



FIRST EXPERIENCE OF THE 'BREWERY 4.0' –

THE INTERNET OF THINGS CONCEPT APPLIED IN AN
OPERATIONAL BEER FILTRATION UNIT

June 10, 2019

One Pentair

A LEADING GLOBAL COMPANY

- ~\$2.8B revenue
- Broad and industry leading product assortment and strong product lines
- Focused on smart, sustainable solutions



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130 locations

In **34** countries

10,000 employees

Our capabilities span the globe

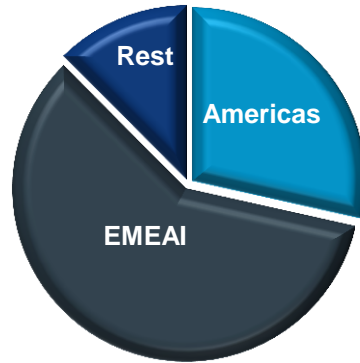
Food & Beverage Business Unit

OVERVIEW

Product Lines



Geographic Distribution



APPLICATIONS



BRANDS



INDUSTRIES

- Beer
- Dairy
- Carbonated Soft drinks
- Biofuels
- Industrial Gases

VALUE PROPOSITION

For industrial customers processing liquid and gaseous media that need a cost efficient and secure production process, Pentair's high quality product portfolio and engineering know-how, provide engineered solutions meeting the customers demands.

OUR COMMITMENT

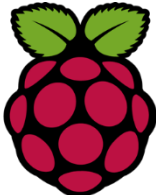
It's our Mission to be a global technology leader in the Food & Beverage and Industrial Market with a focus on optimizing our customers' processes, and partnering with them to achieve their sustainability and performance goals.

Brewing Perfection. For Life.

Introduction

- Pentair organization
- Terms and definitions
- History of BMF?
- What is our philosophy
- How do we use it nowadays
 - Dashboard
 - Mobile app
- How do we want to use it towards the future

