Digital Transformation for Federal Agencies

Forward-Thinking Agencies are Leveraging Data Virtualization to Gain Unprecedented Agility and Constituent Responsiveness

SOLUTION
Data Virtualization for Federal Agencies

WEBSITE
www.denodo.com

PRODUCT OVERVIEW
The Denodo Platform offers the broadest access to structured and unstructured data residing in enterprise, big data, and cloud sources, in both batch and real-time, exceeding the performance needs of data-intensive organizations for both analytical and operational use cases, delivered in a much shorter timeframe than traditional data integration tools.

As industries continue to engage in digital transformation, enabling people to interact with organizations in a more seamless, intuitive manner, people are naturally beginning to expect that government agencies will follow suit.

Unfortunately, as Gartner observed, in *Transitioning to Digital Government Primer for 2018*[1], "The structure of government has remained largely the same for more than half a century, even as citizen expectations have outpaced government's ability to address them. The process improvements of earlier e-government programs have yet to produce integrated, cross-organizational service models that deliver better outcomes for citizens."

To successfully undergo digital transformation, federal agencies will need to undergo changes at many levels of the organization. In particular, they will need to:

1. **Strengthen security, safety, and risk tolerance.** Digital transformation includes integrating between widely heterogeneous sources, but this cannot be supported unless security and safety are givens, and risk is effectively managed.
2. **Modernize to cloud-based infrastructure.** Cloud technologies are an essential component of most modern infrastructures, but such modernizations can be costly. Agencies need to minimize modernization costs and any associated downtime.
3. **Enhance analytics.** By integrating a wide variety of disparate systems, agencies can engage in more powerful analytics, to aid in faster, more effective decisions.
4. **Improve operations.** To be optimally effective, agencies must also be able to implement systems for capturing real-time data from transactional systems and levering this data for improving operations.
5. **Optimize costs.** In addition to cloud migrations, digitization itself is inherently costly, so agencies undergoing digital transformation must find ways to optimize cost.

Data virtualization is a modern data integration technology that facilitates digital transformation by enabling each of the above activities. In this brief, we illustrate how data virtualization can help to transform federal agency with respect to each of these core capabilities.

1 Gartner ID: G00344026

How Does Data Virtualization Work?

Data virtualization is a data management and data integration technology. But whereas most data integration solutions move a copy of the data to a new, consolidated source, data virtualization offers a completely different approach.

Rather than moving the data, data virtualization provides a view of the data, leaving the source data exactly where it is. This means that agencies do not have to pay the costs of moving and housing the data, and yet they still gain all of the benefits of data integration.

Because data virtualization accommodates existing infrastructure in its existing state, it is relatively easy to implement, compared with other solutions. And because it provides data in real time, from a variety of systems that are normally very time consuming to integrate, such as transactional processing systems and cloud-based storage systems, it can support a wide variety of uses cases, including the five listed at the start of this brief.

Data Virtualization Benefits

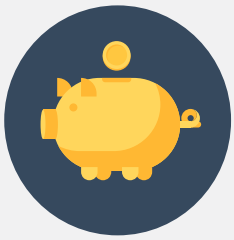
By leveraging data virtualization, federal agencies can gain:

Improved security management, by implementing a single layer for accessing myriad data sources, and by leveraging data for reducing fraud

Zero-downtime cloud migrations, by enabling simultaneous, real-time access to legacy and cloud sources

Enhanced analytics, via real-time access to a wider variety of data sources, and by providing this data to a wider variety of downstream applications

Streamlined operations, by capturing transactional data in real time and establishing real-time feedback loops



An affordable solution with a low maintenance costs, since there is less of a need to replicate and store data

In the next section, we cover how data virtualization can help to transform federal agencies with respect to each of the five capabilities listed above.

Below are three use cases illustrating how data virtualization can help to transform federal agencies.

Seamless Modernization to Cloud

By providing real-time access to myriad heterogeneous data sources, including cloud sources, data virtualization enables seamless modernizations to cloud-based applications and storage systems, without downtime. Because data virtualization abstracts users from the complexities of accessing the individual data sources, users will often not even notice that a modernization has taken place, behind the scenes, while they work.

A federal government agency responsible for enhancing national security (The Agency) relied on the Denodo Platform during and after a critical transition to a new, modern infrastructure that included big data and external cloud storage systems. The new infrastructure unifies information silos and enables the rapid, secure transmission of product life-cycle information across the agency's multiple sites, up to 10 times faster than before, while costing as much as 80% less than traditional data integration alternatives.

Security, Safety, and Risk

Data virtualization establishes a single, unified access layer to all of the applicable data sources. In addition to improving and accelerating data access, this architecture also improves security, safety, and risk aversion, by establishing a single point from which to manage access credentials, user privileges, and other access-specific parameters.

By implementing data virtualization, any organization has already gained an advantage over security, safety, and risk. **An oversight division of a federal or state agency,** however, has taken this one step further. By implementing the Denodo Platform for its data virtualization capabilities, this agency gained a **seamless, consolidated view across hundreds of structured and structured data sources**, including Oracle, SQL Server, Lotus Notes, and VSAM files, enabling powerful predictive and statistical analysis dedicated to the proactive identification of fraudulent usage patterns.

Strengthen security, safety, and risk tolerance - Pantex Plant

Pantex Plant is the production integrator for the U.S. National Nuclear Security Administration (NNSA), as well as a provider of nuclear deterrence solutions for the U.S. Department of Energy. Pantex is the primary nuclear weapons assembly and disassembly facility in the United States and is responsible for maintaining the safety, security, and reliability of the nation's nuclear weapons stockpile.

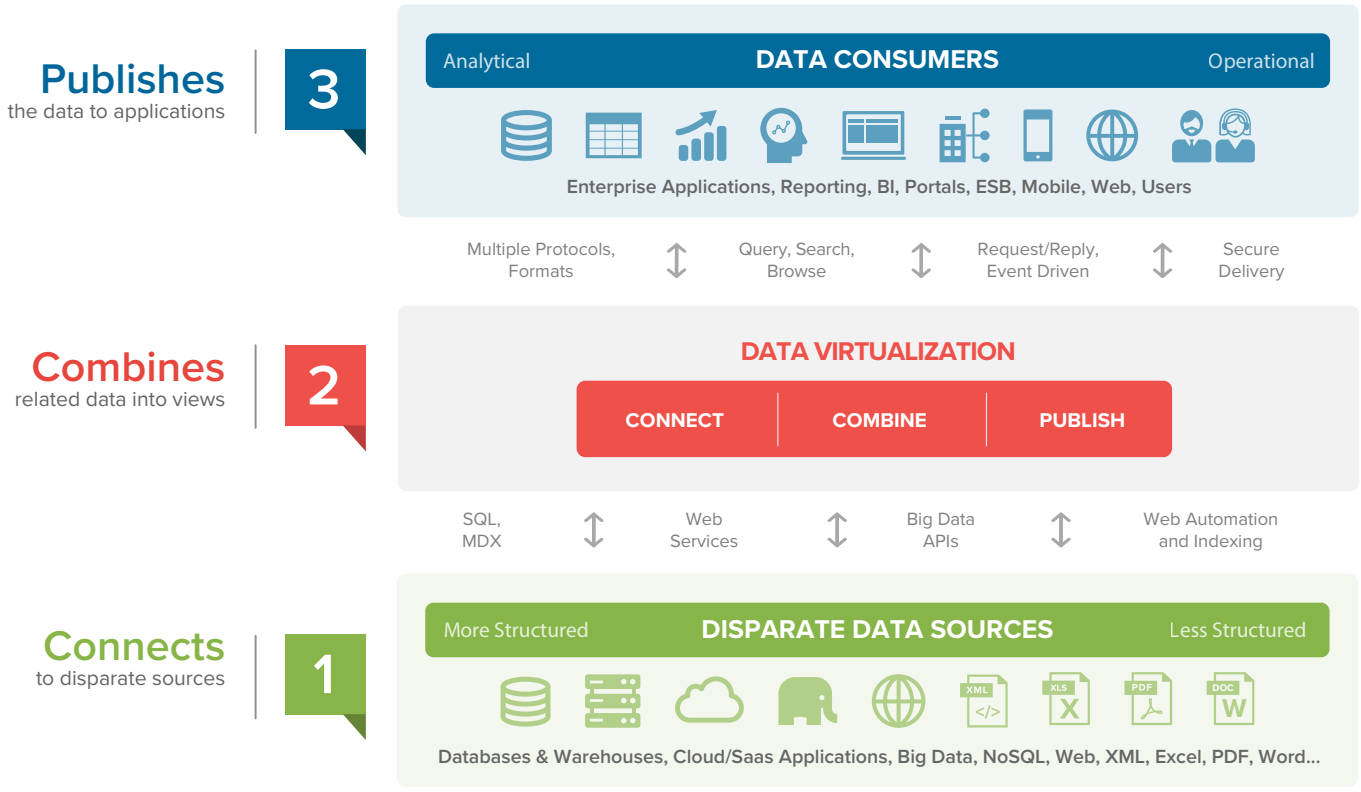
Faced with rising costs and increasing security risks, the NNSA established the Product Realization Integrated Digital Enterprise (PRIDE) program to securely deliver weapon product lifecycle information to engineers, scientists, and other users across different sites in North America. Sponsored by the NNSA, and with funding of about $30 million a year, the PRIDE program is a multi-year initiative to develop and manage a portfolio of applications. Nuclear weapon lifecycle management takes places across a number of specialized and security clearance- driven facilities including Pantex (TX), Kansas City Plant (MO), Sandia Labs (CA), and Y-12 (TN).

