



DIGITAL INSIGHT:

Optimizing the future of plant operations

Nitrogen & Syngas 2019
Stamicarbon workshop

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October 27th, 2019

The innovation & license company
of the former Maire Tecnimont



AGENDA

1. From science fiction to reality
2. Drivers for digitalization
3. Stamicarbon's digital mission
4. Stamicarbon's digital services

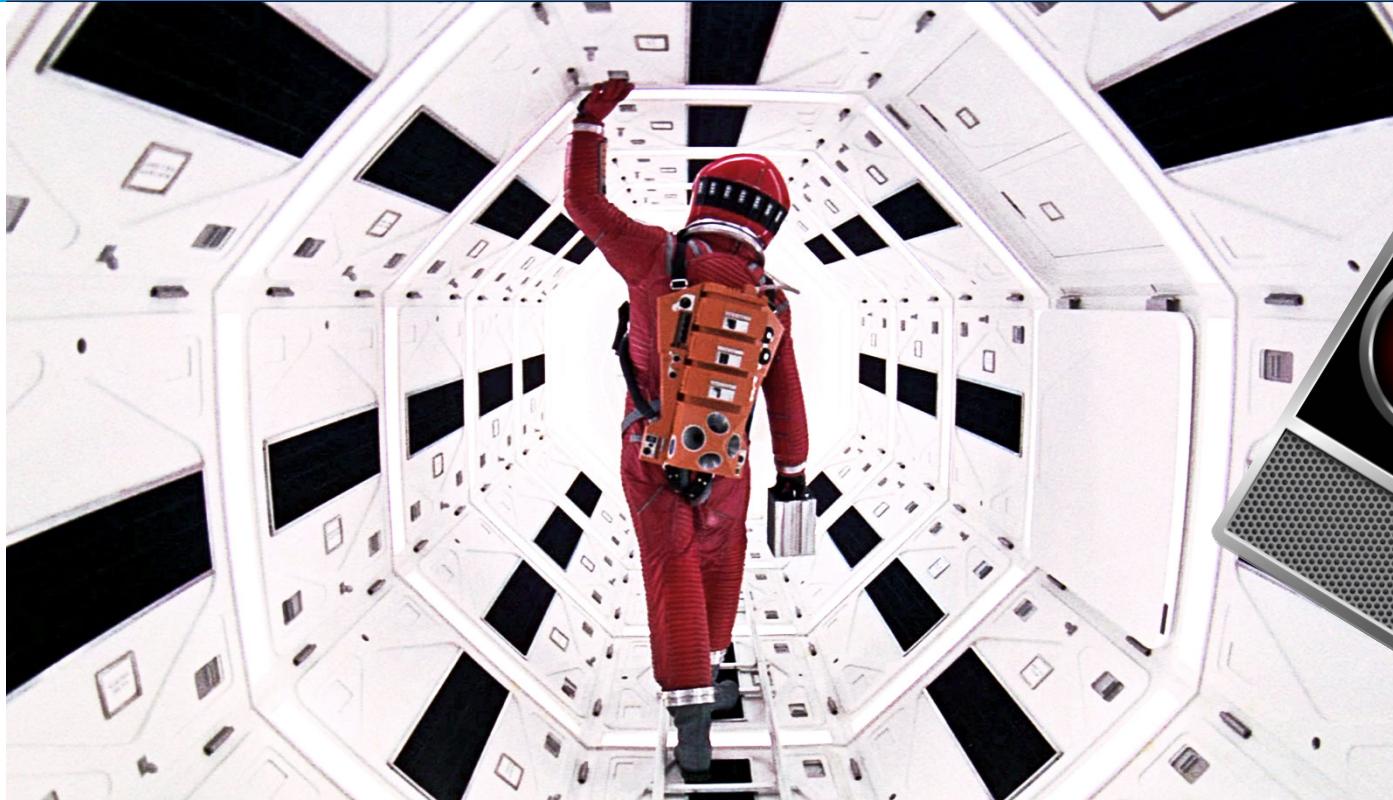
DIGITALIZATION, THE DEFINITION

Using digital technologies and data in order to create revenue, improve business, replace/transform business processes and create an environment for digital business whereby digital information (data) is at the core

Digit(al)ization :

Creating a “bits and bytes version” of analog/physical things such as documents, photographs, microfilm images, sounds etc.

