



Bringing Research to Market

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Impact of EU research

The benefits for Control 2K
being involved in Research Projects



On the road towards Industry 4.0 and digital transformation

We have been involved in several EU research projects that have made a real difference to us.

- [FLEXINET](#) – rapid re-configuration of manufacturing production systems – supply chains
- [ADVENTURE](#) – manufacturing orchestration in the cloud
- [FITMAN](#) – open sustainable ecosystem for Smart Applications (FiWare)
- [CREMA](#) – elastic manufacturing and CPS
- [DIGICOR](#) – will give us tools and ideas on how to create and operate collaborative networks across value chains



Bringing research to reality

- Companies, and especially SMEs, are always more interested in **what products can do for them** rather than the technologies that drive those products
- We have always strengthened the message with our research partners in EU projects that **research should be driven by the end user needs**
- We must make research **results understood by the market** rather than leave them locked in the research world
- We **showcase and demonstrate** products and services that can help manufacturing companies improve their businesses and processes with digital technologies
- We **strengthen and improve our own products** (Industweb 4.0 & Flexeweb) through participation
- EU Commission **drive to exploitable outcomes** not research outcomes



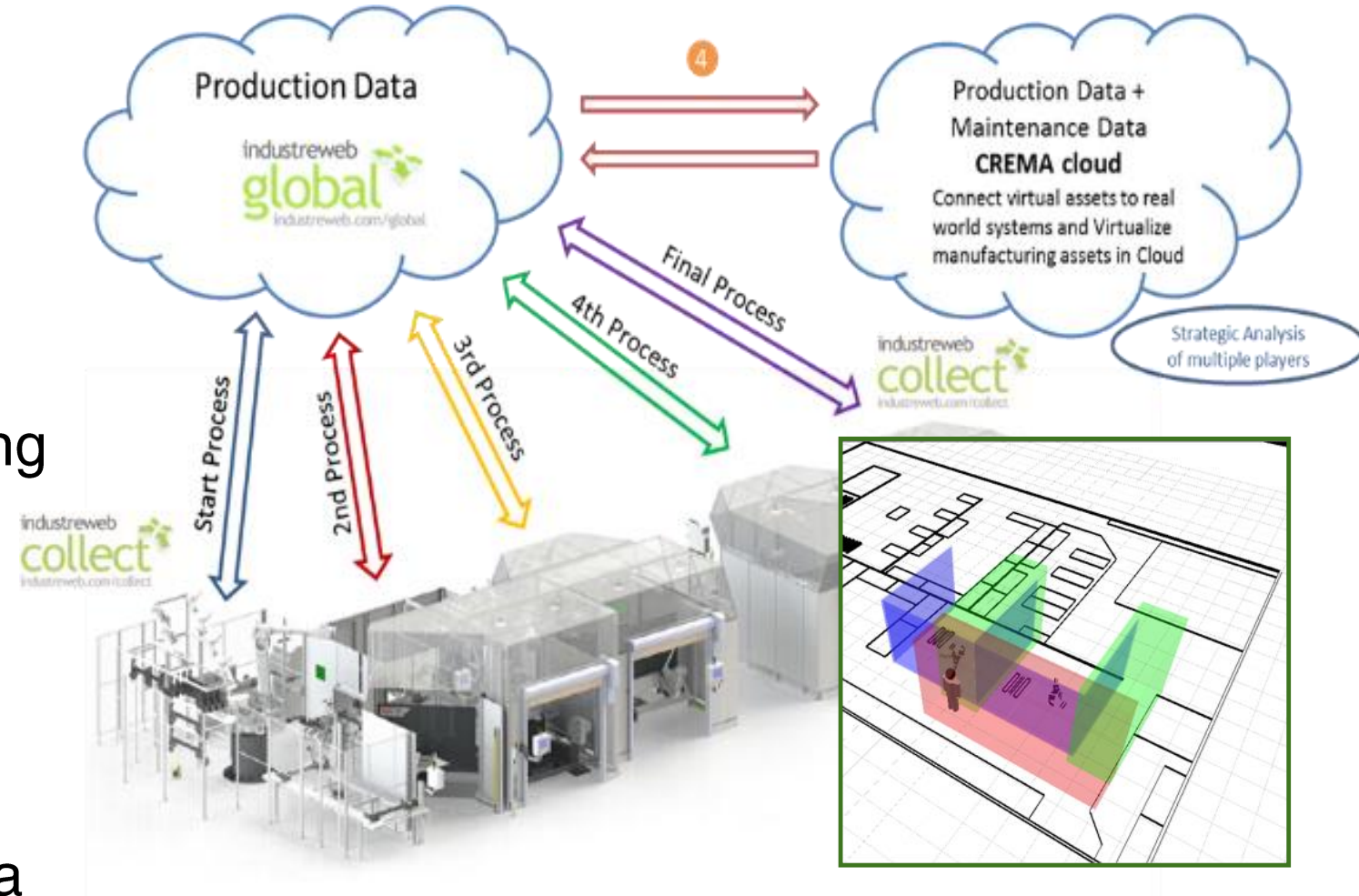
DIGICOR

- Collaborative Manufacturing
 - Digital twin of manufacturing processes
 - Toolstore – offering tools from CREMA, FiWare and any other interoperable platform using
 - DIGICOR platform has the same approach as SMECluster
 - Industweb as Factory Connector – OPC UA + ISA 95 Semantics



CREMA

- Cloud Platform Providing
 - “Elastic Manufacturing” Service Leasing / Releasing
 - CPS
 - Big Data Analytics
 - Process Design and Optimisation
 - Shopfloor data linked to via Industreweb



CREMANufacture

- Exploitation of CREMA
 - Defined Packages
 - Collaborative Monitoring
 - Data Analytics
 - Optimisation
 - Tacking & Tracing
 - Connectivity to the shopfloor via Industreweb
 - Creation of a company to commercialise outcomes

The screenshot shows the website for CREMANUFACTURE, an Industry 4.0 Toolset. The navigation menu includes HOME, FEATURES, ABOUT US, NEWS, and TESTIMONIALS. The 'Our Products' section features four icons representing Collaborative Monitoring, Data Analytics, Optimisation, and Tracking & Tracing. Below this, a paragraph explains that there are four products in the toolset designed to interact with shop floor personnel and analysts. A highlighted box titled 'Collaborative Monitoring and Optimisation Platform for Industry 4.0' contains a 'Toolset' grid with Tracking & Tracing, Optimisation, Data Analytics, and Collaborative Monitoring, alongside three other modules: Process Design, Market place, and System Administration.

