



Enterprise Information Management Strategy

John Backhouse, Chief Data Officer

Mission of the Enterprise Data Office

Rapidly make data fit for purpose and present it for consumption with a reusable reporting and analytic framework guided by SME's, with a dynamically flexible platform allowing for accelerated growth and new business requirements.

Guiding Principles

- * Business driven, customer centric, and collaboration focused
- * Optimize cost-effectiveness and reduce time to market
- * Implement data and information governance policies and procedures at both enterprise and company levels
- * Business driven program with the data office serving as a Center of Excellence (COE)
- * Be flexible with implementation styles – achieve both company level master data management and enterprise interoperability
- * Provide framework for Enterprise Analytics (Descriptive, Diagnostic, Predictive, and Prescriptive)
- * Adopt industry standards and enforce regulatory compliance

Enterprise Data Management Services



* Information Strategy and Governance

- Data will be collected, standardized, normalized, and defined with an enterprise data dictionary allowing business terminology and definitions to be stored in centralized location

* Data Security Management

- CDO will manage the secure storage of all collected data and also manage security access lists with auditing to ensure proper access to data at all levels of the organization.

* Data Integration Services

- The CDO has a world class enterprise data extracting and loading tool that resides on a scalable architecture that allows for rapid ingestion of data while ensuring that data lineage is maintained throughout the data lifecycle.

* Master Data Management Services

- The CDO team will standardize, normalize, validate, and transform all data ingested for the master data domains. Performing these data actions will ensure that the data that is being used is not only valid, trusted data, but that it has been aggregated into a centralized, mastered, single version of truth.

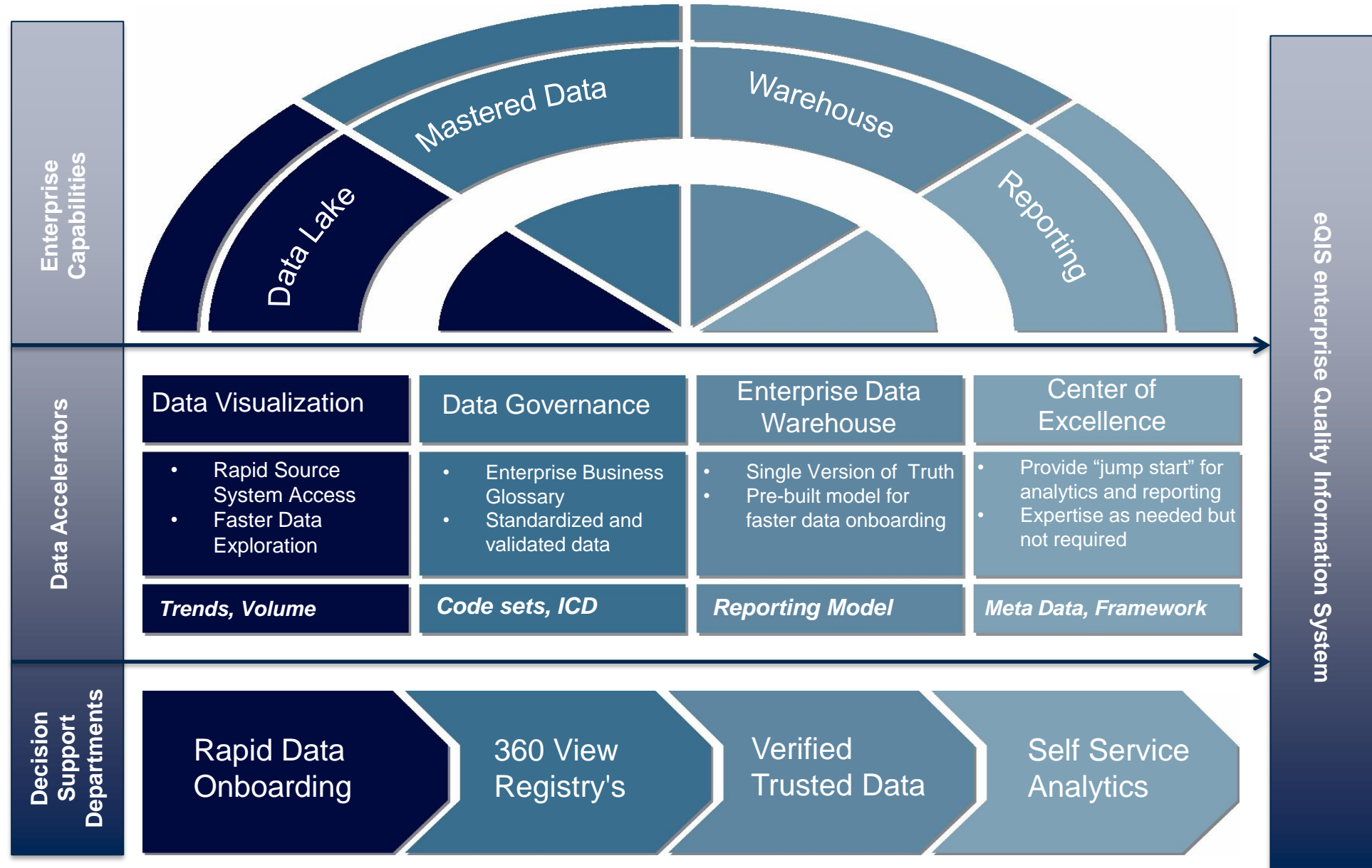
* Data Quality Management

- While the CDO will ensure that the necessary data quality framework is in place and robust, some data must manually be remediated. The CDO will provide a comprehensive set of tools that allows the investigation and correction of data that has been flagged for remediation for the Data Steward of that given area.