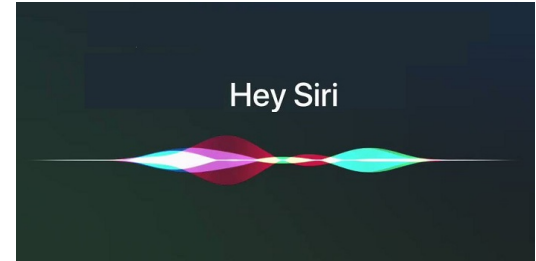
FROM SCIENCE FICTION TO REALITY



HAVE YOU MET THESE ...?

History's future is today's reality...

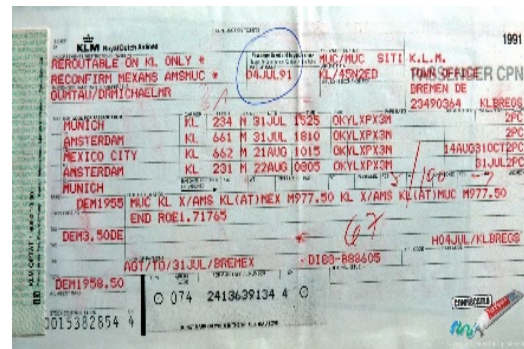
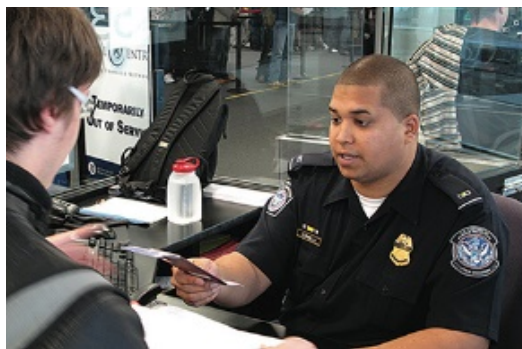
Siri is Apple's virtual assistant, who can interpret questions and perform a lot of your iPhone's tasks



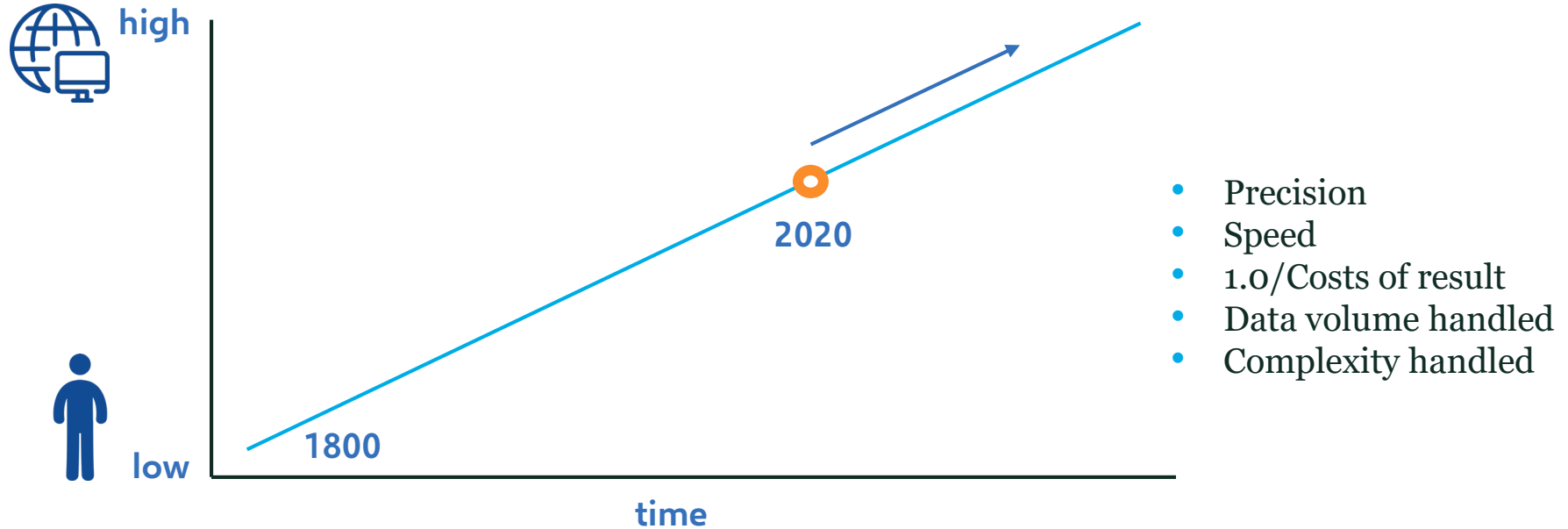
Alexa can play music, read news, tell you the weather forecast, control your house lighting, set your central heating, set your alarm clock.....
In April 2019 over 90.000 skills were available

