WHITE PAPER

AI-DRIVEN NETWORK ENGINEERING

Transforming Infrastructure with CDW Government

CDW Government

CDW

EXECUTIVE SUMMARY

Artificial Intelligence (AI) is reshaping network engineering by introducing new demands for performance, automation, and security. As AI workloads, including Generative AI (GenAI), Large Language Models (LLMs), and Machine Learning (ML), become more prevalent, networks must evolve to meet their unique requirements. Traditional network management approaches may not suffice, necessitating a shift toward AI-driven network automation and NetDevOps methodologies. CDW Government provides industry-leading solutions to modernize and optimize network infrastructures for AI applications, ensuring enhanced performance, efficiency, and scalability.

INTRODUCTION

The integration of AI into network engineering has introduced new complexities that traditional IT infrastructures struggle to handle. AI workloads require high throughput transactions with low-latency data movement, parallelized datagram transmission for distributed computing, dense port connectivity to support multi-GPU environments, lossless packet transmission to prevent costly data retransmissions, and extreme bandwidth utilization to manage high-volume network flows. This whitepaper explores these evolving network requirements and how CDW Government leverages automation and NetDevOps strategies to support AI-driven infrastructures.

THE CHALLENGES OF AI WORKLOADS IN NETWORK ENGINEERING

AI workloads are distinct from traditional IT applications due to their reliance on high-speed, lossless, and parallelized data transfer across interconnected processing units. These challenges necessitate specific networking capabilities, including Remote Direct Memory Access (RDMA) protocols like RoCE (RDMA over Converged Ethernet), which enable efficient data movement with reduced CPU involvement. High-performance networking solutions, such as InfiniBand and RoCE Networks, facilitate large-scale AI model training and inferencing. Additionally, lossless Ethernet fabric ensures packet integrity and minimizes retransmission overhead for LLM processing. Optimizing network architecture is also crucial for managing bursty traffic and maintaining consistent performance.

CDW GOVERNMENT'S AI-OPTIMIZED NETWORK SOLUTIONS

To address these challenges, CDW Government provides comprehensive AI-driven network automation solutions. Automated network provisioning and troubleshooting eliminate manual provisioning, reducing deployment times and minimizing errors, while AI-assisted alarm and event correlation enable faster incident response. Enhanced network visibility and observability are achieved by implementing codified network topology for structured data analysis and integrating network workflows into IT Service Management (ITSM) platforms. Scalable and efficient infrastructure management is supported through modular network functions that optimize costs and deployment time while accommodating multi-cloud and hybrid cloud environments for AI workloads. Optimized talent utilization and workforce efficiency enable skilled network engineers to focus on high-value AI and automation initiatives, leveraging NetDevOps practices for continuous integration and deployment of network configurations.

CASE STUDY: AI NETWORK TRANSFORMATION IN ENTERPRISE ENVIRONMENTS

A leading enterprise faced challenges in scaling its network infrastructure to support AI-driven analytics and automation. By leveraging CDW Government's AI-optimized network solutions, the organization achieved a 50% reduction in network latency through optimized RDMA and InfiniBand configurations. Automated troubleshooting reduced Mean Time to Resolution (MTTR) by 40%, and enhanced observability enabled proactive network adjustments and improved performance.

CONCLUSION

As AI continues to redefine business and operational models, ensuring a future-proof network infrastructure is critical. CDW Government provides cutting-edge network engineering solutions designed to meet the unique demands of AI workloads. Our expertise in AI-driven automation and NetDevOps enables organizations to unlock new efficiencies, enhance performance, and maintain a competitive edge in an AI-enabled world.

For more information on how CDW Government can transform your network infrastructure for AI applications, connect with your account team.