Are you AI ready?

Mastering the Change: Why Data and Machine Learning is Critical to CFOs

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Mastering the Change: Why Data and Machine Learning is Critical to CFOs

- What are the used Case?
- What is AI?
- I have a BI system, what is the difference with AI?
- What are the key building elements I need to focus on?
- What are checklist for control ?
- Where should a roadmap be ?

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Business and CFO demands requires new core data management Capabilities

Demands:

- Reporting > Insight & Data Integrity
- AR Optimization > Default, Fraud and payment risk
- Working Capital Reduction
  - Demand
  - Supply side
- Asset and Asset turnover
  - WIP in factory
  - Logistic Cost

- Productivity
- Insights on activities
- Forecasts demand and response models

Core Data Technologies

- Business Intelligence
- Robot Process Automation
- Machine Learning

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ML is enabling new ways of reasoning and working

Optimization, Personalization, Virtualization Solutions for Sales, Operations, Fraud & Compliance

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Optimization, Personalization, Virtualization Solutions for Sales, Operations, Fraud & Compliance

	Retail	Telecom	Financial
Decision Making -prescriptive	Stock top-up SPS problem Fashion Recommend	Routing Predictive maintenance	Trading credit decision
Planning- Predictive	Shopping Habits	buying Propensity	Credit default
Knowledge acquisition - diagnostics	NLP sentiment analysis	Usage location	Trade docs analysis
Pattern recognition Descriptive	Face recognition	Intrusion detection	Authentication

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Data and ML enables new Capabilities

Key source of competitive advantage:

- The data you have
- The Data Modelling and ML Engineering capabilities you build to test and learn customers behaviours, system dynamic and risks
- Your Decision Making Process: Data Driven & Bottom-up
- Your ecosystem design to acquire data, learn and amortize cost at scale

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What do we mean by AI?

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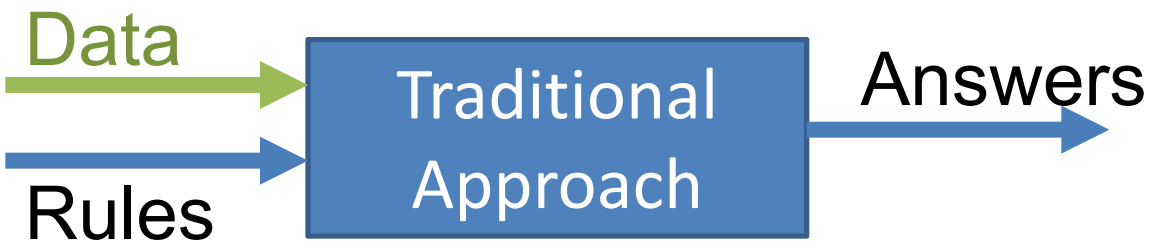
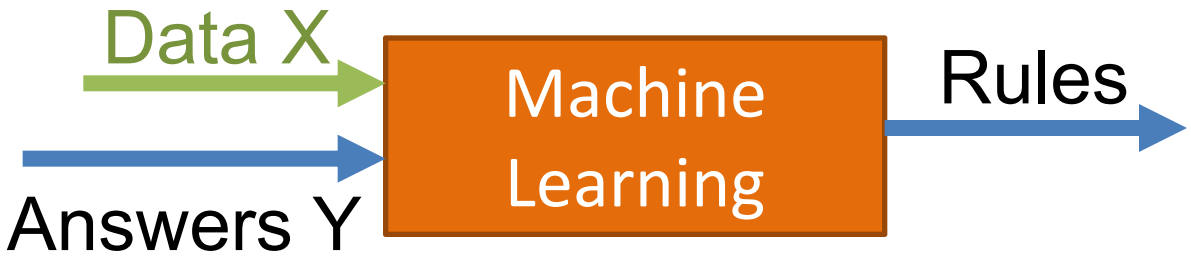
Traditional Approach



New paradigm: ML



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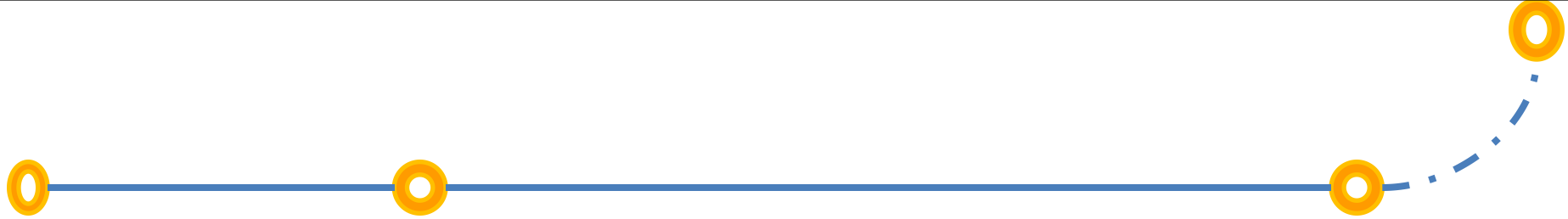

X= -1, 0, 1, 3, 6, 5

Y= -2,-1, 1, 6,11, 9

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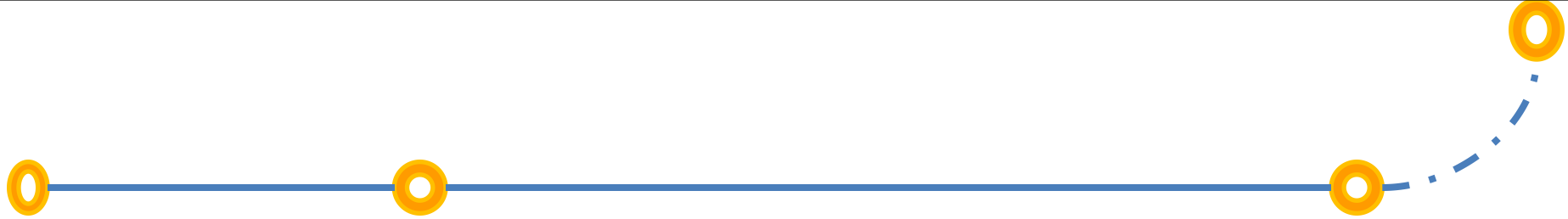

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- ML in your head
- Which Model?

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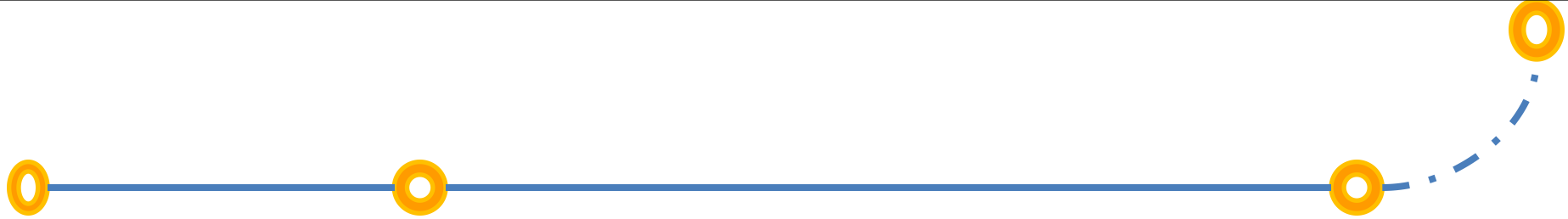

X= -1, 0, 1, 3, 6, 5

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- ML in your head
- Which Model?
- Regression Model : 2x-1

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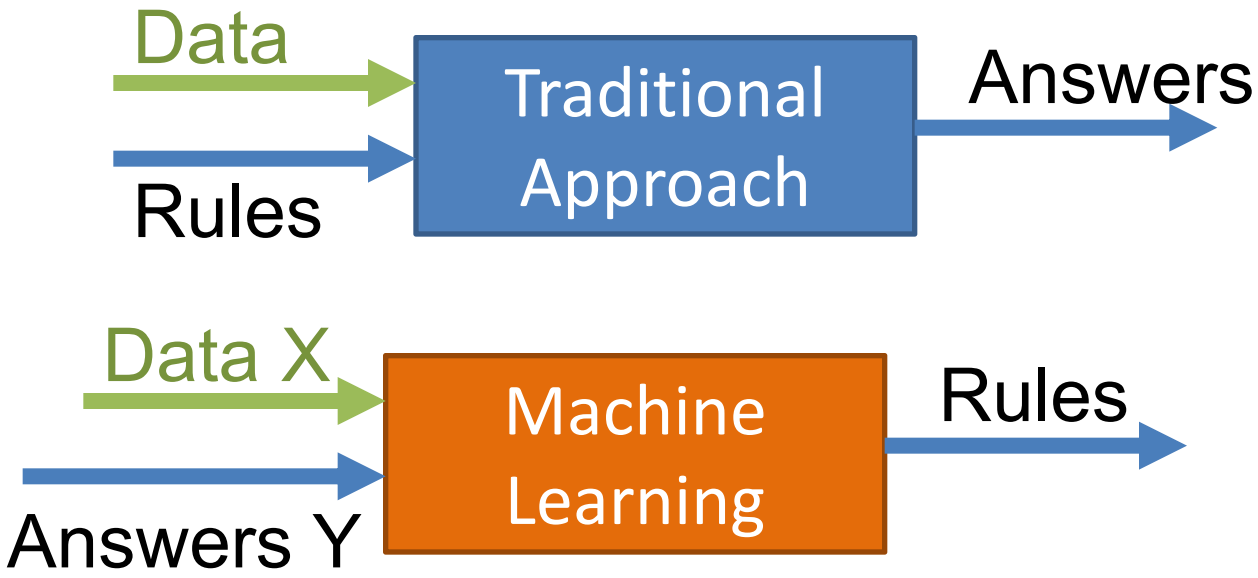
New paradigm: ML



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What is difference between AI and BI?

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Business Intelligence

Descriptive

What happened

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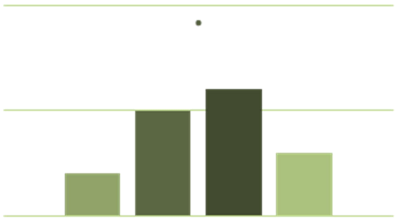
Business Intelligence



Diagnostic

Why did it happen?

Descriptive

What happened

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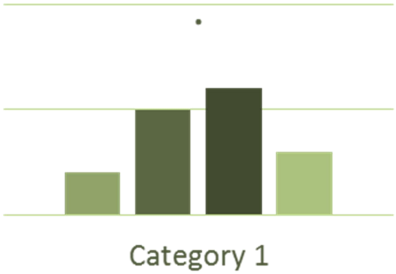
Value in advanced predictive & prescriptive analytics



Predictive

What will happen?

Diagnostic

Why did it happen?

