Enterprise Architecture vs. Data Architecture

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Global Data Strategy, Ltd.
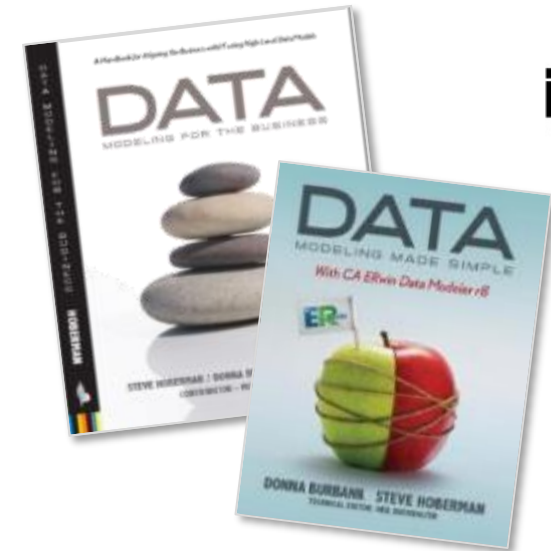October 24, 2024

Donna Burbank

Donna is a recognized industry expert in data management with over 25 years of experience in data strategy, data governance, data modeling, metadata management, and enterprise architecture. Her background is multi-faceted across consulting, product development, product management, brand strategy, marketing, and business leadership.

She is currently the Managing Director at Global Data Strategy, Ltd., an international data management consulting company that specializes in the alignment of business drivers with data-centric technology.

In past roles, she has served in key brand strategy and product management roles for several of the leading data management products in the market.

As an active contributor to the data management community, she is a long time DAMA International member, contributor to the DMBOK 2.0, Past President and Advisor to the DAMA Rocky Mountain chapter, and was awarded the Excellence in Data Management Award from DAMA International.

She has worked with dozens of Fortune 500 companies worldwide in the Americas, Europe, Asia, and Africa and speaks regularly at industry conferences. She has co-authored several books and is a regular contributor to industry publications. She can be reached at donna.burbank@globaldatastrategy.com
Donna is based in Boulder, Colorado, US.

DATAVERSITY Data Architecture Strategies

This Year's Lineup

- **January**   Emerging Trends in Data Architecture – What's the Next Big Thing?

- **February**   Building a Data Strategy - Practical Steps for Aligning with Business Goals

- **March**   Master Data Management - Aligning Data, Process, and Governance

- **April**   How do Data Governance & Data Architecture Support Each Other?

- **May**   The Role of the Chief Data Officer (CDO) in Business Transformation

- **June**   What Does It Mean to be a Data-Driven Organization?

- **July**   Data Architect vs. Data Engineer vs. Data Scientist – Making Sense of Roles in Today's Data-Centric Organization

- **August**   Data Quality Best Practices (with Nigel Turner)

- **September**   Best Practices in Metadata Management

- **October**   Enterprise Architecture vs. Data Architecture

- **December**   The Business Benefits of Data Modeling

What We'll Cover Today

- Enterprise Architecture (EA) provides a visual blueprint of the organization, and shows **key interrelationships between data, process, applications, and more**.

- By abstracting these assets in a graphical view, it's possible to **see key interrelationships, particularly as they relate to data and its business impact across the organization**.

- This webinar will discuss how **data architecture is a key component of an overall enterprise architecture for enhanced business value and success**.
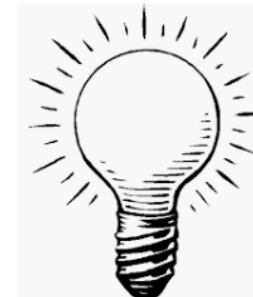
Enterprise Architecture - Definition

Supporting Business Innovation with a Strong Architectural Foundation

- Enterprise architecture (EA) is a discipline for proactively and holistically leading enterprise *responses to disruptive forces by identifying and analyzing the execution of change toward desired business vision and outcomes*.

- ...by presenting business and IT leaders with signature-ready recommendations for adjusting policies and projects to achieve target business outcomes that capitalize on relevant business disruptions.

- EA is used to steer decision making toward the *evolution of the future state architecture*.[1]

Innovation

Foundation

[1] Gartner IT Glossary

Enterprise Architecture – Definition for Data Architects

Modeling is important on many levels

- Just as you need to model the data in an organization, you need to model the organization itself:
  - Motivations & Goals
  - Business Capabilities
  - Business Processes
- As well as the related technologies that support the organization
  - Applications
  - Data
  - Networks
  - Etc.
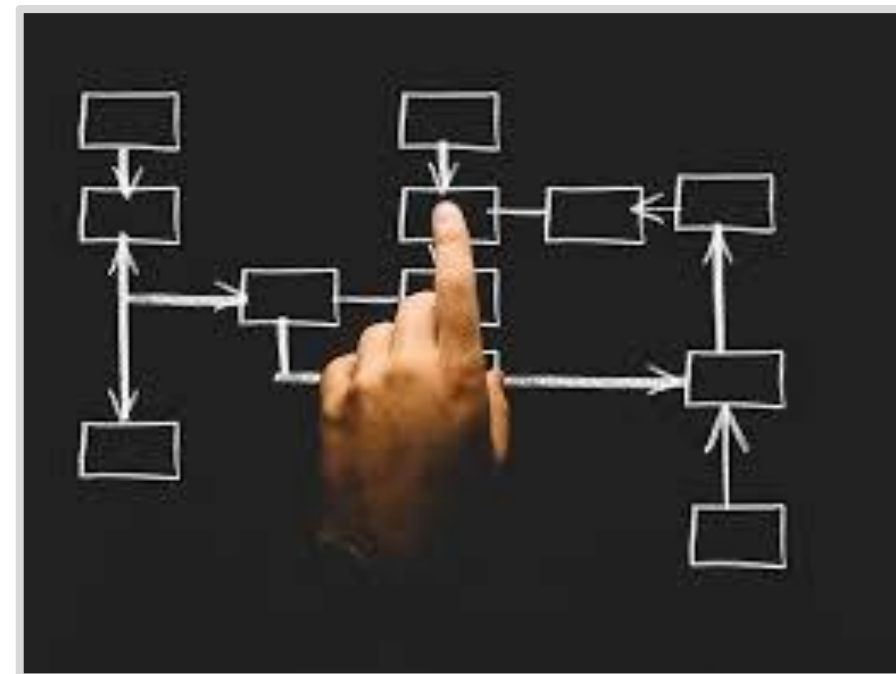
Frameworks for Enterprise Architecture
Zachman Framework

- The Zachman Framework organizes data into the simple categories of:
  - What
  - How
  - Where
  - Who
  - When
  - Why?

- Data fits nicely within the "What" column.

The Zachman Framework for Enterprise Architecture™ — The Enterprise Ontology™ — Version 3.0

https://www.zachman.com

# Frameworks for Enterprise Architecture
TOGAF EA Framework

- The TOGAF Architecture Development Method (ADM) developed by the OpenGroup is a step-by-step approach to developing an enterprise architecture.

