

## Executive Summary

The pay TV and Internet service provider market has been a whirlwind of change in that last two years. The confluence of two developments: the growing popularity of over the top (OTT) videos from companies such as Netflix, Hulu, and YouTube and TV everywhere (TVE), which is the ability to stream video on multiple devices, including the iPad and Internet-ready TVs, Blu-ray players and game consoles.

These market dynamics have created fundamental changes in industry structure. Established players and new entrants are working to develop new business models and find answers to their questions on how to respond to the threats and opportunities of next-generation video in an environment of rapid technological change and uncertainty.

Fortunately, for service providers, Azuki has taken a fresh approach to this problem by delivering services that enable service providers (SP) to offer OTT/TVE services with minimal change in existing infrastructure and back-end systems and doing so with compelling business cases.

### Key Takeaways

- Azuki is well positioned to become the de facto standard for OTT/TVE implementations for SPs. This is a large potential market.
- OTT/TVE implementations for SPs are a large potential market: US cable operators alone have spent \$12–15B per year for the last 5 years.
- Azuki's simple approach to the design hits the sweet spot of the market by providing SPs with the ability to move into the next generation of video delivery and keep their existing infrastructure and workflows.
- The company has a unique approach that allows customers to reuse and protect existing infrastructure investments while moving into the next generation of video delivery.

## Market Dynamics

### OTT/TVE: Here to Stay

When the OTT providers first started streaming video to PC in 2007, the reaction was positive but not overwhelming, and its overall success as a delivery device was not assured.

Many factors, such as delays, image defects, audio synchronization issues, spotty bandwidth availability, and a limited content library, made it only appealing to tech-savvy early adopters. However, having an unlimited amount of video for a fixed price and greater choices than what most video-on-demand (VOD) services offered by cable companies and Internet-based search/discovery contributed to its appeal.

Today, the success of OTT video is not being disputed. Netflix now is the largest pay TV provider in the US with more than 20M subscribers. Video viewing is 50% (Netflix is 30% of that total) of the peak Internet traffic in North America<sup>1</sup>. Worldwide, video will comprise 60% of all global Internet traffic in five years.<sup>2</sup>

Additionally, the popularity of tablets (iPads primarily), a category that has only existed since April 2010, has also fueled the growth of TV everywhere viewing.

### Consequences of OTT and TVE

One of the key, and often overlooked, aspects of these market dynamics is that the consumer has much more control in the equation now than in the past. Before OTT and TVE, the cable company pretty much decided which content would be available and when and controlled the networks' and the customers' premise boxes. Now, consumers have realized that they can get far greater choice in what, when, how and where they view content, and they are starting to demand that the SPs deliver these options.

OTT/TVE is creating significant challenges for SPs. Video traffic is bandwidth intensive and quality of service (QoS) sensitive; consequently, SPs are being forced to invest in network capacity on a faster schedule than they anticipated. At the same time, SPs are facing the prospect of being shut out of revenue opportunities as consumers are subscribing with OTT providers and are expecting the SP to deliver the content over the broadband data connection at no additional charge.

Service providers are also facing business challenges as consumers see OTT as an alternative to premium pay TV services and a way to reduce their monthly bills (cord shaving) or even cancelling service altogether (cord cutting). Currently, this is not a significant threat as the number of people who are cancelling their service<sup>3</sup> is 1–2%. However, there is potentially a bigger problem for SPs; 56% of the respondents have some interest in dropping cable service.

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<sup>1</sup> Sandvine

<sup>2</sup> Cisco Systems VNI

<sup>3</sup> Adweek/Harris Survey

### **Service Providers' Responses to OTT and TVE**

Service providers have had an uneven relationship with OTT. Initially, they ignored it. It was presumed that the quality of the playback and meager selection jeopardized the success of OTT. A few things changed: OTT distributors improved the quality of the playback by upgrading from progressive download to adaptive bit rate (ABR) streaming, and they added to their libraries and even started obtaining rights to original content (both Netflix and Hulu have done this). The introduction of the iPad added fuel to the proverbial fire; consequently, SPs are scrambling to figure out how to deal with OTT. All are looking at how to most efficiently handle the influx of traffic and how to increase revenue/average revenue per user (ARPU). As a result, almost all SPs have offered or are working on their own TVE offerings, and many are looking at expanding access to their content libraries through an alternative OTT offering.

