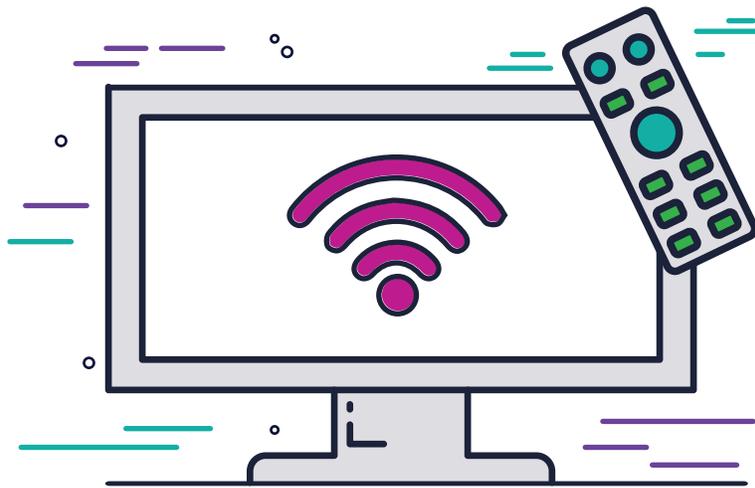


DV | DoubleVerify



ABC'S OF **CONNECTED TV**

ABC'S OF CTV

With consumer adoption on the rise, Connected TV (CTV) is becoming a critical channel for advertisers. Growing advertiser interest in CTV is driving increased ad spend, and heightening the need for objective, third-party verification. DV's comprehensive guide to CTV covers:

- The difference between CTV and OTT
- How quality is measured on this channel
- What questions advertisers should be asking
- How to ensure quality and maximize the effectiveness of your CTV/OTT investment

| Table of Contents

CTV & OTT: Definitions and Adoption	1
The Need for Verification	3
Fraud	5
Brand Safety	9
Viewability	10
Being Part of the Solution	11
DoubleVerify Overview	12

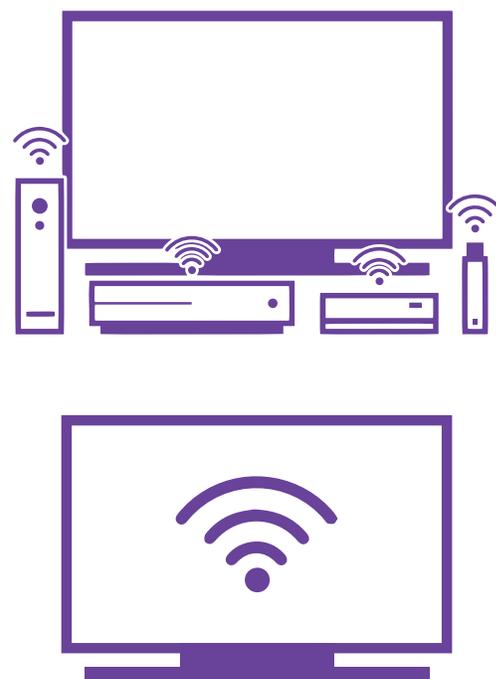
Defining CTV & OTT

OTT or “Over-the-top”, refers to streaming of content through the Internet onto a laptop, mobile device, tablet or Connected TV (CTV). It’s called “Over-the-top” because media is delivered via a high-speed internet connection that bypasses, or goes “over-the-top” of, cable or satellite providers.

