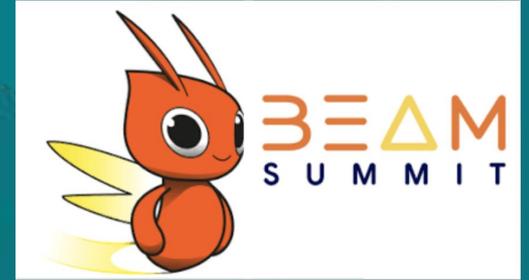


# From Factory to Cloud: The path to Beam

Dan Honey - Oden Technologies



# Dan Honey

Principal Engineer

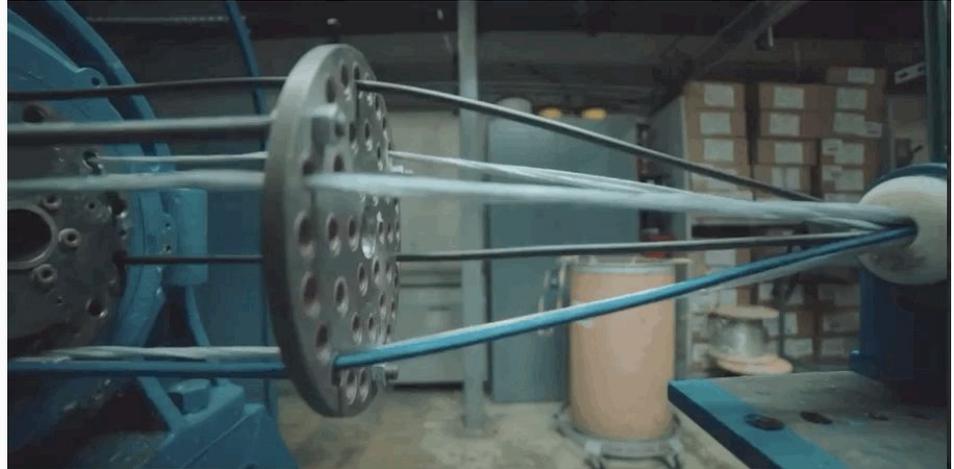


# Oden's Customers

Medium to large manufacturers in plastics extrusion, injection molding, and metal stamping.

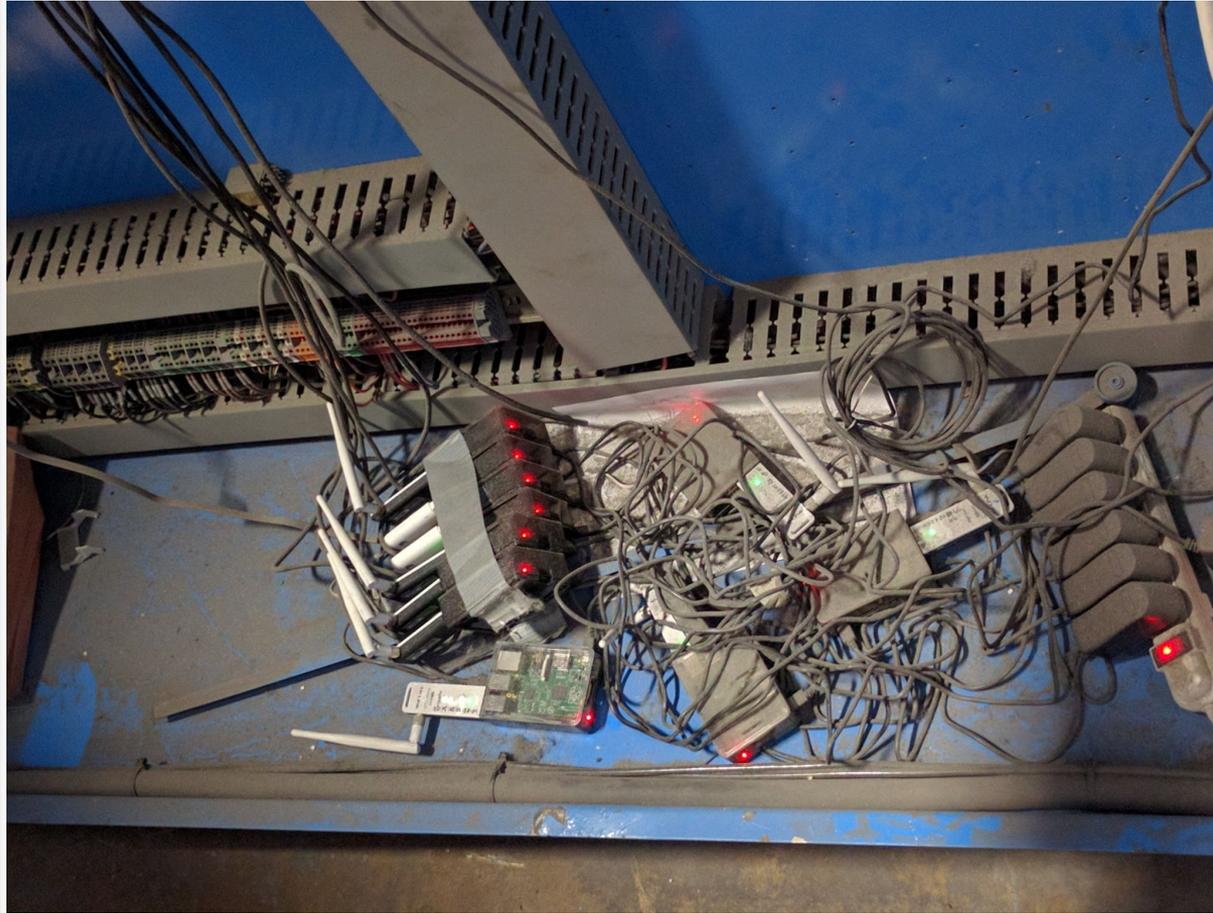
Process and Quality Engineers looking to centralize, analyze, and act on their data.

