Enterprise Content Delivery Networks: For Video, and Beyond

ECDNs deliver quantifiable savings and performance benefits for video streaming and application delivery

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Executive Summary

Enterprise Content Delivery Networks (ECDNs) have gained significant enterprise adoption, largely for their ability to optimize delivery of large-scale video events such as executive town halls. However, both the role of ECDNs and the underlying technology must rapidly evolve to support a wider range of use cases. These include everyday use of streaming video, internal and external webinars and virtual events, and company-wide delivery of software and content, primarily from the cloud.

These use cases are expanding as companies both dramatically increase their use of video and bring a significant percentage of employees back to the office on a full- or part-time basis. Successful adoption of ECDN technology provides significant business benefits, including optimal performance, reduction in bandwidth requirements, and analytics and security to provide visibility into application performance and utilization. Metrigy's primary research, gathered from more than 900 end-user organizations, shows that ECDN adoption has more than doubled since 2020. Those using an ECDN to optimize video, file, and application delivery are saving an average of 22% in annual WAN costs. ECDNs enable companies to easily support growing application data transfer needs, thus ensuring equitable performance for all, regardless of location.

IT leaders should consider ECDN technology to optimize the delivery of streaming video and application data, carefully evaluating competing solutions for scale, deployment flexibility, provision of deep management and analytics insights, and integrations with popular streaming video platforms.

The Workplace of Tomorrow: Hybrid, Interactive, Video-First

The workplace is rapidly evolving. Modern work involves teams of distributed, and often virtual, employees working across a variety of time zones and regions. Hybrid work is becoming the norm, with Metrigy's *Unified Communications Management and Endpoints 2021-22* global study of 396 companies showing that just 21% of companies intend to bring employees back to the office on a full-time basis, while 62.3% will support hybrid work models that provide workplace location flexibility and choice.

This change in work styles, brought on by the coronavirus pandemic, has led to an explosion in the adoption of video, increasing engagement for employees and customers. Now, 38.4% of our study participants say that video is a critical enterprise technology, while another 46.6% say it is important to business operations.
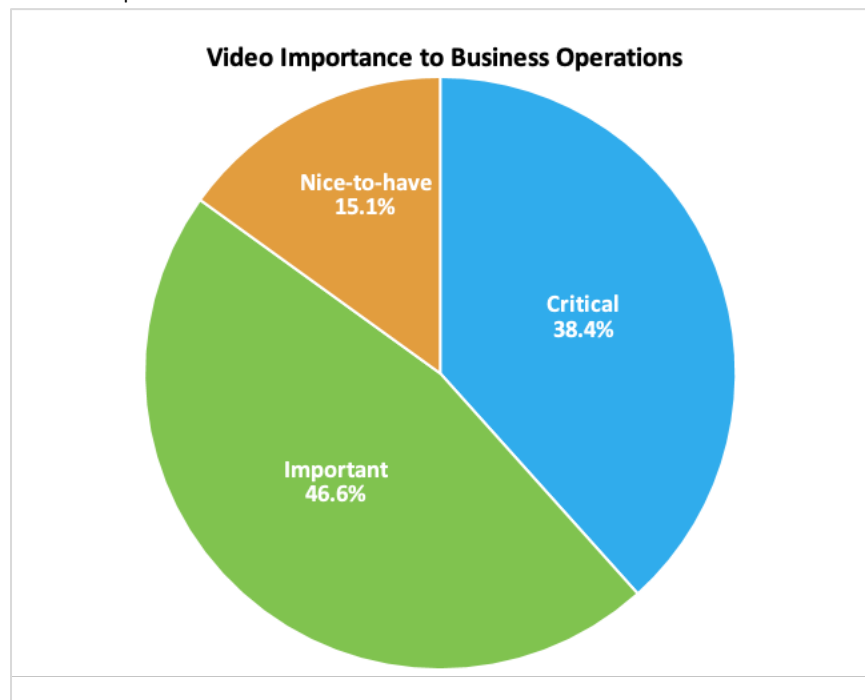

Figure 1: Trends in Video Conferencing Utilization (3Q 2021)

As of the end of third-quarter 2021, video adoption, and utilization, were still increasing for nearly 45% of companies.