Terms and definitions

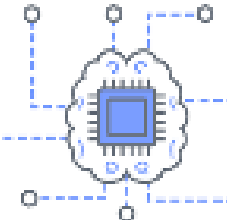


Single board computer

Machine learning

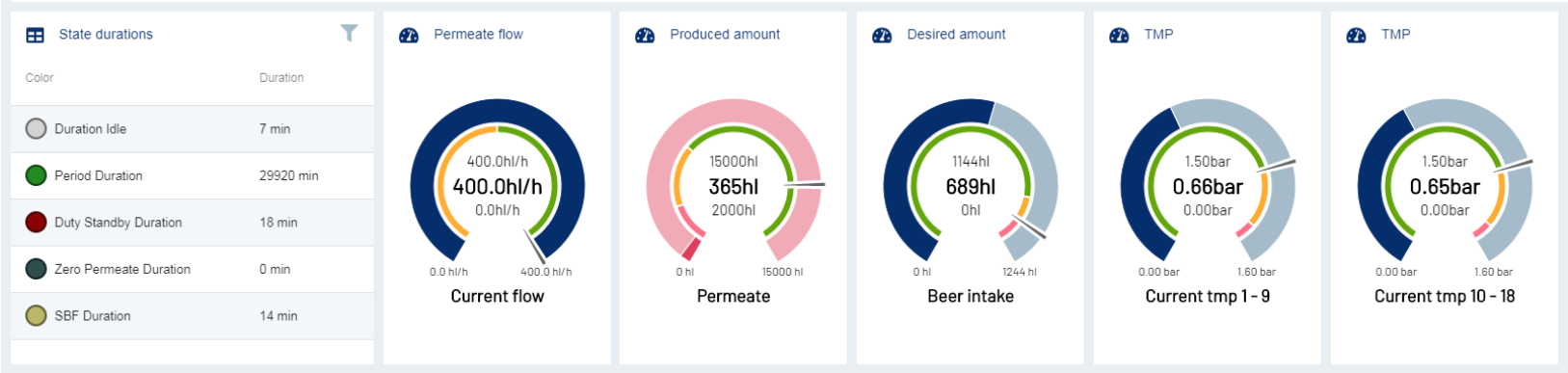


On-demand cloud computing platforms

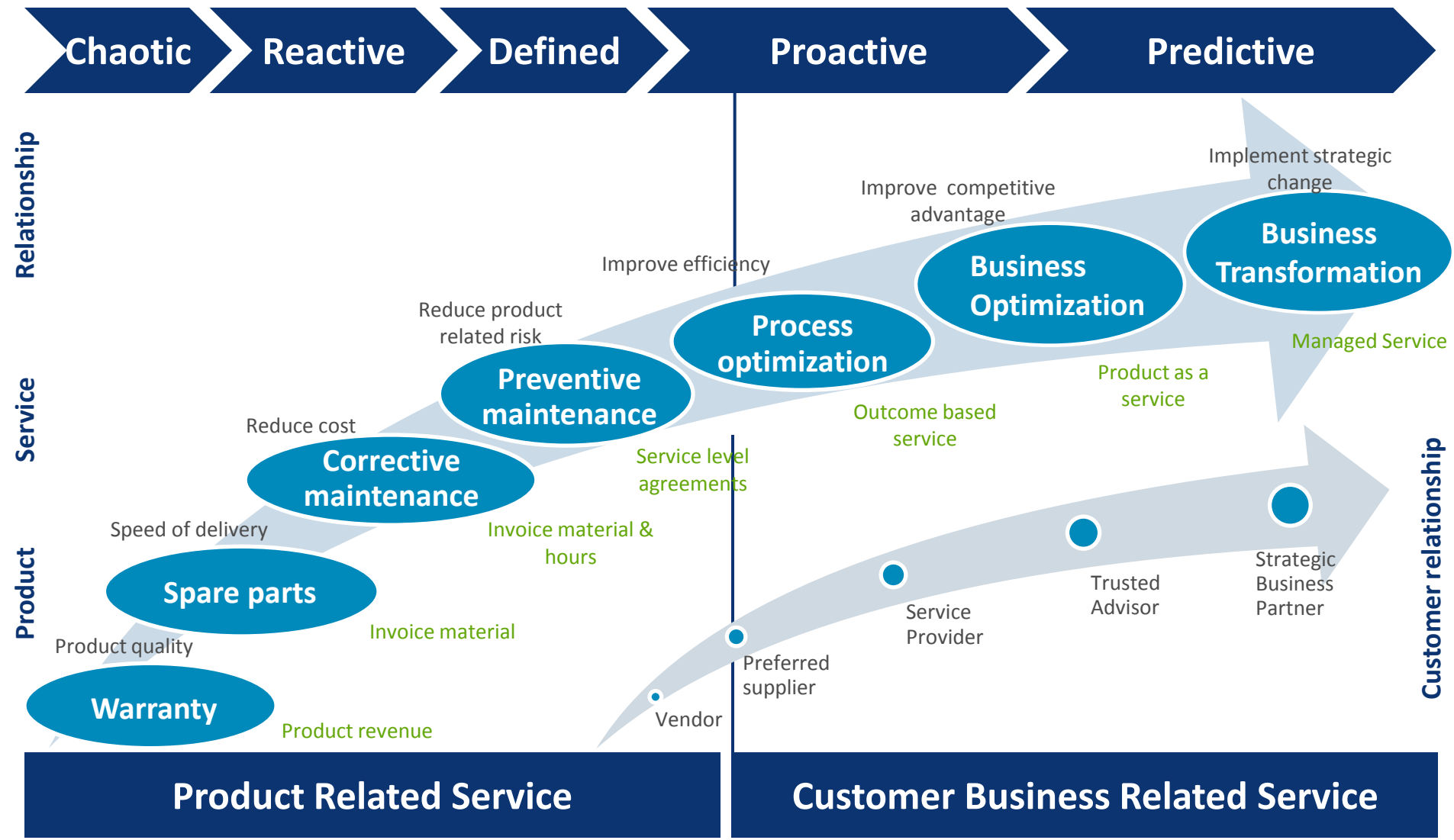


Communication protocol

Dashboard



Pentair (BMF) strategy...



