

Emerging Technology of 2019:

Meet Your New Digital Coworkers



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Executive Summary

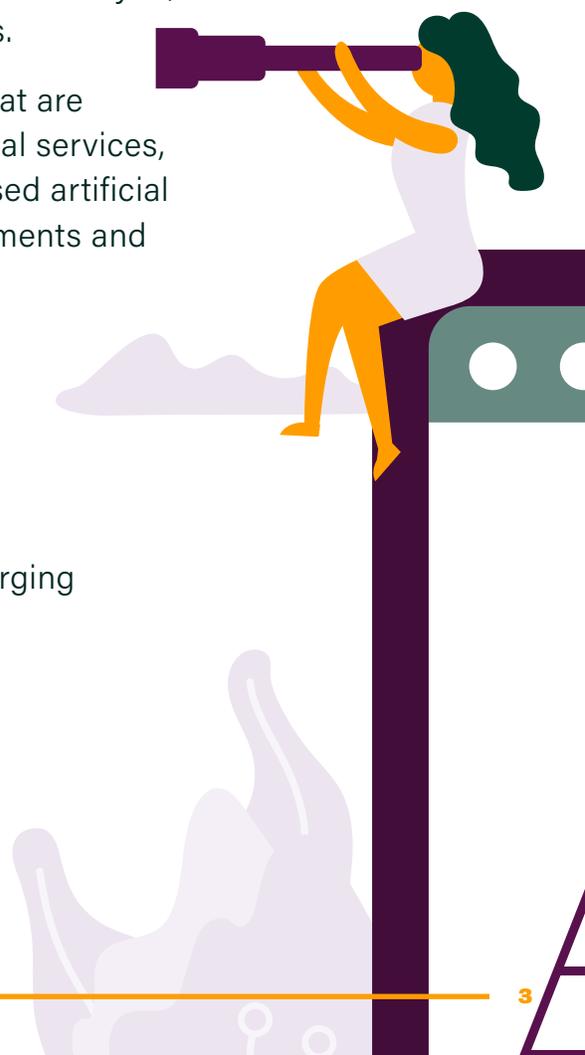
The movie “I, Robot” premiered in 2004, forecasting a future in which robots and humans perform tasks side by side by the year 2035. In the film, robots replace humans in myriad jobs from mundane tasks to human care.

It’s not 2035 yet, but mankind already has robots in homes and offices – even if the ones you see in government have not yet taken on the humanlike lineaments that futuristic movies guessed. In your house, there might be a robotic vacuum cleaner. In your government office, automated voices answer calls and chatbots respond to online inquiries.

Emerging technologies can reduce Department of Motor Vehicles wait times and tiresome but necessary paperwork. This isn’t the future; this is now. Robots and humans are working together in government offices, and technology is expanding to reduce employees’ workload. Reading on, you can learn to look for these technologies at a government office near you, or maybe even at your own. These are your digital coworkers.

For this guide, we’ve focused on four technological trends that are causing seismic shifts in the way government operates. Digital services, robotic process automation (RPA), blockchain and cloud-based artificial intelligence (AI) all have produced both public-sector investments and outcomes. For each technology, you’ll learn:

- How it works
- Key stats and figures
- Potential and practical use cases
- In-depth success stories
- How local, state and federal officials are pushing the emerging tech envelope



Defining Emerging Technologies

Emerging technologies are difficult to sum up in a standard definition. Some technologies might trickle through the public sector years after their introduction in the private sector. Others might be launched inside of government but take years to gain widespread adoption – if they ever do. So how do you define the field of emerging technology in a few bullet points?

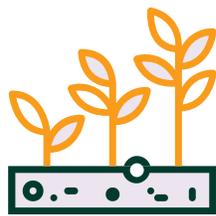
A 2015 [report in Research Policy](#), a multidisciplinary journal that “theoretically and empirically studies the interaction between innovation, technology or research” and the related societal processes, identified five factors for defining emerging technology.

We'll expand on each briefly.



Radical novelty

Radical novelty means that the technologies themselves are new and innovative, but it doesn't necessarily confine the tech to a new field of invention. For example, although the Apple iPhone was not the first smartphone or cellphone, it certainly revolutionized the technology of every mobile device afterward by providing a radically novel iteration.



Relatively fast growth

All the technologies in this guide are picking up steam in government. For example, the first Amazon Alexa technology premiered in 2014, and now the voice recognition capability is ubiquitous across homes in America. As such technology spreads quickly, we've featured only very recent case studies compiled from 2018 and 2019 interviews with government officials.



Coherence

We've chosen technologies that are directly linked to current government missions and capabilities. Online portals reflect this coherence, as they can both provide and absorb information to improve the accessibility of government to citizens. Furthermore, they help free up government employees to work on mission-related duties.



Prominent impact

This is self-explanatory, although it is worth noting that emerging technologies can carry more promise than punch, at least in the present. Oftentimes, impact is reflected by monetary savings that can be reinvested toward agency missions or citizen engagement – measured by online clicks or applications received.



Uncertainty & ambiguity

Finally, the uncertainty and ambiguity factor doesn't suggest that emerging technologies still have kinks to work out. Instead, it offers that every emerging technology has room for growth and “what if” potential, prompting further projects, given available funding and organizational support. Blockchain best epitomizes the question of “what if” in government.

The Landscape of Emerging Technologies in Government

There is no good metric to pinpoint government's stance on the importance of emerging technologies because there is simply too much government for broad assertions. Chief information officers (CIOs) have different priorities, agencies have different balances of power, and federal, state and local IT departments carry diverse constituencies with varied needs and wants. On top of agency-level discrepancies, some emerging technologies are more developed and proven than others.

