Oper8 Global and HiRef: customized solutions for high-performance Data Centers

Oper8 is an internationally active company specializing in the design and management of high-performance IT infrastructures and data centers. With strong expertise **in High Performance Computing** (HPC), technological research, and particularly demanding fields such as **Formula 1,** Oper8 adopts a **fully customized design approach,** avoiding standardized solutions and focusing on what the client truly needs.

THE PARTNERSHIP

On this path of innovation, Oper8 has chosen HiRef as a **strategic partner** for its ability to provide reliable, tailor-made solutions based on specific customer requirements. The relationship between the two companies is solid and ongoing: a collaboration built on trust, the technical quality of the proposed solutions, and continuous support throughout all project phases.

The partnership has resulted in the development of **two separate systems**. The first was designed to ensure high levels of efficiency, with an architecture open to **future expansions**. The second, more complex, was developed to serve **heterogeneous technical areas**, including various workspaces and test rooms, with high requirements in terms of temperature control and total power delivered. Confirming the strength of the collaboration, a third system is currently in an advanced phase and is already ready for installation in the near future.

This synergy confirms HiRef's ability to support its clients in complex projects, offering advanced and reliable solutions for a constantly evolving sector. **HiRef is proud to continue its collaboration with Oper8, sharing a common vision focused on innovation and technological excellence.**

SITE 1 (2023) – An Efficient System from the Start and Scalable for the Future

The first project developed in collaboration with **Oper8** is based on a **400 kW** chilled water system, chosen for its efficiency and high reliability in environments where **no electrical or mechanical downtime is acceptable**. The entire system was designed to ensure maximum operational continuity and to minimize environmental impact. The proposed configuration was specifically engineered to be **scalable**: in the future, the system's capacity can be expanded simply by integrating new units identical to those already installed, while maintaining technological and performance consistency. This setup makes the system not only efficient and high-performing from the outset but also ready to support the **site's future developments**, without the need for complex reconfigurations or structural replacements.

COOLING PRODUCTION

To ensure the efficiency and reliability of the air conditioning system, cold production was entrusted to the **CDA range** a line of air-cooled chillers designed for use in critical technological environments such as data centers. This range offers a **compact and modular** solution capable of combining high performance with low energy consumption.

For this project, **n.4 CDA** units were supplied in combination with **n.4 FanWall HBCV** units, in a configuration specifically designed to ensure maximum reliability and operational redundancy. Each chiller is paired with its corresponding indoor unit, thereby **ensuring functional independence and service continuity under all conditions.**

The units were selected in the **Free-Cooling version**, which takes advantage of outdoor environmental conditions to drastically reduce electricity consumption during most of the year. Another distinguishing feature is the use **of natural CO_2 refrigerant (R744)**, reflecting **Oper8**'s commitment to adopting solutions with an ultra-low environmental impact, in line with carbon neutrality goals and the latest sustainability directives. To support this, the units are equipped as standard with **inverter-driven piston compressors**, which are particularly suitable for use with this type of refrigerant and capable of continuously modulating the cooling power based on the thermal load demand.

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INTERNAL AIR CONDITIONING

To ensure efficient, evenly distributed, and continuous cooling inside the server room, units from the **FanWall HBCV** range were used. These are chilled water air conditioners specifically designed for technological environments where reliability, continuous operation, and optimized airflow are essential requirements.

Each unit is equipped with **dual power supply** to ensure uninterrupted operation even in the event of a fault or maintenance on one of the power lines.
From an acoustic standpoint, the units feature **full double paneling**, designed to minimize noise generated during operation, thereby contributing to the comfort of adjacent spaces.

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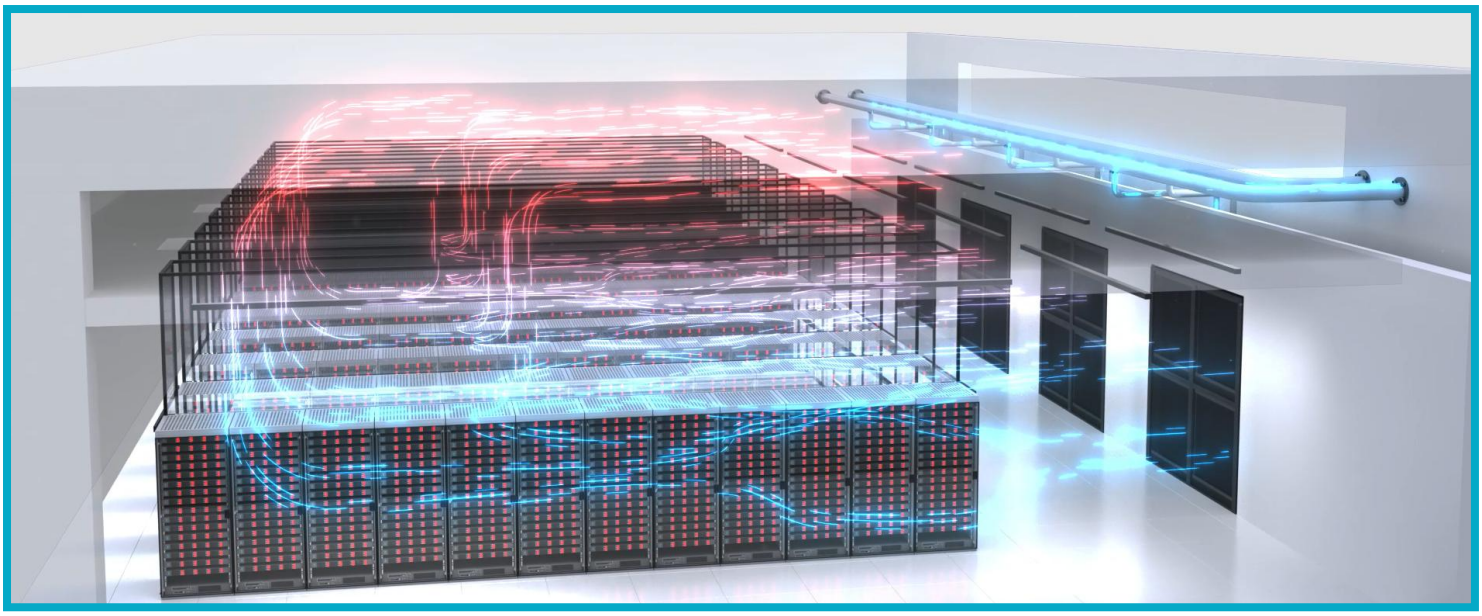
An additional advantage of the system lies in its ease of maintenance: the **FanWall** units are installed outside the server room, in dedicated technical corridors, and deliver the supply air into the environment through specially integrated wall grilles. This layout allows for quick and safe maintenance operations, **without** the need to access the server room directly or **compromise its internal climatic conditions.**
The units are also characterized by high static pressure, which enables efficient and uniform air distribution, preventing the formation of hot spots. The control system is based on a **master-slave logic integrated into HiRef's HiNode system**, which allows for coordinated unit operation, load balancing, and airflow optimization according to the actual thermal requirements at any given time. This approach helps improve overall efficiency and reduce energy waste.



