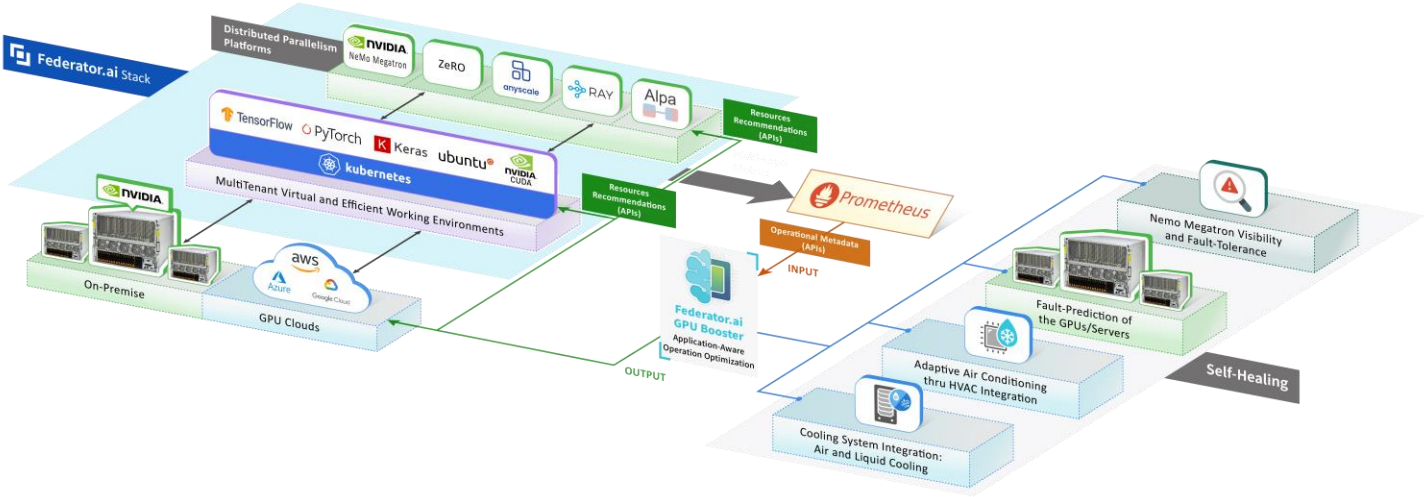
# Federator.ai Smart Liquid Cooling®

## The Future of AI Data Center Cooling: Predictive and Adaptive

## Transforming the Operation of AI Data Centers




Federator.ai Smart Liquid Cooling is a patent-pending, advanced solution that combines GPU workload optimization with dynamic cooling management to enhance the efficiency and reliability of data centers. This innovative integration with Supermicro SCC (SuperCloud Composer) ensures workload-aware cooling by leveraging predictive analytics, real-time metrics, and intelligent controls to maintain the optimal state during uptime, improve Power Usage Effectiveness (PUE), and lower operational costs by reducing unnecessary energy consumption.

## Benefits

The key benefits of Federator.ai Smart Liquid Cooling include:

- **Enhanced GPU Resource Management:** Monitors and optimizes GPU workloads to maximize performance and minimize energy consumption.
- **Intelligent Cooling Adjustments:** Dynamically adjusts cooling flow rates to stabilize GPU temperatures and fluctuations and reduce power usage.
- **Improved Data Center Efficiency:** Lowers Power Usage Effectiveness (PUE) by aligning cooling strategies with workload demands and predictions.
- **Extended Component Lifespan and SLA Compliance**: Enhances component life and reliability through proactive thermal management, ensuring adherence to Service Level Agreements.