Alexa costs \$49.99 @ Amazon

EXAMPLES OF THE PAST - TRAVEL

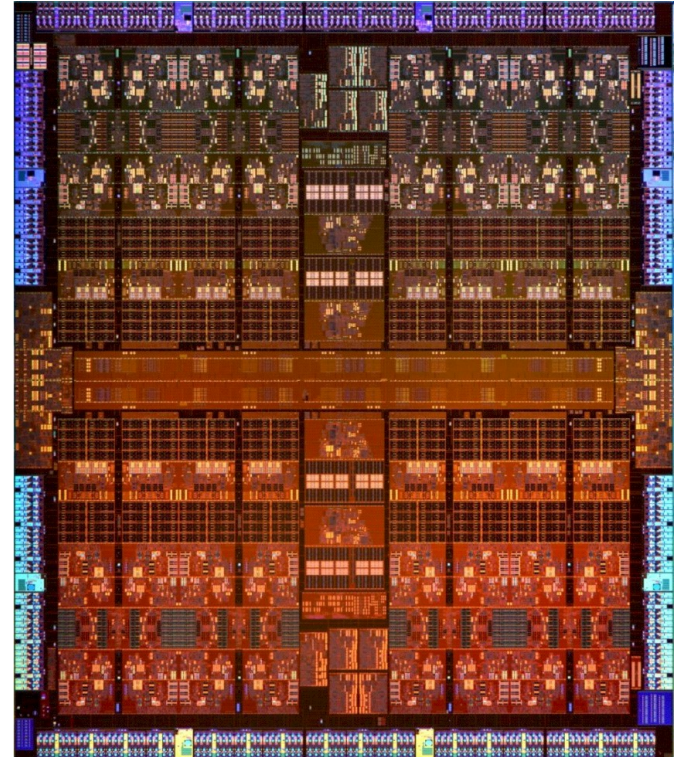


DRIVERS FOR DIGITALIZATION

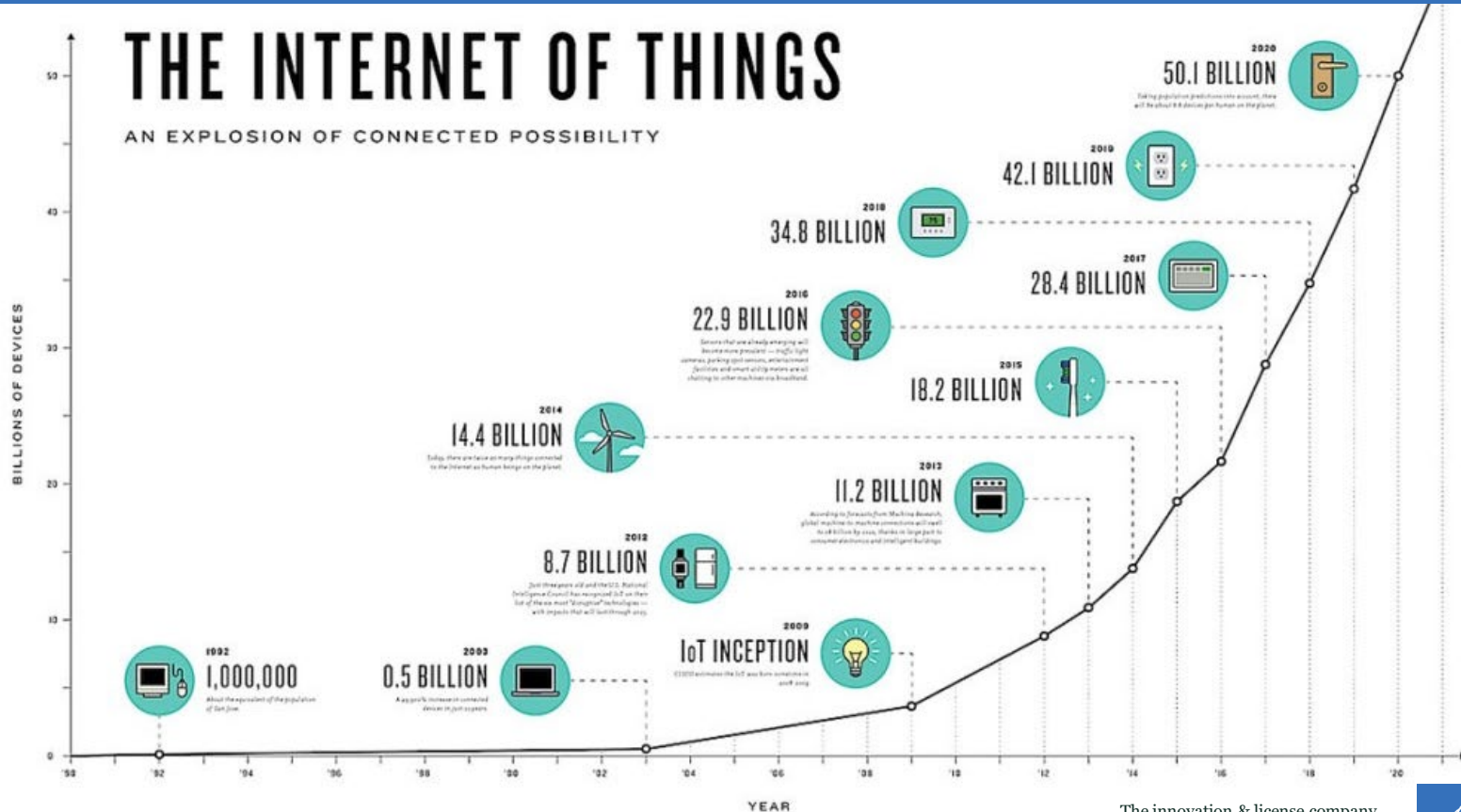


MOORE'S LAW: MORE CAPACITY

- The number of transistors in a dense integrated circuit doubles about every two years
- From under 5000 in the 1970s to 10 billion
- 7 orders of magnitude in size
- 13 orders of magnitude in costs



CONNECTED DEVICES: MASSIVE PRODUCTION OF DATA



TECHNOLOGY TREND SUMMARY

Better hardware & software

- Unlimited stable and secure processing power/storage capacity (cloud computing)
- Cheap and simple to use mobile devices and apps

Better connectivity

- Unlimited cheap, stable communication bandwidth (5G)
- Get connected to other people/systems anytime anywhere on any device

Better security and accepted standards

- Standardized and secure communication protocols (TCP/IP; TLS; HTML5; OPC-UA)

Improved tools

- More software developers with better tools

DATA MEANS BUSINESS

“Everyone’s connected. Everyone has data. What you do with it to understand and serve customers every moment, real-time — that’s what matters. It’s a completely different mindset and way of running a business.”

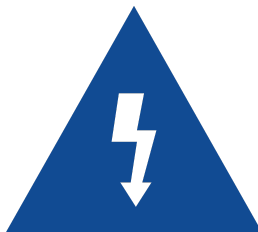
- Robert C. Wolcott



STAMICARBON'S DIGITAL MISSION



Increase
capacity



Reduce
energy use



Reduce
emissions



Reduce plant
downtime



Improve
margins

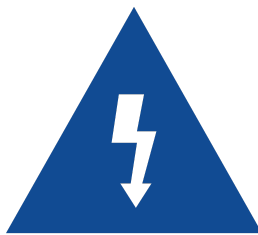


Improve the design
of future plants

QUESTION



Increase



Reduce



Reduce

What (type of) information is your operator lacking to realize these targets ?