### **Obstacles to SP TVE/OTT Offerings**

Service providers face multiple obstacles to successfully offer TVE/OTT:

- Security/DRM: One the biggest issue that SPs must address is content security. If they cannot assure content owners that the content will be protected from unauthorized viewing/copying/redistribution, then the content owners will withhold distribution rights.
- Existing broadband infrastructure: MSOs have HFC that is specialized/optimized for carrying linear TV and is costly to upgrade in terms of capacity and new services. Many MSOs spent significantly in infrastructure upgrades to offer VOD, and they do not want to repeat this scenario. Their long-term plans are in place to move to an all IP network, and they want to make sure any new initiatives do not complicate those plans. (Telcos have an IP infrastructure with DSL, which has bandwidth limitations.)
- Existing backend content management, DRM, billing and advertising systems: SPs have significant investment in these systems and are not eager to make massive changes to them.
- Service providers' brands are about delivering high-quality video, and they do not want to take a chance on providing low-quality, unmanaged OTT video.
- SPs want to offer TVE to as many devices as possible without creating a management nightmare.
- Uncertainty about the business model: SPs are being cautious with capital budgets, and there is lack of real world data on how to calculate return on investment (ROI). This higher level of uncertainty can slow down the approval process for OTT/TVE projects.

### **Challenges in Implementing OTT/TVE**

Although OTT/TVE provides greater choices for viewers, flexibility in time and place of viewing content, and a better search/discovery interface, it is not integrated with existing linear viewing. Consequently, permissions, content libraries, users' experiences and navigation are inconsistent across platforms. From the SPs' standpoint, OTT does not provide the manageability, security, monetization opportunities or analytics that they want:

- To reach all devices all the time, delivery over the Internet (unmanaged networks) must be assumed. However, unmanaged and diverse networks create problems with large differences in availability, quality, speed and consistency.
- Delivering video to all devices is highly desirable from a marketing standpoint, but there is a large difference in operating systems, screen size, resolution, processing power, and security across these devices. Providing consistent security, quality of experience and user interface is very difficult.
- Multiple streaming options, formats and network speed mean a large number of potential permutations to support.
- Technological change: New devices, operating systems and ABRs will be introduced (MPEG-DASH is currently in process), and the OTT/TVE delivery systems will need to incorporate the new devices and technologies with minimal disruption.
- The ability to incorporate ad serving or other billing options to enhance revenue generation.

To meet service providers' OTT/TVE requirements Azuki System introduced the Azuki Media Platform (AMP), a managed and optimized OTT video delivery framework.

## Azuki's Managed and Optimized OTT/TVE Solution

Azuki sets itself apart by taking a novel approach to the OTT/TVE problem. It set out to deliver OTT that SPs would be comfortable deploying. To meet this objective, Azuki added *management* and *optimization* to OTT. Management is a key component because OTT is delivered over a combination of managed and unmanaged networks (though it is primarily over the Internet which is unmanaged), but the SP needs to be able to deliver content on a par with managed networks. Therefore SPs want OTT that can deliver the same security/content protection, user interface/content access, monetization choices, and analytics as their legacy network. Optimization is a key component to providing the availability, reliability and low latency that is needed to deliver a competitive product consistent with the demands and expectations of SP customers.

### Managed OTT/TVE Concepts

Azuki's key concepts in its managed OTT/TVE delivery approach are:

- **Normalization and Standardization of Devices.** Normalization enables Azuki to provide consistent levels of content protection, management and analytics. One of the trickier factors in doing multiscreen implementation is consistency, especially in content protection because of the large number of permutations with devices, operating systems and processing power. Given these parameters, Azuki decided to normalize to STB functionality as the common denominator. It may seem regressive to standardize on an old technology but the approach makes sense because content owners' major concern is securing the programming from unauthorized viewing. Content owners are accustomed to the level of security provided by hardware-based

DRM and are unlikely to allow distributors to use a scheme that is significantly less secure. The other advantage is that it simplifies the integration with backend CMS, DRM and billing systems. Providers can continue to utilize the existing systems and current workflows to manage content delivery to all devices.