Video is going well beyond simple meetings and the occasional town-hall broadcast as companies embrace its full potential to connect distributed workers as well as customers. Video is becoming as important as PowerPoint, Excel, and Word for conveying information and consuming content. Modern workplace video use cases now include:

- Webinars to present on-demand or live content to a large number of internal and/or external viewers

- Virtual events comprising multiple sessions held over one or more days. Examples include internal sales training events, HR education, customer conferences, and partner meetings
- Updates or announcements delivered via informal video recorded and distributed or broadcast live to workgroups, teams, departments, business units, or even an entire company
- Sharing of internal videos of product designs, HR information, training, or ideation sessions
- Sharing of meeting recordings and other visual content such as virtual whiteboards
- Employee access to streaming video delivered by consumer services such as YouTube

Optimizing Cloud Delivery

Beyond video, the shift toward cloud-based applications is drastically changing data flows. In the modern enterprise, cloud apps require frequent updates be pushed out to all users, often with multiple devices. Downloading of large content files stored in cloud repositories from vendors such as Box, Dropbox, Google, and Microsoft creates the potential for network overload, especially as many organizations continue to find that network infrastructure upgrades have not kept up with application demands. Enterprise resource planning (ERP), customer relationship management (CRM), and human resources management platforms from Microsoft, Salesforce, SAP, and other vendors require frequent distribution of content to end-users, with the need for guaranteed performance. And, to combat cloud threats, organizations have increasingly deployed Secure Access Service Edge (SASE) apps that require continual updates to detect new attack threats. Only through cloud application delivery optimization can organizations ensure the reliable and secure delivery of all apps and content.

Enterprise Requirements

All of the aforementioned trends are combining to radically change the way companies architect and manage their data networks. Gone are the days of designing networks according to the 80/20 rule, with 80% of traffic internal and 20% external. Now, the vast majority of network traffic heads out via Internet connection points to cloud-based apps. Video and collaboration platforms used for distributing content increasingly reside in the cloud; more than 80% of our research participants use cloud-based meetings, webinars, and virtual event platforms for employee and customer engagement. And, these apps are now critical for both internal and external communications and collaboration. Poor performance is simply not tolerable and leads to frustrated employees and upset customers. Slow performance = broken apps!

Those responsible for enterprise network services must address the following requirements:

- **Network performance –** Live events require reliable distribution of video and voice so that all recipients, regardless of location, clearly see and hear speakers, and participate in discussions. Network performance must account for location, network access type (Wi-Fi or wired), and available bandwidth.

- **Simplification** – Optimizing video and application delivery from core and cloud to edge must not introduce additional complexity for network operators but rather must provide a simple, and intelligent, means of ensuring application performance.
- **Cost minimization** – Over the years, many organizations have addressed network-related performance issues simply by "throwing bandwidth at the problem." As a result of the growth of cloud-based applications, especially video, companies have invested in additional LAN, WAN, and Internet bandwidth over the last two years, with successful companies more likely to do so, as shown in Figure 2 below. This chart, generated from our global *Workplace Collaboration: 2021-22* study of 476 companies, shows that successful companies (purple bars) are more likely to invest in expanded network services than non-successful ones (blue bars). Here we define successful companies as those that have achieved the highest ROI in terms of cost savings, revenue growth, or productivity improvements from their video investments.
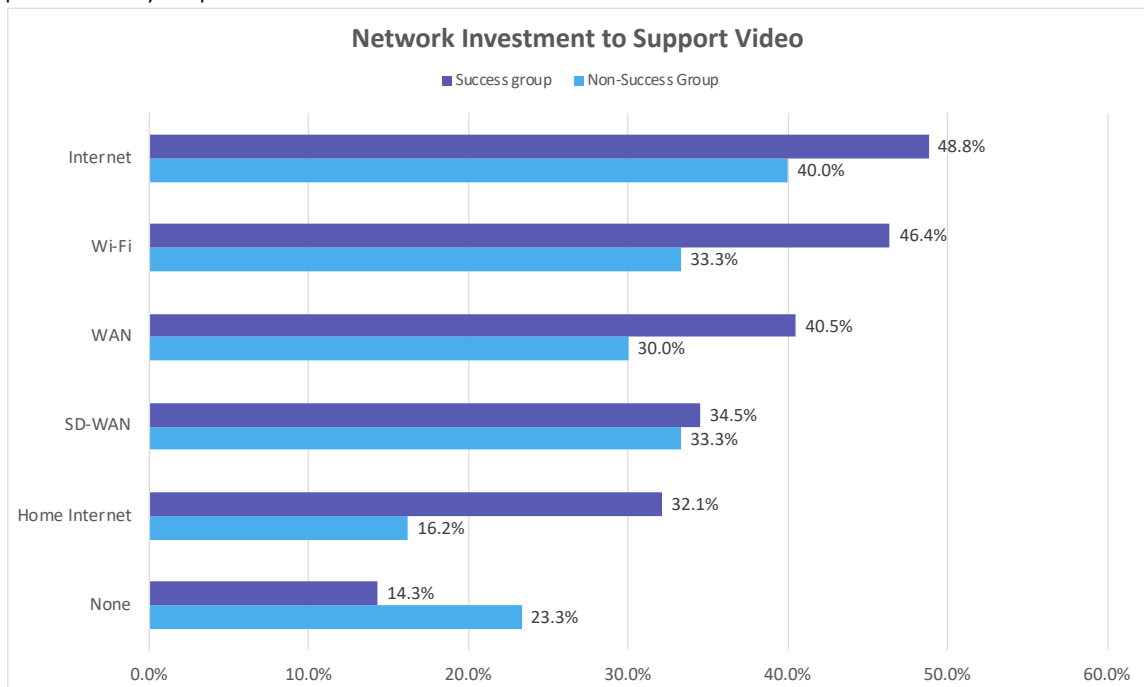
Network Investment to Support Video

■ Success group ■ Non-Success Group

Category	Success group	Non-Success Group
Internet	48.8%	40.0%
Wi-Fi	46.4%	33.3%
WAN	40.5%	30.0%
SD-WAN	34.5%	33.3%
Home Internet	32.1%	16.2%
None	14.3%	23.3%

Figure 2: Network Investment to Support Video

However, in today's world, spending more isn't always the answer. Rather, companies must spend smartly, investing in those network technologies that deliver guaranteed performance with minimal up-front and ongoing costs.

- **Application performance insights** – IT leaders participating in our *Unified Communications Management and Endpoints 2021-22* study say they most need insights into voice and video performance to effectively manage their collaboration applications. This is also important when managing broadcast events such as town halls, webinars, and virtual events. Organizations not only risk poor employee experiences, but also negative customer and prospect engagements that can lead to lost sales, customer churn, and ultimately a reduction in revenue. Additional required insights may include information

such as geographic distribution of video and applications, and bandwidth savings achieved by delivery optimization.

- **Security –** Video and application distribution must be done in a secure manner that guarantees end-to-end encryption and access only by those authorized to receive video streams. Application updates must also be delivered in such a manner that ensures validation of the distributed updates. This means implementing digital rights management, policy-based restrictions, and other capabilities to control application and video access and supporting ever-changing security standards and policies.
- **Deployment speed –** The ability to support new strategic initiatives is paramount. Upgrading networks to support emerging video and application requirements can't take weeks or months and require complex and expensive hardware upgrades. Rather, modern enterprises require rapid deployment of application performance, management, and security capabilities, via software, and the flexibility to make fast changes as application demands warrant. They also require minimal ongoing maintenance to avoid expensive support costs.
- **Integration with network optimization technologies and platforms –** Most companies already have network management optimization platforms in place for general delivery of application traffic. Integrating these platforms with tools optimized for video content and application delivery speeds deployment, reduces cost, and minimizes management complexity versus deploying stand-alone video and application optimization delivery tools.
- **Evolution to next-generation collaboration technologies –** Optimization approaches deployed today must scale to the technologies of tomorrow. This means that optimization vendors should be closely engaged with application vendors that are bringing next-generation technologies, including augmented and virtual reality, and the Metaverse, to market.

ECDNs to the Rescue

ECDNs are ideally positioned to optimize universal delivery of video, content, and applications. Absent an ECDN, every endpoint attending a live or on-demand broadcast, downloading a file, or receiving an app update would establish a dedicated connection to the data source, potentially overwhelming available bandwidth, resulting in performance issues for all. ECDNs address this challenge by enabling edge delivery of video and application data across the enterprise network, minimizing the number of connections to the original data source.

ECDNs provide the following benefits:
- **Distribution –** from one to many, reducing bandwidth usage
- **Caching –** storing content locally within an office location, eliminating the need for those wishing to receive a stream to do so over the WAN, reducing bandwidth use, and improving performance

- **Performance –** ensuring guaranteed application delivery to provide for high-quality video streams and fast download times for other application content, delivering equitable experiences for all
- **Prioritization –** enabling companies to ensure that highly important broadcasts, such as a CEO address, receive priority over other streams
- **Analytics –** enabling IT and business leaders to see both real-time and historical information on performance and reach
- **Security –** ensuring encryption and access control to video streams and application updates in accordance with appropriate security policies

Consider an example of a 100-person office with 100 Mbps of WAN connectivity, with each employee wishing to attend a live company broadcast, delivered in high-definition video. Without an ECDN, this would result in continuous demand of 500 Mbps (assuming 5 Mbps for each HD stream). This would overwhelm the local WAN link and leave no room for other content delivery such as files and app updates.

An ECDN eliminates performance issues and minimizes WAN demand by optimizing video delivery via edge delivery. In this case, the ECDN would deliver one voice and video stream to each of the 100 office locations, and then use a variety of approaches to replicate streams only to those who wish to receive them. This contrast is shown in Figure 3.
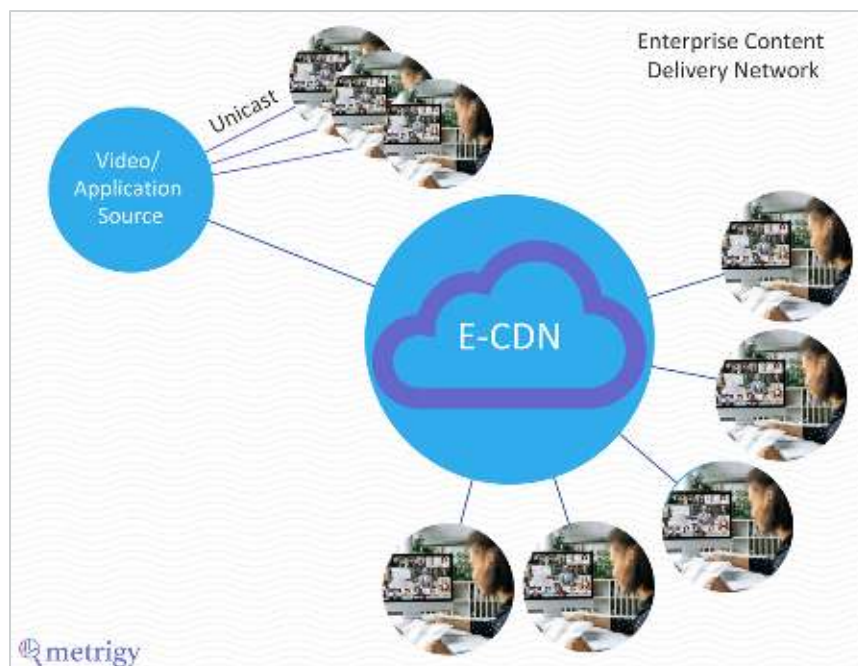

