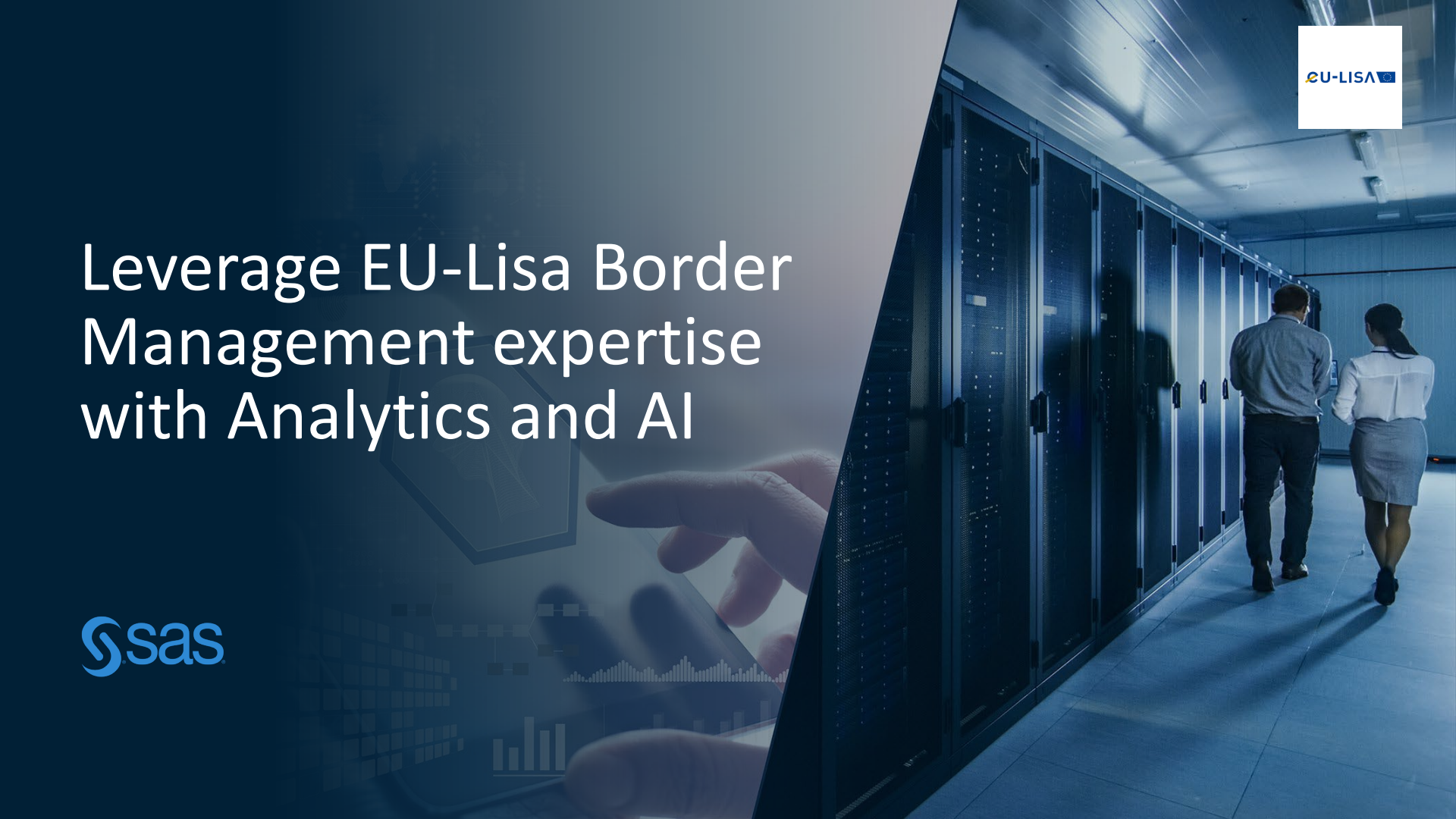
# Leverage EU-Lisa Border Management expertise with Analytics and AI



