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Mission-Critical Application-Centric Infrastructure Performance Management for the Hybrid Cloud

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Over the past 10 years, CIOs have established private cloud infrastructures and watched their use of public cloud capabilities skyrocket. Now they are adding hybrid cloud to their application delivery capabilities. With increased datacenter complexity, multicloud architectures, and modern application and network delivery models (containers, SDNs, PaaS), as well as rising competitive pressures, IT leaders must have broad and deep infrastructure and application transparency to gain knowledge of the customer experience and embed speed and quality mechanisms that deliver sustainable competitive advantages for optimized business outcomes.

Introduction

Mission-critical applications require deep and broad management capabilities to maintain high availability and reduce the impact of potential performance problems that cause downtime, which can impact revenue and damage a company's reputation. Regardless of the underlying cloud delivery architecture, infrastructure management and application management are requirements for understanding the customer experience. As CIOs expand their use of hybrid cloud architectures for increased control and governance (compared with public clouds), IT executives must understand the importance of application-centric infrastructure performance management in delivering an optimized customer experience.

During the past five years, many IT executives have had cause to reconsider their thinking on driving business strategy, new product development, and innovation through hybrid cloud architectures. Why? The reasons are many and include cost savings, staff optimization, and reuse, in addition to increased control, governance, and security as well as improved capacity management while running hundreds of simultaneous applications. IT and business executives increasingly view these benefits as strong elements of the hybrid cloud use case and longer-term optimization capabilities for their organizations. The reality of hybrid clouds is that they are very complex with vast scale and multiple virtualized tiers, and they have multiple point management tools that don't integrate. These challenges must be overcome for an effective hybrid cloud deployment.

Application-centric infrastructure performance management enables teams from IT operations and infrastructure (storage, networking, application, database, etc.) to collect, analyze, correlate, and display infrastructure-centric information within the context of production applications to identify and resolve potential performance bottlenecks. The ability to collect in-depth data from multiple infrastructure layers is critical to understanding component dependencies that help identify and solve potential performance problems before they cause customer degradation or downtime.

Benefits

IT executives realize that the use of hybrid cloud architectures requires a simplified, more integrated view of infrastructure performance management. In the past, IT implemented domain-specific (storage, networking, compute, etc.) performance management tools, each creating a separate pool of data with limited analytic capabilities. Many of these tools act in isolation and don't have the broad context that applications require, notably as changes across infrastructure and applications increase in speed and scope and become more dependent on each other. As hybrid cloud architectures enable the expansion of private clouds to the public, the level of complexity and the need for control rise exponentially. In fact, most enterprises use a multicloud sourcing strategy, utilizing private, hybrid, and public cloud infrastructure simultaneously for different capabilities. This tactic drives up the level of complexity and the number of data components and sources that must be managed.

There are many benefits when considering an application-centric infrastructure performance management platform. Some of the more critical benefits are as follows:

- The use of real-time machine learning capabilities — such as volume and velocity of data collection — to quickly identify problems such as abnormal performance behavior, to prevent recurring problems, and to resolve problems before they impact the customer (It's very difficult to accomplish these tasks without the use of analytics capabilities that utilize automation.)
- The automation of processes that can solve specific issues common in certain cloud environments, such as automating a set of tasks that send critical performance data to ITSM tools to enable fast customer communications (Automation is also growing in importance for enterprises that want to burst capacity needs from the private cloud to the hybrid cloud based on business demands.)
- The utilization of full-stack, predictive visibility and monitoring across hybrid or multicloud environments to provide a deep and clear picture of where a performance problem might occur across compute, network, and storage infrastructures, as well as applications, before it happens
- The availability of roles-based, out-of-the-box dashboards and visualizations that provide different stakeholders across network, storage, application, and compute teams with access to critical performance data, when they need it, from a trusted single source of truth (This drives faster time to problem identification and resolution for cross-silo teams as well as process transparency for audit and compliance requirements.)
- The ability to tap into built-in intelligence that identifies why a performance management problem occurs and best practice recommendations for how to solve the problem
- The use of ecosystem integrations via REST APIs, which are critical for process integration and team collaboration (For example, critical infrastructure performance data can have bidirectional integration with various ITSM tools for faster resolution, streamlined communications, and team synchronization and alignment as problems arise and are solved.)
- The deployment of dependency mapping of infrastructure and application components to enable cross-silo IT teams to quickly view the impact and breadth of a performance problem, the dependencies across the components, and the associated customer impacts

Considering Virtual Instruments

Virtual Instruments specializes in application-centric infrastructure performance management. Founded in 2008, the privately held company provides infrastructure instrumentation and performance analytics for enterprise datacenters. Its solutions provide IT teams with workload visibility and insight into their end-to-end systems across private, hybrid, and public cloud environments. Virtual Instruments helps companies increase the performance, availability, and utilization of their production IT infrastructure, taking an application view of performance. The company has over 500 customers, including enterprise IT, cloud service providers, and storage vendors, and its customer base spans verticals such as insurance, manufacturing, healthcare, financial services, retail, government, telecommunications, and utilities.

