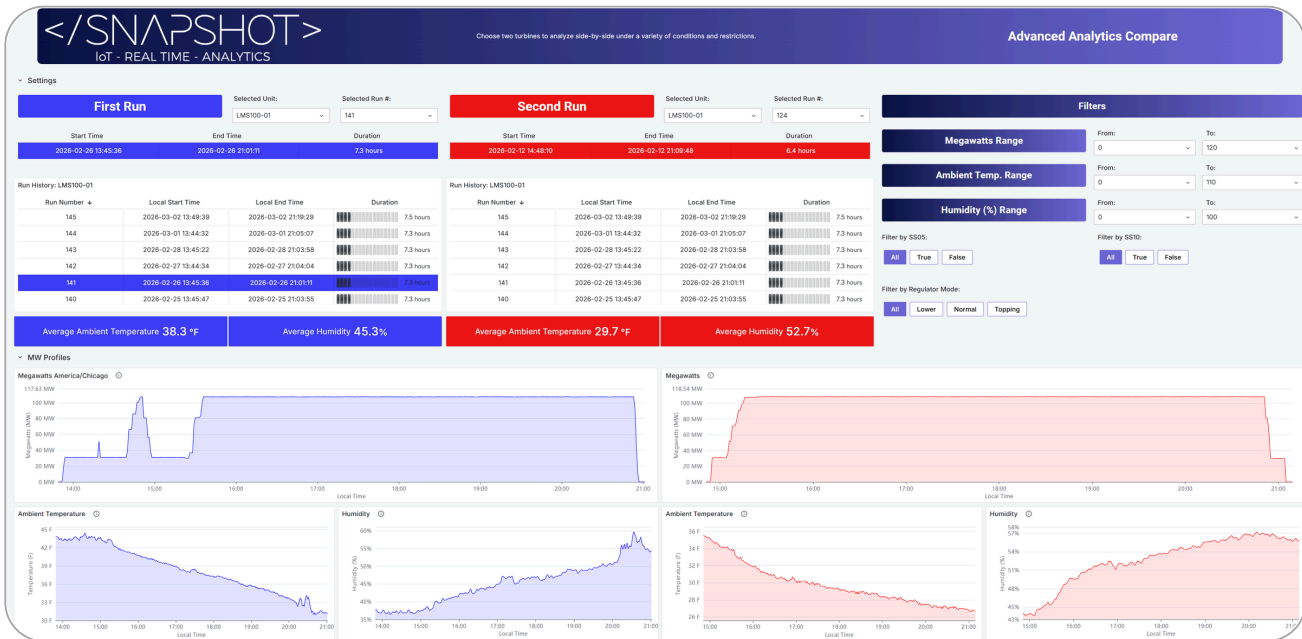


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IoT - REAL TIME - ANALYTICS

Advanced Analytics Comparison (AAC) Side-by-Side Performance Evaluation for Gas Turbine Decision-Making

The Advanced Analytics Comparison (AAC) dashboard enables normalized, side-by-side comparison of gas turbine performance across units or time periods. By aligning datasets under equivalent operating conditions, AAC helps identify performance gaps, degradation, and improvement opportunities without manual data analysis.



Why AAC Matters

- Benchmark fleet, supercore, and unit performance
- Identify degradation vs. historical baselines
- Validate maintenance and upgrade impact
- Compare normal vs. abnormal operating periods
- Support data-driven operational and financial decisions

Data Selection & Filtering

- Compare same or different units across time periods
- Automatic analytics execution across all views
- Filter datasets by:
 - MW output range
 - Ambient temperature
 - Relative humidity
 - Operating mode

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IoT - REAL TIME - ANALYTICS

Dashboard Components

All analytics are normalized and evaluated against MW load or shaft speeds, enabling direct comparison across datasets under equivalent operating conditions.

MW Profile

Displays: MW load, ambient temperature, and relative humidity

- Establishes load distribution and environmental conditions
- Provides context for interpreting performance issues

Performance Analytics

Metrics include: LPC Efficiency, HPC Efficiency, NOx15, Heat Rate

- Quantifies efficiency, emissions, and heat-rate differences
- Enables rapid comparison of overall unit performance between datasets

Compressor Diagnostics

Separate LPC and HPC Analytics measure: efficiency, work, temperature differential, and pressure ratio

- Identifies compressor fouling and degradation
- Detects airflow and compression performance shifts

Variable Geometry

Compares IGV, VBV1, VBV2, and VSV positions

- Detects tuning offsets and control logic differences
- Identifies mechanical or actuator limitation affecting airflow
- Shows performance differences driven by geometry positioning

