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Data is driving agencies to rethink how to take better advantage of edge computing

BY JASON MILLER

If agency chief information officers and chief information security officers ever thought they knew where the edge of their network extended to, over the last few months they quickly learned they were mistaken.

The edge of an agency's network got a lot wider and extended in more directions than many IT executives previously ever considered.

"I think the way we defined edge computing, even 90 days ago, and informed by the environment that we've been operating in recently, that it is going to fundamentally change. I think the term of edge is going to be the key component of that because you can make the argument that the edge is a relative term," said Lt. Gen. Bruce Crawford, the CIO/G-6 for the U.S. Army, during a panel discussion sponsored by Dell Technologies. "The edge is in the eyes of the beholder. I think the fundamental premise here in my thesis is the edge is now wherever the user actually happens to be."

PANEL OF EXPERTS

Kirsten Billhardt, Global Marketing Director, Edge Solutions Group, Dell Technologies

Zach Goldstein, Chief Information Officer & Director, High Performance Computing and Communications, National Oceanic and Atmospheric Administration

Mac Townsend, Technical Director for Architecture and Engineering, Chief Information Office, Defense Intelligence Agency

Lt. Gen. Bruce T. Crawford, Chief Information Officer/G-6, U.S. Army

Jason Miller, Executive Editor, Federal News Network

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Dealing with a barrage of data

This continued growth of where employees, citizens and businesses are interacting with the government, where agencies collecting data from and the need to process that data in real time is driving a host of technological changes starting with the move to the cloud several years ago and now adding advanced analytics to the applications.

Crawford said that means the edge is the tactical operations center, which has traditionally been what many considered to be the outer reaches of a network, but it's also the servicemember or civilian working at home because of the coronavirus pandemic.

This new definition of "edge computing" isn't just a change for the Army.

Zach Goldstein, the CIO and the director of High Performance Computing and Communications at the National Oceanic and Atmospheric Administration, said he even expanded the definition of the edge further.

"We have our internal users about 25,000 scientists, engineers, pilots, navigators, meteorologists and other collaborators, but we also have the American people. NOAA touches everybody in this country every day when you look at our space weather mission and tsunami mission, it's actually worldwide and getting information to them in a secure manner, quickly," he said. "What the edge definition is it's the observation, all the way then out to the users who are doing things to the data and then ultimately to the American people in the world on the other end of our value chain."

"Edge is really about how we can triage that huge barrage of data that's coming in and funnel it down into the components that we need to be able to do our missions as we're going forward and to understand the landscape of what's in the environment. That's the tie in with AI helps us do that," said Mac Townsend, the technical director for Architecture and Engineering in the CIO's office at the Defense Intelligence Agency. "One of the things that we're looking at is how do you take this vast barrage of internet of things, of Army devices and sensors that are out there, of the NOAA weather kinds of capabilities and how do you bring all that stuff together as we're going forward?"

Townsend and the others say it's less about getting technology to the edge, which has its challenges, but what can soldiers or civilians do with the data that is collected to help accelerate decision making?

DIA, for example, is using a thin data model, which is focused on the what, the where and the when to gain a global view of all the data sources feeding the agency's analysts.

Other agencies, like the Army, are re-architecting their networks to take on the big data challenge.

Crawford said the service will spend about $733 million over the next 24 months to move applications, systems and data to the cloud.

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"As we are architecting the network to provide the flexibility that we need, there are some front-end decisions that have to be made that have to do with what decisions by the user are going to have to be made and what data is going to be required on that actual platform that's independent of the reach back to Mecca," he said. "The tactical edge becomes increasingly important given the dynamic nature of the battlefield."

Kirsten Billhardt, the global marketing director for the Edge Solutions Group at Dell Technologies, said to make all that data accessible and therefore more valuable, agencies need to modernize their networks. She said with the amount of data expected to rise to 175 trillion gigabytes around the world by 2025, according to IDC, if an organization's network is struggling so will they as they try to meet their mission and goals.