- **ABR Standardization.** This greatly simplifies media management and content control. Only one format needs to be packaged for all devices and bit rates. Azuki handles differences in device capability via the client software.
- **Content Protection.** Merdan-audited, studio-approved universal content protection for multiscreens.
- **Analytics.** Real-time visibility through metrics and analytics on content consumed by the user (for example, ads, and video) with correlated usage metrics based on quality, content, device and user preferences.
- **Monetization.** Built-in multiple monetization schemes, including subscription, rental, purchase, and advertising (with ad insertion).

### Optimized OTT/TVE Key Concepts

Azuki's key concepts in its Optimized OTT/TVE delivery approach are:

- **Leverage Multiple CDNs** for higher reliability and scalability and geographic reach.
- **Real time monitoring and switching** between CDNs for auto-failover, load balancing, consistent performance and low latency/fast start.
- **Bandwidth Optimization** that delivers highest quality video possible given conditions of the network, device capability and SP policies on bandwidth.

### Architectural Components

Azuki started out with design criteria developed from the perspective of SPs and developed a distinctive framework and architecture. Architecturally, it separated the content-related functions from the delivery mechanisms and client device management. Its solution separates media preparation (ingest, transcoding, DRM wrapping and segmenting), media management (preparation, scheduling, authentication, key management, and publishing), transport management and device management into “containers” (functional blocks with a common external interface). Azuki also normalizes the functionality of the client devices with the Azuki Media Platform, which operates as the gateway/proxy server to the OTT network and mediates between the content, the content management tools, and the consumer-owned (unmanaged) devices.

### Design Criteria

When Azuki set out to design the platform, they used the following criteria:

- Single solution that integrates VOD and LIVE content on all mobile OS silos and screens.
- Single rights management system (so users can get their content from one source and share across devices without re-authentication).
- Deliver end-to-end, “studio-grade” content security across all devices, including consumer-managed devices.
- Provide network performance and QoE equivalent to a managed network, across all networks and devices.
- Provide multiple monetization options on all consumer devices.
- Dynamically collect (real time) metrics from all devices to enable business and operational analytic reports.
- Enable integrated marketing and social network interactivity on all screens.

## Architectural Components of the Azuki Media Platform™

### Preparation Processor

The preparation processor provides a single interface and common workflow for preparing the media for streaming: ingestion, transcoding, segmentation, content protection (DRM wrapping) and uploading. It interfaces to existing ingest, transcoding, DRM, billing, scheduling systems or can be managed as a standalone solution.

### Media Manager

Based on the content, the media manager performs media preparation, scheduling, and publishing. The media manager also authenticates based on the device, user and content rights; it also collects and reports run-time analytics.

### Content Controller

The content controller is the traffic cop that handles client requests, licensing, bit rate adjustments and content routing. It utilizes and leverages multiple CDNs. It performs real-time monitoring of connection at CDN level and will switch CDNs midstream if it detects congestion or delay. It supports intelligent client-side caching and preloading for quick channel switching.

### Media Client

The media client is a critical piece in the solution as it provides universal client functionality. It ensures consistent, studio-grade encryption and authentication on all devices. It is also tightly integrated with the content controller to dynamically manage bandwidth, collect and report data for analytics and interfaces with the ad services to support the placement of targeted advertising.

