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Delivering on artificial intelligence's potential

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Can AI let your teams use their brains better?

That headline is not meant to be demeaning. It's a serious question, and one for which the answer appears to be a resounding "yes" — from both federal technology leaders and industry developers of artificial intelligence and machine learning technologies.

Most people agree that one of AI/ML's greatest potential benefits in government is that it can free data scientists and subject matter experts from the tyranny of clerical and mundane tasks. They then can use their expertise to wrestle with mission challenges and other complex demands.

There are more than a few examples. Here are two:

- Consider federal supply chain risk management efforts. "There really is a very shallow pool of subject matter experts out there in this area. Because that pool is so shallow, we have to turn to automation to help us," shares Brian Paap, cyber supply chain risk management lead at the Cybersecurity and Infrastructure Security Agency.

- Think about decision-making on the battlefield. "At the edge, the ability for things to be deployed and automated versus needing large teams of people to come in and to do those deployments is going to be critical. Warfighters are very talented folks, but they may lack the IT talent at the edge to do this. And that's where we think automation can be helpful," suggests Jim Keenan, vice president for DoD at Red Hat.

In this ebook, we share strategies and tactics for accelerating and maturing federal AI/ML initiatives, along with details about implementing new technology tools, establishing appropriate guardrails and developing metrics for success. In the 10 articles, you will discover advice and insights from multiple agencies as well as AI leaders in industry. We hope it will help your organization mature its own use of AI/ML as you strive to make smart decisions faster by relying on data.

Vanessa Roberts
Editor, Custom Content
Federal News Network

Agencies should make internal workforce investments to improve AI implementation, experts say

BY DREW FRIEDMAN

With the National Artificial Intelligence Initiative Act hitting its two-year anniversary, federal leaders are looking at more ways to invest in their workforces to better implement AI tools.

Although understanding the talent and skills needed to better take advantage of AI is key, there are additional barriers to implementation.

"What we have is a large number of federal agencies that are struggling with antiquated architectures and a lack of skills and talent," said Chakib Chraibi, chief data scientist at the National Technical Information Service at an ATARC event on implementing AI.

AI can play a crucial role for federal agencies, if they are able to implement it effectively. That means creating responsible guardrails like privacy, transparency and fairness in the use of AI, Chraibi said.

At NTIS, "it's helped us make evidence-based decisions, improve on customer experience, perform intelligent automation, enhance data privacy and ethical data practices, as well as strengthen our cybersecurity systems," he said.

Investing in workforce AI capabilities

Some agencies are already aiming to make more internal investments to boost their workforces' understanding of AI, as well as train current employees on best practices. The Army, for instance, is looking to do more internal upskilling and recruiting, while also working to maintain industry partnerships.

"It's key for anybody embarking on an AI journey to know and understand your organization's mission and how AI can enable it," said Army Forces Command Chief Data Officer Jock

> Data scientist talent is very weighted on the industry side right now. What I do see happening over the course of several years is that scale will end up balancing itself out to some degree, as DoD as a whole starts taking on the training tasks.
>
> **— Jock Padgett, Chief Data Officer, Army Forces Command**

Padgett at the ATARC event. "You don't always want to outsource your data and AI talent, so invest in your people upfront."

The Army also wants to add to the internal team that deals directly with AI-related work, Padgett said. Although the Army can make direct hires for software developers and data engineers, the service still relies heavily on the private sector to hire data scientists.

"Data scientist talent is very weighted on the industry side right now. What I do see happening over the course of several years is that scale will end up balancing itself out to some degree, as DoD as a whole starts taking on the training tasks, new skill sets [and] upskilling," Padgett said.

For the Defense Department overall, Jaret Riddick, DoD's acting principal director for trusted AI and autonomy, said that diversity, equity, inclusion and accessibility also play a role in the recruitment process.

The Navy, for example, recently invested roughly $27 million to expand its Historically Black Colleges and Universities/Minority Institutions Program, Riddick said. These types of investments help DoD with "expanding the aperture to look for talent."

"Down the road, there will be a critical need to grow the talent base and to maintain an eye on the capacity of the industrial base in the future, to produce these technologies that we'll need," Riddick said at the ATARC event.

DoD expands investments in HBCU programs

AI is not the only area where DoD is looking to expand its connections with HBCUs. In June 2022, DoD and the Air Force created and funded a new research institute, partnering with 11 minority institutions to create the organization.

Along with these types of minority institution partnerships, DoD is adding other industry partnerships as well.

"We are promoting the growth of new companies, startups and small businesses [and] we are, of course, engaging with the traditional players," Riddick said.

To best implement and use AI, at least some understanding of the technology is necessary at all levels of an agency's workforce, Chraibi said. By assessing the internal resources and skills

that are currently available, agency leaders can then focus on upskilling and training where it's needed. They can also identify what support they may still need to obtain from external sources.

"It's important to have leadership understand this technology, understand what are the needs, what are the requirements, and of course, supply the skills and resources that are needed to be successful," Chraibi said.

