Video on Demand Solution Brief
Viewer-Centric Innovation for High Quality on Demand
Content Consumption at Your Customers' Leisure

When engaging in a global market valued at $16.3B,\(^1\) with a projected CAGR of 7.5% over the next four years,\(^2\) providers understand that “demand” is the key word in “video on demand” (VOD).

As audiences increase, so do their expectations. Engaging with content on an older device, in a location with spotty service, does nothing to dampen the demand for high-quality online content. Factors such as slow startup time, low resolution, and rebuffering all lead to lower engagement, higher abandonment, poor brand perception, and a lower likelihood that a viewer will return.

Although the importance of quality has been the subject of discussion within the industry for several years, content providers committed to long-term success must now adopt a more disciplined approach toward delivery and measurement – the stakes are too high to ignore the links between video quality, viewer expectations, and business performance.

SVOD Brands Are Most Vulnerable to the Negative Effects of Buffering

Buffering is bad for business regardless of how viewers access your content. But VOD subscribers’ quality expectations outstrip those of either ad-supported or transactional models. Subscription video on demand (SVOD) services are the most vulnerable to the negative effects of buffering, particularly with regard to brand performance.

The global VOD market is valued at $16.3B\(^3\) with a projected CAGR of 7.5% over the next four years.\(^4\)

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Aside from content, quality issues pose the biggest threat to attracting and retaining subscribers and viewers of an OTT service.”

– NEW BAY MEDIA
A 2016 research study sponsored by Akamai and conducted by Sensum confirms this. Results based on Sensum’s skin conductance measurement system revealed that SVOD viewers, once engaged with their content, were the most likely to experience negative reactions to buffering and low-quality streams. Their engagement, focus, and happiness fell by 20%, 8%, and 14%, respectively.

SVOD viewers were also the least forgiving of buffering and other quality-related issues. Facial coding and implicit response testing showed poor-quality experiences led to an increase in negative feelings such as disgust and sadness – feelings the viewers transferred directly to the brand.

Perhaps the most significant finding was that 67% of subscribers would cancel their service outright if quality problems continued. SVOD providers may be able to placate angry viewers over the short term with refunds or discounts, but providers facing ongoing quality issues should be taking steps now to rethink and improve their workflow infrastructure. Viewers have options and have no issues with switching providers if another delivers a better-quality experience.

The Benefits of High-Quality Delivery

The equation is simple. Engaged viewers are the key to any monetization strategy. The higher the video quality, the more engaged the viewer. For example: Wuaki.tv, a VOD provider based in Barcelona, Spain, found that simply increasing their average bitrate from 2.1 Mbps to 2.7 Mbps (over the Akamai network) increased viewer engagement by at least 30%.

Obviously, there are cost implications to increasing your bitrate. But these costs are often negligible when placed against the higher costs of viewer abandonment caused by startup delays.

Akamai is here to provide your business with the support and tools it needs to grow – meeting the needs of your audience while leading in a hyper-competitive space.
Operating VOD workflows in the cloud can help providers manage the costs and complexity that accompany online video workflows.

**Must-Have Considerations for a VOD Solution**

Delivering VOD online comes with myriad challenges, some of which can be difficult to manage over the unprovisioned Internet. For example, failures such as startup delays and rebuffering can result in a loss of viewership and revenue. There are many requirements when building a VOD service that can successfully compete in today’s crowded marketplace, but Akamai has identified the six must-haves when striving for the highest VOD streaming quality.

**Akamai, the Trusted Leader for VOD**

Akamai continuously innovates to help you increase efficiency and manage costs while also optimizing quality, scale, and security. Our VOD solution helps you address the six “must-haves” in the following ways.

1. **Robust Origin**

Delivering quality at scale begins with a robust origin solution. VOD providers should look for a high-performance, globally distributed, cloud-based storage solution that caches content as close to their viewers as possible. Operating VOD workflows in the cloud can help providers manage the costs and complexity of delivery. Akamai’s NetStorage meets all of the above requirements, with more distributed cloud storage locations globally than any other solution on the market. Additionally, NetStorage provides dynamic content replication that ensures resiliency of content in multiple locations, by quickly replicating uploaded content to a second region.
A Superior Cloud-Based Delivery Solution Demands
Content Storage That Meets These Five Key Criteria:

- **Automatic content replication** and enhanced delivery performance that is geographically dispersed, offering the resilience needed to keep your content available, regardless of regional power outages, bandwidth congestion, and natural disasters.

