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WHY IT'S TIME TO DIGITALLY
TRANSFORM DATA CENTER MAINTENANCE

Digitized maintenance increases transparency and predictability of data center operations, while reducing total cost of ownership

Data centers are a critical part of successful digital transformation, whether they're managed by hyperscale providers, colocation providers or enterprise teams. Yet, many underperform when organizations want to leverage data to reduce the risks and costs of planned and unplanned maintenance. That's often a result of the systems, processes, and disciplines gaps between information technology (IT) and operational technology (OT).

By digitally transforming maintenance, operators of data centers can identify faults in equipment before they occur and reduce downtime risk. With increased transparency and predictability, organizations can reduce total cost of ownership and be more sustainable.

Just as importantly, operators can reap the benefits of a seismic shift in operations, leaving behind traditional hourly-priced, break/fix and scheduled inspection maintenance models in favor of a preventive, condition-based model with service level agreement (SLA)-based outcomes and commitments.

DATA CENTER GROWTH HAMPERED BY LEGACY MAINTENANCE

The demand for more data center services is unrelenting. "Today, data centers continue to not just survive but thrive alongside hybrid and multi-cloud systems in new avatars such as on-prem as a service," says technology expert Dipti Parmar. "Not just that, data centers are poised to meet the demand for services related to emerging tech such as edge computing, IoT, and 5G."

But those data centers often are reliant on rigid organizational stovepipes. Data center IT and OT systems and processes generally run along parallel tracks, lacking the integration and collaboration that could optimize the uptime of the critical physical assets on which organizations depend.

Hampered by disaggregated data and usually operating around the clock, these operations suffer from lack of insights into the root causes of downtime, and risk outright failure. They are often relying on non-scalable, closed systems that are monitoring different aspects of critical assets with little if any correlation.

Data centers house numerous types of computer systems infrastructure, such as servers, storage devices, and networking equipment, all of which may be subject to programming errors, cyberattacks, and operator error. In addition, these data centers are reliant on complementary power and cooling equipment, fire suppression systems, energy meters, emissions monitoring, and a myriad of sensors. With so many points of potential

failure, diagnosing the cause of a failure can be problematic and time-consuming; in the meantime, downtime losses rapidly accumulate.

Typically, data centers rely on planned maintenance scheduling to avoid critical outage incidents. But that doesn't factor in real-time assessment of equipment health and performance. The result is costly replacement of components that still have a useful lifespan remaining (CapEx hit) or, far worse, unanticipated failures resulting in downtime between scheduled maintenance visits (OpEx hit).

Traditional planned maintenance scheduling is insufficient to deal with rapid scaling of the data center market, especially burgeoning edge data centers that are being located close to the source of data generation and consumption, such as IoT devices and 5G infrastructure. A new era of digitized maintenance with an overlay of remote operations center will create increased transparency and predictability, as well as deliver a reduced TCO.

Integrating all OT and IT subsystems into one dashboard provides an unprecedented level of transparency and predictability to operations, providing holistic oversite of OT and IT performance. In the past, OT and IT groups used disparate and siloed dashboards.

COSTLY LOSSES DUE TO DOWNTIME

Data centers are under intense pressure to scale and to prevent disruptions. Uptime Institute's Annual outage analysis 2021 notes that major outages have a huge impact and "in a few cases, above $100 million in losses." Each year, according to the report, "there are certainly many cases that cost several million dollars, or tens of millions." But the damage can extend beyond financial damage to include impacts ranging from "inconvenience and frustration to compliance breaches, reputational damage, and even loss of life."

The number of data center outages decreased somewhat in 2021, but the impact of those outages was higher than in previous years, Uptime Institute's Global Data Center Survey reports. "While respondents indicate that just over half of all downtime incidents are fleeting and have few consequences, the remaining half cause substantial financial, operational and reputational damage. And 62% of outages that respondents classified as significant, serious, or severe cost more than $100,000 (an increase from 56% in 2020), while 15% of these outages cost over $1 million."

In 2021, Amazon Web Services experienced three data center-related outages in one month, impacting the services of major cloud customers, while Google Cloud had its own problems, and Facebook brought down its own services with faulty configuration changes. Those are just the most prominent incidents, illustrating that even large hyperscale data centers are not immune from unplanned outages, impacting large numbers of their customers.

CRITICAL WORKER SHORTAGE AND THE NEED FOR AUTOMATION

The situation has further deteriorated with the growing shortage of skilled workers, especially in the COVID pandemic and recovery era. Uptime Industry research indicates that 50% of data center operators were having difficulty finding qualified candidates for open jobs in 2020.

"Data center leaders need help across the board," AFCOM's 2021 State of the Data Center Report declares. "While most respondents reported difficulties recruiting at least some types of personnel (73%), no particular role appears to pose a specific hiring challenge. Help is needed in the cloud (29%), data center facilities engineering and technicians (26%), security professionals (25%), DevOps (25%), and so on."

