# AI Converged Infrastructures

## NetApp Solutions

NetApp
December 23, 2022

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# AI Converged Infrastructures

## NetApp ONTAP AI with NVIDIA

Overview of ONTAP AI converged infrastructure solutions from NetApp and NVIDIA.

### NetApp ONTAP AI with NVIDIA DGX A100 Systems

- Design Guide
- Deployment Guide

### NetApp ONTAP AI with NVIDIA DGX A100 Systems and Mellanox Spectrum Ethernet Switches

- Design Guide
- Deployment Guide

### NVA-1151-DESIGN: NetApp ONTAP AI with NVIDIA DGX A100 Systems Design Guide

David Arnette and Sung-Han Lin, NetApp

NVA-1151-DESIGN describes a NetApp Verified Architecture for machine learning and artificial intelligence workloads using NetApp AFF A800 storage systems, NVIDIA DGX A100 systems, and NVIDIA Mellanox network switches. It also includes benchmark test results for the architecture as implemented.

https://www.netapp.com/pdf.html?item=/media/19432-nva-1151-design.pdf

### NVA-1151-DEPLOY: NetApp ONTAP AI with NVIDIA DGX A100 Systems

David Arnette, NetApp

NVA-1151-DEPLOY includes storage system deployment instructions for a NetApp Verified Architecture (NVA) for machine learning (ML) and artificial intelligence (AI) workloads using NetApp AFF A800 storage systems, NVIDIA DGX A100 systems, and NVIDIA Mellanox network switches. It also includes instructions for running validation benchmark tests after deployment is complete.

https://www.netapp.com/pdf.html?item=/media/20708-nva-1151-deploy.pdf

### NVA-1153-DESIGN: NetApp ONTAP AI with NVIDIA DGX A100 Systems and Mellanox Spectrum Ethernet Switches

David Arnette and Sung-Han Lin, NetApp

NVA-1153-DESIGN describes a NetApp Verified Architecture for machine learning (ML) and artificial intelligence (AI) workloads using NetApp AFF A800 storage systems, NVIDIA DGX A100 systems, and NVIDIA Mellanox Spectrum SN3700V 200Gb Ethernet switches. This design features RDMA over Converged Ethernet (RoCE) for the compute cluster interconnect fabric to provide customers with a completely ethernet-based architecture for high-performance workloads. This document also includes benchmark test results for the architecture as implemented.

https://www.netapp.com/pdf.html?item=/media/21793-nva-1153-design.pdf

### NVA-1153-DEPLOY: NetApp ONTAP AI with NVIDIA DGX A100 ystems and Mellanox Spectrum Ethernet Switches

David Arnette, NetApp

NVA-1153-DEPLOY includes storage-system deployment instructions for a NetApp Verified Architecture for machine learning (ML) and artificial intelligence (AI) workloads using NetApp AFF A800 storage systems, NVIDIA DGX A100 systems, and NVIDIA Mellanox Spectrum SN3700V 200Gb Ethernet switches. It also includes instructions for executing validation benchmark tests after deployment is complete.

https://www.netapp.com/pdf.html?item=/media/21789-nva-1153-deploy.pdf

# NetApp EF-Series AI with NVIDIA

Overview of EF-Series AI converged infrastructure solutions from NetApp and NVIDIA.

### EF-Series AI with NVIDIA DGX A100 Systems and BeeGFS

- Design Guide
- Deployment Guide
- BeeGFS Deployment Guide

### NVA-1156-DESIGN: NetApp EF-Series AI with NVIDIA DGX A100 Systems and BeeGFS

Abdel Sadek, Tim Chau, Joe McCormick and David Arnette, NetApp

NVA-1156-DESIGN describes a NetApp Verified Architecture for machine learning (ML) and artificial intelligence (AI) workloads using NetApp EF600 NVMe storage systems, the BeeGFS parallel file system, NVIDIA DGX A100 systems, and NVIDIA Mellanox Quantum QM8700 200Gbps IB switches. This design features 200Gbps InfiniBand (IB) for the storage and compute cluster interconnect fabric to provide customers with a completely IB-based architecture for high-performance workloads. This document also includes benchmark test results for the architecture as implemented.

https://www.netapp.com/pdf.html?item=/media/25445-nva-1156-design.pdf

### NVA-1156-DEPLOY: NetApp EF-Series AI with NVIDIA DGX A100 Systems and BeeGFS

Abdel Sadek, Tim Chau, Joe McCormick, and David Arnette, NetApp

This document describes a NetApp Verified Architecture for machine learning (ML) and artificial intelligence (AI) workloads using NetApp EF600 NVMe storage systems, the ThinkParQ BeeGFS parallel file system, NVIDIA DGX A100 systems, and NVIDIA Mellanox Quantum QM8700 200Gbps InfiniBand (IB) switches. This document also includes instructions for executing validation benchmark tests after the deployment is complete.

https://www.netapp.com/pdf.html?item=/media/25574-nva-1156-deploy.pdf

# TR-4859: Deploying IBM Spectrum Scale with NetApp E-Series Storage - Installation and validation

Chris Seirer, NetApp

TR-4859 describes the process of deploying a full parallel file system solution based on IBM's Spectrum Scale software stack. TR-4859 is designed to provide details on how to install Spectrum Scale, validate the infrastructure, and manage the configuration.

https://www.netapp.com/pdf.html?item=/media/22029-tr-4859.pdf

# TR-4810: NetApp ONTAP and Lenovo ThinkSystem SR670 for AI and ML Model Training Workloads

Karthikeyan Nagalingam, NetApp
Miroslav Hodak, Lenovo

TR-4810 describes a cost-effective, entry-level compute and storage architecture to deploy GPU-based artificial intelligence (AI) training on NetApp storage controllers and Lenovo ThinkSystem servers. The setup is designed as a shared resource for small to medium-sized teams running multiple training jobs in parallel.

TR-4810 provides performance data for the industry-standard MLPerf benchmark evaluating image classification training with TensorFlow on V100 GPUs. To measure performance, we used ResNet50 with the ImageNet dataset, a batch size of 512, half precision, CUDA, and cuDNN. We performed this analysis using four-GPU SR670 servers and an entry-level NetApp storage system. The results show highly efficient performance across the multiple use cases tested here—shared, multiuser, multijob cases, with individual jobs scaling up to four servers. Large scale-out jobs were less efficient but still feasible

https://www.netapp.com/media/17115-tr-4810.pdf

# TR-4815: NetApp AFF A800 and Fujitsu Server PRIMERGY GX2570 M5 for AI and ML Model Training Workloads

David Arnette, NetApp
Takashi Oishi, Fujitsu

This solution focuses on a scale-out architecture to deploy artificial intelligence systems with NetApp storage systems and Fujitsu servers. The solution was validated with MLperf v0.6 model-training benchmarks using Fujitsu GX2570 servers and a NetApp AFF A800 storage system.

https://www.netapp.com/pdf.html?item=/media/17215-tr4815.pdf

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