Although emerging technologies are gaining prominence in government offices now, their growth comes out of both innovation and necessity. Resources and lack of personnel constrain government workforces, and emerging technologies offer a fresh look at solving legacy difficulties.

Designed to address these challenges, the Modernizing Government Technology Act, passed in 2017, authorized Chief Financial Officers Council agencies to create IT Working Capital Funds and established the Technology Modernization Fund (TMF).

Both addendums communicated the government's mission to modernize IT. The fund, in particular, acted as a catalyst for emerging technologies because it disbursed loans to proposed agency projects requiring large upfront costs that agencies might ordinarily be unable to foot. TMF resolved examples of those problems six times in its first year.

At a General Services Administration (GSA) emerging technologies summit, Elizabeth Cain, Acting Executive Director of GSA's TMF Program Management Office, said that emerging technologies would receive special consideration from the Technology Modernization Board.

One award for \$10 million went to the Agriculture Department for a redesign of Farmers.gov that would offer citizen-accessible online portals. These portals, which are percolating throughout federal and local government websites, are prominent examples of digital services.

The push from the top for digitization is evident in another piece of legislation: the 21st Century Integrated Digital Experience Act (IDEA). Passed at the end of 2018, it instructs agencies on how to incorporate and deliver digital services.

One reason why government leaders are clamoring for more modern technologies is they can save time and redirect employees' focus away from repetitive tasks to higher-value work. For instance, digital services enable people to accomplish online, or through an app, what traditionally could have taken hours of direct visits or rerouted phone calls – transforming strenuous workflows.

Chatbots are another example of an emerging digital technology that can save time and increase citizen engagement, a priority for federal, state and local CIOs, who realize that constituents' perception of government as the overbearing big brother hamstrings them from accomplishing their goals.

Chatbots, an example of cloud-based AI, represent how the cloud can directly connect AI to citizen service and change perceptions.

Another time-saving emerging technology is RPA. It uses computers to perform simple and formulaic tasks, quickly completing jobs that traditionally would have taken hours of mindless labor. Employees who use RPA can work within their specialties without tackling the information scrubbing, data entry and simple math that consume valuable time. The Office of Management and Budget has already directed agencies to reduce the amount of time dedicated to low-value work and pushed for RPA.

In their ongoing effort to do more with less, governments are looking to blockchain, another emerging technology that's gaining traction because of its power as a global, immutable ledger. It's already changing the way that agencies can evaluate acquisition – a chronic challenge for government – and the technology has caught GSA's eye.

Of course, emerging technologies come with challenges of their own. Aging workforces may struggle to adjust to tech-heavy processes, and leaders may fail to understand how emerging technology works and why it's needed.

In the next section, we'll explain how each technology operates.

How Digital Services Work



1
Unique signing keys and verification keys are established.



2
A private signing key and message are fused to create a digital signature or stamp of authenticity that is unique to the document.

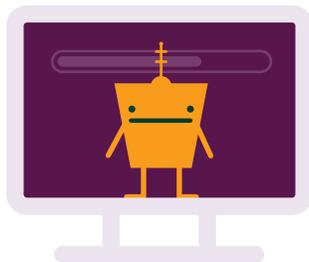


3
The final product is accessed with a public verification key that reveals a viewable but unchangeable form and signature.



4
Information is stored and protected electronically.

How Robotic Process Automation Works



1
Software installs bots on internal systems.



2
Bots receive a series of rules about how to operate, what to do and where to access information.



3
With configuration, bots are granted access credentials, just as human employees would be, and are integrated into permitted internal systems.

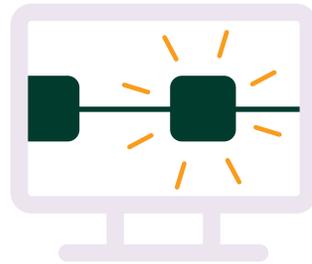


4
When implemented, bots process static data and business rules with rapid computer functions to quickly enter and process data.

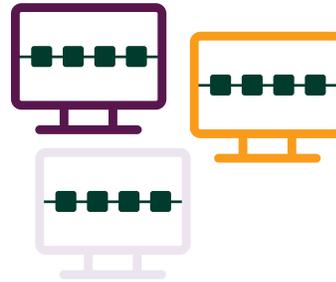
How Blockchain Works



1
A record is started, with types of data, accessibility and encryptions specified by the developer.



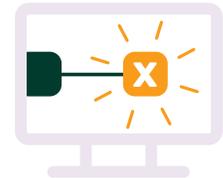
2
Blockchain is accessed by users who in turn generate another version of the shared ledger.



3
Transactions are updated one by one by users and uploaded to each shared blockchain.

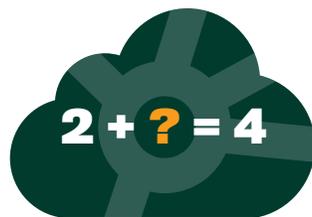


4 a
Blockchain accepts input, as it is consistent with parameters and previous records that every user's ledgers confirm as accurate.

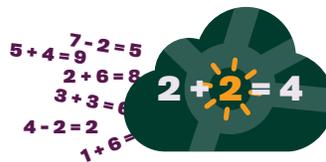


4 b
Blockchain rejects input, as an incorrect or altered value disrupts the chain and alerts every user's ledger.

