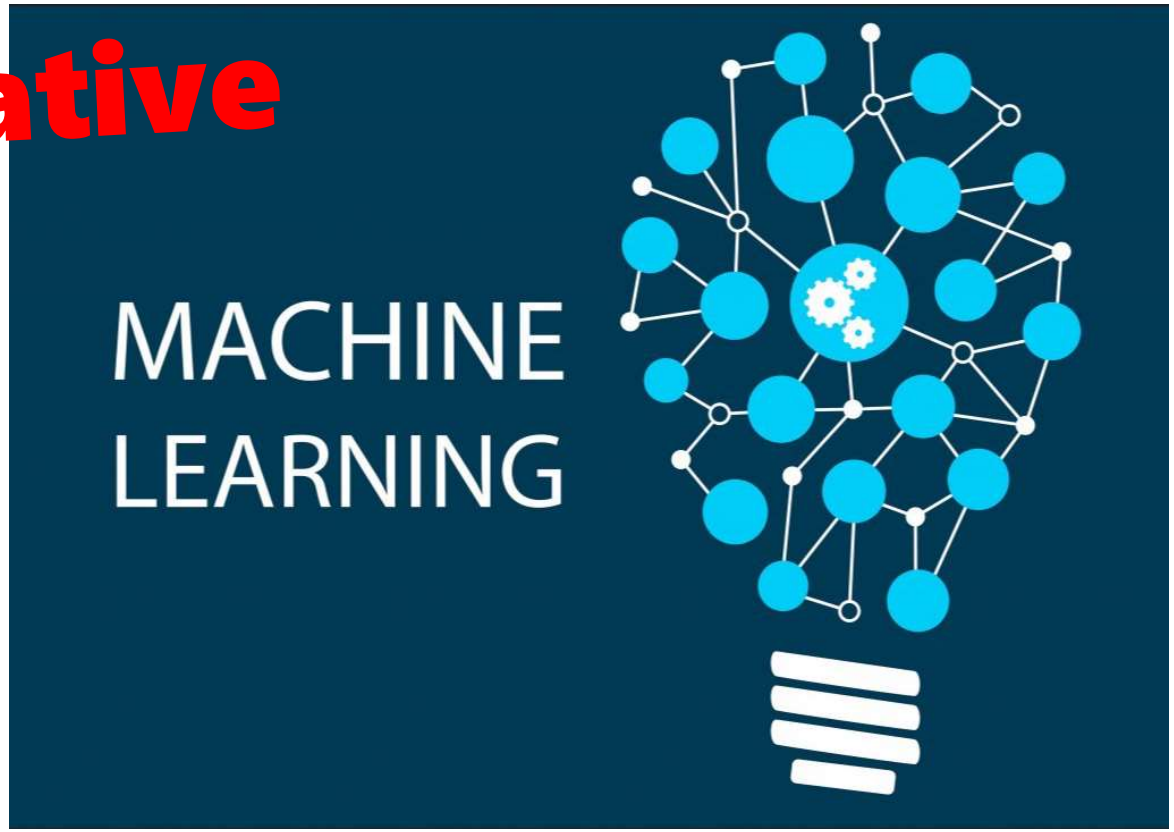
Digital Initiative

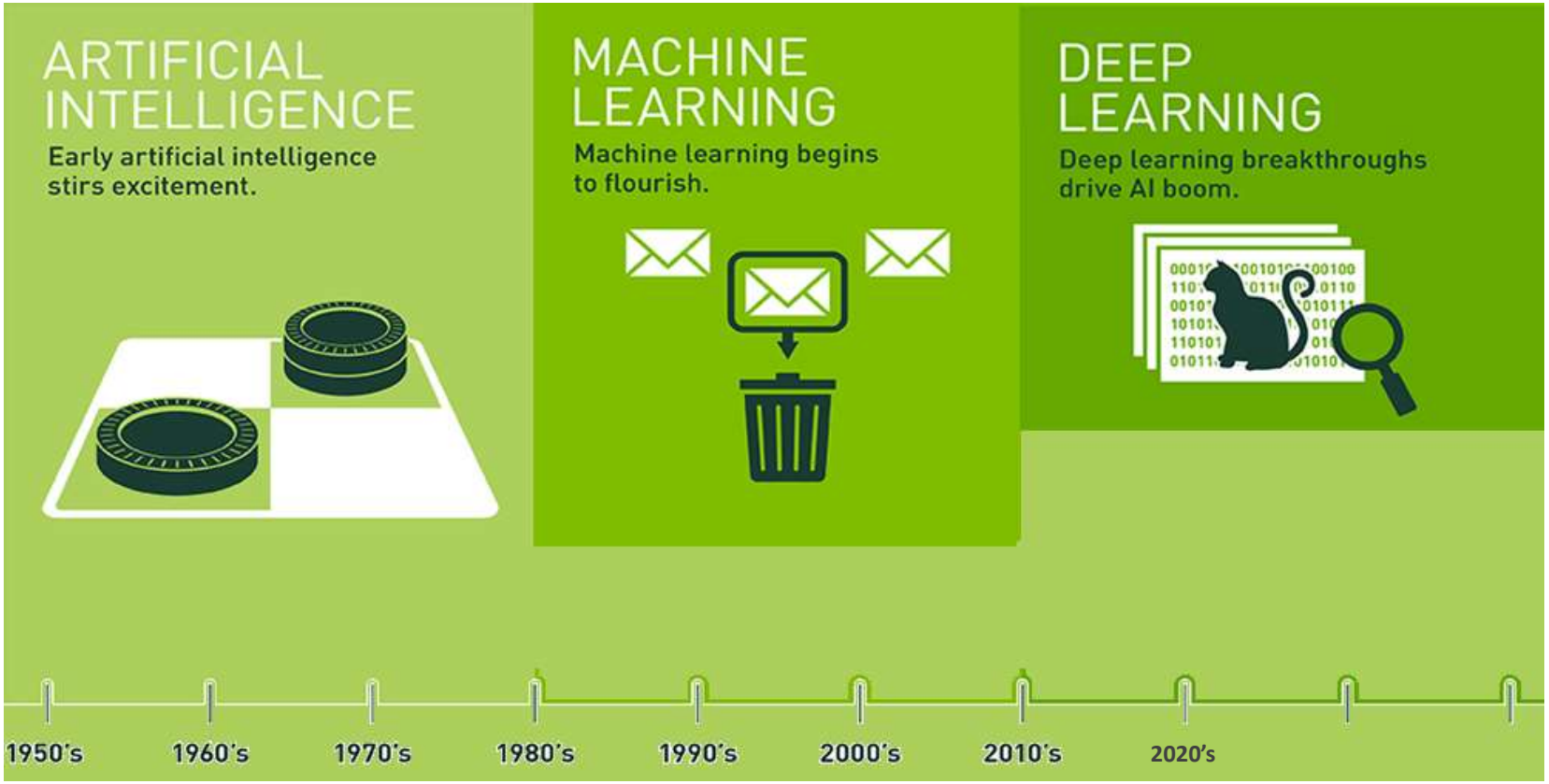
MATRIX



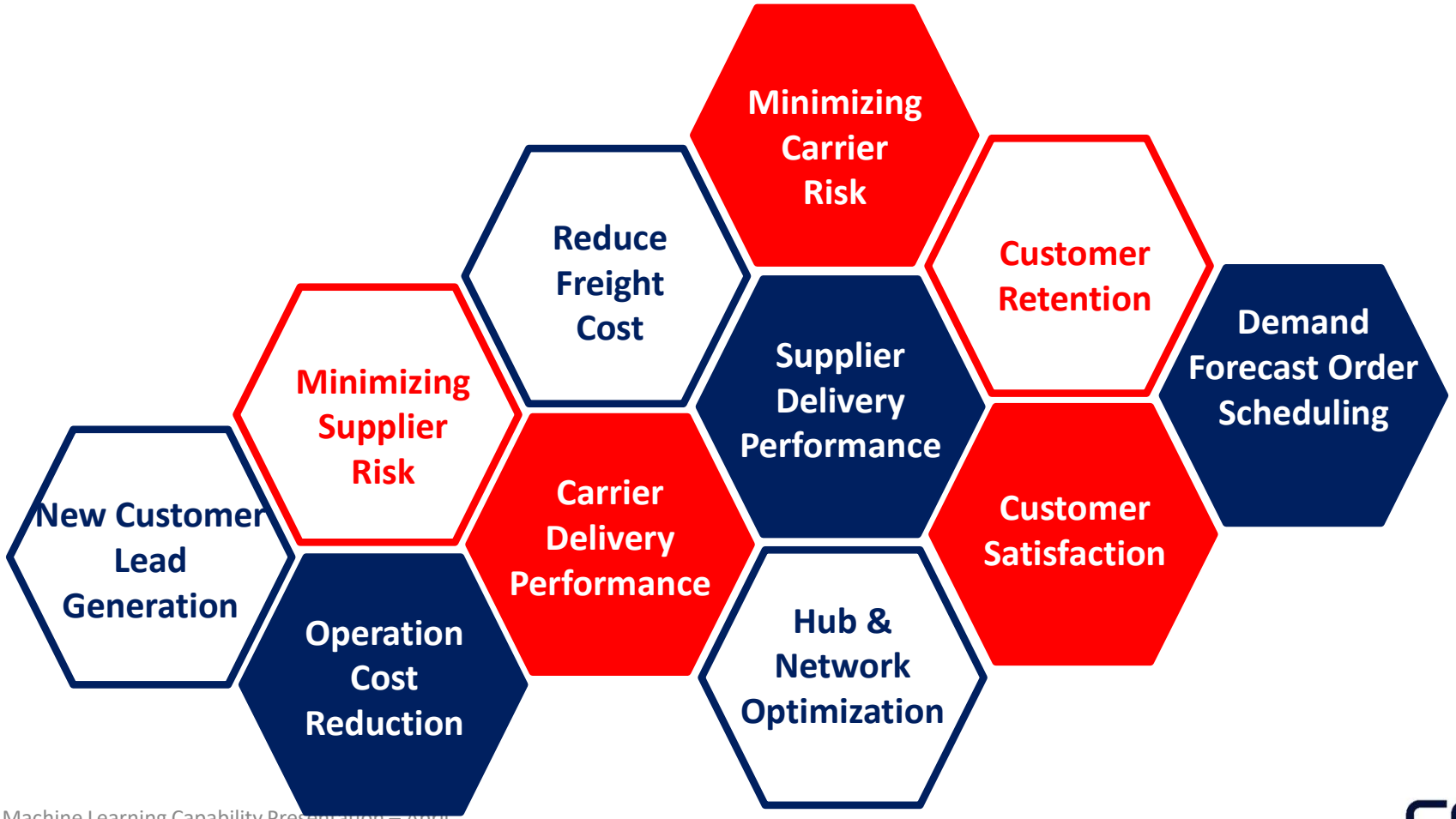
Daphne Liu

CEVA LOGISTICS

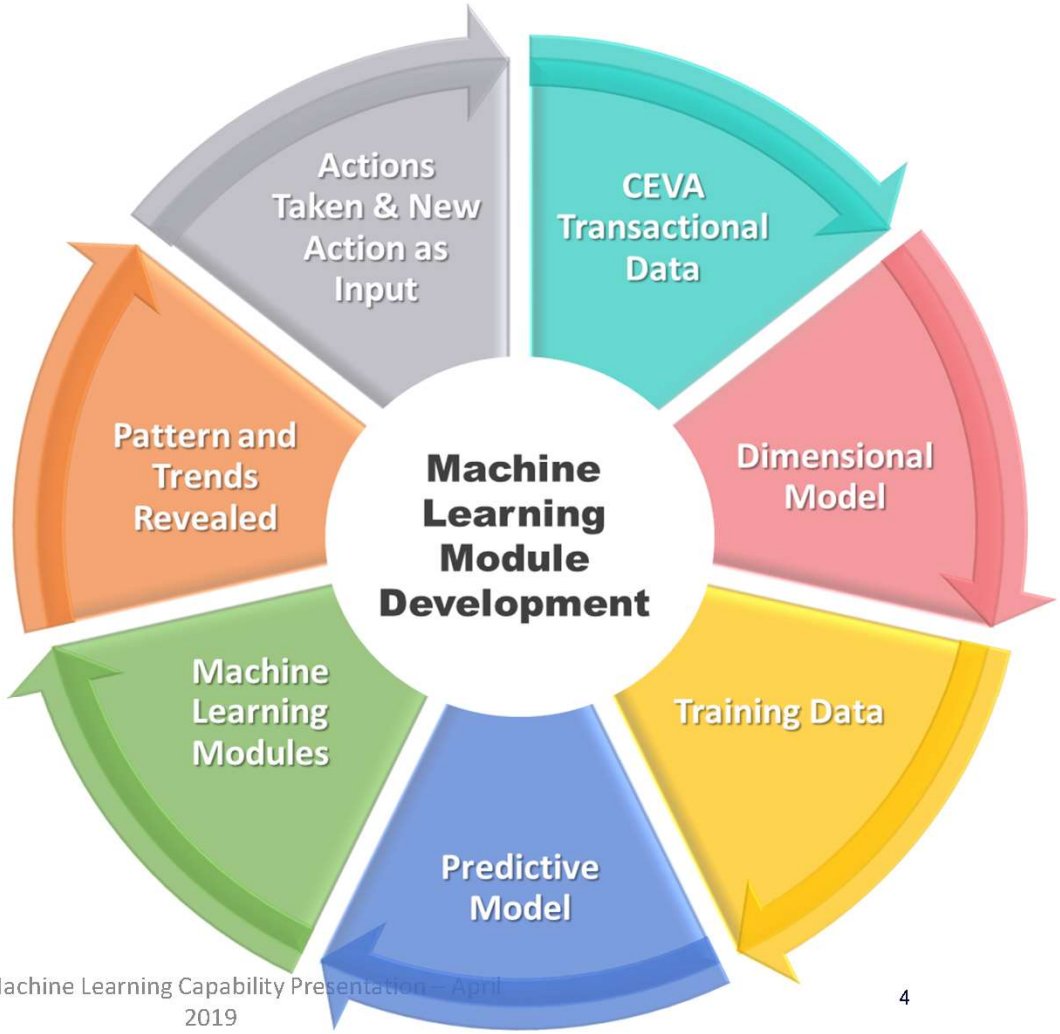
AI vs ML vs DL


ARTIFICIAL INTELLIGENCE
Early artificial intelligence stirs excitement.
MACHINE LEARNING
Machine learning begins to flourish.
DEEP LEARNING
Deep learning breakthroughs drive AI boom.
1950's
1960's
1970's
1980's
1990's
2000's
2010's
2020's

MACHINE LEARNING PROVIDES BENEFITS

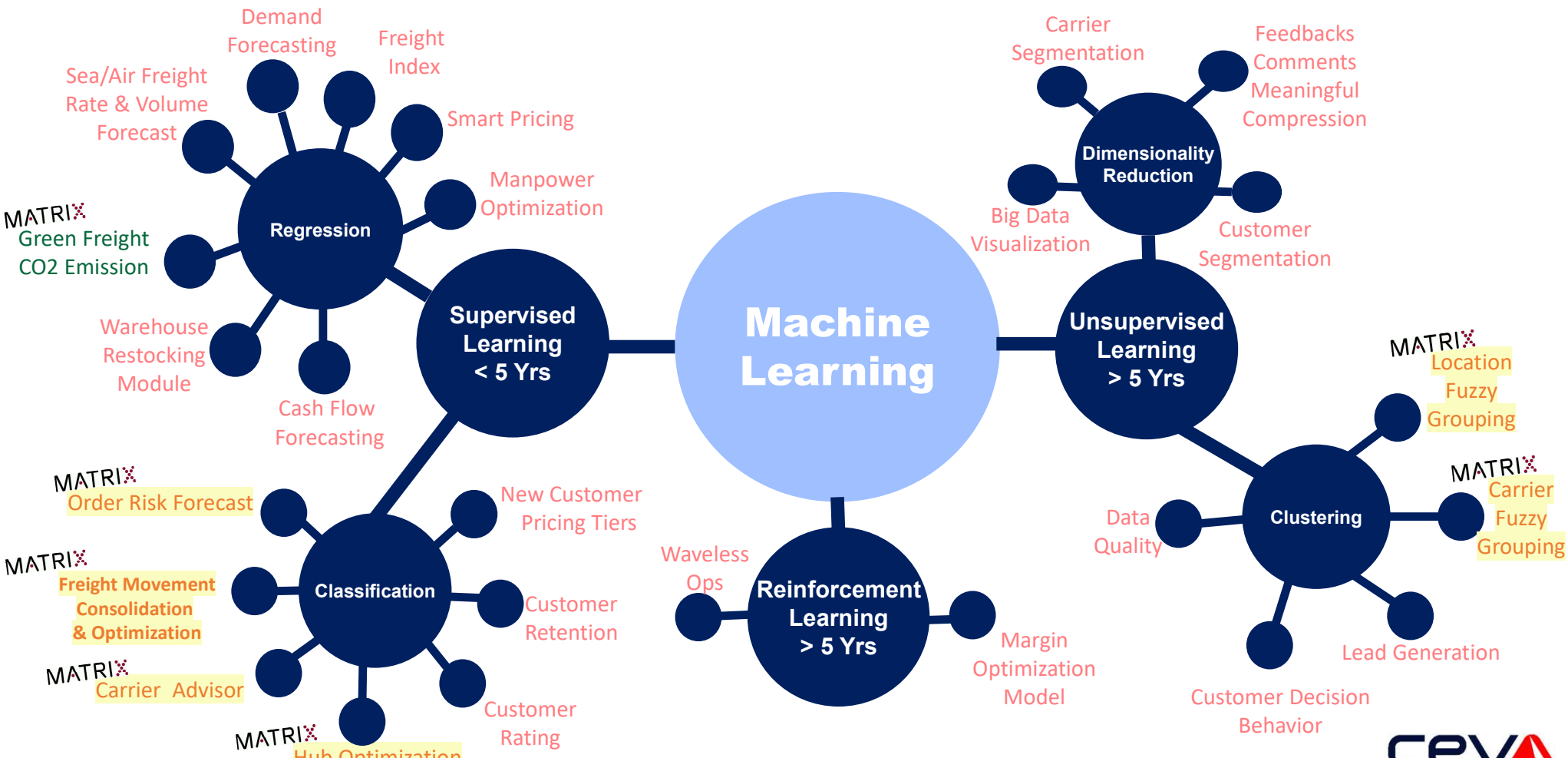


MACHINE LEARNING MODULE LIFE CYCLE

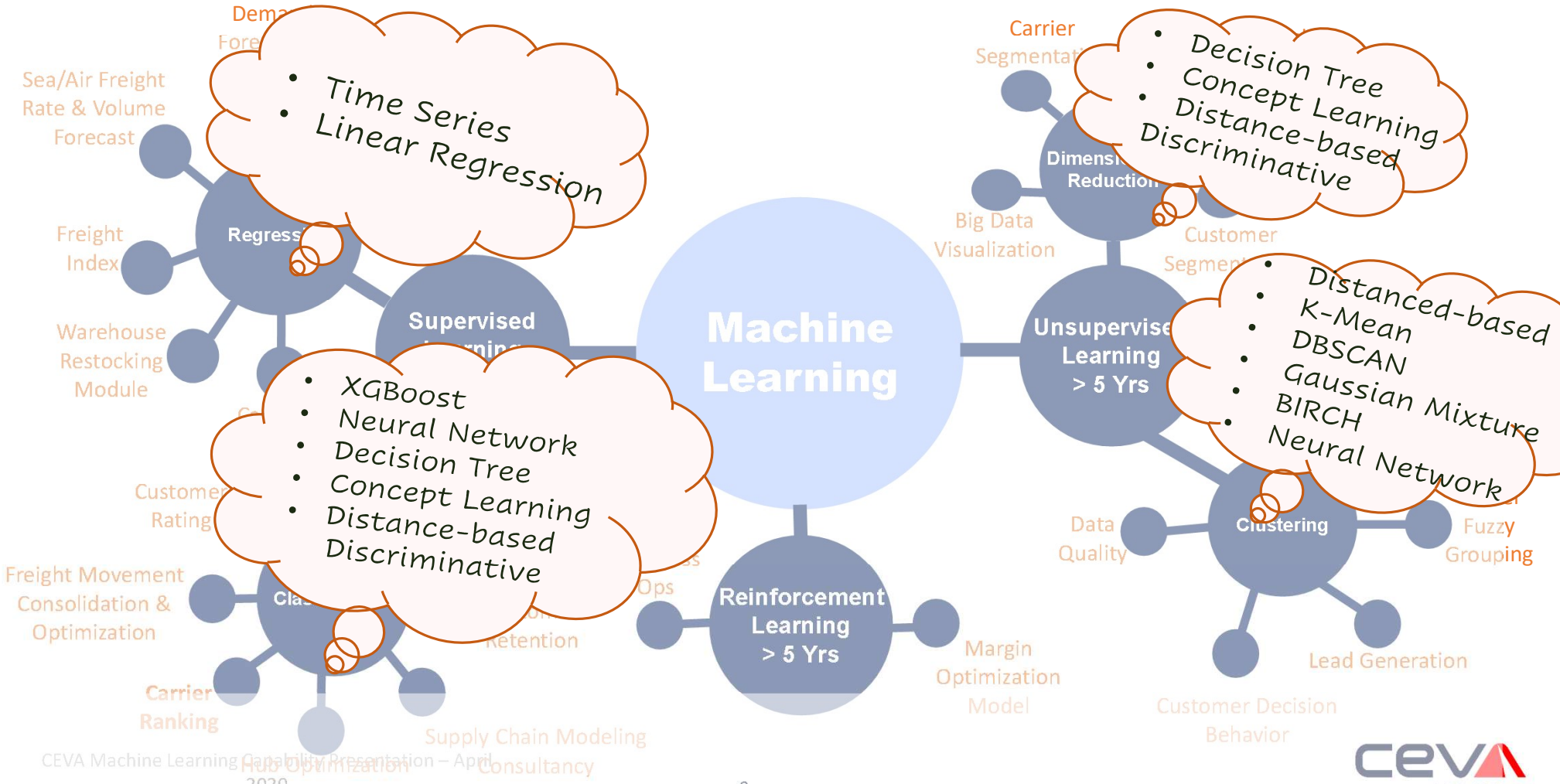


CI CD CT

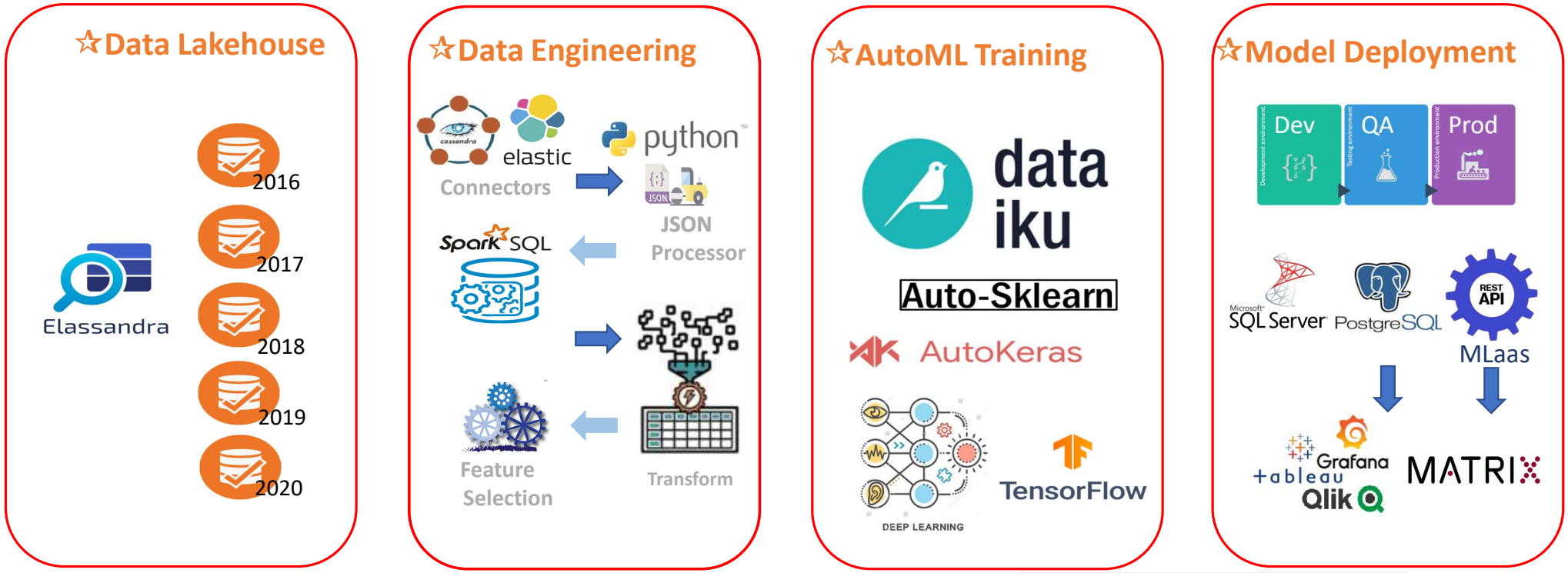
