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Enterprise Data Strategy in the Healthcare Landscape

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The healthcare landscape is changing. Heightened competition and risk in this evolving environment demands an enterprise data strategy that accelerates business objectives efficiently and cost-effectively.

Current State Assessment

Is your organization in need of change, or do you think you are doing all right with your data? The answers to the questions below provide a baseline assessment to address that question. The more "YES" answers, the more likely your current infrastructure is not meeting your organization's needs.

		YES	NO
BUSINESS QUESTIONS	1. Do you have trouble responding to customer inquiries because it's difficult to pull together the data needed to respond to them?	✓	✗
	2. Are there multiple data sources with related data, but no integrated view of that data?	✓	✗
	3. Are there database schemas so complicated that no one wants to touch them anymore?	✓	✗
	4. Are there large IT projects that have been behind budget or failed to launch due to data integration challenges?	✓	✗
	5. Is there data that is important to your organization that is not in a database?	✓	✗
TECHNICAL QUESTIONS	6. Does data modeling ever slow down or hinder the process of application development?	✓	✗
	7. Are there relational tables in which column names were changed or been assigned new meaning "just to make it work"?	✓	✗
	8. Do you have documents or other data that is too complicated to be stored in a relational database, and must be searched separately?	✓	✗
	9. Is important metadata or reference data stored outside of the database, in an Excel spreadsheet or some other place?	✓	✗
	10. Are there ever performance problems or bugs that may have resulted from complicated middleware?	✓	✗

The Healthcare Landscape Is Changing

Today's healthcare landscape faces both familiar and unfamiliar challenges. Everyone is learning to expect that data and requirements can change at any time. Heightened competition as a result of, for example, new regulatory pressures around quality and payment, requires a nimble and efficient enterprise to respond to shifting market dynamics, which are often difficult to predict. With competition comes risk both to discrete product lines and to the enterprise on the whole. What's more, evolving regulatory pressures—from plan design and benefits to quality reporting—breeds risk and uncertainty.

This mélange of competition and risk cannot be combatted merely at the operational level. For payers, providers, and everyone in between who seek to enhance competitive positions and manage risks, the first step is implementing an enterprise data strategy that is closely tailored to and accelerates enterprise business objectives.

Competition

Healthcare today is a highly competitive environment:

- New entrants to the marketplace, particularly around specific product lines (e.g., Medicare Advantage plans) and new accountable care arrangements, rapidly shift competitive dynamics and affect consumer buying preferences.
- Consolidation across payers and providers increases market share around specific offerings (e.g., Medicaid managed care products) and in geographic regions, as well as negotiating leverage around network standards and reimbursement.
- The emergence of new contexts in which to shop for health insurance, ranging from the Marketplaces created under health reform to private health insurance exchanges utilized by large employers, creates new competitive environments with upside and downside risk.

Competing in this crowded marketplace requires developing a robust enterprise data strategy to leverage available data from across the business to drive sound decision-making. As competitive dynamics shift, an organization's data strategy must be nimble enough to adapt in efficient and cost-effective ways.

Risk

Risk is ever-present in today's payer landscape:

- Regulatory pressures and data interoperability requirements, such as ONC's FHIR mandate going into effect this year and next year, breed uncertainty and frustrate the development of long-term enterprise strategies as requirements constantly shift.
- The success of M&A strategies increasingly depends on post-deal execution not just of people and processes, but also of IT systems and architectures.
- Competition itself generates risk in the form of, for example, lost revenues in a specific product line or particular geographic region.

Reducing risk requires not only tailoring enterprise data strategy to known risks, but also querying whether such a strategy can adapt over time to address and mitigate future risks generated in a rapidly evolving landscape.

Does My Data Strategy Accelerate My Business?

For many healthcare organizations, their enterprise data strategy shares a common feature—relational technology. Dating to the 1970s, relational technology was designed for a different era of data. Data in healthcare today has increased in volume, variety, and velocity. What's more, today's challenges in healthcare have become increasingly cross-cutting, requiring a holistic and agile view across the enterprise.

