Realizing the Promise of Self-Service Analytics in Manufacturing

Data virtualization is empowering business analysts in manufacturing enterprises to gain real-time access to integrated data across the entire organization

Many manufacturing companies are investing in big data, cloud, IIoT and IoT, and other modern technologies and approaches for Industry 4.0, but many are challenged by petabyte-scale volumes of machine generated data and field data, coming in real-time. For many manufacturing companies, data silos remain, presenting an ongoing challenge to data architects, IT and the business itself. These obstacles severely limit the value and application of actionable insights that can be gained from the manufacturing and supply chain process.

Self-service analytics promises to liberate business users to perform analytics without the assistance of IT, and this in turn promises to free IT to focus on critical priorities across the entire spectrum of the Technology landscape.

Today, numerous BI and analytics tools begin to realize some of the promises of self-serve analytics by enabling business users to slice and dice data and feed it into a variety of full-featured reports and dashboards. However, self-service analytics initiatives are hindered by several key challenges at the data accessibility level:

1. **Fragmented Data.** Data is spread across multiple databases, data warehouses, cloud and big data systems, No SQL sources, and flat files, in a distributed architecture of On Premise and Cloud.
2. **Multiple, High-Maintenance Data-Integration Initiatives.** When a business user needs to query across multiple sources, companies often charge IT with establishing ad-hoc point-to-point integrations using ETL processes. But if a source needs to be changed, such processes need to be re-written and reworked or rebuilt, which is costly and time-consuming.
3. **Data Delays.** It can often take a long time, such as multiple months, to deliver requested data using legacy data integration processes and the corresponding analysis. After such a time lapse, the data is likely to be less accurate and relevant.

SOLUTION
Self-Service Analytics

INDUSTRY
Manufacturing

WEBSITE
www.denodo.com/manufacturing

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

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4. **Poor Data Integrity.** When business analysts go directly to the data sources themselves, they may not go to the authoritative sources due to decades of duplication and replication, resulting in data that is of questionable quality.
5. **Untraceable Data Lineage.** Finally, if users collect data from sources directly, they may not keep an accurate record of where the data came from, hindering the ability to determine data quality, and eroding trust in the data.

The reality is that tools alone will not enable true self-service analytics. In fact, no matter the tool, or its features, if any of the above data challenges are present, self-service analytics, by definition, is not possible, since IT will be called upon to reactively deliver a solution. Due to issues of data integrity alone, Gartner says that "Only one in 10 [self-service analytics] initiatives will be sufficiently well-governed to avoid data inconsistencies that negatively impact the business." [1]

Data virtualization is a flexible, modern data integration technology that overcomes each of the five challenges above, enabling companies to realize all of the promises of self-service analytics. In this brief, we illustrate how data virtualization enables self-service analytics, and we close with two case studies of companies that have leveraged data virtualization for successful self-service analytics initiatives.

What is Data Virtualization?

Data virtualization is a data management and 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 and duplicating the data, data virtualization provides a view of the integrated data, leaving the source data exactly where it is. This means that companies 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.

Here is how data virtualization overcomes each of the challenges mentioned at the start of this brief:

1. FRAGMENTED DATA IS SEAMLESSLY UNIFIED

With a data virtualization layer in place, all of the data, across myriad systems in its various formats, appears to users as though it sits in a single, easily accessible repository.

2. HIGH-MAINTENANCE DATA INTEGRATIONS ARE REPLACED BY A SINGLE, LOW-MAINTENANCE DATA VIRTUALIZATION LAYER

Unlike legacy data integration technologies such as ETL scripts, data virtualization can easily accommodate changes to the source data without heavy modification.

3. DATA DELAYS ARE VIRTUALLY ELIMINATED, AS DATA CAN BE ACCESSED IN REAL TIME

Integrated views of the data, even across myriad heterogeneous sources, can be delivered to users in real time.