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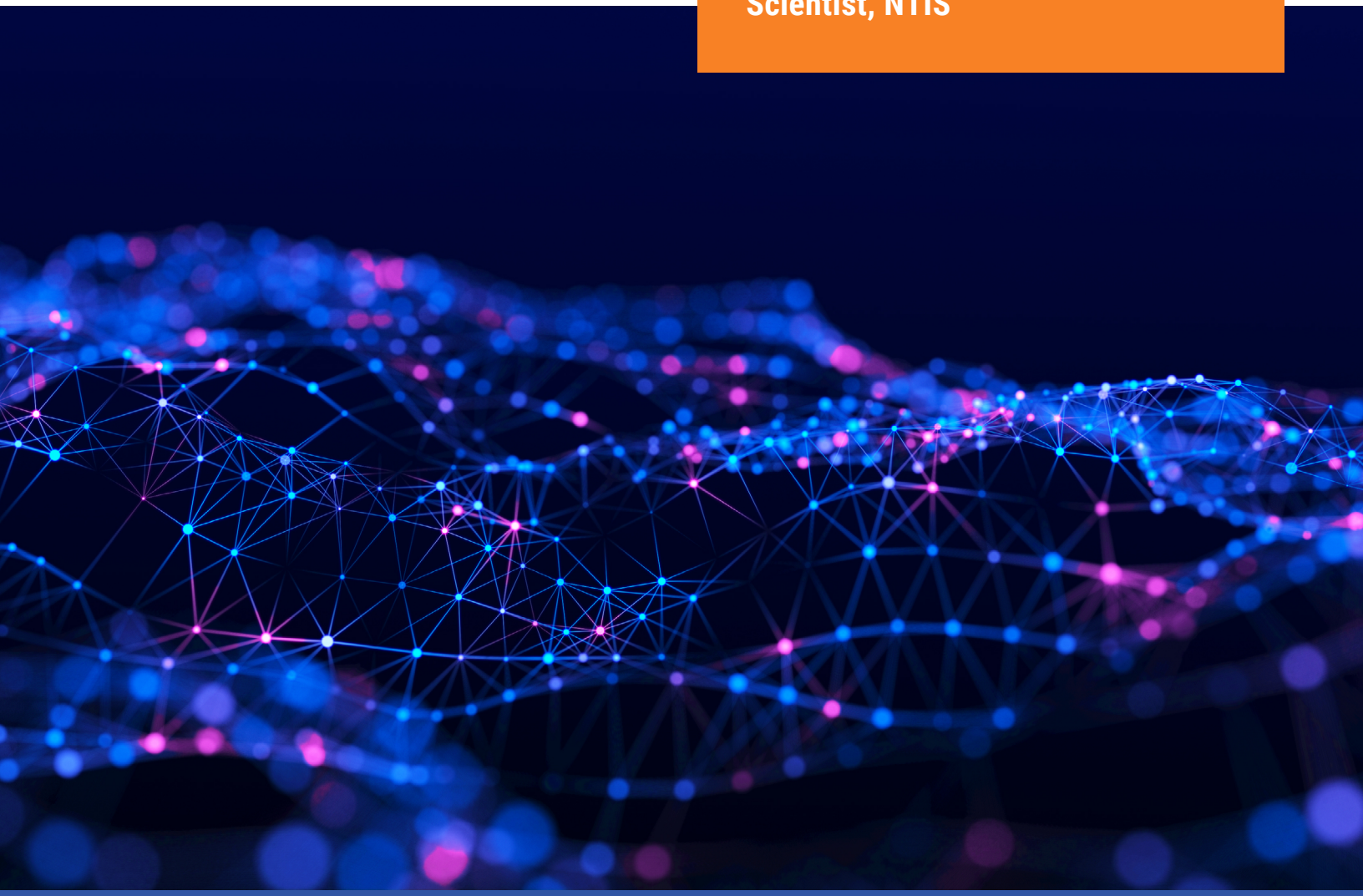
— Chakib Chraibi, Chief Data Scientist, NTIS



How agencies can achieve data readiness for AI

Agencies across the federal government are embracing artificial intelligence and machine learning, but the first challenge they often run into is preparing their data.

Data readiness involves having a managed concept of data that allows the data to understand what model of AI is being applied: machine-machine, machine-human or human-machine. Having data readied will lead to greater speed, agility and transparency in the data.

Enrichment of metadata is a good way to accomplish this. It lets the machine understand more about the data, whether it receives it from a human or another machine, and it allows humans to know more about data output by a machine. That can answer a lot of analytical needs for additional information about the data, as well as supporting the query layer of AI systems.

One effective way to do this is to store the metadata alongside the data itself.

"Not only do you get traceability with the data being alongside your metadata, but you also get that information in a very fast and effective way," said Bill Washburn, chief program officer at MarkLogic Federal.

"If you're doing a geospatial search and you're looking for a plot on a map, or if you're looking for a section of information through a visual acuity — like not just a map but maybe a video, that information being stored alongside means that I only have to search for that information," he added. "There is a great advantage in having those two things be symbiotic."

Managing unstructured data

That's especially helpful when dealing with unstructured data, which the government deals with in droves. The Defense Department and law enforcement agencies are applying AI to video analytics. The intelligence community, Interior Department and agencies like the National Oceanographic and Atmospheric Administration make frequent use of maps and satellite images. And most agencies, including the Veterans Affairs Department and the National Archives and Records Administration, are working hard to digitize paper records.

"An advantage of NoSQL is you don't have to convert images to text. You don't have to change

An advantage of NoSQL is you don't have to convert images to text. You don't have to change it. You don't have to wait for it to be modeled.

— Bill Washburn, Chief Program Officer, MarkLogic Federal

it. You don't have to wait for it to be modeled," Washburn said. "That can be modeled as your data is, rather than having to extract some elements of data to address them as rows and columns."

Many organizations instead enrich their data through the ETL process: extract, transform and load. But that's an extra layer the data must go through, and it doesn't necessarily train the data as it's ingested. With NoSQL and multimodel, you get greater agility and speed in your data by avoiding that extra step, as well as delivering with scalability, Washburn said. That's far more effective in achieving data readiness for AI or machine learning, he added.

No system that brings data in should ever be allowed not to return the data in the way that it was given.

— MarkLogic Federal's Bill Washburn

Ensuring data transparency into AI processes

It also enhances transparency, which aligns the AI goals for many federal agencies, not least of which is the DoD's "Ethical Principles for Artificial Intelligence." Those principles require AI, as well as the data it uses, to be responsible, equitable, traceable, reliable and governable. The goal of the principles is to avoid bias in the data, build trust in the AI models and their decisions, and essentially avoid a "black box AI" situation in which the decision-making process cannot be reverse-engineered or understood by its operators.

"No system that brings data in should ever be allowed not to return the data in the way that it was given. And I think that's a perspective thing that the government needs to get ahold of," Washburn said. "Because if there is a system that's consuming data, a pure audit alone is required. If a system is consuming data and the origination is lost forever as it makes its way through a system, process or application, then how do I know what occurred to my data if I don't know what I originally had?"

That's why building trust through provenance and lineage is so important, he said. Some systems change, add to or curate information. But any data that goes into a system should be able to be easily extracted in the same form that it was ingested. That's the first layer of trust and adherence to those five DoD principles, Washburn added.

Monitoring AI assets

The second layer is being able to track and trace what goes into the system. AI/ML systems may have to adjust data for context. For example, when ingesting names from documents, a system might need to understand that some cultures place family names before given names. In those cases, it might not be appropriate to address a person by their first name. An equitable system should be able to identify these cases and adjust appropriately, and a transparent system should be able to explain when and why it did so, Washburn said.

"We may have that understanding as a human, based on the data that we know has been brought in. But the machine's not going

to have that understanding until you tell it. And I think the approach that you want to take to make that fast and consistent is to tell the machine the same way it's applied to a machine learning model. And applying metadata is a quick way to do just that."

White House aims to accelerate government AI use through 'bill of rights'

BY JORY HECKMAN

Through an artificial intelligence set of principles, the Biden administration is urging agencies to move on from talking about AI and instead start using it and other automated tools more widely in day-to-day work.

The "Blueprint for an AI Bill of Rights" outlines what agencies should do to ensure AI tools designed, developed and deployed — in and out of government — align with privacy rights and civil liberties.

The administration, as part of these efforts, is also working on new federal procurement policy and guidance, to ensure agencies buy and implement AI and automation tools that are transparent and free of bias.

Sorelle Friedler, assistant director for data and democracy at the White House Office of Science and Technology Policy, said that the blueprint is "putting the weight of the White House" behind a policy area that's provoked a lot of conversation but hasn't led to widespread implementation across government.

"We are not really breaking new ground but adding to the conversation and helping us move the conversation forward, from principles into practice," Friedler said at a Brookings Institution event about the bill of rights.

> **We are not really breaking new ground but adding to the conversation and helping us move the conversation forward, from principles into practice.**
>
> **— Sorelle Friedler, Assistant Director for Data and Democracy, OSTP**

White House releases AI roadmap

The Biden administration also released a technical companion to the blueprint that serves as a roadmap for implementing transparent and accountable AI tools in government.

"We are also trying to live up to that across the federal government," Friedler said.

The nonbinding policy document puts a governmentwide focus on automated systems

that have the "potential to meaningfully impact individuals or communities' rights, opportunities or access" to government benefits and services, she said.

"More and more, we're seeing these technologies drive real harms. Harms that run counter to our core democratic values, including the fundamental right to privacy, freedom from discrimination and our basic dignity," Friedler said.

A panel of AI experts said the blueprint makes technology a focus of the administration's ongoing efforts to ensure underserved communities have equal access to federal benefits and services. It aligns to the executive order that President Joe Biden signed on his first day in office mandating agency reports on ways to ensure "equitable delivery of government benefits."

Accounting for possibility of technology to do harm

But Harlan Yu, executive director of the nonprofit Upturn, said many of those agency reports released in 2022 didn't address how AI and related technologies can perpetuate some of those barriers to access.

"You could probably count on one hand — a few fingers, really — how many of those plans address technology issues at all," Yu said. "What that told me was that the federal agencies aren't being attentive enough to these issues, that we really needed leadership at the highest level of government, coming from the White House, to draw political attention to these issues and to make it a priority across the federal government."

Yu noted that Biden's executive order also underscored how many federal agencies don't have the expertise to address many of the technological and ethical barriers that prevent them from adopting AI tools.

"That's something that we need to fix longer term," he said.

The AI bill of rights marks the Biden administration's first major effort to address the use of the technology across agencies.

> **A lot of people might be a little exhausted with AI ethics and AI principles. That is common, if you work in this space. But it is fundamentally different that the federal government did it so thoroughly, did it so carefully, in a way that will drive not only governance, but also hopefully, some independent use of algorithms.**
>
> **— Alex Engler, Senior Governance Studies Fellow, Brookings Institution**

Previously, the Trump administration issued two executive orders on the topic.

Alex Engler, senior governance studies fellow at the Brookings Institute, said agencies didn't prioritize implementation of the Trump executive order requiring them to document their AI uses cases.

"They kind of complied, but [it was] really the absolute bare minimum," Engler said.

AI.gov currently lists about 100 AI use cases across federal agencies.

Engler said the "Blueprint for an AI Bill of Rights" comes at an "absolutely necessary time" to unpack the ethical considerations of how agencies should use AI tools.

"A lot of people might be a little exhausted with AI ethics and AI principles. That is common if you work in this space. But it is fundamentally different that the federal government did it so thoroughly, did it so carefully, in a way that will drive not only governance, but also hopefully, some independent use of algorithms," Engler said.

Putting a spotlight on needed AI guardrails

Putting out this nonbinding policy document helps bring government regulation into focus around the technology, said Jerome Greco, digital forensics supervising attorney with the Legal Aid Society.

"It means that there's effort, money and attention being put into this. It also means that other people are going to pay attention to it," Greco said.

"Whether or not that will cause a long-lasting impact remains to be seen, but it has the ability to do that. It forces people to acknowledge what is being said and either embrace it or have to combat it," he continued.

While the bill of rights outlines AI ethical considerations for much of the civilian government, the document stops short of covering federal law enforcement and national security activities.

"Obviously, in those areas, that's where a lot of these protections are most necessary," Yu said.

The intelligence community and Defense Department each released their own ethical principles in 2021. However, Greco said there are currently few legal guardrails on how federal law enforcement agencies use facial recognition algorithms as part of their investigations.

