



HP Rack Thermal Sensor Monitoring Solution

Presented by **HP IT Global Data Center Services:**
Tools & Automation



Agenda

- Introduction
- Background: Rack Thermal Sensors
- Business & Technical Requirements
- PI System Architecture
- Monitoring & Visualizations
- Measuring Success

Introduction

Members

- Giao Duong
- Ito Meshioye
- T.J. Eason
- Erick Levitre

Hewlett Packard

- HP-IT Global Data Center Services: Tools & Automation
- End-User Organizations:
 - Facilities
 - DC & IT Operations
 - Enterprise Services

Environment

- Six data centers and ten managed compute spaces
- Monitoring in nearly 2,000 racks with over 7,000 sensors

Background

Rack Thermal Sensors

Benefits

- Availability
 - Ensure delivery of power/cooling
- Detection
 - Early warning of potential hot/cold spots
- Risk Mitigation
 - Facility Outage Events and Unplanned Downtime
- Analytics



Leveraged Technology

- Legacy Cooling Solution
- Temperature/Humidity Sensors
- HP iPDU
- Door Contact Sensors

Business Requirements

Objective

- Gain real-time visibility to environmental information for data centers

Drivers

- Increase awareness of remote environments
- Reduce risk for unplanned downtime
- Integrate with formal monitoring and support tools/processes
- Observe and drive operational efficiencies with early warning and detection

Technical Requirements

Objective

- Unify data across both the rack thermal sensor solution and existing legacy cooling solution

Drivers

- Provide reliable, stable, scalable technology
 - Sensors (info, communication)
 - HP iPDU (info, communication)
- Integrate with high availability architecture
 - Additional pair of interface nodes to existing solution
- Provide robust analytics and reporting
 - Custom Screens and KPI Calculation

PI System Architecture Overview

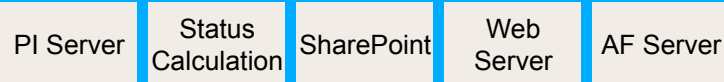
Visualization Layer

- Users login to Citrix using NT credentials to access PI ProcessBook and PI ActiveView client

HP Mobile PI Layer

- Web Servers allow Mobile PI application to sync with system provide mobile users access

PI System



- Utilizing PI 2010 Components
- Built with Redundant Architecture

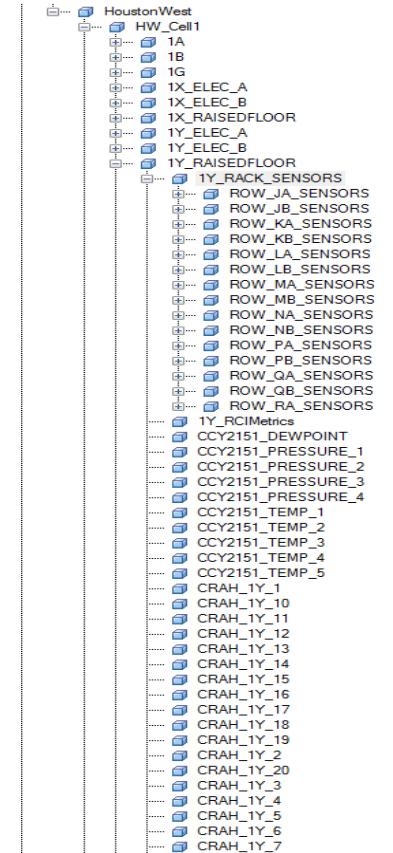
Interface Layer



- Total of 36 interface nodes between six data centers and ten managed compute spaces
- Monitoring over 1million digital and analog points
- Collecting approx. 1.25 TB of data per year

