ESG SHOWCASE

Dell EMC CloudIQ: AIOps for Intelligent IT Infrastructure Insights

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ABSTRACT: As IT becomes increasingly distributed, machine learning is playing an essential role helping IT managers keep pace. The Dell EMC CloudIQ AIOPs application, from Dell Technologies, is changing the infrastructure management game; leveraging intelligence to provide actionable insights and integrated automation across its broad IT portfolio. CloudIQ simplifies and accelerates IT operations and helps often-overworked IT staff to keep their entire IT environment running properly. If you use Dell Technologies products, you should also be leveraging CloudIQ.

Overview

As businesses become more digital, demands on IT increase in scale, diversity, and complexity. For organizations to keep pace, IT *itself* must therefore become more productive—with technology becoming smarter to augment scarce personnel. IT organizations need to pursue this proactive approach. They must seek out tools that provide them with better insight. Consider the data center modernization investment priorities for 2021 of IT managers surveyed by ESG:

- 33% say they will be investing in more remote monitoring/management technology to manage their data center infrastructure.

- 25% say they will be investing in more data center automation tools[1] to help with systems management tasks such as detecting anomalous resource utilization, proactive failure alerts, or automatic policy management.

The future lies in the use of machine learning technology combined with detailed telemetry data to give smart people the insights they need to do more, along with integrated automation to expedite IT operations, accelerate issue identification and diagnosis, and support the organization's AIOps objectives. What if a tool like that were included with the infrastructure that you are already using—a tool that is able to span multiple technologies to provide a more complete vision? *CloudIQ is designed to be that kind of tool.*

With the Rise of IT Complexity, Digital Businesses Must Expect More

Three-quarters (75%) of IT managers surveyed by ESG said IT is more complex now compared with two years ago, with 38% of those organizations identifying higher data volumes as a top driver of the complexity increase. More data translates into more infrastructure, more applications, and more demands on IT from users.

Given the massive scale of modern IT environments and the diverse breadth of technologies in use, solving any problem has simply become more complex and more time-consuming. That complexity comes with a cost. Activities take longer than they should, and too many personnel are being consumed by day-to-day maintenance activities.

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[1] Source: ESG Master Survey Results, *2021 Technology Spending Intentions Survey*, December 2020. All ESG research references and charts in this showcase have been taken from this research report, unless otherwise noted.

Orchestration and Automation Deficiencies Drive Demand for AI/ML

Although automation tools help, they don't provide a complete answer. Consider the 32% of senior IT decision makers who reported experiencing problematic shortages of expertise in the area of IT orchestration and automation. Obviously, their teams need better insight and superior tools. As a result, the integration of artificial intelligence and machine learning into IT management and operations software is becoming essential. In fact, in the same survey, ESG found that 28% of senior IT decision makers identified leveraging AI/ML to support systems management tasks as a top area of data center modernization investment.
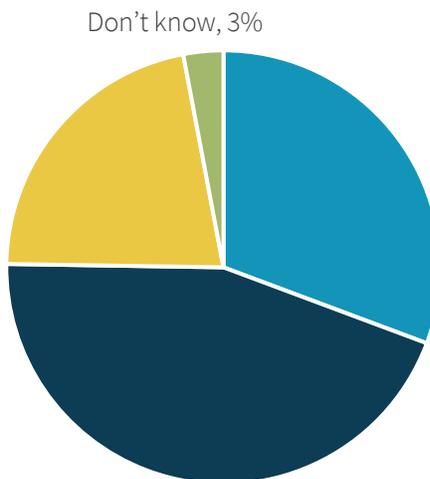
As part of a separate research study, ESG solicited the opinions of 300 IT decision makers about equipment and software that leverage AI/ML as an embedded feature for intelligently automating processes. Forty-five percent of those respondents indicated they prefer systems that offer recommendations based on learned behavior from automated real-time and/or historic data analysis, with staff then executing the recommendations—and another 22% want systems to automatically apply recommended changes, but with the ability to review them before allowing them (Figure 1).[2]

