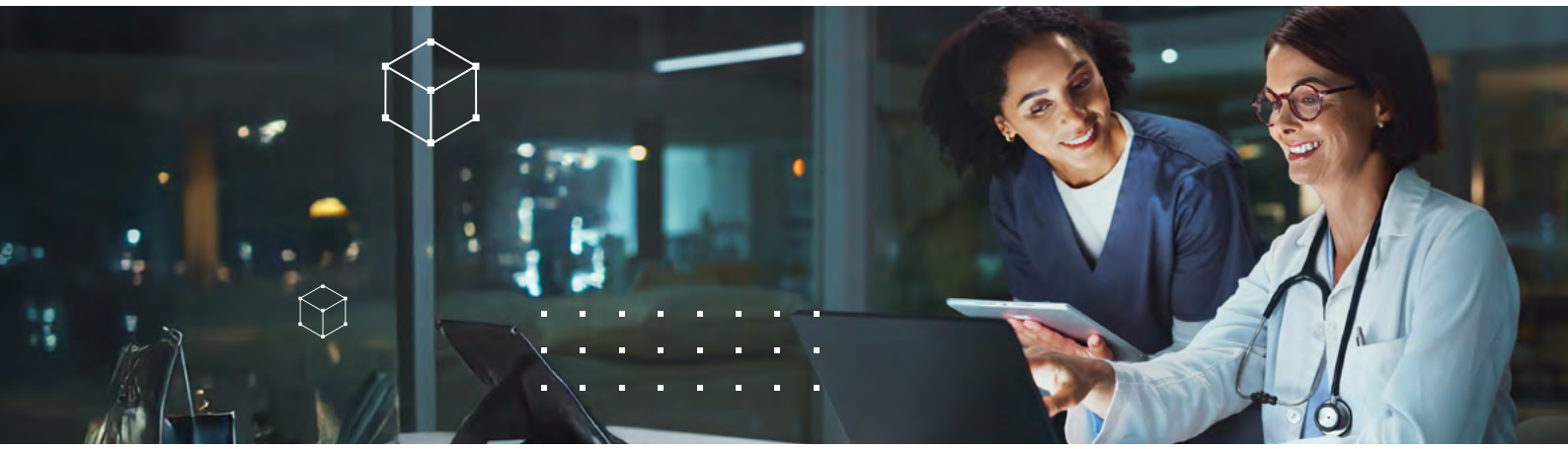

Delivering Real-Time, Governed Data and Analytics Across 90+ Clinical Systems Without Centralizing Patient-Sensitive Data

Overview

A large public health system based in a developed country in the Asia Pacific region, serving nearly two million residents across hospitals, aged care, emergency services, and regional care networks, sought to modernize its data ecosystem to drive better patient outcomes, enable coordinated care, and support real-time clinical decisions.

As part of this transformation, the organization adopted Snowflake as a modern data lakehouse to support high-performance analytics and scalable data storage. However, it quickly became evident that not all data could be ingested or replicated into the lakehouse. With over 600 fragmented and often externally managed systems, and strict privacy and governance requirements across regions, a purely centralized approach was not feasible. Where possible, data replication needed to be minimized, and federated governance across all systems was essential.

To meet these challenges, the organization implemented a logical data architecture with the Denodo Platform at its core. This enabled real-time access, policy-based security, and governed data delivery directly from the source. Denodo acts as the unifying layer across systems, ensuring trust, performance, and control across the entire landscape.

Challenges

Despite ongoing digital investments, the healthcare agency faced several persistent barriers:

- **Fragmented EMR Implementations Across Local Networks**
  Each regional network used the same core EMR platform but configured it differently, with inconsistent schemas and no shared semantic model. This made statewide analytics, clinical research, and operational reporting nearly impossible. Even when some EMR data was ingested into a central platform like Snowflake, this lack of semantic consistency prevented meaningful unification.

- **Replication of Clinical Data Introduced Privacy and Governance Risks**
  Without centralized access control across systems, teams often copied entire databases to meet cross-regional needs. Snowflake's secure sharing supported governed collaboration for some datasets, including limited EMR extracts, but much of the data had to remain in operational systems, due to its complexity and sensitivity, making full replication impractical. This led to audit gaps, increased risk, and inconsistent handling of patient information.

- **Limited Real-Time Visibility into Operational Capacity**
  Hospitals and emergency departments lacked a unified view of ambulance dispatches, bed availability, Emergency Department wait times, and discharge flows. This data had to be continually real-time up-to-date, and continuous replication into a central store like Snowflake was impractical.

- **Legacy and Vendor-Managed Systems Blocked Scalable Integration**
  Many critical systems were externally hosted or lacked APIs and Changed Data Capture capabilities. Traditional ETL pipelines and point-to-point integrations remained fragile and difficult to scale.

These constraints led to a shift in architectural strategy, away from traditional centralization, and toward a federated model that respected, rather than replaced, existing system boundaries.

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Solution

The organization adopted a logical data management strategy to deliver governed, real-time access across its complex environment. Denodo was deployed as the core semantic and access layer, integrating over 90 priority systems out of the 600+ deployed across the network.

Denodo connected directly to both legacy and modern systems, abstracting away complexity and enforcing fine-grained policies for access, masking, and auditing. For use cases requiring high performance, such as dashboards and reporting, Denodo selectively cached virtual views into Snowflake. This reduced load on fragile source systems while maintaining full governance and traceability. Crucially, Denodo was able to combine this cached data with live sources at query time, enabling unified analytics across Snowflake and other clinical systems – all through a single access layer.

Not all workloads flowed through Snowflake: Denodo enabled access to operational systems directly, ensuring flexibility where replication was impractical or non-compliant. The result was a hybrid architecture: data could remain at rest but still be made available securely and efficiently to authorized users in real time.

The solution was built on four key design principles:

- Unified semantic layer across EMR, pathology, imaging, and patient services
- One “front door” for access control, policy enforcement, logging, and auditing
- RESTful APIs and secure caching for both clinical and analytical workloads
- Access strictly confined to internal networks to align with healthcare privacy mandates

Benefits

- **Federated Policy Enforcement**
  Access to 90+ clinical healthcare systems is now governed through a single control layer. Sensitive data remains in place. Researchers and analysts access only authorized views. Denodo works with Snowflake’s secure data sharing for external distribution, never exposing internal systems. A metadata-driven catalog provides visibility into available datasets, access policies, and lineage, reinforcing trust and enabling standardized reuse across teams.

- **Improved Healthcare Operational Agility**
  Data source onboarding has been reduced from months to as little as two days. Priority 1 ambulance response times improved due to real-time visibility into Emergency Department load and cross-hospital triage. Patient flow is now actively managed, with load-balancing capabilities that help redirect cases before EDs become overwhelmed. Clinical dashboards reduced manual coordination, enabling faster, more consistent decisions.

- **Scalable, Trusted Collaboration**
  The platform eliminated fragile point-to-point data sharing and uncontrolled duplication. Cross-network teams now collaborate securely using governed “collaboration zones” and reusable semantic views, improving both trust and efficiency.

  Today, multiple clinical, operational, and research teams reuse the same semantic views and access framework, increasing standardization and reducing redundant effort across domains.

- **Minimized Replication, Maximum Access**
  By virtualizing access rather than replicating data, the health system preserved control over its most sensitive systems. The architecture is sustainable, compliant, and designed to scale, delivering insights without compromising privacy.

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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.