AF Device Modeling

Template-Based Assets
Area centric Tree Structure



AF Device Modeling

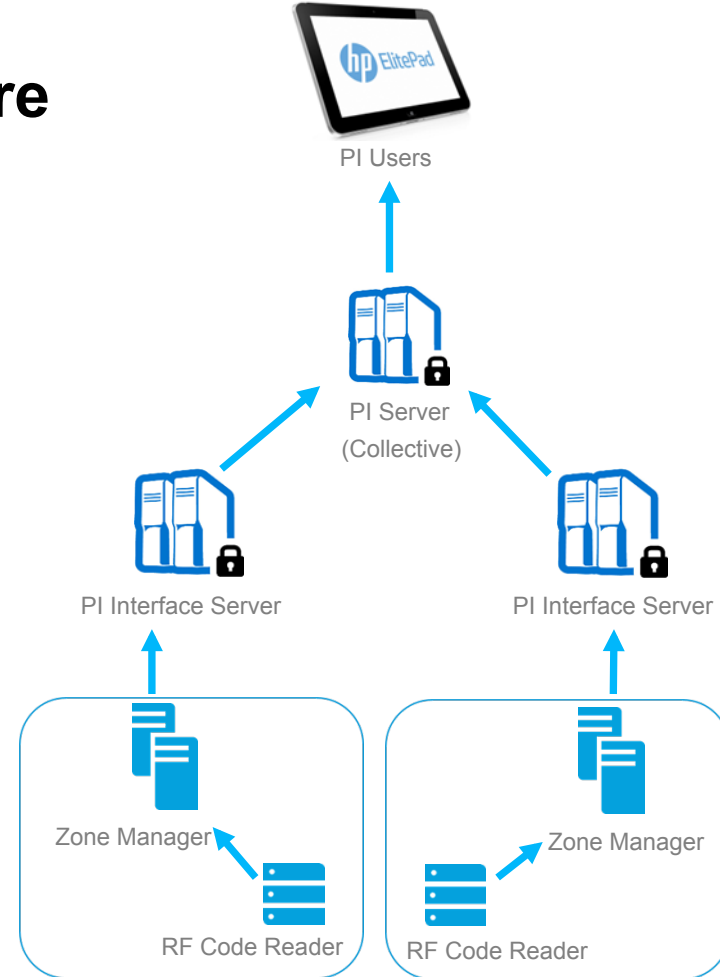
Template-Based Assets
Area centric Tree Structure

The screenshot displays the AF Device Modeling software interface. On the left, a 'Library' pane lists various templates, including 'Rack4Sensors_RFCode_RCS', which is currently selected. Below the library, a sidebar contains navigation options: Elements, Event Frames, Library (selected), Unit of Measure, MyPI, Notifications, and Contacts. The main workspace on the right shows the 'Rack4Sensors_RFCode_RCS' template details. It includes tabs for 'General', 'Attribute Templates', and 'Ports'. The 'General' tab is active, displaying a table with columns for Name, Description, and Default Value. The table lists several attributes, with 'ColdAisleMiddle' highlighted.

Name	Description	Default Value
Alarms		—
Classic		—
ColdAisleAverageTemperature		—
ColdAisleBottom		—
ColdAisleMiddle		—
ColdAisleTop		—
ColdAisleTopDewpoint		—
ColdAisleTopHumidity		—
HotAisleTop		—
MaintMode		—
Status		—

Rack Thermal Sensor Architecture

- Implement rack temperature monitoring in the DC using approximately 1,500 RF Code temperature monitoring devices.
- RF Code Readers
- RF Code Zone Manager
- OSIsoft PI Interface servers
 - PI OPC Interface



Monitoring the Compute Space

Monitoring Elements

- Power
- Cooling
- Door Contacts

Leveraged OSIssoft Components

- AF
- Visualization
- Custom Calculation Engine
 - PI SDK
 - AF SDK
 - PI API
- PI Notifications



