

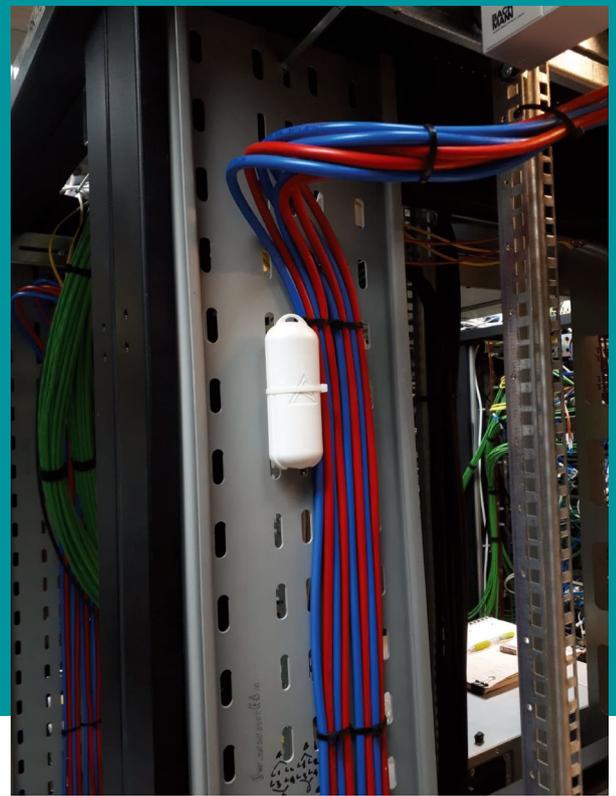


## **WIRELESS TEMPERATURE AND HUMIDITY MONITORING FOR DATA CENTERS**

**A PROJECT BY OUR PARTNER  
CLARITECH**

In today's critical infrastructure data center design and in the context of constant development of the equipment, acquiring real-time temperature and humidity information is crucial for maintaining high standards for the entire infrastructure.

A reliable and efficient data center infrastructure is a critical component of the overall business infrastructure for companies that belong to the IT&C, banking, retail, and manufacturing sectors. Servers uptime, secure communications, and general business continuity are the top concerns on the agenda of every CEO.



## Temperature monitoring: a common challenge for companies

Most of Claritech's customers are facing challenges related to installing additional servers, switching or storage capacity when the existing rack and floor space are limited. Besides the available physical space, power, cooling, and ventilation are top blockers when it's time to increase the data center capacity. Usually, the data center manager is estimating the impact of new equipment over the cooling capacity reserve, by manual calculation or by using DCIM software. Nominal power loads, heat dissipation, BTU capacity, and room heat dissipation parameters are included in the analysis, and a theoretical model can be simulated. In real life scenario, the physical distribution of IT equipment in racks, the cable trays, different rack models and the placement of cooling units will create vertical and horizontal uneven temperature distribution - very cold or very hot air areas.

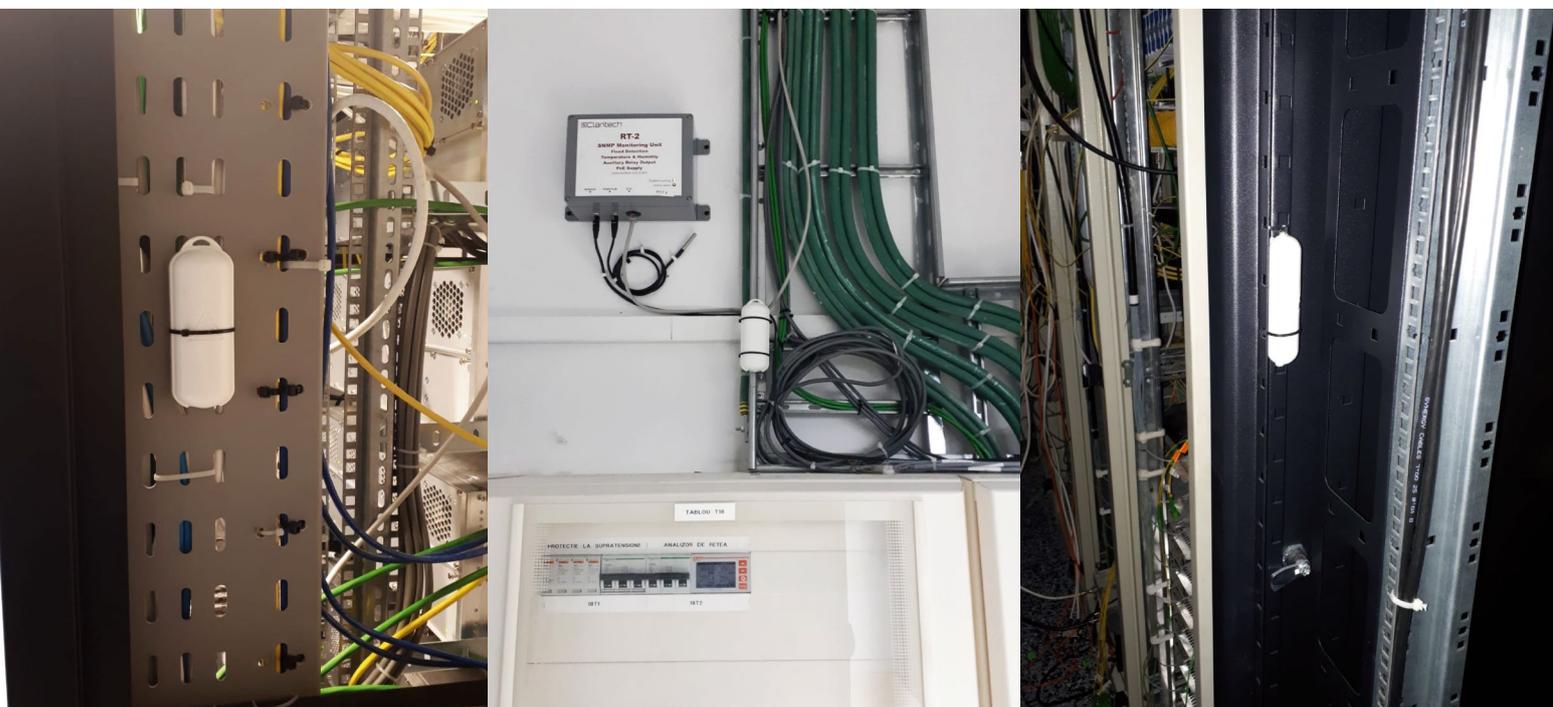
### **This situation has several negative consequences:**

