# Accelerate Your Business with a Logical Data Warehouse

## Enhance your data warehouse with a logical data warehouse, for unbridled agility

**SOLUTION**
Logical Data Warehousing

**INDUSTRY**
Applicable to all Industries

**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.

Business depends on actionable intelligence, and for years this has been furnished by business intelligence tools, which pull the data from a data warehouse. Business stakeholders have come to expect that all of the relevant data is copied to the data warehouse, even if they sometimes have to wait a day for the latest data to arrive.

With all of the recent technological advances, such as big data and cloud analytics, business analysts also expect that they will encounter fewer limitations in their ability to access business intelligence, but unfortunately, they are experiencing just the opposite.

The problem is, some of the newer sources of data, such as data from social media platforms, data from in-process transactions, or raw data about the movement of machines, is just not formatted in such a way that it can be accommodated by a traditional data warehouse. It could be stored there, it could be reformatted, but this is prohibitively costly.

Also, if this data were reformatted stored in the data warehouse, the volume would quickly grow, greatly compounding the cost. Instead, companies are storing this data in less expensive, cloud based storage systems like Hadoop, but the problem remains: Not all of the data is in the data warehouse at the same time, so not all of the data is available for reporting.

The solution to this quandary is the logical data warehouse: All of the data stays right where it is, yet it appears as though it sits in a single place, so all of the data is always available for reporting.
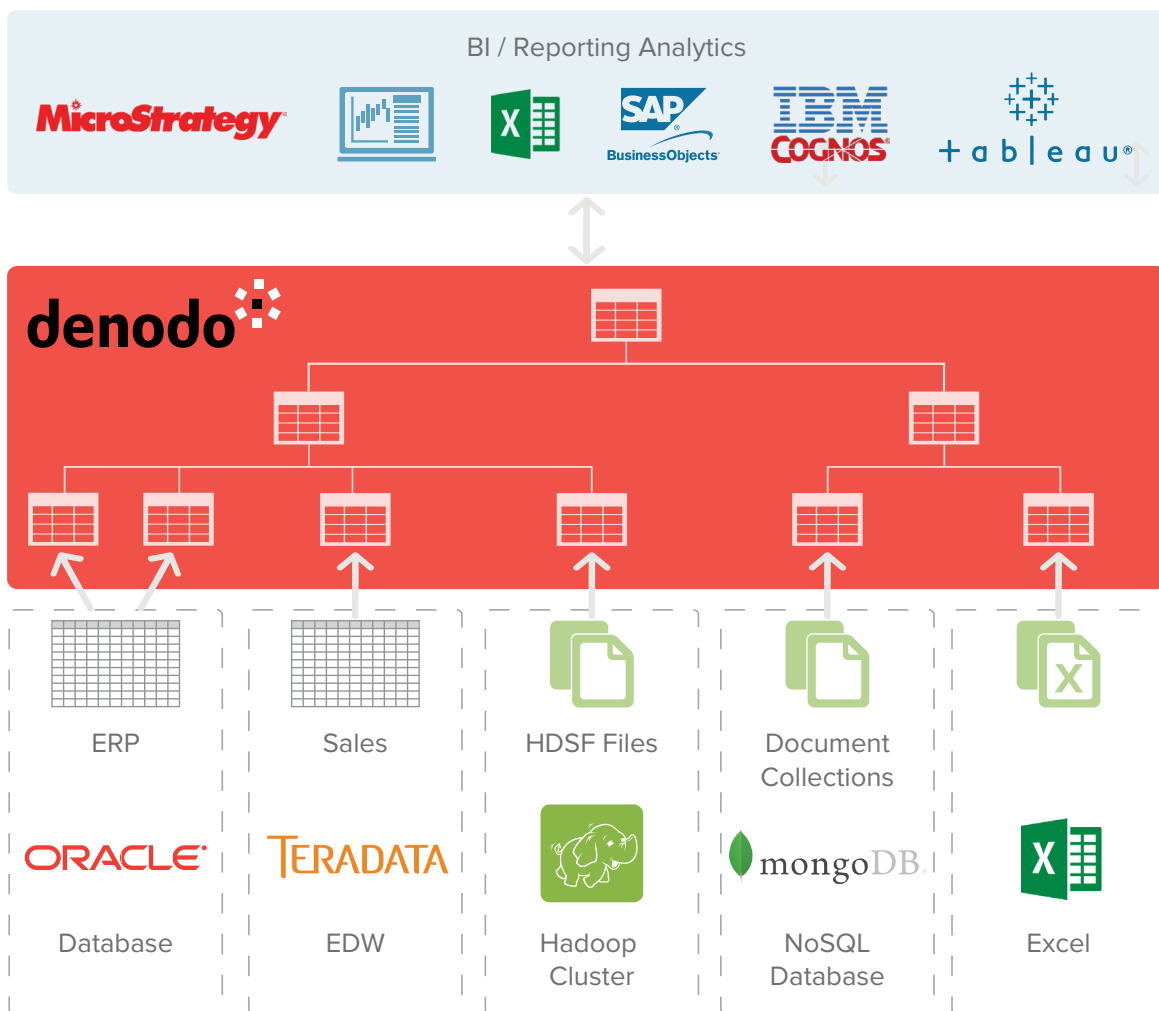
# What is a Logical Data Warehouse?