4. DATA INTEGRITY IS PRESERVED

Because all of the data sources are accessed through the data virtualization layer, companies can use the data virtualization layer to establish strong governance protocols and specify authoritative sources.

5. DATA LINEAGE IS FULLY TRACEABLE

Also, because all data flows though the data virtualization layer, data lineage is fully traceable from users to sources.

[1] "Van der Meulen, Rob. "Managing the Data Chaos of Self-Service Analytics," December 17, 2015 (http://www.gartner.com/ smarterwithgartner/managing-the-data-chaos-of-self-service-analytics/)

The Logical Approach to Data Management

By taking a logical approach to data management and data delivery, through the use of data virtualization, manufacturing companies can avoid the cost and delay of repeatedly moving and copying large volumes of data and instead:

Manifold Increases in production yield and product time-to-market.

Improved product quality and customer satisfaction.

Improved security and compliance with regional data rules, by avoiding replication.

Lower TCO and higher ROI, with investments usually breaking even within a year.

Improvement in the preventative maintenance of parts, and revenue growth from enhanced part sales.

Case Studies

Denodo's innovative customers in the manufacturing space Toyota and Festo have successfully leveraged data virtualization to implement self service analytics.

FESTO

As the world's leading supplier of automation technology and technical education, Festo deploys its products and services to help customers implement smart production capabilities while going digital.

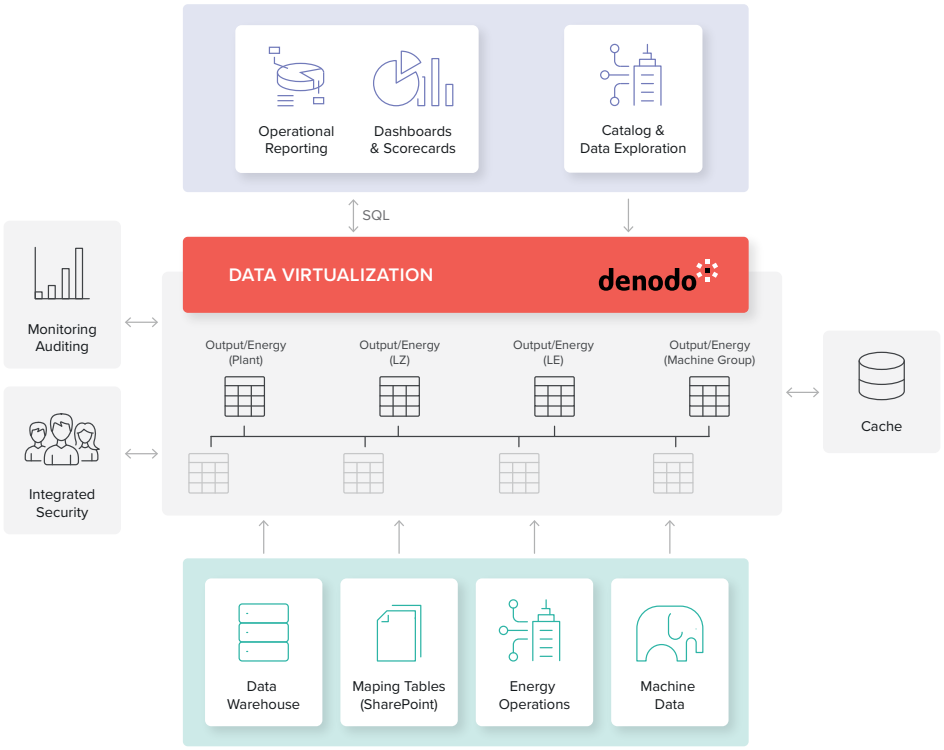
To continue the innovation that has always been at the forefront for Festo, the company needs to optimize operational efficiency, automate manufacturing processes, and deliver on demand services to its business consumers. This includes finding smarter ways to streamline how the company aggregates and analyzes data. It also underscored the need for an agile solution that would better enable Festo to monetize its customer-facing data products.