* EDW and Data Marts

- The business will be provided with a Enterprise Data Warehouse or data marts for them to perform their reporting and analytics. This will enable self service reporting and analytics for the enterprise while the CDO will offer services to jump start any areas where they may not have sufficient resources.

Enterprise Data Management Business Value Map



What is eQIS?



* What is eQIS?

▪ A New approach for Envision

- With eQIS (Enterprise Quality Information System) , we are taking a new approach to Enterprise Data Management for Envision and that started with hiring a Chief Data Officer responsible for this initiative. Envision has never had this title previously in their history, and bringing on a Chief Data Officer shows that we are making the shift to a data driven company

▪ Faster access, Faster results

- Too often in the past we would receive requests for data and it would take us some time to gather all of the requested data and deliver it in a useful manner. Now, we are working on a process that allows for rapid access to the raw data once it is on boarded to allow for faster insight into data.

▪ The right data at the right time

- As part of our on boarding process, we will be putting the data through several different cleansing, normalization, verification, and matching routines so that the data that you use can be trusted. No more concerns around where the data comes from and the trust worthiness of it.

▪ One source for all your questions

- No longer will you have to go from source to source to gather and combine your data into your reports. We will have one since, trusted source (Single Version of the Truth) that will be able to satisfy your reporting and analytic needs.

▪ Reusable Framework

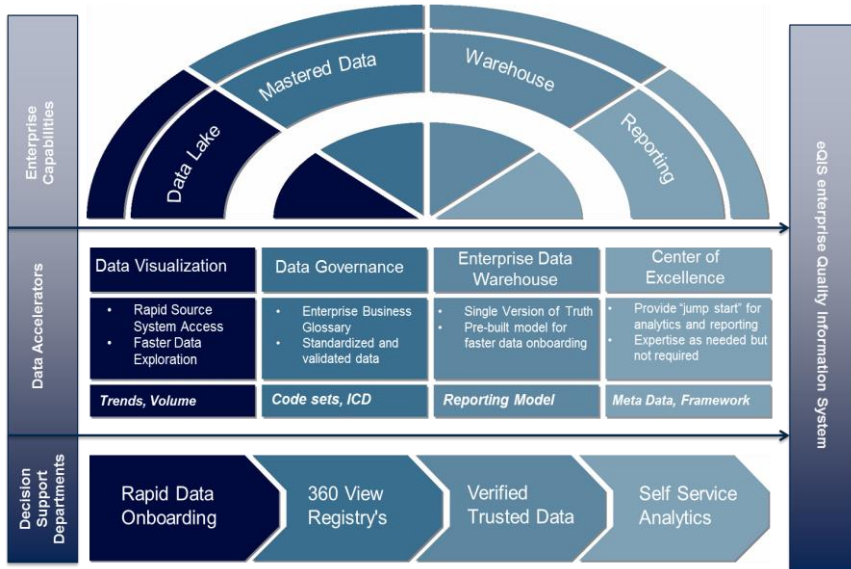
- We will be providing a reusable framework that not only allows you to drive business results, but allows for accelerating your projects. We have a defined process that when followed will serve as a project accelerator allowing us to complete your projects faster. It also allows the business to be more self sufficient and not rely so much on a single point for all their needs.



What is the eQIS Solution?

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Enterprise Data Management Business Value Map



■ Infrastructure and Software

- There have been significant investments made in a centralized data acquisition platform that covers data storage, data acquisition, and hardware to support these activities. As part of this investment, we have purchased a industry leading data model that requires minimal intervention.

■ Ability for providing a longitudinal view for patient information

- Enables businesses to have more information at their ready for such as Patient Profiles, deadly disease alerting, VIP patient handling, etc.

■ Rapid data onboarding and classification

- This allows the business access to the raw data (via a Data Lake) in a timely manner rather than having to wait for the data to go through standardization process. Once data has been on boarded and classified, the business can quickly start doing discovery

■ Enterprise Information Governance

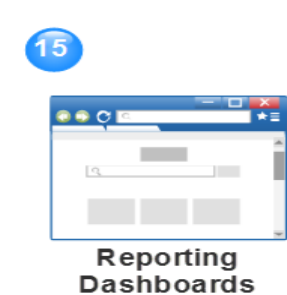
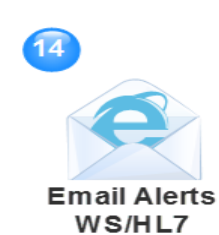
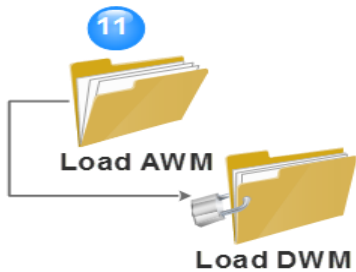
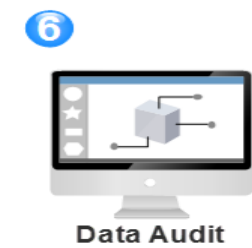
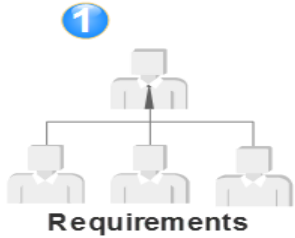
- Allows for all data to be gathered, classified, and defined with business terminology that the business provides with data lineage/history. Given the ability for multiple definitions for each term, it allows for maintaining local independence but reporting at the national levels

■ Center of Excellence

- Provides a framework for a 'rapid start' project that will enable the business to start and realize value quickly using CDO resources while they acquire and identify resources to transition the processes to enable their virtual team



eQIS - From Project to Business Value – Our Process



Process flow for eQIS

* eQIS Process flow

■ Requirements

- Gathering of project requirements for the project including any KPI's or analytics.

