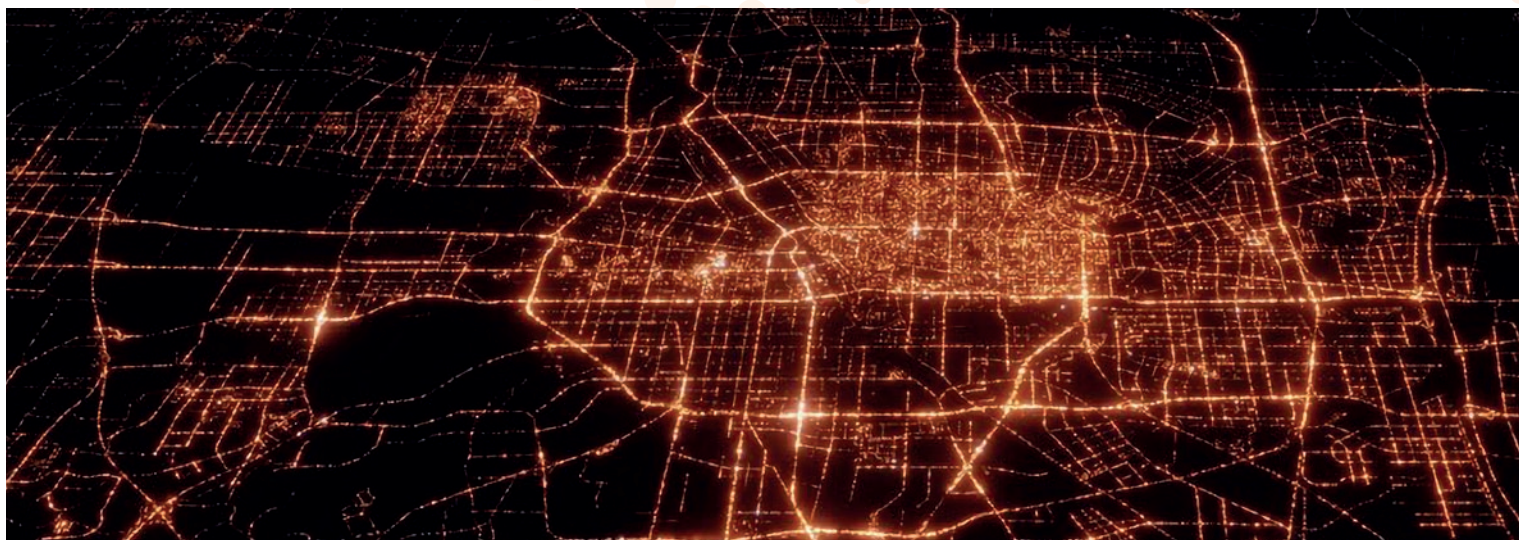




Navigating the Pay-TV Evolution:

TECHNOLOGIES TO WATCH FOR IN 2023

BY WISI

HOW OPERATORS CAN LEVERAGE ABR RECEIVE, SRT, AND ATSC 3.0 TO STAY COMPETITIVE AND FUTURE-PROOF THEIR VIDEO NETWORKS

EVOLUTION CONTINUES IN THE PAY-TV MARKET

If there is one truth about the Pay-TV market, it's that evolution is never-ending. Over the last few years, video streaming has continued to grow as a consumption model. According to Nielsen¹, Americans streamed more than 19.4 million years of content in 2022, an increase of 27%, up from about 15 million years in 2021.

The shift from linear TV to online streaming platforms is partially due to an overall change in video consumption habits, particularly the demand for more convenience. With video streaming services, consumers can watch anything, anytime, anywhere, and on any device.

The COVID-19 global health crisis has also played a key role in igniting

an explosion in video streaming subscriptions. As people spent more time at home for entertainment, remote work, and learning purposes, they increasingly relied upon high-speed broadband services for connectivity and video. However, research² shows that the boom period for video streaming is now over.