Figure 3: ECDN Overview

ECDN vendors offer a variety of technology approaches for application, file, and distribution. These include:

- **Peer-to-peer** – in which each endpoint replicates content streams to other agents on the network. Those wishing to receive content are directed by the ECDN to local endpoints, rather than to the video/application source. Peer-to-peer technologies use either agents running as software on the endpoints or a web browser
- **Caching** – in which a company deploys caches in office locations to serve as a local point for stream replication. In this model, an end-user requesting a stream is directed by the ECDN to their local cache at the edge, rather than to the video/application source. Caches may be deployed as dedicated appliances, or as software running in a virtual private cloud, or on generic hardware

ECDN Adoption: High and Growing

Metrigy has tracked strong growth in ECDN adoption over the last several years. Our *Workplace Collaboration MetriCast 2022* global study of more than 900 companies in Europe, Asia, Australia, and North America found more than 60% of participating companies are using an ECDN today (29.7%) or planning to deploy one (32.2%).

ECDNs are delivering tangible benefits; companies using them report an average WAN cost savings of 22%. This savings comes in the reduction of current or anticipated WAN spend to support increasing video and application utilization. ECDN costs vary, with an average annual per-employee cost of $9.67, ranging from a low of $1 to a high of $25.
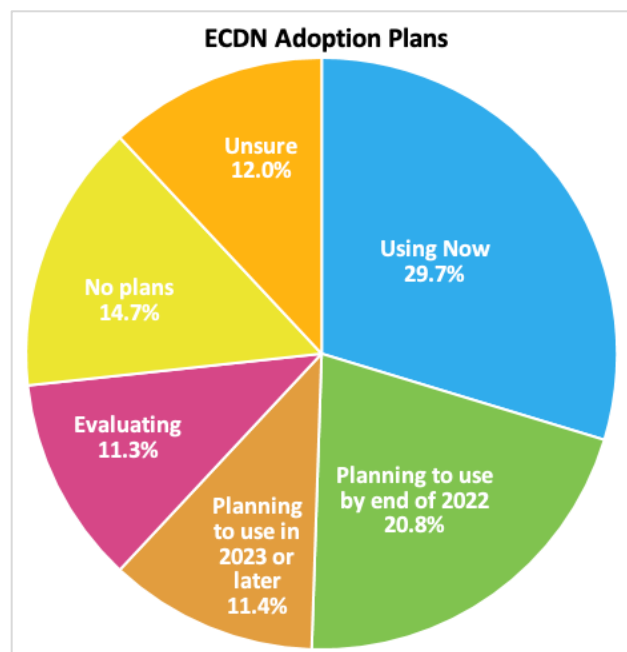

Figure 4: ECDN Adoption Trends

Of those currently using an ECDN, nearly 44% plan to increase their use of it by the end of 2022. Figure 5 shows the anticipated annual growth in spending on ECDNs over the next four years.
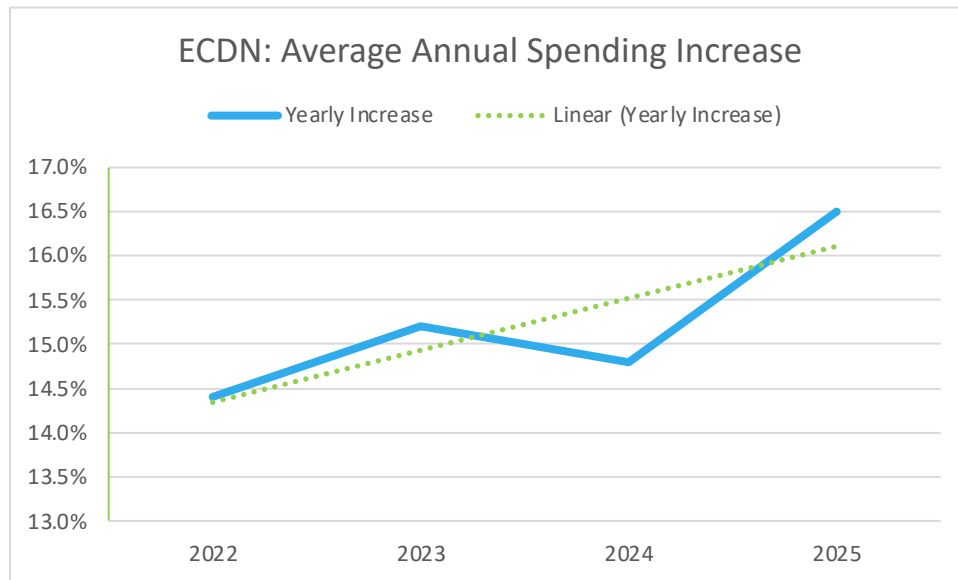
Figure 5: ECDN: Average Annual Spending Increase