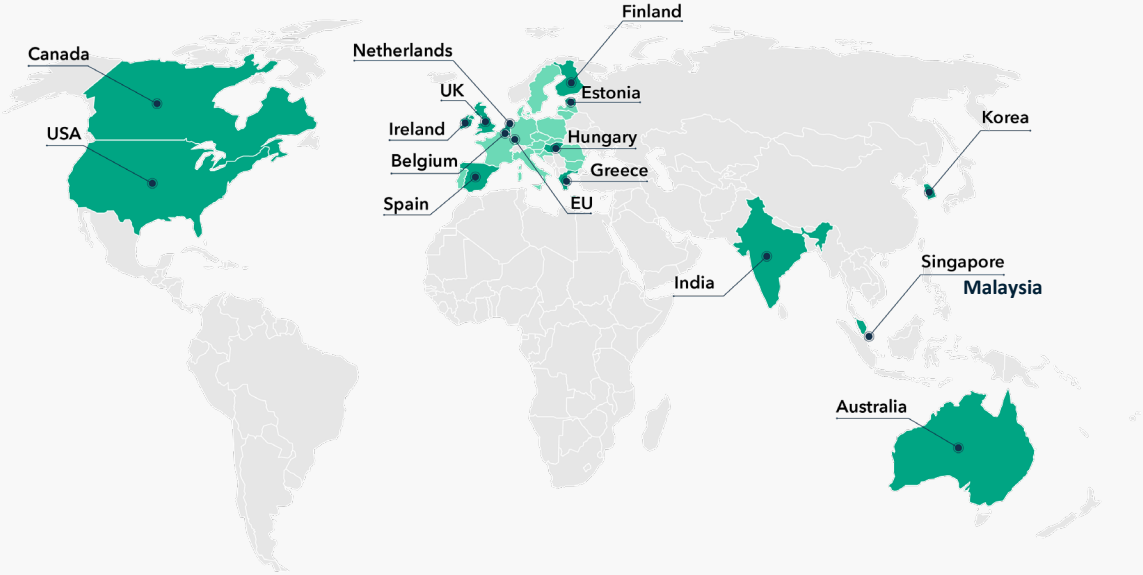
# SAS Analytics supporting borders across the world

INCREASED SECURITY

INCREASED FLOW-RATE

INCREASED REVENUE COLLECTION

INCREASED SAFETY




SEA

AIR

RAIL/LAND

PEOPLE

PARCEL

ROLL-ON ROLL-OFF

CONTAINERS

# The Local Challenge – Scale & Complexity* (UK Borders example)

## SCALE

The challenge now and in the future

### Before BREXIT

**270**
Recognised Crossing Points

**271m**
People crossed the UK Border

**472m**
Tonnes of Freight

**£34bn**
in VAT, customs & excise duties from cross border transactions

### Future

**200%**
Predicted increase in passenger numbers

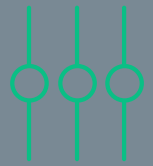
**46%**
Predicted increase in value of imports

With EU withdrawal, the number of decisions on people and goods at the border could increase by 230% and 360% respectively

## COMPLEXITY

**30+**

agencies have an interest in the UK Border



Coordinating and integrating the intelligence, data & objectives of these agencies is one of the major challenges faced on the UK Border

Multiple channels (Rail, Sea & Air) and multiple entities (People, Freight & Parcels) all represents interconnected risks to be reviewed

**The UK Border, Issues and Challenges for government's management of the border in light of the UK's planned departure from the European Union – National Audit Office 20 October 2017*

# The Regional Challenge – Scale & Complexity (Schengen)

## SCALE

The challenge now and in the future

### 2022

**42 000 km**
Coastline

**9 000 km**
Land borders

**300**
International airports

**1 800**
Land and Sea border crossing points

### Future

**? %**
Predicted increase in passenger numbers, refugees

**? %**
Predicted increase in value of border criminality

**500 M** border crossing/y

## COMPLEXITY x26

# Crisis Management: Dealing with a refugee crisis

Provide reliable, timely data for preparedness and resource allocation

## Integrate critical Data Sets

- Provide dashboards by **integrating critical datasets** like daily border crossings.
- **Apply text mining** on border interviews to enrich insights.
- **Leverage Telco data** to gain insights in the end-to-end refugee flows.
- **Predict future flow of refugees**

## Improved Resource Allocation

- Provide timely insight to **help stakeholders maximize resources** in the most efficient way
- **Leverage computer vision from Satellite Images, Drones and CCTV** e.g. to make counts of objects like cars waiting at the boarder & License Plates.

## Situational management cockpit

- Integrate Data and Insights in **Situational Awareness Dashboards with real-time key indicators** and events.

