

## Vendor Profile

# IBM Providing AI Solutions to Government

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## IDC OPINION

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IBM brings decades of experience to every engagement with customers, knows the challenges agencies face in deploying mission outcomes, and works closely with customers in a design thinking model to build solutions. IDC finds:

- IBM provides a wide range of assistance to help organizations get the most from their AI/machine learning (ML) development and models, including application solutions, services, education, and training. IBM has democratized AI through Watson Anywhere.
- IBM's overall goal is to make Watson the most accessible AI solution that can execute wherever the data resides, even if it is split between platforms. This run anywhere approach to AI is appreciated by clients due to its flexibility in development and deployment and ability to analyze data on any cloud.

## IN THIS VENDOR PROFILE

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This IDC Vendor Profile presents IBM's AI capabilities, including a deeper context of AI in health and human services, agency examples and outcomes achieved via IBM Watson, and IBM's future plans. This document is based on briefings from IBM and agency interviews.

## SITUATION OVERVIEW

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### Company Overview

IBM is an American multinational information technology company with over 350,000 employees and is headquartered in Armonk, New York. IBM achieved \$79.6 billion in revenue in 2018 and states that AI, cloud, analytics, and cybersecurity now represent more than half of its revenue – up from a quarter just four years ago – accounting for approximately \$40 billion in 2018. Washington Technology estimates IBM's U.S. federal government revenue in 2018 at ~\$1.2 billion, with defense revenue at ~\$300 million and civilian revenue at ~\$900 million.

IBM has an extensive number of patents and patent applications being granted and filed. Of the 9,626 patents granted to IBM in 2019, more than 1,800 were related to AI. IBM invests heavily in research – more than \$5 billion in 2018. Investment areas include natural language processing (NLP), speech processing, computer vision, machine learning, and AI. IBM's AI research is focused on three areas, namely, advancing AI, scaling AI, and trusting AI, and includes:

- The **IBM Research AI Hardware Center**, a global research hub headquartered in Albany, New York (The center is focused on enabling next-generation chips and systems that support the processing power and unprecedented speed that AI requires to realize its full potential.)

- The **MIT-IBM Watson AI Lab**, a collaborative industrial-academic laboratory focused on advancing fundamental AI research in the areas of healthcare, security, and finance using technologies such as the IBM Cloud, AI platform, blockchain, and quantum to deliver the research to industries

## Company Strategy

IBM recognizes that expediting the pace of AI adoption is no trivial task. It requires an open approach to technology, a philosophy of bringing the best AI to the data, and a commitment to educating students and clients in this 21st century skill. As part of its corporate mission, IBM provides a wide range of assistance to help organizations get the most from their AI/ML development and models, including application solutions, services, education, and training. IBM has democratized AI through Watson Anywhere. IBM's overall goal with Watson Anywhere is to make Watson the most accessible AI solution that can execute wherever the data resides, even if it is split between platforms. Traditionally, IBM Watson has been a solution available only through IBM's Cloud services. Announced a year ago, IBM made its Watson AI platform available on IBM Cloud Pak for Data, which can be deployed on IBM Cloud or any private, public, hybrid, or multicloud environment using Kubernetes technology. This AI platform includes the ability to explain how AI decisions are being made in real time, assisting agencies with greater transparency through explainability and bias detection for algorithms. IBM's run anywhere strategy is intended to enable clients to bring AI to their data wherever it resides – IBM Cloud, AWS, Azure, Google, or an agency's private cloud platform.

In addition to democratizing access to AI technology, the company provides IBM Talent and Transformation, a service that addresses the often overlooked cultural aspects of AI. This service helps clients ensure their teams have the right skills and talent – and the supporting culture and work environment – to support a new way of working that is critical to scaling AI for business. IBM is also making AI broadly available to organizations of all skill levels through the IBM AI Learning and Certification program. This program offers in-lab training workshops, a catalog of online courses, and is designed to ultimately certify a new generation of AI developers on such topics as checking for model bias, applying deep learning, and building intelligent assistants.

## Watson Assistant

Watson Assistant is IBM's AI product that enables building, training, and deploying conversational interactions into any application, device, or channel. Watson Assistant intelligently determines when to search for an answer from a knowledge base, when to ask the user for clarification, and when to direct the user to a human for personal assistance. Watson Assistant can be deployed in any cloud or on-premises environment, enabling versatile AI.

