Big Data/Analytics and Asset Health: Are We Ready?

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What would happen?

What would happen if railroading became boring?

What if we *knew* what we needed to do to keep things boring?

What if it was easy to figure this out?

How would our customers feel?

How would our stakeholders feel?

How would it feel to our people?

Business and IT Context

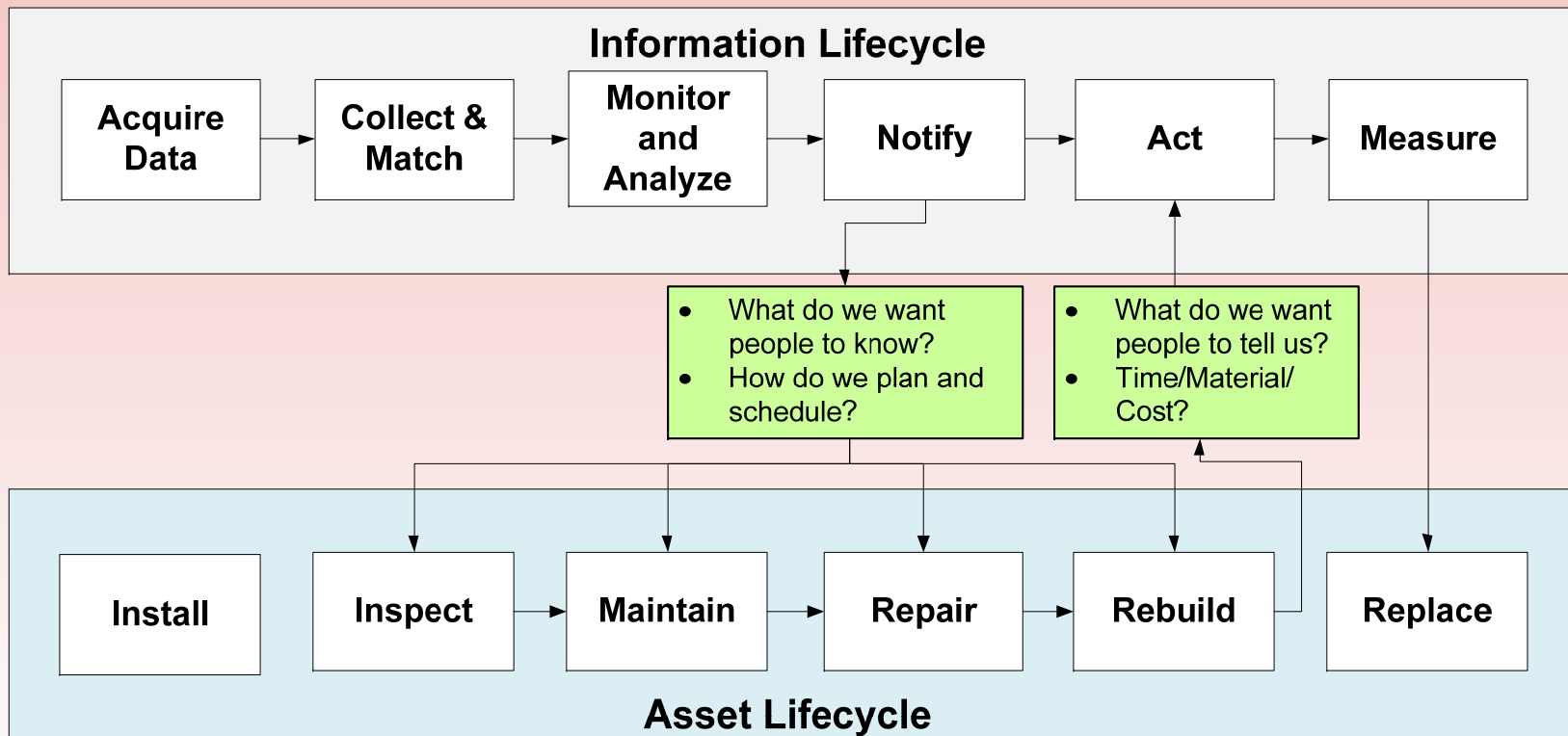**Railroads key operational goals**

1. No one gets hurt, nothing gets broken

2. Our trains move reliably, predictably (not perfectly)

Purpose of IT

1. Help the business meet/exceed operational goals

2. Make it easier for people to be more effective at doing their jobs (OK, by giving us cool tools).

What "IT" might look like

Information Lifecycle

| Acquire Data | → | Collect & Match | → | Monitor and Analyze | → | Notify | → | Act | → | Measure |

- What do we want people to know?
- How do we plan and schedule?

