



Unlocking the Interactive Television Opportunity

Executive Summary

Two-way connections and a wave of new television sets that support them are poised to revolutionize how television broadcasters and cable networks deliver programming and advertisements to consumers worldwide.

By adding a broadband connection to linear TV channels, traditional programmers gain access to a wealth of new opportunities that will drive viewer engagement, create new revenue streams and allow them to compete on par with digital platforms for the first time. Examples of these capabilities include household-level addressable advertising and an array of interactive services such as fantasy/predictive gaming, sports betting, TVOD from linear broadcasts, OTT Video on Demand and personalized audio. Once broadband-enabled, smart TVs provide programmers with precise audience measurement and attribution data from millions of linear viewers.

A dual-stream approach that links broadcasts with features delivered via broadband to the TV is not a new idea. It has already been proven with the Hybrid broadcast broadband TV (HbbTV) standard, which was created a decade ago for the European market to work in conjunction with the existing Digital Video Broadcasting (DVB) digital terrestrial standard. HbbTV is the most commercially successful and widely used interactive broadcast TV standard and is now deployed in 36 countries with over 300 applications on some 44 million connected TVs and set-top boxes¹.

Yet, despite HbbTV's success, delivering interactive features such as targeted advertising and catch-up TV seamlessly and at scale has been a challenge. This is because cable, satellite and IPTV set-top boxes do not respond to the data triggers needed to deliver the broadband content from the original broadcast signal. U.S. programmers looking to launch their own hybrid broadcast standard, the IP-based "NextGen TV", have identified a similar problem in making future interactive services on smart TVs work when HDMI connections are in use.

The solution both European and US broadcast ecosystem participants have identified is Aspect, a global watermarking technology created by Verance that works in existing and future broadcast environments, including ATSC 1.0, ATSC 3.0 & HbbTV. Aspect is embedded into the broadcast signal at the station and received by a software client in a smart TV, which can then use its broadband connection to receive Internet-delivered features and content.

Aspect maximizes revenue and engagement from interactivity by enabling these experiences to survive all distribution paths and reach the greatest number of households possible.

Source: ¹HbbTV

Addressable Advertising on The Rise

According to eMarketer, TV advertising spend in 2019 was \$70.3 billion, representing a 2.9% drop from 2018 as advertisers continue to shift budget to digital platforms². While a slight uptick in television advertising revenue is projected for 2020 (due to the U.S. presidential election and Summer Olympics in Tokyo), eMarketer expects TV advertising will sink back to negative territory in the following years and fall to less than a quarter of total U.S. media ad spend by 2022.

A solution that will help reverse this downward trend is addressable advertising. Instead of delivering the same commercial to all viewers on a market-wide or national basis, addressable advertising lets programmers use the smart TV's broadband pipe to replace a generic spot with a tailored advertisement based on information shared by individual viewers, such as their geographic location, demographic information or personal interests.

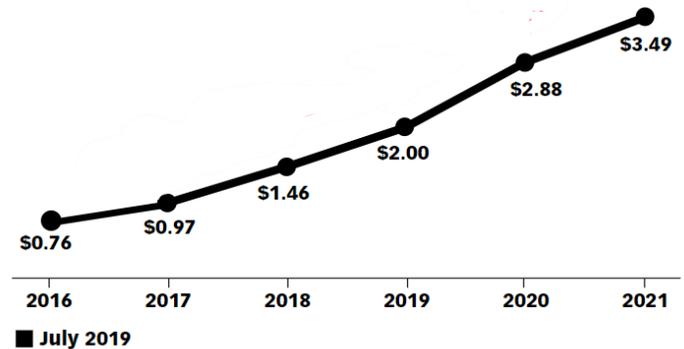
Further, these targeted ads can include interactive triggers that lead consumers to more information via the broadband connection, such as a two-minute "virtual drive" after an automobile commercial or an electronic coupon for a big-box store; all of which can be measured and tracked in real-time.

In 2019, addressable television advertising revenue in the U.S. increased 37.0% to \$2 billion and is projected to climb 40% this year to \$2.88 billion³.

While this predicted growth only accounts for 4.1% of the total \$71 billion TV advertising spend projected for 2021, its upward trajectory is significant. Omar Sheikh, a research analyst for Credit Suisse projects targeted and addressable television advertising will reach \$100 billion by 2030⁴.

