Next-Level Data Center Energy Intelligence driven by AI

Reducing energy costs, CO2 emissions, downtime risks and improving productivity

etalytics
energy intelligence

The problem of inefficient cooling operations in data centers

Why we waste massive amounts of energy and money

Critical Energy Consumers: Data centers form the backbone of digital infrastructure but are also major energy consumers, particularly due to their cooling demands. Effective cooling is crucial for maintaining optimal hardware performance and preventing overheating. However, traditional cooling methods often result in excessive energy use and high costs.

Inefficient Traditional Operations: In typical setups, data centers employ various energy converters within their cooling systems, each characterized by unique features and interdependencies. If the operating point of one asset is changed, this usually has an indirect effect on all others. However, traditional operating methods are rather decentralized and do not adapt to dynamic influences like varying weather conditions, internal loads, or interconnected system dynamics, leading to robust but inefficient energy usage and increased operational costs.

Regulatory and Sustainability Pressures: The push for sustainability and stringent regulations make these inefficiencies increasingly untenable. Data centers face the dual challenge of ensuring supply security while optimizing energy and water use, a task complicated by the rapid growth of the industry. Additionally, the scarcity of skilled specialists exacerbates the problem, often rendering cooling operations up to 50% inefficient.

Need for Efficient Solutions: It is essential to address these inefficiencies to reduce operational expenses and enhance the global sustainability of data centers. Improving cooling efficiency not only cuts costs but also aligns data center operations with broader environmental goals.

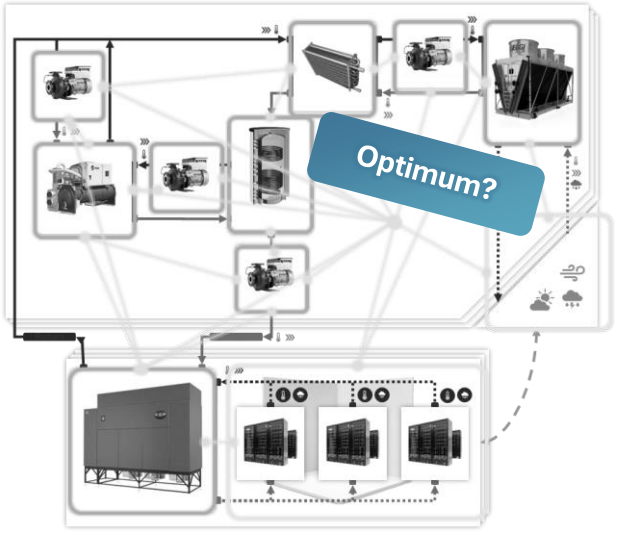
Challenges of data center cooling

Complexity
Large-scale energy system topologies with huge control space, hard to control.

Interdependencies
Component performance impacts are inter-connected, demanding holistic management.

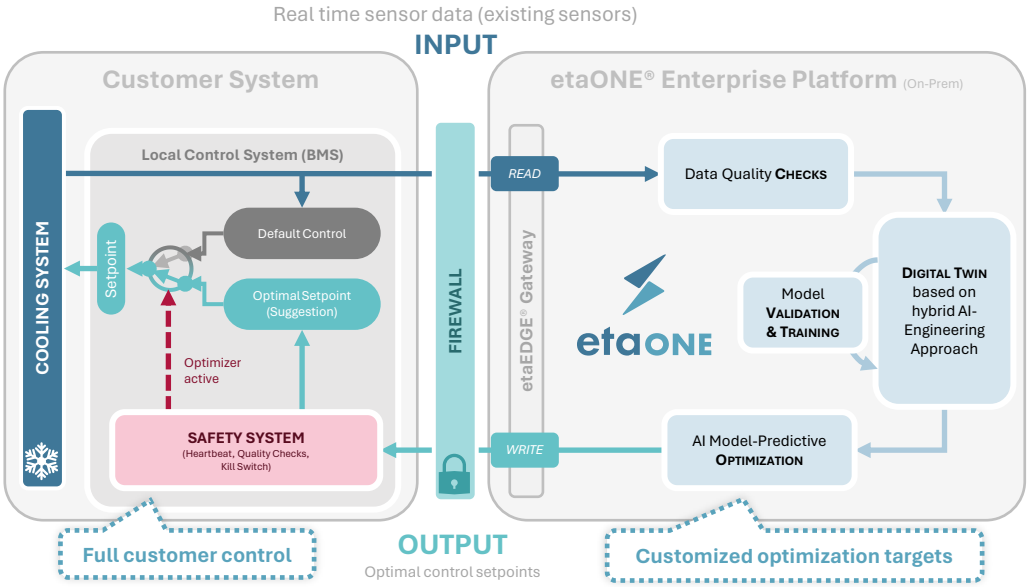
Targets Dilemma
Balancing critical uptime with ambitious PUE & WUE efficiency goals.

