PowerCurve Strategy Management

Machine Learning Capabilities Overview

Presenter:

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Global Decisioning Software Group

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Agenda

ACE overview and End to End ML Ops Vision

ACE use cases

ACE demo

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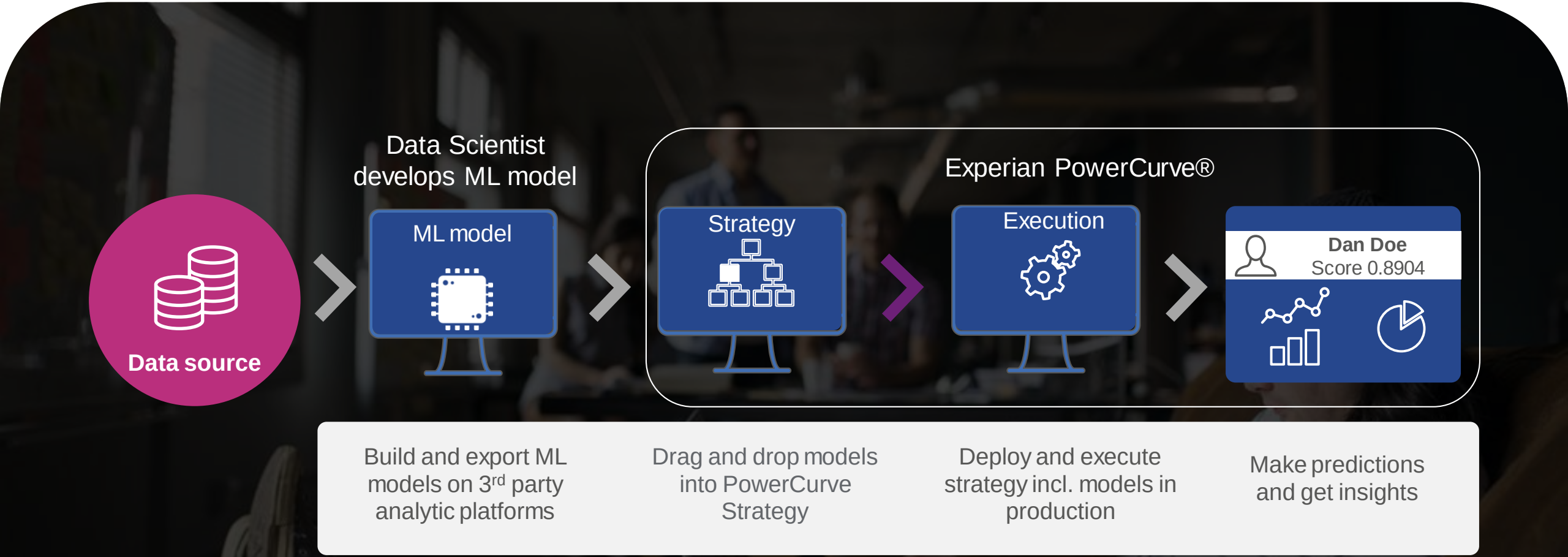
PowerCurve SM solves the last mile to production:

Automating the modeling lifecycle and deployment more effectively



Build and export ML models on 3rd party analytic platforms	Drag and drop models into PowerCurve Strategy	Deploy and execute strategy incl. models in production	Make predictions and get insights

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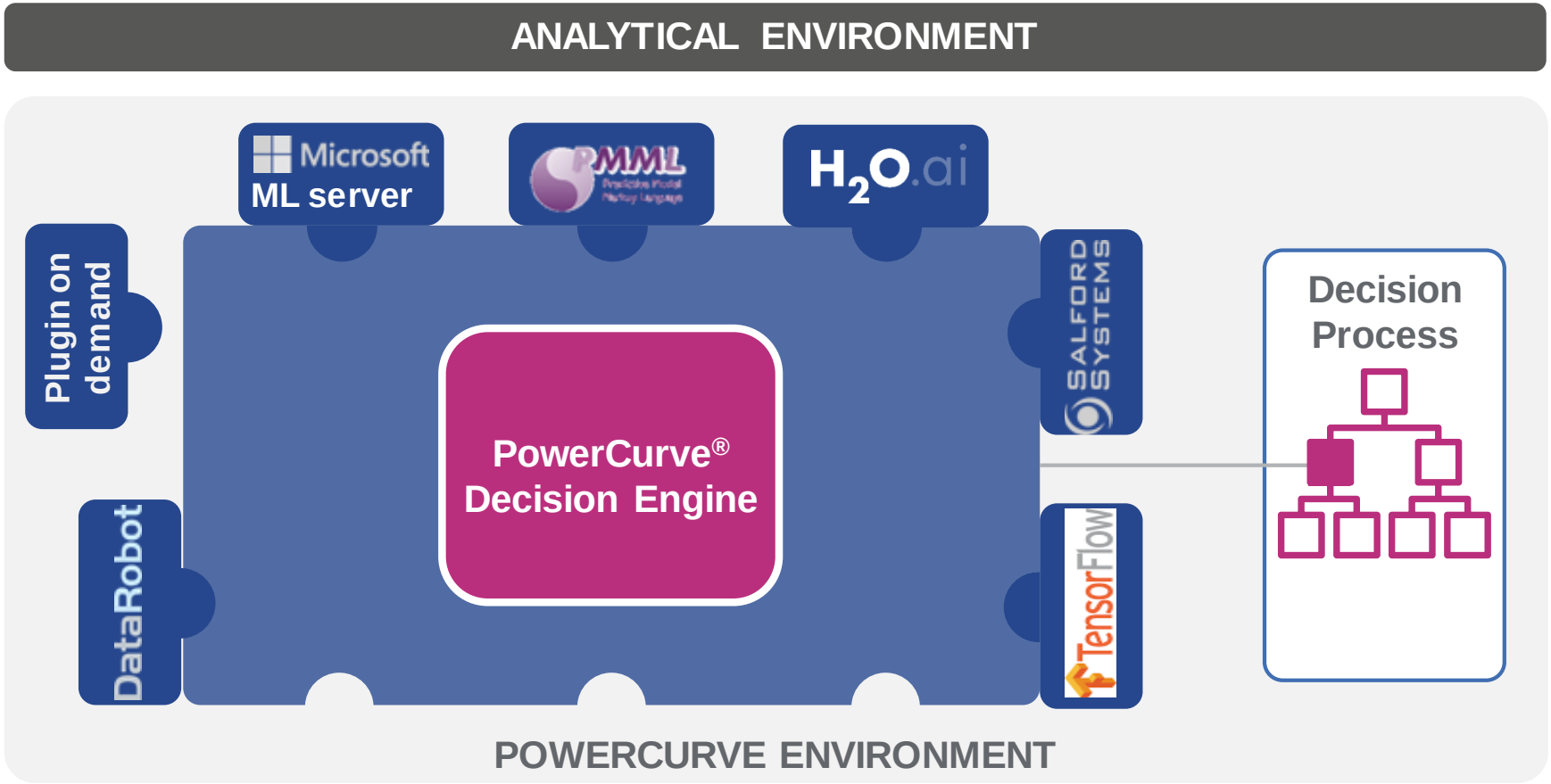
Operationalizing models that use the latest Machine Learning techniques

