Tapping into the enormous potential of 5G

By transforming telecommunications, 5G is a linchpin for innovations that promise to revolutionize government operations

5G TECHNOLOGY HAS the capacity to speed data transfers and connect billions of devices at a time when mission success hinges on fast, secure access to data and people. 5G's potential to enhance all government activities makes it an indispensable component of efforts to modernize IT systems and service delivery.

Because of its low latency and capacity to carry vast amounts of data quickly and efficiently, 5G enables real-time access to information. As a result, it is facilitating the growth of smart cities, the use of artificial intelligence to improve government operations and the adoption of edge computing. The implications are profound for activities as varied as battlefield communications, military logistics and preparedness, and emergency response in situations where critical infrastructure is unavailable.

In addition, the technology gives administrators the opportunity to automate activities for better security and efficiency, and its speed, agility and scalability boost agencies' ability to create new services quickly in response to users' needs.

"5G technology for broadband cellular networks will significantly improve how humans and machines communicate, operate, and interact in the physical and virtual world," states the abstract for the National Institute of Standards and Technology's 5G Cybersecurity project.

SECURITY AND SUPPLY CHAIN RESILIENCE

In a recent pulse survey conducted by Nextgov/FCW, 82% of respondents said 5G technology is an essential element of digital transformation efforts at their agencies. When asked to rate how widely they use the technology on a scale of 1 to 5, a total of 52% were a 3 or higher, and only 16% said their agencies had not adopted 5G.

We also asked respondents where they believed 5G could have a positive impact at their agencies. The top responses reflect concerns across the spectrum of digital transformation: optimizing the use of cloud technology (59%), strengthening cybersecurity (54%), speeding data analytics (53%), improving the ability to deliver innovative digital services (51%) and enhancing employee engagement and productivity (50%).

Gartner researchers predict that 5G connectivity and network infrastructure deployments will increase at a compound annual growth rate of 31.9% from 2023 to 2027, which includes consumer adoption and enterprise digitization. They also said "5G connectivity promises to enhance service delivery and end-user experience but introduces myriad infrastructure and ecosystem complexities." They point to the need to balance cost, spectrum and capabilities.

However, 5G networks also raise concerns about security. Those concerns often center on the use

5G by the numbers

Sources: CISA, NTIA, Nextgov/FCW

82%

Nextgov/FCW survey respondents who said 5G is an essential element of their agencies' digital transformation efforts

26%

Nextgov/FCW survey respondents who said their agencies are expanding their use of 5G technology

$1.5B

The amount of money the Public Wireless Supply Chain Innovation Fund will invest in open and interoperable 5G networks

1 MILLISECOND

Potential data response times with 5G, which enables innovations such as remote surgery and self-driving cars

of China-based companies for an infrastructure that is so integral to government, business and personal communications.

In November 2022, the Federal Communications Commission announced "new rules prohibiting communications equipment deemed to pose an unacceptable risk to national security from being authorized for importation or sale in the United States." The rules, which target five Chinese companies, "are an important part of our ongoing actions to protect the American people from national security threats involving telecommunications," FCC Chairwoman Jessica Rosenworcel said in the announcement.

The Cybersecurity and Infrastructure Security Agency's 5G Strategy highlights a series of initiatives that focus on security and resilience, which include supporting 5G policy and standards development, expanding situational awareness of supply chain risks, and encouraging innovation in the 5G marketplace to foster trusted vendors.

In a related effort, NIST's National Cybersecurity Center of Excellence "is addressing the 5G security challenge by collaborating with industry to create practical solutions that can strengthen the security of a system's architectural components, provide a secure cloud-based supporting infrastructure, and enable the security features provided by the current 5G standards."

THE MOVE TO OPEN, INTEROPERABLE NETWORKS

The 5G industry also relies on the cellular technology specifications issued by the 3rd Generation Partnership Project, which unites seven telecom standards development organizations.

3GPP's website states that those specifications "provide a complete system description for mobile telecommunications." Furthermore, the organization addresses a key component of interoperability by noting that "the major focus for all 3GPP Releases is to make the system backwards and forwards compatible where possible, to ensure that the operation of user equipment is uninterrupted."

To address concerns about security and capitalize on 5G's capacity for innovation, the telecom industry and the U.S. government have been pushing the evolution of 5G toward open, interoperable and often private networks.

The O-RAN Alliance's stated objective is to transform radio access networks (RANs) to be open, intelligent, virtualized and fully interoperable, which will reduce costs, improve performance and provide greater agility. The alliance is a worldwide community of mobile operators, vendors, and research and academic institutions, and its activities include issuing specifications for creating open RAN solutions and establishing centers that provide collaborative and impartial testing environments.

On the government side, the National Telecommunications and Information Administration launched the Public Wireless Supply Chain Innovation Fund, which will invest $1.5 billion "to catalyze the development and adoption of open, interoperable and standards-based networks."

Amanda Toman, the fund's director, told Nextgov/FCW that open systems create an opportunity to build a more resilient supply chain while also noting that they "provide an opportunity to drive innovation and make advancements in terms of our ability to apply artificial intelligence to various challenges and achieve energy-efficiency and cost savings."

'A CRITICAL STRATEGIC TECHNOLOGY'

The 5G strategy that the Defense Department released in 2020 states that "5G is a critical strategic technology; those nations that master advanced communications technologies and ubiquitous connectivity will have a long-term economic and military advantage."

At a recent event, DOD CIO John Sherman noted that 5G's operational uses include smart warehouses, equipment and vehicle maintenance, and health care, whereas tactical 5G will be crucial for activities like DOD's Replicator initiative, which seeks to field thousands of attritable, autonomous systems to counter China's numerical advantage in terms of ships, missiles and troops.

DOD has already implemented smart warehouse technology at Marine Corps Logistics Base Albany in Georgia with the help of industry partners. "A tremendous amount of planning, preparation and continuous execution is applied to ensure the necessary materiel is pre-positioned around the world and available at a moment's notice to support our Marines," said John Larson, the Naval Information Warfare Center Atlantic's team lead for the project, in a press release. "5G technologies deliver the fidelity, speed and security needed to accomplish this mission."

To ensure that civilian agencies follow a consistent approach to security and other considerations when developing 5G networks, the General Services Administration issued Acquisition Guidance for Procuring 5G Technology. It covers standards, government use cases, and contracting tools and strategies.

In addition to a government-wide approach to 5G, NTIA's Toman said partnerships with industry are essential. "Although the Innovation Fund's $1.5 billion is a lot of money, some large companies are spending tens of billions of dollars a year on research and development. So the question is: How can we align government and industry objectives and leverage all the resources in play to achieve the goal of open, interoperable and secure 5G networks?" ■