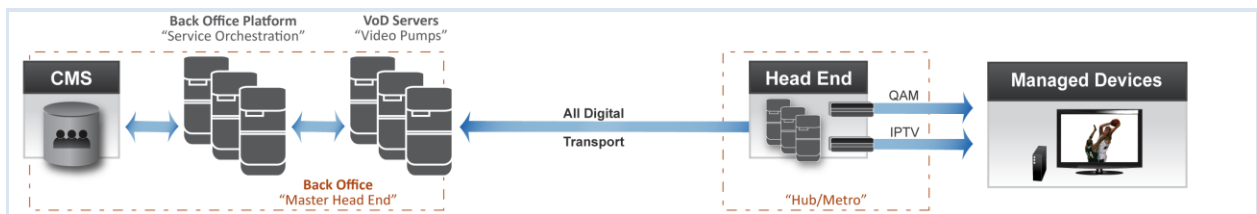


Figure 1. Service Provider Network without TVE

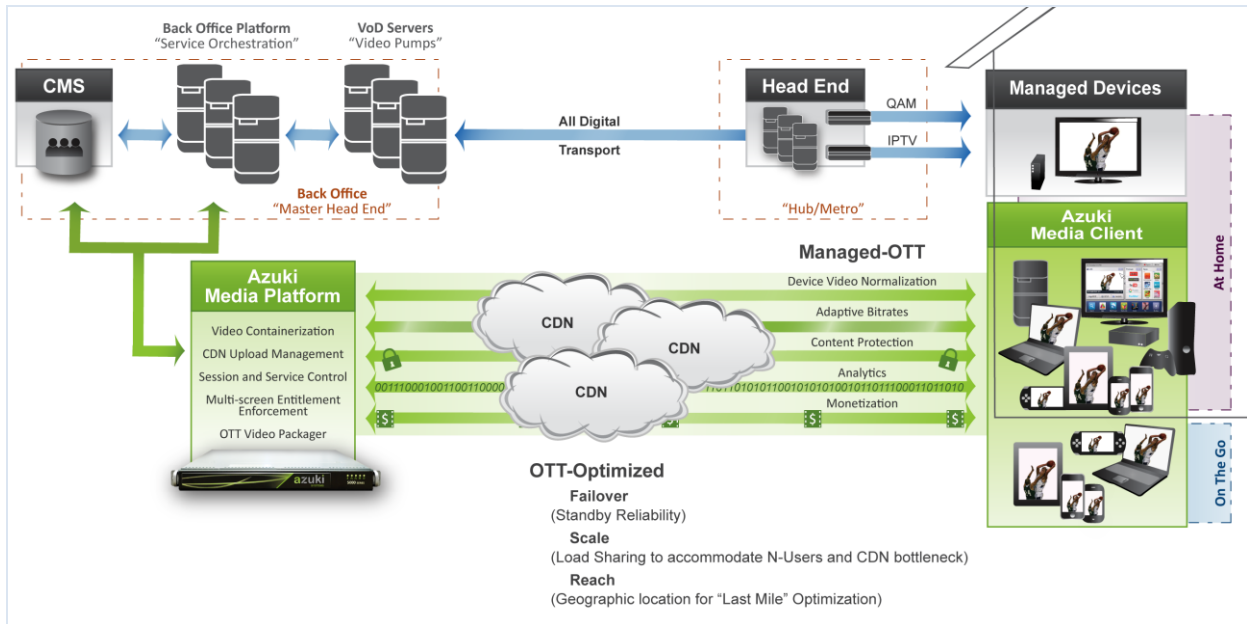


Figure 2. Service Provider Network with Azuki Media Platform for TVE

## Features, Functions and Value Proposition

Azuki features can be characterized in three categories:

### Managed Delivery

- Single package handles DRM enforcement, analytics, and adaptive bit rate delivery across multiscreen operating systems and provides studio-grade security across all devices.
- Cross-platform entitlement enforcement: multiscreen entitlements are managed and enforced allowing purchase, rent or view-free-with-advertising monetization models.
- Real-time metrics and analytics on content consumed (for example, ads and video) by the user with correlated usage metrics based on quality, content, device and user preferences.

### Network Optimization

- Adds automated controls to standard adaptive bit rate streaming, including dynamic segment size management based on device, network type, which optimizes bandwidth consumption and latency.
- Leverages, monitors and manages CDN performance and switches between CDNs to deliver high availability, low latency and scalability.

