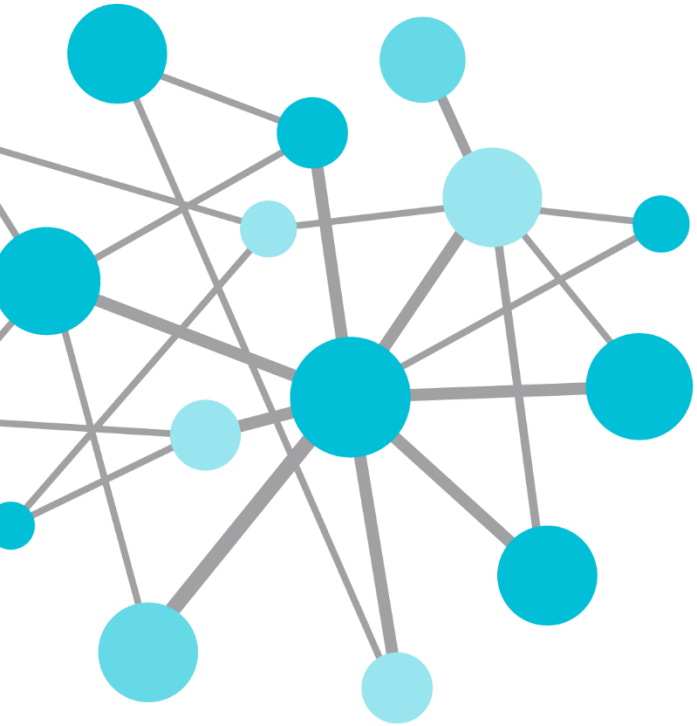


Marine Fleet Condition Based Monitoring

at Marathon Petroleum Company

Presented by **Tim Heck**

Marathon Petroleum Company LP

Marathon Petroleum Company LP

Condition Based Monitoring

Tim Heck

Adv IT Systems Integrator

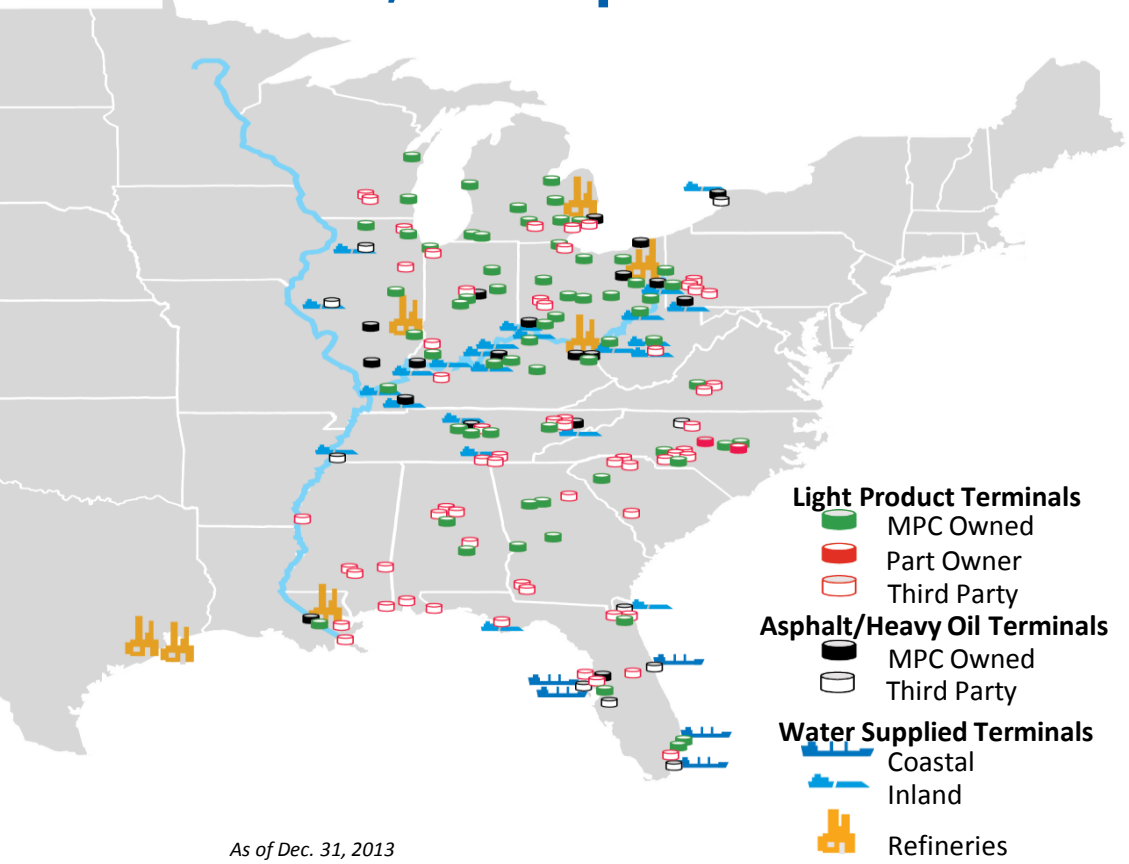
Agenda

- Marathon Petroleum Overview
- Condition Based Monitoring
- PI Architecture
- Business use of The PI System
- Results and Benefits
- Dashboards
- Conclusion

Marathon Petroleum Statistics at a Glance

- Fortune 50 company
- Established in 1887
- Fourth largest U.S. refiner
  - Largest in Midwest
- 2013 Revenues and other income: $100.3 billion
- 2013 Net income attributable to MPC: $2.11 billion
- Employees: approximately 30,000
- Headquartered in Findlay, Ohio
- Approximately 1,480 Speedway convenience stores
- Approximately 5,200 Marathon Brand retail outlets
- Extensive terminal and pipeline network

Terminals, Transport and Rail



As of Dec. 31, 2013

- 64 owned and operated, 2 part-owned and non-operated and approximately 60 third-party light product terminals (gasoline, diesel, kerosene, jet fuel)
- 19 owned and operated and 10 third-party asphalt terminals
- 170 owned transport trucks and 262 transport loading lanes
- 2,165 owned or leased railcars

Marine

- Large private inland petroleum products barge fleet
- Operations include 18 owned/leased inland waterway towboats and 184 owned and 16 leased barges
- Charters additional equipment for brown and blue water movements
- Transports crude, light products, ethanol, feedstocks, and other specialty chemicals

Business Challenge / Project Overview

- Condition Based Monitoring:
  - This effort is expected to reduce extended downtime of equipment due to equipment failure, reduce costs for failure by having better information available, increase mechanical availability, enable a safer working environment, and improve efficiency of the Marine work force.
- Project Scope
  - All vessels
    - Engines
    - Gears
    - Generators
    - Steering
    - Ship Service
    - Tank Alarms

Project Overview

- Marine Repair Facility
  - Cleaning Dock
  - Tank Farm
  - Waste Water Treatment Plant
  - Boiler house
  - Thermal Oxidizer
- Currently six vessels implemented
  - MV Speedway
  - MV Cincinnati
  - MV Ohio Valley
  - MV Nashville
  - MV Paul G. Blazer
  - MV Marathon
  - ~400 data points per vessel

The PI System Architecture Overview

- PI Interface for Modbus Ethernet
  - Leveraging the buffering capability
- PI ProcessBook for viewing graphical representations
- PI DataLink for data analysis
- Looking to utilize PI Notifications in the future