Staffing
Shortage of workers skilled in advanced data center operations.



> **Think of optimizing cooling operations like leading a symphony, where every component, from the rooftop units to the ventilators within the server room, is a vital instrument. As the maestro of this complex system, you need the foresight to predict each element's performance and understand how they interact. This demands a proactive, predictive strategy, enabling you to dynamically respond to fluctuations and fine-tune any elements that are out of sync, whether they require adjustments in setpoints, maintenance, or upgrades.**
>
> Dr. Niklas Panten & Dr. Thomas Weber *(Founders, etalytics)*

The AI copilot addon to your existing control infrastructure for continuous analysis & optimization



SEAMLESS INTEGRATION

No on-site modifications needed as existing sensor data are leveraged.

KEEP CONTROL

Operations exclusively through BMS ensure full control over critical data.

BMS COMPATIBILITY

Flexible integration with diverse BMS platforms ensures seamless connectivity via standard industry protocols (e.g. OPC-UA, REST, MQTT).

IT & OPERATION SECURITY

Following best practices for operation fallback concepts and IT security measures according to ISO 27.001.

Enter *etaONE® Energy Intelligence* to solve the problem

How AI drives DC cooling operations into max efficiency

Holistic Digital Twins: The etaONE® platform tackles the complexity of industrial energy systems by developing comprehensive digital twins. Each asset and its connections are modeled through a sophisticated hybrid approach, blending AI with extensive physical modeling research.

AI-Driven Optimization: The energy intelligence AI copilot works continuously, analyzing and optimizing all components in real time. It takes into account various interdependencies and external factors such as fluctuating workloads, ambient temperature, humidity, and dynamic energy pricing, which significantly enhance efficiency and reduce energy costs.

Proactive Health Assessments: The platform also serves as a basis for ongoing health assessments that enable the early detection of faults and anomalies, facilitating quick troubleshooting actions.

Autonomous Adaptation with Human Oversight: Engineered to autonomously adapt to changing conditions, our AI system minimizes operational risks and the need for manual intervention. During the initial commission phase, a 'human in the loop' approach ensures that operation teams fully trust the AI's capabilities.

Robust and Secure: Optimized for critical infrastructure environments, the system includes stringent security measures such as certifications, on-prem installations to ensure data privacy, and safety fallback protocols.

Efficient Deployment: Designed for quick and seamless deployment across various environments, our solution can be implemented in a matter of weeks without causing any disruption or requiring on-site modifications.

1 » Complimentary Feasibility Study
2 » Platform & Data Setup
3 » Model Training & Commissioning
4 » Safety System & Deployment

LOWER ENERGY & WATER DEMAND
Energy and water demand is decreased by predictive control optimization.

IMPROVED QUALITY OF SUPPLY
Temperature level for cooling and heating supply is more stable with predictive control mechanisms.

DECREASED RISKS
Operation dynamics are used for early fault & anomaly detection and troubleshooting.

DATA-DRIVEN BUSINESS DECISIONS
Retrofit measures or scenarios e.g., varying energy prices, demand, temperatures of the system can be simulated and evaluated.

IMPROVED OPERATION STAFF EFFICIENCY
Operation teams can focus on maintenance instead of worrying about operational efficiency and manual data analysis.

SUCCESS STORY

EQUINIX

49,3 %
Energy Savings (in scope)

>900 MWh/a
Energy Reduction

240 tCO_2/a
Co2 Emission Reduction

< 1 years
Amortization Period

> With the help of etalytics' expertise, we are implementing AI-based operational optimization of the cooling systems at the Frankfurt site based on the etaONE platform. **We are thus supporting a highly innovative approach that can serve as a blueprint for an entire industry.**

JENS-PETER FEIDNER
Managing Director, Equinix Germany

etalytics energy intelligence

AI-ready? Visit » etalytics.com/feasibility-study