TAXONOMY OF MACHINE LEARNING METHODOLOGIES IN LOGISTICS



TAXONOMY OF MACHINE LEARNING ALGORITHMS IN LOGISTICS



Matrix Big Data Machine Learning Data Architecture

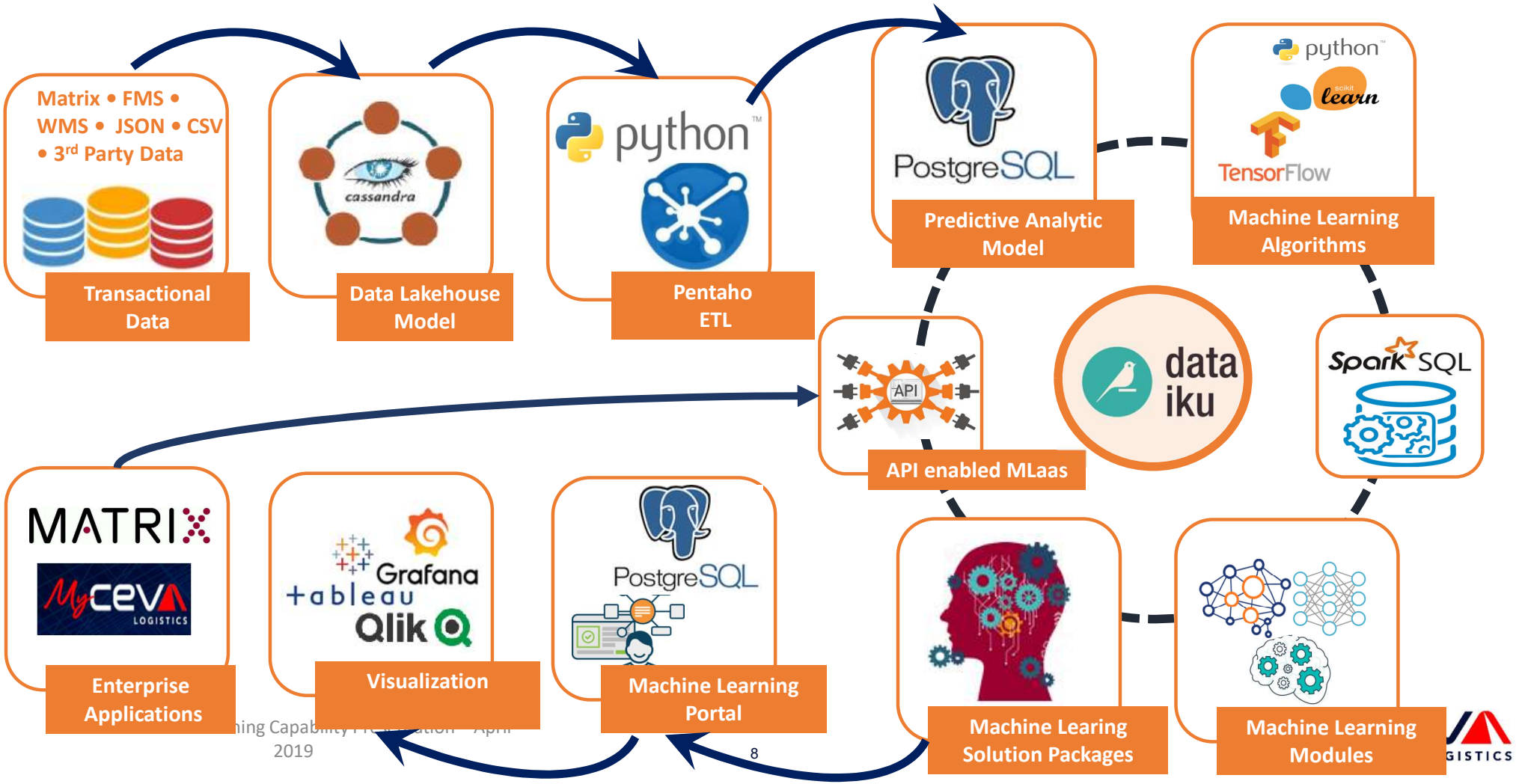


Big Data Parallel Processing
