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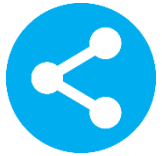

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Modern Data and Analytics Architecture for Digital Transformation

Jason Lewis
Research Director

1 year at Gartner, 25 years industry experience

Jason researches data management strategies within the Gartner for Technical Professionals (GTP) group. Mr. Lewis covers big data frameworks and related technologies and provides insights on data ingestion, data integration and data transformation strategies.

@jclewis

linkedin.com/in/jasonclewis

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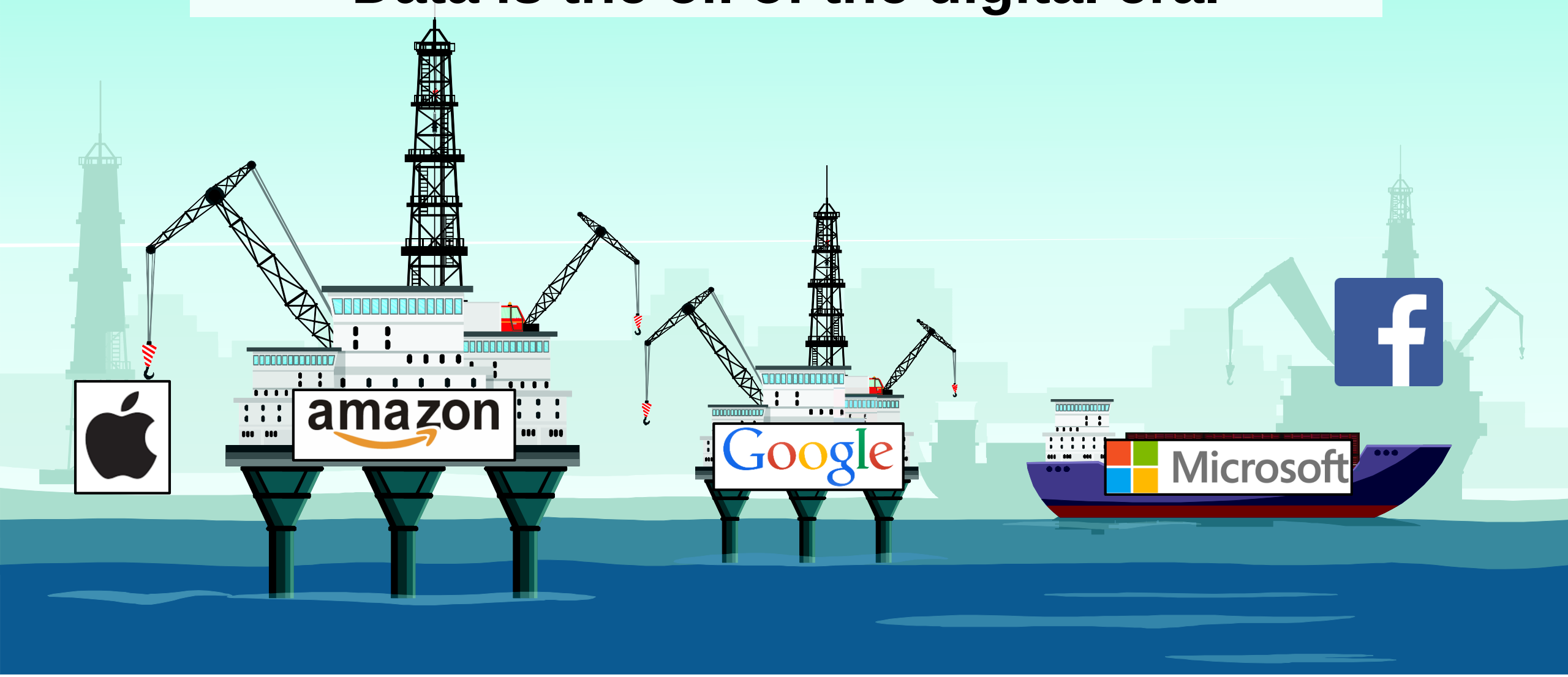
Data is the oil of the digital era.



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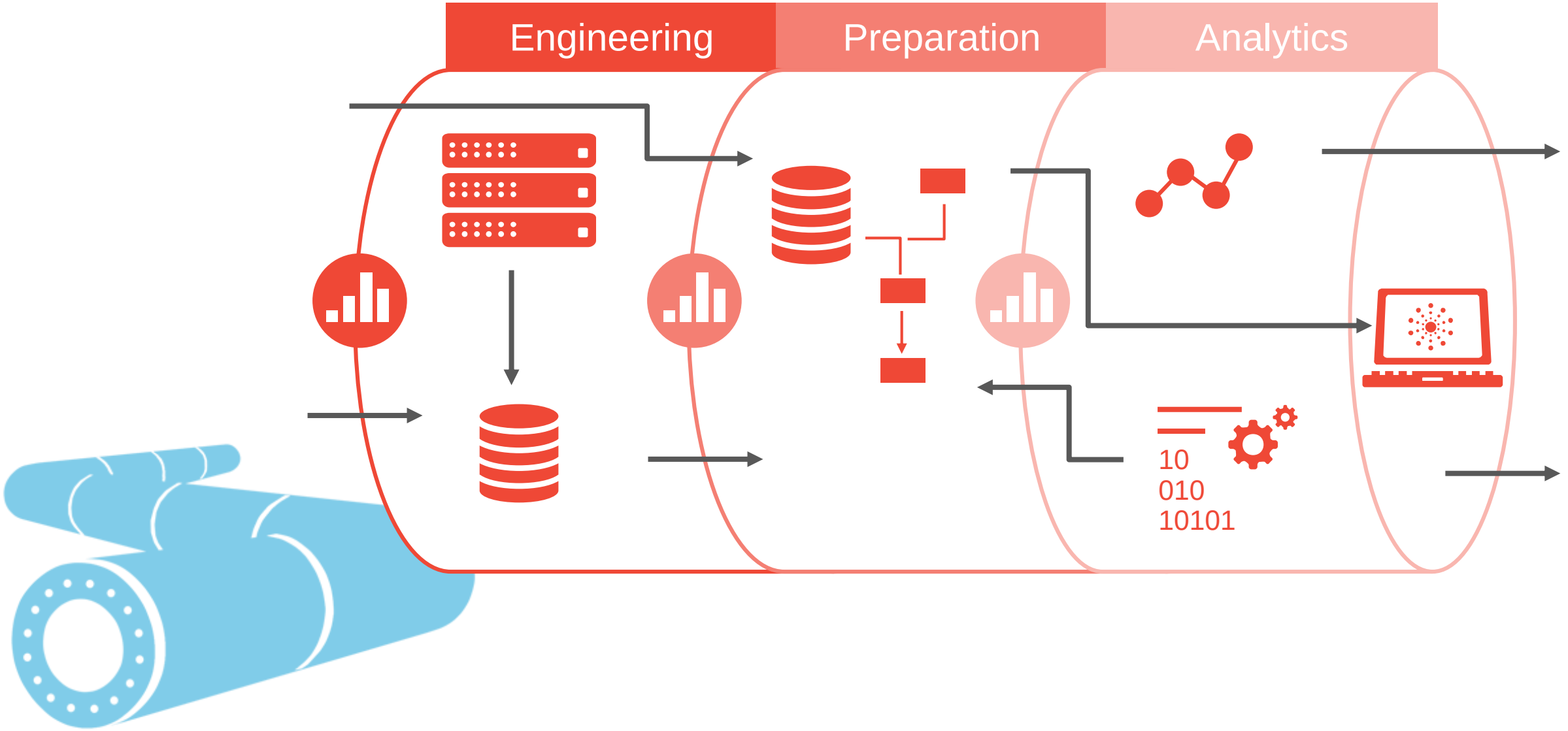

What we do is powerful

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Our Dilemma:

- Streaming and In Motion:
  - IoT
  - Real Time
- Staging/At Rest:
  - More Sources and Types
  - Different Speeds and Levels of Granularity
- High Urgency and Expectations:
  - Self-Service Capabilities

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Our Challenge

Build an architecture that is a conduit of timely, competitive business analytics

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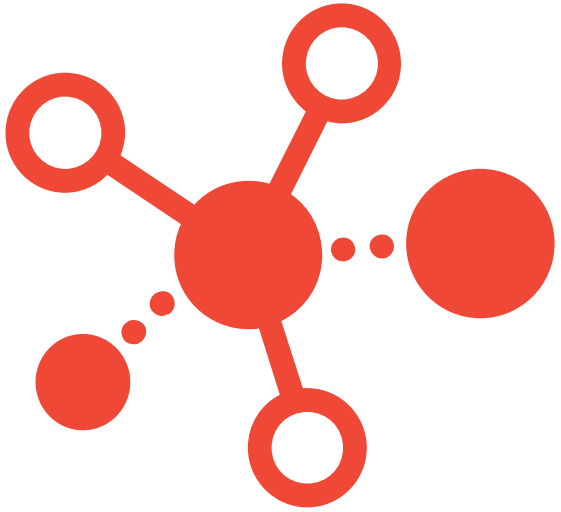
How Do We Build the Conduit for Analytics