Analytic Component Extensions (ACE) framework



Available Now

- Microsoft Machine Learning Server
- R
- python
- PMML Predictive Model Markup Language
- DataRobot
- H2O.ai
- SALFORD SYSTEMS
- TensorFlow

Roadmap

Open R, Open Python

- sas
- Scala

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Analytic Component Extensions (ACE) framework: How does it work?

1 **Build models**

2 **Import models**

INSIGHT GENERATION

Client or Experian Analytic Environment

- Advanced or simple analytical models
- Built on different platforms / languages

Model 1 **R** | Model 2 **Python** | Model 3

Outcome reviews

5 Outcome data enables ongoing modifications to ML decision logic

RUNTIME ENVIRONMENT

Execute decisions within **workflow**

4 **Deploy strategy**

Microsoft ML Server | PMML Predictive Model Markup Language

Tensorflow | DataRobot | H_2O.ai | Salford Systems

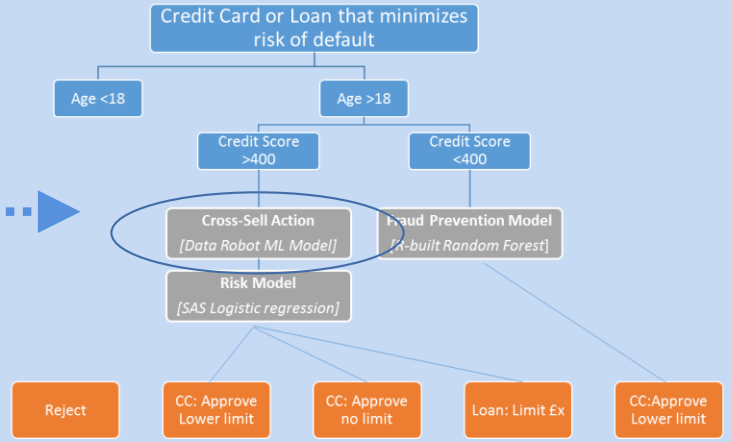
PowerCurve Strategy Manager

3 **Build Strategy Flow**

Plug-ins create new objects to add to process flow

DECISION PROCESS FLOW

(previously "Business objective flow")



DESIGN ENVIRONMENT

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User Personas, Problems solved and Benefits