- It provides a detailed framework for building an architecture around Business, Data, Application & Technology.
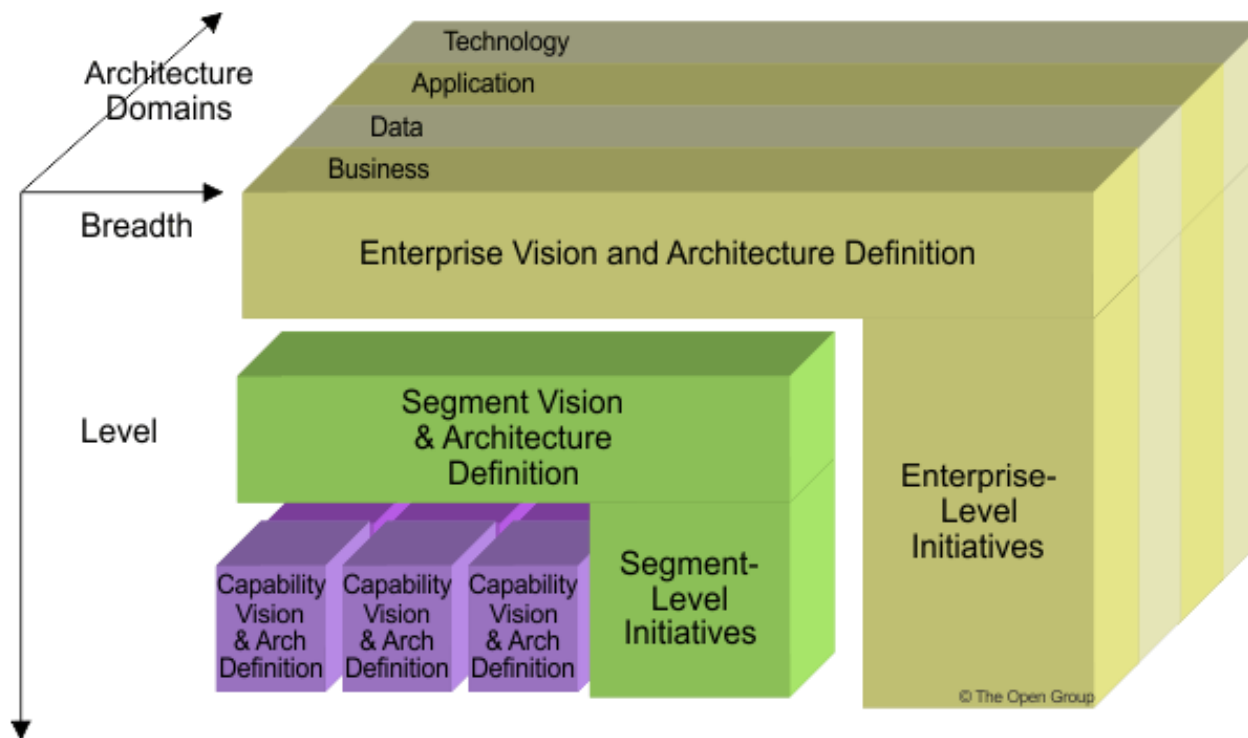
www.opengroup.org

Data as Part of Enterprise Architecture

- Enterprise Architecture provides a high-level view of the people, processes, applications, and data of an organization
- Putting data in business context
  - How does data link to the rest of my organization?
  - If I change data, what business processes are affected?
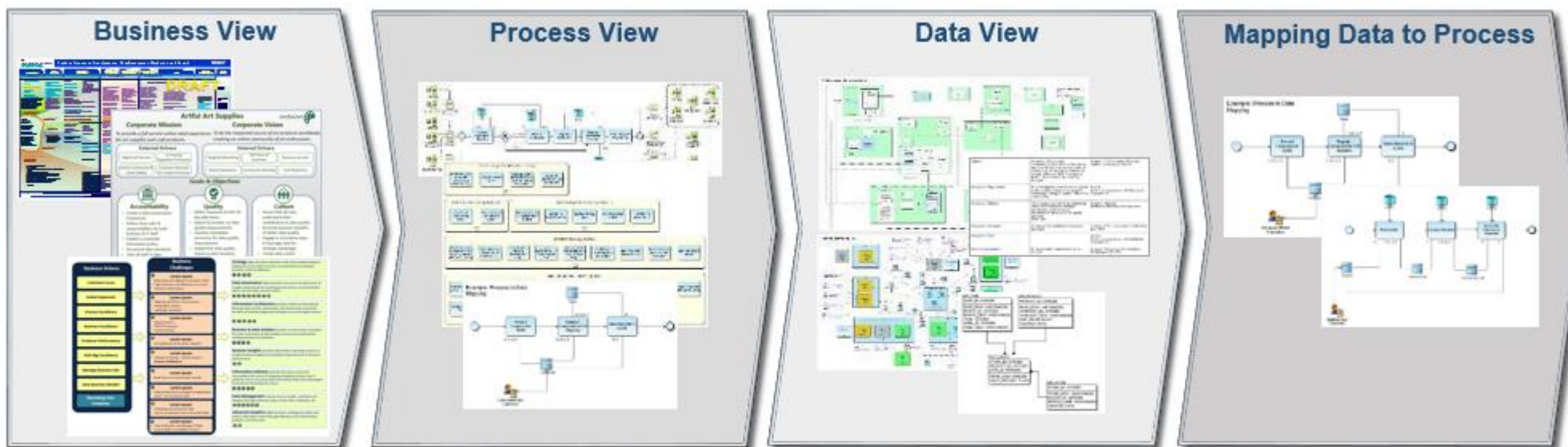
Business View	Process View	Data View	Mapping Data to Process
• Motivation Model	• High-Level Process Models	• Conceptual Data Models	• Process to Data Mapping
• Business & Data Capability	• Detailed Process Models	• Business Glossary	• Where Used / CRUD Analysis
• Mapping Business Drivers to Data Mgt Capabilities		• Logical Data Models	
		• Physical Data Models	
		• System Architecture Diagrams	

What EA Model Types are in Use?

What types of models and diagrams do you use in your Data/Enterprise Architecture?

| Model Type	Percentage
Logical data models	59%
Conceptual data models	53%
Physical data models	53%
Data flow diagrams	51%
Data lineage diagrams	33%
Business process models	28%
System Architecture Diagrams	24%
Don't know	18%
Business Capability Models	13%
CRUD Matrices	10%
Class models	7%
Component diagrams	5%
Sequence diagrams	5%
State diagrams	5%
Javadoc	5%
Other (please specify)	3%

Architecture vs. Construction

- It's a common analogy to use building architecture as an analogy to data architecture.

- When constructing a building, there is a clear distinction between designing a house and building a house.

Design
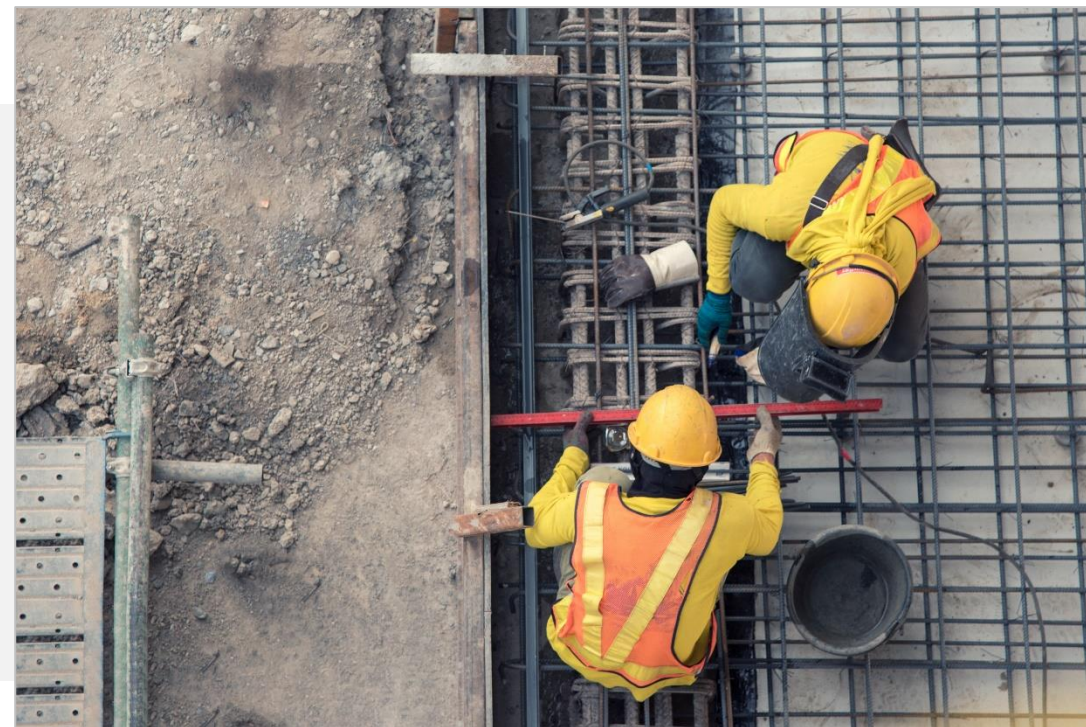
Build

The Role of the Architect

Technology

Business

Janus

Architecture Diagrams and Artifacts – Some Tools of the Trade

Business Motivation Model

Artful Art Supplies

ArtfulArt

Corporate Mission

To provide a full service online retail experience for art supplies and craft products.

