



Enterprise Data Management Success: Strategic Alignment, Modelling & Human Factors

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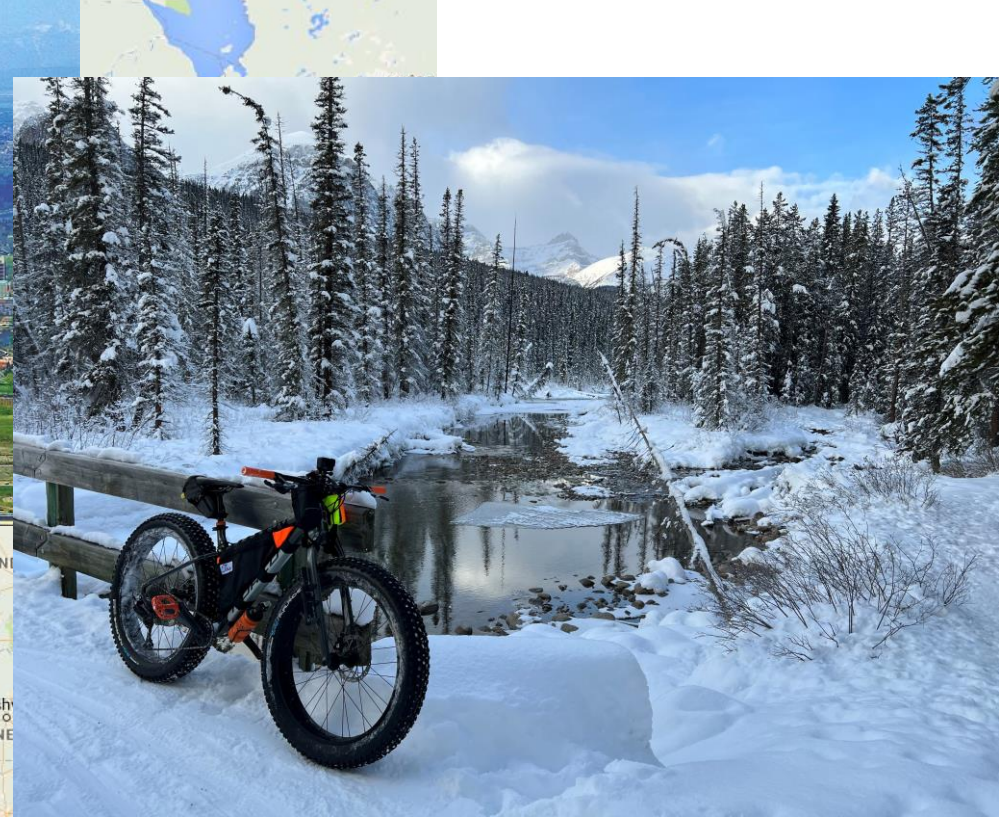
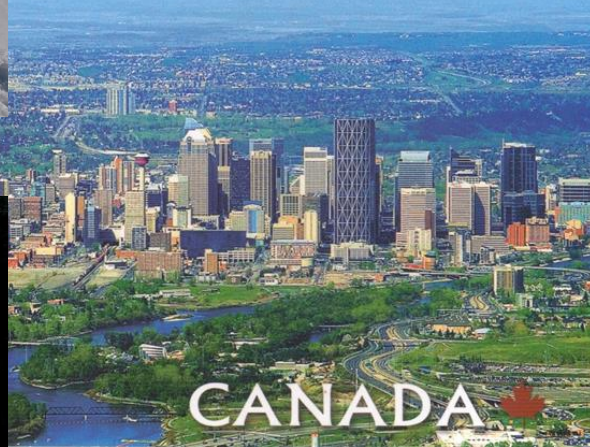
Disclaimer: The views and opinions expressed in this presentation are those of the author and do not necessarily reflect the official position of Microsoft.

Ron Huizenga – Background

- Business & data professional for 37 years
- Focus areas
 - Data architecture/modelling
 - Business modelling
 - Enterprise architecture
 - Business transformation
- Multiple industries
 - Manufacturing, supply chain, retail, health care, transportation, oil & gas, mining, software design & development ...
 - There's always something new to learn!
- Balance of internal roles and consulting
 - Management, project & program management, director, CIO
 - IBM business partners
 - Independent consultant for 20 years
 - Senior Product Manager ER/Studio (5+ years)
 - Enterprise architecture leader



Where's Calgary?



Agenda

- Information capability
- Data management misconceptions
- The Need for Architecture
- Strategic Alignment
 - Realization through modelling
- Enterprise data model
- Lean data modelling
- Data governance considerations
- The people dimension
- Open discussion



Information Capability

Companies are Failing in their efforts to become data driven

- Survey of industry leading, large corporations
 - 72% of survey participants report that they have yet to forge a data culture
 - 69% report that they have not created a data-driven organization
 - 53% state that they are not yet treating data as a business asset
 - 52% admit that they are not competing on data and analytics
 - 93% of respondents identify people and process issues as the obstacle
 - The difficulty of cultural change has been dramatically underestimated
 - 40.3% identify lack of organization alignment
 - 24% cite cultural resistance as the leading factors contributing to this lack of business adoption.
 - Firms must become much more serious and creative about addressing the human side of data if they truly expect to derive meaningful business benefits
- *Source: 2019 Big Data and AI Executive Survey (NewVantage Partners)*

Information Capability Study – How are we doing?

- Very few organizations utilize information to its full potential
- Deficiencies in technical capability, skills, **lacking data culture**
- Lack of investment in value-driven information strategies
- Very few understand how to derive maximum value from information
 - This will erode corporate value if not corrected



* Based on 2015 PwC/Iron Mountain study: Seizing the Information Advantage

Information Management Disparity

- **Misguided Majority – 76%**

- Informed but constrained
- Uninformed and ill-equipped
- Data seen as a byproduct, or taken for granted
 - Low comprehension of commercial benefits that can be gained
- Constrained by legacy approaches, regulations
- Weak analytic capability, or
 - strong analytic capability, lacking value focus
 - Low analytical capacity
- Can be overwhelmed by data volume
- Data is domain of data architects
- IT led rather than business led
- "Spreadsheet hell"

- **Information Elite – 4%**

- Proactive Action
 - Diversify business models
 - Improve operating efficiency
 - Identify / implement new market opportunities
- Tangible data value
 - Linked to organizational KPIs
- Exploit data for competitive advantage
- Balanced approach between security and value extraction
- Holistic approach
 - Governance is part of normal business
- Well defined information strategy
 - Reflects business objectives

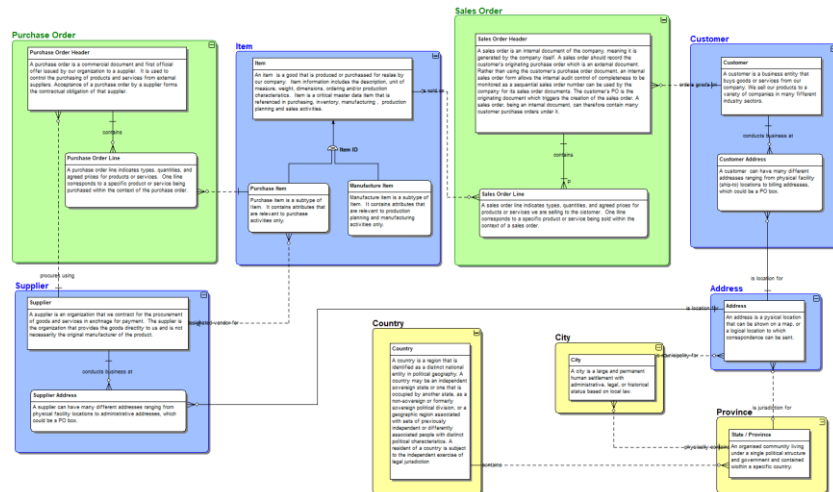
** Based on 2015 PwC/Iron Mountain study: Seizing the Information Advantage*

Data Management Misconceptions

Data Modelling and Data Science are not the same

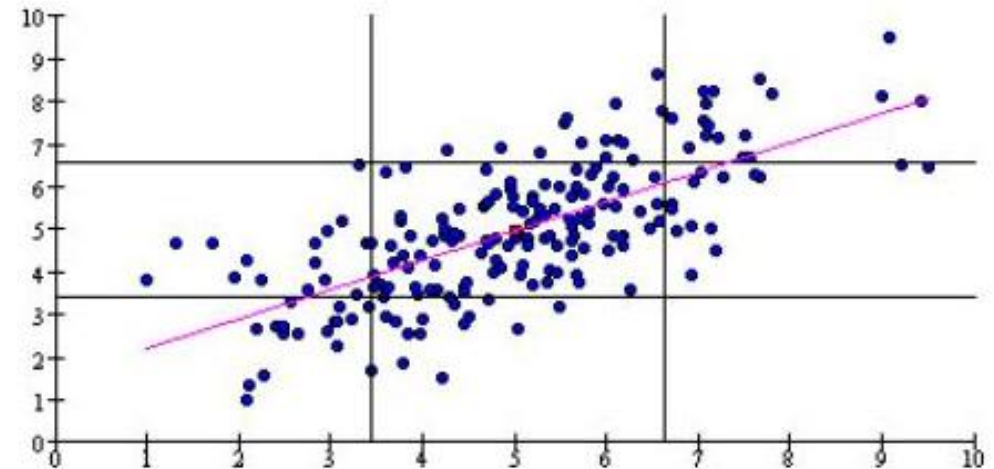
- Data Modelling

- Metadata
- Entity-Relationship modelling
 - Conceptual
 - Logical
 - Physical
- Data Flow and Lineage



- Data Science

- Data Content
- Statistical modelling & analysis
 - Correlation, regression, patterns
 - Trends and algorithms
- Data Visualization
- Major focus on data cleansing



Machine Learning Does NOT Replace Data Management

- Definition:

- Machine learning, a branch of artificial intelligence, can be described as systems that learn from data
 - in order to make predictions, or
 - to act autonomously (or semi-autonomously) in response to what it has learned.
- Can eliminate the need for someone to continuously code or analyze data themselves to solve a problem

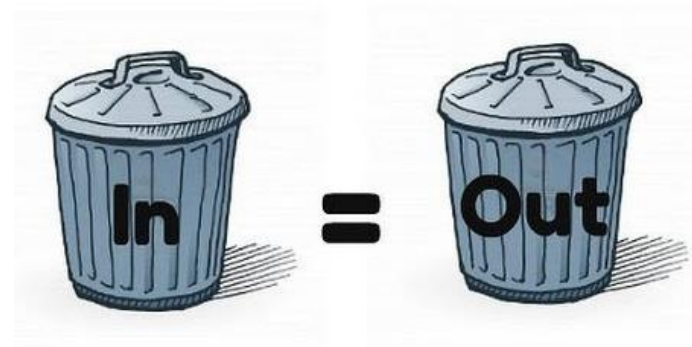


- **“If your data is bad, machine learning tools are useless.”**

- *Thomas Redman (Harvard Business Review)*

- **“If your data is bad, machine learning accelerates garbage-in, garbage-out (GIGO). You simply achieve disaster faster.”**

- *Ron Huizenga*



Beware the “Expert” Reports & Opinions

- Industry analyst reports are opinions, not industry wide consensus
 - They may be biased
 - Be aware that many “industry rankings” are “pay to play”
 - Don’t bet your company’s future on them
 - Read critically for informative purposes only
 - Just because it is expensive, that doesn’t make it valuable
 - Do your own homework!
 - Make your own decisions based on requirements and fit for your organization



Just ... don't

- Just because someone else is doing it, that doesn't mean that you need to
 - Make decisions based upon business strategy and requirements
- The new technology or trend is **NOT** the solution to everything
 - Beware of anything touted as a replacement for all of your existing technology
 - Silver bullets apply only to werewolves



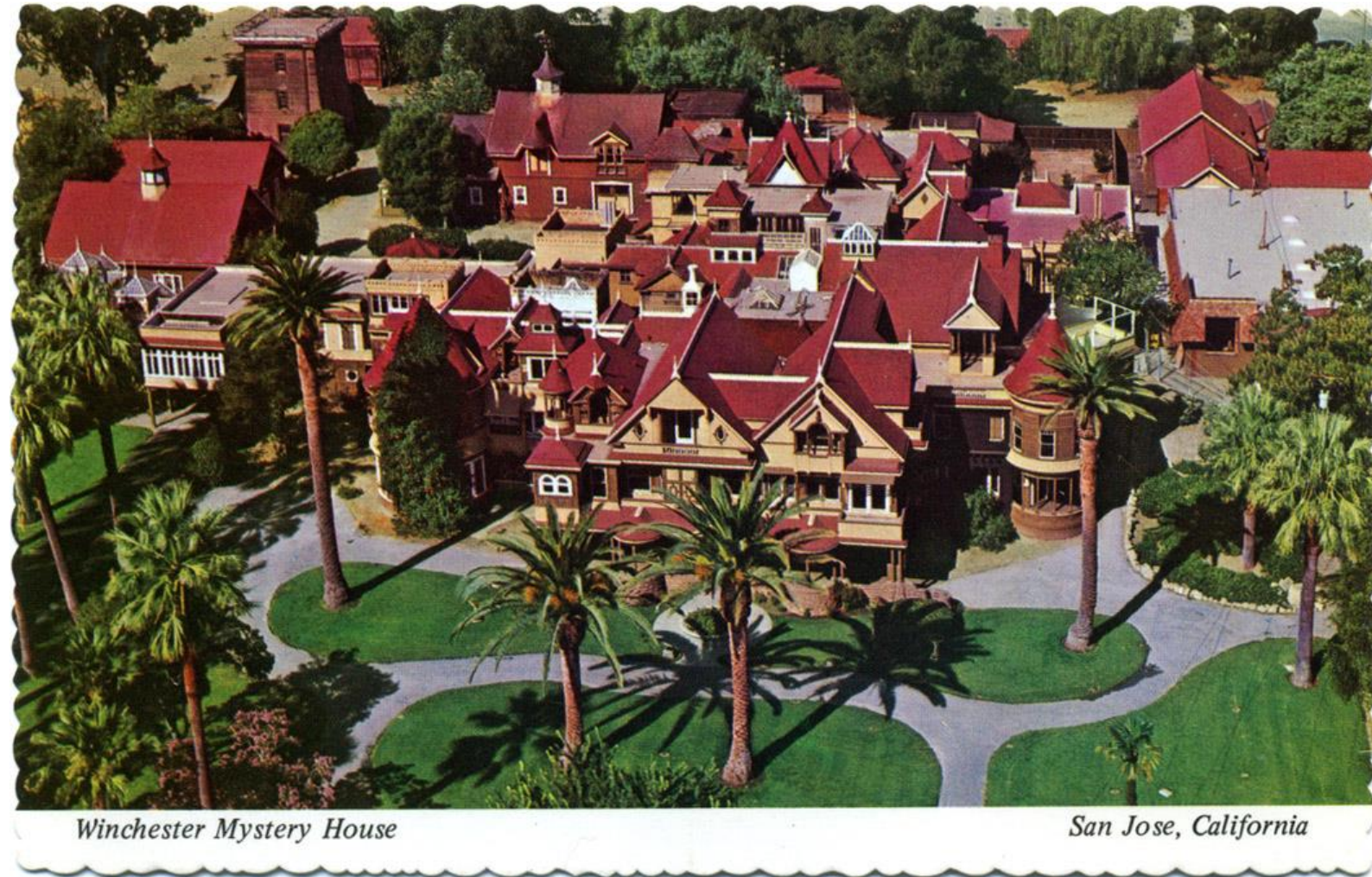
LET'S SOLVE THIS PROBLEM BY USING THE BIG DATA NONE OF US HAVE THE SLIGHTEST IDEA WHAT TO DO WITH



The Need for Architecture

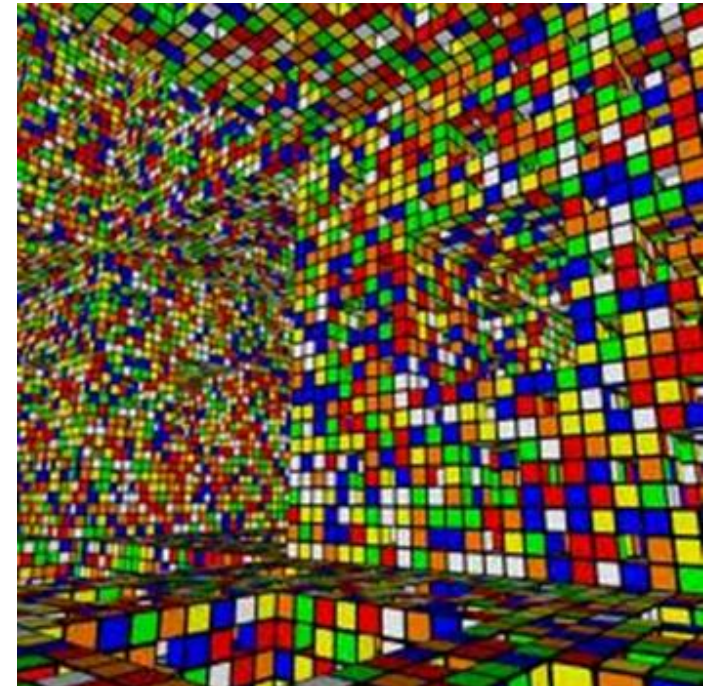
Why do we need Architecture?

- Evolution
 - 38 years of construction
 - 147 builders
 - No Blueprints
 - No Planning
- Result:
 - 7 stories
 - 65 doors to blank walls
 - 13 staircases abandoned
 - 24 skylights in floors
 - 160 rooms, 950 doors
 - 47 fireplaces, 17 chimneys
 - Miles of hallways
 - Secret passages in walls
 - 10,000 window panes (all bathrooms are fitted with windows)

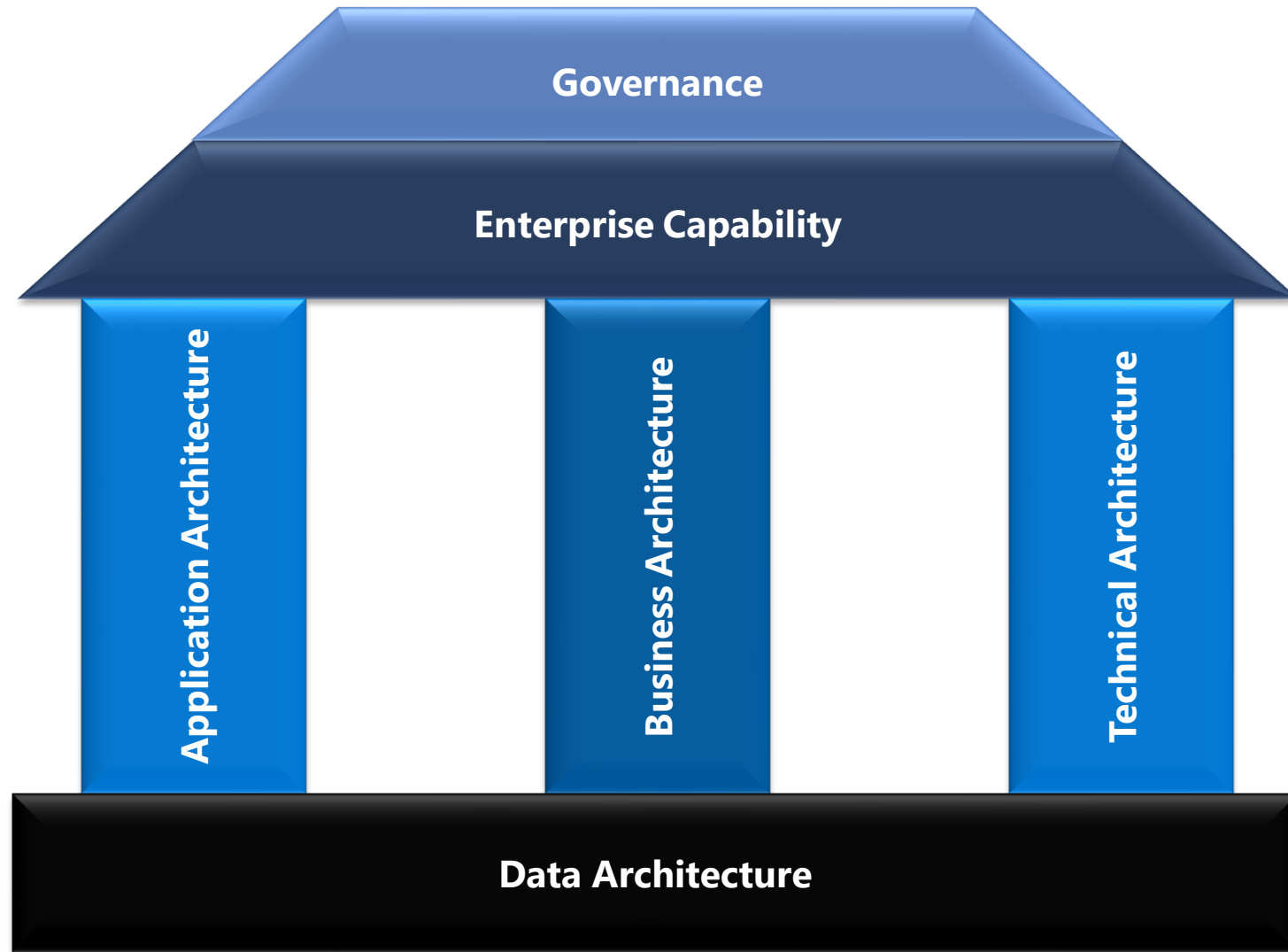


In a typical organization:

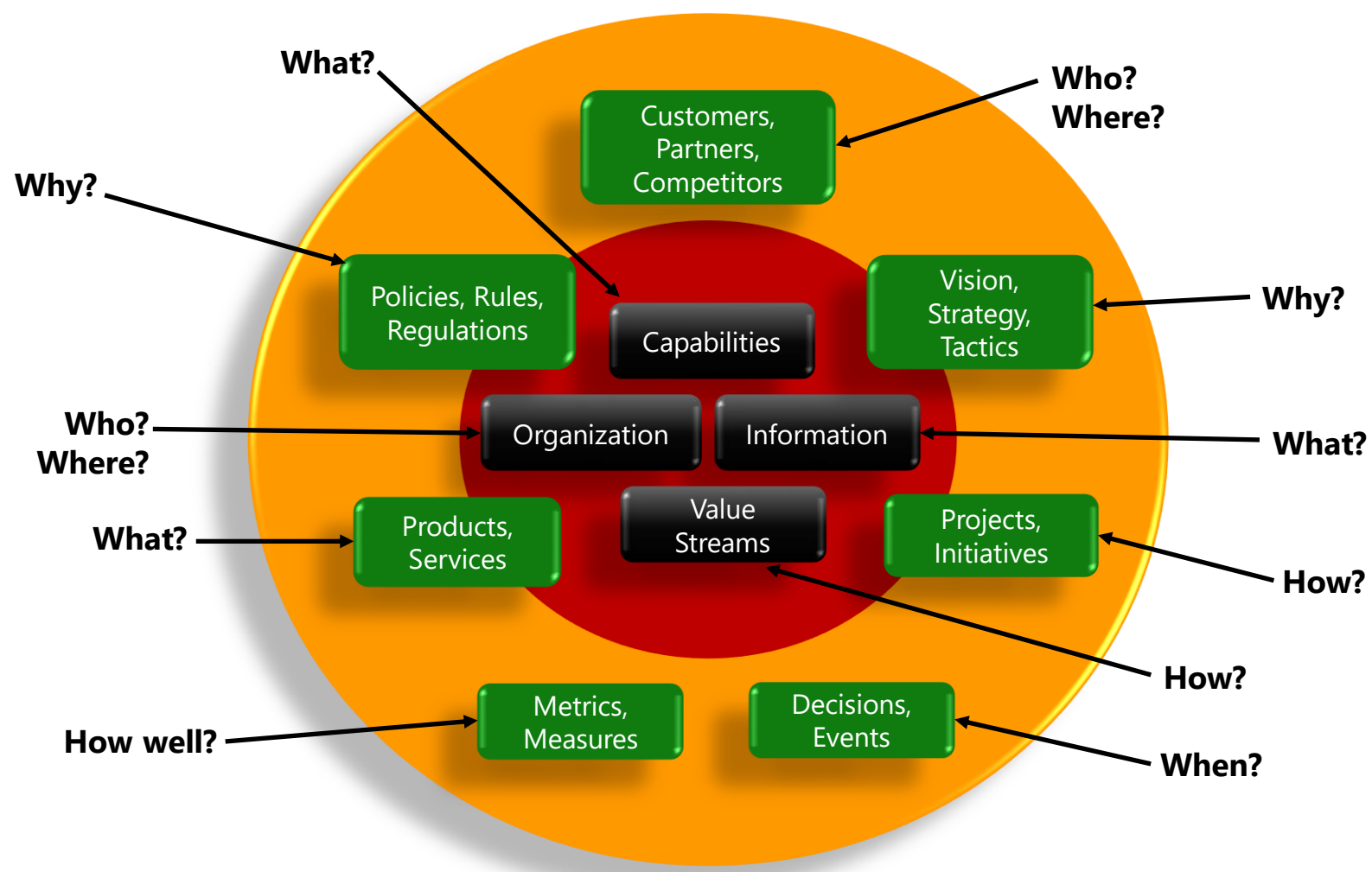
- Proliferation of disparate systems
- Multiple ERP solutions
 - Often combined with mismatched departmental solutions
- SAAS (externally controlled and managed), cloud
- Obsolete legacy systems
- Poor decommissioning strategy
- Proliferation of point-to-point interfaces
- Data warehouse, data marts, ETL ...
- Mergers and acquisitions
 - Multiply the above n times