- **Scalable infrastructure** that removes the burden of storage capacity planning, while supporting rapid on-demand storage needs for services such as DVR functionality for live streaming events.

- **Dynamic mapping** using Akamai’s integrated Global Traffic Management (GTM) algorithms to identify the optimal NetStorage location from which to serve the content.

- **Flexible content management**:
  - Standard file transfer protocol flexibility for broad compatibility with your systems, including FTP, FTPS, SFTP, SCP, RSYNC, RSYNC over SSH, and WGET with file management provided via Akamai’s Luna Control Center.
  - Rapid file transfers with the Aspera Upload Acceleration feature, using client-side software to provide transfer speeds that are multiple times faster than standard transfer protocols, effectively minimizing the negative performance impacts of packet loss, distance, or latency.
  - HTTP API allows you to manage your content from your in-house content management systems.
  - The use of advanced tools unique to NetStorage, including Content Management Shell (CM Shell) and Site Snapshot.

- **A customized, flexible, and cost-effective storage solution** supported by Akamai experts.
2. Reliable, Scalable, Secure Delivery

Providers can measure video quality in many ways, but the primary metrics — rebuffering, startup time, bitrate, and availability — are the most critical. These factors correlate to viewer retention.

Akamai’s Adaptive Media Delivery ensures high quality to viewers, regardless of their location or device type, and across a variety of network types. With more capacity globally than all other content delivery networks (CDNs) combined, Akamai’s scale maintains superior video quality and reliability for the largest online audiences. Additionally, Adaptive Media Delivery is origin-agnostic and capable of integrating with any third-party origin provider.

Revenue losses and lost monetization opportunities by virtue of content theft and piracy continue to plague the media and entertainment industry today. Widespread availability of online video content, coupled with factors like ubiquitous high-speed data connectivity, hyper-connected devices, and living room experiences becoming more popular — all are playing their part in the explosion of video content consumption online making it lucrative for pirates to steal a portion of the pie.

To put things into perspective, the cost of online streaming piracy will hit $52 billion by the year 2022, according to a report by Digital TV Research. Nearly 190 billion visits were made to illegal piracy websites in 2018, 17.4 billion of which came from the United States, 14.5 billion from the Russian Federation, 10.3 billion from Brazil, 9.6 billion from India, and 5.75 billion from the United Kingdom. In terms of the type of content pirated, almost 50% of visits to the pirated websites were for television shows, and nearly 20% of visitors were looking for the most recently released movie.

Security in the media and entertainment industry means securing the entire content consumption path. Any OTT or streaming company that wants to serve or distribute its content to end users must protect its content against an ever-evolving plethora of online piracy and cyber threats.

Akamai provides a robust media content security solution portfolio designed to help media organizations prevent content piracy and unauthorized access, and maximize monetization opportunities for media customers. The portfolio provides a few key capabilities including user authentication, access revocation, geo-restrictions, encryption, watermarking, and securing last-mile delivery using standard transport layer security (TLS).
Prevent Theft
Capabilities designed to prevent theft of the content asset to Link Sharing & Content Piracy

Token Authentication:
Authenticates users using tokens and session level parameters to prevent unauthorized sharing of links. Also supports browsers and platforms that don’t use cookies.

Access Revocation:
Provides an additional layer of protection by providing the ability to revoke an active video streaming session in real time that is either unauthorized or is the source of piracy.

Media Encryption:
Protects HLS video content against unauthorized viewing by applying scalable session-level AES128 encryption at the edge.

Protect Access
Capabilities to protect unauthorized content access from unauthorized users, locations, and devices

Watermarking:
A two-step watermarking solution that provides an edge function to do AB switching on the edge that is robust, secure, scalable, and works with leading watermarking solutions.

Enhanced Proxy Detection:
Bolster protection against geolocation fraud and piracy. Intelligently block requests associated with an anonymous proxy or VPN service using a fully integrated VPN and DNS Proxy detection service.

Content Targeting:
Enhance your program to comply with content rights restrictions by using geo-blocking, which restricts user requests to access content from outside a defined geographic location.

Digital Rights Management:
Support delivery of DRM encrypted video content.

Secure Communication
Capabilities to secure communications with users over HTTPS, using TLS

Standard TLS:
A secure delivery feature that encrypts data in transit using TLS to prevent hijacking or snooping. It supports custom domains and provides performance at scale by delivering HTTPS traffic with similar offload, throughput, and latency as HTTP traffic.

Enhanced TLS:
A secure media delivery option that provides HTTPS delivery using a custom certificate with added security measures, including physical security guarantees for those that need to maintain PCI compliance.
Akamai also offers add-on services that enhance connectivity between video content stored in centralized public cloud platforms or customer-managed infrastructures and the Akamai Intelligent Edge Platform. These include:

**Cloud Wrapper:** For providers that store their content in the cloud, this solution maximizes offload and protects origin infrastructures, delivering significant cost efficiencies. The service provides a highly efficient custom caching layer that wraps around centralized cloud infrastructures, shielding the origin from high volumes of requests and spikes in traffic.

**Direct Connect:** This provides private connectivity between a provider’s data center and Akamai, enabling those who manage their own origin infrastructure to achieve reliable, secure, and cost-effective first-mile transit for their online video.

Captivating your audience starts well before the delivery of high-quality videos. The journey begins at the electronic program guide (EPG) with high-quality digital images. Research from Netflix shows that viewers abandon a service if they don’t find a show they want to watch after 60–90 seconds of browsing (10–20 titles across 1–2 screens). So that means that the EPG better perform flawlessly, no matter which device the viewer is using, regardless of their connectivity profile.

Akamai’s **Image Manager** makes image optimization simple. It is an easy-to-use, automated solution that optimizes each image for the best combination of size, quality, and format tailored for each viewer and device. It also offloads the transformation of derivative image assets to the cloud.

**Responsive HTML5 Media Viewer:** Simply upload digital images, group them together as a collection using an ID, and display them via a mobile-aware HTML5 interactive 360° viewer for customers to seamlessly explore image galleries or slideshows, leading to increased viewer engagement.

**Perceptual Quality Algorithm and Preview:** Lighten the weight of digital images while maintaining the best visual quality by intelligently calculating and applying a precise degree of compression for the maximum level of byte reduction that is imperceptible to the human eye.

**Auto-Convert Image Format:** Automatically detect and convert online images to software-specific image formats to take advantage of the advanced levels of compression that WebP, JPEG-XR, and JPEG 2000 can offer for customers on Chrome/Android, iOS/Safari, and IE/Windows software.

**Auto-Resize for Mobile Screens:** Automatically resize website images for mobile devices based on viewport width so that mobile users are not over-downloading images that are larger (and slower) than needed to fit their screen size.
**Easy and Flexible Integration:** You can use any web-accessible storage location, and Image Manager is also compatible with your existing publishing and purging workflows, giving you full control over your digital image assets and infrastructure decisions to gain maximum benefit from your CDN solution.

**Dynamic Policy-Based Artistic Transformations:** Set image-level policies using query string parameters (QSPs) to speed up code development. Say goodbye to admin consoles.

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**3. Dependable Security**

Hosting your content online via a website provides an unprecedented level of contact with viewers. In addition to hosting videos, your website is also a place where business information (login, credit card, etc.) can be easily accessed by third parties – often using automated tools known as “bots.” For many organizations, bots represent 50% or more of their overall website traffic, from good bots engaged in essential business tasks to bad bots conducting fraudulent activities. Regardless of business impact, bot traffic can reduce website performance for legitimate users and increase IT costs. Organizations need a framework to manage their interactions with different categories of bots and the impact that bots have on their business and IT infrastructure.

**Bot Manager** provides organizations with a flexible framework to better manage the wide array of bots accessing their websites every day. It offers the abilities to identify bots as they first arrive, categorize different types of bots, and apply the most appropriate management policy for each category. This allows greater control over how each organization interacts with different types of bots, maximizing business benefits while minimizing negative business or IT impacts.