■ Data Onboarding

- Onboard data from sources that are required to fill the project

■ Analyze system and map data

- Here we perform a data quality (DQ) analysis to determine what cleansing rules need to be applied to the data and perform data mapping to the EDW

■ Rule sets for normalization and standardization

- This is where we apply the identified DQ rules and begin the data cleansing and verification

■ Master rule validation

- At this point, we validate all the data and create the Master record for the data we are ingesting. For data we are not mastering, we are linking it to the master record to build out the longitudinal view

■ Data Audit

- This step then takes the mastered data and performs audits on the data to ensure no data has fallen out and the data that has a path to remediation

■ IGC/Dictionary

- We define all data that has been collected with business terminology creating a enterprise data dictionary and provide data lineage for showing all points of the data

■ Data Stewardship and Remediation

- The business will provide stewards to manually remediate any data that may have fallen out of the matching process

* eQIS Process flow continued

■ Data Stewardship Portal

- This is where the data stewards and custodians remediate their data and also this provides access to the master record for anyone who needs to view it

■ Data Warehouse – EDW

- Here, we are taking the mastered and non-mastered data mappig and begin loading it into the data warehouse

■ Load AWM / DWM

- Here we will be loading both layers of the Enterprise Data Warehouse. The AWM or Atomic Warehouse is transactional and the DWM or Dimensional Warehouse is used for reporting and analytics

■ Reporting Requirements

- We take the reporting requirements gathered in the beginning and work with the virtual teams to do the report development

■ Reporting Testing

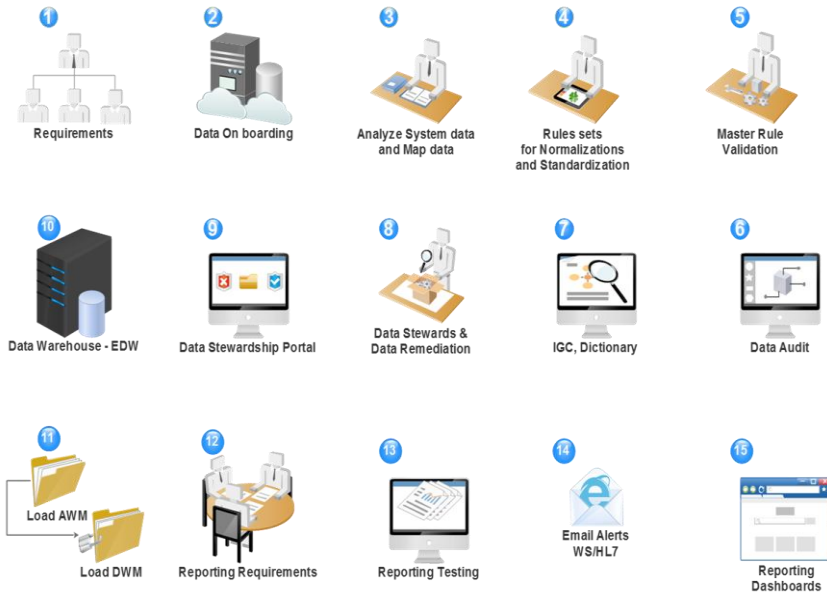
- We take the developed reports and deploy them for testing and validation from business sponsors

