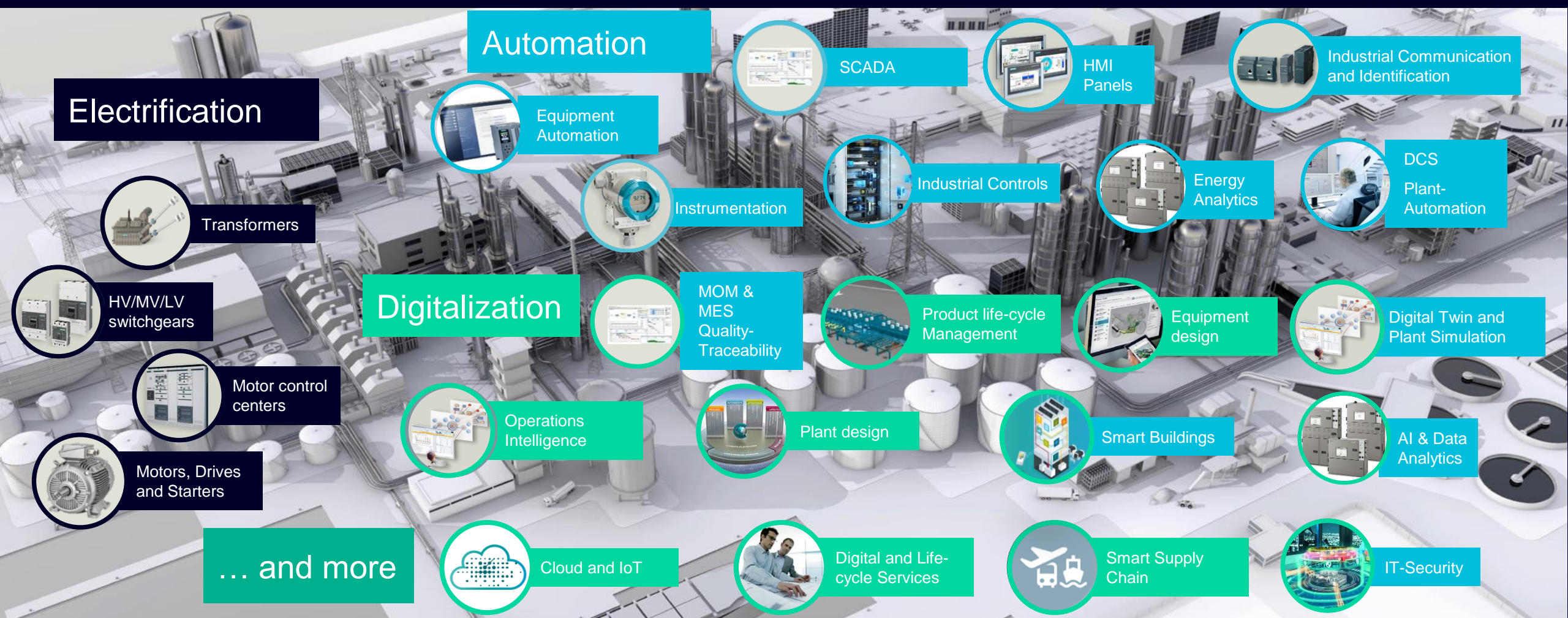


Siemensin esitys tekoälystä

AIKO-projekti | Tampere 25.4.2024

Joonas Isoketo | Lead Data Analyst | Siemens Osakeyhtiö

Siemens is a trusted partner focusing on Automation, Electrification & Digitalization



It's as easy as that, right?