## IBM Watson Studio

IBM Watson Studio is an integrated collaborative environment designed to make it easy to develop, train, and manage models and deploy AI-powered applications delivered via Cloud Pak for Data, and it is also available as a SaaS solution delivered on the IBM Cloud. Teams use IBM Watson Studio to collect and prepare training data and to design, train, and deploy machine learning models. Ranging from graphical tools for model building to tools that automate running thousands of experiment training runs and hyperparameter optimization, IBM Watson Studio capabilities include the ability to:

- Automate AI life-cycle management with AutoAI.
- Visually prepare and build models with IBM SPSS Modeler.

- Build models using images, with IBM Watson Visual Recognition, and texts, with IBM Watson Natural Language Classifier.
- Manage and monitor models through integration with IBM Watson OpenScale, an open platform designed to help enterprises build, run, manage, debug, and operate multiple instances of AI, no matter where the models were developed. The platform supports frameworks such as Watson, TensorFlow, Keras, SparkML, AWS SageMaker, and Azure ML. This AI platform includes the ability to explain how AI decisions are being made in real time, assisting agencies with greater transparency and compliance.
- Deploy and run models through one-click integration with IBM Watson Machine Learning via tools for designing, training, and managing models including:
  - AutoAI automatically analyzes data and generates candidate model pipelines customized for each predictive modeling problem.
  - SparkML Modeler uses the graphical flow editor combining nodes and actions to create a machine learning flow.
  - SPSS Modeler uses the SPSS flow editor to develop predictive models using business expertise and deploy those models into business operations to improve decision making.
  - Neural Network Modeler presents a graphical view of models while being built by combining nodes representing neural network nodes and actions.
  - Experiment Builder automates running hundreds of training runs while tracking and storing results.
  - Notebooks provide an interactive programming environment for working with data, testing models, and rapid prototyping.
  - Machine learning command line interface enables building and working with models in agency environments.
  - Decision Optimization model builder guides users through building and solving prescriptive models.

### ***IBM Watson Health for Health and Human Services Agencies***

IBM Watson Health translates data and knowledge into insights to augment the intelligence of human experts in making more informed decisions about care in hospitals and health organizations. Because many clients face difficulty in navigating across public healthcare and social care organizations to obtain the services they need, IBM is leveraging Watson Health to help constituents access health and human/social services. IBM provides AI-enabled, citizen-centric solutions that personalize health and human services by coordinating actions taken by multidisciplinary teams such as those providing housing, food, and behavioral and physical health. Some of the solutions are discussed in this section.

#### **Program Integrity**

- **Policy Insights** combines field-proven analytics, technological innovation, and deep domain knowledge to help program integrity investigators improve the speed and productivity of their work. With help from Policy Insights with Watson, investigators can conduct thorough review of policy to support their claims payment investigations, improve the consistency of policy reviews performed by all members of the program integrity unit, and optimize the efficiency of investigative resources by detecting and preventing a higher percentage of inappropriate claims payments.

- **Claims Audit** leverages Policy Insights to match incoming claims to determine opportunities for avoiding inappropriate payments (prepay and post pay) and combines the use of AI with fraud algorithms/edits to focus Watson on claims that meet at-risk patterns.

### Enterprise Data Warehouse/Analytics and Strategic Consulting Services

- **Watson Change Detection for Medicaid** (in development for 2020) applies machine learning to monitor and assess the impact of policy changes, identify unnecessary care, and identify fraud, waste, and abuse. Data is enhanced with medical episode grouper, outpatient events grouper, and other methodologies to make the data analytically ready, and machine learning proactively surfaces changes in cost, quality, or enrollment trends without analyst involvement. This approach frees analysts to more effectively focus policy and program operations on what is actionable.

### Social Program Management

- **Caseworker Assistant** answers a caseworker's natural language questions about training, policy, and clients; searches a corpus of policy and training documents for ensuring best practice operations and improved data quality; and provides proactive hints as caseworkers use the system.
- **Citizen Assistant** augments a citizen's interaction with government agencies by streamlining navigation, answering questions, and guiding citizens to achieve their goals.

