Emerging Technologies That Make a Difference Now

How governments can become more agile to better serve their mission in a post-pandemic world

What demands will the post-pandemic future bring to our mission, operations and services? Governments are already asking this question even as they continue their response to the public health and economic crises created by COVID-19. Part of the answer can be found in exploring new technologies and digital transformation that will extend the agility gained during the pandemic to and beyond the recovery.

Yet declining revenues mean any digital initiative must extract new value from existing technology investments. Four emerging technologies will help governments achieve these goals: artificial intelligence (AI) and machine learning, Internet of Things (IoT), data analytics and Fujitsu quantum-inspired computing.

Automation with AI and Machine Learning

Machine learning has become the most popular way to implement AI capabilities and leverage the insights gained into automation. Machine learning extends AI by allowing the device or algorithm to learn on its own how to respond appropriately to new input. For example, an algorithm can learn to identify the extent of invasive plants as it reviews videos or photos from land inspections.

Other use cases include processing images from cameras attached to vehicles, train engines and drilling devices to inspect the condition of roads, rail tracks and water pipes. Images and data from connected cars and traffic signals can be processed by AI systems for real-time, adaptive management of traffic flow.

AI and machine learning technologies are increasingly embedded in smart devices and modern software. By looking for solutions that incorporate these technologies, a government can realize two major benefits. The first is better data insights. The ability to automatically and intelligently process large volumes of information makes it easier to identify trends across multiple and complex data sources. And as machine learning gains new insights, this automated processing can improve over time.

The second major benefit is enabling employees to focus on higher-value analysis and problem solving. Instead of the time-consuming, tedious and error-prone work of manually reviewing data, staff receive alerts, reports and evidence that help them identify problems and needs — as well as the best response.

Broad Controls with IoT

Internet of Things is the broad term describing networked sensors and devices that monitor and control specific, generally small tasks, equipment or functions. In the public sector, a common use case for IoT is in "smart city" devices and services. For example, sensors on streetlights can measure air quality, detect copper-wire theft or monitor traffic flow. Sensors in garbage cans can signal when they need to be emptied.

Although individually these IoT devices and the amount of data they produce may be small, combined their impact can be large. When hundreds or thousands of IoT devices are installed across a government's operations or geographic area, the data gained can create better decision-making and more cost savings from automated control.

More Information from Data with Analytics

Governments collect, maintain and produce huge amounts of data. The challenge is obtaining useful information from it. Analytics software filters and organizes data so it can be understood and applied by employees and the public.

Several use cases illustrate the value of analytics for government. State and local health departments use analytics dashboards to track and compare COVID-19 case rates by area. In a disease outbreak or natural disaster, analytics models help emergency managers predict demand for hospital beds and specialized equipment. For traffic safety, video analytics help transportation planners identify intersections and road segments that need changes to reduce speeding, accidents and near-misses. Real-time analytics on wait times allow better assignment of staff in DMV offices and other public service centers.

When analytics are used widely throughout an organization, the right insights can be delivered to the right people at the right time for improved program and operational outcomes.

Complex Problem-Solving with Quantum-Inspired Computing

Quantum computing is still a technology of the future, but some of its benefits are being realized by the quantum-inspired computing of today. This technology, such as the Fujitsu Digital Annealer, enables a computing system to simultaneously evaluate a tremendous number of variables and potential options. It performs complex optimization tasks faster, more cost-effectively and reliably than traditional computing systems. Another difference from traditional computers: The proprietary Fujitsu Digital Annealer chip can be accessed as a service in the cloud or in an on-premises device.

Quantum-inspired computing offers the power to solve complex problems, streamline operations, and identify opportunities for cost reduction and service improvements.

Quantum-inspired computing might seem to be suitable only for national challenges, such as the UK Space Agency's work to plan missions for removing space debris. Yet large local jurisdictions and state agencies also have the scale and complexity of challenges that can be addressed with this technology. As the following examples show, quantum-inspired computing offers the power to solve complex problems, streamline operations, and identify opportunities for cost reduction and service improvements.

Traffic routing and flow control. Vehicle manufacturers have used quantum-inspired computing to test complex traffic routing algorithms. The goal is to reduce travel times for vehicles and transit buses in large metro areas. One port authority uses quantum-inspired computing to plan optimal signal timing to smooth the flow of cargo traffic.

Natural disaster response. Scheduling and allocating a large mix of personnel, equipment and supplies while responding to situational changes is a big challenge in natural disasters. Quantum-inspired computing offers the capabilities and performance to continually optimize this dynamic puzzle with its many moving parts.

Equipment and crew logistics. Routine operations, such as scheduling and routing a snowplow fleet, can also benefit from optimization to reduce costs and improve service in continually changing conditions.

Bringing the Future to the Now

All of these emerging technologies are worth considering, but a government doesn't need to implement them all at the same time. Start with the technology that will solve the biggest operational challenge or enable improved support for the mission. Then consider how this technology can leverage existing systems to maximize the value delivered. Additionally, a partner with expertise across all of these technologies can help define the best solution, then accelerate its impact for digital transformation.

A government may choose an emerging technology for the benefits of improved public health and safety, enhanced service to constituents, or streamlined and more effective operations. But most of all, by beginning the move to emerging technologies now, governments can better respond to current demands and be better prepared for the unknowable demands of the future.

This piece was written and produced by the Government Technology Content Studio, with information and input from Fujitsu.

Produced by:

government technology

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