Consumers are fatigued by having to choose between so many different streaming services and linear TV options. In 2022, Netflix lost more than 1 million subscribers, and a Global Streaming Study³ found that 35% of people are likely to unsubscribe from a streaming service in the next 12 months due in part to subscription fatigue.

What does the growth in video streaming and subsequent consumer fatigue with so many streaming options mean for cable operators?



As a leading provider of technology solutions to Pay-TV operators, and a company that has been around since the beginning of TV, WISI has a unique understanding of the evolutions underway. This paper will offer insights into how rapid growth in video streaming consumption impacts Pay-TV operators and why it is accelerating a shift toward IP video distribution. Furthermore, the paper will identify three key technologies that operators need to consider implementing in order to streamline their networks and future-proof video delivery. The benefits of ABR receive, the SRT protocol, and ATSC 3.0 will be explored. To conclude, the paper will provide an overview of solutions operators can adopt to stay competitive and keep subscribers engaged.

THE TRANSITION FROM QAM TO IP VIDEO DELIVERY IS ACCELERATING

According to the Devcon⁴ Big Broadcast Survey released in April 2022, IP is one of the top two areas of spending for broadcast and media organisations around the world. Tier-1 operators are transitioning to IP, and smaller operators need to act fast if they want to stay competitive.

WHY OPERATORS ARE EMBRACING IP VIDEO DELIVERY

The growth of OTT video streaming is influencing Pay-TV operators to adopt IP as their primary video delivery method. The move to IP is also being propelled by the growing consumer demand for increased bandwidth and a desire from operators to build end-to-end virtual networks for specific apps.

Moving from QAM to IP video distribution enables operators to future-proof their infrastructure, scale rapidly, and reduce OPEX. As operators replace CableCARD devices that stopped being mandated by the government⁵ and are reaching their end of life, upgrading the entire infrastructure to IP makes sense. With IP video delivery, operators can dramatically reduce the amount of hardware that they have to maintain in their headend. They can also quickly deploy new services to meet the growing expectations of television audiences. Moreover, adopting IP opens additional revenue opportunities for operators, enabling them to offer more data services.

IP delivery also makes different forms of content protection possible. Operators aren't stuck with proprietary encryption technology such as CableCARD. IP streams can be encrypted with non-proprietary, standard encryption options such as BISS and AES-128. This opens doors to a wider selection of vendor equipment, enabling operators to choose more flexible, cost-effective solutions.

With the move to IP, operators may still need to maintain their existing infrastructure at customer premises. It's not feasible for hotels or hospitals to upgrade coax cabling that runs through the building walls. Most hospitality locations need to support analogue or QAM for delivery to the end device. The availability of IP to QAM/analogue equipment makes the transition to IP a reality.

IP LAYS A FOUNDATION FOR USING ABR RECEIVE, SRT AND ATSC 3.0

More than 80% of traffic online today is video traffic⁶, so the move to IP is nearly inevitable for Pay-TV operators. Whether operators completely embrace IP now or rely on a hybrid infrastructure, IP is the future. As operators shift to IP video delivery, there are several key technology innovations they should consider deploying⁷. The following sections of this paper will examine three IP-based technologies that bring substantial benefits to operators.

MAXIMISING OPERATIONAL EFFICIENCY WITH ABR RECEIVE

With the switch to IP, many operators are launching adaptive bit rate (ABR) receive solutions. ABR receive enables operators to repurpose ABR video streams from multiscreen deployments and convert to

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IP transport streams for IPTV services, or to QAM or analogue for hospitality networks.

Using ABR receive operators can deliver video to existing devices. ABR receive is especially relevant for hospitality use cases, allowing operators to supply TV signals to televisions already deployed in rooms.

MARKET DRIVERS FOR ABR RECEIVE

A key reason why operators are considering delivering ABR services is that it's easier and more affordable to allow consumers to use smart TVs and other streaming devices like Roku to connect to TV services, than set-top boxes (STBs). Deploying and updating STBs is a significant expense for operators. Margins are thin in the Pay-TV industry, and any way to save costs is a win for operators.