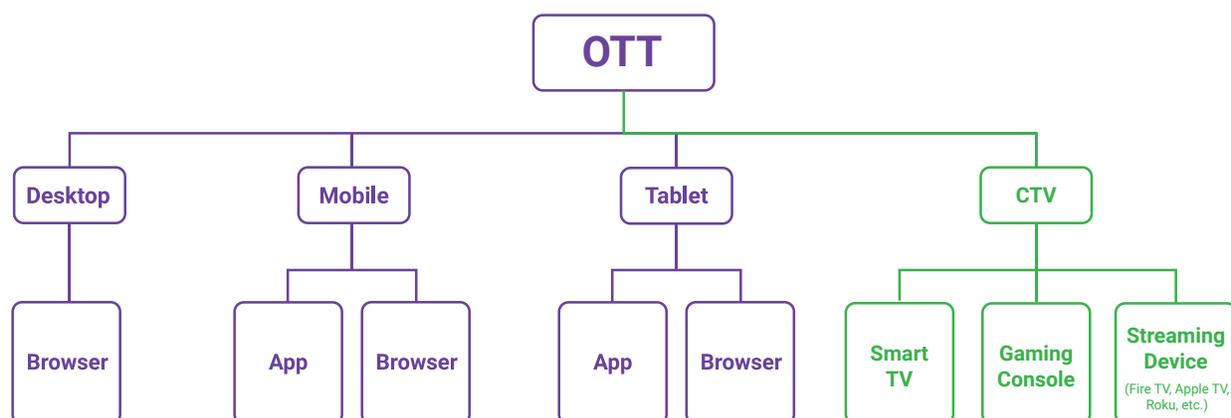
While OTT is a general term used to describe delivery of typically long-form content via an internet connection, **CTV** is a subset of that inventory delivered via connected and dedicated devices – such as smart TVs, gaming consoles or streaming devices – hooked into a big screen, such as a home television.

OTT delivered through CTV is often:

- Full-screen
- Long-form
- Immersive
- Not-skippable



CTV Is One Channel to Deliver OTT Content



Consumer Adoption of CTV

Consumption of Over-the-top (OTT) content is on the rise, and Connected TV (CTV) is one of the fastest growing environments for consumers to access this content.

Over-the-top Content

In the US in 2019, OTT viewership is measured to be as high as 62% of the population, and growing. Increase in demand for OTT is not restricted to the US; demand is also surging globally in both established and emerging markets. This increase in consumer demand for OTT is fueling a paradigm shift in global linear TV advertising spend. Marketers are following the trend in how consumers watch long-form video content, and are allocating more of their media budgets to OTT platforms like CTV.

Connected TV

Of all the ways to access OTT content, CTV has the largest share – with over 56%. In addition, CTV is the only way to reach two critical audiences on the household's biggest screen:



Cord-cutters
Households looking to watch TV on their own schedule.



Cord-nevers
Digitally native audiences that reject legacy linear TV outright.

Access to these premium, highly sought-after audiences makes CTV more attractive than ever to advertisers.

CTV Inventory Spend is Growing

CTV represents one of the fastest growing platforms for ad spend. The appeal of CTV to advertisers is clear when one considers the fast growth of CTV audiences, the measurability of digital video, and the appeal of sound and motion on the living room's biggest screen. CTV ad spend in the US is projected to reach at \$13.3 billion in 2019 and \$20.1 billion in 2020 (Tru Optik) – a growth rate of over 50% year-on-year.

\$20.1B
CTV AD SPEND BY 2020

The Need for CTV Verification

With increased advertiser demand for Connected TV (CTV) inventory, the need for third-party verification is critical.

Fraud

Unfortunately, fraud follows ad spend — especially within emerging channels, where standards have yet to be established and demand outstrips supply. In the past 12 months, DV tracked a 120% increase in fraudulent CTV and mobile apps. Further, we identified more than 500 fraudulent CTV apps in 2019 alone.

eMarketer estimates that almost 60% of CTV inventory will be bought programmatically by 2021. With more inventory bought through intermediary platforms, the risk of fraud rises.

Advertisers need to be able to detect and prevent fraudulent activity that can have a significant, adverse impact on **program success and return on media investment**.

Brand Safety

According to a recent OpenX and Harris Poll study, people spend more time watching Over-the-top (OTT) content than they do driving a car or talking to friends and family. There are myriad programs viewed every minute — some that may be brand suitable, and others that brands may find objectionable.

With so much content available and being viewed through CTV devices each day, advertisers need to ensure that their **brand reputation is protected**.

Viewability

Given that ads on CTV are typically visible, in focus and cannot be skipped, some advertisers have fewer concerns with viewability on CTV. However, as has been established for mobile app and desktop channels, the development of clear standards for viewability measurement on CTV is needed. In the absence of clear standards, advertisers are demanding proxies for viewability — like quartile completion, to have confidence in the performance potential of their ads.

The establishment of a CTV viewability standard is mandatory, in order for advertisers to have the **ability to compare the performance of video campaigns across all devices in a consistent manner**.

