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INTERTRUST WHITE PAPER

Bridging DRM and CAS

How Intertrust XCA™ Provides
a Unified Content Protection
Infrastructure for Broadcasters

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Introduction

Consumers are increasingly opting for Internet-based over-the-top TV (OTT) over traditional linear TV. However, there is still a large population of consumers of linear TV who have not yet cut the cord and the lure of live sports broadcasting is one key type of content that is likely to keep them there for the foreseeable future. Linear TV broadcasters will have to embrace both OTT and traditional broadcast networks. With the popularity of OTT, digital rights management (DRM) is supplanting traditional conditional access systems (CAS) as the content protection technology of choice. The winning content protection technology needs to be future perfect and past-proof. This paper discusses the requirements for such a solution.

Today, there are two mainstream choices for content protection: either conditional access used in legacy satellite and cable TV, or digital rights management, which serves the OTT market.

OTT continues to chip away at cable and satellite subscriber rates with live-linear OTT video expected to surpass traditional broadcast TV by 2023¹. In fact, the global OTT devices and services market will reach USD 165 billion in 2025 compared to USD 29 billion in 2015².

With OTT becoming the mainstream video delivery media, deploying DRM is how to future-proof your content protection. As the inventor of DRM, Intertrust delivers a solution that is cost effective, can be seamlessly upgraded to scale, and is compatible with every major DRM system on the market today.

However, the traditional conditional access system (CAS) infrastructure cannot be ignored. Broadcast technology is infinitely scalable, widely deployed and (so far) offers an unbeatable user experience – especially for live sports. That being said, innovation in CAS has peaked with card-less technology which helps to lower operating and upgrade costs. Therefore, the solution is to past-proof content protection by offering support for both broadband and broadcast devices.

As “one-way broadcast” companies continue to deploy OTT services to compete, they have had to manage two content protection solutions to bridge both digital broadcast as well as OTT video delivery. Managing CAS and DRM is not cost-effective and this inefficiency will become more uneconomical as DRM’s agility has expanded to both on-premise and in the cloud. The solution, then, will be content protection that services traditional conditional access infrastructure while supporting the OTT streaming future.

¹ <http://news.level3.com/2017-04-20-Over-the-Top-Video-will-Overtake-TV-within-Five-Years>

² <http://www.marketwatch.com/story/ott-devices-and-services-market-size-worth-16513-billion-by-2025-grand-view-research-inc-2017-07-24-520328>

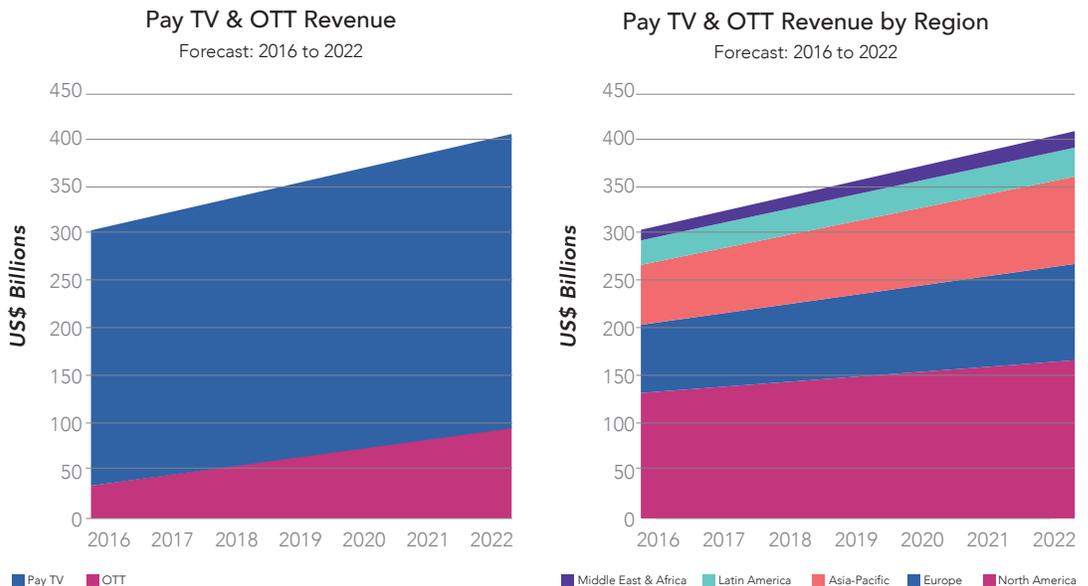
DRM Position Cemented by Surging OTT Demand

There are no signs of OTT growth slowing down. For example, viewership of live-linear over-the-top (OTT) video is expected to surpass traditional broadcast TV³ within the next five years. While the OTT devices and services market will reach USD 165 billion by 2025, OTT media revenue will grow from \$46.5 billion in 2017 to \$88.4 billion in 2022⁴.