US Addressable TV Ad Spending, 2016-2021

billions



Note: targeted TV ads delivered on a home-by-home basis via cable and satellite boxes; includes video-on-demand (VOD); excludes connected TV, smart TV and over-the-top (OTT)
Source: eMarketer, July 2019

247815

www.eMarketer.com

The same methodology used for delivering addressable advertising can be applied to the delivery of interactive television content. Using the broadband pipe, programmers can deliver an array of experiences designed to keep viewers engaged with their content longer and generate incremental revenue. During a sports broadcast, for example, programmers may offer additional audio streams such as hometown announcers or alternative languages, multiple camera angles, and even bring personalized gaming content directly into the program.

Doubling Down on Sports Gaming

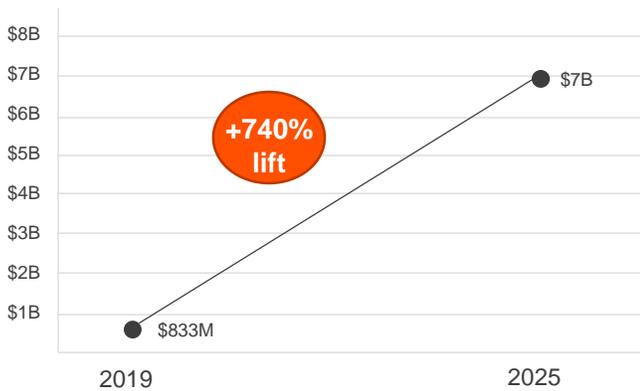
Fantasy/predictive gaming and sports betting, which may include "micro-betting" on individual plays, present another attractive opportunity to drive viewer engagement and new transactional revenue streams.

For non-gamblers and states that have yet to legalize sports betting, fantasy sports drives viewer engagement and provides a natural gateway to conventional sports betting. Fantasy players are 3.5 times more likely to bet on sports and 80% of users are reported to bet at least once per month⁵.

Sources: ²eMarketer; ³eMarketer; ⁴Credit Suisse; ⁵FanDuel

For the 10 states that currently allow interactive/mobile sports betting – and the 28 more expected to launch this capability in the next two years⁶ – the revenue impact is significant. Investment firm Morgan Stanley predicts the U.S. market will generate \$7 billion in sports betting revenue by 2025, an increase of 740% from the \$833 million generated in 2019⁷.

\$7 Billion In Sports Betting Revenue Projected by 2025



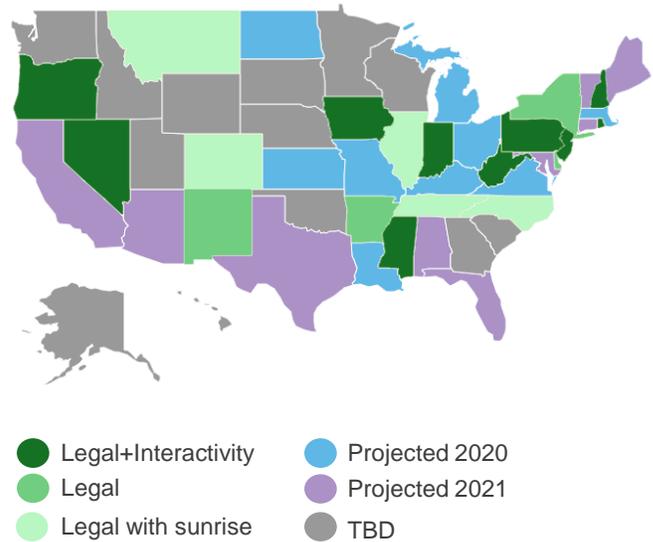
Morgan Stanley

Super Bowl LIV generated a legal sports betting handle nearing \$270 million⁸. Among the 14 states currently offering legalized sports gambling (interactive/mobile or physical sportsbooks), Nevada generated the largest handle at \$154.7 million. New Jersey ranked second with \$54.2 million in bets, an increase of 55% from last year's total. Pennsylvania had the third highest handle with \$30.7 million in bets, 78% of which came from online betting.

New Jersey's online and retail sportsbooks have taken in more than \$5 billion in bets since the state legalized sports gambling in June 2018, with over \$562 million in bets placed in November 2019 and 86.5% of those made online, according to research firm PlayUSA.com Network⁹. In fact, in May 2019, bettors wagered more in New Jersey than in any other state in the country, edging past Nevada and the famed Las Vegas sportsbooks by \$1.5 million.