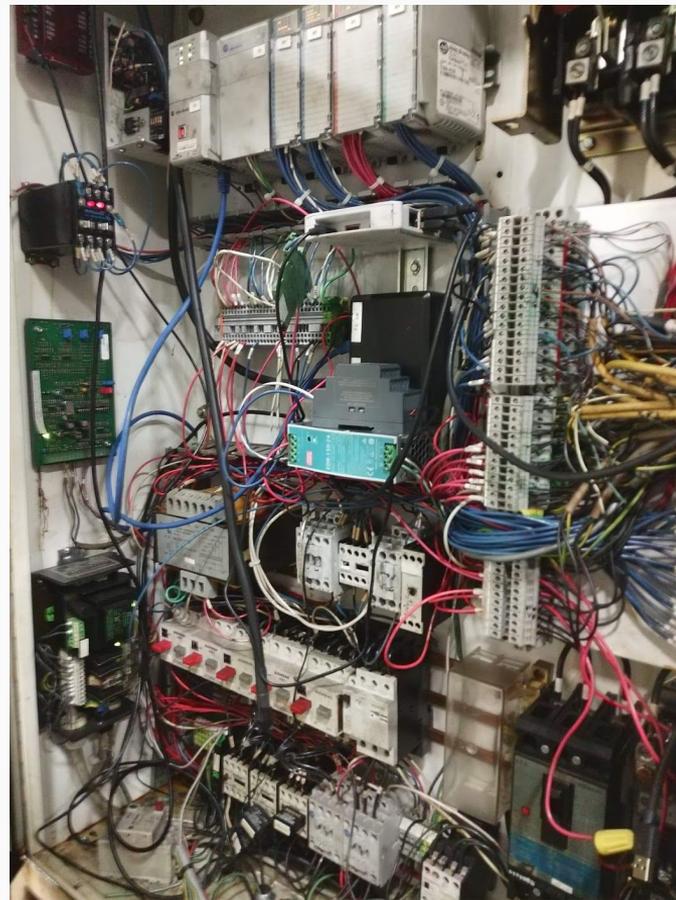
Plant managers who are looking to optimize logistics, output, and cost.



