Principles of a Common Enterprise Streaming Infrastructure

Five Considerations for Deploying an Enterprise Content Delivery Network
An enterprise content delivery network (eCDN) is a layer of software or hardware infrastructure added to the corporate network that helps manage the distribution of bandwidth-intensive media such as video. Organizations have a choice of five distinct approaches to deploying an eCDN and one size does not fit all. Choosing solutions that align to the principles of a common enterprise streaming infrastructure will help organizations optimize the network for today's large scale business demands and deploy an infrastructure that can adapt and scale with future growth.

Video Drives Network Optimization Inside the Enterprise

The growing use of video inside the enterprise presents a new set of challenges for IT departments. Business groups such as corporate communications and learning and development embrace video because it is proving to be a highly effective method of communicating with employees. But video is bandwidth intensive, and the higher the quality (HD and Ultra-HD) or the more interactive (augmented reality and 360°), the more bandwidth it consumes. Most corporate networks are not properly sized to handle the volume of video traffic coming from the cloud over the internet connection nor the bandwidth consumed by video traversing far-reaching corners of the network.

To mitigate network congestion without inhibiting the use of video, IT departments deploy enterprise content delivery networks (eCDN), network infrastructure that optimizes the distribution of video behind the firewall. By intelligently routing the flow of video traffic around the network, performance is significantly improved and congestion is minimized or eliminated. Audiences enjoy less latency and buffering, faster video start times and an overall higher quality, more reliable viewing experience.
Organizations have a choice of five approaches to optimize delivery of video in the enterprise:

External CDN | WAN optimization | Peer-to-peer (P2P) | Multicast | Enterprise caching

An explanation of these five approaches can be found in our companion paper “Video Distribution Behind the Firewall: Approaches for Deploying an Enterprise Content Delivery Network.”

One size does not fit all and often an organization chooses to deploy a combination of eCDN solutions because the topology of the network can vary from one location to the next. Adding video to an enterprise network requires assessment, planning and a well-designed solution. Organizations not only need a streaming video solution for today’s large scale business demands, but one that can adapt and scale for future growth.

An eCDN deployment with the right combination of architecture, technologies and protocols can enable video to traverse the entire enterprise network while alleviating concerns over scalability, quality of experience (QoE), and network resources.

Common Enterprise Streaming Infrastructure

Best practices for deploying an eCDN starts with choosing solutions that adhere to the principles of a common enterprise streaming infrastructure (CESI). A common enterprise streaming infrastructure is one that reliably optimizes the distribution of video from any video source, today and in the future, deploys and expands over time without requiring costly and labor-intensive network upgrades, and meets or exceeds enterprise security requirements. Deploying a CESI-compliant eCDN allows IT departments to maintain an efficient network without introducing new constraints.
At least 79% of enterprises use two or more streaming video platforms\(^1\) and recent research suggests nearly 20% use six or more platforms\(^2\). Although one third of these organizations are working on consolidating platforms\(^3\), a world where one platform can serve all the needs of the enterprise is unrealistic. Video streaming and content management platforms are not all created equal. The requirements for a platform that can support global learning and development programs may fall short of meeting the requirements for executive broadcasts, HR communications or quarterly earnings calls.

Because eCDNs are network overlays, deploying and managing unique distribution infrastructure for each platform is an IT nightmare—and fortunately unnecessary. Many video platform providers offer an eCDN as part of their solution, but some eCDNs are proprietary and work only with the provider’s platform. Organizations want to select an eCDN that is vendor neutral and can be used to support all the video streaming across the corporate network. An eCDN should be able to retrieve and redistribute video from any video source. Not only does this simplify the deployment and management of the eCDN, but it provides maximum flexibility for the future as the enterprise video landscape evolves over time.
Because solving a large-scale video distribution problem all at once is daunting and probably unnecessary.

Business IP traffic is growing at a CAGR of 21% due to the adoption of video⁴. While twenty-one percent is a significant growth rate, the pattern of a typical growth curve is noteworthy. The numbers start small and increase at a faster pace over time. For example, Gartner reported workers spent 7.2 hours per month watching video in 2010, 10.8 hours in 2012, and expected to reach 16 hours by 2016⁵.

This trajectory of growth is good news for enterprises. IT may already be feeling the impact of video on the network, particularly during live events with large audiences. Solving a large-scale distribution problem all at once, however, seems daunting and is probably unnecessary. Some eCDN solutions allow incremental deployments, beginning with specific locations on the network more susceptible to video congestion. These locations benefit immediately, while the rest of the network is optimized at a pace more aligned to the growth curve.

Organizations want eCDN solutions that provide the ability to start small and seamlessly expand over time. They should select one that is extensible and adapts to changing needs without becoming an administrative burden or requiring forklift upgrades. For example, an eCDN that has the ability to automatically self-discover the addition of new components, or one that offers the option to deploy hierarchically or as a mesh, simplifies management when it is time to expand capacity.
Because security has to be of paramount importance for the enterprise as a whole.

The security implementations of eCDN solutions will vary. Evaluate solutions against enterprise security policies, including the level of encryption required, the ability to encrypt video while at rest and in motion, and the likelihood of introducing or propagating malware across the internal network.

Security has always been on the list of top ten IT management issues. In recent years, it moved from near the end of the list to the number two spot, where it remains for 2017 for good reason. The Identify Theft Resource Center and CyberScout reported a 40% increase in U.S. data breaches in 2016 with the business sector receiving the largest percentage of those breaches. And according to Kaspersky, between January and September 2016, ransomware attacks on business increased from once every two minutes to once every 40 seconds.

From networking and applications to data and physical devices, security is a broad area of responsibility for IT teams, and video affects many of these aspects. Security has to be of paramount importance, not just for the health and integrity of video data traversing the network, but for the enterprise as a whole. The security implementations of eCDN solutions will vary not only by the standards with which a vendor chooses to comply, but also by inherent vulnerabilities that could be present simply because of the delivery architecture. Organizations need to evaluate solutions against enterprise security policies, including the level of encryption required, the ability to encrypt video while at rest and in motion, and the likelihood of introducing or propagating malware across the internal network.
Because the hidden costs of failure really add up.

Intelligent resiliency features in an eCDN allow the network to automatically respond and adapt to failures, transparent to users, and then heal itself to resume normal operation when the fault has been resolved. Select solutions with options for high availability clustering and a graceful failover mechanism that shifts traffic to available eCDN resources in the event of a problem.

On average, North American companies are experiencing five downtime events per month\(^9\). For a large company with scores of systems deployed—servers, applications, and network infrastructure—this news is not surprising. What is stunning, however, is the cost of these outages. For a typical large enterprise, downtime can cost more than $60M per year\(^9\). Some of that cost can be attributed to outages affecting systems impacting the ability to realize revenue. While video for business communications may not seem like a contributor to this statistic, consider this: only 17% of that cost is attributed to lost revenue; 5% is the cost to fix the downtime issues, and a whopping 78% is the cost of lost employee productivity\(^10\).

To help ensure predictable performance, resiliency is a critical attribute of the streaming network infrastructure. Resiliency encompasses both availability and reliability, i.e. the ability to maintain full service and performance, as well as fail gracefully at an acceptable level of service when faults and errors arise affecting normal operation.

From a viewer perspective, lost connectivity, buffering and jitter when watching video is considered a resiliency issue. To ensure smooth delivery of the video stream, organizations want eCDN solutions with built-in forward error correction, a method of accounting for errors without requesting retransmission of data, and bandwidth smoothing, a technique for buffering that eliminates bandwidth bursts.

Intelligent resiliency features in an eCDN allow the network to automatically respond and adapt to failures, transparent to users, and then heal itself to resume normal operation when the fault has been resolved. Organizations want solutions with options for high availability clustering and a graceful failover mechanism that shifts traffic to available eCDN resources in the event of a problem. An eCDN that can be deployed in a mesh topology provides increased scalability and resiliency. A mesh deployment supports a regional distribution of caching nodes with auto-discovery, bringing video streams to the network edge and closer to users, while easing the workload on IT network administrators.
The flurry of 2016 year-end reports projected IT budgets would increase for 2017\(^1\), and enterprise software and networking were among the areas of growth. The leading drivers for spend were reported as end-of-life, growth/ additional need and upgrades/refresh cycles, respectively\(^2\). The addition of network infrastructure to support video distribution generally falls into those first two categories, which is good news for eCDN providers. Lest providers get too excited, however, the budget increases are modest at best, and within the first quarter of 2017 Gartner already revised down their forecast for IT spending worldwide\(^2\). Such is the current—and arguably for the foreseeable future—climate of enterprise IT spending.

With budget always a top consideration, IT departments want to maximize the way they use the limited dollars available by seeking solutions that leverage existing investments and protect new investments for the future. Software-based eCDN solutions are always more affordable than hardware-based alternatives, especially when the software can be installed on existing hardware already deployed across the network. Avoiding the need to deploy network equipment or conduct WAN upgrades will drastically reduce the cost of optimizing video delivery. Being able to scale the deployment incrementally as needs grow provides immediate benefit while keeping costs manageable and predictable. Even with robust software distribution capabilities solutions that require client software will add to the overall cost of deployment and ongoing maintenance. Standards-based eCDNs capable of supporting any video source prevent proprietary vendor lock-in to ensure time and money spent today is not a wasted investment in the future.
Summary

This growing use of video inside the enterprise presents a new set of network challenges for IT departments. Enterprise content delivery networks help manage and optimize the distribution of bandwidth-intensive video to lighten the burden on the corporate network by intelligently routing the flow of video traffic around the network. Deploying a common enterprise streaming infrastructure makes the best use of limited IT resources by investing in a solution that confidently meets the needs of the business today and anticipates the demands of tomorrow.

About The Author

Ramp specializes in optimizing the distribution of video behind the firewall to alleviate network congestion and significantly reduce bandwidth consumption. Ramp’s AltitudeCDN™ enterprise content delivery network (eCDN) is a suite of software solutions for multicasting and advanced video caching, two of the most effective approaches for managing the impact of live and on-demand video traffic on the corporate network. Including enterprise administration capabilities and real-time analytics for performance monitoring, AltitudeCDN is a common enterprise streaming infrastructure that will optimize video from all the streaming platforms deployed within an organization. Many providers in our ecosystem of technology partners have tightly integrated AltitudeCDN with their platforms to simplify deployment and management of the combined video solution and provide a seamless solution that ensures the best viewing experience inside the enterprise. For more information, visit ramp.com.

Footnotes

5Metadata Will Improve the Return on Your Video Investments https://www.gartner.com/document/1983316