

Practical view on the role of the PI System in industry 4.0+ and AI for manufacturing

By Remi Duquette & Martin Davis

Maya HTT



Your co- presenter...



Martin Davis

Managing Partner
DUNELM Associates Ltd

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- ✦ C-level Executive
- ✦ Drives business value
- ✦ Multi-sector experience

→ ***Defining your Industry 4.0
Strategy***





DUNELM
Associates

- Helping you define your Industry 4.0 Strategy
- Practical experience driving Industry 4.0 and Operational Intelligence in multi-national companies
- Focus on quality business outcomes resulting in customer satisfaction

Our Process



Your co- presenter...



Remi Duquette

Vice-President

Emerging Solutions

Industrial AI | IIoT | Datacenter Clarity LC®

remi.duquette@mayahtt.com

- 5 spacecraft in orbit
- 100+ Datacenter Clarity LC® sites
- 5,000+ hours on AI-ML-DL
- 10,000+ hours on skates
- 1 short-track speed skating champion

→ *Your industrial AI partner*



<https://www.mayahtt.com/expertise/artificial-intelligence/>

Maya HTT

mayahtt.com



35+

Software solutions developed & maintained

8+ Years

Partnership with OSIsoft

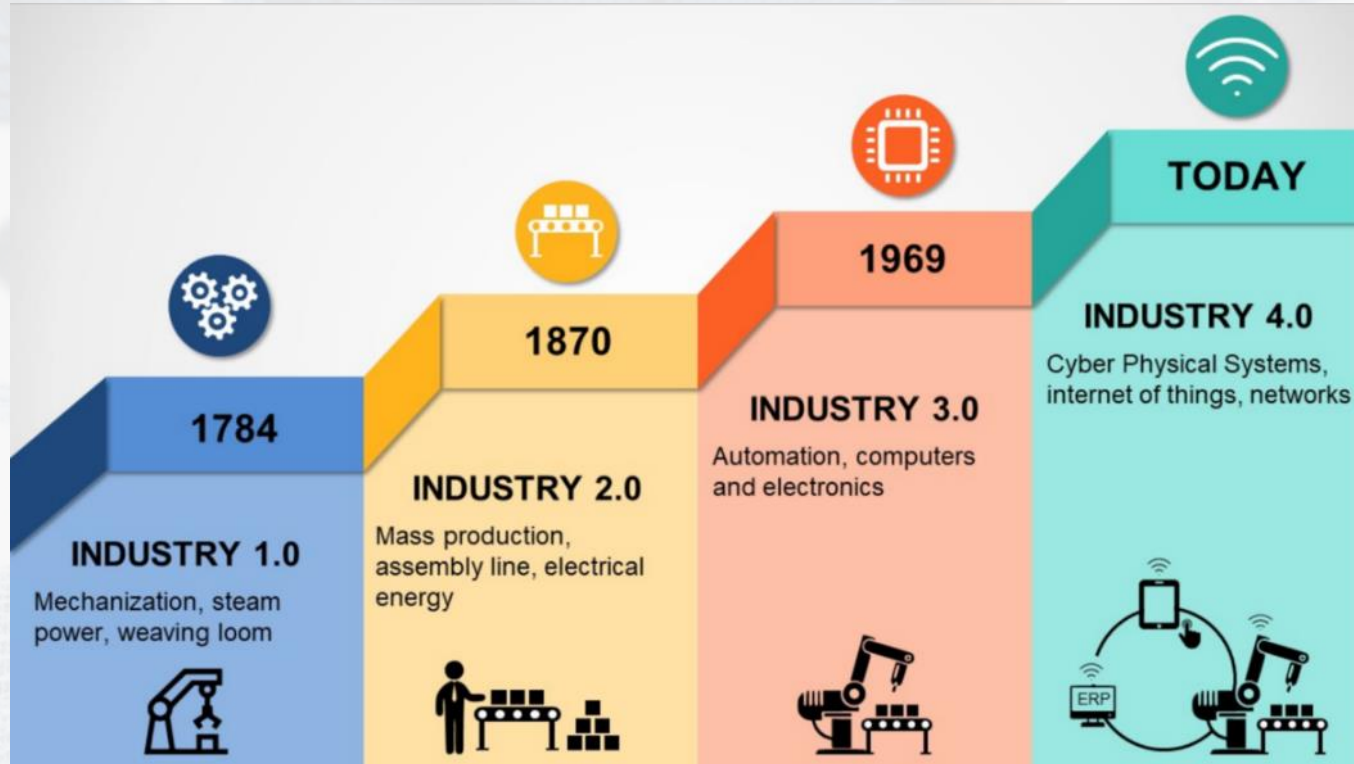
75%

Engineers & Scientists