Figure 1. Nearly Half of IT Decision Makers Desire Analysis-based Recommendations

Think about your equipment/system vendors that leverage or will leverage AI/ML as an embedded feature to intelligently automate processes. Which of the following statements aligns with your organization's expectations or preference in terms of leveraging these capabilities? (Percent of respondents, N=300)

We want the system to automatically detect, analyze, recommend, and apply changes as needed, with the ability of the staff to review outcomes and make changes if required (i.e., self-run), 22%

Don't know, 3%

We prefer full control of the system and that our staff analyzes and defines what should be done (i.e., do nothing), 31%

We expect the system to serve as a recommendation engine only based on learned behavior from automated real-time and/or historic data analysis, but staff should be responsible for implementation and execution of the recommendations (i.e., recommend only), 45%

Source: Enterprise Strategy Group

In any case, the point is that IT needs to leverage infrastructure elements that collect the right level of telemetry information and then combine it with machine learning to produce advanced insights for administrators to either act on or oversee. In other words, IT organizations need *real machine learning*, not just traditional reporting tools. CloudIQ, for example, offers impressive levels of intelligence that can analyze, understand, and provide forecasting and recommendations across the IT environment, while offering an excellent step along the path to enabling autonomous operations.

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[2] Source: ESG Master Survey Results, *Artificial Intelligence and Machine Learning: Gauging the Value of Infrastructure*, March 2019.

Dell EMC CloudIQ

Dell EMC CloudIQ is an AIOps application hosted by Dell Technologies that leverages AI/ML to provide proactive monitoring, analytics, and recommendations based on telemetry data from Dell Technologies infrastructure systems. It is included with Dell Technologies ProSupport Enterprise Suite support contracts. Being cloud-based, CloudIQ doesn't require users to install or maintain any software whatsoever and is enabled by turning on the standard secure telemetry conduit from the user's equipment to the Dell Technologies secure data center.

CloudIQ users can grant Trusted Advisor access to their Dell Technologies or reseller account teams, enabling them to share their CloudIQ interfaces and provide additional best-practice recommendations, optimization guidance, proactive issue recognition, and further remediation advice. According to Dell Technologies, Trusted Advisors report being able to resolve like-for-like issues an average of *three times faster* using CloudIQ.[3]
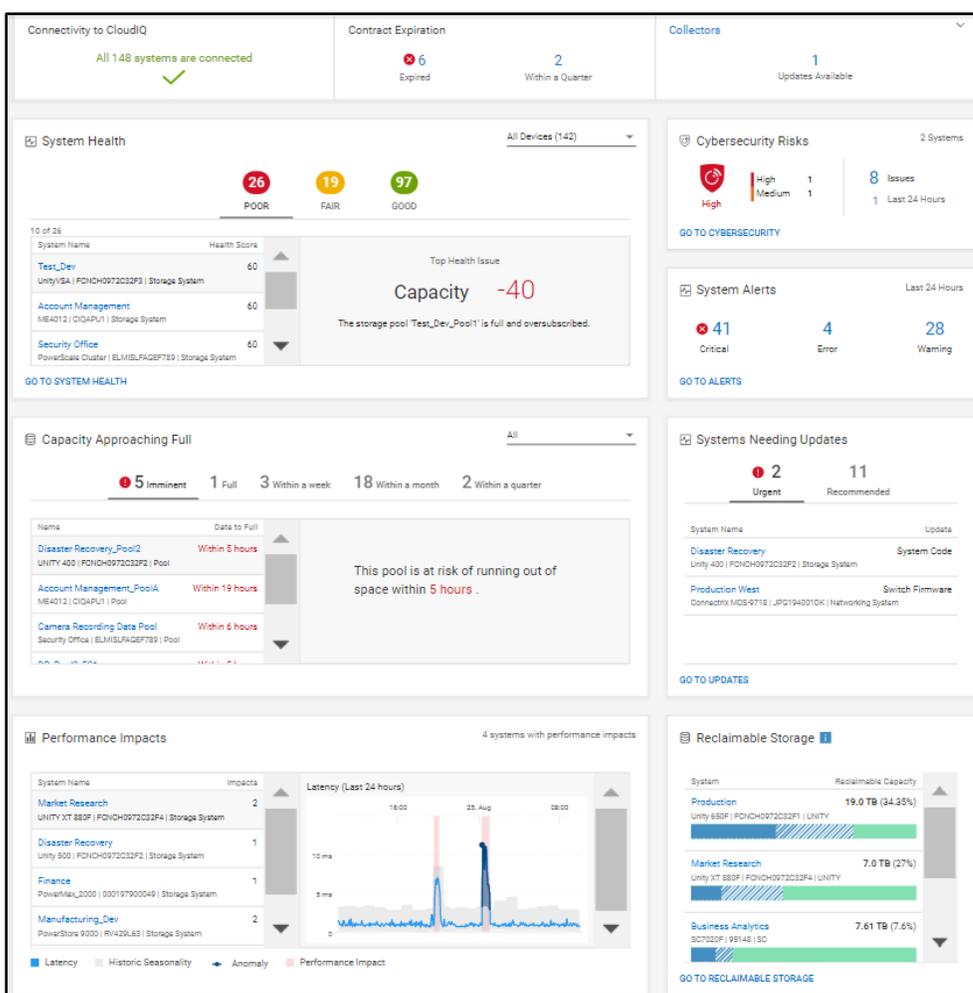
CloudIQ supports a broad mix of Dell EMC servers (PowerEdge), storage (PowerStore, PowerMax, PowerScale, PowerVault, Unity/Unity XT, XtremIO, and SC Series), SAN switching (Connectrix), Ethernet switching (PowerSwitch), data protection (PowerProtect DD and PowerProtect Data Manager), converged and hyperconverged infrastructure (VxBlock, VxRail, and PowerFlex), and infrastructure as-a-service (APEX Data Storage Services), as well as VMware virtualization for a consolidated view across the data path, providing a multiplier effect for CloudIQ's value.

State of All Systems at a Glance: Core, Edge, and Cloud

Accessible via standard browsers and mobile devices, CloudIQ features impressively quick and easy monitoring and analytics capabilities for systems at your data centers, disaster recovery sites, and edge locations, as well as data protection in the public cloud. A neatly formatted overview dashboard provides fleetwide summaries of systems' health, capacity, performance, reclaimable storage, and available firmware upgrades. This simplifies troubleshooting, and from there, you can easily navigate to relevant details and prescribed steps for remediation.

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[3] Based on a Dell internal survey of Trusted Advisors (Dell Technologies account team and partners), conducted March 2020, comparing issue resolution with and without CloudIQ. Actual results may vary.

System Health Scores, Notifications, and Reports

CloudIQ compiles the insights about each monitored system into a single health score that is intuitive to understand and clickable for granular details and recommendations for remediation based on engineering expertise for each system and specific model. Health scores are based on a set of categories, including components, configuration, capacity, performance, and data protection. Any change in health issues triggers health notifications sent to users via email, mobile message, and/or the CloudIQ mobile app, depending on the user's selection. CloudIQ offers the ability to customize reports and optimize communications and collaboration across IT teams, executives, and line-of-business stakeholders. Webhook and REST API can integrate information, such as health notifications, with third-party applications, including ticketing systems, like ServiceNow, or communications platforms, like Slack and Microsoft Teams, for further efficiencies.

