NetApp AI Solutions for Automotive

Accelerate your journey to AI

Key Benefits

Accelerate Data Pipelines

NetApp® solutions unlock the potential of AI in the automotive industry by breaking down data silos and connecting disparate datasets to generate deeper insights.

Deliver Performance for Training and Inference

Balance GPU and all-flash performance for optimum results. Feed, train, and operate data-hungry AI algorithms up to 6 times faster.

Tap Into the Cloud

Take advantage of innovative AI software in the world's leading clouds, without sacrificing advanced NetApp data management and NFS capabilities.

Challenge

Automotive companies face significant challenges as the automobile moves beyond the realm of simple transportation. Customers now expect cars to actively keep them safe, provide internet-connected services, and take on more and more driving tasks on the road to autonomy. Consumers, particularly in urban areas, want pay-per-use services, including ride-sharing applications and short-term rentals of vehicles of every kind.

To remain competitive, automotive companies must transform the way they do business so they can offer the new products and services that customers want while maximizing operational efficiency and shareholder value. Organizations across the automotive industry are adopting artificial intelligence (AI) to help them expand into new markets, optimize workflows, and deliver the latest innovations.

From connected and autonomous vehicles to mobility services to smart manufacturing, success in AI depends on one thing: data. Huge amounts of data are needed to identify patterns, develop predictive insights, and enable autonomy. But this data is inherently dynamic. Data silos and technological complexity are the two biggest impediments to moving AI projects into production. Automotive companies need an end-to-end data fabric to unlock insights and turbocharge innovation.

Become AI Ready

NetApp helps you tailor a data fabric to accelerate your journey to AI. Only NetApp can enable you to streamline the flow of data from ingestion to preparation to training to inference, both on the premises and in the cloud. Our unified data management supports seamless, cost-effective data movement across today's multicloud environments.

NetApp provides deep integration with leading AI technologies so you can simplify, accelerate, and protect your AI pipeline. And NetApp technology enables you to deploy AI with confidence.

Accelerate Your Data Pipelines

Automotive companies require data pipelines that span the globe. For example, an autonomous driving project must collect data from test vehicles across multiple regions, annotate data, train deep learning models, enable simulation, incorporate 3D mapping, and more. Only NetApp offers data fabric technologies to satisfy the needs of complex, high-performance data pipelines with solutions that reach from your core data centers to the edge and to the cloud. (See Table 1.)

■ **NetApp**®

EDGE SOLUTIONS	CORE DATA CENTER SOLUTIONS	CLOUD SOLUTIONS
NetApp® ONTAP® Select gives you the power of ONTAP software on your choice of commodity servers, hypervisors, and media. Available in ruggedized configurations, it can support the harshest environments. NetApp HCI with NVIDIA T4 GPUs provides a powerful, flexible AI infrastructure for inferencing at the edge, including R&D, production, distribution, and warehouse facilities.	NetApp AFF A800 all-flash storage systems deliver ultra-low latency of less than 200 microseconds and massive throughput of up to 300GBps. The NetApp ONTAP AI proven architecture, powered by NVIDIA DGX supercomputers and NetApp cloud-connected storage, meets the most demanding AI training needs. The solution comes with a set of tools to simplify setup and operation. FlexPod® AI is based on an industry-leading converged infrastructure, powered by NetApp AFF cloud-connected storage, Cisco Nexus switches, and Cisco UCS ML M5 purpose-built, AI/ML servers. FlexPod AI provides a versatile, UCS-based platform for AI/ML innovation that is trusted worldwide.	NetApp's cloud data services deliver instant productivity. Bring NetApp's superior data management and NFS capabilities to Azure with Azure NetAppFiles, to Amazon Web Services with Cloud Volumes Service for AWS and to Google Cloud with Cloud Volumes Service for Google. The NetApp AI Control Plane provides full-stack data and experiment management across the hybrid cloud. NetApp FabricPool automatically tiers cold data to the public cloud or to on-premises object storage and automatically recalls data when needed, extending your available storage capacity.

Table 1) Solutions for your AI data pipeline.

Deliver Performance for Training and Inference

Training AI algorithms requires a careful balance of compute and I/O performance, including GPU acceleration and the fastest storage. After a model has been trained, inferencing also places significant demands on infrastructure. NetApp offers solutions to address the training and inference needs that become an integral part of your data fabric.

NetApp ONTAP® AI brings together NVIDIA DGX supercomputers, NetApp cloud-connected all-flash storage, and Cisco Nexus or Mellanox Spectrum switches. This proven architecture simplifies, integrates, and accelerates machine learning (ML) and deep learning (DL). ONTAP AI allows you to start small and grow as needed without disruption. ONTAP AI also offers an array of advanced tools and functions to simplify setup and operation, delivering immediate productivity.

FlexPod® AI builds on the popular FlexPod Datacenter platform. The solution includes Cisco UCS blade and rack servers with full GPU acceleration and high-speed interconnects, advanced Cisco networking, and NetApp all-flash storage.