Gartner first proposed the idea, and describes the logical data warehouse as a "semantic layer" that sits above the traditional data warehouse. Semantics is crucial because two systems can only share data if they speak a common language. By putting semantics in a separate layer, the layer acts as an interpreter, able to speak to any source. To access any data set, business analysts talk to the semantic layer which, in turn, talks to the source.

Philip Russom, a senior director of The Data Warehouse Institute (TDWI), defines the logical data warehouse as simply "a logical or virtual layer of the data warehouse architecture that integrates the physical layers of architecture under it." In this definition, the "logical or virtual" layer maps to Gartner's "semantic" layer, and the "physical layers" map to the "traditional data warehouse."
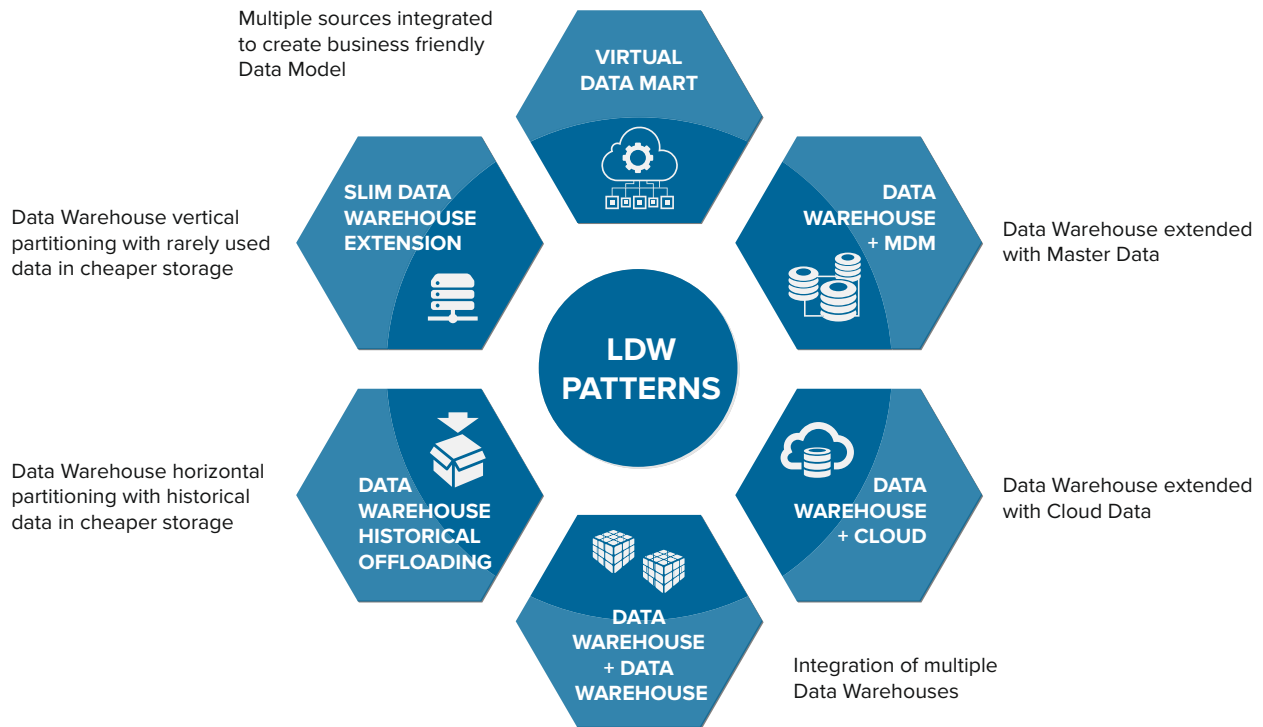
In both definitions, data consumers access the data through a layer that sits above the separate data sources, bringing them together for reporting. Note that the logical data warehouse contains no actual data; it only contains the intelligence for accessing each of the sources.