WIP

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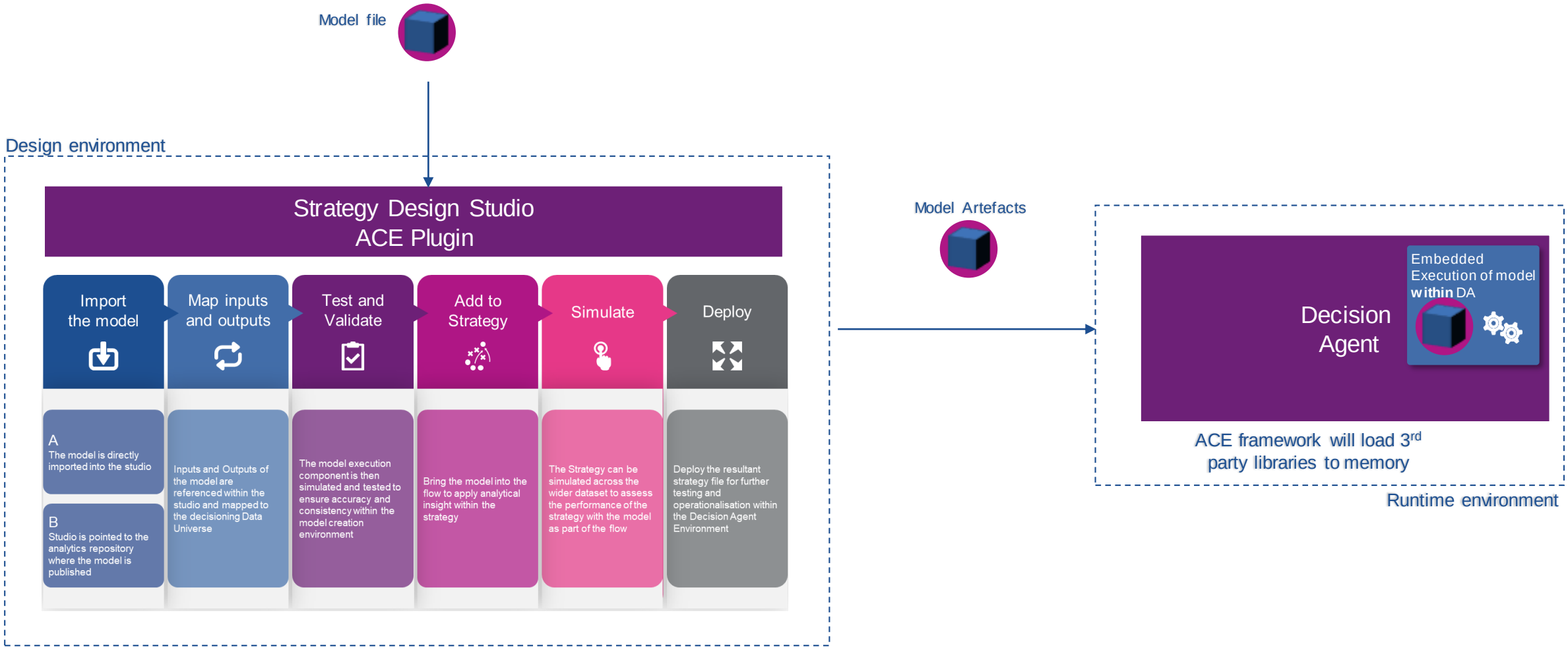
How do analytics/machine learning fit in the decision process?



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Model Governance and Performance

Advantages of ACE Framework

When organisations embrace model deployment through ACE Framework in their decision making, they can see significant improvements in ROI, governance and speed

Model governance
Model bound with business strategy rules is fully compliant through governance, traceability and auditability

Validation and testing Strategy and encapsulated models are tested as a whole using Interactive Tester and Simulation

Speed and efficiency
Preserve the model integrity as no need to recode. Purpose built ACE Plugins are optimised to execute each model technology

Layered into the Decision Process
Models deployed into strategies can be designed, tested and simulated using the PowerCurve champion/challenger

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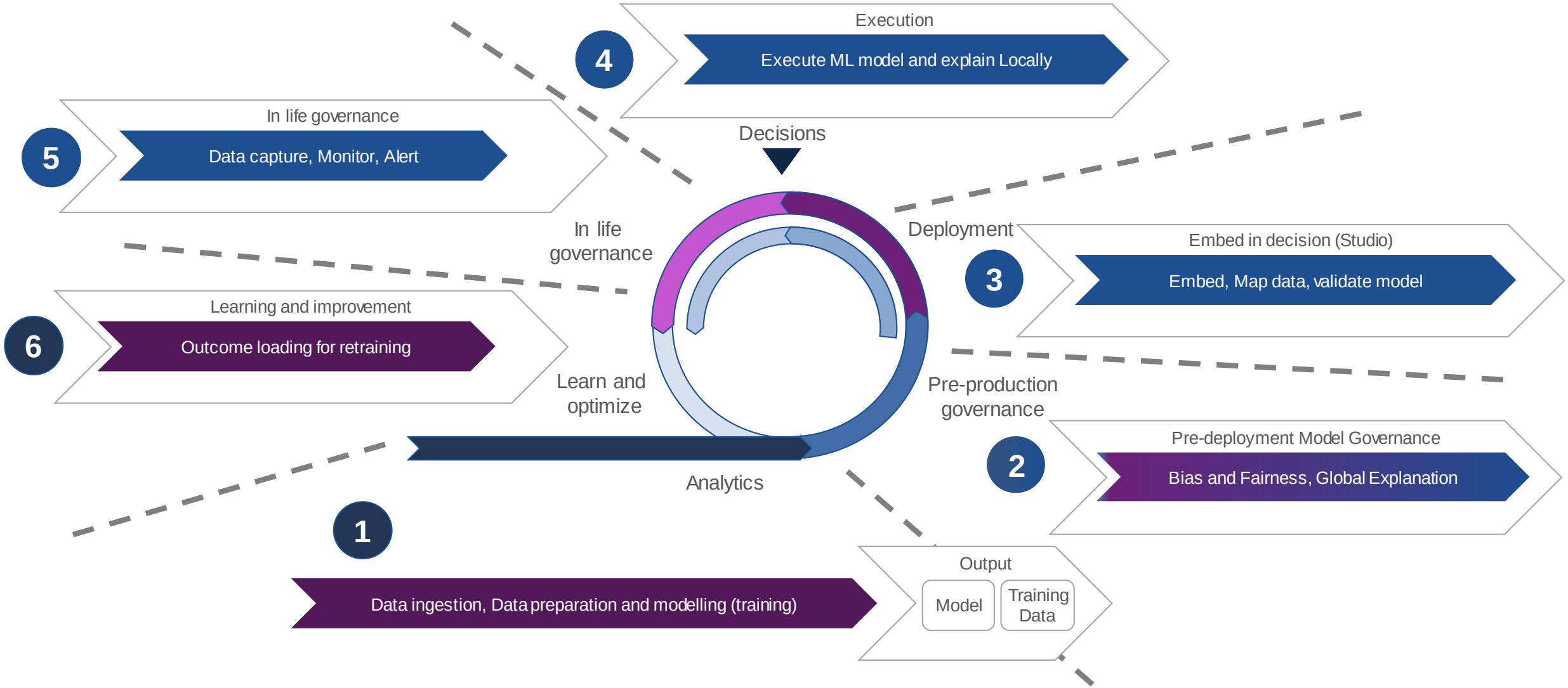
Managing the ML model across its lifecycle in Decisioning

