Data Management within the Data Ecosystem

One of the greatest challenges facing the healthcare world today is how to transform exponentially growing amounts of data into strategic data assets that inform the improvement of care delivery. At HIMSS 2021, the Healthcare Information and Management Systems Society (HIMSS) and Cognosante co-hosted a roundtable discussion where healthcare stakeholders shared their challenges with collecting, analyzing, and leveraging data to improve and accelerate their decision-making. This whitepaper focuses on defining the key elements of data management using Cognosante's Data Ecosystem Framework and the key roles and skills health community and HIMSS community stakeholders should prioritize to successfully achieve data-led transformation.

In the commercial space, Cognosante, has been working with its customers to try and solve these problems through solutions like their Data Ecosystem (DE) Framework. These solutions offer a holistic approach to help stakeholders rethink their data management strategy using a cloud-architected methodology that creates a new and innovative data culture.

HIMSS is a global advisor and thought leader supporting the transformation of the health ecosystem through information and technology. Our vision is to realize the full health potential of every human everywhere.

As a mission-driven non-profit, we offer a unique depth and breadth of expertise in health innovation, public policy, workforce development, research, and analytics to advise global leaders, stakeholders, and influencers on best practices in health information and technology. Through our innovation engine, we deliver key insights, education and engaging events to healthcare providers, governments, and market suppliers, ensuring they have the right information at the point of decision.

Cognosante is a mission-driven technology company dedicated to supporting the health, safety, and well-being of Americans by delivering innovative, transformative solutions that improve health and safety outcomes. Our expertise and integrated approach help federal and state agencies solve complex challenges so they can accomplish their missions.

Through their Data and Analytics practice, Cognosante harnesses the full power of data to help government organizations make smarter, more informed decisions that positively impact and improve care delivery. By synergizing their industry experts, proven processes, and cutting-edge technologies Cognosante provides accelerated and measurable value creation, injects complementary thought leadership, and enhances user experience. Together, Cognosante has developed the Data Ecosystem Framework that offers customers a highly customized solution for data needs that are unique to organizations yet commonly experienced across the healthcare industry. Their Data Ecosystem Framework:

- **Reduces Complexity –** by reducing the number of technology platforms Cognosante can simplify execution of analytics. Their vendor-agnostic position enables them to work with multiple tools across the ecosystem to ensure the right fit for each customer.

- **Supports Data Quality –** by accelerating the integration of quality data in one location, customers can create a reliable, single source of truth for organization-wide reporting and analysis.

- **Increases Interoperability –** The Data Ecosystem supports FHIR connectivity, structured, semi-structured and unstructured data using the analytics technology you prefer.

- **Promotes Reusability –** Cognosante's partner value is rooted in their ability to build solutions that leverage the tools that theirbusiness users are already familiar with – reducing the learning curve required to adopt new data technology.

Data as an Asset

Data is a critical asset for the healthcare community because it enhances the ability to improve care, streamline the patient/provider experience, and maximize savings. Organizations must evolve and accelerate their approach to effective data management as the volume and types of available data continue to increase exponentially across several dimensions including volume, variety, and velocity. Data management is foundational to operational decision-making and strategic planning. The importance of data, and the importance of managing data, cannot be overstated. With a comprehensive data ecosystem, organizations can evolve their data acumen and more effectively use their data to produce actionable insights.

Understanding the Data Ecosystem

Organizations are overwhelmed with data produced by IT systems—the amount of data, disparate data types, fragmented data sources, and multiple data visualizations and reports. HIMSS and Cognosante are helping the healthcare sector make sense of data and influence impactful business decisions by first helping them understand the data ecosystem.

The data ecosystem is the combination of people, processes, and technology that is used to aggregate and analyze information to produce actionable insight. Organizations must not only understand the purpose of each building block (function) within the data ecosystem, but they must also understand how the functions work together to produce actionable insights.

