The business impacts of cloud performance degradations or outages can be significant in today's increasingly digital economy. This paper looks at the vital role of digital performance platforms in improving application acceleration capabilities and network performance management as well as SD-WAN and security solutions.

Ensuring Performance of Increasingly Critical SaaS Applications and IaaS Workloads

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Introduction

The relentless strategic imperative of digital transformation has driven enterprises to adopt cloud both as a convenient destination for applications and workloads and as an operational model that can deliver business agility and increased IT efficiency.

As a result, enterprise adoption of cloud continues to grow robustly, and multicloud has been embraced as the favored cloud posture by most enterprises, with IDC data suggesting that more than 90% of enterprises now embrace multicloud as a strategic posture. SaaS applications are also used extensively by enterprises, and they are becoming increasingly critical to employee productivity, key operational processes, and meaningful business outcomes. These SaaS applications include popular collaboration and productivity applications such as Office 365 (including OneDrive, SharePoint, and Microsoft Office applications), ServiceNow, Salesforce, and various customer relationship management (CRM), enterprise resource planning (ERP), and other business and vertical applications.

Consequently, workload migration to infrastructure-as-a-service (IaaS) clouds and adoption of software as a service (SaaS) have effectively redefined the parameters of the datacenter. The datacenter is now distributed. It includes the traditional on-premises datacenter, and the applications that reside within it, and also extends to colocation facilities, public clouds, and SaaS services. The distributed nature of the datacenter, however, has yielded unexpected complexity.

Indeed, though the benefits that can accrue from adoption of SaaS and IaaS are great, so are the challenges relating to their performance. As these applications grow in importance, their availability and reliability, not to mention their security, must be maintained. By their nature, of course, SaaS applications do not reside in on-premises datacenters. From a network standpoint, this is a potentially complicating factor, and enterprises need to consider the network implications of SaaS adoption. The network is the nervous system for these applications, and enterprises must ensure that it is fit for purpose as applications and workloads migrate to SaaS and IaaS environments.

AT A GLANCE

KEY STATS

» Public cloud IaaS revenue grew 45% in 2018 compared with 41.7% in 2017.

» IDC forecasts the public cloud IaaS market will reach $141 billion in 2023, with a compound annual growth rate (CAGR) of 31.4% for 2018–2023.

» Meanwhile, software as a service (SaaS) will continue to dominate public IT cloud services revenue. In 2018, SaaS revenue reached more than $121 billion, representing 62.4% of total cloud market revenue.

That means enterprises should consider network performance attributes such as latency, packet loss and reordering, jitter, and bandwidth constraints. Depending on the application, any of those factors can lead to a less-than-satisfactory application experience, with deleterious results.

For example, the business impacts of SaaS performance degradations or outages can be significant in today's increasingly digital economy. Given the depth and breadth of SaaS offerings adopted by enterprises, and the growing migration of workloads to IaaS clouds, performance slowdowns can affect time to market for products and services, revenue and sales pipelines, customer experience, employee productivity, organizational reputation, and the ability to maintain and sustain competitive advantage. As a result, enterprises are placing greater emphasis on ensuring that they have insight into and control over the performance and availability of SaaS applications and IaaS workloads.

Unfortunately, the network is an often overlooked and undervalued element in the context of hybrid IT and multicloud. Nonetheless, as the datacenter has become distributed amid the rise of cloud — with applications and workloads residing not only in on-premises datacenters but also in IaaS clouds and from SaaS providers — enterprises are recognizing the need to modernize their network infrastructure across a WAN that serves the needs of both branch offices and remote sites while taking into consideration today's dynamic workforces accessing different application and networks in changing locations via laptops and mobile devices throughout any given workday. All of these network endpoints make up the ecosystem where business is transacted and customers are served.

In this cloud era, business-critical traffic is no longer restricted to predictable and well-defined flows to, from, and between the on-premises enterprise datacenter and branch offices, typically over MPLS virtual private networks (VPNs). Now, as a result of adoption of SaaS and IaaS, enterprises must rethink both their WAN architectures and their standard operational practices, which usually involved manual configuration and management of routers at the branch via command-line interface (CLI). Given the changing nature of applications, workloads, and modern workforce behavior, automation and visibility are now critical requirements, providing operators with the means of delivering the agility, flexibility, and responsiveness prized in an application-centric, digitizing world.

Key Considerations

Enterprises seeking to meet the challenges of supporting business-critical IaaS workloads and SaaS applications must take into account and comprehensively address the following factors:

» **Distance.** Multinational and transnational organizations operate globally, and cloud has made them even more distributed. Different locations experience different levels of latency and have different bandwidth capacities. Latency can significantly affect the performance of applications and the personal productivity of users. Similarly, bandwidth availability constraints can affect application performance and user experience, compromising and slowing many business processes.

» **Expectations of workforce.** In the age of always-on web services, employees and other users of applications have come to expect instant gratification. At the same time, employers expect urgency and 24 x 7, instant action to advance the business. What's more, employees are more dynamic than ever, frequently moving between locations and across networks several times in any given workday. Nonetheless, they expect and are required to work productively across this distributed landscape.