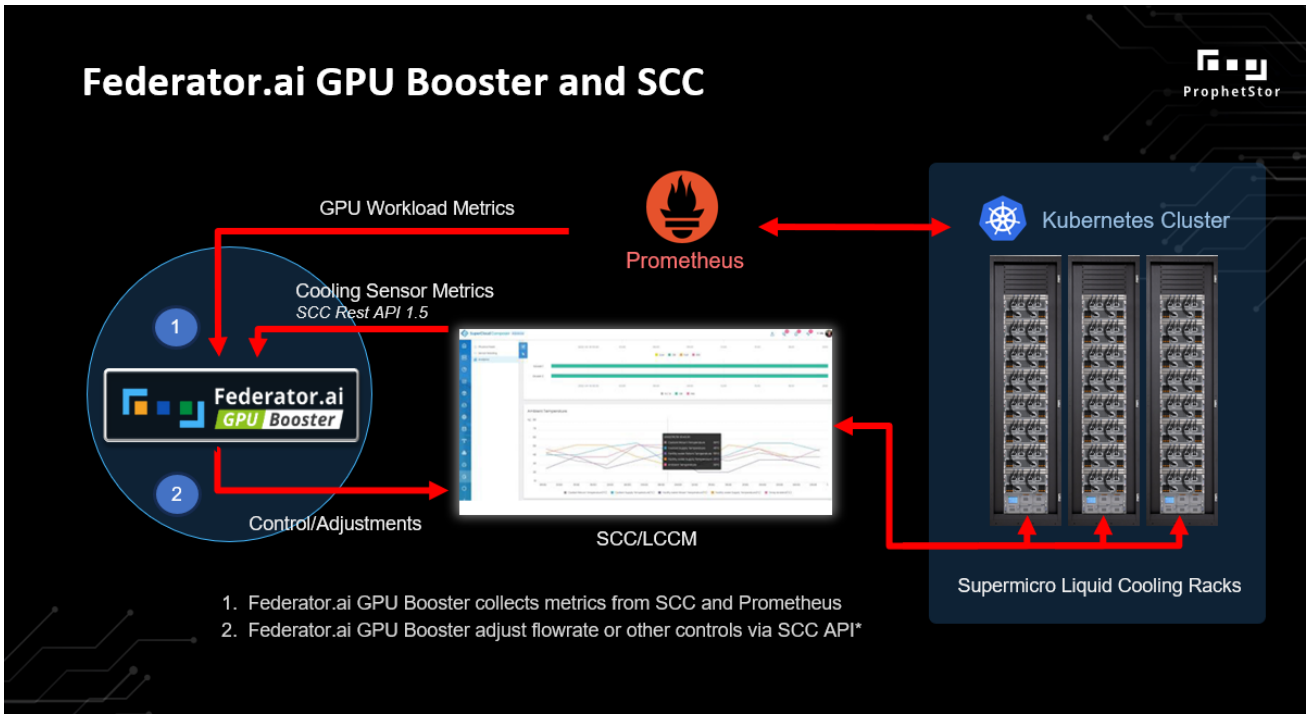
## Prerequisites

Before initiating the installation, ensure your system meets the following hardware requirements:

- **CPU:** Intel Xeon E3 or above
- **Memory:** Minimum of 64GB
- **GPU:** Nvidia H100/H200/GB200 recommended
- **Network:** At least 1 NIC
- **Local Storage:** 1TB SSD recommended
- **Persistent Storage:** (Optional) 500GB NFS storage

## Features

1. **GPU Workload Metrics:** Tracks GPU utilization, power consumption, and temperature in real time.
2. **Predictive Analytics:** Identifies workload distribution patterns and predicts cooling needs.
3. **Dynamic Cooling Control:** Adjusts flow rates and other cooling parameters using SCC API.
4. **Simulator Mode:** Provides simulation of GPU servers and CDUs for testing and optimization.




▲ *Workflow of continuous metric collection and dynamic cooling adjustment*


▲ Displaying hotspots in the rack


▲ *CDU temperature sensors and GPU util/power usage*


▲ *Recommended flow rate to lower GPU temperatures*


▲ *Dynamic flow rate adjustment to control GPU temperature fluctuation*

## Technical Specifications

The system includes the following components and capabilities:

- **Integration with SCC REST API 1.5**: Ensures seamless communication for real-time control.
- **Support for Prometheus**: Collects detailed metrics on GPU workloads and cooling systems.
- **Hardware Requirements:** Designed to operate with Supermicro Liquid Cooling Racks and CDUs.
- **Workload-Based Prediction Models:** Trained using real-world metrics to enhance accuracy.

Federator.ai Smart Liquid Cooling revolutionizes data center operations by combining GPU workload optimization with intelligent cooling management. With predictive analytics and real-time control for liquid flow rate, it ensures enhanced efficiency, lower power consumption, and reliable GPU operations with supported SLA.

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