**Bot Directory:** Continuously updates Akamai’s directory of more than 1,400 known bots in 17 categories that commonly interact with our customers.

**Customized Actions and Policies:** Creation of custom bot signatures and categories to identify specific bots, and assignment of a wide range of actions to take to manage different types of bots (such as alert, block, delay, serve alternate content) based on parameters such as URL, time of day, or percentage of traffic.

**Unknown Bot Detection:** Detection of traffic from unknown bots through intelligent techniques that include behavior analysis, browser fingerprinting, automated browser detection, HTTP anomaly detection, high request rate, and more.

**Bot-Centric Reporting and Analysis:** Real-time and historical reporting on bot traffic, from high-level statistics for insights into bot trends, to detailed analysis of individual bots or segments of your bot traffic with sampled HTTP requests and responses.
Since websites and applications are accessible from the Internet, they offer a relatively simple entry point to access valuable data and are often subject to attacks. Akamai’s **Kona Site Defender** protects websites and applications from downtime and data theft caused by opportunistic and targeted web attacks, as well as DDoS attacks. Akamai’s visibility into 15% to 30% of the world’s web traffic provides intelligence into the threat landscape that allows us to constantly evolve rules to thwart the latest attacks. Our expert services team is available to work with customers to integrate optional components to maximize security and enable organizations to conduct their business without constantly fearing intruders.

**Business Benefits:**
- Reduce risk of downtime, defacement, and data theft
- Protect revenue, customer loyalty, and brand equity
- Maintain performance even under attack
- Reduce costs from spikes in attack traffic
- Reduce capital expenditure on security hardware and software

**Technical Benefits:**
- Integrate easily with existing IT infrastructure and DevOps
- Get deep threat insight visibility
- Maximize uptime and availability during DDoS attacks
- Defend web application infrastructure
- Protect against direct-to-origin attacks
- Scale on demand
- Leverage best-in-class application security expertise

Broadcasters employ an army of freelancers and third-party companies to make and deliver content. These can include video editors, post-production houses, and OB/SNG/ENG providers, all of whom need access to internal business and collaboration applications to perform their necessary assignments. VPNs (virtual private networks) can provide them with access to unnecessary information, systems, and networks. Big picture: Today, talent is widely distributed and remote, and they need to access applications to do their jobs.

Akamai’s **Enterprise Application Access (EAA)** provides simple and secure access and delivery of enterprise applications. It gives individual access to internal applications on a per-app basis without providing full network access, thus improving an organization’s security posture by reducing their attack surface and not allowing lateral movement within the network. EAA is a cloud-based solution...
that is simple and quick to configure, manage, and maintain. IT organizations get a centralized managed solution that does not rely on traditional remote access technologies (VPNs, VDI, RDP, or proxies) or deploying hardware or software within the enterprise infrastructure.

With EAA, there is no direct path into your applications. Instead, EAA dials out a secure, mutually authenticated TLS connection and brings the application to the user. Since there are no tunnels, there is no path for malware to land inside your network and potentially spread to sensitive or privileged systems. All user connections are stopped in the cloud, terminating on secure proxies while applying strong authentication and security controls. You can add your own security controls for increased protection of highly sensitive applications.

Broadcasters are also prone to hackers and attacks by malicious actors. They have three classes of assets that are worth stealing: viewer PII, premium video files, and executive communications. With the shift from advertising to subscription-based monetization, broadcasters and native OTT providers must now collect and secure customer PII, including payment card information (as these profiles have significant value). Likewise, the era of peak TV means content piracy of hit shows makes exfiltration of these files extremely lucrative for hackers.

Targeted threats such as malware, ransomware, data exfiltration, and phishing are increasing in volume as the enterprise threat landscape evolves. Simultaneously, malicious actors are getting better at circumventing traditional security approaches.