Enterprise Architecture Disciplines

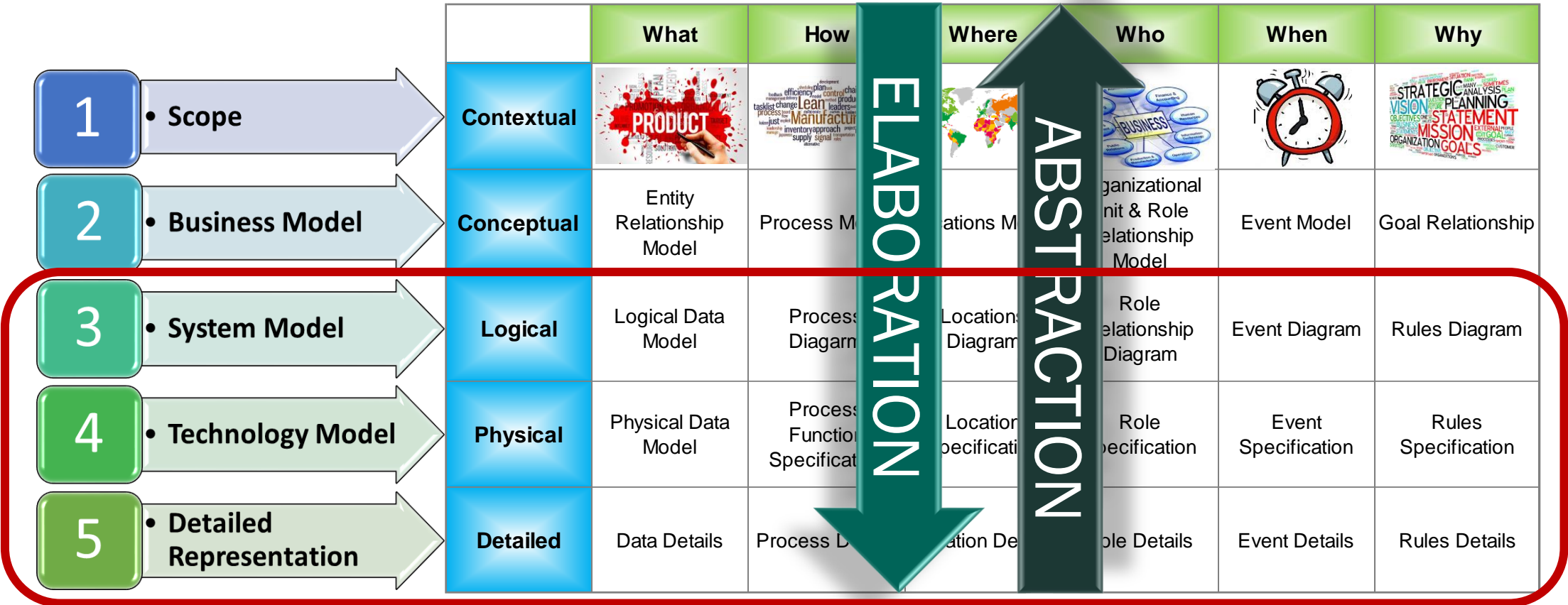


Business Architecture



Enterprise Architecture Framework Example (Zachman)

- Traceability through levels – contextual -> implementation
 - Fairly easy to comprehend at a high level



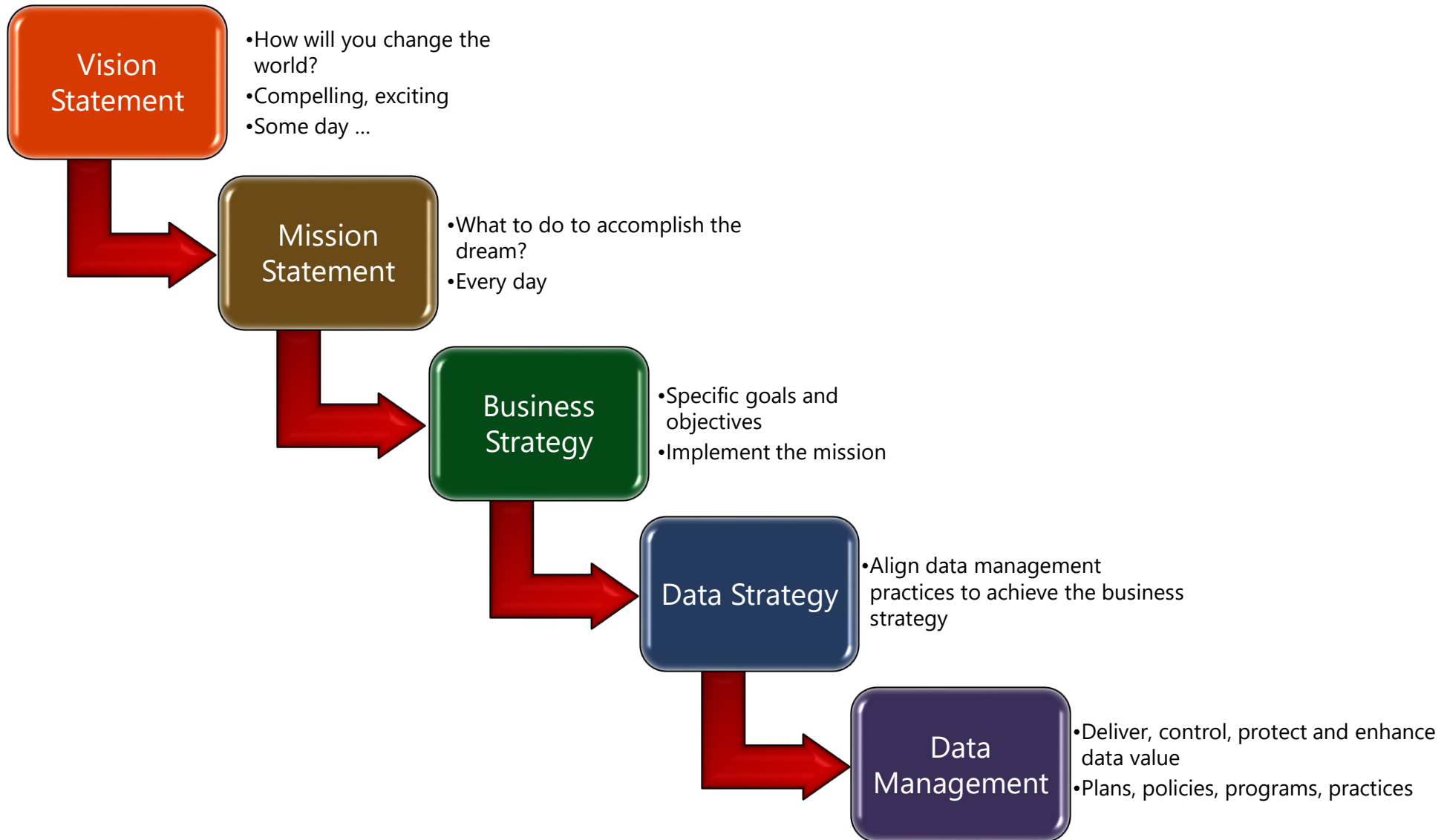
If you focus only on 3 – 5, you will fail!

	Data Maturity					
	Introduction		Expansion		Transformation	
Level	0	1	2	3	4	5
Description	None	Initial	Managed	Standardized	Advanced	Optimized
Data Governance	None	Project Level	Program Level	Division Level	Cross Divisional	Enterprise Wide
Master Data Management	no formal master data clasification	Non-integrated master data	Integrated, shared master data repository	Data Management Services	Master data stewards established	Data stewardship council
Data Integration	ad-hoc, point to point	Reactive, point-to-point interfaces, some common tools, lack of standards	common integration platform, design patterns	Middleware utilization: service bus, canonical model, business rules, repository	Data Excellence Centre (education and training)	Data Excellence embedded in corporate culture
Data Quality	Silos, scattered data, inconsistencies accepted	Recognition of inconsistencies but no management plan to address	Data cleansing at consumption in order to attempt data quality improvement	Data Quality KPI's and conformance visibility, some cleansing at source.	Prevention approach to data quality	Full data quality management practice
Behaviour	Unaware / Denial	Chaotic	Reactive	Stable	Proactive	Predictive
	Technology & Infrastructure		Primary IT Focus		Information & Strategic Business Enablement	
	HIGH		Risk		LOW	
	LOW		Value Generation		HIGH	

	Process Maturity				
	Introduction	Expansion			Transformation
Level	1	2	3	4	5
Description	Initial	Managed	Standardized	Advanced	Optimized
Focus	Individual: people rely on personal methods to accomplish work	Proactive: management take responsibility for work unit operations and performance	Integrated: standard processes based on best practices in work units	Stable: variation reduced - re-use, mentoring, statistical management	Systematic: improvements evaluated and deployed using organizational change management
Work management	Inconsistent: little or no preparation for managing a work unit	Managed: balance commitments with resources	Adaptable: standard processes tailored for best use in different circumstances	Empowered: staff have the process data to evaluate and manage their own work	Continual: individuals and workgroups continuously improve capabilities
Efficiency	Inefficient: few measures for analyzing effectiveness	Repeatable: work units use procedures that have proven to be effective	Leveraged: common measures and processes. Promote organization wide learning.	Multi-functional: advance from functional processes to role based business processes. (ownership)	Aligned: performance aligned across the organization to attain strategic objectives
Culture	Stagnant: no identifiable foundation for commitment and improvement	Responsible: work units manage capability to meeting their own commitments. (Silos)	Professional: organizational culture emerges from common practices across work units	Predictable: metrics in place to predict capability & performance	Preventative: Systematic elimination of defects and problem causes
Business Process	Few activities explicitly defined. Processes lack current state documentation.	Basic management processes and controls established to track progress. Processes planned, documented, tactically performed.	Process is documented and standardized. Cross functionality understood.	Detailed measures of process and output quality. Processes managed, controlled and forecasted using quantitative techniques (and statistical algorithms)	Continuous process improvement enabled by quantitative feedback. Processes fully integrated, fluid, highly predictable
Decision making	Tribal Knowledge, gut-feel decisions, hierarchical structure.	Functional process orientation, data driven decisions, quality by inspection	Integrated processes, performance metrics, data driven decisions	Self service dashboards & analytics, exception management	Competitive advantage through best practice innovation.
Architecture	Disparate IT systems	Random services adoption	Full service adoption	Service Oriented Architecture (SOA)	Process driven enterprise
Low		Productivity			High
Low		Quality			High
High		Risk			Low
High		Waste			Low
Cost cutting		Efficiency			Value generation
Chaos		Management			Leadership

Strategic Alignment

Data Strategy & Business Alignment

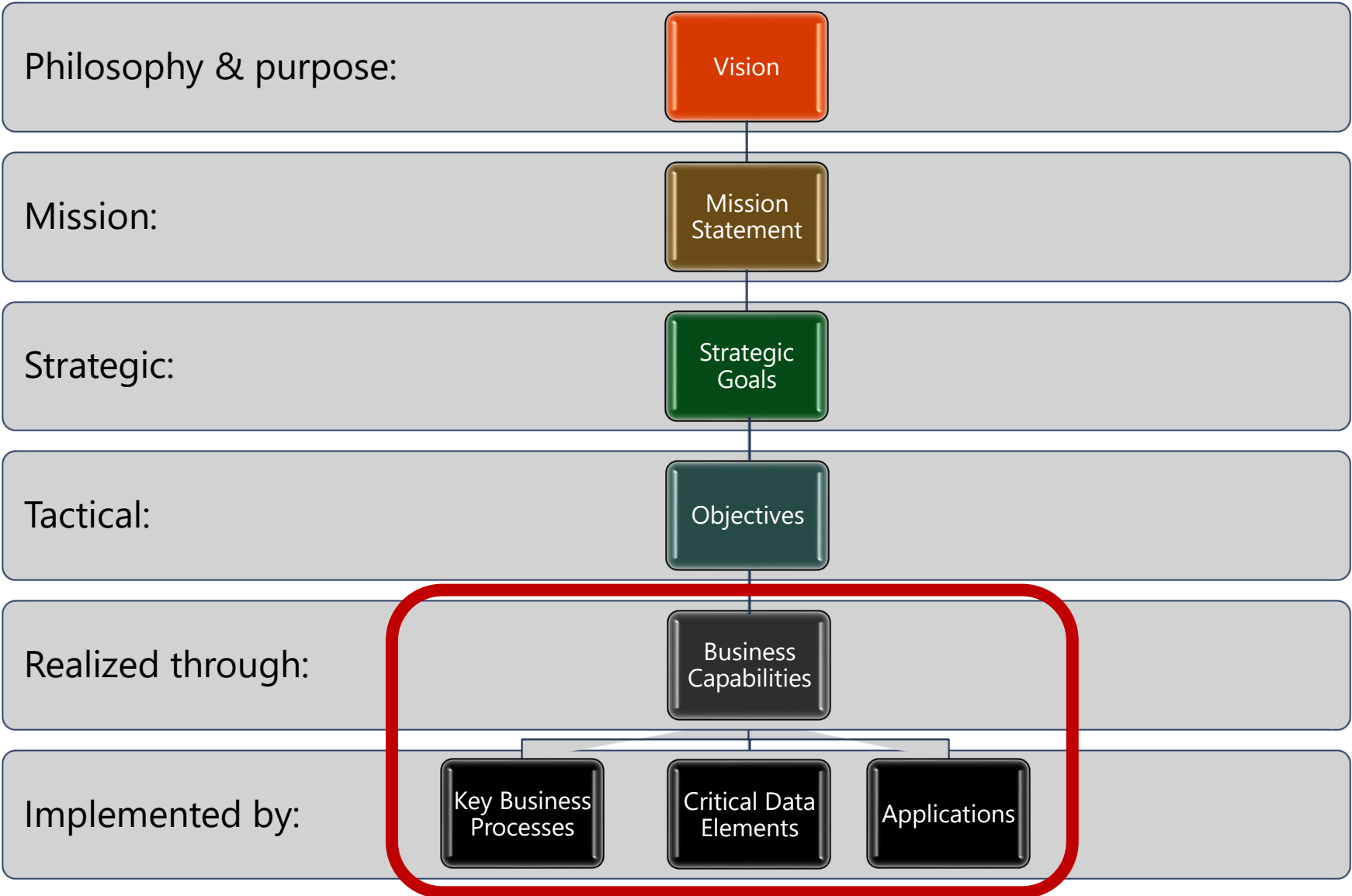


Data Strategy Objectives

- Information governance oversight comprised of all key functional areas
 - Supported by senior leadership
 - Owned by the business – NOT owned by IT
- Culture of evidence-based decision making
 - Information is a valuable asset
- Protect sensitive and valuable information
 - Secure access to those who need it
- Fit for purpose data analysis, interpretation, visualization
- Sound data architecture & enterprise architecture
 - Data modelling – understanding the data
 - Business process modelling – how data is created and used

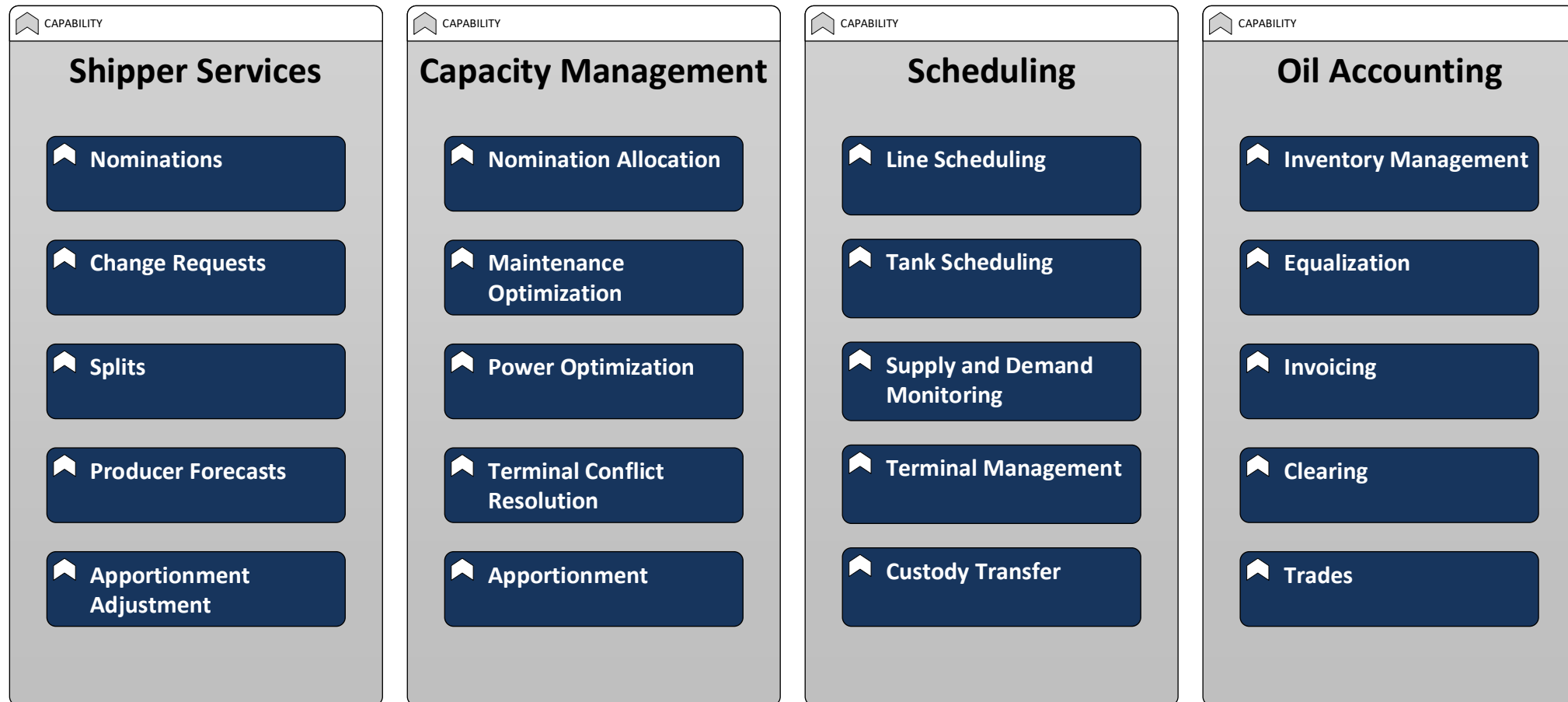


Strategy Realization

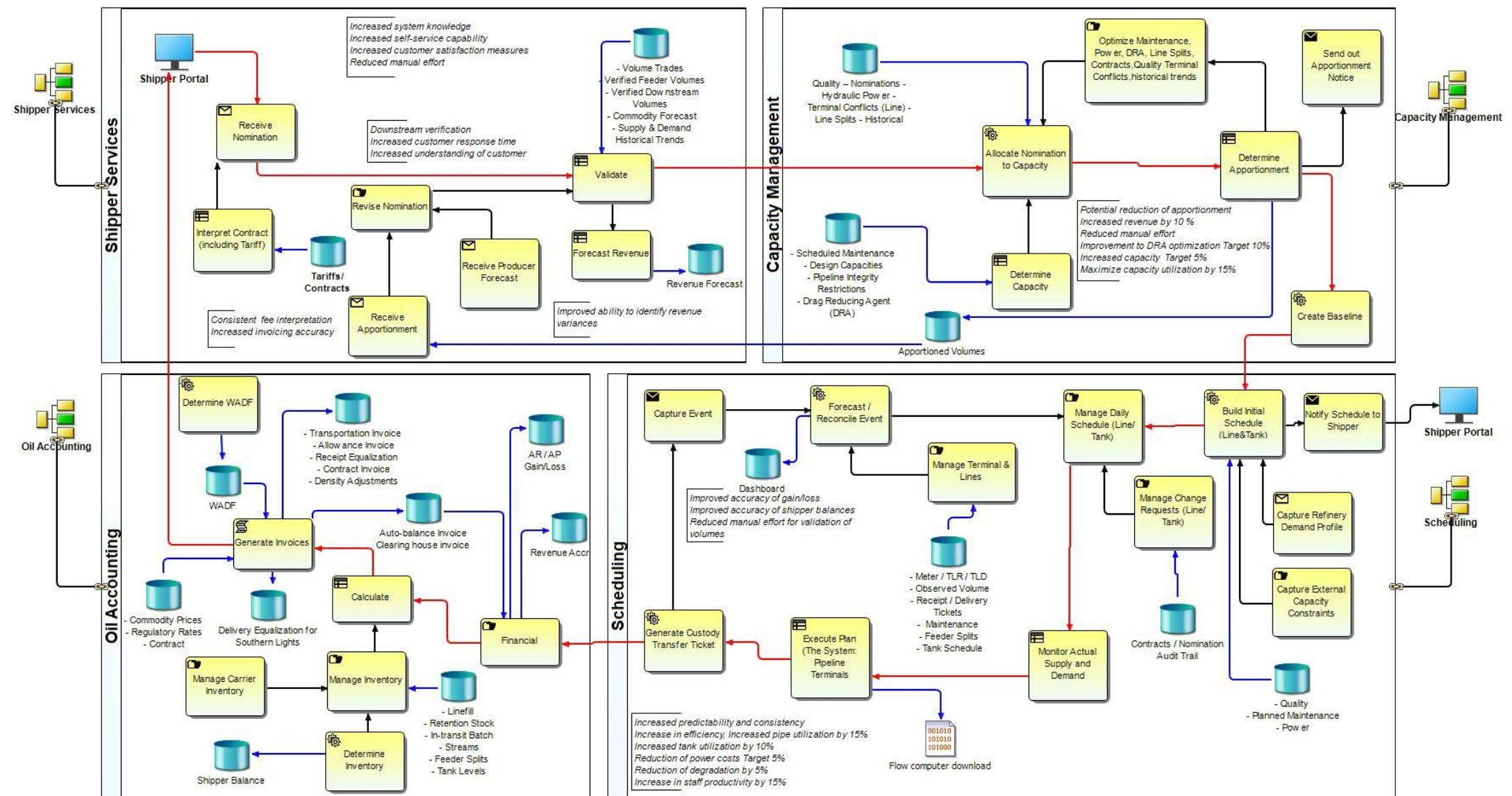


Strategy Realization Through Modelling

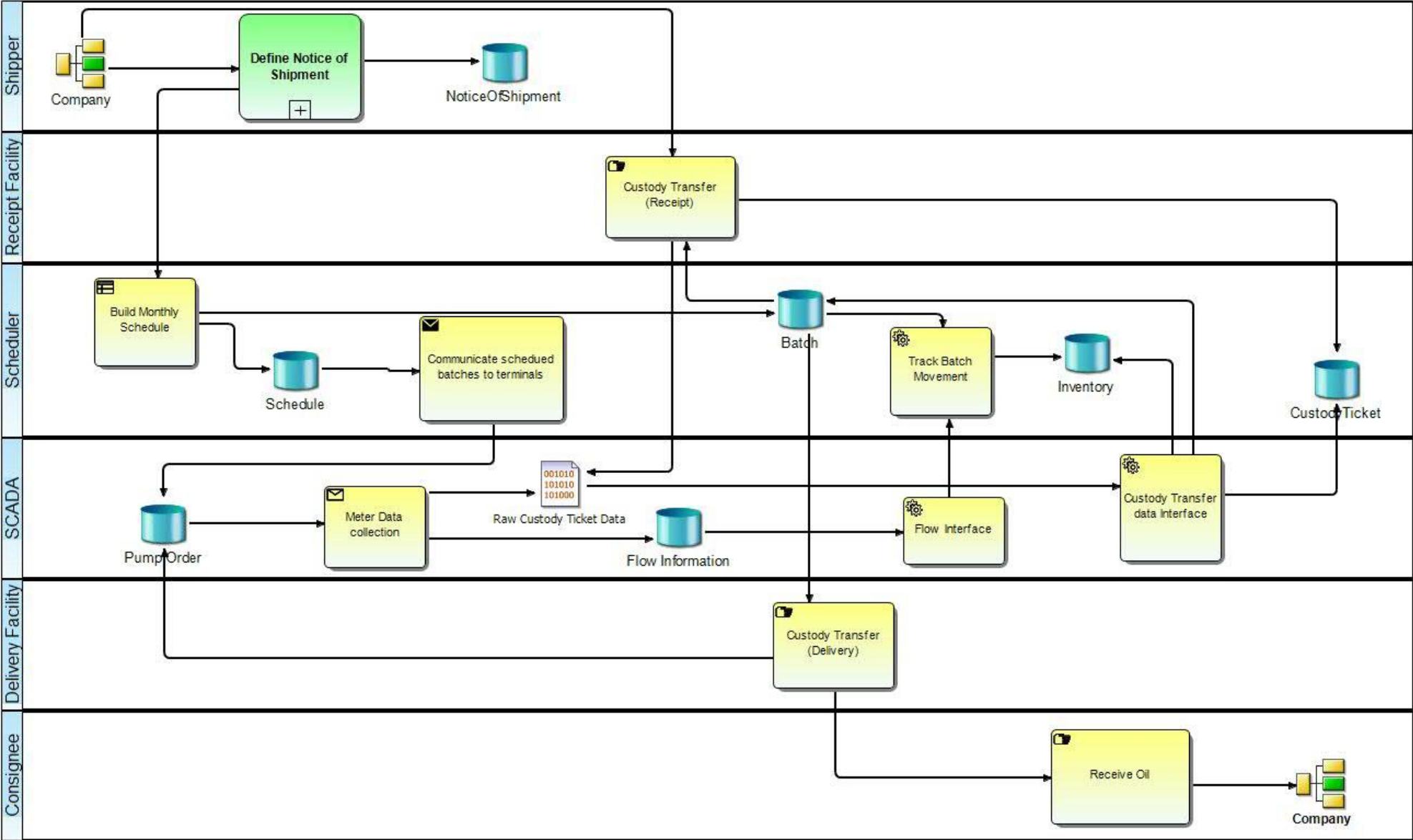
Capability Model



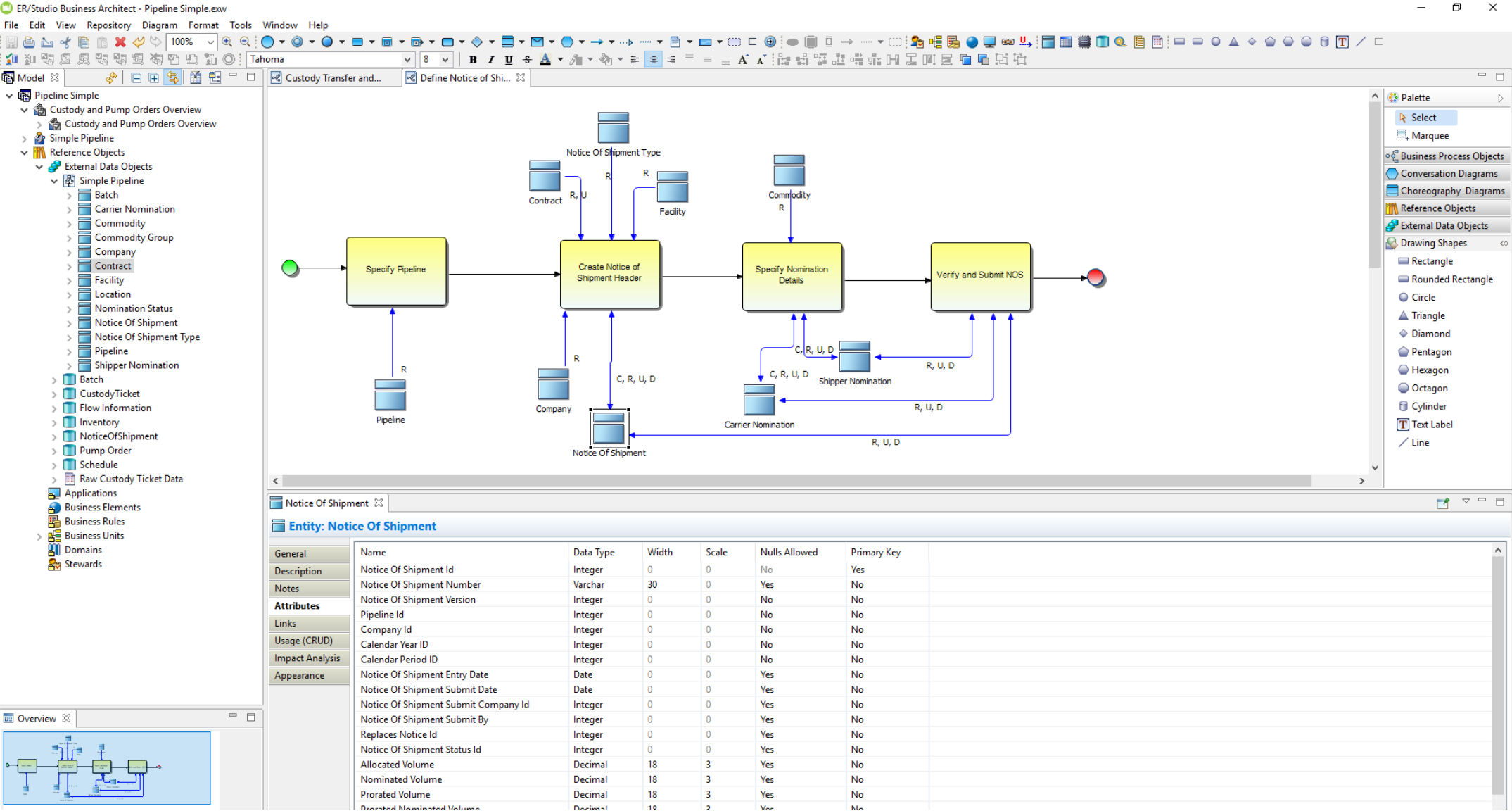
Level 1 Process - Context



Level 2 Process

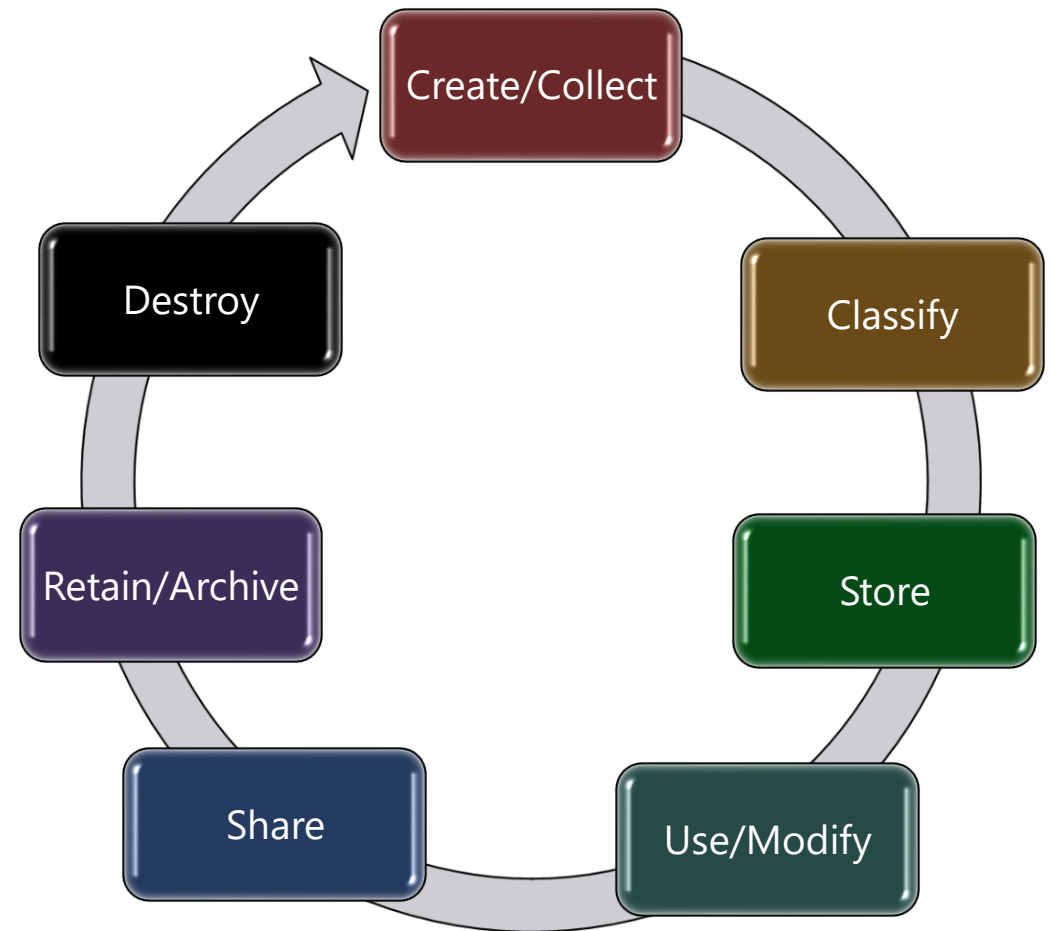


Level 3 Process



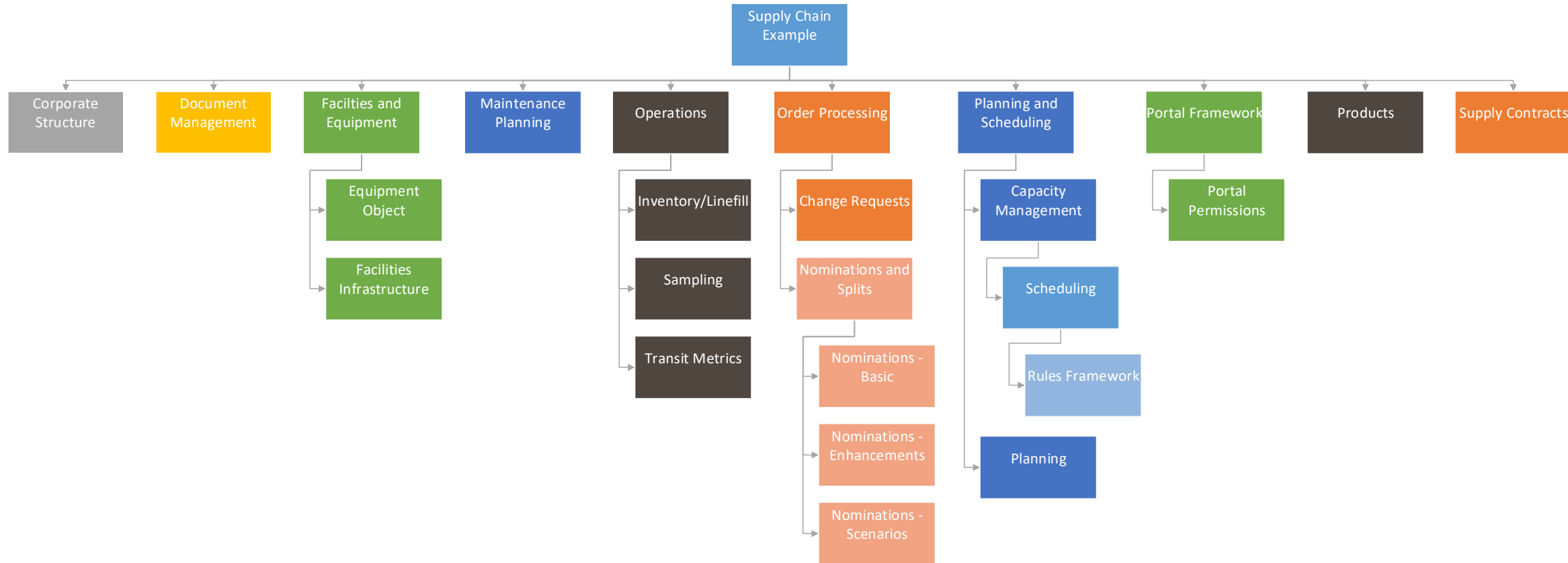
Data - Lifecycle

- Describes how a data element is Created, Read, Updated, Deleted (CRUD)
- Many factors come into play
 - Business rules
 - Business processes
 - Applications
- There may be more than 1 way a particular data element is created
- Model:
 - Business process
 - Data lineage
 - Data flow
 - Integration
 - Include Extract Transform and Load (ETL) for data warehouse/data marts and staging areas

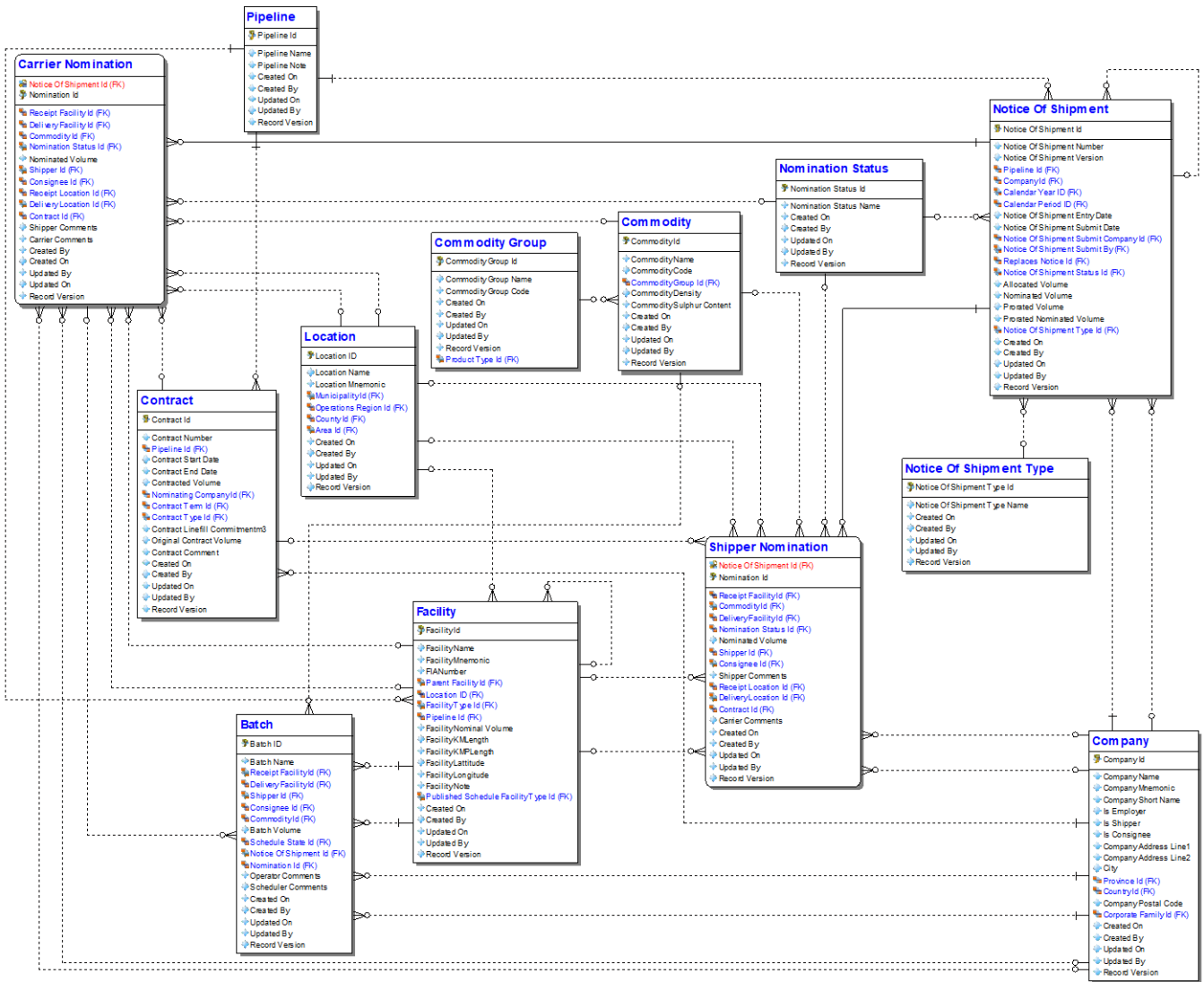


Enterprise Data Model

Align Subject Areas to Business areas & Capabilities

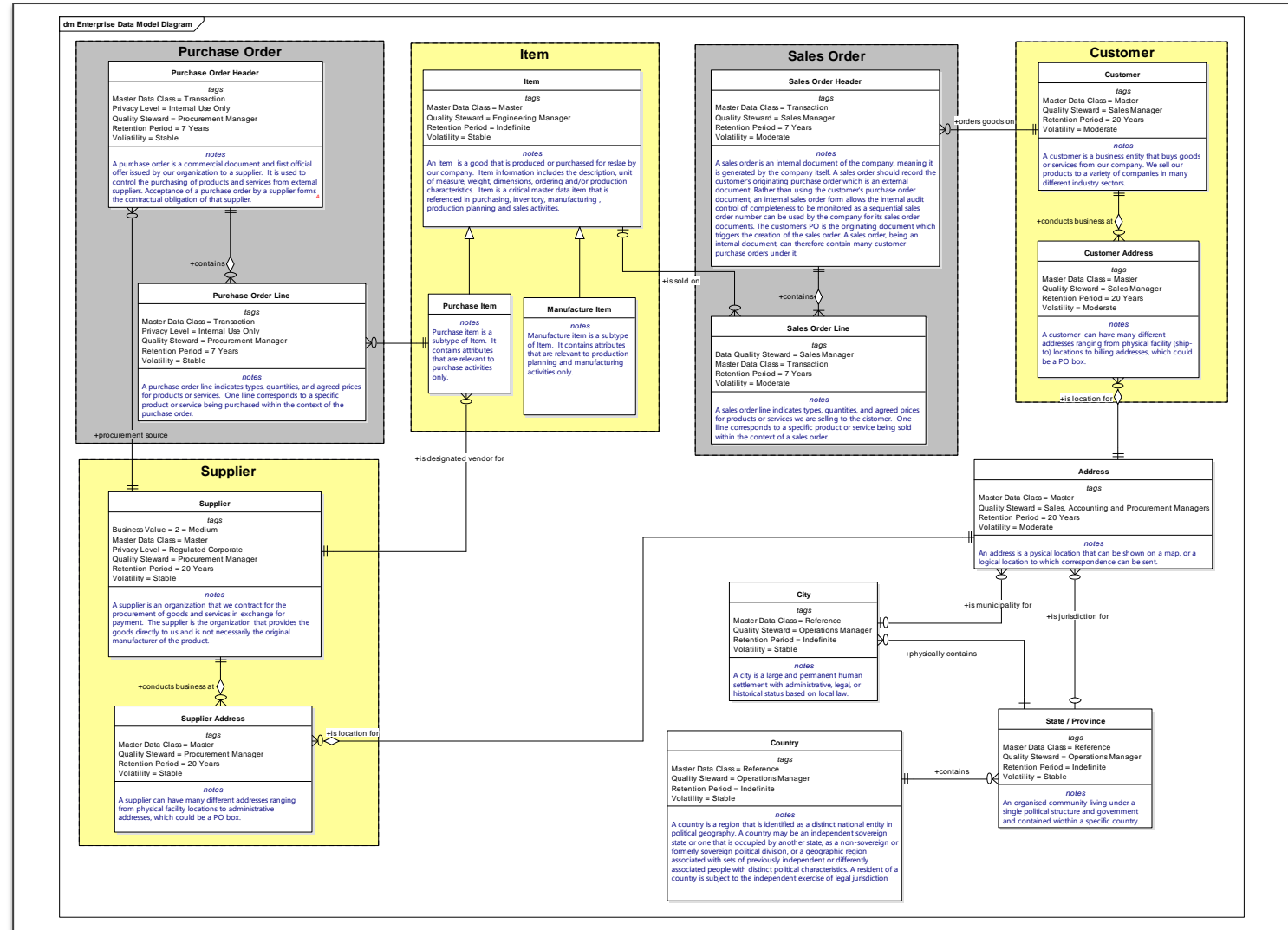


Subject Area Model (Submodel)

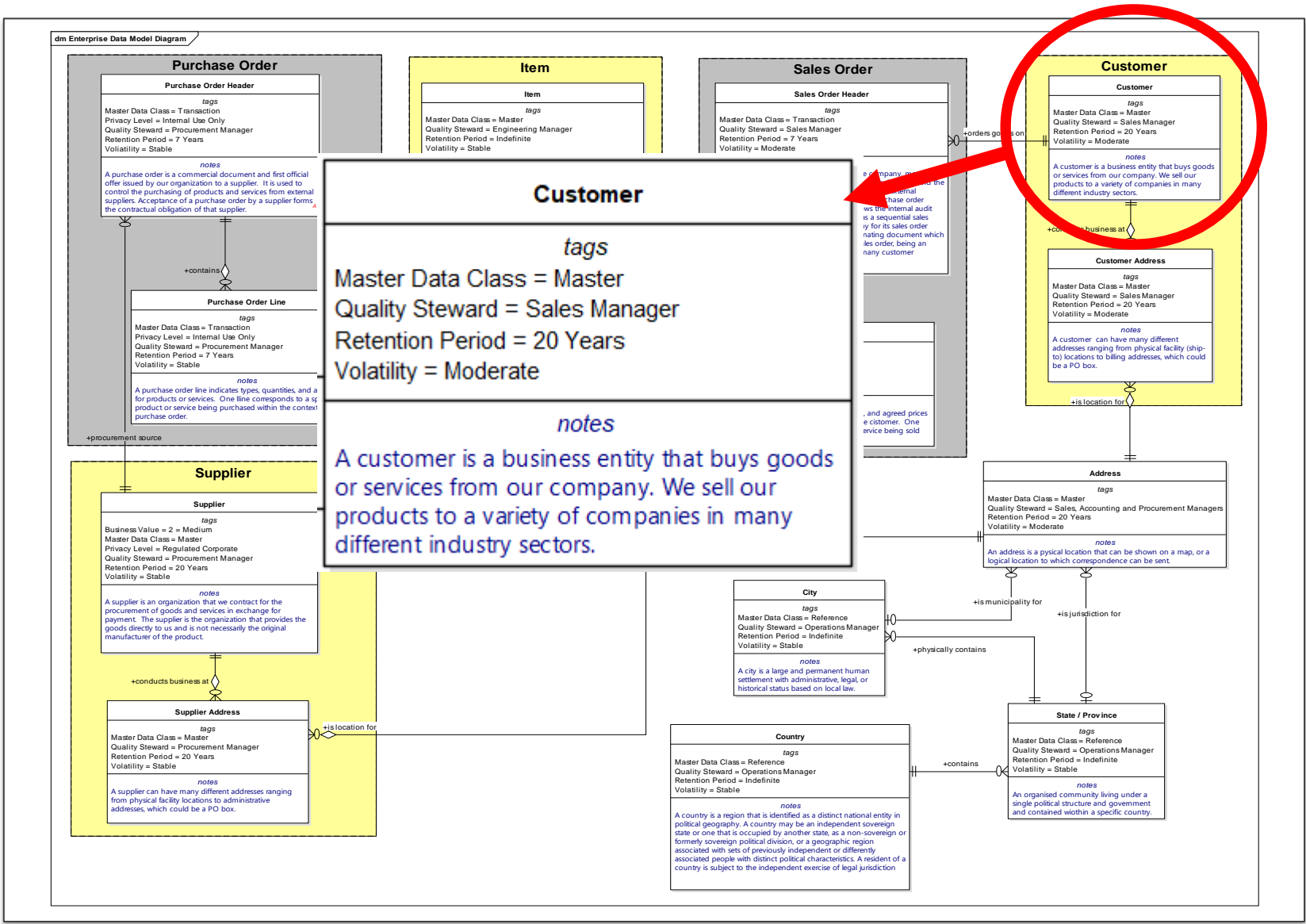


Data Model Constructs

- Full Specification
 - Logical
 - Physical
- Persistence Boundaries
 - Business Data Objects
- Descriptive metadata
 - Names
 - Definitions (data dictionary)
 - Notes
- Implementation characteristics
 - Data types
 - Keys
 - Indexes
 - Views
- Business Rules
 - Relationships (referential constraints)
 - Value Restrictions (constraints)
- Security Classifications + Rules
- Governance Metadata
 - Master Data Management classes
 - Data Quality classifications
 - Retention policies

