

PILLAR FOUR:

PREDICT AND PREPARE FOR THE FUTURE



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, 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 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 that there is an uptick 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."

Taking Maine's Data Warehouse to a New Level

Maine built an ad hoc data warehouse for BI in 1995 — a progressive step at that time. The legacy tool contained administrative and financial information to be shared with administrators around the state. However, only a small percentage of users had the skills to use the tool, and they could only access a limited amount of data.

In 2018, Jeff Jordan, Maine's director of enterprise data services, partnered with the state controller and made the strategic decision to move to a cloud-based solution. Jordan and his team evaluated several solutions, but ultimately chose Oracle Analytics Cloud (OAC).

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"Oracle Analytics Cloud provides a single point of entry to our governed data, allowing us to accomplish all our objectives with one product," says Jordan. "For that reason, OAC became the de-facto choice for me."

The effort — which is still underway — will eventually enable users to access more data, perform ad hoc analyses and predictive analytics functions, and build more meaningful, customized reports using dashboards and other features.

"With OAC we're bringing in a much broader set of data," says Jordan. "Every piece of data in our various administrative and financial services systems is being made available to every data analysis user in state government. Previously they could only view about 200 data elements. Now there are over 8,000 data elements available to our end users."

Using OAC also enables a data "mashup" capability with unstructured data sources while enforcing the business rules of the department.

"End users will be able to extract data from any source they want — structured or unstructured — and mash it all together to create the types of analysis we couldn't before," says Jordan. "Ultimately it will allow us to make better business decisions."

Leveraging Analytics to Protect Honey Bees

According to the World Bee Project (WBP), honey bees are at risk for extinction. To help protect bees, the WBP launched an initiative in partnership with Oracle and the University of Reading School of Agriculture, Policy, and Development to leverage analytics to help slow the decline of bee colonies.

"Imagine a farmer whose crops yield one-third less than they did before," says WBP Founder Sabiha Malik. "That is what we are faced with if bee colonies continue to decline."



HOW TO TAP THE POTENTIAL OF YOUR DATA

Data is an asset for any organization. But getting value out of data is challenging. Today's data is diverse — it exists in many different forms and comes from different sources at varying volumes and rates. Disparate data also needs to be securely stored in a way that is readily accessible to support a growing number of users.

The way data is used has also changed. Today, more users and analysts need to experiment with and analyze data in near real time to support new needs or processes. They often need to analyze a sampling of different data sets to recognize trends or correlations — and they need to get results fast.

Unfortunately, many government agencies still rely on legacy data warehouses based on decades-old technology. As analytics has become a common practice, and a larger volume of more diverse data is collected, the data warehouse

has become the biggest roadblock many agencies face in their path to insight. To meet the demands and opportunities of today and tomorrow, data warehouses need to fundamentally change. They need to become easier to create, faster and more elastic.

To address these issues, Oracle developed the Autonomous Data Warehouse Cloud, a modern data warehouse ecosystem that helps government agencies meet evolving data and analytics needs. The Autonomous Data Warehouse Cloud platform allows agencies to take in any type of data, easily store it, rapidly process it and provide valuable insights in an easy-to-consume visual fashion to help users make smarter decisions. And it supports heterogeneous environments, allowing agencies to continue to use existing BI and analytics tools.

To find out more, visit:

https://cloud.oracle.com/en_US/datawarehouse

The WBP Hive Network will remotely collect data using a network of smart beehives. The data WBP collects will feed into OAC, which will use analytics tools, including artificial intelligence and data visualization, to give researchers new insights into the relationships between honey bees and their environments. Researchers 'listen' to the honey bees and analyze intricate acoustic data captured inside the smart hives, including the movement of bees' wings and feet. Combined with other precision measurements — including temperature, humidity and honey yield — researchers will closely monitor bee colonies, detecting patterns and predicting behaviors. This will enable conservationists and bee keepers to act to protect colonies, such as preventing swarming at the wrong time of year or removing predators like the invasive Asian hornet.

The WBP Hive Network launched in the United Kingdom with expansion expected in the United States and Africa soon.

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-prem 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, 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.

**For more information on Oracle analytics
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