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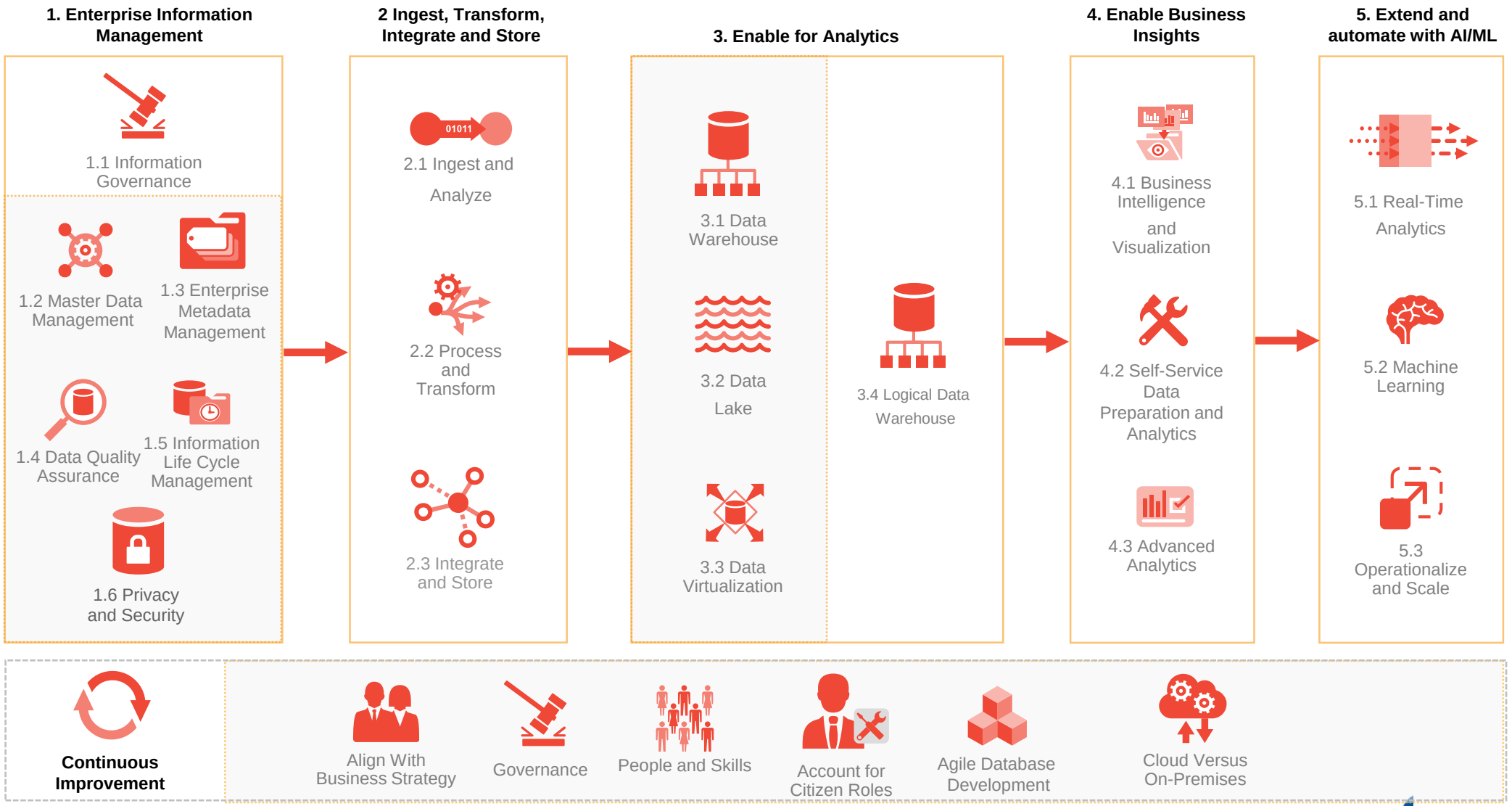
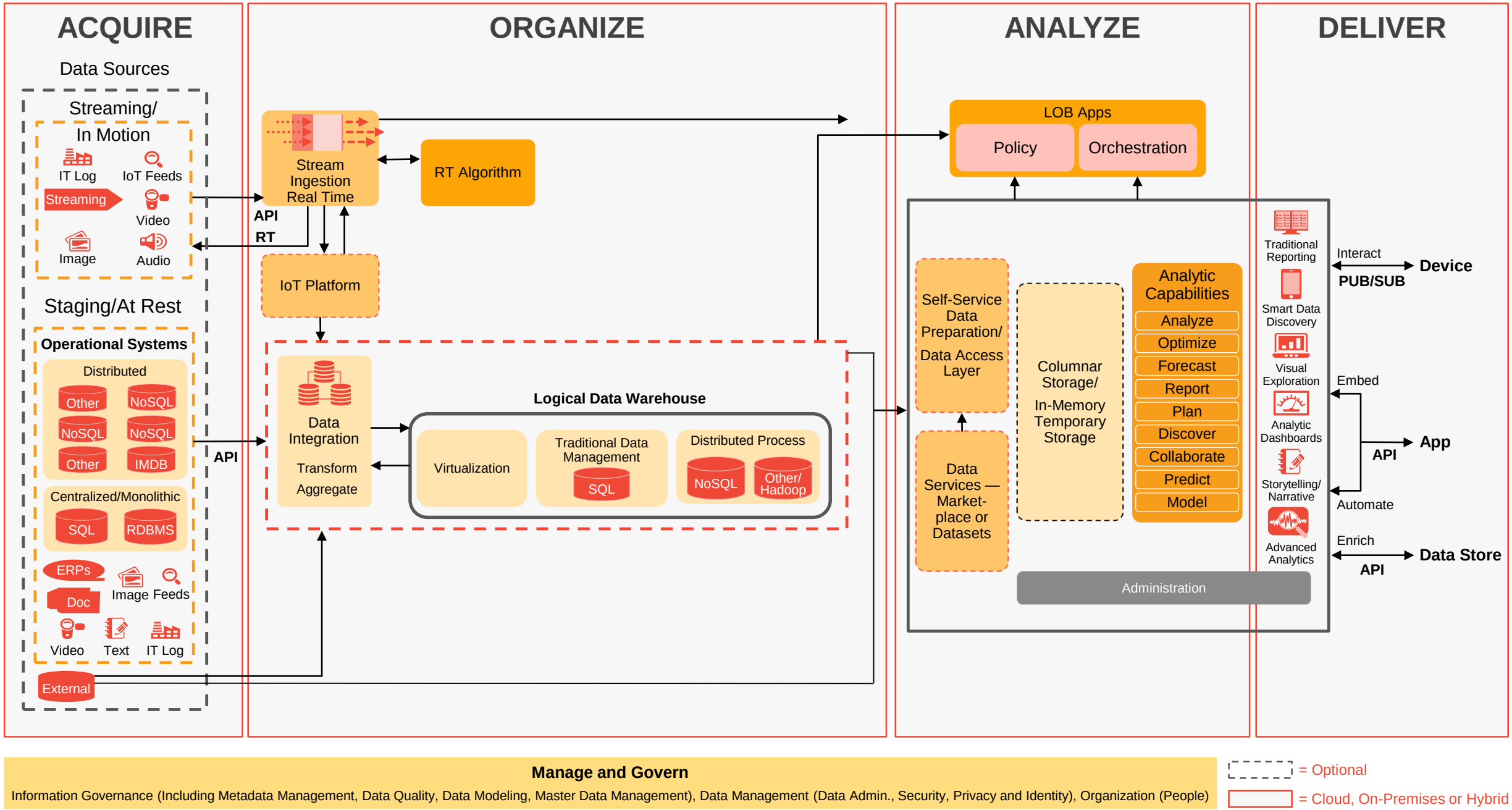
A Path Forward




ACQUIRE
Data Sources
Streaming/
In Motion
IT Log
IoT Feeds
Streaming
Video
Image
Audio
Staging/At Rest
Operational Systems
Distributed
Other
NoSQL
NoSQL
NoSQL
Other
IMDB
Centralized/Monolithic
SQL
RDBMS
ERPs
Image Feeds
Doc
Video
Text
IT Log
External
API
ORGANIZE
Stream Ingestion Real Time
RT Algorithm
API
RT
IoT Platform
Logical Data Warehouse
Data Integration
Transform
Aggregate
Virtualization
Traditional Data Management
SQL
Distributed Process
NoSQL
Other/ Hadoop
ANALYZE
LOB Apps
Policy
Orchestration
Self-Service Data Preparation/
Data Access Layer
Data Services — Market-place or Datasets
Columnar Storage/
In-Memory Temporary Storage
Analytic Capabilities
Analyze
Optimize
Forecast
Report
Plan
Discover
Collaborate
Predict
Model
Administration
DELIVER
Traditional Reporting
Smart Data Discovery
Visual Exploration
Analytic Dashboards
Storytelling/ Narrative
Advanced Analytics
Interact
PUB/SUB
Device
Embed
API
App
Automate
Enrich
API
Data Store
Manage and Govern
Information Governance (Including Metadata Management, Data Quality, Data Modeling, Master Data Management), Data Management (Data Admin., Security, Privacy and Identity), Organization (People)
= Optional
= Cloud, On-Premises or Hybrid