Corporate Vision

To be the respected source of art products worldwide, creating an online community of art enthusiasts.

- Corporate-level Mission & Vision
- May already be created or may need to create as part of project.

External Drivers

Digital Self-Service	Increasing Regulation Pressures
Online Community & Social Media	Customer Demand for Instant Provision

Internal Drivers

Targeted Marketing	360 View of Customer	Revenue Growth
Brand Reputation	Community Building	Cost Reduction

- External Drivers are what you're facing in the industry
- Internal Drivers reflect internal corporate initiatives.

Data-centric Goals & Objectives

Accountability

- Create a Data Governance Framework
- Define clear roles & responsibilities for both business & IT staff
- Publish a corporate information policy
- Document data standards
- Train all staff in data accountability

Quality

- Define measures & KPIs for key data items
- Report & monitor on data quality improvements
- Develop repeatable processes for data quality improvement
- Implement data quality checks as BAU business activities

Culture

- Ensure that all roles understand their contribution to data quality
- Promote business benefits of better data quality
- Engage in innovative ways to leverage data for strategic advantage
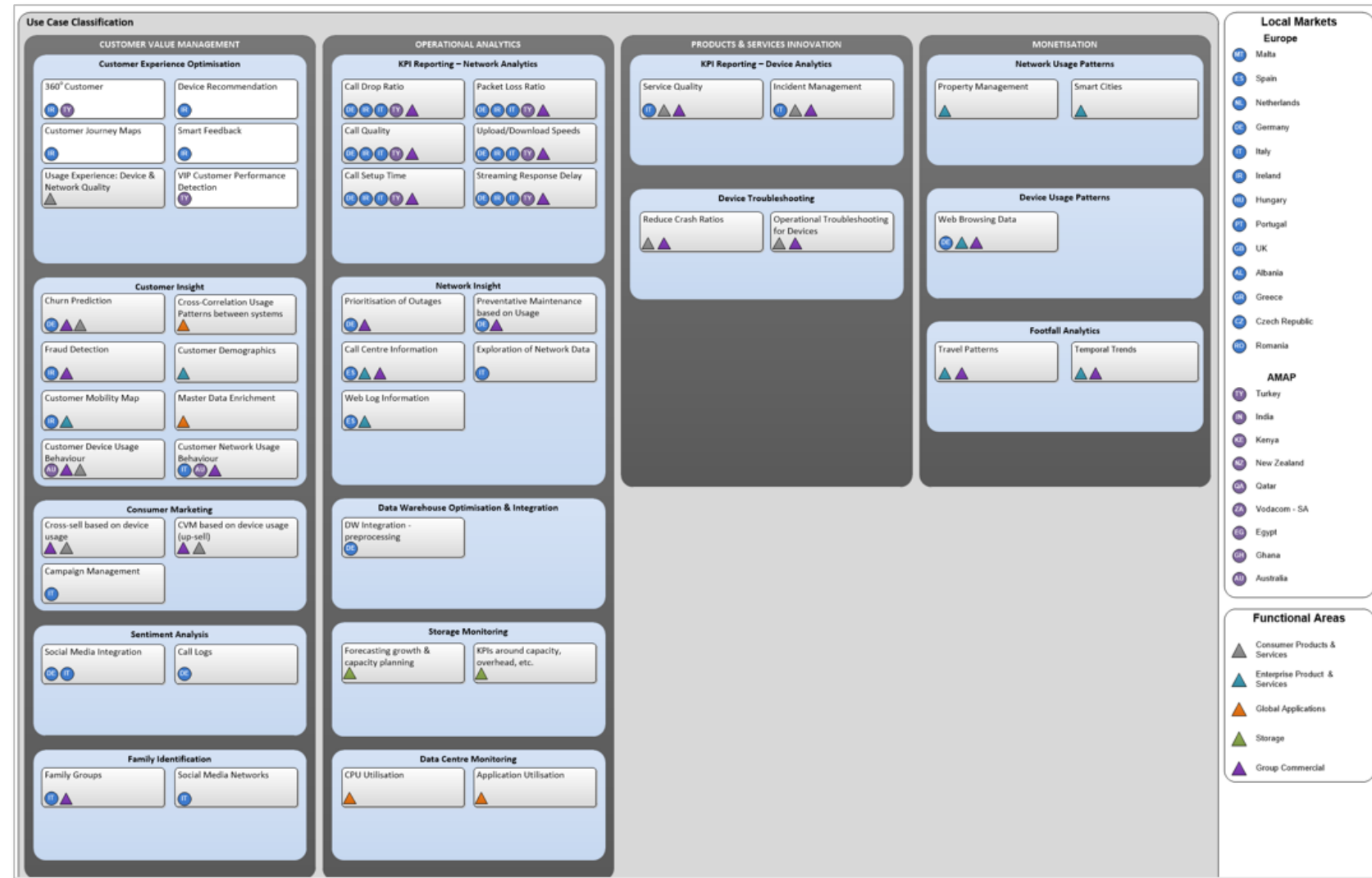- Create data-centric communities of interest

- Data-Centric Goals & Objectives
- Clear direction for the project
- Use marketing-style headings where possible

Use Case Model

- The Use Case Model
  - Categorizes existing demand
  - Provides a "heat map" of usage patterns
- Particularly important for large, geographically distributed teams & departments.