Legend:
 Value proposition
 Business model

Number of BMF's

North America

5

Europe

51

Asia Pacific

56

Latin America

10

Africa

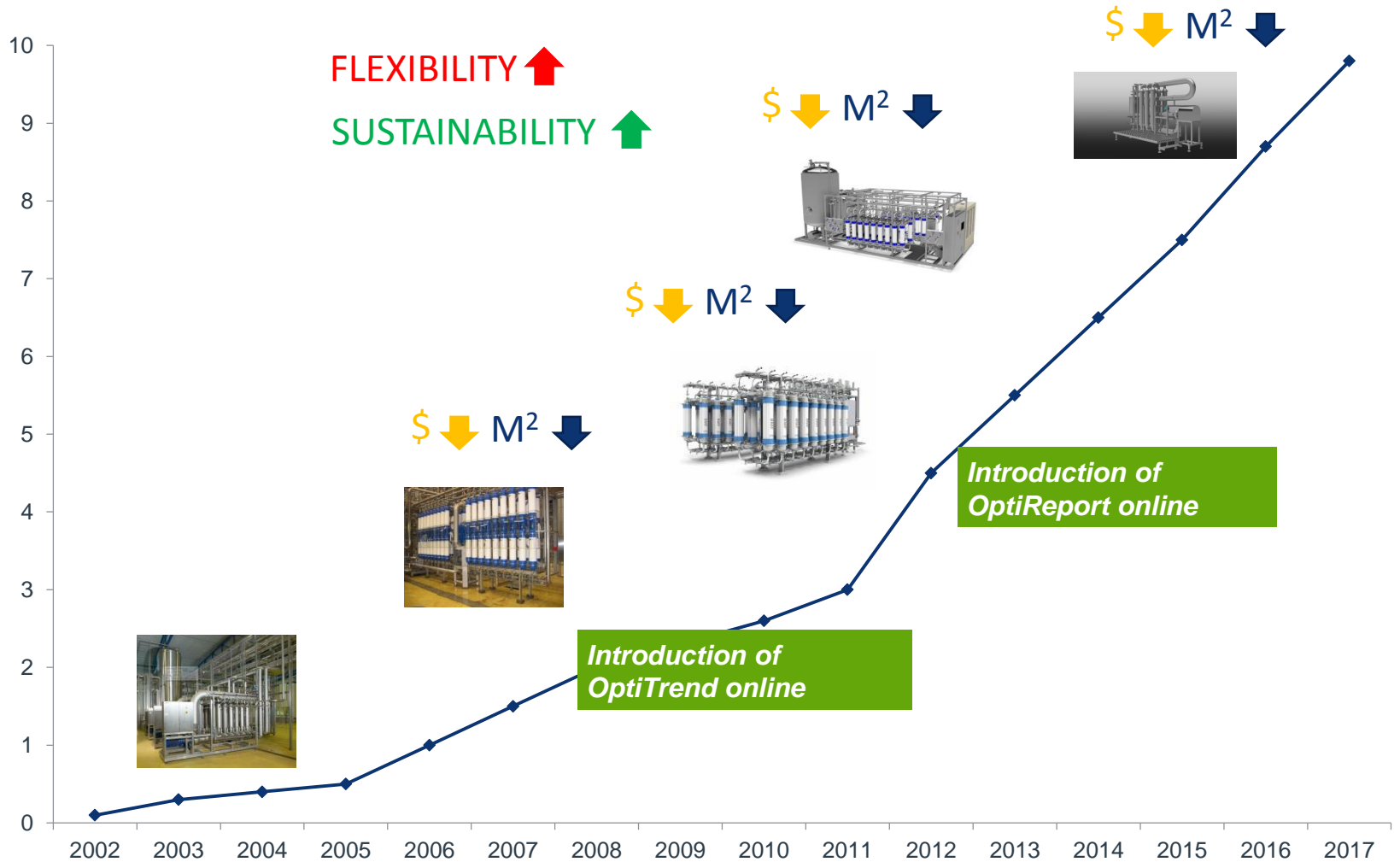
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 OETTINGER[®] MOLSON Coors AB InBev ★ Heineken[®] Carlsberg DIAGEO ThaiBev KIRIN