As healthcare data has changed, so too must an organization's data strategy. For healthcare organizations of all types, the persistence of relational technology as the backbone of their data strategy hinders their ability to compete and manage known (and as-yet unknown) risks in today's healthcare environment. More specifically, this persistence breeds inefficiencies in business models in at least three ways.

1. Relational technology produces slow and expensive data integration projects

Large-scale data integration projects, particularly during post-deal M&A execution, must be implemented efficiently and cost-effectively.

Relational technology forces data into tables with rows and columns, causing project timelines to grow as developers constantly model—and re-model—incoming data sources. Because schemas often change as project timelines progress, relational technology produces an inefficient cycle of constant ETL (extract load transform), where even a minor change like adding or replacing a column in a table becomes time- and resource-intensive.

What's more, because relational databases are designed to run on a single server, scaling to accommodate high data volumes becomes time-consuming and costly as expensive proprietary hardware must be added.

2. Relational technology cannot handle mixed workloads

Mixed workloads are a hallmark of any enterprise. Operational workloads—day-to-day business transactions that occur in real-time—and analytical workloads—operations focused on business intelligence and data analysis—play equally important roles in any enterprise IT strategy.

Relational technology splits workloads between databases optimized for operational workloads (online transaction processing systems (OLTP)) and databases optimized for analytical workloads (online analytical processing (OLAP)). This creates a cascading array of systems to manage different tasks needed to run the business, each requiring cumbersome ETL to share necessary data.

With complexity comes cost. Most IT departments spend a significant share of their time maintaining the array of systems required under a relational model to both observe and run the business. Without an easy way to deliver information to different users in the right way at the right time, relational technology pushes inefficiencies far beyond just the IT department.

3. Relational technology is a mismatch for modern application development

Payers rely on applications as a crucial link between volumes of data and the insights that drive enterprise business objectives. Whether to provide a mobile app for consumers to securely access personal healthcare information or to power analytics around risk adjustment for a particular population, payers need a database platform that makes application development easy and efficient.

Because modern application programming languages handle data differently from relational technology, application development on a relational database requires object-relational mapping (ORM). ORM is bi-directional active-active mapping between the objects in the application layer and the data as it is represented in the relational database schema. This cumbersome workaround tears the data apart, adding more overhead and mapping, rather than preserving the interesting aspects of the data inside an object.

Imagine building that mobile app for consumers to securely access personal healthcare information. After shredding the data across tables in the relational model, the developer has to reassemble or aggregate the data, in order to present it to the user. This process not only slows down development cycles, but also hinders performance and adds more opportunities for buggy code.

> **“If it were not for MarkLogic, we would have been in a much worse place than we were in October of 2013. In October, when things were bad, we had the option to pivot, to scale out of a poorly written application without the need to rewrite large portions of the app during open enrollment. MarkLogic gave us a set of options that would not have been possible with other technologies.”**

— Henry Chao,
Former Deputy CIO & Deputy Director of the Office of Technology Solutions,
Centers for Medicare & Medicaid Services