Intelligent Capacity Tracking, Anomaly Detection, and Forecasting

CloudIQ possesses advanced machine learning capabilities for capacity tracking and prediction. It uses an ML algorithm that leverages a seasonal decomposition model to feed a forecasting algorithm as the foundation of its storage capacity forecasting. CloudIQ trains this ensemble model across all connected systems to further enhance the algorithm for more reliable capacity utilization forecasting, indicating to IT administrators when systems are reaching full capacity.
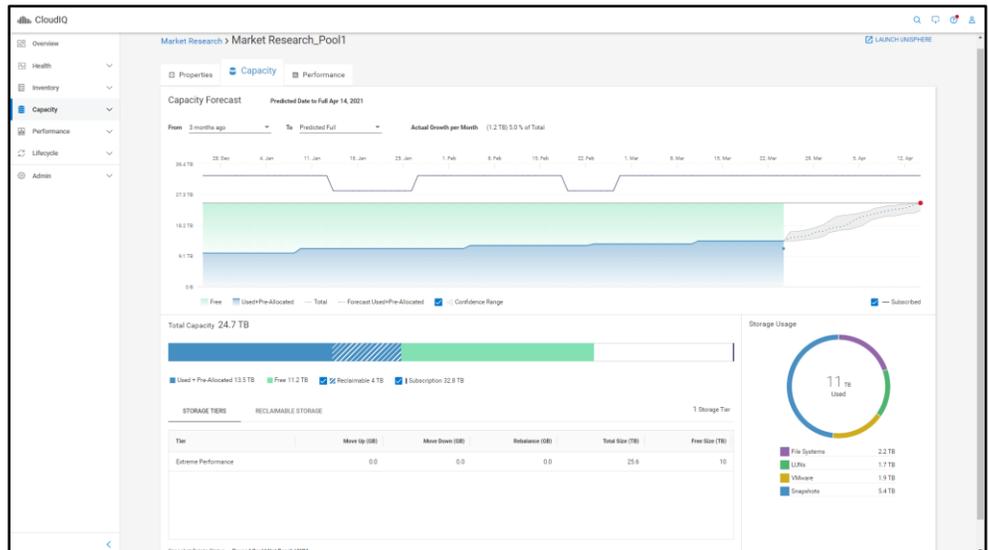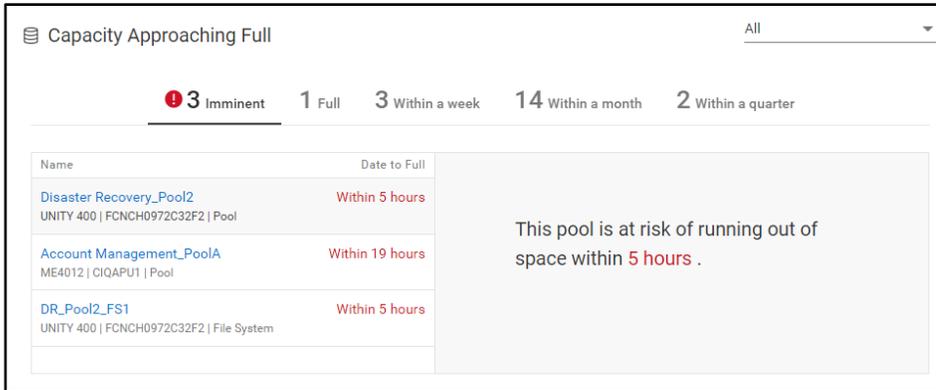
CloudIQ can also identify sudden anomalies in thinly provisioned storage pools' capacity consumption, including spikes that pose a threat of imminently reaching full capacity. This capability helps administrators see that they need to take immediate action to avoid data unavailability due to oversubscription.