Reduce plant
downtime

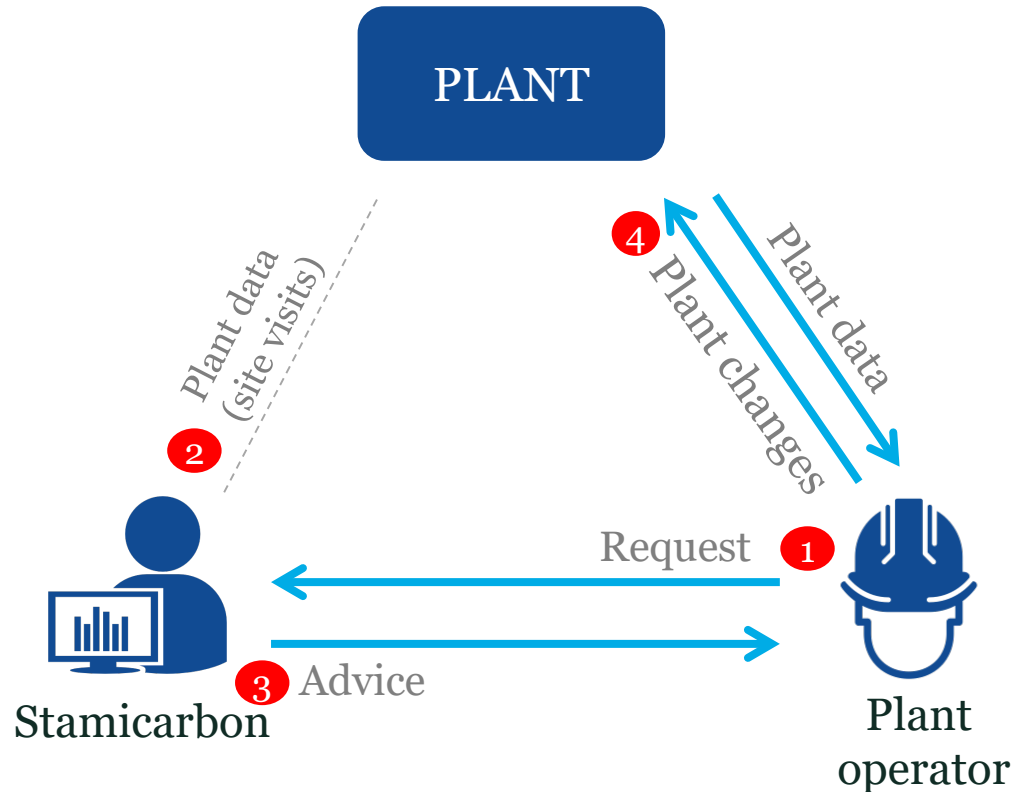


Improve
margins



Improve the design
of future plants

TRADITIONAL SERVICES MODEL



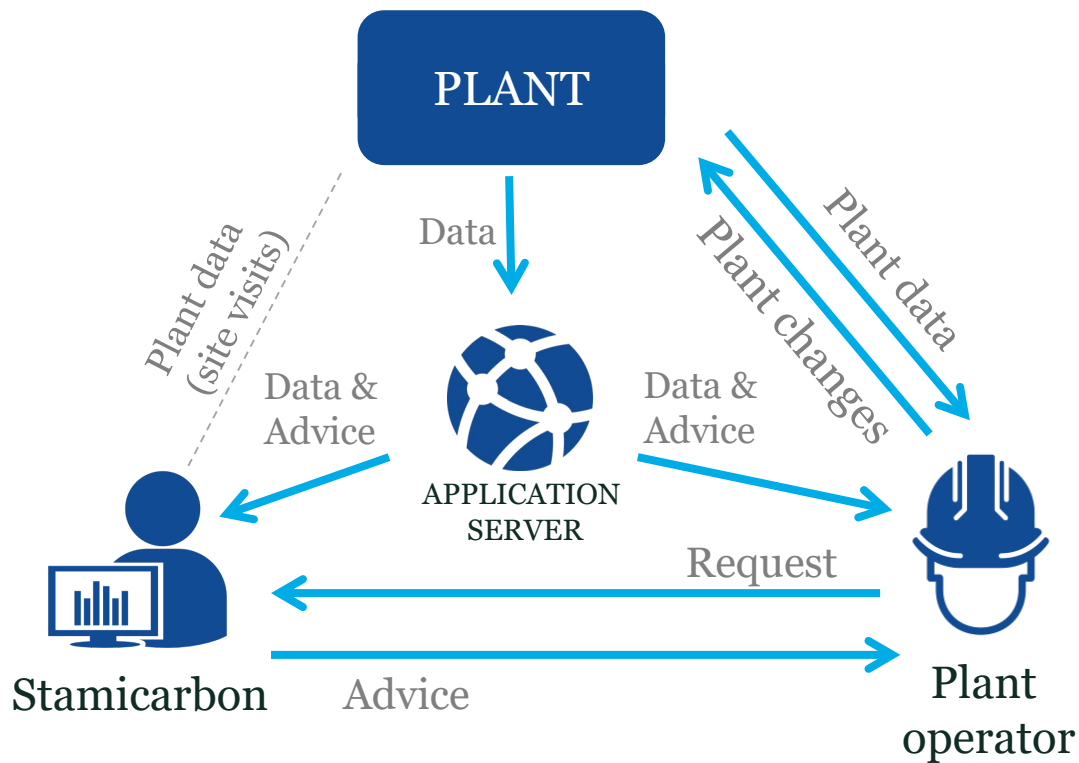
TRADITIONAL SERVICES MODEL

- Plant assessment
- Troubleshooting
- Training
- Inspection

CHARACTERISTICS

- » Occasional
- » By humans
- » On request
- » Offline

DIGITAL SERVICES MODEL



DIGITAL SERVICES

- Process monitoring & insight
- Troubleshooting
- Reporting
- Operator training
- Risk-based inspection planning
- Benchmarking
- Plant optimization with Real Time Optimizer and Model Predictive Control