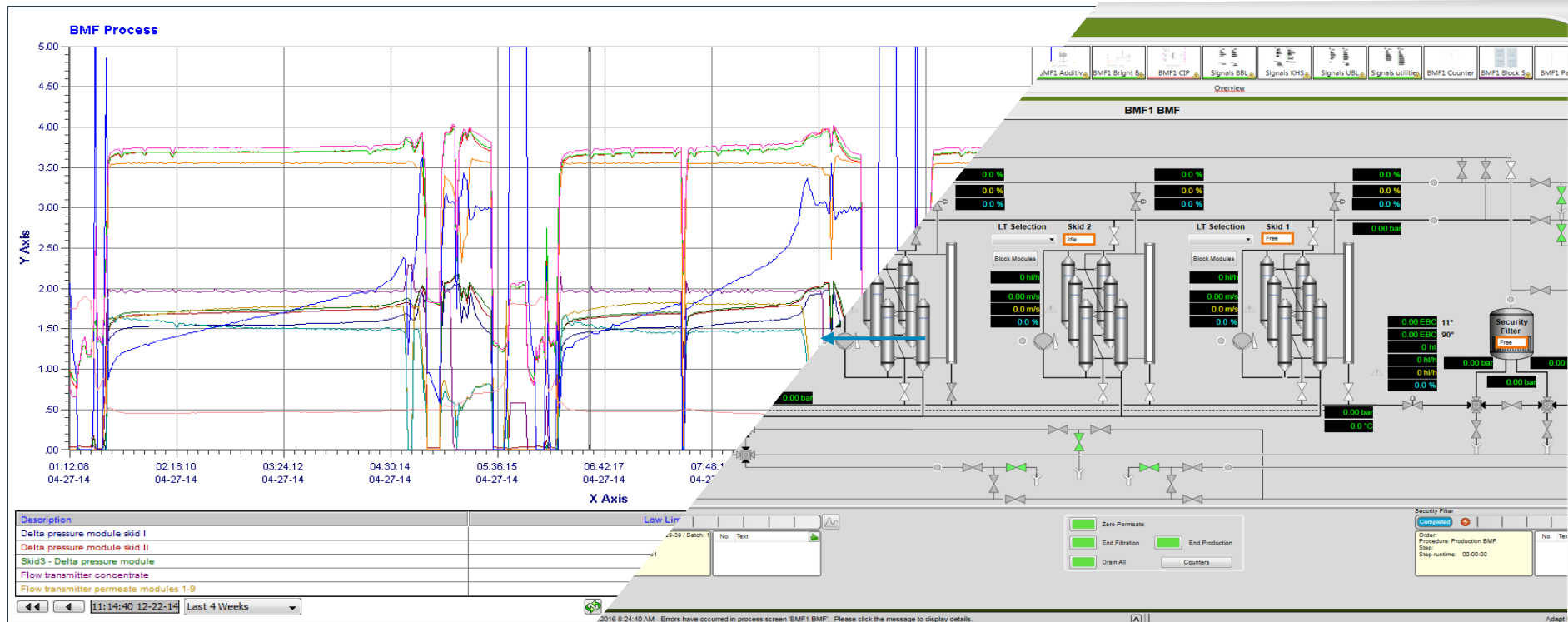
ANNUALLY >150 MILLION MEMBRANE FILTERED HECTOLITERS ARE CONSUMED.

History of BMF

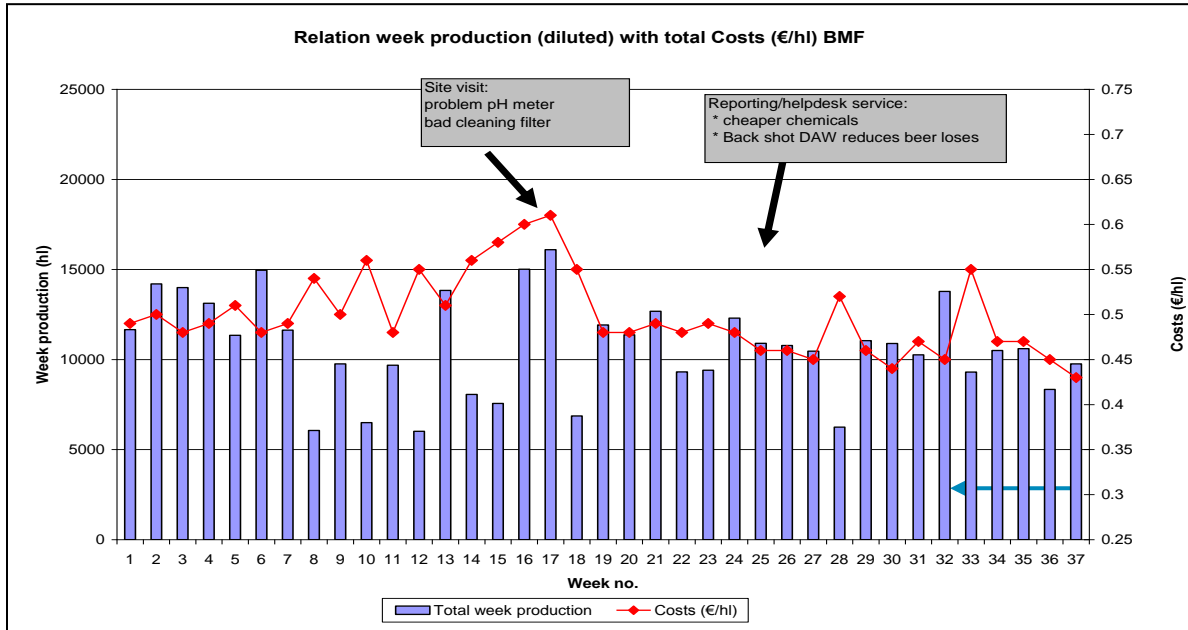
% of world beer production produced by Pentair BMF