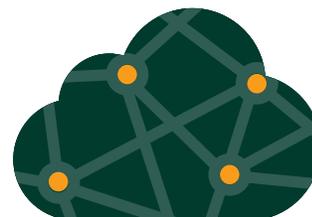
How Cloud-Based Artificial Intelligence Works



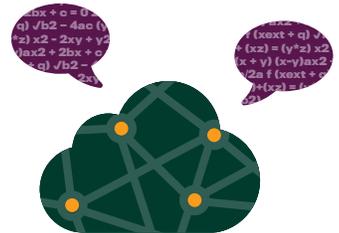
1
An artificial neuron in the cloud processes a mathematical formula that has uncertain factors.



2
Through a series of repetition with different inputs and outputs, the neuron calculates the right "multiplier" in the formula.



3
After determining the multiplier, AI generates more complex formulas by creating artificial neural networks comprised of connections between neurons.



4
With a connected neural network, AI uses multiple formulas to answer difficult questions that depend on several factors.

Digital Services

Digital Services are formerly paper-based processes that are now delivered through an electronic network, such as an intranet or internet, and documented electronically. These services are the most widespread emerging technology in government because they often save agencies time and money by streamlining workflows for citizens and government employees alike. Although some digital services have been in use for years, governments have recently been offering more portals for employees and citizens. Digital services occupy a wide range of government provisions, including e-signatures, service portals and e-payment processing.

88%

of citizens would be likely to use digital options for government payments if they were offered

“Every day, millions of people interact with the government. We apply for Social Security and small business loans. We look for health insurance and financial aid. But too often, outdated tools and systems make these interactions cumbersome and frustrating.

13

“digital service plays” are identified by USDS

What if interacting with government services were as easy as ordering a book online? The challenges behind HealthCare.gov brought this question to the forefront, changing our government’s approach to technology.”

- U.S. Digital Service (USDS)

66%

of public service leaders say a personalized citizen experience is a top-three priority

Your Digital Coworker

- 1. Online service portals** answer citizens’ questions in real time, reducing the need for workers to spend valuable time answering repetitive questions or completing tasks that users can handle themselves, such as reserving space at a public park.
- 2. E-filing technology** can process the details of contracts, taxes, payments and more, allowing governments and communities to have direct, streamlined exchanges. This can come into play with online vehicle registration.
- 3. E-signature technology** can reduce the printing and delivery stress on government, offering a way to bypass inefficient workflows across offices by sending memos electronically.

\$13

are saved by the state of Utah for every online service compared to the paper equivalents

Success Story: Santa Clara County Offers and Internalizes Digital Services

Ann Dunkin, CIO of Santa Clara County, California, is no stranger to innovation and emerging technologies in government. Before coming to Santa Clara County, she was CIO at the Environmental Protection Agency, and although the populations she served there might have been different in number and demographics, the roles are strikingly similar.

"Pretty much the entire public sector is wrestling with how to be more responsive, to implement technology quickly, to respond to changing needs and demands and change in technology itself," Dunkin said.

To tackle the familiar challenges, Dunkin turned to a familiar solution: Agile development, a process she helped EPA implement.

The incorporation of digital services by Agile development has saved the county hundreds of millions of dollars, she said. In Santa Clara County, e-signatures, which are behind much of the savings, have fundamentally changed the way the county goes about day-to-day operations.

"Digital service is not simply digitizing a paper workflow or taking an existing client/server application and going to the web or going to mobile, but really rethinking it and transforming it," Dunkin said.

Before digital signatures were in place in Santa Clara County, workflows were much less efficient. Documents would cycle for days or weeks, as they went from signature to envelope to desk over and over again.

Tip: *The [Government Paperwork Elimination Act](#) requires that, when practicable, federal agencies use electronic forms, filing and signatures to conduct official business with the public. That means agencies should take a step back and evaluate their processes.*

The average circulation time of a document in Santa Clara County was five days before the county implemented digital signatures. Now, the average time is five hours. Dunkin said that saving 70 percent to 80 percent of cycle time is the simplest example of how digital services can transform workflows. But she added that there are ripple effects across agencies that many don't consider.

For example, agencies can reinvest the saved money and time into other digital services, which can build on one another. Alternatively, they can use the savings to pay off legacy costs and contracts or to reinvest in citizen experience.

That's true across any level of government, Dunkin said.

E-signatures may be the simplest example of how digital services can transform government, but they're far from the only one. Santa Clara County, the 17th most populous county in the United States, offers a variety of other digital services to residents and employees.

Dunkin noted that when people think of digital services, they often think of mobile-friendly portals or applications. Mobile-friendly is no longer a choice, however, as many residents rely exclusively on their cellphones to pay bills and interact with government.

Having these services available is especially key for connecting with poorer communities, where residents might have access to only smartphones. The county allows for partial payments on taxes through its e-portal, which lets people pay when they can and, in the long term, can help restore communication between government and citizens.

At EPA, Dunkin launched an e-enterprise portal, which prominently offered environmental information in one centralized location that was accessible by citizens, regulators, contractors and EPA employees.

That enabled EPA to bridge the gap between all its stakeholders, and Dunkin has sought to accomplish similar goals in Santa Clara County. Using online portals, county residents can reserve park space, access voter registration services and scan restaurant inspection scores.

As part of a larger effort of digital transformation, the county is now moving toward e-filing, which would expedite permitting processes countywide.

For Dunkin, the key to success is seeing the bigger picture.

"You really do understand that the productivity gained is amazing," Dunkin said. "And that productivity translates to more."

Takeaway: Don't think about digital services as exclusively helping employees or citizens. Many digital services can make life easier for employees and citizens alike, either through direct or indirect benefits.



