Manufacturing Digitalization Project

Griffin Lorimer, CPE
Dru Walkowski, EE
Nicholas Sawmiller, EE

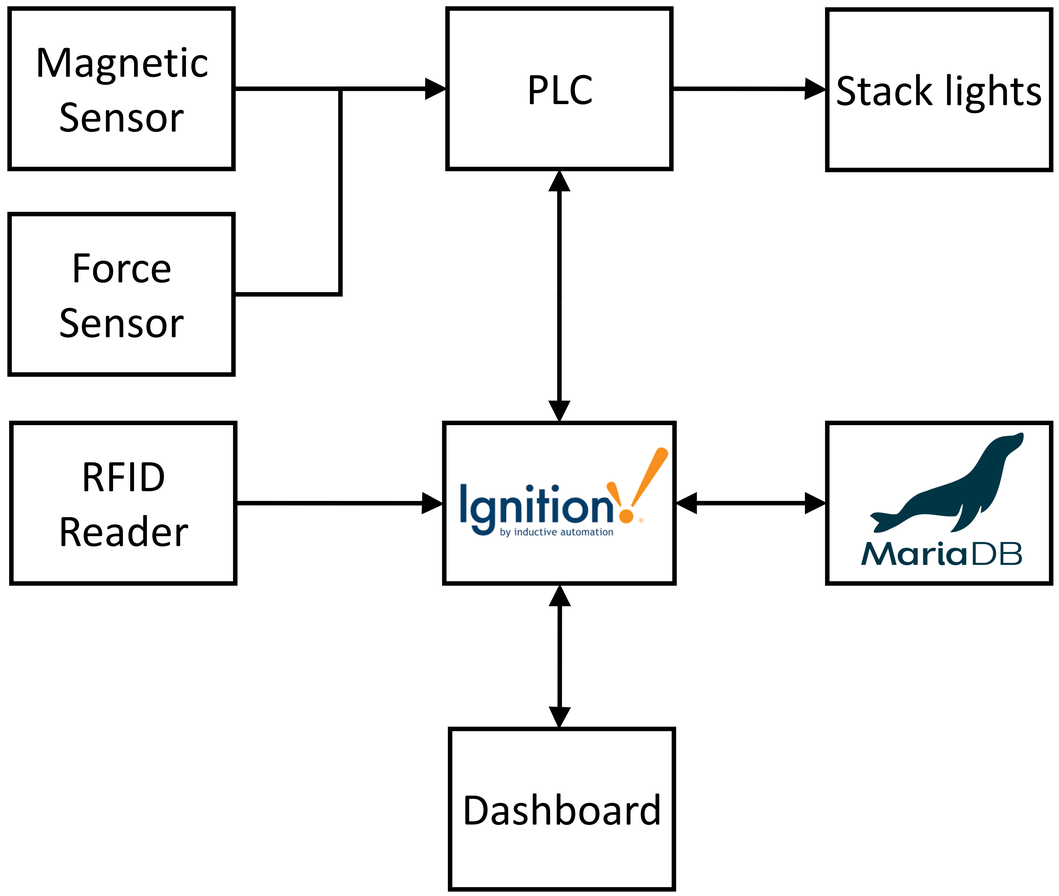
Abstract

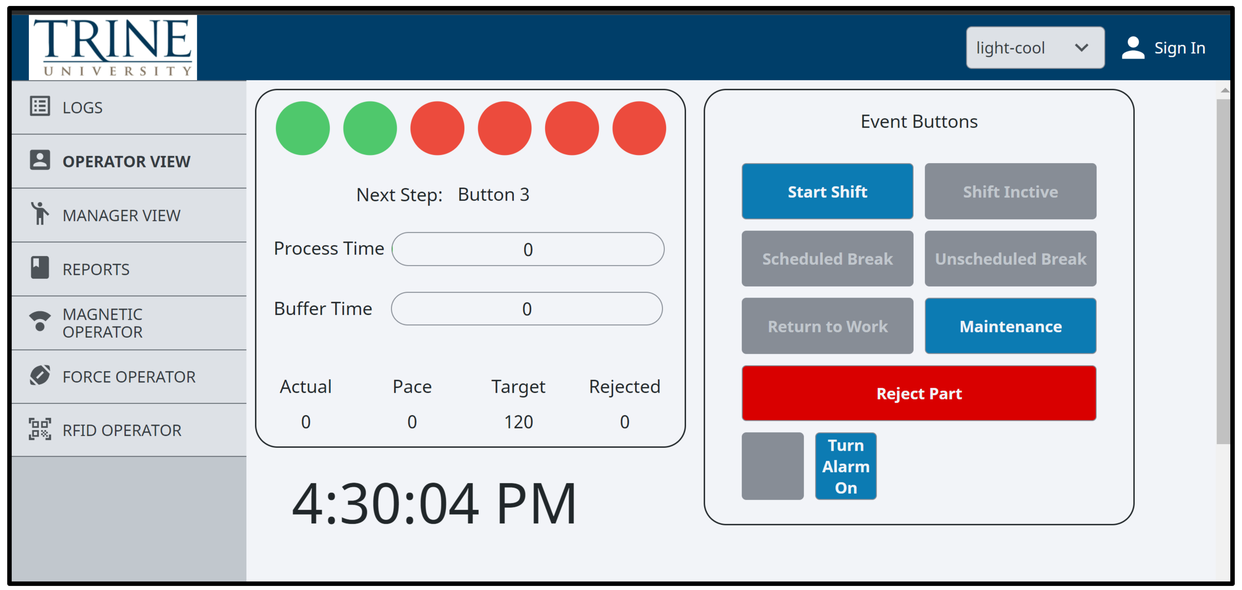
ULTRA is continuously improving their manufacturing production floor. Part of this is their manufacturing digitalization effort. In order to make their lines more efficient, real-time data is needed to make adjustments on the fly.

Our Trine team has partnered with ULTRA to help them in this effort. Through the use Ignition, a data tracking and visualization software, the Trine team will provide a dashboard to track target metrics that can be used in this way. The dashboard will collect these metrics for a small part of the manufacturing floor. The dashboard will be used as a model for ULTRA to continue the implementation throughout the plant.

In order to know when a part of the manufacturing process is started or finished, trigger mechanisms are needed. The Trine team is prototyping three trigger mechanisms through three different technologies. This will provide multiple ways for ULTRA to implement triggers in their production floor.