Subscription video-on-demand (SVOD) comprises 40 percent of the OTT market with the majority of the revenue coming from the United States. By 2022, SVOD penetration will be 132% of US TV households with many homes having more than one SVOD platform⁵.

“All TV is now OTT” - ABI Research

In comparison, the largest pay TV providers in the US lost 405,000 net video subscribers in Q3 2017, a large increase compared to the loss of 250,000 subscribers in Q3 2016. Large losses were seen across the top six cable companies who lost 290,000 subscribers in Q3 2017 compared to a loss of 90,000 subscribers in Q3 2016. Some of the more staggering losses came from satellite TV services, which lost over 1.5 million subscribers in 2017 – a loss of nearly double in 2016 which reported a “pro forma” loss of 760,000 subscribers⁶.



³ <http://news.level3.com/2017-04-20-Over-the-Top-Video-will-Overtake-TV-within-Five-Years>

⁴ <https://www.statista.com/statistics/260179/over-the-top-revenue-worldwide/>

⁵ <https://www.benzinga.com/pressreleases/17/08/b9996845/north-america-ott-tv-and-video-forecasts-to-2022-by-platform-household->

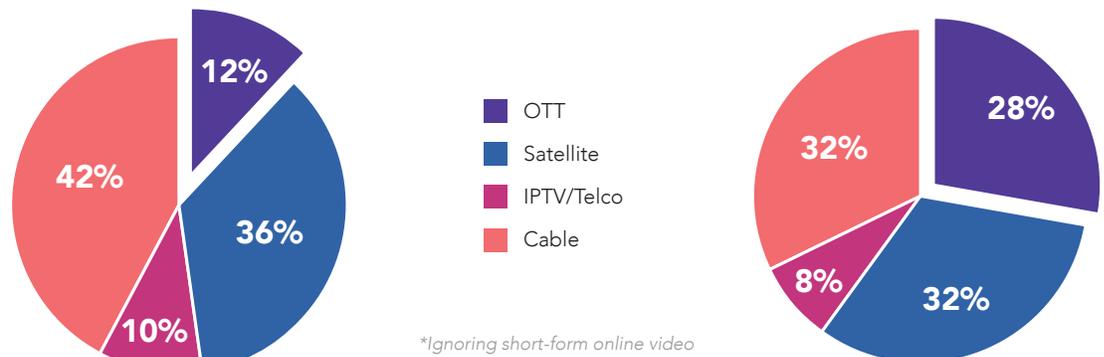
⁶ <http://www.leichtmanresearch.com/press/111517release.html>

Traditional Pay TV revenues are expected to continue to remain much larger than OTT revenue through 2022. (Source = ABI Research) Still, with OTT revenue growing at higher rate than Pay TV, video service operators need to address both.

Globally, consumption among cord-cutters, i.e. consumers who drop pay TV services, is growing rapidly. On average, cord-cutters consume nearly 80 hours of content per month. Mobile is a major contributor to the OTT video boom as watching OTT video on mobile devices grew 85% between 2010 and 2016. Meanwhile, consumption on fixed screens decreased 14% over the same period⁷. This will contribute to a 16% gain in OTT revenue from 12% of market share in 2016 to 28% of market share in 2022. In Europe, the market share will increase from 11% to 21%⁸. As OTT takes a dominant position, DRM, which revolutionized content protection with the advent of the Internet, will also be the dominant content protection technology.

OTT and Pay TV Market Share (North America)

OTT*: 16% Points Market Share Gain



In the North American market, OTT is forecasted to more than double its market share by 2022 compared to 2016. This growth is coming at the expense of traditional Pay TV systems. (Source = ABI Research)

⁷ <https://edelman.digital.com/wp-content/uploads/2016/12/2017-Edelman-Digital-Trends-Report.pdf>

⁸ <https://www.abiresearch.com/market-research/product/1029927-ott-20-understanding-the-new-pay-tv-landsc/>

“For years, broadcasters and network TV operators were gatekept by conditional access providers who dictated onerous pricing and business terms in exchange for restrictive content protection, while Internet TV operators used cheap, efficient DRM sourced from multiple parties.”

-Talal Shamoon, Intertrust

Live Sports a Boon for Traditional Broadcasters

While it is clear that OTT's upward trajectory is unstoppable, traditional broadcast will continue to be a vibrant part of the video ecosystem. The Nielsen Company reports that in Q1/2018, on the average adults in the US actually spent 16 more minutes watching live TV than they did in the Q3/2017⁹. One very important use case where broadcast is expected to continue to have an advantage over OTT for some time is live sports.