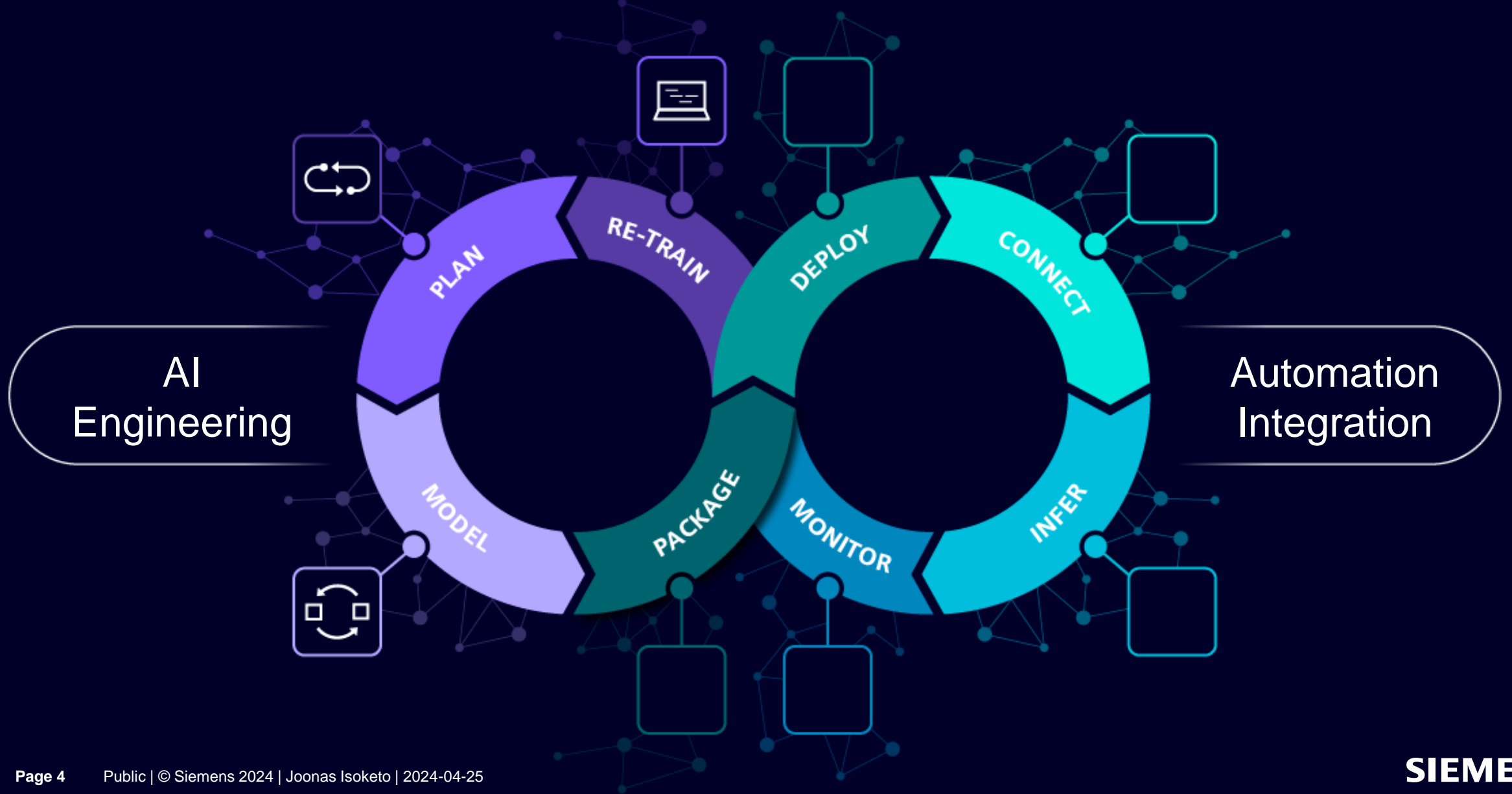


**Great AI
use case**



**Productive AI
solution
(industrial grade)**

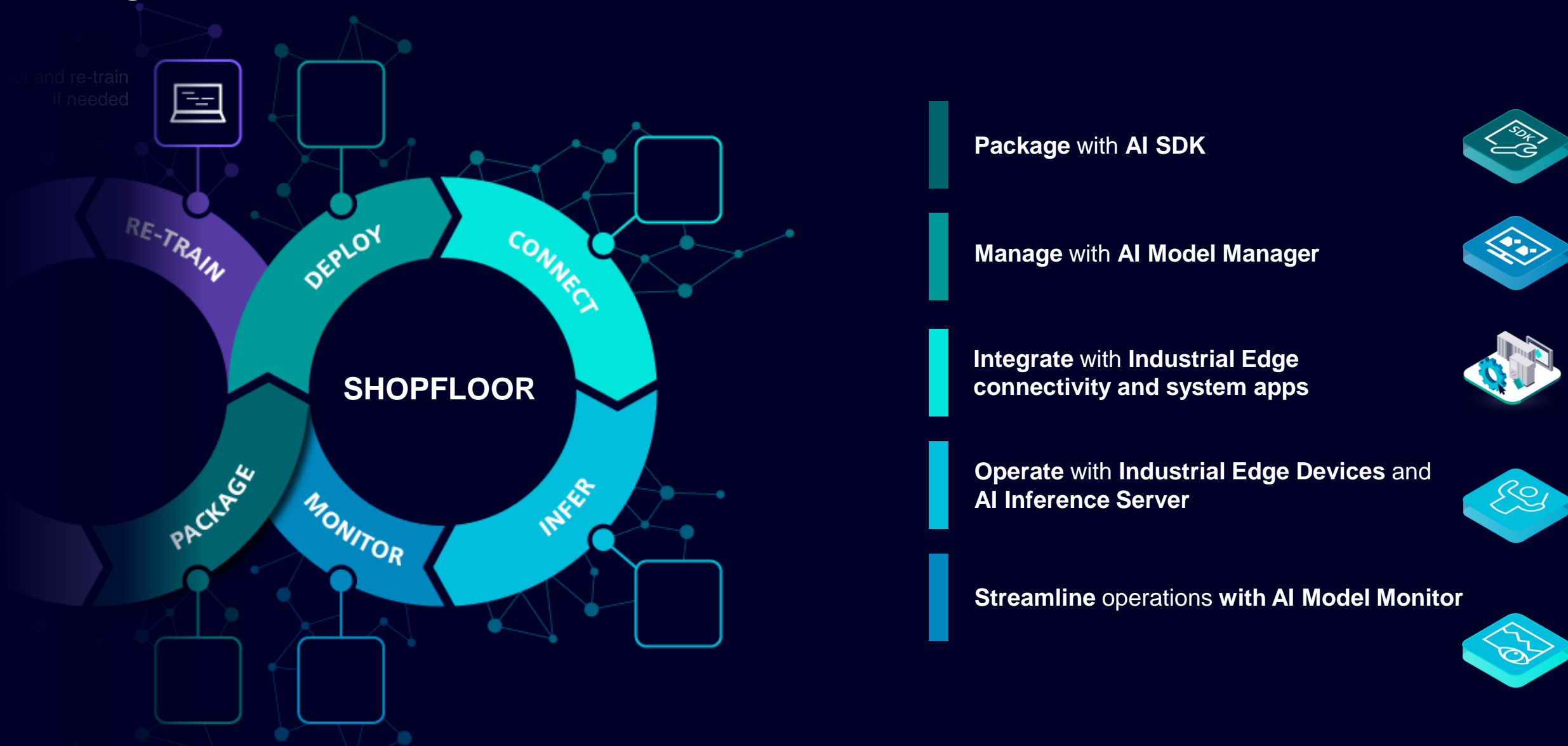
The good news: there is a repeatable pattern to integrate AI in automation