Multi-Threaded Bulk Data Loading

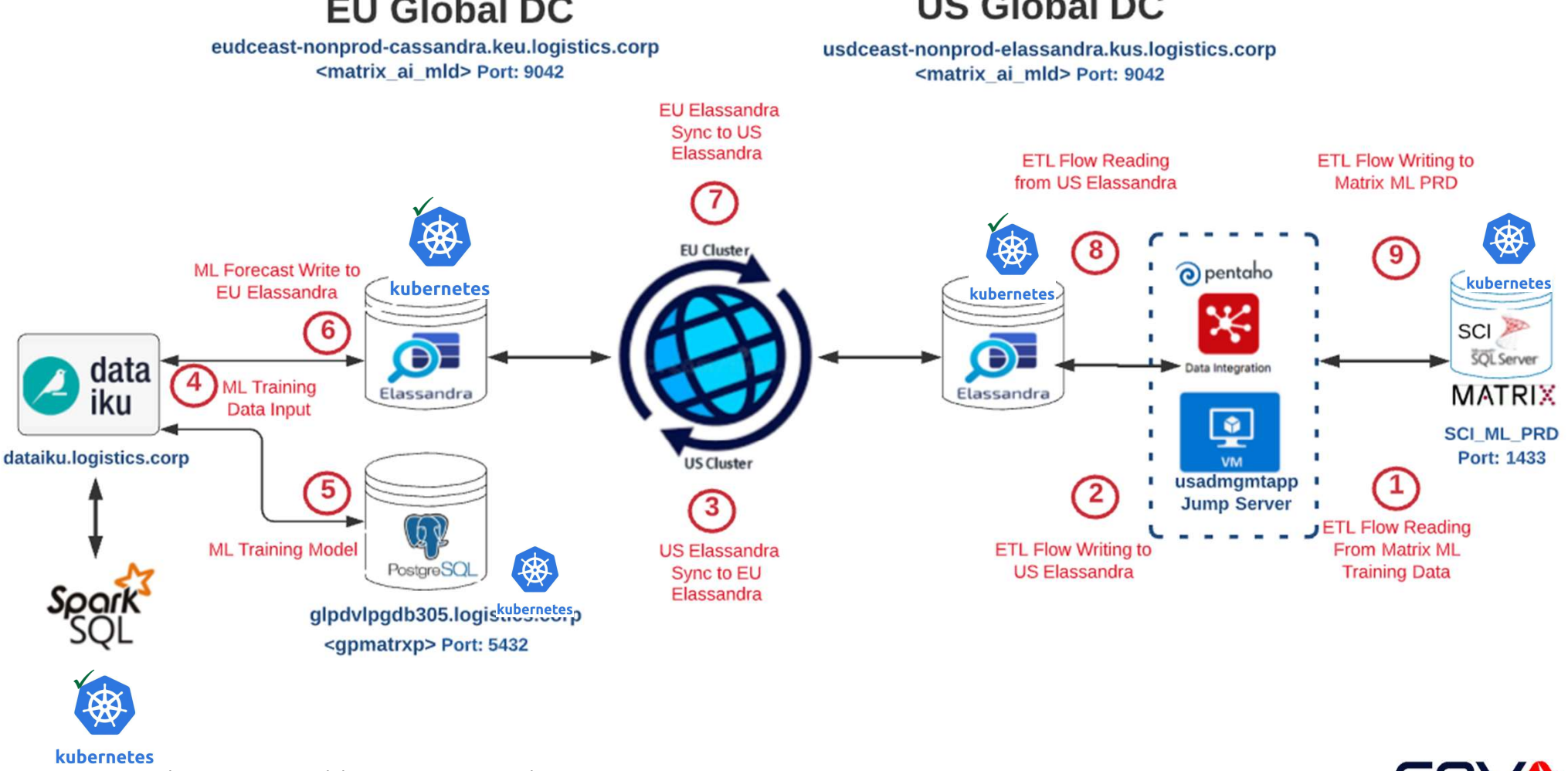
Big Data Training Process

Trained Machine Learning Models

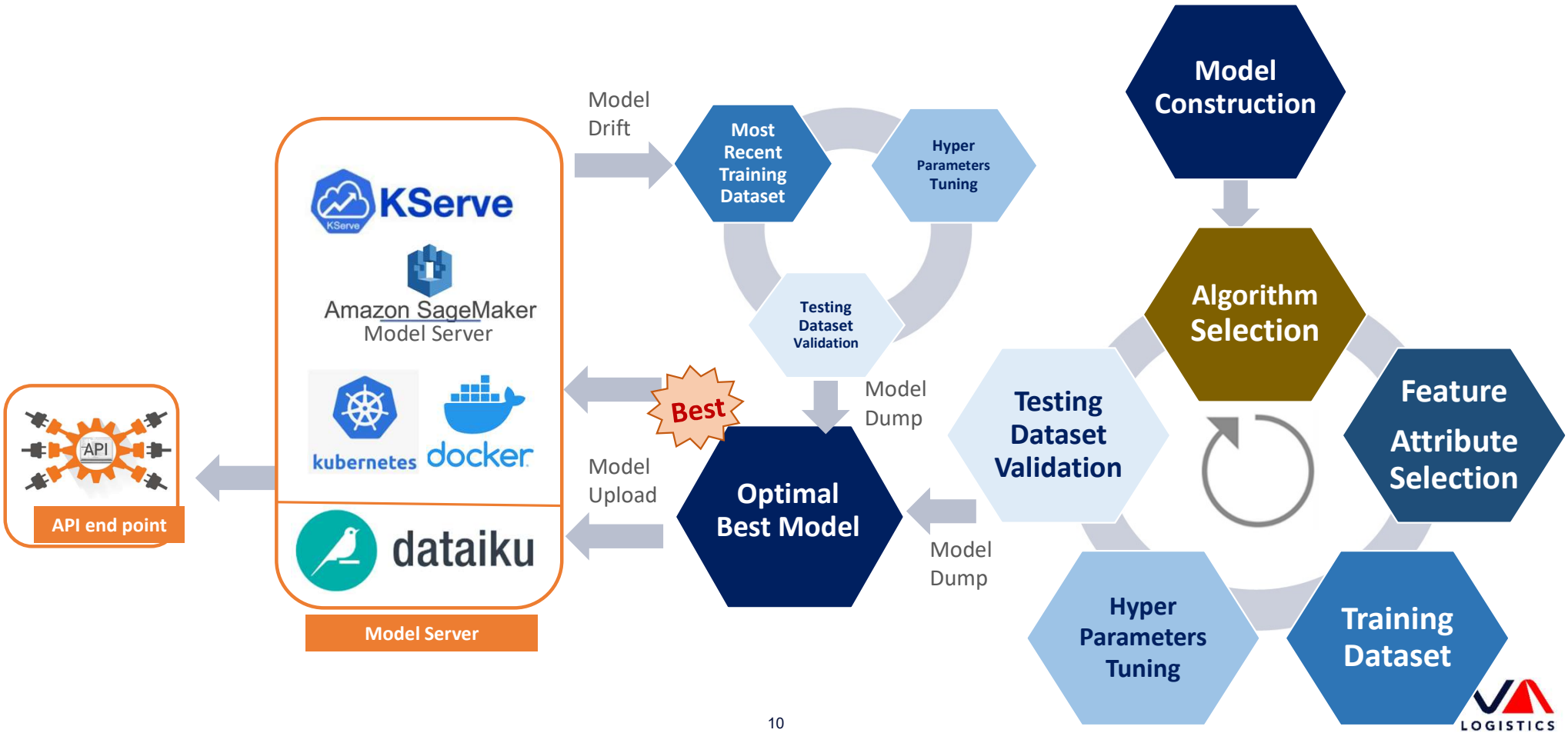
MACHINE LEARNING/AI PORTAL ARCHITECTURE



MATRIX ML Architecture



ML Model Validation/Deployment



Enterprise ML Platform Project Management

Data Model

Gold
- Clean Data/Denormalized
- Data Source: Structured/Unstructured
- MDM Mapped
- Data Size in > 0.5 TB
- Refresh Automatically