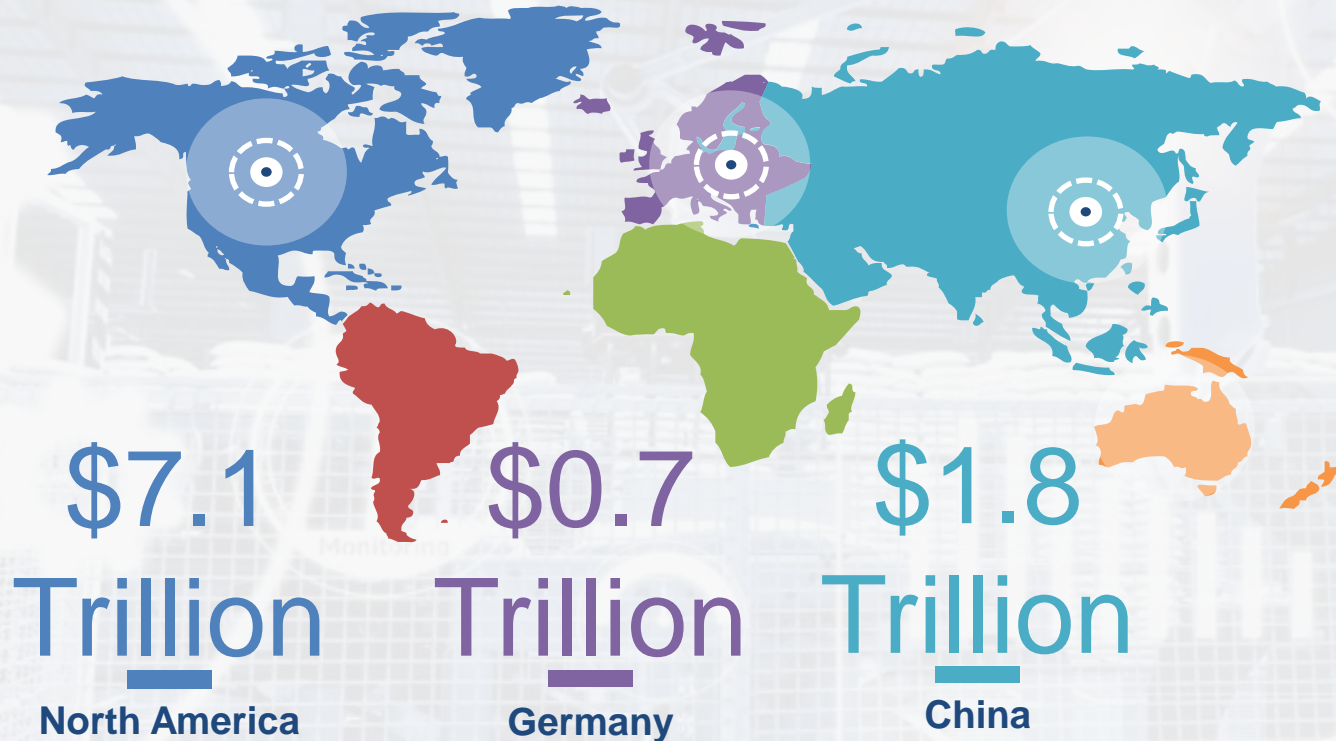
22%

PhDs

Industry 4.0 - The 4th Industrial Revolution



GDP Value of Industry 4.0 by 2030



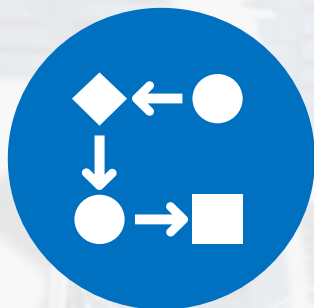
Industry 4.0 Adoption

99% of companies have heard of Industry 4.0

57% in the early stages of adoption

30% ONLY, report extensive adoption

Real Benefits from Industry 4.0



Improve OEE

60%
Achieved
Productivity
Increases



Reduce Costs

50%
Reduced
Operating
Costs



Quality

42%
Improved
Product
Quality



Innovate

13%
Increased
Ability to
Innovate

Bottom Line Impact

Industry 4.0 provides opportunities to:

- Reduce unit costs
- Increase capacity with minimal investment
- Increase revenue & profitability
- Improve transparency of business performance
- Grow through increased capacity



Industry 4.0 has been proven to deliver results

What is Industry 4.0?

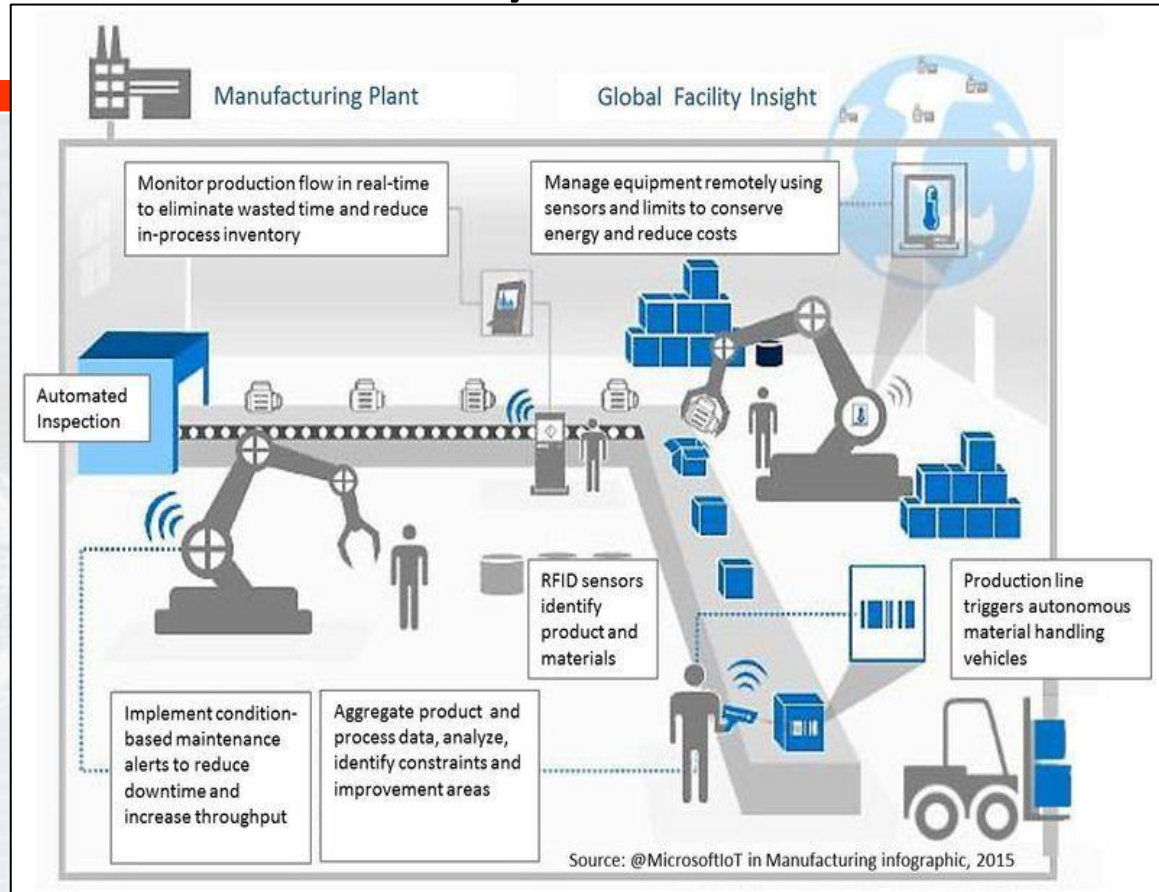
Put simply:

Turning real-time data from your equipment into real-time information to make decisions and improve your processes (manual or automated).



What is Industry 4.0?

- Everything connected
- Data becomes actionable information
- Real-time information to the right people
- Automated analytics
- Autonomous actions



Practical Examples of Industry 4.0?