# In the beginning...

- There was Hardware
- We were scrapy
- It worked...
  - 12-18 hour days
  - "OSHA" compliance
  - Lots of devices
  - Lots of machine manuals
  - Lots of Redbull



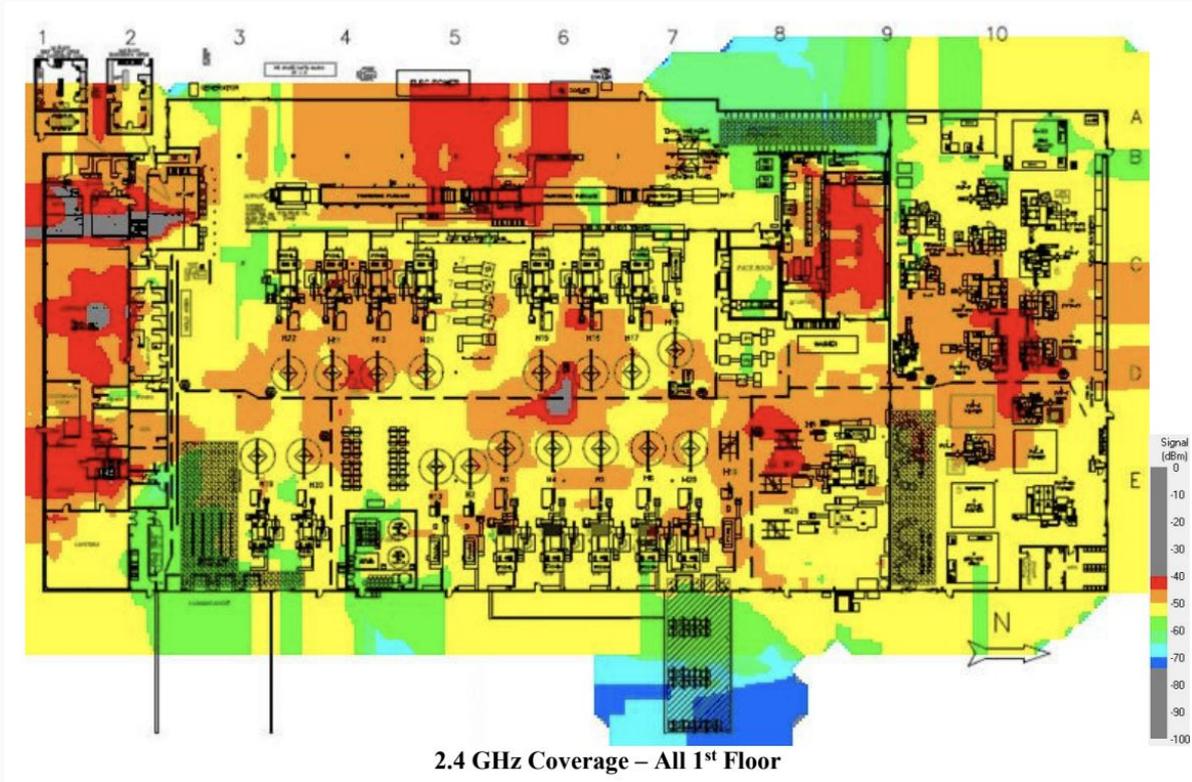


# It worked until it didn't

How bad could it be?

I'm glad you asked...

- WiFi connectivity
- Time keeping (RTCs)
- Power surges
- People unplugging your stuff
- Security concerns
- Maintenance
- Expensive converters
- Embedded fleet != Server rack