Using data virtualization, the Denodo Platform enables companies to establish a logical data warehouse that can connect myriad data sources, be they on premises or in the cloud, in real time.

# Logical Data Warehousing: Six Scenarios

The Denodo Platform is both flexible and powerful, enabling companies to establish a wide range of logical data warehouse scenarios. Here are six of the most common use cases:

Multiple sources integrated to create business friendly Data Model

**VIRTUAL DATA MART**

Data Warehouse vertical partitioning with rarely used data in cheaper storage

**SLIM DATA WAREHOUSE EXTENSION**

**DATA WAREHOUSE + MDM**

Data Warehouse extended with Master Data

**LDW PATTERNS**

Data Warehouse horizontal partitioning with historical data in cheaper storage

**DATA WAREHOUSE HISTORICAL OFFLOADING**

**DATA WAREHOUSE + CLOUD**

Data Warehouse extended with Cloud Data

**DATA WAREHOUSE + DATA WAREHOUSE**

Integration of multiple Data Warehouses

## 1. The Virtual Data Mart

This is the simplest configuration for a logical data warehouse, as it simply enables business analysts to access any data they need without needing to concern themselves with the technical details of data access. A virtual data mart integrates multiple data sources that are normally separate, and makes them appear to the users and reporting tools as if they reside in a single place.

## 2. The Data Warehouse, Extended with Master Data

You can also use a logical data warehouse to blend data from your data warehouse with data from your MDM system. The MDM system stores the "golden records" for customers or products, so when business analysts pull data from the data warehouse, it is synched with the master data in real time, greatly reducing costly errors while enhancing customer service agility.

## 3. The Data Warehouse, Extended with Cloud Data

Data from different cloud environments, such as Salesforce.com, is not always stored in the data warehouse, and this can greatly impede business intelligence. In this scenario, the logical data warehouse provides seamless, real-time access to virtually any data stored in the cloud, fully integrated with data stored in the data warehouse for powerful business intelligence initiatives.

## 4. Multiple Data Warehouses, Integrated as One

In this case, logical data warehouses can integrate two or more existing data warehouses, and make them appear as one. This is a powerful scenario, as many companies will be forced to accommodate two or more data warehouses, due to a merger, and physically integrating them, by migrating all the data from the separate warehouses into a single, monolithic data warehouse, is extremely costly and time consuming.

During migrations, such as from an on premise data warehouse to a Cloud-based data warehouse (e.g. Redshift or Snowflake), logical data warehouses can smooth the transition by shielding users from the complexity of accessing both sources. In fact, with a logical data warehouse in place, users might not even notice that there was a migration.

**5. Data Warehouse Historical Data Offloading**

Many companies are using cloud-based storage clusters like Hadoop as an inexpensive way to store high volumes of historical data. But this data is then separated from data in the data warehouse, for reporting purposes. In such cases, a logical data warehouse blends data from the two systems, again in real time, so you can run queries across all the data without disturbing your business processes.

**6. Data Warehouse Extension**

Similarly, companies often want to store frequently used data on hand, in the data warehouse, but store seldom-used data in cloud-based storage. A logical data warehouse enables companies to store the data anywhere they choose, without impeding real-time business intelligence.