Sensors & Dashboards on all key machine centers



Robotics and Autonomous Vehicle



Predictive Maintenance using Artificial Intelligence



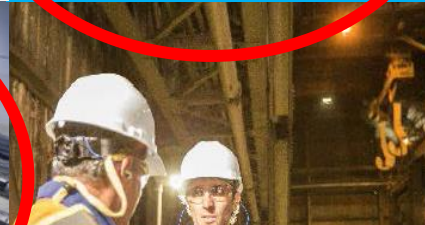
Digital work instructions / Augmented Reality



Predictive Maintenance



Autonomous Factories



Personnel Safety / Collision Avoidance



Remote Monitoring and Mobile Tools



Asset Tracking & Management



OEE (Overall Equipment Efficiency) by machine center



Real-time Quality Detection

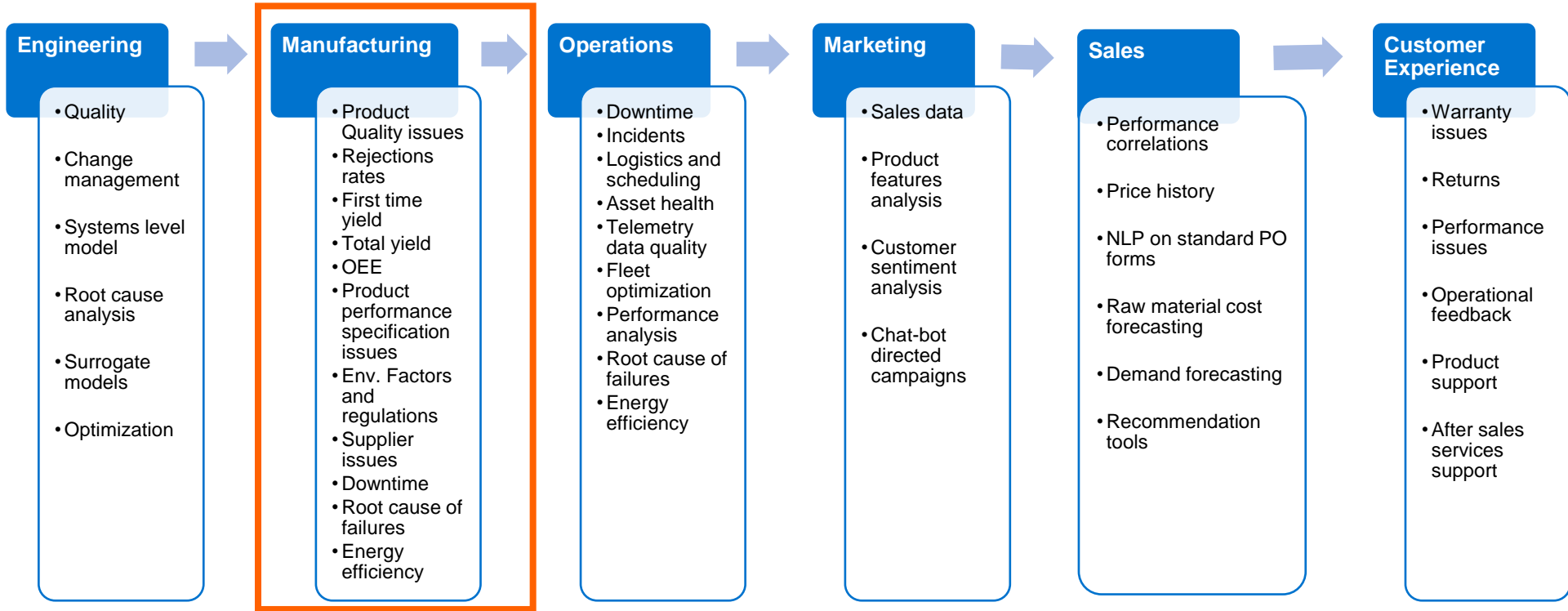


Condition-Based Maintenance (Automated)



Are you AI-ready?