Exhibit 1: Cognosante's Data Ecosystem Framework. Our modular approach allows us to compose a data ecosystem that meets the needs of our customers.
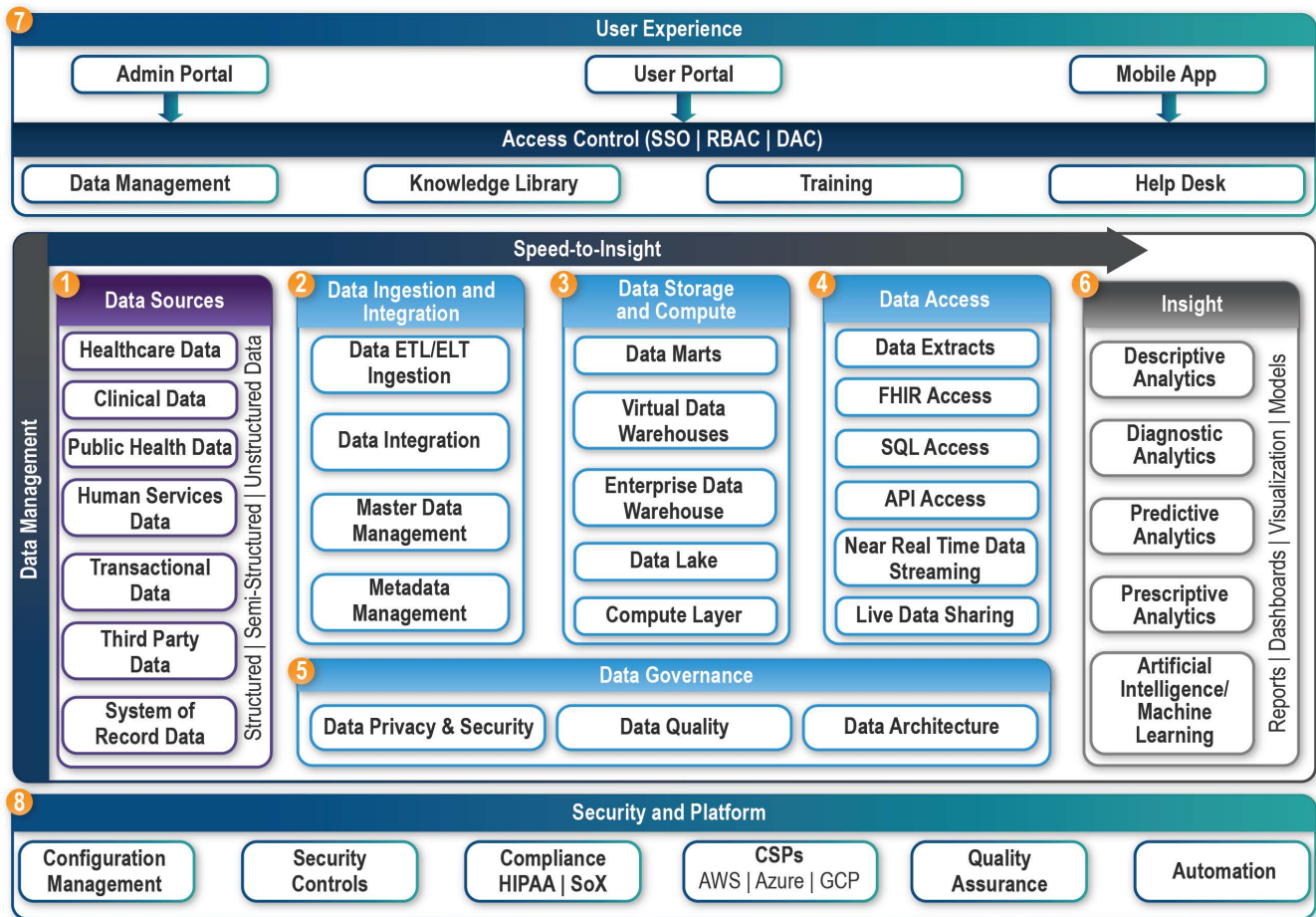
① Data Source Identification. Creating a data ecosystem begins with identifying where credible data originates. Organizations often have disparate data sources that feed their analytics. During the design and implementation of a solution, data experts should solicit and analyze the organization's requirements and then coordinate with stakeholders and vendors to determine the types and sources of data needed. Solution teams should then incorporate all internal and external required data sources to deliver a system that generates the most meaningful and actionable analysis and insight.
Commonly Associated Roles: Business Analyst
Key Skills: Business Requirements Solicitation, Requirements Analysis, Use Case Development

② Data Ingestion and Integration. Once data sources are identified and cataloged, organizations transport and combine data from multiple sources to provide a unified, single view of the data. A variety of tools can be used to automate and accelerate data ingestion and integration activities, and artificial intelligence (AI) and machine learning (ML) can be applied to data and metadata to accomplish data-led transformations. Cognosante's experts specialize in recommending the right mix of technologies, based on organizational needs and objectives, to create a seamless, elastic, and serverless processing bridge between any data source and the Data Storage and Compute component of the cloud environment.
Commonly Associated Roles: Data Engineer, ETL

Specialist, Data Migration Specialist, Data Architect
Key Skills: Data Migration, Data Acquisition Frameworks, Programming Languages, Relational Databases, Data Pipeline Development, Data Modeling, Data Transformation, Data Verification and Validation, Trusted Data Sources

3 **Data Storage and Compute.** Selecting the right solution for storing data in a manner that supports complex queries is critical. The cloud has improved the flexibility and agility of data storage and compute. Ideally, solutions incorporate an advanced data platform with an innovative architecture natively designed for operation in the cloud. The data platform supports persistent storage of structured, semi-structured, and unstructured data using any combination of data lakes, enterprise data warehouses (EDW), or data marts and provides virtual, elastic compute instances to manage heavy computing loads. This composable solution is a new way of thinking and operating to overcome traditional EDW challenges.
Commonly Associated Roles: Database Administrator (DBA), Systems Architect, Data Platform Administrator
Key Skills: Advanced SQL, Stored Procedures, Multiple Databases (i.e. Oracle, SQL Server), Datastacks, Security, Auditing, Schema Development

4 **Data Access.** Enabling the retrieval, modification, copying, or movement of data from a data ecosystem's IT components in an on-demand, authorized fashion is integral to an organization's analytics functions. Data ecosystem solutions should enable secure, governed data access through a variety of methods to include data extracts, SQL access, API access, FHIR, near real time streaming, and live data sharing. Users should be able to designate data for sharing and grant one-to-one, one-to-many, or many-to-many permissions to the data based on established data governance practices.
Commonly Associated Roles: Database Administrator (DBA), Systems Architect, Data Platform Administrator, Business Intelligence Analyst, Data Scientist
Key Skills: Business Intelligence Applications, Data Modeling, Data Visualization, Data Transformations, Healthcare Systems

5 **Data Governance.** Data ecosystems should support organizational efforts to manage the availability, usability, integrity, and security of the data in enterprise systems, based on internal data standards and policies that also control data usage. Data governance underpins the cloud operations of our recommended solution. Data stakeholders throughout the project lifecycle should prioritize the data most important to the enterprise. A strong data governance solution supports documentation of policies and rules that define data retention, and metadata attributes to support identification of the data elements and categories to which these policies and rules are applied. Effective solution architects also advocate for the creation of an enterprise data catalog to identify the data assets of the organization and where they are located. The role of both data governance and the enterprise data catalog is to empower all data users to know, use, and trust available data sets.
Commonly Associated Roles: Data Engineer, Data Steward, Data Architect, Data Quality Specialist
Key Skills: Master Data Management, Structural Relationships, Data Quality, Data Dictionaries, Flow and Sequence Diagrams

6 **Data Analysis.** Creating the ability to systematically apply statistical and/or logical techniques to describe, illustrate, condense, recap evaluate data to generate meaningful insight is the ultimate purpose of a data ecosystem. Many business intelligence (BI) and geospatial analysis platforms, data science tools, and programming languages can be leveraged in the data ecosystem to advance and mature the analytic capabilities of an organization. This includes advanced technologies that use machine learning and natural language processing to automate the analysis process normally done by an analytics specialist or data scientist and represents the future of analytics. Companies like Cognosante, for example, helps organizations identify the right mix of analytics technologies and mature their analytics program over time enabling them to make data-informed proactive decisions.
Commonly Associated Roles: Business Intelligence Analyst, Data Analyst, Data Scientist, Reports Analyst
Key Skills: Master Data Management, Structural Relationships, Data Quality, Data Dictionaries, Business Intelligence Applications, Data Modeling, Data Visualization, Data Transformations, Healthcare Systems

7 **Admin and User Portals.** A comprehensive and effective data ecosystem would not be complete without streamlined access for administrators and users. Organizations need a portal, with an approved access control methodology, to provide a single point of entry into the data ecosystem which enables users and administrative teams to securely access the functionality and information they require.
Commonly Associated Roles: Developer, Web/UI Designer, Training Manager, Interface/Data Manager, Help Desk Specialist
Key Skills: Web Designer, UI/UX, Wireframes, HTML, CSS, Visualization Tools

8 **Security and Platform.** Configuration Management, Security Controls, and Personal Identifiable Information (PII)/Personal Health Information (PHI) Data Compliance along with Quality Assurance, and automation tools are critical to implementing and using a data ecosystem successfully. These tools and services vary dependent upon the selected Cloud Service Provider (CSP).
Commonly Associated Roles: Cloud Engineer, Compliance and Security Specialist, Cyber Security Specialist, Quality Assurance Specialist, Change Management Specialist, DevOps Specialist
Key Skills: IT Governance, Auditing, Cybersecurity, DevOps, PHI Management, AWS, Google, Azure

CONCLUSION

This Data Ecosystem Framework is designed to support speed to insight. Organizations charged with improving access to and delivery of care deserve scalable and composable solutions that ensure data is properly discovered, collected, integrated, accessible, usable, safe and trusted. The value of a Data Ecosystem Framework is experienced through actionable insight that enables management to make better decisions.

CONTACT US TO LEARN MORE

HIMSS
Eli Fleet, Director Government Relations
Eli.Fleet@himss.org
(o) 703.562.8834
www.himss.org

Cognosante, LLC
Denise Tocco, Vice President Business Development
denise.tocco@cognosante.com
(m) 303.548.3678
www.cognosante.com

Scan the QR code to learn more about how we strengthen healthcare delivery through data interoperability solutions

SCAN ME

Co-produced by   And

cognosante ®
INNOVATE WITH PURPOSE

HIMSS ™