# Performance

Throughout this brief we have mentioned that logical data warehouses provide real-time access to data across myriad sources. However, how do logical data warehouses compare with traditional data warehouses, in terms of processing queries?

There is almost no difference in query processing performance between a logical data warehouse and a traditional data warehouse. In one performance test between a traditional data warehouse and a logical data warehouse, the traditional data warehouse took 20.9 seconds to return a 1.99 million row result on a query of "total sales by customer," and it took a logical data warehouse solution just a half-second longer.

# Logical Data Warehousing Business Benefits

- Gain access to all enterprise data for business reporting, in real time.

- Improve upselling and cross-selling opportunities.

- Enhance the speed of operations and customer service.

- Support data migrations without impacting business continuity.

- Maintain independence from IT for data access.

# Case Studies

In this section, we present the case studies of four companies that have successfully leveraged the power of logical data warehouses.

# Case Study: Seacoast Bank

Seacoast Banking Corporation of Florida is one of the largest community banks in Florida. Recently, the bank was feeling the impact of maintaining separate systems for such functions as back office operations, data warehousing, and loan origination, and a series of mergers and acquisitions were adding to the complexity.

Seacoast Banking users from Core Banking, Internet Banking, Risk, and other groups had to request static reports from the IT team for operational and analytical purposes. This ad hoc, manual reporting process was both inefficient and time consuming. Seacoast wanted to implement a modern BI tool that would help users to slice and dice the data to meet their analytical reporting needs.

## Solution
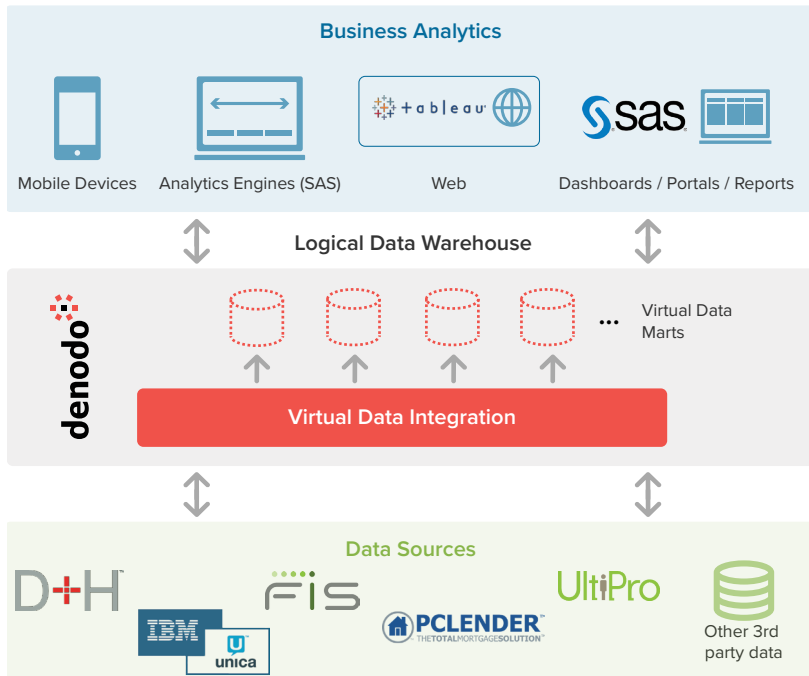


Seacoast leveraged the Denodo Platform, which uses data virtualization to establish a logical data warehouse. The logical data warehouse seamlessly integrates operational data across cloud-based and on-premises information systems and delivers the aggregated views to analytical and reporting tools such as SAS and Tableau. With the logical data warehouse in place, Seacoast is now able to provide enterprise-wide self-service BI and develop interactive trend reports using modern reporting tools.

More importantly, Seacoast is now quickly accessing, unifying, and modeling new data to serve multiple business units, which enables the bank to handle credit administration, risk mitigation, internal operations, and Bank Secrecy Act requirements, in near real-time. Seacoast can now quickly pull data, which the bank regards as a significant, value-added improvement.

Mark Blanchette, VP and director of Business Technology and Data Management at Seacoast Bank, says that "Denodo's data virtualization technology has played the most important role in enabling our business users to garner valuable information through self-service reporting. The Denodo Platform's capability has significantly increased the speed at which business is carried out at Seacoast Bank."

