Accelerating Data-Driven Transformation and Modernization in the Public Sector

Turning Government Data into a Source of Strategic Innovation

Governments amass large volumes of data, but they are often unable to gain the maximum value from it because government data is often scattered, siloed or poorly integrated and their bureaucracies can hinder change. By democratizing data access and using data more effectively, the public sector can simplify public-service delivery, accelerate IT modernization efforts, reduce fraud and abuse, achieve mission readiness to defend national interests, catalyze massive operational efficiencies while reducing cost, minimizing risk, and boosting public satisfaction and trust.

With so much data and so many users, public sector institutions, agencies, and departments are partnering with Denodo because they need a new way to think about data. Relying on traditional data centralization paradigms such as monolithic data warehouses and even newer cloud data lakes and data lakehouses, which today are just additional data sources, adds to the infrastructure and process complexity that governments struggle with, in their desire to work at speed and scale. Governments need to embrace a distributed data paradigm, which works more effectively with today's decentralized data topologies.

The Denodo Platform is actively helping public sector entities across the globe to implement a seamless data supply chain to reach data from any source and deliver it in real-time to any consumer, anywhere.

Public sector leaders are beginning to realize that they have an opportunity to become more responsive to their constituents by unlocking the value of their data in three key ways:

| By transforming core mission operations and modernizing systems | By more effectively engaging with citizens and improving access to services | By enriching the nation with better education and healthcare programs |

Government departments and agencies act as a safety net for their nations. Their ability to respond to perpetual risks while effectively delivering services to citizens is pivotal. These organizations' employees and leaders are embracing their missions to serve by using design thinking, agile development, intelligent process automation, and digital revitalization to emerge bolder.

Transform and Modernize Mission Operations

Data, and its effective management, is transforming government decision-making and further empowering governments to tackle their most demanding missions. As a result, many governments worldwide have made interoperable, connected data a top priority. For example, the United States, the United Kingdom, and Germany published their federal/national data strategies which include the mission to transform their government's use of data to drive efficiency and improve public services based on an appropriately safeguarded, connected, and interoperable data infrastructure. As shared in the U.S. 2020 Federal Data Strategy Action Plan, "If the Federal Government does not maintain its role as a preeminent supplier and sophisticated, ethical user of data, it will no longer be able to fulfill its civic duty to the public." Denodo supports federal agencies as they navigate how to accelerate the use of data to deliver on mission, serve the public, and steward resources while protecting security, privacy, and confidentiality. Denodo also supports national data strategies and evidence-based policymaking initiatives to meet current and future data demands.

Modernizes and consolidates multiple mission projects with 96% faster time-to-delivery – two weeks vs. a projected one-year timeline and 99.8% project cost savings – 80 hours vs. a projected 40,000 hours.

— The U.S. Federal Aviation Administration

"With a long-term mission of safely and securely maintaining the nation's nuclear weapons stockpile and dismantling weapons retired by the military, our data virtualization strategy plays an important role in expediting projects by enabling fast and secure data movement through different facilities."

— Stefanie Elsea, Program Information Technologist, B&W Pantex - The U.S. National Nuclear Security Administration (NNSA)

Improve Citizen Services and Experience

Digitalization is needed to deliver the rapid transformation of public services, to provide citizens with the same level of experience they get from the private sector. Citizen users now expect a timely response to inquiries over any interaction channels such as the phone, in-person, or via one of the many other contact channels from their local authorities. A real-time, integrated 'single view of the citizen' across the many data systems is needed to provide better service and shorter waiting times. It also reduces the cost of training staff on the many different applications and platforms they would otherwise need in order to view data in its original state. Virtualized government data can also drive down the cost of complying with the increasing number of data protection and privacy regulations such as Europe's GDPR, California's CCPA, and India's Personal Data Protection Bill.

"The Denodo Platform has eased the data integration process at Istat and enabled more complex and rigid data systems to be connected for the statistical analysis of demographic, economic, and social data."