Step One
Getting Control

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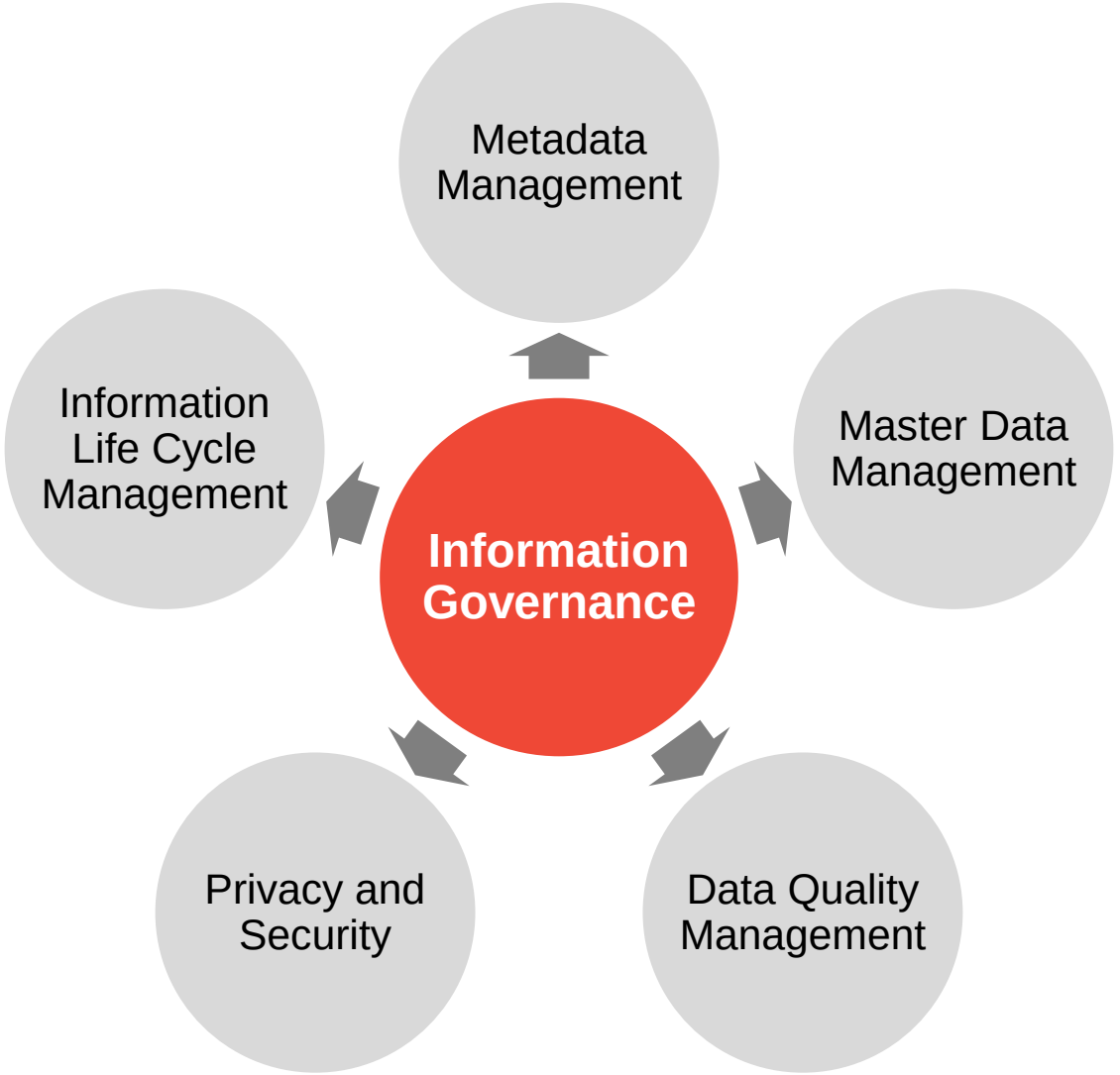
Enterprise Information Management



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Investing in "better analytics" without getting data quality and governance right is **worse** than wasting money — it actually adds risk.

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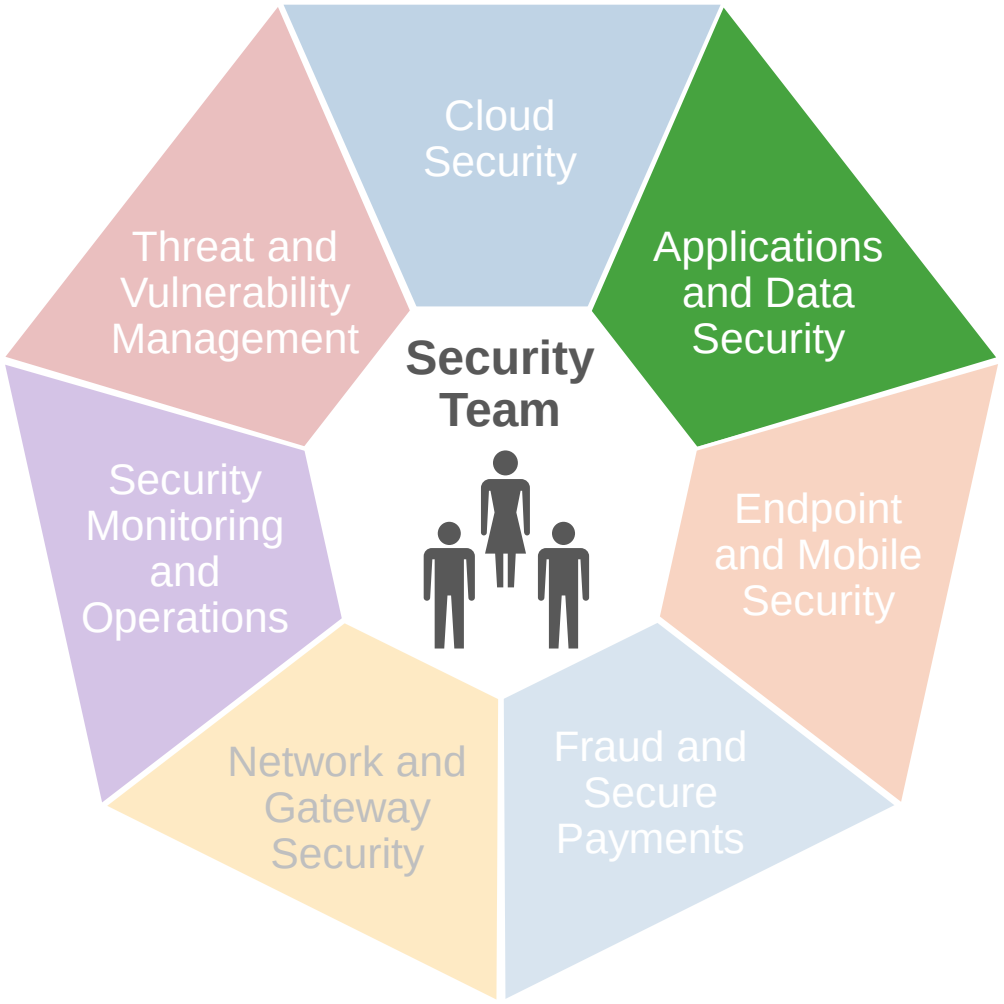
Privacy and Security



- Data security governance defines policies and controls
- Data is pervasive; data security must be too
- Data residency and hacking are top risks
- Develop application security architectures
- Application security testing is critical

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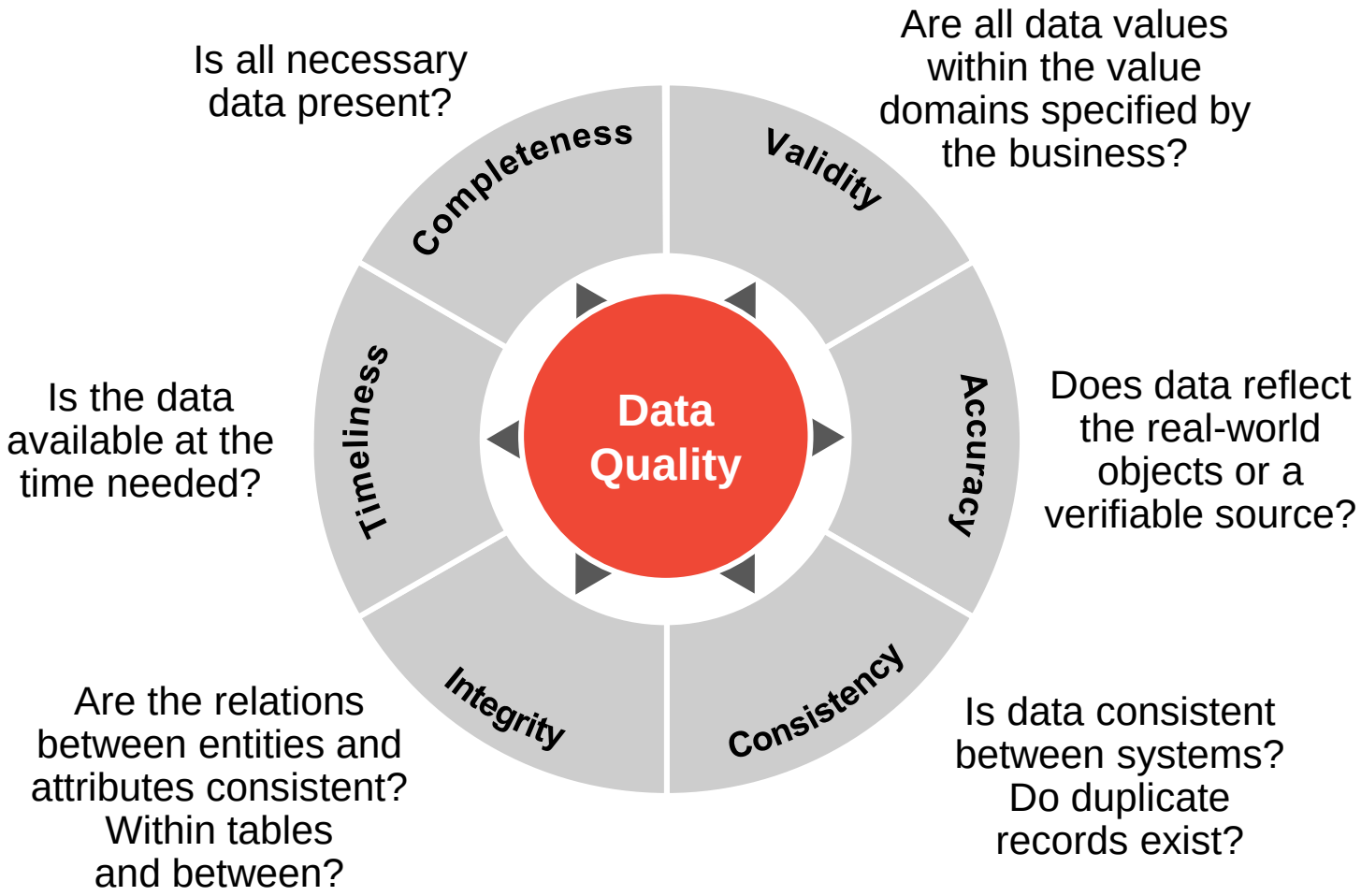
Dimensions of Data Quality