## Benefits

- The logical data warehouse has significantly improved the ability of Seacoast's Banking operations groups, such as Deposit and Loan Operations, to make timely, accurate decisions.

- The logical data warehouse integrated the data in less than half the time that a traditional extract, transform, and load (ETL) solution would take, enabling Seacoast to meet the operational and analytical needs of multiple business units within the organization.

- The logical data warehouse helped Seacoast to reduce reporting time from up to three days for static reports to as little as two hours for interactive, self-service reports that serve business users in loans, deposits, fraud, credit, and risk departments.

- Powered by the logical data warehouse, Seacoast can now perform critical business operations, such as loan processing, in real time.

# Case Study: Vizient

Vizient, Inc., the largest member-driven health care performance improvement company in the country, provides innovative, data-driven solutions, expertise, and collaborative opportunities that lead to improved patient outcomes and lower costs. Vizient embraces the Veteran's Health Administration (VHA), the University HealthSystem Consortium, Novation, MedAssets Spend, Clinical Resource Management, and Sg2.

Due to the recent acquisitions, financial data, supplier sales data, and member sales data was stored across myriad disparate systems and data marts, and Vizient needed to integrate this data before the siloed data impacted business continuity. Additionally, Vizient needed to integrate this data so that the company could gain the agility to pursue the new opportunities afforded by its emerging identity.
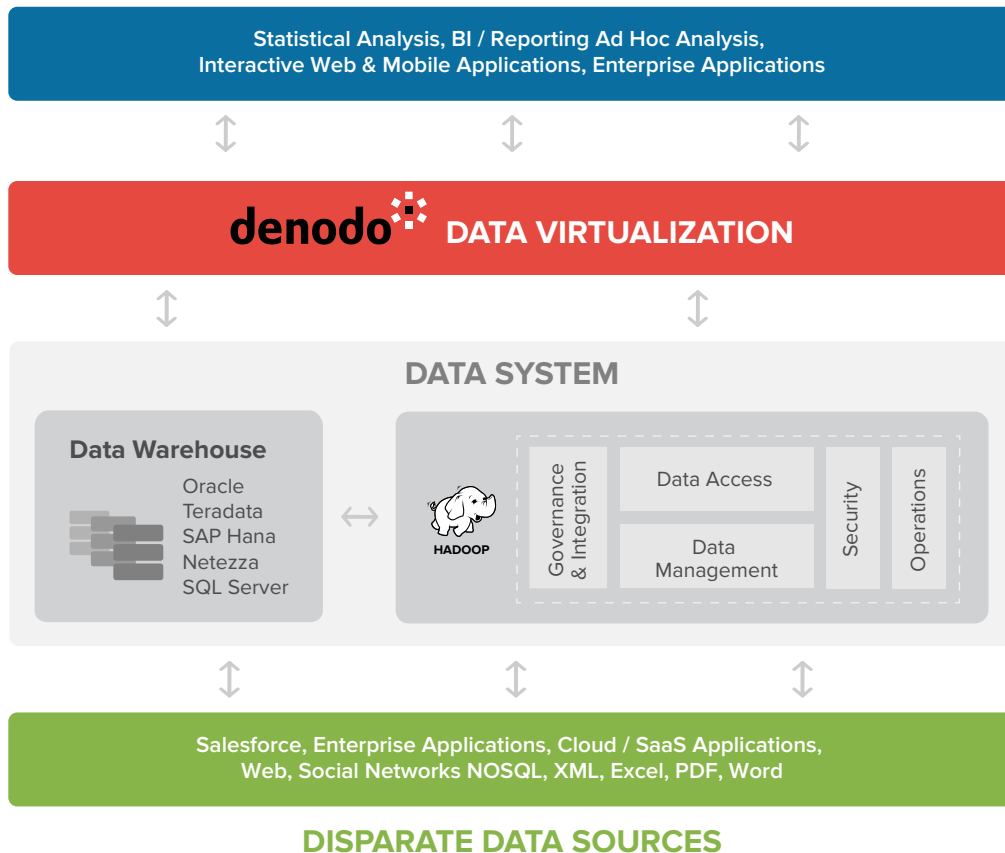
## Solution

Vizient leveraged the Denodo Platform to connect all of the data via a logical data warehouse configuration that established a series of logical data marts working in tandem.

