

**MICHIGAN STATE**  
**UNIVERSITY**

# Alpha Presentation

## Predix Enabled Toy Train

### The Capstone Experience

#### Team GE

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Spring 2017



*From Students...*  
*...to Professionals*

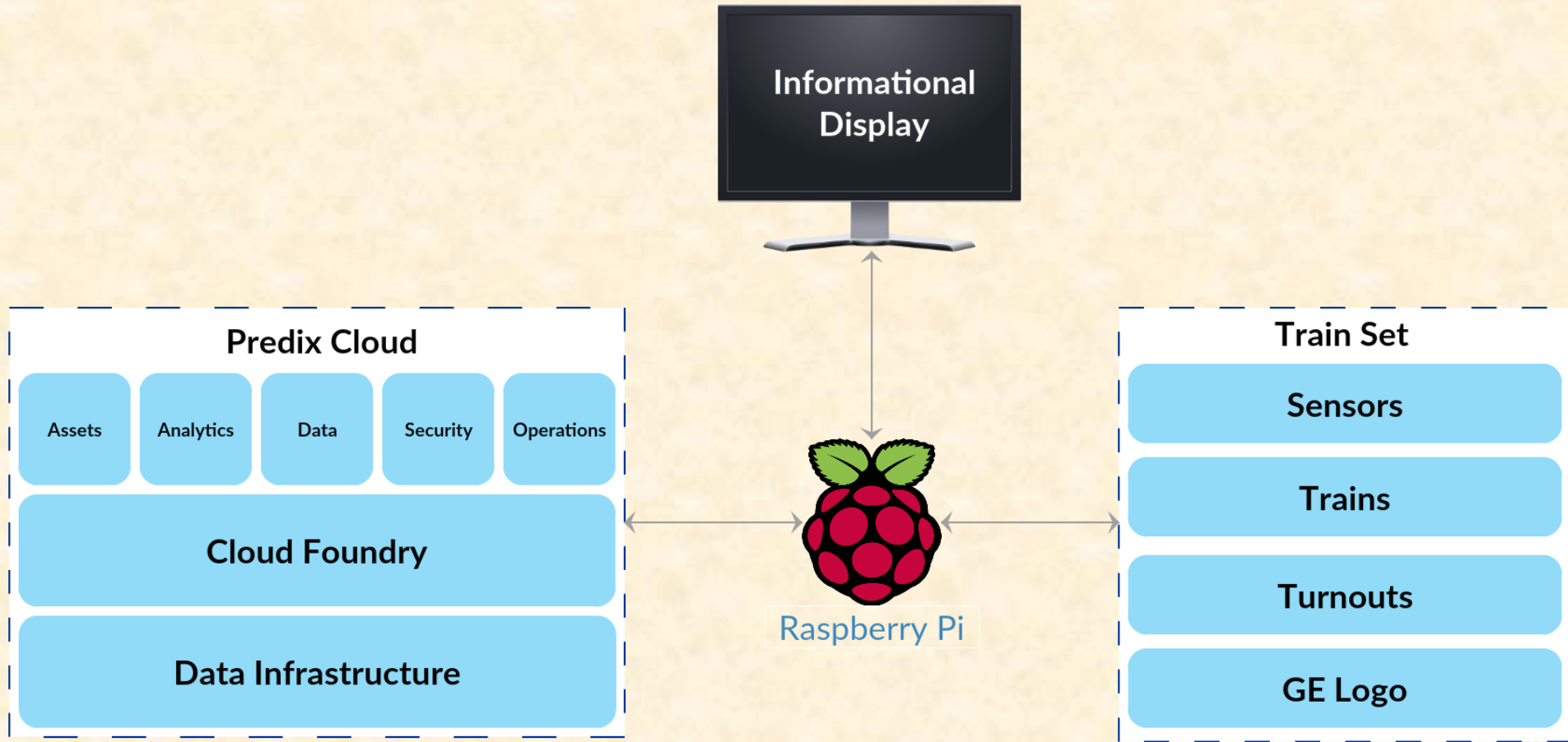