What Makes CTV Measurement Challenging

- Lack of agreed-upon standards
- Inconsistent app/inventory measurement signals
- Advanced measurement in CTV using VPAID or JavaScript is not widely supported
- Limited adoption of app-ads.txt to identify authorized resellers
- Inconsistent naming conventions across platforms

Advancing CTV Measurement

DV has been providing protection on Connected TV (CTV) since 2018, allowing advertisers to monitor CTV impressions throughout their campaigns. Further, we have dedicated significant technical and human resources to build solutions that provide:

- Comprehensive fraud protection, including significant investment in identifying emerging fraud schemes
- Brand safety solutions that mirror what we provide on other devices
- VAST visibility-certified supply and quartile completion to measure whether an ad had the opportunity to be seen

DV's CTV verification solutions are being developed using our existing video OmniTag, adapted to the unique characteristics of this medium. This approach lets us protect brands across CTV inventory in a scalable and streamlined way, and requires minimal effort from advertisers and publishers.

Take Action!

We encourage CTV buyers to demand independent measurement of fraud, brand safety and viewability. Actions buyers can take include:

Start Measuring CTV Inventory Today

Quality measurement starts with transparency. DV's existing tagging infrastructure – properly implemented and deployed – can provide that transparency. Advertisers should demand that supply partners become certified for measurement, and that their verification providers are able to scale across this medium.

Push Industry Groups To Advance Standards

CTV app identification standards and development of a shared technical solution for viewability measurement are needed to move CTV inventory into a more standardized framework. The OM SDK working group has been tasked with establishing these standards, and with pushing the technology to ensure consistent measurement. Adoption of the latest version of the OM SDK by supply partners, therefore, is critical.

Enlist Brands In Advocacy Efforts

Brands must be educated about the need for independent measurement. They can demand CTV targeting from their DSPs and buying platforms, in order to enhance delivery of quality CTV impressions in their programmatic buys.

Advocate With Major CTV Suppliers

Major CTV suppliers (Apps/Devices/Operating Systems) must also be educated about the need for robust third-party measurement to create a healthy and trusted ecosystem. We want to ensure a “walled garden” scenario does not arise, with individual providers gating access to quality data.

Detecting Fraud in CTV

As soon as Connected TV (CTV) began being sold through intermediary platforms, it became a target for fraud. Intermediation made it possible for fraudsters to start spoofing CTV inventory. DV began building its fraud solution in early 2018 to address these issues, and has continued to evolve our protection to address emerging fraud schemes and protect CTV advertisers.

Our comprehensive solution combines machine learning and human expertise, and does not require the use of an SDK or custom integration. To build our solution we:

- Developed completely new telemetry specifically designed for CTV
- Built an advanced data collection infrastructure of devices
- Deployed new machine learning models to identify patterns and detect fraud common on CTV devices
- Created a dedicated hardware lab with advanced capabilities to reverse-engineer CTV threats
- Hired a team of fraud analysts specializing in CTV inventory and the app ecosystem

DV's fraud detection solution works even in those instances where only a DV video OmniTag is in place, and covers a broad array of techniques – from app fraud to device spoofing and Server-side Ad Insertion (SSAI) manipulation. Here are some of the more common varieties of fraud we see:

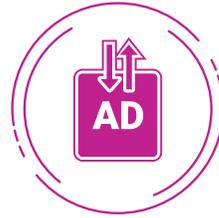
Fraudulent Apps	SSAI Bots	Other Bot Schemes
<p>On CTV, fraudulent apps will manipulate the environment in one or more ways:</p> <ul style="list-style-type: none">• Create automated, completely fabricated ad calls coming from non-existent devices.• Play ads back-to-back.• Spoof the “app name” parameter to appear as if they are CTV ads.	<p>SSAI bots exploit the fact that much of the data coming from SSAI servers is self-declared, making it easier to spoof the user agent, client IP and/or bundleID.</p>	<p>As on other devices, bot fraud occurs when impressions are served to a fraudulent, non-human requestor. Often, bots will target CTV inventory by spoofing the device type to appear as if they are a CTV device.</p>

A Proven History of CTV Fraud Prevention

DV's Fraud Lab, with over 10 years of experience in identifying and uncovering emerging forms of fraud, is hyper-focused on combating Connected TV (CTV) fraud. We are continuously identifying new fraudulent CTV apps, bots and fraud schemes, and bolstering our protection for global advertisers. Below are a few examples of the larger and more diverse schemes we've recently uncovered and safeguarded our clients against.