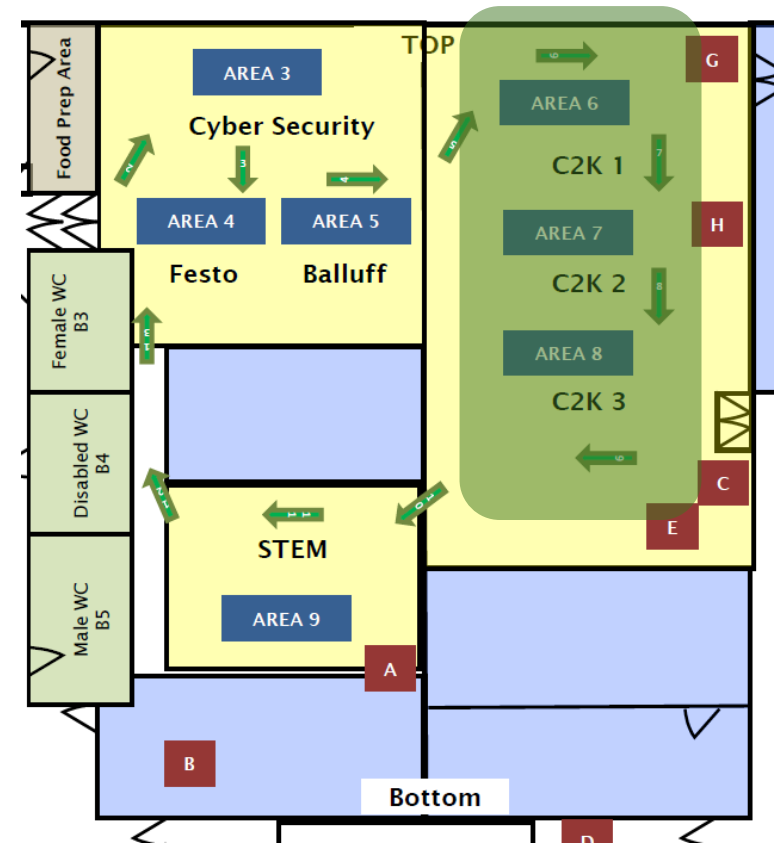
Industreweb Business Case

- Industreweb as Glue between systems
- Outline costs
 - Cell (approx £9K)
 - Line (approx £24K)
 - Plant (approx £200K)
- Smart Data not Big Data - Fog computing approach



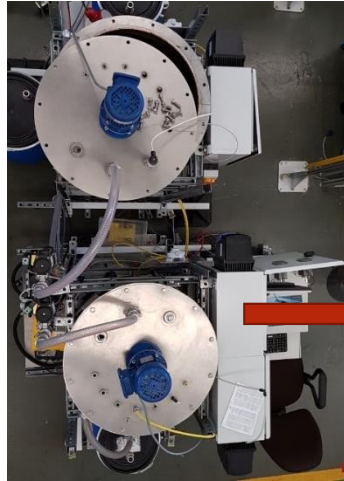
Demo - Setting the scene

- Prototype scenario - cosmetics manufacturing process
 - Wide selection of process types for our example
 - Process Control
 - Assembly
 - Pick'n'Place / Packaging
- Industweb 4.0 applied to orchestrate the process

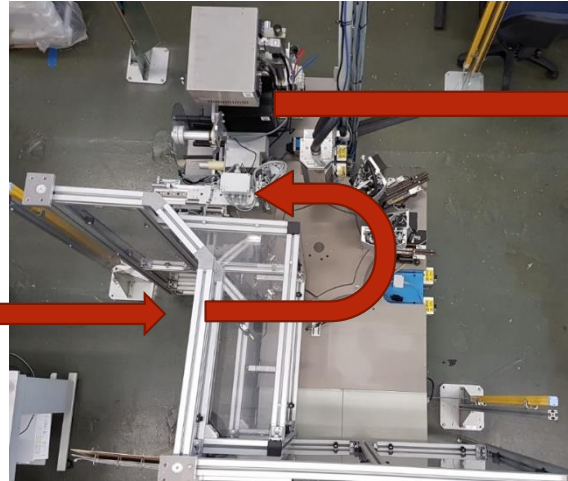


Prototype Area Layout

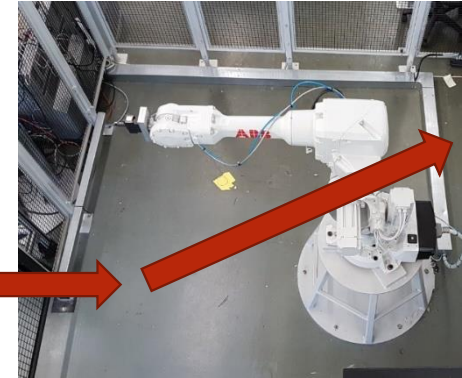
VR Suite
Vactory Digital Factory
(Area 8)



