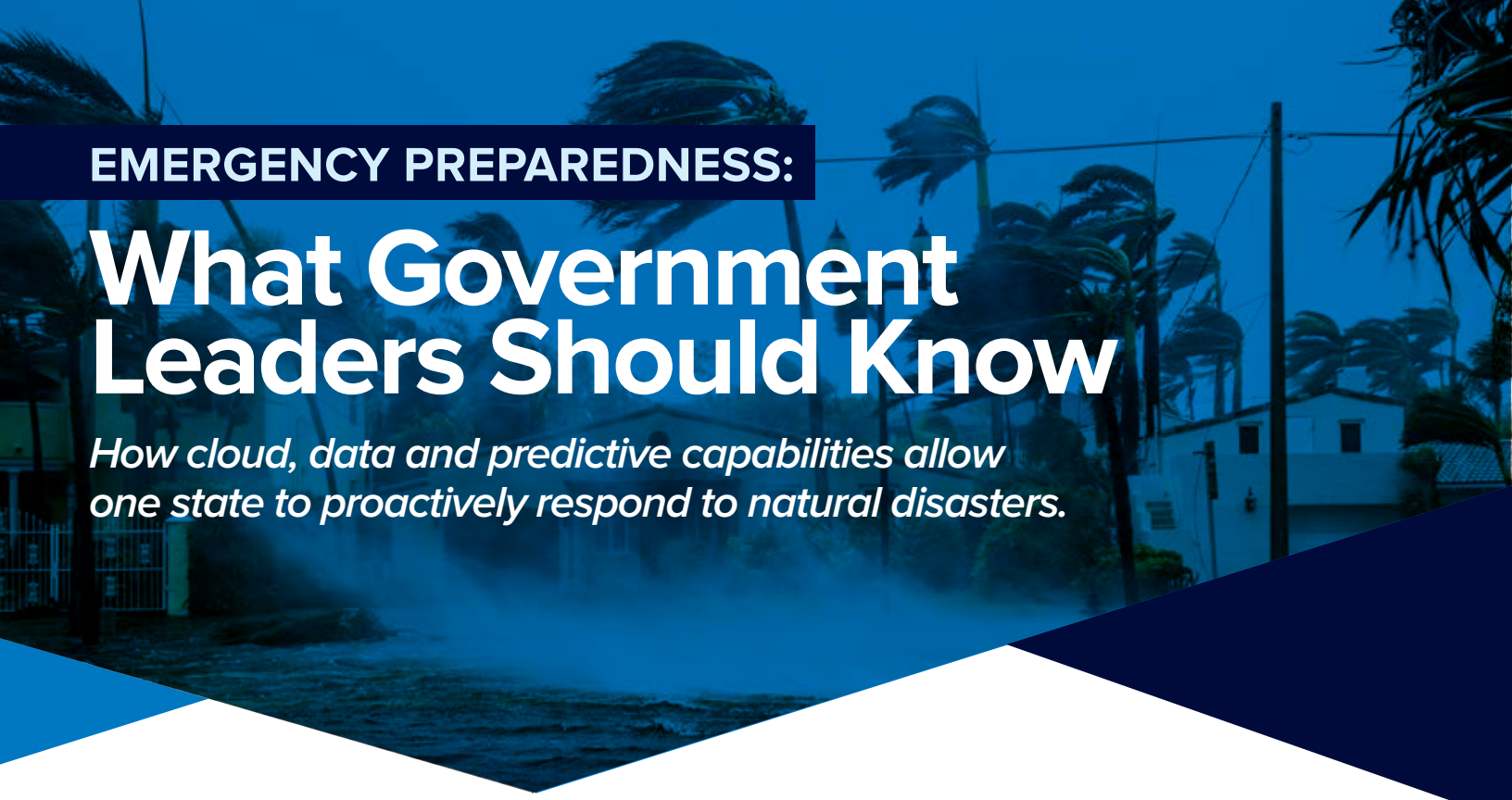

EMERGENCY PREPAREDNESS:

What Government Leaders Should Know

How cloud, data and predictive capabilities allow one state to proactively respond to natural disasters.

The severity and frequency of natural disasters such as hurricanes, fires and snowstorms are increasing government leaders' concerns about emergency preparedness and management. Rapid, appropriate action before, during and after disasters can mean the difference between life and death.

How can agencies bring together the data they need — both from internal and external sources — to protect and serve their communities when time is of the essence?

One state is showing the way by using a private cloud platform and artificial intelligence (AI) to create actionable insights that help its leaders move human and physical assets where they are most needed when disasters loom.