Business Capability Models

- A business capability model outlines the core functional areas of the organization.
  - Note: this is not the same as an organizational chart
  - Capabilities can be overlaid with key data domains to create a "heat map" of cross-functional data usage.
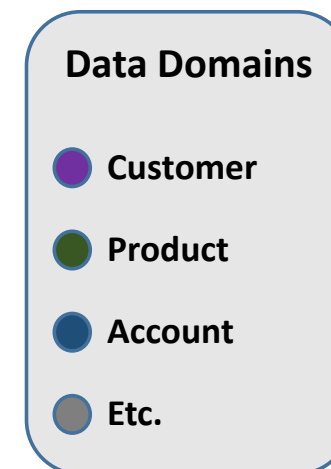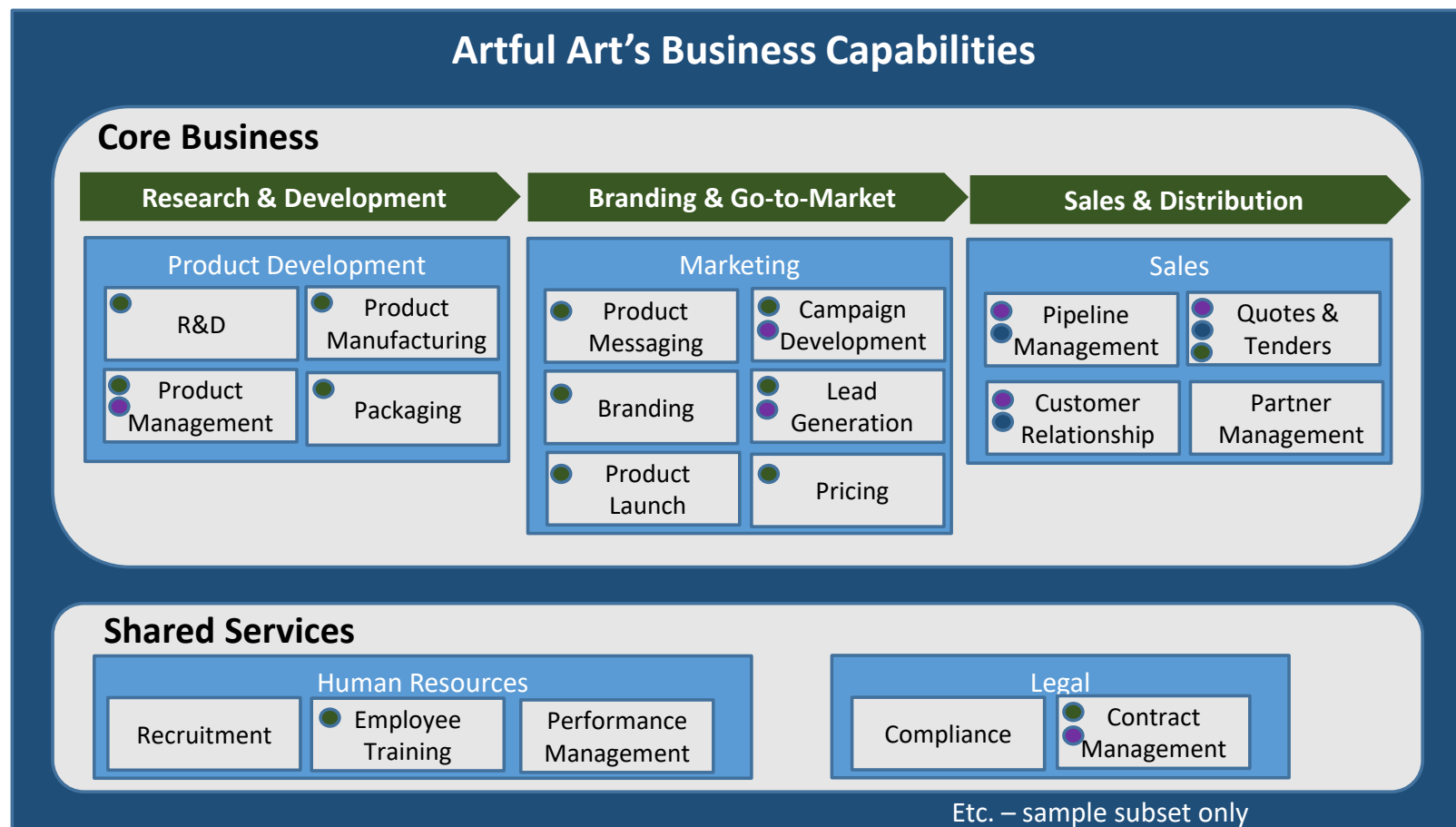
Data-Driven Merger for Financial Services

The combined information assets of both companies is one of our biggest strategic advantages.
- CEO

- A key driver for a recent merger of two large financial institutions was the integration of data assets
  - Streamlining the merger of the two organizations by *integrating the data assets*
  - Identify ways in which *data can be used to strategic advantage*
- Organizational Structure & Business Capability Alignment were critical
  - Understanding how data was used across the organization
  - Identifying efficiencies & opportunities for collaboration

Business Capabilities Company A

Business Capabilities Company B

Common Data Foundation
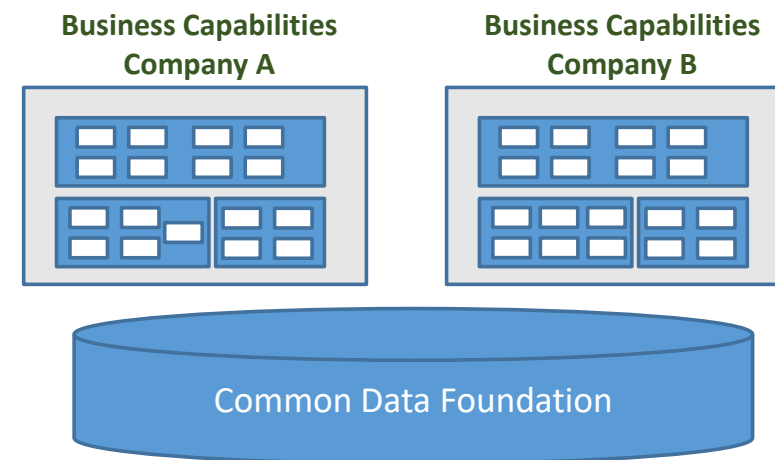
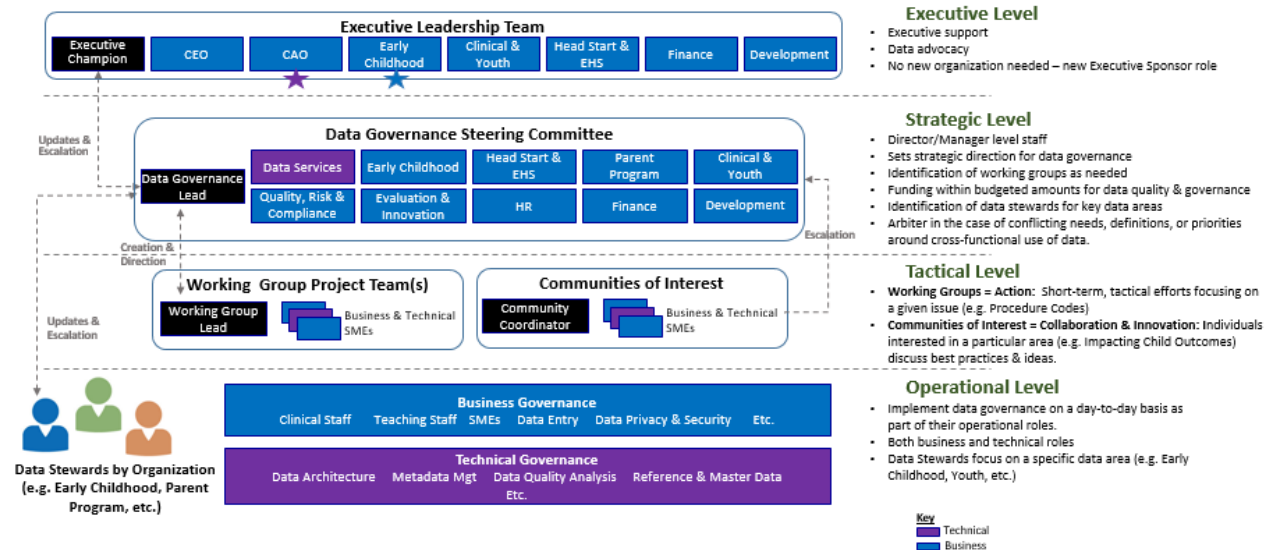# Aligning Organizational Capability to Data Governance

