

High-resilience prefabricated Data Center: HiRef contributes to one of Italy's most important digital infrastructures

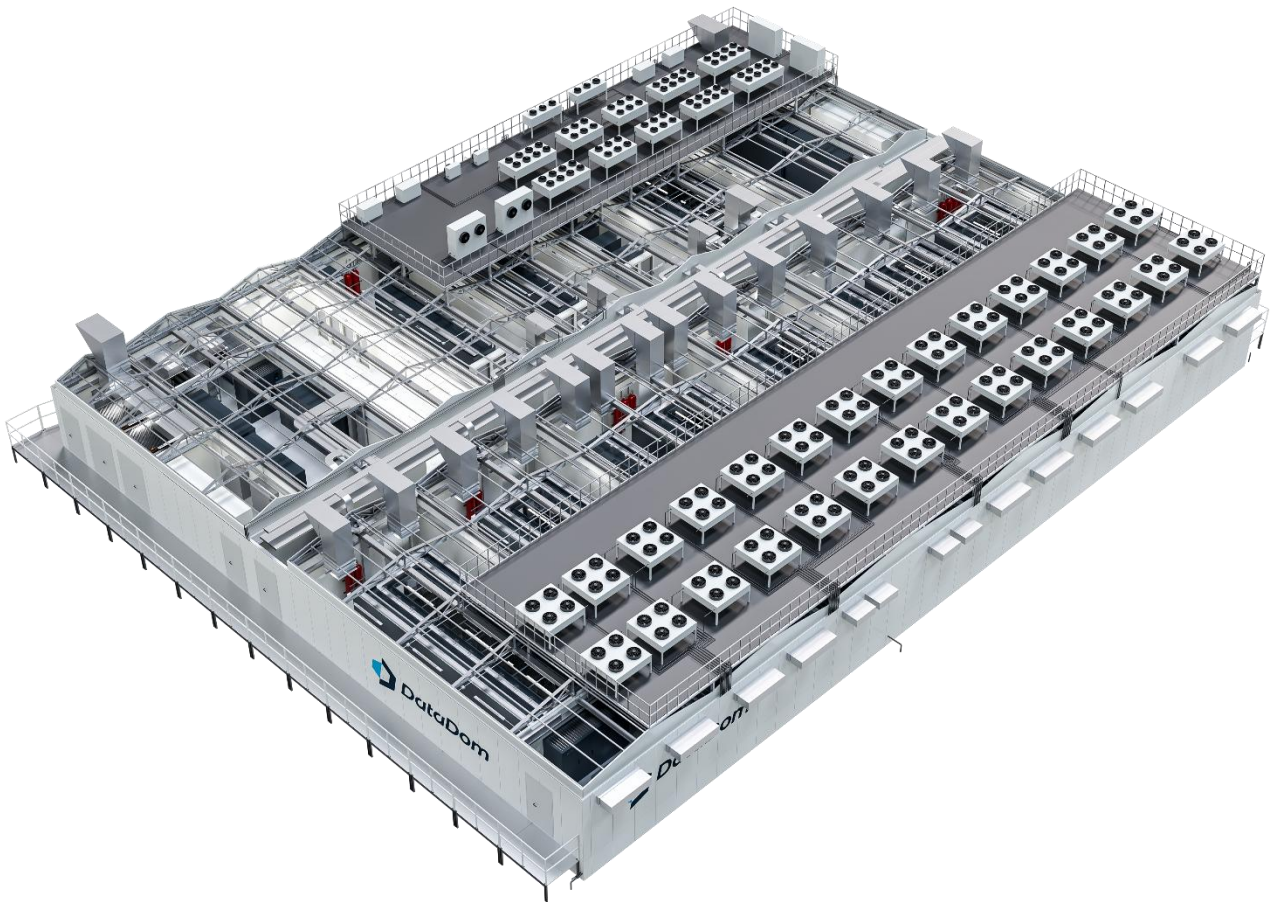
HiRef, together with the companies of the **HiWorld Group**, contributed to the development of one of the largest prefabricated Data Centers in Italy. The infrastructure, located in Central Italy, is designed to support the digital services of a leading state-owned public company and currently represents a new national benchmark in terms of size, performance and safety standards. The project required a solution capable of ensuring maximum plant safety and reliability, while combining rapid execution, energy efficiency and operational continuity under any circumstance.

The project consists of the construction of a prefabricated modular Data Center of approximately 1,200 square metres, made up of 44 modules assembled on site in just 5 weeks. The final configuration provides more than 200 racks for a total capacity of 3 MW, developed according to a redundant 2N architecture. This approach enables the infrastructure to guarantee service continuity even in the event of a fault affecting part of the system, thanks to backup systems sized to meet the resilience requirements specified by the customer.

