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From Cloud to Edge: Rethinking AI Deployment

Government and industry are embracing edge computing to drive real-time outcomes using AI-driven, collaborative enterprise architectures and hybrid environments.

The push for smaller, more powerful laptops and tablets has hurt desktop sales, but artificial intelligence is shifting the conversation toward a more balanced approach. As organizations adopt AI to boost productivity, they need a mix of devices tailored to different roles and environments. Laptops offer mobility and connectivity for field work, while desktops remain ideal for in-office use due to better performance, easier hardware upgrades and cost efficiency. AI-enabled devices also support local data processing, improving privacy and reducing reliance on cloud connections.

During a recent **FedInsider webinar**, experts from government and industry met to discuss the future of an AI-driven workplace and how to choose the right combination of technologies to support and empower the use of AI.

A Shifting Enterprise Architecture

Advancements in AI are meeting devices at the edge – on laptops, mobile devices, cameras and more. This is substantially changing enterprise architectures, said Dr. Darren Pulsipher, Enterprise Architect for the Public Sector at Intel Corp.

This cycle isn't new. At first, everything was in the mainframe and was never meant to go out. Then, everything came into the cloud and was never meant to go out to the edge. Now, everything is back at the edge again.

"We are processing a lot of great things out at the edge and doing a lot of inference without having to move all of this data to the cloud and the generative AI infrastructure," Pulsipher said. "To me, this is an exciting time, especially for an enterprise architect."

At the Library of Congress, AI is being used to support staff and redesign workflows where necessary. "We. . . give them the tools to use AI techniques in order to help them in the work that they do," said Natalie Buda Smith, Director of Digital Strategy for the Library of Congress. "We process a lot of data here. . . So how can we support the staff? It may be an AI technique, or it may be by giving them access to a feature. That is what is really making a difference for us right now."

How AI should be run – in the cloud, in a data center, on-premises or in the field – depends on the agency's mission needs, and how much data needs to be moved from the edge to a data center. New technologies like neural processing units, for instance, can now be run on laptops without requiring a lot of computing power. "You used to only get that power in a big data center or the cloud, but some of that power has now gone out to the edge," Pulsipher said. Even so, aggregating results from multiple edge devices could still require the cloud.

"What I am starting to see emerge is what I call dynamic orchestration across heterogeneous infrastructure," Pulsipher said. Rather than running a workload just in the cloud or in a data center, workloads run across a heterogeneous ecosystem – forming an intelligent, collaborative orchestrator that moves data and workflows based on the operating environment. This is where enterprises are headed.

Featured Experts:

- **Natalie Buda Smith**
  Director, Digital Strategy,
  Library of Congress

- **Dr. Darren Pulsipher**
  Chief Enterprise Architect,
  Public Sector,
  Intel Corporation

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Getting AI Ready

Having an AI-ready enterprise can improve federal programs. Think about the warfighter's needs in the field – if they could run inference and AI on their devices completely disconnected, it would remove the risk of emitting radio frequencies that are vulnerable to enemy electronic warfare. Then, when they reconnect to the network, data would sync seamlessly.

The Food and Drug Administration could benefit from similar technology on farms tracking a salmonella outbreak, collecting data at remote farms, processing it using AI, and then reviewing those conclusions back at the office with further AI processing. "We are just on the tip of some really incredible things with distributed AI out there in the world," Pulsipher said.

Before agencies can realize these benefits, they need AI-ready systems. Inference chips, like NPUs, are emerging because they can run on very little power in small devices like laptops for a long period of time without a GPU. Intel is already working on similar chips because of their potential.

At the Library of Congress, workers are on multiple campuses in different locations, and AI is inserted into the tools they use. "There is no AI tool that will do it all, so we are thinking through the best mix of hardware and software, and what AI is best for each specific role," Smith said.

The Library of Congress has a strong governance foundation, and Smith said they must consider how to deliver and use AI tools across multiple devices and platforms, and how to integrate a centralized process to govern and manage them all. Deciding which teams need higher performance or AI-capable systems versus more standard configurations, however, is never a one size that fits all type of solution.

"If you have a really good way of managing all these different types of devices, software and models, and if you already have very strong infosec and infrastructure management, AI magnifies it even more. But if you don't have one, it exposes you," Pulsipher said.

Integrating the Right AI Advancements for the Future

As autonomous agents gain traction and the Library of Congress realizes its potential, the way it approaches adoption matters. "You need that strong foundation of IT security and governance, and then a strong foundation of data management combined with good data," said Smith, "and then you can build onto that with agents."

Keep humans in the mix first to review the work of agentic AI, and once it can be trusted, teams can allow for more agentic behavior. "We make sure that we experiment, try things out, confirm there is a human in the loop, and that there is control when we need it," Smith said.

Security must be built in from the start, Pulsipher added. Don't ignore security for the sake of speed, especially if it's not baked into the software. "We have to put our heads on straight and start thinking systemically instead of just one type of solution," Pulsipher said.

That's where an enterprise architecture comes into play. The world of AI requires collaboration – between platforms, systems, tools and people. "What AI is really forcing us to do is make sure that we are collaborating across all of these different roles," Smith said. "You really need distributed governance as a way for people to let you know what's going on, but also for policies and a centralized repository of what we have. It's a constant conversation across the organization, and it's a collaboration."

The discussion made clear that the next phase of AI in government will not be defined by any single device, platform or deployment model. It will be shaped by how well agencies build the foundation to support AI across cloud, data center and edge environments while keeping governance, security and human oversight firmly in place. As AI becomes more embedded in daily work, the agencies that benefit most will be those that treat it not as a standalone tool, but as part of a broader enterprise architecture designed to support smarter decisions, stronger collaboration and mission outcomes at scale.

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