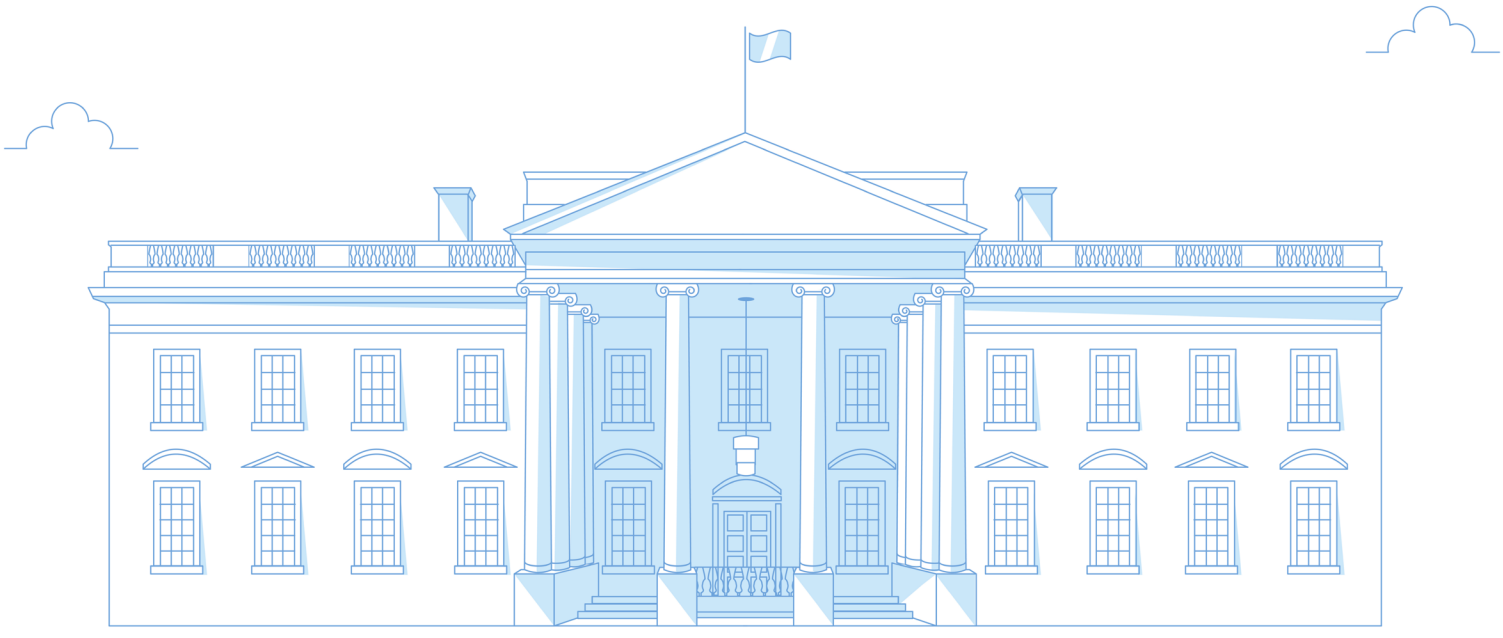
The AI bill of rights "is not binding. This is not legislation. It could lead to that, and I'm hopeful that it does on many fronts, but it currently doesn't. And our courts are not set up to handle these things," Greco said.

By exempting law enforcement organizations, "I think it emboldens them because they're just so used to … not being held accountable, not to have any sort of transparency," he added.

Friedler said the administration is continuing to meet with companies on developing their own ethical AI principles too. "There are a lot of chances for innovation and making this an industry competitive advantage — to really make AI that people trust, that respects our rights," she said.

Yu said the blueprint represents "mile one of a long marathon" and is the impetus for the administration to introduce rulemaking and guidance, and for Congress to introduce legislation.

"This document, in the long term, will be judged not by what's on paper, but all the concrete actions that are going to flow from this document, particularly from the federal agencies," Yu said.



Supporting AI/ML at the tactical edge

The Defense Department has been working for years to realize its vision of tactical edge computing. The goal? To orchestrate multiple commercial and private tactical clouds and deliver battlefield intelligence and data fusion in ways never done before.

One early test, Project Convergence, showed it's possible to reduce the time it takes to move accurate target data from "sensor to shooter" from 20 minutes to 20 seconds. That kind of accelerated decision-making will be crucial to the future of armed conflicts.

The biggest challenge is the environment in which these edge networks must operate. DoD must plan for contested environments, where infrastructure is not always available, connectivity is denied by the adversary, and hardware must be mobile and assumed to be under direct physical threat.

"Our customers' situation is characterized by being frequently disconnected, has low latency and lacks resiliency," said Jim Keenan, vice president for DoD at Red Hat. "Tactical edge reduces and mitigates much of that by bringing compute closer to the edge to better support the warfighter, instead of everything being backhauled from a data center. And whether that tactical edge is on board a ship, the back of a Humvee or out of a small system that's been set up and deployed just to support theater operations, that mission is enabled and reduces those challenges characterized by our warfighters' situation."

Proving what's possible at edge

For example, during an exercise in February 2022, the First Corps based out of Joint Base Lewis–McChord was able to perform mission command functions from a C-17 Globemaster III over the Pacific Ocean en route to Guam and then later from a naval ship. The idea was to distribute command and control functions over a series of nodes, rather than centralize it, so that the technical functionality could remain mobile and present less of a target to adversaries.

The pilot showed that the capability was not only more resilient than existing First Corps

> **At the edge, the ability for things to be deployed and automated versus needing large teams of people to come in and to do those deployments is going to be critical.**
>
> **— Jim Keenan, Vice President for DoD at Red Hat**

solutions, but the performance, reliability and latency were superior to anything used previously, said Army Chief Information Officer Raj Iyer. "Technically, we know it can work."

After laying the cloud foundation at the tactical edge, the next step is bringing artificial intelligence and machine learning (AI/ML) to bear to shorten the decision-making cycle. In austere, contested environments, the ability to link back to a centralized data center, upload data and wait for the analysis to come back is a luxury at best — and frequently impossible.

That's why Keenan said he sees the beginnings of exponential growth in the number of AI/ML applications that will be available to warfighters at the tactical edge within the next few years. At the farthest edges, environments become more constrained. The platform must be able to easily deploy, handle and maintain applications, including day two operations, while seamlessly integrating with the data and managing in denied, disrupted, intermittent and limited (DDIL) bandwidth conditions. Doing this right will help streamline and simplify processes and decision-making for warfighters, Keenan said.

To address that need, Red Hat developed Device Edge, which combines Red Hat Enterprise Linux and Kubernetes. It's a flexible platform that combines consistency across all devices and locations with unparalleled AI/ML workload support, he said.

"At the edge, the ability for things to be deployed and automated versus needing large teams of people to come in and to do those deployments is going to be critical. Warfighters are very talented folks, but they may lack the IT talent at the edge to do this. And that's where we think automation can be helpful," Keenan said.

> **AI/ML and the Internet of Things create massive amounts of data. We're basically taking that and moving all those capabilities, all those things that are going to be key warfighting enablers, closer to the data set, closer to the warfighter.**
>
> **— Red Hat's Jim Keenan**

"Automation makes things repeatable and removes all manual intervention. For the warfighter on the ground, anything that can reduce manual intervention, anything that can simplify operations in contested environments, is going to be important."

Ensuring a common operating picture enterprisewide

That's one reason Red Hat is focusing on ensuring Defense agencies can have a common experience and operating environment across all their automation functions, from the data center to the cloud and then to the edge. To accomplish this, the company is focusing on deploying Ansible across DoD, Keenan said. That can enable and enhance edge deployments by providing a common operating picture across the enterprise.

