

A Blueprint for Agency Modernization

Innovation at Cloud Speed

ORACLE GOVERNMENT 360

PILLAR FOUR:

EMERGING TECHNOLOGIES POWERED BY PREDICTIVE ANALYTICS

Government 360 is not just about being smart today; it's also about preparing for tomorrow. The three pillars we've examined so far enable government agencies to lift and shift to the cloud, automate and mobilize the back office, and provide a better customer experience. The fourth pillar focuses on analytics, business intelligence and machine learning — tools that equip agencies to gain data-driven insights that position them for a more effective, efficient and innovative future.

The Evolution of Data and Analytics

The amount of data available to agencies today is growing at a phenomenal pace. According to IDC Research, data volume will increase at a compound annual growth rate of 42 percent through 2020. In the 2010-2020 decade, IDC predicts the world's data will grow by 50 times, or from about 1 zettabyte in 2010 to about 50 zettabytes in 2020.

Data comes in one of two forms: structured, which is organized data produced by business systems, and unstructured, which is essentially everything else — social media posts, images, video, audio tracks and signals from sensors. The more data of either type an agency produces and collects, the more business intelligence it can gather, and the more predictive analytics can inform and improve

government services. On the commercial side, IDC estimates there is a \$430 billion economic advantage to organizations that analyze data and deliver actionable insights. For government agencies facing fiscal pressure, analytics can help them make more informed, impactful decisions that maximize limited resources.

But agencies are often overwhelmed with data and unsure of what to do with it. How do they turn data into intelligence that can show them which programs are working and which aren't? How can they gain visibility into their data so they can refocus resources and drive transformation to solve problems?

Some early analytics tools promised a lot and delivered little. But analytics tools have evolved. Today's tools are more sophisticated and easier to use, allowing agencies to address a range of challenges without requiring them to build expensive data warehouses. These tools let government agencies pull both structured and unstructured data together to answer questions they've never been able to ask before, find hidden patterns in data using intelligent visualizations and machine learning, and detect anomalies and predict outcomes.

To better understand how it works, let's examine some areas where analytics is being used in state, local and nonprofit agencies.



Creating a Data-Driven Culture in Las Vegas

Al Pitts is on a mission to create the future of data and analytics for the city of Las Vegas. As the manager of enterprise data and analytics, Pitts leads an effort to use data to run a smarter, more effective and more efficient city.

“We want to move our city toward a data-driven culture, giving our C-suite the ability to make decisions based on data, not just their gut or whim,” says Pitts.

Las Vegas has been an Oracle business intelligence (BI) customer for more than a decade. But more recently, Pitts began using geographic information system (GIS) data, operational data and more to create executive dashboards for the city manager, chief operations officer, chief community services officer, chief public safety officer and chief financial officer.

“These five different chiefs are now able to, at a glance, look at a dashboard that gives them insights into their respective areas and allows them to perform their jobs more effectively,” says Pitts.

For example, the chief public safety officer is combining public safety information, fire and police data, and IoT sensor data to more quickly respond to emergencies.

“If there is an emergency, someone typically dials 911 and relays the situation to an operator who dispatches first responders,” says Pitts. “But using IoT, BI and analytics we can get an automatic alert when an airbag is deployed, for example. An information packet is then sent to a dashboard and we can dispatch fire and rescue immediately without any human intervention whatsoever, cutting down on the turnaround time and potentially saving lives in the process.”

On the back end, analytics are used to examine trends over time.

“We can look at a particular intersection, for example. Maybe there’s something wrong with the timing of the signal,” says Pitts. “We can analyze that data, realize there is an uptick

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in the number of accidents happening in that intersection, and then proactively check the lighting and make sure the signal is actually operating the way it’s supposed to.”

Turning Data into Insights in San Joaquin County

Like most counties, San Joaquin County, Calif., collects a vast amount of data about its operations and the community it serves. But until recently, the county couldn’t put that data to use.

In 2018, San Joaquin County agreed to work with Graviton Consulting Services and Oracle on an Oracle Analytics Cloud (OAC) proof of concept. Leveraging a data lake and OAC would give the county a low-cost way to apply analytics across its vast troves of data — whether that data resided in cloud-based systems or legacy systems.

The county focused the proof of concept on its biggest expense — personnel. Leveraging OAC, the county analyzed sick leave for 7,200 county employees. It then built dashboards and heat maps to display a variety of information, including which days employees were most likely to call in sick and how much sick leave each employee used.

The county identified several unexpected trends, including the fact that some personnel did not account for sick leave used, waived sick leave benefits in exchange for cash payouts or did not use any sick leave at all for multiple years. Unused sick leave creates a future expense for the county because employees can cash that leave out at retirement. The county





didn't want to needlessly drive up that balance and create a large future liability.