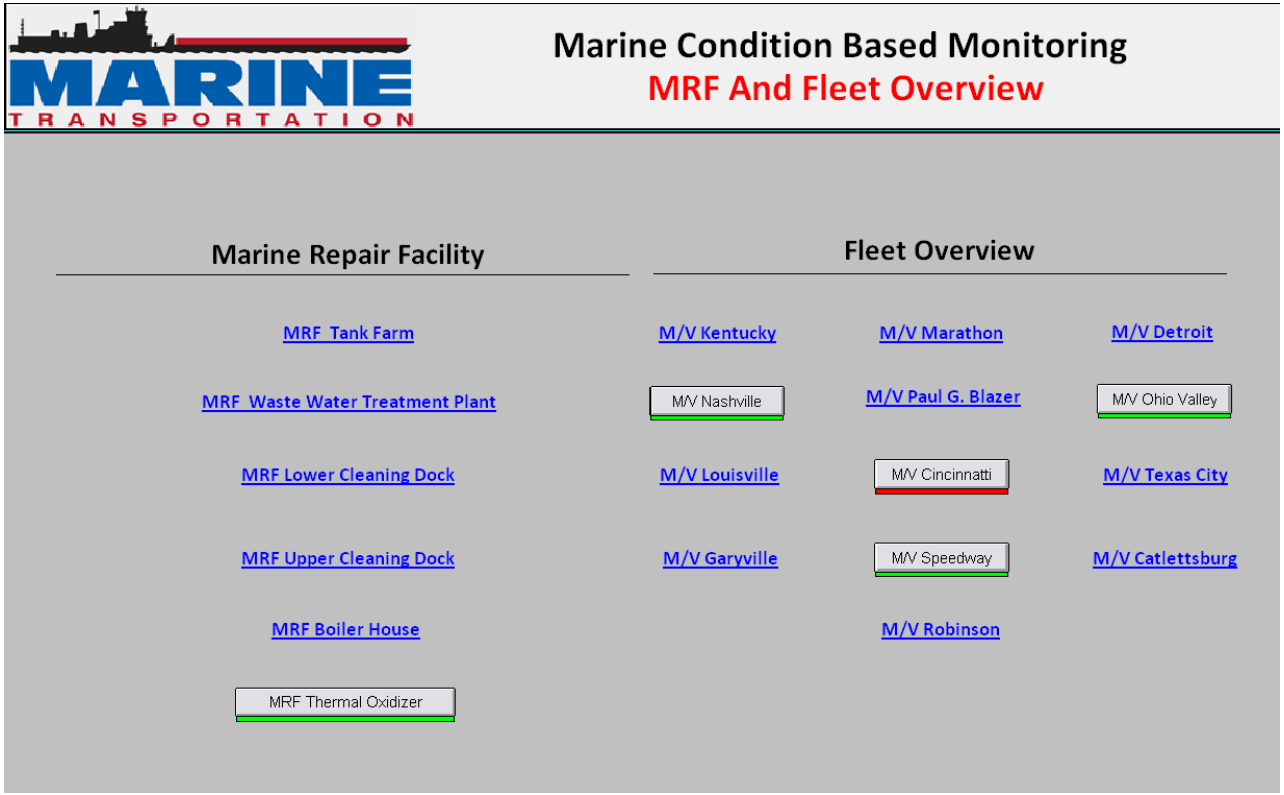
Use of the PI System

- Preventative maintenance potential
- Updates existing alarm panels
- Fuel burn metrics
- Historical data for incident investigation and trouble shooting
- Move workforce from data capturing to data analysis