» **Security constraints, vulnerabilities.** Given the wide-ranging environments, security constraints and potential vulnerability are also a prominent concern. Enterprises need to adopt a secure posture that meets new requirements without inhibiting productivity. There can be no compromise between application and network security and responsiveness and performance of applications.

» **Cloud workloads.** The challenges of cloud workloads include egress and proximity, which must be taken into consideration across regions and availability zones so as to mitigate the aforementioned latency.

» **Application mix.** Amid hybrid IT and multicloud, managing and maintaining the performance of the overall application mix can become problematic, especially as enterprises add to modern digital applications and services and increase the volume of data that must traverse constrained links on a network comprising a range of heterogeneous connectivity transports.

To be sure, the role of the network is crucial in a multicloud context. As the integral digital nervous system, it should be carefully evaluated and modernized to address the requirements arising from adoption of SaaS and IaaS and to ensure that application availability and performance are maintained and optimized. This is of particular importance in the context of digital transformation, where the application has achieved primacy and the quality and immediacy of digital experiences are paramount considerations.

Understandably, visibility into multicloud network and application performance is essential. Enterprises need a means of gaining a semblance of control over an increasingly challenging distributed environment. Through pervasive visibility, enterprises can achieve insights into application and network performance that allow rapid troubleshooting and remediation. Ultimately, pervasive, closed-loop visibility into how the network supports and delivers applications and digital experiences can result in a proactive, rather than reactive, approach to maintaining and enhancing application performance spanning IaaS workloads and SaaS services.

Benefits

If the network implications of SaaS and IaaS adoption are addressed comprehensively and holistically, application performance and digital experience can be maintained and even enhanced and optimized to account for distance, latency, and network constraints involving attributes such as bandwidth. This favorable technological outcome confers a range of positive business outcomes.

Resulting benefits can include higher enterprise employee productivity, greater overall organizational efficiencies, increased business agility, improved customer service, and a meaningful mitigation of application and service disruptions that can incur significant business costs in the form of lost opportunities, reduced revenue realization, slower time to market for products and services, and damage to an organization's reputation or brand.

Perhaps the most important benefit is that SaaS applications and IaaS workloads, when able to perform optimally, fulfill their promise for enterprises pursuing digital transformation strategies and hybrid IT postures, helping them achieve their business digitalization objectives, resulting in competitive advantage, increased revenue, and higher profitability.

In the current period of digital transformation and hybrid cloud, more enterprises are tracking downtime costs, and they are finding that average downtime costs, irrespective of enterprise size, are increasing as their business processes and customer engagement models become increasingly digital. IDC estimates that the mean cost of application downtime is

$250,000 per hour, across all industries, organizational sizes, and geographies, with the actual cost of downtime varying widely by organization. For many of those organizations, the benefit of avoiding a downtime event handily covers the cost of protecting against it.

Key Trends

In recent years, IDC has witnessed a rapid increase in adoption of IaaS cloud and SaaS application services. IDC surveys have repeatedly found that the imperative of greater business and IT agility, the need for IT and infrastructure modernization, and the desire for specific application features and functionality are primary drivers that lead enterprises to embrace cloud services.

Public cloud IaaS revenue grew 45% in 2018 compared with 41.7% in 2017. IDC forecasts the public cloud IaaS market will reach $141 billion in 2023, with a compound annual growth rate (CAGR) of 31.4% for 2018–2023. Meanwhile, SaaS will continue to dominate public IT cloud services revenue. In 2018, SaaS revenue reached more than $121 billion, representing 62.4% of total cloud market revenue. Adoption of cloud enterprise SaaS business applications — such as ERP, supply chain management (SCM), and human capital management (HCM) — accelerated across all segments in 2018, with most enterprise buyers taking a "SaaS first" or "SaaS also" posture for new applications.

IDC predicts that in 2022 organizations will spend more on vertical SaaS applications, excluding desktop and internal employee productivity applications, than on horizontal applications. This is attributable to the unprecedented range and quality of vertical applications available, a growing percentage of which integrate smoothly with industry-specific business processes and workflows. What's more, these vertical applications will be integrated with market-leading horizontal applications and platforms.

These IaaS and SaaS environments are being combined by enterprises in a variety of multicloud arrangements. In IDC's 2018 *CloudView Survey,* 83.7% of cloud-user respondents indicated that they had deployed multiple clouds and cloud types (including IaaS and SaaS), and fully 94% of respondents anticipated a multicloud posture in 2019. In the same survey, 80% of respondents reported using SaaS applications.

Enterprises seek to derive several business outcomes from proficient management of multicloud environments. According to IDC's 2019 *Multicloud Management Survey*, time to value, operational agility, stability, and improved customer experience are the outcomes most frequently anticipated.

Multicloud challenges are anticipated, too. In the same survey, application performance and availability was cited by 48.5% of United States–based decision makers as one of the most pressing issues resulting from multicloud infrastructure strategy.