The company's flagship product, VirtualWisdom, is a monitoring, visualization, and analytics platform that helps organizations manage performance, availability, and utilization across their physical and virtual infrastructures. It collects and analyzes data from IT infrastructure using hardware probes to monitor Fibre Channel SANs and NAS infrastructures and software probes to monitor virtualized infrastructure, network flows and switches, and software-defined storage and hyperconverged systems. VirtualWisdom collects wire and machine data across application and infrastructure topologies. The product then feeds the data into the analytics engine, which enables capacity and workload optimization, problem identification and resolution, and application-centric visibility into roles-based dashboards.

The company complements the ability to monitor critical infrastructure in production with the ability to perform performance validation in the form of load testing across any storage technology — NFS/CIFS/SMB, iSCSI, Amazon S3, OpenStack Swift/Cinder — and monitors a wide range of infrastructure components, such as virtual machines, SAN, NAS, software-defined storage, converged storage, and — in 2018 — cloud storage. Infrastructure performance management platforms are becoming more critical to enterprise datacenters because of the growing complexity and heterogeneity of hybrid and multicloud infrastructure. The importance of understanding the performance, health, and utilization of the infrastructure in the context of critical applications is clearly increasing.

Challenges

As more workloads are migrated to the hybrid cloud, the use of private cloud continues and overall application and infrastructure complexity rises. IDC believes Virtual Instruments faces certain challenges, including the following:

- Continuing the expansion of analytic capabilities to drive additional intelligence across the product portfolio, thus reducing the time to identify and solve a problem, as well as preventing problems from recurring based on automated actions and intelligent thresholds
- Expanding infrastructure and application data collection coverage as new modern, heterogeneous cloud-based application development and deployment models take hold in the enterprise
- Balancing the demands between IT, business executive, and manager dashboards and visibility design requirements
- Building out integrations across multiple tools and across various domains as many IT organizations transform their application delivery and operational models to require more seamless end-to-end process transparency and data sharing
- Determining the need for deeper and broader application performance management data integration and visibility for enhanced problem resolution capabilities
- Innovating by utilizing customer advisory boards that bring together single-company peers from across silos to drive product innovation and enhancements through feedback sessions

- Exploring adoption of new cloud-based delivery models and SaaS for new product innovation and license flexibility
- Becoming broader and deeper in network performance monitoring, either organically or through partnership or acquisition

Essential Guidance

As hybrid cloud delivery models play an increasingly larger role in transforming the IT organization and the importance of infrastructure performance data collection and analytics rises, CIOs and IT executives should consider the following recommendations:

- Assess the existing skills and capabilities of cross-silo teams related to infrastructure performance management, and determine the ability of those teams to collaborate on various problem resolution scenarios; then identify the associated data source gaps.
- Determine the critical infrastructure performance metrics required to drive an optimized process for problem identification and resolution, capacity planning, and data-driven decision making.
- Develop a use case for application-centric infrastructure performance management that includes metrics that communicate business outcomes, such as time to market, revenues and profits, and customer satisfaction.
- Identify the leading problem identification and resolution issues, capacity planning challenges, and baseline data collection and analytic requirements that will improve resolution times and reduce service desk tickets and poorly performing applications.
- Define the analytics required for various problem resolution processes, and map the "best fit" data to the questions that machine learning algorithms can answer, recognizing that analytic capabilities are only as good as the data they can utilize.

Conclusion

IDC believes that the need for performance and visibility into infrastructure and applications will only grow as the use of next-generation architectures increases and as application development and deployment models become more sophisticated. In addition, application-centric analytic capabilities are becoming a key requirement to embed speed into the problem identification and resolution process, which can lower costs and optimize staff utilization. As modern application development processes continue to propagate in enterprise IT organizations and as software-defined datacenters take hold, the need to collect data from these ever-changing infrastructures also grows. CIOs and IT executives who don't invest in this area risk falling behind their peers and face an increased level of business risks.