The Trine team will also model stack lights. Stack lights will be used in order to notify production floor operators of their pace. It will also help production floor managers know when a machine is down.



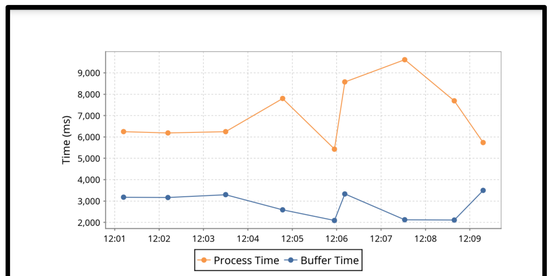


RIGHT: Dashboard created in Ignition. Information on this dashboard include takt time (divided in process and buffer times), the daily rate, and the daily quota among other data to inform the operator. Event buttons are displayed prompting the operator for input in case of such event.

Design Objectives

1. Prototype three different product triggering mechanisms that can be used to track the timing of different processes. These triggering mechanisms will be developed using the following technologies:
   - Magnetic Sensor
   - Weight Sensor
   - RFID
2. Create an online dashboard to monitor sub-cell metrics. These metrics include:
   - Daily Rate
   - Takt Time Gauge
   - Downtime Reason Input
   - Daily Quota
   - Graph showing output/time period
3. Model stack lights to be installed in sub-cell to represent timing.

BELOW: Example report generated in Ignition showing takt time graph and output over the day.



Average Process Time	Average Buffer Time
7.1 seconds	2.8 seconds