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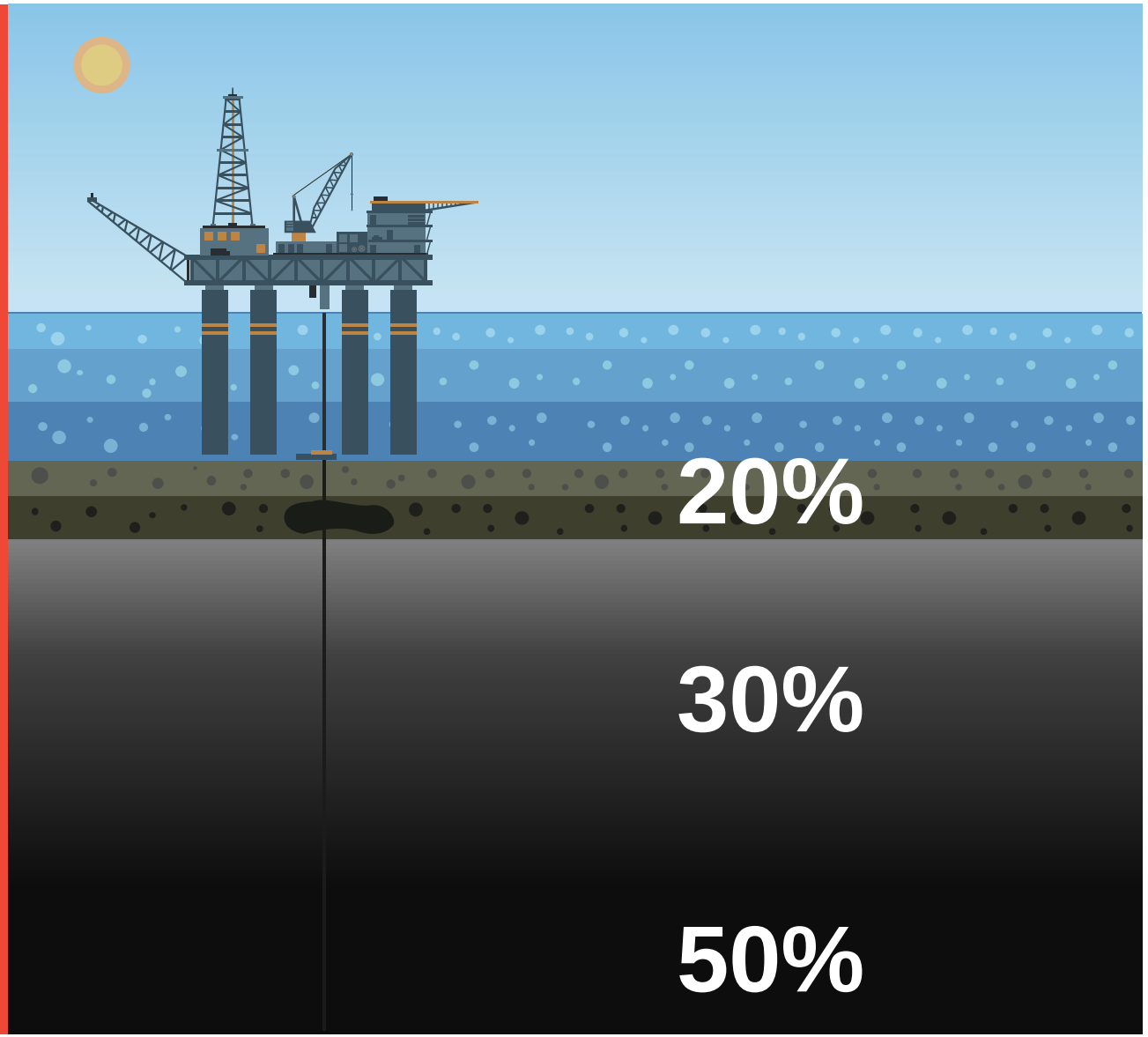
Extracting Insight

- 30% of data is redundant, outdated or trivial (ROT)
- 50% of data has an indeterminate value, while the remaining data is mission-critical
- $1,274,400 to $3,823,200 in wasted spending on ROT
- That 50% represents waste, resulting in unnecessary storage costs of $2,124,000 to $6,372,000.
- **Unrefined insight = incalculable**



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The Power of Metadata for Discovery and Curation

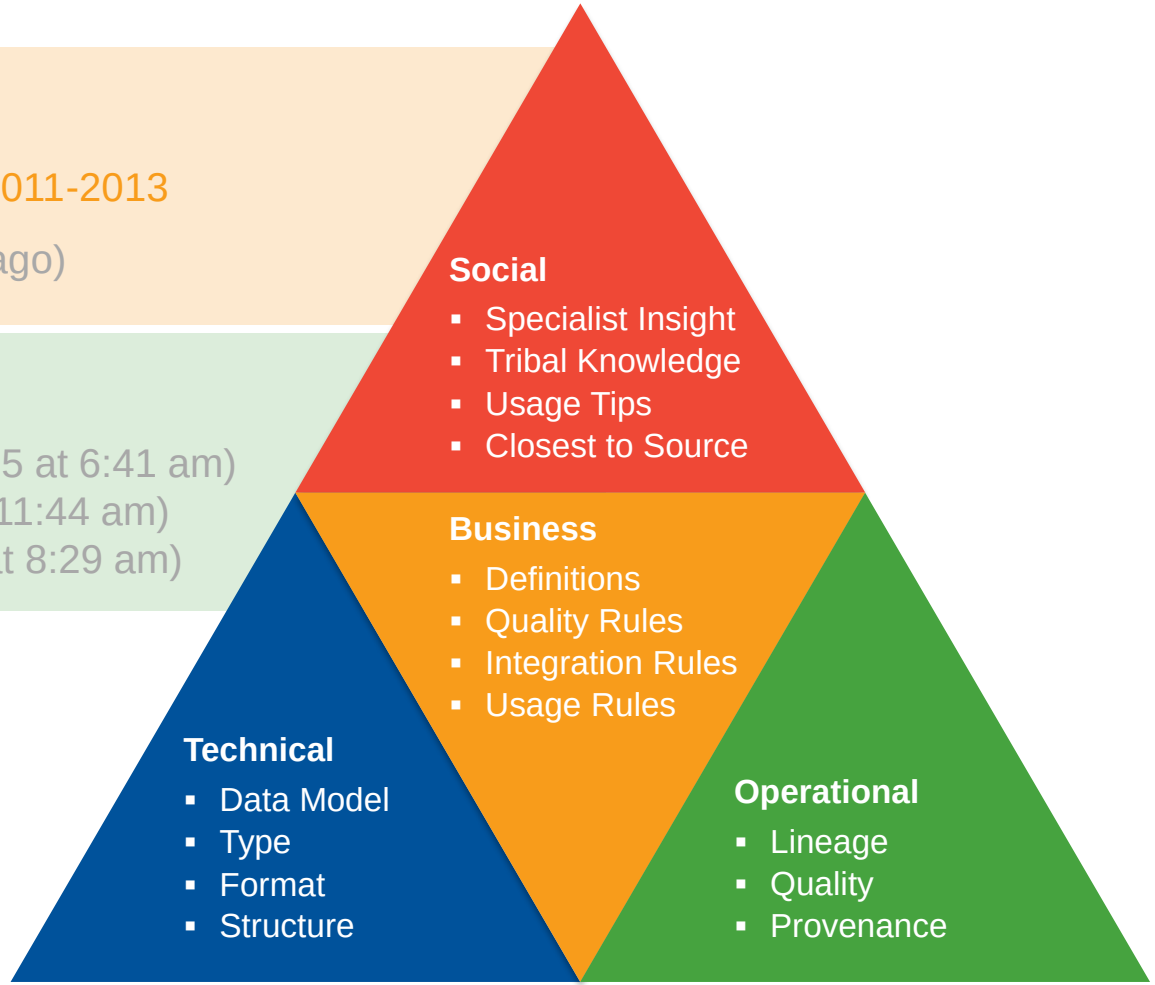
Warning

This table contains data from 2011-2013

Colin Poindexter (a minute ago)

✓ Endorsed by:

Anders Fischer (Aug 18 2015 at 6:41 am)
Satyen Sangani (Aug 23 at 11:44 am)
Gianthomas Volpe (Apr 11 at 8:29 am)



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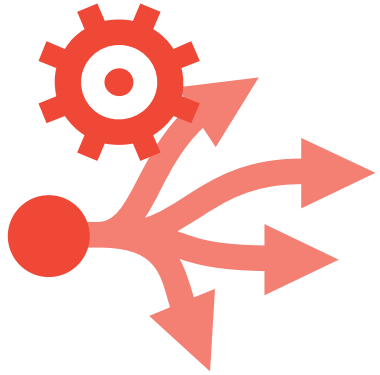

Step Two
Acquire and Organize

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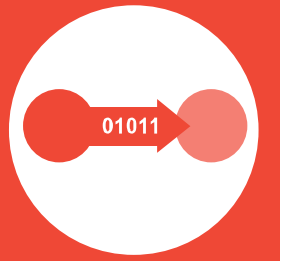
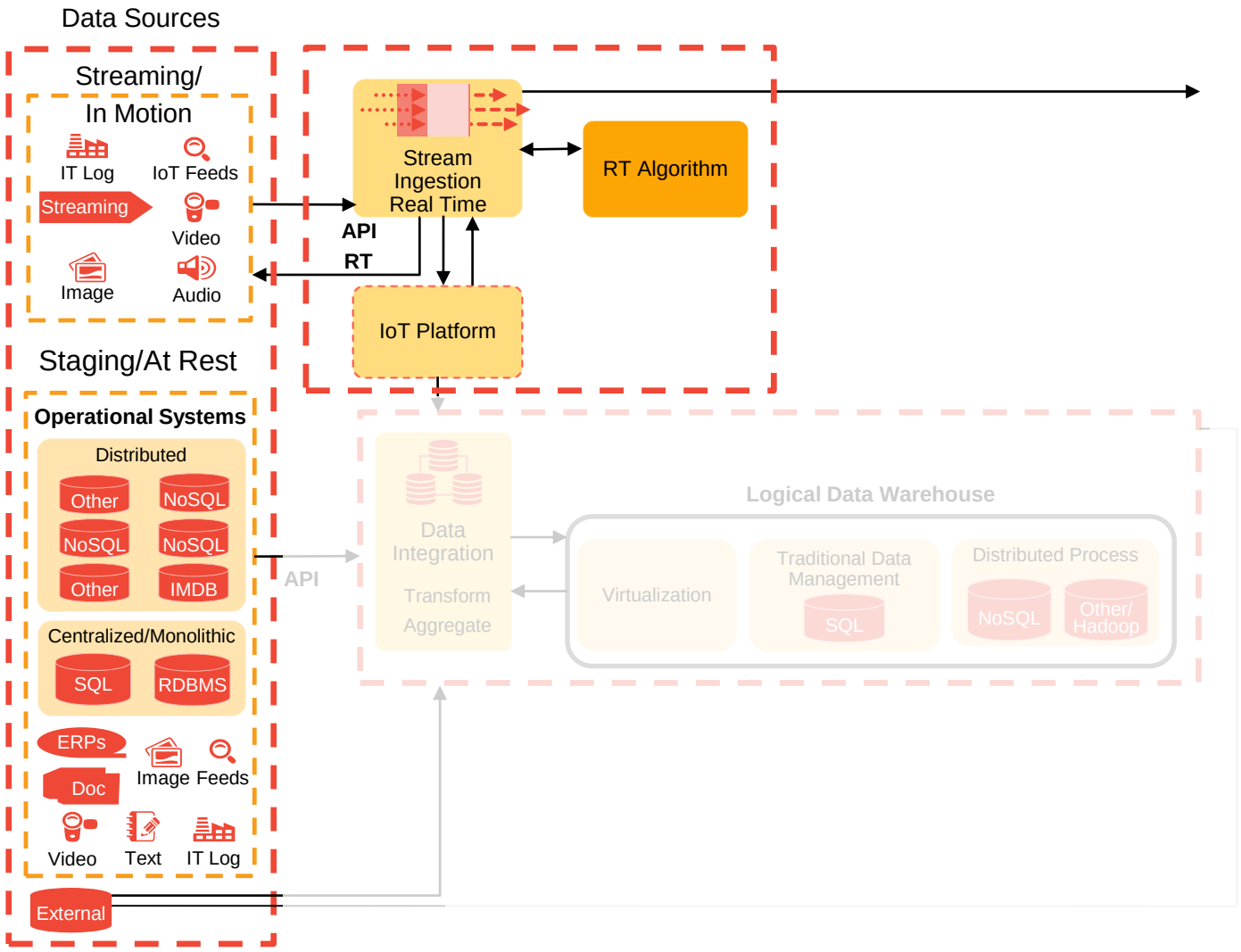
Ingest and Analyze:



- Streaming and In Motion:
  - IoT
  - Real Time
- Staging/At Rest:
  - More Sources
  - More Types of Sources
  - Different Speeds and Levels of Granularity
- Internal and External to the Organization



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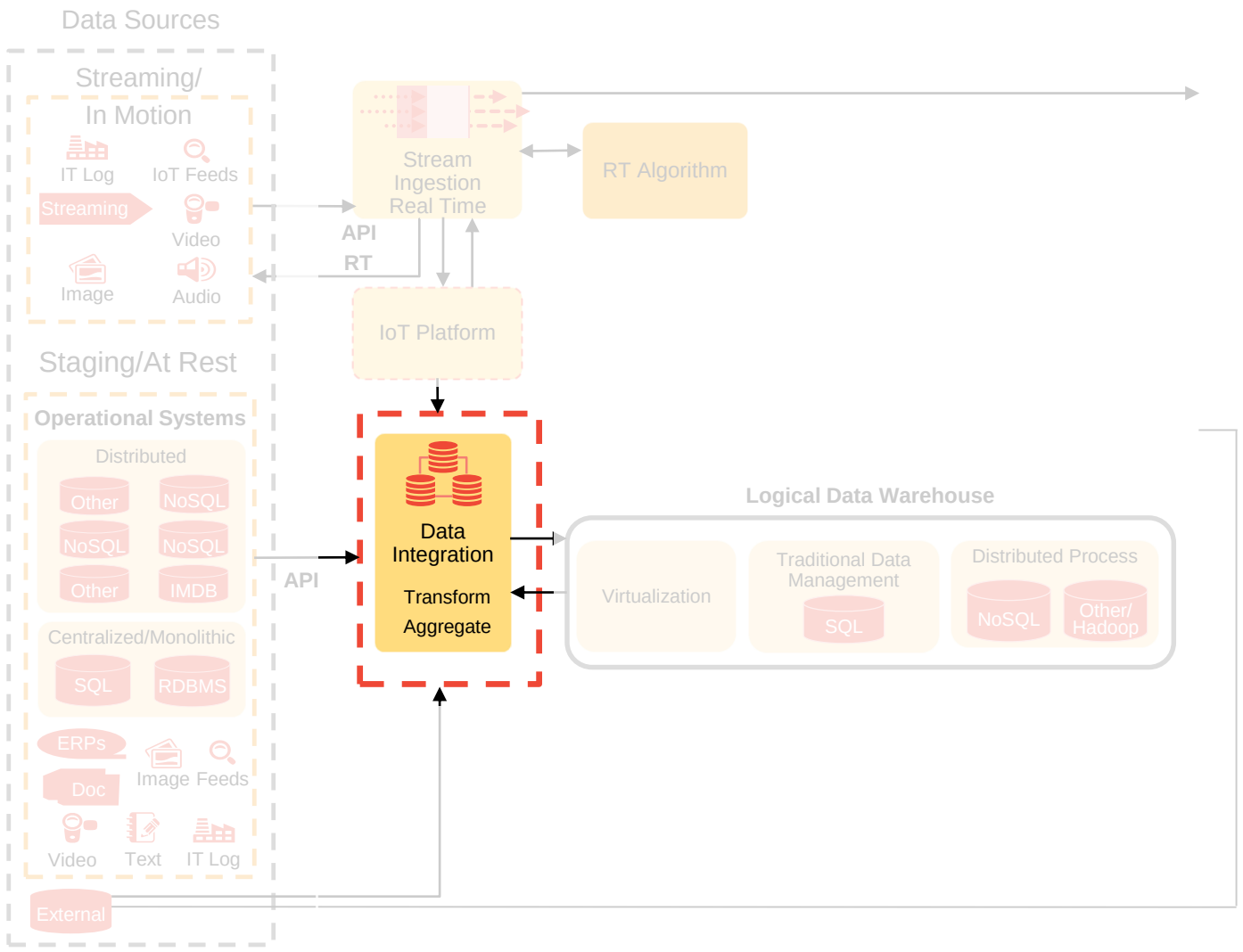
Process and Transform:

- Prepare, Clean, Enrich and Modify Before Storing
- ETL/ELT
- Apply Policies During Transformation