That approach will also ease training requirements. Not only is the data then interoperable, but warfighters will gain a seamless, consistent experience across any environment within DoD. That makes training easier and requires that warfighters be less specialized to support a specific mission, Keenan said. Instead of having to deploy one of a limited number of specialists to forward positions, DoD teams can train and deploy more highly utilized warfighters.

That has exponential benefits. Specialists require support to help protect them, and that increases the people placed in harm's way. The use of automation to streamline processes means fewer specialists will need to be deployed, which means fewer support personnel will also be needed. That saves not only training and manpower investments, but also human life, he said.

"AI/ML and the Internet of Things create massive amounts of data. We're basically taking that and moving all those capabilities, all those things that are going to be key warfighting enablers, closer to the data set, closer to the warfighter," Keenan said. "That's going to be a competitive advantage for our warfighters."

GSA, CISA turn to AI tools, standards to help secure federal supply chains

BY JASON MILLER

Agencies are finding out quickly that there is a lot more that goes into trusting the vendors that they work with than what's on the outside.

New tools are giving agency acquisition and cybersecurity workers something equivalent to an MRI scan of the companies.

The General Services Administration began using artificial intelligence to do pre-award assessments of a vendor earlier this year. Previously, GSA would focus its efforts mostly post award, which meant vendors potentially could put the government at greater risk.

GSA is using several illumination tools that rely on artificial intelligence and machine learning (AI/ML) to gain better insight, especially around the use of Chinese telecommunications products that are prohibited under Section 889, said Nnake Nweke, GSA's director of cybersecurity supply chain risk management in the Office of the IT category in the Federal Acquisition Service.

GSA uses the tools to better understand counterfeit issues and look at vendors' affiliates and subsidiaries — "to understand exactly where they're coming from," he said at the ATARC Mobile Summit. "There are also issues of foreign ownership and influence. These are some of the insights that those AI-enabled illumination tools provide."

> "It's a lot easier to fix problems before a company has a contract than after they get on the schedule.
>
> **— Nnake Nweke, Director of Cybersecurity Supply Chain Risk Management, Federal Acquisition Service, GSA**

Protecting agencies, industry alike

The AI tools give acquisition workers mapping reports and visibility into products, Nweke added. Acquisition workers rely on several tools to provide the best data and information. The goal of these pre-award reviews is to protect both agencies and industry before vendors get on the schedule.

"It's a lot easier to fix problems before a company has a contract than after they get on the schedule," he said. "We want to create a secure marketplace and ensure vendors are complying with Section 889 initially."

GSA eventually plans to expand the pre-award audits to other requirements, such as software bill of materials and supply chain risk management (SCRM) plans.

Over the past year, the agency's SCRM efforts have resulted in about 20 findings that helped ensure companies were complying with the prohibition against Chinese made telecom products from Huawei and ZTE.

Because the initial use of the pre-award analyses was successful, GSA plans to expand their use to other contracts and areas beyond Section 889.

The agency has been looking at post-award supply chain risks for several years. In April 2022, it identified 200,000 products and labeled them "of concern" to the federal supply chain. The products came from several high-risk categories, including industrial control systems, HVAC systems and security cameras.

Managing SCRM data requires automation

Because there is so much data, the key to using these tools successfully is more automation, said Brian Paap, cyber supply chain risk management lead at the Cybersecurity and Infrastructure Security Agency. There is just too much data and not enough people to fully understand the information and drive decisions, Paap at the FCW Summit: FedRAMP.

> **There really is a very shallow pool of subject matter experts out there in this area. Because that pool is so shallow, we have to turn to automation to help us to identify risks, to reduce risk, to be able to work with vendors on what we're finding out about their products or their companies.**
>
> **— Brian Paap, Cyber Supply Chain Risk Management Lead, CISA**

"There really is a very shallow pool of subject matter experts out there in this area," he said. "Because that pool is so shallow, we have to turn to automation to help us to identify risks, to reduce risk, to be able to work with vendors on what we're finding out about their products or their companies, and be able to mitigate problems quicker, faster and communicate with other elements within our own organization so they're made aware of these issues with these threats faster."

CISA is trying to address both that challenge of a shallow pool of experts and the automation piece through two learning agenda efforts, Paap said.

The learning efforts focus on software validation and verification and software illumination from a standards and requirements perspective, Paap said.

"We want to determine when enough is enough when you have 651 capabilities," he said. "It's crazy to think that we can have a vendor capability that will be able to meet all of those.

So what makes sense? What is the nice-to-have, and can we push that off? And what does the future need to look like?"

Ultimately, CISA wants to help define what's needed to build a scalable SCRM program that can help agencies now but also five to seven years from now. "That's the approach I'd like to take moving into the marketplace, leaving that extra room for growth," Paap said.

Creating a supply chain security baseline

The learning agenda efforts, Paap said, will help agencies gain a better picture of what SCRM compliance looks like in two critical areas:

- Gaps that exist in current standards shared by the National Institute of Standards and Technology and other organizations.
- Ways that AI/ML and other technologies can help develop and manage SCRM programs.

CISA has also launched a pilot effort with six Chief Financial Officer Act agencies. Paap said this initiative will seek to determine what it will take to develop a cyber supply chain risk management plan for an agency's headquarters and operations, and how to make it flow down to suborganizations successfully.

"We developed that guide, and we are rewriting it as we get new information. We provide templates, artifacts, strategic plans, roadmaps, resource guides and funding charts to help them get started on something," Paap said.

"If they can get that governance piece down and they have their strategic plan, and then they start acting on those milestones within their organizations and map them down to their strategy, then they can start figuring out what type of capability they need in their mission space that is best for them to use, not just because someone came by and it looked really cool," he continued. "It's a struggle right now."

How instant, secure AI identity proofing can transform user experience

People will change banks for a better user experience, but when it comes to essential government services that's not an option. Agencies don't face the same level of competition as commercial organizations.

That doesn't mean that they shouldn't strive for the best customer service possible. In fact, that's why federal agencies and research organizations have identified customer experience as a major factor in improving people's trust in government. As the public has gotten used to a world of instant gratification, major organizations are all chasing that "Amazon experience." How can agencies make it easier for people to obtain essential services?

Mobile identity proofing

One way is through mobile identity proofing, which lets people access government services by validating their identity anywhere at any time, rather than requiring them to show up in person at brick-and-mortar offices, said Brian Hettinger, senior director of product marketing for mobility at ABBYY. One example of how this capability can be extremely valuable — and that most people are familiar with — is at a department of motor vehicles.