Moving from Reactive to Proactive Measures

The Great Lakes region of the United States is notorious for ferocious snow and ice storms, as well as high winds, flooding and other weather-related events. One state in the region gets hit especially hard by lake-effect snowstorms that can create road hazards, shut down schools and businesses, impede emergency response and more. It's vital to move snowplows and other assets to affected areas as quickly as possible to keep communities safe and functioning.

How can government agencies bring together data to protect and serve their communities when time is of the essence?

The state's IT department had a disaster-preparedness asset management database and reporting tool that provided information about assets (e.g., drivers, snowplows, trucks and salt) and where they were located across the state. However, the system presented the location of assets at a point in time, a static view, which only enabled emergency management to be reactive and did not meet the state's needs.

The state's governor challenged the IT team to come up with a more predictive and prescriptive approach to emergency management — one that would allow it to proactively reallocate assets well before events struck an area. In a state where snow can strike a region hard and then move many miles away in the course of a day, this was a tall order. Leaders need to know the location of both human resources and physical assets at any point in time, where storms are headed, the predicted snowfall, and the best use and routing of resources to control costs and optimize responses.

"The key to solving this type of problem is optimization. They know where assets are, but how do they optimize them and become prepared to move them to the right geographical location?" says Nick Perillo, CTO and Cloud Architect, Government Industry, IBM.

Using AI Building Blocks to Infuse Intelligence and Optimize Response

To meet the challenge, the state worked with IBM to deploy a private cloud platform and related technologies that support a variety of AI capabilities, including predictive modeling, an optimization engine and prescriptive analysis. An intelligent dashboard pulls all this information together for easy user access. The dashboard displays a map of the state broken down by county, with real-time weather forecasts. Users can click to see what assets are in a geographic region, and then make decisions on where to move them.

At the heart of the state's AI strategy is a portfolio of micro-services. These micro-services provide the core functionality required to move toward AI maturity: collecting data, organizing data, analyzing data and infusing intelligence into decision-making and operations.

Collecting data. The state has relational data stores that hold asset information, weather data and data from other sources. All of this data — regardless of whether it is stored internally or externally, structured or unstructured — is connected, interoperable and accessible.

Organizing data. A centralized catalog of data sets allows users to quickly shop for data. For example, when they search for data sets related to snowplowing equipment, the system's meta data will tell them what data sets match their criteria and where they can find that data. Data governance mechanisms anonymize or obfuscate data as needed for modeling, ensure only authorized users can access and manipulate data, and track who has made modifications to help ensure modeling is reliable.

"It's important to understand the lineage of the data before you feed that to people for modeling," advises John Thomas, Distinguished Engineer and Director, IBM Data and AI.

Analyzing data. Once data collection and organization processes were in place, the state and IBM collaborated to build predictive models. Collaboration was essential to ensure the needed skill sets and expertise — in programming and development, data science, emergency management and other disciplines — could be applied to modeling and optimization exercises.

"Expertise and skills can be siloed, too. Having all these skills present in a single person is not usually possible; you need a full stack team to do this right," says Perillo.

The resulting models were based on weather predictions and historical data on past asset requirements and allocations. The state then fed that output into a decision optimization model, which incorporates a variety of parameters (e.g., number of roads/miles that need to be plowed, number of inches of snow, workers' schedules and availability) to identify the actions that will improve the state's response. Optimization considerations include not only costs of allocating people and resources but also fairness of the allocations and other constraints.

Infusing intelligence into decision-making and operations. This building block refers to the solution's real-time intelligent dashboard, which shows the recommended course of action based on the decision optimization model. Decision-makers can look at the dashboard modeling, recommendations and other information to decide next steps quickly and confidently.

"The decision-making is still done by humans, but the solution augments intelligence to help them make that decision," notes Thomas.

All combined, these steps and technologies have positioned the state to make better decisions about disaster preparedness and emergency management.

Bringing Use Cases to Life

Other state and local government agencies can use these technologies to optimize their responses to disasters and other emergencies. For the best outcome, IBM's Thomas recommends that organizations take a sprint-based approach to their use cases.

"It's also very important to understand and clarify your business needs and metrics before you start writing code and incorporating data science," he says.

By understanding the business needs and metrics at the outset, organizations can bring forth meaningful use cases that help their communities prepare for emergencies, save lives and recover quickly from disasters.

This information is part of the IBM Government Cloud Virtual Summit, a free, online event featuring 17 sessions with insightful keynotes, illustrative case studies and deep dives into job-critical topics for government leaders. To view any of these sessions, visit: www.govtech.com/ibmvirtualsummit