New Jersey sportsbooks took in \$318.9 million in bets, while Nevada took in \$317.4 million¹⁰.

Over 70% of U.S. States Expected to Legalize Betting by 2021



Action Network

Further, sports betting drives viewer engagement. According to a Nielsen Sports study commissioned by the American Gaming Association, sports bettors comprised 25% of the NFL's television audience in 2015, but accounted for 47% of all minutes viewed. In essence, sports bettors watch about twice as much sports coverage as non-bettors¹¹. Additionally, 70% of people in the U.S. said they are more likely to watch a game if they bet on it, according to a survey by the Seton Hall Sports Poll published in November 2018¹².

Programmers are paying attention. NBC Sports, Fox Sports and ESPN all air regular sports betting news shows, and NBC Sports Washington has experimented with a betting-focused streaming broadcast, "Predict the Game," for coverage of the NBA's Washington Wizards. Sinclair Broadcast Group has indicated that sports betting was a major driver for its acquisition of 21 regional sports networks (RSNs) from Disney¹³. Fox has even created its own sports betting app, "FOX Bet," to take online bets in New Jersey and Pennsylvania.

Sources: ⁶Action Network; ⁷Casino.org; ⁸Legal Sports Report; ⁹PlayUSA.com; ¹⁰New York Times; ¹¹American Gaming Association; ¹²Casino.org; ¹³Baltimore Sun

Barriers to Success

Despite its significant business potential, some marketplace realities and technical challenges still need to be overcome to ensure the success of interactive television. Most pressing is the high percentage of television viewership that takes place via pay-TV services and requires the use of a set-top box.

Today, 75% of U.S. TV households subscribe to a live pay-TV service from a cable, satellite, Telco, or Internet-delivered provider, according to a recent report from Leichtman Research Group¹⁴. While that number is down from 84% in 2014, it still confirms the bulk of the audience is getting their broadcast content delivered through a pay-TV set-top box instead of receiving it for free via an over-the-air antenna.

Correspondingly, the percentage of TV households that rely solely on over-the-air reception remains relatively low, at 15%, according to research from the Television Bureau of Advertising (TVB), which represents the advertising interest of local stations. Cord-cutting has boosted this number of OTA-only TV homes significantly from November 2014, when it stood at only 10.7%¹⁵. But it is clear that the scale necessary for a lucrative targeted advertising business still exists in only the pay-TV universe.

That presents a technical hurdle for broadcasters looking to deliver new interactive features to smart TVs, as it places a third-party device — the cable, satellite or IPTV set-top — between them and the consumer's TV set. And the way most pay-TV viewers hook up their TV set to the operator-provided set-top box — with an HDMI (High-Definition Multimedia Interface) cable — hampers the delivery of those interactive features.

For example, the dynamic ad insertion (DAI) of targeted commercials relies on metadata and time codes sent within the broadcast signal to control it. DAI splices in a targeted spot within a compressed broadcast from local or remote storage, such as storage built into a smart TV, based on cable-industry-standard SCTE 35 tags that denote when a

local advertising insertion opportunity occurs. But those SCTE 35 tags are stripped out when passing through an HDMI connection, meaning the smart TV never gets the instruction to play the targeted spot from its storage.

Likewise, interactive content delivery to smart TVs could be hampered by HDMI. XLinks metadata placed within a broadcast signal to direct a smart TV to a relevant web page would also be stripped out from the video on its way from the set-top to the TV.

European broadcasters on the HbbTV platform have already experienced these problems delivering interactive content through HDMI, as many pay-TV customers with a cable, satellite or IPTV set-top have had difficulty in getting HbbTV to work on their connected TVs¹⁶. Similarly, some U.S. broadcasters see cable set-top boxes as a potential stumbling block for the interactive services they plan to launch later in 2020.

75%

U.S. TV households subscribe to a live pay-TV service.

The way most pay-TV viewers hook up their TV set to the operator-provided set-top box — with an HDMI cable — hampers the delivery of those interactive features.

Sources: ¹⁴Leichtman Research Group; ¹⁵TVB.org; ¹⁶Rethink Research

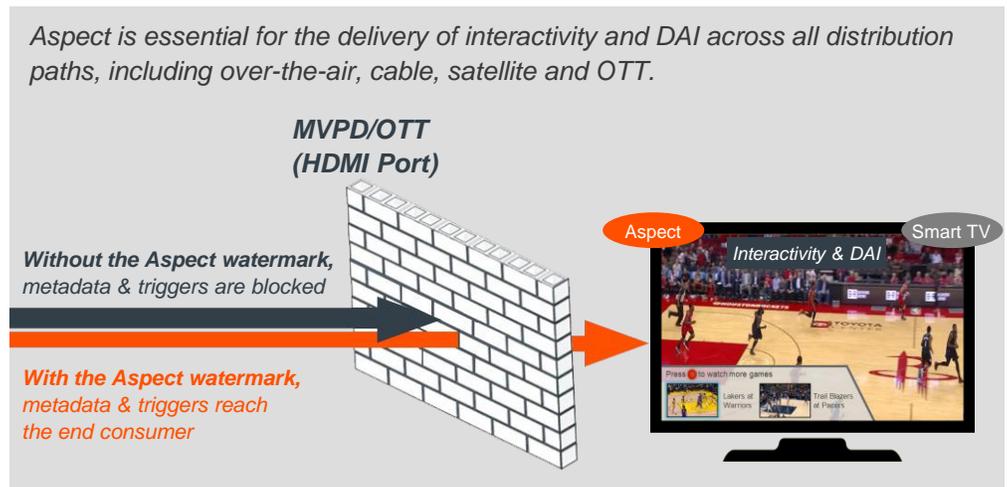
Aspect Watermarking Provides A Solution Today

Fortunately, a solution to the HDMI problem already exists in the form of Aspect, Verance's unique watermarking technology for broadcast & cable content that is designed to survive all distribution paths including over-the-air, cable, satellite and OTT services.

Aspect watermarking is a global standard that supports ATSC 1.0, ATSC 3.0 & HbbTV today.

Aspect watermarking already works in today's broadcast environment (ATSC 1.0) and has been incorporated into the NextGen TV standard (ATSC 3.0), which stations will begin broadcasting in 40 markets in 2020.

Aspect has also been adopted for use within the HbbTV environment as a way to ensure interactivity, personalization and targeted advertising can reach all European households, regardless of the distribution channel. The newly published "Application Discovery Over Broadband" specification uses watermarking to ensure consumers can access HbbTV services on their television sets, even when they receive TV service through a legacy set-top box.



A Proven Technology

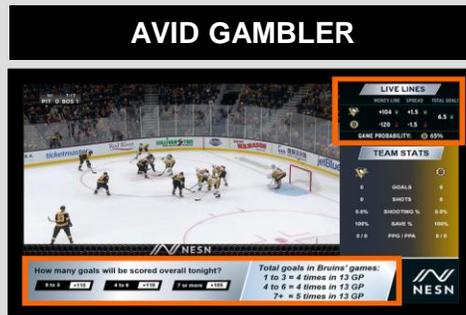
In 2019, Verance partnered with broadcasting and cable networks, television manufacturers and technology providers to deliver leading interactive experiences and validate the Aspect technology across both legacy and future TV distribution paths.

Fantasy & Sports Betting

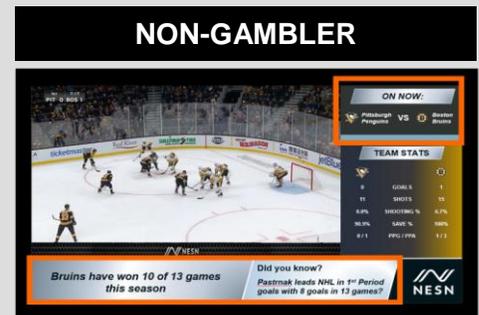
Verance is currently partnering with a leading cable sports network and technology provider to deploy a fantasy sports / predictive gaming application and bring it to the first screen. In addition to enabling interactive gaming to be delivered across all distribution paths, Aspect discerns between avid gamblers and non-gamblers, as well as between jurisdictions with and without legalized sports betting to deliver personalized experiences that drive viewer engagement and transactions.

Aspect maximizes the sports gaming opportunity by bringing personalized experiences to the largest audience across all screens – including televisions.

Personalized L-bars deliver the most relevant experiences – fantasy, predictive gaming or sports betting – based on viewers’ interests and state legalization.