SITE 2 (2025) – Maximum reliability and zero compromises

The second project developed in collaboration with **Oper8** was designed **to air-condition heterogeneous environments**, including operational offices and server rooms for testing facilities, where precision, reliability, and thermal control are essential requirements. In such a demanding context, closely linked to the world of **Formula 1**, the system must **ensure absolute operational continuity**, with no room for service interruptions or failures.
The entire system design was carried out with the utmost care to ensure compliance with the functional and performance requirements set by the end customer.

HiRef stood out for its responsiveness and technical expertise, working closely with the **Oper8** team to define the most suitable solution and **ensuring timely delivery of the units**. Thanks to effective collaboration and a solid design approach, the target was quickly achieved, fully meeting the specified requirements.
The system, designed to deliver high performance under all operating conditions, provides a total cooling capacity of **2.2 MW**, efficiently and evenly distributed across the various areas. The technologies adopted reflect a focus on sustainability and ease of maintenance, meeting the high-quality standards required in sensitive work environments.

COOLING PRODUCTION

To meet the cooling needs of this system, **HiRef** supplied **n.15** units from the **TAS** range, a line of air-cooled chillers designed to deliver high performance, operational reliability, and maximum energy efficiency. The **TAS** units stand out for their excellent **Energy Efficiency Ratio** (EER), ensuring significant cost savings over time.

For this project, the **TAS** units were supplied in the **Free-Cooling** version, which allows substantial energy savings by taking advantage of favorable external climatic conditions. The adopted **low-noise configuration** ensures reduced sound levels thanks to the compressor sound jackets, which contribute to acoustic comfort while meeting the design specifications.

The units use **R454B refrigerant**, a gas with a **low Global Warming Potential** (GWP), in compliance with recent environmental regulations. The refrigeration circuit is designed with **multiscroll technology** on a dual circuit, a solution that ensures load modulation and redundancy, which is essential for maintaining service continuity even in case of mechanical failures.

Moreover, each unit is equipped with **dual power supply** to prevent potential failures of the main electrical network. High-efficiency **EC fans** enable precise control of airflow and help reduce energy consumption during partial load phases. The configuration is completed by **LAN connectivity**, which allows immediate integration with supervisory and centralized control systems, facilitating remote monitoring and intelligent management of the entire plant.

INTERNAL AIR CONDITIONING

The internal air conditioning system was designed to ensure precise and continuous thermal control in **areas with different uses**, each with specific requirements in terms of layout, cooling capacity, and system accessibility. To meet these needs, two complementary **HiRef unit** types were selected: **TRF CS** and **JREF CW R**, configured to efficiently integrate with the architecture and functions of the various serviced rooms.

A total of **n.15 TRF CS** units were installed—chilled water air conditioners designed for installation outside the data center, in dedicated technical corridors. This choice allows all routine and extraordinary maintenance operations to be performed without needing direct access to the server room, thereby maintaining constant thermo-hygrometric conditions and minimizing operational risks. The **TRF CS** units feature a fan section located beneath the raised floor: this configuration not only ensures homogeneous air distribution, but also allows more space for the finned coil, increasing the heat exchange surface and thus the available cooling capacity.

Complementing these units, **n.4 JREF CW R** chilled water conditioners were installed **to air-condition technical rooms housing electrical panels and UPS systems**. These are **compact** units, ideal for **installation in tight or technically constrained spaces**. The airflow is directed **downward into the raised floor**, delivering effective cooling directly to the electrical equipment. Their compact size and optimized configuration make these units particularly suitable for ensuring continuous operation in rooms with limited access or architectural restrictions.

TRF CS

JREF CW R