— Massimo Fedeli, CIÒ of Istat - Italian National Institute of Statistics

Enrich Society with Better Education and Healthcare Programs

Educational institutions might have collected valuable information about their students, such as their demographics, grades, and classes. Still, often, data can be siloed and only really accessible to particular people or department. This siloed data makes it harder to put the information in context and understand everything applicable to students' educational experiences. Schools that overcome these silos will find new and improved ways to serve their students. Unified student views can impact the personalized learning opportunities, the format of classes, the resources, and the support that can be available to students.

"The Denodo Platform is at least three integration tools in one and likely more. We routinely discover new and inventive ways to access data using the platform."

— Daniel Young Chief Data Architect - Indiana University

Government agencies can also do more to clarify the benefits of sharing data and ensure citizens of the responsible use of their data. Ernst&Young's 2021 Connected Citizen survey indicates that using personal data to help track and prevent disease is supported by 52% of citizens globally. Government sponsored healthcare programs must be able to quickly assemble a reliable, trustworthy, and accurate view of data from providers, employees, facilities, supply chains, and even medical devices to provide the best possible care.

"The Denodo platform enables us to release small changes very quickly, allowing us to rapidly adapt to user requirements and also improves our system turnaround time by 30 to 50%."

— Chief Technical Operations Manager, Canada's Largest Public Healthcare Provider

Democratize Data with a Logical Data Fabric Powered by Data Virtualization
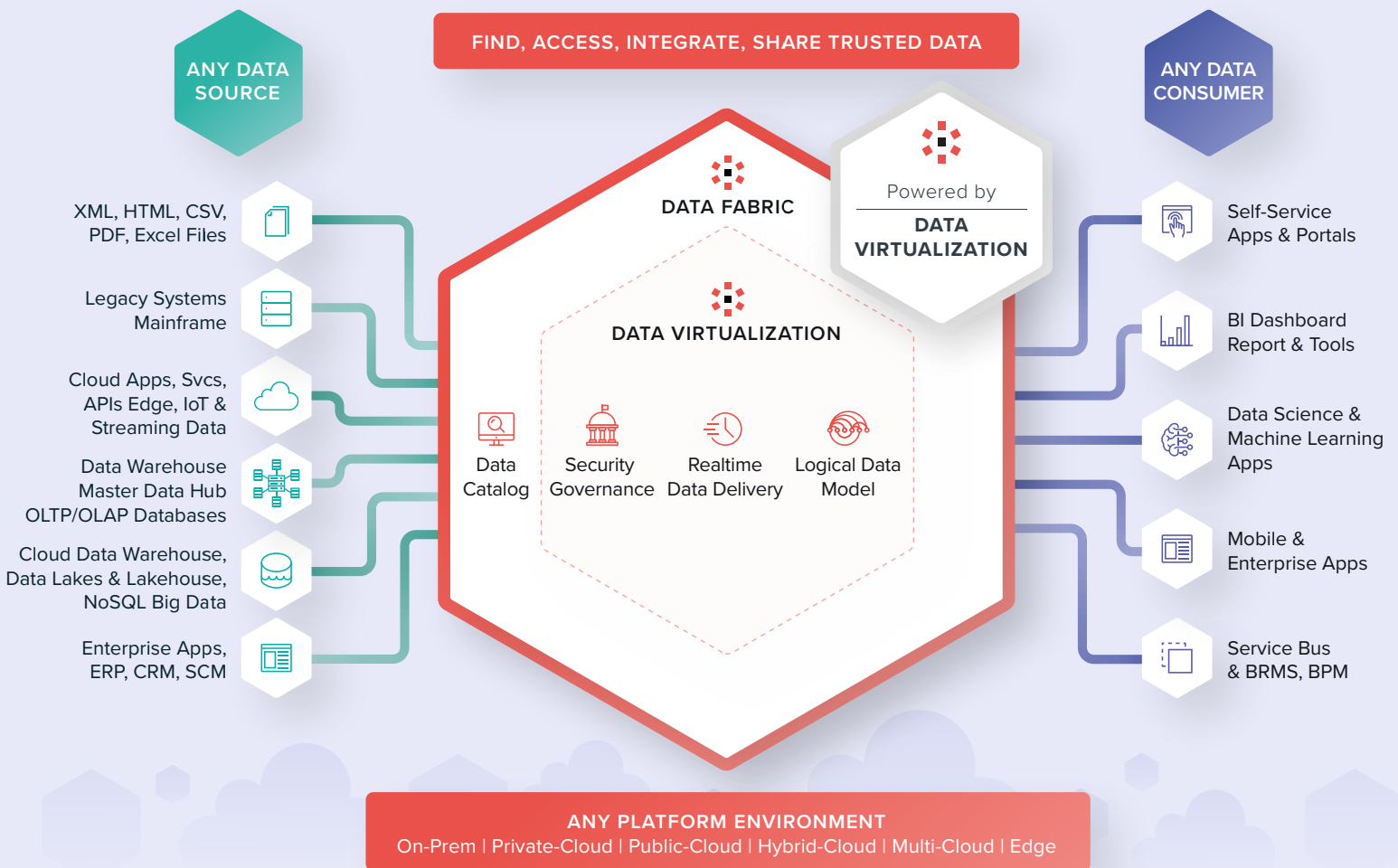
A logical data fabric architecture enables unobstructed yet secure access to distributed data. It helps data engineers, data architects, data scientists, data analysts, developers, and data consumers, i.e., all stakeholders, quickly find, understand, access, shape, integrate, share, and use trusted data throughout government institutions, agencies, and departments.

