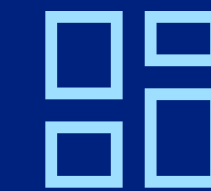Create personalized shopping journeys with AI-powered recommendations, real-time promotions and seamless checkouts.

Faster decision-making

Track inventory, automate restocking, and enable faster checkouts with instant data insights.

In-store AI

Cut outbound data costs and enhance operational resiliency with in-store AI while driving revenue growth through streamlined workflows, improved staff productivity, and more efficient decision-making.

Data-Driven Planograms

Leverage advanced analytics to create smarter, more effective planograms. Optimize product placement to enhance the customer experience and maximize sales.

Enhanced Security

Process data locally to reduce cyber risks. AI detects and prevents fraud in real-time.

By leveraging AI and edge computing, retailers can enhance security, efficiency, and customer satisfaction.

Breaking Barriers: Tackling AI Adoption Challenges

AI is more than just a tool, it's a catalyst – accelerating innovation, driving profitability, and creating a more agile retail industry.

While AI offers clear benefits, many retailers face the following adoption or scalability challenges:

Data silos

Legacy systems often lead to fragmented data, reducing the effectiveness of AI models.

Cost and expertise

Migrating from traditional systems to AI-enabled architectures requires a significant investment of time and resources.

Security concerns

Data Privacy & Security: Handling sensitive data with AI brings new risks. Retailers must protect customer data and internal operational data from breaches, fraud, and leaks.

Complexity at the edge

Many organizations lack the infrastructure to effectively process distributed data in real-time.

