IoT Analytics Blueprint

Pentaho enables organizations to minimize unscheduled downtime, optimize fleet activities, and improve customer experience by blending machine-generated IoT data with other contextual data to feed predictive models.

Increasing volumes, variety, and velocity of data coming from sensors, machines, and other connected devices bring significant data integration challenges. Pentaho helps organizations efficiently prepare and blend machine and sensor data with other assets — such as data from your ERP or CRM systems — to provide the necessary context to deliver transformative business outcomes.

What is it?

Organizations using IoT analytics can:

- Uncover patterns in equipment and device data with powerful machine learning and data mining tools
- Apply insights to fine-tune equipment for better operational efficiency
- Ingest and process machine and sensor data in big data architectures
- Prepare, model, and explore semistructured and unstructured data sets
- Connect natively to Hadoop distributions, NoSQL stores, and analytic databases
- Blend sensor and machine data with traditional data stores
- Operationalize R, Python, or Weka models and machine learning functions as a part of the data integration workflow

Why do it?

Organizations that manufacture, transport, and sell goods and services have vast business processes to manage. The large variety of machinery across value chains results in high operational costs. Inefficiencies such as production delays, inclement weather that slows deliveries, and unexpected machine failures can lead to millions in lost revenue and increase the cost of doing business.

Organizations can use analytics to:

- Improve customer satisfaction
- Increase operational efficiencies
- Improve product/service quality
- Increase profitability

Value of Pentaho

Customer savings can range from several hundred thousand dollars to millions of dollars. The Pentaho platform offers many capabilities to help you maximize ROI:

- **Metadata injection** allows you to automate data ingestion and onboarding from many sources. Users can cleanse and blend to create analytics-ready data models. Metadata injection speeds up development, testing, and deployment time by 10x.
- **Streamlined data refinery** allows organizations to create custom data sets through automation quickly. Implementing a streamlined data refinery speeds time to insight by significantly reducing time to visualizing and reporting.
- **Machine learning orchestration** makes data science teams more productive in the areas of preparing data, engineering new features, deploying new predictive models, and updating models with new environmental data.
- **Embedding analytics** allows insights to be delivered at the point of business impact directly into IoT applications and services.

End-to-end architecture
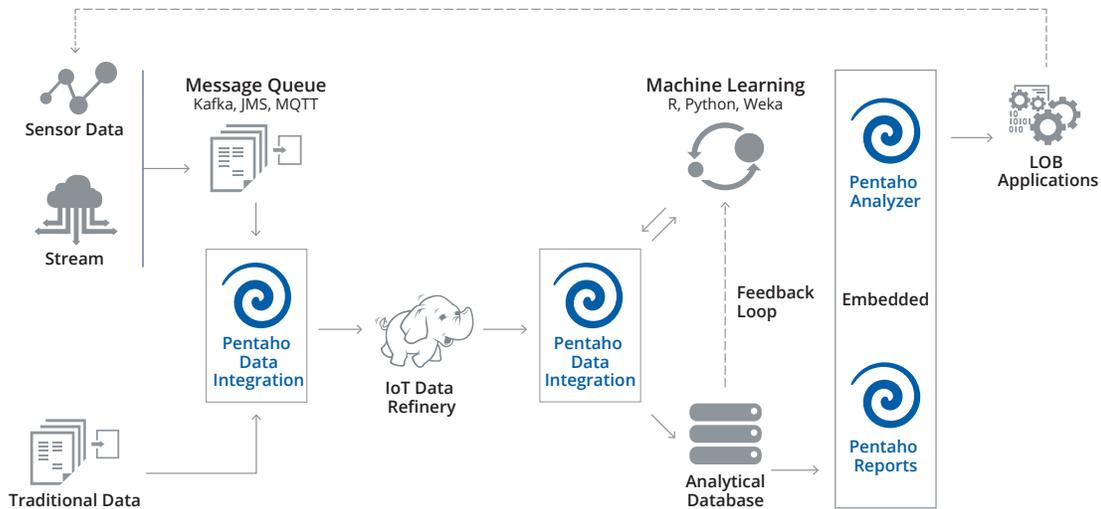
PENTAHO ACCELERATES THE IOT ANALYTICS PIPELINE TO TRANSFORM BUSINESS OUTCOMES

Customer use cases

Emerging use cases continue to drive business value by blending machine and sensor data with other corporate data assets. These include:

- **Predictive and preventive maintenance** uses predictive algorithms to determine operational challenges before they happen. With this insight, organizations can intervene and replace parts and entire machines before they fail and identify product quality problems ahead of time.

  - **Caterpillar** collected sensor data from fleets of ships transported via wireless networks and processed and fed the data to predictive models that resulted in annual maintenance cost savings of over $800K per ship and several million dollars across the entire fleet.

- **Telematics and fleet management analytics** help businesses analyze and optimize fleet activities, including vehicles, trains, airplanes, and ships. Time of delivery of goods can be changed quickly due to unplanned events like inclement weather or new import/export regulations.

  - **Hitachi Rail Europe** received 3.6 million data points per second from its train sensors. Pentaho collected the train sensor data and passed it to predictive models to produce a variety of reports and ad hoc analysis that reduced transportation costs by over £20M.

- **Customer experience** enables firms to identify existing and new categories of products and services to bring to market, reduce churn, and acquire new customers.

  - **IMS** processed and fed telemetry data to predictive models for reports and analysis. The categorization of customer profiles resulted in IMS recommending the most optimal insurance offering to customers, improving customer acquisition and retention rates.

"Pentaho fills a gap to operationalize the data integration process for advanced and predictive analytics. Having embedded Pentaho for over seven years to provide remote and onboard analytics for maritime fleets and ships and several years' experience with Pentaho Data Integration, Weka, and R, we are now helping clients blend a 360-degree view of all equipment data sources to enable early prediction of potential machinery failure."

– **KEN KROONER**
President, CAT® Marine Asset Intelligence (on deploying R and Weka algorithms in Pentaho for predictive maintenance)

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