Moreover, ABR delivery allows operators to launch an entire TV offering via the internet. Essentially, operators can enter any market where they are able to obtain a franchise without building any infrastructure (i.e., an outside plant) within that market.

Furthermore, operators are embracing ABR delivery to deliver video offerings that blend traditional cable TV with OTT services. Comcast's Xfinity X1 interface is an excellent example of how tier-one operators are offering hosted video offerings to address the consumer demand for linear TV and OTT all in one.

TECHNICAL

Other operators are using the X1 platform as a white-label offering to provide their subscriber with the ultimate entertainment experience. In addition, operators have tried to replicate the X1 experience with their own hosted video platform.

There is a core driver behind the adoption of ABR receive in the Pay-TV industry. Pay-TV operators serve two main types of customers – residential subscribers and businesses, including those in the hospitality industry. As operators migrate residential networks to use multiscreen ABR, they must maintain linear QAM and analogue-based video for business accounts, resulting in unnecessary duplication and significant operational costs.

Video content coming into the headend must be transcoded to ABR profiles for multiscreen delivery to residential networks, and it also must be processed to feed linear QAM and/or analogue networks. Going through two different workflows to feed two different types of subscriber networks can be costly.

To help operators support existing hospitality networks, the ABR Receiver was created as a way to re-use multiscreen video streams for legacy deployments. This removes the duplication. The same ABR streams used to serve residential subscribers and over-the-top deployments can be repurposed to feed the edge.

CHALLENGES TO OVERCOME WITH ABR RECEIVE

Any time operators adopt a new technology there are challenges they must overcome.

The cost of replacing CableCARD gateway devices and TVs at hospitality sites is high and there are a large number of boxes in the field. Another issue is replacing coaxial cabling at hospitality sites. It's not practical to assume a hotel or hospital can update this infrastructure. Usually, the WiFi or internet service at these locations is not good enough to also support ABR video. For these reasons, the transition to ABR delivery at hospitality locations can't happen overnight.

Currently, about half of set-top boxes in the global TV market support legacy formats. Digital terrestrial television, satellite, and cable operators will need to bridge the gap to IP with an ABR receiver. What's more, the global 4K set-top box market is anticipated to grow at a compound annual growth rate (CAGR) of 8.4% from 2023 to 2030⁸. The commercial application segment is expected to grow at the fastest CAGR over the forecast period. Significant expansion of the hospitality industry, malls, and hospital constructions, among other activities, is creating favourable growth opportunities for STBs in the commercial sector. As a result, operators will need to plan to continue supporting QAM-based linear delivery for the foreseeable future.



BENEFITS OF ABR RECEIVE

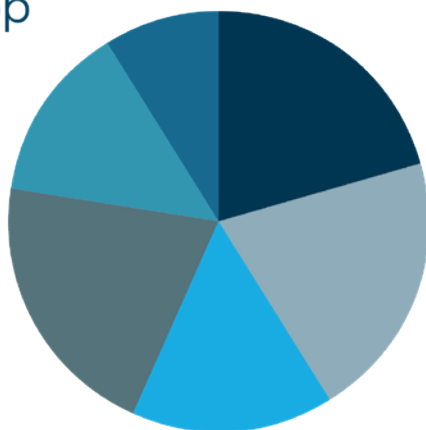
Using ABR receive, operators can bridge their next-gen and legacy video network infrastructure. The benefits of utilising ABR for receive include:

- **Increased operational efficiency:** With an ABR receiver, operators can eliminate duplication in the headend, using the same ABR streams for business accounts that continue to serve linear workflows. Not only does this boost operational efficiencies, but it also reduces costs for operators.
- **Better viewing experiences:** Changing from ABR back to multicast IP, QAM or analogue allows operators to provide a more enjoyable experience during large events by synchronising screens in venues like sports bars and stadiums.
- **Robust content protection:** Content protection is a key requirement for operators. ABR receivers offer secure end-to-end content protection with robust decrypt capabilities. Furthermore, ABR content protection is non-proprietary and more standardised than CableCARD. ABR receive can work with any ABR packager that delivers encrypted HLS, DASH, or CMAF video profiles.

Global 4K Set-top Box Market ⁸

\$2.2B

Global Market Size,
2022



■ Internet Protocol Television (IPTV) ■ Satellite ■ Cable
■ Digital Terrestrial Television (DTT) ■ Over The Top (OTT) ■ Hybrid

HOW WISI IS BRINGING INNOVATION TO ABR VIDEO DELIVERY

As a leading manufacturer and technology supplier for Pay-TV operators, WISI is leading the charge for ABR receive innovation.

To help operators support existing hospitality networks, we offer a way to reuse multiscreen video streams for legacy deployments, removing duplication. With the ABR receiver, operators can repurpose ABR video streams from multiscreen deployments and convert them to IP transport stream for IPTV services, or to analogue or QAM-based hospitality networks. The groundbreaking solution allows video operators to connect multiscreen Pay-TV services to the edge and maintain existing infrastructure investments at hospitality sites. With our solution, operators have options to output any type of format, IP, analogue or QAM, depending on site requirements.



KEY APPLICATIONS FOR ABR RECEIVE:

- Hosted video distribution
- Hospitality
- Off-net video delivery

OPTIMISING LIVE VIDEO DELIVERY OVER THE INTERNET WITH SRT

Another technology that operators should consider deploying in today's increasingly IP-based and ever-evolving video landscape is SRT. SRT (Secure Reliable Transport) is a video transport protocol used to deliver high-quality, low-latency video across unpredictable networks. SRT optimises streaming performance across noisy or unpredictable networks while addressing security concerns and focusing on high performance video. It is designed to protect against jitter, packet loss, and bandwidth fluctuations to help ensure the best viewing experience.

Video streaming over the internet can be unpredictable. Operators need a video delivery protocol that is reliable, secure, and efficient, while also maintaining exceptional video quality. A significant issue for live video streaming in particular is latency. Today's viewers expect high-quality, low-latency video experiences.

SRT uses a retransmission technology known as Adaptive Repeat reQuest (ARQ) to handle common errors when transmitting video and audio data over the internet, such as random bursts of lost packets. ARQ works by first establishing a two-way connection between the source and destination points. Each data packet is given a unique sequence number. The receiver uses this sequence to determine if all packets have been received correctly and in the right order. If packets are missing or contain errors, the receiver creates a list of these sequence numbers and automatically requests the sender to retransmit.

In addition, SRT relies on encrypted streams and a caller/listener handshake concept to ensure easy firewall traversal. The handshaking process used by SRT respects and maintains existing corporate security policies by allowing outbound connections without requiring dangerous, permanent exterior ports to be opened in a firewall.

SRT is successfully used by leading video content and service providers around the world for a wide range of applications, including remote content creation and

distribution, wholesale distribution, hospitality, live events and sports, satellite replacement for small headends, direct connections to broadcasters, and headend consolidation. Utilising SRT, operators can ensure secure video transport across unmanaged networks with low latency for these use cases.

MARKET DRIVERS FOR SRT

One of the key drivers for SRT is the growing demand for outstanding streaming quality. Today's consumers expect a flawless streaming experience. Latency can be an issue.

During a live sports event operators need to provide viewers with high-quality, low-latency video experiences. Research shows that subscriber loyalty and satisfaction are strongly linked to streaming quality. Nearly 30% of viewers⁹ are likely to end a video after the first occurrence of buffering, which increases significantly to 66% after a second rebuffering. SRT helps optimise streaming performance across noisy or unpredictable networks, enabling operators to address streaming quality requirements.

Another reason why operators are adopting SRT is to ensure secure delivery of video streams over unmanaged networks. Video delivery over the internet can be unpredictable. Since the internet is not a managed network, operators

Nearly 30% of viewers are likely to end a video after the first occurrence of buffering, which increases significantly to 66% after a second rebuffering.

need a way to ensure secure transport of video streams. Also, operators want to increase the efficiency of the video delivery process, and SRT offers unparalleled efficiency.

Moreover, operators have a strong desire to move away from the high costs of satellite transmission or dedicated fibre links. The cost savings of SRT can be huge compared with using a satellite downlink.