High value data centers simply can't afford to rely on understaffed teams and low-value systems and processes. Yet, many lack visibility and insights, and suffer from insufficient integrated monitoring across disparate proprietary components. With no "single version of the truth" with which to predict pending failures or quickly diagnose the causes of outages, data centers are absorbing added costs and risking customer dissatisfaction.

Like other business sectors, data centers need to rely more on automation tools and efficient monitoring to adapt to worker shortages and employee demands for hybrid and remote work conditions. In a 2021 multi-country survey of data center managers, 93% express concern about lockdown monitoring — their ability to stop building management systems in the event of a problem — and 72% worry about the potential for downtime and closure (72%). Other top concerns cited in that survey include OT cybersecurity (72%) and maintaining uptime (68%).

As demands for data escalate, data centers are also struggling to contain power consumption and emissions and ensure compliance with increasingly strict regulations.

DIGITIZING DATA CENTER MAINTENANCE

Today's business requirements necessitate maximum uptime of data center assets. The "gold standard" for IT service levels agreements (SLAs) is 99.999% uptime, so data centers need solutions that allow them to minimize the risks of downtime while meeting cost and energy efficiency, without adding redundant systems or processes.

Today, most data center teams must manually collect information from disparate systems. Typically, they rely on scheduled

equipment inspections and pay-as-you-go services that are inefficient and costly.

Despite overwhelming reliance on planned maintenance, breakdowns don't typically follow a schedule. Traditional maintenance procedures often result in replacing components that could still function for a prolonged period, and an inability to recognize signs of impending failure between scheduled maintenance. A data center needs to be managed as efficiently as possible to reduce downtime risk – while keeping operating expenses (OpEx) low. Operational solutions that enable quick reaction are essential. They must provide transparency into increasingly complex and dynamic data centers, so that operators and administrators are able to identify pending faults before they occur.

In 2021, worldwide spending on data center IT hardware and software amounted to $185 billion, up 10% from the previous year, according to Synergy Research. But as spending on IT systems increasingly focuses on integration and automation, it is easy to overlook the lack of digital transformation among OT systems that monitor, control, and protect processes, equipment, and operational environments. From an IT department's perspective, OT systems have been out of sight and thus haven't always had the same level of monitoring or maintenance hygiene.

In the past, it was common practice to "air-gap" control system networks — in other words, disconnect them both directly and indirectly from the Internet — as they typically didn't need to interact with Internet-based services or other corporate networks. This was widely considered sufficient as an OT security measure, but this is no longer operationally feasible in today's connected world.

Integrated solutions that span data center infrastructure deliver the efficiency, resiliency, and sustainability that organizations and their stakeholders demand. Integrated solutions can be deployed more efficiently, are more agile, and have greater intelligence. The convergence of sensors, data, and connectivity provide more ways to analyze what's going on in virtually any environment, including data centers.

Smart devices proliferating throughout connected buildings can provide an enterprise-wide view of building control systems and sensors. They provide transparency into operations and deliver the insights to drive productivity, operational efficiency, and improved response times.

By integrating key aspects of IT and OT, organizations can take advantage of advanced fault detection reliability models and machine learning that empowers data-driven maintenance strategies.

Digitization is essential to optimize asset lifecycles, streamline costs, and protect performance and business reputation. With digitization, data centers can implement condition-based maintenance to reduce downtime risk and decrease maintenance costs. Organizations can optimize critical asset lifespans and better detect asset wear that can negatively impact energy efficiency.

CLEAR INSIGHT INTO TRUE PERFORMANCE

With decades of learnings and expertise in maintenance of critical OT equipment in buildings, Honeywell has introduced an innovative solution that digitizes thermal assets in the data center.

Honeywell Forge Digitized Maintenance, a cloud-based, software-as-a-service (SaaS) solution, used vendor-agnostic, advanced fault detection asset reliability models to monitor data center critical thermal assets and enable condition-based maintenance

strategies. Providing a platform for data analytics, it uses sensors and system integration to analyze systems, controllers, and equipment, tracking system performance of critical OT assets in the data center.

A building maintenance case study (see chart below) showed that Honeywell Forge had been instrumental in early detection of intrinsic faults at a minute level, before they would have been eventually detected at a macroscopic, system level in normally scheduled inspections. In fact, simulation results show that an early warning was often given 100 days before a scheduled inspection detected a fault.

Honeywell Forge Digitized Maintenance is designed with the capability to monitor data center assets and detect early signs of maintenance issues before they become root causes for system downtime. Advanced analytics and asset-specific KPIs help organizations identify issues before they cause failure or impact on SLA compliance, with the goal of reducing downtime risk. The solution incorporates more than 200 advanced, manufacturer-agnostic rules to monitor data center critical thermal asset health and proactively trigger degradation alerts.