## Benefits

Supported by the logical data warehouse, Vizient was able to:

- Unify disparate accounting and finance data marts across various legacy organizations into a shared virtual repository.

- Provide a consolidated view of supplier sales data across all customers of Vizient's various organizations.

- Integrate member spend and supplier sales data from all Vizient organizations to identify opportunities for increasing contract utilization.

Statistical Analysis, BI / Reporting Ad Hoc Analysis,
Interactive Web & Mobile Applications, Enterprise Applications

denodo **DATA VIRTUALIZATION**

**DATA SYSTEM**

**Data Warehouse**

Oracle
Teradata
SAP Hana
Netezza
SQL Server

HADOOP

Governance & Integration

Data Access

Data Management

Security

Operations

Salesforce, Enterprise Applications, Cloud / SaaS Applications,
Web, Social Networks NOSQL, XML, Excel, PDF, Word

**DISPARATE DATA SOURCES**

# Case Study: Logitech

Logitech is a Swiss global provider of personal computer and tablet accessories with EMEA headquarters in Lausanne, Switzerland and American headquarters in Newark, California. The company develops and markets products like peripheral devices for PCs, including keyboards, mice, trackballs, microphones, game controllers, and webcams. The company also has offices throughout Europe, Asia, and the Americas, and conducts its sales and marketing activities across America, Europe, the Middle East, Africa, and Asia Pacific.

For several years, Logitech had been developing and delivering data services for analytics using on-premises systems. But provisioning data services for business users has been reactive, time consuming, and inefficient. The company's modern product and service offerings, such as security video analysis and smart home devices, required predictive analytics, real-time data analytics, and cognitive science. To gain these capabilities, and be able to offer the right service to business users at the right time, Logitech wanted to move IT operations to the cloud. Cloud technology would empower IT organizations to redefine the way data services are produced and delivered.

## Solution
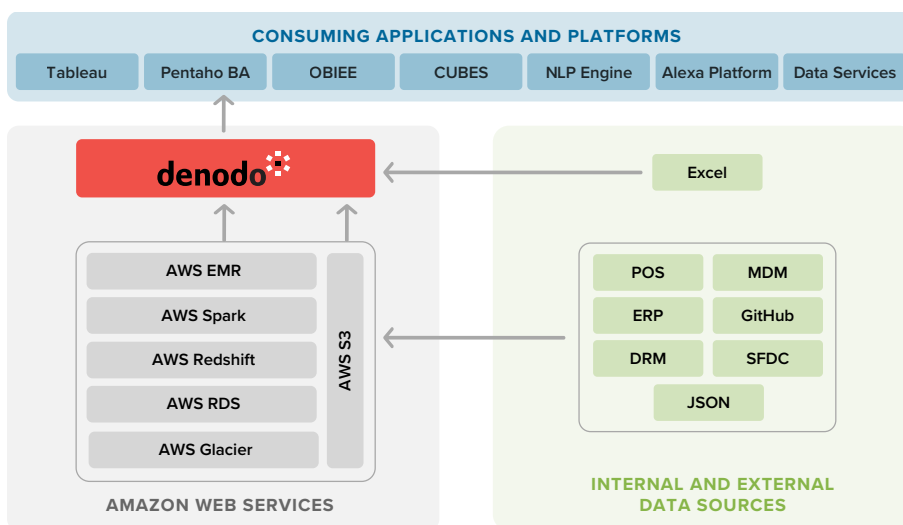


Logitech chose the Denodo Platform, hosted on Amazon AWS, to establish a logical data warehouse. In this new architecture, data from various on-premises sources and other third-party cloud based sources such as DRM, MDM, ERP, POS, Github, and Salesforce, are loaded into Amazon S3.

Denodo also integrates data coming directly to it from on-premises Excel files and machine generated data, social media data, other Internet data, and other sources.

After creating a single consistent data store, Denodo feeds analytics and reporting applications such as Tableau, Pentaho BA, and web services. In the Logitech infrastructure, Denodo has become the single source of truth, feeding the entire consumption layer.