Organizational Capability, Organizational Structure, and Roles are key to Data Governance and Data-Centric Organizational Structures
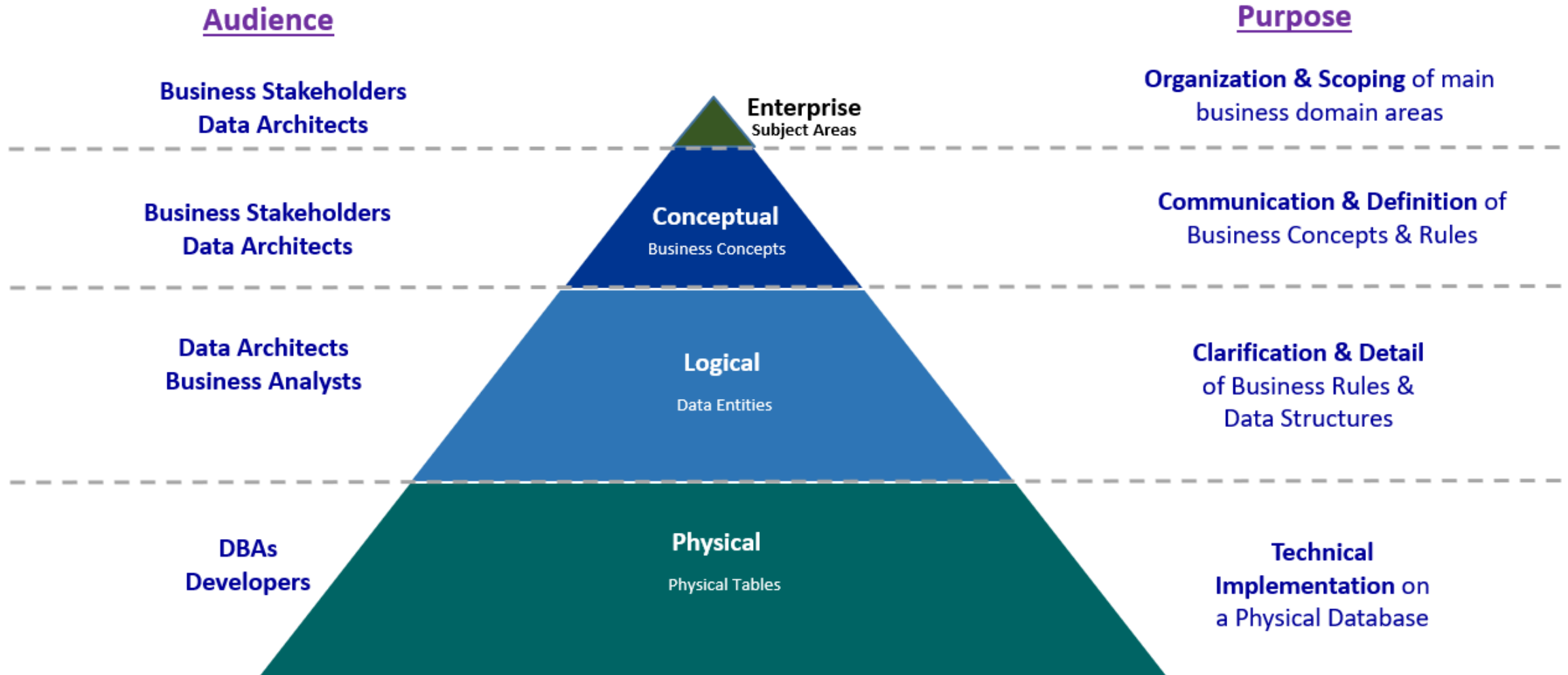
Aligning to Organizational Capabilities
e.g. From Plan to Production to Sales & Distribution

Designing Org Structures for Data-Centric Efforts
e.g. Aligning Data Governance to Individual Culture

Data Models

Audience

Business Stakeholders
Data Architects

Business Stakeholders
Data Architects

Data Architects
Business Analysts

DBAs
Developers

Enterprise
Subject Areas

Conceptual
Business Concepts

Logical
Data Entities

Physical
Physical Tables

Purpose

Organization & Scoping of main
business domain areas

Communication & Definition of
Business Concepts & Rules

Clarification & Detail
of Business Rules &
Data Structures

**Technical
Implementation** on
a Physical Database
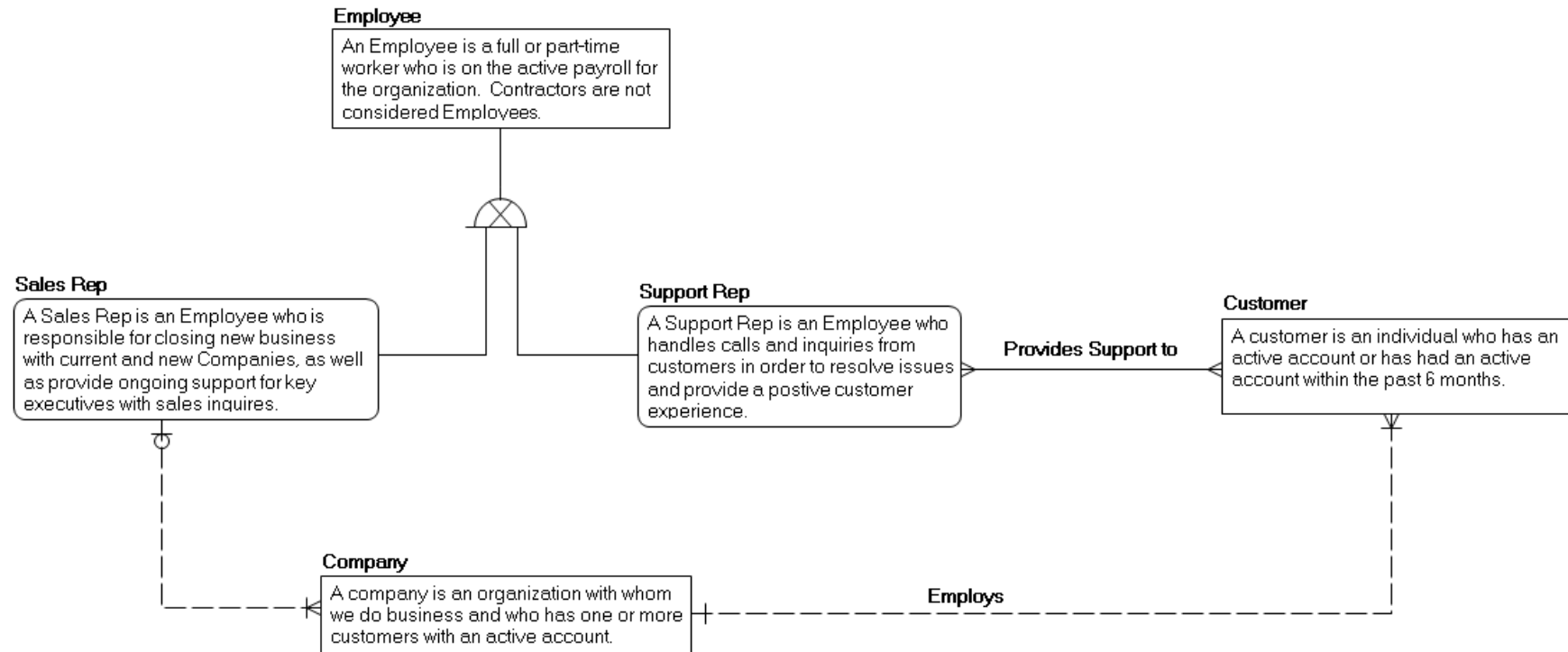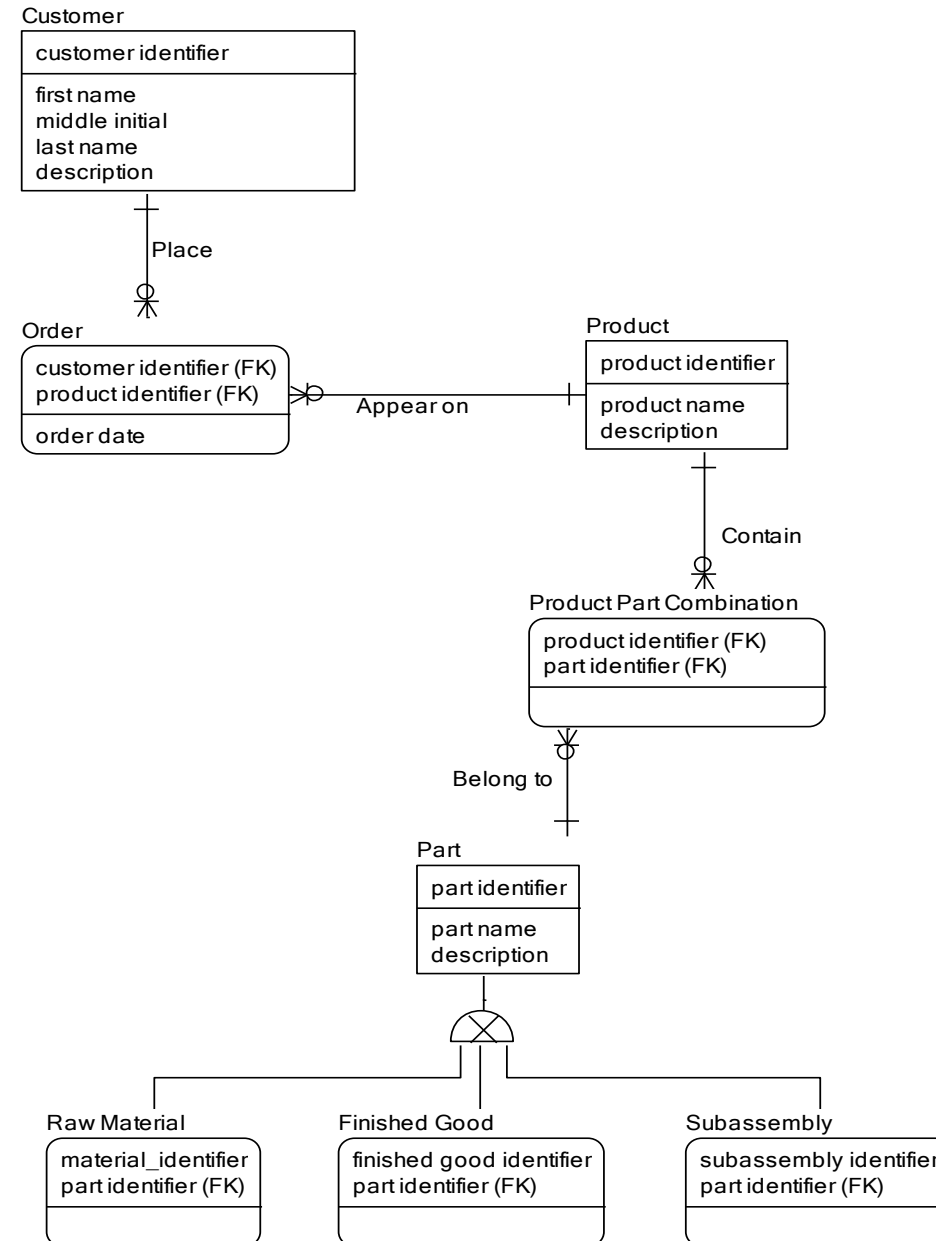
Conceptual Data Model