SSAI Abuse

Falsified SSAI servers created millions of ad requests per day, abusing thousands of residential IP addresses spoofed to make impressions seem real. The fraudulent impressions appeared to originate from hundreds of spoofed apps.

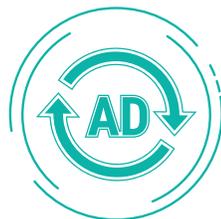


FRAUDULENT APPS

A large number of low-quality apps recorded a spike in traffic over a short period of time. DV found this traffic to originate from a small group of IPs and spoofed user agents that were masquerading as users with CTV devices in their homes. They appeared to be consuming almost non-existent content for hours per day.

FALSIFIED USER/DEVICE DATA

DV identified spoofed ad calls on multiple CTV channels. These ad calls were designed to appear to originate from real CTV devices, as part of real channels. In fact, the calls were entirely fabricated.

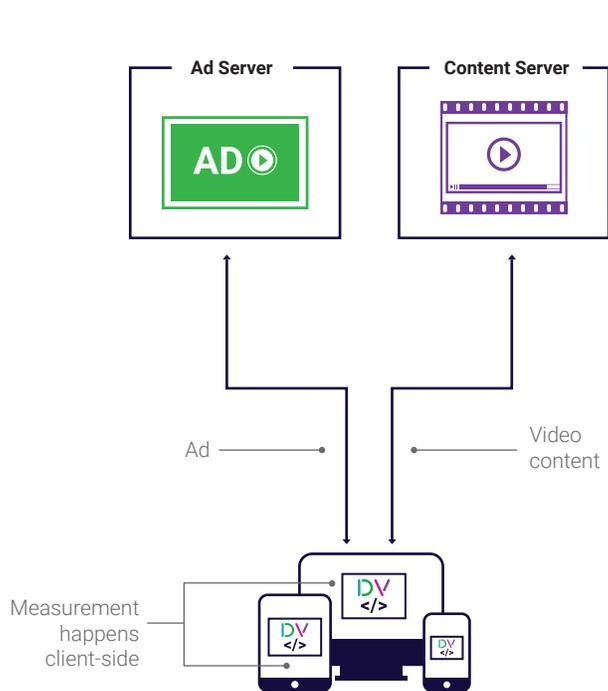


NONSTOP ADS

DV recently found a group of fraudulent apps playing ads back-to-back for hours, instead of presenting the users with content. These apps also abused SSAI in order to spoof the IP and user agents.

How Video Ads Are Served

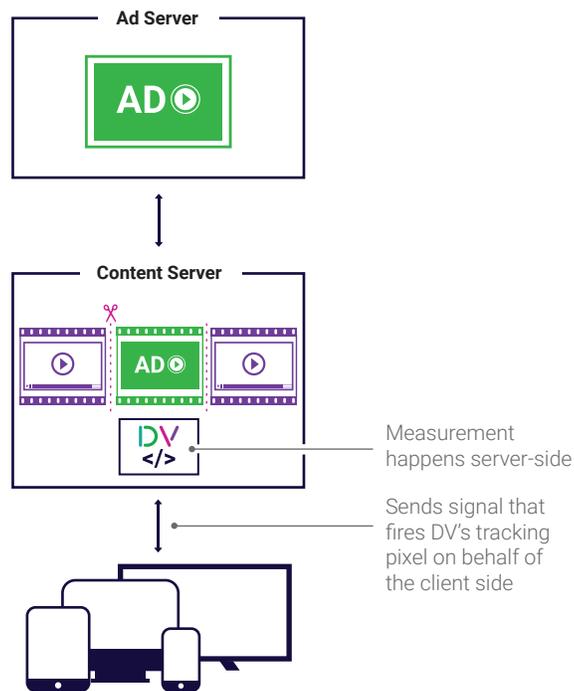
As part of the fraud discussion, it is important to understand the differences in Client-side and Server-side Ad Insertion. Of particular importance is a review of how these two primary paths for video ad serving handle measurement and verification, and how fraud is perpetrated.



Client-Side Ad Insertion (Common for most video ads)

Standard for most mobile and desktop video delivery.

