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Aerospace Leader Transforms Flight Data to Propel Engine Excellence

A global leader in aerospace, specializing in the design, manufacturing, and maintenance of aircraft engines, has over 85 years of experience and a 30% market share in the aero engine module supply business. The company partners with top OEMs like Pratt & Whitney and GE. Beyond its OEM role, and is a recognized leader in maintenance, repair, and overhaul (MRO), providing world-class aftermarket support for both commercial and military aircraft.

Challenges

With a diverse set of operations spanning OEM, MRO, and sensitive military projects, the company faced growing complexity in managing its data, hindering data access, integration, and operational efficiency:

1. **Proactive Maintenance Planning:** The company had difficulty planning proactive aircraft maintenance activities due to data silos, as each aircraft had different flight histories (documenting the weather, route, timings, etc.), which resulted in different parts, services, and invoicing. Comparing flight histories during shop visits was a laborious manual process.

2. **Productivity Analysis:** The company had more than 11,000 engine experts making more than a thousand aircraft shop visits in a year. With experts working on different calendar days and across 17 locations, inaccurate productivity comparisons were impacting delivery schedules.

3. **Data Silos:** Core systems like SAP BW and PostgreSQL were disconnected, isolating data across platforms. This siloed structure made it difficult to connect and access critical data, especially data shared with partners, with whom the company is deeply involved in engine manufacturing and servicing processes.

4. **Lack of a Data Catalog:** Without a central data catalog, there was no single reference for available data products or datasets across the company, making it challenging for employees to effectively locate and leverage data.

5. **Restricted SAP and non-SAP Data Access:** Accessing data within SAP was limited including integrating SAP and non SAP data, with minimal options for consuming, connecting, and visualizing data to support business insights.

6. **Absence of Role-Based Data Ownership:** The company lacked a cross-system role-based data ownership structure, complicating data responsibility allocation and compliance with additional data governance requirements.

7. **Diverse Stakeholder Requirements:**

    - Business Needs: The business team wanted accessible data across multiple channels with an end to silos, enabling a clear overview of available information.

    - IT Requirements: IT needed role allocations in line with company policies, with data responsibility clearly delineated between IT and business teams.

    - Company Council Demands: The company's Council, advocating for employee data privacy, insisted on compliance with data governance policies in the source systems. Significant discussions were held to ensure data privacy while enabling a user-friendly platform.

To enhance operational efficiency and decision-making, the company needed a data management solution that could unify disparate data sources without adding additional complexity.

The Solution

The company implemented the Denodo Platform to streamline data accessibility, improve data governance, and deliver actionable insights across its business operations. Denodo provided:

1. **A Centralized Data Access Point:** Established a single access point for analytics, reporting, and data processing, consolidating data from silos such as SAP, PostgreSQL, and other big data systems into a unified platform.

2. **Data Consolidation and Domain Structure:** The company used Denodo to organize data into domain-specific virtual databases across its core systems. This structure enabled the creation of distinct data domains (e.g., Market and Production), consolidating previously siloed data and providing seamless access.

3. **A Comprehensive Data Catalog:** The Denodo Catalog provided a clear overview of available datasets, improving data discoverability and usability across the organization.

4. **Role-Based Authorization and Active Directory Integration:** The Denodo Platform's integration with Active Directory enabled the company to implement a centralized, role-based authorization system. Authorization is granted across three levels:

   - Public: Accessible to all employees.

   - Domain Internal: Granted to users needing access to specific internal data within each domain.

   - Restricted: Limited to selected individuals, such as executives, with a specific role-request process for highly sensitive data.

5. **A Cross-System Data Ownership Model:** Through Denodo, the company has been able to establish a cross-system data ownership approach, transferring data management responsibility to business teams familiar with the data, rather than relying solely on IT. This model has promoted data governance and accountability across departments.

Benefits

The Denodo platform has driven significant improvements in data management, governance, and operational efficiency:

1. **Expanded Data Coverage and Platform Demand:** By providing comprehensive data coverage and ease of access, Denodo has become increasingly valued across the company, resulting in high demand for the platform's capabilities.

2. **Enhanced Training and Data Ownership:** The company implemented training on data products and data ownership, emphasizing the importance of data responsibility among business users and fostering a data-driven culture.

3. **Valuable Use Cases in Operation:** Denodo enabled specific, impactful use cases like Calendar Productivity Data and Flight Radar Data, which provided actionable insights for productivity reporting and maintenance planning.

4. **Expansion Plans:**

   - The company plans to integrate more data sources, such as object storage, Kafka, and cloud-based systems, to further enhance data accessibility.