End to end MLOps: Analytics to Decision Ops

PowerCurve
ML Platform



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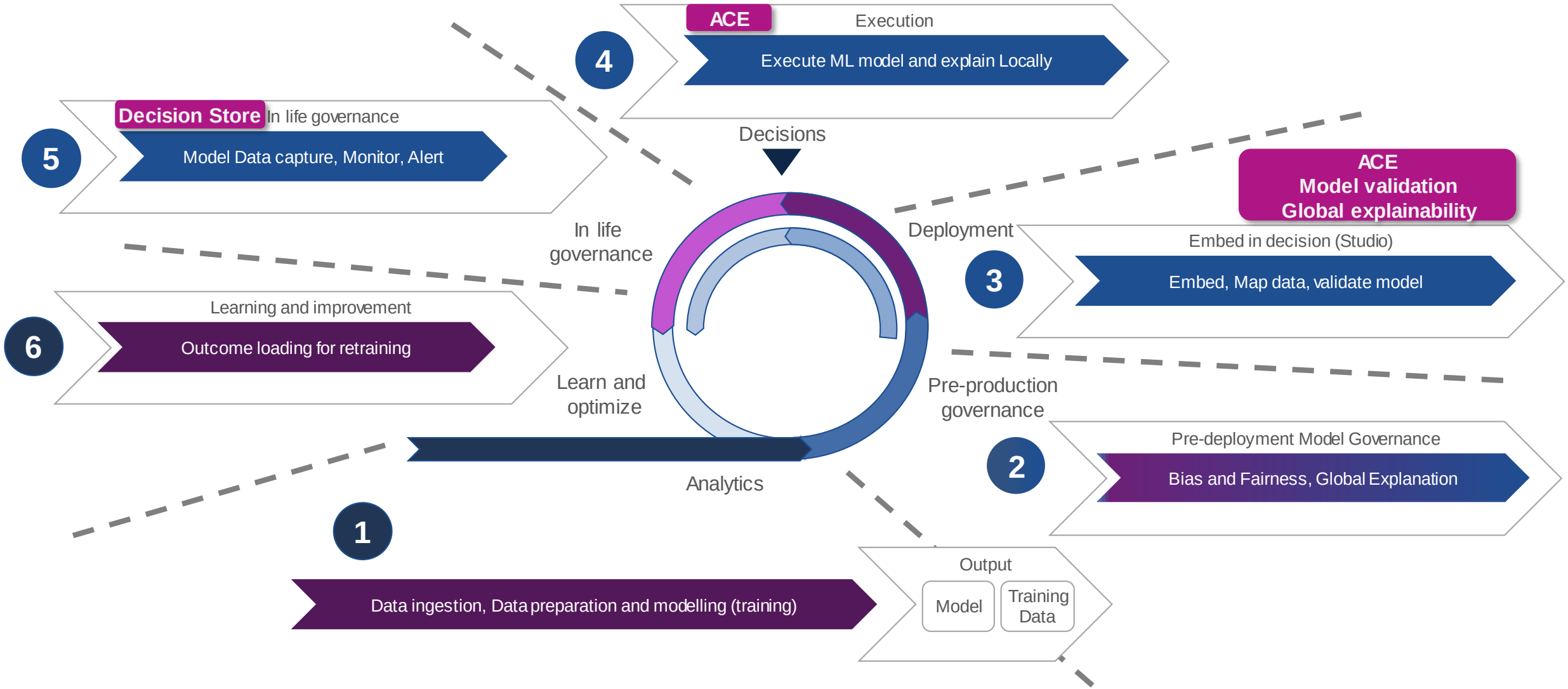
PowerCurve Capability
ML Platform