Combustion Analytics

Displays fuel and water flows relative to MW Load or Water Flow Demand

- Identifies combustion tuning differences
- Shows incorrect fuel or water settings
- Surfaces hardware issues (valves leaks, flow inconsistencies)

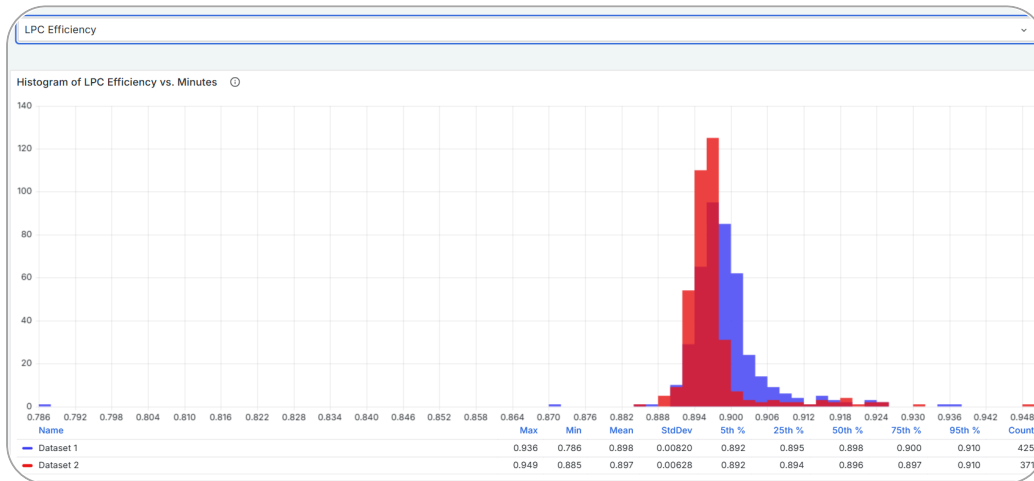
Performance Statistics

Provides statistical summaries for each dataset and parameter including average, median, min/max, and histogram visualization

- Quantifies performance differences with statistical rigor
- supports defensible engineering conclusions
- eliminates need for external analysis tools

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The Advanced Analytics Comparison (AAC) dashboard transforms complex performance data into clear, actionable insight, which enables faster, more confident decisions across operations, maintenance, and engineering.

Accelerate Root-Cause Identification

Rapidly isolates performance gaps across units or time periods, reducing time from detection to diagnosis

Improve Maintenance & Tuning Effectiveness

Validates maintenance actions and identifies tuning or control inefficiencies based on qualified performance impact

Protect and Recover Revenue

Detects efficiency losses early and promotes recovery of lost MW and heat-rate performance

Enable Data-Driven Decision Making

Delivers normalized, statistically-grounded comparisons that improve clarity in operational and engineering decisions

The table displays a comparison of various performance metrics between two datasets. The columns represent different statistical measures: Avg 1, Avg 2, Median 1, Median 2, Min 1, Min 2, Max 1, and Max 2. The rows list different performance indicators such as Heat Rate, HPC Efficiency, HPC Pressure Ratio, HPT Efficiency, HPT Pressure Ratio, IC Effectivity, IPT Efficiency, IPT Pressure Ratio, LPC Efficiency, LPC Pressure Ratio, and LPT Efficiency. The data is color-coded, with blue for Dataset 1 and red for Dataset 2.

Statistic	Avg 1	Avg 2	Median 1	Median 2	Min 1	Min 2	Max 1	Max 2
Heat Rate	8631	7969	7671	7592	7395	7404	66752	93848
HPC Efficiency	0.834	0.833	0.833	0.833	0.815	0.813	0.872	0.858
HPC Pressure Ratio	10.0	10.3	10.5	10.5	1.75	1.78	10.7	10.7
HPT Efficiency	0.948	0.937	0.941	0.938	0.828	0.852	1.11	1.06
HPT Pressure Ratio	0.411	0.410	0.410	0.410	0.340	0.360	0.820	0.670
IC Effectivity	1.14	1.09	1.06	1.06	0.402	0.411	1.71	15.4
IPT Efficiency	0.597	0.623	0.634	0.635	0.323	0.309	0.647	0.647
IPT Pressure Ratio	0.471	0.472	0.470	0.470	0.440	0.440	0.860	0.850
LPC Efficiency	0.899	0.896	0.898	0.895	0.755	0.789	0.981	0.986
LPC Pressure Ratio	3.85	4.10	4.24	4.28	1.03	1.03	4.30	4.31
LPT Efficiency	0.928	0.915	0.915	0.910	0.903	0.900	1.08	1.05

AAC delivers faster insights, clearer comparisons, and measurable performance improvements by turning turbine data into decisions that directly impact plant reliability and revenue.