The challenges that led to the PRIDE program include:

- Impeded data sharing within and across facilities – Different legacy systems and applications stored data in multiple formats, making information difficult to share. This problem was intensified by the high security restrictions between facilities.
- Delayed data delivery – There was no central repository from which data could be quickly accessed. Information delivery was delayed because of overnight file extract requirements, multiple emails and calls, and a lack of data ownership.
- Governance challenges – Data sharing through email, the lack of a version control system, and document based information sharing, often cut off lineage information and made it difficult to trace data back to its source.
- Security challenges – Across multiple facilities, data in transit was susceptible to breaches.

The Solution

To address these issues, NNSA planned to build an “Integrated Digital Environment (IDE)” to provide unified access to weapon lifecycle data across different facilities and enable the timely, secure sharing of data. Pantex migrated data and documents from a legacy Document Management System (DMS) to a Product Lifecycle Management (PLM) solution from PTC Windchill. After the migration of document-based information, Pantex leveraged Denodo data virtualization to set up virtual data marts for downstream users and to feed IBM Data Stage Extract Transform Load (ETL) processes for loading data into the data warehouse. Pantex Plant works in collaboration with several national laboratories to test surveillance assemblies that are manufactured at Pantex. This process requires Pantex to provide the complete list of assembly components, so personnel at the laboratory can put together a bill of materials report before the testing process commences. Previously, this information was extracted from an Oracle database at Pantex, copied to a spreadsheet, and emailed to the laboratory, where it was manually entered into a Maximo Manufacturing Resource Planning (MRP) system. Pantex deployed data virtualization to present a normalized view of the as-built component data to several members of the laboratory team. The data virtualization platform plugged into the source databases, extracted data for the necessary equipment parts and sub-assemblies, and published this data as a secure SOAP web service, that could be easily accessed by laboratory engineers.



Benefits

By implementing data virtualization in multiple initiatives as part of the PRIDE project, Pantex saved $600,000 in only three months of production. With a one-time data virtualization investment of $520,000, Pantex thus achieved a 15% return on investment. The success of these projects resulted in continued funding from NNSA to Pantex as a part of the PRIDE initiative.

The data virtualization solution has also helped Pantex to reduce:

- Training, licensing, and maintenance costs
- Project cycle times, from the timely sharing of data
- Risk, through better security

Enhanced Analytics - Lawrence Livermore National Laboratory

Data virtualization can not only access data from a wide variety of sources, including cloud-based sources and transactional sources, but it can also deliver integrated views of the data across myriad applications. The combination results in faster, more capable analytics. By implementing the Denodo Platform, **Lawrence Livermore National Laboratory (LLNL)**, established a self-service data delivery interface that greatly enhanced the laboratory's analytics capabilities. IT stakeholders could provide a foundation of reusable data services, and business stakeholders could extend those services to address myriad business needs, while maintaining full control over business rules.

In addition, a national laboratory (The Laboratory) leveraged the Denodo Platform to facilitate a seamless transition from a traditional, physical data warehouse to a logical data warehouse, which is capable of connecting to a wide variety of other data sources that are normally not compatible with a physical data warehouse. The logical data warehouse enabled The Laboratory to create a self-service portal centralizing data distribution for data scientists and others, enhancing analytical capabilities. The new data infrastructure also reduced production cycles by more than 40%. Similar to a cloud modernization effort, in addition to enabling access to a wider variety of digital information, the logical data warehouse saved The Laboratory millions in development, software, and hardware costs, and shortened project schedules by years.

Improve operations - DoD services

The Agency wanted to reduce their Oracle footprint and migrate their data to a Hadoop-based data lake to support its data warehouse modernization efforts. At the same time they wanted to combine their two data centers, ultimately to support advanced analytics to help their personnel in the field. These types of projects tend to be time consuming, costly, and complex, due to the amount of data replication involved and they tend to incur large storage costs.

By implementing data virtualization, the Agency was able to provide simultaneous access to both data centers, to the data warehouse and the data lake during the transition. As a result, there was virtually no disruption to the data consumers while these changes were taking place. It also provided economic relief, as the Agency was able to reduce its data integration expenses by 80 percent. Supported by the new data infrastructure, the Agency can respond up to 97 percent faster than it could using the previous infrastructure and can easily and securely embrace new cloud-based platforms and services. By implementing data virtualization and, in turn reducing software/hardware storage cost and shortening timeline for data warehouse modernization, the Agency is saving ~$4M per year.

The Power of Digital Transformation

In time, all federal agencies will engage in some form of digital transformation, to unlock greater efficiencies and capabilities. Using data virtualization, however, agencies will be equipped to begin sooner rather than later. As illustrated in this brief, some agencies have already begun.