Marine Fleet Condition Based Monitoring at Marathon Petroleum Company

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Condition Based Monitoring

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Agenda

- Marathon Petroleum Overview

- Marathon and PI

- MPC Marine - Condition Based Monitoring

- PI System

- Business use of The PI System

- Results and Benefits

- Dashboards

- Conclusion

Marathon Petroleum Statistics at a Glance

- Fortune 25 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: ~30,000

- Headquartered in Findlay, Ohio

- Approximately 2,740 Speedway convenience stores

- Approximately 5,300 Marathon Brand retail outlets

Marathon Petroleum Corporation and PI

- PI System License since mid 80's
  - 2nd ever Production PI server in Cattlesburg

- Current Usage
  - 7 Refineries
  - Terminal Visualization
  - Terminal of the Future
  - Marine Vessels

- 1.1 million PI Tags
  - Refinery ~715,000
  - Terminals ~200,000
  - EA&S ~140,000
  - SD&P ~35,000
  - Marine ~15,000

Terminals, Transport and Rail
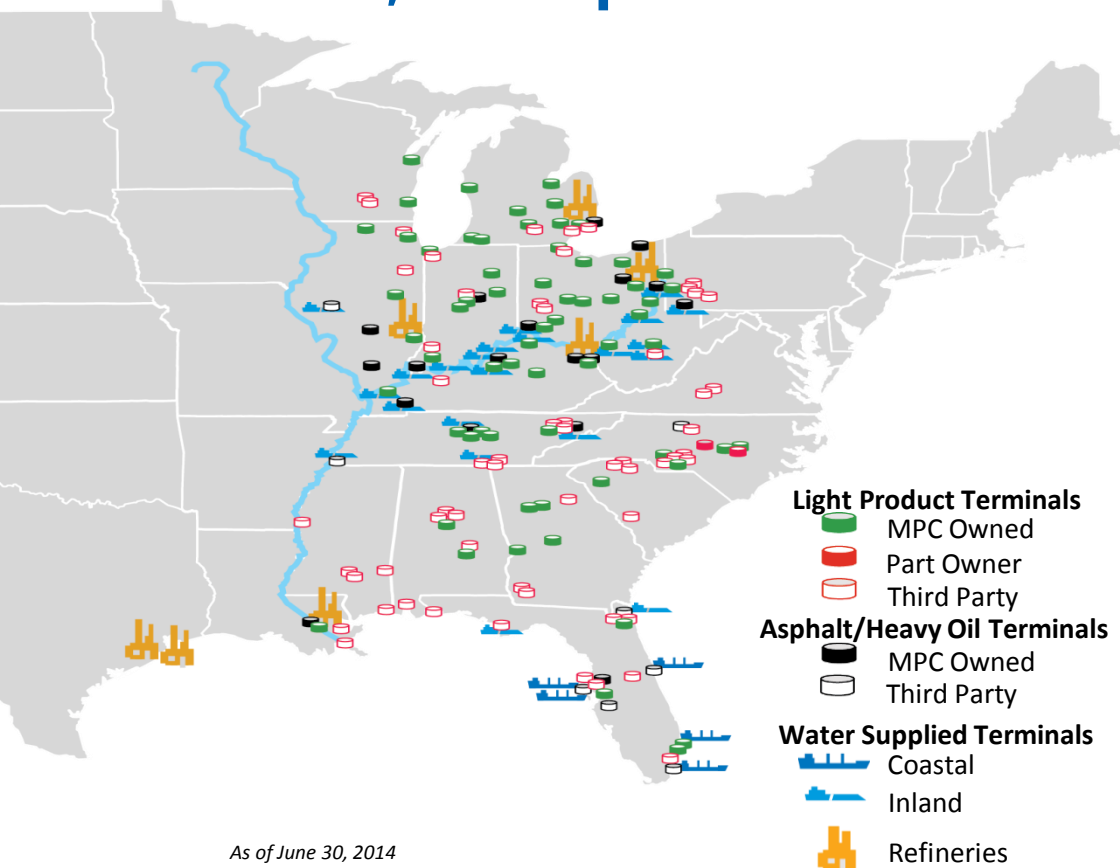
- 63 owned and operated, two part-owned and non-operated and approximately 60 third-party light product terminals (gasoline, diesel, kerosene, jet fuel)

- 18 owned and operated and eight third-party asphalt terminals

- 170 owned transport trucks and 262 transport loading lanes

- 2,165 owned or leased railcars

Light Product Terminals
- MPC Owned
- Part Owner
- Third Party

Asphalt/Heavy Oil Terminals
- MPC Owned
- Third Party

Water Supplied Terminals
- Coastal
- Inland

- Refineries

As of June 30, 2014

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

- Marine vessels
  - Engines
  - Gears
  - Generators
  - Steering
  - Ship Service
  - Tank Alarms

- Marine Repair Facility
  - Waste Water Treatment Plant
  - Thermal Oxidizer
  - Maintenance Float
  - Tank Farm
  - Boiler house

Project Progress

- Marine Repair Facility
  - Cleaning Dock
  - Tank Farm
  - Waste Water Treatment Plant
  - Boiler house
  - Thermal Oxidizer

- Currently nine vessels implemented (~400 data points per vessel)
  - M/V Speedway
  - M/V Cincinnati
  - M/V Ohio Valley
  - M/V Nashville
  - M/V Paul G. Blazer
  - M/V Detroit
  - M/V Kentucky
  - M/V Marathon
  - M/V Map Runner

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

- PI Notifications to identify system outages

- PI Coresight for future mobile analysis

- PI AF for future analytics

MPC Marine 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 CDM 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
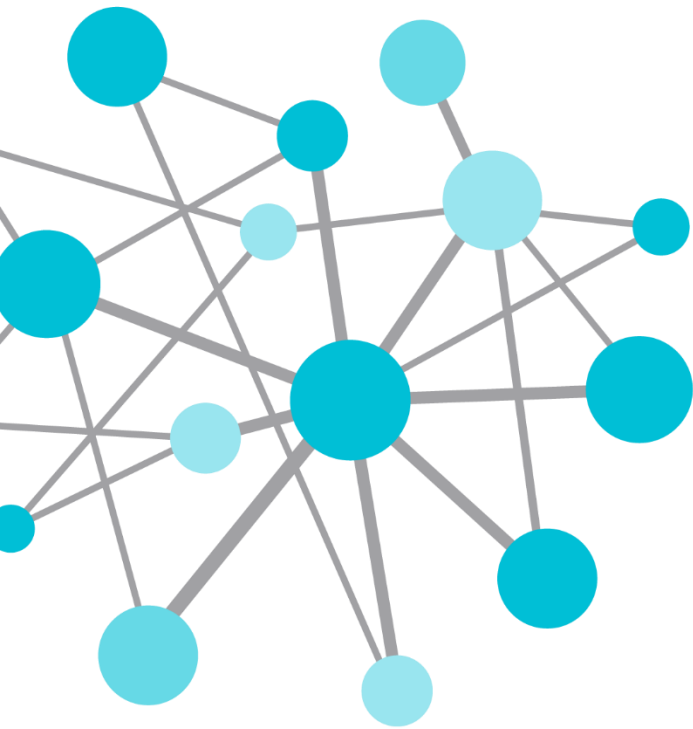
Dashboards – Marine Overview
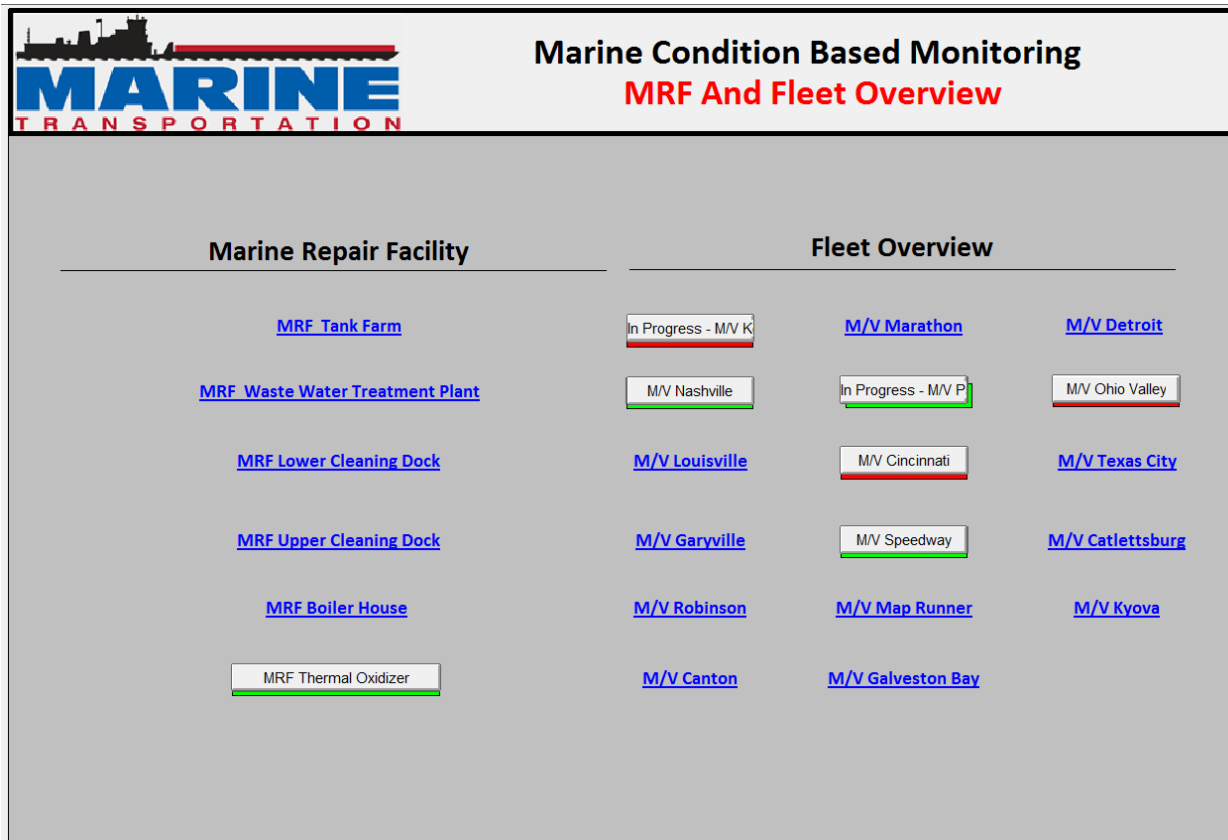
Dashboards – Vessel Overview
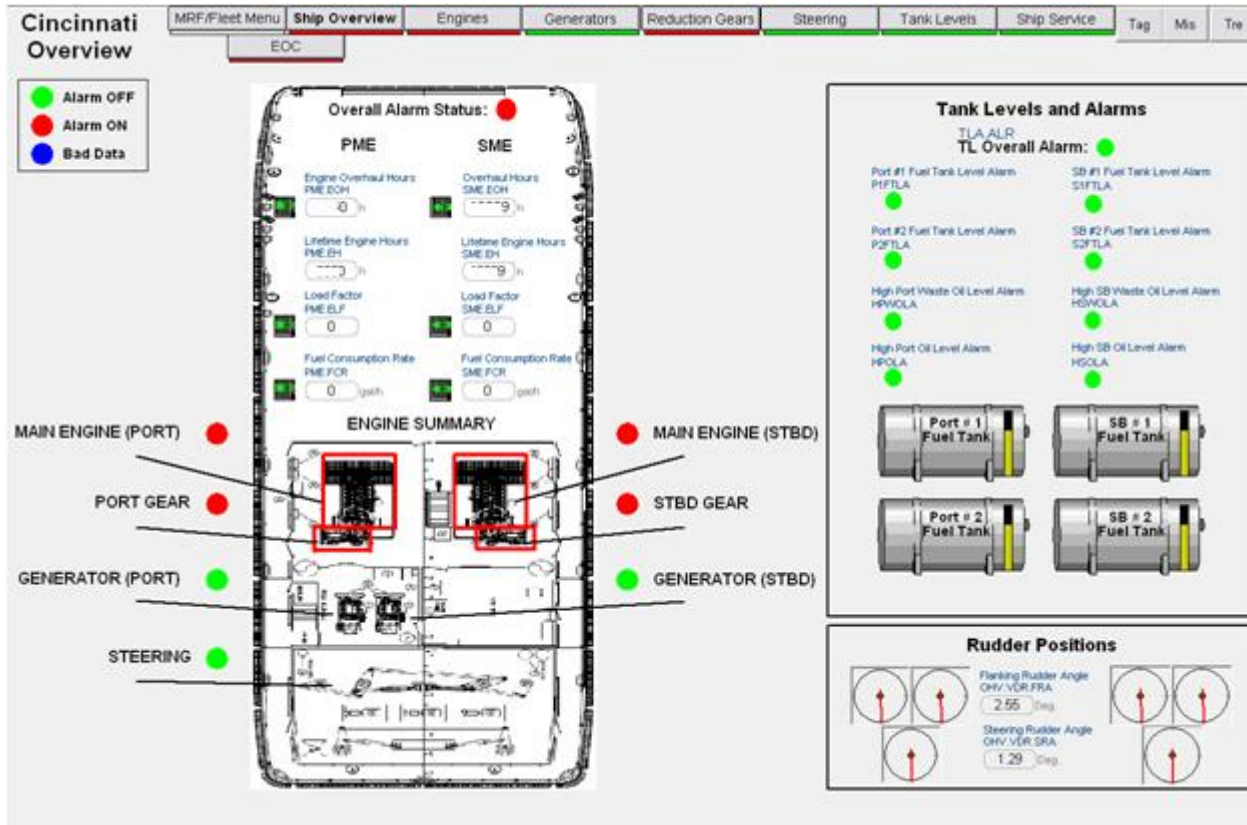
Summary