The county also used OAC to evaluate whether it could negotiate better healthcare plans or add additional healthcare benefits to help keep employees healthy. It also looked at how it could use the tool for succession planning to be better prepared for future workforce shifts.

Based on findings from the proof of concept, the county made several changes that will ultimately reduce its risks and expenses.

"Performing some quick, easy analytics on its data helped the county think about how to improve productivity and increase efficiencies," says Vineet Srivastava, president and CEO at Graviton Consulting Services. "Just by bringing data into OAC and animating it, the county pulled out insights it wouldn't normally be able to see."

The original proof of concept created an appetite for additional analytics projects among San Joaquin County's executive staff. Another OAC project underway uses analytics to examine the county's homeless population and evaluate each person's fit for rehabilitation programs.

The county is also currently expanding the volume and types of data it's feeding into OAC to create other types of insights and examine other areas where it can apply OAC's analytics and machine learning capabilities.

The Oracle Approach: Machine Learning Advances Analytics

Most state and local government agencies see the potential in data. But transforming that data into actionable intelligence is challenging. OAC provides comprehensive cloud-based analytics in a single platform, so agencies don't have to stitch multiple systems together. The integrated analytics platform has the horsepower to analyze any type of data from any source — on-premises data warehouses, streaming data from IoT, data managed by Hadoop, video and text data, and more. And because Oracle Analytics leverages cloud, agencies need less manpower to manage infrastructure and applications.

OAC equips government agencies to get more value from their data. For example, a growing number of agencies use the solution for predictive maintenance,



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allowing them to anticipate which machines or systems are most likely to break down so they can perform maintenance before expensive problems occur, improve labor planning and leverage warranty claims. By combining analytics with machine learning, it is now possible for agencies to enter into a new realm of predictive analytics, from calculating the probability that an underserved student will complete high school to predicting when electricity or water are at their peak usage.

OAC’s embedded machine learning helps take the human bias out of data analysis and lets agency leaders

see anomalies, make predictions and model scenarios to ascertain answers to important “what if?” questions. It helps leaders ask questions they did not previously know to ask. Always on, and always working in the background, machine learning is continuously learning from the data it takes in, making it smarter and more accurate as time goes by.

Most critically, advanced analytics platforms let government agencies use data to inform the way they operate, providing insights that help them deliver on their missions both today and in the future.



MAINE'S JOURNEY TO CLOUD-BASED DATA ANALYTICS

Maine's use of technology is evolving to improve data access, analytics and decision-making throughout the state.

Maine's Department of Administrative and Financial Services has always had high aspirations for its data. In 1995, the state built an ad hoc data warehouse for business intelligence (BI) — a progressive step at the time. The tool contained administrative and financial information that could be shared with program administrators around the state. The problem was only a small percentage of users had the skills to use it, and the system was slow.

"One of our employees told me, 'When my customer asks me a question, they've lost interest by the time I can provide an answer.' That really stuck with me," says Jeff Jordan, director of Enterprise Data Services for the state of Maine.

As years went by, it became clear that unless the state modernized the solution, Jordan's team would not be able to accomplish its goal of promoting and enhancing data sharing across state government.

"The data was being extracted and duplicated repeatedly. People didn't know where to find what they were looking for," says Jordan. "It created an unmanageable level of complexity for end users."

The Roadmap to a Modern Solution

In November 2018, Jordan and his team received the green light to upgrade the existing BI solution and move it to the cloud.

"We wanted to allow employees to build out the reports they use to manage the day-to-day operations of state government in one place. We wanted to increase the visual nature of the data. We also wanted to enable some modern aspects of data and analytics and business intelligence that the 1995 implementation — which only allowed us to extract row sets of data — lacked."

Jordan and his team evaluated several solutions and ultimately chose Oracle Analytics Cloud.

"Oracle Analytics Cloud provides a single point of entry and would allow us to accomplish all our objectives with one product," says Jordan.

But moving from a legacy BI system to a cloud-based analytics platform was not without challenges.

"We had 25 years of historical reporting in the legacy system that people were counting on being able to access and use," says Jordan.

Jordan's team needed to create a roadmap that would take them from the legacy BI solution to a modern, cloud-based analytics solution in a gradual but timely manner. The team focused on building a data model first. But building the data model took time and ultimately delayed the new platform's rollout.

"My advice to others is to start from a place where you can show value early, because that makes the rest of the project much easier," says Jordan.

Once the data model was complete and the project was moving forward again, Jordan's team focused on building strong communications among the parties that would use the new tool.

"Our IT staff needed to understand how to use it and the business staff needed to understand the data," he says. "To be successful, we had to ensure partnership and mentorship between those two groups."

Jordan's team then created a user group to share best practices such as how to utilize data in different ways or how to display it to provide the most value to end users.