"Everybody has had the experience of going into the department of motor vehicles and standing in line. It doesn't mean you didn't receive good service. But standing in line or taking time off work can be a big challenge and inconvenience," Hettinger said. "We're helping DMVs take critical document-centric services online so they can be completed by citizens wherever and whenever is most convenient."

The challenge arises from balancing making online services — especially mobile services — easy to use with integrating enough security to prevent fraud. That's where document-centric identity proofing and affirmation comes in, he said. ABBYY lets mobile users validate their identities by taking pictures of key documents,

> **If a government agency can leverage more advanced identity proofing and affirmation platforms, and give citizens a greater level of service, it benefits everyone.**
>
> **— ABBYY's Brian Hettinger**

including photo identification and utility bills, and photos of themselves for comparison.

Role of AI/ML

A half dozen years ago, the technology that makes this possible didn't exist. Now it does, but it's rarely found in a single package, ready for implementation. That's because it requires multiple types of artificial intelligence and machine learning to complete the process. First, it requires facial identification software to match a person's photo to the one on an ID card. Then it requires a separate instance of AI to scrape unstructured data from the ID and other documentation.

"Pick any state, say California. There are two dozen different variations of a driver's license within just that one state," Hettinger said. "You need machine learning to understand where the data is located on an ID card, then another level of advanced AI and machine learning to recognize what the human eye can't see and affirm if it is an authentic ID. Then, you need to be able to conduct facial matching and comparison to ensure that the person is alive and not just holding up a fake picture."

Until now, agencies that wanted to implement such an approach had to work with multiple vendors and acquire the components separately before integrating them into their own systems. That can be expensive and time-consuming — and not always effective, Hettinger said.

According to an interview with Ajay Gupta, chief digital transformation officer at California's DMV, with centralized, intelligent document processing and a human-in-the-loop approach, it now takes AI about 30 to 45 seconds to review each document. That's down from 2 minutes when the effort started.

> **If a government agency can leverage more advanced identity proofing and affirmation platforms, and give citizens a greater level of service, it benefits everyone.**
>
> **— ABBYY's Brian Hettinger**

Combatting fraud and saving taxpayers' dollars

ABBYY's platform not only integrates all those technologies into a single, streamlined process, but it also incorporates other biometric authenticators of identity to build a high level of trust that users are who they say they are. For example, if an ID has an address in Washington, D.C., but the device accessing the services is located in another country, that's a red flag.

"A key factor to keep in mind is that just one of these identity proofing and affirmation solutions can be helpful," Hettinger said. "However, any of these solutions alone is not nearly as powerful as when they're combinedmore holistically rather than in pieces and parts. A holistic approach makes it easier to spot instances of fraud."

Information sharing is one of the most powerful tools agencies must limit widespread fraud, he said. Why? Because this approach

leverages AI/ML across several document-centric systems, and the more data gathered, the easier it is to spot red flags that may indicate a fraudster. Additionally, over time, a government agency can begin to identify new scamming techniques being developed to defraud their identity proofing system and share that information with other agencies, extending the government's ability as a whole to defend against such attacks.

A streamlined and robust identity proofing and affirmation platform can also deliver significant return on investment. Hettinger said DMVs report that servicing customers in person costs between $10 to $60 per customer, depending on the location and size of the branch. Allowing a large portion of those customers to prove their identities via mobile devices can cut those costs to a fraction, he said.

But that's not the only savings. By implementing these tools, agencies can reduce the time employees spend on rote tasks, like data entry and paperwork processing, so they can focus on tasks that require more critical thinking.

"If a government agency can leverage more advanced identity proofing and affirmation platforms, and give citizens a greater level of service, it benefits everyone," Hettinger said. "Agencies reduce costs and citizens have improved user experience, leading to higher customer satisfaction. It truly is a win-win for everyone."

Army pilots test AI to streamline selection boards

BY ALEXANDRIA LOHR

Army command selection boards in the future may depend on automated scoring based on machine learning models derived from past evaluations.

Lt. Col. Kristin Saling, director of the Innovation Cell at the Army Human Resources Command, said her team at HRC used a natural language computing program to cull data from thousands of evaluations and speed scoring before sending them to selection boards.

The program is part of an initiative to use artificial intelligence and machine learning to save time on the selection process. HRC will evaluate the pilot, which occurred throughout 2022, to see how the results measure up against the Army's traditional selection board process.

"Instead of convening a board of I don't know how many general officers to go through and review these files over the course of three weeks, we pull them in for about three days and have them do quality control on that selection process," Saling said during a Defense One webinar.

In preparing for the pilot, Saling said her team set up a system of dry runs.

"We have trained the model on a set of about 140,000 evaluations, and we will be scoring and rank-ordering about 1,800 records using an ensemble model that takes into account evaluations and a number of other criteria, with each record comprised of multiple evaluations and other data," Saling shared in a written response to Federal News Network.

Reducing the burden on Army staff

Typically, a selection board made up of Army officers physically travels to Fort Knox, Kentucky. They meet for three weeks and review all the evaluations and paperwork in a candidate's file. The board then decides whether the candidate should be promoted or selected for a command.

Saling's team had the job of figuring out how to use AI to reduce the workload of the selection board.

"We are using natural language processing techniques to apply scores to documents in personnel files in concert with guidance from Army Human Resources Command and the Secretariat," Saling said during the webinar.

Saling works with a team of eight, including one member who she said has expertise in natural language computing. Her team partnered with HRC's Command Management Division and the Army Secretariat to create the programs used for selection boards.

The Army Secretariat conducts all centralized active component, reserve component, officer and noncommissioned officer selection boards. The Secretariat conducts over 80 boards a year.

It includes all officer promotion boards from the grade of chief warrant officer three right up to major general.

The service has been running the pilot program side by side with its traditional selection boards. The results of the pilot program will be compared with the results of the standard selection boards, and the Army will then evaluate how to proceed going forward.

"If everything goes well, we're going to put it into production" in 2023, Saling said.

> **We have trained the model on a set of about 140,000 evaluations, and we will be scoring and rank-ordering about 1,800 records.**
>
> **— Lt. Col. Kristin Saling, Director, Innovation Cell, Army Human Resources Command**

Additional HR opportunities for applying AI

The program is also being used in a pilot for invitations to Command Assessment Boards. The CAP program started three years ago as a

system to evaluate officers being considered for promotion in a more hands-on environment.