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Industry Spotlight

Leveraging GIS as an Integrator to Produce Mission Outcomes

An interview with Dan Levine, Geospatial Innovation Officer at Geographic Information Services, Inc. (GISinc), and Steve Mulberry, Enterprise Architect at GISinc

To make a gadget work, it's always best to read the instructions first. But what if instructions aren't included, or if they are mercurial, changing every day to account for the environment?

Over the years, geographic information systems (GIS) have matured to central enterprise business systems in most government agencies, and they carry more capabilities now than ever. The true power of GIS is often realized by ingesting information from other systems and technologies to visualize patterns and relationships never seen before.

As new technology — such as the proliferation of Internet of Things (IoT) devices — floods the market, the potential of GIS expands and the versatility of geospatial analysis balloons. IoT and sensors are the current cool gadgets, but the true power to work smarter can only be delivered with the convergence of IoT and GIS. Unfortunately, agencies often lack the strategy or means to capture this potential.

To explore what the future of GIS looks like, GovLoop interviewed GISinc Geospatial Innovation Officer, Dan Levine, and Enterprise Architect, Steve Mulberry.

“Every agency already has GIS capabilities, but they are not typically used to their fullest potential,” Levine said. “Agencies are missing opportunities to make better decisions with a geospatial lens applied to their problems.”

Geospatial technology can evaluate everyday situations in government, but recently the visibility of these analyses has magnified. Whereas geospatial systems have been used for resiliency efforts or traffic management throughout communities, now there are more sensors than ever — although many are developed for esoteric purposes. For example, GIS leaders are incorporating indoor IoT sensors — that track patterns and utilization — to comprehensively collect environmental information, such as stream and rain gauge monitors that update business systems, boosting the preparedness of communities.

Agencies often fail to realize the potential of GIS as an integrator, a central platform where new and old systems can be utilized. Agencies can sort spatial data and information inside a GIS — as opposed to losing information in an obscure desktop folder — while layering new inputs on top of mapping technology. GISinc is helping agencies leverage existing systems and align them with mission-based GIS capabilities.

The sheer volume of data and systems can be intimidating for agencies, but the right industry partner can integrate legacy and new technology alike into a common solution that directly impacts mission outcomes.

“Systems that are not managed become stale,” Mulberry said. “Your existing GIS can be the catalyst for integrating old and new business systems, thereby making both relevant and giving you the geospatial decision-making ability to work smarter.”

Agencies need to realize the potential that they can unlock with GIS. Strong business leadership, strategic data advocacy and savvy IT portfolio management are crucial for maximizing the usefulness of existing geospatial resources.

Takeaway:

GIS is more than an on-demand supplement for agencies. Rather, mapping systems have everyday applications and can integrate multiple business systems to produce mission outcomes.

Robotic Process Automation

RPA can execute simple input and procedural and formulaic tasks in spreadsheets and computer programs. RPA takes software code, deciphers it and performs the operation. The bots go to work from that point in spreadsheets, applications and portals, using computer inputs to process information one piece at a time. RPA has the potential to eliminate countless hours of tedious labor, and eventually perform more difficult tasks.

“One of the automation technologies that is generating interest in the federal government is robotic process automation (RPA). RPA is a tool that helps automate routine tasks, such as copying and pasting information from one system to another. ... Some agencies already have ‘bots’ (short for robots) in production.”

- Bureau of the Fiscal Service

Your Digital Coworker

1. **RPA can complete simple computer functions** for employees, such as opening emails and attachments and logging into web programs.
2. **RPA can scrape data from the web**, including scanning social media and gathering statistics.
3. **RPA can input and process the data** of taxes, license applications, revenue collection and more, removing manual workloads from tasks that require data input and calculation.

8,760

is the number of hours unattended RPA bots run in a year

0

is the number of NASA Shared Services Center employees who have lost their jobs because of a successful RPA implementation

10-20%

of human work hours are spent on repetitive computer tasks

3-6

weeks is the usual completion time for process automation in RPA projects

Success Story: Innovation Cell Hatches RPA Revolution at DLA

Studies have shown that engaging in thought-provoking work is key to productivity and workplace enjoyment. And yet for many people, a large part of their job is mindless – simple repetitive tasks that don't require specialized training.

"There's a lot of frustration across every workforce and ours where people have these mundane data entry sort of projects that they have to do, and it needs to be done," said John Lockwood, RPA Program Manager at the Defense Logistics Agency (DLA). "They do it, and then that comprises the large portion of their workload, or maybe too large of a portion. And it doesn't allow them to do the other things that maybe they were hired to do."

That's a problem, and one that RPA is helping DLA solve. The agency began implementing RPA into everyday tasks in September 2018 and plans to automate 50 processes in the first year and develop another 10 to 15 contemporaneously.

At DLA, RPA has made a difference from the start – literally. New employees experience the benefit of RPA when they're onboarded. The bots automate a process that used to require human resources officials and IT to manually enter new employees' information so that they could gain access to software and start working.

Now, those employees submit their information, and RPA allows them to access software applications closer to their start dates. The agency estimates it has saved \$2 million in productivity from this front-end process alone, as HR and IT departments don't have to spend time and resources on data entry, and new hires can begin working earlier.

Although these bots can expedite processes, they don't require a system overhaul. Actually, they operate just like humans, despite lacking a physical presence.

For example, in a spreadsheet, a bot would still work cell to cell, operating in response to the formula. The bot would not, however, populate the entire document in one stroke.