Decanting /
Processing



Filling / Assembly /
Machining

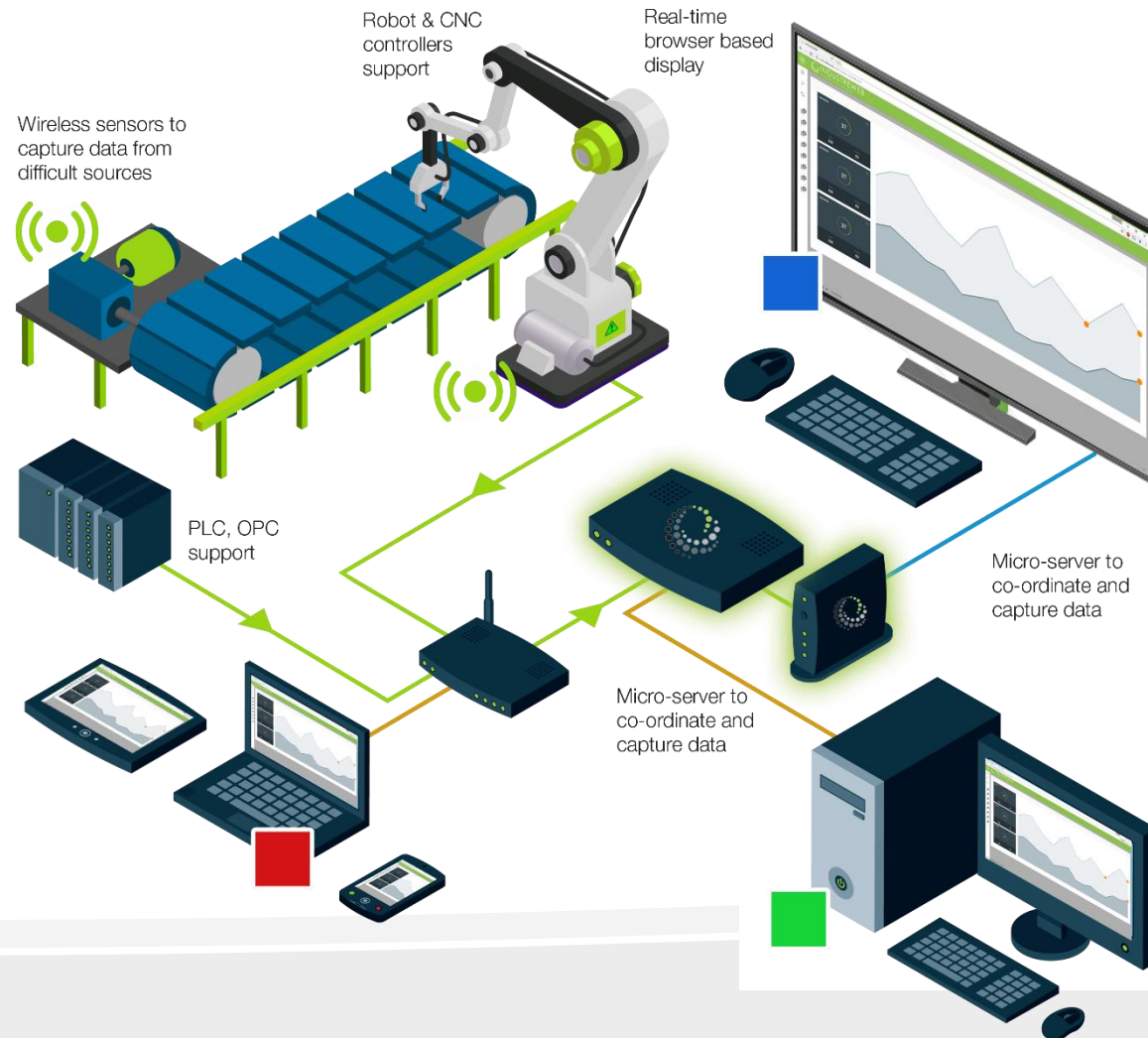


Pick and Place /
Packaging

ANDON
+
Knowledgebase
(Area 7)

Work Instructions
+
Error Proofing
(Area 6)

Application of Industweb 4.0



- Interfaced with all sources of data
 - Siemens PLC, Omron PLC, Wireless, ABB Robot Controller
 - Actively monitoring and acting upon events
- Visualisation via a responsive web interface
- Notifying via SMS, Email, IM
- Data Store integrated
- 5 Products to be demonstrated