## Intelligent Performance Tracking and Anomaly Detection

CloudIQ samples performance telemetry data every five minutes, leverages a machine learning algorithm that learns normal storage performance patterns over a given time period, and then indicates whenever a performance metric (an anomaly) falls out of those bounds.
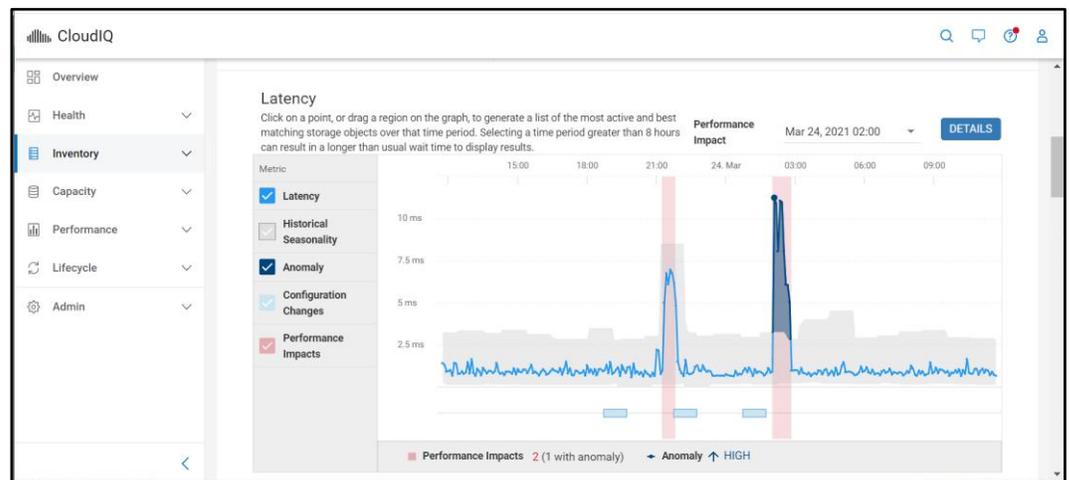
Using a set of advanced machine-learning and time-series correlation algorithms and integrated visualization, CloudIQ helps administrators more quickly conduct performance troubleshooting—giving them a deeply informed understanding of performance deviations that have recently occurred, plus detailed insights on potential resource contention. A performance impact will be identified, for example, when there is high latency and a corresponding drop in IOPs and/or bandwidth. This helps administrators differentiate between non-impacting spikes and spikes that have demonstrable performance impacts and require remediation.

Virtual Machine Awareness and Workload Contention Analysis

CloudIQ offers integration with VMware to understand relationships between the individual virtual machines and the supporting infrastructure for broader perspectives on performance and workload contention. By understanding these relationships, CloudIQ can isolate issues, such as performance latency spikes causing workload contention, and then highlight the specific component(s) in the data path that are the likely root cause. An end-to-end map shows each
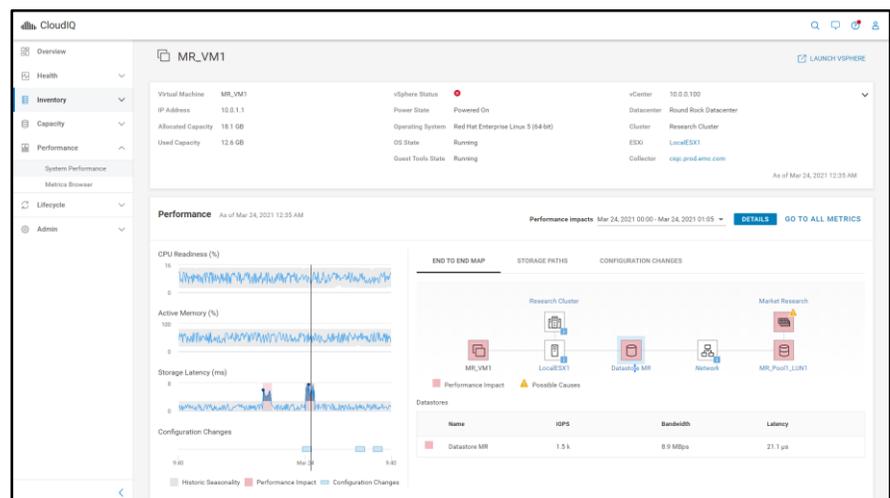
virtual machine, server, network, storage system, and specific objects (e.g., storage volume). Key performance indicators for latency, IOPs, and bandwidth are also shown with the end-to-end map with CPU and memory KPIs and configuration changes to further speed troubleshooting. Given the complexity of today's infrastructure environments, this ability to automatically identify the probable root cause of issues will significantly reduce the impact on personnel, freeing IT staff to focus on other, value-added projects.