History of BMF online trending



History of BMF reporting



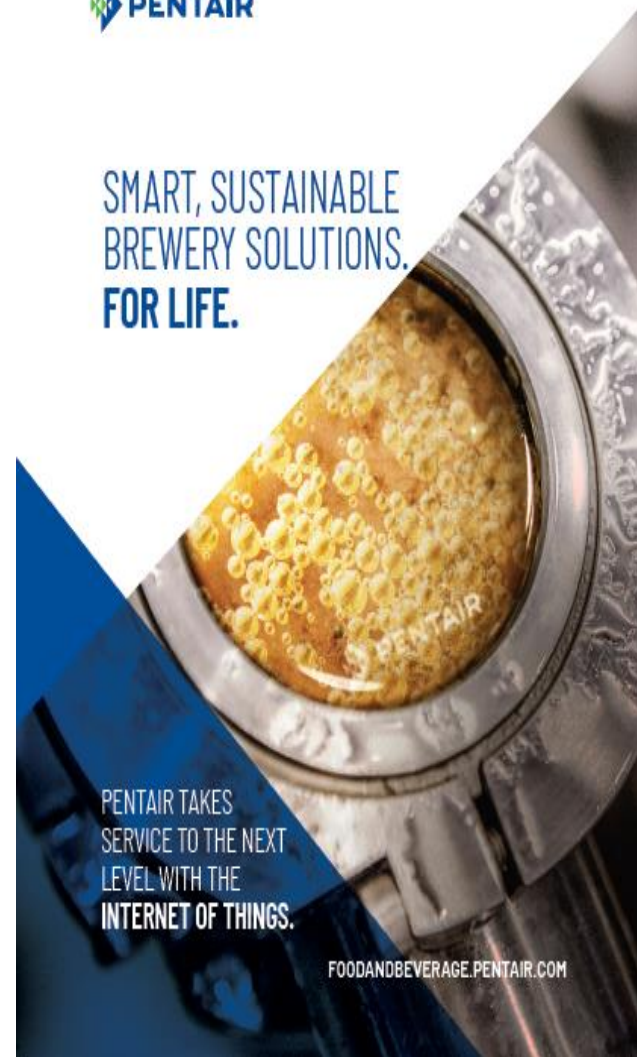
Monitoring and Trending

Pentair IoT highlights

- ◆ Plug and play gateways
- ◆ Multiple connections per gateway
- ◆ Ready for existing industrial drivers and customization
- ◆ Possibility of 3th party integration
- ◆ Infrastructure expandable on all dimensions
- ◆ Dynamic dash boarding / KPI's / Trending / Reporting / Benchmark
- ◆ Enables smart interaction between devices
- ◆ Gain of efficient remote service
- ◆ No data governance issues and 100% secure



SMART, SUSTAINABLE
BREWERY SOLUTIONS.
FOR LIFE.



PENTAIR TAKES
SERVICE TO THE NEXT
LEVEL WITH THE
INTERNET OF THINGS.

FOODANDBEVERAGE.PENTAIR.COM

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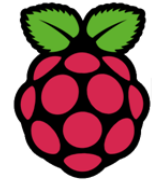
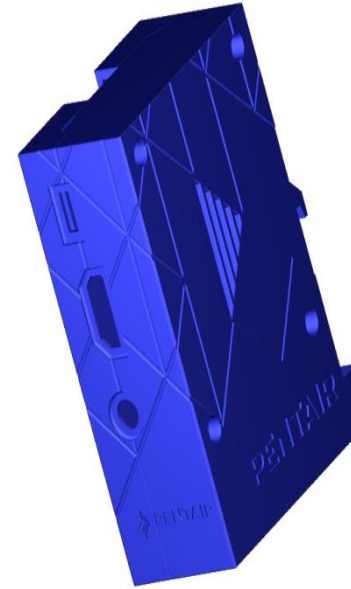
System data to Cloud connection

◆ Cost effective Hardware

- ◇ Utilization of commodity hardware
- ◇ Plug and play replacement of controller
- ◇ Gateway allows multiple data payloads
(Brewery / Laboratory environment)
- ◇ Configures as add on controller for installed base
- ◇ Primary controller specific product (e.g., S4)

◆ Launching partner for AWS on Greengrass ensuring:

- ◇ Cloud on device, intrinsic data security
- ◇ Data governance covered by AWS



RaspberryPi



AWS
Greengrass

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Data treatment in cloud

- ◆ **Flexible**

- ◇ Scalable system in all dimensions
- ◇ Powerful AWS tools for computing

- ◆ **Cost-Effective**

- ◇ Pay per use on storage and compute capacity
- ◇ Cost effective infrastructure

- ◆ **Reliable**

- ◇ Access to global redundant data centers. That are foreseen with the latest updates this makes it a 100% save surrounding



SMART, SUSTAINABLE BREWERY SOLUTIONS FOR LIVE

Data treatment in cloud

- ◆ **Scalable and high-performance**

- ◇ Expendable server capacity and compute power on demand

- ◆ **100% secure**

- ◇ We have an end-to-end connection to all our installations
- ◇ Clear data ownership (Customer data stored on own account)
- ◇ Cloud on device, intrinsic data security
- ◇ Data is entirely encrypted



SMART, SUSTAINABLE BREWERY SOLUTIONS FOR LIVE

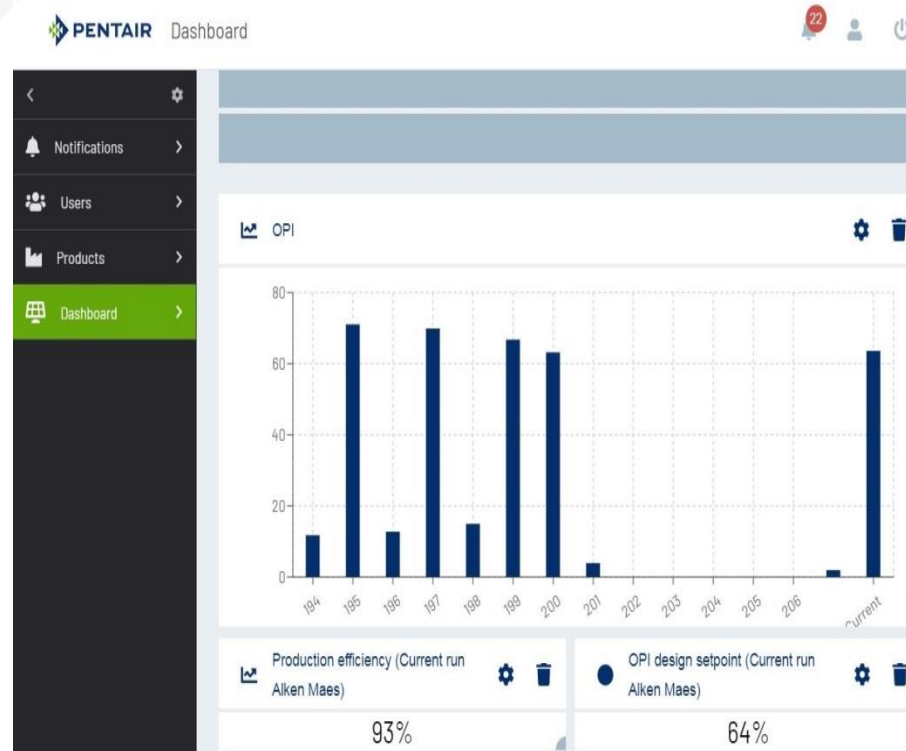
DYNAMIC DASH BOARDING: OPERATOR VIEW



- ◆ Push notifications for immediate action and information sharing (breakdown & anomaly detection)
- ◆ Alarm notifications on process disturbance
- ◆ Real time trending for quick process analytics
- ◆ OEE/KPI for measuring overall shift/plant performance

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DYNAMIC DASHBOARDING: MANAGEMENT VIEW

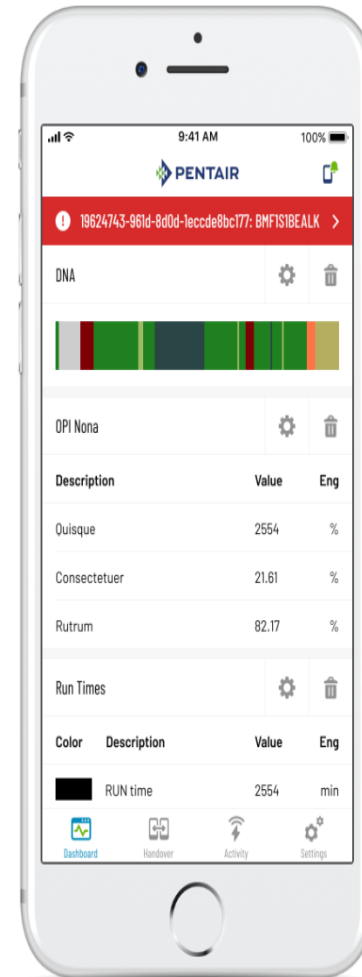


- ◆ OEE/KPI information for benchmarking against different installations and production locations
- ◆ Dynamic reporting on Availability, Performance and Quality (OEE)