# Project Overview

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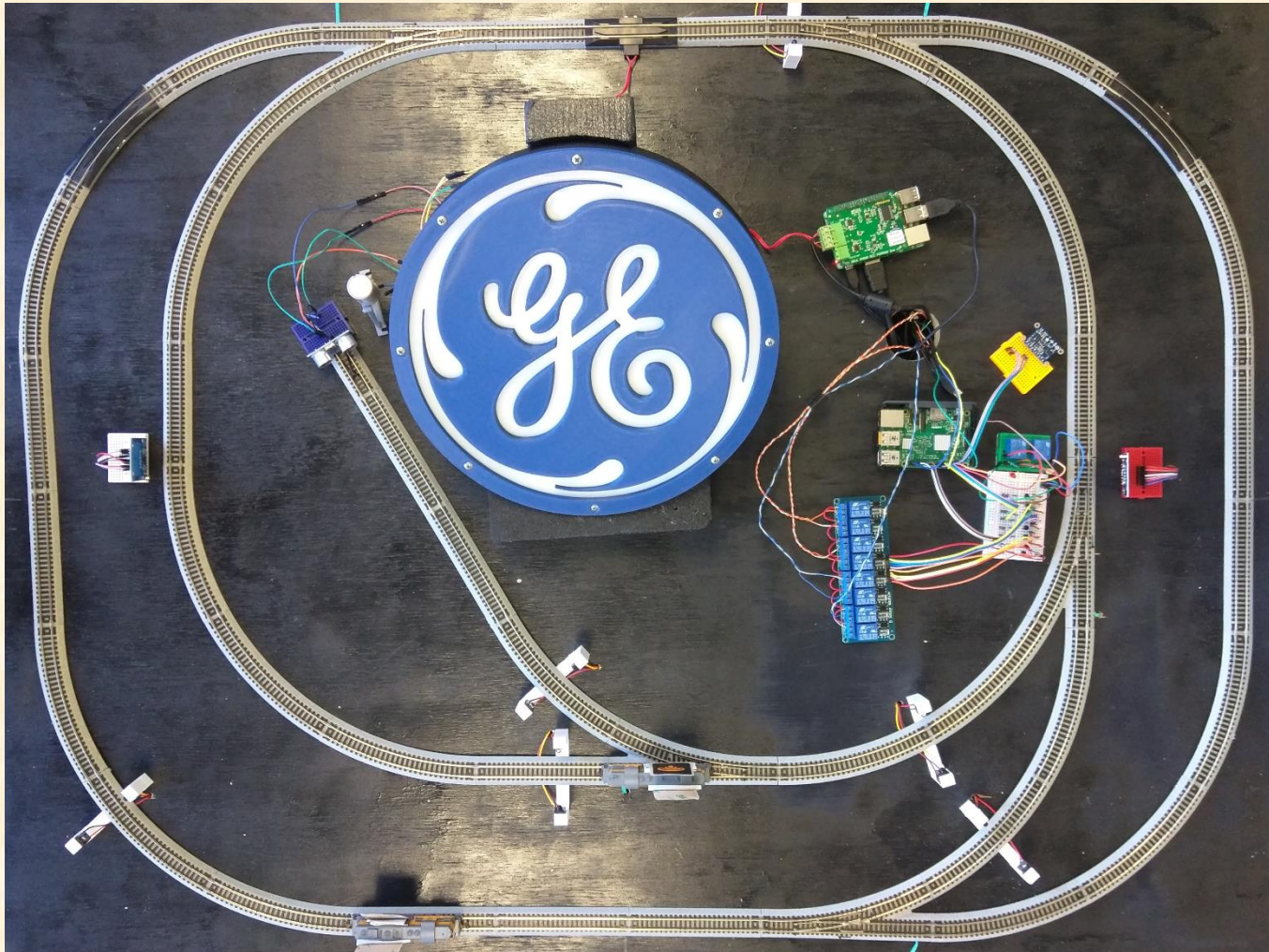
- Demonstrate the capabilities of Predix and its services with the Toy Train
  - Receive, analyze, and monitor data collected from the train and sensors along the track
  - Send analyzed data back to make decisions about the train's movement



