DIGITAL INSIGHT:

Optimizing the future of plant operations

Nitrogen & Syngas 2019
Stamicarbon workshop

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AGENDA

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

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**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

- Precision
- Speed
- 1.0/Costs of result
- Data volume handled
- Complexity handled

The innovation & license company of Maire Tecnimont
• 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

**THE INTERNET OF THINGS**

*AN EXPLOSION OF CONNECTED POSSIBILITY*

- **1982**: 1,000,000
  - About the equivalent of the population of New York City
- **2003**: 0.5 BILLION
  - Respectively, the number of connected devices in 2003 was
- **2010**: 34.8 BILLION
  - The number of connected devices will reach by 2020
- **2019**: 42.1 BILLION
  - The number of connected devices will reach by 2030
- **2024**: 50.1 BILLION
  - The number of connected devices will reach by 2040

*Extracted from: The World Economic Forum*
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; TSL; HTML5; OPC-UA)

Improved tools
• More software developers with better tools
“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
Turn real-time plant data into meaningful information by using our urea know-how to enhance insights and control and drive continuous optimization.

- Process simulation
- Process monitoring
- Remote guidance
- Plant optimization
STAMICARBON’S DIGITAL MISSION

- Increase capacity
- Reduce energy use
- Reduce emissions
- Reduce plant downtime
- Improve margins
- Improve the design of future plants
What (type of) information is your operator lacking to realize these targets?
TRADITIONAL SERVICES MODEL

PLANT

Stamicarbon

Plant data (site visits)

Plant data

Plant changes

Request

Advice

1. Request

2. Plant data (site visits)

3. Advice

4. Plant data

Plant operator
TRADITIONAL SERVICES MODEL

- Plant assessment
- Troubleshooting
- Training
- Inspection

CHARACTERISTICS

» Occasional
» By humans
» On request
» Offline
DIGITAL SERVICES MODEL

PLANT

Stamicarbon

Data & Advice

Plant data (site visits)

APPLICATION SERVER

Data & Advice

Data

Plant changes

Request

Advice

Plant operator
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
DIGITAL SERVICES

- Process monitoring & insight
- Troubleshooting
- Reporting
- Plant optimization with Real Time Optimizer and Model Predictive Control

CHARACTERISTICS

» Available 24/7
» By machines

What digital service would you or your company need?
• Digital intervention
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).
MODEL TUNING
- Process design model
- Interviews
- Historical data
- Experience
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.
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

**Results:**
- Smoothly running plant
- 4% more throughput
- 4% less steam consumption
DIGITAL SERVICE PROVIDERS

SaaS

PaaS

IaaS

CLOUD FOUNDRY

Stamicarbon

SIEMENS

Ingenuity for life

accenture

amazon web services

Windows Azure

Alibaba Cloud

The innovation & license company of Maire Tecnimont
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 ....
شكرًا جدًا
THANK YOU FOR YOUR ATTENTION