### Watson Care Manager

- **Notes Highlights** is activated in all existing IBM Watson Health Watson Care Manager clients and automatically activated for new Watson Care Manager customers. Notes Highlights helps the care team manage the large amount of information in case files using natural language processing and other AI tools to extract concepts, worry words, protective factors, and other filters from all the case notes and unstructured text shared by the care team. Notes Highlights extracts, summarizes, and presents information previously hidden in case notes. Users see, search, and discover the most important concepts found in case notes at a glance. This allows supervisors, auditors, and newly assigned caseworkers to identify gaps in service and patterns of behavior, discover areas requiring action to address identified problems, and better identify and understand protective factors.
- **Design Sprints/design thinking** facilitates designing and validating a solution in structured four-day workshops. IBM's approach includes bringing together agency line-of-business and technical stakeholders to collaborate on the solution design by:
  - Understanding and sketching as-is process and targeting use cases
  - Prioritizing the most relevant use case and storyboarding the solution
  - Prototyping the design flow to enable end-user validation
  - Validating the prototype with end users and iterate on the design

### Health and Human Services Use Cases

IBM Watson Health works with health and human services agencies in over 40 states in the United States, with federal healthcare agencies in the United States, and in 11 countries around the world. Its systems are used by more than 280,000 caseworkers serving and protecting more than 57.5 million individuals annually and supporting self-service applications for 30 million people worldwide.

Health and human services examples include:

- **Sonoma County, California.** The challenges faced by Sonoma County, California, in meeting the needs of beneficiaries requiring comprehensive services such as assistance with substance use disorders, criminal justice engagement, housing, and food assistance are typical of the coordination, communication, and integration difficulties between local, county, and state departments. The siloed nature of service delivery often prevents data sharing and care coordination. This results in fragmented service delivery, service gaps, missed handoffs, client confusion, and poor outcomes. Sonoma County executives recognized they needed to address the needs of their constituents with integrated and coordinated data and services and engaged with IBM to conduct a design thinking workshop. The resulting solutions included the IBM Connect 360 platform that brings together a composite client picture from various department back-end systems coupled with IBM Watson Care Manager, a social program management software that uses advanced analytics and AI to bridge silos and support planning and service management for individuals and programs. Results include a 360-degree view for service providers that improves work quality and satisfaction, casework enabled by NLP-based notes, reduced duplication of services and improved workflow efficiencies, simplified client access to programs across multiple departments, and increased contact with staff – building relationships and trust and effectiveness.
- **Veterans Affairs (VA).** In response to the growing concerns about the rate of suicide among veterans, IBM worked with VA's Office of Suicide Prevention to identify how technology can provide resources and services to service members, veterans and their families, in advance of a stressful or traumatic event. Results indicate that technology can assist with building resiliency and better equipping individuals to handle these events as well as avoiding depression, anxiety, and suicide ideation. VA and IBM also launched a collaborative program to help veterans strengthen their behavioral and emotional resiliency; notably, during the transition from active duty to civilian life. Studies routinely find that this transition is one of the most challenging. Veterans struggle with the loss of a clear, shared mission and the kinship of fellow service members. As a result, VA provides veterans a mobile app, designated GRIT or Get Results in Transition," that leverages IBM's Mental Fitness 360 platform. The application provides required features and functionality to address mental wellness, enable social connectedness, and support a user's social health – starting with employment. The employment components of the app provide personalized job matching by using AI-backed technology to align a user's background, skills, military experience, preferred location, and job field with thousands of open jobs. This app searches through jobs posted to over 51,000 job sites, including those with new jobs posted on a daily basis such as Indeed.com. Users can easily upload a resume or take a picture of their resume to save their information, making it easy to apply for jobs found through the app. Although in beta trial, approximately 3,000 veterans have used this employment app.

## FUTURE OUTLOOK

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IBM helps clients by focusing on responsible stewardship (i.e., conducting business with trust, transparency, and purpose). This means ensuring that clients' data is secure, that clients retain control of their data, and that clients can trust AI technology and its recommendations. According to former IBM Chairman, President, and CEO Ginni Rometty's address at IBM Think 2019, "There can't be AI without IA (information architecture). This is because agencies need a business platform to connect all of their digital services and manage the life cycle of their AI apps."

IBM believes that in the future, change detection will inform how agencies can deliver next-best actions. For example, IBM predicts that a state Medicaid agency will assemble a corpus of data from which it extracts insights. The agency then applies machine learning to convert these insights to rules, creating a mechanism for recommended next-best steps across the claim payments stream. Agencies will apply conversational AI to help a caseworker learn and accomplish complex tasks. AI-driven navigation will expedite screening by helping citizens work more logically through an application process – transforming a linear "answer-then-next process" into one that is more customized and efficient. AI will enable agencies to address social and economic issues such as aging populations, families with complex needs, budget, youth unemployment, and addiction.

IDC agrees that this future is possible, with the caveats that agencies ensure they are using AI in an ethical and responsible manner and invest in training employees on how to work in this complex human and machine learning environment.

IDC expects IBM to intensify its focus on the following three areas:

- **Analytically ready data.** Analytics providing value across agencies through the integration and management of data in a cross-program enterprise data warehouse, providing insight and answers to questions that cross traditional agency boundaries
- **AI-infused data management.** The infusion of AI and machine learning-based acceleration and automation into the data management platform, accelerating the ability of health and human services agencies to integrate new sources of insight and gain access to business answers faster
- **AI-driven workflow.** Move beyond simple business intelligence reporting and retrospective analytics to deliver AI-driven workflow automation, driving real-time decisioning, reducing cost, and improving citizen experience

## ESSENTIAL GUIDANCE

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In addition to breaking down information silos and working with legislators to change inconsistent policies, agencies are pursuing continual improvement, innovation, and variation based on leveraging data and AI technologies to identify and fulfill changing needs to enhance scale, scope, and citizen engagement. Applications based on AI, machine learning, and continual deep learning are enabling agencies to collect and analyze vast amounts of data, identify patterns based on customer interactions, reduce the amount of time spent on mundane tasks, and provide the ability to verify citizen changes in circumstances. Agencies are deploying intelligent systems to reduce errors and delays in the enrollment process via digital verification, as well as errors in benefit administration to ensure that benefits are accurately delivered. AI has immense potential to help agencies better analyze data, drive improved constituent services, and transform how citizens, enterprises, and agencies work, learn, and interact.

Agencies seeking to bring AI to their data – wherever it resides – and deploy a simpler, faster way to build, run, and manage AI models and applications across any cloud should consider IBM Watson. The portability provided by this solution has the promise of bringing AI closer to data sources and developers and enable rapid and agile insight delivery at any decision point. Consider IBM when you need to develop an AI solution that can scale to high volume, connect to various data sources, and are enabled by many AI options and backed by robust R&D. IBM brings decades of experience to every

engagement with customers, knows the challenges agencies face in deploying mission outcomes, and works closely with customers in a design thinking model to build solutions.

## Advice for IBM

IDC Government Insights recognizes IBM for its focus on robust apps and solutions and flexibility in Watson Anywhere. However, as a cautionary note, the company shouldn't let its internal organizational focus on technology or segments impede velocity. IBM would do well to enhance its strength and history of working with agency executives by taking a more cohesive approach to presenting not only the Watson capabilities but also the outcomes that IBM has enabled agencies to achieve. Balance the emphasis on technology and capabilities with measured accomplishments of agency clients at all levels of government. In addition to mission outcomes, speed and ease of use by developers should be captured.

## LEARN MORE

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### Related Research

- *Artificial Intelligence: IDC's Automation Evolution Framework for Government* (IDC #US46030520, February 2020)
- *IDC FutureScape: Worldwide National Government 2020 Predictions* (IDC #US45588419, October 2019)
- *Integrating Health and Human Services Drives Success in Sonoma County* (IDC #US45457919, August 2019)
- *IDC's Worldwide Digital Transformation Use Case Taxonomy, 2019: National Civilian Government* (IDC #US44301619, June 2019)
- *Responsible AI in Government and Vendors Providing Tools Testing for Bias* (IDC #US45068919, May 2019)
- *IDC PlanScape: Responsible and Ethical AI for Federal and State Governments* (IDC #US44856318, February 2019)

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