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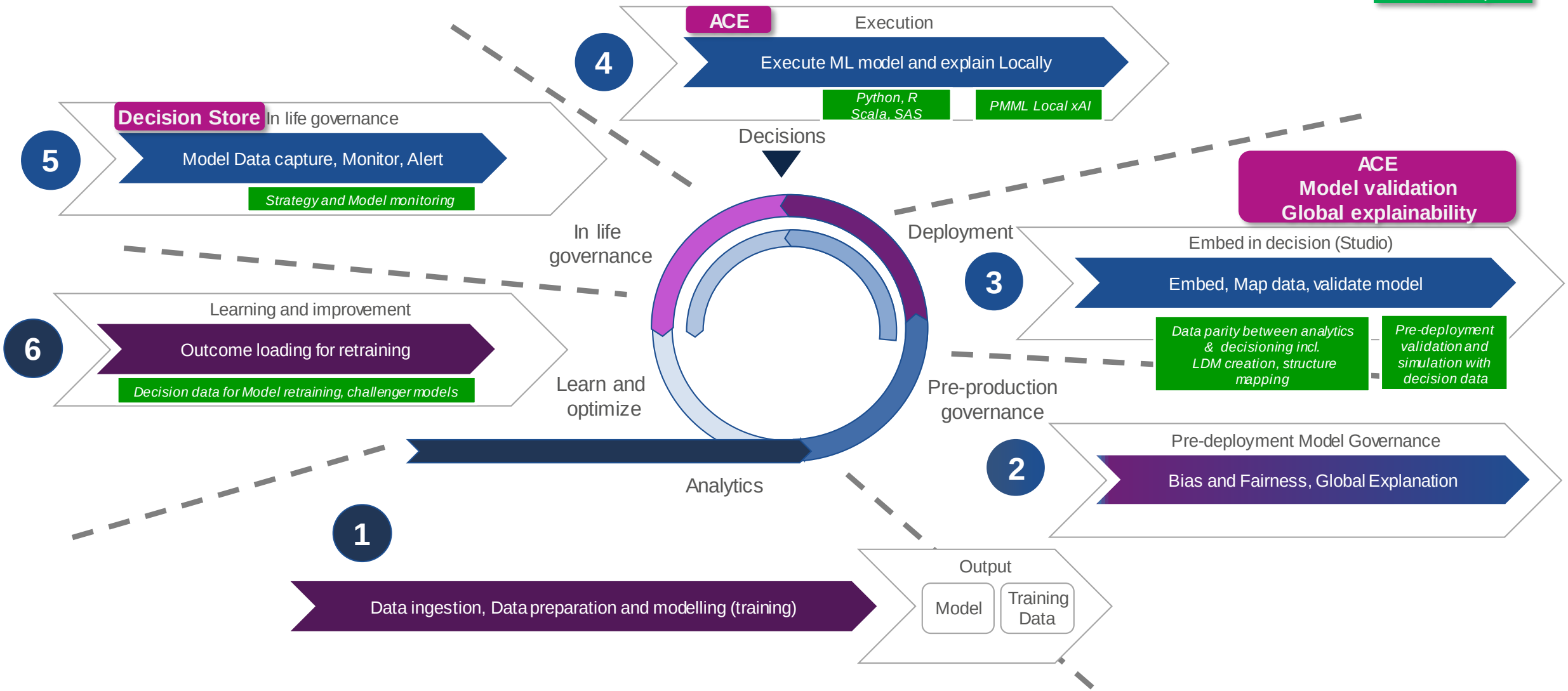
PowerCurve Capability
ML Platform
Roadmap



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Python / R model execution in PowerCurve

Embedded Execution of model **within** DA

Deployed as a REST API endpoint

Swagger/ Model

Decision Agent

REST Call

Available without ACE

Microsoft MSML

ACE Plugin

Swagger/ Model

Decision Agent

Model bound to strategy REST call to MSML

Available through ACE

PMML Predictive Model Markup Language

ACE Plugin

Decision Agent

Available through ACE

docker

Open R and Open Python

ACE Plugin

- *New Open Python and Open R ACE Plugins will consume swagger of containerised R/Python models*
- *PowerCurve manages execution of model containers*

Decision Agent

REST Call

Roadmap

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Foundational
Release in 2019 Aug

Decision Store unlocks the power of data to create opportunities, improve strategies and build models

Generate decision data for strategy testing, replay and analytics

Choose
decision data to capture at strategy or node level

Store
decision data at run time to a standard environment

Search, retrieve and use
decision data in Studio

Test and improve
strategies with chosen decision data test sets

PAIN POINTS

Inflexible capture.
Non-standardised storage.
IT reliance for search.
Outdated non diverse data sets.

BENEFITS

Flexible capture. Standardised storage.
Business user search. Rich data sets.
Adhering to regulations.

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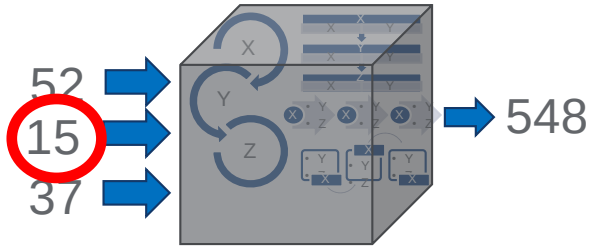
What is Local Explainability?



Which variables for a specific observation were important in producing that specific result? For example, which characteristic was most responsible for applicant A getting rejected?

What does this mean for PowerCurve features?

- Experian has a patent pending method being integrated into PowerCurve
- Method works for tree based models
- Initially PMML only
- Pricing on request

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Use cases

- **Score Cards**
- **Probability of default**
- **Propensity models**
- **Affordability**

See Case studies for more

Python and R Model operationalisation Case study

An Indian banking and financial services company. It is the largest private sector lender by assets and the largest bank in India by market capitalization. Upgraded to PCSM in 2019

Summary

Client wanted to implement their Python, R and H2O models quickly in PowerCurve. They developed the models using R Studio, Python and H2O Driverless AI Platforms.

Client stood up an instance of Microsoft Machine Learning Server (MSML) on their premise. They then deployed the R and Python models in PCSM to execute the models in MSML at run time.

