

Problem Statement & Description

Data Center Monitoring Platform:

Our digital world is powered by enormous server farms housed in data centers. Maintaining a tightly controlled environment in these facilities is essential to reduce downtime.

By providing real-time monitoring and automated temperature, humidity, and pressure controls, we can ensure a stable and efficient environment for optimal server performance and equipment longevity, as well as significant cost savings.

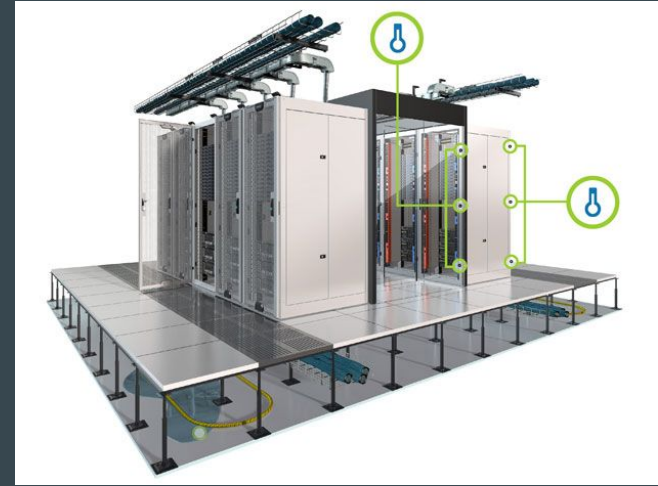


Image source : Google Images

What - The Problem

- Temperature Control: The American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) recommends a temperature range of 18°C to 27°C (64°F to 80°F) for optimal server operation¹. Deviations from this range can lead to increased power consumption and possible equipment failure
- Humidity Control: ASHRAE recommends an acceptable relative humidity range of 20 and 80%¹. However, it also states that the upper moisture level should be kept below 60% RH, possibly lower than 50% in order to avoid corrosion
 - Very low humidity levels can increase the risk of Electrostatic Discharge (ESD), which can damage sensitive server components.
 - Conversely, excessively high humidity levels can lead to condensation on server components, promoting corrosion.
- Pressure Monitoring: Sudden pressure changes can indicate air leaks within the facility. These leaks can impact the efficiency of cooling systems
- Additionally, large data centers may develop hot spots and cold spots over time, which can adversely affect server performance. The aggregated data collected from the array of deployed constrained devices can be visualized on the cloud dashboard to identify such regions

1. [Roger Schmidt, Madhusudan Iy. \(2005\). Data Centers: Meeting Data Center Temperature Requirements. 44-48. ASHRAE Journal, Vol. 47, No. 4](#)

Why - Who Cares?

Data centers are one of the most energy-intensive building types, consuming 10 to 50 times the energy per floor space of a typical commercial office building. Collectively, these spaces account for approximately 2% of the total U.S. electricity use ¹

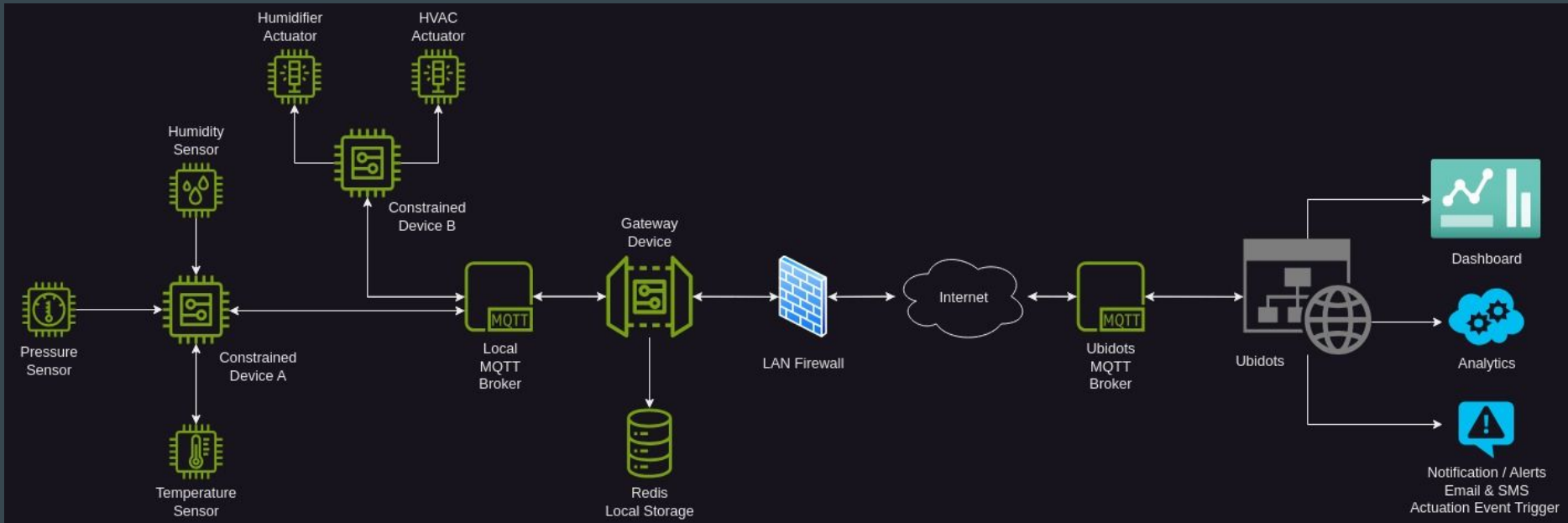
A significant proportion of this energy is used to power the data processing and storage equipment, plus the data security systems and network infrastructure. Almost all of this energy is eventually converted to heat. Elevated temperatures can affect the performance and reliability of IT equipment. In the worst case, it will lead to failure, which can be costly.

Humidity can also be a problem. If it is too high, then moisture can form on sensitive components such as motherboards, hard drives and connection devices, potentially causing corrosion and equipment failure. Conversely, if humidity levels are too low, there is increased likelihood that electrostatic charges will build-up, with a subsequent high voltage discharge damaging sensitive components.

Regardless of the physical location of the data centre or the type of cooling system, it is critical for effective management and control that both temperature and humidity are continuously monitored.

1. <https://www.energy.gov/eere/buildings/data-centers-and-servers>

How - Expected Technical Approach



Demo Video



Results

- Reduced Downtime: By proactively managing temperature and humidity, the system can help prevent equipment failures that lead to downtime.
- Energy Efficiency: Maintaining optimal temperatures within the recommended range allows data centers to operate their cooling systems more efficiently, reducing energy consumption and costs.
- Predictive Maintenance: Data collected by the system can be used for predictive maintenance. By analyzing trends in temperature and humidity readings, potential issues can be identified and addressed before they become major problems.