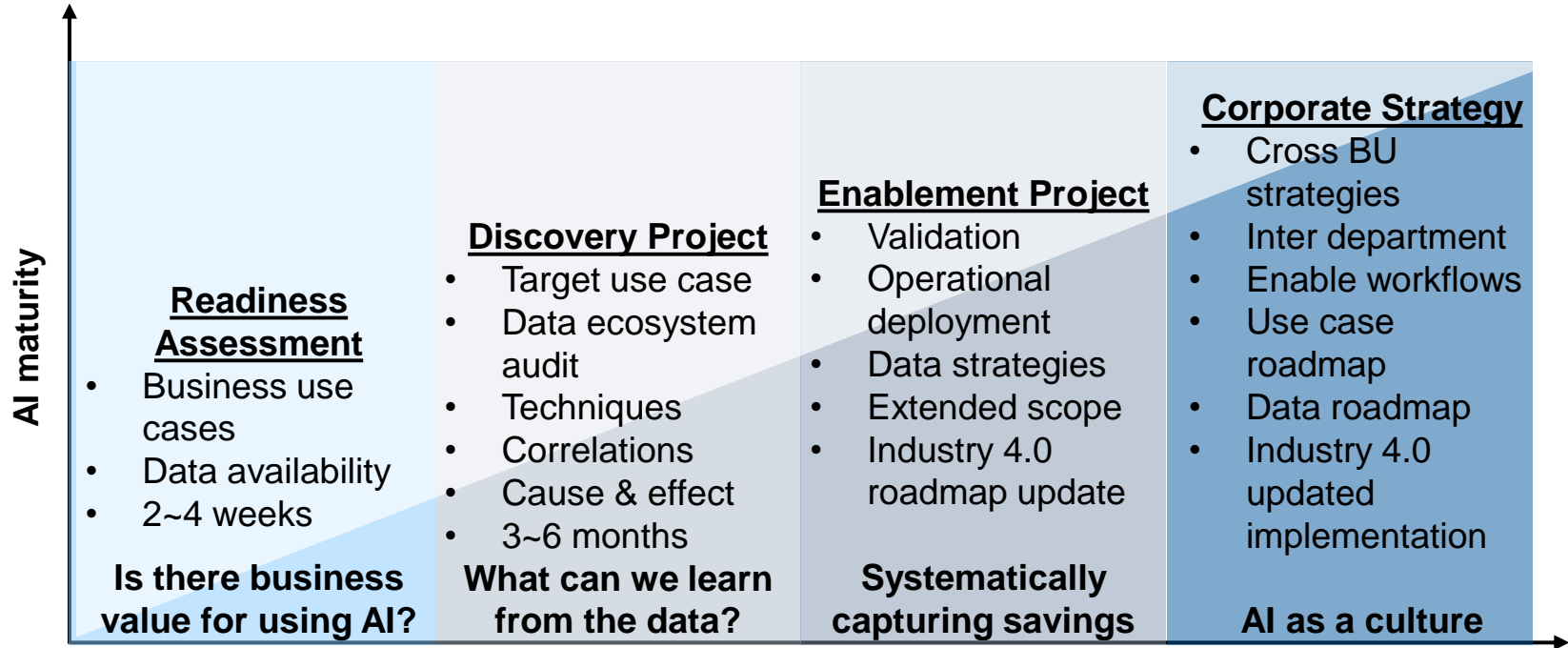
AI Project Exploration Road-mapping





Getting started

A typical AI adoption roadmap



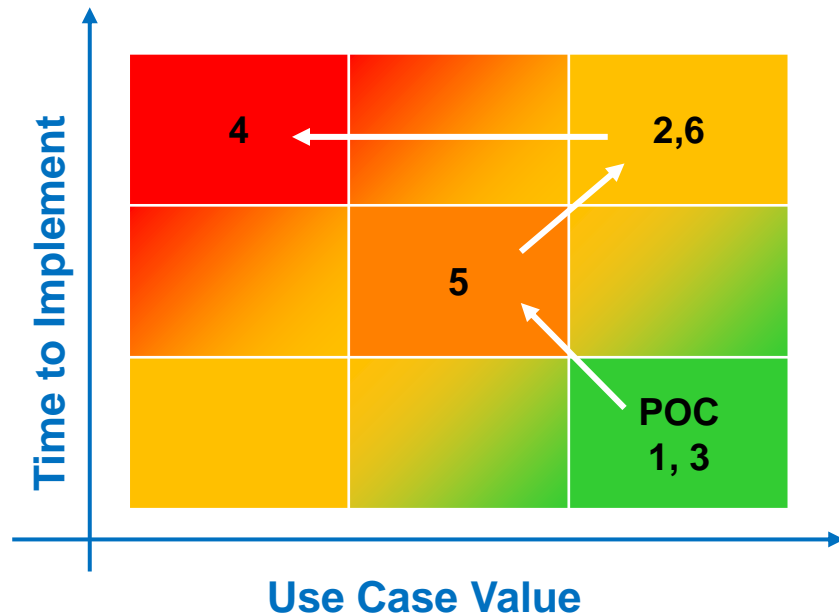
Adoption Stages & Timeline



Getting started – Establish YOUR AI Roadmap

A typical AI adoption roadmap

Use Cases	
1	Reduce product quality issues
2	Increase first time yield success rate
3	Reduce end product performance variability
4	Increase energy efficiency
5	Optimize machine & people capacity
6	Find machine downtime root causes and run preventative maintenance





AI-based Metal Parts Machining Cost Prediction

Metal parts manufacturer **Build an AI model to predict metallic parts manufacturing cost**

Challenge

- Custom parts manufacturer
- Current quoting process : MS Excel sheet with 100's rules
- Time consuming, error prone

Solution

- Large library of historical parts, multiple features & costs
- Extract CAD features to classify parts
- Build a neural network to predict cost