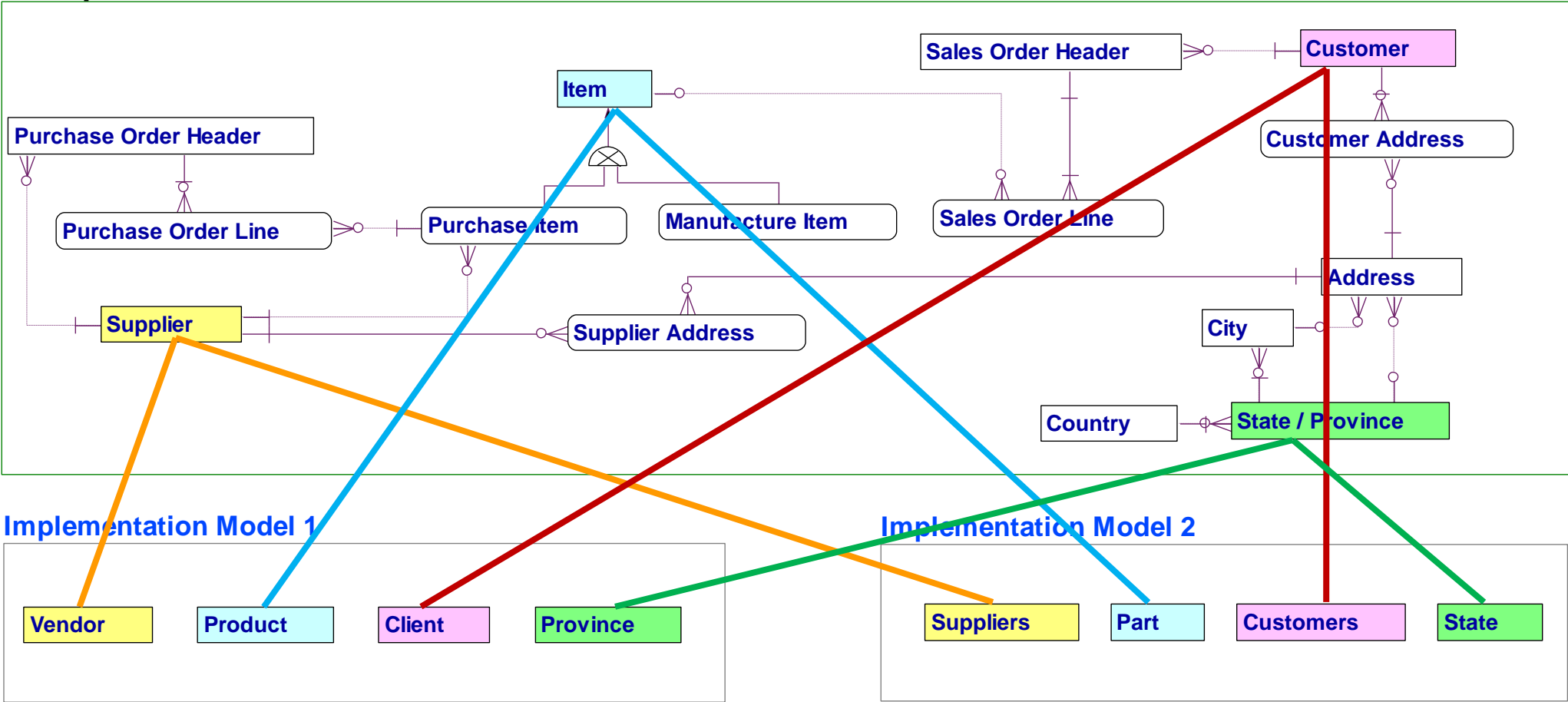


Governance Metadata



Mapping Entity Instances to Enterprise Model

Enterprise Data Model



Enterprise Data Model

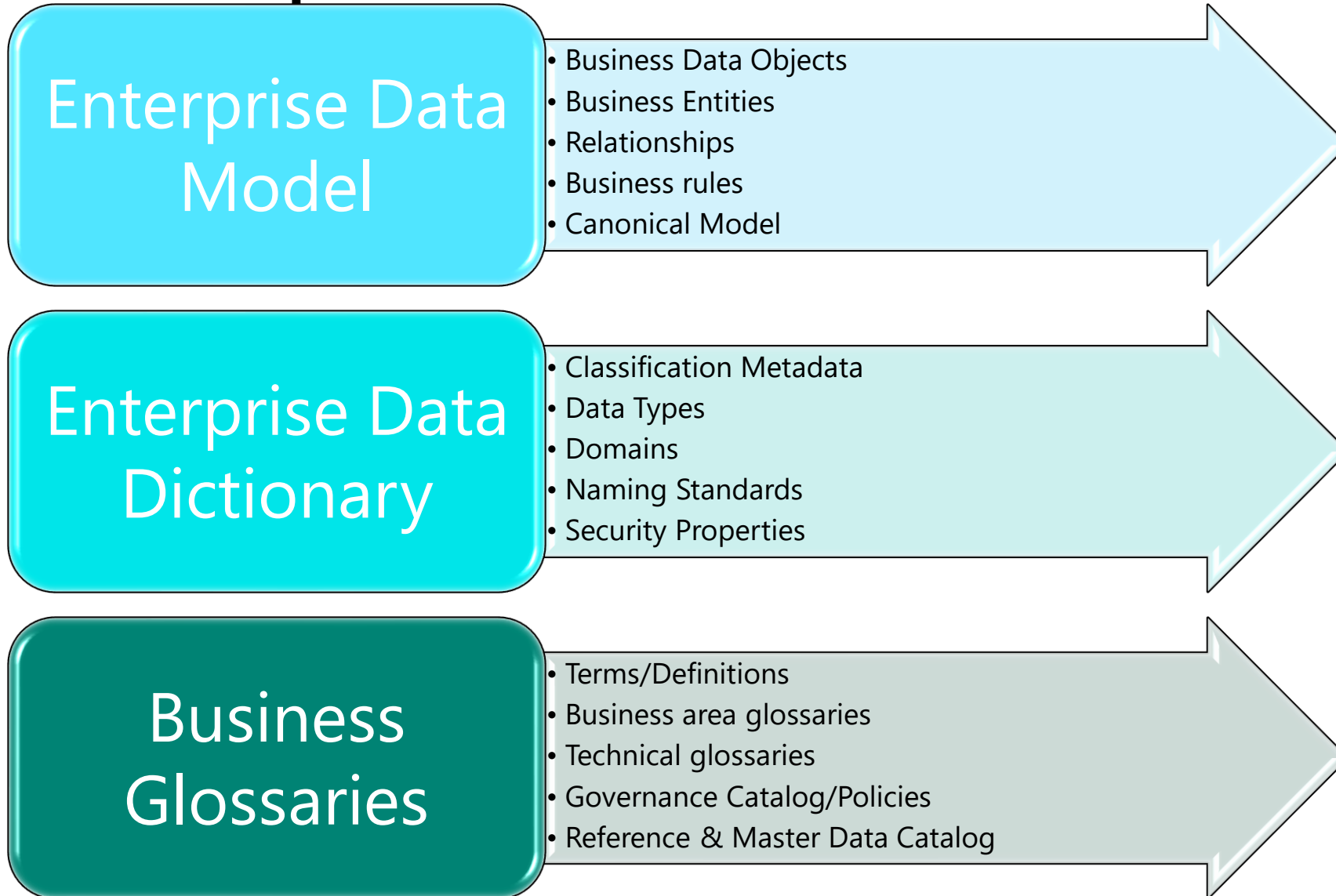
What it is

- Long-term focus (ongoing)
- Investment
- Basis for communication
- Foundation for standardization
- Continually evolving - incrementally
- Framework for all enterprise data assets
- Business focused
- Strategic imperative
- Requires both business and data modelling expertise
- A rationalized, intelligent design
- Platform independent
- Common sense and practical

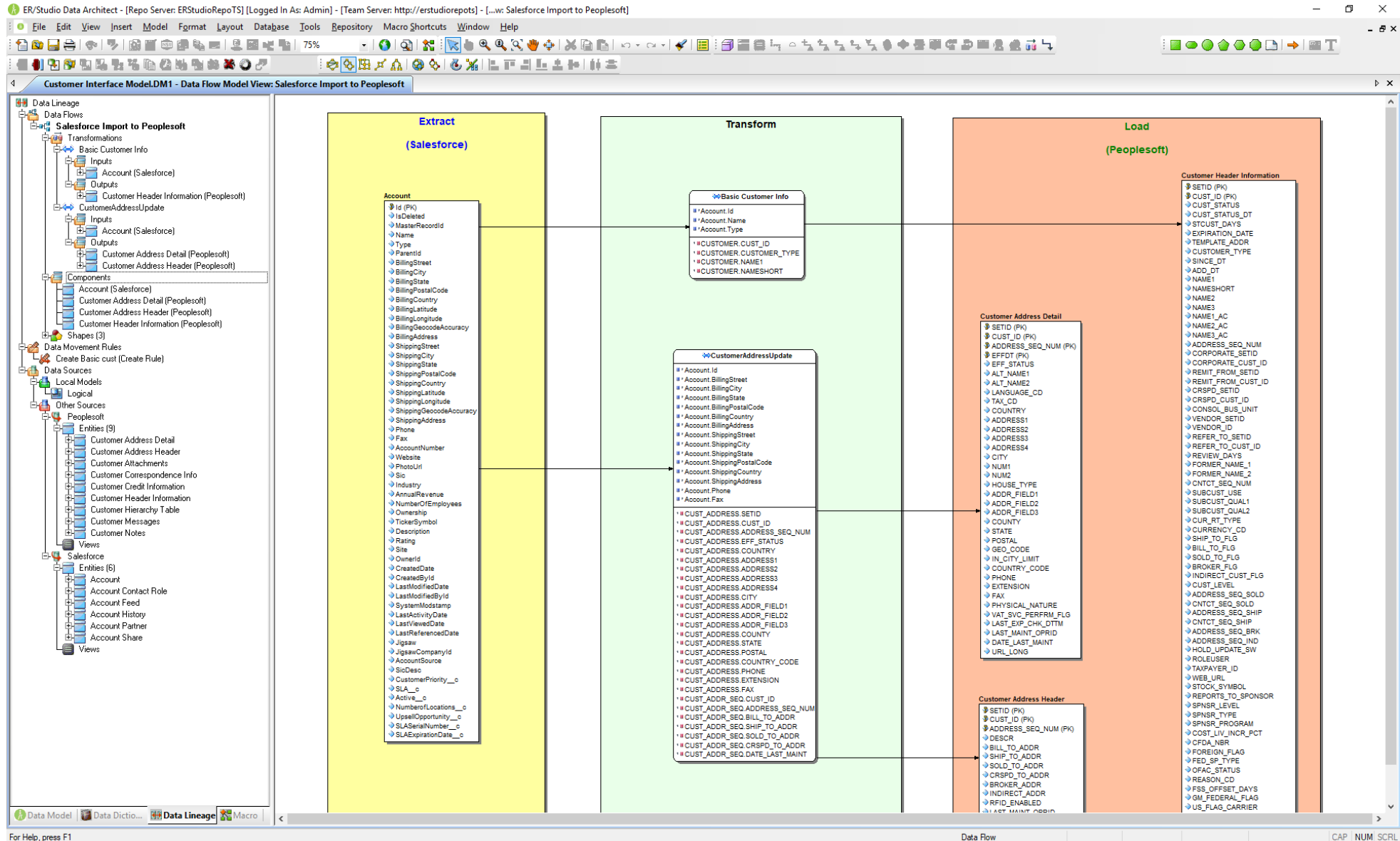
What it is NOT

- A project
- Operational expense
- Just a pretty picture
- Incompatible with agile
- Ivory tower artefact
- Application/business area specific
- For IT use only
- Waste of time
- Something that can be created by developers or junior modelers
- Documentation after the fact
- For a specific database
- An academic exercise

The keys to comprehension



Data Flow and Lineage (Point to Point Interface)

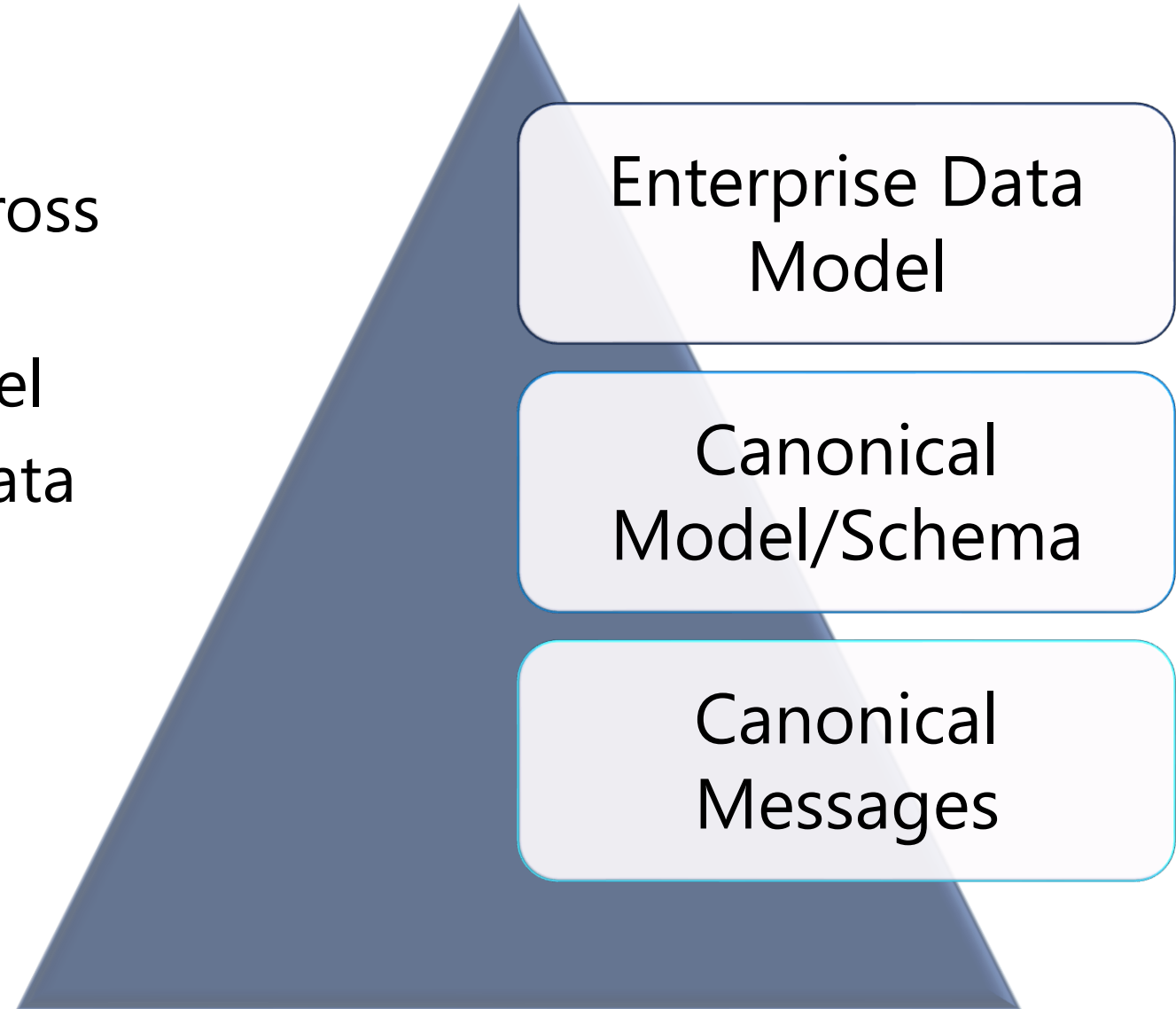


Service Oriented Architecture (SOA)

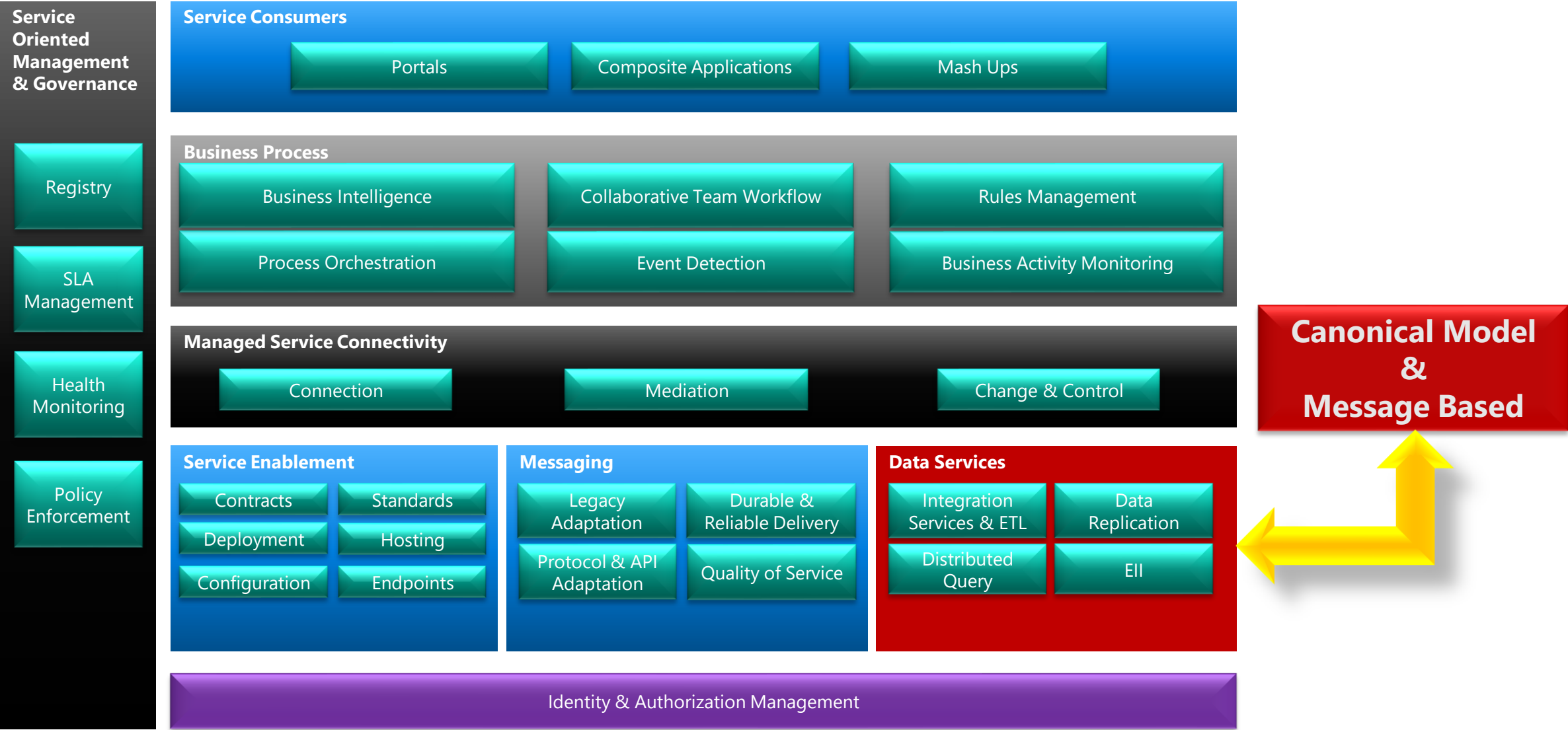
- An architecture design pattern based on distinct components providing services to other components
 - Application functionality
 - Data services
- Independent of
 - Any specific vendor
 - Any specific product
 - Any specific technology

Canonical Model

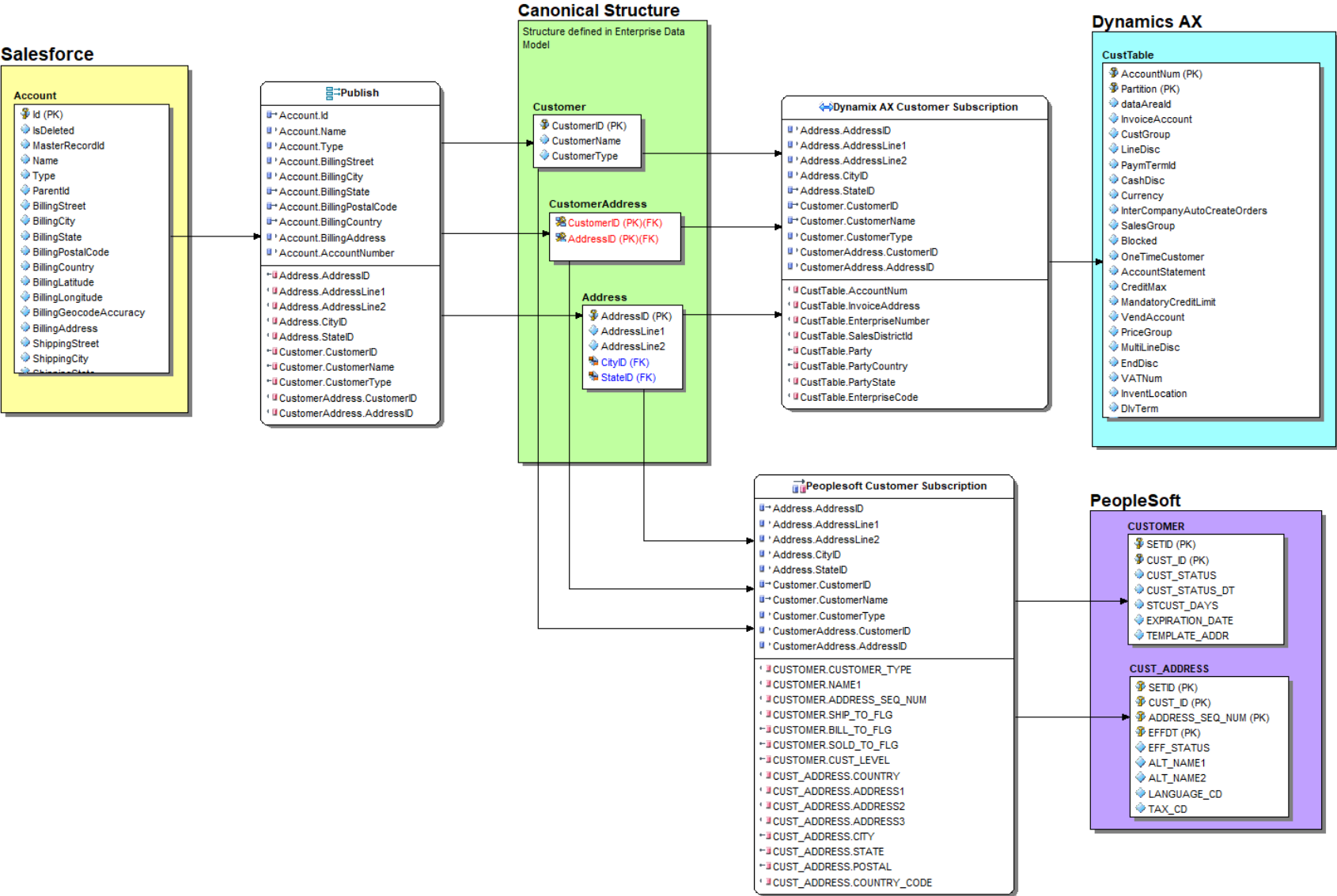
- SOA design pattern that uses standardized data model(s) across all data services
- Based on Enterprise Data Model
- Standardized and consistent data elements
- Standardized messages
 - And payload
 - All transformations based on canonical schema
 - From data sources
 - To data subscribers



Service Oriented Architecture with Canonical Model



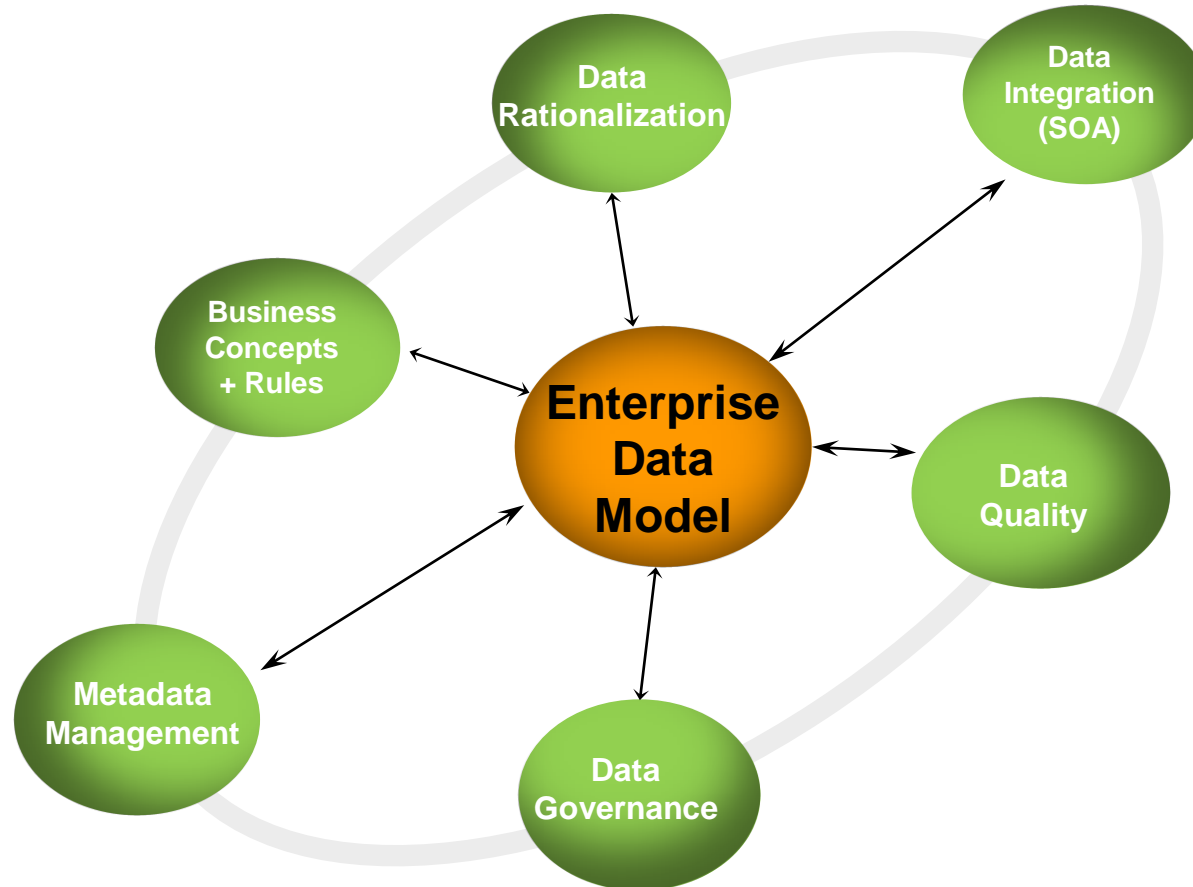
Data Lineage: SOA Publish & Subscribe



Information in the Right Place, at the right time

An Enterprise Data Model is the focal point for comprehension of information, in context, facilitating effective communication throughout the organization.

