A World-Class Solution for Federal Artificial Intelligence (AI)

CTG FEDERAL

NetApp®

Today's Challenge for Federal AI Workloads: Subpar Performance and Capacity

Many of today's federal missions are extraordinarily complex, whether they are plowing new fields of scientific discovery, curing disease, charting the next milestones in space, or designing more accurate models to predict the weather. The government's compute-heavy workloads—such as research, data analytics, artificial intelligence (AI)/machine learning (ML), and modeling and simulation—are among the most demanding anywhere.

AI clusters, for example—in which thousands of interlinked customer computers run countless calculations in parallel, which are then collated to produce results that spawn subsequent calculations—require responsive and robust IT infrastructures. This is especially true with large language model (LLM) training, which puts data through a cyclical pipeline as agencies constantly train, retrain and evaluate different model versions. This requires massive datasets to repeatedly cycle through the various stages of the AI pipeline an indefinite number of times. On top of this workload, agencies must retain previous model versions to assess whether the training has been effective.

All of this requires immense computational power and storage—which is why many agencies with AI workloads struggle with subpar performance and capacity. They find themselves hobbled by fragmentation or overextended by increasingly large and complex workloads. Often, their storage environments max out, which makes them unable to accommodate future workloads. And for agencies opting to make bandwidth investments, many find themselves incapable of fully exploiting those investments.

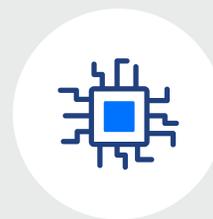*When facing these challenges, government agencies need solutions that can:*

Meet demands for performance and capacity

Fully exploit the highest available bandwidth speeds

Operate with high efficiency

Scale as needed

These demands of a data-driven enterprise require a new approach to storage with an integrated combination of high-performance hardware and adaptive, scalable storage software. The approach needs to support existing workloads as well as adapt and scale quickly to address new applications and evolving IT models.

CTG Federal/NetApp Storage Solutions for AI and ML

CTG Federal, a small business that serves dozens of federal defense, intelligence, and civilian organizations with IT expertise and solutions, has teamed up with NetApp, a leading storage provider to the U.S. government, to deliver federal agencies a high-performance AI storage solution that is exceptionally efficient, highly scalable, and capable of fully leveraging 40, 100 and even 200+ Gigabit Ethernet networks.

SOLUTION OVERVIEW

The solution is a high-performance storage cluster comprising I/O storage nodes, allowing it to handle multiple petabytes of storage for the most demanding AI/ML workloads. The nodes are managed by a common operating system and constitute a single storage namespace, which simplifies management by presenting a single interface for all data, regardless of where it resides.
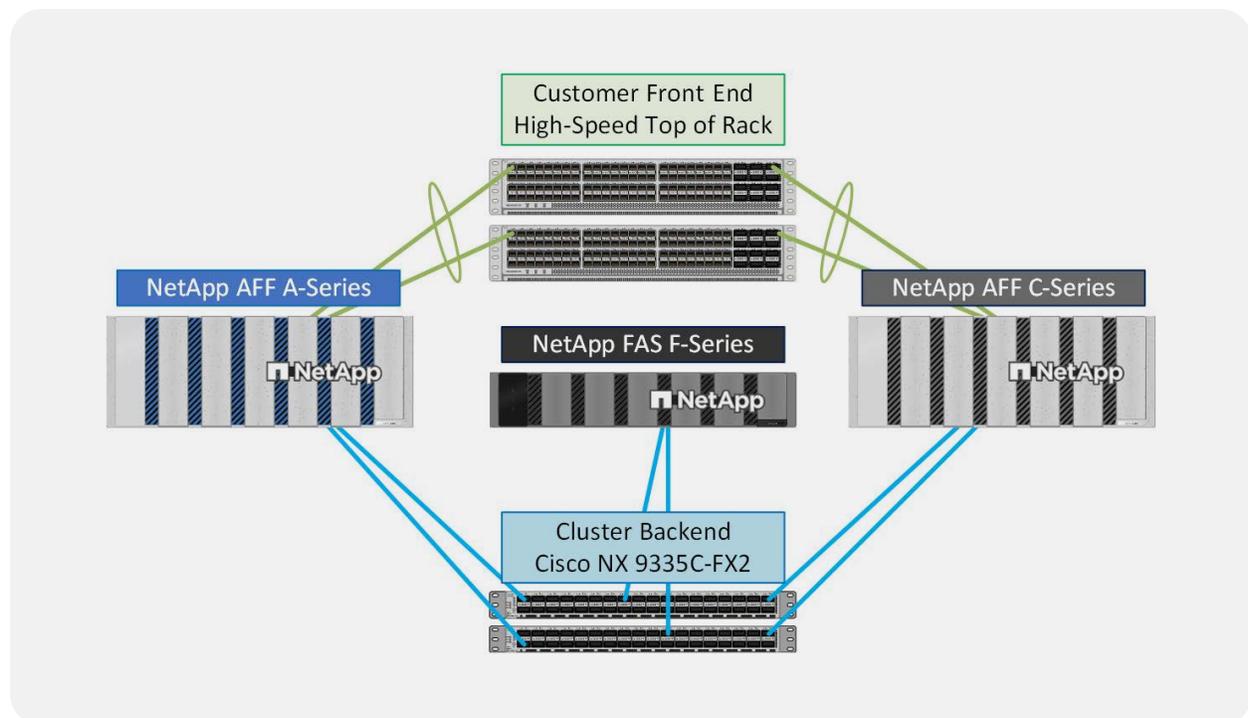
Each node within the storage cluster consists of a controller, the NetApp ONTAP operating system, its storage and its network connectivity. Nodes are paired for high availability (HA). Collectively, they comprise the storage cluster and communicate with each other over a private, dedicated cluster interconnection.

EXCEPTIONALLY FAST STORAGE

The storage may consist of any combination of Non-Volatile Memory express Solid State Disks (NVMe-SSDs), Capacity NVMe-SSDs or spinning hard drives. For this proposed solution, the storage consists of four NetApp FAS F-Series hybrid-flash storage controllers (Fabric Attached Storage), two NetApp AFF C-Series controllers (All Flash FAS with Capacity NVMe SSDs) and four NetApp AFF A-Series controllers. NVMe is a storage protocol that was designed for use with faster media. It lowers latency and boosts input/output operations per second (IOPS). The All-Flash FAS (AFF) A and C-series controllers offer the fastest end-to-end NVMe all-flash array to accelerate critical workloads, including AI and ML applications.

NETWORK

The nodes within the storage cluster communicate via a redundant pair of high-speed Cisco Nexus 9336C-FX2 switches, while the clients connect to the storage through redundant pairs of data center top-of-rack switches— usually Cisco Systems Nexus 9000 series switches or the NVIDIA Spectrum-X™ networking platform.

Customer Front End
High-Speed Top of Rack

NetApp AFF A-Series

NetApp AFF C-Series

NetApp FAS F-Series

Cluster Backend
Cisco NX 9335C-FX2

AI/ML Key Benefits

This CTG Federal/NetApp AI/ML storage solution delivers numerous significant benefits to federal agencies. This solution delivers:

EXCEPTIONAL OPERATIONAL EFFICIENCIES

The more data agencies have, the better their models will be. With in-line compression, data deduplication and data compaction made possible by Intel Quick Assist Technology (QAT), agencies can store more data using fewer disks without sacrificing performance.

ACCESSIBILITY FOR MULTIPLE TYPES OF CUSTOMERS

With multi-protocol access, NetApp's AI/ML solution accommodates virtually any type of customer, including Windows, Linux and Unix.

MINIMAL STAFF SUPPORT

Extensive automation features create operational efficiencies that lighten employee workloads.

HIGH SCALABILITY UP AND OUT, WITH EASE

Agencies can add upgraded storage capacity to existing controllers to scale up (increasing capacity) as well as add more controllers to scale out (increasing capacity and performance). Additionally, this solution scales linearly—meaning two nodes will deliver two times the performance, and four nodes will deliver four times the performance. Because ONTAP's virtualized storage infrastructure makes it easy to move data non-disruptively, the solution scales with zero downtime.

