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# Presentation TalktoMe Platform

An look into the world of IIoT

## 1. Why IIoT

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Many manufacturers are leveraging real-time machine data from the industrial internet of things (IIoT) to find ways to improve profitability and production efficiency. One of the most valuable KPIs manufacturers track this way is overall equipment effectiveness (OEE).

### 1.1. How to improve

Step 1: Track manufacturing KPIs and identify issues that could impact production before they become critical.

Step 2: Diagnose the root causes of these issues, identify top production losses and decide on countermeasures.

Step 3: Take action to address these root causes and improve performance.

### 1.2. Machine monitoring through the Industrial Internet of Things

According to data collected by the World Economic Forum, monitoring machine production and performance through IIoT has proven to help manufacturers achieve:

- 30% Reduction in maintenance costs.
- 12% Savings on scheduled repairs
- 70% Reduction in machine breakdowns

(World Economic Forum®, January 2015)

#### Key Performance Indicators (KPI's)

- Overall Operating Efficiency
- Overall Equipment Efficiency
- Waste meters
- Setup Time
- Throughput, meters produced / time
- Capacity Utilization, Actual Output / Potential Output x 100
- Yield, Good Parts Produced / Total Units Produced
- Scrap, Total Scrap / Total Product Run
- Planned maintenance percentage (PMP), Planned Maintenance Time / Total Maintenance Time
- Availability, Uptime / Uptime + Downtime



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According to Quality Digest,

*“a 10% improvement in OEE can generate an increase in operating income of more than 60%.”*

Manufacturers can improve OEE (and profits) by identifying machine issues early through real-time performance monitoring, implementing solutions and learning from the process.

### 1.3. Roles

By defining roles we improve the platform to these specific users.

- Plant Manager
- Machine Manufacturer Maintenance Manager
- Machine User Maintenance Specialist
- Machine Manufacturer Maintenance Specialist

(INNIUS, 2019).



## 2. What do we have at this time

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### 2.1. TL;DR

TalktToMe is a platform that enables the user to analyse the data from his machine. As a result of this he or she will be able to improve utilization and identify issues and bottlenecks.

### 2.2. Longer story:

The platform extracts data from the machine and stores it in a database. There are multiple types of visualizations in the dashboard, all adapted and corresponding to the data type.

An advanced time scrolling and zooming function is integrated in order to view the bigger picture or zoom into a specific part of the job and visualize the events that happened. The data surrounding the graphs adjust automatically according to the selected time zone.

The main data like operation mode, machine speed and quality indicators are displayed on the main screen. Other KPI's like OEE, Waste meters, Setup Time, Yield, Utilization and Availability are ways to show different measures to show specific aspects of the performance.

Error and Events are displayed on the timeline and can be switched on/off by type. There are also tables that display the latest errors and events. For the errors there is an most common list, by this list you can analyze the biggest issues.

The status Current State and Current Web speed display the last known status in near real time.

### 2.3. TS;WM

See H3. Going through the platform.



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### 3. Going through the platform

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1. Talktome.mps4u.com
2. Login: MPSPDemo  
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3. User info
4. Global view -> advanced view
5. Selecting machine
6. Explaining time zone
  - a. Selector
  - b. Zoom in, zoom out
  - c. Automatic update
7. Machine mode
8. Zoom in waste counters
9. Web tension
10. Register deviation
11. All informations taps on the single statistics
12. OEE
13. Errors
14. Events
15. Report function
16. Logout



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## 4. Talk To Me MPS service level agreements, Deliverables

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### 4.1. Performance

- Performance report
- Performance analysis
  - Training
  - Change-over analysis
  - Speed analysis
  - Utilization optimization

### 4.2. MIS

- Application interface MIS.
  - Jdf CERM
  - ? Label Traxx
  - ? Theurer
  - ? Microsoft products
- API to Utilization system
  - Partner API: only accessible by an provided license. Based on the REST API structure.

### 4.3. Service

- TalkToMe needs to be available to the helpdesk employees to do analysis of the machine.