The NetApp AFF systems used in both ONTAP AI and FlexPod AI keep data flowing to AI processes with the industry's fastest and most flexible all-flash architecture. NetApp solutions unify data management across your AI pipeline.

For inference needs at the edges of your network, including production, distribution, and warehouse facilities, we offer the powerful, flexible NetApp HCI AI infrastructure with NVIDIA T4 GPUs.

Tap Into the Cloud

AI success requires an agile infrastructure and a complete ecosystem of technologies and solutions. The cloud can enable your team to kick off AI projects quickly and efficiently and can support proofs of concept, testing and development, data preprocessing, and full-scale production training.

Today's leading clouds offer a rich ecosystem for building AI applications and training ML and DL models. Fast data services are essential to maintain high GPU utilization and to complete training runs faster in the cloud. NetApp cloud data services deliver instant productivity. Take advantage of NetApp's superior data management and NFS performance with Azure NetApp Files, Cloud Volumes Service for AWS, or Cloud Volumes Service for Google. The NetApp AI Control Plane provides full-stack data and experiment management across the hybrid cloud.
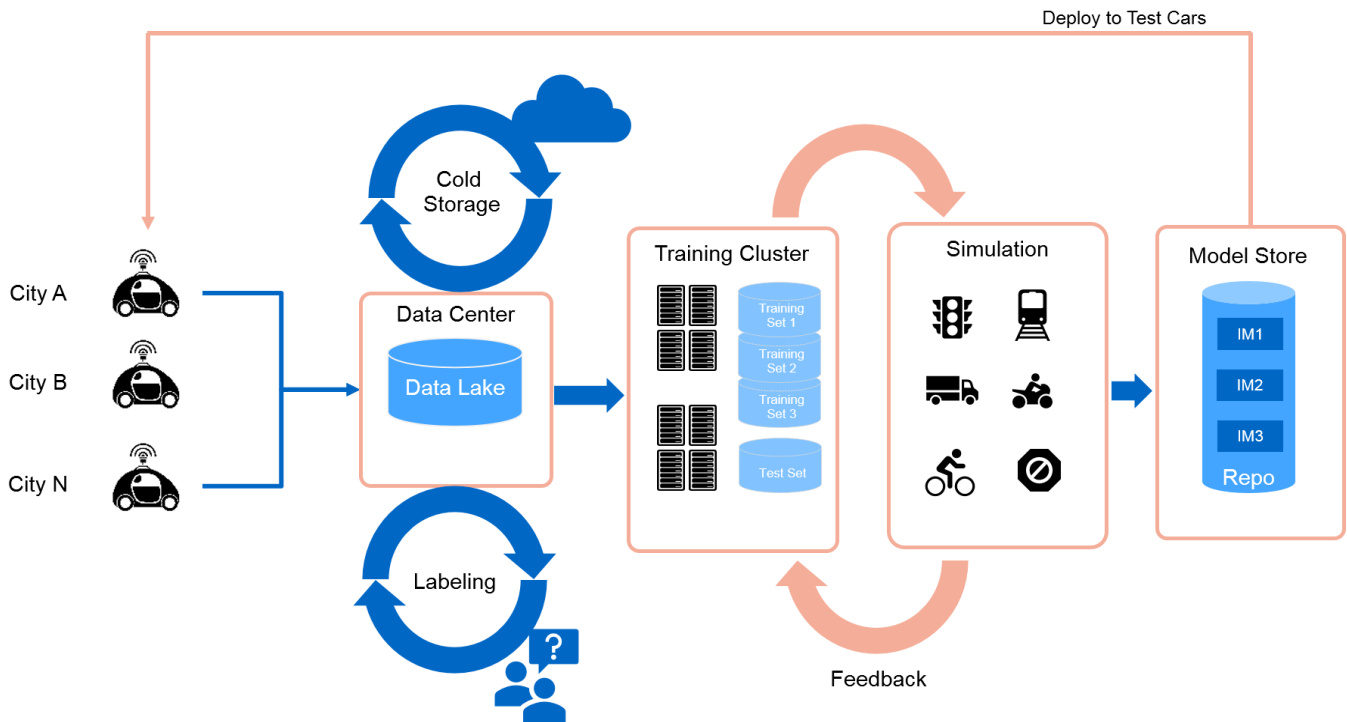
Figure 1) Data pipeline for autonomous driving.

Top Automotive AI Use Cases

Autonomous Driving
Autonomous driving is the holy grail of the automotive industry right now, but the challenges are significant. Each car deployed for R&D generates up to 1TB of data per hour. Teams can expect to accumulate hundreds of petabytes of data as autonomous driving projects progress.