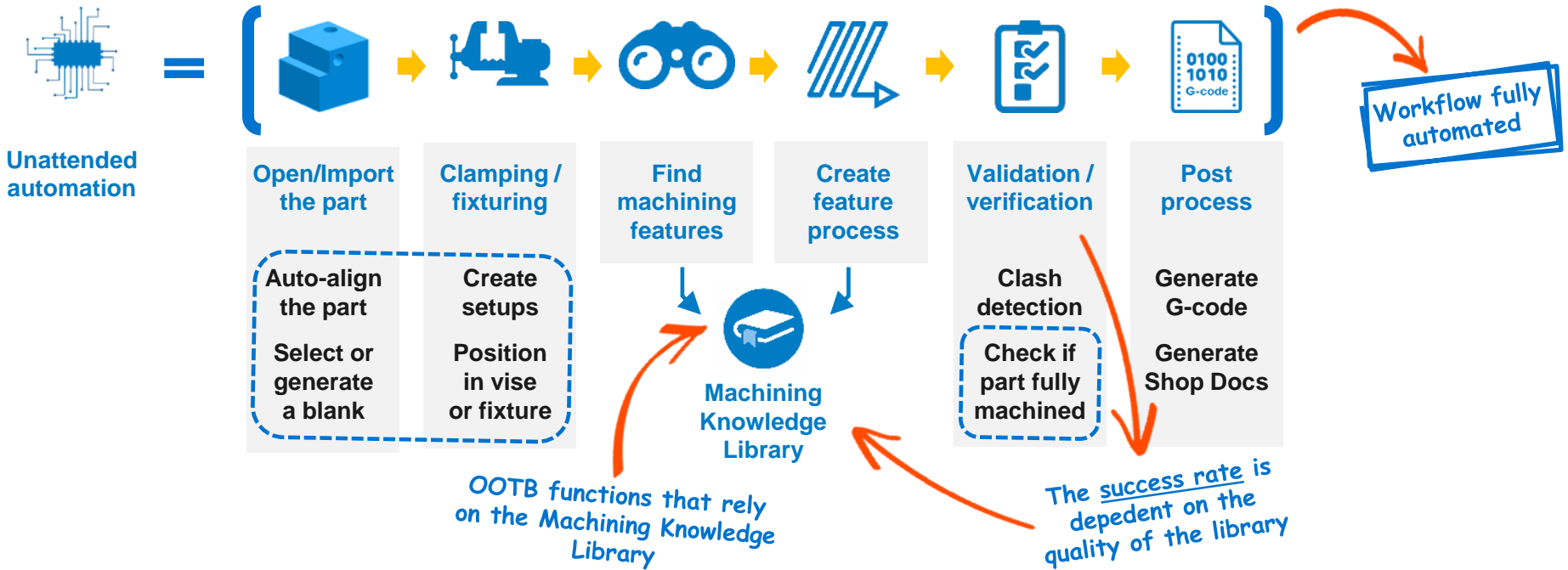
Benefits

- Accelerate quoting process
- Improve reliability of quotes



AI-based Metal Parts Machining

Underlying structure of AI automation





Manufacturing Quality – AI Use Case Example

Reduce product QA rejection & variability

**STEP 1
BUSINESS NEEDS &
USE CASES**

**STEP 2
DATA PRE-
PROCESSING**

**STEP 3
AI CREATION
& OPTIMIZATION**

**STEP 4
AI PROBATION
& SME
VALIDATION**

**STEP 5
AI BUSINESS
RESULTS**

Total Industrial AI Project Duration : ~3-6 months

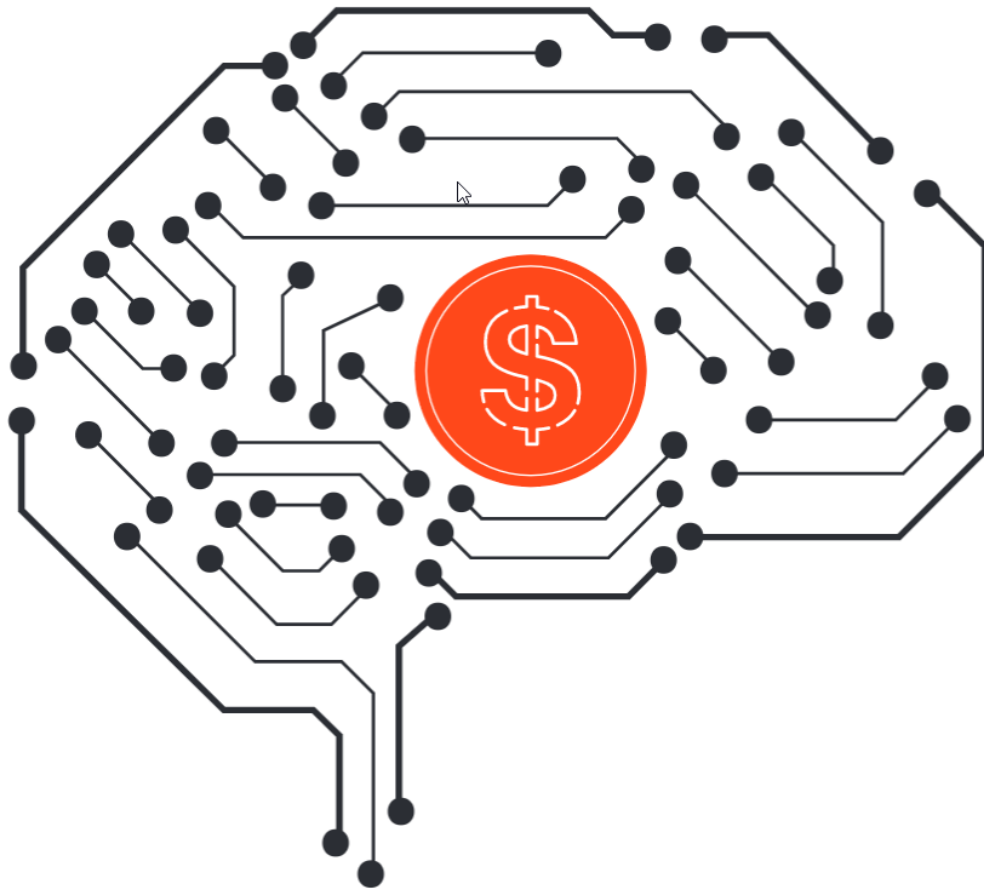


7 Elements leading to success in AI for manufacturing

- ✓ Business use cases – identified source of value
- ✓ Data infrastructure in place
- ✓ Data quantity in support of business case
- ✓ Data quality and operational bias
- ✓ AI model and data pipeline to operational AI model
- ✓ AI integration and process
- ✓ Open culture and change management



Data cleaning is
60%
of AI project costs





LIGHTHOUSE project

Outlier detection powered by OCS



Raw Data with
Unlabeled Events



What does an
anomaly look like?





AI Solution: Outlier Detection App



Better information
Better dashboards
Better decisions
Better service



Outlier Detection

Maya's Outlier Detection Application powered by PI AF

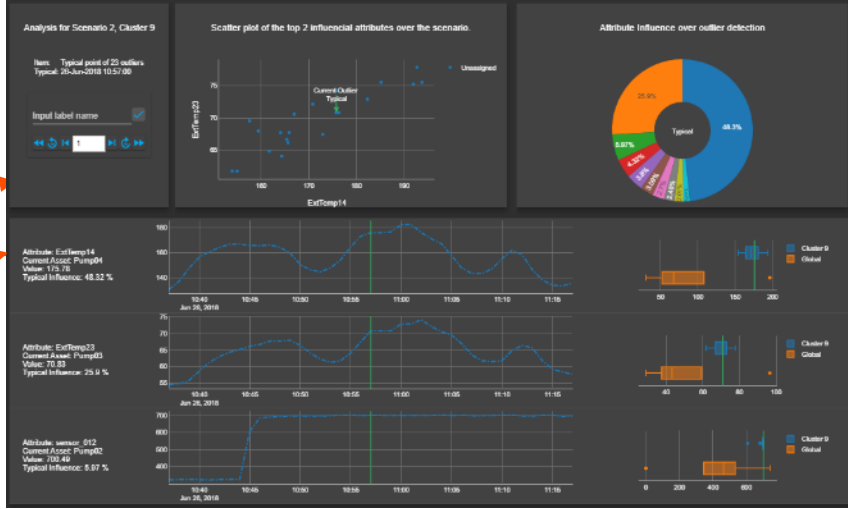


Real-time AI

PI Integrator for Business Analytics

PI AF

PI Data Archive(s)



Business Analysis

AI

Continuous Improvement

Root Cause Analysis

Troubleshooting

...

Predictive Maintenance

Demand Forecast

...

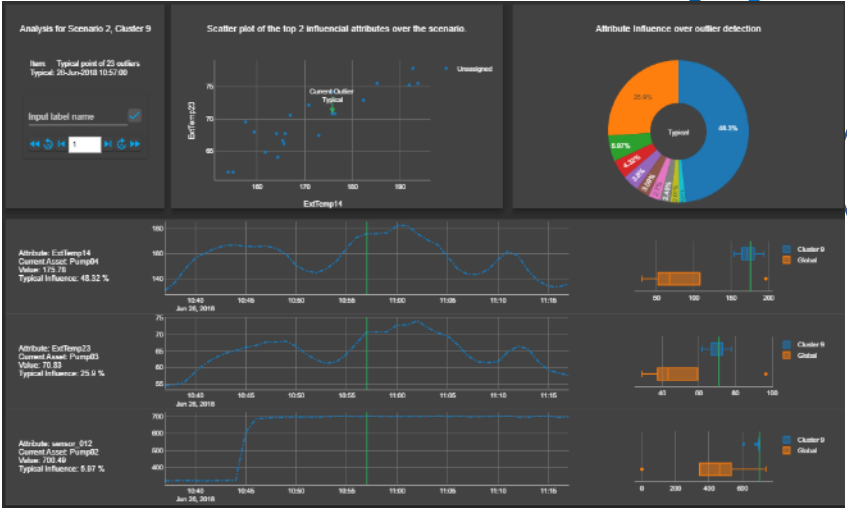


The New Way

Maya's Outlier Detection Application powered by OCS



OSIsoft
Cloud Services



Business Analysis

AI

Continuous Improvement

Root Cause Analysis

Troubleshooting

...