Data virtualization is the essential component of a logical data fabric approach. Rather than physically moving data from various on-premises and cloud sources using the traditional extract, transform and load (ETL) processes, data virtualization connects to different data sources, integrates complete view of the data in real time, using the metadata, and creates a virtual data layer. The resulting logical data fabric enables self-service access, so users can query the data where it resides. This capability gives data engineers, data scientists, and citizen analysts faster access to information — regardless of the data's platform or location. Self-service access also means that users can start querying the data immediately, without waiting for a data engineer to find and prepare it.

A logical data fabric enables:

- **Data for Any Data Consumer and Use Case:** Gain timely, trusted, self-service, and sharable data services for various analytical, operational, and governance use cases with automated data discovery and quality control.

- **Data from Any Data Source:** Access, integrate, and transform data-at-rest and data-in-motion across disparate, distributed data landscapes using metadata and pipelines with trusted security and protection.

- **Deployments in Any Platform Environment:** Adapt forward with a logical data fabric which flexibly spans distributed on-premise, private-, public-, hybrid-, and multi-cloud environments providing data integration across hybrid- and multi-cloud data landscapes.

For organizations seeking to integrate multiple data sources, clouds, compute engines, domains, and systems, there should be no question about implementing a logical data fabric architecture.

ANY DATA SOURCE

FIND, ACCESS, INTEGRATE, SHARE TRUSTED DATA

ANY DATA CONSUMER

DATA FABRIC

Powered by
DATA VIRTUALIZATION

DATA VIRTUALIZATION

Data Catalog

Security Governance

Realtime Data Delivery

Logical Data Model

XML, HTML, CSV, PDF, Excel Files

Legacy Systems Mainframe

Cloud Apps, Svcs, APIs Edge, IoT & Streaming Data

Data Warehouse Master Data Hub OLTP/OLAP Databases

Cloud Data Warehouse, Data Lakes & Lakehouse, NoSQL Big Data

Enterprise Apps, ERP, CRM, SCM

Self-Service Apps & Portals

BI Dashboard Report & Tools

Data Science & Machine Learning Apps

Mobile & Enterprise Apps

Service Bus & BRMS, BPM

ANY PLATFORM ENVIRONMENT
On-Prem | Private-Cloud | Public-Cloud | Hybrid-Cloud | Multi-Cloud | Edge

Find, Access, Integrate, and Share Trusted Data for Operational Excellence

The business value of logical data fabric is clear. It provides one place to go for all data for better and faster insights. It offers consistent, high-quality, governed, and secure data to everyone across the organization. It simplifies the journey to data democratization. And government employees and users will spend less time searching and more time analyzing the data. The Denodo Platform helps public sector organizations with the following solutions:

Citizen360°, Logistics360°, Student360°, GovService360° integration — Gain real-time data access, integration, and sharing across all enterprise systems, regardless of data format, location (on-premises or any cloud), or latency and the flexibility to consume data in multiple ways.