**Enterprise Threat Protector (ETP)** leverages real-time Akamai Cloud Security Intelligence and Akamai’s proven, globally distributed recursive DNS platform to proactively identify and block targeted threats such as malware, ransomware, DNS data exfiltration, and phishing. Security teams can centrally manage and enforce unified security and acceptable use policies in minutes for all employees, protecting content and operations from security threats.

**Significantly improve security defenses** by proactively blocking DNS requests to malware and ransomware drop sites, malware command and control (CnC) servers, and DNS data exfiltration and phishing domains based on unique and up-to-date threat intelligence.

**Instantly add protection without complexity or hardware** with a 100% cloud-based solution that can be configured and deployed in minutes (with no disruption for users) and rapidly scaled.

**Simply reduce risk and improve security** for off-network laptops without using a VPN with the lightweight Enterprise Client Connector, which enforces your security measures and acceptable use policies.

**Easily reduce management time** by administering security policies and updates from anywhere in seconds to protect all locations.
Quickly and uniformly enforce compliance and your acceptable use policy by blocking access to objectionable or inappropriate domains and content categories.

Immediately increase DNS resilience and reliability with Akamai’s carrier-grade global intelligent platform.

4. High-Quality Playback

As an extension of our VOD solution, Akamai’s Adaptive Media Player (AMP) is designed to deliver the best viewer experience every time, on every device. Serving hundreds of millions of viewers monthly, AMP is trusted by the world’s top publishers to deliver high-quality, cross-platform video at scale.

The move of video consumption to online channels has created a newer set of challenges around monetization of content. Content providers can no longer reach their audiences through a single viewing device and single viewing experience; viewers are using an ever-growing array of devices, each with an ever-changing ad-blocking landscape. To continue to monetize effectively, content distributors need to become more efficient in targeting their viewers and generating revenue from content.

Akamai’s Live to VOD Asset Creation capability is a quick and easy way to create clips for use cases such as Catch Up TV, highlight creation, and content time-shifting by converting Live and 24/7 simulcast streams into stand-alone VOD assets.

Akamai’s Dynamic Ad Insertion (DAI) capabilities utilize market-leading technology to dynamically serve targeted ads at the viewer level, resulting in an overall improved viewing experience and additional opportunities for monetization.

Server-Side Implementation: Allows for improved mitigation of ad blocking while serving targeted ads at the viewer level, and providing clickable and dynamic overlay ads to enhance engagement.

Frame-Accurate Signaling: Coupled with server-side stream manipulation, allows for delivery of seamless and frame-accurate transitions between ads and content.

Conditional Blackout and Program Replacement: Enables limitation or replacement of content for specific audiences without the need for additional encoding or packaging.

Near Real-Time Analytics: A telemetry API provides reporting into real-time statistics on user engagement, ad server performance, and key metrics essential for optimizing the revenue from your streams and in line with IAB specifications.
Akamai’s DAI solution is platform-agnostic and capable of working with most third-party ad-decisioning providers. Integration with Adaptive Media Delivery provides a highly robust media distribution solution to provide the highest-quality viewing experience for their live content, while targeting viewers at scale.

5. Visibility and Insight

Visibility into the quality of video performance is critical to uncovering insights that impact the viewer experience. Akamai’s Media Analytics is a cloud-based, self-service solution composed of two key modules that help content providers get a pulse of their business through data and insights critical to engage, retain, track, and further monetize their online audiences.

**Quality of Service (QOS) Monitor** offers real-time visibility into the quality and performance of video streams, as content is streamed live, through key metrics that include startup time, rebuffer rates, audience size, bitrates, availability, errors, and more.

**Audience Analytics** provides a comprehensive overview of key trends and audience behavior as they engage with video content. Customizable Business Summary and Quality of Service dashboards give a snapshot of factors influencing the video experience.

To complement client-side visibility, Akamai’s Media Reports provide server-side insights into traffic, visitors, downloads, and video streaming performance to track content and make sure it’s reaching the viewer with the highest quality for the best streaming experience. Media Reports provide significant enhancements in monitoring the performance of their video operations and close the reporting gap required by businesses to stay relevant and differentiate their services to their online audiences.

**Server-Side Monitoring:** Gain visibility and insight into first-mile and streaming performance through server-side reporting for key metrics that impact your viewer’s experience and overall video operations. Track traffic, visitors, URLs, and more for live, live linear, and on-demand content.