BENEFITS OF SRT

SRT offers multiple advantages for cable operators, including:

- Increased security and reliability: SRT protects video streams using industry-standard encryption AES 128/256, the same type of encryption that is trusted by governments and organisations around the world. SRT protects content throughout the entire video chain, from contribution to distribution, in turn protecting precious revenue streams. Offering an unparalleled level of reliability, SRT optimises streaming performance across noisy or unpredictable networks while addressing security concerns.
- Exceptional quality: SRT protects against jitter, packet loss, and bandwidth fluctuations to help ensure the best viewing experience. Leveraging advanced low latency retransmission techniques, the protocol protects streams against packet loss. As video and audio packets are streamed between two endpoints, SRT detects and adapts to the real-time network conditions between the source and destination devices.
- Outstanding flexibility: Video delivery is constantly evolving, and now more than ever operators need flexible solutions. Unlike other proprietary protocols, which are expensive to implement and difficult to implement from an interoperability standpoint — SRT is an open-source protocol. Being an open-source protocol, SRT simplifies interoperability between distribution and contribution devices, giving operators the freedom to work with devices from different vendors.
- Groundbreaking efficiency: SRT is more efficient than alternative protocols, including Real-time Transport Protocol (RTP), which relies on Forward Error Correction (FEC) to recover corrupted or missing data. The drawback of using RTP+FEC

is that for this technique to work, extra bandwidth for the FEC data is required. FEC packets are sent whether they are needed or not, using up additional bandwidth. SRT only resends packets if it detects that they are being lost in the process, preserving valuable bandwidth.

HOW WISI IS TRANSFORMING VIDEO DELIVERY WITH A COMPREHENSIVE SRT PRODUCT FAMILY:

As a member of the SRT Alliance and leading provider of solutions for Pay-TV operators, WISI offers support for the SRT protocol in its Intelligent Headend Product family, which includes the Inca IP Video Platform, Tangram High-Density Video Platform, and Chameleon Headend Platform.

We offer operators an unparalleled level of flexibility, with high-density video platforms capable of sending and receiving SRT streams and outputting in IP, QAM, analogue, ASI or SDI. Moreover, our solutions also feature powerful management and monitoring tools, providing operators with increased visibility into the health of video streams being delivered over SRT.

KEY APPLICATIONS FOR SRT:

- Remote content creation and distribution
- Wholesale distribution
- Hospitality
- Live events and sports
- Satellite replacement for small headends
- Direct connections to broadcasters
- Headend consolidation

PREPARING FOR THE FUTURE OF TELEVISION WITH ATSC 3.0

ATSC 3.0, also known as NEXTGEN TV, is a new broadcast television standard created by the Advanced Television Systems Committee (ATSC). It has been deployed in North America, South Korea, and Jamaica. Brazil has also announced that it will use essential ingredients of the standard as the country transitions to a next-generation television system, and other countries around the world are looking into its benefits.

The key difference between ATSC 3.0 and the previous ATSC 1.0 standard

is that the next-generation terrestrial broadcast system is built on IP, bringing together over-the-air and over-the-top content. By adopting technology that supports ATSC 3.0, operators will be able to provide viewers with higher quality experiences, including 4K and 8K, along with immersive audio. Ultimately, ATSC 3.0 is a way for operators to deliver local TV channels, news channels and live sports with superior quality and a better experience to end users.

MARKET DRIVERS FOR ATSC 3.0

By the end of 2022, approximately 66 broadcast television markets¹⁰ had successfully deployed ATSC 3.0 in the U.S. In 2023, more broadcasters are expected to roll out the new technology.

As the broadcast industry embraces ATSC 3.0, Pay-TV operators need to ensure that they can receive NEXTGEN TV signals. While ATSC 3.0 is not yet a mandatory format for video operators in the United States, the new standard is the future of over-the-air TV and lays the foundation for a more engaging, immersive television experience.