Figure 6 shows annual spending increases broken out by company size.

ECDN Spending: Annual Increase				
Employees	**2022**	**2023**	**2024**	**2025**
<2,500	13.5%	13.7%	12.9%	15.0%
>2,500	17.3%	20.6%	21.5%	21.6%
Yearly Increase	14.4%	15.2%	14.8%	16.5%

Figure 6: ECDN Spending Changes - Global by Company Size

Picking the Right Solution

Those evaluating ECDN solutions have a lot of options from which to choose. Here are five areas to look at when evaluating competing services:

- **Extensibility –** The use cases of ECDNs are rapidly expanding beyond video. ECDNs must be extensible to support not only critical video applications, but also file delivery, application updates, and other content delivery use cases as they emerge, all while maximizing existing network infrastructure investments.
- **Flexible Delivery and Ease of Use –** As noted earlier, there are a number of different ways to deploy an ECDN, ranging from peer-to-peer (browser or agent-based) to using local caches. The choice of which technology to use may depend on a variety of factors, including cost, amount of streaming traffic, features, and security requirements. Buyers should look for solutions that offer the widest variety of solutions, including the ability to mix and match technologies in different offices rather than using a one-size-fits-all

approach to meet specific application and site needs. They should also look for speed of deployment to ensure the shortest time to realize ROI.

- **Manageability and Analytics –** Vendors vary in their capabilities to deliver real-time and historical insights into performance, engagement, and reach. Given the importance of video in so many organizations these days, insights into employee engagement are critical in determining effectiveness of visual communications. Manageability should also include insights into underlying network performance to enable adjustments to routing schemes, or the application of additional bandwidth as needed to overcome congestion points.
- **Scale –** As the number of video events and cloud-delivered software updates grows, so too does the need to implement an ECDN solution that can scale with the needs of the customer. An ideal solution must be able to support large numbers of simultaneous streams all with appropriate performance. And, it must support real-time scale to ensure optimal application performance no matter the scenario.
- **Partnerships and Integrations –** The video content management and streaming market is undergoing a fundamental shift as vendors in the meeting space increasingly add video streaming capabilities to their platforms. Organizations may leverage multiple video streaming platforms depending on needs and business unit preferences. The ideal ECDN provider should offer integrations into commonly used meeting and streaming platforms from leading vendors including Brightcove, Kaltura, Microsoft, Qumu, and more.

Conclusions and Recommendations

As companies shift to a hybrid work model, with the majority of applications now coming from the cloud, they must optimize their network to support increasing use of video for employee and customer engagement, and more frequent application updates. ECDNs offer a way to optimize delivery of one-to-many traffic across the network, resulting in better performance and insights into application utilization, as well as a reduction in network investment costs. ECDNs are delivering demonstrable ROI today, with an average WAN cost savings of 22% annually.

Therefore, IT leaders should:

- Evaluate ECDNs to optimize delivery of streaming traffic, including video and universal file and application delivery
- Pick an ECDN solution that offers flexible deployment models, deep analytics and insights, and that can natively integrate with a wide variety of video streaming sources
- Evaluate potential cost savings by leveraging ECDNs to optimize application delivery, thus avoiding expensive network upgrades

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