Descriptive

What happened

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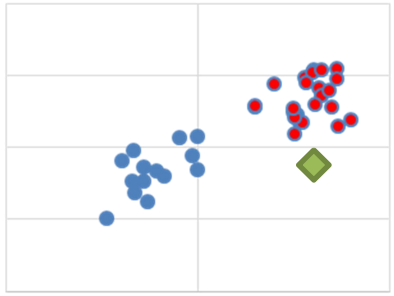
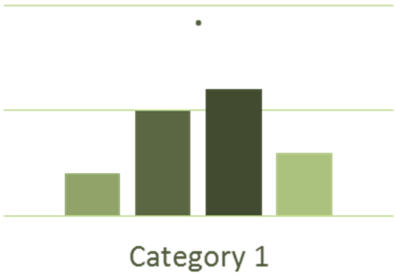


Similarity | Closeness
Instance Based Learning
Representation & Dimensionality reduction



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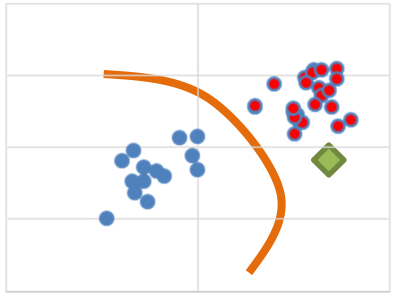
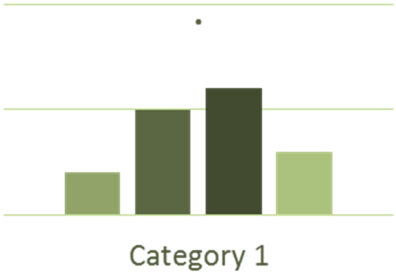


Boundary learning



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What will happen?

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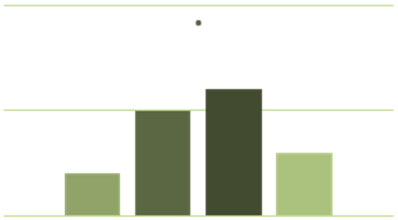
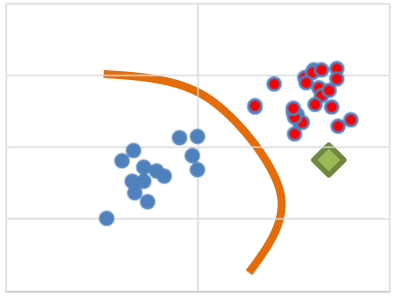


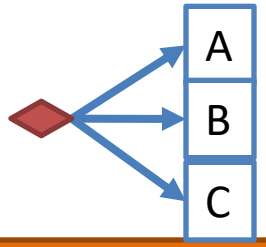
Diagnostic

Why did it happen?



Predictive

What will happen?



Prescriptive

What Action should we take to make it happen?

Descriptive

What happened

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Building Blocks

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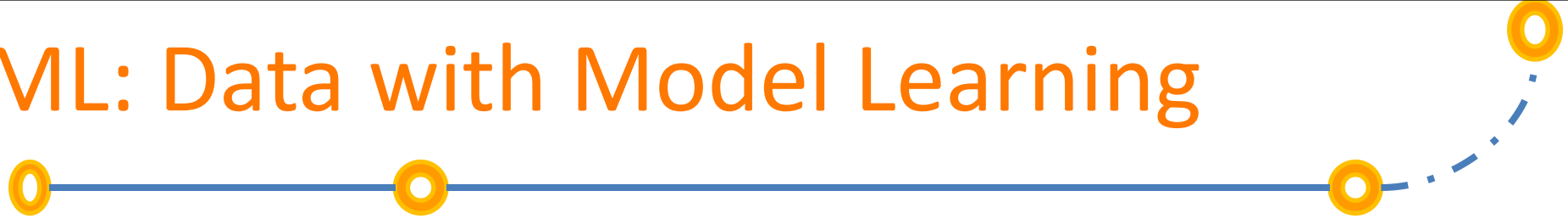
ML: Data with Model Learning



Model Deployment & Governance

Use CASE

Algo Selection

Data Modelling

Data Representation

ETL PROCESS

Data

Data

Data

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Data Representation

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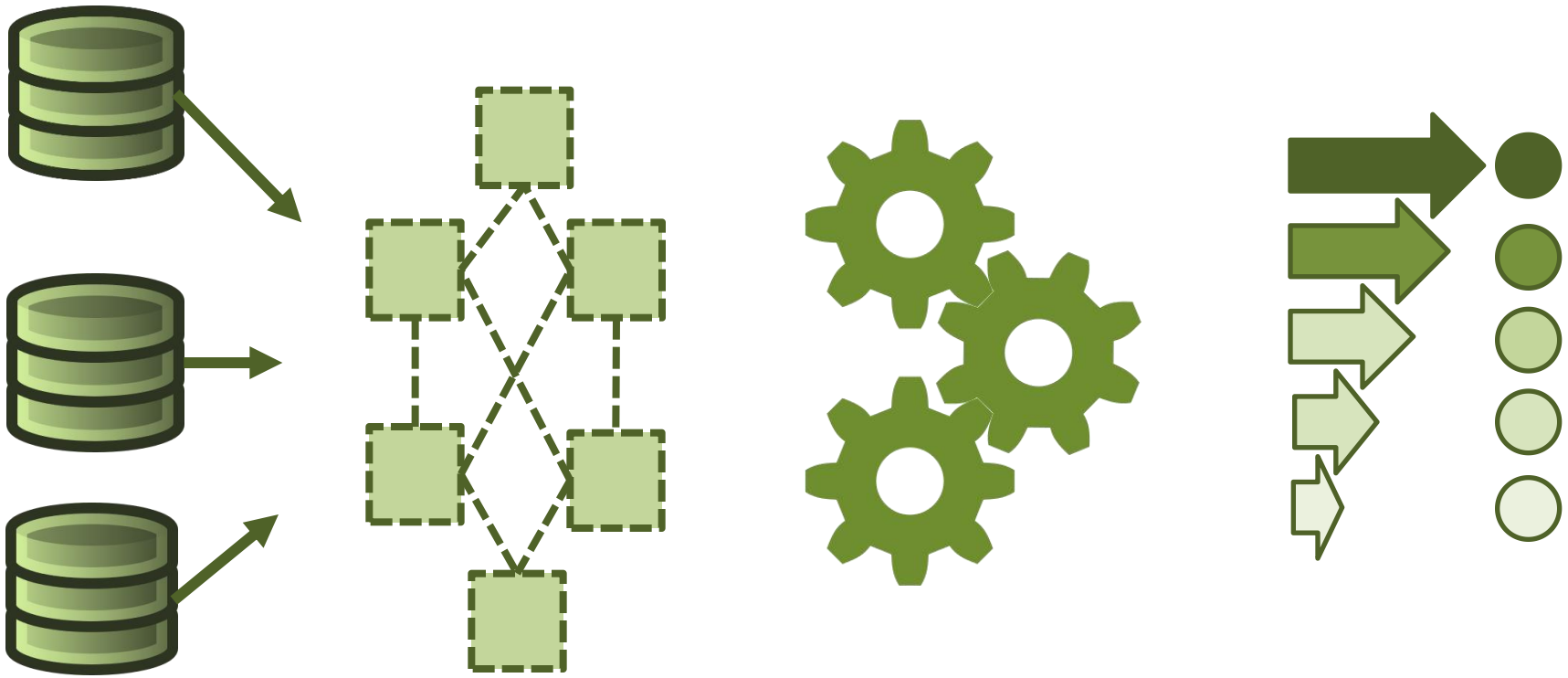
Ingest - Extract - Transform - Load Process



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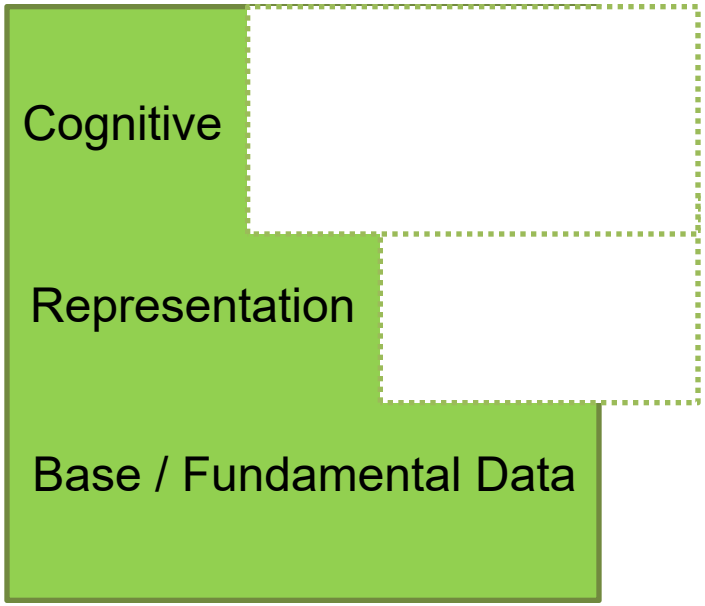
Data Layers Ridesharing Co



Reliability
Drivers

Route as Graph

Traffic Sensors

Shortest Path

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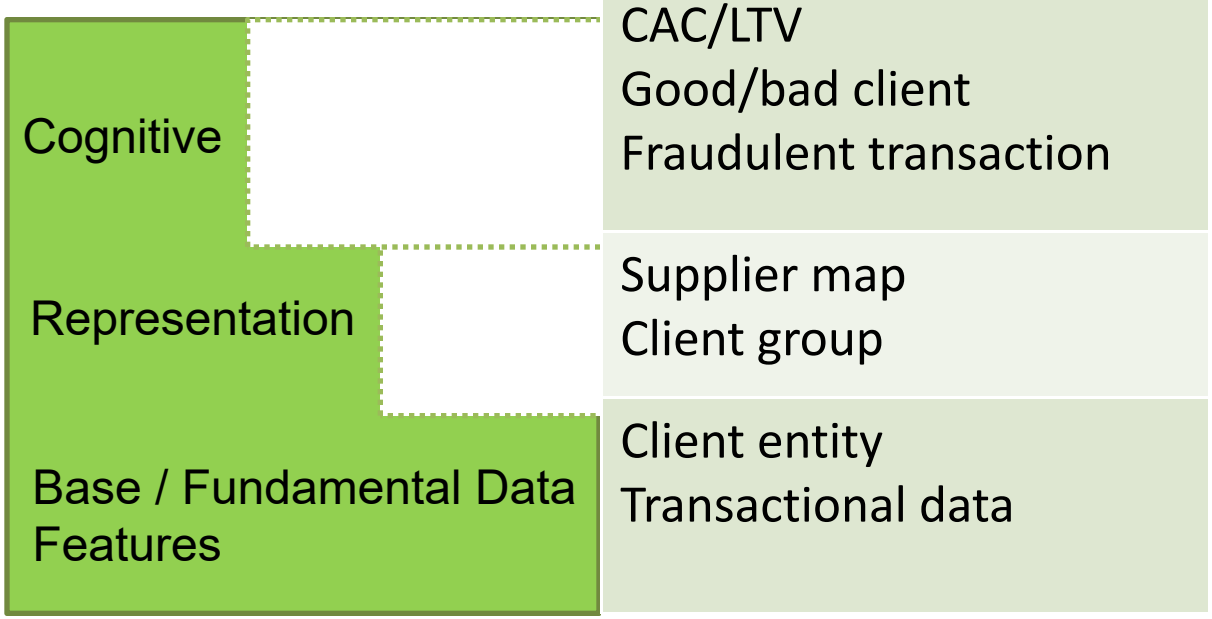
Data