■ Email Alerts

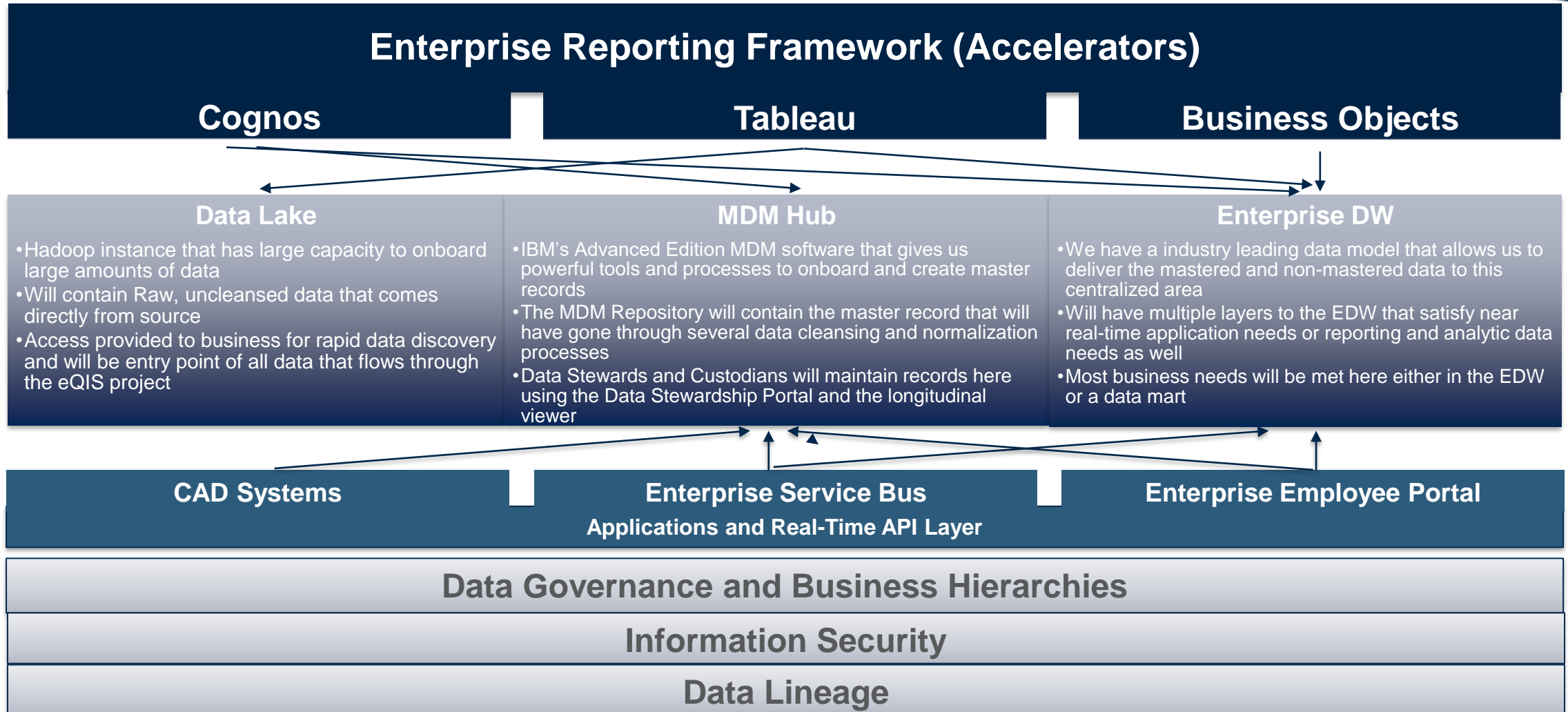
- At this point, we can provide alerting on the data incoming by way of email, text, web services, ect..

■ Reporting Dashboards

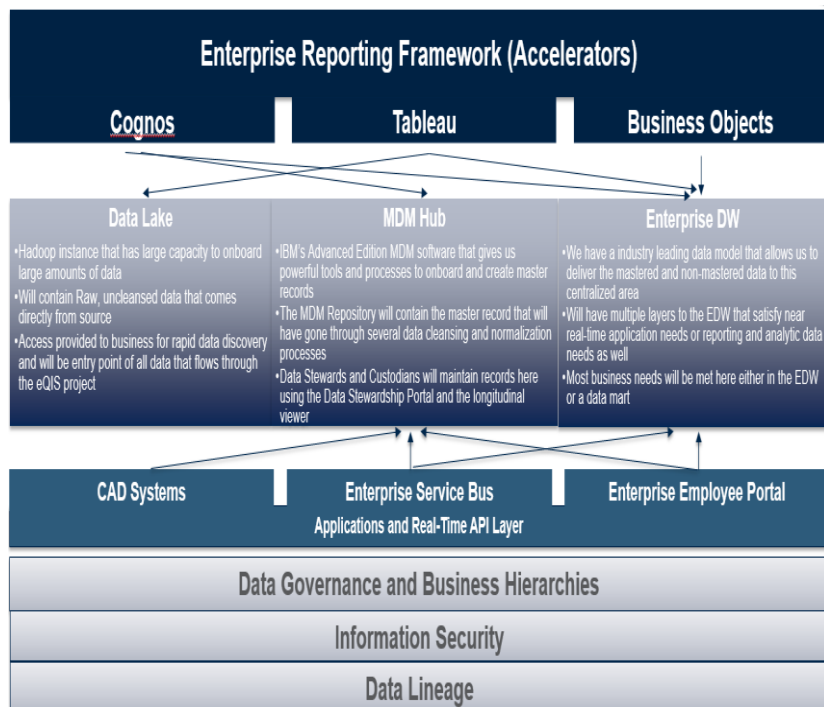
- Once the reports have been tested and validated, we then can produce and deliver any dashboards required from the project



eQIS Framework (Accelerators)



Enterprise Data Management Services



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Enterprise Data Office and Business Operations

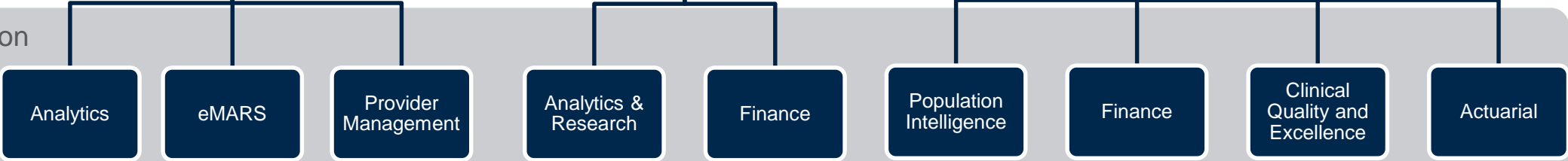
Enterprise Data Management projects, information governance/security, framework, policies, guidelines, CoE, business accelerators



Operating company decisions support responsible for operating company data management projects, compliance with enterprise policies, security, framework, and guidelines