### 4.4. Tooling / Spares & upgrades

In the future RFID tools?

### 4.5. Operator

- TalkToMe needs to be available to the trainer to motivate and track the progress and performance to the operators.

### 4.6. Maintenance

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## 5. Advantages of the MPS platform

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- Local backup storage in case there is an internet failure
- Database optimized for industry 4.0 data.
- Strong compression of the stored data
- Retention policies.
- Efficient data collection by subscribing to data sets. Result that the internal machine network receives no additional load.
- Flexible machine and database configuration, so no useless data is being logged. If an extra on-rail unit or printstation is added the database will scale up.
- Multiple Dashboard types with optimized data for each group like Management, Job Scheduler, Operator and Service mechanic.
- Dashboard
  - The dashboard scales the data depending on the selected time range.
  - A synchronized zoom or zoom out function for all the data graphs.
  - Easy to read color codes for the types of data and the current state.
- Easy to configure time intervals
  - A window of 15 seconds
    - Used for maintenance and debugging errors in the press.
    - This minimal interval enables the viewer to analyze the data on cause and effect.
  - A window of 5 min
    - Typical operator efficiency, ramping up etc.
  - A window of 60 min
    - Typical job change analyses and waste
    - Typical job analysis and utilization
  - A window of 24 hours
    - Typical shift analysis, utilization and job analysis
  - A window of 30 days
    - Compare the data to review the improved or declined efficiency
  - A window of a year

## Types of data

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- Machine Utilization
  - Web speed to check the production over time.
  - Operation mode of the machine to see if the machine is use like it should. Maby it takes too long to start or you are wasting precious meter of material to setup the machine?
  - Benchmark of the machines productivity against anonymized data.
- Print quality
  - Is the tension setting correct?
  - How does the register behave in comparison to all the print stations.
- Machine benchmark
  - Availability score
    - Runtime divided by total active time.
  - Performance score
    - Production meters divided by target production meters
  - Overall Equipment Effectiveness
    - Availability score times performance score
- MIS / Job info
  - What job is running with wat kind of material, print settings or active station?
- Machine Error log
  - Log error or alarms to analyze the correct use of the machine.

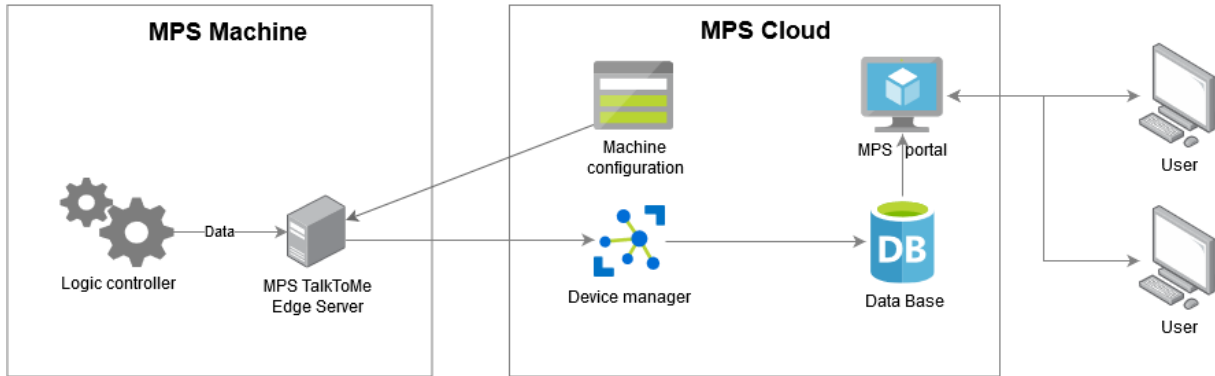
For the future we have some other features in mind like:

- Machine scheduling
  - Enable the machine scheduler to gain more insight in the time and recourse needed to complete a job with an x meter and an y kind of job settings(material, numbers of printstation or extra features).
- Predictive maintenance
  - Check the lifetime against the recommended lifetime to alert on spare parts
  - Run self-checks and analyze the data over the machine lifetime.
- Cost analysis
  - How much is produced with what cost?



