DAFS Analytics

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Category: Data Management, Analytics & Visualization
State: State of Maine
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EXECUTIVE SUMMARY

The DAFS Analytics project was established to revitalize the legacy data warehouse environment for the State of Maine's administrative data. This data set included more than 8000 data elements and more than 5 TB of **accounting, human resource, and budget data**. The scope of the project was focused on the delivery of a **three-tier service model** for self-service reporting and data analytics. The project produced an **Information Portal** for the typical consumer of administrative data, an **Analytics Workbench** for the needs of the data analyst and the ad-hoc reporter in the workforce, and a **Data Science Lab** for the citizen data scientists working various jobs within state government.

The technology for this product was procured and delivered in the **Oracle public cloud**, using **Oracle Database as a Service**, **Oracle Analytics Cloud Service**, and **Oracle Identity Cloud Service**. All the data has been encrypted both in flight and at rest to meet compliance and regulatory standards.

In order to successfully implement the product, the State of Maine awarded an RFP for Integration Services to **AST Corporation** (https://www.astcorporation.com/). AST is an Oracle platinum partner with specialization in public sector analytics and enterprise performance management.

For assistance in the ongoing management of the Oracle cloud environment the State of Maine awarded an RFP for managed services in cloud database and Linux administration to **Rolta Advizex** (https://advizex.com/). Advizex is also an Oracle platinum partner with a managed service dedicated practice.

The delivered functionality is expected to **fundamentally change the way employees interact with data**. DAFS Analytics lets the data analyst interact with a **governed data source** and "mash up" data from **ungoverned sources** in the system. It also allows a data consumer to create new tables in the enterprise data warehouse environment and flow data into those tables using light weight transformation tools without requiring administrative permissions on the underlying technology platforms.

Previously all **data enrichment** projects had to be conducted outside the system. Repeatable process was difficult to impossible. With the new system, even in the earliest results, we have seen recurring operational tasks reduced from several hours needed each week to just minutes. Employees can automate their own processes without IT interaction.

NARRATIVE

The State of Maine relies on its administrative data to run its day to day operations. The Department of Administrative and Financial Services charted the DAFS Analytics project, with the intent to modernize data operations, improve security, and deliver improved functionality and performance. Expected outcomes included:

- Create a three-tier model for self-service data
- Provide a single point of entry for access to governed data assets
- Provide consistent and uniform application of data access restrictions
- Improve performance of access to drilled details
- Improve presentation of data, such that it will be easily accessible to both veteran and newcomer state data consumers
- Modernize the presentation of data so that analysis can meet the speed of business
- Allow data mashup capability with ungoverned data sources, while enforcing the business rules of the department
- Allow the re-use of consistent reports across departments and roles by supporting content-based filtering

While the final product has delivered these expected outcomes, it is worth noting that the project delivery took longer than expected. The stand up and provisioning of the underlying technology was timely, but the exercise in data modelling three distinct subject areas and more than 8000 data elements took longer than anticipated. While frustrating, this extra effort was produced on budget, and the additional time was deemed worthwhile because of the value it added to the data consumer.

Concept

DAFS Analytics is the result of a gap analysis conducted in 2016. The most glaring deficiency found in that analysis was the statement from one financial analyst, "***By the time I can provide an answer, the business has lost interest in the question!***" Initially the project team assumed this statement indicated performance problems in the legacy data warehouse. On further investigation it was apparent the statement spoke more about the lack of functionality.

Based on research from **Gartner** (www.gartner.com) it was decided that the state should pursue a three-tier service model. The needs of data consumers vary by role in the organization. The enterprise solution would need to satisfy the needs of all. By provisioning a single technology that could satisfy all three service levels, Maine would put day to day data operations into the hands of business data analysts. Increasing the speed to answer for analysts working with ungoverned data, while still allowing the central technology department to maintain integrity and security controls on the governed data sets.

Security of the data was a paramount concern. The legacy warehouse consisted of multiple unencrypted databases and relied on windows 2003 Operating system components. The vulnerability management situation had become unmanageable. Automated extracts of data produced replica subsets of the data in downstream systems with no controls of data access and integrity once it was pulled from the system of record.

Maine embraced the cloud as a strategy to stay current with technology enhancements, post implementation project. **Oracle Analytics** was selected as the primary user interfacing technology for the project after a meticulous requirement mapping exercise. Two requirements made the major difference in product selection; end to end encryption including a data masking function, and a single point of entry for all data. Products from other vendors could not provide what the state needed for a single point of entry.