- Verification data is gathered at the device-level, where the user is interacting with the ad content.
- Clear verification signals can be sent from the device to measurement providers.
- Runs VPAID, allowing for viewability measurement.
- Results in sub-par user experience (latency due to necessary buffering).
- Does not allow for live streaming.



Server-Side Ad Insertion (Common for CTV)

Also known as “dynamic ad insertion” or “ad stitching”, SSAI stitches video and ad content together at the server level, rather than at the client level.

- In most cases:
 - Verification data is gathered at the server level and is limited.
 - Information about the ad, impression and environment is mediated by the server.
- No independent validation on the client side.
- Does not run VPAID.
- Ensures quality viewing experience.
- Works on live streaming video.

SSAI Ad Insertion and Fraud

When measurement happens at the server level and client-side data (user/app/device) is self-declared (vs. directly measured), it is more complex to validate this data – making SSAI an attractive target for fraudsters. Bad actors can abuse legitimate servers, making them request ads on behalf of fake users, on fake apps, on fake devices, watching fake content. SSAI-generated fraud can also involve more sophisticated app spoofing, IP spoofing and device spoofing. These tactics add to the complexity of validating data. For example:

- Apps are often spoofed without their knowledge.
- Multiple CTV devices are spoofed to make traffic appear diverse and legitimate.
- Residential IPs are used to masquerade as TVs in someone’s living room.

Beware of false positives: Since both legitimate and fraudulent SSAI can run from the same data center, distinguishing between the two is critical to access clean inventory at scale.

How DV Addresses SSAI Fraud

DV’s SSAI fraud solution is based on a sophisticated analysis of the impact and risks driven by SSAI-served ads. This analysis serves as the foundation of DV’s algorithm-based solution that:

- Identifies IPs that are used for SSAI-served ads.
- Distinguishes between fraudulent non-human data center traffic and valid SSAI IPs (where the client IP is not provided).
- Identifies cases of fraudsters manipulating the IP address to make it appear valid.

CTV Targeting Certification

Fraud happens throughout the value exchange via a variety of tactics, and supply partners need to be just as vigilant as advertisers. With this in mind, DV recently launched the industry’s first CTV Targeting Certification for programmatic platforms, to protect advertisers from fraud and invalid traffic (IVT) in the CTV space. In order to be certified by DV for CTV Targeting, a platform must demonstrate the ability to prevent fraud and IVT, by applying DV’s pre-bid app and device fraud protection for CTV inventory transactions.

AMOBEE

 **theTradeDesk**

 **AppNexus**
A Xandr Company

 **MediaMath**

SPOTX

 **ADELPHIC**
BY VIANT

Certified as of January 2020

Brand Safety in CTV

Because of its premium nature, Connected TV (CTV) inventory is automatically considered to be trustworthy by many advertisers. However, long-tail programming with inconsistent production value may constitute a risk to brand reputation. For this reason, it's important that we begin to address brand safety in CTV.

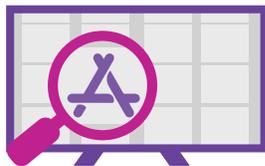
DV's Approach to CTV Brand Safety

Brand safety starts with transparency — first into the device and app, then into the content itself, allowing us to build controls for advertisers that mirror those we provide in other environments. Our measurement team has laid the groundwork to create clarity into the buying environment — normalizing app names and working with our supply partners to ensure accuracy. Building on our existing tagging infrastructure, DV's CTV brand safety solution will offer comprehensive coverage at the most granular level, all measurable through DV Pinnacle®.

Expected Timing

Brand Safety Capabilities

H1 2020



PHASE 1

Device and app transparency — monitoring and reporting, providing clarity into where your ads are running — across thousands of apps, covering over ten app stores.



App-level brand safety controls — including:

- Inclusion/Exclusion lists
- Star ratings
- Store categories
- Age ratings

No Custom integration required!

H2 2020



PHASE 2

Content-level transparency — monitoring and reporting, providing clarity into the context and programming your ads appear beside.



Content-level brand safety controls — including:

- Category avoidance
- Avoidance of specific programming

Viewability in CTV

Many believe that ads on Connected TV (CTV) are inherently viewable and non-skippable. This may seem logical, but it doesn't account for other factors — like how many pixels are in view, whether the tv screen is on, or if programming is continuously playing in the background. Since these factors impact the effectiveness of advertising on CTV, advertisers increasingly are demanding the ability to verify viewability on CTV. Doing so would create a common measure for advertisers to evaluate media effectiveness across all channels.