- A conceptual data model provides core **definitions** of key data objects.

- It also shows key **relationships** between data objects.

- Even a simple diagram as the one on the right can tell a powerful **"story"**

.... And uncover key b**usiness issues and opportunities**.

Employee
An Employee is a full or part-time worker who is on the active payroll for the organization. Contractors are not considered Employees.

Sales Rep
A Sales Rep is an Employee who is responsible for closing new business with current and new Companies, as well as provide ongoing support for key executives with sales inquires.

Support Rep
A Support Rep is an Employee who handles calls and inquiries from customers in order to resolve issues and provide a postive customer experience.

Provides Support to

Customer
A customer is an individual who has an active account or has had an active account within the past 6 months.

Company
A company is an organization with whom we do business and who has one or more customers with an active account.

Employs

Logical Data Model

- A logical data model describes key business rules and definitions.

- Attributes are typically shown.

- Cardinality specifies additional detail regarding relationships.

.... The Logical Model defines additional detail regarding data entities, attributes, and their relationships.

Customer
- customer identifier
- first name
- middle initial
- last name
- description

Place

Order
- customer identifier (FK)
- product identifier (FK)
- order date

Appear on

Product
- product identifier
- product name
- description

Contain

Product Part Combination
- product identifier (FK)
- part identifier (FK)

Belong to

Part
- part identifier
- part name
- description

Raw Material
- material_identifier
- part identifier (FK)

Finished Good
- finished good identifier
- part identifier (FK)

Subassembly
- subassembly identifier
- part identifier (FK)

Case Study: Data Models by Business Capability
Dataversity Webinar from March 2019

In March 2019, Kiewit gave a great case study of how they used data models for business success.

Catch the replay at: https://www.dataversity.net/das-webinar-data-modeling-case-study-business-data-modeling-at-kiewit/
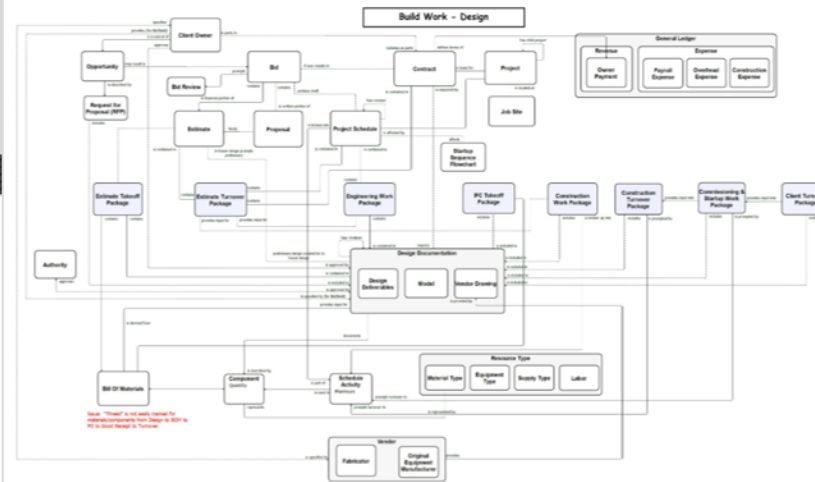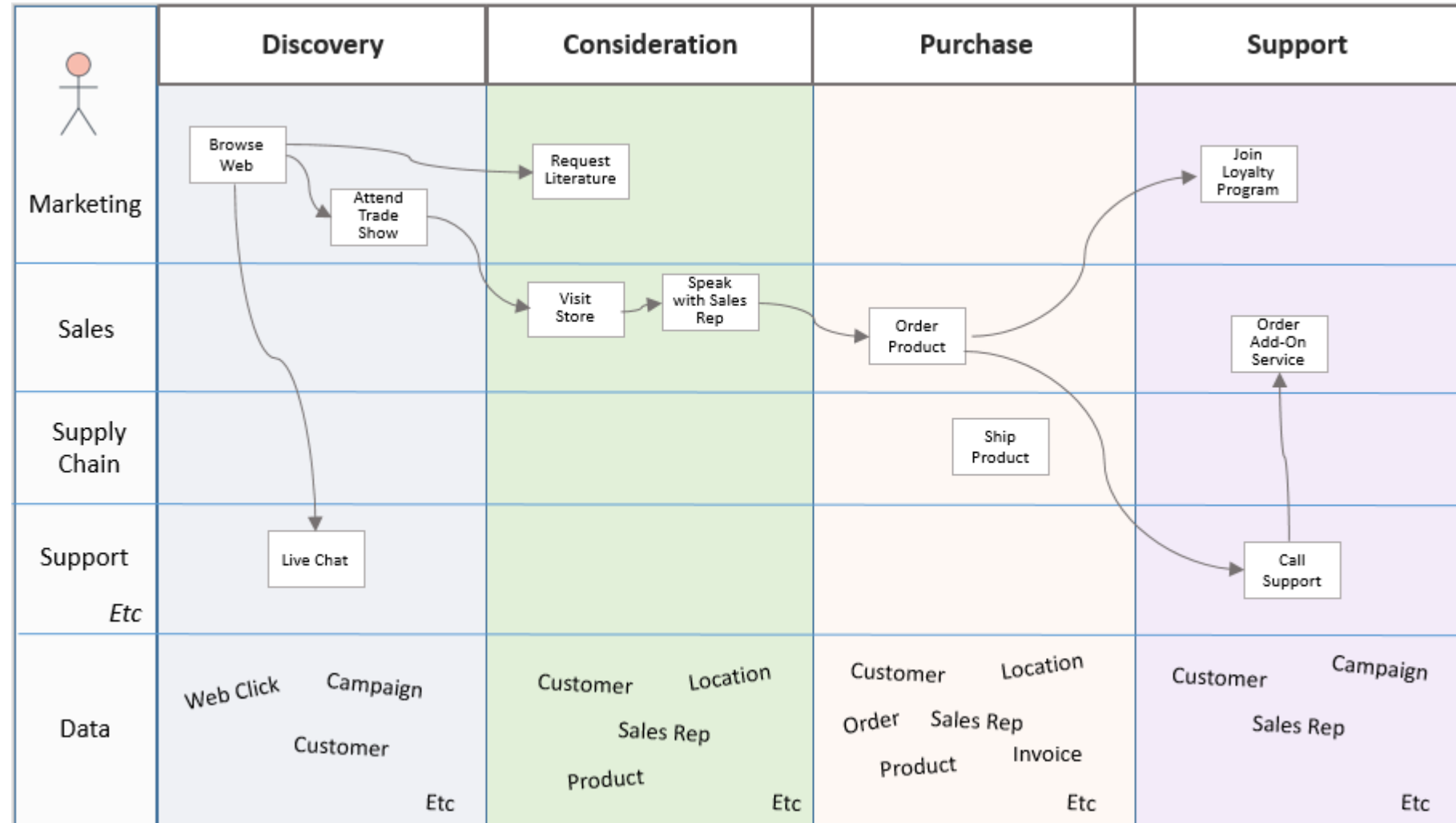
Process / Workflow Models