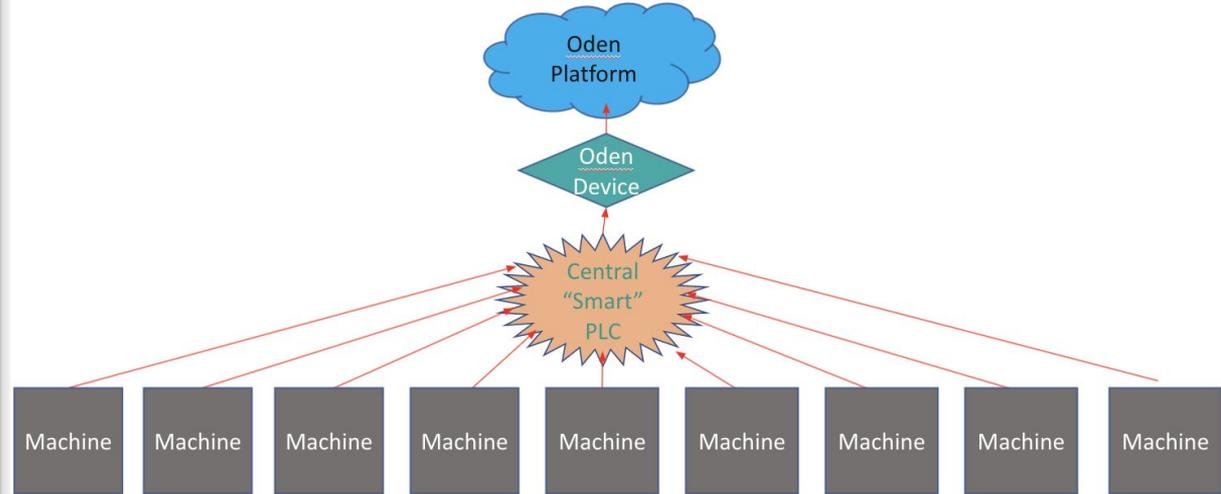
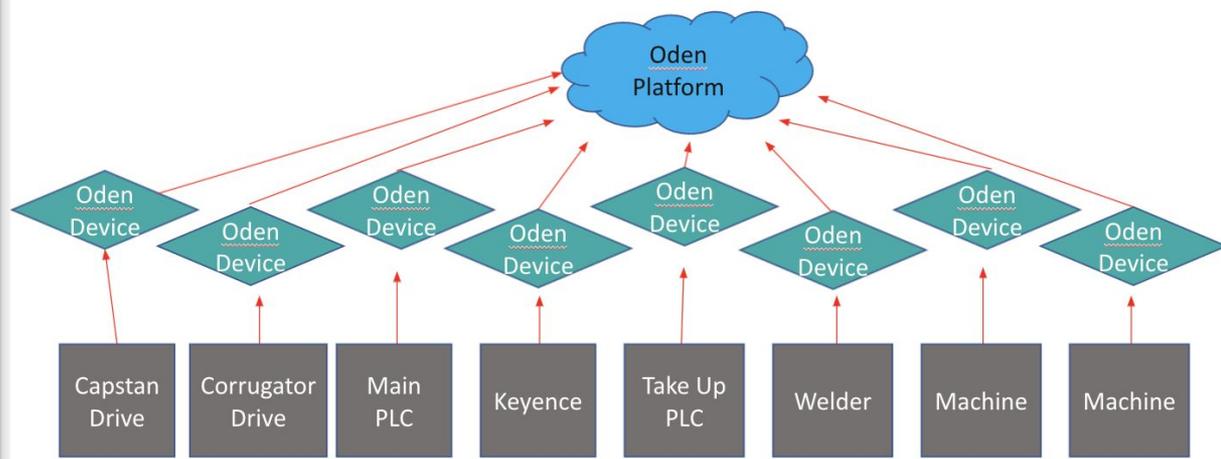


There has to be a better way!



# Learn from the industry

- Aggregate data
- Use off the shelf solutions
- Reduce hardware footprint
- Reduce cost of deployment
- Once device per factory



# Realize your true value

- Pivoted away from hardware
- Focus on value: ML & Analytics
- Still a lingering device presence
- Trade 1000 devices for a 100



## Daily Run Report

Runs completed 9:00am EST February 12, 2019 – 9:00am EST February 13, 2019  
Runs sorted by worst Cpk for Cold OD Avg

### SWJNG519-LQ8

Line 10 · 10 Reels · 06:11 2/12 – 11:42 2/12 · 3h 16m uptime

View run →

METRIC	MEAN	STD DEV	TARGET	NON CON*	Cpk
Cold OD Avg	0.403	0.010	0.391 - 0.411	4.235%	<b>0.274</b>
Feet per min	274.794	194.059	-	-	-

### SWHD72Y-R4

Line 10 · 10 Reels · 10:08 2/12 – 12:34 2/13 · 1h 35m uptime

View run →

METRIC	MEAN	STD DEV	TARGET	NON CON*	Cpk
Cold OD Avg	0.141	0.002	0.135 - 0.145	0.242%	<b>0.782</b>
Feet per min	829.680	492.109	-	-	-



The path to Beam...