"The value of data goes way up when you transition from tabular reports and extracted spreadsheets to charts and graphs and other types of visualizations," he says.

As the project progressed, strong executive support helped keep it moving forward.

"We were fortunate that leadership was very supportive of this project," says Jordan. "They helped us through some hard times, and they stuck to it because they saw the value that was being delivered."

Once planning processes were complete, Jordan's team decided to build the new cloud-based analytics platform around a three-tier service model. The first tier is a data analytics workbench that allows the agency's data analysts to perform ad hoc analyses. The second tier is an information portal that allows users to get the data they need using a self-service model and simple navigation.

"Most folks aren't interested in writing a query. They just want to know the answer to a question. We wanted to make it quick and easy for our employees to get to the data they need to do their jobs," says Jordan.

The third tier is a Data Science Lab that includes technologies such as machine learning and artificial intelligence to enable users to further evaluate data and support better decision-making throughout the state.

"There's so much new data every day. Oracle Analytics Cloud allows our data consumers to get that data into the warehouse quickly for analysis with other data sets and then use the latest technologies to analyze it and get value from it," says Jordan.

Getting More Out of Data

Today, Maine's cloud-based analytics platform allows state employees to access data and build customized reports using dashboards and other features. The new solution also provides a single point of entry to the department's data and allows users to combine both structured and unstructured data sources.

"Users tell me this is so much easier and faster," says Jordan. "We're also bringing in a broader data set. Every piece of data in our various systems is now made available to every data analysis user in state government. There are now more than 8,000 data elements available to end users, which is a massive increase."

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The tool also enables self-service for the hundreds of people that use it each week.

"The result is reduced reliance on IT. Data consumers can work with data without having to wait in the queue for us to help them," says Jordan. "That also means we have more time to make changes or get new features into the system sooner."

If an end user comes up with an enterprising use of data, Jordan's team can share that application within the broader system so other departments or users can take advantage of it as well.

The new system also enables automation. End users can turn what used to be one-off processes they performed manually into tasks the system performs for them.

"They set it and forget it, and they get the data they need into either their hands or their consumer's hands on a regular basis," says Jordan. "They are seeing a lot of efficiency gains as a result."

Finally, because the system is cloud-based, users were able to continue using it when the pandemic struck and government employees moved to remote work environments.

"The system has been used to provide information to the governor's office around what the modern state government workforce should look like in 2025," says Jordan. "That data is being used for some potentially interesting long-term workforce strategies."

Despite its success with the new analytics system, Jordan's team doesn't plan to stop there. The next step in Maine's analytics journey is adoption of Oracle's Autonomous Data Warehouse, a cloud service that will make it easier for the Department of Administrative and Financial Services to operate its data warehouse, secure data and develop data-driven applications. The state expects to complete implementation in the fourth quarter of 2020.

"The team is hard at work on that, and I'm hopeful it will further enhance our ability to perform data science work throughout the state," says Jordan. "We're maximizing the value of our data now, and most importantly, our data is more readily available than it has ever been before."

CONCLUSION



Throughout this white paper, we've provided government leaders with a framework for agency modernization, included examples of where these concepts are becoming a reality and shared stories that illustrate what can happen when IT leaders perceive government through the eyes of the people they serve.

In exploring these Government 360 concepts, it's clear that government agencies can no longer rely on traditional methods of conducting business. They must move away from monolithic systems that are costly to run and maintain, take too long to deploy and prevent IT teams from moving beyond activities that simply “keep the lights on” to more innovative ventures. Moving to cloud-based solutions positions agencies to make incremental and affordable changes in their systems and processes.

The COVID-19 pandemic taught us that failing to evolve is not an option. Government organizations that had moved some workloads to the cloud were better positioned to offer employee telework options and maintain citizen services during a time of strict stay-at-home activities. Government organizations that neglect to modernize also face long-term sustainability issues. An agency that is not forward

thinking or that utilizes antiquated technology will perpetuate an image of government as out of step with its citizens, and may struggle to attract new talent. Cities that rely on outdated technologies and processes can also fail to attract new businesses and industry, leading to lower tax revenues that impact the organization's ability to provide citizen services.

We hope we have helped you build a vision for how to adopt modern processes that enable you to deliver the digital services citizens demand, and you can move forward with a strategy for ongoing government modernization.

No matter where you are with any of the four core concepts in the modernization process — moving workloads to the cloud, mobilizing and modernizing the back office, creating a smarter connected government, or implementing predictive analytics and other future-ready technologies — the key is to get started. Modernizing government services is a journey, not a destination. It won't always be easy. But the effort put forth to create a circle of citizen engagement, constituent service, private business productivity and civic mission will certainly be worth it.

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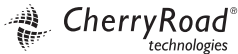
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