NAVISTAR®

Reducing Maintenance Costs up to 40 percent for Connected Vehicles

"Using real-time big data to frame business decisions and deploy proactive maintenance has opened new revenue streams and delivered additional customer value."

— Troy Clarke, CEO, Navistar

Navistar is a leading manufacturer of commercial trucks, buses, defense vehicles, and engines, widely known for its International® Truck and IC Bus® brands.

Challenge

Typically, vehicle manufacturers schedule vehicle maintenance based on miles traveled or time since last appointment. But these are very rudimentary and only two of thousands of data points that can signal the need for maintenance. Unscheduled maintenance and vehicle breakdowns account for a large share of total costs for vehicle owners.

To help fleet and vehicle owners move from a reactive approach to a more predictive model, Navistar needed to analyze a wider range of data in real time, including vehicle sensor data. However, its traditional data warehouses couldn't support the growing volume of fast-moving, high-volume telematics data. "As we collected more data, the analytic process slowed to a near halt on our legacy systems," said Ashish Bayas, chief technology officer, Navistar.

Solution

Navistar built an IoT-enabled remote diagnostics platform, called OnCommand® Connection, on Cloudera Enterprise. The platform brings in over 70 telematics and sensor data feeds from more than 300,000 connected vehicles—including engine performance, truck speed, acceleration, coolant temperature, and brake wear. This data is then correlated with other Navistar and third party data sources, including meteorological, geolocation, vehicle usage, traffic, historical warranty, and parts inventory information. The platform currently stores over 60 terabytes (TB) of data and uses machine learning and advanced analytics to automatically detect engine problems early and predict maintenance requirements.

Fleet and vehicle owners can now monitor truck health and performance from smartphones or tablets, prioritize needed repairs, and quickly identify the nearest dealer service locations that have the relevant parts in stock, available technicians, and available service bays. "With Cloudera, we can analyze data in ways and speeds that were not previously possible," said Terry Kline, chief information officer, Navistar. "We can evaluate billions of rows of data from connected vehicles in hours, not weeks, to enable predictive maintenance."

Implementation

Navistar first built a prototype in September 2014. The company put the platform into production just six months later, and today is expanding its analytic services. "We continue to innovate using the Cloudera platform to gain valuable insights from growing sources of information," said Kline.

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Key Highlights

Industries
- Manufacturing
- Transportation

Location
- Headquarters: Lisle, Illinois, USA

Business Applications Supported
- IoT
- Predictive maintenance
- Remote diagnostics
- Route optimization

Impact
- Reduced maintenance costs and vehicle downtime by up to 40 percent
- Decreased the maintenance cost-per-mile for one company's vehicles to less than three cents, down from 12 to 15 cents
- Reduced the number of tows one school district needed year over year
- Enables Navistar to analyze billions of rows of data in hours instead of weeks

Data Sources
- Vehicle sensors
- Navistar and third party systems for meteorological, geolocation, vehicle usage, traffic, historical warranty, and parts inventory information

Solution
- Modern Data Platform: Cloudera Enterprise
- Workloads: Analytic Database, Data Science & Engineering
- Components: Apache Spark, Apache Impala (incubating), Apache Kafka
- BI & Analytics Tools: Information Builders WebFOCUS In-Document Analytics, Microsoft Power BI, Microsoft SQL Server Analytic Services Models, Microsoft SQL Server Reporting Services, SAS Enterprise Guide, Tableau Desktop, Tableau Server
- Data Science Tools: Python, R, Scala
- ETL Tool: IBM InfoSphere DataStage

Big Data Scale
- 60 TB

Results

With OnCommand Connection, Navistar has helped fleet and vehicle owners reduce maintenance costs by up to 40 percent. One Navistar customer reduced the maintenance cost-per-mile for its vehicles, which previously was 12 to 15 cents, to less than three cents.

Early detection also reduces vehicle downtime by up to 40 percent and minimizes towing costs. In addition, when downtime occurs, vehicle owners typically lose US$1,000 in revenue per vehicle daily. With over 300,000 vehicles across 2,300 customers, the total impact can be significant.

Navistar also uses the platform to help school buses run safely and on time. One school district with 110 buses that travel 1.5 million miles annually reduced the number of tows needed year over year, thanks to the predictive insights.

"The results are overwhelmingly positive," said Troy Clarke, CEO, Navistar. "Using real-time big data to frame business decisions and deploy proactive maintenance has opened new revenue streams and delivered additional customer value."

About Cloudera

Cloudera delivers the modern platform for machine learning and advanced analytics built on the latest open source technologies. The world's leading organizations trust Cloudera to help solve their most challenging business problems by efficiently capturing, storing, processing and analyzing vast amounts of data. Learn more at cloudera.com.

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