Receives an L-bar with interactive sports betting information and gaming options



Receives an L-bar with sports information unrelated to betting

Personalized Audio

Verance partnered with audio technology provider Dolby and public broadcaster KPBS San Diego to deliver personalized audio within existing TV programming (ATSC 1.0) across over-the-air, cable and satellite paths. The test successfully delivered the dialogue enhancement feature of Dolby AC-4, which makes it easier to clearly hear dialogue in a program, as a standalone audio stream over the Internet and synchronized it with video delivered through a live linear broadcast from KPBS.

Aspect supports multiple personalized audio capabilities.



Brings dialogue forward relative to background noise



Select from multiple languages or Visual Description Services

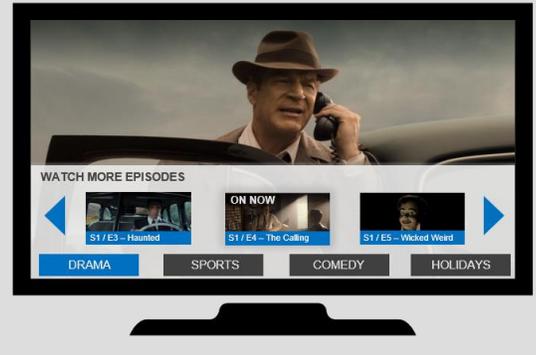


Select audio commentary from alternate sources

Mini-EPG

Verance partnered with a leading television manufacturer and cable network to deploy a mini-EPG within a NextGen TV interactivity runtime environment (ATSC A/344) using Aspect watermarking. The mini-EPG was designed to increase viewership by promoting relevant network content and worked across over-the-air and cable distribution paths.

Aspect delivered a mini-EPG across over-the-air and cable distribution paths.



The Aspect platform has an acquisition time of a single video frame to identify the channel and time code upon a content switch, offering frame-accuracy and a 100% match rate of identifying programming content.

How It Works

The Aspect platform, which includes audio and video watermarks that are inaudible and imperceptible to TV viewers, works by embedding a consistent 50-bit payload that encodes a URL and time code into the audiovisual signal which repeats every 1.5 seconds. The watermarks are easily inserted into a broadcaster's program stream at the station or network operations center using professional signal processing equipment that already exists in their normal delivery chain.

The Aspect watermarks are received by a lightweight software client in the consumer receiver, the Aspect Receiver Toolkit, which then triggers frame-accurate delivery of interactive and personalized features in live, or VOD content. That content is delivered via the television set's broadband connection, and can be either preloaded in local storage or pulled in real-time.

The Aspect platform has an acquisition time of a single video frame to identify the channel and time code upon a content switch, offering frame-accuracy and a 100% match rate of identifying programming content. The platform uses the Internet to pull direct data from the Aspect-enabled receiver for audience measurement, interactivity and addressable advertising, and then synchronizes content and feature instructions from the programmer for further enriched experiences.

For advanced television features such as Dynamic Ad Insertion, the pairing of audio and video watermarks is vital for the seamless activation of addressable ads. When a viewer initiates "trick play" features such as fast forward, skip or rewind and the audio is muted, the video watermark continues to track the content with frame-level accuracy. Similarly, the audio watermark determines the replacement ad language when two different households are watching the same program in different languages.

Summary

Two-way connections and a wave of new television sets that support them are poised to revolutionize how television broadcasters and cable networks deliver programming and advertisements to consumers worldwide, creating a wealth of new opportunities to drive viewer engagement and revenue.

To maximize the interactive television opportunity, the industry needs a flexible solution that allows these experiences to seamlessly scale across all distribution paths. The Aspect platform provides this solution today. Aspect works in existing and future broadcast environments and supports multiple global standards, including ATSC 1.0 & 3.0 and HbbTV.

About Verance

Verance® Aspect™ is a global watermarking platform that powers broadband features on broadcast television by enabling sports betting, dynamic advertising and interactivity across all screens and distribution paths. Aspect supports new and existing industry standards including ATSC 3.0 and HbbTV and works in today's ATSC 1.0 broadcasting environment. Leading programmers such as FOX, NBC and PBS are currently deploying Aspect.

Verance content measurement and enhancement technologies are at the forefront of innovation and set the industry standard for television, movies and music. Our solutions have been adopted by over 100 leading entertainment and technology companies and deployed in over 350 million consumer products worldwide. For more information, visit: www.verance.com