Visualization

HP Private Cloud

- HP Mobile PI

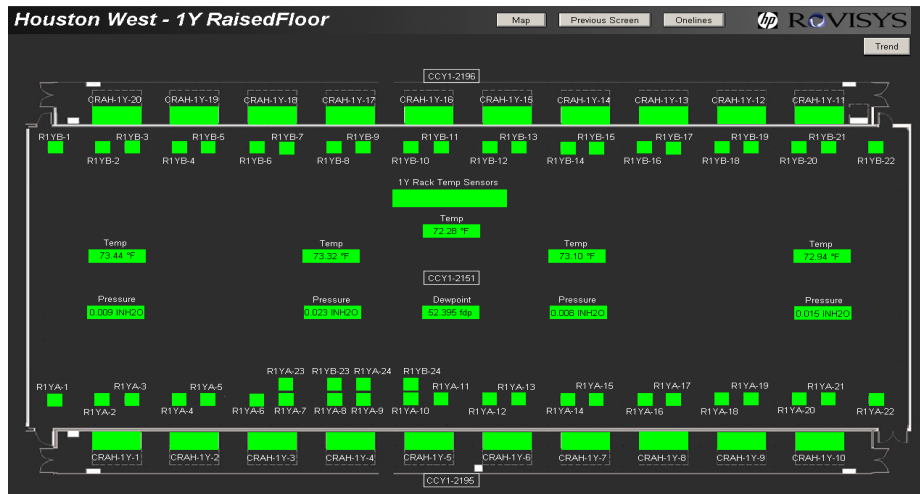
Citrix Server hosts visualization

- PI ProcessBook

- PI ActiveView

Rack/Row Based Screen Navigation

Real Time Data Trends



Visualization

HP Private Cloud

- HP Mobile PI

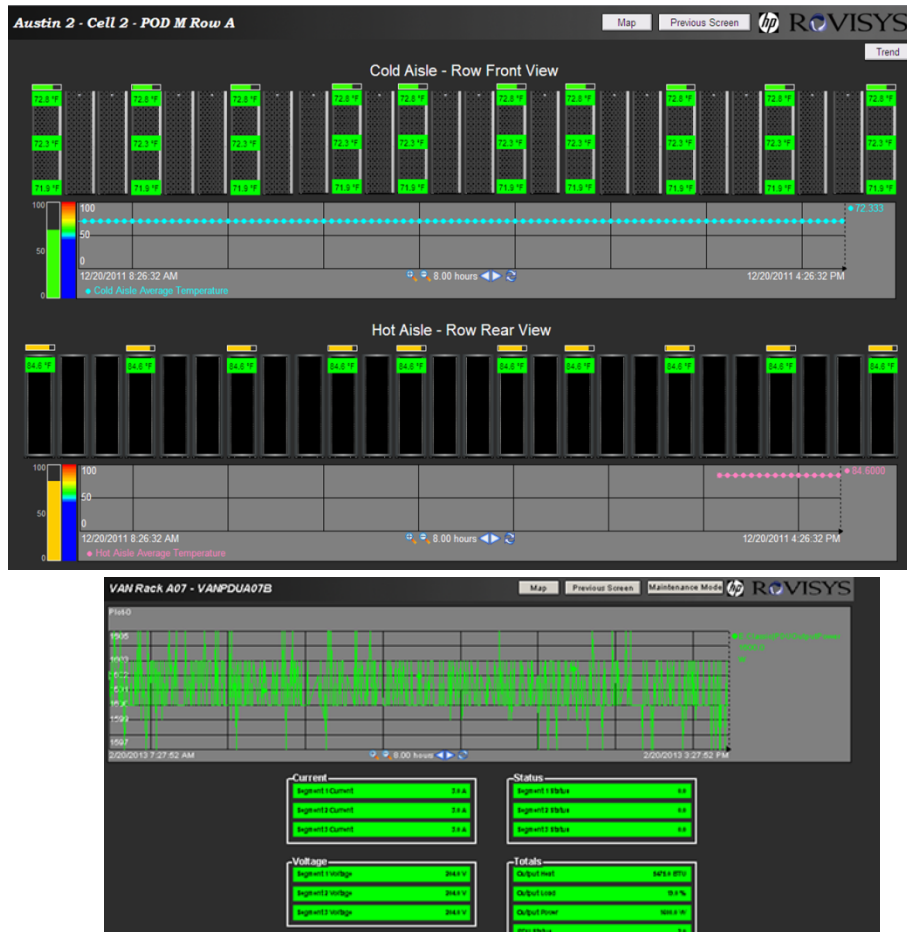
Citrix Server hosts visualization

- PI Processbook

- PI Activeview

Rack/Row Based Screen Navigation

Real Time Data Trends



Visualization

HP Private Cloud

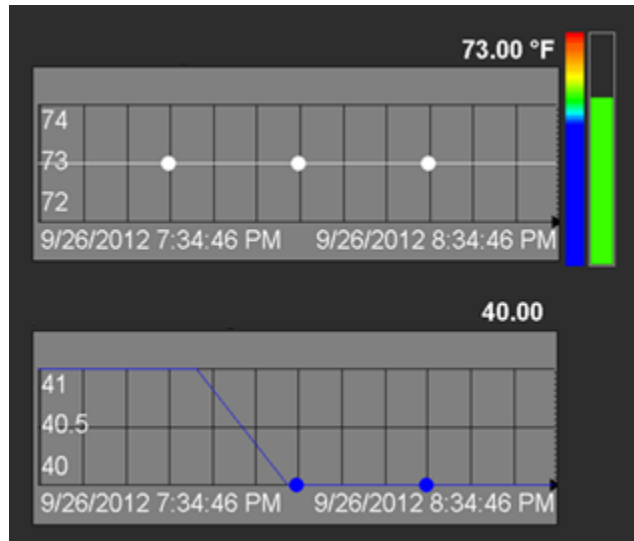
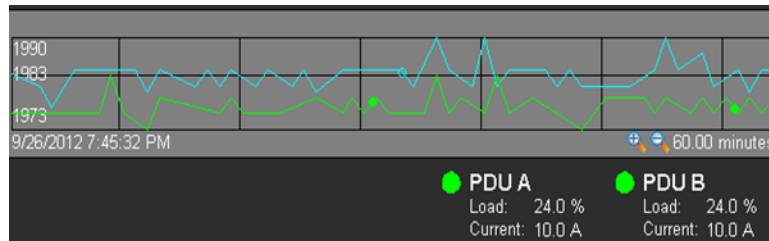
- HP Mobile PI

Citrix Server hosts visualization

- PI Processbook
- PI Activeview

Rack/Row Based Screen Navigation

Real Time Data Trends





Key Performance Indicator

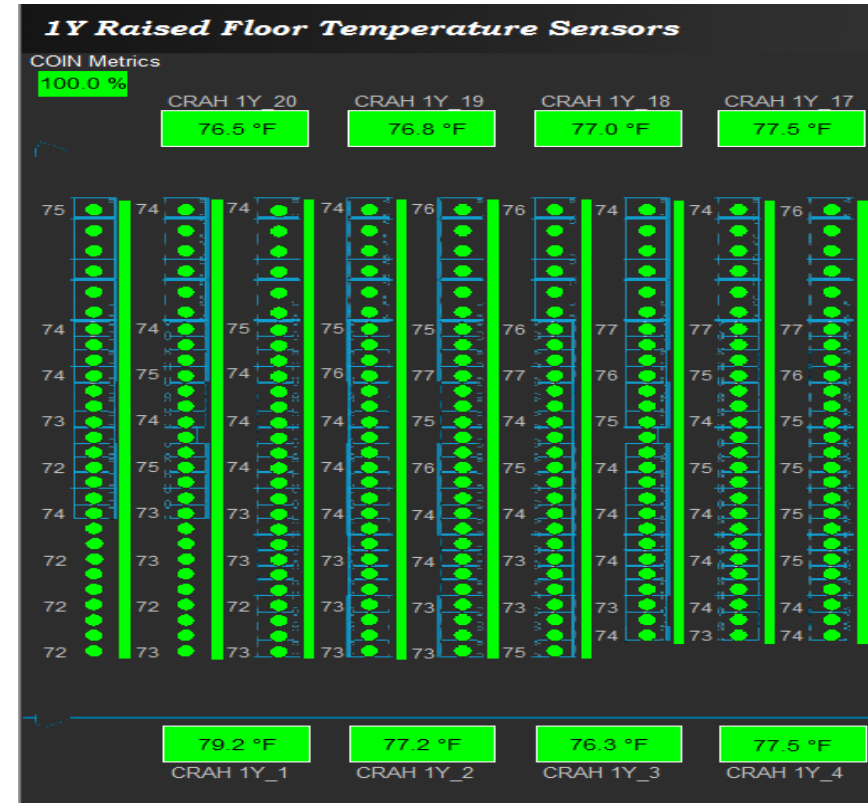
Cooling

Optimization

Index

Number

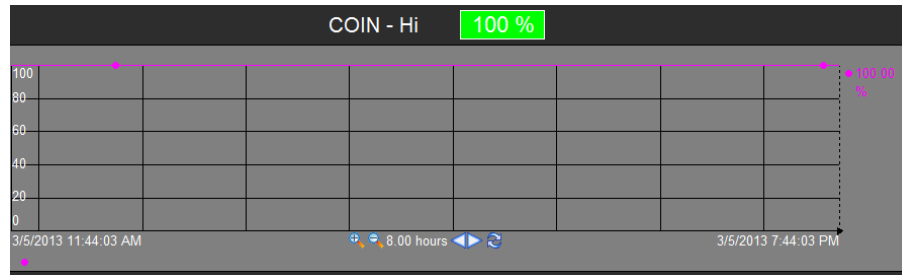
A computation that measures the number of racks within the acceptable levels of safe temperature readings.



Key Performance Indicator

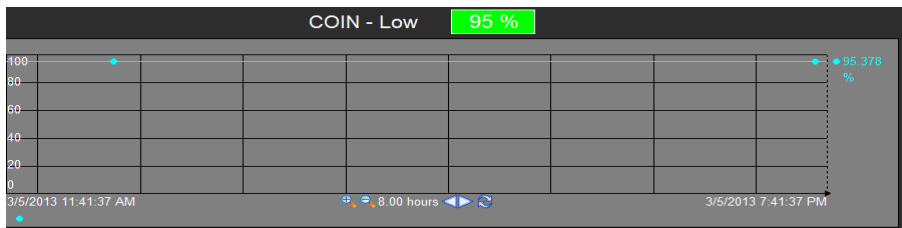
COIN High

Percentage of racks that are below 81 F



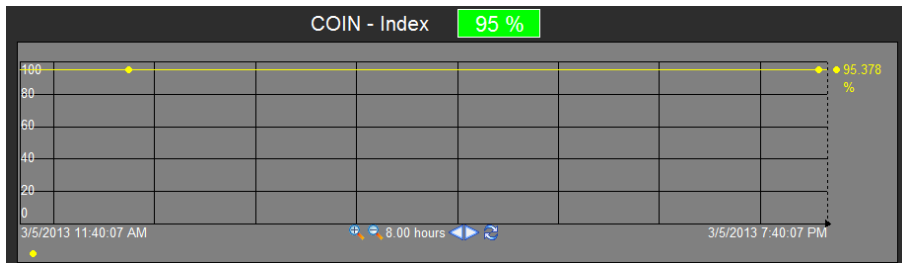
COIN Low

Percentage of racks that are above 65 F



COIN Index

Percentage of racks that are within 65 and 81 degrees F



Conclusion/Benefits

- One single version of the truth
- Repurpose legacy solution
- Proactive maintenance
- Increased detail of environment

Contact Info

Hewlett-Packard

GDCSToolsAutomation@hp.com



THANK

YOU

Brought to you by

