FEDInsider

DATASHEET

Modernizing Federal Networks for Edge Computing

Agencies and the tech industry are working together to transition networks to the edge while data loads increase.

FEATURED EXPERTS:

- **COL Joseph Pishock**
  Director, Global Networks & Services,
  U.S. Special Operations Command J63

- **Jim Westdorp**
  Chief Technologist,
  Ciena Government Solutions Inc.

- **Colin Gosnell**
  Director of Engineering,
  Comcast Government Services, LLC

Government agencies are largely turning to edge computing, but need modernized networks to help secure, collect and analyze data at the edge. Technologies like Network Functions Virtualization (NFV) exist to support network modernization and fast service delivery by using the infrastructure as a sensor to provide visibility to support secure operations.

Government and industry leaders spoke at a recent **FedInsider panel** to discuss edge optimization and how they're utilizing this approach to modernize their networks. The following are some of the most important aspects of their discussion.

Benefits of edge computing

According to Col. Joseph Pishock, Director of Global Networks and Services for the U.S. Special Operations Command (SOCOM), the Department of Defense (DOD) began adopting modern collaboration tools like Microsoft 365 once the pandemic forced operations to change. This has enabled the department to send data from the enterprise out to the edge, which puts a new demand on its transport due to the amount and variety of data that the DOD collects today.

For instance, data is recorded that supports the DOD's intelligence platforms and provides frame of reference for conflicts around the globe. The department has adopted an infrastructure to support these national assets at the edge and provide data storage and analysis. In other words, compute at the edge allows SOCOM to collect video data from drones and intelligence data from platforms in Iraq or Afghanistan — and then store and analyze it quickly.

"Those large platforms are now replaced by smaller systems," Pishock said, "for greater scale and higher quality of video." These systems also support the next generation of intelligence, surveillance, and reconnaissance, allowing the command to gain insights in real time from IoT devices at the edge like handheld drones and sensors. This is critical, as Pishock said SOCOM's data flows are expanding at a rapid rate.

Keeping up with data

As edge computing becomes more prevalent, network traffic becomes less steady. Data warehouses stored or replicated in the cloud were originally meant only for data and processing occurring in the cloud, and thus can no longer efficiently support some of the loads they are experiencing.

Instead, edge compute systems are doing a lot of the analysis themselves and then uploading their results to those same cloud infrastructures. This reduces processing load within the data centers but can also increase the amount and types of data being transported. Data flow today is happening in large spikes of activity, according to Colin Gosnell, Director of Engineering at Comcast Government Services. "We started to need to develop networks that are able to handle large data chunks rather than consistent data flows," he said.

Ciena Government Solutions is also seeing a dramatic increase in network edge capacity. Its chief technologist, Jim Westdorp, said not too long ago that the edge of the network for most organizations would

ciena | COMCAST BUSINESS

aggregate about 1Gig of Ethernet activity in a typical day; today, it is more like 10 to 100Gigabit per second over the same period. "The edge of the network is now 100 times the size of what it used to be five to ten years ago," Westdorp said. "And it's continuing to accelerate."

Ciena Government Solutions provides the network equipment used to build the physical network. And as the capacities have gone up at the edge, the overall demand and use of the network has changed, particularly as it relates to data centers. They're seeing a need for processing, computing, and even storage at the edge.

Improve edge computing with technology

NFV is a network architecture that virtualizes classes of network node functions into building blocks that can connect to deliver communication services. Gosnell said the technology collapses what used to be very large stacks of boxes that each had specific use cases for routers, switches, or security devices. Functions that were hardware based have now been modified to be software driven, which increases flexibility and the ability to modify different threats and use cases.

Every time there is a stack, reliability goes down — because each one of those pieces of equipment is a failure point. NFV increases the reliability of the network by only having one physical element that the user needs to perform maintenance on. It also allows the user to operate these networks within a single viewpoint.

Pishock said SOCOM is using a similar technology that he referred to as a tactical mission network, which is a cloud-hosted set of collaboration tools allowing partners to consume services at the edge and collaborate.

Gosnell also pointed to the Data Over Cable Service Interface Specification (DOCSIS) as an example of an evolving technology that can help with edge computing. DOCSIS 4.0 increases the ability to meet access elements that will be driven by edge computing by modifying the capabilities of the cable network infrastructure. Moreover, DOCSIS 4.0 reaches a traffic flow of 10Gig, a ten-times growth increase over previous standards. And considering the amount of fiber in Comcast's network, Gosnell said if they can enable it to handle high-speed data flows for edge applications, it increases the flexibility that agencies can use to implement their different requirements.

Technology for easy transitioning

There's also technology that can take Time-Division Multiplexing (TDM) and convert it to Ethernet. TDM is more than 20 years old and is a traditional way of transferring data across a network by taking chunks of data and assigning them to a particular time slot. Today, newer networks are based on packets and not time slots, but there is still equipment using TDM signaling protocols — particularly at the edge. As networks have modernized, the core of the network is modernized first and then pushed out towards the edge, but Westdorp said TDM is not an ideal technology to use in the core of the network — especially for scale and efficiency.

Yet many government agencies have TDM within their specialized acquisition systems, so it is impractical to just get rid of it. "What you really want to have is an ability to convert from TDM to Ethernet so you can use modern converged infrastructure to carry the data, while still being able to use the original equipment that was designed," Westdorp said.

That's why TDM conversion technology is so important. It can facilitate the use of high-value equipment while enabling the use of a modern network — and transitioning is critical to helping agencies update to networks that support edge computing. "It is hugely disruptive of both the users and the carriers' infrastructures to do rip-and-replace type operations, and frankly, it's not particularly cost-effective either because it can be very expensive," Westdorp said.

Industry, Gosnell added, can do its part by making the elements they control simple to consume, and focusing on "increasing the flexibility of how the government can use the solutions."

Hosky Communications, Inc.
3811 Massachusetts Avenue, NW
Washington, DC 20016

- (202) 237-0300
- info@FedInsider.com
- FedInsider.com
- Facebook.com/FedInsiderNews
- Linkedin.com/company/FedInsider
- @FedInsider

Ciena
7035 Ridge Road
Hanover, MD 21076
Contact: **Jim Westdorp**

- (410) 865-4735
- JWestdor@Ciena.com
- Ciena.com/Government
- Facebook.com/CienaCorp
- Linkedin.com/company/Ciena
- @Ciena

Comcast Business
11951 Freedom Dr Ste 900
Reston, VA 20190
Contact: **Colin Gosnell**

- (703) 843-0084
- Colin_Gosnell@Comcast.com
- Business.Comcast.com/FedGov
- Facebook.com/ComcastBusiness
- Linkedin.com/company/Comcast-Business
- @ComcastBusiness

ciena | COMCAST BUSINESS