

THE POWER OF DATA BEHIND ADVANCED ANALYTICS IN GOVERNMENT

Government, academia and private industry are partnering to get the most out of data by leveraging high-performance computing and artificial intelligence.

Billions of connected devices around the world are generating trillions of megabytes of data each day. As these massive datasets are transferred and stored in cloud data centers around the world, insights are drawn and used to Billions of connected devices around the world are generating trillions of megabytes of data each day. As these massive datasets are transferred and stored in cloud data centers around the world, insights are drawn and used to change the way we do business.

How is this data being managed, and what advancements are being leveraged to solve the nation's most pressing challenges? Several data experts [talked with FedInsider](#) during a recent webinar to explore how the power of high-performance computing is being used for everything from climate-based modeling to biometrics.

The following are some of the most important aspects of those efforts.

Advanced Analytics at Work

In the biomedical space, high-performance computing is being used to advance the role of personalized blood simulations to study and treat cardiovascular disease. Amanda Randles, assistant professor of biomedical and computer sciences at Duke University, said she's working on the development of a code that takes clinical data from

medical imaging like MRI scans to develop simulations of someone's vasculature, coronary arteries and blood flow.

These models can be used to diagnose a patient, explore a treatment option or predict possible procedure outcomes using non-invasive methods — and running them requires some of the biggest supercomputers in the world.

Similar model-based methods are also being used to understand long-term changes in climate and its impact on the Earth. Frank Indiviglio, acting deputy director of High Performance Computing and Communications for the National Oceanic and Atmospheric Administration (NOAA), said the agency is taking artificial intelligence and advanced analytics even further than climate-based modeling.

NOAA is focused on improving physical parameterization for weather and all Earth systems to enhance their computational performance and efficiency. Observational improvement is a big part of this area. The weather forecast is determined by observations collected through various means, like satellites and sensors on the field and in space. Getting the right data into the model at the right time provides a more accurate forecast, and AI can do quality control of those observations.

FEATURING:

> Ron Thompson

Associate CIO, Transformation & Data, NASA



> Frank Indiviglio

Acting Deputy Director, HPC, NOAA



> Dr. Amanda Randles

Assistant Professor, Biomedical & Computer Sciences, Duke University



> Curt Smith

VP & GPU Datacenter Architect, NVIDIA



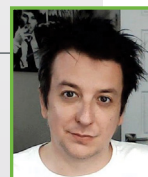
> Randall Berger

Distinguished Chief Technologist, Hewlett Packard Enterprise



> Chris Sexsmith

Program Director, Data Science & Edge Computing, Red Hat



Tapping into the Power of Shared Data and Collaboration

Prior to the [2019 Executive Order on Maintaining American Leadership in Artificial Intelligence](#), Randall Berger, distinguished chief technologist at Hewlett Packard Enterprise, said the federal government was only at 1% utilization of AI and machine analytics.

The executive order mandated putting more federal funding into these areas, which helped implement machine learning, AI and analytics into government business and missions. The COVID-19 pandemic also accelerated advanced technology adoption, and agencies and industry are working together to share resources and solve critical problems.

The Energy Department's National Laboratories diverted a lot of resources with supercomputers and high performance computers last year to vaccine development, for instance. Berger suggests federal utilization of AI could be "getting close to 50% where most government agencies are really relying on or looking at machine learning and AI today."

According to Curt Smith, Vice President and GPU Datacenter Architect at NVIDIA, this consortium effort can be replicated and is already being used by various branches of government as they begin to work together on implementing AI methods.

Overcoming Advanced Analytics Hurdles

Smith said another challenge is processing the amount of incoming data. "It's difficult for both the bandwidth and the throughput of that data to keep up with the need to shorten the time to make decisions," Smith said.

How to Advance Computational Power

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