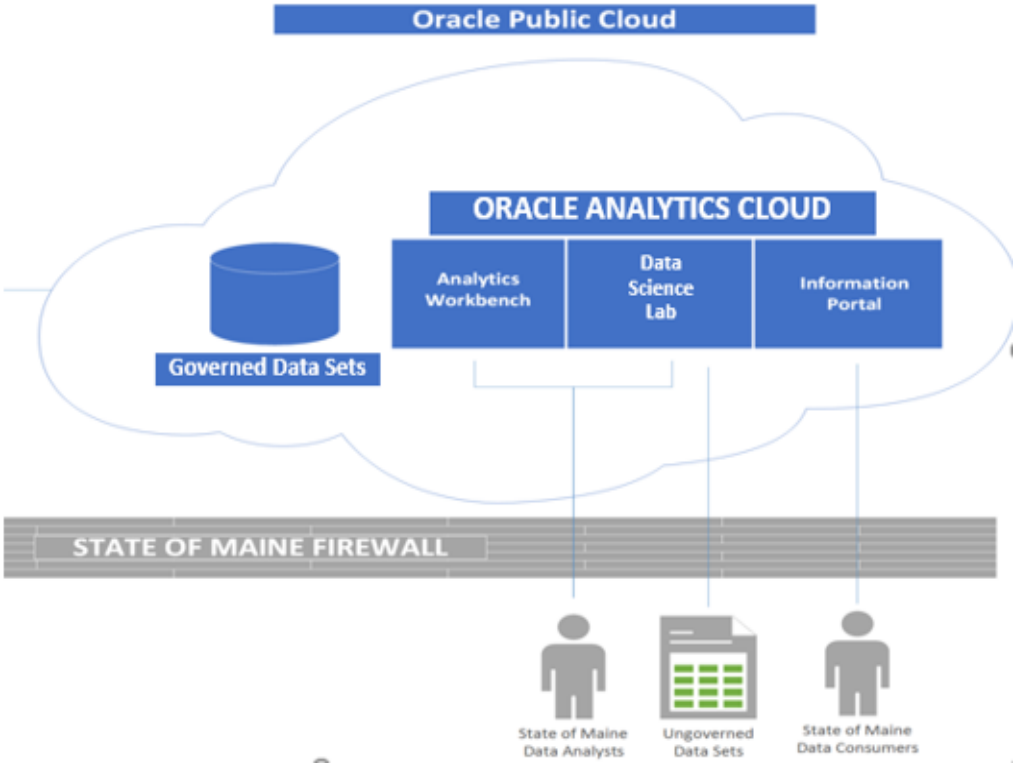

Illustration 1. Concept Architecture

Significance

Successful data analytics requires **partnership between business and IT**. The technology department is not equipped to fully understand the implications of the data collected, recorded and used by the business. Meanwhile business cannot keep pace with the changing technologies, data security practices and automation tools they rely on the technology department to provide. Data management and data analytics can only be successful by the merger of these two roles.

DAFS Analytics, powered by the Oracle Analytics platform is intended to build a bridge between these two worlds. The technology department is provided the tools to take an administrative role in designing and modelling the semantic layer required to wrap security controls and data integrity rules around the business data. Meanwhile the business analysts are empowered to create new data sets in a

controlled environment. These ungoverned data sets can be used for interim operations, and if found to be valuable can be integrated into the governed data set.

Day to day reporting and analysis is turned over completely to the business. Since the data models have been created in the governed semantic layer there is inherent trust in the answers delivered from the system. Business analysts can build and automate the delivery of reports and dashboards using tools expected of ABI systems deployed in the early 2010's. This is in stark contrast to a legacy of extracting data to excel and producing one off reports.

Enhanced Data visualization capabilities are delivered to data analysts with a wide variety of widgets available in the tool palette. Visualizations, including charts and graphs, customizable mapping layers, and KPI tools are combined in the **Oracle Data Visualizer**. These features are not unique to the selected Oracle product, but they are importantly not missing.

Machine Learning and **Natural Language Processing** capability have been provided to the end user in an **out-of-the-box** fashion. Augmented data exploration is now possible, with the cloud computing environment harnessed to guide the data consumer to interesting outliers and trends in the data.

Impact

The impact of DAFS Analytics must be looked at under two different lenses, from the perspective of the business, and from the perspective of the technology department.

From a business perspective the adoption process has been varied. The lasting impact of a legacy warehouse means that literally thousands of reports will need to be reengineered in the new technology. This can be daunting for those report consumers who did not do the original development, activities which may have happened decades earlier.