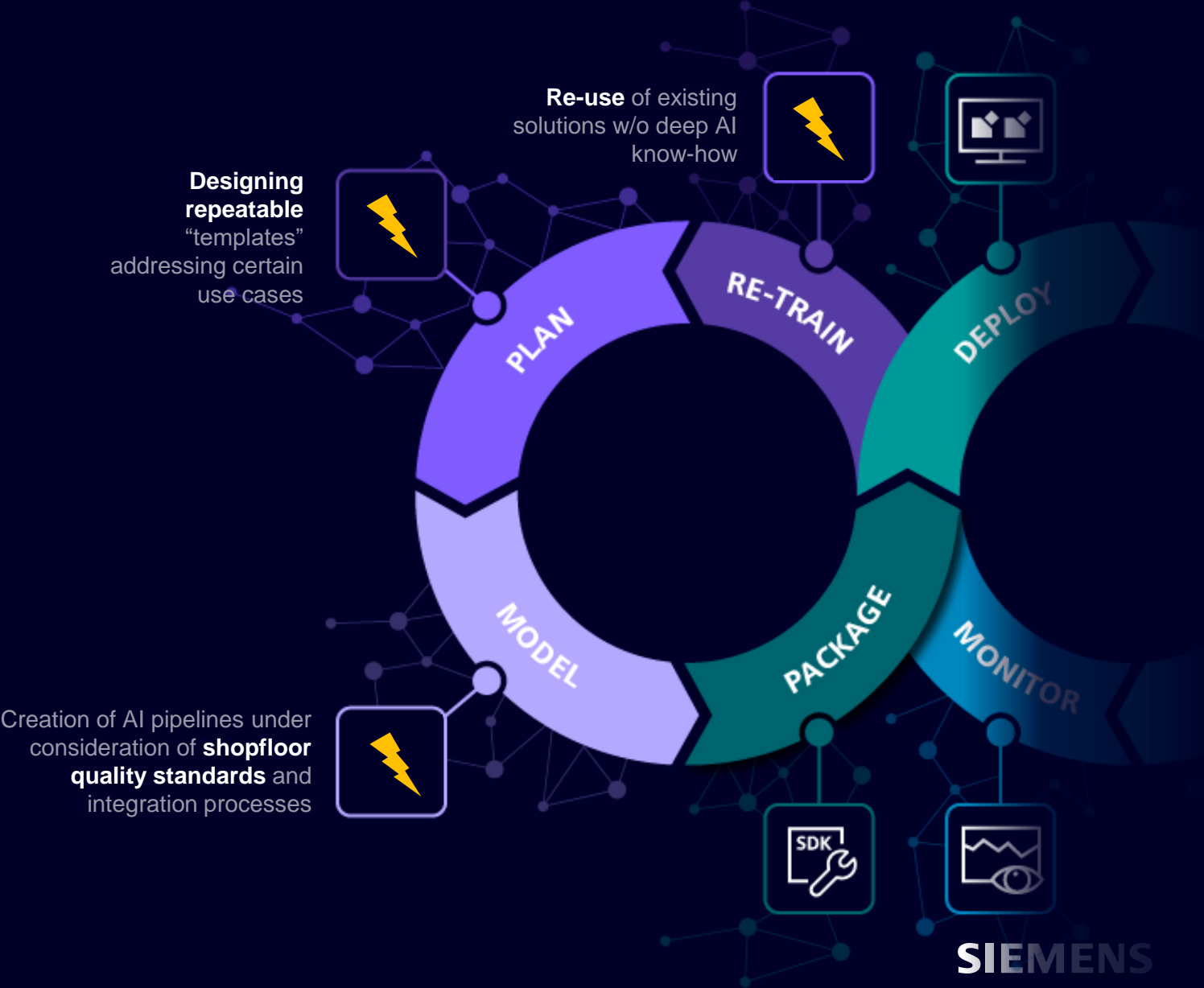
When AI hits the shopfloor things get interesting!



Integrate Industrial AI reliable and scalable with a standardized infrastructure



Let's also have a quick look at the other Side





Case **Altech**[®] FENNOAQUA Minimizing Fish Feed Waste with Artificial Intelligence

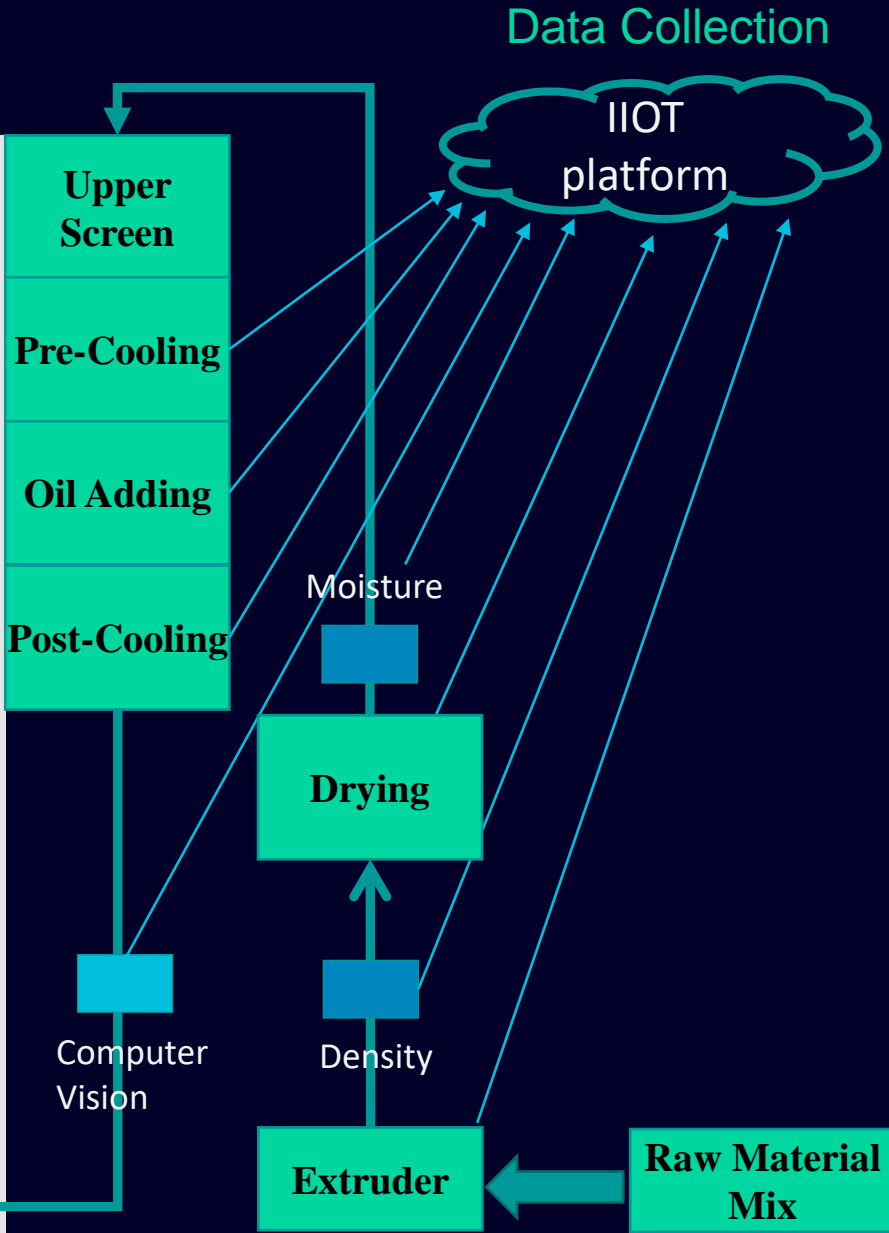
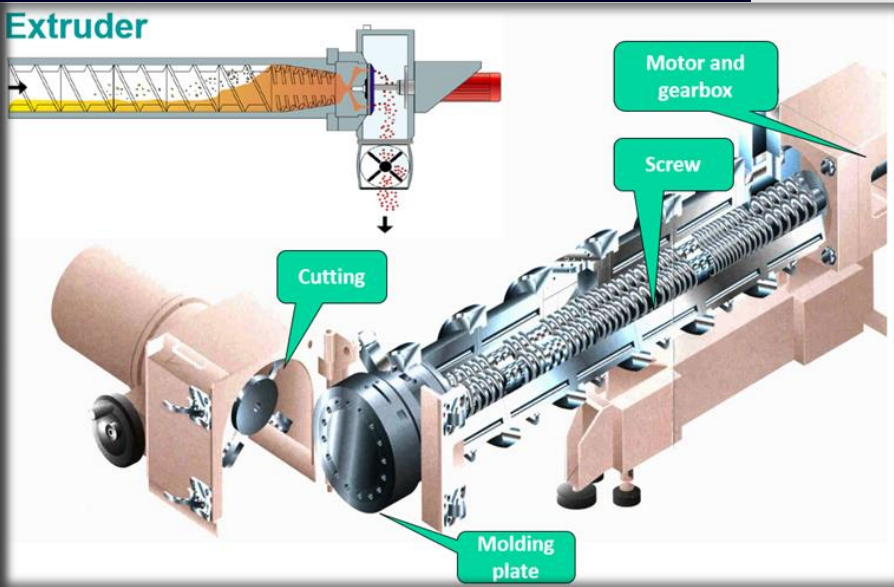
Joonas Isoketo | Lead Data Scientist | Siemens Osakeyhtiö