SMART, SUSTAINABLE BREWERY SOLUTIONS FOR LIVE

DYNAMIC DASH BOARDING: SERVICE & MAINTENANCE VIEW

- ◆ Push notifications for a quick response on breakdown or anomaly
- ◆ Alarm notifications on process disturbance
- ◆ Real time and historical trending for process analytics
- ◆ Plant optimization based on global best practices



SMART, SUSTAINABLE BREWERY SOLUTIONS FOR LIVE

Serious Service and IoT

- ◆ **Pro-active service**

- ◇ Detect process anomalies or mechanical failures before they occur
- ◇ Be able to inform the right people at the right time

- **Plant optimization**

- ◇ Knowing 24/7 what is happening in your process
- ◇ Clear production reports for optimization of your processes

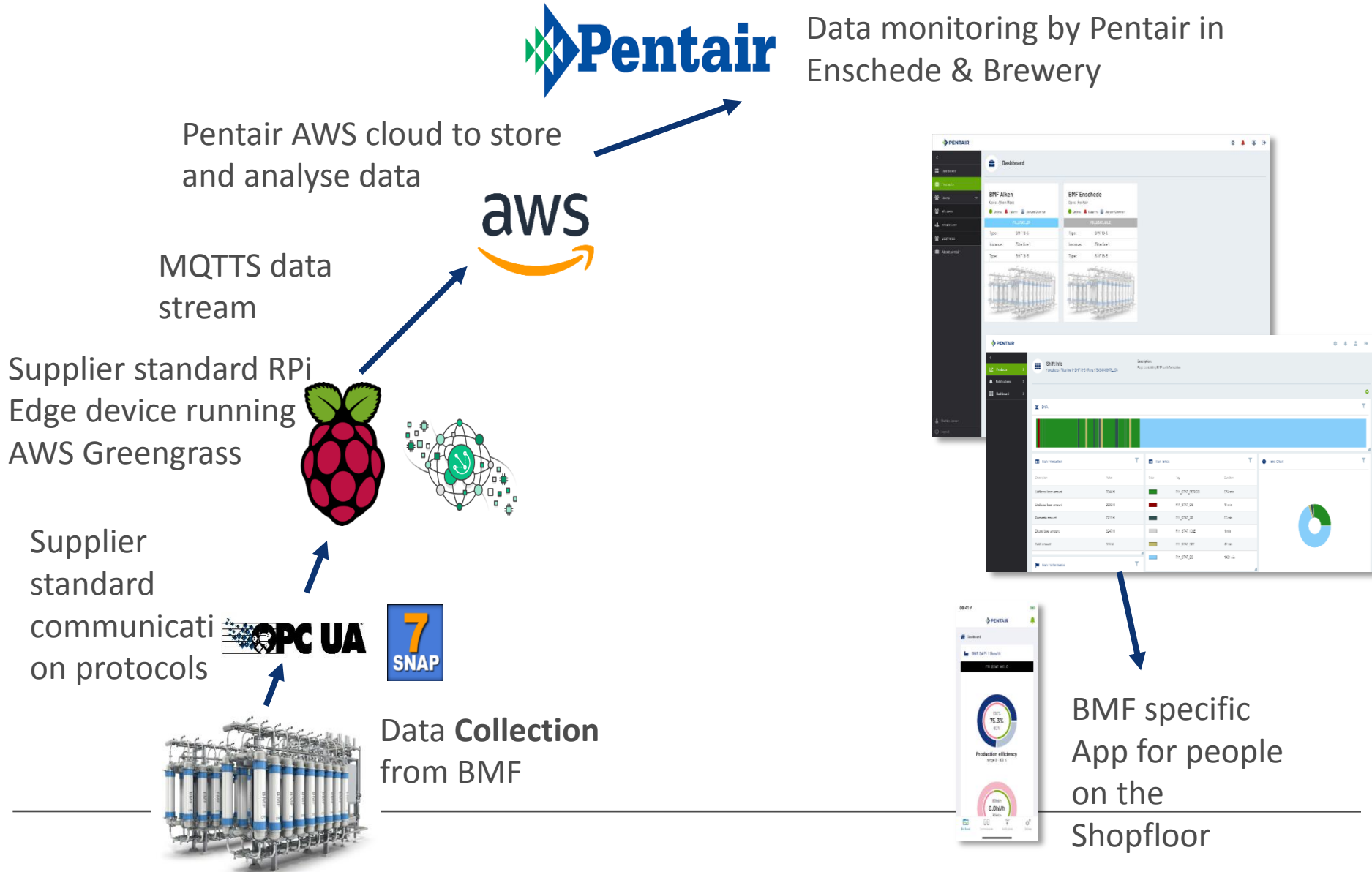
- ◆ **Instant trouble shooting**

- ◇ Single login on AWS console gives all insights of the process and operations

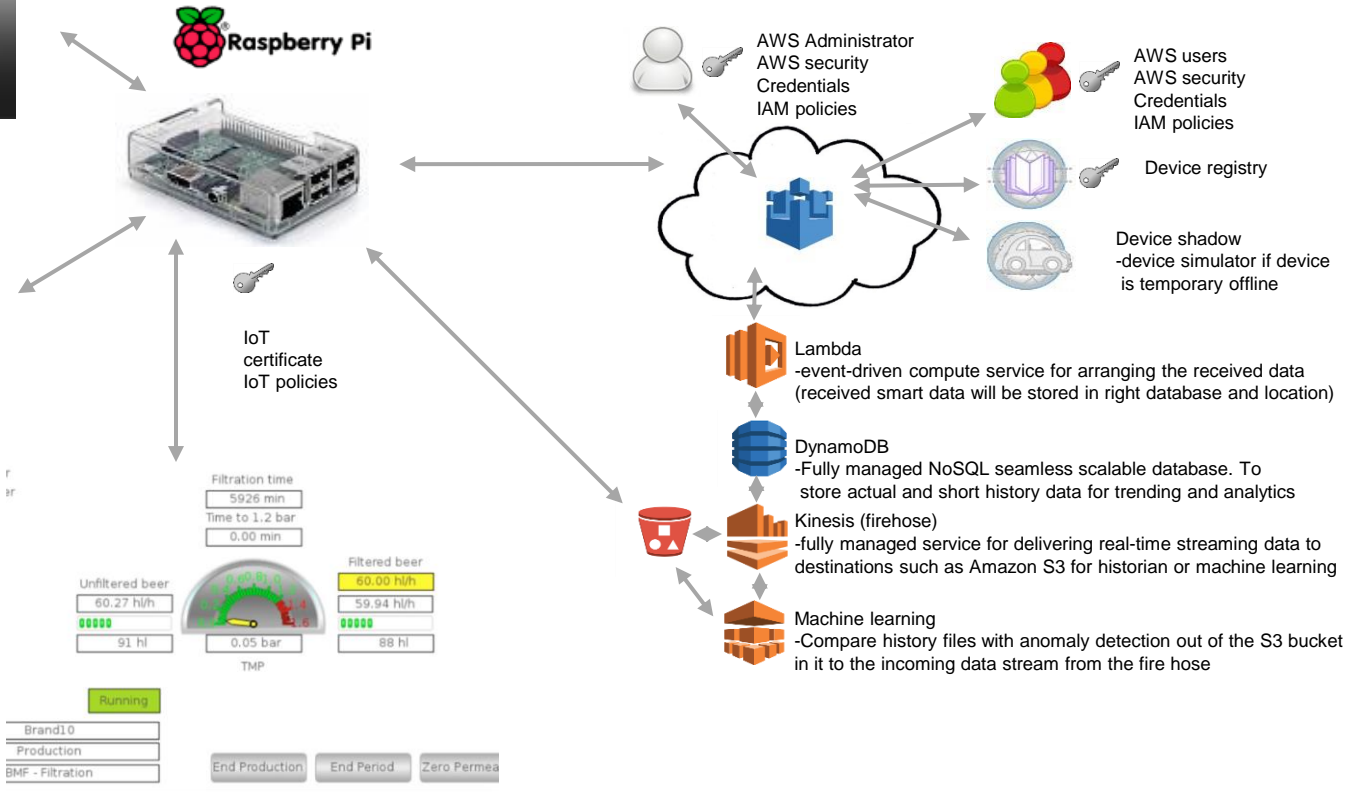


SMART, SUSTAINABLE BREWERY SOLUTIONS FOR LIVE

Our scope – Supplier standard connectivity of BMF



Safety



Systems in the Field