   - The organization aims to explore hybrid architecture concepts and large language models for advanced data handling.

   - The company also plans to improve the granularity of its current authorization structure using tag-based policies for secure, controlled data access.

The company was able to implement two significant use cases:

1. **Flight Radar Data for Maintenance Analysis:**

   - **Objective:** This use case enables the tracking and analysis of global flight data to understand engine usage patterns and identify servicing needs.

   - **Solution:** The company purchases flight data containing detailed flight information (flight paths, departure/destination, aircraft type, etc.). This data is stored in a Postgres database and connected to internal engine and maintenance records across different applications through the Denodo Platform to compare flight history with aircraft shop visits.

   - **Benefits:**
     - The ability to perform detailed analysis of engine wear and performance based on environmental and usage factors, supporting proactive maintenance.
     - Providing valuable insights into operating conditions (e.g., desert or ocean flights) affecting engine health, which allows for targeted service strategies.
     - Aligns services with data-driven insights, enhancing the company's ability to optimize maintenance schedules and improve service quality.

2. **Calendar Data for Productivity Analysis:**

   - **Objective:** This use case involves productivity reporting, by providing a structured view of dates, including public

holidays and weekends, enabling teams to create accurate productivity comparisons over specific periods.

- **Solution:** Calendar data includes key date information, making it accessible for productivity analyses without the need for manual date entry.
- **Benefits:**
  - Improved reporting accuracy by providing a standardized date reference.
  - Streamlined workflows, reducing manual data entry.
  - Nuanced analysis of productivity, accounting for non-working days, which supports better business decision-making.
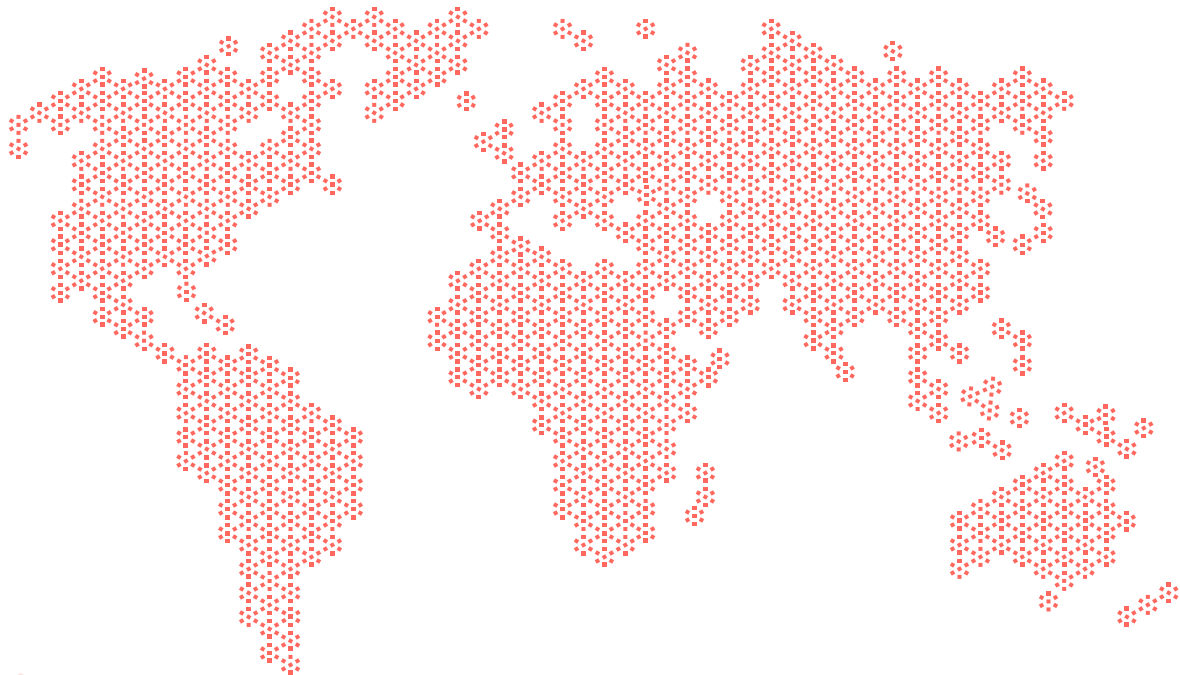
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Denodo is a leader in data management. The award-winning Denodo Platform is the leading logical data management platform for delivering data in the language of business, at the speed of business, for all data-related initiatives across the organization. Realizing more than 400% ROI and millions of dollars in benefits, Denodo's customers across enterprises in 30+ industries all over the world have received payback in less than six months.