AVEVA PI WORLD

Driving long-term competitive advantage at North American Construction Group (NACG)

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About NACG

- Heavy civil contractor
- Safety is primary goal
- 65+ years in business
- 650+ pieces of mine mobile equipment
- External equipment and component rebuild services
- Operates throughout North America - Primarily in Alberta oilsands

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Reliability department

- Condition based monitoring via oil sampling
- Preventative maintenance program
- Component failure analysis and product improvement
- Financial and labor analysis
- Continuous improvement in everything we do

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Project Goals

- Capture real-time data from diverse fleet
  - 70% Cat + 30% Hitachi, John Deere, Komatsu and Volvo
- Store and analyze data in-house
- Proactively monitor fleet health from head office
- Get data in the hands of field operations

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Project expected benefits

- Improve equipment health
- Reduce maintenance costs to drive competitive advantage
- Situational awareness by aligning resources and parts with work
- Monitor road condition and congestion
- Impact environment, social, and governance (ESG) criteria

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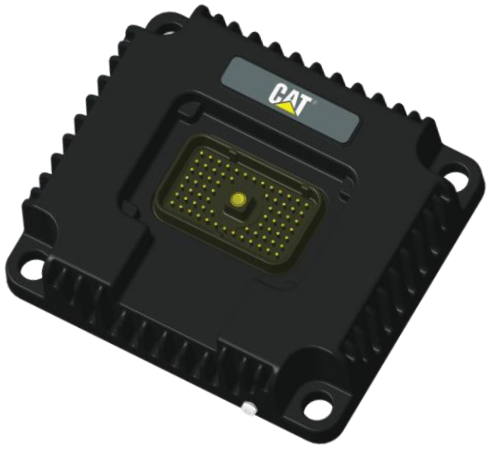
Data acquisition options explored

- Evaluated 30+ systems
- Field Trialed 3 systems
- 3rd party systems do not capture full dataset
- Cat solution supports the PI System
- Traditional dispatch system doesn’t fit our operating model
- We are one of Cat’s first customers to use this system



Cat® Product Link™ Elite (PLE)

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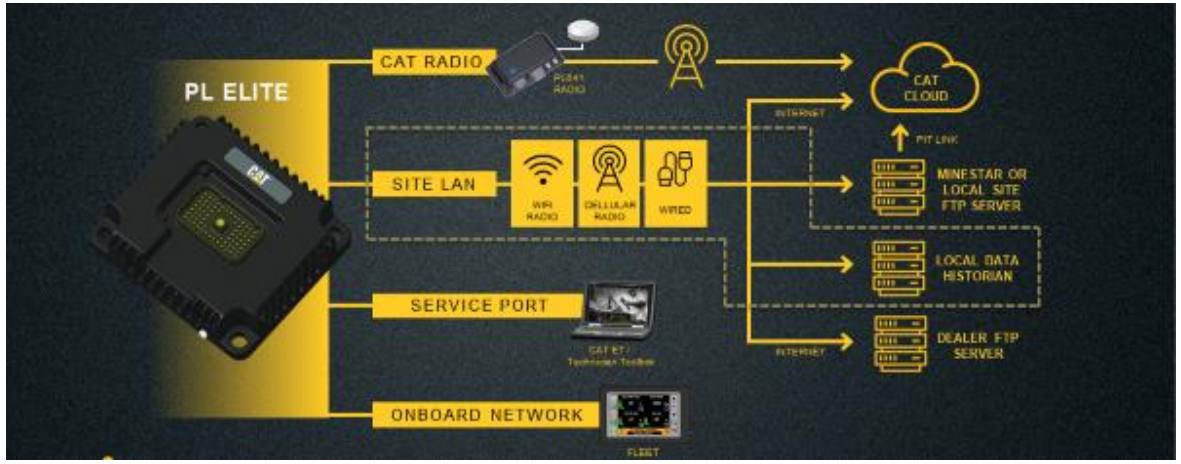
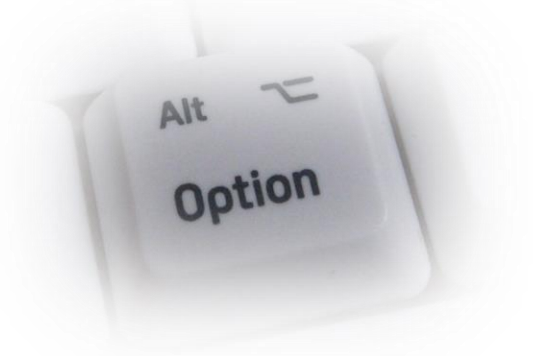
Caterpillar PLE Advantages

- Caterpillar has 10+ years of PI System experience
- PLE is existing, proven hardware
- Supports Caterpillar and other OEM equipment
- Captures data in real-time and sends directly to customer's PI System
- Caterpillar Mining Performance Solutions gets customer up and running quickly



Timeseries database options explored

- Evaluated various options using dataloggers and databases
- PI System had the best structure and support resources
- Caterpillar works directly with the PI System and understood implementation details
- AVEVA provided an evaluation sandbox environment to ensure components worked well together to meet the business needs



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Project implementation
Data logger installs

Hired and trained field technology technician

Setup long term support contracts

Technician shows up on-site with parts in-hand

Target 150 installs by end of 2021

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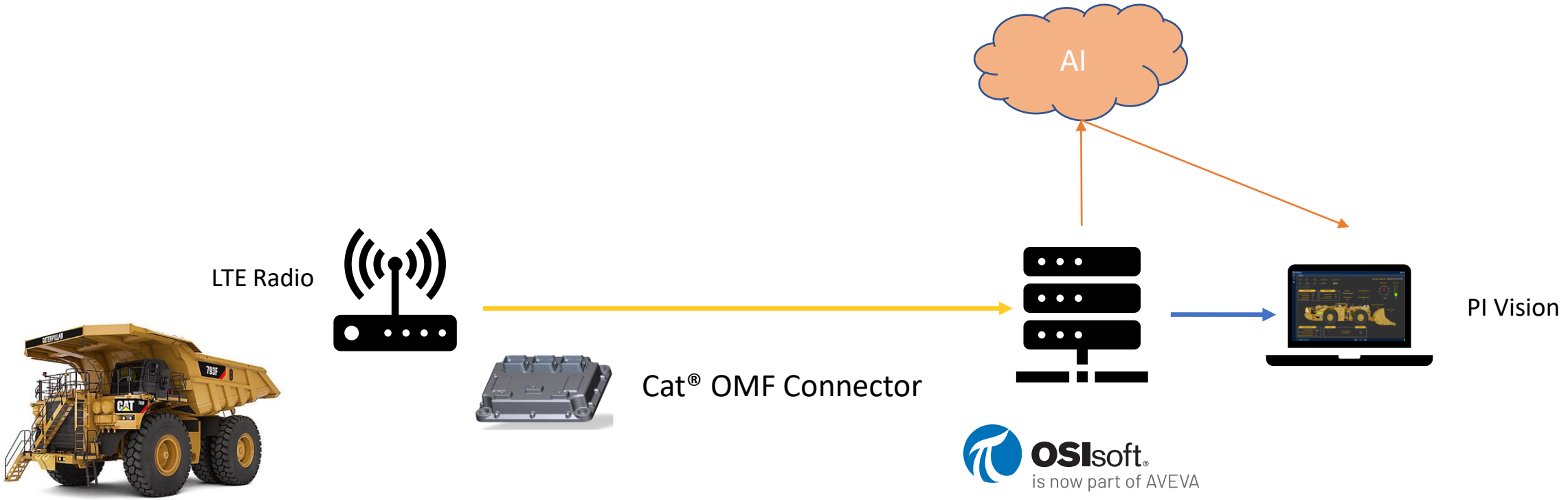
Data acquisition



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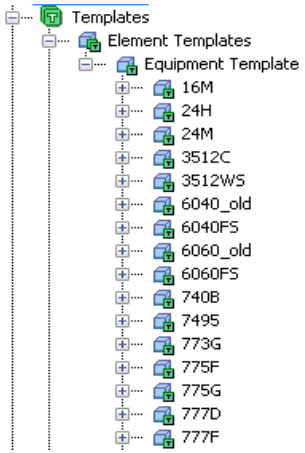
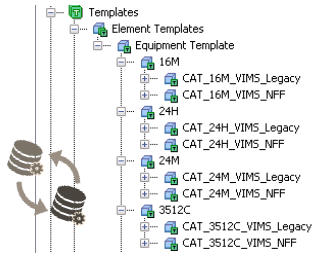
Data Architecture

PI Server Asset Framework, data standards, data compression, technology review

Find Existing Equipment Model



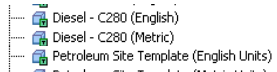
Template Switching Based On Software Version



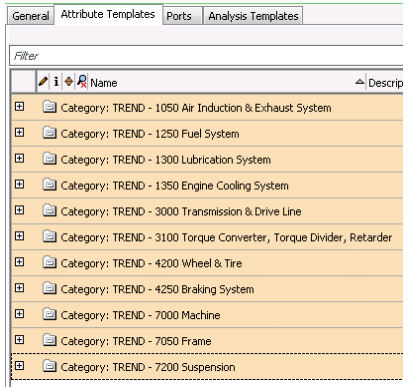
Template Switching Based On Unit Conversion

KPA

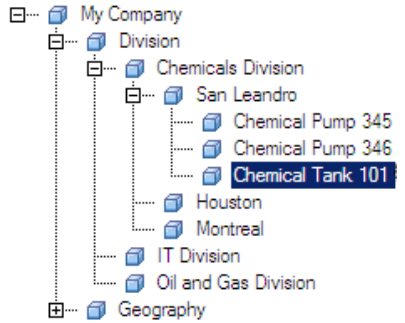
PSI



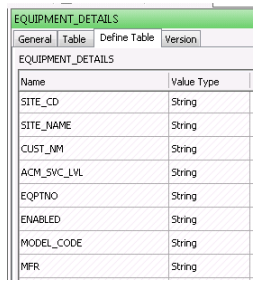
Categorizing Equipment Component Level



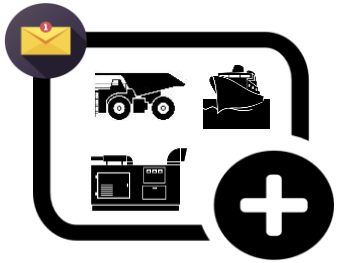
Asset Update



AF Table for Auto Onboard

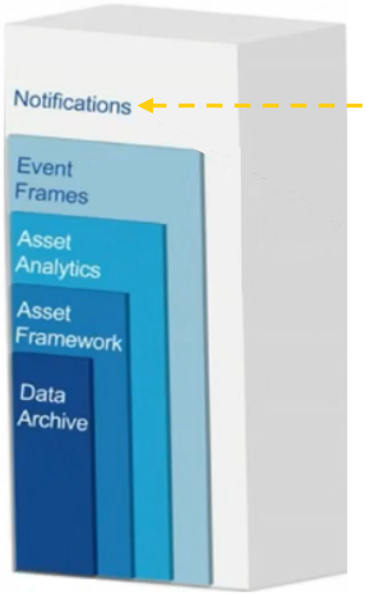


Notification To Add Missing Model



Asset Onboard

An enabler for advanced analytics



PI System

OSIsoft. is now part of AVEVA

Active Event: High Exhaust Temperature Differential

Notification Process

PI Vision

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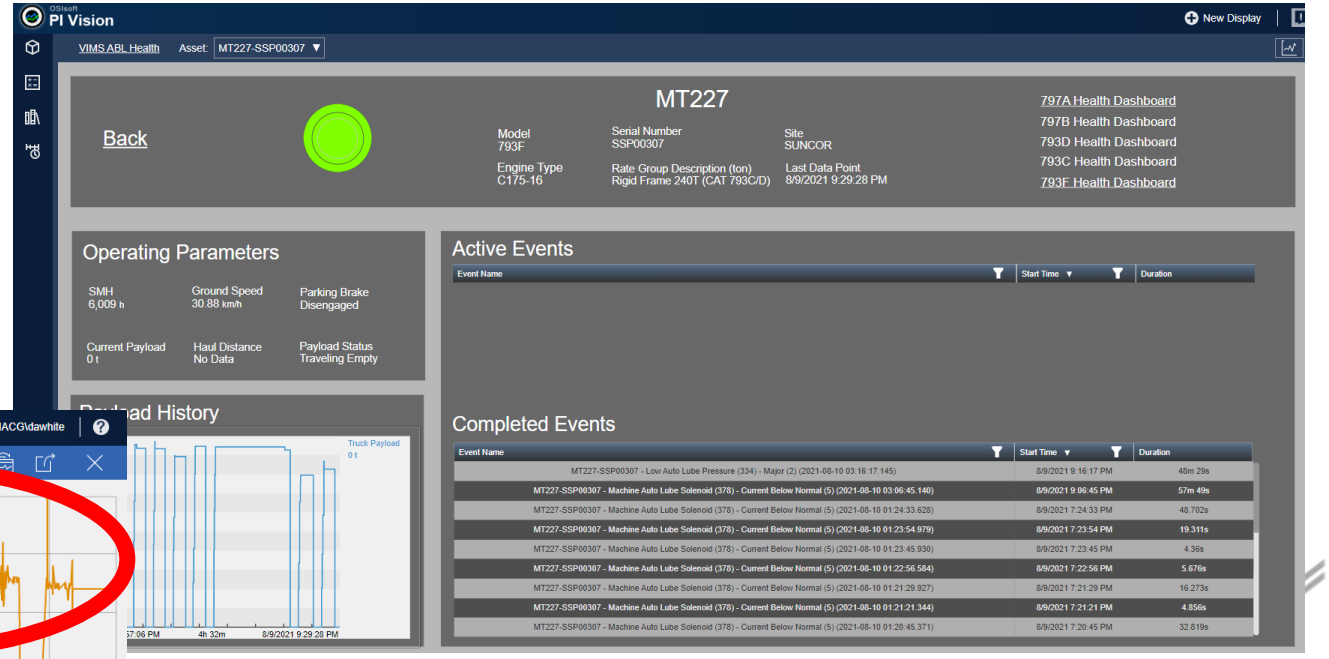
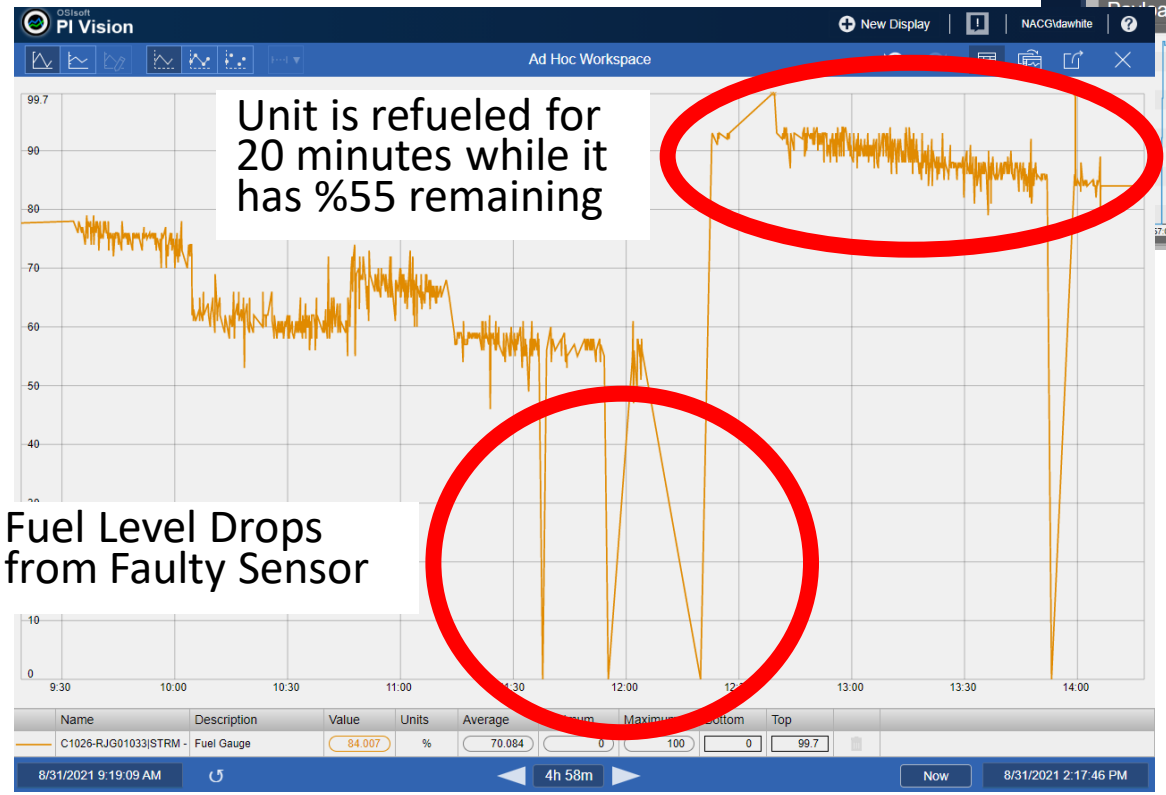
Current Benefits

- First analyst is using PI Vision





- Equipment In-Cab Warning to Operator that they are out of fuel
- Site was stopping production to refuel
- Analyst recognized the sensor was faulty from Pi Vision and instructed site to continue running unit until planned downtime where the sensor was replaced

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Next steps
Additional software

- Esri ArcGIS: operations interface
- CMA Workflow Tool: managing reactions to the data
- AI partnership: investigating potential for AI use on mine mobile equipment
- Analyst team will scale to 4-6 members
- Realtime monitoring from head office

TRANSPORTATION

World-Class Equipment Management

Challenge

- Providing state-of-the-art real-time monitoring and analytics capabilities for NACG's large equipment fleet across multiple sites

Solution

- Deployed the latest AVEVA PI System technology including Asset Framework and PI Vision as an advanced foundation for condition-based monitoring & advanced analytics

Benefits

- Increased production and operational efficiency, reduced maintenance costs and lowered environmental impact

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