Predictive Maintenance

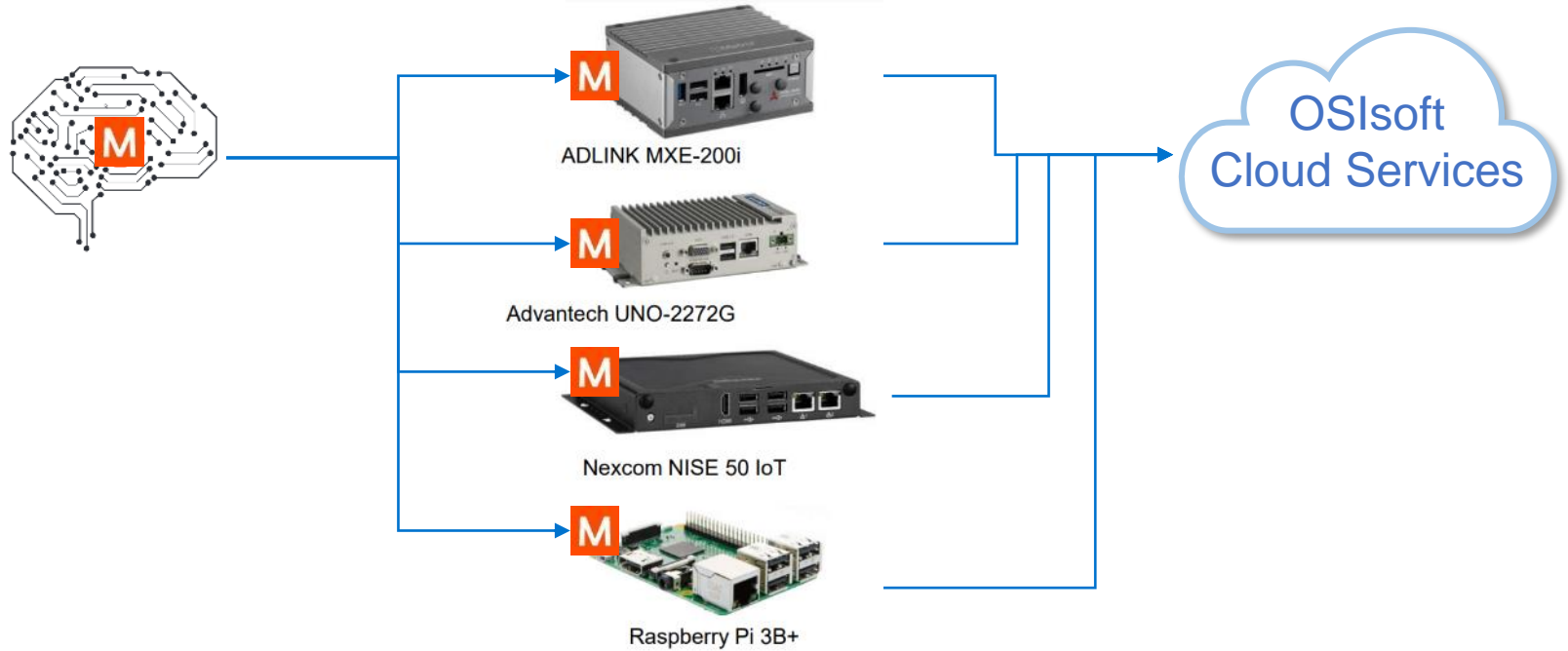
Demand forecast

...



What's Next?

Bring AI models to the edge with OSIssoft Edge Data Store (EDS)





What's Next?

No-Code | Low-code Apps powered by OCS

“We need it now!”

We need to take new ideas and products to market quickly

We need to streamline and automate our operations

We need to digitalize our customer experience

Business demand

IT supply

“We have an 18-month backlog!”

I'm not able to respond fast enough to new business requirements

My existing systems are not flexible enough

I need to stay in control



What's Next?

No-Code | Low-code Apps powered by OCS



Citizen developer



Business analyst



Business engineer



Professional developer

Business

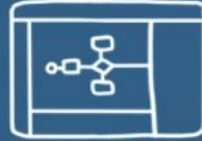


IT

No code



Low-code



Code



What's Next?

No-Code | Low-code Apps powered by OCS



Low-code development

Build cloud-native applications 10x faster with 70% less resources



Multi-experience

Applications for any channel, any device, online and offline, smart and connected



Unlock and extend your data and systems

Integrate data and logic from Teamcenter, MindSphere, ERP, CRM and more



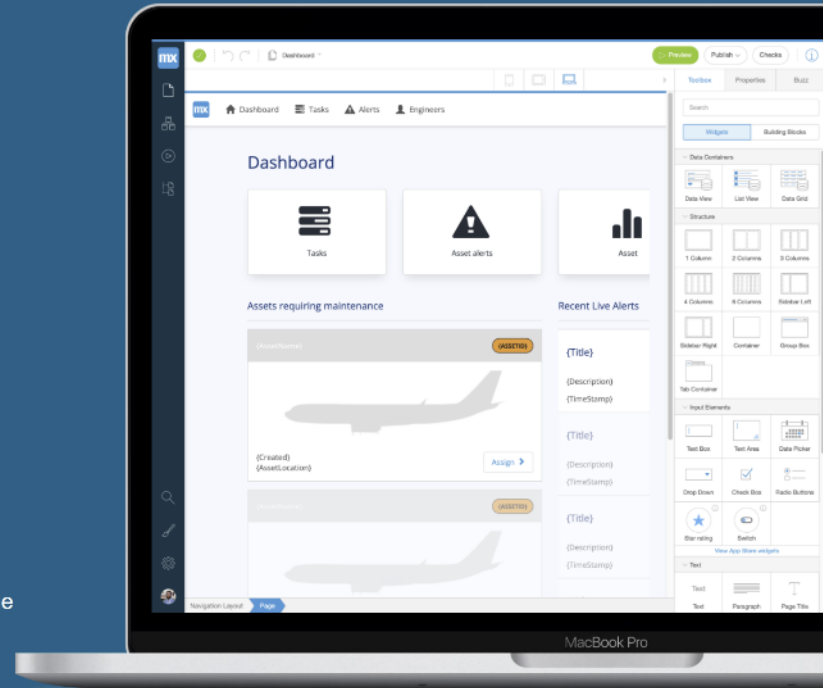
Enable the Digital Twin

Deep integration with Siemens portfolio to build applications that enable the most robust Digital Twin