## Use Analytics for Risk identification

- Use analytics and decisioning techniques to **support decisions on entry and quickly triage to identify individuals at risk.**
- Share data across borders to **recognize patterns that signal illegal practices** e.g. human trafficking, smuggling.
- Leverage AIS and vessel data to identify **vessels with high likelihood of transporting goods prohibited by sanctions / human trafficking.**

## Early warnings from Social Media

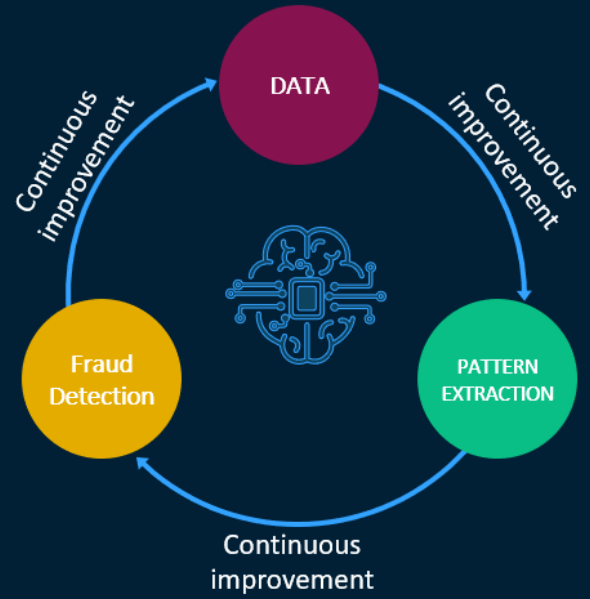
- Obtain early **insights on key events based on external data sources like** (Social) Media.

# 20+ years of experience in Analytics and AI

## Enrich Rule-based with AI based Screening

- Traditional Rule-based approach


- Machine Learning Approach



# eu-LISA has already implemented AI

Mainly for internal purpose

- Chatbot
- Improvement of Internal Processes
  - Infrastructure management
  - Service desk optimization
- Improving biometric matching algorithm
- Next: Forecasting to optimize internal workloads?

# Leverage domain expertise with AI

## 3 Core Concepts

### OPERATIONALIZE

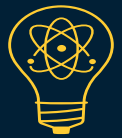
ADVANTAGES EU-LISA?

Build, test and maintain data pipelines; Provide machine learning models with quality data and automate this process via a ModelOps framework

### DEMOCRATIZE

ADVANTAGES EU-LISA?

Leverage existing domain expertise to accelerate innovation. Demystify the process of analytical development and allow domain experts to create their own insights through low/no code capabilities with user friendly interfaces.

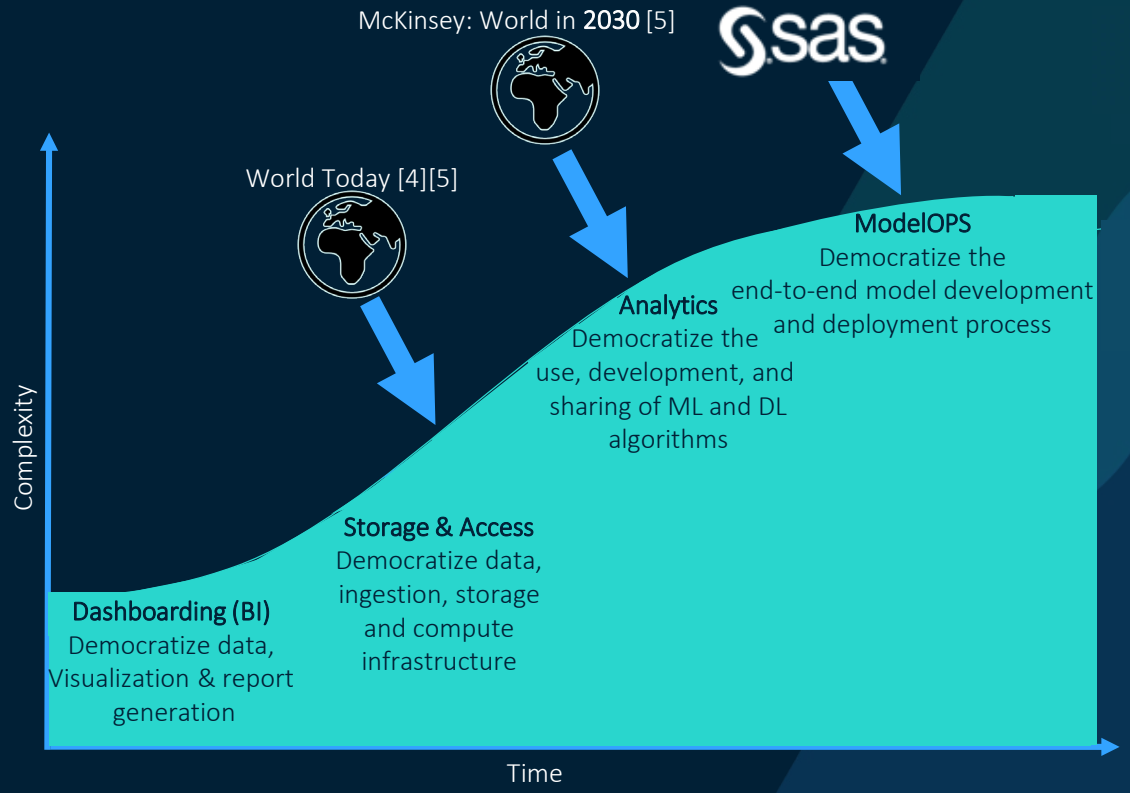


### TRANSPARANCY AND ETHICS

ADVANTAGES EU-LISA?

Make data and insights transparent and explainable, and check the ethical dimension of AI models via decision transparency

# Our Future of Analytics and AI: Democratization

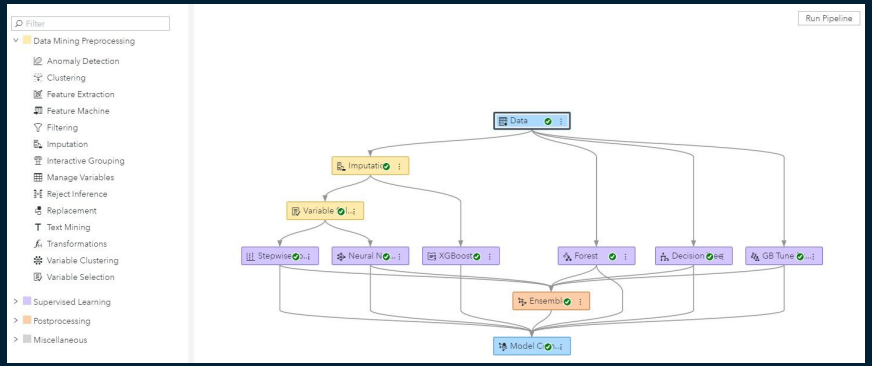


# Democratization: Different profiles, different interfaces

2 types of interfaces within the environment. The reason for this is to **support multiple types of users**

## 1) Visual Interface

For users who prefer a drag-and-drop interface to get their work done.




## 2) Programming Interface

For users who have a programming background.

```
In [1]: %%writefile scrapers.py

        import pandas as pd  #data stuff
        from pandas.io.json import json_normalize
        import os  #basic stuff
        from datetime import datetime, timezone, timedelta
        import requests  #scraping stuff
        import html5lib
        from bs4 import BeautifulSoup


        class cnnParser:

            def __init__(self):
                self.timeout = 10 #time to wait beforing timing out on requests
                        #set as object variables

                self.today = datetime.today().strftime("%m_%d_%Y")
                self.headers = {
                'User-Agent': "Mozilla/5.0 (Macintosh; Intel Mac OS X 10_11_5) AppleWe
                              'Accept': 'text/html,application/xhtml+xml,application/
                              'Accept-Charset': 'ISO-8859-1,utf-8;q=0.7,*;q=0.3',
                              'Accept-Encoding': 'none',
                              'Accept-Language': 'en-US,en;q=0.8',
                              'Connection': 'keep-alive'}

            def save_html(self, u, fileName= 'testing.html'):
                resp = requests.get(u,timeout = self.timeout, headers = self.headers)
                resp.raise_for_status()  # <- no-op if status==200
                Html_file= open(fileName,'wb')
                Html_file.write(resp.content)
                Html_file.close()
                return fileName
```

