IoT Category: Health & Medicine

Business Background:

Companies in the pharmaceutical and food sector have to ensure that all products are immaculate and not contaminated with mold or bacteria. There are various legal requirements to document that the complete production process took place in a correct and hygienic manner. Products, without having an immaculate production documented, are not allowed to be sold, they have to be depolluted.

Business Process:

During production, samples are taken regularly. The samples are checked for bacteria and mold contamination. For this purpose, samples are taken by wipe test off surfaces and are applied to nutrient solutions. Depending on the examination method, these samples are incubated at different temperatures for different periods of time. Thereafter, the samples are checked for bacteria and mold contamination. The temperature and time of incubation is essential to obtain reliable results.

Story:

For the producer of pharmaceuticals / food a correct and traceable incubation of samples is essential:

- no contaminated products due to false negative checks are distributed
- no clean products due to false positive checks are depolluted
- no clean products are depolluted because of missing documentation of correct production

Vision Proposition for IoT:

A smart sensor as IoT can assist the process as follows:

Each trolley, used to carry the samples to the incubation rooms, is equipped with a sensor. The sensor measures periodically its exact location, the temperature and time. This information is immediately forwarded to the SAP Cloud Platform.

Each sample, placed on a trolley, is scanned and uniquely assigned to the trolley. In the backend system, the specification of the sample indicates the type of incubation room, the required temperature and the period, the sample should remain in the incubation room.

Now having the sensor´s data the system compares the type of the required incubation room with the exact whereabout of the trolley. If the trolley is placed into a wrong incubation room, it can be immediately recognized, and an alarm is sent to the responsible person.

During the time in the incubation room the sensor continuously measures the temperature. If the temperature deviates from a tolerated range, an alarm is sent. The responsible person can then check, if the incubation room is defective or adjusted incorrectly and decide to adjust the temperature or transfer the samples to a different incubation room.

If necessary, a maintenance of the incubation room can be triggered.

At almost reaching the desired incubation time, the responsible person can be alerted again to remind removing the samples from the incubation room.

The sensor has recorded the temperature and location for the entire period of incubation and has sent this information to a data set in the background system. This data set therefore can be considered as a digital twin. As a result, for each sample it can be shown retrospective the exposing time and temperature.

In addition to the legal requirements to document the sample processing, this log can be evaluated in case of unclear results of the samples. This is an aid in deciding whether the samples have been processed correctly and thus are valid or ineligible.

Time-To-Value Aspects (Improved Business Outcome)

Attaching sensors to trolleys and implementing this solution can be implemented on the fly without system downtime. Activating this solution does not disturb or change the existing processes and no additional work is required for assigning the sample to a specific trolley/sensor as this is done already. Applying this solution avoids mistakes and allows for a better valuation of the quality of the samples.

Other areas, where this application may be applied, are monitoring temperature and time in ship containers or the cold chain of frozen goods.

Business Metrics:

Avoid wrong incubation rooms -> entire set of samples may be spoiled, product have to be depolluted, high financial loss

Ensure compliance with required temperature range over time-> entire set of samples may be spoiled, product have to be depolluted, high financial loss

Ensuring the correct incubation process -> by the alert to remove the samples from the incubation room

Documentation of incubation temperatures and times -> simplifying audit (Digital Twin)

Conclusion:

- Products are less likely to be erroneously depolluted or even erroneously put on sale -> cost savings and risk minimization
- decomposed products are not on the market -> less recalls, better company image on customer side

System Landscape and Architecture Overview: