



Akamai and Microsoft Azure: Optimizing IaaS and PaaS Performance with the Power of CDN

Introduction

"The strategic partnership to host Akamai CDN on Microsoft Azure is addressing the needs of enterprises for real time and secure access to digital media, further enabling them on the journey to digital transformation (DX)." Ghassan Abdo, Research Vice President, IDC

Migration to the cloud is an unstoppable trend. IDC's 2017 *CloudView Survey* revealed that 70.9% of businesses worldwide are currently using or indicate that they have at least firm plans to implement public cloud infrastructure-as-a-service (IaaS) offerings for some portion of their organizations' IT requirements. The survey also showed that 83.2% of businesses have embraced "cloud-first" or "cloud-also" approaches to acquiring net-new and replacement IT capabilities, capacity, and functionality, indicating that next-generation digital-transformation-oriented initiatives will reside by default in the cloud. The benefits of moving workloads and applications to the cloud include improved IT resource utilization, more productive use of IT staff, cost savings, improved business agility, and accelerated time to market for new products and services.

While public cloud IaaS offerings from providers such as Microsoft Azure are typically more geographically distributed than traditional hosting services, public cloud hosted applications, workloads, and content face the same performance challenges related to latency, throughput, and consistency. Content delivery network (CDN) solutions offered by providers such as Akamai, which optimize the performance of traditional websites, are core to solving these problems faced by cloud-based workloads. Recognizing that high-performing digital experiences are key to a company's digital transformation, Microsoft has built best-in-class CDN services from Akamai by embedding services directly into its Azure platform and Azure solution architectures.

This paper explores the advantages of Azure CDN from Akamai for next-generation applications and workloads hosted in Azure's hyperscale multitenant IaaS environment and how the integrated IaaS-CDN capabilities of Akamai and Microsoft Azure can optimize the end-user experience of cloud-delivered workloads for sectors such as financial services, media, manufacturing, retail, and healthcare.

Situation Overview

Business disruption is being driven by digital transformation as companies across all industries are being forced to change longstanding ways of doing business. The pressure is especially intense in consumer-oriented sectors such as

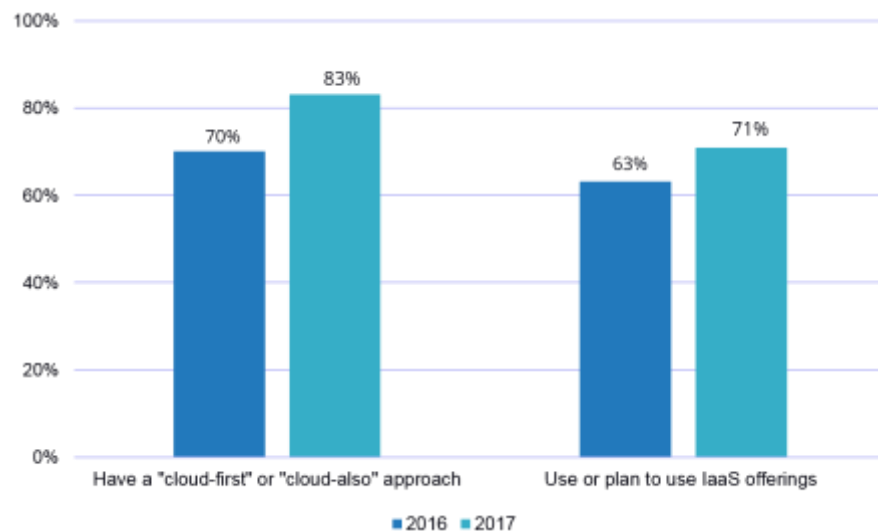
Virtually all digital transformation initiatives are dependent on the cloud services delivery model.

retail/ecommerce, media/entertainment, travel/hospitality, and consumer electronics where scale, speed, operational flexibility, and the customer experience are direct determinants of business success.

For the majority of these businesses digital transformation — the use of 3rd Platform technologies such as cloud, mobility, Big Data analytics, and social to create new business value through digitally enhanced offerings, operations, and relationships — remains the top driver of IT spending and will continue to be so in the years ahead. Virtually all digital transformation initiatives are dependent on the cloud services delivery model. Because of its scalability and flexibility, cloud's importance as a delivery platform is rising exponentially as digital transformation momentum accelerates. In fact, public cloud services are now growing at almost seven times the rate of overall IT market growth.

IDC's 2017 *CloudView Survey* of over 6,000 enterprise respondents revealed that 70.9% of businesses worldwide are currently using or indicate that they have at least firm plans to implement public cloud infrastructure-as-a-service (IaaS) offerings for some portion of their organizations' IT requirements. The survey also showed that 83.2% of cloud-using businesses have embraced "cloud-first" or "cloud-also" approaches to acquiring net-new or replacement IT capabilities, capacity, and functionality, indicating that next-generation digital-transformation-oriented initiatives will reside by default in the cloud. This is an increase from 70% of cloud-using businesses that said they had embraced a "cloud-first" or "cloud-also" approach in 2016.

Figure 1
Worldwide Cloud and IaaS Adoption Trends



Source: IDC, 2018

The benefits of moving workloads and applications to the cloud include improved IT resource utilization, more productive use of IT staff, cost savings, improved business agility, and accelerated time to market for new products and services. In IDC's 2017 *CloudView Survey* nearly 50% of businesses indicated concerns about security in the cloud. This is not a new phenomenon as concerns about security and

governance complexity in the cloud have been cited repeatedly in our annual CloudView surveys since 2009.

Interestingly, though, about 40% of respondents cited superior security capabilities available from service providers as a major incentive to move to the cloud. Our assumption is that security (and related issues of privacy and trust) will continue to give pause to enterprises moving systems and data to the cloud, but that pause will get shorter and shorter over time as the incentives to move to the cloud — including stronger security services — become increasingly compelling.

Content and Customer Experience in the Digital Era

As mentioned earlier, the impact of digital transformation and disruption of business models is especially intense in consumer-oriented sectors where scale, speed, operational flexibility, and the customer experience are direct determinants of business success. Content today is integral to driving customer engagement, customer journey management, and overall customer experience.

And it goes without saying that people are hungry for content and are consuming it at a faster pace than ever before. The on-the-go nature of content consumption demands immediate output. Websites need to be instantaneous, so performance is critical on any preferred device (such as PC, tablet, and smartphone) and network (fixed or mobile). According to *The State of Online Retail Performance Report*, 49% of online users expect page load time to be less than 2 seconds. The same report indicates that mobile users will abandon a website if the load time exceeds 3 seconds. These statistics confirm a direct relationship between website performance and business success. For ecommerce businesses and media companies, this increases the challenges around congestion due to higher page weights, the number of images (HD), greater video and interactivity requirements, third-party content, etc.

The digitalization of TV and the growing importance of IP technology for delivery as well as content creation have led to the rise of OTT TV and video across the globe. The creation, delivery, and use of online video will continue to grow as one of the most popular ways to share content. The total number of internet video users worldwide (watching streaming video or downloading video online) is expected to increase to just over 6 billion users in 2021, for a CAGR of almost 8% between 2016 and 2021.

The CDN-IaaS Value Proposition

The increasing growth in world internet traffic will continue to impact global networks. Although there will be an abundance of capacity in the last mile, it is the core of major networks and interconnected cloud datacenters that will become increasingly congested. To bridge the gap between the congested core and the last mile it is crucial to provide content delivery (servers) at the edge to relieve the burden — moving content and applications in closer proximity to the end users. Today, CDNs carry a substantial portion of the world's internet traffic. They have become an essential tool to handle the demands created by the massive amount of web content, live high-definition (HD) video, flash sales, and large downloads on the internet today. In specific terms, CDN technology provides the following

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primary benefits to a business — performance, availability, security, and intelligence.

Performance ensures a high-quality user experience. When requested, content is cached (pre-saved) by a CDN's servers. End users will get that content by connecting to the nearest CDN server rather than waiting for their request to go directly to the origin. Acceleration technologies such as Sureroute optimize delivery of dynamic content directly from the origin by utilizing the fastest and most reliable routes to the end user. CDNs accelerate delivery of cached and non-cached dynamic content. Availability refers to content that remains accessible to end users under high-stress situations such as excessive user traffic, intermittent spikes, and potential server outages.

Given the increasing volatility of the internet threat landscape, helping to secure websites is a significant CDN requirement. Today's most advanced CDNs provide cloud-based solutions that are designed to protect content providers and users from a wide array of attacks and stay up to date on mitigation strategies. As carriers of nearly 60% of the world's internet traffic, CDN providers generate immense amounts of data about end-user connectivity, device types, and browsing experiences across the globe. Through analytics, they can provide customers with insight into this data, enabling them to react accordingly.