"They look like a human from the systems perspective," Lockwood said, noting that information is still restricted by access credentials. "They have an account, and they can go and log in and get the appropriate information."

The bots that have streamlined new-hire processes at DLA are attended, meaning that they operate in response to an individual's request. In other words, someone has to push a button to set the bot into action, and when the person logs off, so does the bot.

Some may view bots as an exciting complement to the existing workforce, but others might fear the worst – that bots are replacing employees or upheaving existing, successful workflows. That's a natural but unfounded concern.

"It's not here to replace workers. It's here to supplement workers and help them out," Lockwood said. "We give a demo and in that demo, we show how the robot actually does similar things to a human, but it can do it faster, and the robot's not going to make mistakes. The developer may make mistakes, but the robot's not going to make mistakes."

Tip: *To get buy-in for RPA, demonstrate to non-technical and IT employees that bots operate in response to commands – on-screen and with a cursor. It can remove anxiety about a new technology that does human work and spark curiosity for future projects.*

Lockwood said that non-IT workers have come to him asking for bots to assist in their workflows. They can frequently relieve 10 to 20 percent of an employee's workload, Lockwood said.

The agency measures its progress by looking at hours saved instead of costs, Lockwood said. That's consistent with the familiar public-sector sentiment of having to do more with less.

"We're not focusing on, 'We can replace the individual,'" Lockwood said. "We're focusing on allowing that individual to do other things that they're handcuffed [from] because they have to get these tasks done."

Lockwood added that there's potential for RPA to expand into other areas as it is implemented further. After workers see that one process can be automated, they're interested in what's next, he said.

"All are saying, 'Look, a robot can do this. Well, now how about Phase Two, how about Phase Three?'" Lockwood said.

Takeaway: **The more standardized the processes, the easier it is to implement RPA because benefits can be distributed across the department as opposed to in silos.**

MEET THE NEW DIGITAL WORKER

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Industry Spotlight

Robotic Process Automation: Enhancing the Human Worker

An interview with Jeff Brown, Senior Account Executive, Automation Anywhere

Working in government, you might feel you're behind where you need to be. In addition to performing your outlined roles, you're also burdened with auxiliary responsibilities – logging data, doing simple arithmetic and going in and out of your email inbox regularly.

In a recent interview with GovLoop, Jeff Brown, Senior Account Executive for Automation Anywhere's Justice Vertical, discussed how robotic process automation (RPA) creates more time for workers in resource-strapped government agencies. Using programmed bots, RPA software rapidly completes simple tasks on user systems.

RPA is changing the game for office workers everywhere. Whereas repetitive and basic tasks in a traditional setting can take tens of thousands of hours to complete, software-enabled bots can accomplish these same tasks with rapid speed and infallible accuracy – saving time and costs. For example, the State Department could use RPA in the processing of passport applications to standardize data input – removing time-exhaustive labor and the potential for human error.

"If you think about the way people go about their day, there are a lot of manual tasks that are not necessarily part of their job description but have to happen in order to complete the job," Brown said. Brown added that the product is more important than the process, and employees don't want their time taken up by dispensable tasks.

Considering an average workflow, workers frequently have to log into a database, locate the information they need, transfer it to a file and then organize it. This process could take 15 minutes.

For most workers, distraction or small mistakes could easily stunt workflow – but not with a bot. Bots could do the same task in seconds. Bots, while operating through a user interface, work at express pace, and do so without error or rest.

The potential of bots is limitless. While simpler tasks – such as email processing, data entry and website scanning – can be accomplished by bots with designated purposes, the incorporation of machine learning and predictive analytics can broaden and improve bots' functionality. Bots can even improve on their own processes.

"There's no limit to what they can do. The magic really comes into how you deploy them," Brown said.

The versatility of bots is where Automation Anywhere separates itself. Automation Anywhere offers thousands of models out of the box, meaning they can be implemented much faster for even greater cost savings. Bots are built on a centrally managed, secure and scalable hybrid platform, and they are equipped with analytics and artificial intelligence.

As bots continue to evolve, humans can harbor apprehensions about robotic coworkers. However, government employees have little to worry about – bots can free them up for high-value work as opposed to menial labor. Governments, behind on responsibilities, need to keep employees productive for mission-critical responsibilities.

"It's not a replacement for the human," Brown said. "It's an enhancement for the human."

Takeaway:

RPA can take the strain off of human employees by alleviating simple and mundane tasks. However, instead of replacing employees in government offices, who do indispensable and highly skilled work, bots will free up the workforce to focus on mission-critical tasks.

Blockchain

Blockchain is an electronic record maintained and certified by multiple databases to track a history of inputs. The ledgers blockchain creates are immutable, because all transactions must be confirmed by the other records, and therefore false transactions are immediately declined. In government, blockchain garnered appeal because it lacks hacking vulnerabilities, can take on public and private forms, and can automatically verify and trigger business transactions based on input formulas.

Your Digital Coworker

1. **Blockchain can establish a complete, detailed history** of land ownership data that governments can use to assess property for title and tax purposes. The government of Ghana uses blockchain-based land information in conjunction with satellite imagery to resolve property disputes.
2. **Blockchain as a shared service** can allow multiple agencies to access a shared record of secure information, such as for government hospitals during the transition of an active service member to veteran status.
3. **Blockchain can be used to improve the financial visibility** and categorization of government transactions, such as for contracting in the Health and Human Services Department (HHS).

“Blockchain is not a silver bullet for the US Government; however, there are areas of government interest where distributed ledger technology appears to be well-suited to delivering specific and tangible benefits. These include public records, budget allocation, supply chain monitoring, and the government approval chain process.”