"We deployed the Denodo Platform to aid us in moving our data analytics platforms to the cloud, and Denodo data virtualization played a critical role in that journey," said Avinash Deshpande, principal, Big Data and Analytics at Logitech.

## Benefits

With the logical data warehouse enabled by the Denodo platform, Logitech was able to:

- Perform a live migration to the cloud, with minimal impact on business operations.

- Create a symbiotic environment for rapid innovation, supported by the required governance structure.

- Hold down costs while reaching exceptional service levels.

- Enable business users to consume information in an easy, self-service manner.

- Engage in rapid prototyping, for a reduction in operational expenses.

- Greatly accelerate data science and analytics efforts.
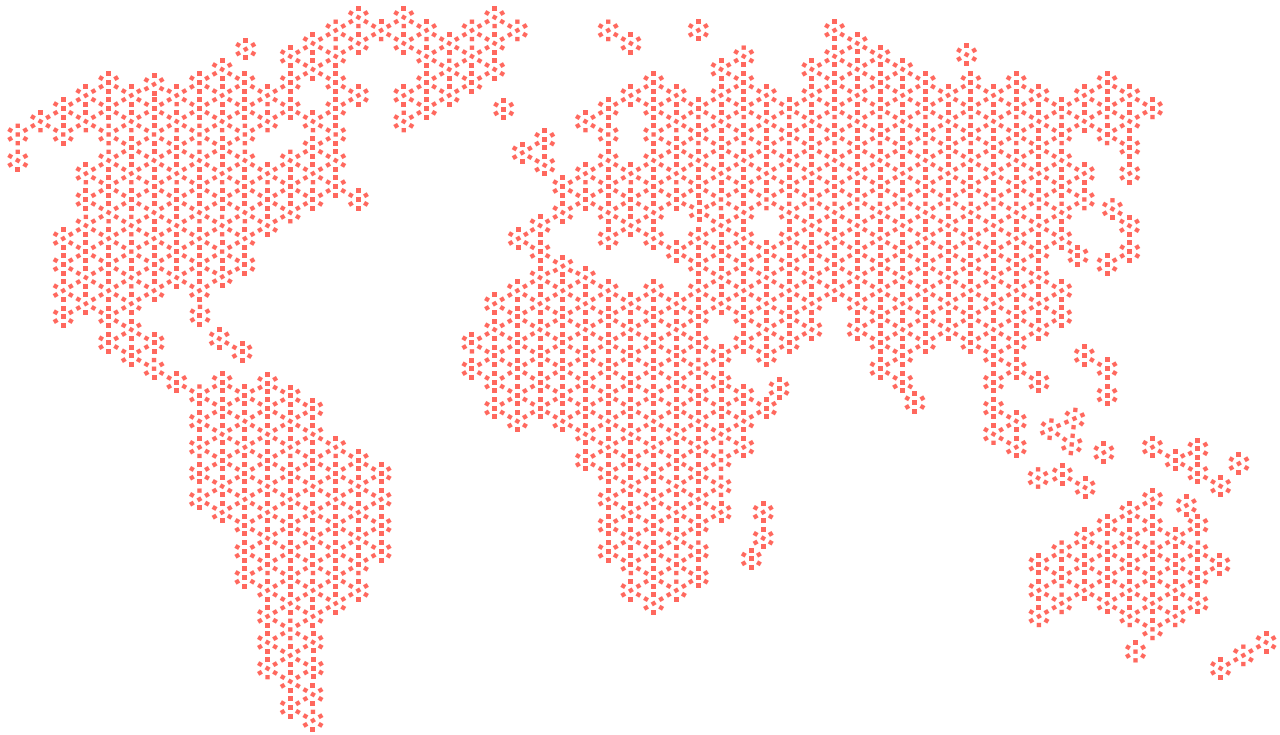
# denodo

Denodo Technologies is the leader in data virtualization providing agile, high performance data integration, data abstraction, and real-time data services across the broadest range of enterprise, cloud, big data, and unstructured data sources at half the cost of traditional approaches. Denodo's customers across every major industry have gained significant business agility and ROI.

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