For H2O models, the model jar files were exported from the H2O platforms and directly imported and executed within PowerCurve through the H2O ACE plugin.

Scorecards in Python, R and H2O are used for variable and scorecard creation.

ML use cases and benefits

Data preparation scripts in Python using Pandas library to convert raw to aggregated model ready variables

c. **250-300 Python, R and H2O models**

Use cases:
Income estimation, credit score models and collection model

Algorithms:
Logistic regression, Decision trees, Random forest, Gradient boosting, Extreme Gradient boosting

Client Benefits:
Reduced model deployment time
Model recoding

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PMML Model operationalisation Case study

An EMEA leader in Auto and Credit Group financing, and an expert in debt collection which has gained wide recognition through its expertise, agility and sense of innovation serving over 300,000 customers.

Summary

PowerCurve® Strategy Management with integrated machine learning capabilities, enabling the company to deliver 1.5 million vehicle valuations every day, while ensuring further improvements to the accuracy of €1 billion asset re-sale valuations.

The business also wanted to ensure it could accurately and reliably offer consistent decisions on the 1.5 million quotations being requested every day, while at the same time, improving analysis and safe recovery of the €1 billion of assets being underwritten every year.

Client was focused on the improvement in analysis of vehicles' predicted cash surrender values, a major risk component of the medium-term commercial agreements amounting to around €1 billion in financial commitments for the company.

ML use cases and benefits

" Thanks to PowerCurve Strategy Management, Client Finance can call upon and deploy nearly **80 quotation models**.

In addition to being able to quote future redemption values more precisely by using a large amount of available information, the challenge to be able to quote faster and in greater volumes to meet the expectations of new online partners. Today, the tool is handling about 1.5 million quotations every day."

— Director of Strategy and Data Science, Client organisation

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SAS Model operationalisation Case study

A leading bank in Latin America, part of a large multifunctional business group with businesses in banking, insurance, construction and mining among others, have operationalized SAS models in PCCM and PCSM

Summary

Client wanted to implement their SAS models quickly in PowerCurve. They had the original xmls of the models from SAS along with the design license for SAS.

Their model development-deployment cycle was to test the model in SAS, approve and then export as PMML.

The delivery team successfully proved to the client the ease of PMML model ingestion all the way up to execution within strategies. The solution including the models was tested successfully in UAT and went live in May 2019.

It has been used as default probability to approve or reject customers. A combination of the three models is used for credit limit assignation, offers and pricing.

ML use cases and benefits

PMML models ML predictions & classifications:

- Default probability in credit cards in a specific timeframe. E.g. @12 months
- Propensity to increase the use of the credit card above x%. Example 30%
- Clustering of characteristics such as Credit Line, Experience, Utilization, and other variables

Reduced model deployment time:
The ability to export SAS models as PMML saved time in flow construction &segmentations and in testing.

Model recoding:
Previously recoded the models in PowerCurve. With the new ACE Framework, Client only had to construct their ML model once in SAS, export, convert and deploy. No recoding.

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Machine Learning Operationalisation

DEMO

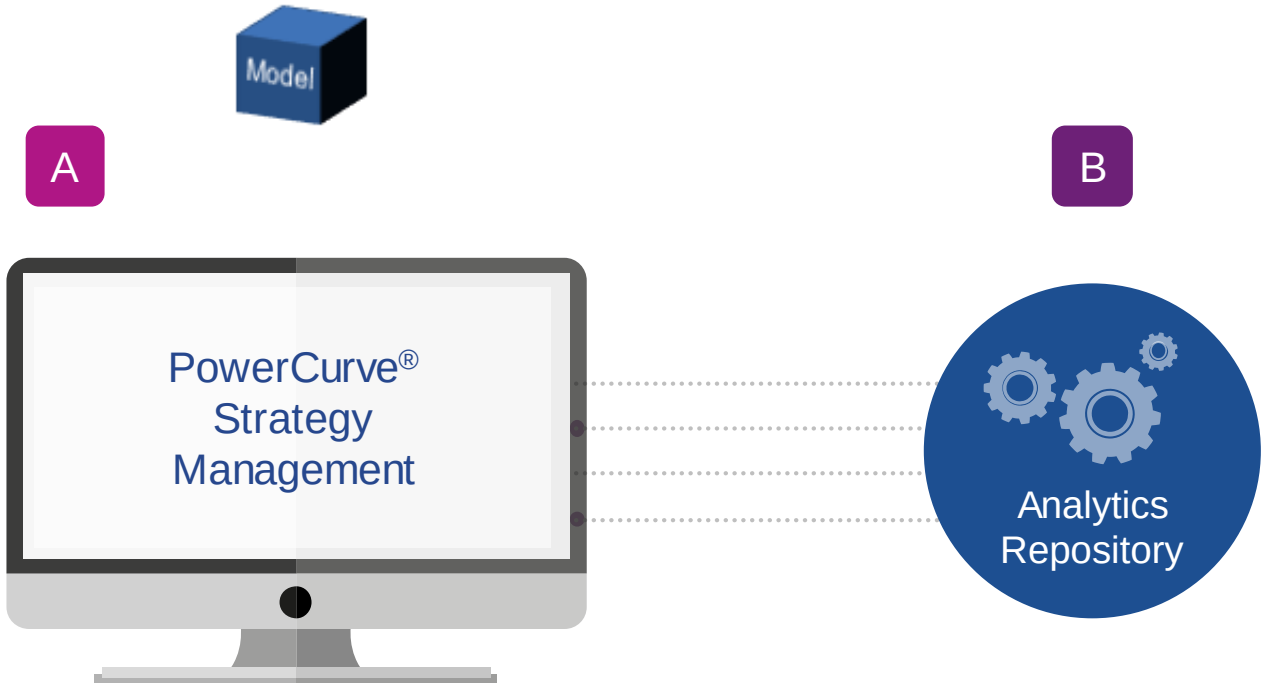
- Adding a Machine Learning model to your Strategy is that Easy!
- Govern your model with PowerCurve – validate your model and know what you are deploying
- Explain your models to regulators with full confidence

How do analytics/machine learning fit in the decision process?