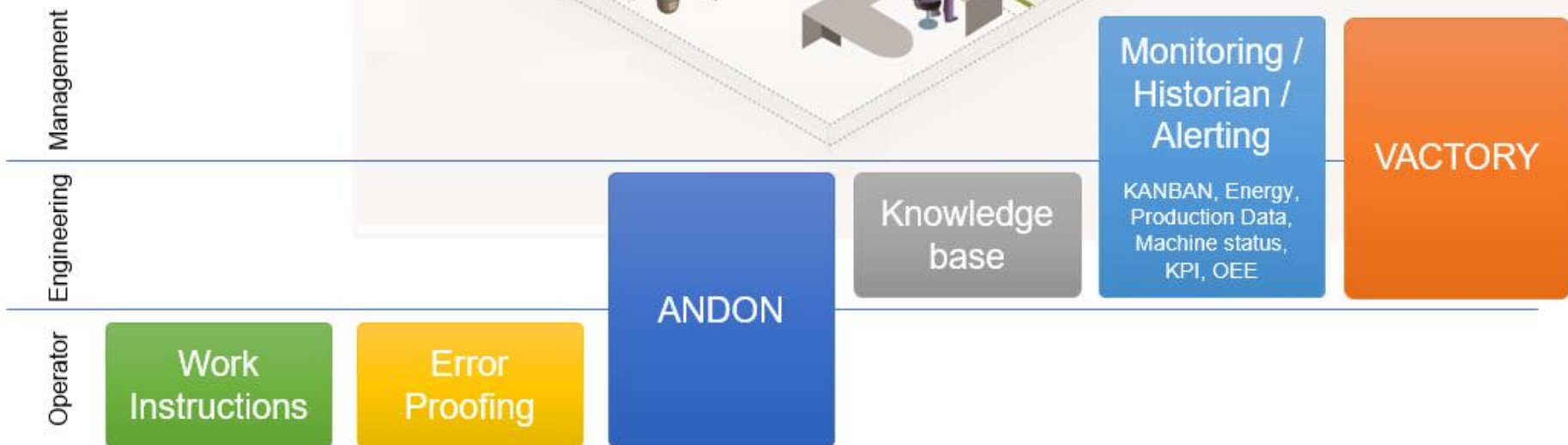
INDUSTREWEB 4.0

CONNECTING INDUSTRY

Industreweb provides the **glue** to join shop floor systems to IT infrastructure enabling Industry 4.0 capability



Toolsets provided:



Operator – Work Instructions (Area 6)

- Train up, work instructions - m/c setup, changeover, strip down
- Deploy documents shopfloor wide
- PDF, Video, Images
- Version control so only the right documents are available
- Built in Audit trail
- Product changes are communicated to key machines e.g. the mix in a specific product

The screenshot displays the 'INDUSTREWEB 4.0' interface with a green header and the TENNECO logo. The main content area is titled 'FIXTURE CHANGE OVER WORK INSTRUCTIONS PACKAGING ROBOT'. It includes a table with the following details:

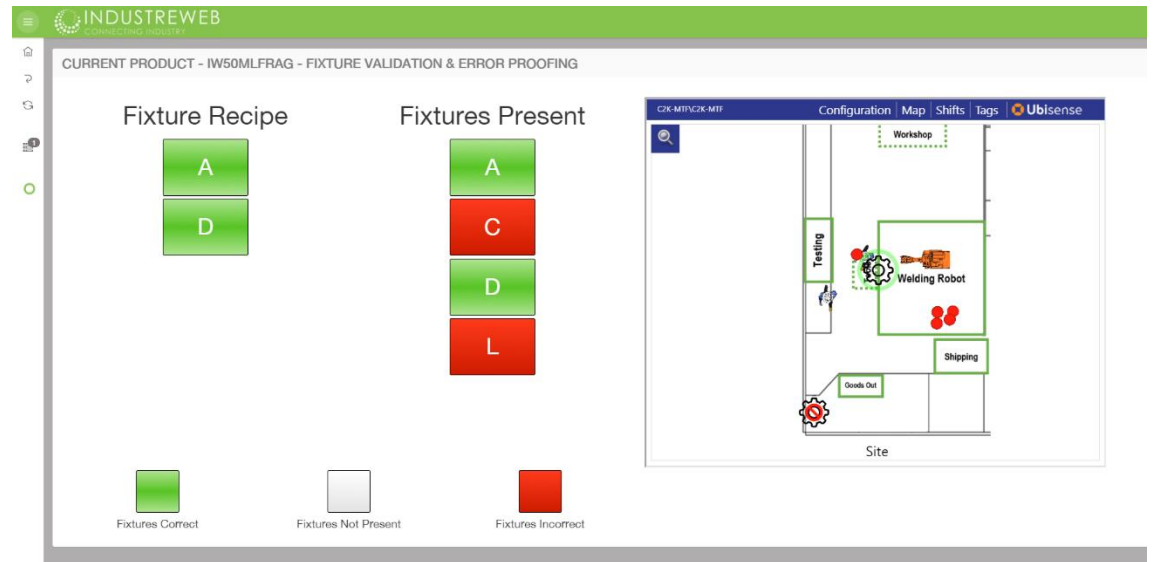
Date: 16-11-2017	Pick And Place/Packaging Robot
Action Required:	Procedure for Packaging Robot

