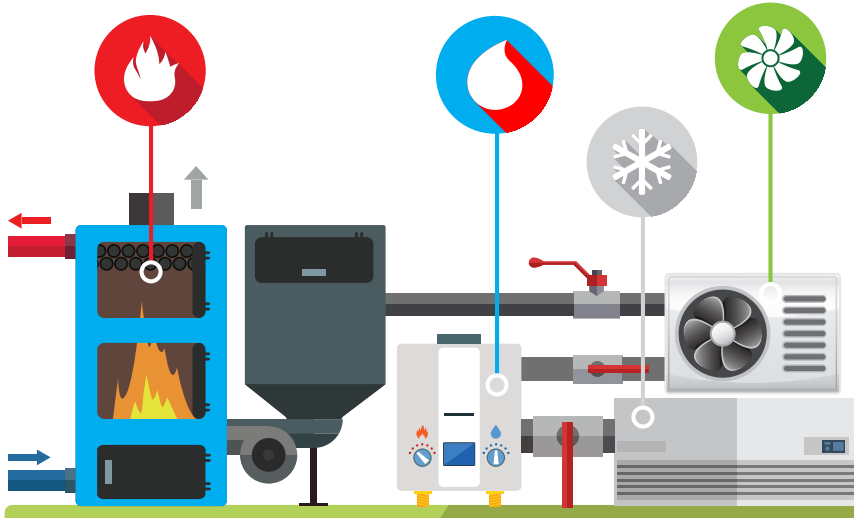


Optimize your HVACR with mnuvo's SmartObjects™ platform

From insights to actions for HVACR manufacturers



mnuvo



The Industrial Internet of Things (IIoT) represents a huge opportunity for the HVACR industry where a small change in performance can result in huge losses for the bottom line.

If equipment fails unexpectedly, building managers face downtime and potentially displeased occupants. Additionally, the older the HVACR system, the greater the probability that operating costs are higher than they should be.

mnubo's SmartObjects service is an industry leading IoT analytics and data science library for HVACR manufacturers and solution providers. The SmartObjects service organizes, stores and analyzes equipment usage and diagnostics data and delivers actionable insights. Usage, sensor and events data from HVACR units are used to power compelling insights to manufacturer's, technicians and front line workers. Some examples include:

1. Build better, smarter products

Connected HVACR's measure flow, temperature, pressure and vibration levels in real-time. mnubo's SmartObjects service integrates the HVACR data, time-series, events and external data sources (product type, operating hours, geo-location, weather, etc) and monitors usage, and interactions. Manufacturers can perform flexible queries to understand how, when and where their HVACR are being used. SmartObjects also applies data science to build usage and engagement profiles to group HVACR on their usage behaviour which helps the manufacturer tailor its product and services to each segment.

2. Improve operational efficiency

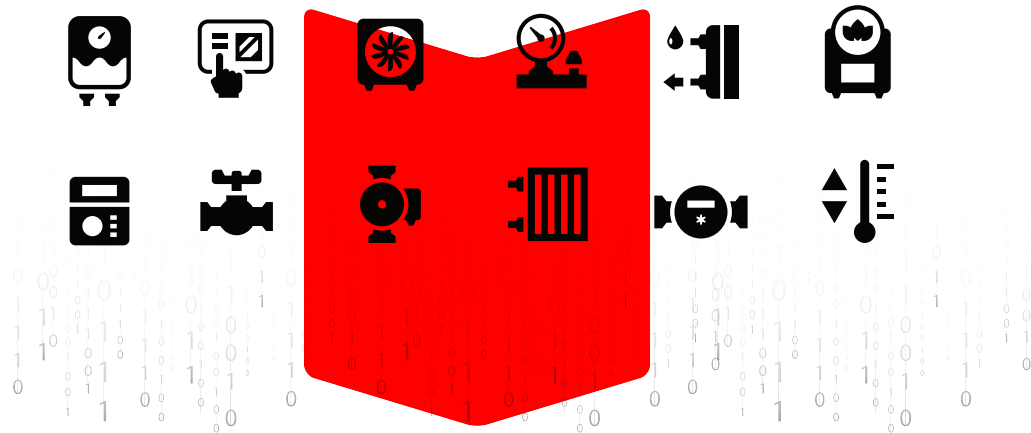
In addition to usage data, mnubo's SmartObjects service stores and analyzes the HVACR's diagnostic events data to determine trends, patterns and highlight potential issues. The manufacturer is notified of issues, anomalies and abnormal behaviour, as well as operational issues such as temperature and vibration fluctuations. Over time, SmartObjects can apply its data science on the failure and anomaly dataset to build predictive maintenance models that can highlight issues before they occur and allow the manufacturer to take proactive measures to address equipment related issues.