# Leverage eu-Lisa expertise with AI

## 3 Core Concepts

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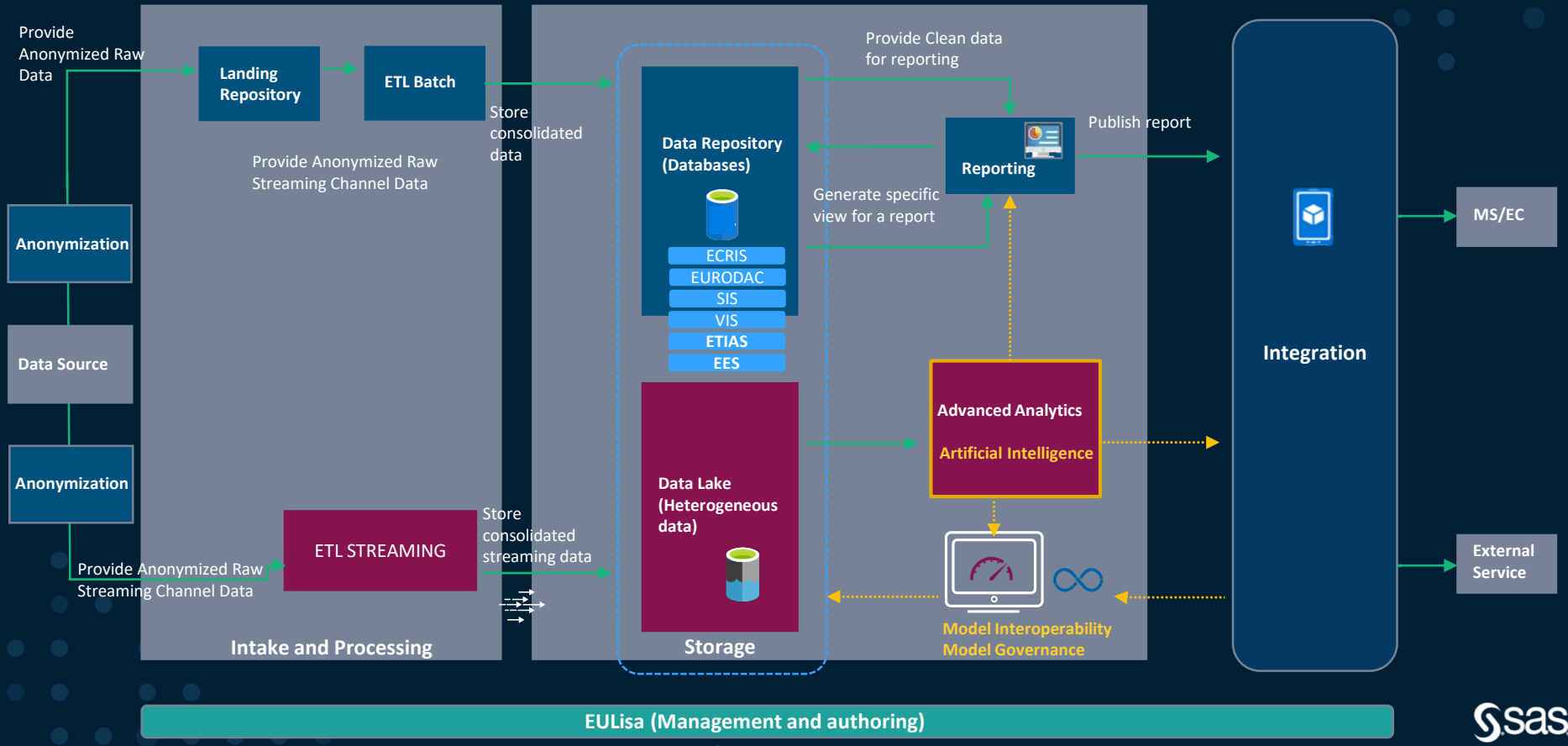
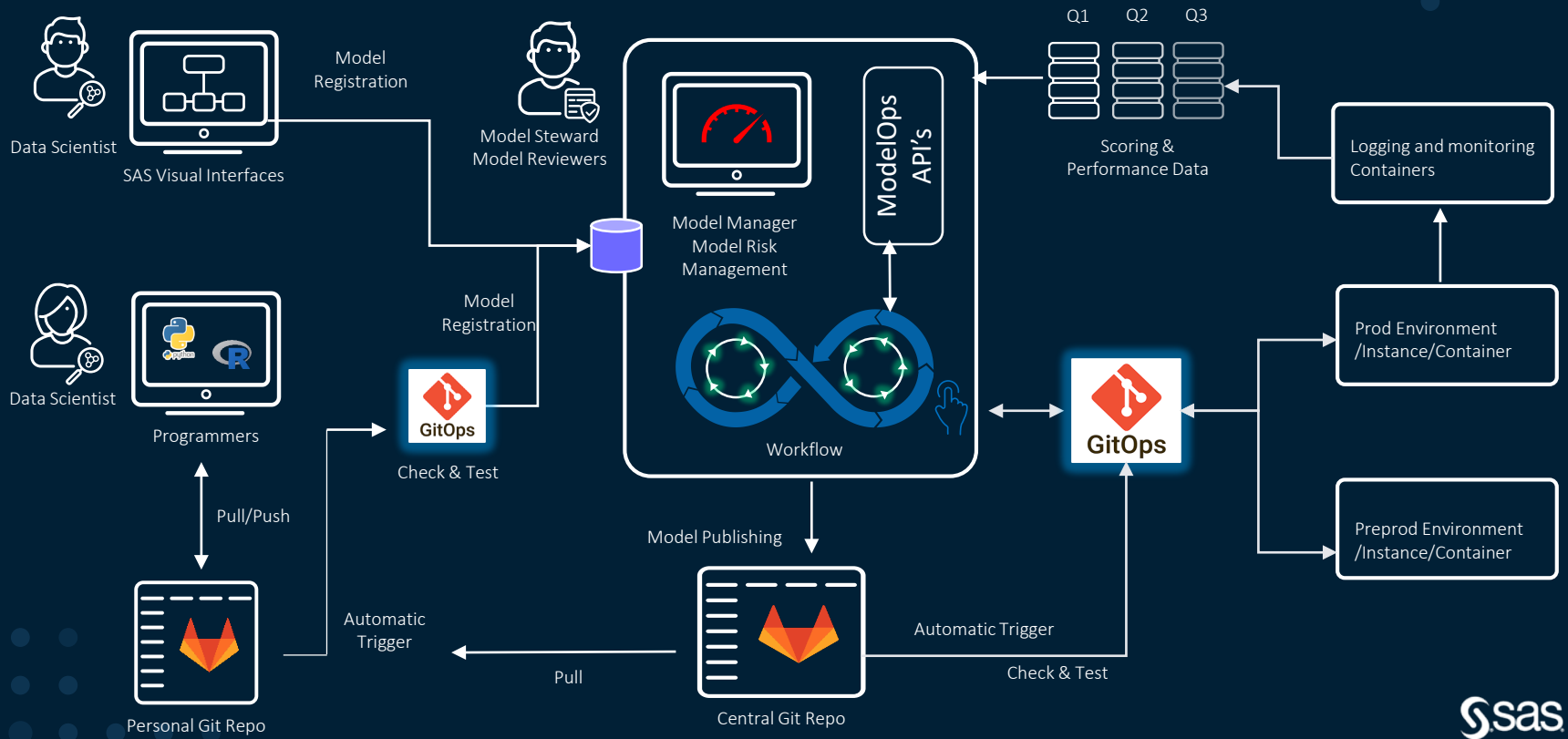
# Fitting AI in Eu-Lisa's system Workflow