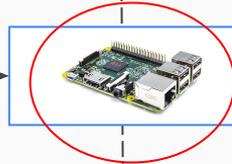


# How we ingest raw data with devices



Sensor Readings  
Machine comms

OPCUA



Cloud IoT Core

Streaming Calculations  
Pub Sub  
Dataflow

```
{  
  "ServerTimestamp": 1598457417,  
  "ServerDate": "Wed Aug 26 15:56:57 2020 UTC",  
  "Values": {  
    "TagName": "melt-temp1",  
    "TagValue": 356.81,  
    "TagQuality": "good",  
    "TagTimestmap": 1598423417  
  }  
}
```

```
[{  
  "value": 356.81,  
  "timestamp": 1598423417,  
  "metric": "57ae4a63-d36a-5d22-8ad9-ec69dad50337",  
  "uuid": "b5d9ba17-9d09-49d5-b2f0-0f921f4feeea",  
  "route": "/metric"  
}]
```

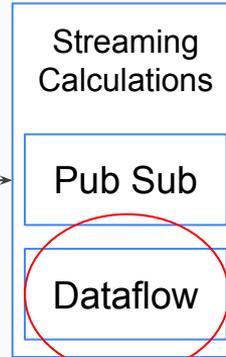
# How we ingest raw data with beam



Sensor Readings  
Machine comms



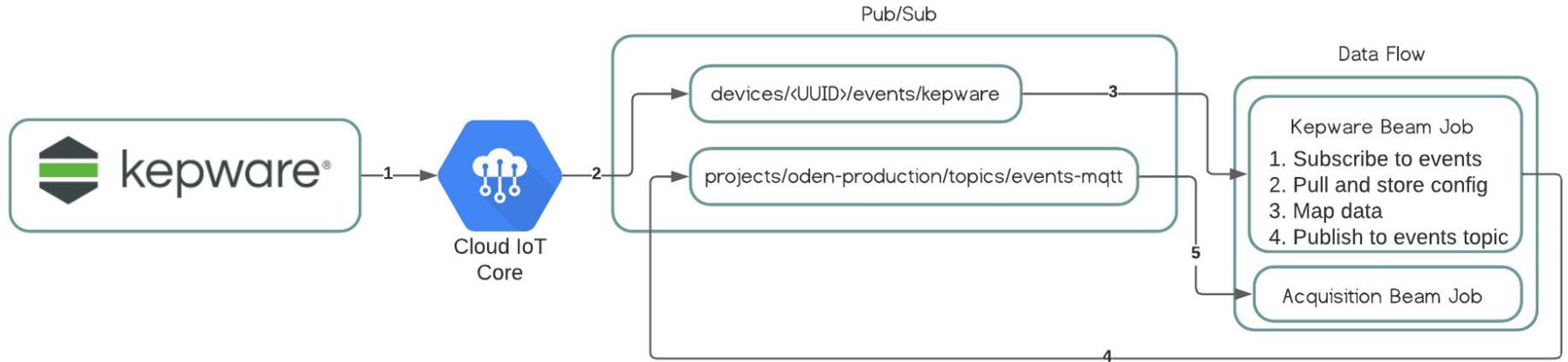
Cloud IoT Core



```
{
  "ServerTimestamp": 1598457417,
  "ServerDate": "Wed Aug 26 15:56:57 2020 UTC",
  "Values": {
    "TagName": "melt-temp1",
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```

```
[{
  "value": 356.81,
  "timestamp": 1598423417,
  "metric": "57ae4a63-d36a-5d22-8ad9-ec69dad50337",
  "uuid": "b5d9ba17-9d09-49d5-b2f0-0f921f4feeea",
  "route": "/metric"
}]
```

# How it works



End