Festo was challenged in finding an agile and robust way to integrate the data from the existing silos, which included the data warehouse, machine data sources, and other sources, in a way that would reduce the reliance on IT by the business users while providing the quick turnaround and flexibility that the users were demanding.

Solution

The Festo Big Data team developed a Big Data Analytics Framework to provide a data marketplace to better support the business. Using the Denodo Platform, this framework integrates data from numerous on-premises and cloud systems, including streaming data, machine data, and data-at-rest, and provides access to the integrated data in real time. Because the framework establishes a unified access layer, it provides consistent data access and governance across the different silos of data. As a result, business users now have easy access to all the data they need, when they need it. To meet the demands of the business and deliver speed, flexibility, and agility, Festo implemented the Denodo Platform as a key component within the Big Data Analytics Framework. The logical layer delivered by the Denodo Platform provides virtual views that are tailored for business analysts, data scientists, and developers across multiple departments.

"This is a win-win for us, as the business now has the flexibility they need, and they no longer have to rely on IT when they want to pull data," says Diethard Frank, IT Product Management Big Data at Festo. The views incorporate data from local sources to help stakeholders meet last-mile requirements. The Denodo Platform also gains efficiencies since it removes the need to replicate data – data remains in the source data stores, and it is accessed through business focused virtual views.



Benefits

The Denodo Platform supports Festo's Big Data Analytics Framework by:

- Deliver enhanced insight across the business without having to physically move data
- Simplify data consumption and provide a single endpoint for accessing all data
- Quickly integrate new data sources and available to user communities in real time
- Facilitate smarter decision making via additional information-enrichment capabilities
- Increase the speed and agility of both business and IT, as business users can now drive and maintain their own dashboards for significant increase in customer satisfaction

TOYOTA-ASTRA MOTOR

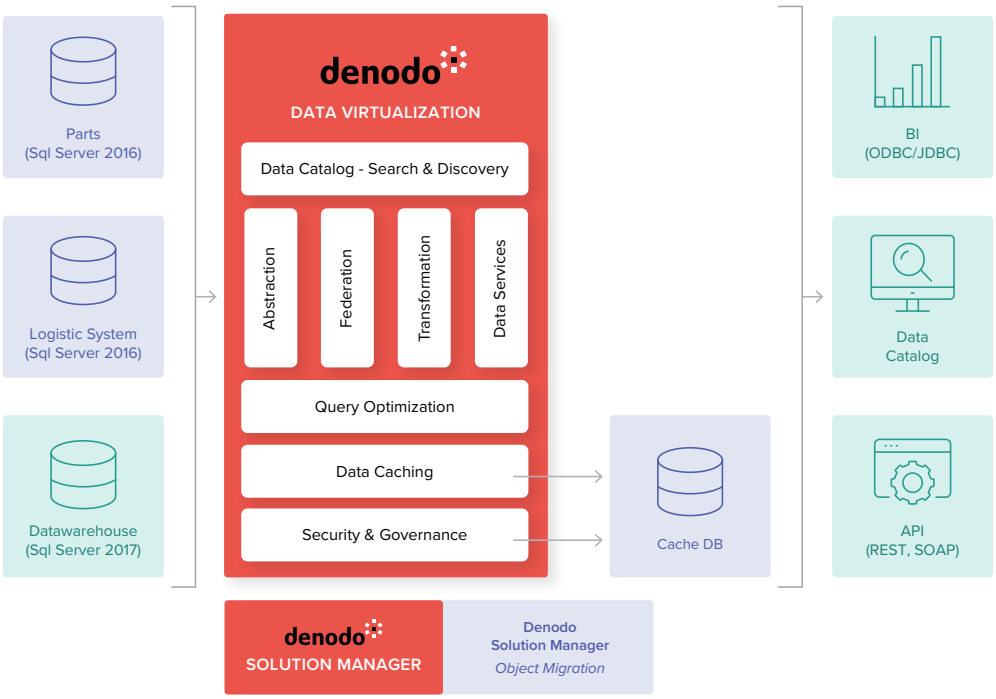
PT Toyota-Astra Motor (TAM) is a distributor of Toyota vehicles in Indonesia and currently the market leader in the Indonesian automotive industry. TAM wanted to simplify its complex data management landscape, reduce the time-to-data for its multiple operational reporting requirements, and eliminate the need for shadow IT.