**API Access:** Access your data with an API to use in any other desired user interface (UI).

**Intuitive and Easy UI:** Manage and track your data using an upgraded dashboard that features easy downloads to .pdf formats and recurring email setup.

**Customized Reporting:** Use the many dimensions and metrics offered by Media Reports to quickly drill down and discover major trends and engagement levels by your audience. Or customize your data in ways that allow you to easily access and share metrics that only matter to your business.
Your website’s user experience directly affects your business outcomes, especially if it aids new subscriber acquisition or ad revenue, or hosts your video content. The challenge with site performance is quantifying “how much” it impacts your digital experience – balancing page speed against site changes for the highest business outcome and best customer satisfaction. Akamai’s mPulse provides visibility into the immediate impact of user-perceived performance on session length, engagement, revenue, and other key business metrics, in addition to contextual intelligence and easy-to-understand visualizations for effective decision making.

**Real-Time Performance Data and Insights:** Get actionable insights from real-time performance data across all your web and mobile users, for visibility into website elements that are impacting individual user experiences, for identification of bottlenecks or single points of failure.

**Patented “What-If” Feature:** Understand the relationship of performance and user engagement. mPulse combines 100% of real-user data with advanced predictive analytics for visibility into trends impacting your website, as well as into the unique relationship between performance and successful revenue and conversion outcomes.

**Full Single Page Application (SPA) Support:** Get support for all SPA frameworks – even custom.

**Control Marketing Campaigns in Real Time:** Using Google Analytics, Adobe Analytics, or IBM Digital Analytics, combine performance and marketing analytics to visualize and adjust campaigns in flight.

**Conversion and Activity Impact Scores:** Understand how web page performance impacts conversions and session length.

**Management of Third-Party Resources:** Understand the performance impact of all third parties and third-party vendors, then take action to optimize.

When preparing the season finale of a hit show, content providers can expect large audiences. To ensure your audience doesn’t miss a second of action, your end-to-end architecture must be ready for future demand and sudden peaks in visitor traffic. Ensure that every viewer is satisfied – and doesn’t jump to your competitor – with Akamai’s scalable, global performance-testing platform, CloudTest.

Akamai CloudTest helps you stress test your website and OTT architecture from end to end. Offered as a managed service, it delivers testing at any scale via the cloud in production or inside a pre-production environment. You’ll benefit from the expertise of Akamai’s performance engineers to create, manage, and report the findings of your tailored test plan. Testing capabilities include test video workflows for live and on-demand streams, web and mobile apps, APIs, databases, and web services, all with full support for continuous integration. Real-time analytics and customizable dashboards provide actionable intelligence, allowing for root-cause analysis while tests run, and granular control to dynamically ramp tests up or down. When paired with Akamai’s real-user monitoring service, mPulse, testing scenarios can be scripted based on real-user traffic patterns, allowing for the most realistic and accurate testing.
6. Expert Services and 24/7 Support

Finally, it's critical to surround your operation with the right team of dedicated experts to help plan, monitor, and support your service from the ground up. Our Services and Support team gives you access to our globally distributed media experts who are an extension of your staff. They provide trusted advice and assistance from initial deployment to ongoing support, maintenance, monitoring, and management. Dedicated, round-the-clock point of contact minimizes the impact of time-sensitive issues.

**Video on Demand Solution**

- **Origin**
  - Robust Storage
    - NetStorage

- **Delivery**
  - Reliable, Scalable, Secure Delivery
    - Image Manager
    - Adaptive Media Delivery
    - Manifest Manipulation

- **Secure**
  - Dependable Security
    - Bot Manager
    - Kona Site Defender
    - Enterprise Threat Protector
    - Enterprise Application Access

- **Playback**
  - High-Quality Playback
    - Media Acceleration
    - Adaptive Media Player

- **Visibility & Insight**
  - Analytics
    - mPulse
    - CloudTest
    - Media Analytics
    - Media Reports

- **Services**
  - Expert Services & 24/7 Support
    - BOCC Services & Support

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**SOURCES**