- [Homeland Security Department \(DHS\)](#)

“Federal agencies are eager to better evaluate and adopt distributed ledger technologies (like blockchain) that use encryption and coding to improve transparency, efficiency and trust in information sharing.”

- [GSA](#)

\$10

bonds could be issued by the city of Berkeley, California because of blockchain technology, a 99.8 percent reduction in the minimum bond cost because of previously complicated and expensive financing fees

2017

was when [Nevada](#) became the first U.S. state to adopt blockchain technology

20%

of investment in blockchain analysis firms comes from U.S. government agencies

\$100 billion

is the global value of Bitcoin, which runs on blockchain technology

Success Story: HHS Awards First Federal Blockchain Contract

Blockchain, which powers cryptocurrency and has proved itself an effective profit generator, has produced a lot of buzz in the federal government but also many doubts about its usefulness in the public sector. On Dec. 13, 2018, that all changed.

The Health and Human Services Department (HHS) awarded its first blockchain contract as an acquisition vehicle to streamline the notoriously lengthy federal procurement process. By creating a single, absolute record of vendors' information, HHS can bypass resubmissions and acquisition legwork to instead focus on solutions.

"The way that we look at blockchain in the Department of Health and Human Services is it is an enabler for modernization," said Jose Arrieta, Director of the Office of Acquisition Workforce and Strategic Initiatives at HHS. "It gives us the ability to separate data from process."

HHS uses blockchain to compile a centralized record of acquisition contracts that can be sorted according to certain parameters. Acquisition agents can see the price range of certain products, and in return, industry partners can know the going rate for their products.

HHS has more than 100 contracts and \$24.2 billion of contract spending. The five-year investment in blockchain is authorized for \$34.7 million, with a goal of an 896 percent return on investment (ROI).

Arrieta noted that without blockchain, it takes six months to even gather the data from software systems during the acquisition process. The data, being so siloed, is onerous to retrieve.

All those numbers are to say, blockchain has incredible cost-saving potential in government – even in areas that aren't traditionally considered. The HHS project is the first federal authority to operate – or permission for industry solutions to integrate with government IT systems – using blockchain for public procurement in the world, Arrieta said.

Easing the burden on industry was a central focus for ensuring an ROI with blockchain, he added. While the onus on government to lighten industry responsibility may not be clear, the connection is actually simple.

The federal acquisition process can be costly and time-consuming for both government and industry. Vendors must go through extensive checks, demonstrations and paperwork before

they secure – or fail to secure – a federal contract. Meanwhile, government needs faster acquisition times to ensure that their solutions remain relevant – especially in the technology space.

"We believe this [blockchain-based] infrastructure is the way government will modernize all of its administrative functions and then extend itself with those savings into the mission space," Arrieta said.

With blockchain, agencies can vet their data, organize it centrally, and protect data privacy and security by detaching identity through encryption. Then, they can keep identity information off the chain and determine who is who by comparing verifying information on the chain.

The process of incorporating blockchain and securing the contract was not easy for Arrieta. However, a fleshed-out plan and support from within HHS allowed the agency to see the process through and achieve an immediate ROI.

"When you have support like that, you can do iterative implementation," Arrieta said. "Why? Because what that support is telling you is, 'OK, go out, take a chance, spend a little money, create a proof.'"

Arrieta did exactly that. After his team identified \$2 billion in potential savings, they created a business model and looked for solutions. They aimed to capture \$720 million over five years, starting with 5 percent – or \$36 million in savings – after the first year, by looking at products, process improvements and moving to the cloud.

So far, HHS has spent \$2.85 million and met all its goals, meaning the project is highly scalable, as well as effective.

Arrieta hopes that the project will spark interest from other departments, and that the federal government can use the framework at HHS to build more blockchain projects. DHS has already looked into blockchain technology, for instance.

For those considering it, Arrieta emphasized an iterative approach that produces business value, scalability and immediate payoff.

"Somebody at a higher pay level would have to determine if they wanted to scale it across government," Arrieta said. "At this point, we just want to prove that it works, and we want to be able to provide that insight and that valuable information as it relates to HHS data to anybody that may have a need for it.

Takeaway: Iterating a blockchain project is crucial for success. The sooner mission outcomes are demonstrated, the better chance it has of agency adoption.

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Industry Spotlight

Open Source: The Engine Behind Integrating Emerging Technologies

An interview with Dave Cohn, Cloud Native Subject Matter Expert for North American Public Sector at Red Hat

Innovation is often symbolized by a lightbulb – a spark of individual inspiration that propels unforeseen progress. But those in IT know that technological breakthroughs take much more than a moment of novel brilliance.

Rather, innovation builds off of prior knowledge and requires collaboration among those with diverse skill sets and specialties. Furthermore, it takes time. For that reason, open source technology has traditionally opened the door to cohesive innovation and integration.

Speaking recently with GovLoop, Dave Cohn, Cloud Native Subject Matter Expert for North American Public Sector at Red Hat, explained why open source is the bedrock for integrating emerging technologies in government.

“The best ideas bubble up through the actual open source project itself,” Cohn said. “That’s how you really drive innovation in cloud and e-technologies and create these new emerging technologies.”

Open source allows government to “crowdsource” its projects and leverage other technologies, Cohn said.

In government, where limited funds often stall out IT modernization projects, resourcefulness is required to get emerging technologies off the ground. The community of open source projects is an invaluable resource.

Red Hat’s open source technology is non-proprietary and spans from Linux to Kubernetes to its newest cloud-based Istio technology, tailored to cloud-native projects and microservices.

