



# DATA CENTER CASE STUDIES

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# ABOUT PURKAY LABS

Purkay Labs is a Boston-based company focused on creating innovative tools and services for independent validations of the data center performance and efficiency. Our mission is to make simple, stand-alone, and cost-effective hardware designed specifically for mission critical facilities.

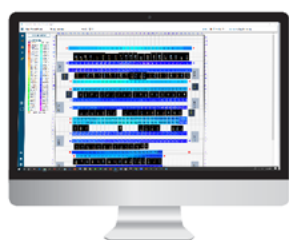


## **AUDIT-BUDDY™ - HARDWARE**

Use this portable temperature and humidity monitor to spot check and diagnose environmental issues.

### *Benefits*

- Standalone tool - no permanent installation or downtime
- Cost-effective
- Operational out of the box

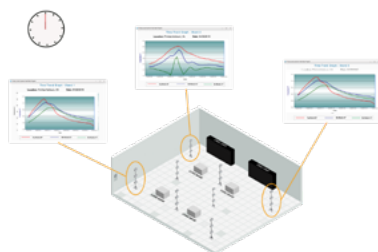


## **INTERACTIVE DATA HALL® - SOFTWARE**

Manage your space, power and cooling data in a single software program. Designed specifically for the busy facility manager.

### *Benefits*

- Track assets
- Drill down to cabinet and tile level information
- Establish benchmarks of data center with before & after view

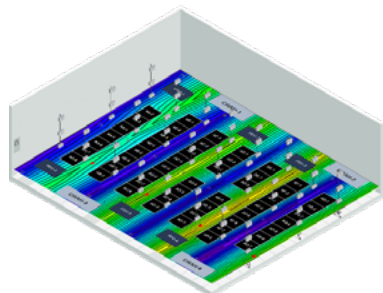


## **BASELINE RENTAL PACKAGE - SERVICE**

Measure temperature and humidity at three different heights at multiple locations across a room. See real-time data on cooling performance, and get automatically generated time-trend graphs.

### *Benefits*

- Automated and structured method of data collection
- Save time & labor on data post-processing
- Validate data center performance during Integrated Systems Tests



## **DYNAMIC HEAT MAP RENTAL PACKAGE - SERVICE**

Create real-time, dynamic maps of the changing heat distribution across a room, or vertical space. This package allows users to see the overall cooling performance and variations across an entire room simultaneously in an easy to digest manner.

### *Benefits*

- Validate the original CFD or SLA
- Improve systems functionality to quickly identify airflow issues
- Use in tandem with baseline package or alone



## **ON-SITE ASSESSMENT - SERVICE**

Our expert team of highly trained technicians will perform a detailed audit of your facilities' layout, environment and airflow management.

### *Benefits*

- No client labor or downtime required
- Uncover energy efficiency opportunities
- Manage airflow issues, like hot spots or cold spots

# COLOCATION PROVIDER TIER IV USE CASE

Tier IV Colocation provider frees up excess cooling capacity with Purkay Labs' Dynamic Heat Map Service

**Client**

Confidential - Tier IV Colocation Facility

**Location**

Confidential

**Tools**

- [AUDIT-BUDDY™ 2.0](#)
- [Dynamic Heat Map Service](#)

**Savings**

- Freed up 25,000 CFM or 60 Tons of cooling capacity

**Key Results**

- Mapped airflow patterns in a 40,000 square foot Colocation facility
- Freed up excess cooling capacity
- Resolved dispute between Tenant and Client on cooling

**The Problem**

In 2018, a major Colocation provider (the Client) was having a problem with a tenant that was running their server fans continuously in a shared multi-tenant space. The Client was concerned that the Tenant was taking more cold air than necessary, affecting nearby tenants. The Client wanted to resolve the issue by measuring airflow. The problem was exacerbated by the fact that the Tenant was not convinced they were creating a problem by running the fans continuously.

**The Solution**

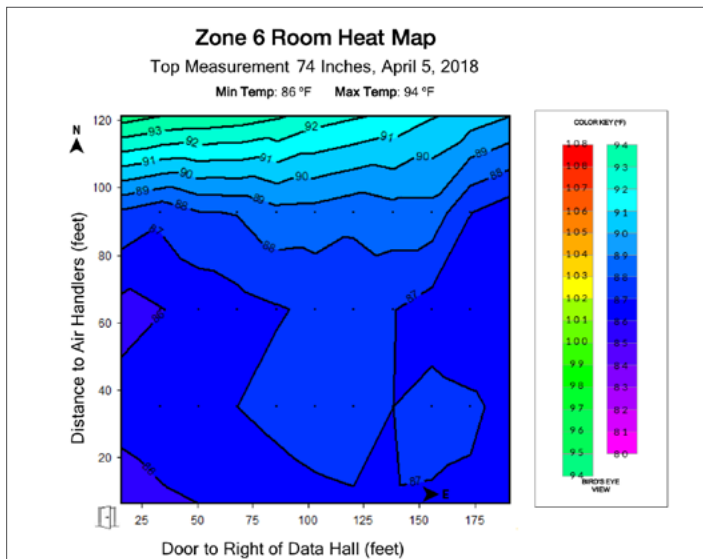
Purkay Labs used their hardware and software as a part of the Dynamic Heat Map Service to map the airflow. They took measurements across the return plenum to record the heat distribution across the room.