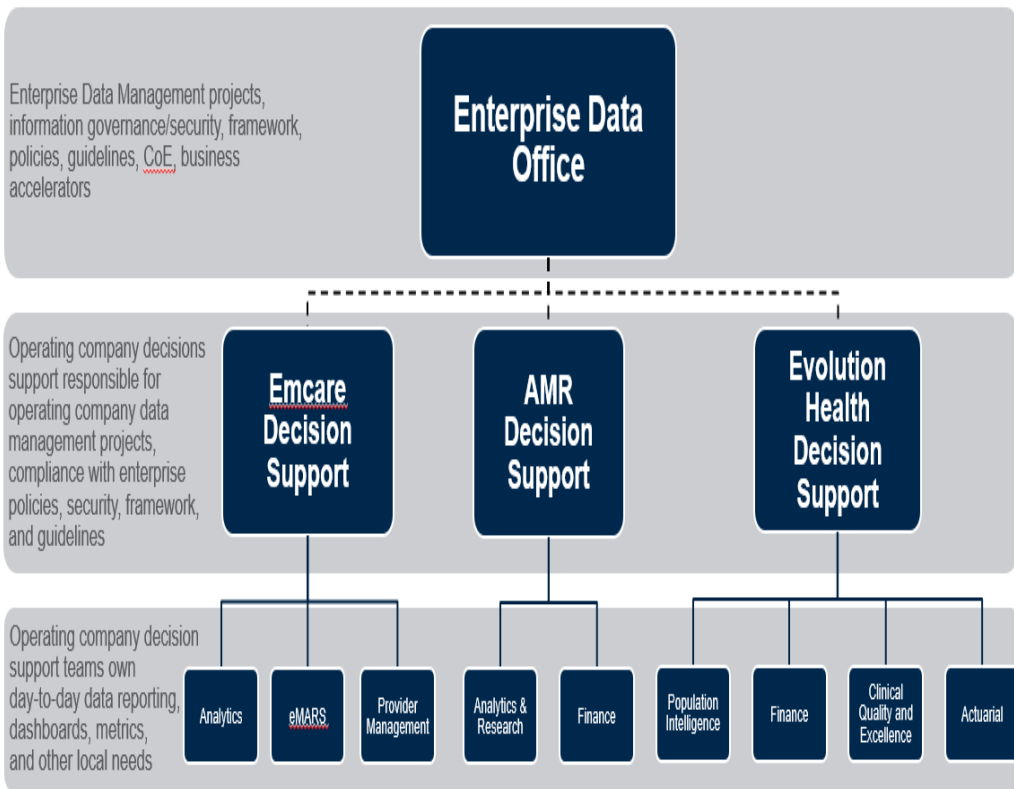


Operating company decision support teams own day-to-day data reporting, dashboards, metrics, and other local needs