Candidates go to Fort Knox for in-person assessments that focus on their knowledge and skills. Invitations to CAP currently come from a separate selection board that screens candidates. If the AI pilot program is successful, invitations could be computer-generated and eliminate the need for a separate selection board.

"The team will evaluate whether or not this process can effectively replace the pre-CAP CSL board as a method of inviting personnel to CAP," Saling said.

The Army put the CAP program in place to address what it saw as deficiencies in the command selection process and an over-reliance on evaluations written by candidates' past supervisors.

Saling also sees possible uses for the program beyond the selection boards.

"We will also have a tool that can be tailored and applied to other selection boards, such as the Senior Service College Board and applied to recruiting personnel with strong files to selective and nominative programs," she said.

AI in government: The art of the possible

Federal agencies are only just beginning to plumb the depths of capabilities that artificial intelligence and machine learning can deliver. Any time an agency gathers real-time data, it's an opportunity to apply AI/ML to improve services.

The technology can help agencies modernize legacy systems, capitalize on supply chain analytics and free up employees from repetitive, clerical tasks. But agencies lack the technical expertise and visibility into using data models, so they've fallen behind the private sector in implementing AI/ML, said Jeffrey Phelan, public sector chief technologist for H20.

"The single biggest challenge in government is they don't have enough data scientists. And the reality is they're never going to be able to find them, grow them or afford them," he said. "We have to think differently about how we tackle the problem."

That's why Phelan suggests that agencies adopt commercial best practices and lean on vendor partners to help improve the use of AI/ML to better serve the public and warfighters.

"We can bring in a capability that's the equivalent of 10 or 20 data scientists in a box," he said. "We can do a lot of that pick-and-shovel work, a lot of that clerical work that's currently being done by humans, and we can still allow those federal data scientists and those domain experts to interact in the workflow. But we're changing the kind of work they're doing."

> **The single biggest challenge in government is they don't have enough data scientists. And the reality is they're never going to be able to find them, grow them or afford them.**
>
> **— Jeffrey Phelan, Public Sector Chief Technologist, H20**

For example, Phelan said, the Defense Department had nine data scientists who spent seven weeks building a model to predict adversary locations. Using AI and industry best practices, H20 generated 500 additional models in two hours. And that's not an atypical outcome, he said.

Driving returns with AI/ML in dollars and sense

H20 works with several dozen private sector organizations, helping them implement AI/ML into their workflows. Phelan gave an example from the company's work with AT&T, which had spent two years trying to improve its fraud model by 1%. After all, he pointed out, 1% of $1 billion equates to $10 million in recouped revenue. Over the course of a single phone call, H20 helped AT&T improve its fraud model by 34%, Phelan said.

"When you have someone who's been working for two years to move it 1% and you're actually able to move it 34% in about a 45-minute timeframe, their heads kind of explode a little bit," he said.

And that's not the only way H20 was able to help AT&T using AI/ML. It also worked with AT&T to apply AI to the maintenance logs for repair trucks. The analytics found that by changing the batteries on the trucks during tire changes could reduce what AT&T spent on towing services from $7 million to around $50,000.

H20 also helped AT&T and Apple implement a method to share fraud information centered on iPhones without having to share proprietary customer data.

In another use case, H20 worked with UPS to remap delivery routes when the pandemic drastically changed traffic patterns and vehicles on the road. Similar algorithms could easily be applied to help the Postal Service or the Defense Logistics Agency improve shipping routes, Phelan said.

"What we're trying to do is help modernize that data infrastructure," he said. "We're trying to help the government understand what the art of the possible is because a lot of these systems are legacy systems. They have to figure out: 'How do we continue to improve these services?' "

Making AI accountable

The problem is that government tends to get stuck in the experimentation phase with AI because it lacks visibility into its systems, Phelan said. A lot of AI is a "black box," meaning it's impossible to explain how the technology achieves the results that it does. And that's not viable for federal agencies; agency executives must be accountable. They must sit before Congress and explain exactly how they arrived at a conclusion, he pointed out.

AI in government needs to be responsible. It must be documented, auditable and compliant. It needs to be ethical. It's impossible to eliminate all bias from an algorithm, but it is possible to ensure that bias isn't negatively affecting protected classes of people, Phelan said. The use of AI/ML must be secure from manipulation, especially in matters of personally identifiable information, protected health data and matters of security. There needs to be a human in the loop to check for anomalies and outliers in the data. That's how trust is built with AI systems, he said.

But importantly, Phelan noted, building that trust lets data scientists and domain experts in the government change the way they work, focusing on the cognitive tasks rather than the clerical work.

> We're trying to help the government understand what the art of the possible is because a lot of these systems are legacy systems. They have to figure out: 'How do we continue to improve these services?'
>
> **– H2O's Jeffrey Phelan**

"That's our biggest goal: helping them understand that a machine can read a very technical, very detailed medical document and understand a diagnosis. They can understand a test result. They can understand a recommendation," Phelan said. "It can be done very accurately. It can be audited. It can be reviewed by a human. And we can do that 10 or 100 times faster than what people will do with the same amount of data — sometimes at a higher accuracy rate."

NRO, NGA expand industry partnerships to access more data, apply AI

BY JUSTIN DOUBLEDAY

In the government's intelligence realm, both the National Reconnaissance Office and the National Geospatial-Intelligence Agency are pushing ahead on projects to expand their data analytics and artificial intelligence capabilities by partnering with industry.

NRO in late September awarded study contracts to six providers of space-based radio frequency data. Meanwhile, NGA is taking over management of Project Maven, the Pentagon's AI pathfinder initiative.

NRO issued the Commercial Strategic Enhancement Broad Agency Announcement in fall 2021 to create a new method for periodically issuing rounds of awards for a variety of commercial space capabilities.

The agency wants to work with companies under study contracts to evaluate their capabilities and then possibly expand the work into broader partnerships where that makes sense, said Pete Muend, director of NRO's Commercial Systems Program Office.

The agency made the first awards to five commercial satellite radar vendors under the BAA earlier this year.

With the radar studies well underway and the award of the radio-frequency sensing deals, the next focus for the BAA will be hyperspectral imagery providers, Meund said during a webinar hosted by the Intelligence and National Security Alliance. NRO issued a call for proposals from hyperspectral companies in November 2022.