- 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

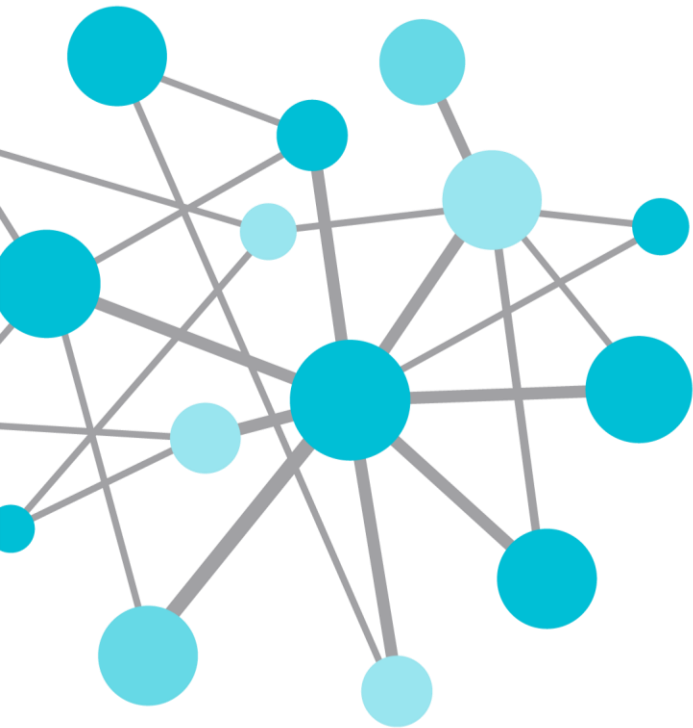- Continuing to learn, adapt and utilize new technology

Questions

Please wait for the microphone before asking your question

Please state your name and your company

THANK YOU

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