Addressing these challenges is as critical as adopting AI itself. Retailers must ensure their infrastructure is prepared to handle the demands of AI, edge computing, and real-time analytics.
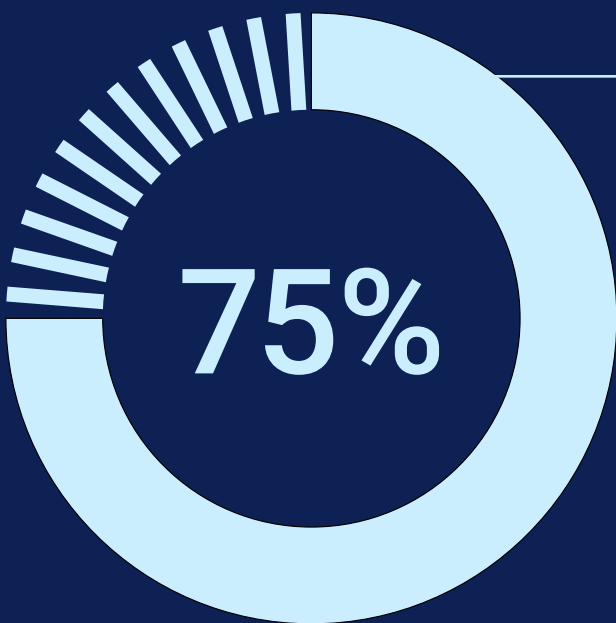
Key Insight
The inability to find adequate AI talent or explainable tools was cited as a major hurdle by one-third of retailers.[1]
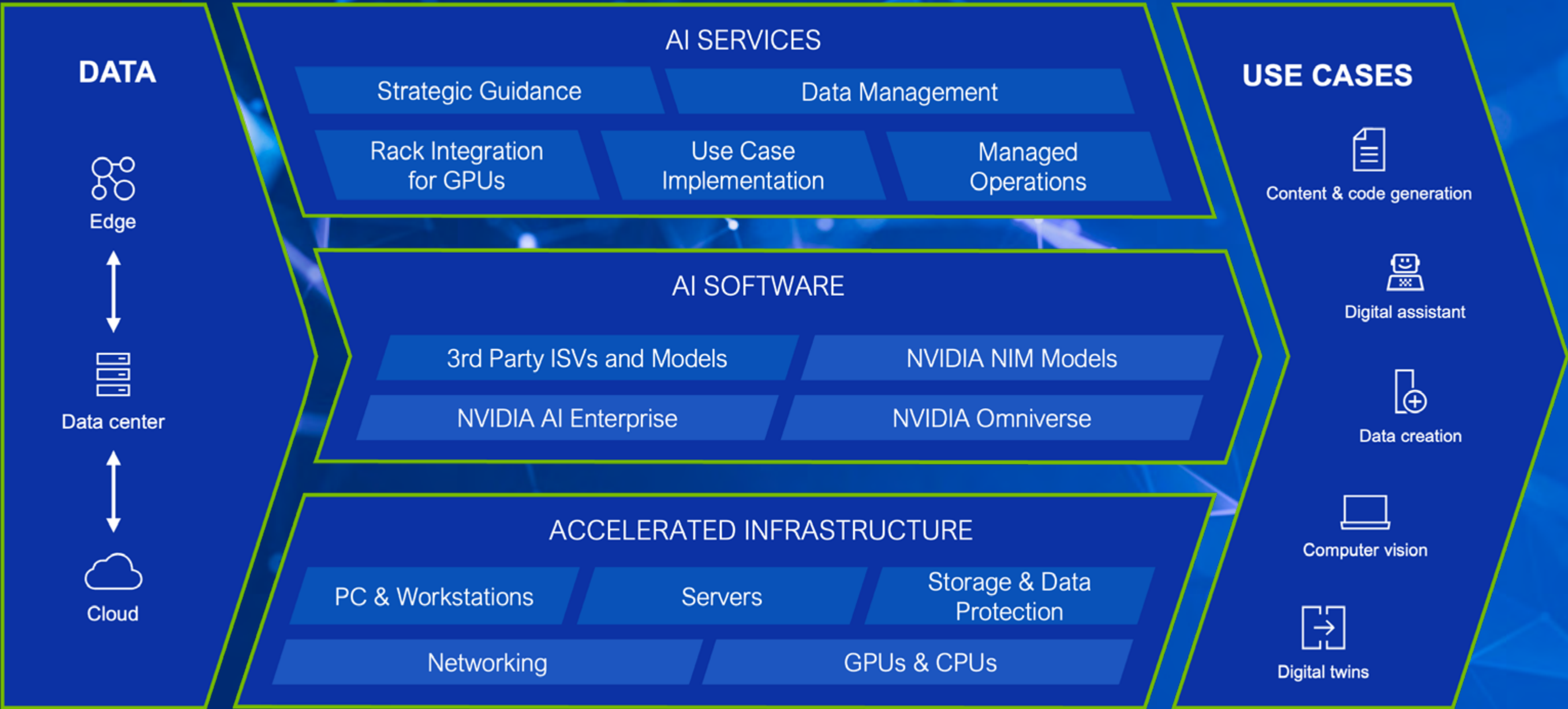
[1] State of AI in Retail and CPG 2025 Report, NVIDIA.

The Dell AI Factory with NVIDIA Accelerates AI Innovation

The Dell AI Factory with NVIDIA reduces the time for AI adoption by up to 86% compared to doing it yourself[2]. It provides the foundation for modern AI computing and is the industry's first end-to-end AI enterprise solution.[3] It's a framework that helps maximize the value of data, which is increasingly generated at the edge.

75%

In fact, Gartner predicts that 75% of enterprise-managed data will be created and processed outside of the core data center or cloud.[4]

DATA

Edge

Data center

Cloud

AI SERVICES

Strategic Guidance

Data Management

Rack Integration for GPUs

Use Case Implementation

Managed Operations

AI SOFTWARE

3rd Party ISVs and Models

NVIDIA NIM Models

NVIDIA AI Enterprise

NVIDIA Omniverse

ACCELERATED INFRASTRUCTURE

PC & Workstations

Servers

Storage & Data Protection

Networking

GPUs & CPUs

USE CASES

Content & code generation

Digital assistant

Data creation

Computer vision

Digital twins

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2 https://sponsored.bloomberg.com/quicksight/dell-nvidia/how-ai-factories-accelerate-ai-adoption-and-implementation-and-roi

3 Based on Dell analysis, July 2024.

4 Gartner, "Innovation Insight for Edge AI," Arun Chandrasekaran & Eric Goodness, April 10, 2024

The foundation of the Dell AI Factory with NVIDIA is an end-to-end AI optimized infrastructure portfolio.