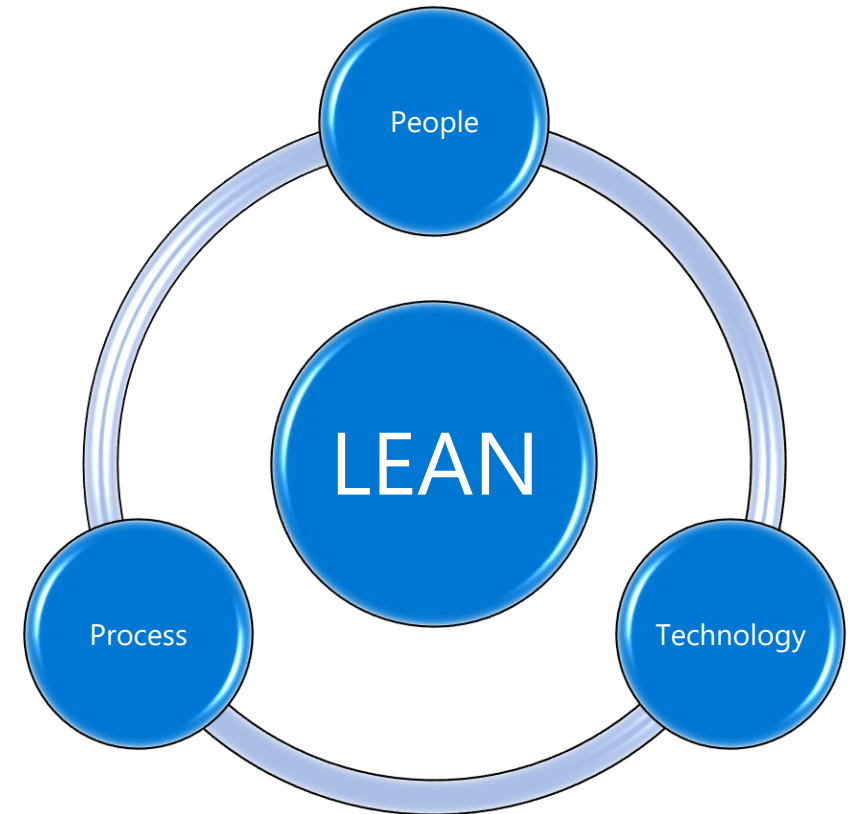
- A major investment
- With major returns



Lean Data Modelling

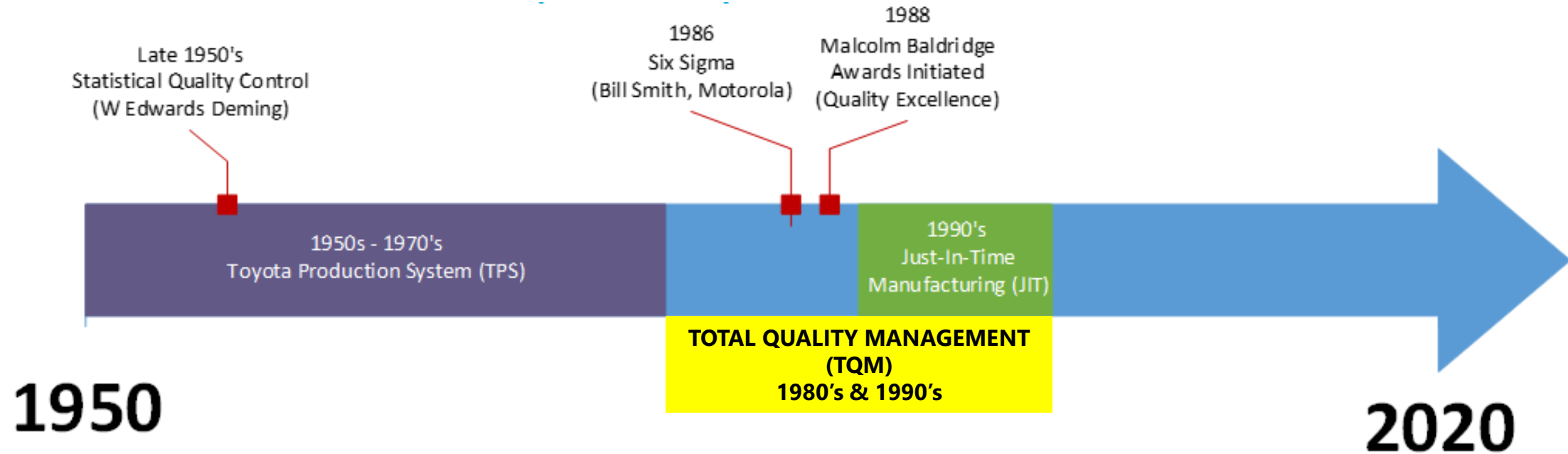
Lean Data Modelling Discussion

- A brief history lesson
- Methodology contrast
- The human factor
- Data modelling's increasing value
- Case study
 - Plan vs. reality
 - Quality metrics
 - Data modelling impact
- Lean principles
 - And how to apply them to data

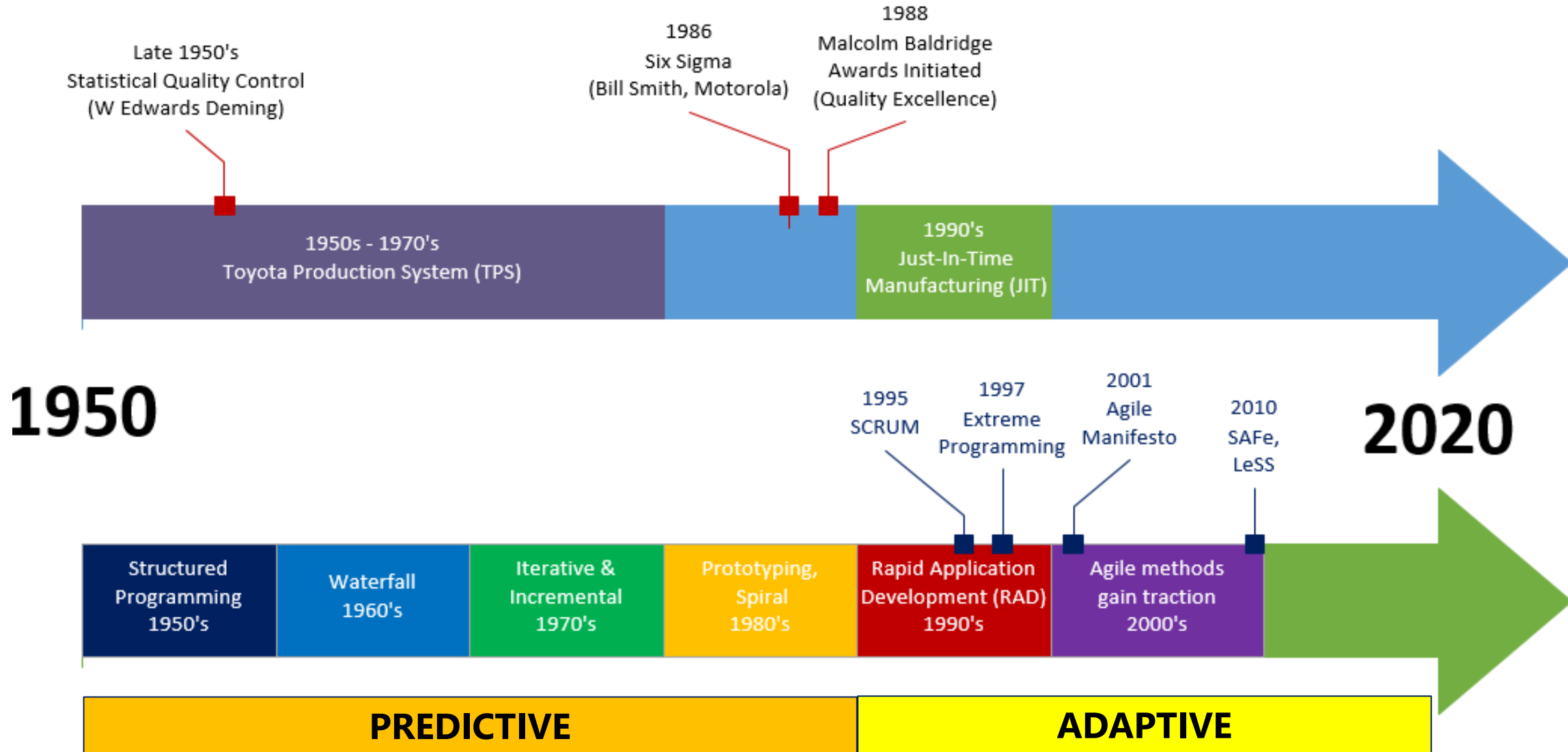


A Brief History Lesson (Part 1)

Industrialization (manufacturing) is the basis for systems development:



A Brief History Lesson (Part 2)



Methodologies and Definitions

- Waterfall

- A **linear, sequential** approach to the **software development** life cycle (SDLC)
- Used in software engineering and product development.
- Emphasizes a logical progression of steps.
 - Requirements -> Analysis -> Design -> Develop -> Test -> Deploy -> Maintain



- Agile

- **Software development** based on **iterative** development
 - Requirements and solutions evolve through collaboration
- Self-organizing, cross-functional teams
- “Increases productivity and reduces time to benefits relative to waterfall”
- Variants
 - SCRUM
 - Extreme Programming (XP)



SCRUM

- A lightweight process framework for Agile [software development](#)
- Fixed duration iterations called Sprints (30 days)
- Product backlog
- Sprint backlog
- Self organizing team
 - Product Owner
 - Keeper of the requirements
 - SCRUM Master
 - Keeper of the process
- Daily SCRUM meetings
- Sprint kickoff, Sprint Retrospective

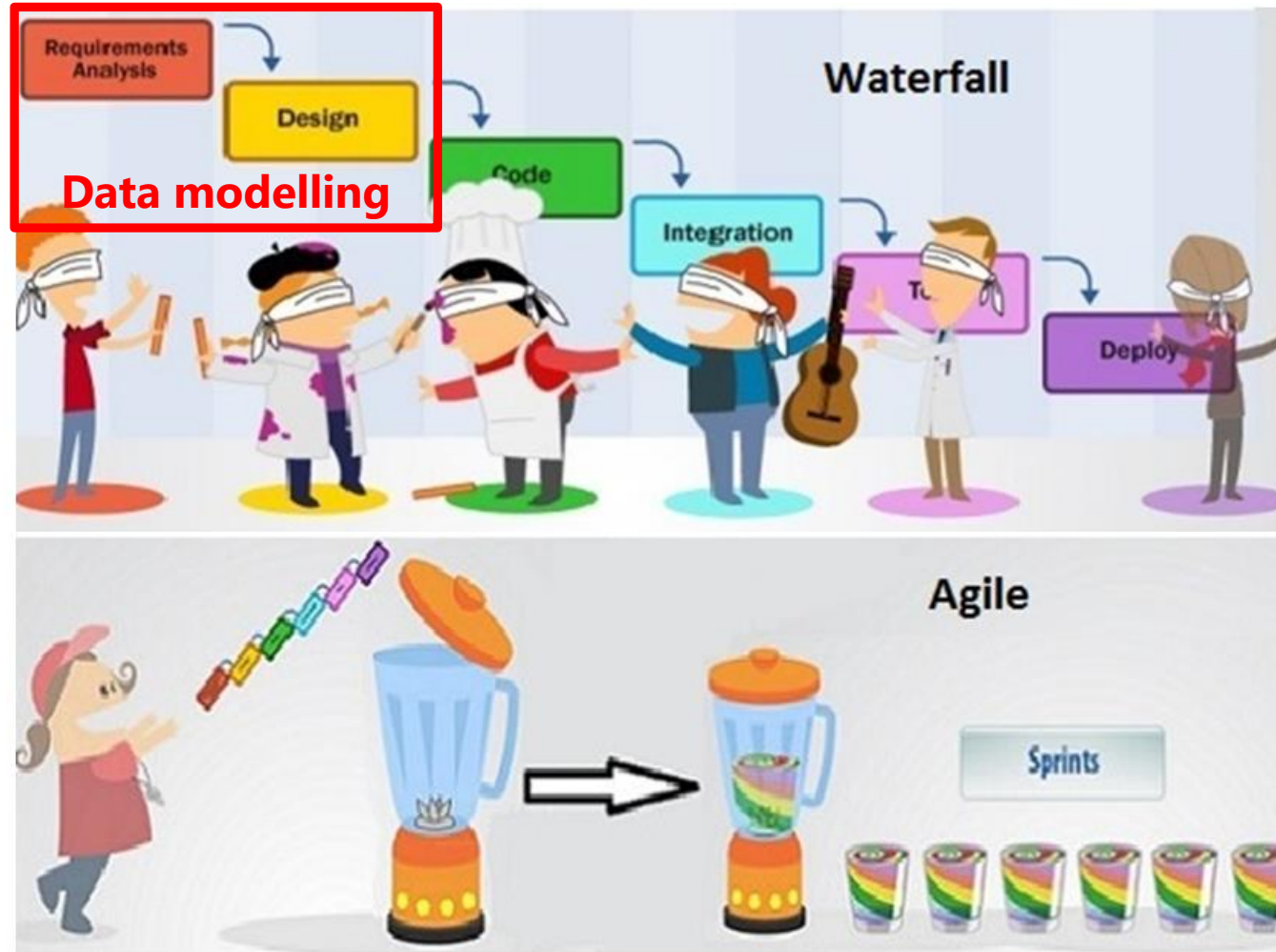


Extreme Programming (XP)

- The most specific (Radical) of the agile **software development** frameworks
- Five values of XP:
 - Communication - face to face discussion with white board
 - Simplicity - "what is the simplest thing that will work?"
 - Constant Feedback - build – feedback – adjust
 - Courage - "effective action in the face of fear"
 - Respect – respectful collaboration in the team
- Practices
 - User stories
 - Paired programming
 - Small Releases
 - Simple Design
 - Refactoring
 - Continuous integration
 - 40 hour work (maximum)



Waterfall vs. Agile



Agile Cycles



Agile: Misinterpreted and Misaligned

- Short term project perspective vs. longer term organizational benefits
- It's all about producing usable **software** in every iteration
 - Often used as an excuse to shortcut or omit other important deliverables
 - Data architecture/integration
 - Documentation
 - Decommissioning of replaced applications/systems
 - Sound architecture often overlooked because **"the business user didn't tell us that"**
 - Requirements interpreted too literally
- Blind focus on software only
 - "Models are good documentation, but they are immediately obsolete."



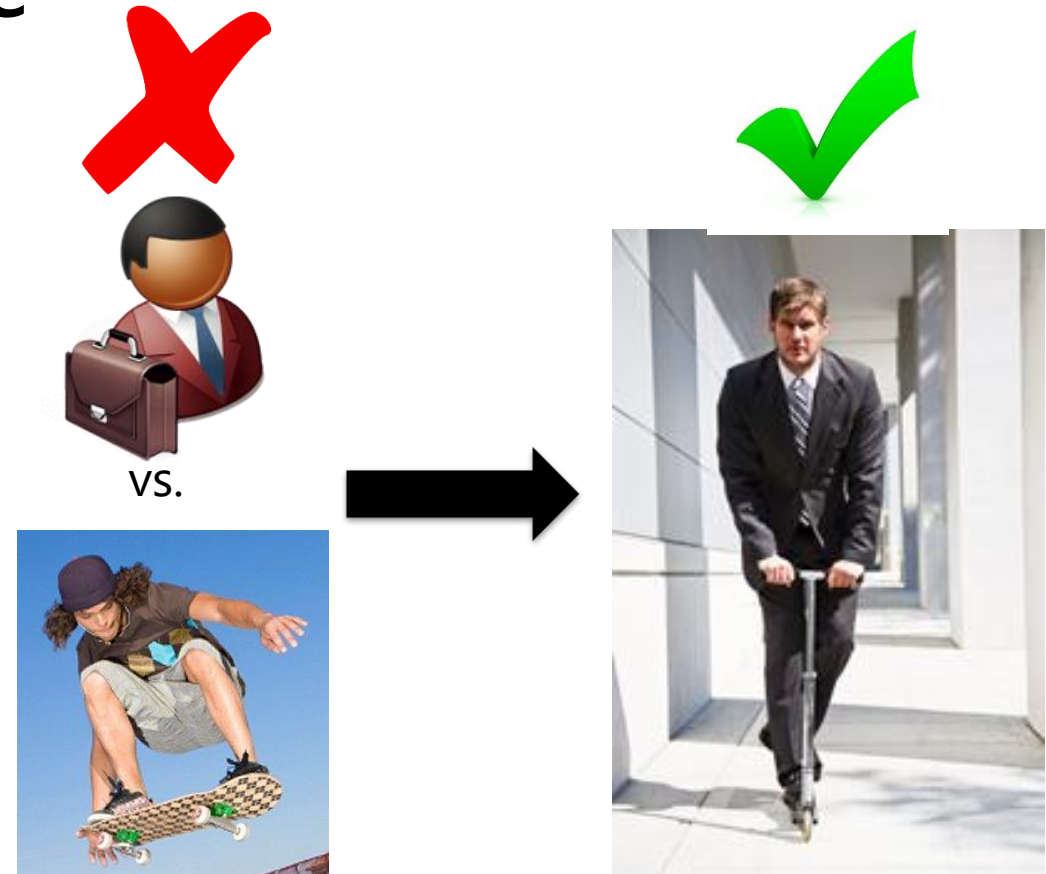
The Human Factor

- Scrum vs. Extreme
- Self-organizing team concept
 - Often misinterpreted as role-less (extreme)
 - Any person can perform any role
 - Can switch from sprint to sprint (iteration)
 - No specialization
 - Reality
 - A formula for disaster in all but the simplest of projects
- Often accompanied by attitude of disdain for data modellers
 - "They just slow us down"
 - "We don't need a data model"
- Short-sighted management
 - Long term compromised in favor of short term project goals.



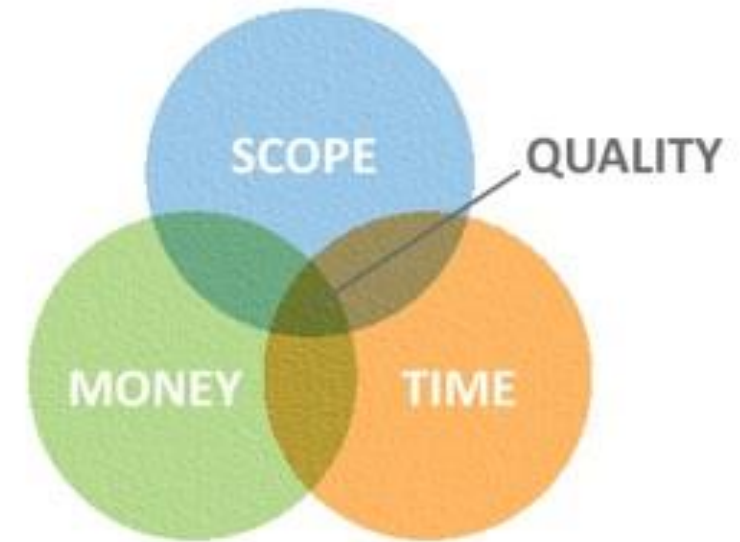
Data Architect/Modeller in Agile

- Enterprise data perspective
- Facilitator
 - Enabler vs. Gatekeeper
- Full engagement in sprint planning
 - Ensure completeness of deliverables
 - Prioritization of dependencies
- Iterative work style
 - Many simultaneous deliverables
- Collaboration
 - Work with multiple teams simultaneously
 - Cross-project focus



Case Study– As Planned

- Supply Chain – Commercial Application Suite
- 1 Common Database
- 4 Parallel Development Streams
 - By functional area
- Planned Duration: 1 year
- Planned Cost: \$6,000,000
- Agile Methodology (**Extreme** & Scrum)
 - Developers responsible for all design/development
 - 2 week sprints (iterations)
- Weekly budgeted direct staffing costs: \$ 92,800
 - Did not include business SMEs as they were covered separately in corporate budget



Initial Weeks

Excitement!

Anticipation!

Reality:

- High defect rate
- Backlog growing rapidly
- By week 16, 50% of effort being spent addressing defects
 - Direct cost \$46,400/week
 - Without being addressed, project schedule would need to be extended 40 weeks (additional cost of \$ 3.7 million)

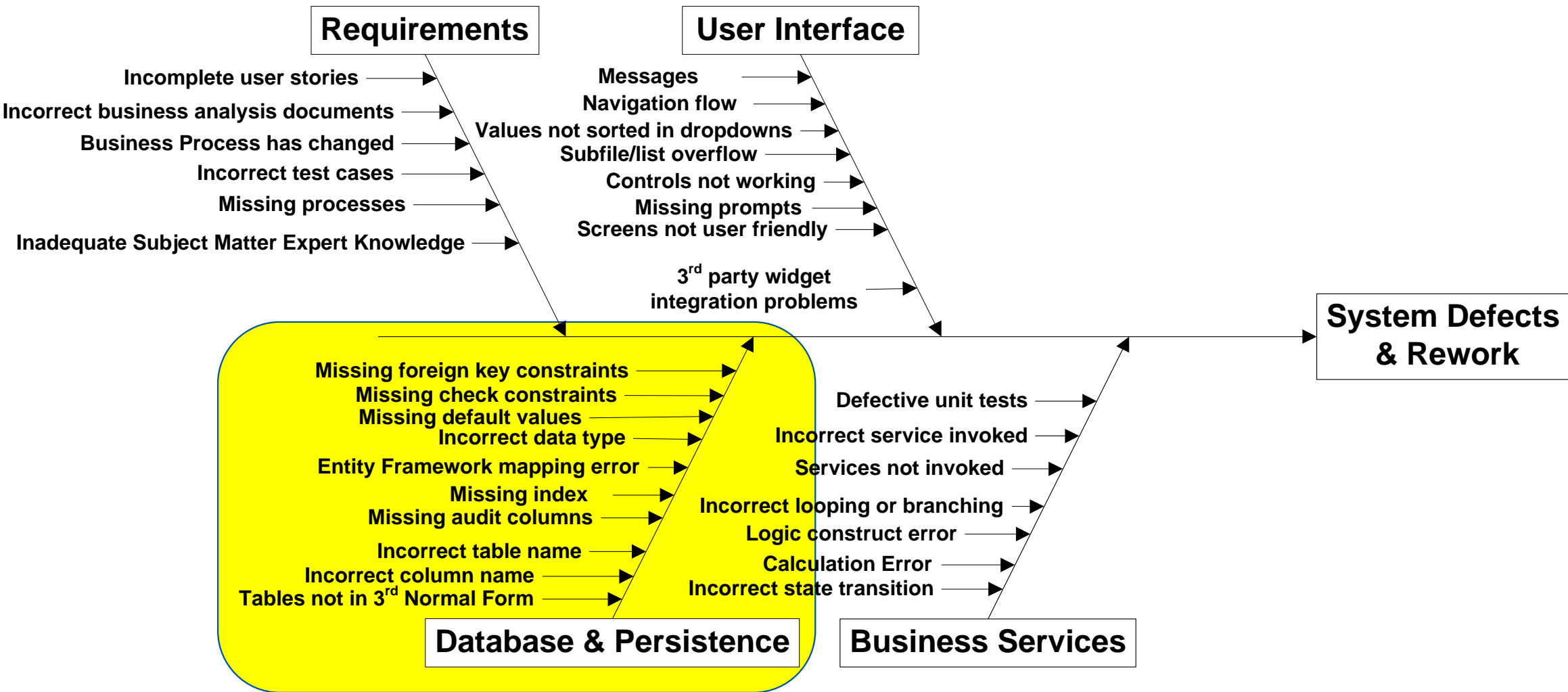


Problem Assessment

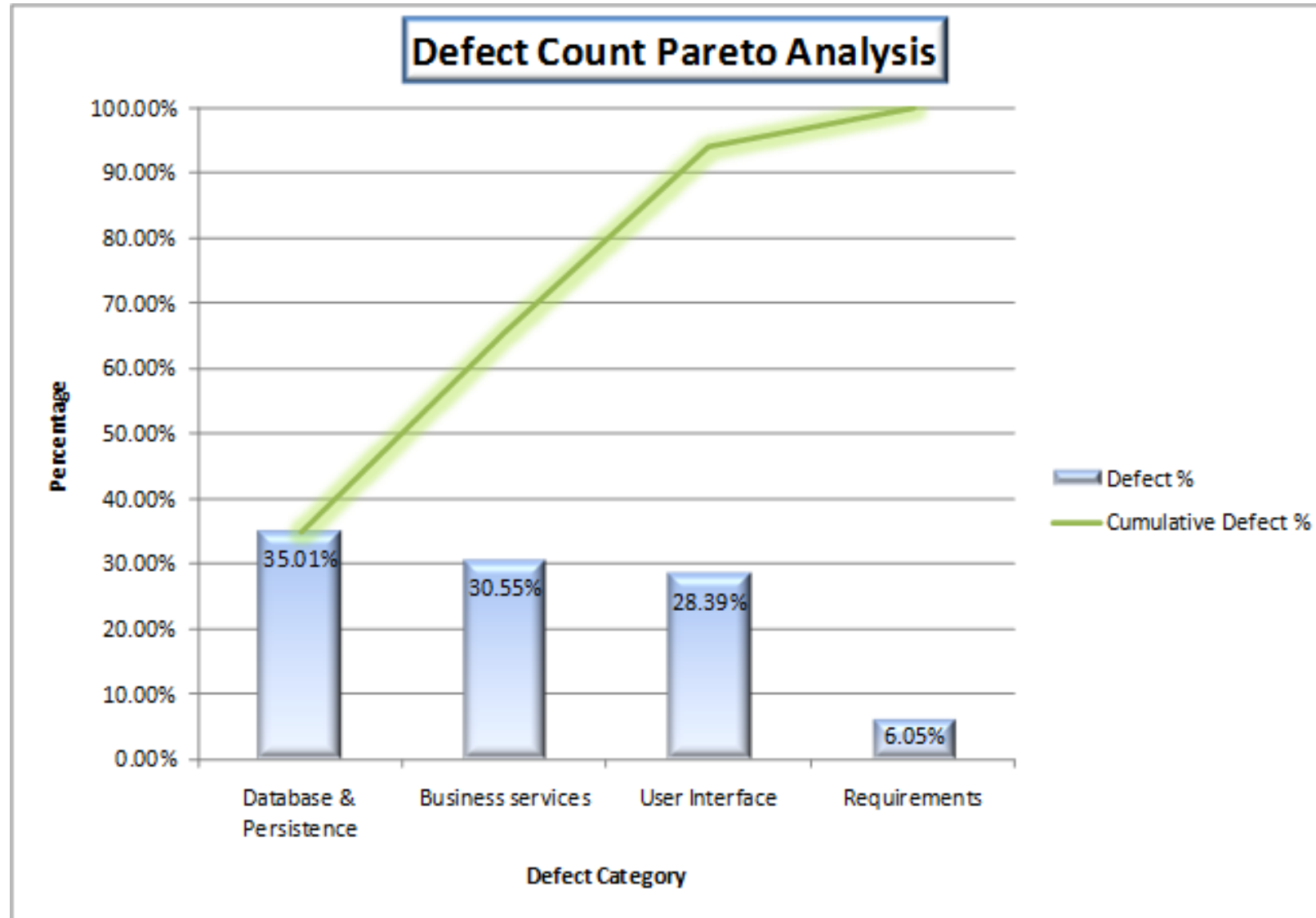
- Define
 - Defect categories
- Measure
 - Discrete vs. weighted impact
 - Linear vs. cumulative measurement
- Analyze
 - Time series distribution
 - Defects per object
 - Defects vs. opportunities
- Improve
 - Remediation strategy
- Control
 - Comparative metrics