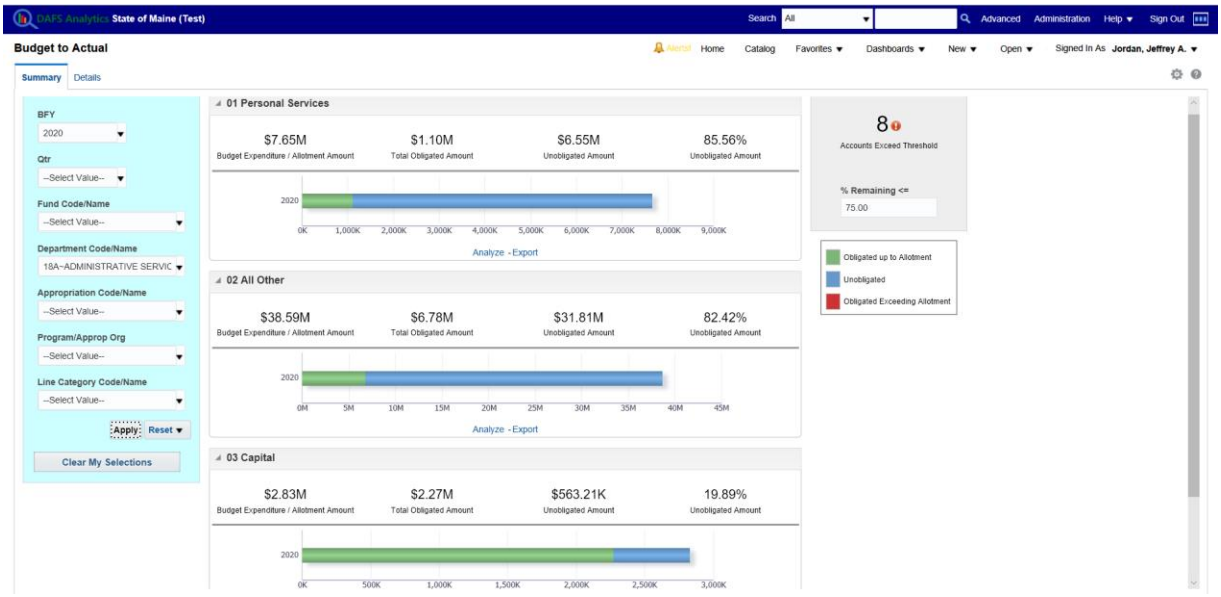

Illustration 2. Sample Budget to Actual Dashboard

However, tech savvy adopters have been and are actively creating new and reusable analysis to power business operations. Anecdotes have circulated in the user group meetings and project circles about end users turning exhaustive manual processes into automatic deliverables. The data consumers in general are hopeful about what the new technology can bring to them, as evidenced by these **stakeholder quotes**:

I continue to speak with the user community and the groundswell of excitement and user adoption is palpable.
Phillip Platt, Director of Shared Services, DAFS, Early Adopter

Oracle Analytics provides us a way to connect our data to the system. The connection tool is relatively user friendly. Because our data is now in the system, we can turn what were formerly one-off projects into ongoing processes. This will return dollars to our business as we identify incorrect payments and bad transactions.
Natalie Bragan, Sr. Financial Data Analyst, DHHS, Early Adopter

The only query tool I have used for the last month is Oracle Analytics Cloud.
Doug Cotnoir, State Controller, Project Sponsor, Early Adopter

The technology department has made several gains through the implementation of this technology. In an era where trust between the state agencies and the technology department has been strained, the DAFS Analytics project has been a source of success. By providing new and innovative functionality, the data services team is building the trust and partnership needed for success with the business.

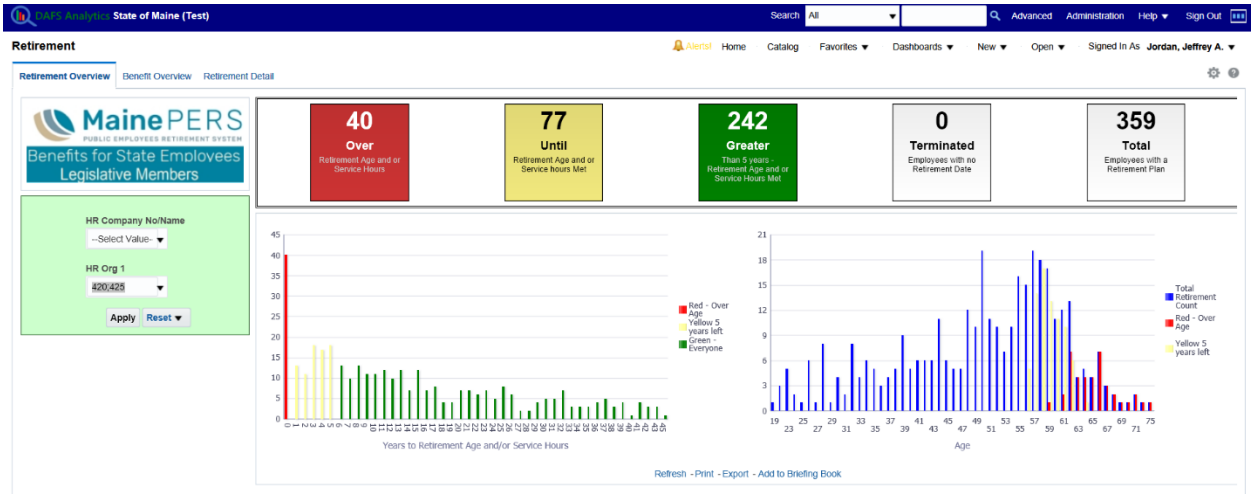

Illustration 2. Sample Retirement Impact Dashboard

The project has also set the stage for the retirement of numerous legacy assets which threaten the security posture of the entire network. Vulnerability management of the new environment has been dramatically improved. The static data encryption and in-flight data encryption features have allowed for improved compliance. Finally, the new functionality and improved performance have all been delivered within the operational budget of the legacy.