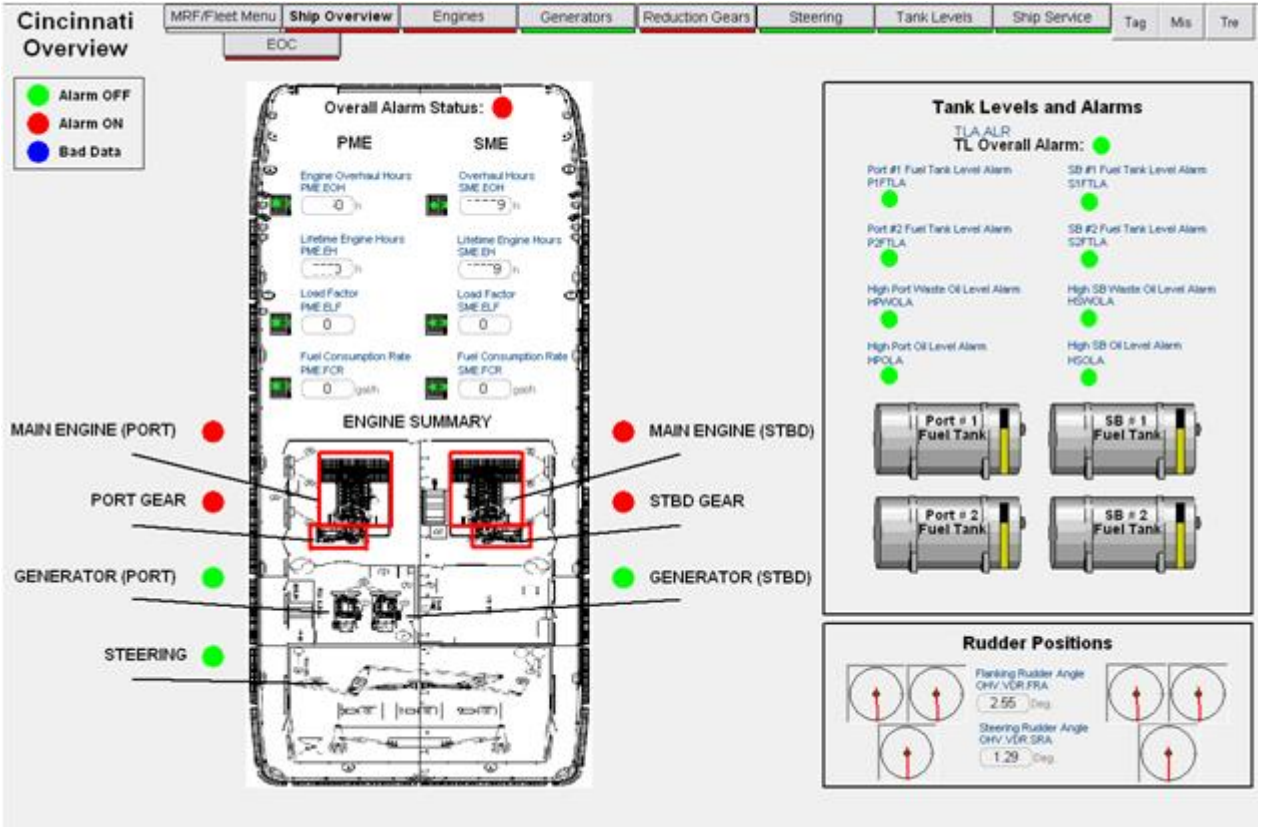
Results / Benefits

- Leverage previous initiatives to provide network access to the Marine Fleet
- On average 7% of the CBM data being pulled over the network was being lost when vessels traveled during bad weather, under bridges or through locks. This issue has been mitigated by placing the PI Interface for Modbus Ethernet on the vessels to buffer data that would be otherwise lost.
- Reduced downtime and increased mechanical availability through better understanding of equipment performance
- Enable safer working environment by reducing unnecessary equipment maintenance
- Overall efficiency improvement with the workforce

Dashboards – Marine Overview



Dashboards – Vessel Overview



Summary

- Innovative method of connecting real-time business data to end-users and de-silo business systems to a single platform.
- Leveraging past expertise within Marathon Petroleum and the industry to benefit the Marine organization
- Continuing to learn, adapt and utilize new technology

Contact Information

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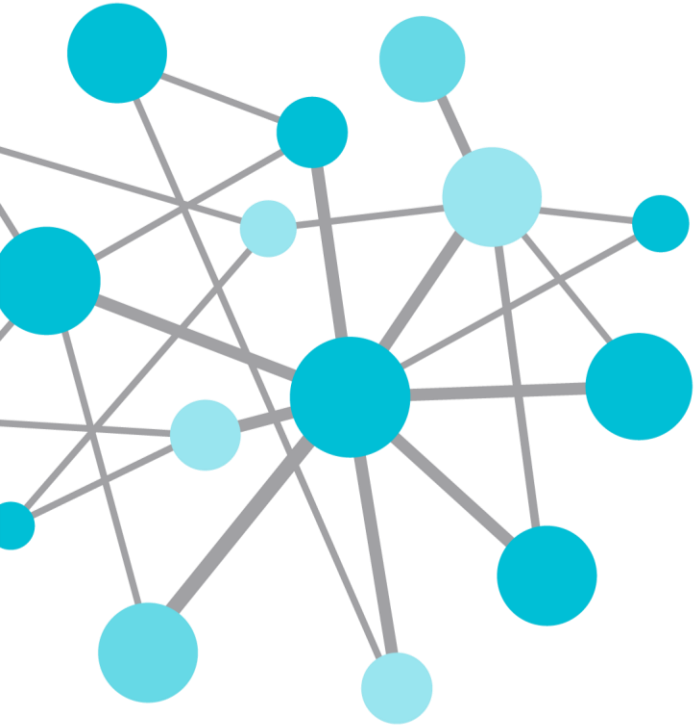

THANK YOU

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