

January 2014

# HP's Data Center Management

How HP is using the PI System to maximize data center performance and corporate value



## TABLE OF CONTENTS

1	SUMMARY	3
2	BUILDING A STRONG FOUNDATION	4
3	EMPOWERING EMPLOYEES	5
4	CREATING VALUE FROM	7
5	CONCLUSION	8
6	ABOUT OSISOFT, LLC	9

## 1 SUMMARY

HP is one of the world's most recognizable IT companies. Its global product line spans everything from the online photo service Snapfish to consumer laptops and desktop computers to containerized data center solutions for corporate customers — and hundreds of consumer and business-facing offerings in between.

To support these operations, the company operates e-commerce websites, corporate websites and dozens of mission-critical internal software tools. All of these systems depend on HP's six global data centers and 10 managed compute spaces. After a data center consolidation effort in 2006, HP turned to the PI System to help improve its data center monitoring and maintenance operations.

The PI System was initially installed to improve HP's building monitoring in its data centers. But more than six years later, HP has met its initial goals for implementation and is continuing to discover new opportunities for improvement, thanks to the PI System. The PI System provides the critical data infrastructure that HP needed to begin building better tools, metrics and process that improve its data center operations, boosting uptime and energy efficiency and increasing the productivity and creative problem-solving potential of its staff.

## 2 BUILDING A STRONG FOUNDATION

HP's data center consolidation effort, launched in 2006, was a substantial effort by the company to streamline all of its data center elements, from applications to building footprints to network architecture. The plan also required significant investment — a \$3 billion cost — from the company. To ensure that it reaped the maximum benefits from the plan, the company turned a critical eye on its data infrastructure.

Optimizing data center performance draws on a number of factors, from local weather forecasts to internal environmental metrics such as humidity and temperature to the health and performance of the data center's electrical and mechanical devices. Power consumption and backup power generation also have to be monitored continuously to ensure that even if the local power grid fails, the data center doesn't experience any downtime.

On the IT side of its business, HP understood that it depended on data to improve the reliability and performance of its servers and networking gear — but it lacked a similar level of detail for the physical building of its new data centers. A legacy building monitoring system provided real-time data to the company about its power use and limited environmental data, but it didn't offer reporting and analysis tools which could be used to address critical problems and assess long-term issues in the data centers.

Even after the consolidation effort which shrank HP's number of data centers by 90 percent, the new data center organization (which includes both greenfield and existing sites) was still massive. In total, the six data centers comprise 475,000 square feet, representing 50 megawatts of provisioned critical load. To manage this data, HP installed the PI System, which accommodates very large volumes of real-time data from a wide range of sources, whether data points are available by the second or by the month. The PI System was installed across all six sites—gathering data from 2,000 server racks and 7,000 building sensors. Altogether, that means HP is tracking data from more than 1.5 million points. Each year, these data streams produce more than 1.25 terabytes of data.

Enabled by the PI System, HP's data center consolidation efforts have created significant operational savings for the company. And, because the PI System accommodates a wide range of data visualization, analysis and role-based access, HP has been able to leverage this wealth of information to push its data center efficiency efforts even further.

### 3 EMPOWERING EMPLOYEES

For HP, the data center consolidation effort also meant taking a more strategic approach to staffing. Today, the data center operation is managed by a small, centralized team that keeps a close watch on the entire data center fleet, across all six sites. That team is responsible for monitoring the performance of the sites on a day-to-day level, as well as helping to identify preventative maintenance opportunities and strategic improvements that will drive further data center efficiency.

First and foremost, though, the data center team is responsible for ensuring that HP's data centers are always online. "Preventing unplanned downtime is a big deal for us," Erick Levitre, Global Data Center Services: Tools & Automation Manager, says. "Our goal is zero downtime."

To achieve that goal, HP has adopted a clear, asset-based framework that enables it to provide role-based access to the data. "Operators and technicians don't necessarily look at the same things all the time," says Levitre.

Operators may track data about the facility's performance over a typical month or week—anything from power consumption trends to the effect of seasonal weather patterns on cooling loads to the health and status of backup batteries and generators within the facilities. But technicians are the "first responders" of the data center and their goal is to create continuous uptime for the buildings by replacing and repairing faulty equipment as quickly as possible. The PI System enables different employees to get the data that they need, when they need it.