Reference Customer



- Fish feed production since 1986
- Turnover 37,3 M€ on 2021
- Total capacity 50 000 ton/year
- More than 60 products available in different package sizes

Production process



Go-through of the AI project



Project Phases Towards Waste Advisor Tool

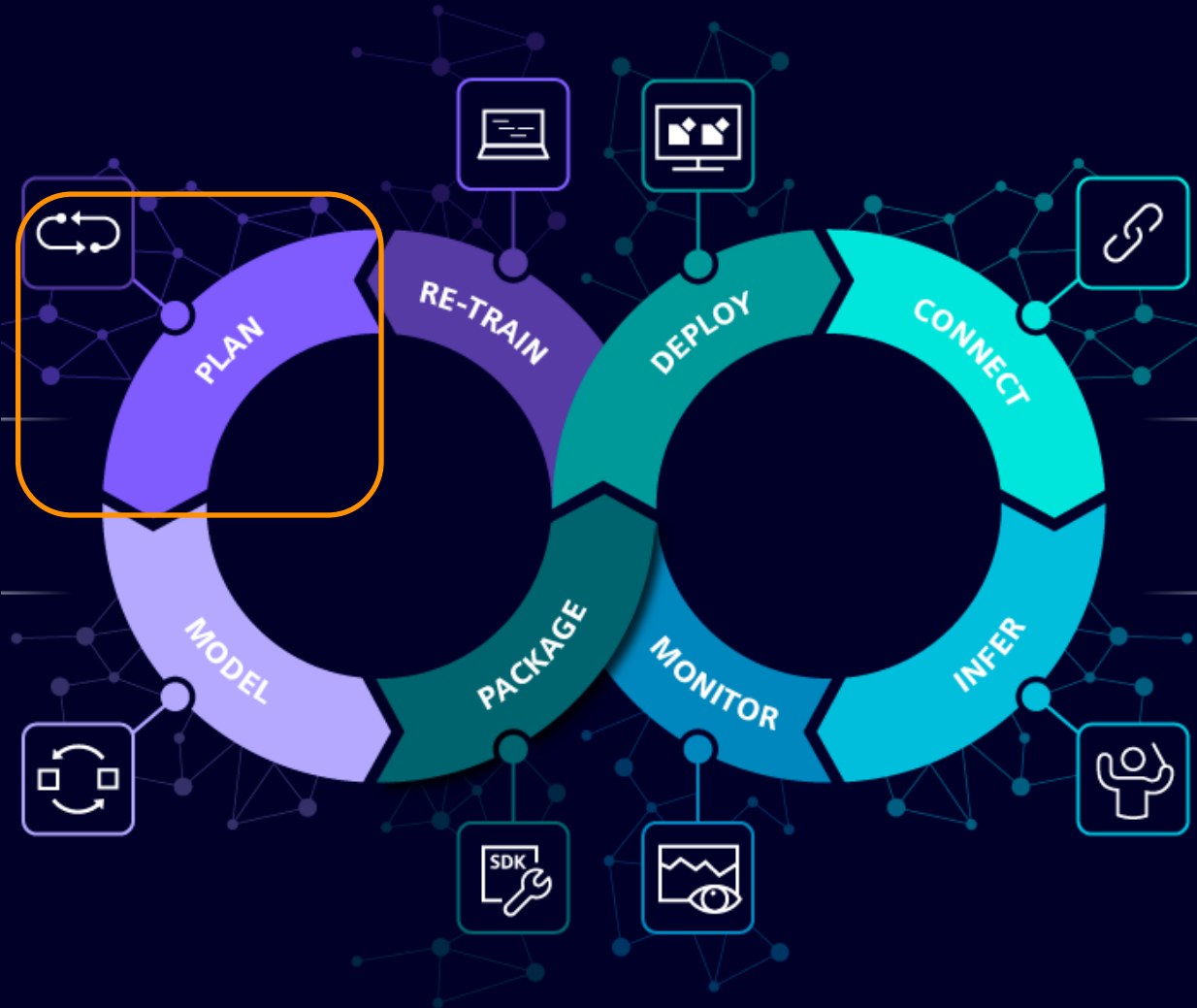
Plan

Target

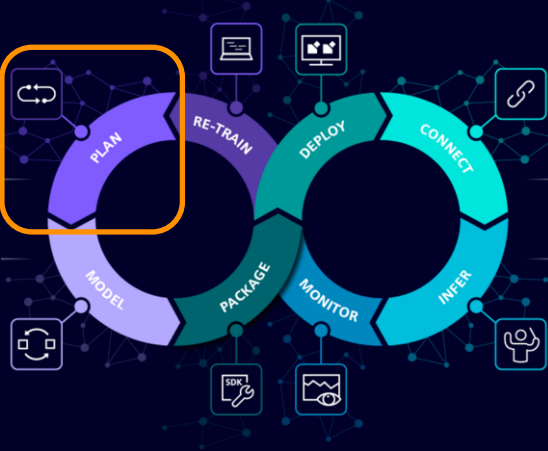
- Reducing waste
- Increasing yield
- Improving quality