This is complemented by an ecosystem of AI software applications and tools designed for AI solutions, such as NVIDIA AI Enterprise, NVIDIA NIM microservices and NVIDIA Omniverse.

Dell Services also provides the insight and skills to maximize the value of your AI use cases – from strategy and planning to implementation and scaling.

Recent survey findings reveal that AI factories are pivotal in shaping the future of retail. They enable faster product development and shorten time-to-market cycles, providing institutions with a competitive edge.

The global AI market is projected to hit **$243.7 billion** in 2025, with retail emerging as a key driver of this expansion, influencing **53%** of U.S. purchase decisions.[5]

These advancements are transforming how retail organizations innovate and adapt to a constantly evolving digital landscape.

[5] https://www.forbes.com/sites/garydrenik/2025/04/08/how-ais-2437-billion-boom-is-reshaping-retail-and-beyond/

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Accelerate AI Innovation at the Edge

Whether it's smart shelving for inventory, personalized promotions on interactive kiosks, or real-time data from stores, the edge is where modern retail experiences are shaped. With edge computing, this data doesn't need to be sent to a central location for processing – AI inferencing at the edge allows it to be analyzed and acted on locally. This leads to reduced latency, faster decisions, and enhanced security.

| By 2027, **62%** of data-intensive compute will reside in edge environments [6] | **87%** of the Fortune 100 use Dell Technologies edge solutions [7] | Dell Technologies is the **#1** global leader in edge storage and edge servers [8] |

[6] 451 Research Market Monitor analysis of low-latency workloads across eight key industries in the US; Edge Workload Total Addressable Market (TAM) Analysis, 2023.

[7] Dell Technologies internal analysis of US Fortune 100, February 2025

[8] IDC Worldwide Quarterly Enterprise Infrastructure Tracker: Buyer and Cloud Deployment, Q4, March 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 brings the power of Dell AI Factory with NVIDIA to the edge by enabling retail organizations to securely scale their infrastructure and orchestrate AI applications across any location. Support for virtualized and containerized environments is seamless, while NativeEdge Blueprints automate the deployment of frameworks and applications for faster, more efficient AI innovations.

Zero-Touch, Zero Trust. Retailers can deploy hardware and applications quickly without excessive time spent on-site. Simply unbox, plug, and go. Zero Touch deployment ensures systems auto provision a Zero Trust security framework that protects sensitive data and locks down ports reducing risks during and after deployment.

Seamless Edge-to-Core Integration. NativeEdge supports the automated orchestration of AI applications across edge, core, and multicloud environments. This flexibility ensures retailers can innovate at scale without getting locked into specific platforms or vendors.

Streamlined Operations Across Locations. For retailers managing multiple stores, NativeEdge provides centralized control for deploying updates and managing infrastructure, reducing downtime and complexity.

Benefits of Dell NativeEdge

The world's most **adaptable and open** edge operations ecosystem [9]	Up to **68% time savings** by automating edge application orchestration [10]	**Less than 1 minute** to deploy infrastructure and applications [10]	Achieve up to a **71% retail ROI** over 3 years [11]

Dell NativeEdge: Accelerate AI innovation at the edge

Zero-touch onboarding

Zero-trust security

Multicloud orchestration

Edge operations software solution

Infrastructure management   Application orchestration

NativeEdge OS   Containers   Virtual machines

[9] Based on Dell Technologies internal analysis, February 2025

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

[11] Dell internal analysis, February 2025. Based on 3-year model comparing pre-NativeEdge vs. post-NativeEdge deployment across 500 composite retail grocery sites. Actual results may vary.

Why Dell NativeEdge and NVIDIA

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 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 tight integration between Dell NativeEdge and NVIDIA delivers:

Faster, easier deployment of AI models and inferencing solutions to distributed edge locations.

Zero-touch deployment of edge AI apps across infrastructure based on zero-trust security principles to meet the rigorous standards of retail organizations.

Ease of Edge AI solution lifecycle management with scalability to support any workload – from transactions to stock management.

Transformative Use Cases in Retail

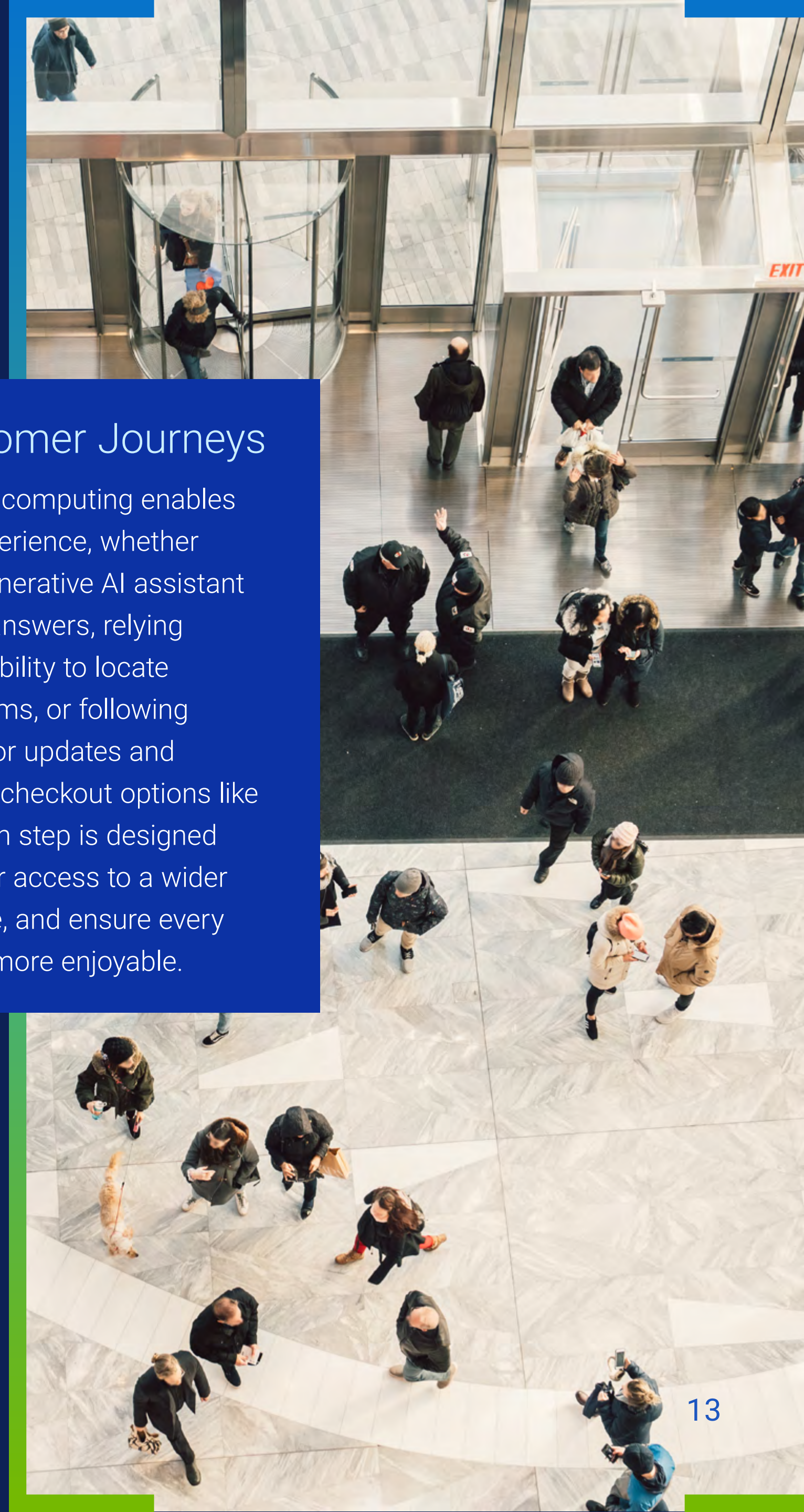## Real-time Product Recommendations and Offers

AI-powered touch points can offer customized product recommendations based on customer profiles, or other items in cart, paired with in-the-moment incentives based on demand, customer preferences, or inventory levels, creating optimal revenue opportunities.

Shoplifting and Fraud Prevention

Edge-based computer vision and real-time analytics detect suspicious activity, prevent theft, and identify fraud at self-checkout or point-of-sale. Integrated with smart shelves and RFID tags, these systems can trigger instant alerts, reduce shrinkage, and help staff respond quickly to protect inventory and profits.