**Solution (Continued)**

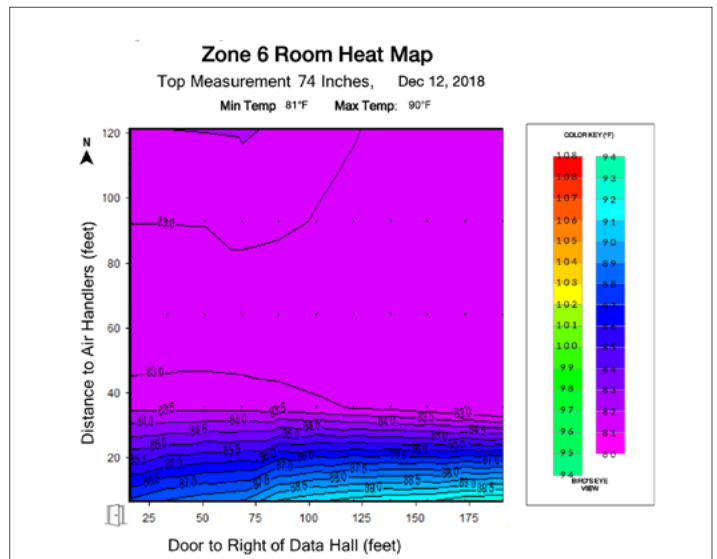
The variance in the temperature in the Dynamic Heat Map (bottom left) generated by Purkay Labs indicated the presence of horizontal bypass, where cold air is moving from one cage to the next, instead of moving vertically to the return air plenum. This occurs when there is not enough airflow being delivered to one cage.

**The Results**

Using the Purkay Labs Report, the Client was able to confirm to their Tenant that they were providing sufficient airflow, and that the Tenant could safely stop running their fans 24/7. The Client was able to cut 25,000 of CFM. This freed up capacity for other tenants in the shared facility. In December 2018, the Client re-ran the same test, using their own AUDIT-BUDDY™ systems and sent the data to Purkay Labs for analysis. The heat maps generated from this data (bottom right) confirmed that reducing the fan speed reduced the amount of horizontal bypass.



Before Map- April 2018  
Max Temp: 94°F Min Temp: 86°F



After Map- Dec 2018  
Max Temp: 90°F Min Temp: 81°F

# DATA CENTER COMMISSIONING USE CASE

Purkay Labs Redefines IST Testing at Newly Commissioned Facility

## Client

Confidentia I- Fortune 25 Commercial Bank

## Location

- Confidential
- 4,000 Square Feet
- 400 kW IT Load
- 540 kW Cooling

## Tools

- [AUDIT-BUDDY™ 2.0](#)
- [Time-Trend Graphs](#)
- [Dynamic Heat Map Service](#)

## Key Results

- Comprehensive monitoring of entire data center during IST
- Tested efficacy of CFD model during Transient tests
- Significant labor reduction in the post test reconstruction of data

## The Project

In 2019, a Fortune 25 Commercial Bank (the Client) ran its Integrated Systems Tests to ensure that all systems worked together as designed in its newly built data center. Purkay Labs was brought in by the commissioning agent to monitor the environment during these tests.

Purkay Labs provided 24 AUDIT-BUDDY™ stands that were placed across the data hall, every 4.5 feet. No installation was required, the cabinets were not touched. The stands were removed after the test, leaving no footprint in the data center. These stands collected temperature and humidity data every minute for 24 hours. The data was streamed to a central laptop, using a private static IP address, to see live data during the different tests.

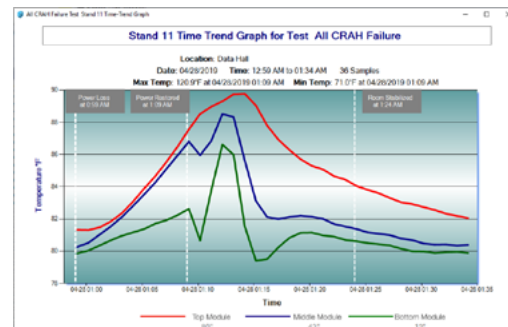
## Key Results

Purkay Labs completely redefined how commissioning is performed benefiting both the commissioning agent as well as the Client. Instead of relying on a few strategically placed loggers, Purkay Labs was able to offer a structured and scientific way of measuring all the aisles of the data center during the commissioning tests. Data was available instantly, including live time-trend graphs showing stratification throughout the data center.

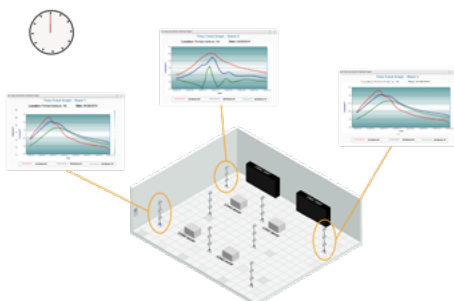
This allowed the Commissioning agent to be very productive, eliminated post test reconstruction of data with loggers. The instantaneous data and graphs allowed the client to cancel a few tests and schedule some new ones. The data also uncovered some weaknesses in the CFD model by measuring temperatures higher than what the model had predicted.