Ideation of the Solution

- Understanding the process: losses, yield and quality
- Data sources



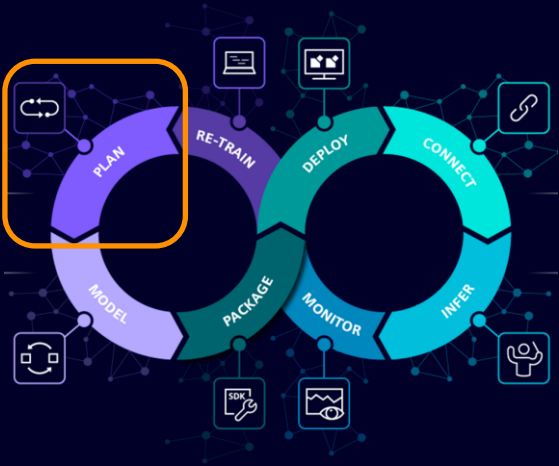
Baseline



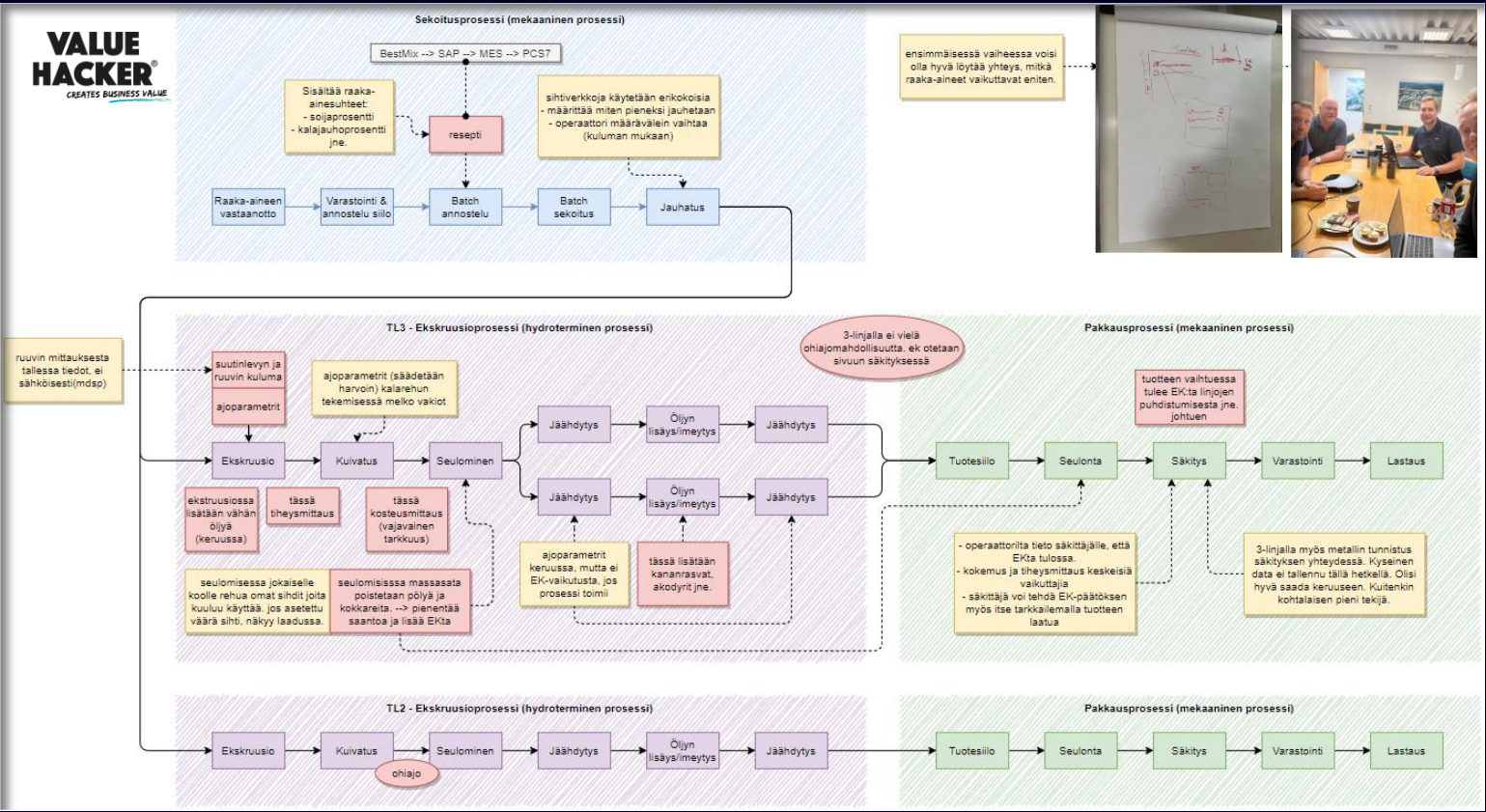
EXTRUDERSEURANTA

Tuote	Pvm.	Kone	Linja	Maara	Silosta/siloon	Ominaisp. g/l	SUUTIN LEVYN NRO:					
Hercules 7	2.8	14			B1/236	MITTAEI ~440-460	High					
Ajo alkoi klo.	Vesi ext. kg/h	Vesi valm. kg/h	Valm. lampö	Höyry kg/h ext/valm	Öljy kg/h	Syötö kg/h	Päämoot. rpm	Päämoot. virta/A	Leikkuri r/min	Oskari / Öljy 1. Rasv. 2. Rasv.	valm. rpm	Kuittaus
02.00	450	500	95	85/100	70	30	1500	150	150	150	150	
04.00												
06.00												
08.00												
10.00												
12.00												
12:20												
14.00												
16.00												
18.00												
20.00												
22.00												
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Designing the solution