Identifying key data dependencies in core business processes

- Process models are a helpful tool for describing core business processes.
  - "Swimlanes" outline organizational considerations
  - Data can be mapped to key business processes to understand creation & usage of information.
- They are particularly helpful for areas such as Master Data Management (MDM) where process is critical to data stewardship & integration.
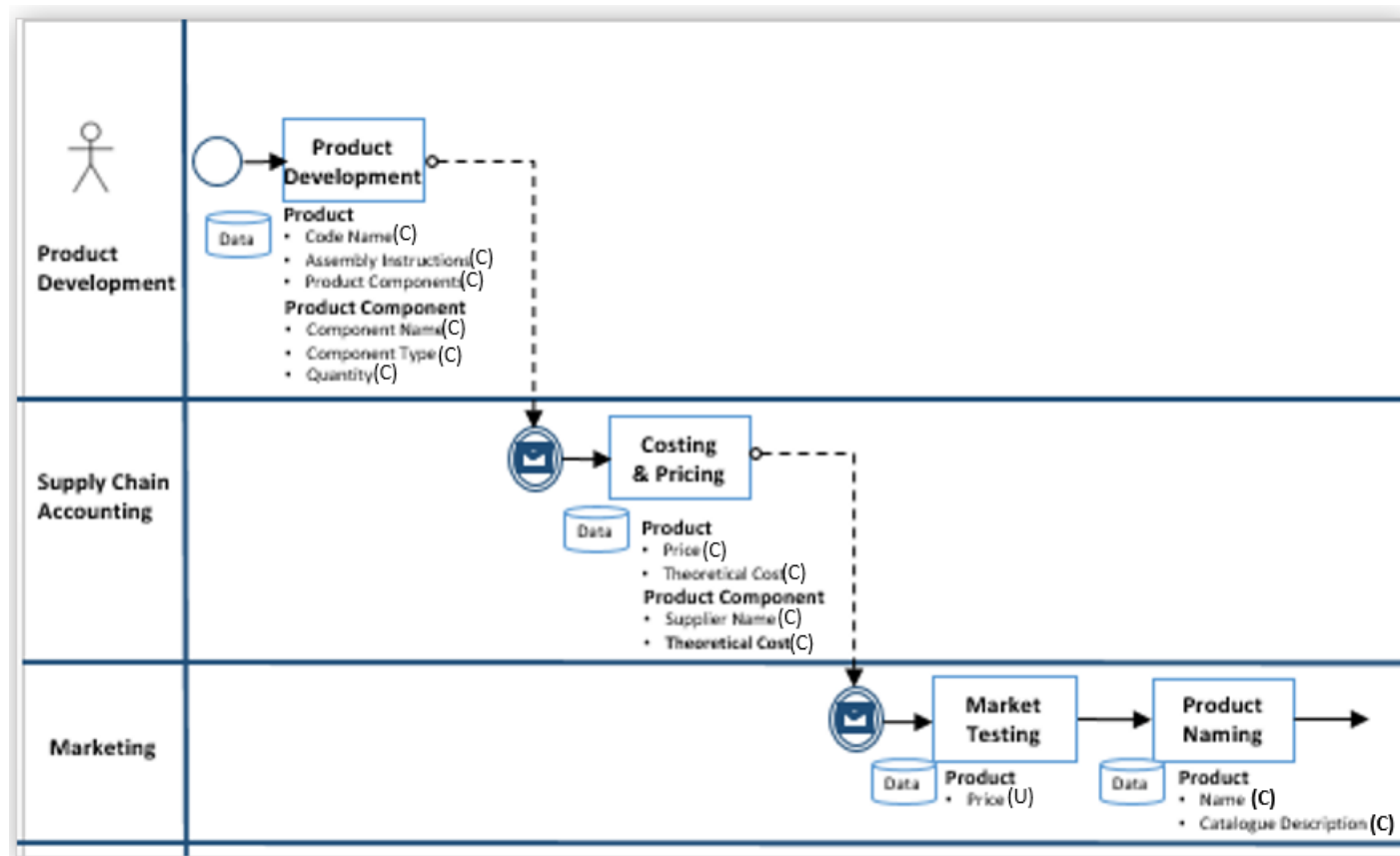
Customer Journey Map

- A customer journey map outlines key phases of the customer in their "journey".

- They are similar to a process model, but with a different focus & perspective.

- Creating a data overlay is a helpful way to see the key data touched at each point in the journey.

- Journey maps can be created for other industries as well, e.g. Student, Patient, etc.

|	Discovery	Consideration	Purchase	Support
Marketing	Browse Web, Attend Trade Show	Request Literature		Join Loyalty Program
Sales		Visit Store, Speak with Sales Rep	Order Product	Order Add-On Service
Supply Chain			Ship Product	
Support	Live Chat			Call Support
Etc				
Data	Web Click, Campaign, Customer, Etc	Customer, Location, Sales Rep, Product, Etc	Customer, Location, Order, Sales Rep, Product, Invoice, Etc	Customer, Campaign, Sales Rep, Etc

CRUD Matrix

Create, Read, Update, Delete

- CRUD Matrices shows where data is **C**reated, **R**ead, **U**pdated or **D**eleted across the various areas of the organization.
- They can be created by department, by system/application, etc.
- This can be a helpful tool in data governance & data quality.

	Product Development	Supply Chain Accounting	Marketing	Finance
Product Assembly Instructions	C	R		
Product Components	C	R		
Product Price		C	U	R
Product Name	C		U,D	
Etc.				

Process Models & CRUD Fit Well Together

- Business Process Models describe key activities within the organization.

- Linking these processes to the data that is Created, Updated, or Deleted (CRUD) is important to understanding data usage.

Business Process Model
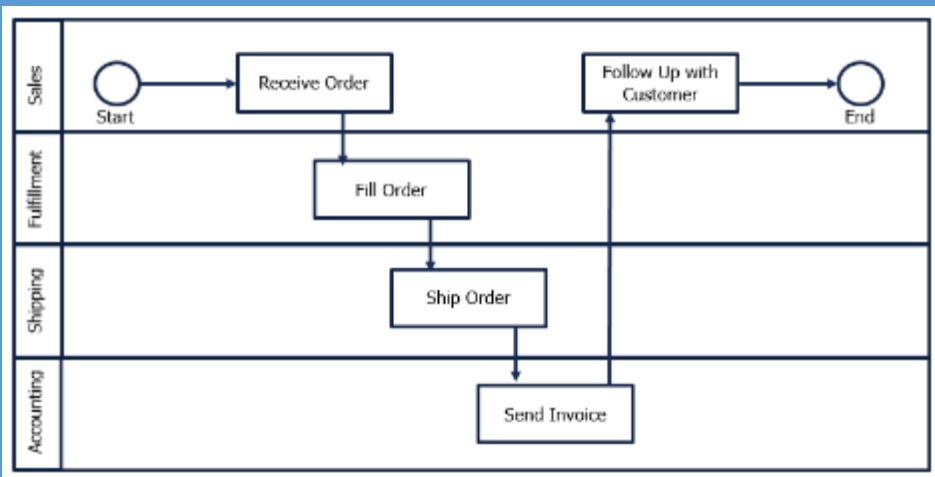
CRUD Matrix

|	Customer	Order	Account	Invoice	Product
Receive Customer Order	R	C	C, R		
Process Customer Order	C,R,U		R,U		R
Fill Order	R,U		R,U		R,U
Send Invoice	R,U		R,U	C	