DV's CTV Viewability Solution

While definitions for viewability in CTV have yet to be created, the existing MRC definition for viewability within digital ads — that 50% of the ad is in view for at least two seconds — provides a baseline for gauging potential impact.

DV is building a solution that will provide advertisers with the ability to measure the effectiveness of their CTV ad campaigns by providing two key data sets: Quartile progression and fully on-screen measurement. Measurement based on these two factors will give advertisers insight into how long the video ad played, and whether the ad was displayed on the entire screen.



Quartile Measurement for CTV

Quartile completion metrics are measured and reported for impressions that are delivered via the DV video OmniTag, which already enjoys wide adoption across video partners. DV will provide a breakdown of video ad playback, enabling a buyer to understand how many impressions were played to completion, and identify drop-off patterns along the way.

DV's solution measures quartile completion via image tags implemented on standard VAST quartile trackers. These trackers are supported today on effectively all CTV traffic that is compliant with VAST 2.0 and higher. This new quartile completion measurement will be performed on any impression where quartile trackers are implemented, regardless of the device.

VAST Visibility Certification Ensure Ads Are Fully On-screen

Fully on-screen metrics are a subset of completion metrics on supply where DV has also completed a VAST Visibility Certification. Such certified impressions are confirmed to originate from sources (devices, apps, platforms) that deliver 100% of the ad's pixels on the screen consistently. These metrics are the best proxy for viewability — ensuring that all the ad's pixels were visible on the screen for the duration of the measured quartile. No other provider is offering this level of coverage, or assurance that an advertiser's ads are being properly measured.

Being Part of the Solution



DV strongly believes that we must address the standardization issues that impede measurement in a scalable, consistent way. Industry standardization would provide advertisers with a consistent measure of media quality across all of their campaigns.

Since its inception in October 2017, DV has been part of the IAB Tech Lab's Open Measurement Working Group, which manages the creation and adoption of the Open Measurement Software Development Kit (OM SDK). The OM SDK facilitates third-party viewability and verification measurement for ads served to mobile app environments, without requiring multiple ad verification service providers' Software Development Kit (SDK). Ultimately, it is the goal of this working group to develop standard viewability measures for CTV that can be incorporated into an SDK for CTV.

Road Map to Standardization and Consistent Measurement

IAB TechLab rolls out VAST 4.1 in 2018, which provides additional data needed to support OTT measurement.

IAB OM Working Group launches OM SDK version 1.3 for mobile app, including updates for better measurement, audio ad support and additional enhancements.

CURRENT

Implementation of Open Measurement Interface Definition (OMID) for web browser, covering comprehensive online video.

Definition, implementation and adoption of OM SDK for CTV, enabling consistent measurement across the channel and eliminating the need for custom, one-off integrations.

What's Next: DV Exclusive (H1 2020)

Pre-serve Filtering

Pre-serve Filtering enables filtering of non-compliant video impressions on VAST traffic, without requiring VPAID. Pre-serve Filtering works on all video ad traffic that is tagged with the DV video OmniTag – across desktop, mobile web, mobile app and CTV. We do not require any supply-side or custom integrations for this to work.

DV is the only provider to offer this type of protection.

DoubleVerify: Powering the New Standard of Marketing Performance

DoubleVerify is the leading independent platform for digital media measurement software, data and analytics. DV authenticates the quality of digital media for brands, providing pre- and post-bid solutions across platforms, channels and formats.

Achieve Clarity and Confidence in Your Digital Investment

The DV Authentic Impression® is a proprietary, MRC-accredited metric that ensures both media quality and media effectiveness. To be counted as Authentic, an impression must satisfy all of the following criteria:

- Fully viewed
- By a human
- In a brand safe environment
- Within the correct geography

DV is the only company accredited to measure and de-duplicate impression quality in this manner — enabling brands to use the Authentic Impression® as their definitive measure of quality.

DV's CTV verification solutions reinforce our commitment to power the new standard of marketing performance across devices, formats and platforms — giving you clarity and confidence in your digital investment



LEARN MORE

If you'd like to learn more about DV's solutions please contact Sales@DoubleVerify.com

Let's Build a **Better Industry**®