### Value Proposition

- OTT with content protection and QoE of a managed service.
- Rapid deployments with minimal changes to existing networks.
- Investment protection for legacy back-end systems and compatibility with future network architectures.
- Enable two-sided business model.

- Manages session shifting between different types of devices, which enable smooth viewing of content across multiple screens on different networks.

### **Cross Platform Integration**

- Integrates with existing back-office infrastructure (billing, subscriber management, content management and storefront)
- Integrates with existing CMSs, transcoders, rights management systems, ad networks, user databases and multiple CDNs.
- Works across the entire workflow: ingestion, transcoding, segmentation, DRM wrapping, upload to CDN.

### **Differentiation and Value Proposition**

Azuki's differentiating capabilities include:

- End-to-end entitlement control per subscriber, device and content
- Dynamic multiscreen ad insertion
- Extended HTML5 compatibility for monetization and security
- Detailed consumption analytics and metrics from all device types
- Anywhere, anytime, any device session shifting

The primary value proposition of Azuki is that it enables SPs to offer OTT/TVE service with the security, reliability and QoE of a managed video service. Making the OTT behave like a “managed” service is important because SPs want to offer OTT/TVE to give their customers the anytime, anywhere, any device convenience with the same economics; protect the content and deliver a consistent quality viewing experience. Additionally, Azuki enables SPs to get into the OTT/TVE business quickly with minimal changes to the network and back-end systems while providing a migration path to future network architectures. Having an approach that is “friendly” to legacy systems and workflows and is quick to deploy on the existing network and appeals to SPs in terms of investment protection and reducing risk. Furthermore, Azuki enables a two-sided business model (increasing ARPU and the number of customers). Being able to provide additional revenue generation has been one of the major challenges for SPs. Azuki has provided a mechanism for delivering this functionality integrated with existing billing and ad insertion systems.

## **Analysis and Opinion**

Azuki's value proposition hits the sweet spot of the market by providing SPs with the ability to move into the next generation of video delivery and keep their existing infrastructures and workflows. Azuki has successfully designed a solution that protects and extends the utility of legacy equipment and enables a transition to a new generation of technology.

### **Strengths**

Cheng Wu, Azuki's founder, is a technical visionary and a highly successful serial entrepreneur. He founded many well-known networking companies such as Arris, Arrowpoint (acquired by Cisco) and

Acopia (acquired by F5). Strong technical founders typically have no trouble attracting and retaining top engineering talent. The company is doing quite well with sales and has marquee customers, including HBO Go, Time Inc., and Showtime.

The company's approach is quite different from its competitors' approaches. Azuki is faster, less costly, less disruptive and less risky than its competitors who often require network upgrades or reconfigurations. The Azuki approach does not paint an SP into a technological corner and works well as a migration strategy to next-generation access or network technologies, whether it is converged IP core, DOCSIS 3.0 or FttH.

Azuki is also one of the few vendors in OTT/TVE that has a good story to tell about a two-sided business model of revenue generation.

### **Weaknesses**

Azuki's main issue is its size. It is venture funded and does not appear to have problems raising capital; however, it is still limited in its marketing and sales budget, which could limit its growth potential and or market awareness.

### **Opportunities**

Azuki is well positioned to become the de facto standard for OTT/TVE implementations for SPs. This is a large potential market: US cable operators alone have spent \$12–15B per year for the last 5 years. Even if spending on OTT infrastructure were 2% of the total, it would be \$250M per year for US cable companies only.

### **Threats**

The major threat to Azuki is the potential that larger players such as Cisco or Alcatel-Lucent could use their market power to their advantage. Additionally, uncertainty about strategy or direction on the SP's part could slow down the market.

## **Conclusion**

Service providers need to formulate and implement their strategy regarding OTT/TVE, both on an offensive and defensive basis. Although SPs are rightfully very concerned about ROI and changes/disruptions to the network and OSSs when they trial and evaluate new systems, they must develop business models that capitalize on this growing market to stay competitive and meet their customers' demands. Azuki has a well-conceived system for helping SPs take the step into OTT/TVE: its solution is nondisruptive, provides both offensive and defensive capabilities and can be easily deployed and tested in short time frames.

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