Frictionless Customer Journeys

From start to finish, edge computing enables a seamless shopping experience, whether customers are using a generative AI assistant to find products and get answers, relying on real-time inventory visibility to locate in-stock or online-only items, or following dynamic digital signage for updates and guidance. With seamless checkout options like cashierless payment, each step is designed to remove obstacles, offer access to a wider selection than ever before, and ensure every visit is faster, easier, and more enjoyable.

Store Layout Planogram

Inefficient store layouts reduce customer satisfaction and sales performance. By analyzing customer flow and virtual models of stores, digital twins identify optimal product placements and layout improvements. This increases sales per square foot and improves customer dwell times significantly.

Inventory Optimization

Overstocking or understocking leads to financial losses. Digital twins simulate inventory levels, purchase trends, and warehouse spaces to predict future needs and balance supply. This can reduce inventory holding costs and results in fewer stockouts during peak seasons.

By leveraging AI and edge computing for these diverse applications, retailers create smarter, safer, and more sustainable business models.

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 NVIDIA acceleration, 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 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 AI workstations and AI PCs 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, even in resource-constrained environments.

Edge Gateways
Compact in design, Edge Gateways enable you to collect, consolidate, and extract value from vast amounts of edge-generated data.

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.

Hyperconverged Infrastructure (HCI)
Benefit from the breadth of the Dell Technologies HCI portfolio that allows for choice based on your desired outcomes.

Networking
Enable simplified design, management and monitoring of powerful Ethernet fabrics to handle modern workloads like Generative AI and Edge AI inferencing.
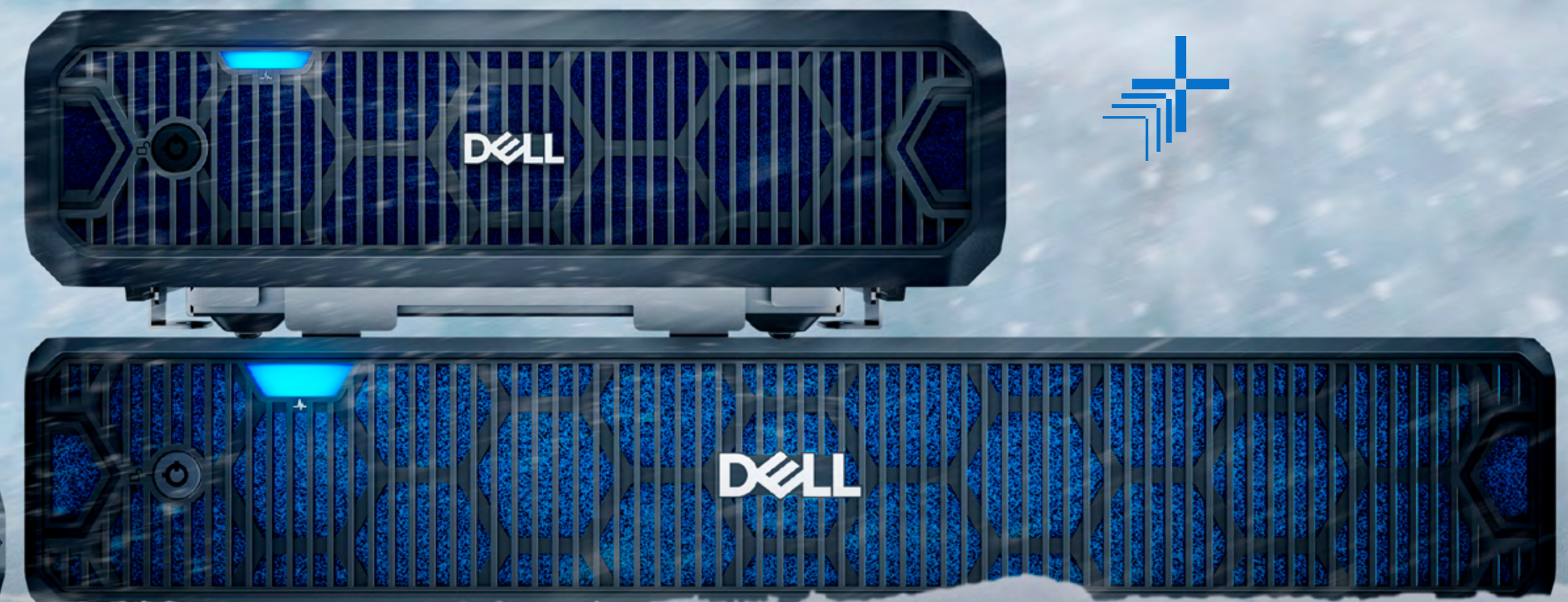
Data Management
Empower your customers to access data across edge, core and multicloud to power analytics workloads for faster model tuning and business insights.