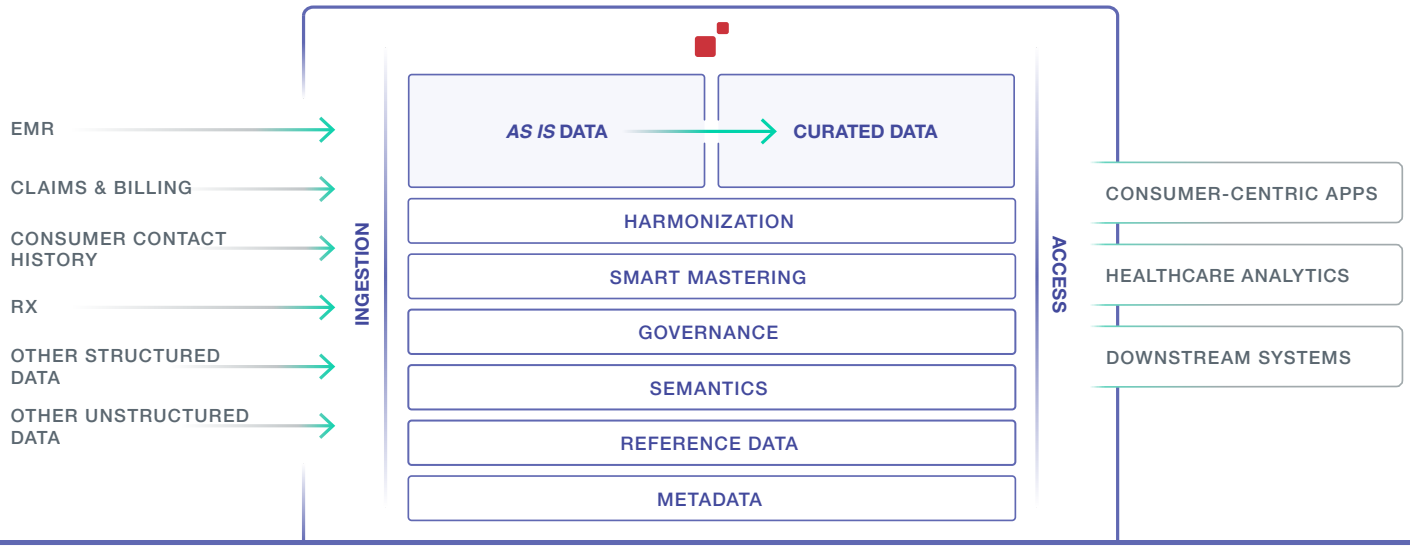
A Next Generation Approach to Healthcare Data Strategy

The MarkLogic Data Hub Platform is a unified solution that unlocks value from all of your enterprise data with more agility and security than ever before. The Data Hub brings all of your multi-structured data together and curates it for both transactional and analytical purposes. It works by ingesting data as is from any source, indexing it for immediate query and search, and curating it through a process of harmonization, mastering, and enrichment.

Organizations can deploy this multi-model platform in minutes with MarkLogic Data Hub Service, a fully managed cloud service. Or, you can deploy a self-managed data hub in any environment (cloud, hybrid, or on-premises).

MarkLogic's Data Hub platform provides unique value for healthcare organizations that want to build an agile, data-centric strategy.

- **A flexible data model** for storing and leveraging common sources of structured healthcare data, such as claims data, as well as unstructured data to incorporate key insights for population health initiatives.
- **Built-in search and query**, combined with semantics, to access information in real-time and provide context around all of an organization's data.
- **Scalability and elasticity** to adapt to increasing data volumes and allow for architectural agility as new data sources are required to address specific business challenges.
- **Enterprise features**, such as ACID transactions and granular role-based security at the document level, augment a platform designed to combine observe-the-business and run-the-business functionalities.



MarkLogic in Healthcare

MarkLogic's Data Hub platform delivers value across the healthcare landscape, resulting in less risk and enhanced competitive positioning.

- **Centers for Medicare & Medicaid Services**
  MarkLogic's database platform acts as an operational data hub for HealthCare.gov and the Data Services Hub, enabling over 12 million total enrollments or automatic re-enrollments through HealthCare.gov.

- **Top 5 Commercial Payer**
  This organization has used MarkLogic's database platform to simplify and accelerate product development by bringing together disparate sources of consumer data, and replace slow and complicated legacy systems.

- **Top 5 Commercial Payer**
  This organization has used MarkLogic's database platform for a variety of data integration projects, including integration of over 200 sources of employee data for consumption by over 50 downstream systems.

- **Top 3 Medicare / Medicaid Payer**
  This organization has used MarkLogic's database platform to build a metadata hub that provides a 360 degree view of customer interactions, as well as an integrated clinical data repository to support early patient interventions and improved health outcomes.

More Information

Simplifying Complex Data Integration
This white paper explains how MarkLogic simplifies data integration and eliminates friction between IT and business.
www.marklogic.com/resources/simplifying-complex-data-integration/

Data Hub Guide for Architects
Read the eBook to learn why a data hub is the best approach for solving modern data management challenges and addressing changing business needs.
www.marklogic.com/resources/data-hub-guide-for-architects/

What is MarkLogic?
Read more about MarkLogic's differentiated set of capabilities.
www.marklogic.com/product/data-hub/

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