At some point in the future, ATSC 1.0 signals will be turned off, and if operators don't have the capability to support ATSC 3.0, they risk being left behind. As ATSC 1.0 receive equipment ages out or starts failing, it only makes sense to replace this with ATSC 3.0 compatible equipment. By investing in new technologies now, operators can ensure their video network is future-proof and have peace of mind that they are ready for the future of television.

BENEFITS OF ATSC 3.0

The compatibility of ATSC 3.0 with existing infrastructure makes it a cost-effective and easy-to-launch solution. Benefits of ATSC 3.0 for operators include:

- Better signal quality: ATSC 3.0 offers a new modulation scheme that is based on OFDM (Orthogonal Frequency Division Multiplexing) modulation. OFDM is more spectrally efficient and less susceptible to multi-path interference, ensuring better signal quality.
- Superior video and audio: ATSC 3.0 enables the delivery of 4K/ UHD content, including wide colour gamut, high dynamic range and high frame rate images, with Dolby AC-4 Atmos audio, bringing a more visually

appealing and sounding television experience to viewers.

- Expanded reach: With the ATSC 3.0 standard, operators can deliver television signals to a wide range of screens such as smartphones, tablets, and vehicle devices.
- Future-proof video network: ATSC 3.0 is based on IP technology, allowing operators to easily adapt to new and future technologies, including High Efficiency Video Coding (HEVC). HEVC is a video compression standard that is 50% more efficient than its predecessor AVC.

HOW WISI IS REVOLUTIONISING ATSC 3.0 FOR OPERATORS

WISI is helping operators prepare for the future of television and IP video delivery with its new ATSC 3.0 receiver module. Using the module, operators can receive ATSC 1.0 (8VSB), QAM or ATSC 3.0 signals and output IP transport streams to feed existing networks. This gives operators the flexibility to migrate to ATSC 3.0 when they are ready, while still supporting traditional ATSC 1.0 (8VSB) video signals. Our ATSC 3.0 receiver module is compatible with the Inca IP Video Platform and existing 4400 chassis family. Deployment and upgrades are easy via a single software license.

Each module includes four RF receivers, with support for up to four physical layer pipes per receiver. ATSC 3.0 channel bonding is also supported, allowing for future applications such as 8K video

signals. By utilising a modular platform, operators have the flexibility to add modules to transcode HEVC video to MPEG-2/MPEG-4 within the same chassis.

Key applications for ATSC 3.0:

- Local TV channels
- News channels
- Live sports

IN SUMMARY

A recent Brightback report¹¹ found that 98% of US consumers subscribe to at least one OTT streaming app, and according to Deloitte the average household has four streaming subscriptions¹².

The rise of streaming and subsequent increase in subscription fatigue opens up new opportunities for operators. The question is, how can operators adapt to meet the demand for video anytime, anywhere, on any device?

Transitioning to IP video delivery enables operators to future-proof their video networks, quickly deploy new services, and lower the cost of video offerings. With IP, operators can scale rapidly to meet the demands of modern audiences. Moreover, IP allows operators to tap into the growing number of cord-cutters that prefer to use an internet connection for accessing video content.

As operators embrace IP video delivery, there are several IP-based technologies that they should consider deploying in order to stay competitive, deliver exceptional quality, and prepare for the future. ABR streaming ensures a flawless experience and increases operational efficiencies for operators. The SRT protocol improves security and reliability for IP-based video delivery, amongst other benefits. Finally, ATSC 3.0 enables better signal quality, 4K content, and immersive audio, making it a must-have for next-gen video delivery.

By adopting these innovative technologies, operators can create a foundation for success today, enable future business growth, and keep subscribers engaged with their service.

WISI: LEADING TECHNOLOGY INNOVATION FOR THE PAY-TV INDUSTRY

With almost 100 years of experience in providing innovative and reliable technology solutions, WISI is well-equipped to lead operators through the market and technology changes that are happening — now and in the future. We can help you design and implement networks that acquire and process high-quality video signals from virtually any source, and in almost any format. In addition, our award-winning built-in monitoring solutions can provide you with more reliable operations and an attractive total cost of ownership.

www.wisigroup.com

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