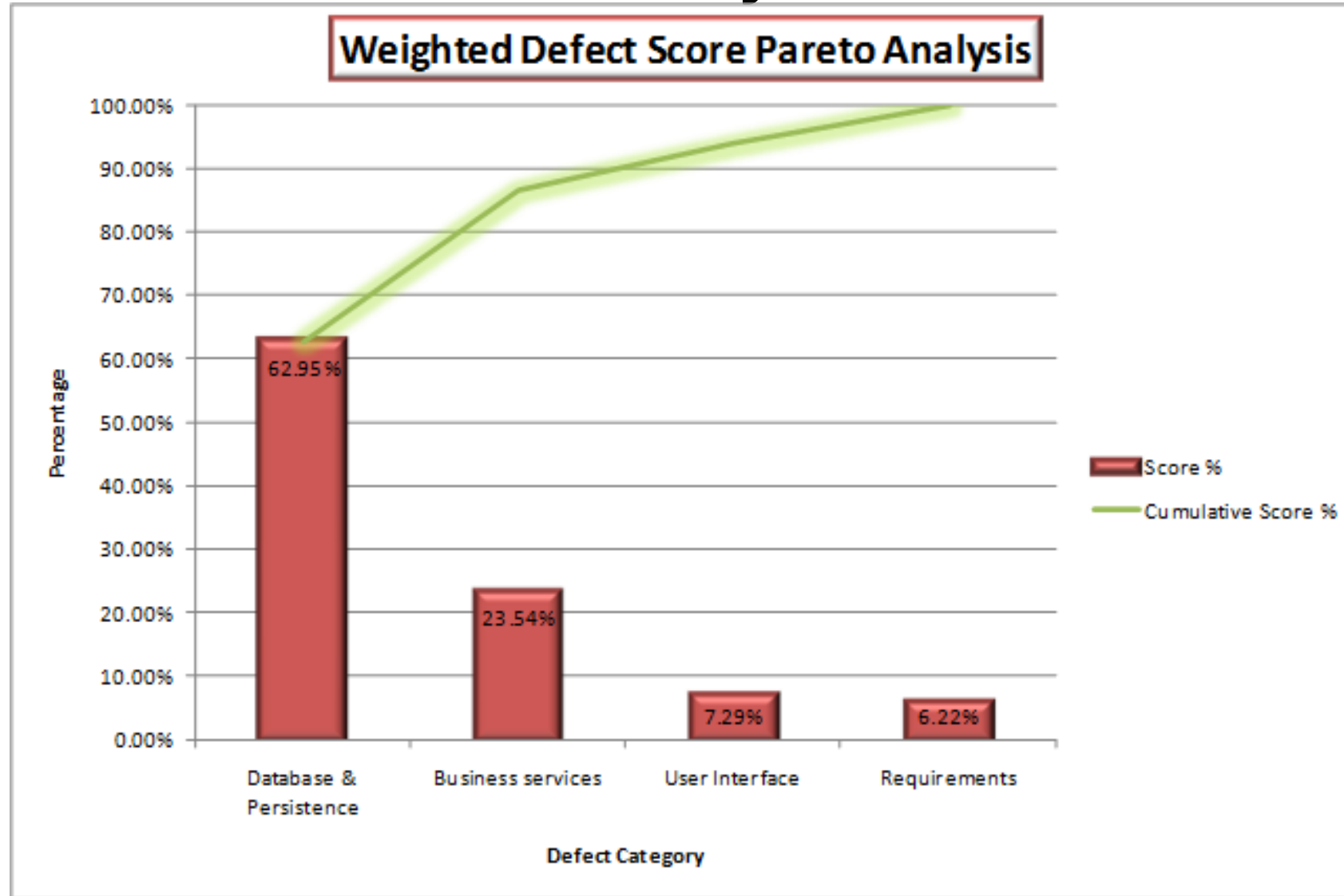
Define: Defect Categories & Impact



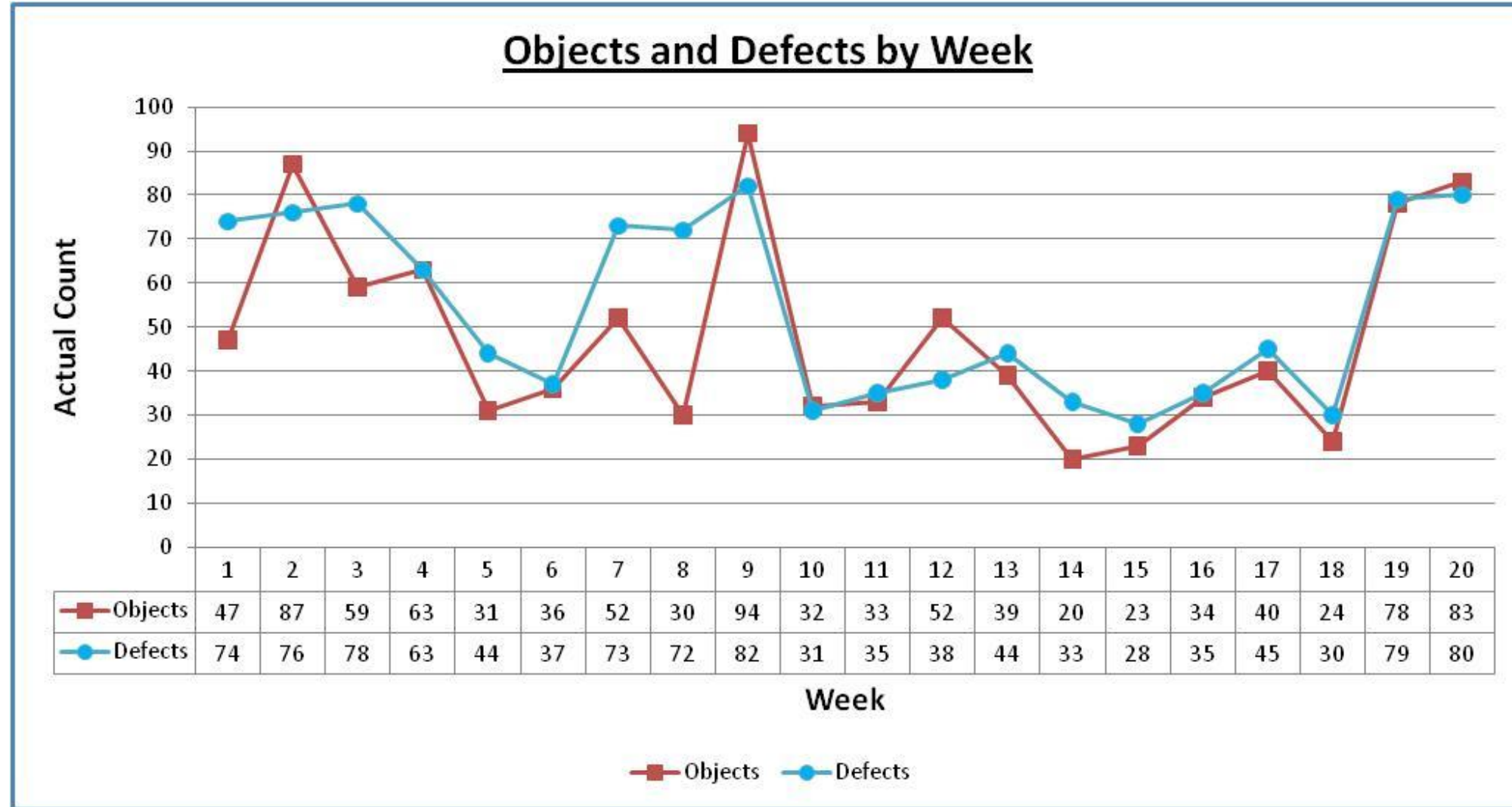
Cumulative Defects



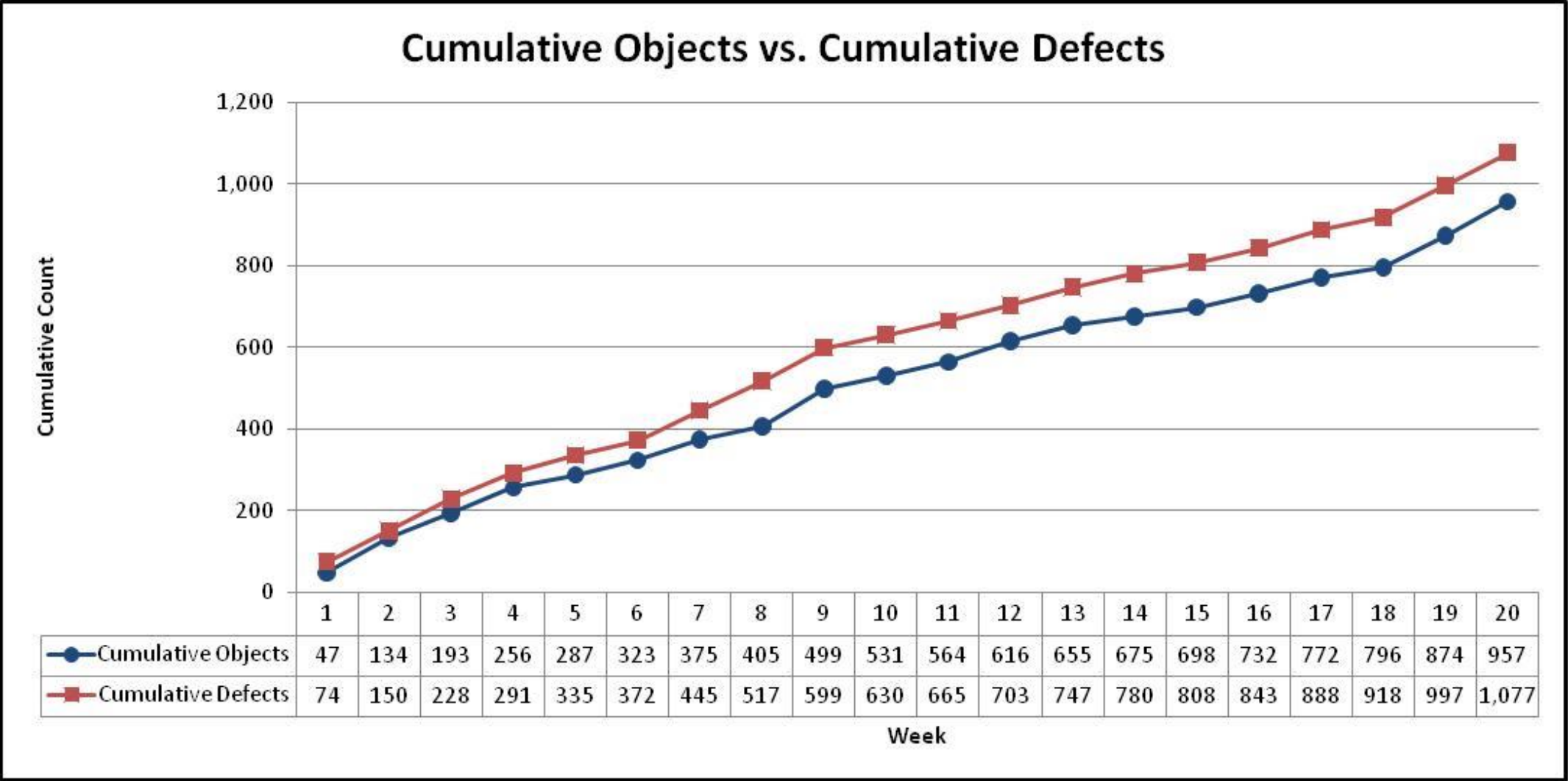
Cumulative Defect Severity



Time Series Distribution of Defects



Smoothing – Cumulative Analysis

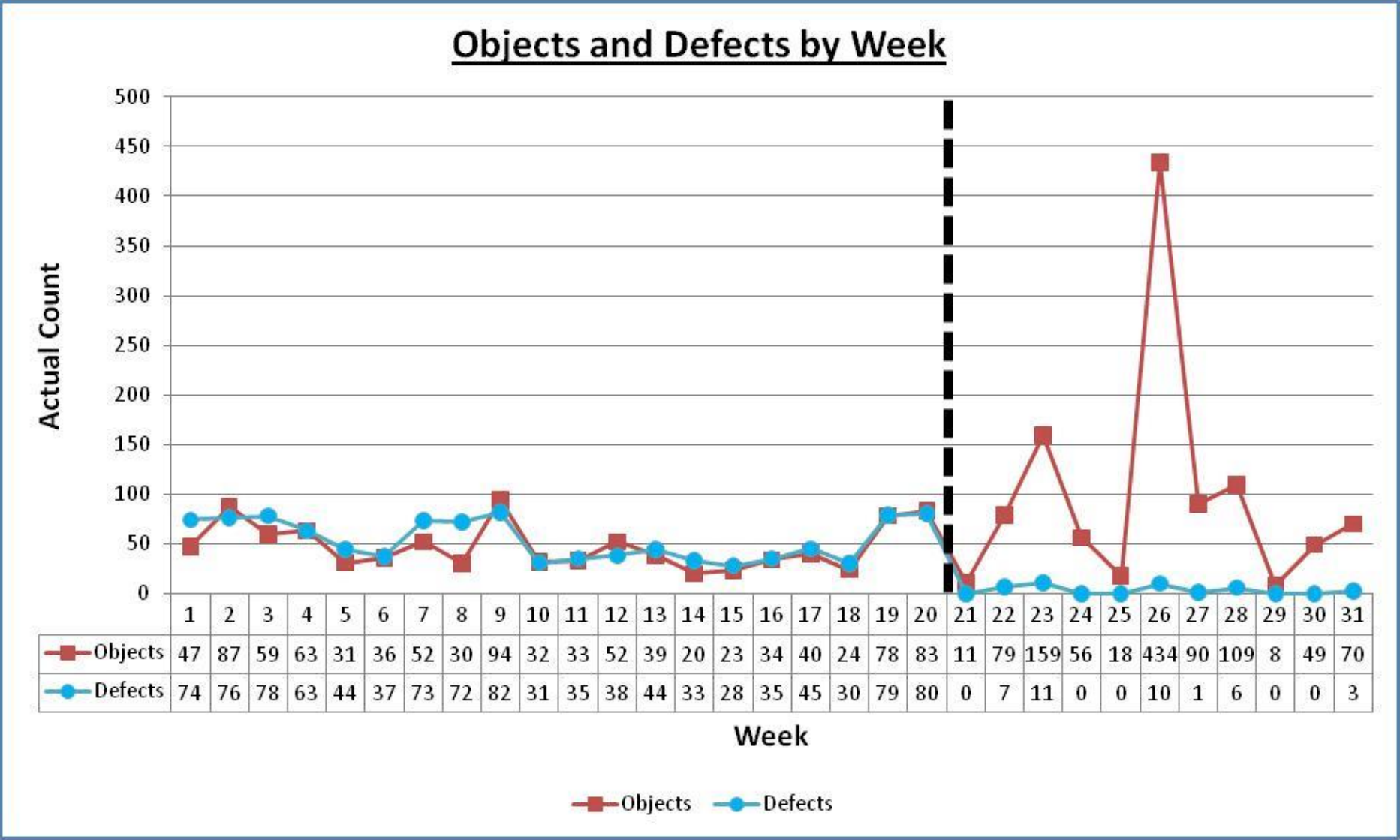


Remediation

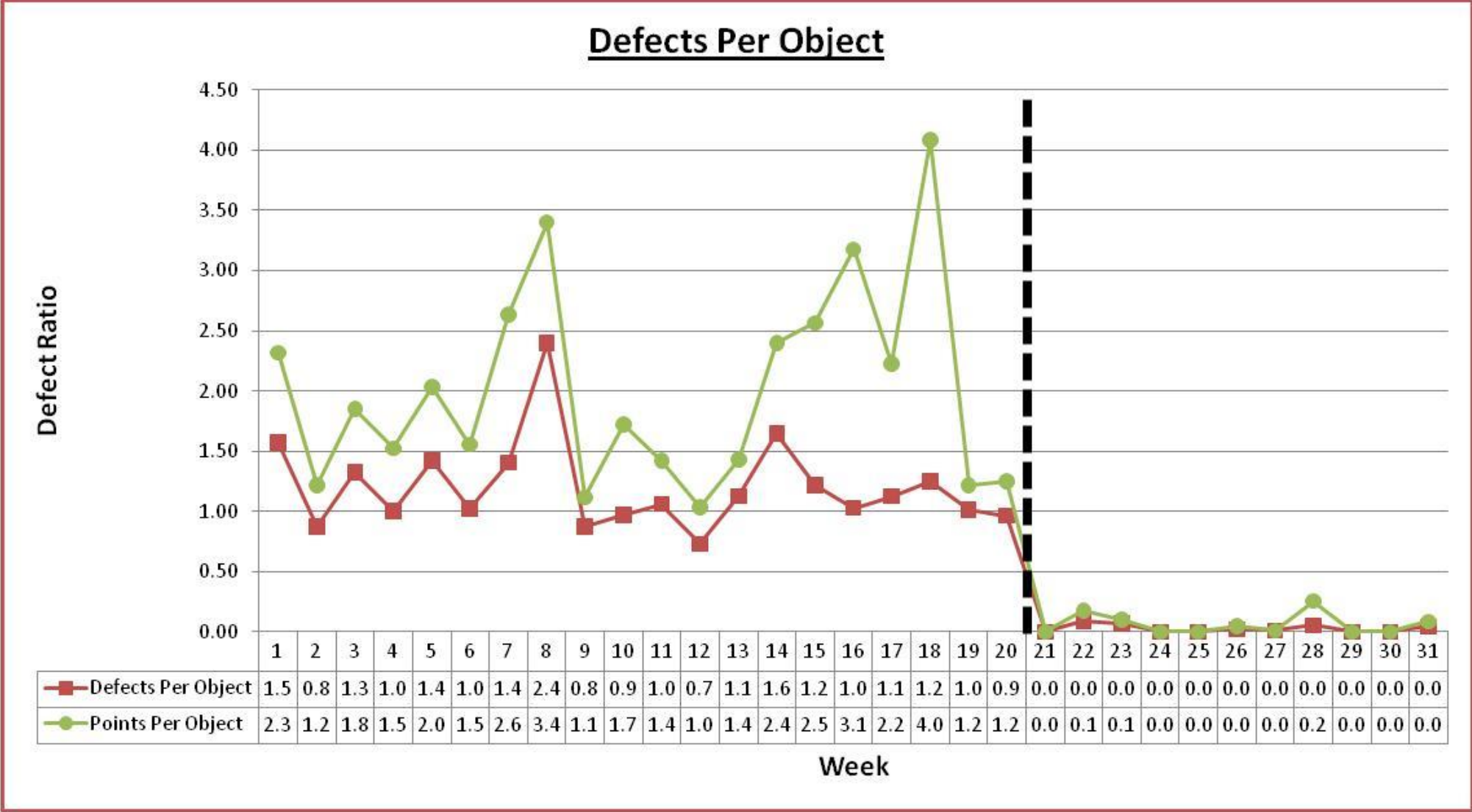
- Apply LEAN principles to:
 - Increase efficiency (eliminate waste)
 - Build in quality
 - Create knowledge
 - Optimize
- Use Senior Data Architect – Cross Team Focus
 - Introduced in week 21 of project
- Process Changes
 - Model all changes
 - Generate DDL from modelling tool
 - 1 developer dedicated to persistence mapping
 - Works for data architect
- Halt functional design/development to reset
 - Redesign database
 - Sprints dedicated to problem cleanup
- Target: Reduce data defects by at least 75% going forward



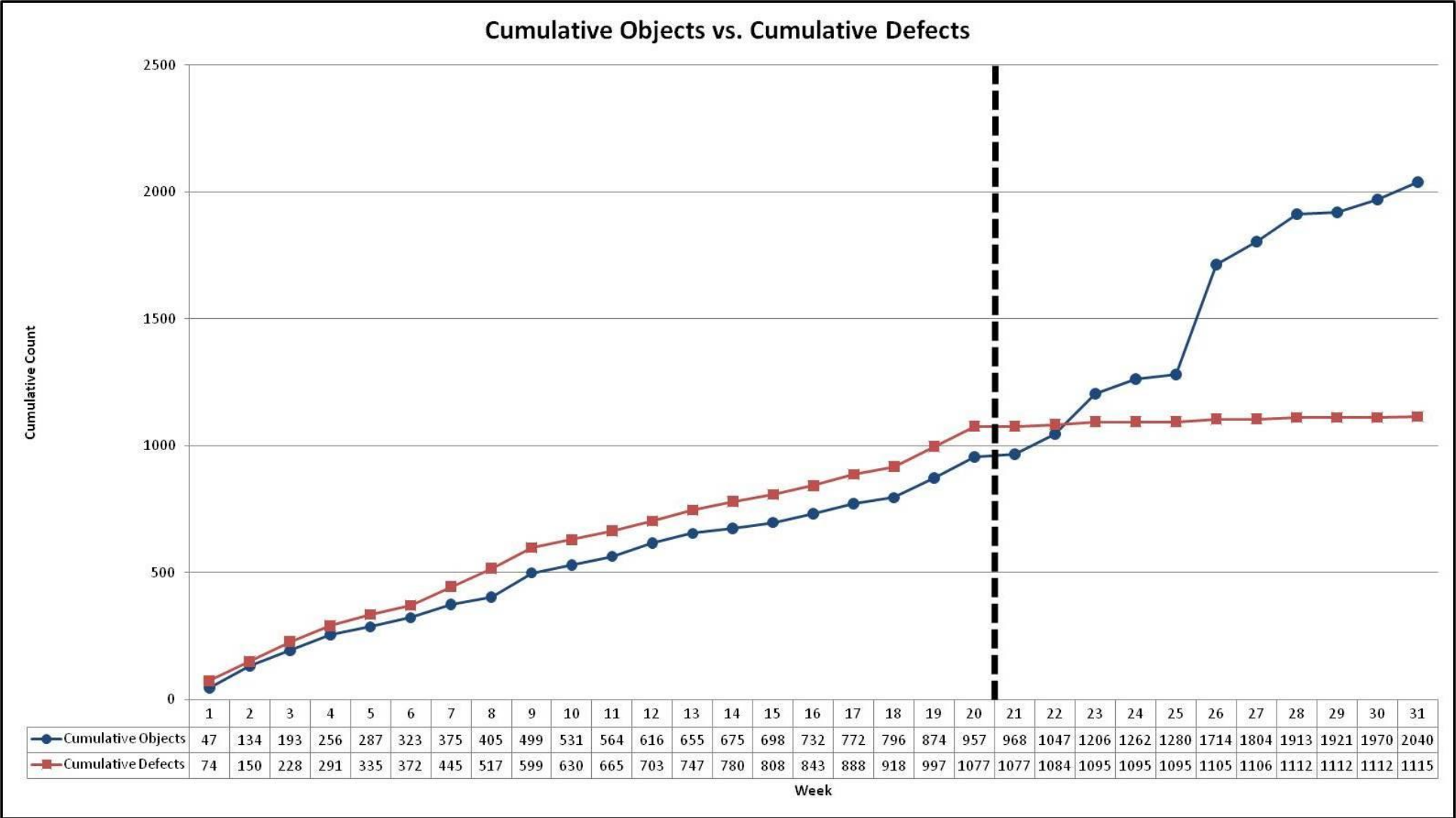
Objects & Defects/Week Comparison



Defects Per Object Comparison



Comparison – Cumulative Objects vs. Defects



Comparative

Measurement	Measurement Period (Weeks 1 -20)	Control Period (Weeks 21 - 31)	Performance Improvement
Interval Length (weeks)	20	11	
Objects Created	957	1,083	
Defects	1,077	38	
Defect Opportunities	4,090	4,333	
Defect Points	1,696	87	
Defect Point Opportunities	8,886	8,991	
Average Objects/week	47.85	98.45	205.76%
Average Defects/week	53.85	3.45	1558.82%
Average Defect Points/week	84.80	7.91	1072.18%
Average defects/object	1.13	0.04	3207.37%
Average Defect Opportunities/Week	204.50	393.91	
Defects/Opportunity	0.263	0.009	3002.60%
Defect Points/Opportunity	0.191	0.010	1972.46%