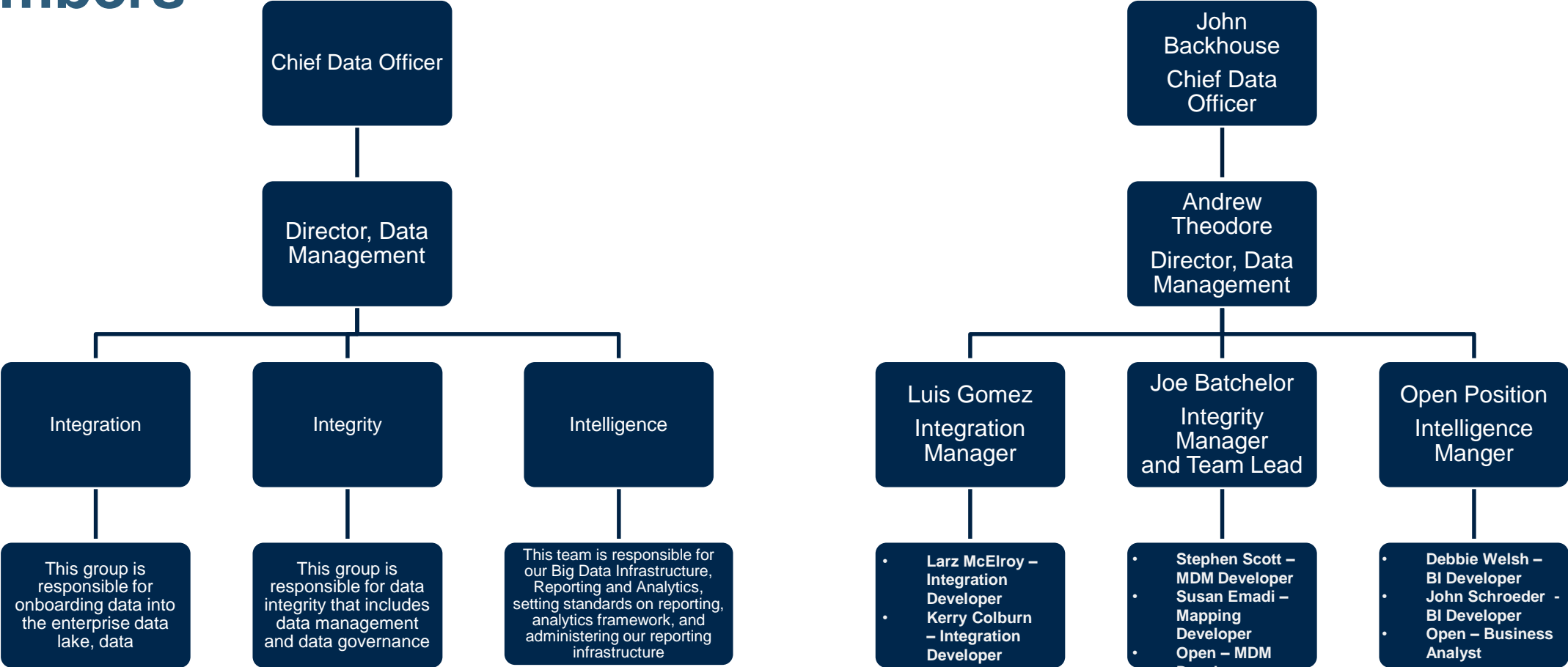


Operating Company Decision Support Departments

- * Each operating company will continue to have their own decision support departments that will oversee and manage the operating companies data management projects and requirements.
- * The Enterprise Data Office will provide the operating companies with a monthly projects report, data catalog, published quality metrics, and enterprise BI dashboards/reports. The operating companies will provide guidance and prioritization support to the Enterprise Data Office.
- * The decision support teams will work closely with the Enterprise Data Office to gain secure access to enterprise data, quality management tools, will follow the EDO framework and guidelines, and security requirements.
- * The decision support will provide resources at times to the enterprise data office on enterprise data management projects and will be integrated into the project team for the duration of the project
 - Below is a list of team members that would typically exist (but is not limited to) on data management projects and will be request on operating company data management projects as well as enterprise data management projects:
 - ❑ **Subject Matter Expert:** Is an individual or team who understands the business request and can provide the business requirements e.g. KPI's, business rules, formulas, data management objectives.
 - ❑ **Data Custodian or Application Owner:** An individual or team who knows the system(s), application(s), and business processes to support the objectives of the project. An understanding of the application functionality, business rules, and end-user requirements.
 - ❑ **Data Steward:** Is responsible for data remediation, data quality, and ensuring consistency throughout the delivery of the project.
 - ❑ **Business Intelligence Report Writer:** Is responsible for developing the requirements and required dashboards, KPI reports, and other reports to support the project

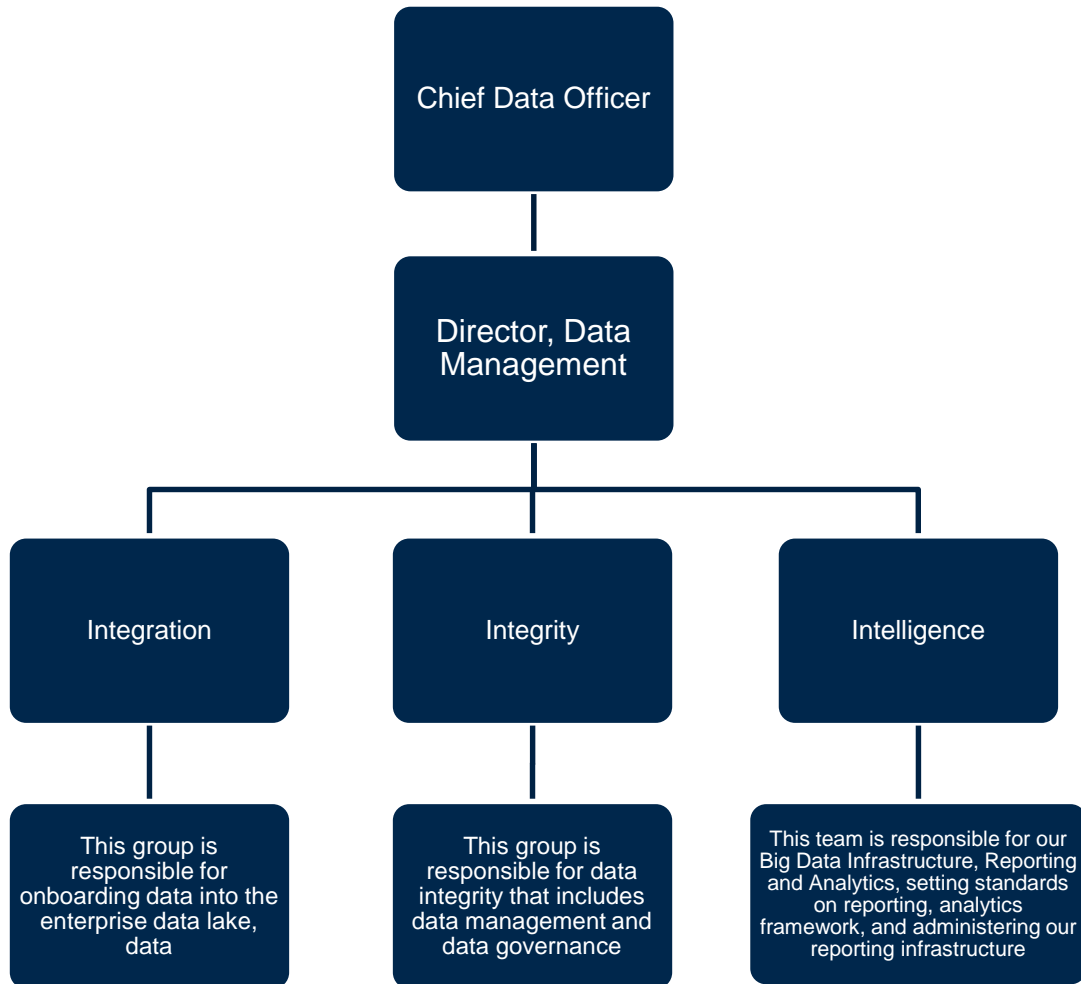


Enterprise Data Office Structure and Members



Enterprise Data Office Structure

* Roles and Responsibilities



■ Chief Data Officer

- The Chief Data Officer is responsible for Enterprise Data Management including Data Governance and Enterprise analytics. This person is also responsible for setting the strategy for these areas and ensuring it is in alignment with the corporate strategy.