Enabling Edge AI Innovation with Advanced Server Hardware

As retailers navigate an increasingly digital-first world, the demand for secure, high-performance infrastructure has become a top priority. Dell PowerEdge XR servers, powered by NVIDIA accelerated computing, are engineered to meet these demands head-on, delivering powerful, scalable solutions for AI applications at the edge. With real-time data analysis capabilities, these servers ensure low latency and high performance beyond the traditional data center, even in space-constrained or challenging 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

The Path Forward:
The Retail Experience of the Future

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The future of retail is about more than just technology; it's about creating human-centered, omnichannel, agile experiences that reflect your customers' evolving expectations. AI and edge computing are transforming every aspect of the industry – from operations to customer journeys. **The Dell AI Factory with NVIDIA**, **Dell NativeEdge** and edge infrastructure solutions pave the way for retailers to innovate with confidence, delivering measurable business results while navigating the complexities of modern retail.

By harnessing the power of AI today, you're not just meeting the needs of your customers; you're laying the foundation for decades of success. Explore how Dell Technologies can help **drive your transformation** today and prepare your business for tomorrow.

Take the Next Step

Accelerate and simplify your AI journey with Professional Services

The **Dell Accelerator Workshop** is a great first step for retail organisations 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 GenAI 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 GenAI, synthesized in an Executive Overview.
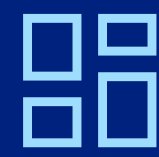
Interested in validating the capabilities of NativeEdge in your edge environment? Contact your Dell sales representative to discuss the possibility of deploying an onsite proof-of-concept experience for Dell NativeEdge.
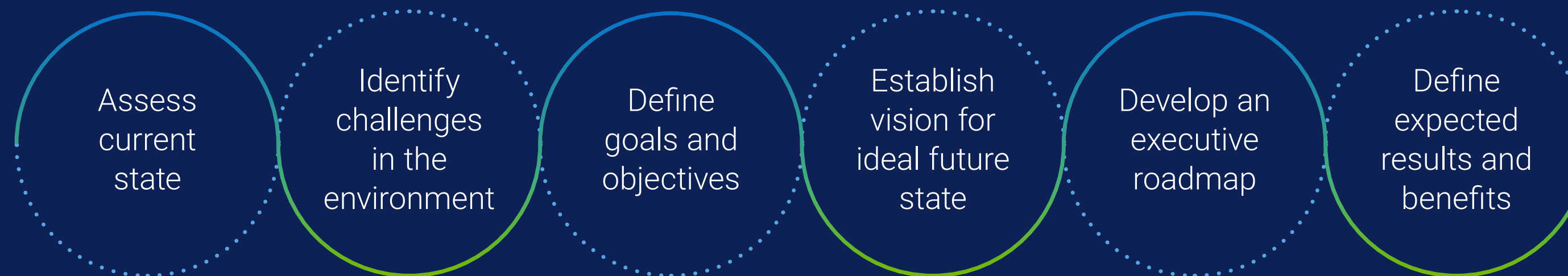
Develop a Generative AI strategy and roadmap tailored to your organization

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

Build your Generative AI operations with training and infrastructure management expertise

Assess current state

Identify challenges in the environment

Define goals and objectives

Establish vision for ideal future state

Develop an executive roadmap

Define expected results and benefits

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

For more information about Dell NativeEdge and AI solutions for retail, visit **Dell.com/retail**.

Dell **AI Factory**

WITH NVIDIA

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