- some equipment will have significantly reduced lifespan due to very high temperature
- cooling capacity is wasted in some cold regions, which leads to spending valuable resources on wasted energy
- the cooling system will run almost to full power when there's no need for that, determining shorter maintenance intervals
- incorrect evaluation for new equipment installation in terms of available space, size or installation place



## Humidity monitoring for equipment protection

Humidity is another critical parameter when estimating the heat load of air mass flowing in the data center room, especially where free cooling or outside air ventilation systems are used.



The data center room managers are not relying anymore on a single temperature or humidity measurement point. Traditionally, these sensors are wired sensors, placed on a wall. In some cases, the sensors will have a display for manual reading of parameters and sometimes with a dry contact alarm when temperature or humidity is above/below a threshold. More recent sensors have an Ethernet interface, and reading is done by manually logging in the web interface of the sensors or by receiving automated email messages from the sensors. Some customers that understood the importance of distributed datacenter room temperature and humidity measurements have invested in a network of sensors.

However, such networks are expensive to install, occupy Ethernet ports in each rack, need a local power supply (PDU outlets or PoE enabled switches) and are difficult to rearrange or relocate. Existing wired solutions are limited when it comes to the number of sensors and typically are deployed in a single 2D layer. Multiple wired sensors are usually not integrated into a central platform, and their measurements are not correlated with energy consumption patterns or with air conditioning loads. That's why the data center operator is not able to predict easily heat build-up situations or to automatically improve the Power Usage Efficiency of the datacenter.

## A simple, wireless solution for both issues/challenges

Claritech recommends a multi-layer or multi-level network of temperature and humidity sensors at least at the bottom and the top part of the racks, with several measurement points along the rack isles. Our Aranet wireless sensor solution overcomes the challenges mentioned above by providing up to 100 long-range sensors for a single Aranet Pro base station. The energy efficient sensors are powered from internal AAA batteries which provide up to 10 years of transmission life, with measurement frequencies every 1, 2, 5 or 10 minutes.

The base station gathers information within the range of up to 3 km and stores data locally allowing a secure and continuous remote access to the readings from any location. Also, the set of sensors ensures reliable readings about the environmental parameters in the data centers. The Aranet advantages are:

- 1 24/7 monitoring and collection of business-critical data without reading limitations;
- 2 Aranet systems are simple to install and easy to operate even without an Internet connection;
- 3 The solution is easily scalable to support hundreds of sensors in multiple locations and provides the necessary API integrations;
- 4 Aranet complimentary software – the SensorHUB enables analysis and access to the sensor readings via PC, smartphone or tablet;
- 5 No subscription/license fees for storing data locally on the base station and the software upgrades are free;
- 6 The system detects when thresholds have been exceeded and provide early warning notifications via e-mail when something needs attention;
- 7 Summary reports (including minimum/maximum/average) of the readings can be sent via email for further analysis, providing compliance

## A country-wide Internet Service Provider implements Aranet sensors

One of the most important Romanian country-wide Internet Service Provider used the Aranet system in its primary data center facility. The data center, which is in an older building, has multiple data rooms separated by thick reinforced concrete walls and is spaced apart by corridors. The Aranet system was installed in less than one hour, by placing wireless temperature and humidity sensors in multiple locations in the racks and rack isles. The Aranet base station was connected to the secured VLAN, and the graphs can be read directly on the bases station's web interface.

Furthermore, the sensor data (ID, location, temperature, humidity, battery level, and RF level) was integrated into a standalone dashboard application. In this dashboard, 2D and 3D data are displayed conclusively showing real-time and historical temperature and humidity changes over time in various data center zones. The system provides critical data for the data center operation identifying hot air pockets and allowing the customer to adjust the load and usage share of the air conditioning units intelligently.

This customer already has implemented a comprehensive energy metering system, and automatic PUE calculation provided by Claritech and is using the Aranet data to correlate the Power Usage Efficiency with indoor datacenter temperatures and outdoor temperature. A predictable data center energy model is extracted, and significant deviations from the model are tracked and notified for further investigation.

## Final thoughts

The Aranet wireless sensor system is suitable for small to large datacenters with base stations available for up to 12, 50 or 100 sensors. The base station has a built-in battery that will provide approximately 30 minutes of backup power. The Aranet base station built-in software provides several user access levels and modern responsive web interface. Voltage, current and CO<sub>2</sub> sensors are also available.

We invite you to test the solution and to explore the benefits of the newest wireless IoT technology provided by Aranet.



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