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### General architecture

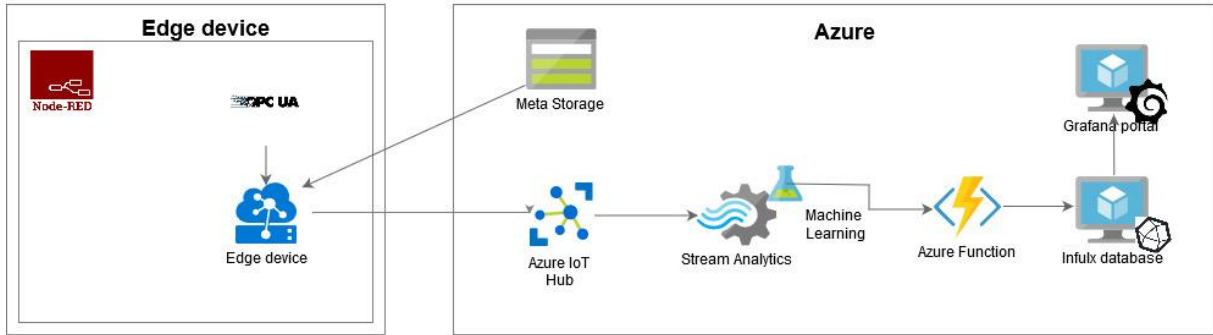






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More specific architecture





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Your top 5 losses account for **45:23:02** of lost time (**66.88%** of all losses). Your OEE over this time period was **85.4%**.

<b>1</b>	<b>15h:05</b> 22.2% of losses	<p><b>Your top loss is Down Time &gt; Infeed Material Jam.</b></p> <ul style="list-style-type: none"> <li>This loss increased at a rate of 7.9% over the selected time period.</li> <li>There have been 73 occurrences (averaging 0:12:23 each).</li> </ul>	<p>Trend: +7.9%</p>
<b>2</b>	<b>12h:27</b> 18.3% of losses	<p><b>Your next largest loss is Setup &gt; Removing Die.</b></p> <ul style="list-style-type: none"> <li>This loss increased at a rate of 4.1% over the selected time period.</li> <li>There have been 67 occurrences (averaging 0:11:08 each).</li> </ul>	<p>Trend: +4.1%</p>
<b>3</b>	<b>11h:05</b> 16.3% of losses	<p><b>Your next largest loss is Speed Loss.</b></p> <ul style="list-style-type: none"> <li>This loss decreased at a rate of 16.3% over the selected time period.</li> <li>There have been 1,467 slow cycles (averaging 0:00:09 each).</li> <li>There have been 714 small stops (averaging 0:00:13 each).</li> </ul>	<p>Trend: -16.3%</p>
<b>4</b>	<b>3h:25</b> 5.0% of losses	<p><b>Your next largest loss is Down Time &gt; Engineering Adjustments.</b></p> <ul style="list-style-type: none"> <li>This loss increased at a rate of 16.5% over the selected time period.</li> <li>There have been 94 occurrences (averaging 0:02:10 each).</li> </ul>	<p>Trend: +16.5%</p>
<b>5</b>	<b>3h:21</b> 4.9% of losses	<p><b>Your next largest loss is Setup &gt; Installing New Die.</b></p> <ul style="list-style-type: none"> <li>This loss decreased at a rate of 39.6% over the selected time period.</li> <li>There have been 100 occurrences (averaging 0:02:00 each).</li> </ul>	<p>Trend: -39.6%</p>



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## 6. Verwijzingen

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INNIUS. (2019). *How machine production monitoring powers profits*. Arnhem: INNIUS.

World Economic Forum®. (January 2015). *Industrial Internet of Things: Unleashing the Potential of Connected Products and Services*. Cologne/Geneva: World Economic Forum®.