The instructions are organized into five numbered steps:

- 1** OBJECTIVE - FIXTURE change over to suit PRODUCT PACKAGING. Includes images of an empty cardboard box and a box with a fixture inside.
- 2** Check FIXTURE RECIPE, Make sure FIXTURE RECIPE matches FIXTURES PRESENT. Shows two comparison screens. The left screen has a red 'X' indicating a mismatch, while the right screen has a green checkmark indicating a match.
- 3** Place FIXTURES in Position. Includes an image of a hand placing a fixture into a machine.
- 4** Final VISUAL INSPECTION of FIXTURES ready for PACKAGING. Includes an image of the fixture in the machine.
- 5** Once RECIPE is correct and GREEN LIGHT is on PRESS GREEN BUTTON. Includes an image of a control panel with a green light labeled 'D11/DO1' and a red button labeled 'D15'.

Operator – Error Proofing (Area 6)

- Guidance to operators tasks
- Detecting human error
- Prompting for corrective actions
- Interlocking processes to prevent safety or quality issues

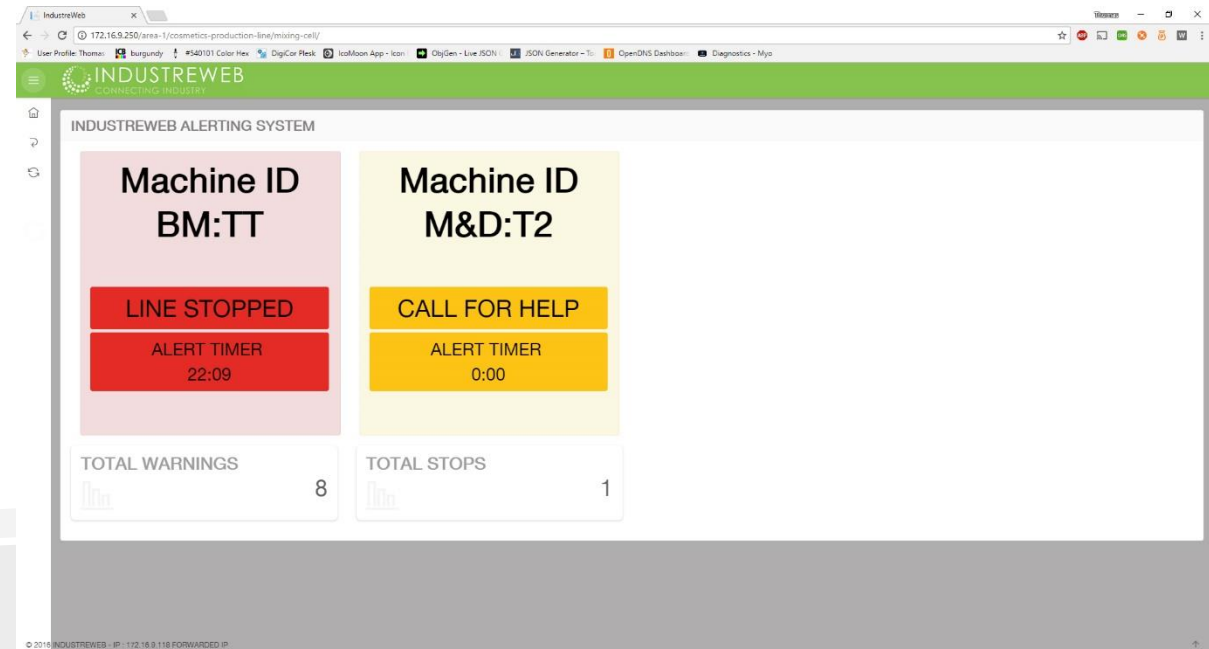


Ublsense



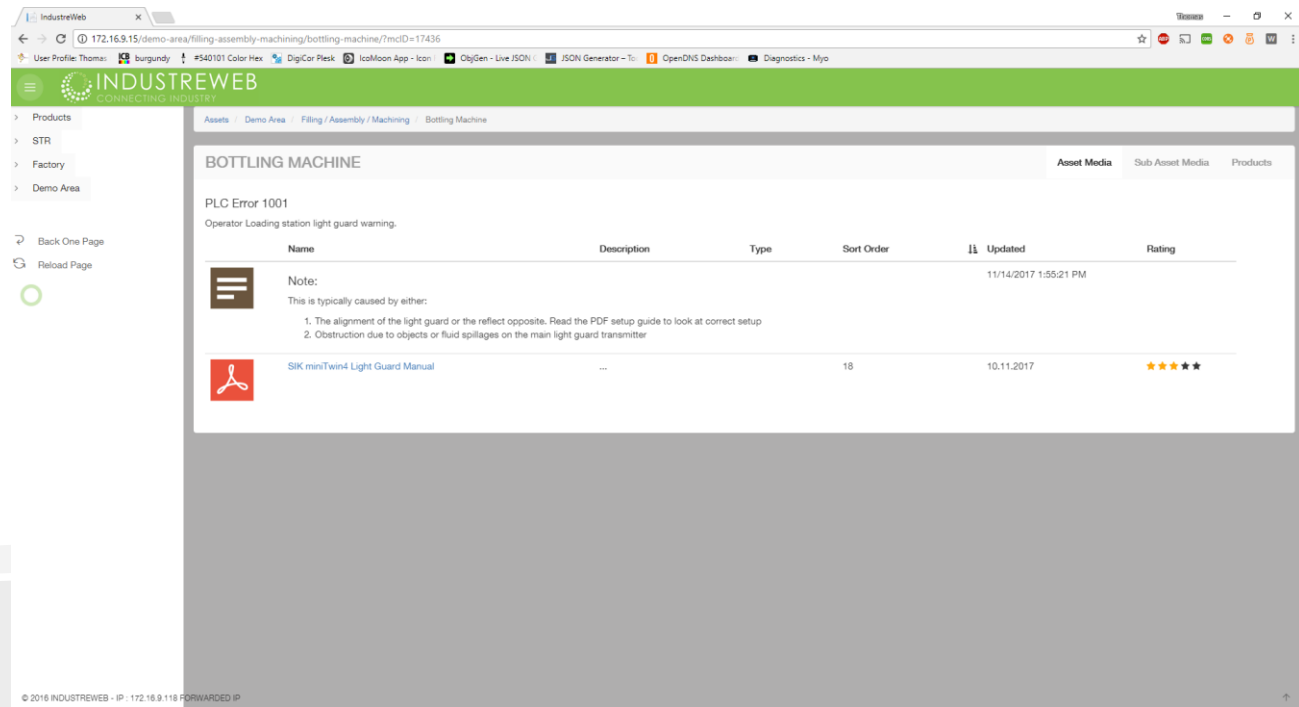
Operator / Engineer – ANDON (Area 7)

- Raise alerts based on Quality issues and machine stoppages e.g.
 - Air pressure issue
 - Label type / positioning
 - Fitting bottle nozzle & top
- Alert machine stoppages
- Notify engineering staff
- Create alert escalations for long running faults
- Track resolution times and stoppage reasons



Engineer – Knowledgebase (Area 7)

- Capture valuable fault resolution knowledge
- Rate approaches to fault resolution so you learn from what works best in practice
- Support for common media types
- Trigger fault resolution methodologies when PLC error codes occur



Extended Use Case for CREMA – VACTORY (Area 8)

- Visualisation of Digital Twin of manufacturing process
- Overlay key production measurables
 - Energy, OEE, KANBAN status etc...
- Invasive machine monitoring
- Support for Virtual production assets
- Support for Gesture Bracelets and Voice control





In Summary

- Translating research into products that solve real customer issues
- Taking a real world approach that recognises the realities of production demands, and influencing factors such as cost, risk and trust
- Be able to demonstrate the results