International Pharmaceutical Company

Business Alignment and IT Strategy

- An international Pharmaceutical company was looking to make better use of its data to streamline its:
  - Clinical Development
  - Commercial Processes
  - R&D.
- Business alignment was a key first step
  - Greater understanding how data was used by and critical to key business activities
  - Created "blueprints" of how the business runs—then how data maps to that"
  - Data models, Process models, & mappings
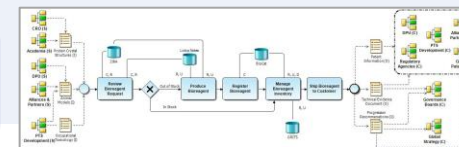 - Identified opportunities for business efficiencies

1 Clearly Define & Promote Services
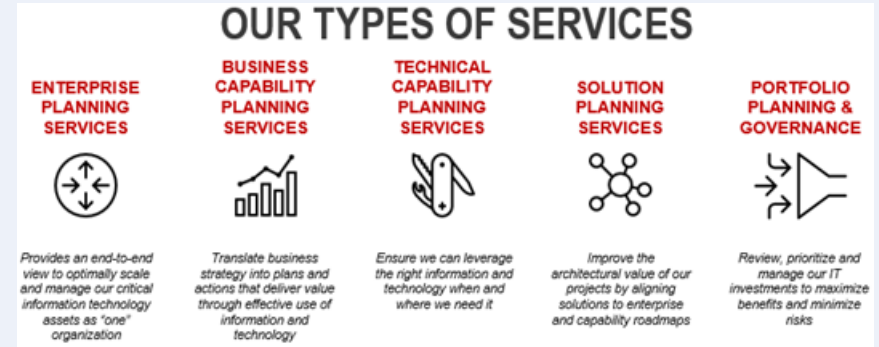
2 Align with Business Needs & Capabilities
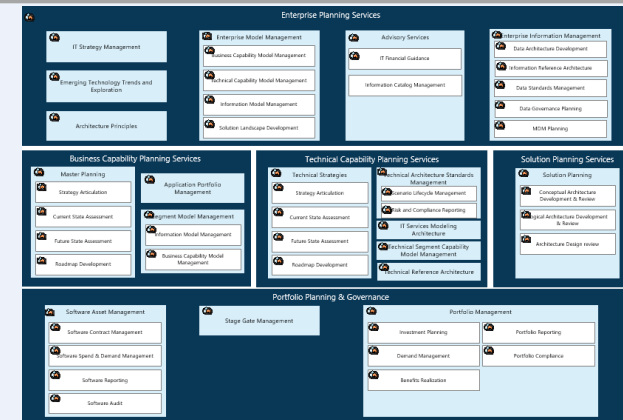
3 Integrate into Project Governance

Architecture a stage gate for every project – Data, Process models & mapping

Roles & Culture: Pharmaceutical Company

- **Business Acceptance: Clinical Scientists had data models on their office walls**
 - "Blueprints" describing their clinical development

- **Architecture team had clear direction**
  - "Who we are and what we do" clearly articulated to the business
  - Best Practices made processes more efficient
  - Governance driving architecture as a "must-have" for each new initiative.

System Architecture Diagrams

System architecture diagrams can create a "big picture" of how systems and their components fit together – both at the high-level and more detailed level.
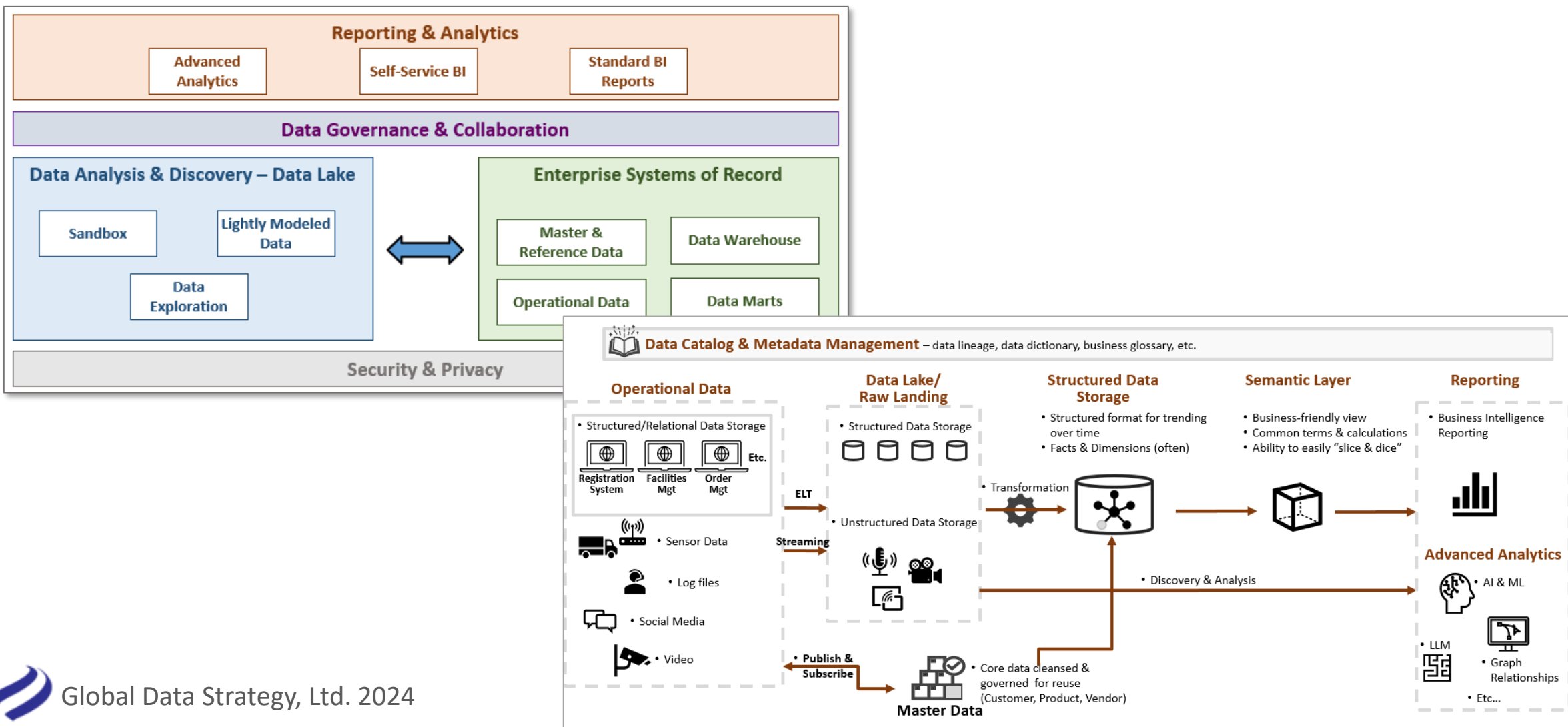
Summary

- Enterprise Architecture provides a series of models and diagrams to **describe the organization to maximize business value**

- While the number and diversity of platforms is increasing it is important to:

  - Focus on the business need and application

  - Design fit-for-purpose solutions using a number of interrelated technologies

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Who We Are: Business-Focused Data Strategy
Maximize the Organizational Value of Your Data Investment

In today's business environment, showing **rapid time to value** for any technical investment is critical.

But technology and data can be complex. At Global Data Strategy, **we help demystify technical complexity** to help you:

- Demonstrate the ROI and **business value of data**

- Build a data strategy **at your pace to match your unique culture** and organizational style.

- Create an **actionable roadmap for "quick wins"**, which building towards a long-term scalable architecture.

Global Data Strategy shares experience from some of the largest international organizations scaled to the pace of your unique team.

Global Data Strategy has worked with organizations globally in the following industries:

Finance · Retail · Social Services · Health Care · Education · Manufacturing · Government · Public Utilities · Construction · Media & Entertainment · Insurance …. and more

Thoughts? Ideas?

Questions?