

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. These are your digital coworkers.

- Digital Services
- Robotic Process **Automation (RPA)**
- Blockchain
- Cloud-Based Artificial **Intelligence (AI)**

Defining Emerging Tech



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 – instead springing from creative modern advancements.



Relatively fast growth

All the technologies mentioned here are picking up steam in government. 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. Technologies that can directly help both constituents and government employees are thus featured.



Prominent impact

Impact is often reflected by monetary savings that can be reinvested toward agency missions or citizen engagement – measured by online clicks or applications received.



Uncertainty & ambiguity

Every emerging technology has room for growth and "what if" potential, prompting further projects, given available funding and organizational support.



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. Digital services occupy a wide range of government provisions, including e-signatures, service portals and e-payment processing.



"digital service plays" are identified by USDS



are <u>saved</u> by the state of Utah for every online service compared to the paper equivalents



How Santa Clara County Uses Digital Services

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. Now, the average time is five hours.

The incorporation of digital services by Agile development has saved the county hundreds of millions of dollars, said Ann Dunkin, Chief Information Officer (CIO) of Santa Clara County. 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. The county has invested in numerous other digital services.





Robotic Process Automation (RPA)

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.

of human work hours are <u>spent</u> on repetitive computer tasks

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



How DLA Uses Robotic Process Automation

The Defense Logistics Agency (DLA) 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.

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.



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.

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bonds could be issued by the city of Berkeley, California because of blockchain technology, a 99.8 percent reduction in the minimum bond cost

2017

was when Nevada became the first U.S. state to adopt blockchain technology

How HHS Uses Blockchain

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.

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).

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

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Cloud-Based Al

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.

is the rate at which cloud adoption has <u>increased</u> year to year



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



How Mississippi Uses Cloud-Based Al

Mississippi's Alexa program – titled "Ask Mississippi" – launched in 2016 but since has grown to Google Home applications as well. Mississippi was the second state to launch an Alexa skill, with Utah being the first.

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.

Ask Mississippi has won several awards, including the Emerging and Innovative Technologies Award from the National Association of State CIOs. Only a few states have implemented voice-response technology so far.



5 Best Practices for Implementing Emerging Technologies

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. While resources are limited, agencies can trailblaze by incorporating emerging technologies into their workforces.

- **1.** Proceed iteratively and build with Agile development
- **2.** Start by proving business value and seek advice from business leaders
- **3.** Communicate with employees
- **4.** Integrate and layer new technologies
- **5.** Focus on outcomes and citizen experience



How Red Hat Helps

Innovation is often symbolized by a lightbulb – a spark of individual inspiration. But the truth is technological breakthroughs take much more than a moment of novel brilliance. Rather, innovation builds off of prior knowledge and requires collaboration among diverse skill sets and specialties. For that reason, open source technology has traditionally opened the door to cohesive innovation and integration.

More than a feature for agencies to implement, open source represents

a mindset and ideology that has to match internal methods and practices. Red Hat can help agencies tie their projects and technologies together securely, using hardened open source to merge projects through Agile and iterative processes.

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.

"The best ideas bubble up through the actual open source project itself. That's how you really drive innovation in cloud and e-technologies and create these new emerging technologies."

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



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