[eBook]

CDNetworks

Mastering Cyber Security & Media Delivery: A Comprehensive Guide for Elevating Online Education

The online education sector has been going through several major trends and upheavals. The shift to remote learning in the last three years, adoption of AI and machine learning technologies and the need for personalized experiences have resulted in a sharp increase in the demand for online education services. So rapid is the growth of the industry that according to Statista, the global online education market is expected to reach $325 billion by 2025, growing at almost 7%. But this also means that educational institutions will face numerous challenges in their attempts to deliver good learning experiences that meet the rising demands.

Complex Challenges in Educational Content Delivery

Succeeding in the education sector depends on effective delivery of learning content, spanning video content, multi-format course materials and interactive media. Businesses in today's education landscape have to facilitate content delivery to cater to the varied needs of students and faculty, often distributed across geographies.

There is also the challenge of ensuring smooth streaming in online classrooms in order to achieve a productive and engaging educational environment. Accommodating these requirements requires advanced video processing capabilities that can handle the intricacies of collaborative and interactive e-learning formats.

Large-scale content distribution for online learning

The students are often located in different parts of the world, with the learning material being accessible online, often in the form of Massive Open Online Courses. To facilitate this requires large-scale content distribution capabilities.

Whether it's distributing course materials, interactive media, or recorded lectures, educational institution's IT infrastructure needs to be able to efficiently, seamlessly and scalably deliver this content to its remote students.

Low latency streaming for online classrooms

In virtual classrooms and online learning environments, any delays in accessing learning material can diminish the user experience for students and even affect their progress. Live interactions, real-time collaboration, and active engagement with course materials necessitate a streaming infrastructure that ensures minimal delays. Achieving low latency is therefore critical to providing an immersive and responsive learning experience.

Video processing capabilities for collaborative e-learning

The third pillar of content delivery for educational institutions involves robust video processing capabilities. When video content is a part of the collaborative learning experience, in the form of lectures, explainers or video conferencing, the

platforms used for collaborative learning should have the ability to process video content efficiently.

These capabilities should go beyond mere playback and include features such as real-time collaboration tools, discussion activities, interactive assessments, Digital Rights Management (DRM) and adaptive content delivery.

Cyber Security Challenges in Online Education

Educational institutions have consistently ranked among the prime targets for hackers and cybercriminals due to the combination of valuable data, lack of cyber risk awareness, and significant, widespread vulnerabilities. Data from Check Point's Mid-Year Report for 2022 reveals a staggering 44% increase in cyberattacks on the education sector compared to the previous year, with an average of 2297 attacks reported weekly.

If institutions are targeted, it could have a serious tangible impact on the learning experience for students, jeopardize the organization's reputation and even derail the business altogether. Therefore, educational institutions must earnestly address the significant challenges presented by these potential cybersecurity threats.

Distributed denial of service attacks (DDoS)

We are seeing more cases of DDoS attacks targeted at educational institutions these days. A survey by the UK government on cybersecurity breaches revealed that all types of educational organizations had been affected. These included 44% of further education colleges and 30% of higher education institutions reporting the detection of DDoS attacks in the preceding 12 months.

These malicious attacks aim to disrupt online learning platforms by overwhelming them with traffic, rendering them inaccessible to students and educators. The result is a less than ideal learning experience for students, making it difficult for them to keep up their learning pace and even to submit time-sensitive tasks online.

Unauthorized account takeovers

Another common cyber threat that educational institutions have to deal with involves the compromise of user accounts. These unauthorized account takeovers usually are a result of phishing attacks, credential stuffing attacks or weak authentication practices and compromise sensitive student and institutional data. In the UK government survey, it was revealed that 45% of higher education institutions had found their accounts or systems compromised and used for illicit purposes.

Unauthorized access compromises student data and erodes trust in the security of digital education. The survey also found that six out of ten higher education institutions reported losing money or data or compromise of accounts for unauthorized purposes, during detected breaches.

Ransomware and malware threats

Ransomware and malware threats are other common threats that impact educational institutions. A 2023 survey by Sophos found ransomware attacks to be more common in the education sector compared to other industries. Lower education institutions saw 80% of them being hit by ransomware, while higher education institutions saw 79%. When ransomware and malware attacks are carried out successfully, it can result in financial losses, reputational damage and worse.

A recent example was Lincoln College, which shut down in 2022 after a ransomware attack derailed the entire school's financial standing, even as it was attempting to deal with budgetary issues due to COVID-19.

Empowering Education: Seamless Delivery & Cyber Defense Strategies

As educational institutions confront these significant challenges posed by media delivery and cybersecurity threats, implementing proactive strategies is essential to stay ahead of the curve and ensure a secure learning environment. The following strategies offer some actionable steps for educational institutions.

Fast & Reliable Learning: Optimizing Content Delivery

To ensure smooth, individualized, and high-quality online classes, institutions need a one-stop solution that can deliver educational content seamlessly while also interacting in real-time and flexibly. CDNetworks offers a comprehensive solution that combines the power of Content Delivery Networks (CDN) and Media Delivery to give you the following benefits:

Accelerate online education content delivery

By utilizing 2800+ Points of Presence (PoP) resources globally and leveraging advanced technologies, CDNetworks efficiently caches video courses and learning materials to the edge. This ensures students worldwide access learning content quickly through the nearest edge PoPs, minimizing latency and improving access speed. In the face of a surge in online student numbers, CDNetworks steps in to help educational institutions effortlessly handle the peak traffic, avoiding server overload.

Additionally, CDNetworks reduces data transfer from the origin server, easing strain on servers and network infrastructure,

and saving institutions bandwidth costs. These measures guarantee students rapid access to vital learning materials, significantly improving the overall virtual educational experience.

Minimize video delivery latency

Teaching and learning are hard enough without adding connectivity issues to the workload. Connectivity has become critical for teachers to gain visibility into what is happening in their virtual classrooms. It's also a vital tool for enabling students to collaborate and provide real-time feedback, allowing educators to improve their lessons based on student comments.

For virtual classrooms where educators and students require frequent interactive communication, such as small group teaching, CDNetworks uses a combination of RTC technology and its CDN to ensure that educators and students from around the world can engage in real-time interaction and seamless streaming without buffering delays.

For large-scale live public classes, By leveraging and optimizing WebRTC, CDNetworks Low Latency Streaming reduces live streaming latencies to below 500 milliseconds, enabling students to experience live video content in real-time and enjoy a ultra-fast and smooth online classroom experience.

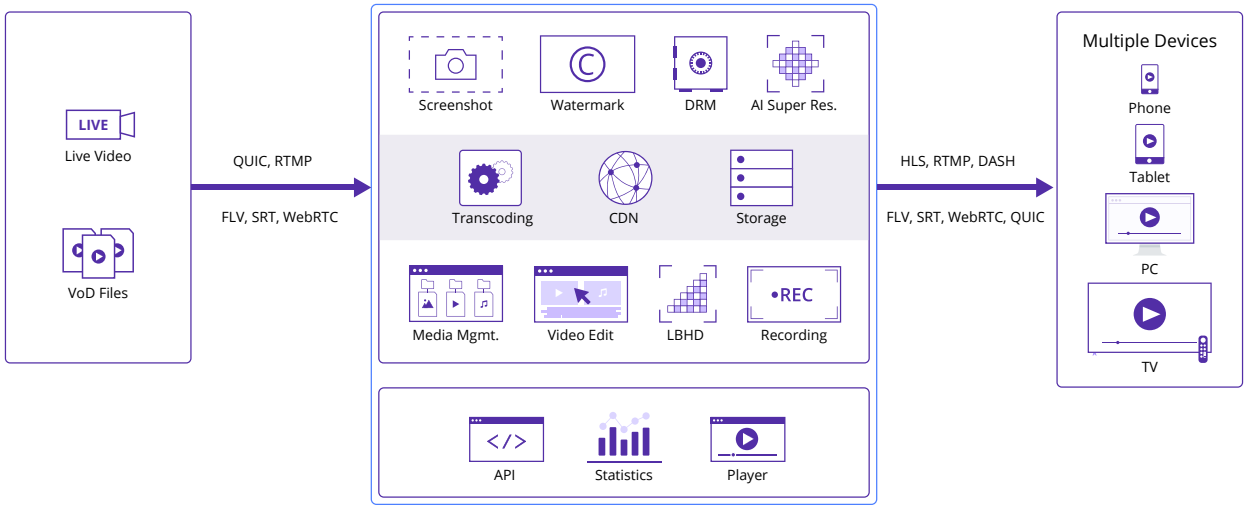
Provide powerful video processing capabilities

To provide educational institutions with the necessary video processing capabilities, CDNetworks offers media delivery solutions, including Media Acceleration Live Broadcast and Media Acceleration VoD. These solutions incorporate multi-bitrate transcoding to make the learning material accessible for almost any device and bandwidth capacity.

Additionally, they feature video editing and real-time screenshot capabilities, enabling educators to capture and record content any time. Furthermore, CDNetworks offers a variety of security strategies to protect your online educational content by encrypting it, securing its distribution, and controlling viewing access using HTTPDNS, access control, anti-hotlinking, watermarking and built-in DRM.

All these capabilities are put together, empowering educators to create, edit, and deliver high-quality, and reliable videos, ultimately enhancing the learning experience.

Deliver Best Learning Experience to Your Students



WAAP Solution Safeguarding Educational Security

In addition to seamless video delivery, institutions also need robust cyber security solutions to combat and defend against various types of threats. To help with this, and to make online education delivery safe from cyber threats, CDNetworks offers WAAP solution, which provides the necessary protection and reliability by accomplishing the following:

Ensuring uninterrupted education: mitigating DDoS

In remote education, mitigating Distributed Denial of Service (DDoS) attacks can significantly jeopardize the ability of educational institutions to deliver seamless services to students. Fortunately, CDNetworks' DDoS Protection can greatly reduce the risk with the following education-optimized features:

Multi-layer Protection: CDNetworks provides fast and effective Layer 3/4 and Layer 7 DDoS mitigation, including SYN Flood, ACK Flood, ICMP Flood, UDP Flood, HTTP Flood, SlowLoris attacks, and more. This robust defense is integral in maintaining the continuity of the learning experience.

Distributed Mitigation: CDNetworks DDoS Protection is deployed on its distributed Points-of-Presence (PoPs) positioned around the world. This ensures that DDoS traffic scrubbing is distributed, resulting in a faster and more scalable defense mechanism.

Always-On Protection: With over 20 global DDoS scrubbing centers and 15Tbps of total capacity, CDNetworks delivers always-on protection, real-time monitoring, and alert services for educational websites, applications, and network infrastructures which ensures that educational institutions can provide a reliable and uninterrupted online learning experience.

Fortifying education: preventing account takeovers

Account takeover threats in education sector often exploit automation, with credential stuffing being a common attack vector. Protecting against such risks requires a robust bot management service like CDNetworks Bot Shield. By distinguishing between legitimate student traffic and bots, as well as identifying malicious bots, Bot Shield can effectively protect educational institutions against automated attacks and fraud.

The primary defense strategy involves rate limiting, restricting the number of times an IP address can submit requests to your educational site or network. This is particularly effective against brute-force bot attacks. Additionally, abnormal behaviors on your educational site can be swiftly detected and thwarted through features like fingerprint challenges, CAPTCHA challenges, and two-factor authentication.

Bot Shield goes beyond mere protection by offering a real-time dashboard, reporting, analytics, and alerts. This ensures continuous insights into web activities, securing the online education experience and safeguarding critical assets like student transcripts, grades, and records.

Building digital fortresses: defending against ransomware and malware

Securing educational web applications from ransomware and malware threats requires dedicated measures, and CDNetworks' Cloud-based Web Application Firewall (WAF) stands as a robust defense. It shields education institutions against a spectrum of web application vulnerabilities, covering the OWASP Top 10, including injections, directory traversal, XSS, and more. Using a blend of signature-based detection and machine learning, CDNetworks adeptly identifies both known and novel attacks in education sector, providing a shield even against zero-day threats targeting educational web infrastructures.

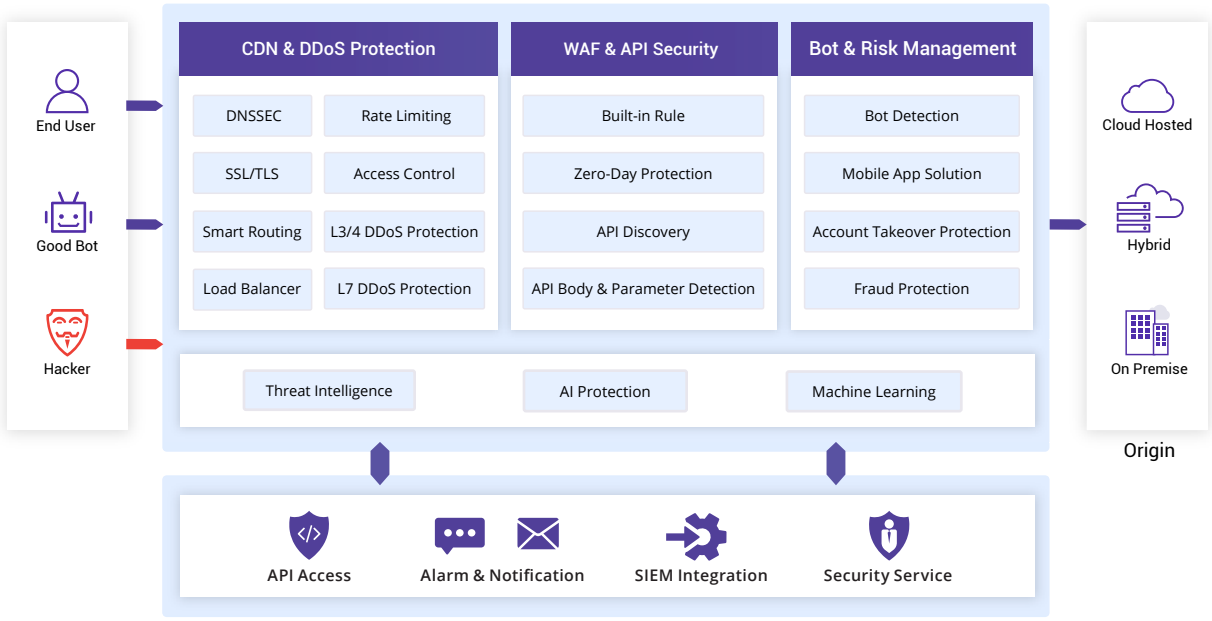
Additionally, CDNetworks' WAF empowers educational institutions to inspect all business network traffic. This ability does not only detect potential dangers such as ransomware prior to their damaging the institutions' computers, but also hinders data exfiltration attempts, thereby safeguarding sensitive data of educators and students.

Guarding education: professional security services

Specifically designed for educational institutions, CDNetworks' WAAP solution offers professional security services to strengthen the fundamental cloud infrastructure, applications, and operations of these institutions.

Supported by various reporting services, CDNetworks' Professional Security Services keep you well-informed about your cloud environment's security status. CDNetworks dedicated security team provides proactive monitoring and surveillance services, especially attuned to major events in the education sector. With reliable 24/7 continuity, these services allow educational institutions to focus on their core mission without compromising on security.

CDNetworks Comprehensive WAAP Solution



Summary

Through the implementation of these strategies, educational institutions benefit from CDNetworks' expertise in resolving media delivery and cybersecurity challenges. This enables teachers and students to experience smooth, individualized, and high-quality online classes. Furthermore, these measures empower educational institutions to establish a resilient digital environment, placing utmost priority on the safety and integrity of the online learning experience.

Abundant Resources & Capabilities

200,000+	2,800+	270+	200Tbps+	3.3B+	20+
Global Servers	Global CDN PoPs	Cities in 70+ Countries	CDN Capacity	Daily attacks Mitigated	Scrubbing Centers

Explore CDNetworks' Comprehensive Solutions

Web Performance

Deliver maximum web and application performance and reliability anywhere in the world – 24/7.

- Content Acceleration
- Dynamic Web Acceleration
- Cloud DNS+
- CDN Pro

WAAP

Keep your business safe from both malware and cybersecurity attacks with multi-layered security technology.

- DDoS Protection
- Web Application Firewall
- API Shield
- Bot Shield
- Security Services

Media Delivery

Deliver solid streaming experiences to consumers with ultra-low latency, high reliability and scalability.

- Media Acceleration VoD
- Media Acceleration Live Broadcast
- Low Latency Streaming
- Cloud Streaming Solution(VoD/Live)
- Object Storage

CDNetworks

As the APAC-leading network with over 2,800 global Points of Presence and more than 20 years of technology experience, CDNetworks embraces the new era of Edge and takes it to the next level by using the Edge as a service to deliver the fastest and most secure digital experiences to end users. Our diverse products and services include web performance, media delivery, cloud security, zero trust security, and colocation services— all of which are uniquely designed to spur business innovation.

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