TAM had a fragmented data architecture, with data trapped in different business silos. The company relied primarily on extract, transform, and load (ETL) processes to integrate data from its enterprise data warehouse and transactional databases on SQL Server. This data warehouse was loaded in batches using SQL Server Integration Services (SSIS) ETL sessions, and then multiple data marts were created on top of this data warehouse, again using SSIS ETL sessions, which provided data for business reporting through Power BI. This process was extremely slow, manual in nature, and difficult to govern. Moreover, the ETL sessions increased the overall maintenance cost of the data architecture as data was replicated across layers.

In addition, multiple operational teams within TAM performed their own analytics and generated business reports. In the absence of an enterprise semantic layer, this led to multiple connections to different data sources, complicating the data architecture, and making maintenance even more difficult. Data latency was also a challenge, as business users did not always receive the most recent data. These issues resulted in multiple inaccurate definitions of core business metrics.

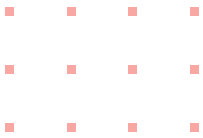
Solution

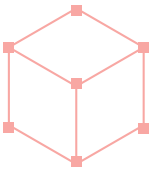
TAM implemented the Denodo Platform above the company's enterprise data warehouse and the transactional databases, seamlessly integrating several different source systems to create a logical data warehouse. This enabled multiple reporting tools to now connect only to the virtual layer, eliminating the need to individually connect with multiple data sources. The Denodo Platform is implemented as a unified data access layer between the data consumers and the data sources, and because it acts as a single point of entry to all enterprise data, it enables an enterprise-wide centralized implementation of data governance and security. The data catalog built into the Denodo Platform made data search and exploration extremely easy even for nontechnical users, and it also doubled down as an ad hoc query engine. The Denodo Platform enabled the democratization of the data in TAM's data ecosystem, enabling different business user groups to find the right dataset and use it for their own analysis.

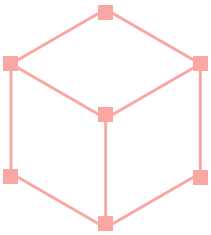


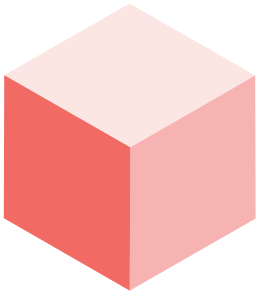
Benefits

- A flexible data architecture - The Denodo Platform made TAM's data architecture more agile. Data sources can now be integrated much more quickly without causing any business downtime. For improved performance in processing large data sets, TAM was able to leverage the caching database, to avoid impacting the source system
- Data democratization and self-service - Other than making data discovery and search very easy, the data catalog functionality in the Denodo Platform helped users to analyze the data lineage of various data sets while also improving the overall trust and confidence in the data that they were using. This enabled a certain degree of self-service among the business users and eliminated the need for shadow IT
- Data governance and security - By providing a single point of entry to enterprise data, the Denodo Platform enabled TAM to create centralized data access, data governance, and security policies across all of TAM's data sources. This also made it convenient for the IT team to audit user activities, and enabled real-time monitoring.









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Denodo is a leader in data management. The award-winning Denodo Platform is the leading data integration, management, and delivery platform using a logical approach to enable self-service BI, data science, hybrid/multi-cloud data integration, and enterprise data services. Realizing more than 400% ROI and millions of dollars in benefits, Denodo's customers across large enterprises and mid-market companies in 30+ industries have received payback in less than 6 months.

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