Silver
- Clean Data/Denormalized
- DataSource: Structured/Unstructured
- Data Size > 10 GB
- Refresh Automatically

Brown
- Clean Data Denormalized Form
- Data Size < 10 GB
- Refresh Automatically

RAW
- Various Forms
- Data Size in MB
- Refresh Manually

Algorithm

Regression
- Linear
- Time Series

Classification
- XGBoost
- Neural Network
- Logistic Regression

Optimization
- Gradient Decent

Neuro-Linguistic Programming
- Sentiment Analysis (+/-)
- NER (Reason Code)
- Stemming & Lemmatization(Reason Code)

ML Solution Deployment

Large
- Multiple Algorithms
- Cross Data Centers
- Multiple Data Sources
- Dashboard/API Access

Medium
- Multiple Data Sources
- Multiple Algorithms
- Dashboard
- API Access

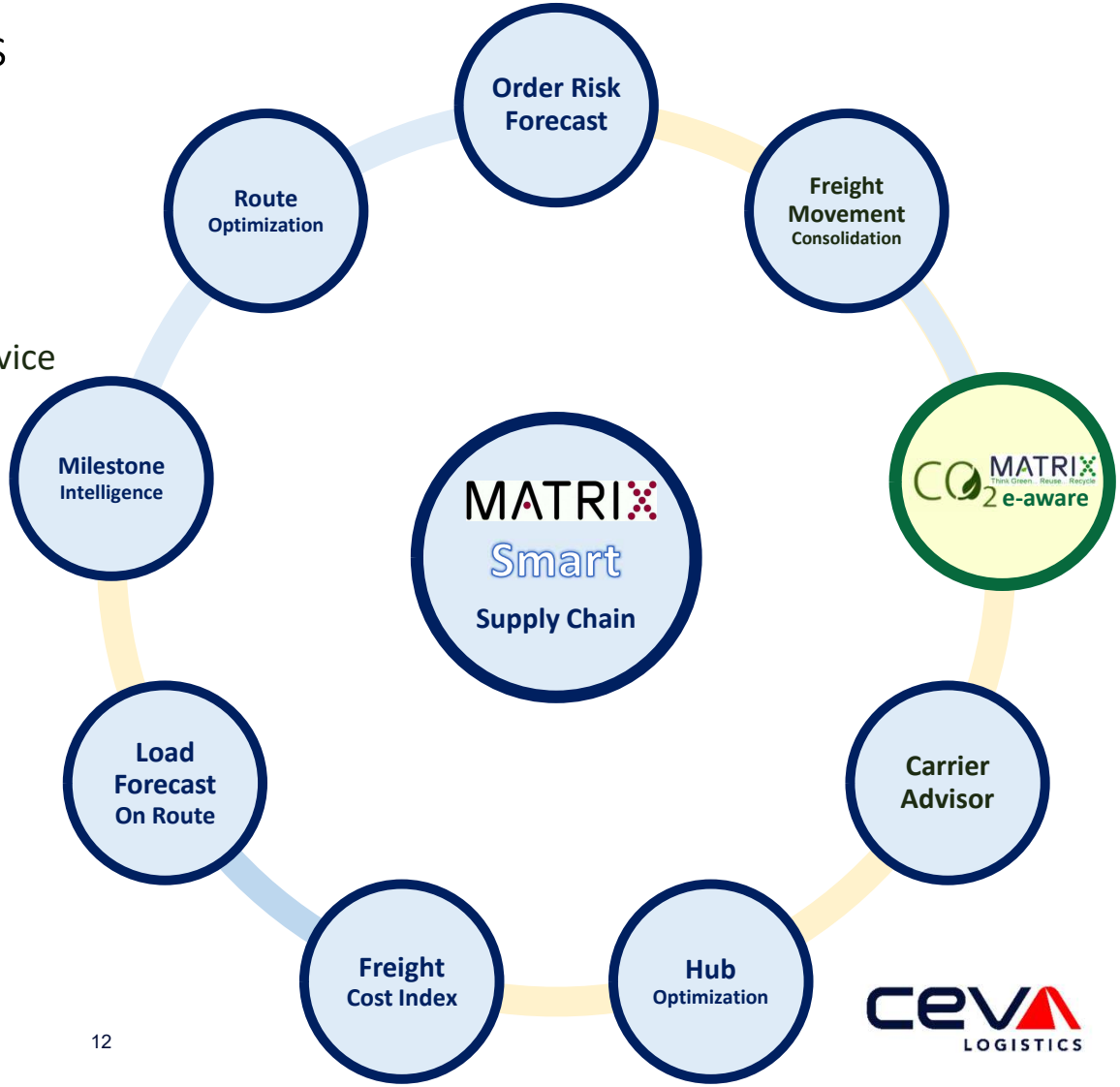
Small
- Single Data Source
- Single Algorithm
- Tableau Dashboard Delivery