Extension to Public Cloud
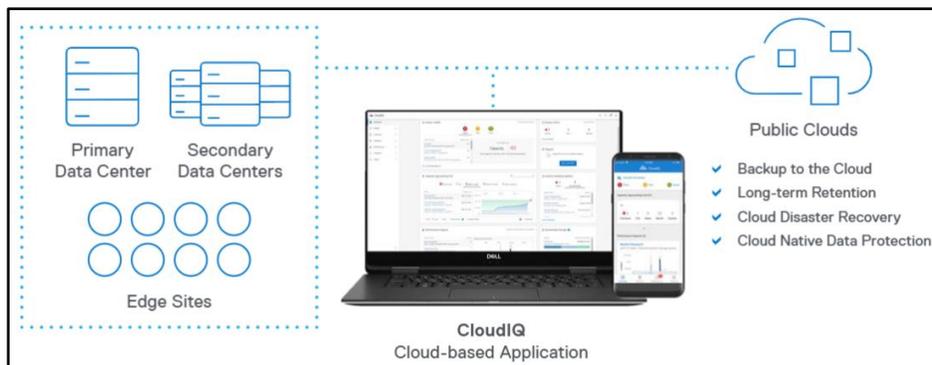
With the proliferation of hybrid cloud deployments, IT needs a way to normalize monitoring and problem solving across private and public cloud environments to reduce complexity. CloudIQ's first step in this direction leverages its integration with Dell Technologies' PowerProtect DD series, DDVE and Data Manager data protection products, which enable tiering of on-premises VMs, file systems, workloads, and applications to public clouds, as well as in-cloud data protection for cloud-native assets. CloudIQ shows its power to simplify operations by monitoring on-premises and cloud data protection assets along with associated on-premises primary storage assets.

Cybersecurity Monitoring

Leveraging telemetry data, CloudIQ automatically assesses the infrastructure environment for violations of users' security configuration policy, notifying users of misconfiguration, and recommending actions. As a result, administrators receive an immediate and clear view of the security risk profile focusing on hardening the infrastructure configurations. Security configuration recommendations are based on NIST 800-53 r5 and NIST 800 – 209 standards, as well as Dell Technologies best practices.
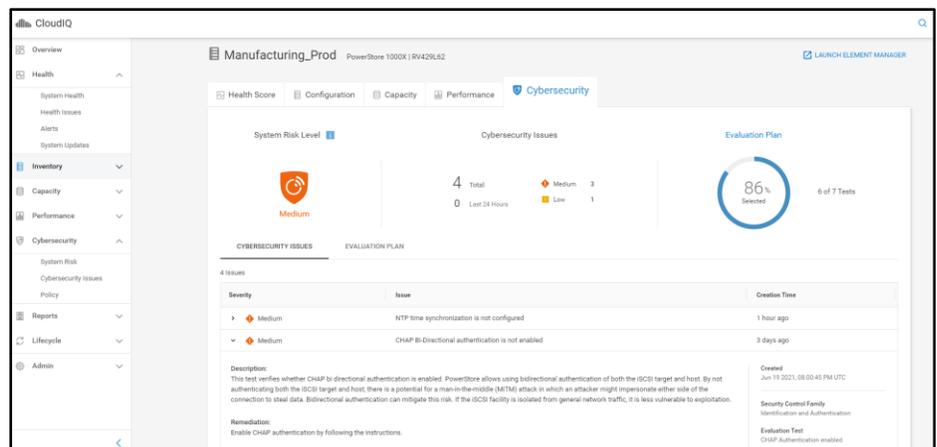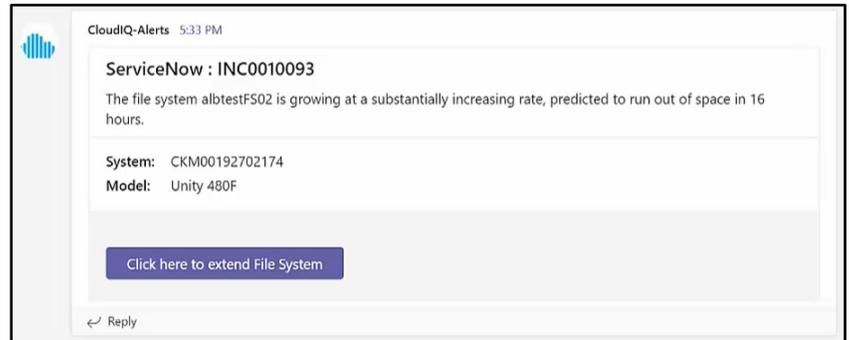