Connected Vehicles
Today, cars use cellular and WiFi connections to upload and download entertainment, navigation, and operational data. In the near future, we'll also see cars connecting to each other, to our homes, and to infrastructure. AI will play a role in predictive maintenance, in-car assistants, recommenders for infotainment, and more.
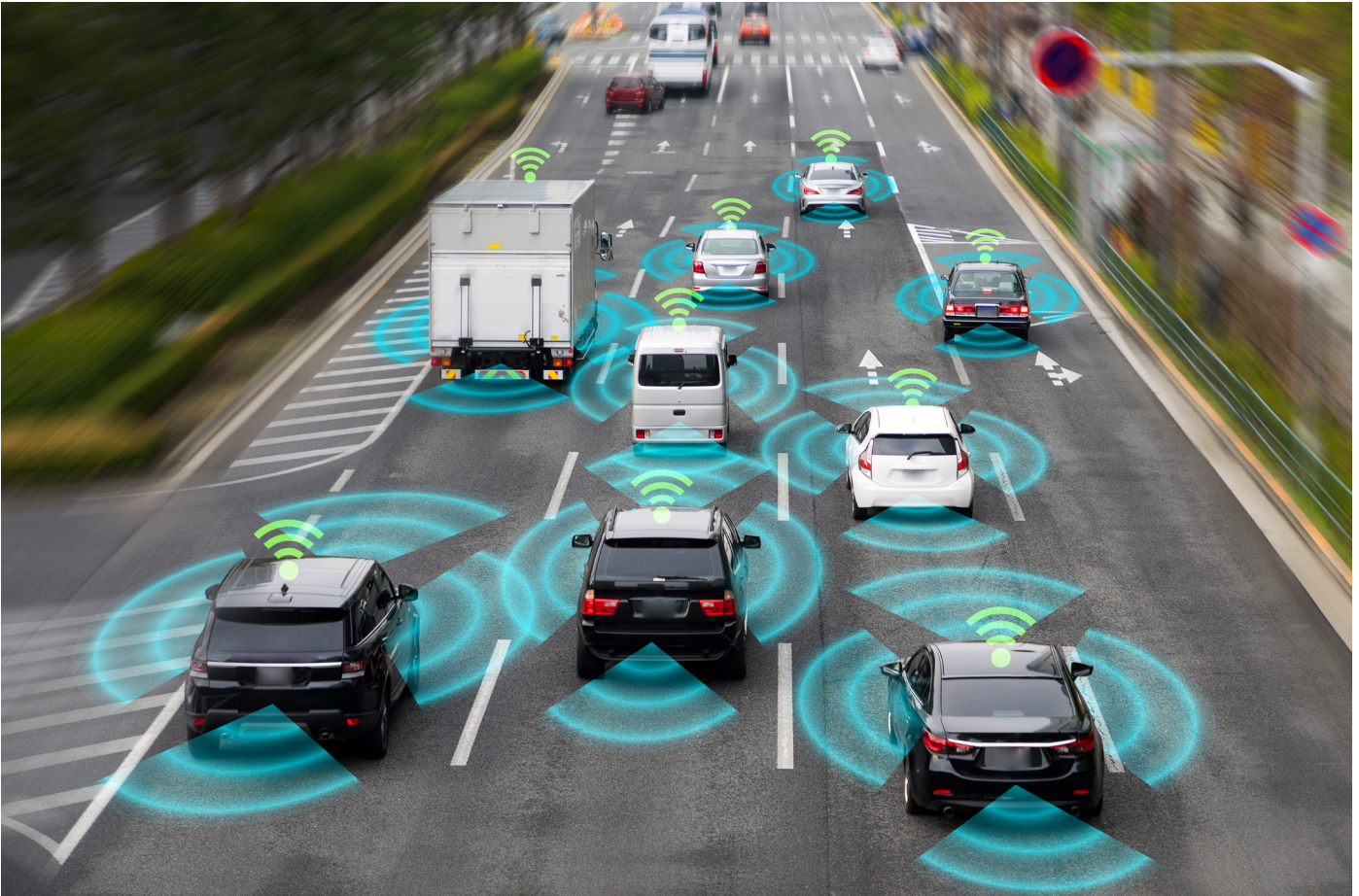
Mobility as a Service
Machine learning challenges in mobility-as-a-service models are significantly different from those in autonomous driving; they include things like predicting demand, optimizing fleet efficiency, setting prices, and preventing fraud. These distributed problems may require smart algorithms on the consumer's device (smart phone), in the vehicle, and in the cloud, along with long-term, secure data management for compliance.

Smart Manufacturing
Automotive companies must increase operational efficiency to free up capital for other investments. Industrial Internet of Things (IIoT) and Industry 4.0 technologies are the key to streamlining business, automating and optimizing manufacturing processes, and increasing the efficiency of the supply chain.

A Partner for AI Success

NetApp is creating advanced tools that eliminate bottlenecks and accelerate results, from data ingest to training to inference. With NetApp, data management and complicated infrastructure never impede your AI efforts. Our data fabric technologies and services can jump start your company on the road to success. An ecosystem of NetApp AI partners offers additional support for all aspects of your AI projects.

Where to Find Out More

To learn more about NetApp's solutions for automotive AI, visit netapp.com/ai.

About NetApp

NetApp is the leader in cloud data services, empowering global organizations to change their world with data. Together with our partners, we are the only ones who can help you build your unique data fabric. Simplify hybrid multicloud and securely deliver the right data, services and applications to the right people at the right time. Learn more at **www.netapp.com**.