CHARACTERISTICS

- » Available 24/7
- » By machines
- » Subscription based or pay for use
- » Online

- Process monitoring & insight
- Troubleshooting
- Reporting

CHARACTERISTICS

- » Available 24/7
- » By machines

What digital service would you or your company need ?

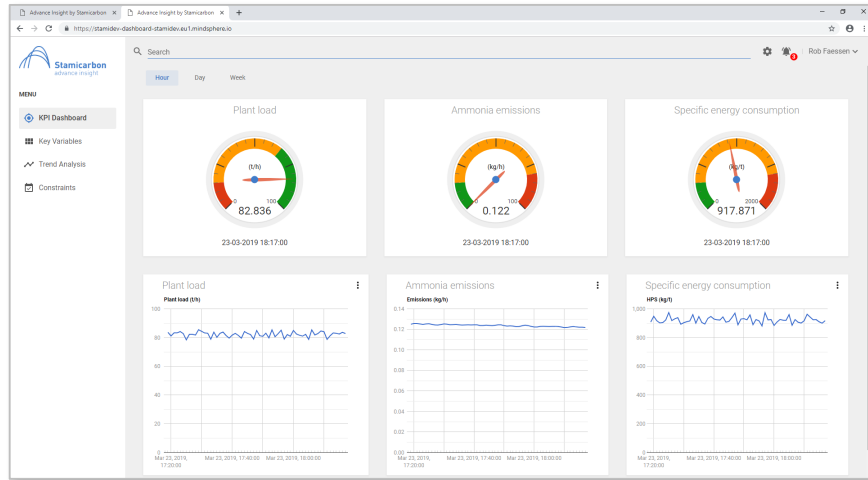
- Plant optimization with Real Time Optimizer and Model Predictive Control