One of the project's distinctive features is its prefabricated approach, which makes it possible to significantly reduce time-to-market compared to traditional construction. The modules are designed, manufactured and integrated according to an industrialised process, resulting in an infrastructure that is scalable, replicable and faster to install. The solution was also developed using 100% recyclable materials and a cement-free approach, helping to reduce the environmental impact of the overall project.

From an energy efficiency perspective, the Data Center was designed to achieve a PUE value of ≤ 1.25 at full load, a particularly significant result when compared with the average values of the national market. The project is also prepared for certification according to the international ANSI/TIA-942 Rated 4 standard, confirming the high level of reliability and safety of the infrastructure.

This achievement confirms the value of an integrated approach in the development of this type of facility. Today, especially in the Data Center sector, customers need a partner capable of supporting them throughout the entire project development process, from design support to the coordinated supply of the main infrastructure components. In this context, the **HiWorld Group** provided complementary expertise, integrating engineering know-how, precision air conditioning solutions, prefabricated modular technology, electrical switchboards, rack cabinets and supporting infrastructure systems. This vision makes it possible to offer complete solutions, designed to respond consistently to increasingly demanding efficiency and safety requirements. The project demonstrates how the strength of the Group lies in its ability to transform different specialist skills into a single coordinated proposal. This model enables **HiRef** to support the customer not only as a technology supplier, but as a partner capable of contributing to the definition and construction of resilient, scalable infrastructures, ready to meet the needs of next-generation Data Centers.



THE TECHNICAL SUPPLY

HiRef's supply included a complete precision air conditioning system, designed to ensure thermo-hygrometric control across the different functional areas of the infrastructure: **data halls, power rooms, entrance rooms, areas dedicated to electrical systems and the related energy storage systems.**

For the cooling of the data halls, **24 NRG units** with low-GWP R513A refrigerant were installed, configured to meet the project's requirements in terms of operational continuity, energy efficiency and system redundancy. Thanks to the use of inverter compressors, the **NRG** range enables precise and continuous regulation of cooling capacity, adapting the operation of the units to the actual thermal load of the Data Center. This feature is particularly relevant in a critical infrastructure, where IT loads may vary over time and where stable environmental conditions **must be maintained with the highest level of efficiency.**

The indoor units are installed in a **technical corridor separated from the rack environment.** This configuration allows maintenance activities to be carried out without direct access to the data hall, increasing operational safety and reducing the risk of interference with IT equipment.

The system also integrates **direct Free-Cooling**, managed through dedicated plenums and filtration chambers located inside the technical corridor. The **enthalpy control logic** allows Free-Cooling to be activated only when outdoor conditions are genuinely favourable, avoiding the use of this operating mode when there is no real energy benefit. **In this way, the system always prioritises the most efficient operating mode according**

to environmental conditions and the actual thermal load. The units are also equipped for complete humidity management, both in dehumidification and humidification mode, thanks to onboard humidifiers. This makes it possible to maintain thermo-hygrometric conditions within the parameters required to protect IT equipment and ensure the operational continuity of the infrastructure.



The remote condensers were configured with EC fans to ensure efficient heat exchange management and accurate ventilation modulation according to operating conditions. The integration of inverter compressors and EC fans makes it possible to optimise the system's energy consumption, **reducing power absorption at partial loads.**

For the air conditioning of the rooms housing electrical equipment, **8 units from the HTS range** were installed, also operating with R513A refrigerant. These units are specifically designed for telephone exchanges and shelters. Conceived for ceiling or wall installation, they are particularly suitable for air conditioning technological environments **where internal space is limited or entirely dedicated to equipment.** The rational layout of the internal components facilitates installation even in compact

configurations, while the accurate thermodynamic and airflow design ensures high levels of energy efficiency and operational reliability.

In addition to the air conditioning system, the project enhanced the integrated expertise of the **HiWorld Group** through the supply of rack cabinets (**IT.MET**), low-voltage electrical switchboards (**ECAT**), specialist support for plant design (**HiRef Engineering**) and complete prefabricated modular structures (**DataDom**). This approach made it possible to offer an integrated solution in which precision cooling, electrical infrastructure and engineering support were developed in a coordinated way.

A “DISASTER SAFE” STRUCTURE

The infrastructure was developed with particular attention to physical resilience and operational continuity, meeting advanced anti-seismic requirements and the need to guarantee service operation even under extreme conditions.

A key role is played by the anti-seismic dampers, integrated into the structure to mitigate the effects of ground motion and help protect the entire system. This solution was supported by **specialised technical-scientific consultancy and dedicated simulations,**

with the aim of verifying the system's response even in the most critical scenarios. This made it possible to create a “disaster safe” solution, designed not only to safeguard the structural elements, but also to preserve the functionality of the systems and the availability of the hosted services. In a country characterised by different levels of seismic risk, a prefabricated Data Center designed according to anti-seismic criteria represents a significant added value, especially when the infrastructure is intended to manage highly relevant data.

To learn more about prefabricated solutions, visit the [DataDom website by clicking here.](#)