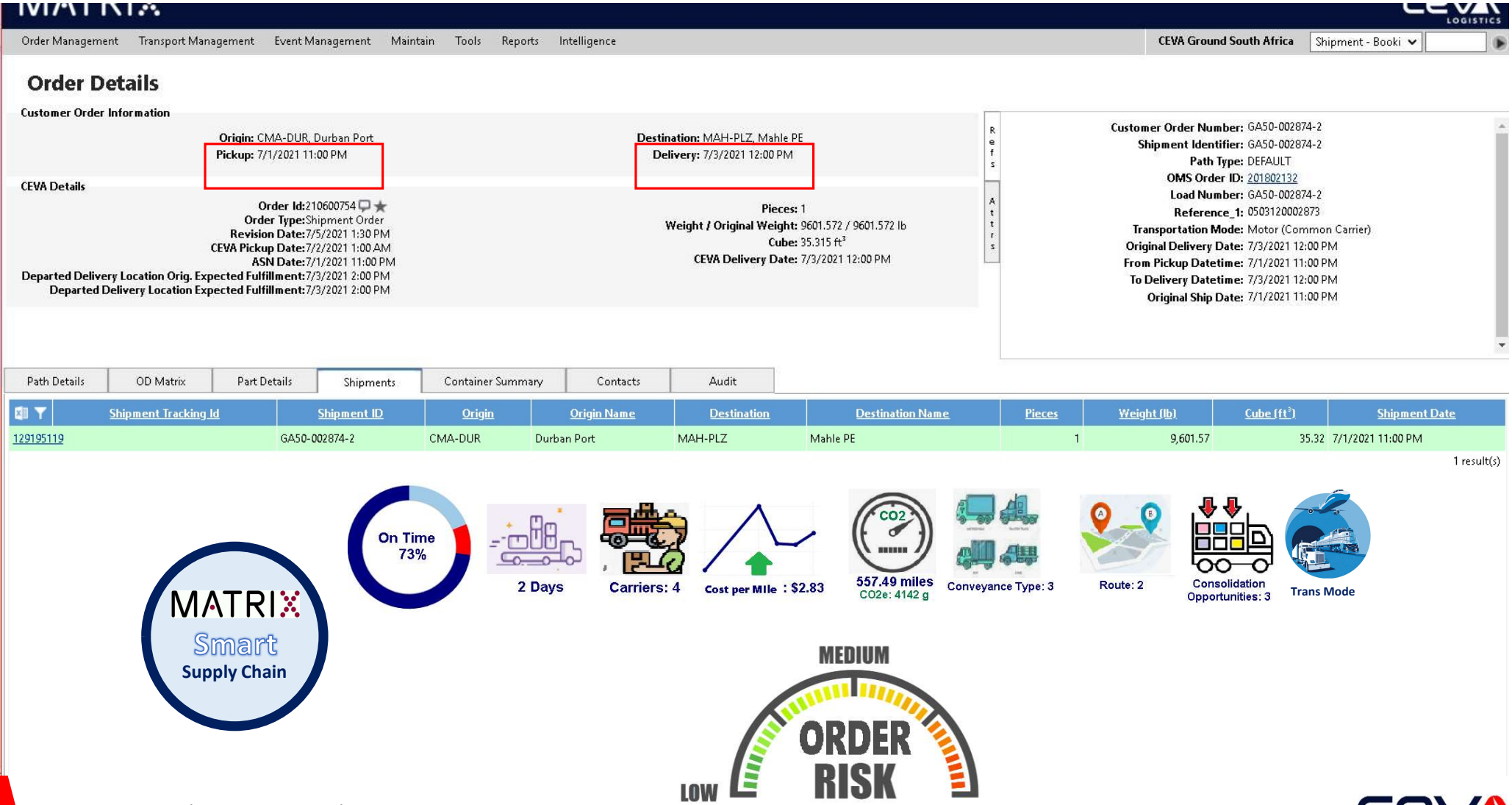
Adhoc
- Data not in Data Lake
- Single Algorithm
- Result in text file format(S3)

MATRIX Digital Platform Modules

Supply Chain Intelligence as a service (SCIaas)
Machine Intelligence as a service (MIaas)
Supply Chain Smart API

- **Service at Order & Scheduling level**
  - Order Risk Analysis by City Pair, Carrier, Service Level and Seasonal Trend
  - CO2e Aware Advisor
  - Freight Movement Consolidation
  - Carrier Advisor
  - Milestone Intelligence
  - Freight Movement Consolidation
- **Service at Network Planning**
  - Load Forecast on Route & Lane
  - Hub Optimization
  - Freight Cost Index & Trend (FSS)




Order Management
Transport Management
Event Management
Maintain
Tools
Reports
Intelligence
CEVA Ground South Africa
Shipment - Booki
Order Details
Customer Order Information
Origin: CMA-DUR, Durban Port
Pickup: 7/1/2021 11:00 PM
Destination: MAH-PLZ, Mahle PE
Delivery: 7/3/2021 12:00 PM
CEVA Details
Order Id:210600754
Order Type:Shipment Order
Revision Date:7/5/2021 1:30 PM
CEVA Pickup Date:7/2/2021 1:00 AM
ASN Date:7/1/2021 11:00 PM
Departed Delivery Location Orig. Expected Fulfillment:7/3/2021 2:00 PM
Departed Delivery Location Expected Fulfillment:7/3/2021 2:00 PM
Pieces: 1
Weight / Original Weight: 9601.572 / 9601.572 lb
Cube: 35.315 ft³
CEVA Delivery Date: 7/3/2021 12:00 PM
Refs
Attrs
Customer Order Number: GA50-002874-2
Shipment Identifier: GA50-002874-2
Path Type: DEFAULT
OMS Order ID: 201802132
Load Number: GA50-002874-2
Reference_1: 0503120002873
Transportation Mode: Motor (Common Carrier)
Original Delivery Date: 7/3/2021 12:00 PM
From Pickup Datetime: 7/1/2021 11:00 PM
To Delivery Datetime: 7/3/2021 12:00 PM
Original Ship Date: 7/1/2021 11:00 PM
Path Details
OD Matrix
Part Details
Shipments
Container Summary
Contacts
Audit
Shipment Tracking Id
Shipment ID
Origin
Origin Name
Destination
Destination Name
Pieces
Weight (lb)
Cube (ft³)
Shipment Date
129195119
GA50-002874-2
CMA-DUR
Durban Port
MAH-PLZ
Mahle PE
1
9,601.57
35.32
7/1/2021 11:00 PM
1 result(s)
MATRIX
Smart
Supply Chain
On Time
73%
2 Days
Carriers: 4
Cost per Mile : $2.83
CO2
557.49 miles
CO2e: 4142 g
Conveyance Type: 3
Route: 2
Consolidation
Opportunities: 3
Trans Mode
MEDIUM
LOW
ORDER
RISK

Building a strong CEVA Digitalization Team

Data Scientist

- **ML Algorithms**
- **Statistics**
- **SQL/No SQL**
- **Big Data**
- **Python**

Data Analyst

- **SQL**
- **Data Analytics**
- **Tableau**

Data Engineer

- **Python**
- **Spark SQL**
- **SQL**
- **Big Data ETL**
- **Machine Learning Libraries**