3. Deliver insights across the HVACR value chain

Data insights expose manufacturers to new competitive opportunities and threats. Usage data uncovers how value is created and captured, how equipment is utilized and how relationships with business partners are identified and defined. mnubo's SmartObjects service tracks the HVACR's life states from unconnected (ex: manufactured, shipped, purchased, etc.) to connected states (ex: registered, activated, end of life, etc.) to identify inefficiencies in the value chain. SmartObjects also correlates warranty, maintenance and service plans with product usage and wear to optimize usage-based warranty services. After-market services and end-to-end lifecycle monitoring enable optimized inventory and supply-chain.

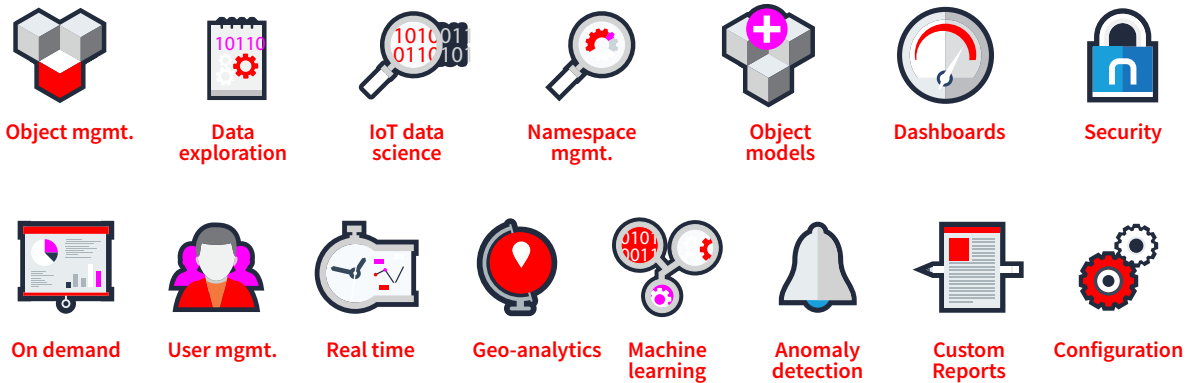
mnubo's real-time view of usage data assesses, diagnoses and recommends actions for HVACR manufacturers. Insights from connected HVACR systems drive broader market understanding, identify issues before they occur and empower business-wide operational strategies.

HVAC manufacturers



Ingestion API

mnuo SmartObjects™



IoT business value for manufacturers

<p>Product usage insights how/when/where are my products used? ...by location, features, product type etc. ...by usage profiles, trends & patterns etc.</p>	<p>Asset health & performance scoring how are the assets performing, what are the trends over time etc. benchmarking and aggregate feedback etc.</p>	<p>Predictive maintenance anomalies, failures, abnormal behaviour etc. reduce cost of truck rolls</p>	<p>Linked data streams product life-cycle analysis usage-based warranty</p>
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mnuo is an IoT Data Analytics company with the purpose of extracting business value from sensor data by delivering real-time insights, predictive analysis and powering richer applications. mnuo offers a SaaS solution to connected object manufacturers and other IoT players to ingest, enrich and analyze their IoT data. mnuo's services benefit customers in consumer, enterprise, and industrial verticals. Over the past year, mnuo has seen a 400% increase in the number of connected objects using its services. For more information, visit www.mnuo.com

email mnuo

general: info@mnuo.com
 sales: sales@mnuo.com

call mnuo

phone: 1.514.313.1400
 fax: 1.514.940.9702

visit mnuo

1751 Richardson Street, Suite 4110
 Montreal, Quebec H3K 1G6