■ Director, Data Management

- The Director, Data Management is responsible for driving the strategy set forth by the Chief Data Officer. This person also oversees the data management team and sets direction and deliverables to the team leads. This person also manages resource allocation, project review, planning, and budgeting in conjunction with the Chief Data Officer. This resource will also fill in at a technical role when needed and assist the teams when necessary.

■ Integration

- This group will be responsible for getting all source system data and landing it in the staging and PSA environments and maintaining historical and transactional data feeds. During that process, there will be light data quality and standardization and normalization performed. They also will be responsible for data and systems lineage. Will also have specialist in areas of HL7, EDI, X12, and other industry standard health information exchanges. This includes support of the IBM technologies along with legacy SSIS technologies.

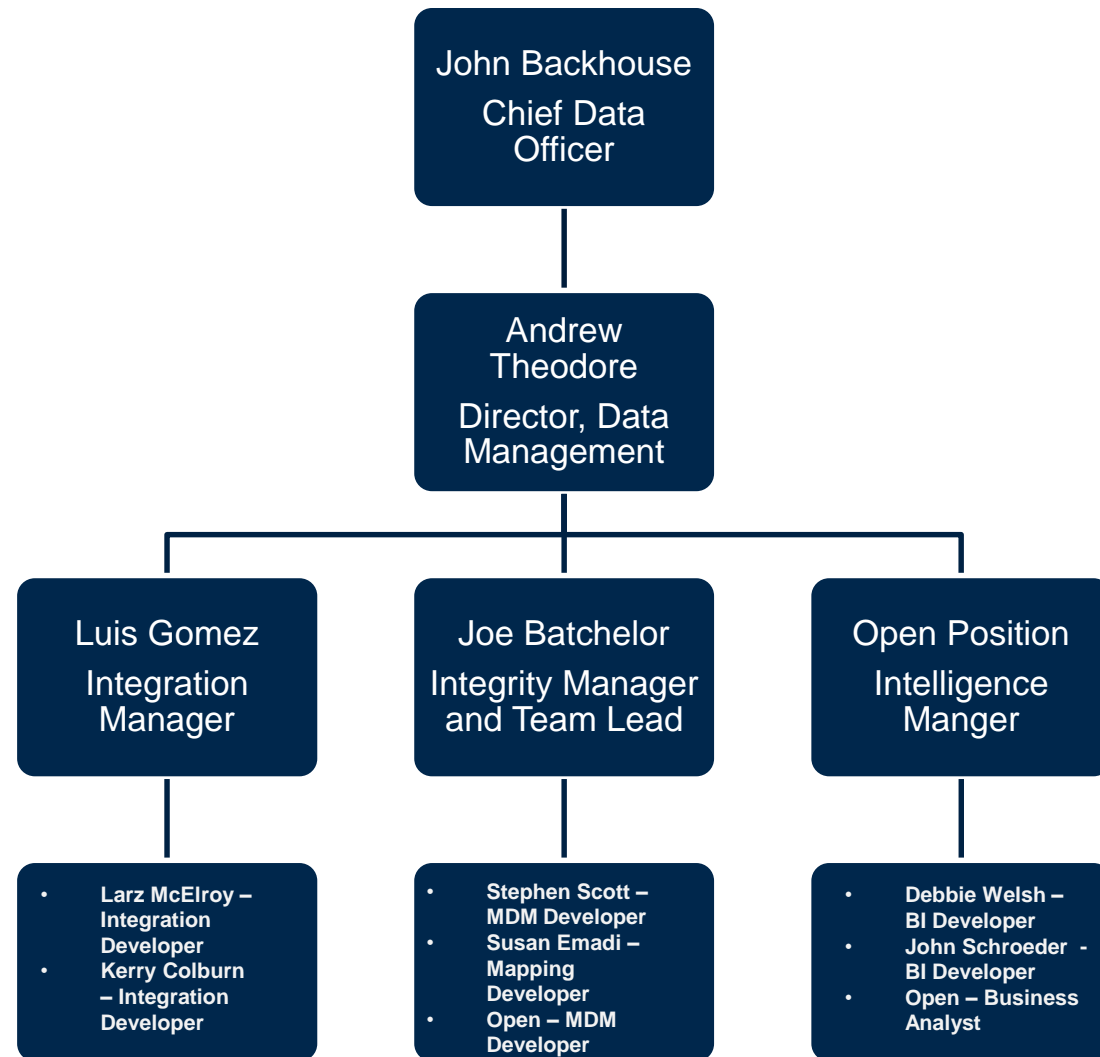
■ Integrity

- This group will be responsible for all aspects of Data Integrity that includes Master Data Management, Data Governance, Information Governance, Business Glossary and Hierarchy management. They will also produce and manage Data Rulesets, Business Process Rulesets, Data Remediation, and Instance Record Management with the data lineage. This group will create a consumption layer for the mastered and non-mastered data through a 360 viewer of the golden record. Publication and management of the master record that includes exposing these records in a real-time CCD C32 format.