#### 3.1 Managing with Mobility

With a focus on new, leaner staffing, HP wanted to have tools that made its staff more effective. The highly extensible PI System platform enabled HP to create the customized solution it needed to achieve this goal. Through a partnership with Rovisys, HP has developed a Mobile PI platform that leverages its own private cloud infrastructure and PI System data and analysis tools to create a thin-client application for its data center staff.

Whether users are sitting at their desktop or laptop or on the run with a tablet or smartphone, Mobile PI allows them to access the appropriate data for their situation quickly and easily. For field technicians, in particular, Mobile PI has had a dramatic impact on the amount of time required to address data center issues. Instead of traveling back and forth from their desktop monitoring environment to the data center facility, they're able to make assessments in real-time, on the spot.

HP also uses the Mobile PI system to provide its technicians in the field with notifications about problems that need to be addressed and detailed information about a device that can aid in troubleshooting those problems. "The Mobile PI System has increased employee awareness of the big picture and given them the ability to really be proactive in the field," Levitre explains. "At the end of the day, it's getting people to be more productive."

When a worker is in the data center, adjusting a system, they're able to dynamically update the equipment within the PI System, setting it to "maintenance mode" that prevents changes in the device state from triggering sensitive alarms and enables them to visualize information about that device independently. The result is faster maintenance cycles and more accurate data about the system's overall operation.

## 4 CREATING VALUE FROM

By streamlining data center maintenance operations, implementing preventative maintenance plans and enabling more strategic data center management techniques, HP has seen a marked improvement in its environmental and cost performance metrics. One area in which HP was able to see immediate improvements in its operations was in leak detection.

HP uses the PI System to track real-time data about its cooling systems. With the ease of connecting multiple sensors throughout a system, HP can easily detect when fluid leaks were occurring — and where. When leaks occur, PI System alarms quickly alert the data center operations team and dispatch employees to the field. Mobile PI then provides clear location information, diagnostics and investigative tools to help resolve the issue quickly, before high temperatures or water damage impact server performance. “A lot more granular data from the PI System is really helpful to visualize the issues and make better decisions about what to do,” Levitre says.

They've also introduced a new metric for tracking real-time data center cooling performance. COIN, or Cooling Optimization Index Number, tracks the number of racks that are between 65 and 81 degrees Fahrenheit — the safest acceptable temperature range for server operation. HP also tracks COIN High and COIN Low, which indicates the number of racks above and below that range, respectively.

This allows engineers to quickly see whether cooling should be increased or decreased throughout the data center. They can access additional PI System data to drill down into these numbers and find hot and cold spots, addressing cooling distribution as needed and — over time — optimizing air flow and layout of the data center to reduce the frequency of these events.

The company has also been able to create new value for its business and drive innovation across the industry. As HP's data center monitoring solution has become increasingly sophisticated, they've been able to apply that to projects for their clients and customers, providing detailed insights and products aimed at achieving similar efficiency gains outside their own operation.

## 5 CONCLUSION

Over the past 7 years, HP has seen dramatic improvements in the performance and efficiency of its internal data center operations. These improvements have had long-ranging impacts on both the bottom line and the top-line. Reduced operating costs, as well as new business opportunities, have been direct benefits of the company's new data center management strategy. The PI System has been an important tool for enabling these changes.



## 6 ABOUT OSISOFT, LLC

OSIsoft, a global leader in operational intelligence, delivers an open enterprise infrastructure to connect sensor-based data, operations, and people to enable real-time and actionable insights. As the maker of the PI System, OSIsoft empowers companies across a range of industries in activities such as exploration, extraction, production, generation, process and discrete manufacturing, distribution, and services to leverage streaming data to optimize and enrich their businesses. For over thirty years, OSIsoft customers have embraced the PI System to deliver process, quality, energy, regulatory compliance, safety, security, and asset health improvements across their operations. Founded in 1980, OSIsoft is a privately-held company, headquartered in San Leandro, California, U.S.A, with offices around the world. For more information visit [www.osisoft.com](http://www.osisoft.com).

For more information please visit [www.osisoft.com](http://www.osisoft.com)

A white paper produced by:

