“By 2021, 80% of all internet traffic will be video, up from 67% in 2016.”¹ Internet Service Providers (ISPs) and Content Delivery Network (CDN) operators have been working hard to accommodate this “video boom,” but now, CIOs are facing the video boom inside their network. With the sudden increase of high quality video delivery, enterprise networks can crumble under the load. No matter where the traffic has to be delivered, if it is high resolution and high bitrate video, delivering it at scale has become a challenge for both ISPs and enterprise networks.

CDN technology has addressed many of the problems that affect the user experience: It is able to cache content to offload long-haul connections; by locating point of presences (PoPs) closer to the end-user it can reduce round-trip times, thereby increasing overall delivery speed; and it can protect the content provider’s origin servers from traffic spikes or excessive load. New features, often pioneered by newer players in the space, are re-energizing the industry and driving it forward.

**Closed ecosystems**

There is, however, a fundamental problem with the way current CDNs operate: They are closed ecosystems. They are not interconnected and there is virtually no single provider that can deliver the same quality of service everywhere, in every single network. And while the various CDN solutions compete fiercely to increase efficiencies, drive down cost, add new features, etc., they are still primarily interested in locking you in to spend your entire budget with them as opposed to a competitor.

This often creates conflicting priorities between the CDN provider, the customer, and the user. The customer wants a single solution for a problem. End-users want the best quality no matter how it is delivered or who delivers it. CDN providers want to deliver virtually all of the content to your network to help maximize their volume and revenue. However, content producers often need to reach a global audience with viewers located in places where different CDN providers are better positioned to offer high quality services. This situation creates serious problems for CDN customers, who must find a balance between the need to control costs, offer viewers an optimal user experience, and manage the complexity of integration between disparate CDNs.

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¹ Cisco
Single source solutions versus global reach

While there is a standard protocol to interconnect autonomous networks via Border Gateway Protocol (BGP) and verify the information flow between remote parties, different CDN providers remain independent, with different and often incompatible feature sets, capacity, and geographical reach. That means, if you want to receive a “package” of content via a CDN to a certain “address” on your network, the speed, reliability and even the availability of delivery depends on the relationship between the actual CDN and your network. While a single provider solution is simple to implement and maintain, the risk of vendor failure is constant and it is unlikely that a single CDN vendor will be able to serve a global audience with the same quality of service.

The multi-CDN strategy

When you choose a CDN provider, you are faced with its inherent limitations in network reach and capacity. As a response to this problem, a multi-CDN strategy is common practice. This approach usually take one of two forms:

1. Limit the use of CDN features to a level that is supported by all CDNs the same way; or
2. Integrate the different features of the selected providers one-by-one to achieve an even field across them, and support constant compatibility checks and code maintenance for the long-term.

CDNs are primarily paid based on bits delivered, so it is in their interest to deliver as much of their client’s content as possible, even though another player may deliver better service and higher quality in a particular region or network. The burden falls on the customer integrating with the CDN to measure and make decisions based on delivery quality for the benefit of their users. This industry environment and conflicts of interest can make content delivery with consistent quality to all viewers quite a challenge, especially when trying to reach a large number of viewers concurrently in distant networks—and it is made even more difficult when reaching deep into enterprise networks.

To make matters worse, the majority of video and application traffic is moving to HTTPS, which renders transparent caching practically impossible. Existing proxy appliances that provided a partial remedy to handling increased traffic by caching repetitive content are becoming obsolete. While ISPs have been working together with CDNs and other caching technology providers for many years to resolve this issue, an optimal solution for corporate networks has yet to appear.

Solving the problem

There are several ongoing efforts to address this problem, but customer pressure will also be required to drive a change. There has been work done by the Internet Engineering Task Force (IETF) on Content Delivery Networks Interconnection (CDNI) that addressed the issue of permeability across public CDNs, which also could address CDNs on enterprise networks (eCDNs), but the work has come to a stop in recent years. The Streaming Video Alliance (SVA) is trying to bring common sense and a manageable future for streaming video, while differences in geopolitical governance and technical compatibility remain challenges.
Advent of eCDNs

In the world of enterprise networks, choosing a viable eCDN solution should be the first step for customers. The second is to integrate the eCDN service with your user applications and maintain them during their useful lifetime. A recent development in the industry that should enhance customers with both cost and maintenance is the advent of Software-as-a-Service (SaaS) companies providing virtualized eCDN appliances to help content delivery. With this approach, SaaS providers of CDN services can extend their reach deep into enterprise networks and help reduce stress on the network.

The road ahead

Content delivery at scale to both ISP and corporate networks remains a challenge. Companies targeting remote users are trying to find the right balance, while corporations typically look for the most efficient and cost effective solution to their problem. There is ample opportunity for existing players to innovate or for new entrants to come into the marketplace and address these challenges in a novel way. As these solutions become available, content providers and users will likely welcome them as they can offer an enhanced user experience, lower prices and greater flexibility.
About IBM Watson Media

Created in January 2016, IBM Watson Media brings together innovations from IBM’s R&D labs with the cloud video platform capabilities of Clearleap and Ustream. Through the unit, IBM delivers a powerful portfolio of video services that spans open API development, digital and visual analytics, simplified management and consistent delivery across global industries. IBM Watson Media supports top media and enterprise companies with reliable video on-demand and streaming services.

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