The Bottom Line

- On time completion
- Avoided \$3.7 million overrun
- Senior enterprise data architect + modelling tools \$200K
 - Duration of project
- ROI: $(\$3.7 \text{ million} - \$200\text{K}) / \$200\text{K} = 1,750\%$
 - Had this been done at the beginning of the project, returns would have been even greater



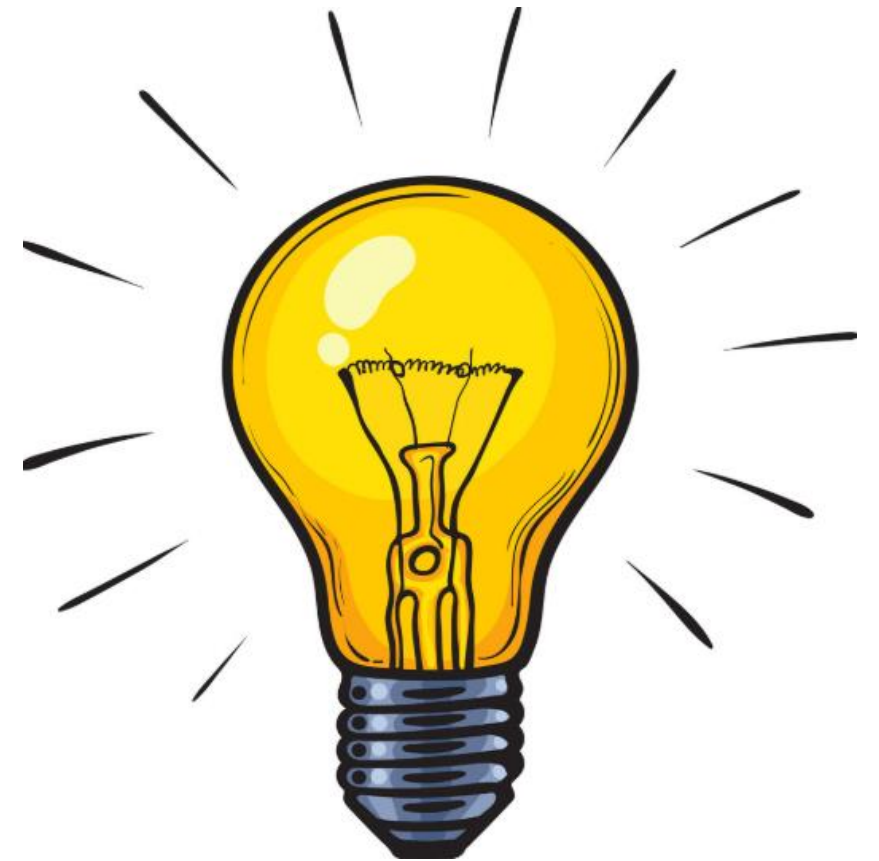
What is LEAN?

- Has its basis in manufacturing, and has been adapted to knowledge work
 - Toyota Production System (TPS)
- Organizational focus vs. Agile's software focus
- Repeatable process to minimize waste, maximize value
- Requires
 - Quality standards
 - Collaboration of specialized workers
- Kaizen
 - "kai-" (change) "-zen" (good)
 - "continuous improvement" or "small incremental improvements" of all areas of a company



LEAN Principles

- **Eliminate waste**
 - Eliminate anything that does not add value
- **Build quality in**
 - Quality is everybody's job!
 - Test driven, incremental development with constant feedback
 - Automate processes prone to human error
- **Create knowledge**
 - Properly document and retain valuable learning
- **Deliver fast**
 - Remove blockers
 - Don't over-engineer
- **Respect people**
 - All aspects: communication, handle conflict, onboarding, process improvement
 - Empowerment
- **Optimize the whole**
 - Don't sacrifice quality for speed
 - Understand capacity and downstream impact of all work
 - Identify and optimize value streams



Agile vs. Lean

- **Agile**

- Proposed as “a better way of developing software
- Bottom-up focus
 - Short cycle, frequent delivery
- Kanban usage
 - Fixed duration iterations
 - Limit time of development
 - Each iteration begins with a fresh board
- Focus is delivering software

- **Lean**

- Strategic as well as operational
 - Improve IT’s value to the organization
- Top-down, End-to-End Focus (E2E)
 - “See the whole”
- Kanban usage
 - Continuous flow
 - Limit work-in-progress
 - When a task completes, **PULL** the next in sequence
- Focus is delivering real value
 - (not just software)

“Agile is the new Waterfall”

Managing Iterations

Start of Iteration

- Participate fully in iteration planning
- Ensure there is a “Named Release” as of completion of previous iteration
 - Always have a baseline for compare/merge !
- Submodels
 - Structure by relevant topic/subject area
 - At story level if necessary to facilitate communication
 - Roll up to parent level submodels



Managing Iterations

- Always have a baseline for compare/merge !
- Within iteration workflow
 - Model each change, associating with appropriate task/user story
 - Generate incremental DDL script(s) and stage to build server
 - Use a robust script naming convention, particularly if utilizing automated build systems
 - 1 data modeller may be working with multiple dev teams simultaneously
 - Some designs will be originated by data modeller
 - Others may be from developer "sandbox"
 - Compare/merge and redesign as appropriate
 - Ensure developer uses the officially sanctioned script
 - Create "Named Release" at end of iteration
 - Create delta script by using compare/merge
 - Based on Named Release from the previous iteration
- Use sub-models for audience specific perspective
- Maintain the discipline!
- Participate fully in iteration planning and retrospectives

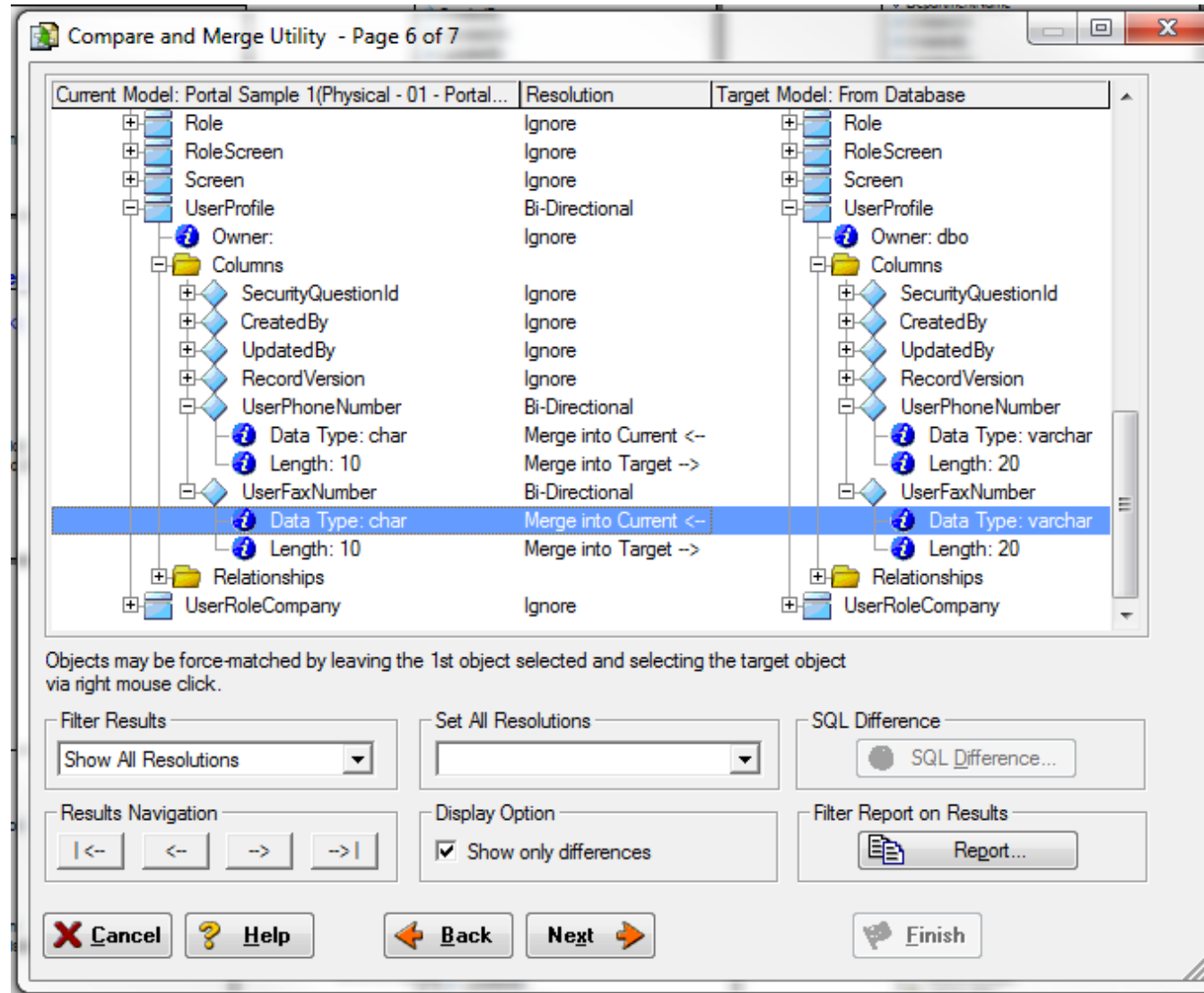


Managing complexity

- Have an overall plan guiding the initiative
 - Usually requires analysis and some modelling BEFORE development starts
- Some areas may be very complex, requiring multiple iterations to design/develop
- Use data model design patterns as a starting point
- The “wave” approach
 - Data modellers working on some items 1 or 2 iterations ahead of the development team
 - Logical / Physical modelling separation facilitates this
 - Make changes to logical model in advance
 - Compare/merge appropriate changes to physical at the right time
 - Enterprise perspective of the data
- Fully documented data models!!
 - Data dictionary definitions
 - Documented relationships/role names
 - The physical model IS the implementation
 - ALL physical constructs



Compare and Merge



Generate Script

-- Standard Alter Table SQL (subset shown for example)

```
ALTER TABLE dbo.UserProfile
ALTER COLUMN UserPhoneNumber varchar(10) NULL
go

ALTER TABLE dbo.UserProfile
ALTER COLUMN UserFaxNumber varchar(10) NULL
go

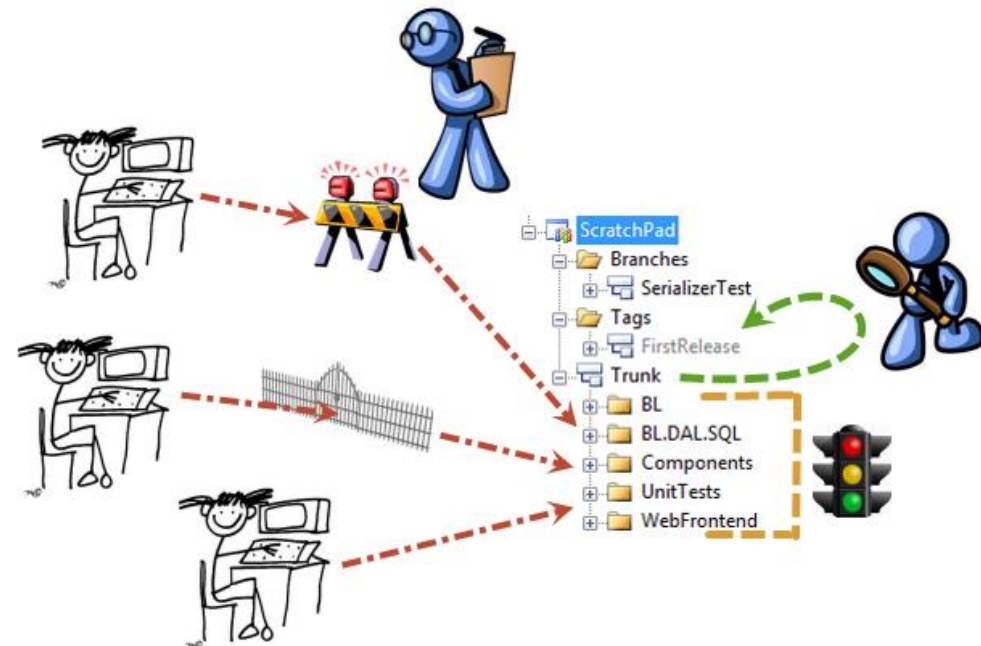
CREATE TABLE dbo.Country
(
    CountryId          int          IDENTITY,
    CountryName         varchar(50) NOT NULL,
    CountryAbbreviation varchar(3)  NULL,
    CONSTRAINT Country_XPK_CountryId
    PRIMARY KEY CLUSTERED (CountryId)
)
go

CREATE TABLE dbo.Province
(
    ProvinceId      int          IDENTITY,
    ProvinceName     varchar(50) NOT NULL,
    CountryId        int          NULL,
    ProvinceCode     varchar(3)  NULL,
    CONSTRAINT Province_XPK_ProvinceId
    PRIMARY KEY CLUSTERED (ProvinceId)
)
go
```

```
ALTER TABLE dbo.Province
    ADD CONSTRAINT Province_FK_CountryId
    FOREIGN KEY (CountryId)
    REFERENCES dbo.Country (CountryId)
go

ALTER TABLE dbo.Company ADD CONSTRAINT Company_FK_ProvinceId
    FOREIGN KEY (ProvinceId)
    REFERENCES dbo.Province (ProvinceId)
go

ALTER TABLE dbo.Company ADD CONSTRAINT Company_FK_CountryId
    FOREIGN KEY (CountryId)
    REFERENCES dbo.Country (CountryId)
go
```



End of Iteration wrap-up

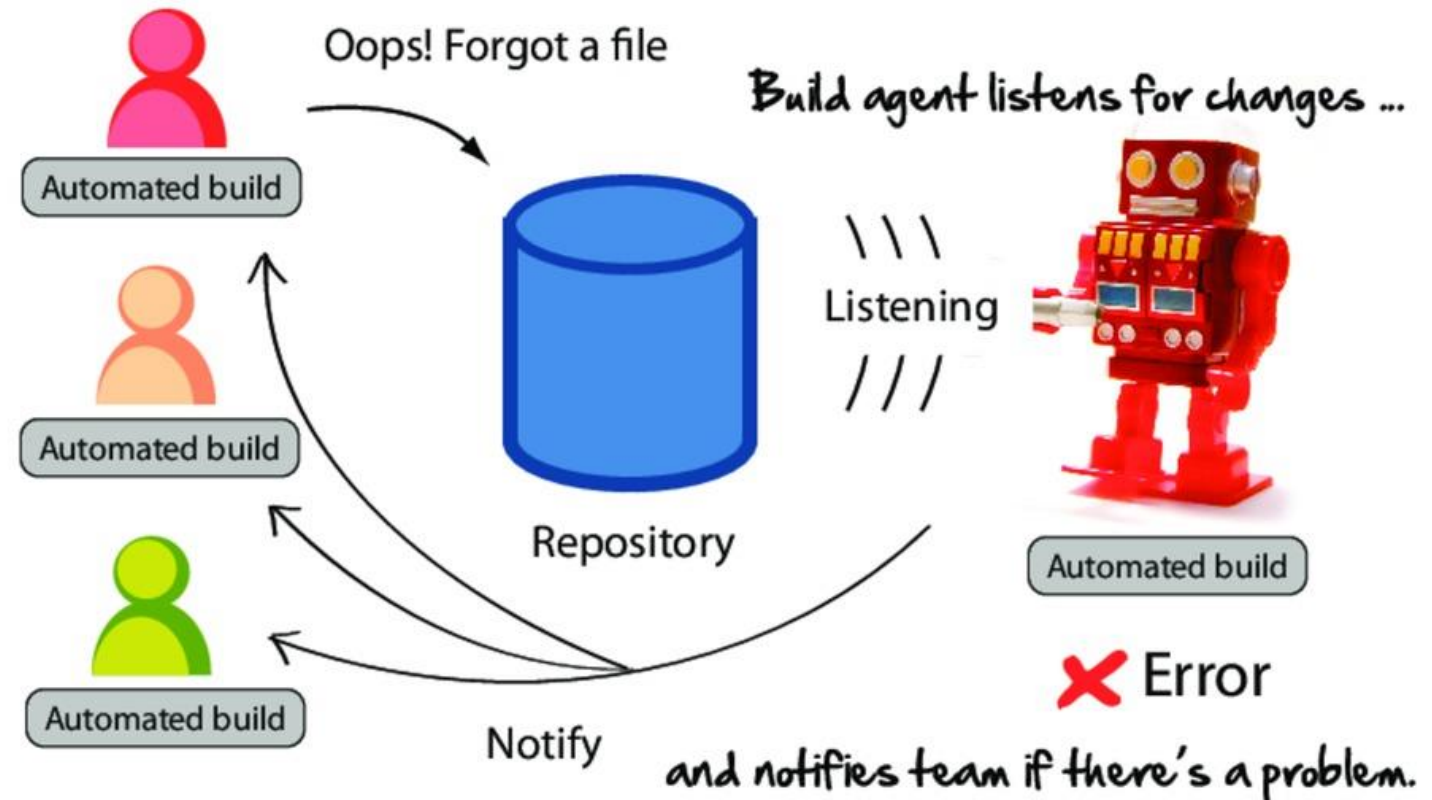
- Create "Named Release" at completion
 - Serves as baseline for start of next iteration
 - Serves as baseline for comparison at **ANY** later point
- Create delta DDL script by using compare/merge
 - Based on Named Release from end of the previous iteration
- Create full database DDL script
 - Can be used to easily create "sandbox" databases quickly
- Ensure the model(s) have been published
- Participate fully in planning and retrospectives
 - Lessons learned
 - Celebrate the successes



Automated build system Considerations

- Require synchronized deliverables
- Database (DDL)
- Application code
- Persistence
 - Data services
 - Framework updates

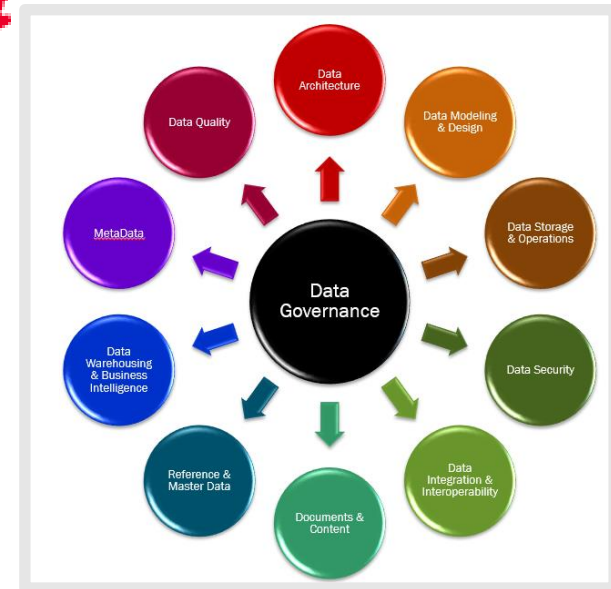
Developers



Data Governance Considerations

Data Governance

- You can't just buy it, so stop trying to!
- Governance requires lots of hard work and commitment throughout the organization
 - People
 - Process
 - Culture
 - Technology



Some Questions modelling Can Address

- To understand organizational data
 - What's important?
 - Where is it? (can be many places)
 - Where did it come from?
 - How is it used (business processes)?
 - What is the chain of custody?
 - What are the business rules?
- Governance
 - How do I identify private information?
 - How long should I keep the information?
 - Master Data Management classification
 - Data quality
 - Is it fit for purpose?
 - What changed and why?



From Data to Knowledge

Where is the data?

- Identify data stores
- Reverse engineer

What is it?

- Naming standards
- Mappings to link entity instances

Where did it come from and how is it used?

- Visual data lineage
- Business process models

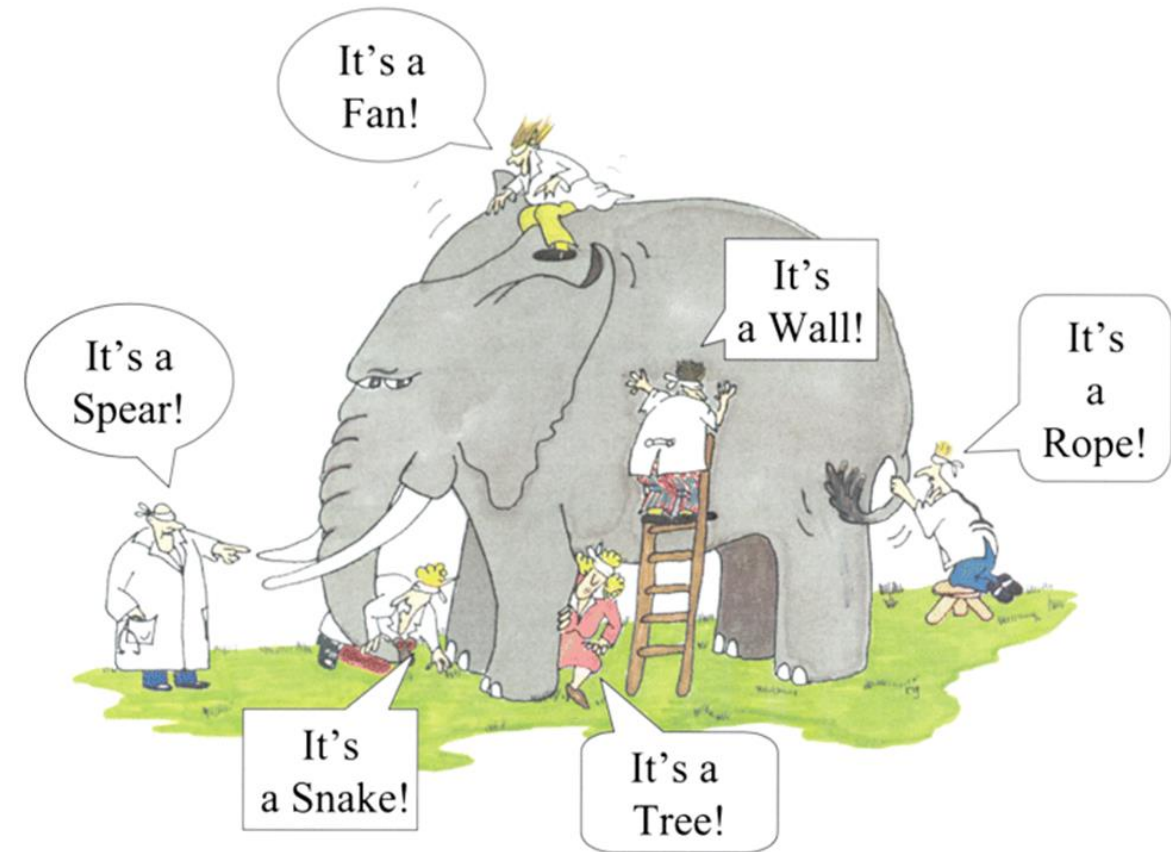
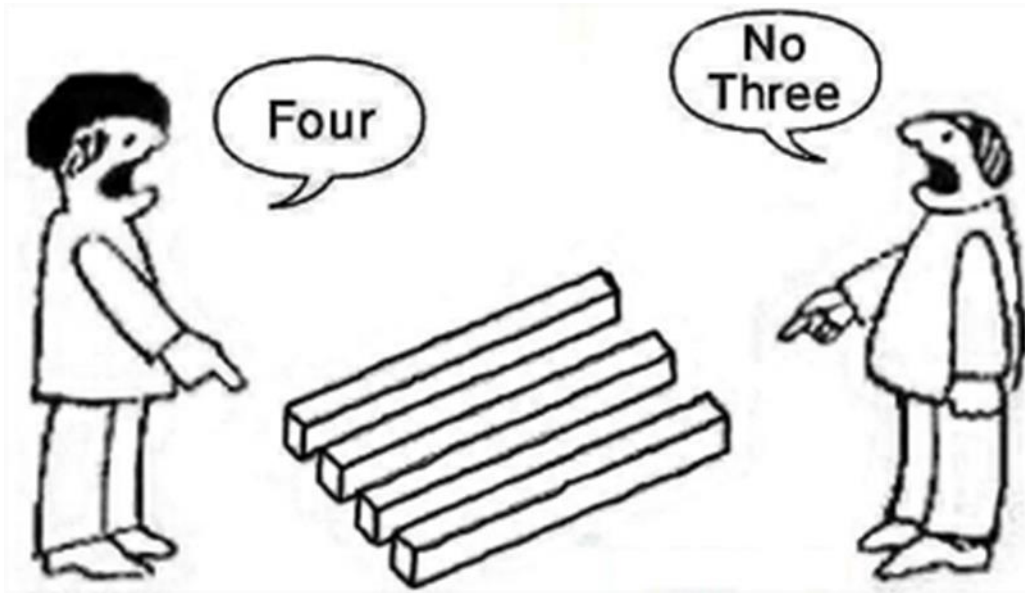
What does it mean?