Multi-cloud

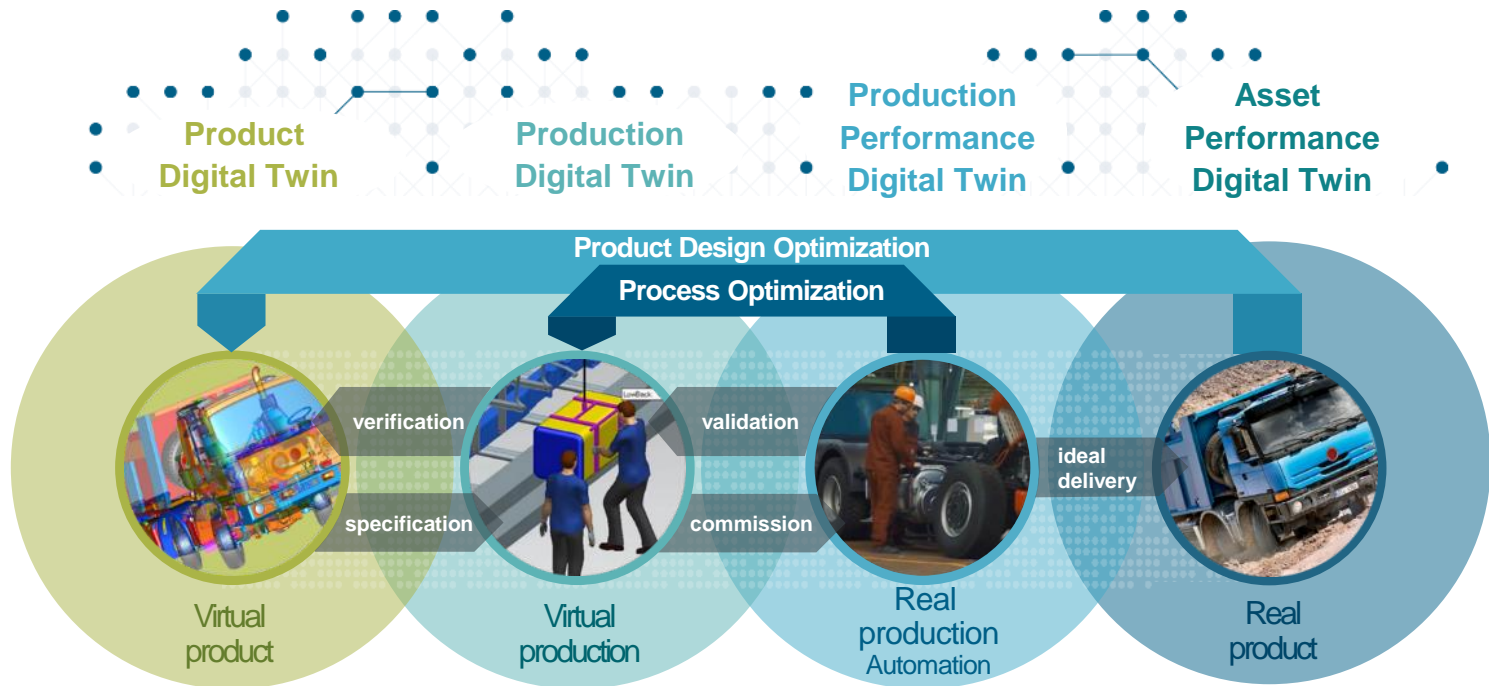
1-Click deploy to any public or private cloud, as well as on-premises and edge





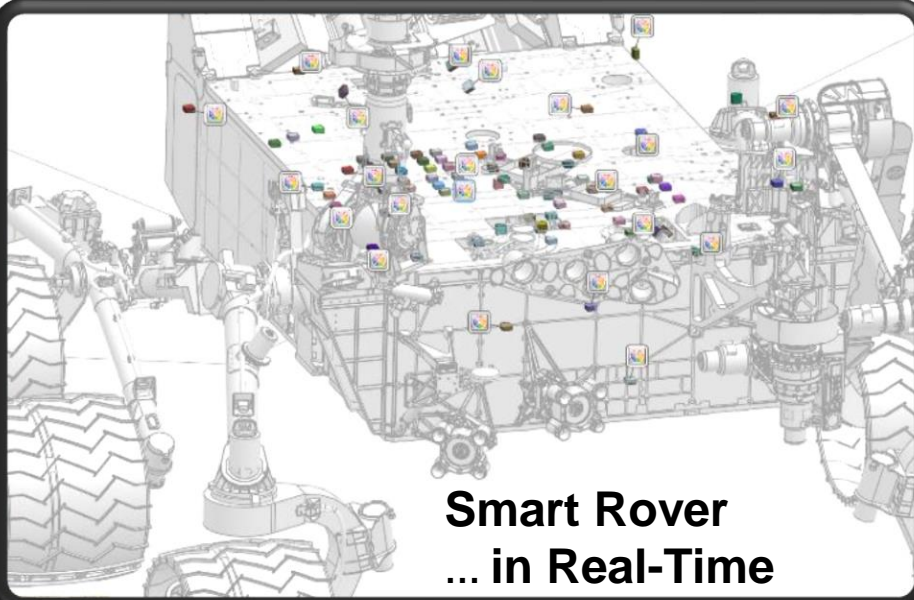
What's Next

Digital twin across a product's lifecycle

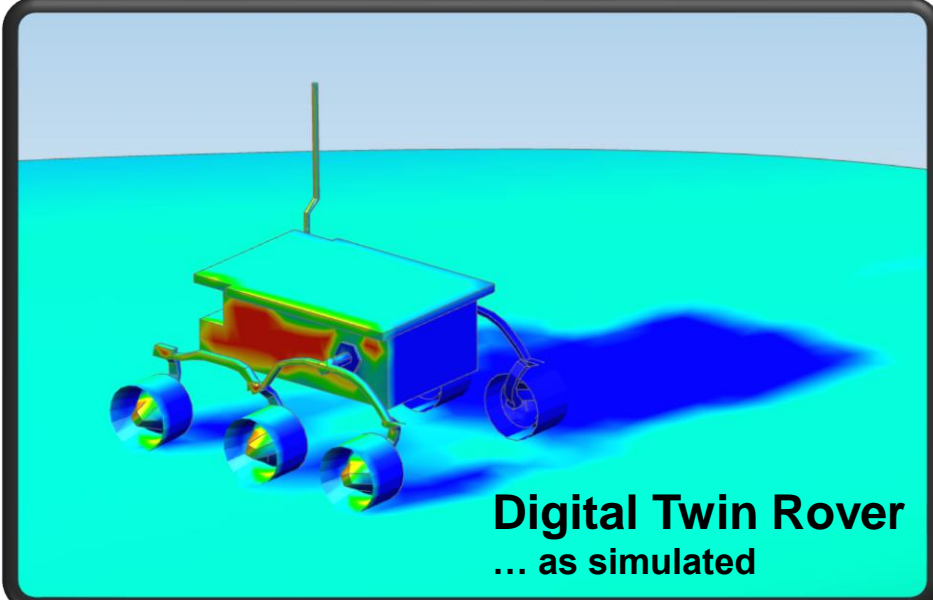




What's Next: Digital Twin

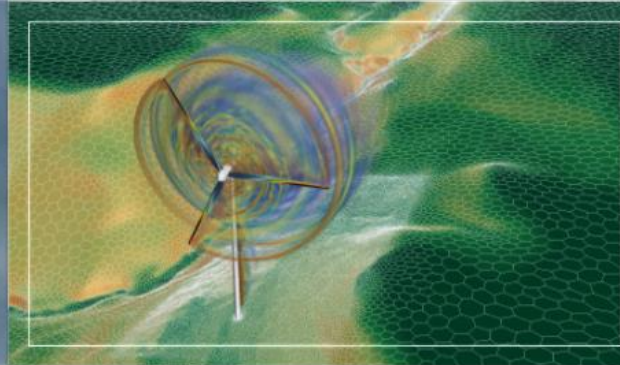
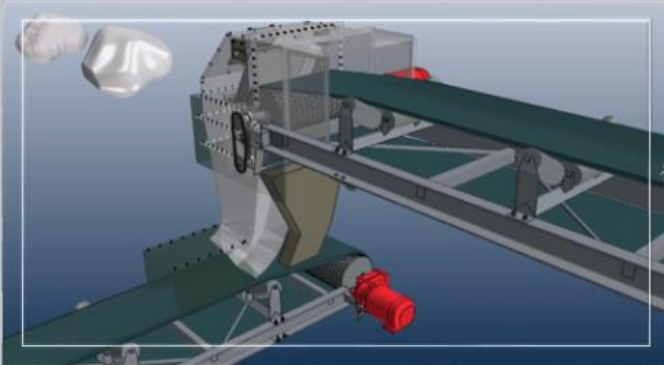