Understanding the production process and quality

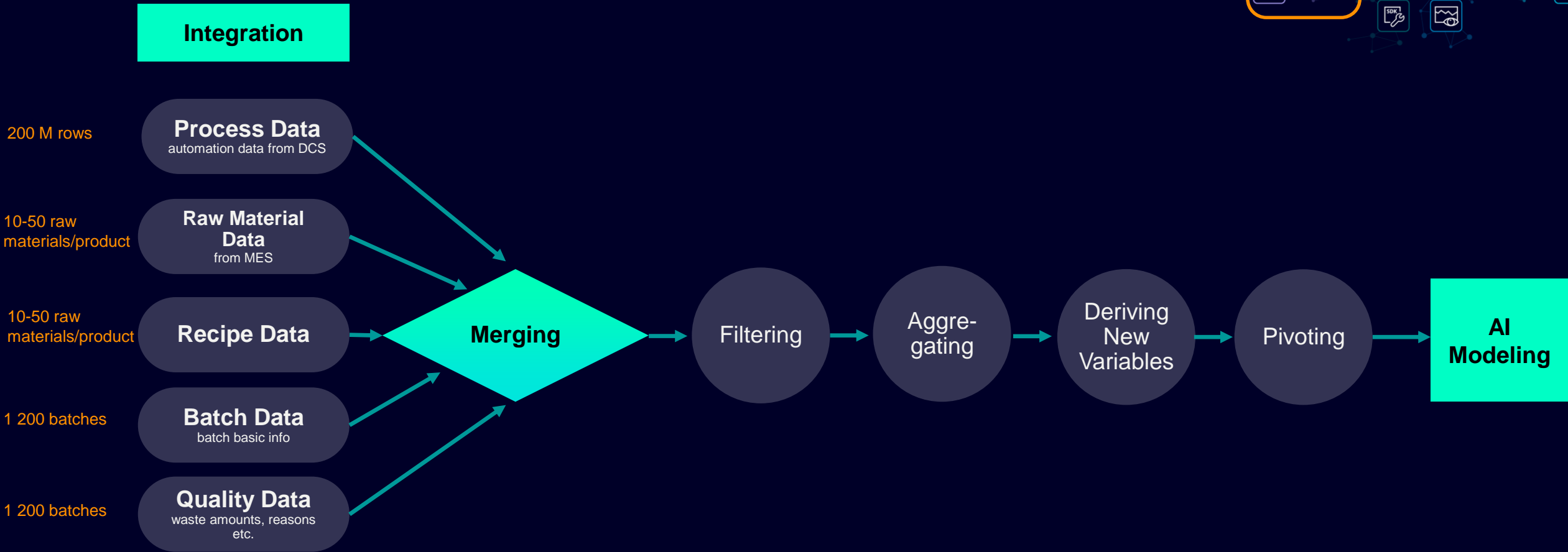
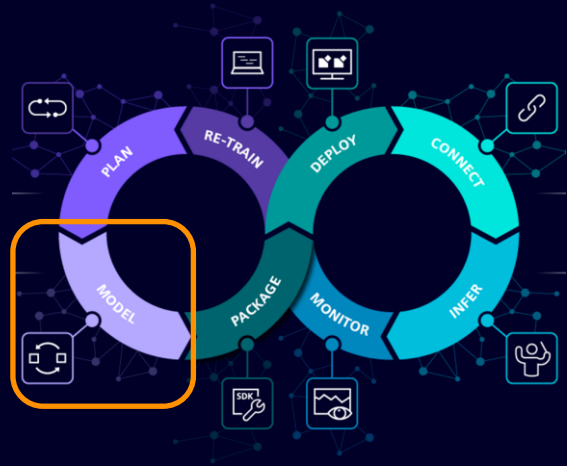


Data Sources

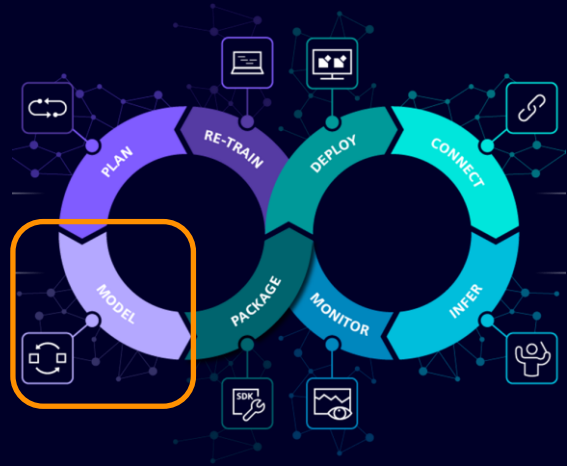


- **Process Data**
 - 500 positions, 1/min, 1.5 y
- **Quality Data**
 - Waste amounts and reasons per batch
- **Recipe Data**
 - Raw material components and design rates