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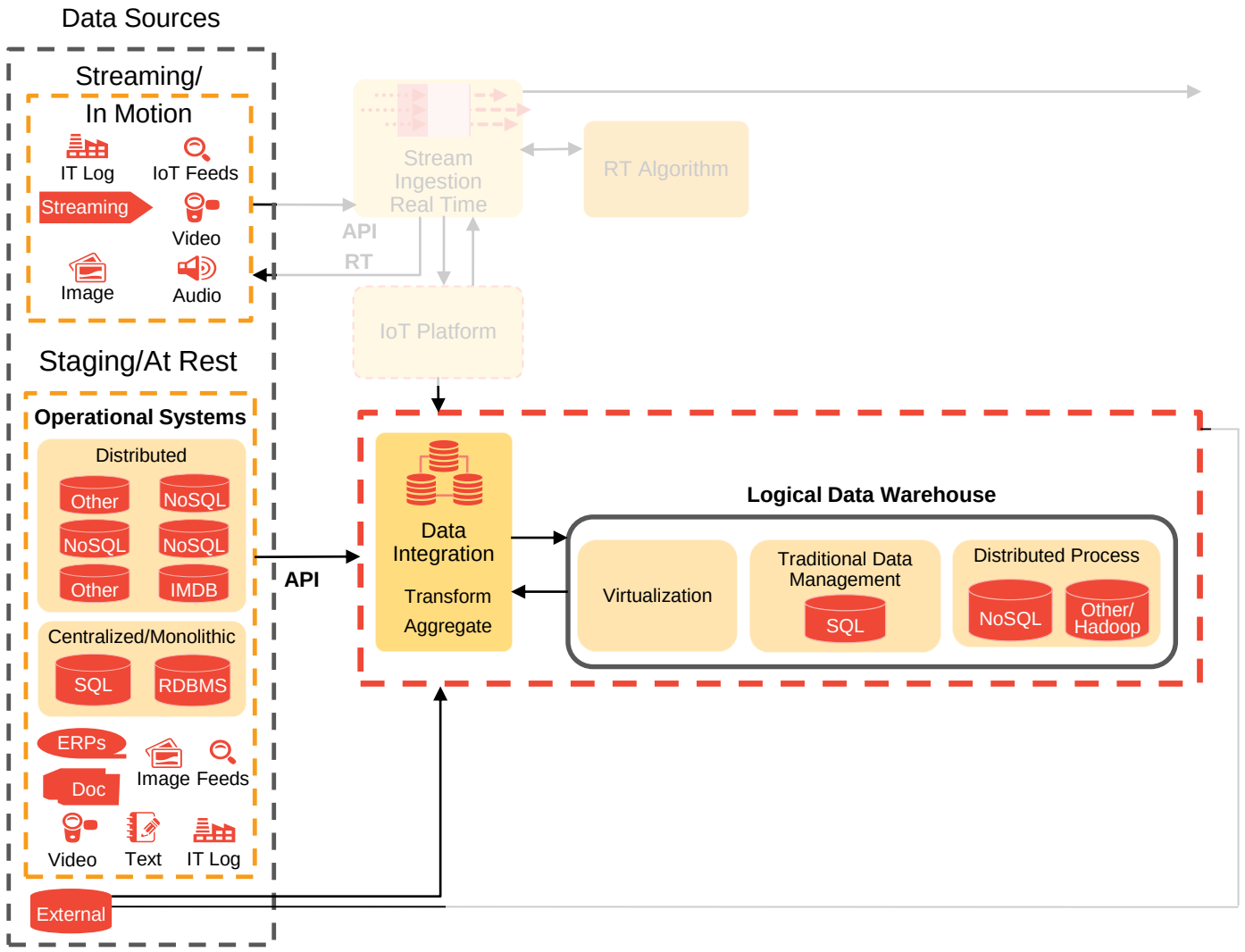
Integrate and Store:

- Account for On-Premises, Cloud and External Sources
- Add Self-Service Integration Capability
- Choose the Optimal Storage Layer



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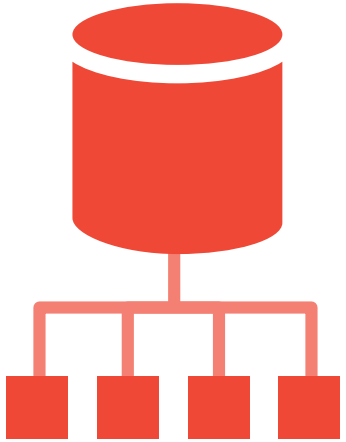
Step Three
Enable for Analytics



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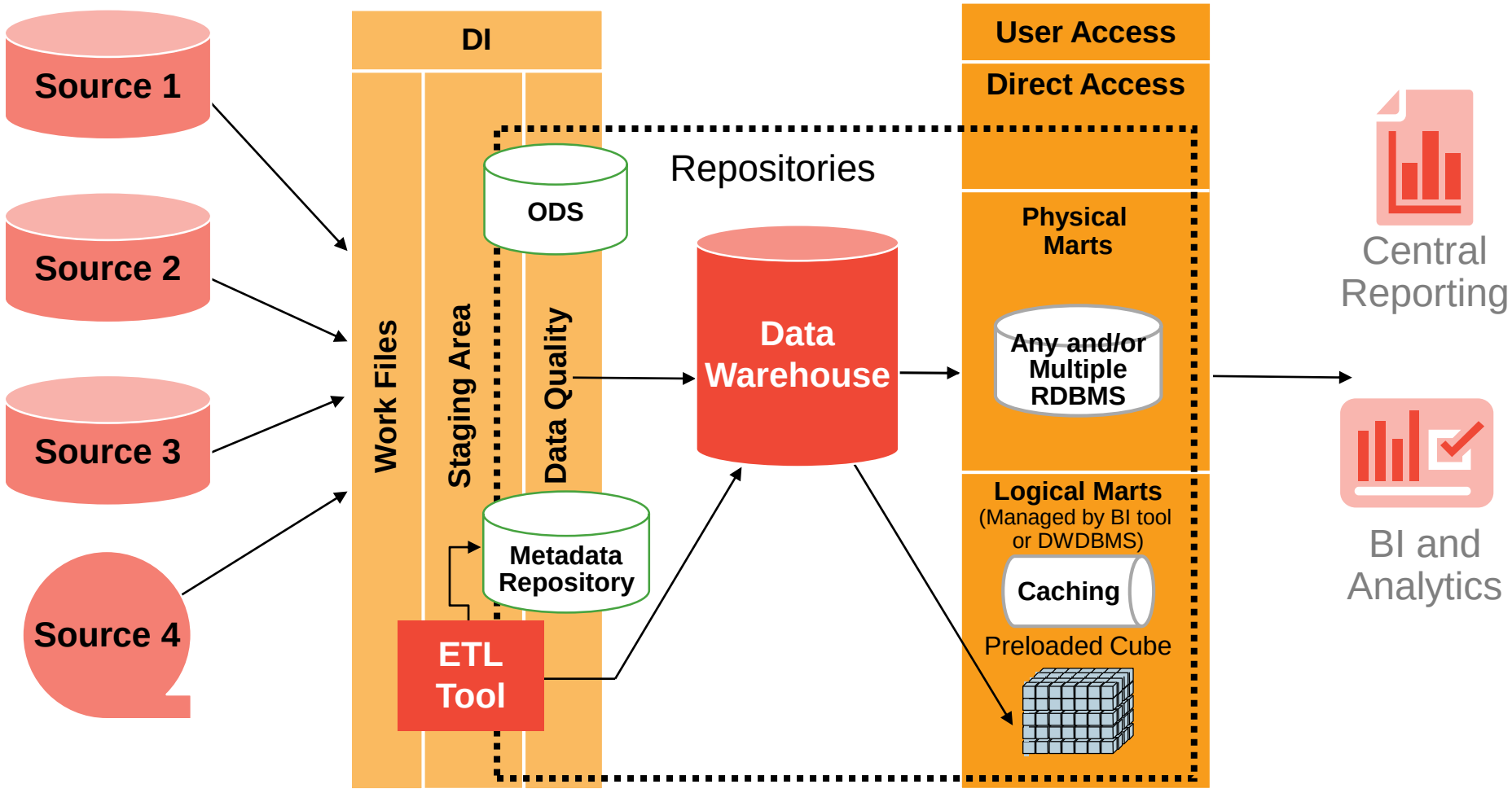
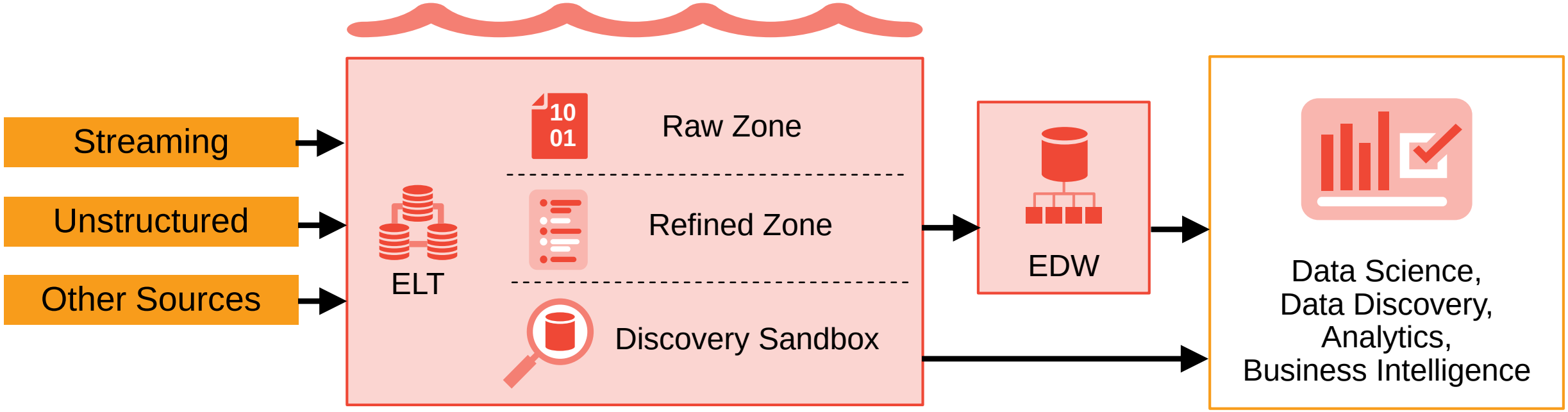
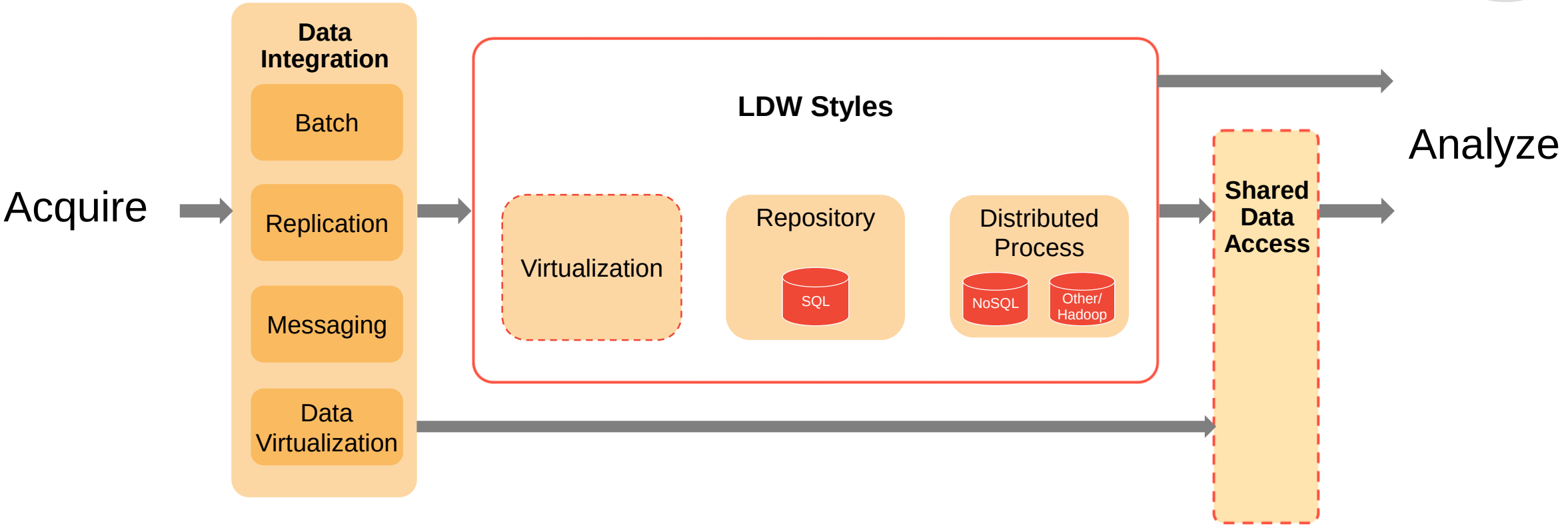
Enable: Data Warehouse



