Intelligent Control of Energy Use

A Global Leader in Mobile Technology Improves its Test Center Availability

Critical Environment Data Monitoring and Visualization of Hardware Test Labs

Background

A global leader in mobile, fixed IP and optics technologies had a problem of availability and reliability in one of their key test centers in Chennai, India, which had to maintain different critical ranges of temperatures and humidity at different locations within the center for running a series of tests of the manufactured electronic hardware product components. In addition, the global manufacturer had multiple laboratories in the same building and there was a need for a central visualization and control center for all of their laboratories. Finally, it was also necessary to define " evolving conditions " predictively and trigger an alarm "before" a shut down of the equipment occurred due to undesirable temperature/humidity gradients. The existing building management system was common to several other businesses and therefore could not cater to the specific and "local" needs of the data/test center.

Business Challenge

For running Data Centers, Server Rooms and Research Labs effectively, we needed to understand and track the desired and the designed environmental parameters for the Network Critical Physical infrastructure (NCPI), especially,

1. The Heat Load;
2. The Power Density of the Rack Location Unit (RLU);
3. The Cooling Requirements for each RLU.

In the case of the Heat Load, it is important that the threshold of heat load per sq. m (or sq. ft) of area is not crossed. For Power Density, it is desirable to track the power density profile of the RLU across its area and more importantly the peak and the non RLU power densities.

Also, it is imperative that the temperature, humidity and air flow volume provided to the individual RLUs are also tracked. The last item has an impact on the first one as well and varies quite dynamically whereas item 2 does not vary frequently (as racks are not added and removed frequently).

It is well known that a desired optimum temperature needs to be maintained for every test laboratory and/or data center and any violation of these limits can lead to auto shut down of servers and associated equipment which can in turn lead to poor availability – a metric that is absolutely critical for the functioning of data center related businesses.

Humidity equally plays an important role. Though a rise in humidity does not shut off the servers, this can lead to condensation and failure of components in the server/test room. When the humidity is low, the static charges accumulate and this can lead to failure of components due to static discharge.

Solution

eC4 is a closed loop end to end solution for monitoring and control of critical control variables of NCPI, including humidity and temperature, in a Data Center or a Test/Research Lab environment.

eC4 has a built-in sensor system to collect critical data. The solution is modular and reconfigurable in that the sensors can be moved around and placed in different locations according to need. A dashboard for monitoring the Critical Oversight Parameters (COPs) is also provided along with the system.

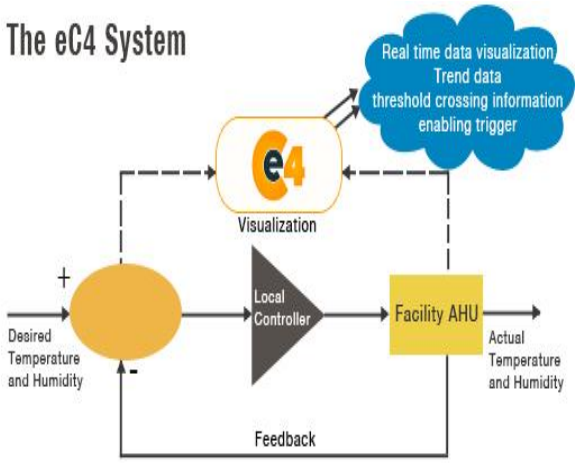
eC4, along with a combination of temperature and humidity sensors, was placed in appropriate locations in the environment and connected to the eC4 data collector/controller to capture the local temperature/humidity gradients within specific areas of interest.

The data collector was configured by a user to collect appropriate data in real-time. User defined metrics were derived from this collected data and used for proactive monitoring of any emerging symptoms of shut down of the center due to temperature and humidity gradients at various locations.

Appropriate control action was taken (in response) by the controller module to maintain the desired values. The response included the automatic switching off of the AHU in addition to sending alerts.

Benefits

The client was able to configure, modify, monitor, track and control their own (user defined) metrics related to temperature, humidity, heat load per area, etc., of local areas within the data center at more stringent levels using stand alone and portable cooling units as opposed to maintaining the whole center at stringent levels – which reduced the cost of energy consumption.



Secondly, a drill down of the gradients of the "local areas of interest" and the corresponding trend over a period provided them the necessary analytical information to validate the efficacy of the air flow of the supply air systems. Once again, this allowed for a mid-term improvement in energy costs. Finally, as a result of the above mentioned results, the availability of the center increased, and it was also optimized to the lowest value of energy consumption.

Non-intrusive Method

The implementation of eC4 does not require major rewiring or intrusion into the existing electrical systems. Therefore, the cost of ownership of eC4 is extremely low. Typically, it can be expected that the customer will receive a return of investment in less than a year.

About eC4

Energy costs constitute a high proportion of the overall operational costs of a facility. It is critical to understand the extent and the sources of energy "leaks" and take steps to minimize them. Energy leaks occur all the time due to operational inefficiencies, equipment inefficiencies and process inefficiencies. eC4 identifies such leaks in large facilities. By connecting to different pieces of critical equipment or meters in your facility, eC4 "looks for" opportunistic reduction of energy leaks in real time.

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