Data management for advanced analytics & AI/ML — A rapid self-service data pipeline for advanced analytics and AI/ML empowers employees to mine data pro-actively with automated data discovery and quality control, rather than relying on technical teams.

Hybrid-, multi-cloud data access and integration — Integrate and synchronize data across hybrid, multi-cloud environments. The Denodo Platform has a low-code/no-code unified web-based data design studio; automated and transparent infrastructure management interface for easy multi-cloud and hybrid-cloud deployment, management, monitoring, and smart query optimization powered by artificial intelligence (AI).

Data governance, compliance, and privacy — Integrated governance and security management provides complete visibility, traceability, lineage, masking control, authentication, authorization, and encryption -- deliver only the sanctioned data to sanctioned users.

Cloud-native application transformation — Low-code APIs and data services enable rapid development, modernization, and the adoption of cloud-native apps strategy. It allows developers to take advantage of easy-to-use, real-time data-service publishing options, whether for distributing datasets, building visualizations, or embedding views into transactional applications and processes.

The Denodo Platform leverages data virtualization to seamlessly implement a logical data fabric architecture, employing modern features such as semantic data layers, metadata management, an automated artificial intelligence/machine learning (AI/ML)-driven data catalog, and hybrid, multi-cloud deployment options to break down the boundaries separating applications, data, clouds, and people to support the government's mission, IT transformation initiatives, and mandates.

Modern Data Management Powered by Data Virtualization

Powered by

DATA VIRTUALIZATION
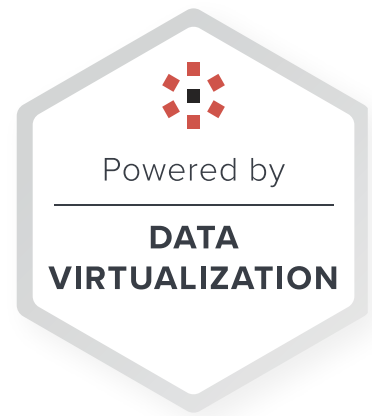
As demand for data grows there is a need to shorten the time-to-value by accelerating data engineering. Current approaches are too slow and costly, they cause reinvention and they can lead to inconsistent data. Data virtualization provides an agile approach to creating data products. Data products can be governed in one place and data can be provisioned to consumers without replication. Data virtualization is an excellent foundation for modern distributed data architecture and management.

To summarize, here are 10 things to know about modern data management powered by data virtualization:
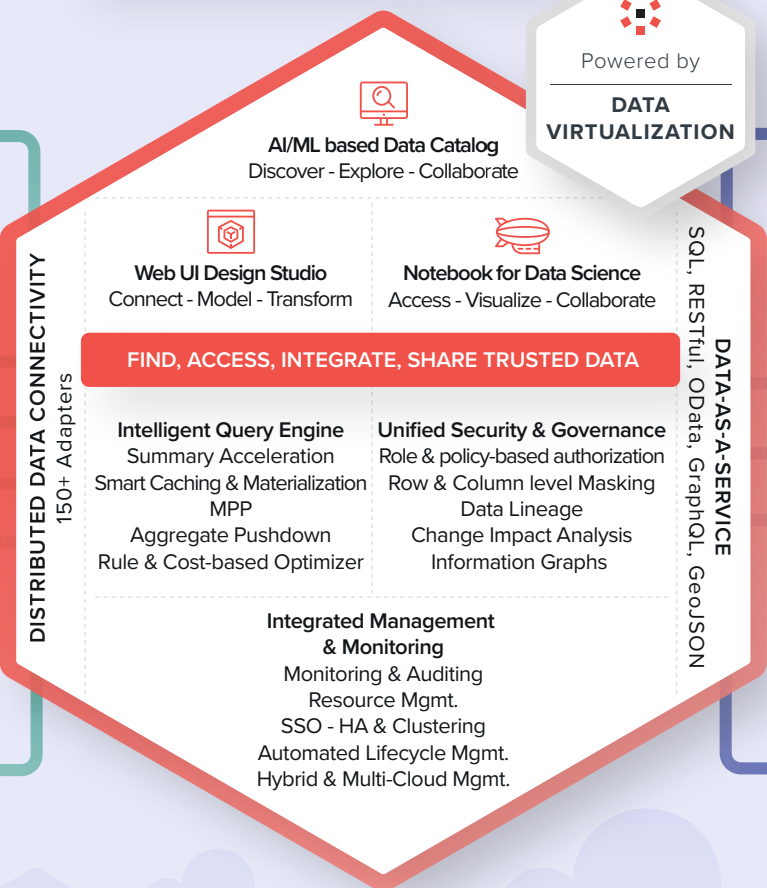
1. **It is more economical than traditional integration tools.**
   Physically replicating, moving and storing data multiple times is expensive. Data virtualization creates a virtual data layer eliminating duplication risks and costs.

2. **It is an easier way to manage data.**
   Create a virtual data layer with semantic consistency by combining your diverse, distributed data sources, on-premises or in the cloud, and get results in real time.

3. **It drives better utilization of traditional data warehousing, data lakes, and data hubs.**
   Data virtualization wraps traditional monolithic systems and presents them as one integrated system to drive better adoption, utilization, and ROI.

4. **It maximizes performance.**
   Modern Data virualiation provides a comprehensive set of dynamic query optimization techniques and caching like aggregation pushdown, massively parallel processing (MPP) capabilities to accelerate data access, with unparallel speed.

5. **It enables self-service analytics, machine learning and data science.**
   Data virtualization removes the historical static data vs. real-time streaming data barrier, making it easy to combine your data-at-rest with data- in-motion and build applications that provide a real-time edge.

6. **It enables secure data governance.**
   Data virtualization establishes a centralized access point for all data and metadata in the enterprise to enable security enforcement, auditing, monitoring and data governance. Comply with regulations including those that require encryption and masking.

7. **It goes far beyond data federation.**
   Modern data virtualization unifies metadata management, the data catalog, MPP query acceleration, and data governance to automate data findability, accessibility, reusability, and sharing by all users.

8. **It offers faster and better ROI.**
   A typical data virtualization project pays back in less than six months of implementation. With data virtualization, the organization can achieve 50% to 80% time savings over traditional integration methods.

9. **It is more agile than traditional methods.**
   Data virtualization enables rapid ideation and experimentation. This agile approach lets IT implement feedback driven development. It enables swift business services delivery based on continuously evolving requirements.

10. **It provides cloud deployment options Including containers.**
    Data virtualization continues to extend its menu of cloud-deployment options across leading cloud platforms, including Amazon Web Services (AWS), Microsoft Azure, Google Cloud Platform (GCP) and it also offers easy deployment to Kubernetes container engines.

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- XML, HTML, CSV, PDF, Excel Files
- Legacy Systems Mainframe
- Cloud Apps, Svcs, APIs Edge, IoT & Streaming Data
- Data Warehouse Master Data Hub OLTP/OLAP Databases
- Cloud Data Warehouse, Data Lakes & Lakehouse, NoSQL Big Data
- Enterprise Apps, ERP, CRM, SCM

DISTRIBUTED DATA CONNECTIVITY 150+ Adapters

AI/ML based Data Catalog
Discover - Explore - Collaborate

Web UI Design Studio
Connect - Model - Transform

Notebook for Data Science
Access - Visualize - Collaborate

FIND, ACCESS, INTEGRATE, SHARE TRUSTED DATA

Intelligent Query Engine
Summary Acceleration
Smart Caching & Materialization
MPP
Aggregate Pushdown
Rule & Cost-based Optimizer

Unified Security & Governance
Role & policy-based authorization
Row & Column level Masking
Data Lineage
Change Impact Analysis
Information Graphs

Integrated Management & Monitoring
Monitoring & Auditing
Resource Mgmt.
SSO - HA & Clustering
Automated Lifecycle Mgmt.
Hybrid & Multi-Cloud Mgmt.

DATA-AS-A-SERVICE
SQL, RESTful, OData, GraphQL, GeoJSON

Any Data Consumer:
- Self-Service Apps & Portals
- BI Dashboard Report & Tools
- Data Science & Machine Learning Apps
- Mobile & Enterprise Apps
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Learn more at https://www.denodo.com/en/solutions/by-industry/public-sector-and-education

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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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