Successful open source projects are accompanied by Agile development practices and “fail fast” approaches. Agencies have to adopt iterative practices in order to maximize the value of emerging technologies.

“Our government needs to innovate just as fast as any major enterprise out there, sometimes even faster,” Cohn said. “When you look at the Defense Department and our military, you can’t do things the old way. You can’t start building things, and then go back to the drawing board a year later and make changes. You have to make an iterative process as you go.”

Red Hat works through the integration processes with agencies to prepare

them for new technologies, ensuring that they’re integrating systems and achieving their desired outcome. Moreover, Red Hat can help agencies tie their projects and technologies together securely, using hardened open source to merge projects through Agile and iterative processes.

Unlike an application or service, open source is much more than a feature for agencies to implement. Instead, open source represents a mindset and ideology that has to match internal methods and practices.

By recognizing the value of open source, agencies can dictate a future in which the public sector is on the cutting edge, not lagging behind.

“The technology’s only half the battle. It’s really how do you change the culture, how do you build an Agile and DevOps approach, and how do you really go forward and be successful,” Cohn said.

Takeaway:

While many agencies might struggle with the cost of technological adoptions, open source can open windows to all sorts of emerging technologies. Instead of focusing on costs, agencies should focus on best practices and agency culture – ensuring that their methodology is Agile and will allow them to grow with technology.

Cloud-Based Artificial Intelligence

Cloud-based AI is unlocking new forms of artificial intelligence that integrate across platforms, applications and silos. Cloud-based AI can carry more capabilities than traditional AI programs, as it can access a suite of accessible functions that big data cloud providers can host as-a-Service. What's more, cloud-based AI has democratized AI tools, giving local governments the ability to access previously exorbitantly expensive or unfeasible features.

“The AI technology landscape includes interdependencies with many other technology areas. There are several foundational technology areas that must be aligned for government to successfully implement AI including data services, cybersecurity, and cloud. ...

Through cloud.gov, federal partners are able to **easily acquire and deploy cloud-based AI services** and products within their technology environment.”

- [GSA](#)

Your Digital Coworker

1. **AI can scan tweets** to find areas, locations, foods and restaurants with high rates of food poisoning to streamline food inspection.
2. **The IRS is considering cloud-based AI** to “proactively detect and respond to cyber- and insider-related threats.”
3. **AI can advance human/machine collaboration** in warfighting, and a Defense Department integration could mean that soldiers can access more services.

147

usages of Utah's Alexa application were recorded in the first five days after it launched with no public promotion of it

\$44.1 billion

could be saved in government by investing in AI that speeds up tasks by 200 percent

1.2 billion

hours could be saved in government by investing in AI that speeds up tasks by 200 percent

2%

is the rate at which cloud adoption has increased year to year

Success Story: Mississippi Uses Cloud- Based AI for Citizen Help and Knowledge

Want to know the word of the day? How about the standings in the NBA playoff race, or the 33rd president of the United States?

Just go home and ask "Alexa." Amazon's cloud-based voice response system has become famous for technological integration within homes, but many people don't think of these same technologies when it comes to the government.

Mississippi's IT department did.

"We really want to make it as easy as we can for citizens to interact with us, and we want to continually look for ways to do that," said Renee Murray, Team Leader for the Program and Contract Management Team at the Mississippi Department of Information Technology Services. "So, we see this as the first step in a much larger initiative."

Mississippi's Alexa program – titled "Ask Mississippi" – launched in 2016 but since has grown to Google Home applications as well.

Only a few states have implemented voice-response technology so far. Mississippi was the second state to launch an Alexa skill, with Utah being the first.

Ask Mississippi has won several awards, including the Emerging and Innovative Technologies Award from the National Association of State CIOs.

Users can ask an Amazon or Google device for a fun fact, but the state built Ask Mississippi to be far more than a responsive game of Trivial Pursuit. The skill links to Mississippi's integrative MyMississippi platform, which contains user-specific data, such as driver's licenses, hunting licenses and weather alerts. "If I want to set a reminder for myself when my driver's license expires, then that's more helpful to me," Murray said. "This allows me to get the reminders that I need when I want to get them."

Ask Mississippi has answered more than 5,000 questions so far, and there are 1,500 unique utterances – or scenarios – built into the system. The utterances are flexible and can respond to different word arrangements, meaning that questions phrased differently but asking for a singular answer will elicit the same response. The skill receives 12 to 15 questions a day, said Dana Wilson, General Manager and Subsidiary President of Mississippi Interactive – the state's e-government partner.

The technology was built on the cloud, but it wouldn't have been possible without the wide-reaching tools that the state had available. Cloud-based web tools, offering serverless computing and voice recognition and response, allowed for multiple interfaces to the Ask Mississippi technology. All the AI tools are built for the cloud.

As part of a broader citizen accessibility campaign, Mississippi became the first state to launch an official state chatbot, called Missi, and in 2017, debuted a cloud-based virtual 360-degree tour of the state capitol, with fun facts and frequently asked questions embedded into the program as part of the AI.

Even the utterances that might be more lighthearted – such as "Alexa, tell me a fun fact about Mississippi" – still fulfill a larger purpose. States often operate from strange proximity to their citizens. While local governments have next-door effects and impacts to show their citizens and national government has sweeping powers, state governments are more ambiguous in the minds of citizens, who may wonder what everyday services result from state influence.

Cloud-based AI is one way that states can directly communicate their role and reach citizens.

"People are going to be more interested in using something that is meant just for them," Murray said.