# System Architecture



# PICTURE OF THE TRAIN

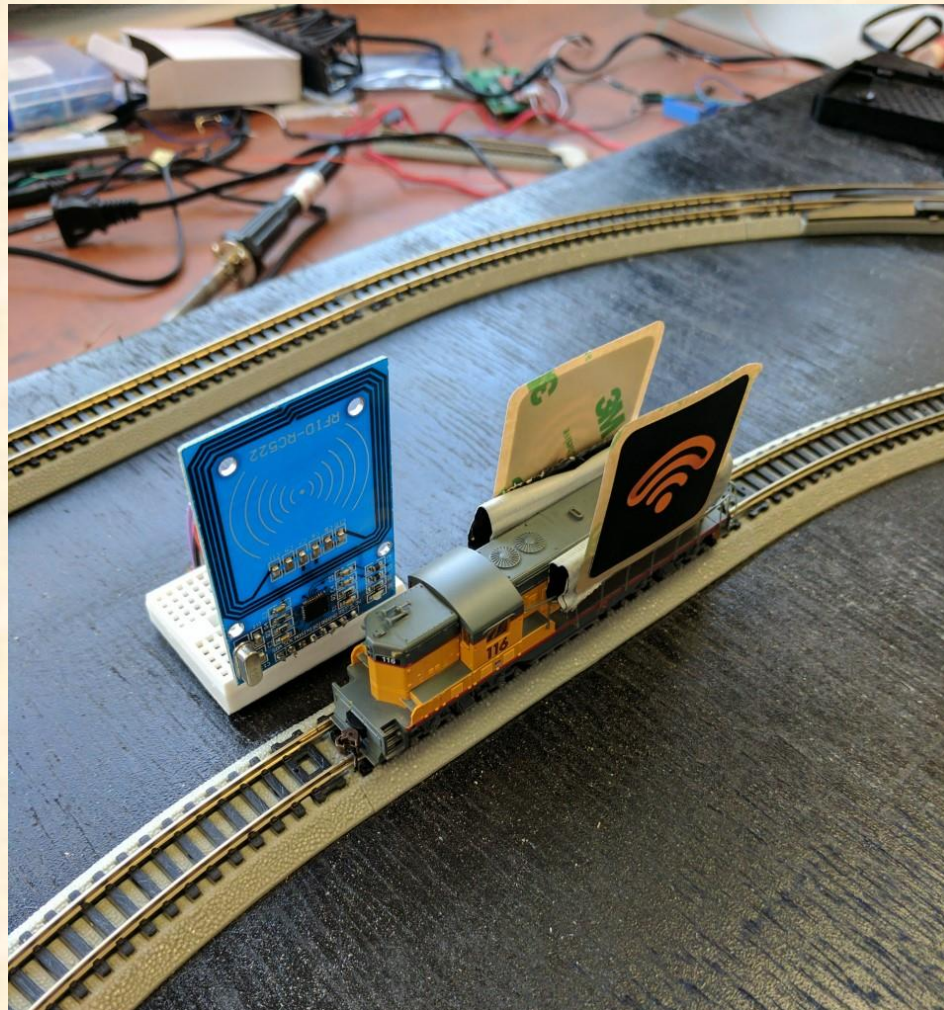




# Sensors – Beam Breakers



# Sensors – RFID Module and Tags



# Predix Dashboard

## Predix Enabled Toy Train



Dashboard

About

Live Data Demo

### TEMPERATURE SENSOR ▼

PREDIX TRAINS > PETT > SENSORS

OUTPUT (AVG)

1.322 m/s

CRANK-FRAME-CO...

10.663

RELIABILITY

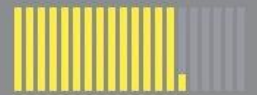
60.0%

AVAILABILITY

71.0%

KPI HEALTH

71%



### ASSET PERFORMANCE

See Live Data

Refresh: 3 sec ▼

Meter	Alert Status	Current Value	Units	Last Meter Reading	Threshold Min	Threshold Max	Delta Threshold
crank-frame-compressionratio	<span style="color: green;">●</span>	2.518		2017-02-19 08:10:10 -0500	2.5	3	▲ 16.05%
crank-frame-dischargepressure	<span style="color: green;">●</span>	17.163	psi	2017-02-19 08:10:10 -0500	0	23	▲ 25.38%
crank-frame-suctionpressure	<span style="color: red;">●</span>	0.401	psi	2017-02-19 08:10:10 -0500	0	0.21	▲ -91.01%
crank-frame-maxpressure	<span style="color: green;">●</span>	25.824	psi	2017-02-19 08:10:10 -0500	22	26	▲ 0.68%
crank-frame-minpressure	<span style="color: red;">●</span>	0.000	psi	2017-02-19 08:10:10 -0500	0	0	▲
crank-frame-velocity	<span style="color: green;">●</span>	0.023	m/s	2017-02-19 08:10:10 -0500	0	0.07	▼ 32.91%
crank-frame-temperature	<span style="color: green;">●</span>	65.356	F	2017-02-19 08:10:10 -0500	65	80	▲ 18.31%