Import the model

A
The model is directly imported into the studio

B
Studio is pointed to the analytics repository where the model is published



ML Server
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Predictive Model Markup Language
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TensorFlow
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SAS
SALFORD SYSTEMS

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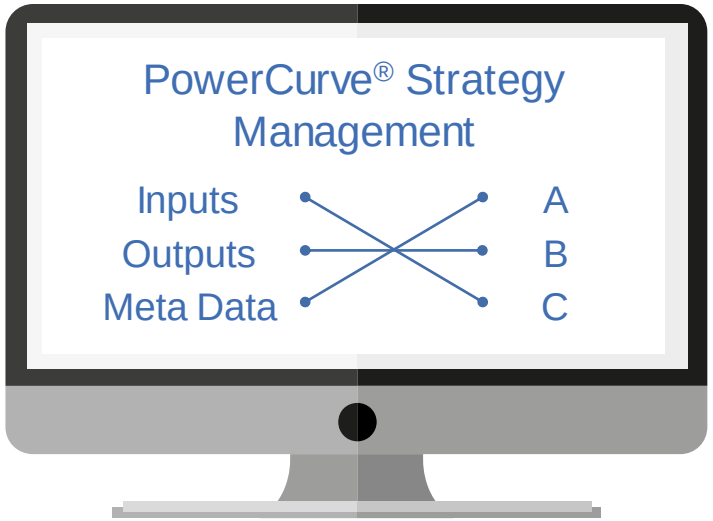
Map inputs and outputs

Inputs and Outputs of the model are referenced within the studio and mapped to the decisioning Data Universe



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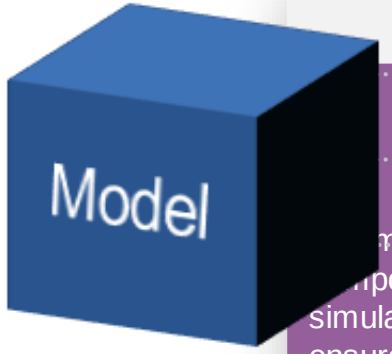
Test and Validate



model execution
nponent is then simulated and tested to ensure accuracy and consistency within the model creation environment

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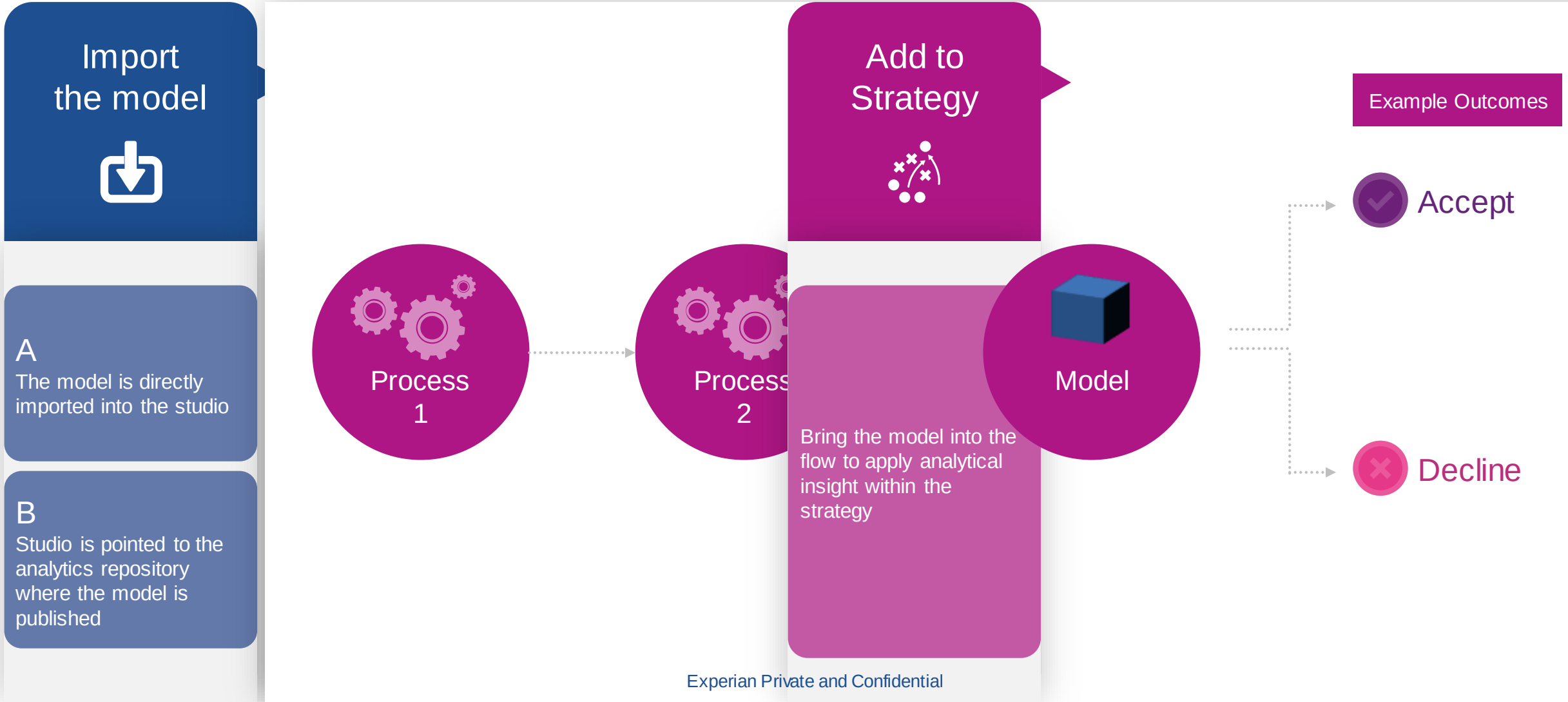

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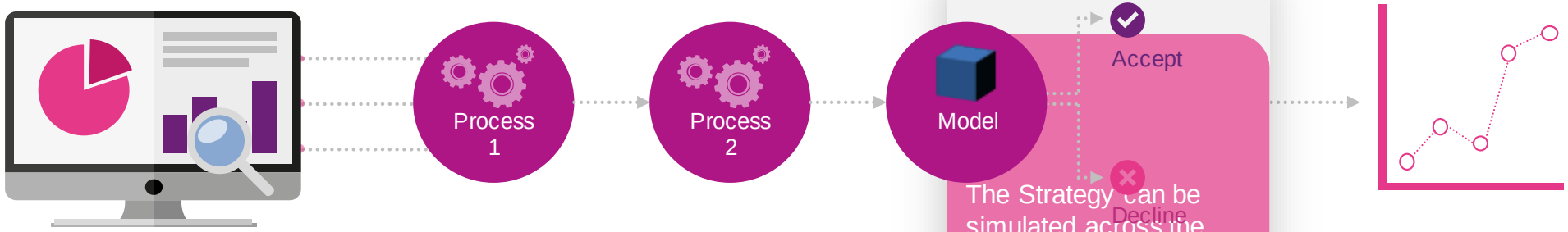

Simulate

The Strategy can be simulated across the wider dataset to assess the performance of the strategy with the model as part of the flow

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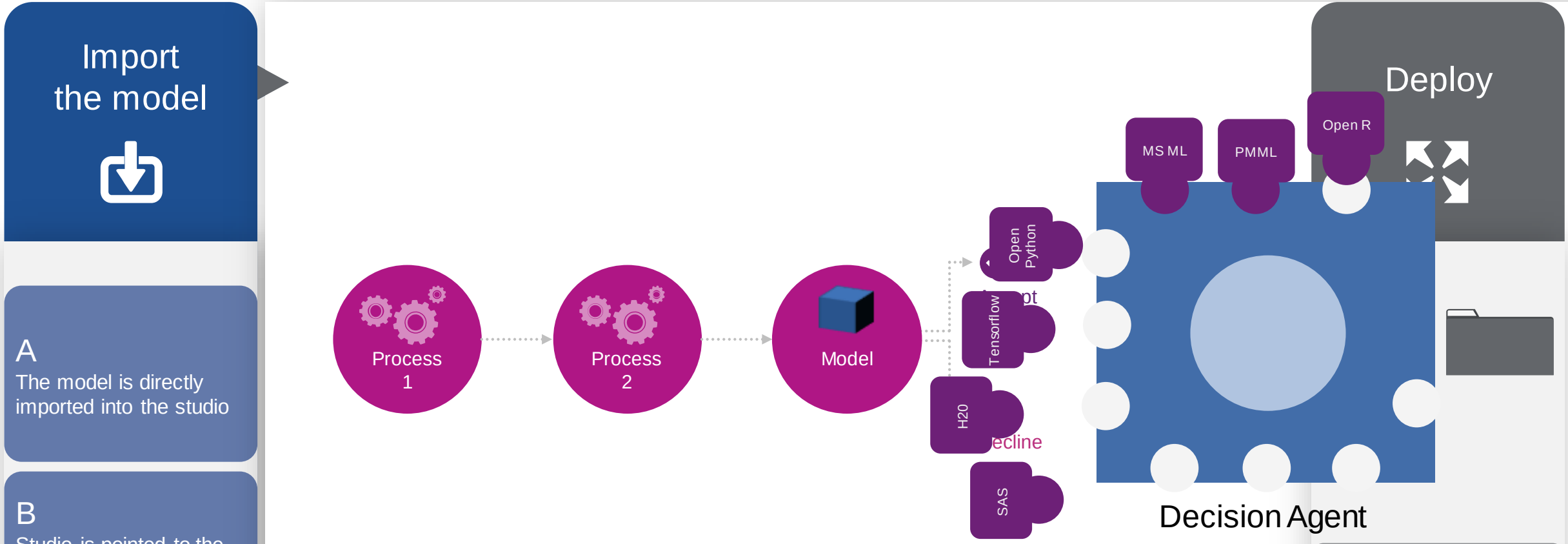

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