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Fortunately, a growing number of enterprises have begun to appreciate the network implications of cloud, including SaaS. In a survey of U.S. enterprise communications managers, IDC asked respondents to identify the issues that were having the most impact on WAN and datacenter operations and strategy. The issue that was cited most often, by about 35% of respondents, was "cloud computing, including SaaS and IaaS."

Cloud is also driving modernization of enterprise WANs. When enterprise respondents to IDC's *Software-Defined WAN (SD-WAN) Survey* were asked to cite their most important WAN challenges, security requirements related to cloud services topped the list. Other prominently mentioned challenges are as follows: managing consistent user experiences for on-premises applications and cloud applications (including SaaS), cost-effectively delivering SaaS and other cloud services across the WAN, and the need for better analytics and visibility across the hybrid cloud landscape.

Considering Riverbed

Riverbed offers a flexible and interoperable digital performance platform to address the IT challenges that can impede digital business innovation and growth. The Riverbed platform encompasses application acceleration capabilities and network performance management, as well as enterprise-grade, secure SD-WAN solutions, with a focus on customers achieving optimization, acceleration, visibility, and control for complex digital architectures. With a heritage in WAN optimization, which involved understanding application behavior over networks and mitigating latency, Riverbed's objective is to provide customers with modernized digital networking for cloud- and SaaS-centric enterprises.

Riverbed's portfolio consists of the following:

» **WAN optimization** is an area in which Riverbed has been a perennial market leader, with reportedly thousands of enterprise customers worldwide leveraging its technology to ensure application performance across complex network environments. Riverbed's WAN optimization is now available in a wide range of form factors and pricing models to help customers achieve bandwidth savings and overcome the negative effects of latency. From that foundation in WAN optimization, the Riverbed portfolio has evolved to address the following:

  ■ **Application acceleration.** Application acceleration provides support for modern applications such as leading enterprise SaaS applications and cloud workloads, in addition to long-time support for on-premises applications. With its application acceleration capabilities, Riverbed offers fast, reliable delivery of SaaS, cloud, and on-premises applications to any user anywhere (including mobile users), increasing workforce productivity regardless of location or network type. As an example, today Riverbed is helping global enterprises maximize investments in Microsoft Office 365 by enabling faster performance for mobile and office users anywhere.

  ■ **Network performance management (NPM).** NPM provides comprehensive visibility and analytics designed to give enterprises the control needed to optimize hybrid IT resources and ensure service quality and network security.

  ■ **Software-defined WAN (SD-WAN).** An integral part of the company's portfolio, the Riverbed SD-WAN solution offer customers an enterprise-grade approach to delivering multicloud applications across the most complex transport networks, integrating routing, application acceleration, network visibility, and security services.

Collectively, the Riverbed portfolio is designed to address the wide-ranging requirements associated with ensuring and maintaining performance across the networks that connect enterprise applications, including distributed SaaS applications and IaaS workloads, to geographically dispersed users. This, in turn, helps enterprises protect their investments and boost workforce productivity, customer satisfaction, and a competitive edge.

Challenges

Although Riverbed can seize a substantial opportunity by helping its enterprise customers ensure and maintain the speed and quality of digital experiences and performance in an era increasingly defined by cloud applications, both IaaS and SaaS, it will have to surmount challenges.

One of the foremost challenges will be persuading customers, across buying centers and constituencies, to understand the importance and value of taking a holistic view of digital performance. Networking teams and application teams, to say nothing of increasingly assertive DevOps teams, often work in parallel rather than together. In many organizations, collaboration and well-defined separation of concerns have not been resolved into a reconciliation of interests within the larger picture of digital performance. Another challenge, of course, relates to the competitive landscape, wherein NPM and SD-WAN vendors might already have a presence at enterprises where Riverbed is also present.

Many vendors are seeking to establish leadership in ensuring hybrid and multicloud digital performance and application delivery, spanning on-premises traditional applications as well as IaaS and SaaS applications, and Riverbed will have to articulate its solution portfolio message clearly and powerfully to achieve success. Nonetheless, Riverbed has a substantial installed base of enterprises customers, and it is well positioned to assist them as they modernize and augment their infrastructure to align with digital transformation, business outcomes, and delivering enhanced digital experiences to customers, employees, and partners.

Conclusion

One of the logical consequences of digital transformation, which has involved the embrace of SaaS and IaaS clouds as destinations for a spectrum of modern and established applications and workloads, is that optimal performance and continuous availability of cloud-based applications have become greater concerns among enterprises. Understandably, performance degradation or outages of SaaS and IaaS applications can have a growing impact on an enterprise's ability to deliver on the full value of digitalization strategies.

As a result, enterprises are looking at adopting products and technologies that can help them address the need for application acceleration, performance, control, visibility, and security across a complex landscape of hybrid environments and networks. With its portfolio of offerings spanning those areas of need, Riverbed is well placed to partner with its enterprise customers in implementing an application-oriented, digital network infrastructure designed to support successful business outcomes in a multicloud world.

About the Analyst

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