PEERLESS CUSTOMER SUPPORT

NetApp and CTG Federal offer personalized, follow-the-sun support for customers in any location. For government customers, NetApp offers support provided by U.S. citizens based in the United States.

A Premier AI Solution Deployed Using Industry Best Practices

In delivering this AI solution to our federal customers, CTG Federal employs numerous industry best practices and system features to ensure top performance and system resiliency for our customers.

To optimize performance and efficiency, this solution utilizes:

THE FASTEST NETWORKS AVAILABLE

10G/25G/40G/100G/200G+ Ethernet

JUMBO FRAMES

These data packets are six times the standard size—making data transmissions far more efficient and improving performance.

THIN PROVISIONING ON THE AFF CONTROLLERS

Storage is provisioned dynamically, improving storage utilization and efficiencies.

FLEXGROUPS

These highly scalable, single-namespace NAS containers provide automated load distribution and scalability, supporting higher performance and simpler management.

To optimize system resiliency, this solution utilizes:

PORT CHANNELS ON THE CONTROLLERS

These are used to aggregate physical network links to improve performance and prevent outages due link failures.

DATA LOGICAL INTERFACES (LIFS) ON EACH STORAGE NODE

If there is a network component failure, a LIF serving NFS or SMB can fail over to a different physical port anywhere in the NetApp cluster. A LIF serving SAN protocols will use host-based standards to be redirected to a functional port, maintaining availability.

Conclusion

Federal agencies with cutting-edge AI/ML workloads need best-in-class storage solutions that perform fast and reliably—and that scale up and out as needed. As a premier NetApp integrator and value-added reseller in the federal marketplace, CTG Federal delivers a solution that employs exceptional operational efficiencies, industry best practices, and system features for improved performance and resiliency.

CTG Federal: An Indispensable Agency Partner For NetApp Modernizations

Having deployed hundreds of integrated NetApp solutions to federal customers, CTG Federal delivers unrivalled expertise and value to federal agencies looking to simplify, streamline, and modernize their data infrastructures with NetApp solutions. We are one of only a handful of value-added resellers that carry NetApp A-Team membership.

As NetApp A-Team members, CTG Federal has access to privileged product roadmap information, product and corporate engineering. In fact, CTG Federal staff help write NetApp certification exams. In addition, CTG Federal offers:

- A century of combined NetApp experience within our sales, engineering and operations staff.
- A sales and engineering staff that is fully certified and NetApp-accredited on the full portfolio of NetApp solutions and products.
- Best practices on the design, architecture, and sizing of NetApp solutions.
- NetApp product updates and NDA (non-disclosure agreement) roadmaps to help agencies future-proof their modernization plans.

- Promotional pricing, discount programs, and value-added price breaks.
- Speed, efficiency, and accuracy in booking, shipping, and tracking customer purchases.
- Dedicated and knowledgeable post-sales and logistical support.
- NetApp-certified and accredited engineering staff for pre-sales support and post-sales implementation and migration work.
- U.S. citizen, U.S.-based, DoD TS- and DoE Q-cleared personnel at all levels of sales and engineering.

About CTG Federal

CTG Federal, a Cohesive Technology Group company, is a small business that excels in servicing dozens of federal defense, intelligence, and civilian organizations with best-in-class information technology. Our experienced team of sales and engineering professionals design and deliver IT hardware and software solutions that save time and money for our customers. Headquartered in Virginia, we have dedicated resources in all regions across the continental United States.

Contracts

DUN & Bradstreet: 080932836
UEI: G2D4Q7UKR5P5
CAGE Code: 7ZHE9
NAICS Code(s): 541519

NASA SEWP V
Contract Number: NNG15SD12B
Group: Group B_Small Business

GSA Multiple Award Schedule (MAS)
Contract Number: 47QTCA25D003P

DOE ICPT
Contract Number: ICPT CISCO BOA 4I-30062-0008A

Dell Technologies ICPT Agreement
Contract Number: 4I-31841 Small Business

Horizon ELA
Contract Number: W519TC-25-D-A005

ITES-4H
Contract Number: W519TC25DA013

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