"There is growing importance of having actionable intelligence for those frontline teams wherever they may be, whether it is in a military environment or being able to have good weather information to prepare a community," she said. "It gives them a clear view of the ground truth of what the reality is to be able to make good strong decisions and that, 'edge' looks a little bit different depending on what the environment is."

Getting the network ready for advanced analytics

The combination of a modernized network, advanced analytics and the cloud can reduce latency and reduce time to decision making.

Billhardt said if data doesn't have to make that round-trip to the cloud or back to the data center, then agencies can get instantaneous analysis of relevant data.

"You can have the predictions in the analysis to those frontline teams so that they can make the

right, high-quality quick decisions that can lead to a more safe environment and more efficient in environment and help progress the mission," she said. "It's just taking advantage of all the goodness that comes with that data, but not letting it overwhelm you. That edge is a huge enabler to reduce that data and make it manageable over your networking capabilities and in your other computing centers."

Goldstein said the stress NOAA is experiencing on its networks from the sensors and other data collecting tools has to be addressed in the short term.

One way the agency is doing that is through a new AI project.

"The AI project is designed to help us not only conserve bandwidth. When you're loading terabytes of data down from a satellite and you only need the most important information for a model, and also you don't want to take the time for human quality assurance of that data, which is something else we do, how we can better how we can use AI at the edge?" he said.

Goldstein said the incubator project through NOAA's high performance computing program aims to save human interaction and bandwidth, but also to improve the forecast by making sure that the data that arrives first is this most valuable in terms of the accuracy of the forecast.

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Billhardt said NOAA's AI project is a good example of why agencies are using a multi-, hybrid cloud approach to address these challenges.

"By using a multi-cloud approach and being able to think of that as a fabric technology architecture, so that you could move data and then analyze those workloads, where it matters, while it matters, using that right level of compute needed for the job is I think what most organizations are striving for," she said. "So having that consistent fabric and thinking about the orchestration and the security and the manageability and virtualization and all these underlying enablers is going to give you that capability to run the right data at the right place at the right time to feed these amazing new capabilities we have with AI and machine learning. With fresh fuel fresh data to keep your front lines informed with the highest quality information possible."

Classified networks add to the challenge

The Army shifted its modernization strategy in some ways to focus less on application rationalization and modernization and more toward a data-centric approach to take advantage of advance analytics more quickly.

"What the Army did, which was pretty interesting, in November was we actually put out an execution order to the entire Army to take a step back and look at all four mission areas and the data in those mission areas. We will decide what is going to migrate to a cloud environment," Crawford said. "So

what is our mechanism going to be to divest in non-authoritative data sources. So there's a resourcing piece to this, but to bring it forward to the AI and ML discussion, it makes no sense to put AI and ML tools on top of dirty data. There's a trust aspect to it that we didn't have before. Ultimately, if the user does not trust the data, meaning they're getting you know inaccurate readings, etc., then you have to ask yourself a hard question about the importance of your effort."

At DIA, the challenges with getting computing to the edge and making the data and tools more valuable is double because of the classified environment employees regularly work in.

Townsend said DIA is upgrading the speed and bandwidth of its classified networks to bring them up to 200 gigabytes.

"We understand that we're not ever going to be able to match the amount of data that's coming out of the internet of things so the modernization that we're looking at is not just about upgrading hardware on network devices and things of that nature, but also figuring out the strategies of how we can triage data at the source and move things back toward a more centralized cloud environment," he said. "We're looking at a lot of these edge devices and things of that nature to run on our several different environments at the edge. We can't always afford to have a monstrous cloud at different places so we have what's called a hybrid environment. We have to make sure that the services that we provide can run on each of these different hardware platforms as we're going forward."

Dell's Billhardt added taking advantage of the cloud and edge computing is both a major challenge, but an amazing opportunity too. She said agencies should embrace it and invest the time and resources to get them going in the right direction because the payoff in mission success will happen quickly.

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