- Data dictionary
- Business Glossary

How do I govern it?

- Reference & master data management
- Data Classification
- Security classifications
- Regulatory policies

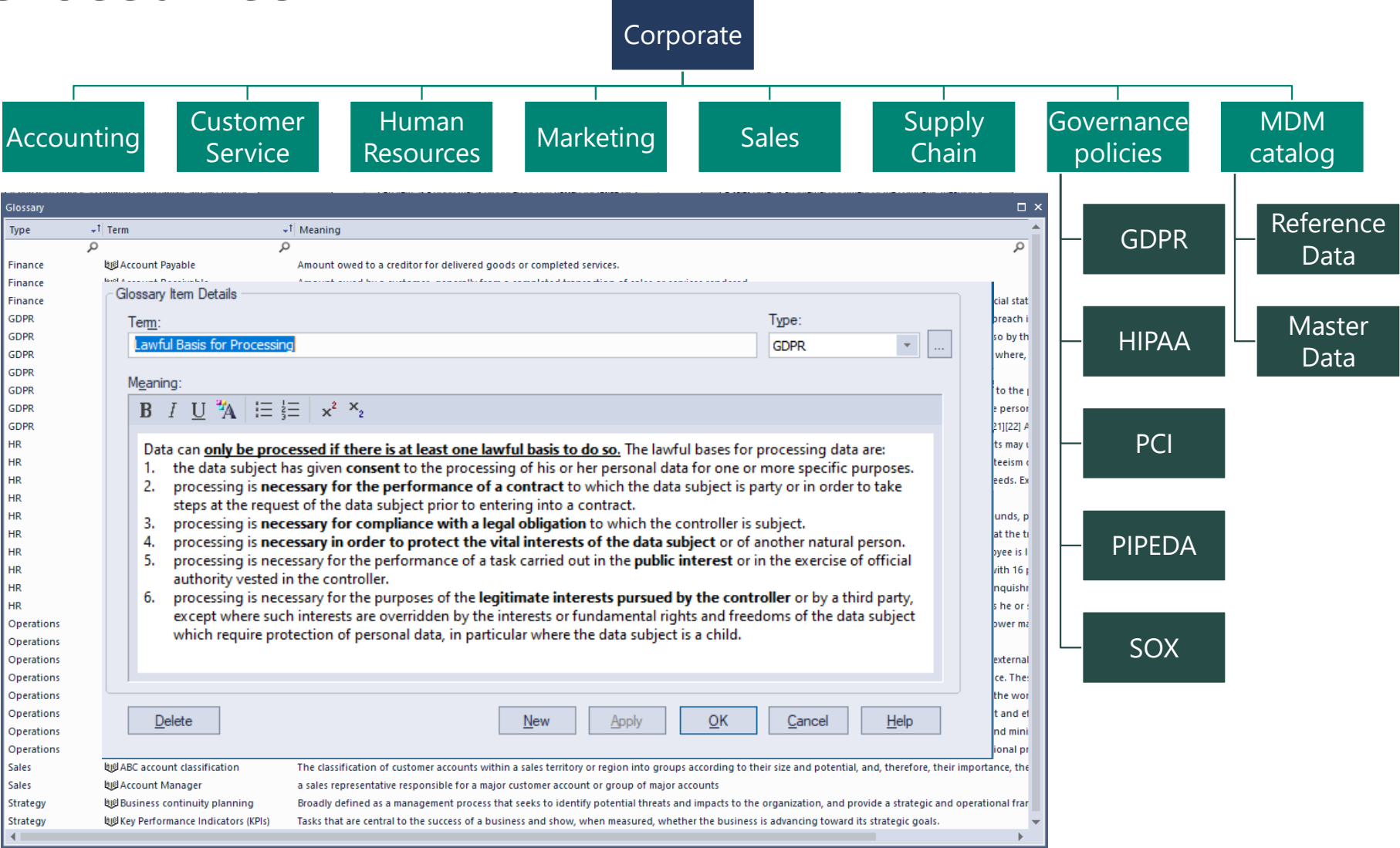
The Need for Common Understanding



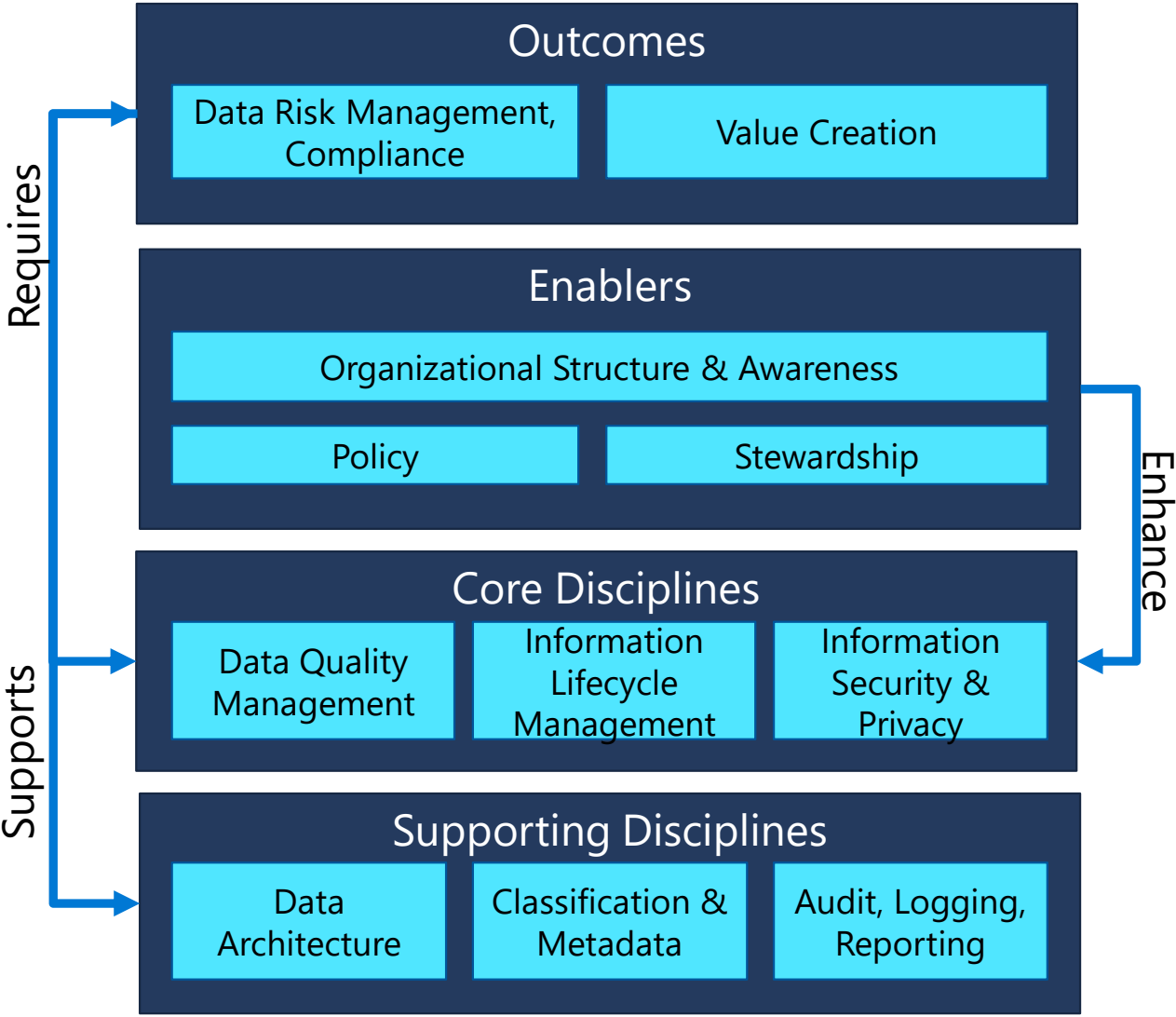
Business Glossary – Why?

- Maximize understanding of the core business concepts and terminology of the organization
- Minimize misuse of data due to inaccurate understanding of the business concepts and terms
- Improve alignment of the business organization with the technology assets (and technology organization)
- Maximize the accuracy of the results to searches for business concepts, and associated knowledge

Business Glossaries



Effective Data Governance



No.	Category	Description
1	Data Risk Management, Compliance	The methodology by which risks are identified, qualified, quantified, avoided, accepted, mitigated, or transferred out.
2	Value Creation	The process by which data assets are qualified and quantified to enable the business to maximize the value created by data assets.
3	Organizational Structures & Awareness	Describes the level of mutual responsibility between business and IT, and recognition of the fiduciary responsibility to govern data at different levels of management.
4	Policy	Policy is the written articulation of desired organizational behavior.
5	Stewardship	Stewardship is a quality control discipline designed to ensure custodial care of data for asset enhancement, risk mitigation, and organizational control.
6	Data Quality Management	Methods to measure, improve, and certify the quality and integrity of production, test, and archival data.
7	Information Lifecycle Management	A systematic policy-based approach to information collection, use, retention, and deletion.
8	Information Security, Privacy	Describes the policies, practices and controls used by an organization to mitigate risk and protect data assets.
9	Data Architecture	The architectural design of structured and unstructured data systems and applications that enable data availability and distribution to appropriate users.
10	Classification & Metadata	The methods and tools used to create common semantic definitions for business and IT terms, data models, types, and repositories. Metadata that bridge human and computer understanding.
11	Audit Information, Logging, Reporting	The organizational processes for monitoring and measuring the data value, risks, and efficacy of governance.

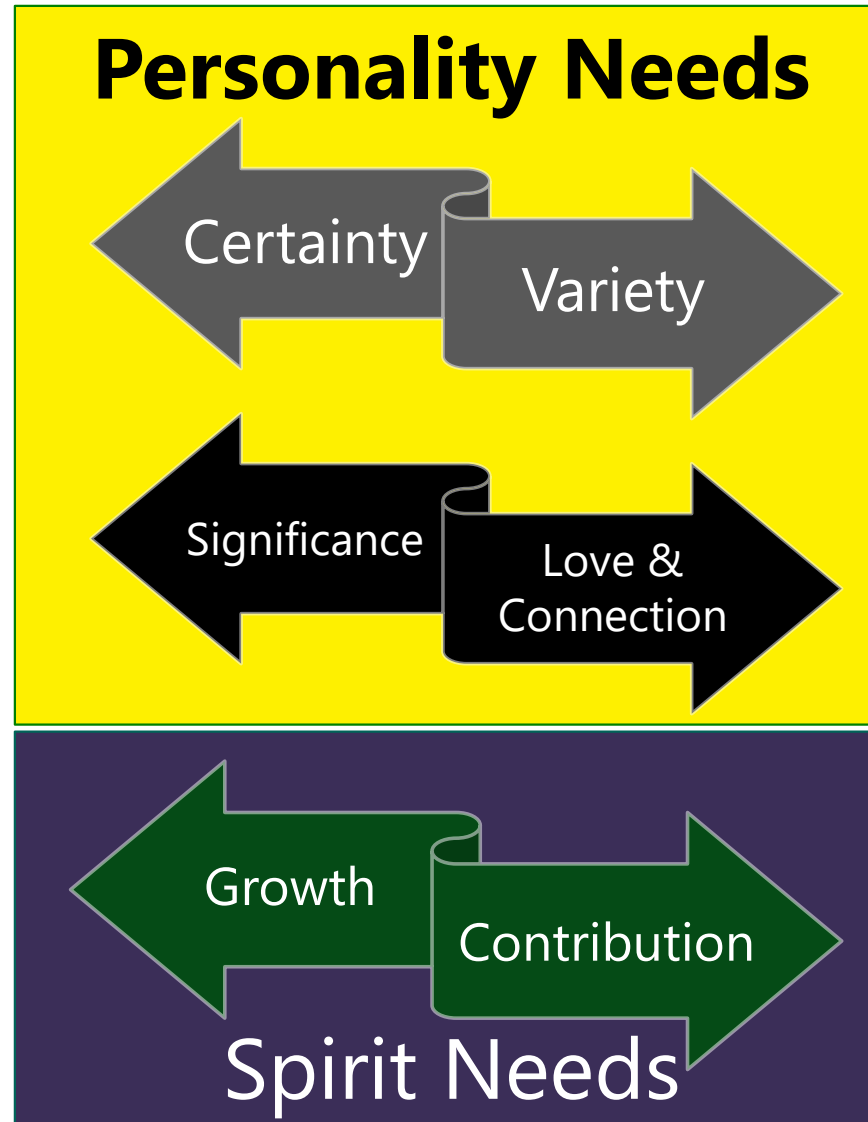
The People Dimension

First and foremost, It's a people problem

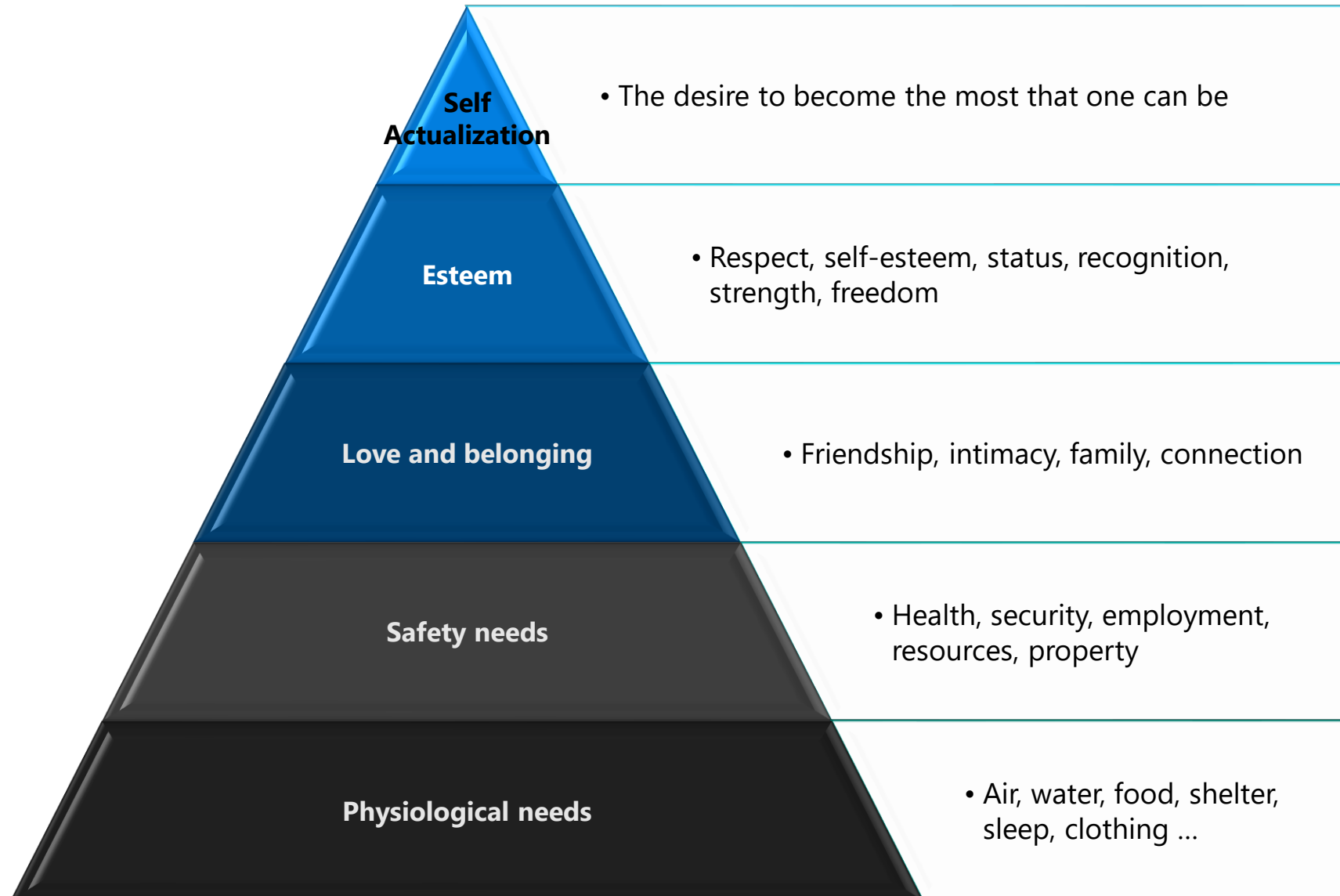
Some wisdom from Tony Robbins:

- We need to overcome human nature
 - 92% of the 17 million people that try to quit smoking each year fail.
 - 95% of people who lose weight fail to keep it off long term.
 - 88% of people who set New Year's resolutions fail at their attempt.
 - Only 10% of the population has specific, well-defined goals, but even then,
 - seven out of the ten of those people reach their goals only 50% of the time
- Two forces that motivate people:
 - Avoid pain
 - Gain pleasure
- This causes the 'yo-yo' pattern in some people
 - they go back and forth between taking action to create change and losing their drive to take any action at all.
- Change is never a matter of ability, it's a matter of motivation.

Six Core Human Needs – Anthony Robbins



Maslow's Hierarchy of Needs



Organizational Change Management (OCM)

- Definition
 - A framework for managing the effect of new business processes, changes in organizational structure or cultural changes within an enterprise.
 - OCM addresses the “people” side of change management.
- Effective OCM includes:
 - A common vision for change
 - Strong executive leadership to communicate the vision
 - Strategy for educating employees and other stakeholders
 - Metrics and a plan to measure success
 - Contingency plan
 - Communication plan
 - Rewards that encourage stakeholders to take ownership

70% of organizational change initiatives fail!

Change Management: Addressing Resistance (1)

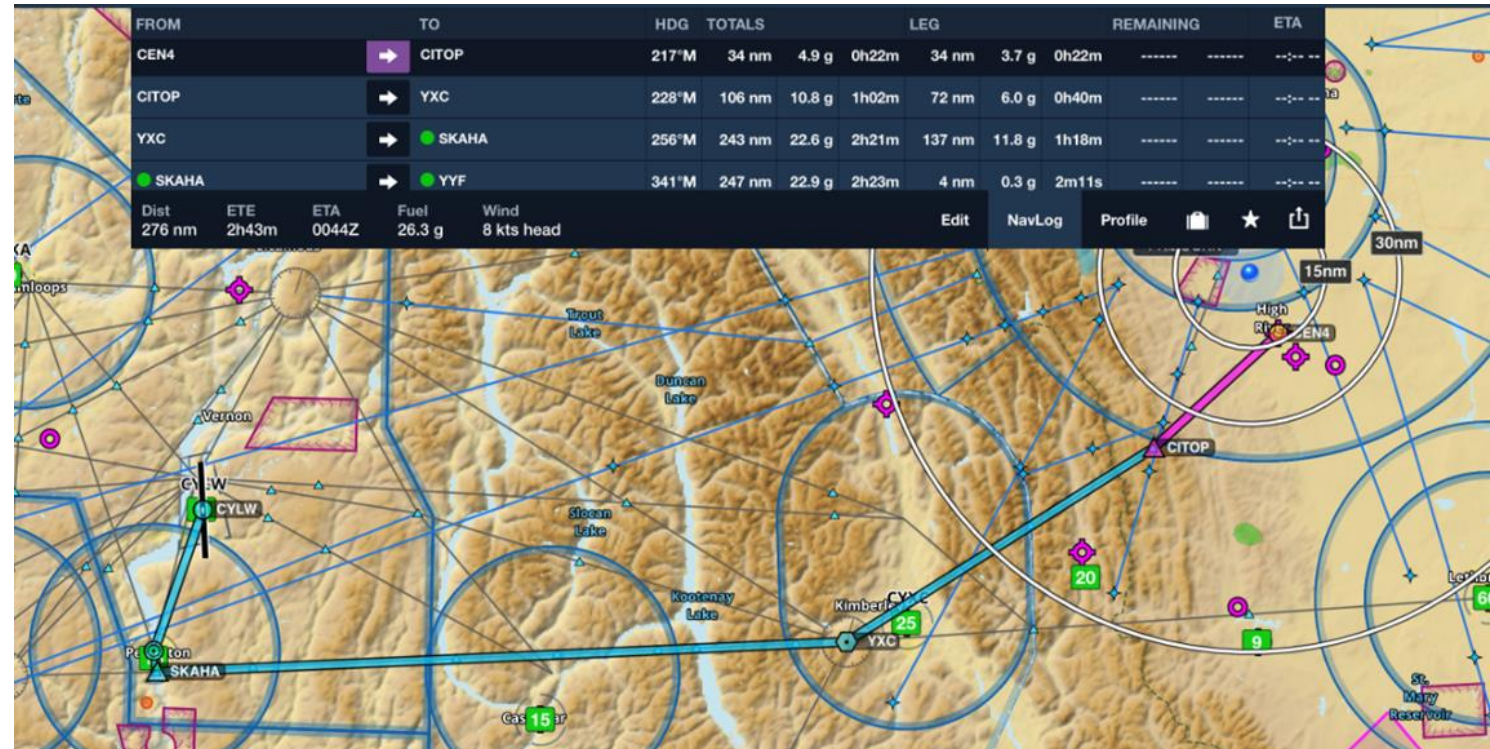
Source	Description	Remediation
Uncertainty	People will dig in their heels if they don't know what to expect. They prefer the known (even if it is bad) to the unknown.	Create a process comprised of clear, simple steps with timetables. Encourage all to communicate their questions and concerns.
Loss of control	Individuals feel that the changes are interfering with their sense of autonomy.	Invite others into the planning. A sense of ownership will motivate them.
Surprise	People will resist decisions that are imposed on them, especially if there is no warning.	Communicate in advance. Solicit input.
Change overload	Too many changes at once can be confusing, distracting and disrupting.	Minimize unrequired differences associated with a central change. Focus on the important and necessary changes.
Loss of face	People will be defensive if the change directly impacts something that they created or own.	Celebrate the positive benefits of their efforts. Include them in planning so that they feel retained ownership.
Peer Pressure	People are social by nature. People will resist change to protect the interests of a group they belong to.	Don't underestimate the impact of this. The need to belong to a group is very powerful. Involve the group in planning.

Change Management: Addressing Resistance (2)

Source	Description	Remediation
Loss of self-confidence	People may be afraid that they don't have the necessary skills to adjust to the proposed change.	Change management should include detailed and complete communication, education, training, mentorship and support.
Extra work	Many staff are often overloaded to begin with. Accommodating new change can be extremely difficult, causing significant stress.	Many changes add additional work in the near term, which reduces over the longer term. Management needs to secure the correct resources, which may require temporary assignments from one area to another. All participants should be rewarded for their efforts
Ripple effect	Change in one area can often cause disruption in other areas, both inside and outside the organization.	Leadership must identify and consider all impacted parties. They must work with those parties to minimize disruption.
Old wounds	Ghosts of the past are most likely to surface during times of change.	Leadership must find ways to heal the past in order to enter the future in a positive manner.
It's too real	Change can cause pain!	Be: Honest, Transparent, Fair Implement change in an expedient manner
Climate of mistrust	Meaningful organizational change cannot occur in a climate of mistrust. Mutual mistrust will doom a change initiative to failure. Trust is fragile and difficult to repair.	Trust must be rebuilt in order to succeed.

How do we implement lasting change?

- Have a defined target
 - Break down into small, sustainable changes
 - Plan, then execute
 - Incorporate contingencies
 - Without a plan, the chance of success is virtually ZERO
 - “Hope is not a strategy”
- Concrete
- Measurable
- Continuous improvement approach
 - Evaluate, measure, adjust
 - Add additional changes
 - In small increments



Summary

Summary – Part 1

- Information capability in organizations is poor (and declining!)
 - This not only impacts data governance, but also organizational effectiveness.
- Organizations that are successful with governance:
 - Have higher data maturity + process maturity
 - Achieve alignment between business strategy, data strategy and governance
- Enterprise architecture is essential
 - Especially model driven data architecture and business architecture
 - Enterprise data model
- Lean principles improve
 - Value focus, efficiency, waste reduction, customer satisfaction
- Approaches utilizing lean are the most successful
 - Predominantly adaptive
 - With predictive capabilities incorporated

Summary – Part 2

- We must address the human side of the equation, rather than chasing technology
 - Understand what motivates people
 - Overcome resistance to change
- Organizational change management
 - Common vision
 - Strong leadership
 - Create a climate of trust
 - Remove uncertainty
 - Teamwork
 - Education
 - Rewards
- **Communicate, facilitate and celebrate success!**



Thank You!

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