This level of automation frees administrators from having to manually check individual configurations to ensure that they continue to align to the company's policy. Without this level of automation, maintaining effective levels of security can be a daunting challenge as IT infrastructure scales and evolves.

API Integrations for Automated Workflow

Achieving the most effective and efficient IT operations requires the combination of human and machine intelligence working in concert to expedite and automate activities. Dell Technologies' strategy for CloudIQ is for it to integrate with third-party tools to augment your organization's automation and AIOps strategy.

When CloudIQ determines a new risk or a change in health status, it can forward information and initiate workflows, such as service ticketing and escalation, in third-party IT service management and enterprise notification systems like ServiceNow, Slack, or Microsoft Teams by using standard Webhook API or REST API calls. This allows for the right insights, recommendations, and automation options to be delivered to the right people as quickly as possible. By expediting collaboration between machine intelligence and human intelligence, CloudIQ can dramatically simplify and accelerate operations for Dell Technologies Infrastructure.

CloudIQ Simplifies IT Infrastructure

The capabilities of CloudIQ are advanced enough to translate into a clear set of real-world, business-level benefits. With the help of CloudIQ, IT can:

- **Get a single consolidated view of systems across the core (data center), edge, and cloud**, including health, alerts, and ability to compare systems' key performance indicators to assist with infrastructure-related planning decisions.

- **Accelerate time to resolution of system health issues** by receiving notifications with recommendations for resolution.

- **Quickly and easily determine system risk** when demands are exceeding system capacity or performance.

- **Ensure that hosts always have high-availability access** to resources.

- **Quickly isolate performance impacts**, performance anomalies, and resource contention.

- **Automatically identify the highest-performing objects and the top consumers of resources**, ensuring they align with business priorities.

- **Find reclaimable storage** that might be unassigned or inactive, freeing up capacity.

- **Create customizable reports** to improve collaboration and engagement with IT personnel across line-of business stakeholders and executive teams.

- **Automatically identify when system updates are recommended** to ensure compliance with best practices and product robustness.

- **Examine findings that are presented to them securely on their mobile devices** or via email, focused on the most relevant information, such as changes that have occurred, without needing to log into the system.

- **Improve cybersecurity protection** through automated configuration assessments and notifications of vulnerability.

- **Attain greater infrastructure insights in an economical way**, as CloudIQ is included in standard infrastructure systems support contracts.

The Bigger Truth

Businesses' demands for IT services will only increase with application environments becoming more diverse and IT infrastructure growing larger and becoming more disaggregated. In the wake of these transformations, tasks that were once simple now take too long and consume too many precious personnel resources—resources that are already scarce and becoming scarcer given the high demand for technical talent.

IT organizations need tools like Dell Technologies CloudIQ that leverage machine learning and other advanced techniques to collect and consolidate insights from a wide breath of technologies, and then offer recommendations, including automation, while plugging seamlessly into your business's AIOps initiatives. CloudIQ saves precious time and frees critical personnel resources for higher value tasks and accelerates operations. If you use Dell Technologies infrastructure products, you should also be leveraging CloudIQ.

For more information, visit DellTechnologies.com/CloudIQ.

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