Data Preparation



Training the AI model



Input Data

Training Data
prepared data set in batch level, 70 %

Test Data
prepared data set in batch level, 30 %

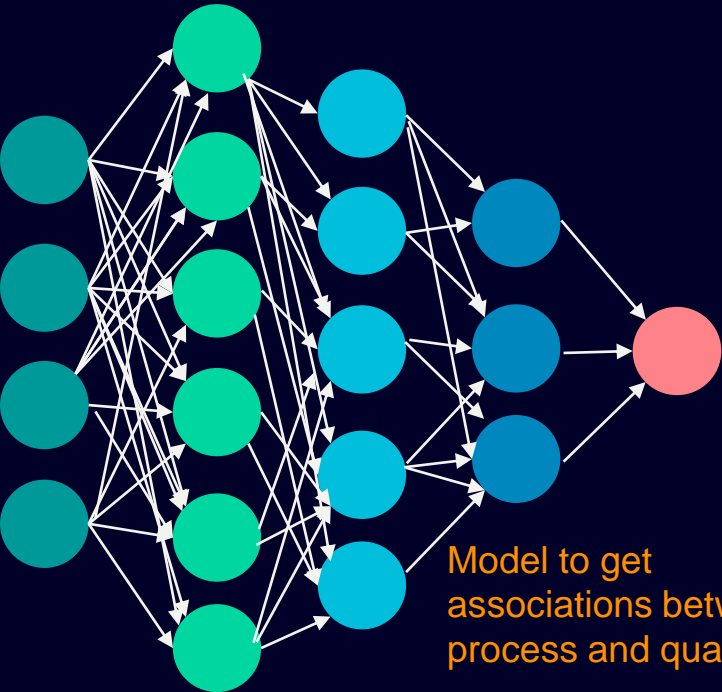
Online Data
latest process values

AI model is created based on training data

Test data was applied to evaluate the model

Get live predictions in operations

ML/AI Model



Model to get associations between process and quality

Prediction and Actionable Insights

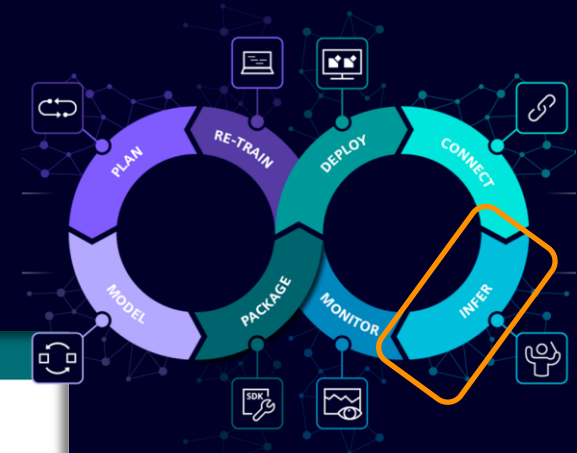
Waste prediction
Actionable insights

A screenshot of a software interface displaying a table with 7 columns: Rank, Parametri nimi, Suositusarvo, Nykyarvo, and Edellisen arvon erot. The table contains 7 rows of data. The interface includes a header with the company logo and some navigation elements. The table data is as follows:

Rank	Parametri nimi	Suositusarvo	Nykyarvo	Edellisen arvon erot
1	Parametri 1	85.50	81.00	Ed-1: opasno: 82.0, vaarallisuus: X Ed-2: opasno: 82.0, vaarallisuus: X
2	Parametri 2	111.79	100.00	Ed-1: opasno: 100.0, vaarallisuus: X Ed-2: opasno: 100.0, vaarallisuus: X
3	Parametri 3	7.80	8.04	Ed-1: opasno: 8.0, vaarallisuus: X Ed-2: opasno: 8.0, vaarallisuus: X
4	Parametri 4	93.87	89.44	Ed-1: opasno: 87.7, vaarallisuus: X Ed-2: opasno: 100.0, vaarallisuus: X
5	Parametri 5	7.97	7.37	Ed-1: opasno: 8.0, vaarallisuus: X Ed-2: opasno: 8.0, vaarallisuus: X
6	Parametri 6	314.41	3401.13	Ed-1: opasno: 3200.0, vaarallisuus: X Ed-2: opasno: 3000.0, vaarallisuus: X
7	Parametri 7	84.07	84.92	Ed-1: opasno: 85.0, vaarallisuus: X Ed-2: opasno: 100.0, vaarallisuus: X

Waste Advisor

AI Solution to Minimize Waste and Maximize Yield and Quality



Prediction with current settings = what the yield and waste are predicted to be when running the process as is

Prioritized recommendation list how to avoid the waste to born

← Quality Advisor

REFRESH

Altech FENNOAQUA

Production line: TL2 Batch Nr: 3767 Product: Circuit Silver Opti 2,5 | 963027 Start time: 09.11.22 klo 06.26.52 Batch size: 100 000 kg

Prediction with current settings

Yield

Waste amount

X %

Y kg

Prediction with recommended settings

Yield, additional potential

Waste, reduction potential

Waste, saving potential value

X %

Y kg

Z EUR

Recommendations

Rank	Parameter name	Recommended value	Current value	Values in previous batches
1	Current [A]	586	409	Prev.-1, Value: 550, Yield: X %
2	Temperature C]	130	120	Previous Batch: Value: 130, Yield: X %
3	Temperature C]	130	120	Previous Batch: Value: 130, Yield: X %
4	Temperature C]	89	92	Previous Batch: Value: 90, Yield: X %
5	Oil [kg/s]	116	59	Previous Batch: Value: 110, Yield: X %
6	Density [kg/l]	465	492	Previous Batch: Value: 470, Yield: X %
7	Steam [kg/l]	105	154	Previous Batch: Value: 110, Yield: X %

Basic data of the current batch

Prediction with recommended settings = what the yield and waste are predicted to be with saving potential when running the process using recommended values

Actual values that were used when two previous batches were manufactured

Recommended value = Desired values for each setting processed by artificial intelligence
Current value = current value in the process



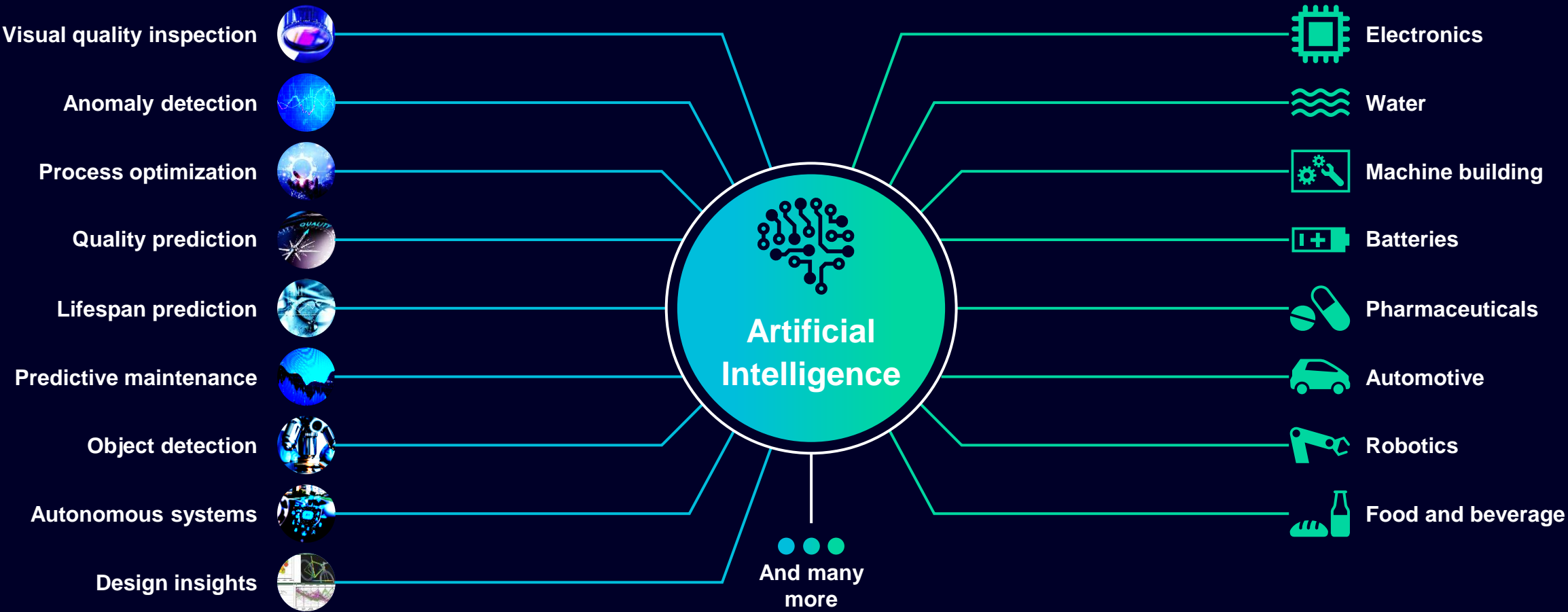
Artificial intelligence has managed to meet the expectations set for it, and the amount of waste has been reduced.

