

# Edge Computing and Hybrid Cloud are Keys to Modernization

Federal civilian agencies, as well as the Defense Department's sprawling array of agencies, are moving to develop fast, effective applications and computing capabilities at the far reaches of their networks. To do so, they are leveraging cloud and edge computing technologies to bring these capabilities closer to the mission.

Edge computing and hybrid cloud have been shifting business dynamics in commercial markets for some time, allowing businesses to shift their purview from maintaining and upgrading legacy IT systems to adopting technologies that move the business forward. Edge computing capabilities, in particular, put more computing power nearer to users, where it's needed, instead of centralizing it in a less accessible location. Equipped with these technologies, businesses are pushing quickly ahead with new applications and features spun out to their far-flung locations.

The same hybrid cloud and edge computing dynamic is taking hold in government, as well, for similar reasons. According to a recent Gartner [study](#), cloud computing will remain solid because it offers agencies the operational agility, elasticity and scalability they need to meet today's mission in new, faster and more innovative ways. Hybrid cloud and edge solutions can also turn nagging capital expenses into everyday operating expenses, as capabilities are based on outside infrastructure that costs less to operate.

## DATA COMES CLOSER

"Edge computing is all about bringing processing and storage capability closer to where data is generated," said Pervaiz Bhatti, Staff Solutions Architect at VMware. "This distributed computing is a great infrastructure strategy where ultra-low latency and real-time response are critical to application performance and user experience."

Simply put, according to Bhatti, edge computing is essentially a scaled-down software-defined data center at the edge, that delivers services and capabilities that enable edge native applications and solutions at remote locations. It brings compute, storage and network abstraction in the form of virtualization to the edge in a small form factor.

Hybrid cloud is a combination of private cloud and a single public cloud, that facilitates flexible application delivery anywhere. Cloud platforms have become an integral part of government IT modernization efforts because they allow a leap forward in capabilities without the expense of completely overhauling an agency's own network facilities.

These platforms can be put to use in an almost endless number of ways. For example, emerging government capabilities, such as [artificial intelligence-driven medical applications](#) that [depend on sensors](#) in the field, can help deliver innovative medical care to the front lines of conflicts or other crisis zones, or help keep track of material and even people. The U.S. Army has recognized those possibilities and is working to make them a reality. In 2019, it made cloud infrastructure to support its operations a priority, establishing an [Enterprise Cloud Management Office](#). The office is integrating cloud throughout its enterprise, from warfighting to business operations.

VMware edge computing solutions can help government organizations — and especially the DoD — easily build, run, manage, and secure traditional and next-gen applications.

"Agencies such as the Food and Drug Administration, the Internal Revenue Service and the State Department that have extensive remote locations are particularly interested in expanding capabilities at the edges of their networks," said Bhatti. "Agencies that have remote offices, coupled with the need to manage computer resources, are good use cases."

## MANAGING A MORE COMPLEX ENVIRONMENT

While edge computing allows organizations to distribute workloads across the cloud while simultaneously extending out to the edge — pushing apps and services closer to where people, data and things connect to the networked digital world — means agencies also have the added task of making sense of this more complex IT environment.

"The edge has both resource requirements and economic constraints," said Grant Challenger, Director of Edge Computing at VMware. "At that intersection

you need to define the software solution that will drive business outcomes. The number one challenge is deployment and lifecycle management of edge.”

There are some issues that come with pushing computing to the edge of the network that must be taken into account, said Bhatti. For instance, lifecycle management and troubleshooting for remote sites can become more complex and challenging if an agency doesn't have the staff located at the remote locations to manage hardware, software and application life cycles.

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Director of Edge Computing, VMware

Limited network integration between on-premises and public cloud, conflicting APIs, policies and varying user interfaces, as well as complicated patching and updating, can also crop up. Security is an ever-present concern as well. Some users, like the U.S. Army, have practical concerns that might affect operations on the tactical edge, such as weight, portability and power consumption.

Holistic solutions, such as the VMware Edge Compute Stack, allow organizations to get a handle on those issues.

The stack is available in different sizes that correspond to an agency's business needs and supports edge-native apps built on virtual machines VM, containers, or web assembly that leverage multi-cloud services. It runs standard Operating Systems (OS), empowering IT and OT to deliver intelligent real-time solutions. It can be securely deployed across all types of wired and wireless networks, as well.

### **✓ KEEP THINGS AS SIMPLE AS POSSIBLE**

Bhatti advised agencies that want to maximize hybrid cloud and edge computing to think about some key factors as they move forward.

Simplicity, he said, should be an overarching consideration. Simplifying network connectivity between cloud and edge should be uncomplicated. Using a single control and data plane for network connectivity, as well as uncomplicated security measures such as micro segmentation and threat detection and response are approaches that can lead to more effective operations. Setting up supporting processes and

organizational procedures to manage remote sites and the cloud can also help, said Bhatti.

### **💡 NEW POWER TO THE FIELD**

Edge computing and hybrid cloud can be technological game changers for federal agencies. They can field new computing power and new applications in support of increasingly difficult missions the federal government demands of them. Using them effectively, however, requires some forethought and planning, as well as the ability to see ahead clearly without adding unnecessary complications.

### **📶 EDGE NATIVE APPS EMERGE**

As organizations distribute workloads across multiple clouds and simultaneously extend out to the edge — apps and services are pushed closer to where people, data and things connect to the networked digital world. A new type of workload is emerging — edge-native apps — that have to run at the edge to perform as they were intended. Applications such as augmented reality/virtual reality, connected vehicles, frictionless retail checkout and immersive gaming are mostly mainstream these days. Some of those apps, along with collaborative robots, drone fleets and digital twins, have been helped along by expanding 5G wireless connectivity.

Where a workload is placed at the edge is key to meeting requirements of edge-native apps.

An edge-native workload placed anywhere between the cloud and the remote customer location and delivered as a service is called the near edge.

An edge-native workload placed at a remote customer location at the closest proximity to the endpoints is called the far edge. VMware Edge Compute Stack is a purpose-built, integrated VM and container-based stack that enables organizations to modernize and secure edge-native apps at the far edge.

To learn more about Presidio Federal and our partnership with VMware, please visit:

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