Mississippi plans to expand and improve on the technology. Ask Mississippi is Agile and routinely updated by state officials. Wilson said the updates have refined the service and made it smoother over time.

Additionally, the state hopes to tap into customer experience and streamline processes for citizens and employees alike. Today, Ask Mississippi can save citizens a 15-minute phone call or trip to a department or library by answering direct and specific questions. The skill cannot yet process payments or requests.

That will change, if everything goes according to plan. The state has been actively researching how Alexa can answer "When does my license expire?" with the date and a follow-up: "Would you like me to renew it for you?"

The Department of Wildlife, Fisheries and Parks is already looking into an automatic renewal plan that would directly integrate with whatever payment method is on file.

Takeaway: Cloud-based AI has the potential to tear down bureaucratic barriers. Look for cloud service providers that will allow for integration of data and applications.

The Infor logo consists of the word "infor" in a white, lowercase, sans-serif font, set against a solid red square background. The background of the entire advertisement is a photograph of a modern, blue and white high-speed train on a multi-track railway, viewed from a low angle looking down the tracks towards the horizon under a hazy sky.

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Finding the Right Enabler to Reach Mission Milestones

An interview with Bob Benstead, Vice President of Business Development and Strategy, Infor Public Sector

The potential of technology is breathtaking – there's no denying that. But ask most constituents where they want their tax dollars spent, and technology investments inside of government offices won't top the list. Instead, they'd want smoother roads, shorter lines and safer communities – more tangible productions of government.

Governments need new technologies to provide quality services and amenities to citizens, but they're often caught in a lasso of legacy applications and prohibitive costs. To find out how agencies can translate IT into showpiece results, GovLoop interviewed Bob Benstead, Vice President of Business Development and Strategy, Infor Public Sector.

"The government always has to know that technology has to serve or improve your service with citizens," Benstead said.

To reach and better serve citizens, governments cannot afford to spend IT budgets on band-aids or temporary fixes for legacy technologies. They need something that will dramatically alter the way they deliver services.

Governments need an enabler.

An enabler allows governments to incorporate front-facing emerging technologies that actively contribute to mission objectives. Therefore, the benefits are immediately visible to agency employees and customers.

For example, governments can incorporate intelligence and predictive capabilities into call centers to collect case information and respond to simple questions, freeing up employees to deal with more complex and important matters. Such technologies can reduce costs for agencies and eliminate wait times and inconsistent experiences for constituents on the other end.

These capabilities are enabled by a purpose-built cloud suite, which Infor offers. Managing the cloud as Software-as-a-Service through Infor can prepare agencies for what's next – by offering Internet of Things (IoT) asset capabilities, predictive tools and artificial intelligence.

In real time, this means agencies can mitigate familiar risks in government and expand the reach of services. For example, in special event management, a uniform platform for permitting and licensing expedites the process for contractors and agencies. Then,

governments can use drones, IoT sensors and AI in conjunction to mitigate the overcrowding of public spaces, ensuring a safer and manageable experience.

"The technology in and of itself is not the goal," Benstead said. "It's an enabler to improve decision support and operations, deliver more services or reduce a problem."

From there, governments can go through a checklist to ensure they're providing the right experiences. That starts with making sure that the ultimate goal of IT modernization is well defined.

Next, Benstead said, agencies can take steps to ensure that technology is useful and cost-effective in government. "Avoid bright lights," he urged, and prioritize gains first, however small they may be. A successful project can provide a template for public sector improvement that will help garner buy-in from all corners going forward.

Takeaway:

Government leaders need to understand their IT portfolios and prioritize doable projects with high returns on investment. New systems should never be acquired without a thorough cost-benefit analysis.

5 Best Practices for Implementing Emerging Technologies

1 Proceed iteratively and build with Agile development

Mississippi and Santa Clara County both use Agile to maximize their budgets and resources when implementing new online technologies.

2 Start by proving business value and seek advice from business leaders

HHS' internal support quickly and effectively implemented blockchain technology because a thorough pilot program removed the need for external studies and lengthy reviews.

3 Communicate with employees

While any emerging technology involves change management, DLA was able to stoke employee support for RPA by offering examples of decreased workload.

4 Integrate and layer new technologies

Mississippi needed cloud technologies to unlock Ask Mississippi AI, and moving to the cloud is a key for successful blockchain at HHS.

5 Focus on outcomes and citizen experience

Santa Clara County reinvested in community programs with savings gained from streamlining previously time-consuming processes.

Conclusion

Deciding how to incorporate emerging technologies in government can come from an individual lightbulb moment, community pressure, or a combination of desperation and innovation. Regardless of how they're incorporated, emerging technologies have the potential to free up government workers for high-value, mission-critical work.

Digital services, RPA, blockchain and cloud-based AI all can disrupt government and create new efficiencies throughout agencies. Considering the constraints on government, these technologies can save money and time, and empower employees to focus on mission outcomes, specifically citizen services.

Although their possibilities are somewhat unexplored in the public sector, your new digital coworkers can also socialize with one another, as encouraged by federal programs such as TMF. Building emerging technologies to integrate can maximize their capabilities. While resources are limited across government, agencies can trailblaze by incorporating emerging technologies into their workforces.

About GovLoop

GovLoop's mission is to inspire public sector professionals by serving as the knowledge network for government. GovLoop connects more than 300,000 members, fostering cross-government collaboration, solving common problems and advancing government careers. GovLoop is headquartered in Washington, D.C., with a team of dedicated professionals who share a commitment to the public sector.

For more information about this report, please reach out to info@govloop.com.

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