■ Intelligence

- This group will be responsible for our managing our Big Data and Hadoop initiatives, our reporting and analytic systems and framework, and assist the business with their reporting and analytic needs. They will be able to help the business jump start their reporting and dashboarding needs eventually leading them to a more self service model. They have expertise in Tableau, Microsoft, and Cognos technologies.

Enterprise Data Office Team Members



Operating Company DSS Projects

* Envision Healthcare

- Master Patient Record
- Provider Profiling
- Enterprise Data Governance
- Guardium and Optim deployment (Database Monitoring and obfuscation)

* Evolution Health

- BPCI Bundle Analysis
- Population Awareness
- BCBS Monthly and Quarterly Reporting
- Devero / Ascension / Finance Dashboards and KPI's

* AMR

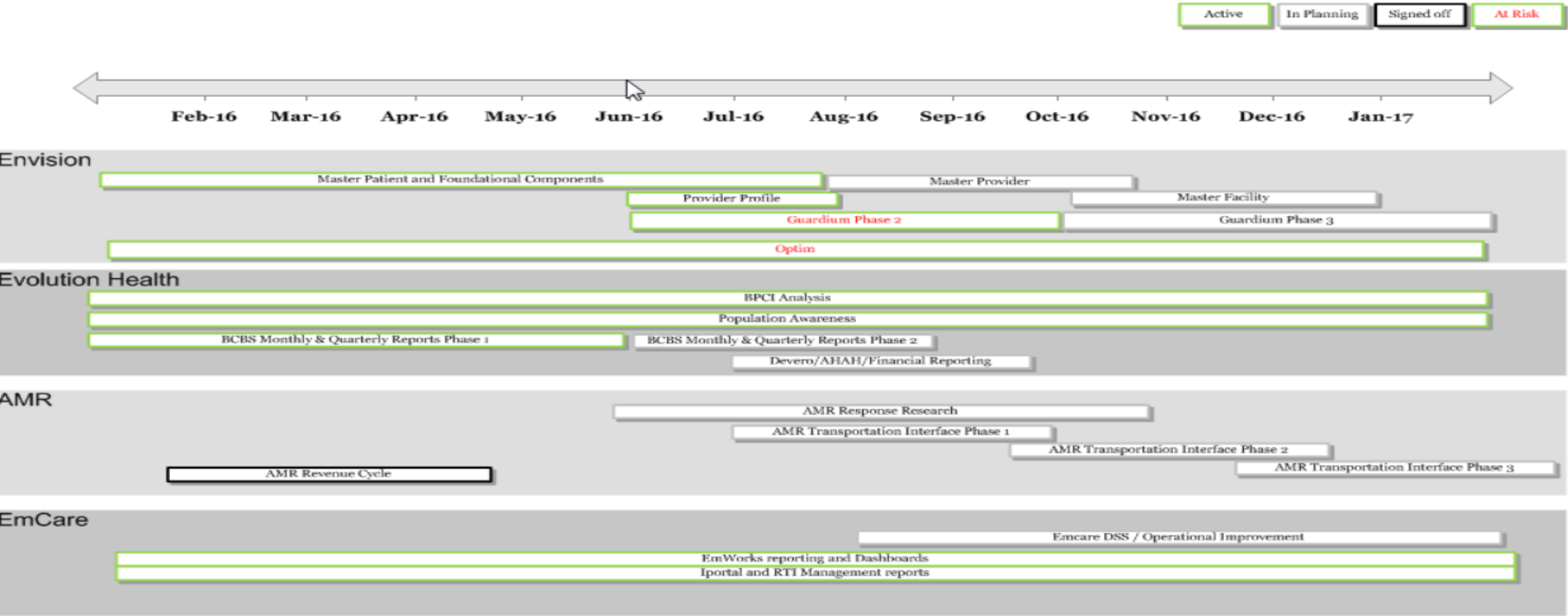
- Ambulance Response Research
- AMR Transportation Interface (Online Ordering)
- AMR Revenue Cycle Management

* EmCare

- Emcare DSS / Care Improvement Platform
- Iportal Physician Reporting / RTI Management Reports
- EmWorks Reporting and Dashboards

Data Management Roadmap - 2016

CDO Road Map 2016 - 2017



Feedback/Comments/FAQ's

* What is the value of Mastering and having a centralized data store?

- To date we've been able to identify two tangible key business value points. The first being the automation the report generation and report scheduling that has save EVH Informatics Team 80 hours a week ($80 * \$50/\text{hr avg} = \$4,000 / \text{week}$). We have been able to run our algorithms to improve the patient engagement data set that resulted in a bottom line increase of \$1,800,000 million dollars for Evolution Health.

* Why is the current process taking longer than expected?

- We have run into multiple issues surrounding quality of the data, time to gain expertise on the software platform, and lack of accurate product documentation.

* How long will it take to Master data or bring new data into the eQIS solution?

- Now that the foundation is complete, we expect a new domain end to end to take no longer than 3 months, if not sooner. As we onboard more domains, the on boarding process will get faster.

* How many domains do we have left and what are the critical or foundational components?

- We have 5 foundational master domains that are critical components all business lines that includes additional data per domain that is addendum that is to be identified.

* How can you speed up business access to the data we have on boarded?

- We have two solutions for this and the first being the data lake or large data repository. We can give access to this raw, unfiltered data for rapid data discovery and prototyping. The second would be the single, central governed repository to all business units for their consumption that contains a reporting an analytic framework that will help speed insight into the data.