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Submitter Information

Organization: Dell
Technologies

General Comment

Attached please find Dell Technologies' Response to the Development of a 2025 National AI R&D Strategic Plan RFI, Docket ID No. NSF-2025-OGC-0001.

Attachments

Dell Technologies Response to the AI RD 2025 Strategic Plan RFI (5-29-25)

May 29, 2025

Faisal D'Souza, NCO
Office of Science and Technology Policy
Executive Office of the President
2415 Eisenhower Avenue Alexandria, VA 22314

via www.regulations.gov

Re: Docket ID No. NSF-2025-OGC-0001: Request for Information on the
Development of a 2025 National Artificial Intelligence (AI) Research and
Development Strategic Plan

Dell Technologies Response to the AI R&D 2025 Strategic Plan RFI

Dell Technologies is pleased to submit this response to the Request for Information (RFI) regarding the development of the 2025 National Artificial Intelligence (AI) Research and Development Strategic Plan. This document is approved for public dissemination. The document contains no business-proprietary or confidential information. Document contents may be reused by the government in developing the 2025 National AI R&D Strategic Plan and associated documents without attribution.

We commend the Administration's commitment to ensuring U.S. leadership in AI and appreciate the opportunity to contribute insights from Dell. Incentivizing domestic R&D can protect U.S. intellectual property, champion U.S. innovation and support open ecosystems to sustain global economic advancement in AI. Our recommendations focus on aligning national R&D efforts on federal government and enterprise workloads, addressing energy infrastructure, and driving solutions to distributed interoperability challenges.

Realizing AI's full potential will require substantial and appropriate R&D investment focused to help address chip resourcing and increased compute power, data storage and energy efficiency needs. Public and private sector collaboration provides the optimum basis from which to move forward, with the 2025 National AI R&D Strategic Plan now representing a generational opportunity to translate ambition into action, together.

Dell Technologies included other R&D suggestions in our response ("***A Blueprint for U.S. AI Global Leadership***") to the RFI on the Development of an AI Action Plan.

Three critical areas the 2025 National AI R&D Strategic Plan should address:

1. Strategic Imperative: Intelligent Energy Orchestration for AI Infrastructure

As AI workloads surge, they are placing unprecedented demands on national energy infrastructure, threatening to outpace the capabilities of current systems. Without intelligent energy orchestration, power availability becomes a critical bottleneck—limiting innovation, scalability, and national competitiveness.

To address this, the U.S. must lead in R&D focused on AI-driven energy management systems that dynamically optimize power usage across data centers, edge devices, and hybrid cloud environments. This includes:

- **Predictive workload scheduling** to align compute demand with energy availability. This strategy leverages machine learning and historical data to forecast compute demand and align it with periods of high energy availability, particularly from renewable sources like solar and wind. By anticipating when workloads will peak and when clean energy will be most abundant, systems can dynamically shift or delay non-urgent tasks to optimize energy efficiency and reduce carbon emissions.
- **Real-time power optimization** to reduce waste and improve efficiency. Real-time power optimization continuously monitors and adjusts energy use to cut waste and boost efficiency. Using sensors and smart control algorithms, systems adapt instantly to workload and power changes, fine-tuning voltage, frequency, and resource use. This reduces idle power draw, improves performance per watt, and supports more sustainable operations.
- **Integration with decentralized energy sources** such as microgrids, battery storage, and renewables. Such integration enables computing systems to operate more sustainably and resiliently. By tapping into local energy generation and storage, data centers and edge devices can reduce reliance on centralized grids, lower transmission losses, and better manage power during peak demand or outages. This approach supports real-time energy balancing and enhances the use of clean, locally produced power.

The federal government should promote R&D to create **open, interoperable frameworks** that enable energy-aware computing—essential for defense, public services, and private sector growth.

2. Aligning National R&D with Federal and Enterprise AI Workloads

Federal and enterprise AI workloads—spanning defense, healthcare, energy, finance, education, and intelligence—are among the most complex and consequential in the world. To maintain global leadership in AI, the US should align national R&D efforts with the evolving nature of these mission-critical workloads. We bring decades of experience working with the enterprises, Federal government and regulated industries to deliver secure, modular AI infrastructure—tailored to local compliance needs while enabling global innovation.

- **Publish long-term AI workload roadmaps to guide academic and industry research.** The federal government should lead the development of comprehensive, forward-looking AI workload roadmaps that forecast the types of computational tasks, data modalities and deployment environments expected across agencies, including requirements for data flows, latency and security. This will catalyze innovation across academia and industry to develop architecture and tools that are tailored to future needs.

- **Promote modular, scalable AI architectures that adapt across cloud, edge, and mobile environments.** Future workloads will not be confined to centralized data centers; they will rather extend to a continuum from cloud to edge to mobile. The government should encourage the development of modular AI architectures that can be easily reconfigured and deployed across diverse environments. These architectures should support plug-and-play components, enabling rapid adaptation to new mission requirements or hardware platforms. Modular designs will enable rapid deployment, interoperability and resilience across agencies, ensuring that AI systems can evolve alongside changing operational demands.
- **Leverage defense and national security use cases as anchor tenants to drive innovation in secure, high-performance AI systems.** Defense and national security applications are some of the most demanding and high-impact AI use cases. These use cases can serve as proving grounds for advanced AI capabilities, such as real-time decision-making at the edge or autonomous systems in dynamic conditions and inform R&D efforts and accelerate the development of robust, secure and adaptable solutions that benefit broader applications which extend to enterprise implementation.

These efforts will provide **essential guidance** for both federal, enterprise and academic researchers, ensuring R&D investments are **strategically aligned** with evolving technological and mission-critical needs.

3. Challenge: AI Workloads Are Outpacing Infrastructure Capabilities

AI's rapid evolution is pushing the limits of current infrastructure, demanding a national response on the scale of the CHIPS Act. A dedicated R&D initiative focused on distributed, AI-ready infrastructure could catalyze the development of next-generation digital and physical systems. This effort should be guided by anticipated federal and enterprise workloads and designed to support seamless collaboration across national labs, universities and industry. Key areas for federal supported R&D should include:

- **High-speed, low-latency national networking to connect strategic nodes with secure, fiber-optic backbones and data center interconnects.** As AI workloads grow in complexity and scale, the ability to move massive datasets quickly and securely between strategic hubs (e.g., federal agencies, research labs and critical infrastructure operators) becomes critical. As an example, if a model is trained at Oak Ridge National Lab (ORNL) and deployed at the Stanford AI Lab (SAIL), the underlying infrastructure should be able to handle the data flow without bottlenecks. A national, secure and high-speed backbone connecting these nodes would enable distributed AI workloads to operate as a cohesive system, supporting real-time collaboration, federated learning and rapid deployment of mission-critical models across the country.
- **AI-optimized data centers designed for energy efficiency and renewable power integration.** As AI workloads scale, their power demands are

outpacing the capacity of many regional grids. Future data centers must be designed with energy availability as a first-order constraint while still delivering the performance needed for next-generation workloads. This includes integrating renewable energy sources, advanced cooling systems and workload-aware scheduling to manage energy use more efficiently. Future data centers should also be modular and scalable, capable of adapting to evolving workload profiles. Addressing both energy availability and operational flexibility will be critical to sustaining AI growth at scale.

- **Edge and mobile AI infrastructure to support real-time, distributed inference and decision-making.** AI leadership depends on the ability to deploy intelligent systems wherever decisions are made, from factories to vehicles, hospitals and remote locations. R&D should focus on developing lightweight, power-efficient models and hardware accelerators that can operate resource-constrained environments with limited connectivity. Innovations in model compression, on-device learning and secure data handling for edge deployments are essential. In addition, research should advance orchestration frameworks that enable dynamic coordination between edge, mobile and cloud systems, allowing workloads to shift based on latency, bandwidth and compute availability. Simulation environments and testbeds should also be developed to evaluate edge AI performance under real-world conditions to ensure reliability and adaptability to the requirements of different sectors.

Such R&D would enable **seamless collaboration** across national labs, universities, and industry, accelerating innovation and ensuring infrastructure keeps pace with AI demands.

We appreciate the opportunity to contribute to this important initiative and stand ready to support the development of a strategic R&D plan that ensures the United States remains at the forefront of AI innovation.

Dell Technologies