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Data representation is used case dependent

	Retail	Telecom	Financial Services
Cognitive	Support lift confidence Fraud score	Churn rate Proba Erlang C model for wait time	Exp. Default Failure FCT probability AML score Customer reliability
Representation	FB-Emotion client product Graph	Bills ARPU Churn rate	Network clients client product Graph Leverage ratio
Base / Fundamental Data Features	Location Customer page views Social Media	Transactions On boarding data	Client entity metrics Transactional level metrics X Age

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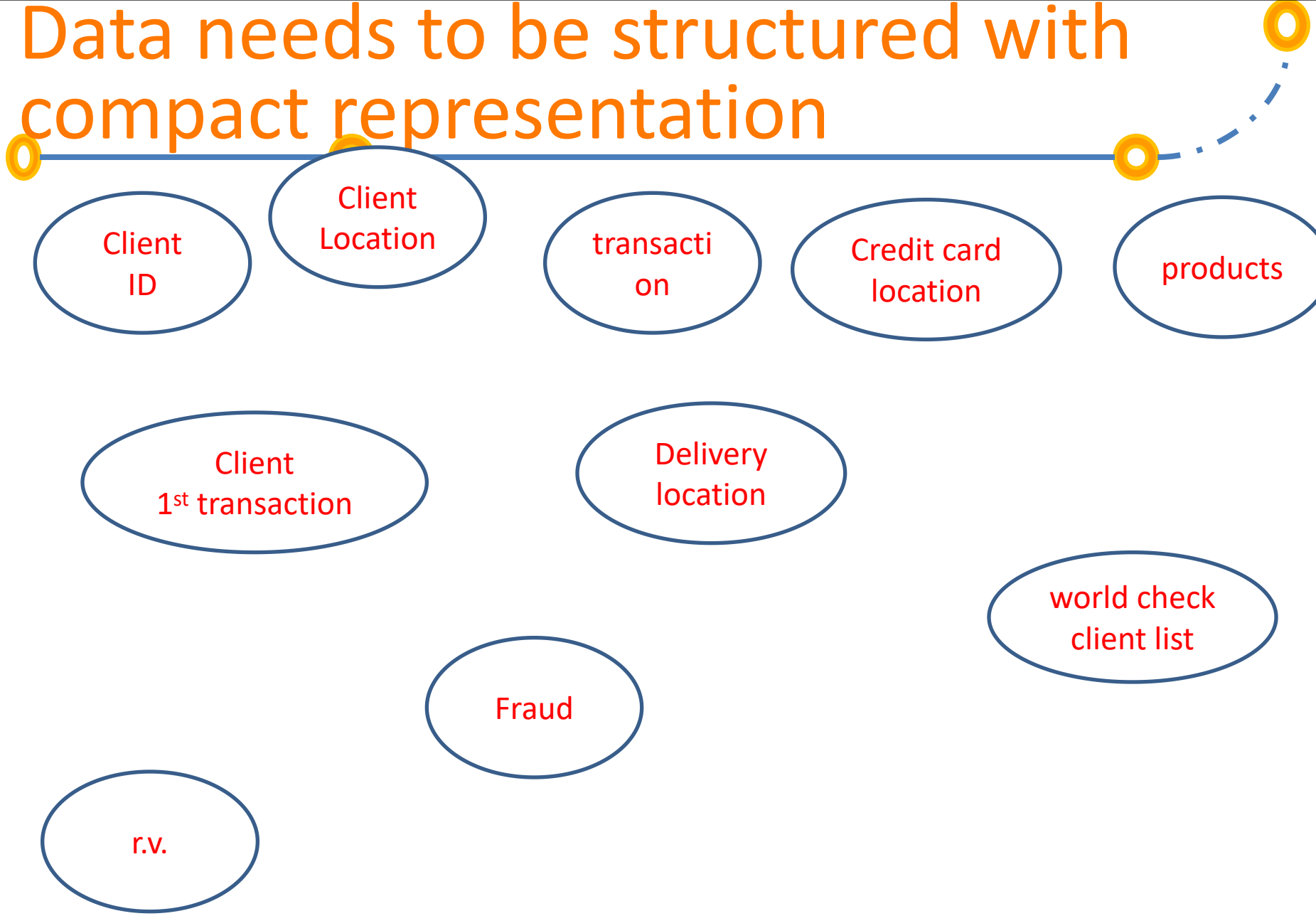
Data needs to be structured with compact representation



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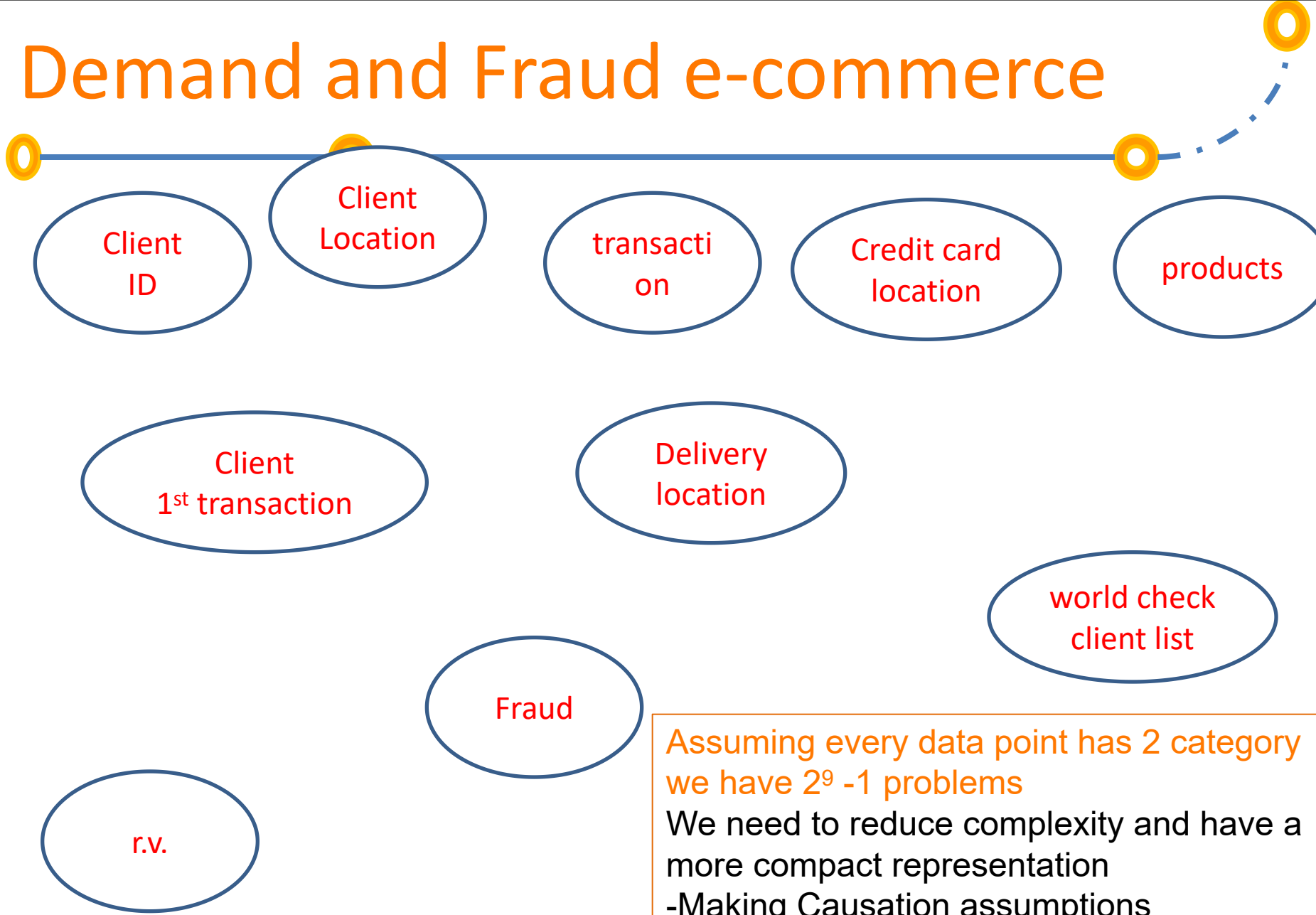
Demand and Fraud e-commerce



Assuming every data point has 2 category we have 2^9 -1 problems

We need to reduce complexity and have a more compact representation

-Making Causation assumptions

-Data is part of a systems of connected processes and users experience

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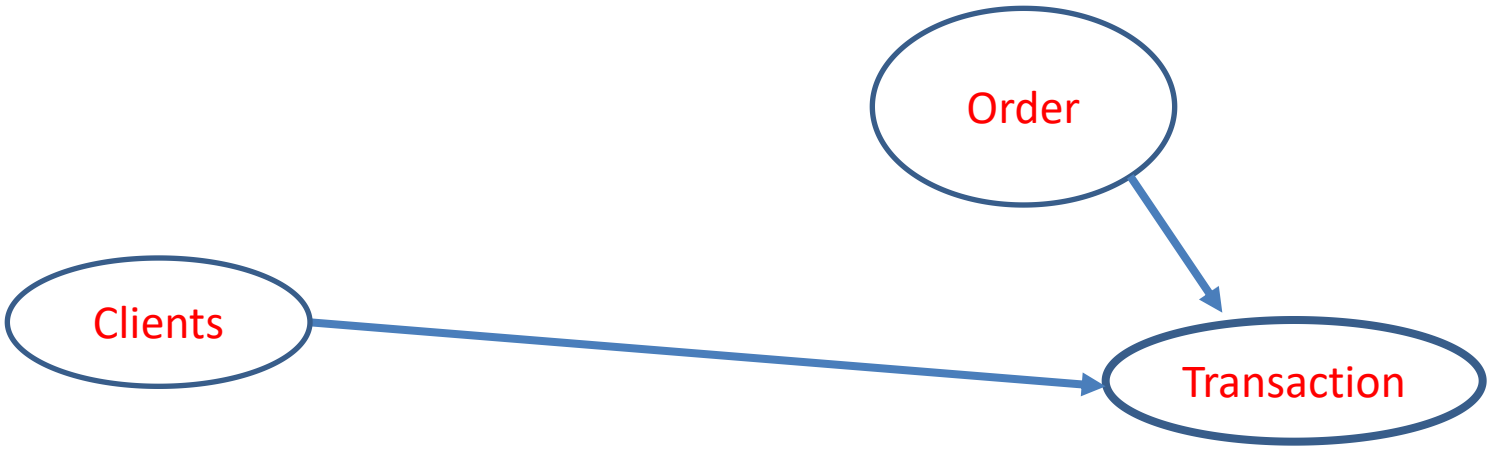
Demand and Fraud e-commerce