Enable: Data Lake



Enable: LDW Conceptual Architectural Diagram



Manage and Govern

Metadata Management, Data Quality, Data Modeling, Master Data Management, Data Admin., Security, Privacy and Identity, Organization

Step Four
Enable Business Insights

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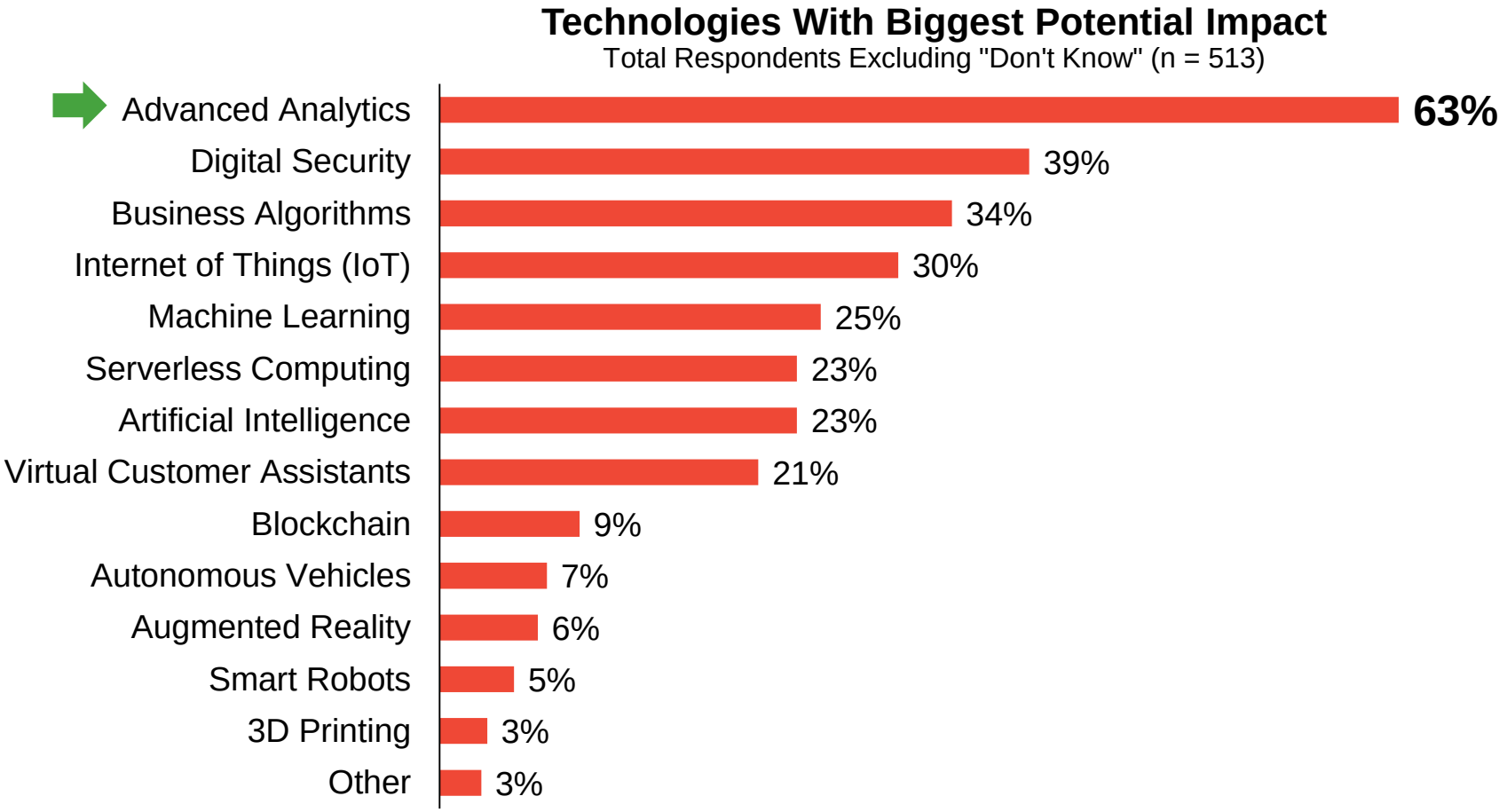
Advanced Analytics Has the Most Potential to Change the Organization in the Next Five Years



Multiple Responses Allowed
Base : Total, Excluding Don't Know, n = 513
GTP_T4.In your opinion, which three of these technologies would have the most potential to change your organization over the next five years?

Enable: Evolve to Address Three Tiers of Needs

Reports + Dashboards + Data Discovery + Data Mining + $E = mc^2$ Advanced Analytics

Information Portal

Analytics Workbench

Data Science Laboratory

Business

Business Operations | **Decision Makers** | **Decision Makers** | **Business Operations**

Information Analyst

Data Scientist

IT

Report Writer

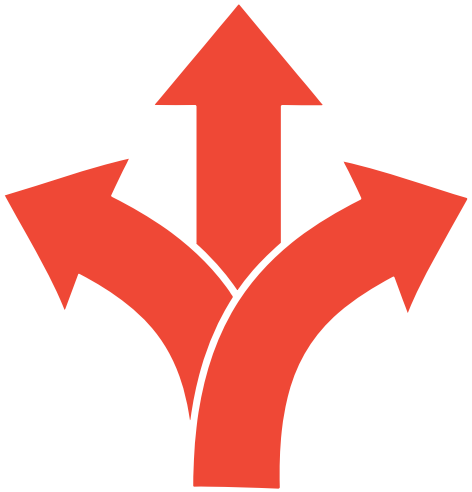
Detailed Data | IT/OT | Audio | Image | ...

Local Data Marts | Ad Hoc Files | Social | Open Data | External Data Providers | Text | ...

IT/OT | Enterprise DW | **Information**

Information Producers | **Information Consumers**

Scale Out
Extend and Automate



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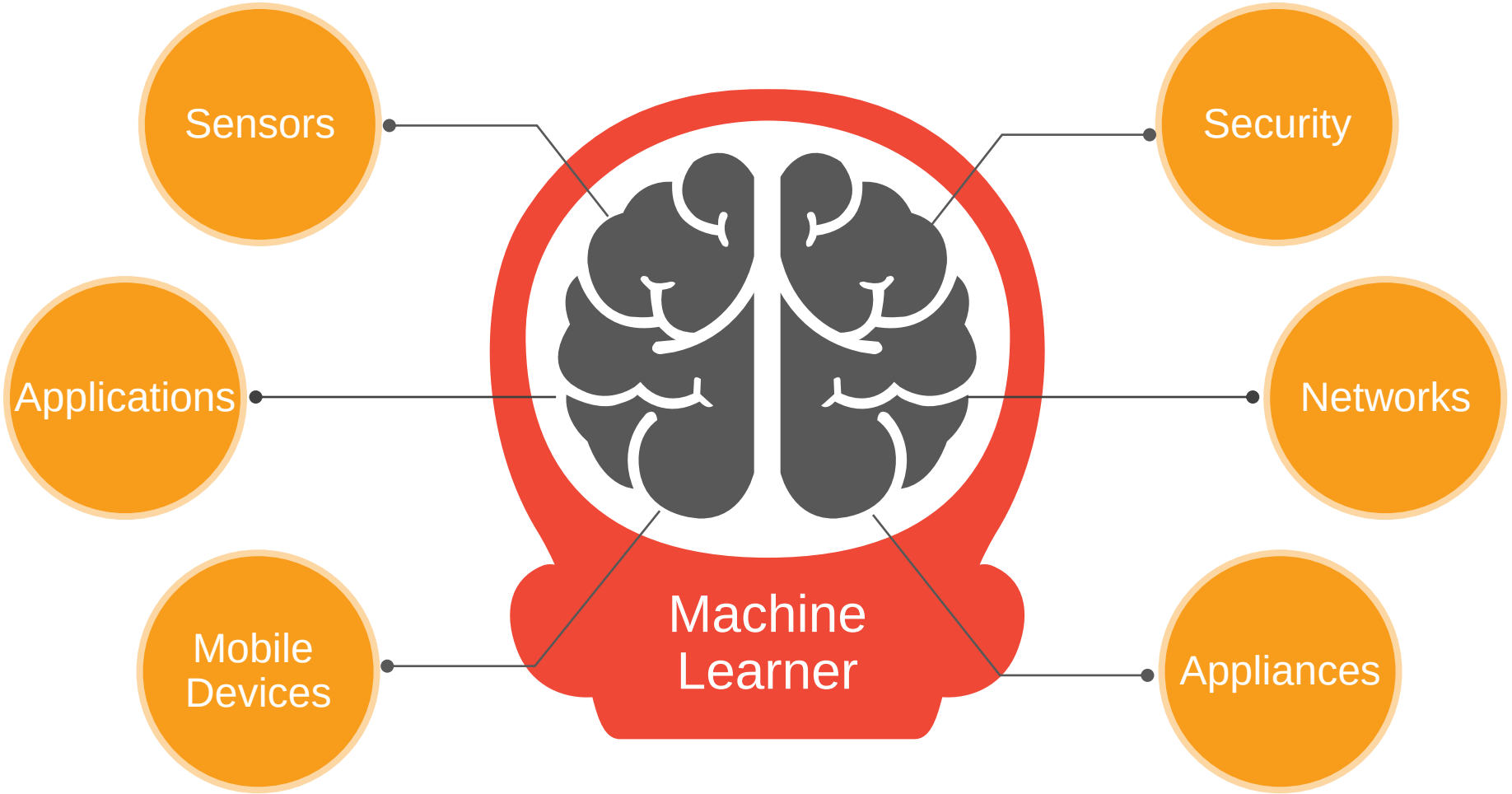
Machines Learning From Data Without Being Explicitly Programmed