EARLY NOTIFICATION CASE STUDY
Could Honeywell Forge Digitized Maintenance Have Found More Issues Than Planned Maintenance At This Site

	DECEMBER	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY
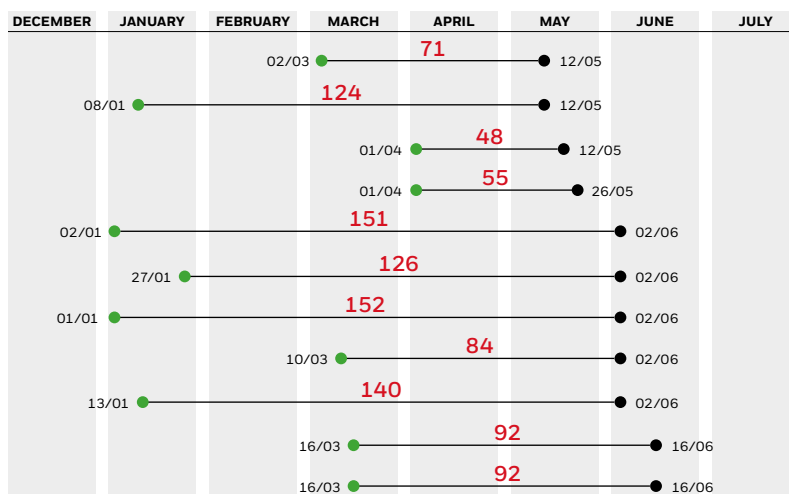
- ● Honeywell Forge could have found **
- ● Planned Maintenance found
- **xx** Difference in day s between Honeywell Forge and Planned Maintenance identification of fault
- ** This chart represents a single site using BMS point history data to simulate when Honeywell Forge Digitized Maintenance could have identified the issue. This analysis provides one possible outcome, bul s not intended to represent the perfonnance in any other situations.

KEY SOLUTION COMPONENTS:

Portfolio KPI visibility
– Providing a holistic view of facility performance, including zone temperature control, asset availability, energy consumption, and service case performance. Understand where to focus resources and track performance against targets and benchmarks.

Advanced analytics
– Combining asset performance data with analytical models encoded with decades of data center expertise.

Pre-failure alerts
– To provide actionable intelligence to the right person before the fault occurs. Mobile notifications alert managers of performance anomalies and task workers with pinpoint direction designed to help diagnose and resolve problems.

Equipment can sometimes break without warning, causing costly downtime and requiring urgent fixes or replacement. Detecting and fixing issues before they cause component failure help extend asset lifetime, save maintenance costs, avoid costly downtime, and the expense of urgent fixes or replacements. Honeywell Forge Digitized Maintenance is designed to assist in identifying and notifying service teams about unnoticed asset wear that can often decrease energy efficiency and thus increase OpEx.

Dashboards, KPIs, metrics, and insights of the Honeywell solution make managing and reporting easy, providing better use of limited resources, and alleviating arduous equipment management and reporting tasks.

INTEGRATION FOCUS

Honeywell Forge Digitized Maintenance, as part of the Honeywell Data Center Suite, fully integrates with Honeywell Data Center Manager, which also provides access to other value-add offerings including Portfolio View to deliver seamless performance in operations management via an innovative, modern user experience. Honeywell Forge Digitized Maintenance also provides seamless integration to popular computerized maintenance management systems (CMMS).

Data Centre Manager is an on-premise software solution that is agnostic to vendors and persona based. It is designed to connect and manage both OT and IT system data in one dashboard, turning data into insights and actionable intelligence.

Designed to manage data center building, power, and IT assets, Data Center Manager is built on the Niagara Framework, a comprehensive open platform for the development and deployment of connected products and device-to-enterprise applications.

With an open API, open distribution business model and open protocol support, Niagara has become the operating system of choice for connected buildings and data centers, along with manufacturing systems and smart cities, worldwide. The Niagara Framework enables cost reductions and profitable operations, and helps organizations improve strategic decision-making.

PLANNING AHEAD FOR DATA CENTER MAINTENANCE

The nature of the data center is evolving toward hosting cloud- and edge-based workloads and services. Operational solutions that enable quick remediation are essential and must offer a single source of truth for keeping data centers operating efficiently, as well as to rapidly scale worldwide deployments.

The disparate worlds of OT and IT need to more quickly converge on their ability to use data analytics to ensure optimal performance and reduced downtime of critical data center functions. Honeywell Forge Digitized Maintenance is driven by asset performance data and advanced analytical models encoded with decades of data center and building expertise.

Honeywell's worldwide operations for lifecycle solutions and services for mission-critical operations can help data center operators reduce their focus on daily operational risks and maintenance details, so they can concentrate more strategic initiatives that drive business growth. Learn more about how you can proactively monitor and manage your data center with Honeywell Forge Digitized Maintenance.

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