Akamai's Intelligent (Global Edge) Platform consists of a highly distributed global content delivery network infrastructure of over 243,000 servers in more than 1,700 networks in over 130 countries. Around 85% of the world's internet users, in fact, are within a single "network hop" of an Akamai CDN server. This clearly reflects its market leading presence in terms of the scale and reach of its "edge platform" infrastructure, which extends beyond hyperscale cloud IaaS/PaaS players' "availability zone" footprints.

Going beyond basic caching Akamai also provides a wide array of solutions to enable acceleration of HTTP traffic, going into smarter areas and services, using context to adapt delivery based on application performance.

For websites and applications, Akamai provides the following capabilities:

- **Advanced caching:** As websites become more dynamic, advanced caching enables CDNs to cache more content more efficiently.
- **Dynamic site acceleration:** Dynamic/uncacheable content requires multiple acceleration techniques, including route- and transport-layer protocol optimizations.
- **Front-end optimization (FEO):** Optimizing individual digital experiences. FEO complements caching and site acceleration by lightening payloads, shortening browser "think time," and prioritizing tasks.
- **Image optimization:** Optimizing images across diverse networks, browsers, and devices, and managing images automatically.
- **API and mobile app acceleration:** Using advanced tools to cache certain APIs, while accelerating non-cacheable APIs.

The Azure CDN combines the intelligent cloud services of the Azure platform with the delivery advantages of Akamai's highly distributed CDN in addition to Akamai's acceleration and security solutions.

- **Predictive acceleration:** Optimizing uncacheable content, using techniques such as preconfigured rules, request-pattern analysis, and real-time traffic data.

For media streaming, Akamai provides the ability to dynamically deliver high-quality experiences across a variety of network types and varying connection speeds, by applying correct behaviors, caching, and settings for multiple formats, regardless of the device type. For example, Akamai complements TCP-based HTTP with UDP protocol to enhance and accelerate communication with an end user. Akamai provides performance at scale to address fast-growing demand for content and sudden spikes.

The Benefits of Integrated IaaS-CDN

Two years ago, Microsoft and Akamai signed a strategic partnership to host Akamai CDN services on Azure. The IaaS-CDN integration is aimed at enhancing public cloud computing to meet businesses' needs for a secure, enterprise-class cloud, leveraging Akamai's global edge platform of distributed infrastructure to bring content and apps closer to customers/end users. The Azure CDN combines the intelligent cloud services of the Azure platform with the delivery advantages of Akamai's highly distributed CDN in addition to Akamai's acceleration and security solutions.

The partnership enables customers to access Akamai CDN on pay-as-you-go terms, whereby (first-line) support services are provided by Microsoft. The integrated IaaS-CDN solution provides a seamless fit with other Azure components (storage, media services, IoT). By integrating Akamai's Intelligent (Global Edge) Platform with IaaS/PaaS, customers can drive benefits in performance and workload management of apps and services hosted in the cloud, all creating a better end-user experience.

It also enables users of the Azure CDN service to leverage Akamai's various optimization scenarios, such as:

- **General web delivery:** Allows quick and reliable global access to static web content.
- **Dynamic site acceleration:** Accelerates the delivery of dynamic web content globally. For mobile access, it utilizes mobile image optimization technology.
- **Media streaming:** Provides the best possible viewing experience at scale for today's "any device, anywhere" reality.
- **Large file download:** Optimizes download of software, games, and large file-based digital media.

Azure developers can easily optimize workloads with Akamai directly through the Azure portal. A pivotal benefit of the integrated Azure CDN service is the ultimate quick provisioning as customers can be up and running on Azure CDN from Akamai in less than 60 seconds. Analytics complement the end-user experience by providing insight into workload performance and user base.

Next-Generation CDN for the Digital Economy

Akamai is capitalizing on the customer migration to cloud services by integrating its market-leading CDN capabilities into a public cloud platform. Cloud customers will benefit from improved CDN experience on the public cloud.

Akamai provides the components needed to deliver digital/online experiences securely and at scale with enterprise-grade performance. It provides simplicity and real-time analytics insights which reduces costs and increases time to market.

It is clear Akamai is well underway to enable customers and users to accelerate the adoption of the third-party platform technologies including cloud, mobility, analytics, and social. These are the crucial ingredients of a successful digital transformation which will help businesses innovate more rapidly and drive new revenue streams to remain competitive in this highly dynamic digital business climate.

IDC UK

5th Floor, Ealing Cross,
85 Uxbridge Road
London
W5 5TH, United Kingdom
44.208.987.7100
Twitter: @IDC
idc-community.com
www.idc.com

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Global Headquarters: 5 Speen Street Framingham, MA 01701
USA P.508.872.8200
F.508.935.4015 www.idc.com.

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