- Petri Elonen | Plant Manager | Alltech Fennoaqua

Achieving smarter and efficient product development and production

Typical application fields

Application fields

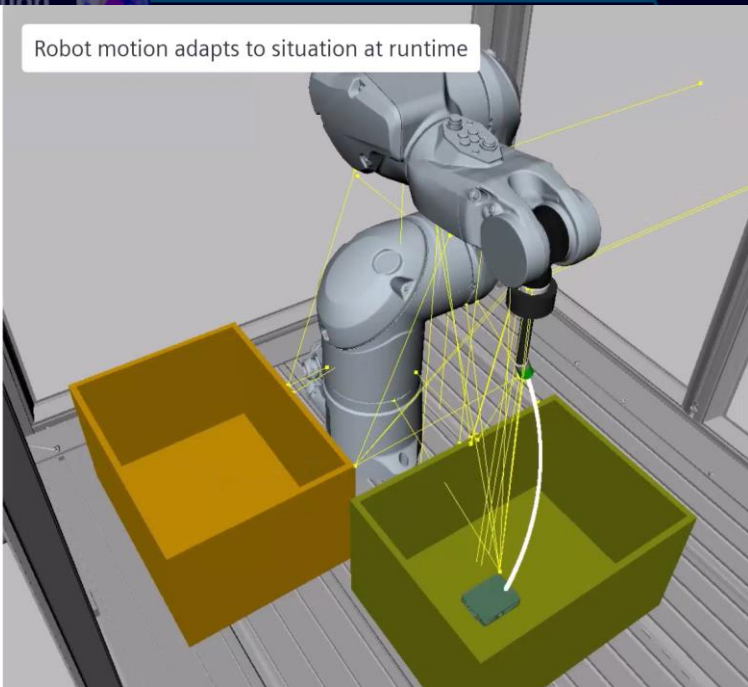
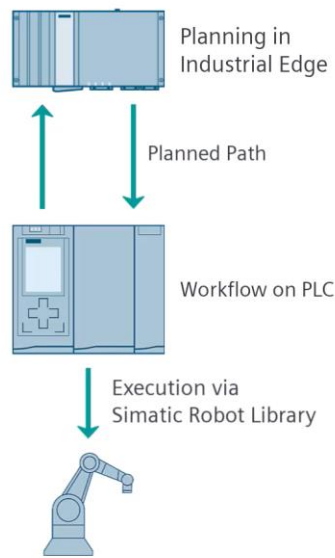


Achieving smarter and efficient product development and production

Typical application fields

Application fields

Visual quality inspection

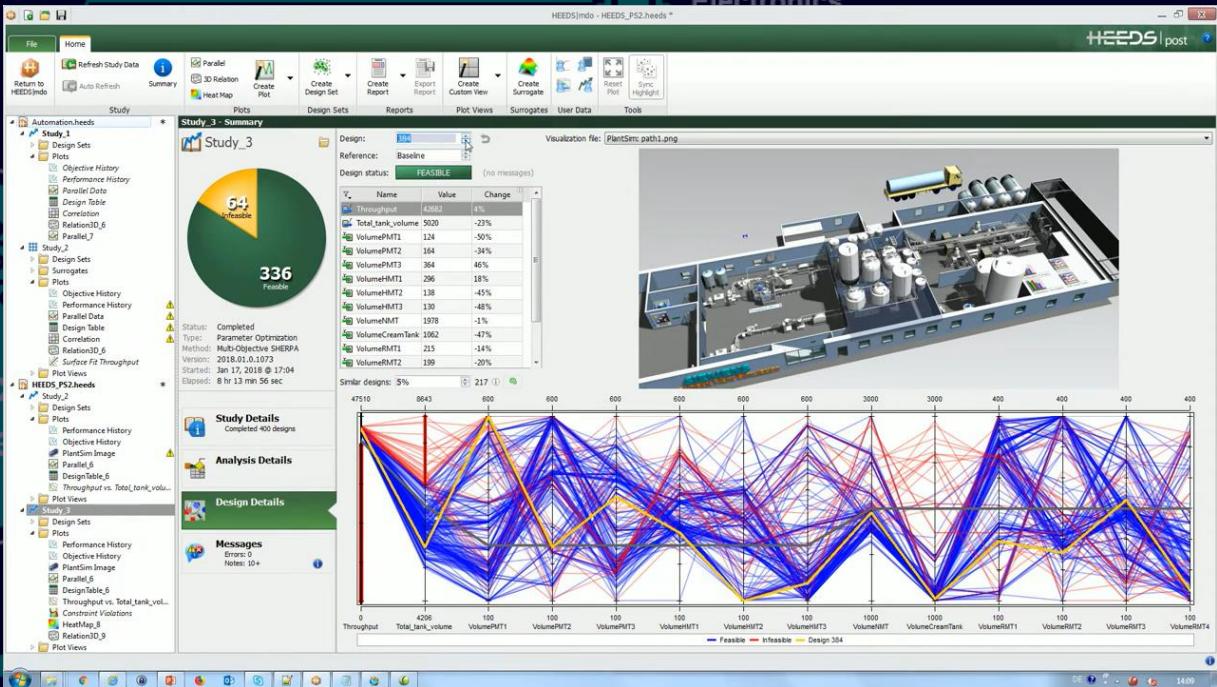


Design insights

And many more

Industries

Electronics



Questions and Answers

I Thank You!



Joonas Isoketo

Lead Data Analyst
Digital Industries

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