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# Predix Dashboard

## PARAMETER COMPARISON

crank-frame-compressionratio



crank-frame-dischargepressure



crank-frame-suctionpressure



crank-frame-maxpressure



crank-frame-minpressure



crank-frame-velocity



crank-frame-temperature



02/17/2017

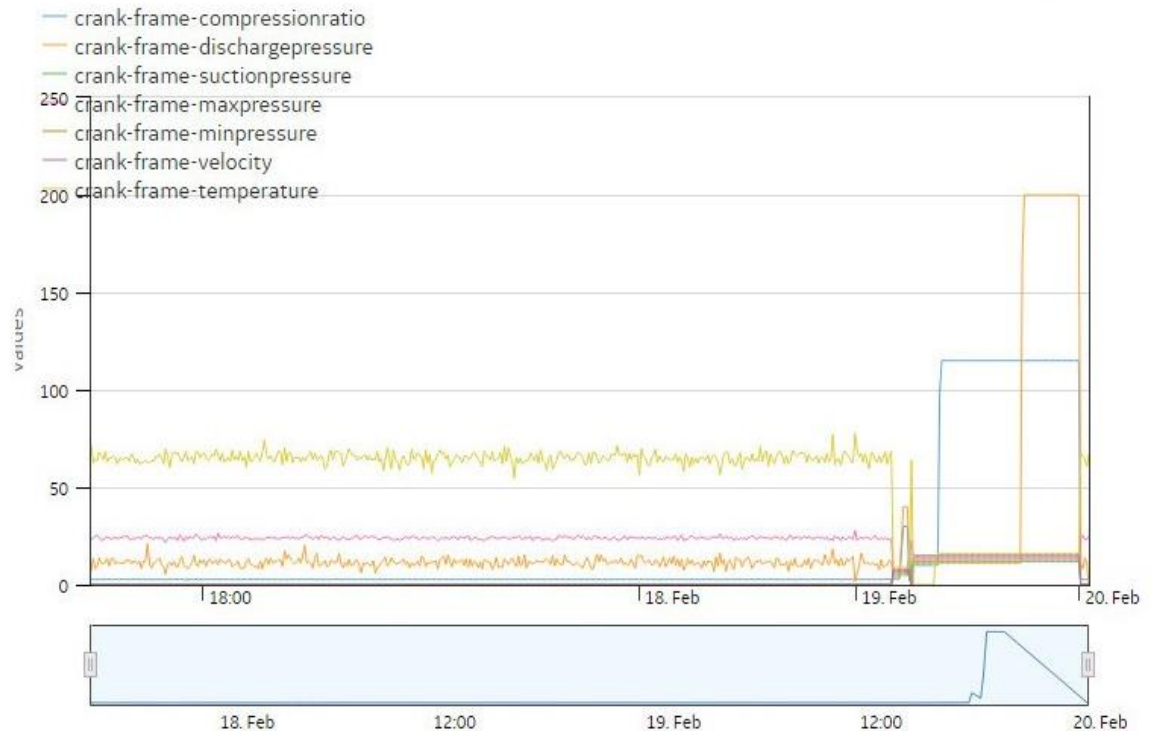
12:01:00 PM

TO

02/19/2017

08:10:06 PM

Update



app\_user\_1 ^

app\_user\_1 ^



# What's left to do?

- Predix Analytics
  - Getting the sensors to talk to Predix
  - Run anomaly detection to monitor sensors
  - Use machine learning analytics on data to prevent collisions
- Scripting for the Train
  - Run Jython scripts without the use of PanelPro
  - Use Data from Predix to Make Decisions

# Questions?

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