Extracts Knowledge From Data to Transform Simple Machines Into Smart Machines:



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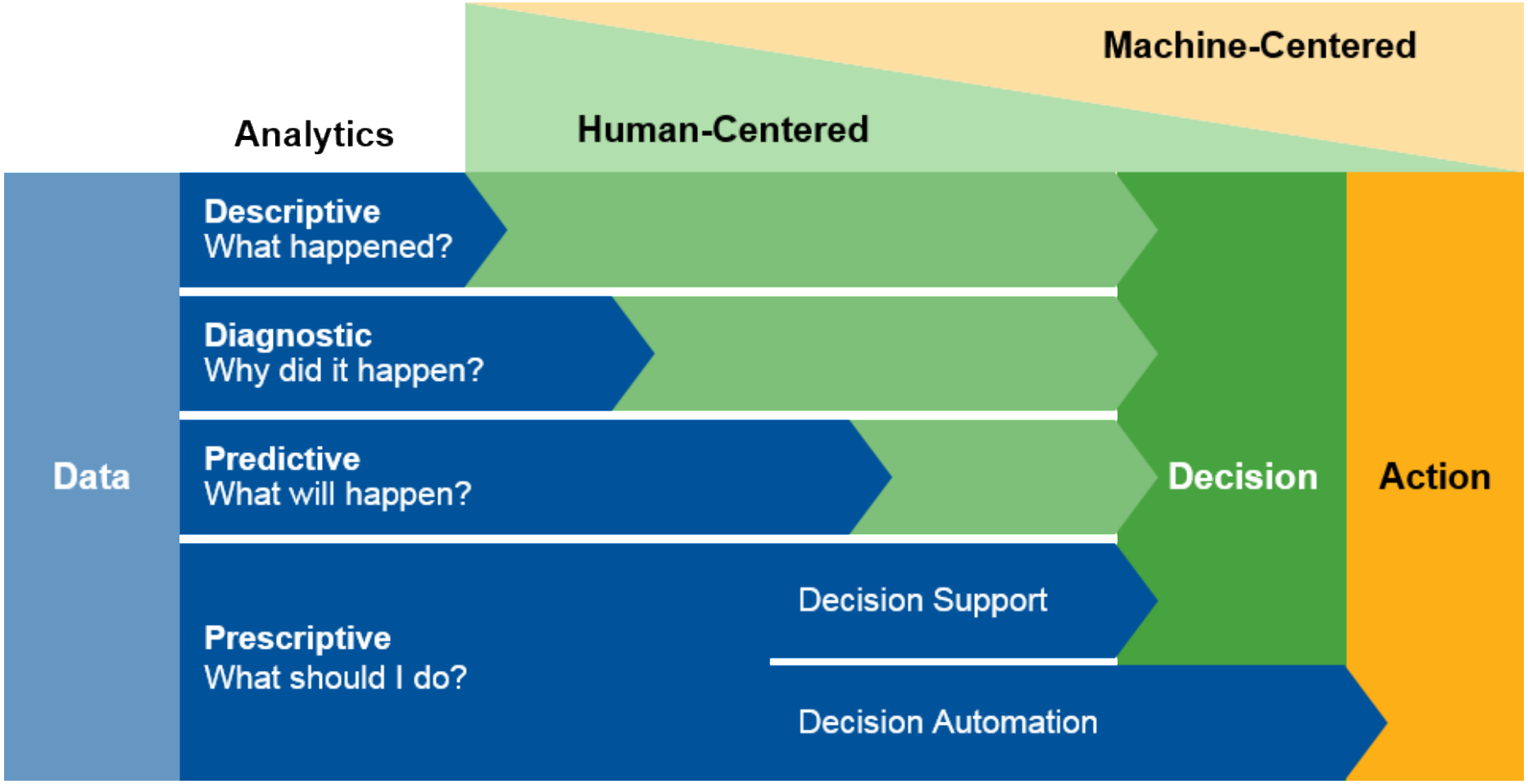
Data-Driven Processes



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Operationalize Analytics

Model Development

DML data science activities to develop models

Deployment Architectures

AI engineers to support Development, Test, and Production environment

Integrated Intelligent System Shared Database

Model reuse, auto-tuning

Model Management

Repository for managing and storing models

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Polling Question

Which answer best describes your organization's adoption of cloud-based analytics?

A. **None – no formal plans to utilize cloud-based analytics**
B. **Limited – investigating, experimental use cases**
C. **Substantial – cloud-based analytics in production**
D. **Committed – all present/future efforts in the cloud**

How to participate in our polling

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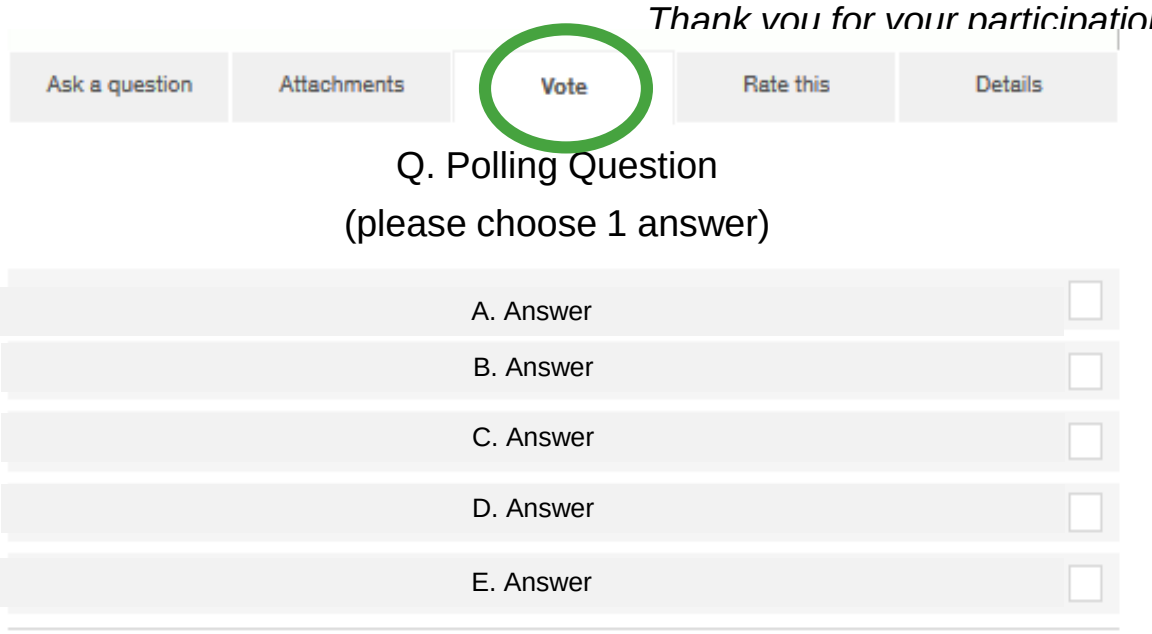
On the bottom of your screen under the "Vote" tab, the poll question will be visible.

Please click the box to make your selection. Once selected, you will then be able to see audience participation results.



Scale Analytics in the Cloud:

- Jump-Start Analytics
- Feasible and Secure
- Elastic scalability
- Rapid innovation
- Managed services

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Roadmap to Algorithmic Business

- Build on a solid foundation
- Identify technology gaps and assess skills
- Develop a transition plan, incorporating cloud-based analytics
- Transform your architecture to support real-time decisions and automated actions

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Recommended Gartner Research

- Identifying and Selecting the Optimal Persistent Data Store for Big Data Initiatives
  Sanjeev Mohan (G00322578)
- Solution Path for Planning and Implementing the Logical Data Warehouse
  Henry Cook (G00320563)
- How to Create a Data Strategy for Machine Learning-Powered Artificial Intelligence
  Carlton E. Sapp (G00324342)
- Preparing and Architecting for Machine Learning
  Carlton E. Sapp (G00317328)

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Free Research

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