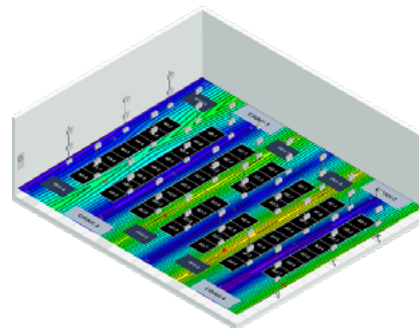
Stand Layout Representation



Live Time-Trend Graph Updates



Trend Graph Configuration



Dynamic Heat Map Representation

# ENTERPRISE OWNER/OPERATOR USE CASE

Fortune 50 Telecom saves \$10K a month with Purkay Labs' On-Site Assessment Service

### Client

Confidential - Fortune 50 Telecommunications Provider

### Location

- Ashburn, VA
- 15,000 square feet
- 992 kW IT Load
- 1010 kW Cooling

### Tools

- [AUDIT-BUDDY™ 2.0](#)
- [On-Site Assessment Service](#)
- [Interactive Data Hall Program©](#)

### Savings

- Reduce monthly electricity bill by \$10,238

### Key Results

- Increased average intake temperature by 5-6°F
- Lowered PUE by .03
- Increased Energy Efficiency by 4.8%

### The Problem

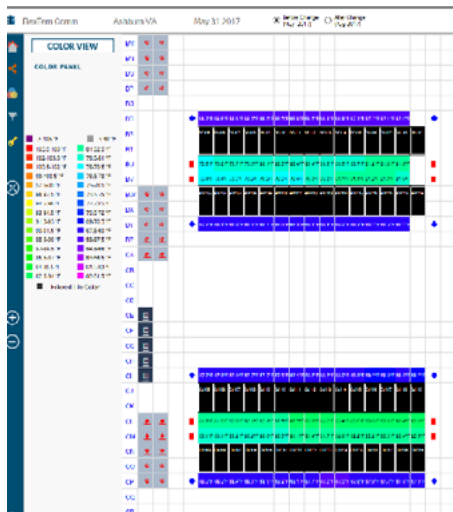
A Fortune 50 Telecommunications Provider (the Client) wanted to change their cooling strategy by controlling the data center by the CRAC outlet temperature versus the return. They used Purkay Labs' On-Site Service to create a "before" and "after" of the environment to benchmark the success of the cooling strategy change, so they could implement in other facilities.

### The Solution

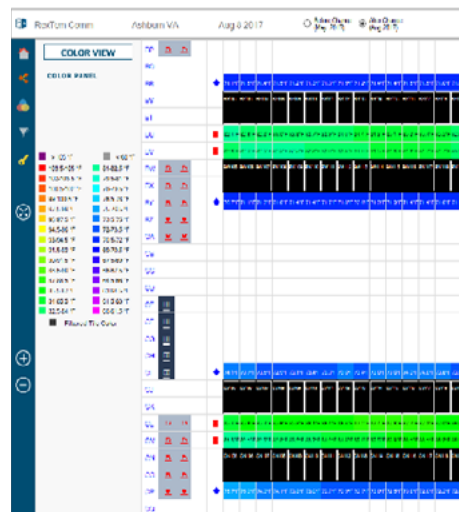
Purkay Labs was contracted to create a "before" snapshot of the Data Hall Environment. In April 2017, Purkay Labs used AUDIT-BUDDY™ systems measure 284 cabinets at three heights. This service took 4 hours, including set-up time. In July 2017, the Client changed to a supply air control. In August 2017, Purkay Labs returned for the "after" review.

### The Results

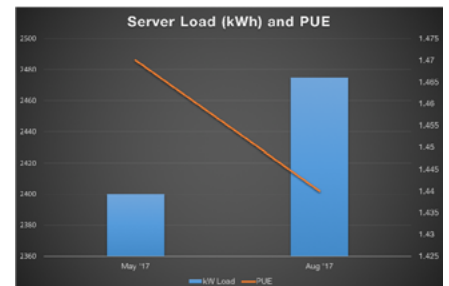
- Purkay Labs provided a custom Interactive Data Hall© Program with all the space, power and cooling information, and the before and after trends. The Client was able to see that:
- The average cold aisle and hot aisle temperature increased by 5-6°F.
  - While the electrical load in the hall increased by 3%, the electricity bill for the entire facility dropped by 6%.
  - The facility PUE dropped from 1.47 to 1.44.
  - The Client was able to cut \$10,238 per month from an overall electricity bill of \$213,297.20. This was a 4.8% net decrease in the electricity bill, even though the IT load went up by 3% during the same period.



**Before Map- April 2017**  
Average Intake Temp: 63.4-70.4°F



**After Map- August 2017**  
Average Intake Temp: 69.5-75.7°F



**Server Load Increase Vs. PUE Decrease Chart**