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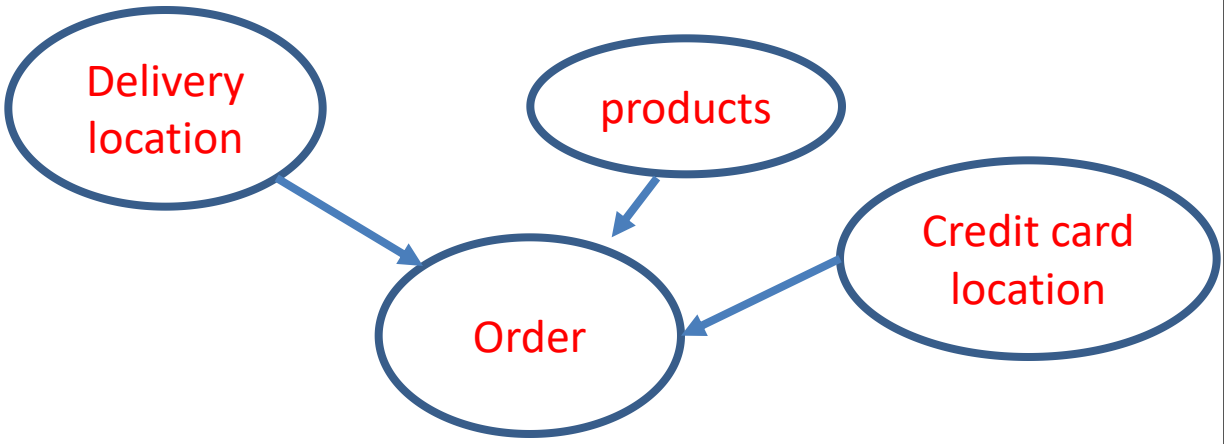

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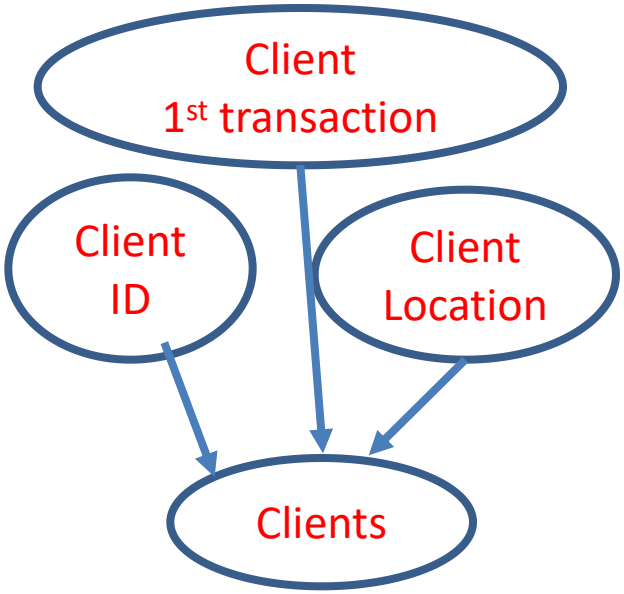

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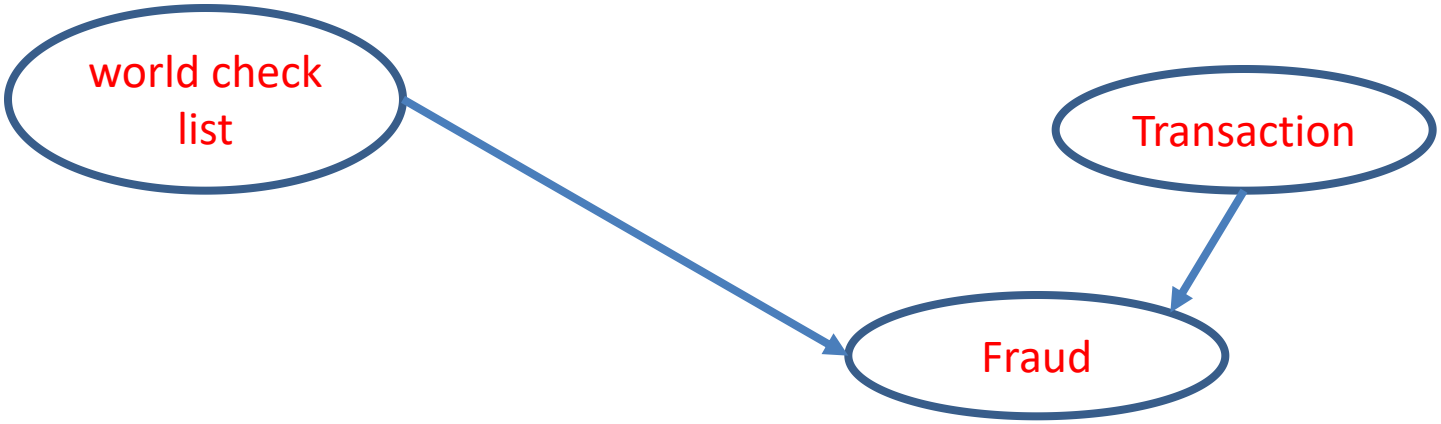

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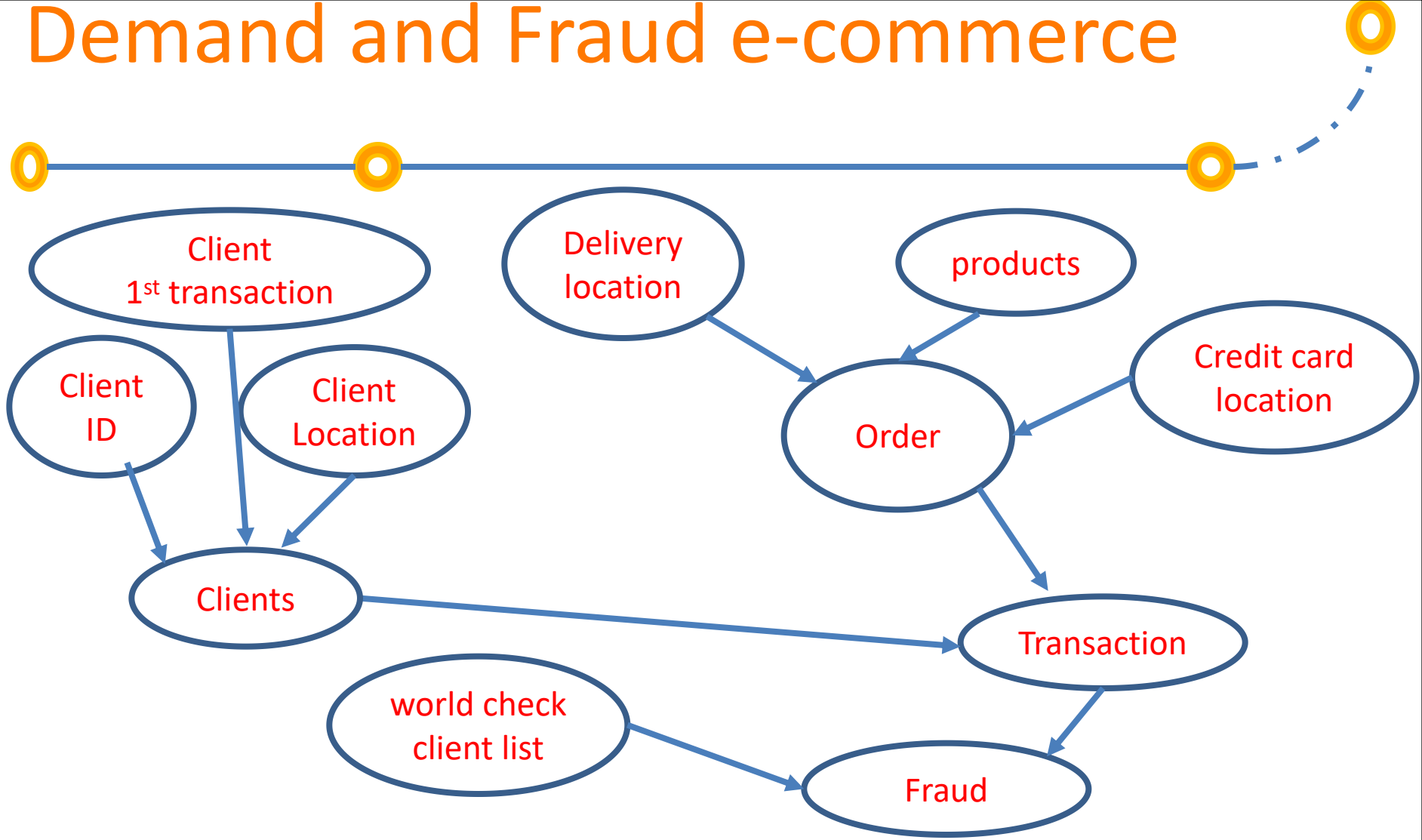
Demand and Fraud e-commerce



Graph Representation

- Identification source of data
- Enable the IETL consistency
- Structured relationship data rv

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Algo Selection and Data Modelling

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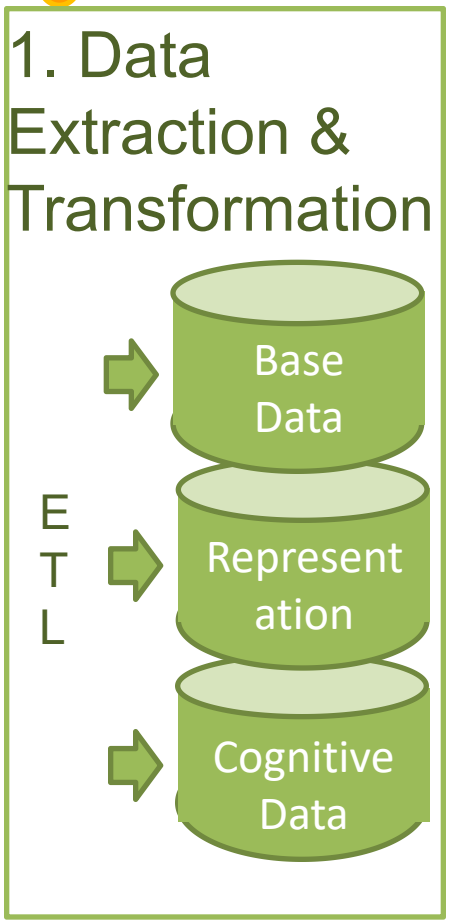
Data Modelling
Machine Learning Engineering 2.0



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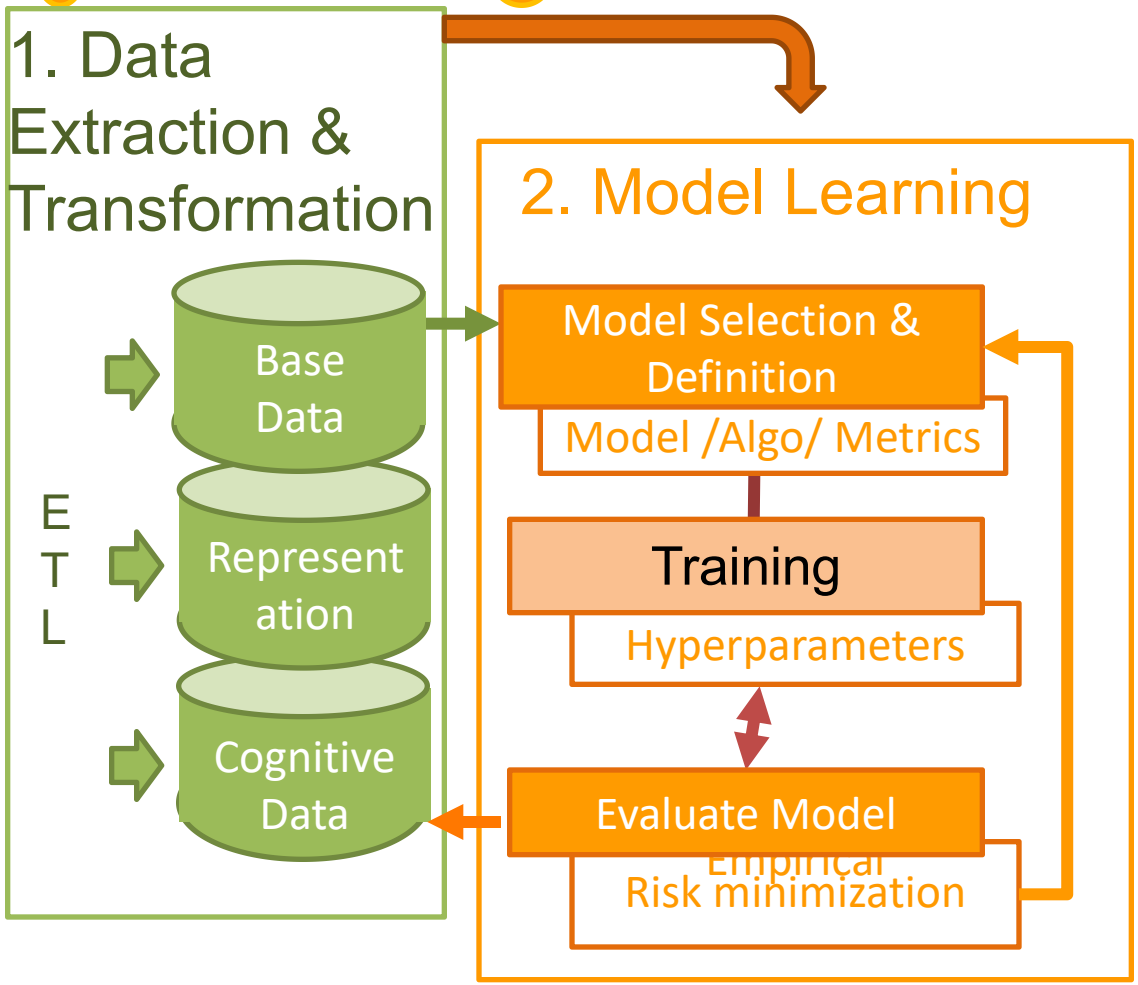
Machine Learning Engineering 2.0



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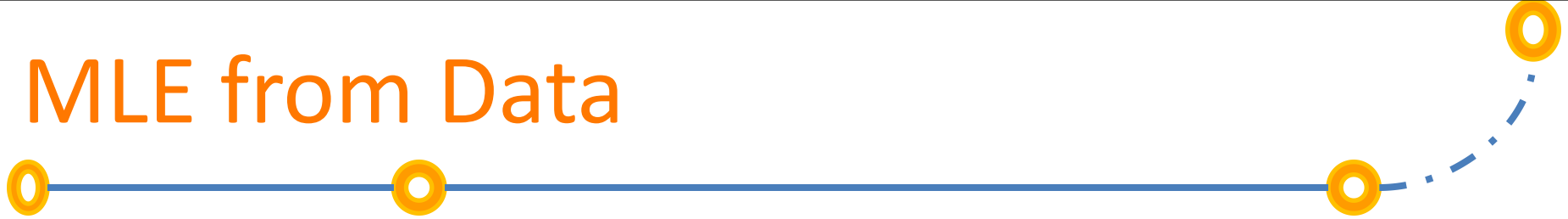
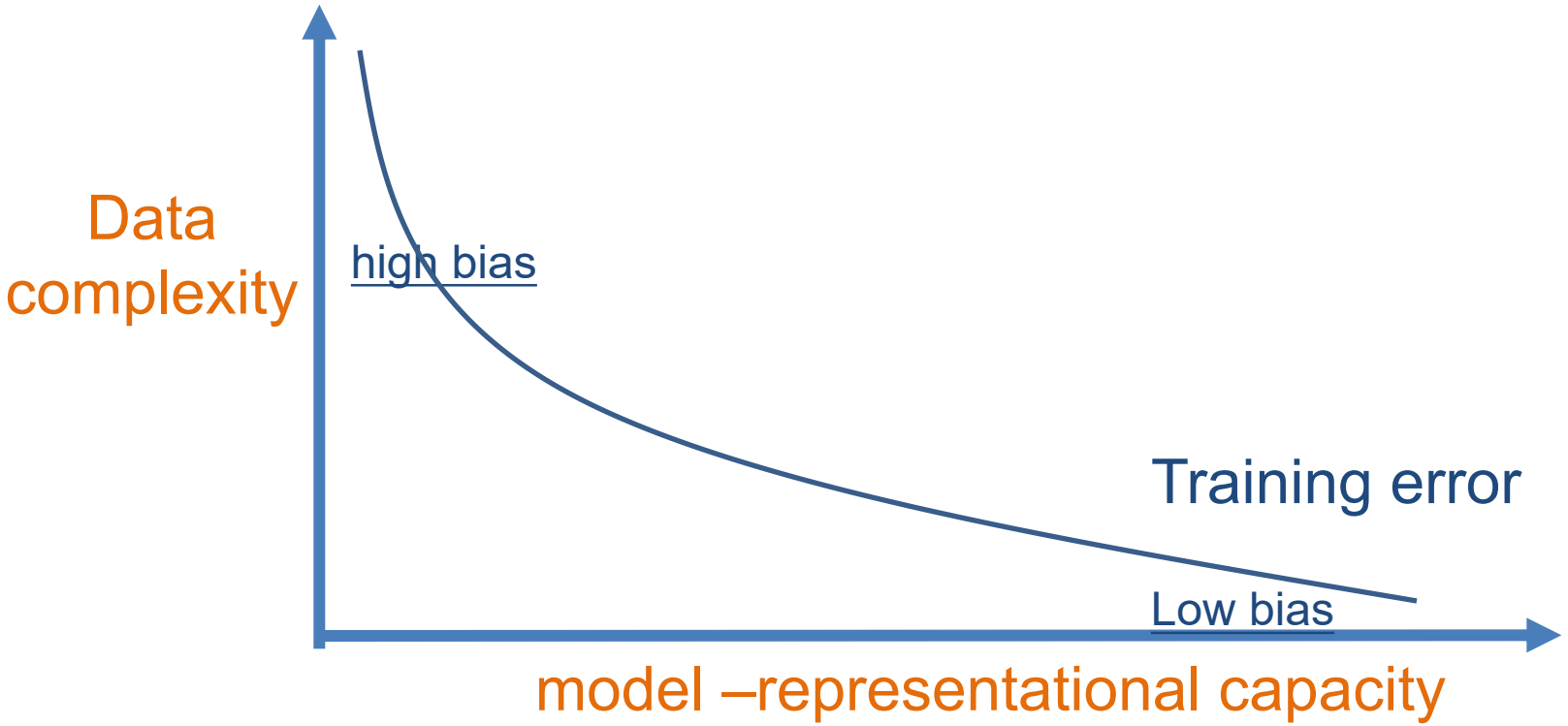
MLE from Data



Drug response Predict House price Demand Forecast	Customer propensity to buy, churn or default Predict maintenance	Image Labelling, NLP, MT, TS Class., Anomaly Detection Cybersecurity	Customer segmentation or grouping documents into sets	Learning a Game plan with rewards without knowing the rules
Models				
Regression	**Classification**	**Deep Learning**	**Clustering & Retrieval**	**Reinforcement Learning**
Algorithm				
Linear Regression LR+ Regularization SVMR Decision Tree R.	Logistic regression * SVM Decision Trees * Random Forest Ensemble * Boosted Tree Cox Prop. Hazard	ANN Convolutional NN Recurrent NN Stacked AutoEncoder	K-means Clustering Hierarchical clustering DBSCAN Mix of Gaussian Latent Dirichlet Allocation (LDA) Tree Search	Expected Max Policy iteration Value Iteration Temporal difference Q-learning State action reward state action (SARSA)
Empirical risk minimization, Metrics, Bias and Variance Performance				
RMSE, R^2	Accuracy, Precision, Recall, F1Score, ROCAUC	Reg + Class metrics Logistic Loss	Silhouette	Rewards
Non Bayesian Model & Data Representation				
Times Series		**Representation Learning Dim. Reduction**	**K- Nearest Neighbours**	**Dynamic Programming**
ARIMA State Space Model Kalman Filter Survival Analysis		Graphical Model Association rules Principal Component Analysis SVD/Matrix Factorization LDA/QDA		Kalman Filter HMM

Tendency to overfit data with increased model capacity



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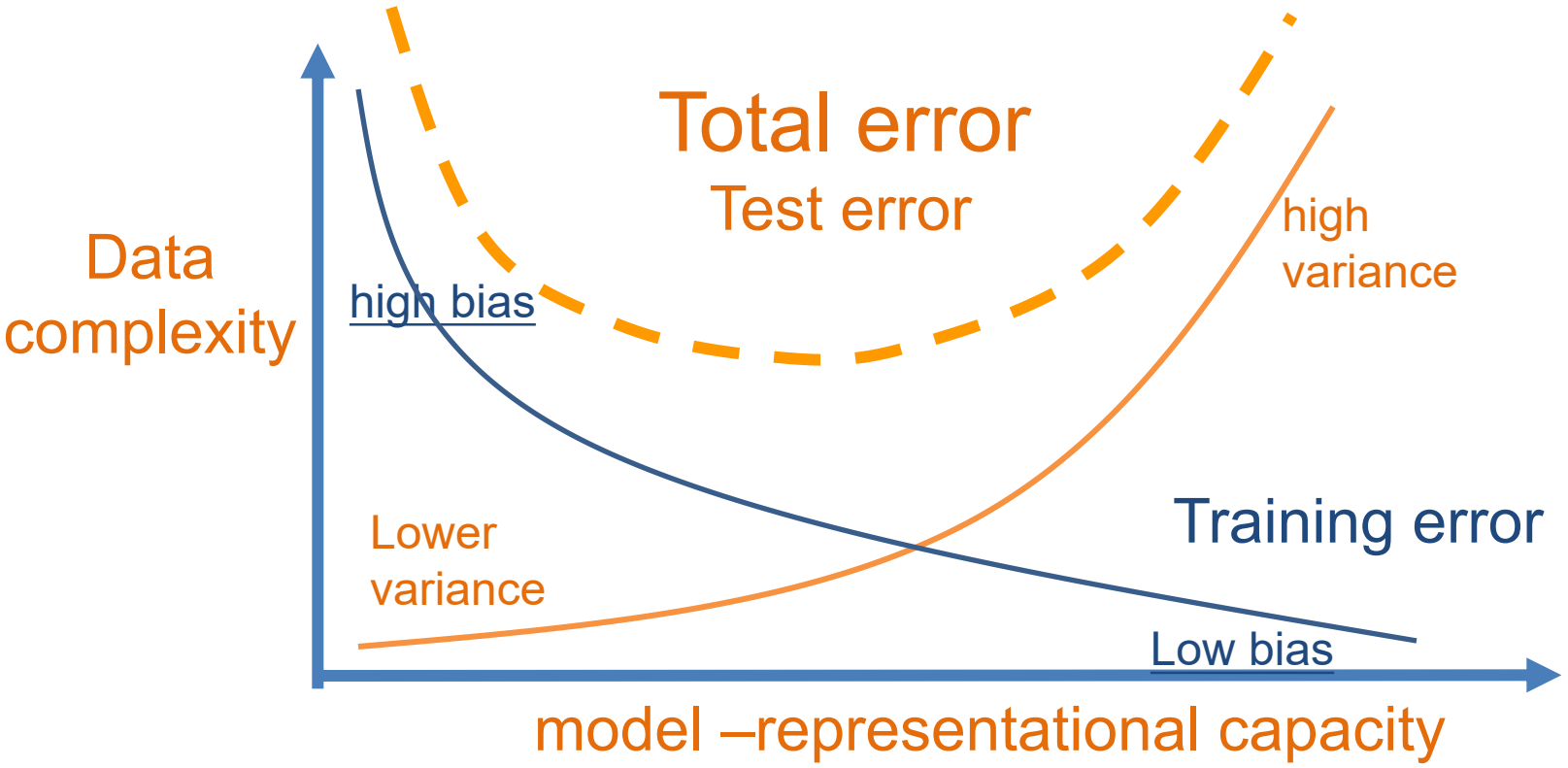
Real value is Test error not training error



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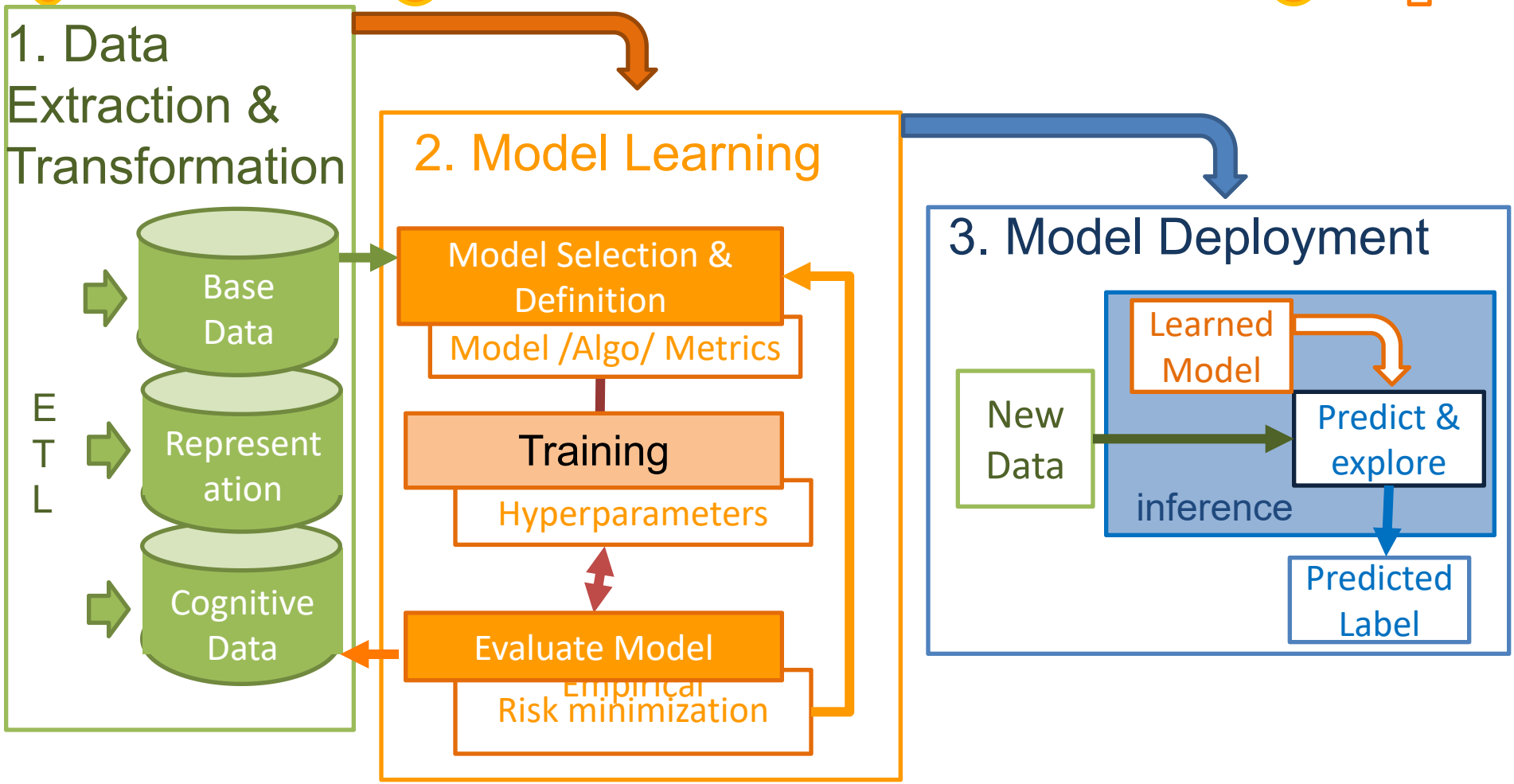
Data Modelling
Machine Learning Engineering 2.0



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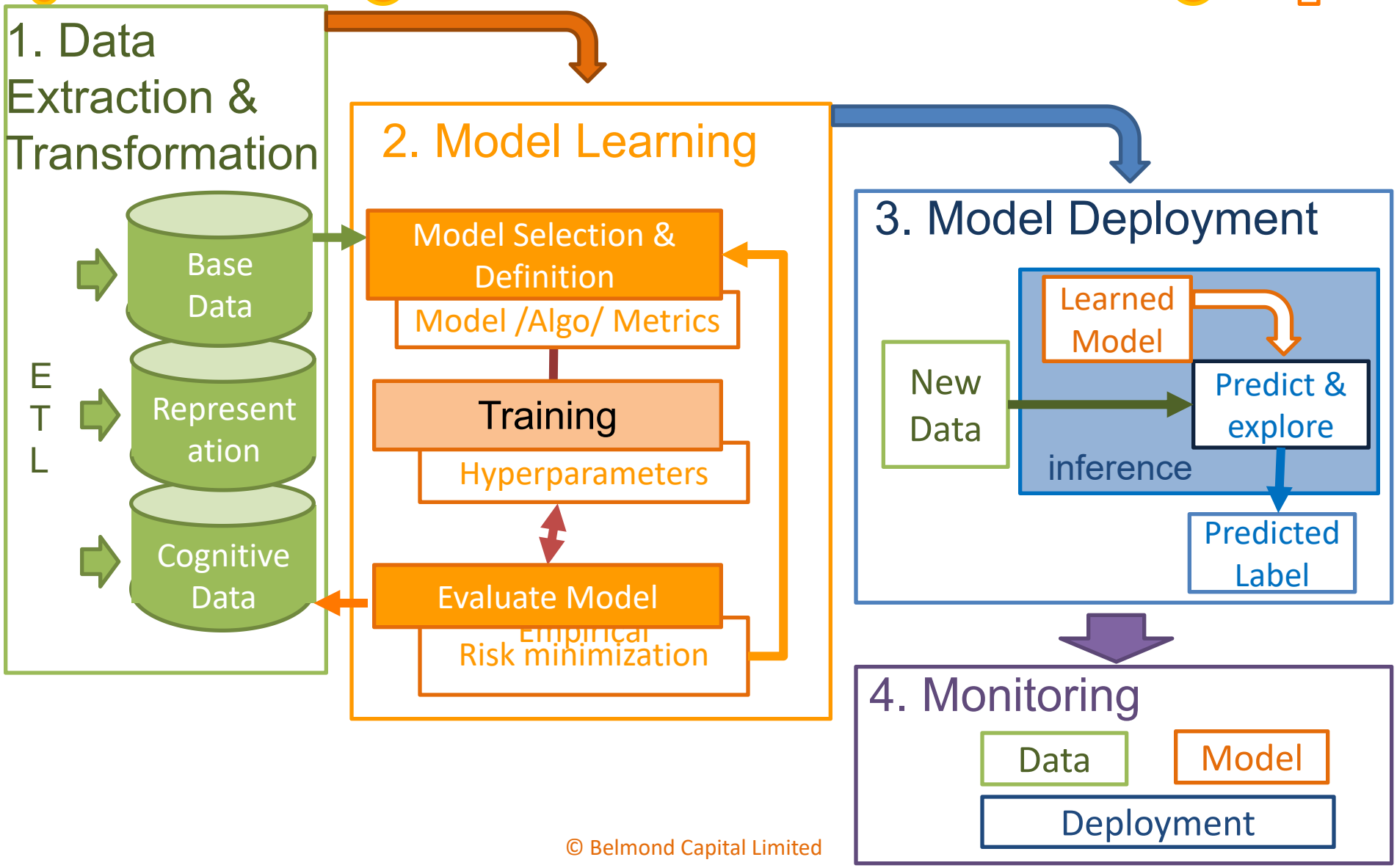

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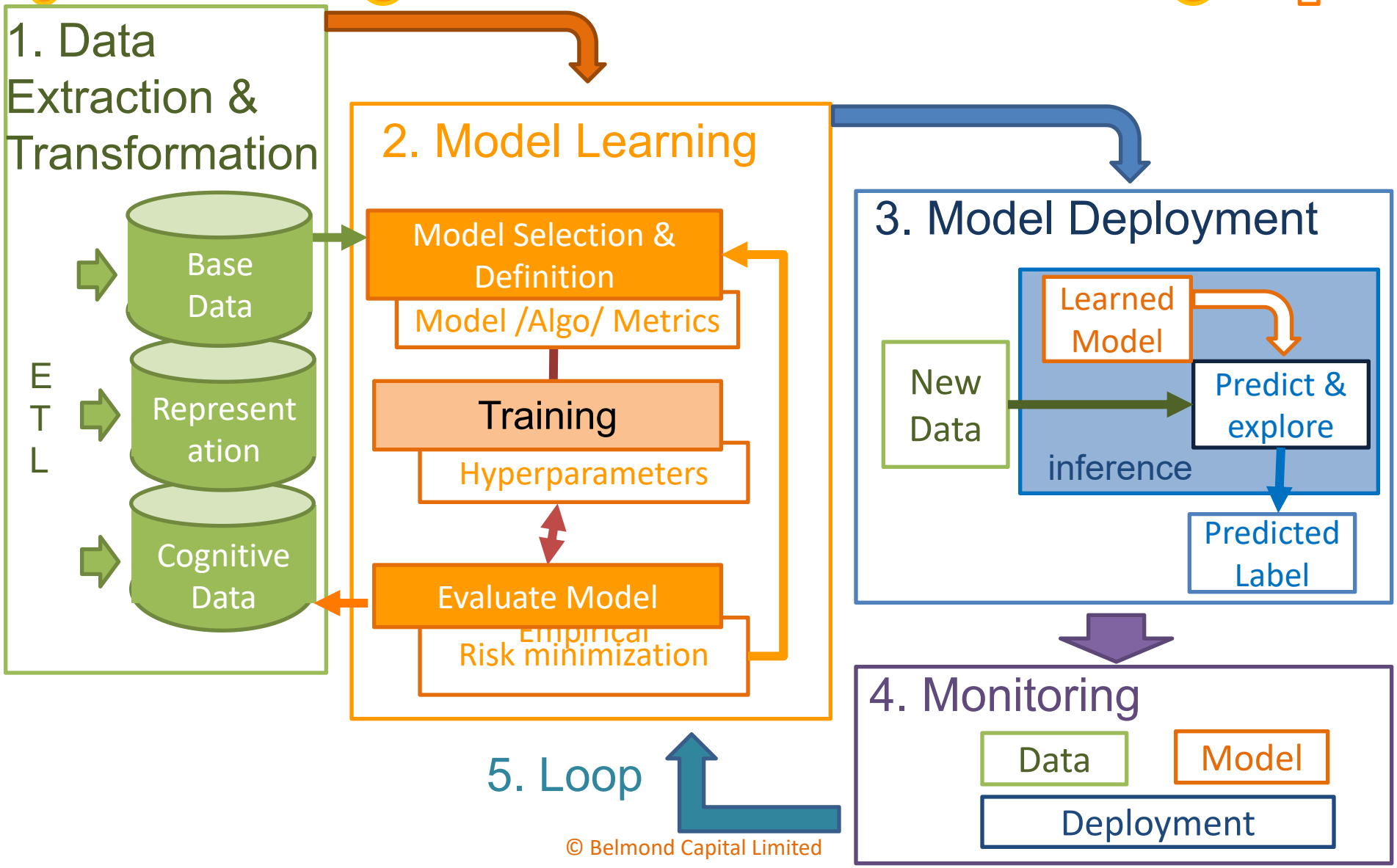

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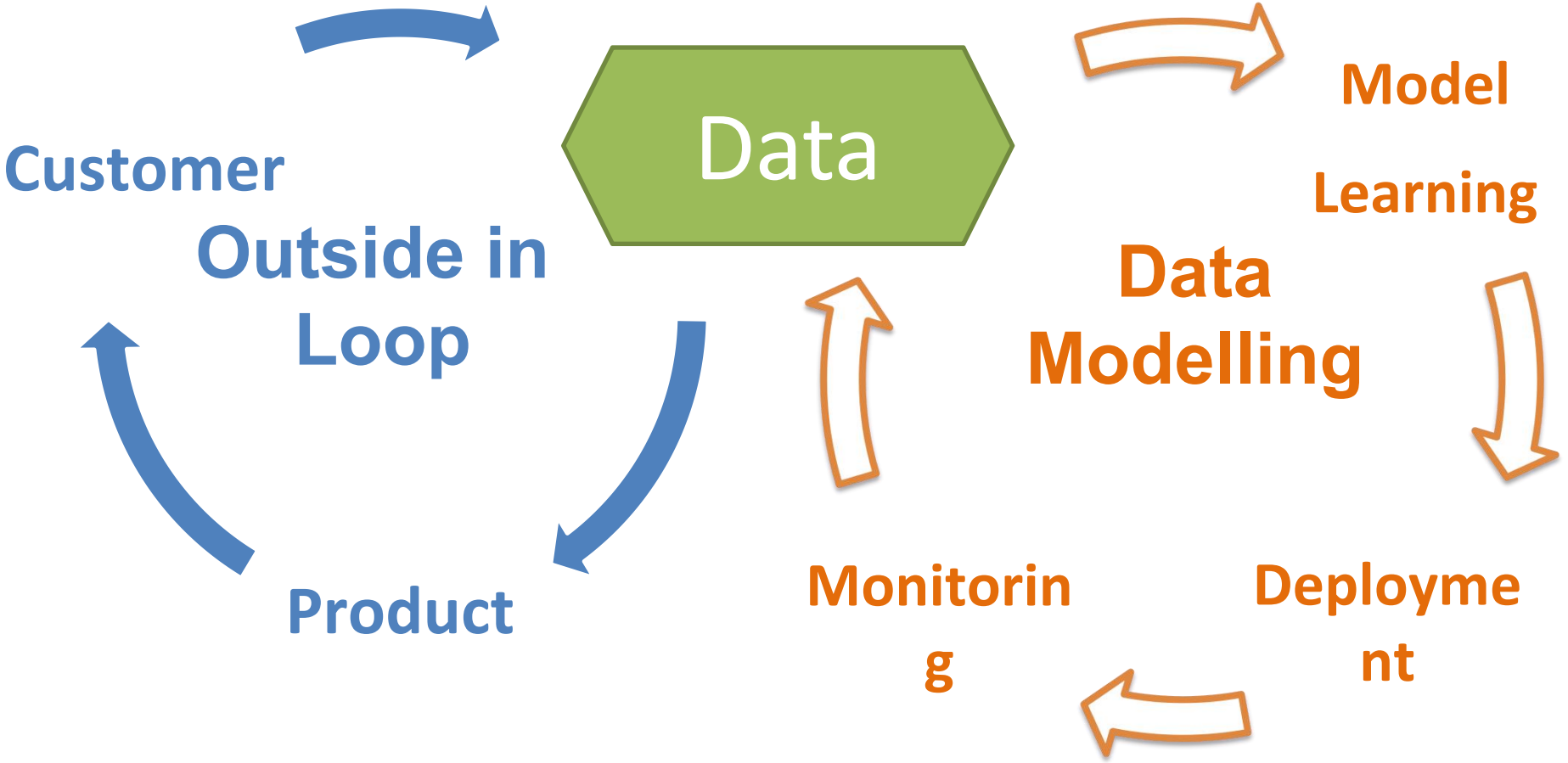
Data Modelling with Model Learning



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Data Modelling Key considerations

- Clarity Use case
- Metrics selection
  - Accuracy
  - Precision/ Recall
  - AuC
- Model
  - Simplicity High Bias or high capacity
- Governance
  - Traceability and explainability importance

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Model Deployment & Governance

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process and governance checklist

The data you have	→	Data Representation Data Access & UAM
The Data Modelling and ML Engineering capabilities you build to test and learn customers behaviours, system dynamic and risks	→	ML Metrics Model control Data Stationarity review Model review Board
Your Decision Making Process: Data Driven & Bottom-up	→	Customer Journey impact Bias and Fairness review
Your ecosystem design to acquire data, learn and amortize cost at scale	→	Data Access review Ops Risk Data Usage review –purpose & fairness

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Data and Machine Learning Roadmap

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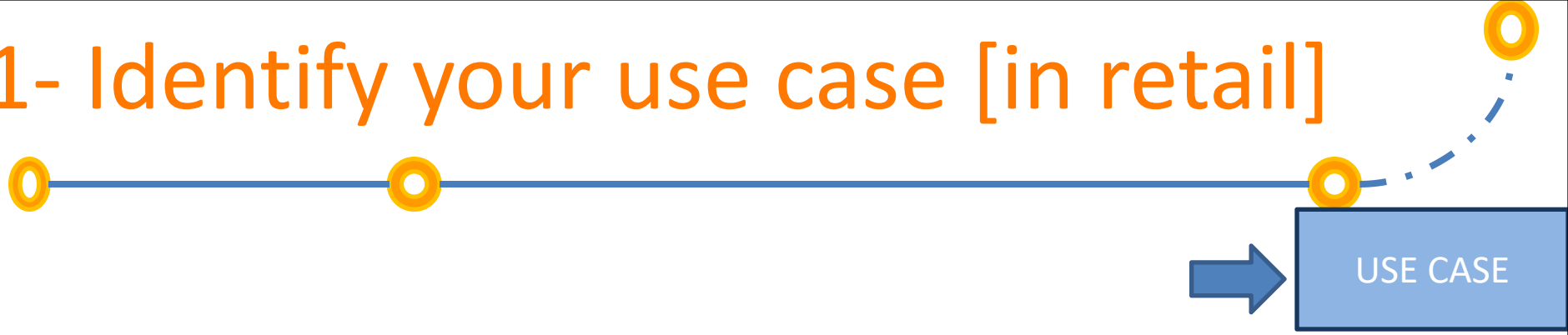
1- Identify your use case [in retail]



	Back Office	Middle office	Front office
Top use case	Stock Allocation Inventory Optimization	Merchant Transaction Fraud detection	Netflix/ amazon Personalization
Testing	Site selection	Mobile Alternative data Auto generation Ad	Chabot's
Not yet mature Use case	Seller fraud & Traceability	Visual Search CNN Anonymous Customer analytics	Real time offer Smart tools

1

2

CFO

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2A- Identify Data & its representation

Data Representation

Data

Data

Data

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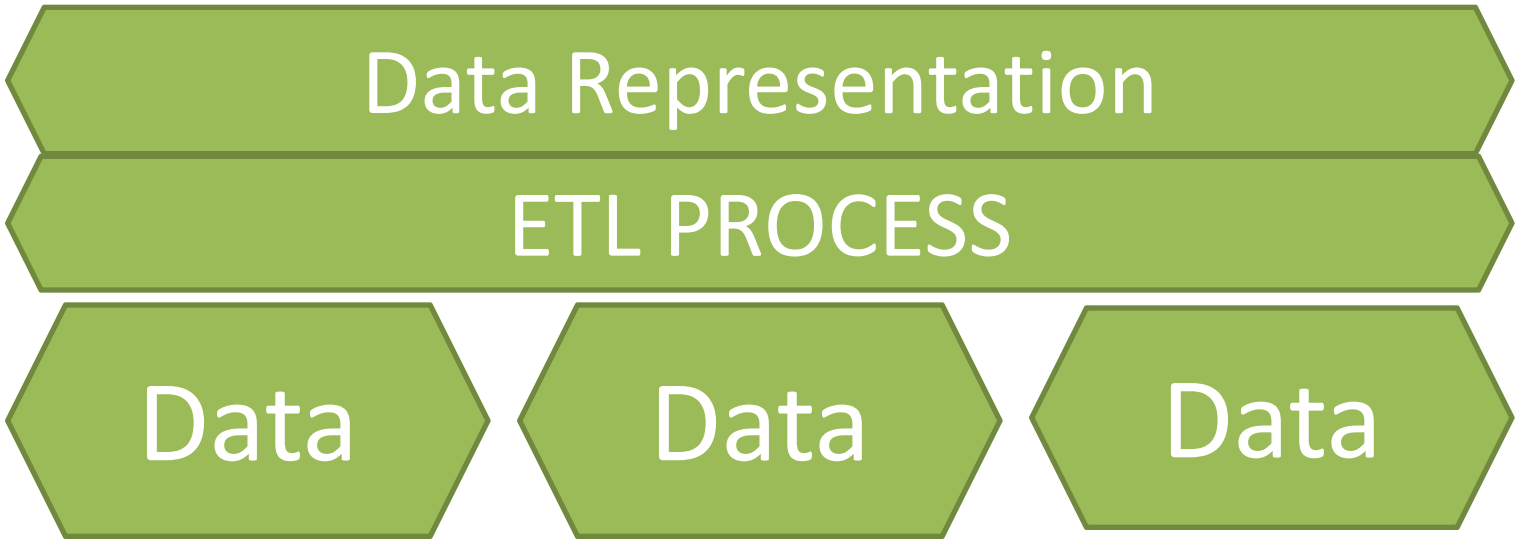
2B- Define Data IETL (Ingest Extract Transform Load Process)

USE CASE



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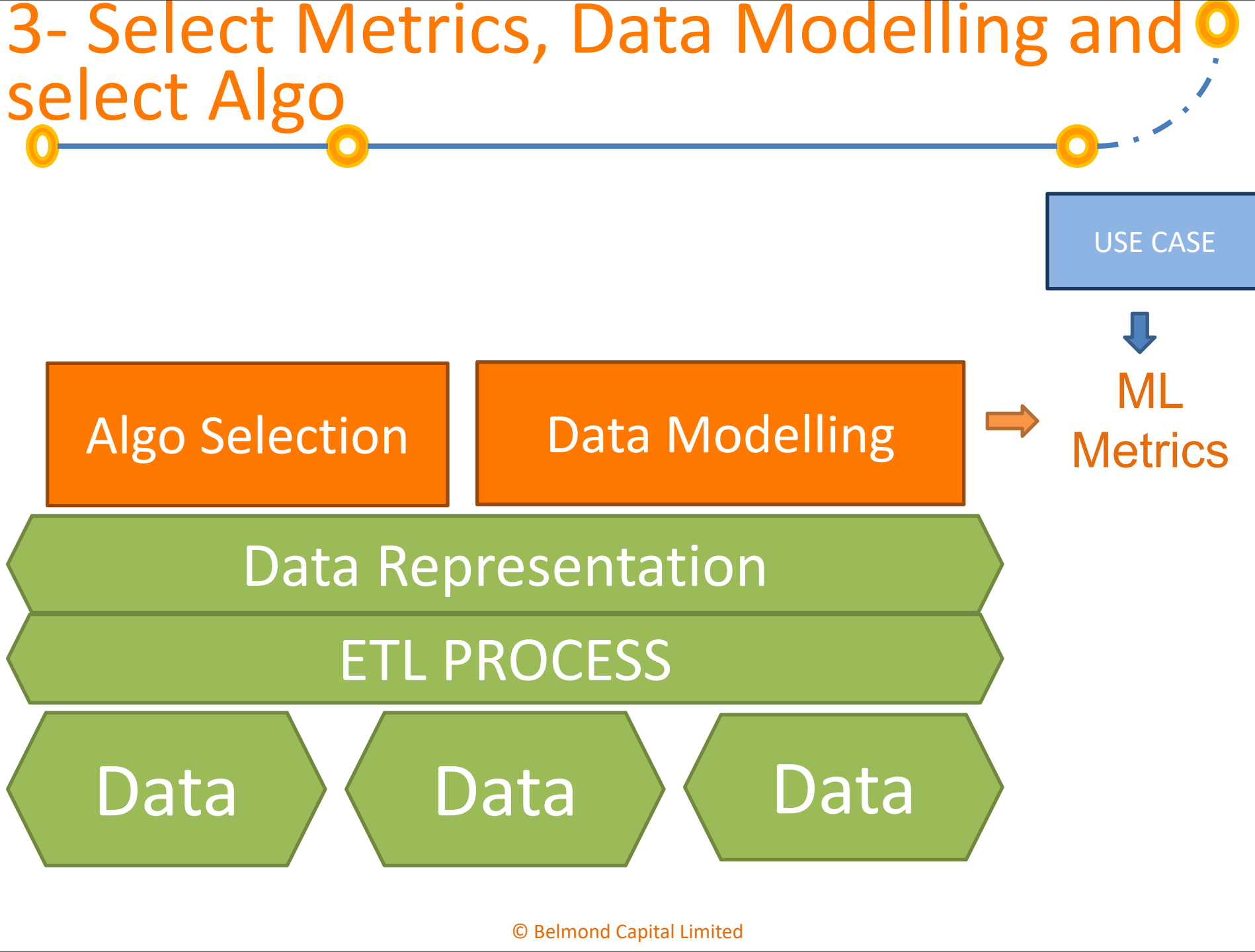
3- Select Metrics, Data Modelling and select Algo



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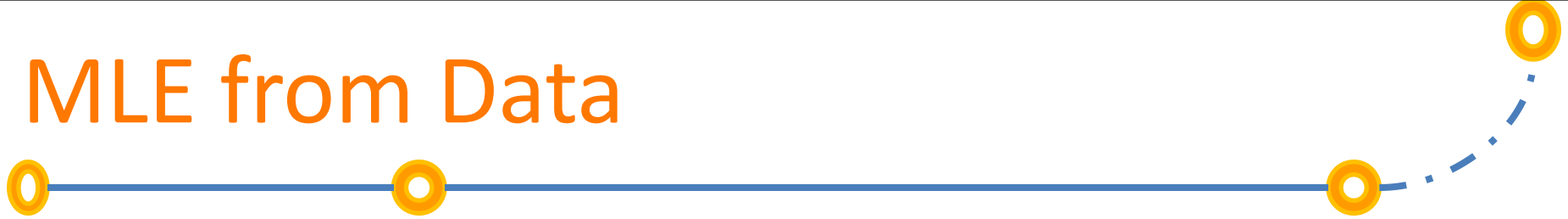
MLE from Data



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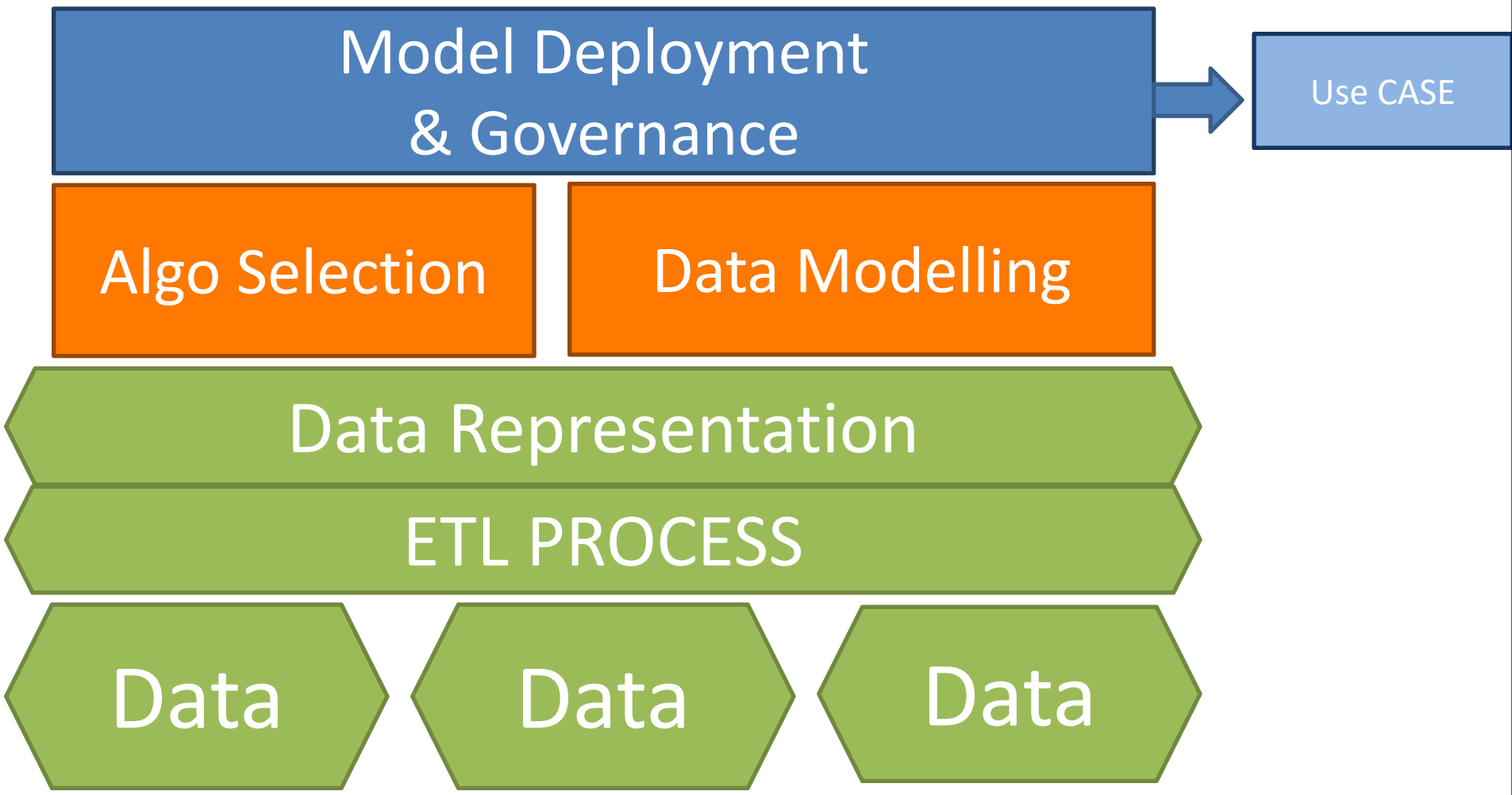
Times Series		**Representation Learning Dim. Reduction**	**K- Nearest Neighbours**	**Dynamic Programming**
ARIMA State Space Model Kalman Filter Survival Analysis		Graphical Model Association rules Principal Component Analysis SVD/Matrix Factorization LDA/QDA		Kalman Filter HMM

4- Deploy Model and review governance



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- Investment Tech Companies
  - Data / AI or hard tech
- Assessment AI deployment
  - Use case
  - Data Availability
  - Data Modelling governance
- Support ML Corporate Journey
  - Data and graph representation
  - Training AI Fraud / AML
  - Governance assessment ML
  - Executive training

Are you AI ready?

philippe.touati@belmondcapital.com

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