- What do we want people to tell us?
- Time/Material/Cost?

| Install | → | Inspect | → | Maintain | → | Repair | → | Rebuild | → | Replace |

Asset Lifecycle

Based in recent CSX benchmarking of other industries and companies, Monitor and Analyze is "the thing"

Where Are We

Clearly as an industry, we've made huge strides:

1. **Mechanical: AAR/EHMS/ATSI/Car Health**

2. **Engineering...predictive maintenance, heat orders, etc**

3. **New data acquisition systems (vision, Motes, etc)**

And much, much more is at the gate, NOW:

1. **Locomotive data/PTC (loco, wayside)**

2. **Signals, Wayside Eqpt, MoW, Stationary Assets of all kinds**

3. **A truly interconnected world....**

Big Deal: Enterprise Data Strategy

Lots of data, silos

- Structured/Unstructured

- Continuous/Discrete

- Silos/Some Third Party

- Time Random/Streaming

Creating an Enterprise Data Strategy is Key

- "Internet of Things" is here (PTC as an enabler)

- HADOOP, Other Scalable Enterprise Data Systems
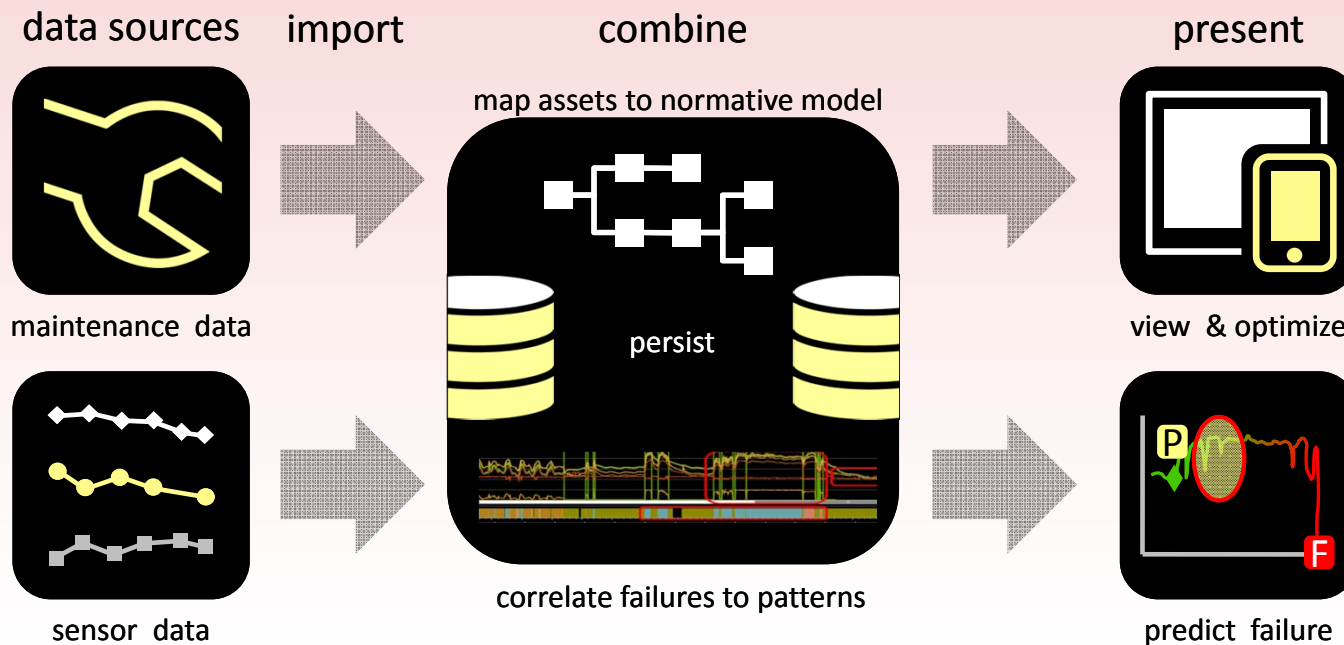
Culture

Move from Data Science to Operations:

1. The current state is *<u>unacceptable</u>*

2. Data not as a problem, but as an answer (potentially) and an asset

3. IT is the key

4. Tweak existing processes (Kaizen/continuous improvement)

5. *Redesign processes (Kaikaku/Radical Change) w/Big Analytics*

   - *Condition based vs. Periodic = $$*
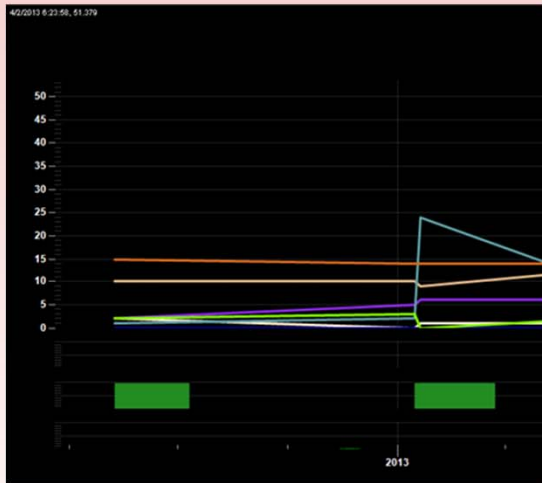
"New" Tools

Analytics Platforms

- Intuitive, Fast, Teachable

data sources   import   combine   present

map assets to normative model

maintenance data

persist

view & optimize

sensor data

correlate failures to patterns

predict failure

New Tools

Myriad data Tags:

Results displayed:
- Ranking Factors
- Time to Failure

Actions: How do we Respond?

Insights are fine: What to do?

1. **Productionizing findings is key**

2. **Right person, right place, right time**

- **Do this (fix)**

- **Look at this (inspect)**

- **Did you know (assess)**
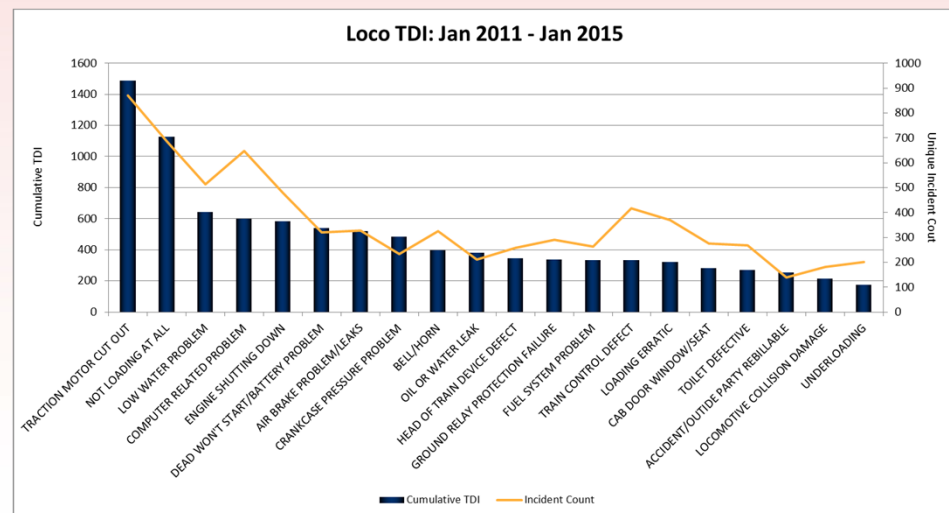
- **On it's way out (plan)**

Measuring Results

Challenge: Business Proposition

If we are using Big Analytics, and Insight properly, we should see this needle move (the current state change)

- **Derailments**

- **Train Delays**

- **Unplanned Outages**

- **API (availability)**

Loco TDI: Jan 2011 - Jan 2015

To Get There

1. Business Context….keep it on the "Front Page"

2. Data: Strategy and Commoditization

3. Culture: Not just and OR thing. It's a Railroad thing

4. New Tools: Analytics In Production and Part of Landscape

5. Actions: Field and industry collaboration. Do we have the right corrective actions?

6. Results: Calming things down.