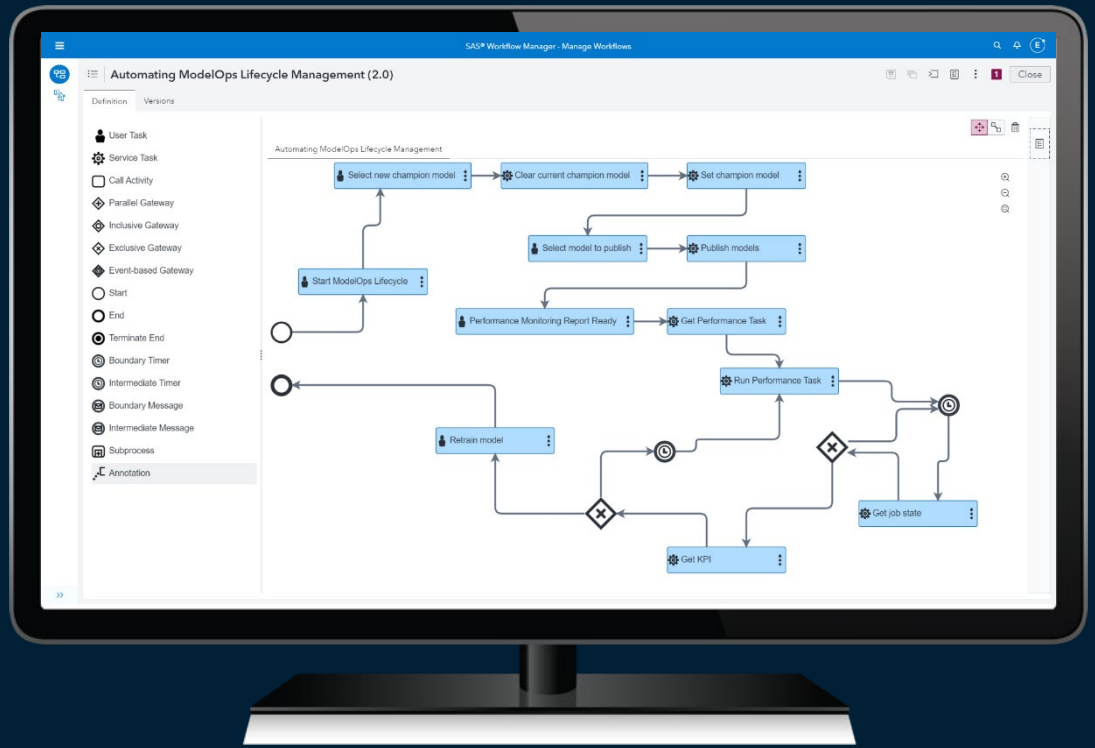


# Operationalize Models

## How a ModelOps environment might look like



- Create custom workflows that match business requirements and processes
- Start a workflow process to track the progress of your project
- Apply out-of-the-box task templates
- Use the open, RESTful API to communicate with the model lifecycle system and integrate with third-party applications

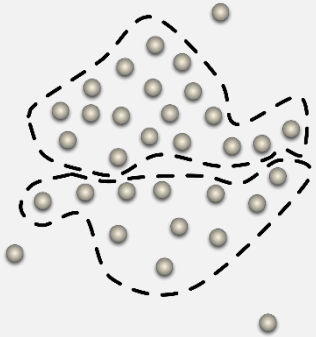


# ML Techniques

## Supervised vs. Unsupervised Learning

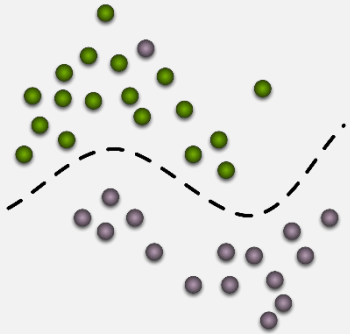
### Unsupervised Learning

- Unlabeled data
- Clustering, feature extraction, data description, **anomaly detection**
- Algorithms: k-means, PCA, SVDD…



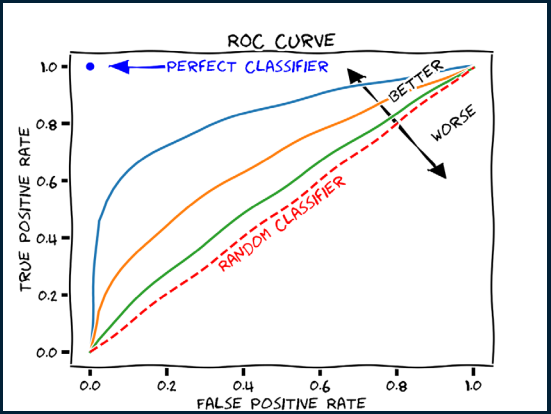
### Supervised Learning

- Labeled data
- Discrete or continuous target
- **Predictions based on historical data**
- Algorithms: Logistic Regression, Gradient Boosting…



# Assessing Model Accuracy

## Decrease the False positives and negatives




| | Prediction | | |
|---|---|---|---|
| **Reality** | | + | - |
| | + | TRUE POSITIVES | FALSE NEGATIVE |
| | – | FALSE POSITIVE | TRUE NEGATIVES |

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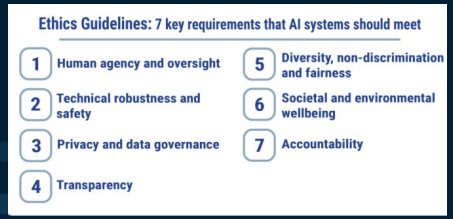
# Regulatory Context

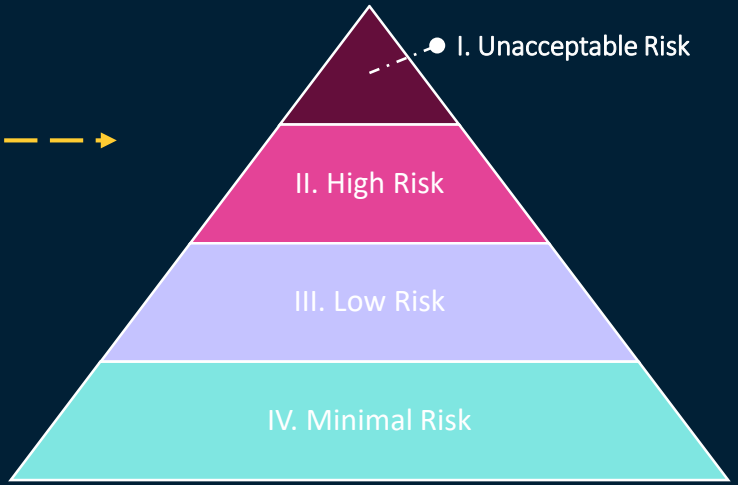
## EU AI Act (in progress) and EU-Lisa Ethics Guidelines

**Laying down harmonized Rules on AI**
21.04.2021 - European Commission Draft

Instead of opting for a blanket regulation covering all AI systems, the European Commission has used a risk-based approach based on three tiers:

*I. Unacceptable Risk*
*II. High Risk*
*III. Limited Risk*
*IV. Minimal Risk*



# Embedded Responsible AI Capabilities

**Data privacy, quality, compliance and governance**

- *Use SAS data preparation features to detect and rectify data quality, compliance and privacy issues, identify sensitive variables*

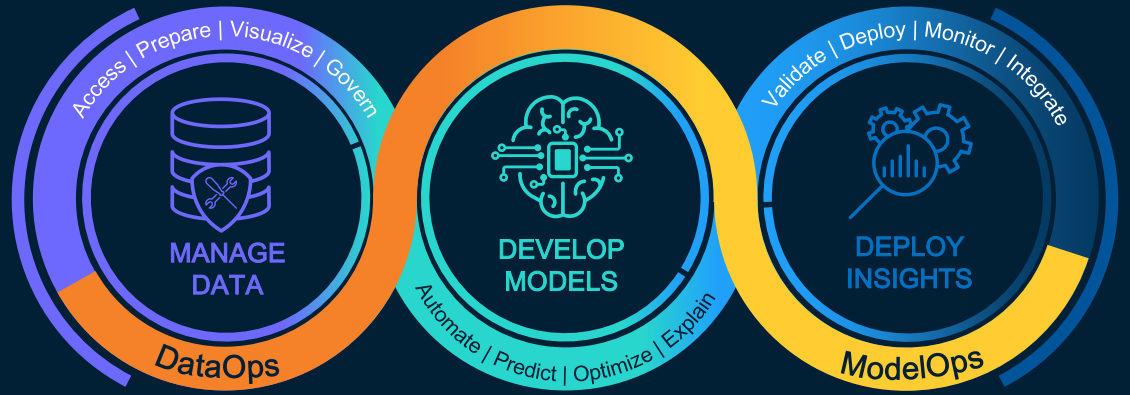
**Model interpretability and bias assessment**

- *Model performance statistics and interpretability reports help identify bias and shortcomings*

**Model-bias monitoring**

- *Currently SAS provides programming and visualization tools to create customized bias monitoring reports ("Fairness Dashboards")*

QUESTION




DECISION

**Fair decisions monitoring**

- *Test and monitor impact of automated customer decisioning*

***Decision accountability***

- *Structured decision flows capture what constitutes a decision, and lineage reveals the history of steps*

**Data-bias detection**

- ***Explore data distributions*** *to identify data anomalies and potential bias*

**Model transparency**

- *Reports on model parameters, drivers and performance statistics are automatically created and described in natural language*

**Model governance, traceability, compliance**

- *Model management provides metadata, versioning and audit trail for enterprise model repository*

## Credit Score Model

Version 1.1.2
Updated: 12/31/2020

Model Owner: James Carver
Materiality: High
Status: In production

Approved uses:
Auto
Credit Card

Last validation: Fit for purpose
Last validation: June 2020
Next validation: Dec 2021

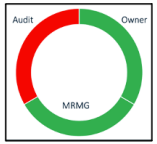
Assumptions:
3-month Libor < 0.05
unemployment (UNRATE) < 8%

Detail
- Training data
- Model History
- Network diagram

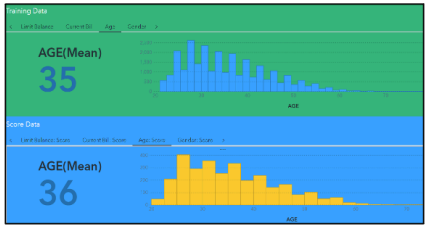
# Ethical AI Report Card

The Credit Scoring model is used to estimate the riskiness of 1000s of loan applications. It applies advanced deep learning techniques that uses 500+ dimensions. It must constantly be reviewed for bias and compliance with the Fair Lending regulations. If this model is not properly cared for and used it has the potential to harm our company's earnings and hurt our reputation.

Model Wellness




| Ethics Rubric | |
|---|---|
| Risk Classification | High |
| AI Team Certified | Yes |
| Clients Impacted | +1,000 |
| Explainable | Yes |
| Inputs | 500+ |
| Bias | No |
| Fairness | Yes |
| Concept Drift | No |
| Performance | Good |
| Monitoring frequency | Monthly |
| Contingency plan | No |
| Human overridable | No |
| Recalibration policy | Yes |



# Conclusion

SAS provides leading-edge AI technology that **EU-Lisa** can start using right away when **EES** and **ETIAS** are fully operational with a focus on:

**OPERATIONALIZATION** **TRANSPARANCY AND ETHICS** **DEMOCRATIZATION**

Next to these embedded topics, our Modular and Microservices-driven components fit in the interoperability driven **EU-Lisa architecture**

↓ **TIME** ↓ **TCO** ↓ **RISK**

# Thanks!

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