**Smart Rover
... in Real-Time**

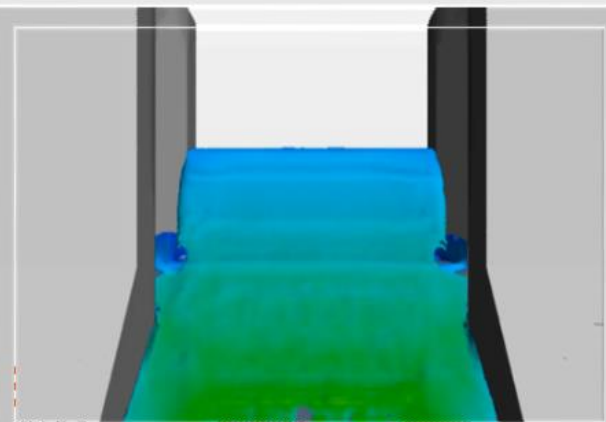
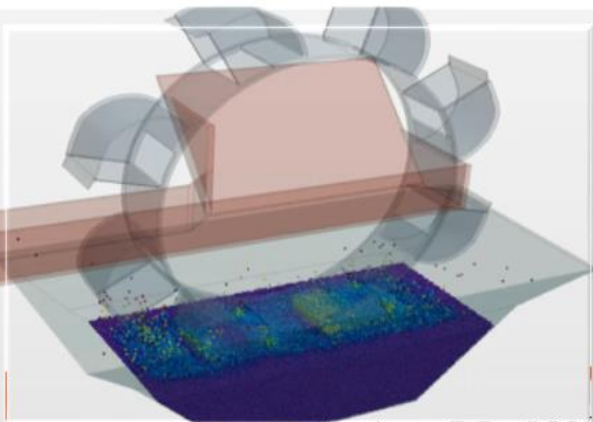
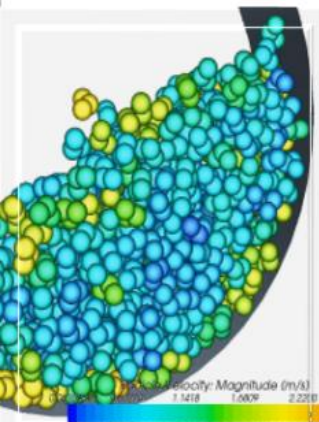
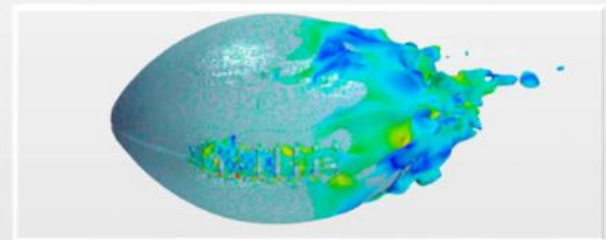


**Digital Twin Rover
... as simulated**

<https://www.mayahtt.com/expertise/artificial-intelligence>



Maya HTT Better thinking Better future®





Industry 4.0

Corporate Strategy

- Smart / Digital Factory
- Operational Intelligence
- Lean/6-Sigma approaches
- Automation
- Trained and empowered digital workers

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Industrial Internet

Enabling Technologies

- Everything connected (devices/machines/people)
- IIoT devices
- Existing operational data
- Analytics (incl. Big Data)
- Cloud computing
- AI/ML

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Competitive Advantage

Improved Performance

- Increased revenue & profitability
- Increased visibility
- Improved OEE
- Reduced downtime

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Industry 4.0

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Industrial Internet

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Competitive Advantage

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Operational Excellence, built on Operational Intelligence,
powered by



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Contact us for an Industry 4.0 or Are you AI-Ready Audit and Workshop...



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- [Are you AI ready?](#)



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Check out my [Industry 4.0 Blog](https://industry40iiot.com)
<https://industry40iiot.com>

Questions?

Please wait for
the **microphone**

State your
name & company



Please remember to...

Complete Survey!
Navigate to this session in
mobile agenda for survey

An advertisement for the OSISOFT PI World app. It features a dark blue background with white text. On the right, a smartphone displays the app's logo and name. Below the text are two buttons: 'Download on the App Store' and 'GET IT ON Google Play'.

TO DOWNLOAD APP,
SEARCH OSISOFT
PI WORLD

Download on the
App Store

GET IT ON
Google Play

OSISOFT
PIWorld

謝謝 KEA LEBOHA
 TARADH LEIBH 고맙습니다
 БАЯРЛАЛАА MISAOTRA ANAO
 DZIĘKUJĘ CI NGIYABONGA TEŞEKKÜR EDERIM GRACIES
OBRIGADO شكرا SALAMAT
 DANKON TANK TAPADH LEAT
 KÖSZÖNÖM DANKIE TERIMA KASIH GRACIES
 СПАСИБО МУЛТUMESC
 PAKMET CIZGE HVALA FAAFETAI
 GO RAIBH MAITH AGAT ESKERRIK ASKO
 БЛАГОДАРЯ GRACIAS HVALA ХВАЛА ВАМ
 МАНАДСАНД **THANK YOU** TEŞEKKÜR EDERIM
 ТИ БЛАГОДАРАМ
 DANK JE EΥΧΑΡΙΣΤΩ GRATIAS TIBI **GRAZIE**
 TAK DANKE MAHALO IĀ 'ŌE TAKK SKALDU HA
 RAHMAT **MERCI** DZЯKYI
 HATUR NUHUN GRAZZI PAKKA PĒR **ありがとうございました**
 PAXMAT CAҒA SIPAS JI WERE TERIMA KASIH DI OU MÈSI
 FАLEMINDERIT UA TSAUG RAU KOJ ĐAKUJEM
 TI БЛАГОДАРАМ MATUR NUWUN
 СИПОС
 CẢM ƠN BẠN
 WAZVIITA