EXAMPLE: REPORTING

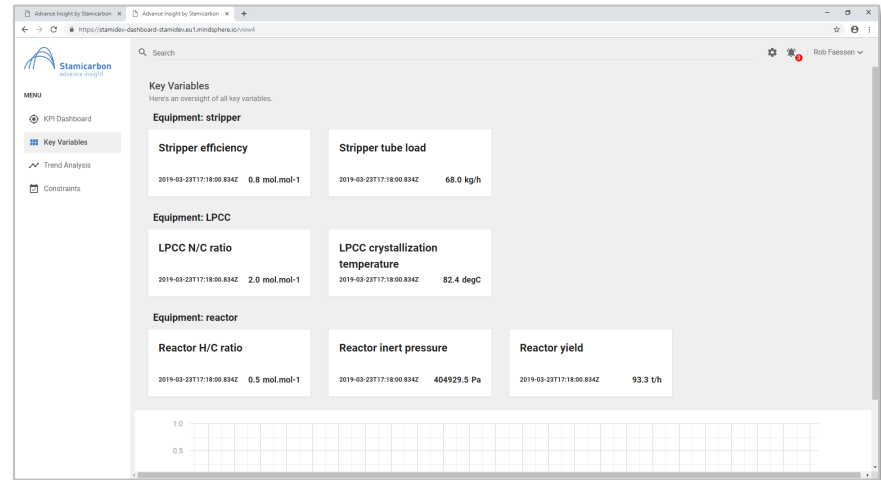
- Digital intervention



EXAMPLE: ADVANCE INSIGHT - PROCESS MONITOR



KPI dashboard

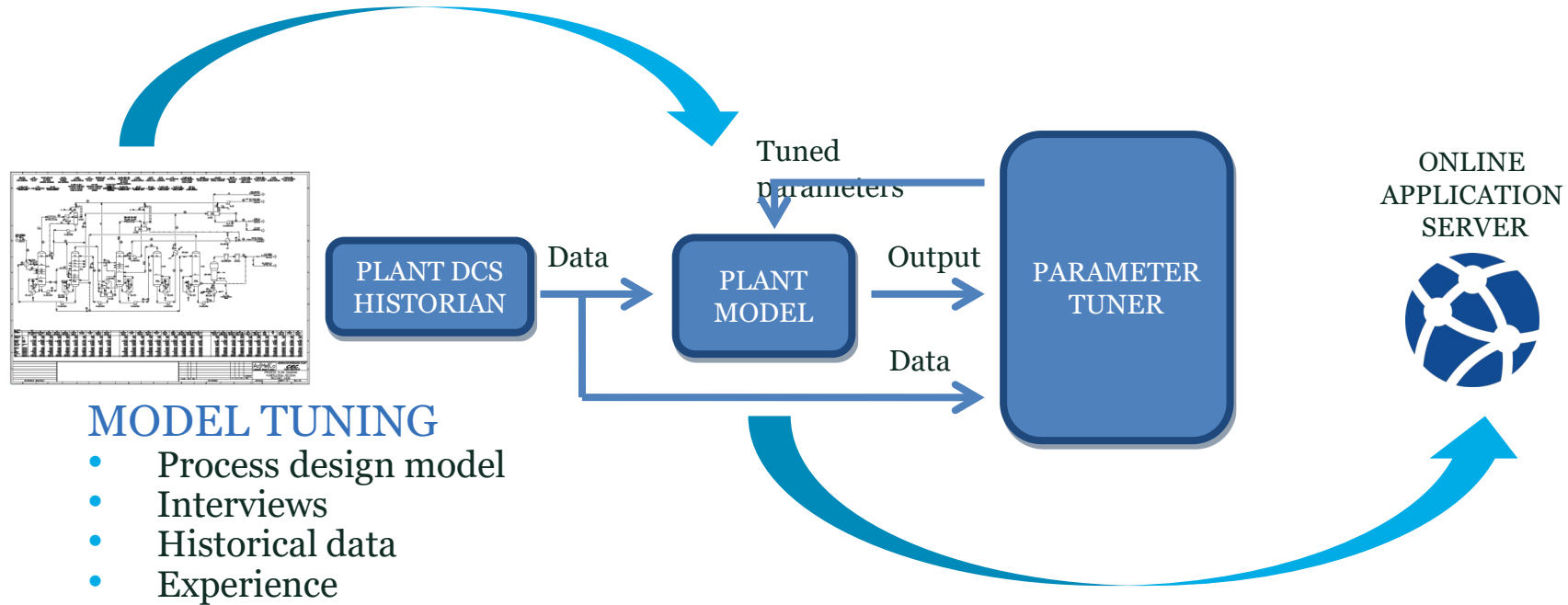


Key variables dashboard

The Process Monitor provides insight for stabilizing and optimizing a plant manually. It comprises:

- KPI dashboard (throughput, emissions, specific energy consumption)
- Key variables dashboard (important information for control and optimization).

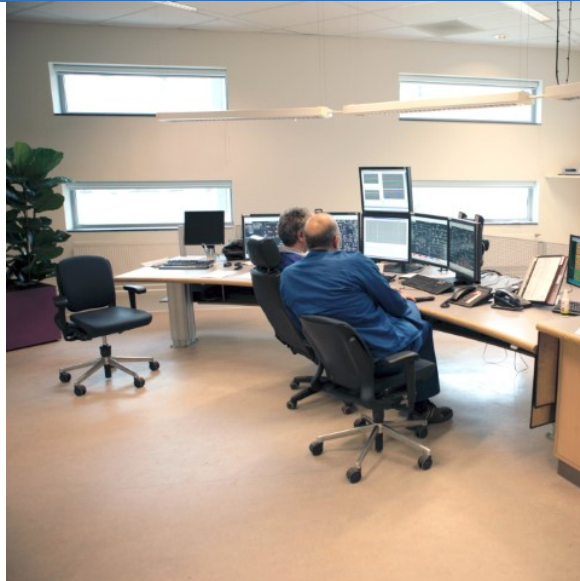
SIMULATION IN PARALLEL WITH PLANT OPERATION



EXAMPLE: ADVANCE INSIGHT - PLANT OPTIMIZER

- Pushing the plant to the limits, while monitoring and controlling multiple parameters simultaneously
- Digital technology takes this to a whole new level.





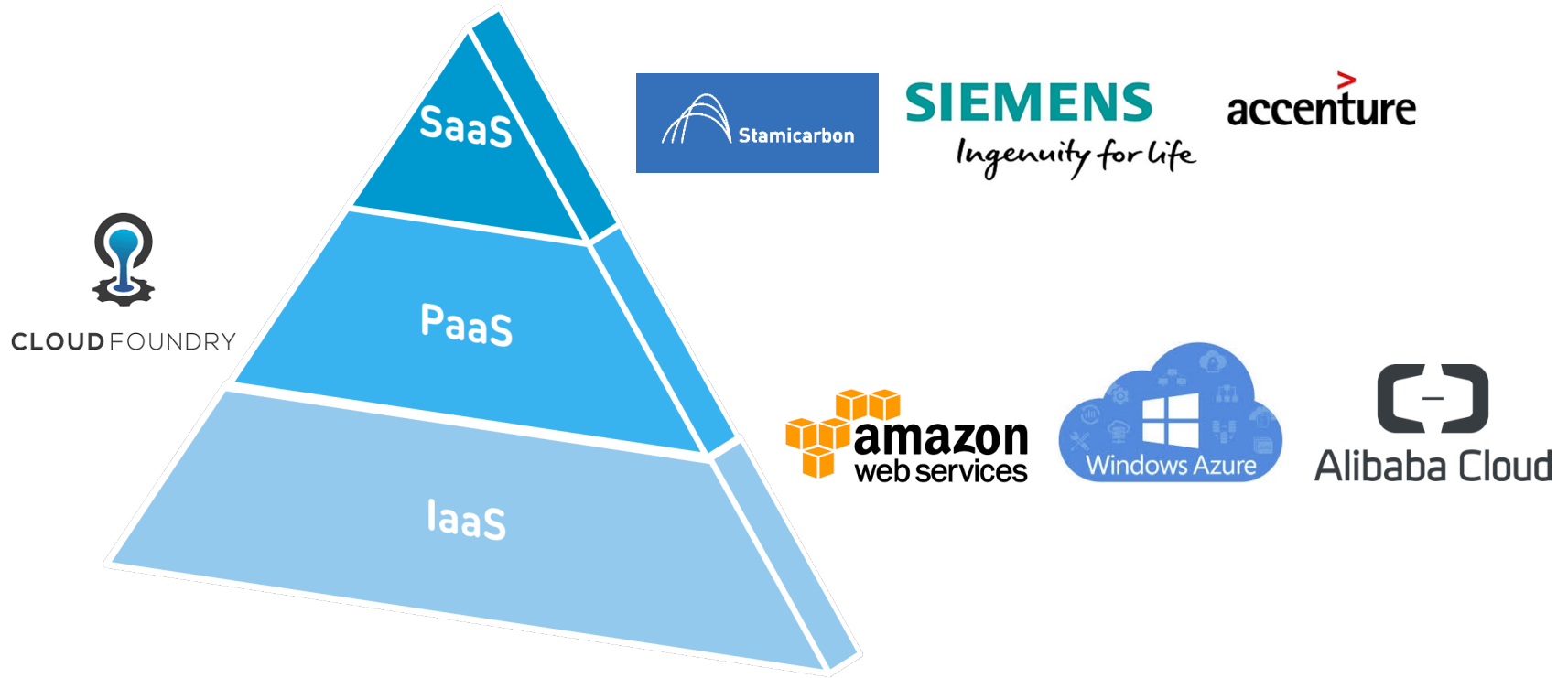
Results:

- Smoothly running plant
- 4% more throughput
- 4% less steam consumption

OCI, Geleen, the Netherlands:

- **Process Monitor:** calculates key variables based on tuned process model
- **Real Time Optimizer:** determines optimum operating point given constraints
- **Model Predictive Controller:** determines optimum of setpoint changes over time, respecting constraints

DIGITAL SERVICE PROVIDERS



A close-up photograph of a person's hands, wearing a blue jacket, holding a large quantity of small, white, spherical granules. The granules are piled in the palms and fingers. Overlaid on the center of the granules is the word "QUESTIONS?" in a bold, blue, sans-serif font.

QUESTIONS?

DISCUSSION TOPICS

1. Our operators are very experienced; they know how to optimize the plant, additional data will not bring any benefits
2. Our company will never allow to connect plant data to the internet ...
3. These services are a serious threat for the employment within our company ...
4. Stamicarbon, forget about this, you better provide us

شكراً جداً

THANK YOU FOR YOUR
ATTENTION