In addition to the study awards, NRO in May also expanded its primary contract for

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>
> **— Pete Muend, Director, Commercial Systems Program Office, NRO**

commercial imagery through three contracts. Agency officials say the agency will "buy what we can, build what we must," meaning NRO will still develop and build custom satellites where commercial capabilities can't fulfill requirements.

"There are still going to be needs that the commercial providers are not yet able to satisfy or won't be able to satisfy, particularly around sensitivity or classification and those sorts of things," Muend said. "We'll continue to have to build other national systems to meet those more difficult requirements, more and more challenging requirements, especially as our adversary continues to present more and more difficult challenges for us."

Expanding geospatial AI/ML programs

With NRO expanding the sheer amount of imagery in what it refers to as a "hybrid architecture," the agency has begun will implementing AI and machine learning to manage and analyze its growing cache of imagery resources.

"We're using AI and ML to help drive visualizations and common operating pictures, as well as to make sure the warfighters can make the decisions that they need, at the speed they need," Muend said. "We're using it to reduce latencies and to detect leading targets. Those targets and adversaries are just getting more and more challenging."

> **We're looking for the best-of-breed algorithms to use in both cases, both the ones that are in-house operations and the ones that are being used in private industry.**
>
> **— David Gauthier, Director of Commercial and Business Operations, NGA**

As for NGA, the agency plans to use Project Maven's algorithms to parse and analyze the data the agency ingests, regardless of whether the information comes from classified satellites or commercial sensors, said David Gauthier, director of commercial and business operations.

But he also said NGA's commercial services program is interested in buying analysis that may use AI/ML capabilities developed by industry.

Ultimately, the agency wants to integrate the government's in-house algorithms with commercially developed capabilities to help NGA with "deluge control," Gauthier said. The agency must manage a potentially overwhelming amount of geospatial information, he said.

"We're looking for the best-of-breed algorithms to use in both cases, both the ones that are in-house operations and the ones that are being used in private industry," he said.

"What I think is interesting about working with the Maven program going forward is we're looking at how we also cross the streams: How can we cross-pollinate the best algorithms that may be curated in the government and pass them to industry for getting better solutions? And then, how do we curate the best algorithms in industry and buy that intellectual property and bring it into the government so that we can use it against our data holdings?"

Four strategies to move your agency up the AI maturity curve

Most federal agencies already have some skin in the artificial intelligence and machine learning game. Pockets of excellence are springing up constantly across the government as agency teams experiment with new ways to apply AI.

But agencies that have reached this milestone are now encountering a new set of challenges: how to increase their AI maturity, how to scale their experiments into fully developed programs and how to bake AI best practices into their business processes.

> You can just do the math: Buying a point solution for everything just doesn't really scale.
>
> **— Chandler McCann, Chief Technology Officer, DataRobot**

AI maturity spans five distinct phases:

Phase 1 — AI interest: A federal team has heard of AI, is eager to explore its possibilities and has aligned its organizational data strategy to the mission.

Phase 2 — AI experimentation: Small teams run data science experiments to understand the art of the possible.

Phase 3 — AI in production: The agency deploys AI models, makes predictions and realizes impacts. AI starts to become part of organizational processes.

Phase 4 — AI mature processes: The agency has established standardized practices and procedures. It has many AI modules delivering value and is focused on scaling.

Phase 5 — Fully scaled AI: The agency now has hundreds or even thousands of models running.

Chandler McCann, field chief technology officer at DataRobot said he sees many agencies stuck trying to move up the maturity curve from Phase 2 to Phase 3. They've made investments in people and infrastructure but aren't yet seeing a lot of results.

> **The most important thing agencies can do is to focus on how to actually get these models into production and add value across the units.**
>
> **— DataRobot's Chandler McCann**

"Going away from that center of excellence to scaling machine learning and AI throughout your organization, it's really a complexity problem," McCann said. "Different parts of your organization can be at different stages of maturity. While you may have one group — say, an analytic cell or a data science cell — that has gained a lot of skills, translating that to another organization that is at Phase 1 can be challenging."

Strategies to scale AI

McCann offered a few strategies to facilitate that move up the maturity curve:

- **Adopt an iterative mindset:** To do that, focus on base hits, not homeruns, he said, adding that he's seen that approach work in several organizations.

  For example, it's probably smarter to start by applying machine learning to the supply chain than to try to optimize the outflow of the entire Army. Rapid iteration and incremental wins build momentum and experience.

  That's what the Army Office of Business Transformation did. It spent a long time trying to figure out how to manage unliquidated obligations on the books, McCann recounted.

  By rapidly iterating on the problem over the course of a year, the service was able to develop thousands of variations of models and hundreds of ways to frame the problem. Using that approach, the BT Office eventually settled on a deployment that wound up saving more than $1 billion a year across the Army.

- **Apply the 80/20 rule:** Although rapid iteration is the key to scaling, agencies also need to acknowledge that most procurement practices are set up for moonshots, and it's important to continue to invest in those as well, McCann said. The way to achieve balance is to ensure 80% of AI/ML projects leverage standardized tools and workflows, instead of trying to reinvent the wheel for each effort.

  "A really common trap, if you're in that early stage, is just to want to buy a point solution for everything," he said. "There are in any given command dozens, but likely hundreds, of opportunities to apply

machine learning. And you can just do the math: Buying a point solution for everything just doesn't really scale."

- **Establish a common framework:** Agency leadership needs to get involved in developing a framework for translating business needs to AI use cases. An AI roadmap and backlog of use cases is essential for an organized approach to scaling, rather than having scattershot pockets of excellence developing tactics out of sync, McCann said. An agency should prioritize its use cases by impact and feasibility and set a strategy for iteration, he advised.

- **Define metrics for success:** Agencies need to think about the number of models they have and their impact. Over the past few years, agencies have made lots of investments in tools, data federation and onboarding talent. Strategies are proliferating. It's time to focus on getting value out of those investments, he said, which requires setting metrics for what success looks like in implementing and using AI/ML.

"That value is by making sure you get a strategy for how to implement AI in your work," McCann said. "The most important thing agencies can do is to focus on how to actually get these models into production and add value across the units. If you're looking for easy places to start, identify where you're using rule-based systems or internal processes with which you're really familiar."