There are a number of innate advantages that broadcast has over OTT when streaming live sporting events. Latency in live television streams continues to be a serious issue for OTT, as well as poor picture quality, and buffering issues. These issues can potentially lead to subscriber attrition as 34% of sport fans in a recent survey stated they would cancel a service that gives them these issues¹⁰. Major concerns factoring into the responses include spoilers in the event the stream has not caught up to the live game or missing key plays in the game. 43% stated they would feel they had wasted their money if they experienced latency issues.

Live sports is one of the primary motivators keeping people connected to the cord



Source: PwC Consumer Intelligence Series video survey, 2017 (c) 2017 PricewaterhouseCoopers LLP, a Delaware limited liability partnership

Live sports video transmission continues to be a very lucrative and competitive market. For example, the large and multi-cultural population in the U.S. has made it a battle ground for coverage of the English Premier League, Tour de France, rugby, and motocross, to name a few. In fact, loyalty to live sports viewership in the United States is one of the primary reasons customers there have not cut the cord, with 81% of sports fans subscribing to pay TV and 91% stating they subscribe to pay TV for access to games¹¹.

Takeaway: Video service operators will need to find solutions that bridge both traditional broadcasting infrastructure as well as OTT. For content protection, that means supporting both conditional access as well as DRM.

⁹ <https://advanced-television.com/2018/08/23/nielsen-us-live-tv-viewing-up-16min-in-6-months/>

¹⁰ <https://phenixrts.com/#research-sports-report-2017>

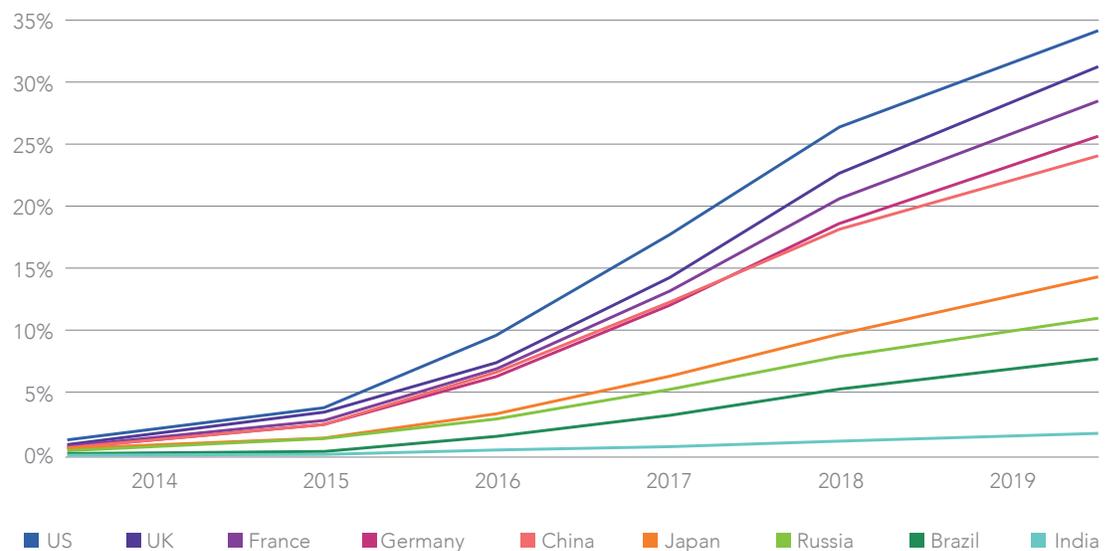
¹¹ <https://www.pwc.com/us/en/advisory-services/publications/consumer-intelligence-series/i-stream-you-stream/pwc-videoquake-i-stream-you-stream.pdf>

Addressing the Rise of 4K Televisions and UHD Content

When considering content protection infrastructure technologies, another trend that video service operators need to carefully consider is the expected rise of 4K/Ultra HD (UHD) and high dynamic range (HDR) content. 4K/UHD televisions are now one of the fastest-growing segments in the history of consumer electronics. Within the first three years of shipments, 4K/UHD TV shipments overshadowed HDTVs by nearly 4x with 16 million units shipped compared to 4.2 million units¹². Rapid penetration is occurring globally with 35% of all U.S. households forecast to have a 4K/UHD television by 2019, followed by the United Kingdom with 31%, 25% in the European Union, and 24% in China.

The global 4K/UHD TV market is expected to reach \$380.9 billion by 2025 due to enhanced graphics, the pressure for manufacturers to reduce prices and the popularity of ultra-high definition (UHD) content¹³.

4K (UHD) TV household penetration by major country



Source: IHS

4K/UHD TVs are forecasted to have a significant market share in many major countries by 2019. (Source = IHS Markit)

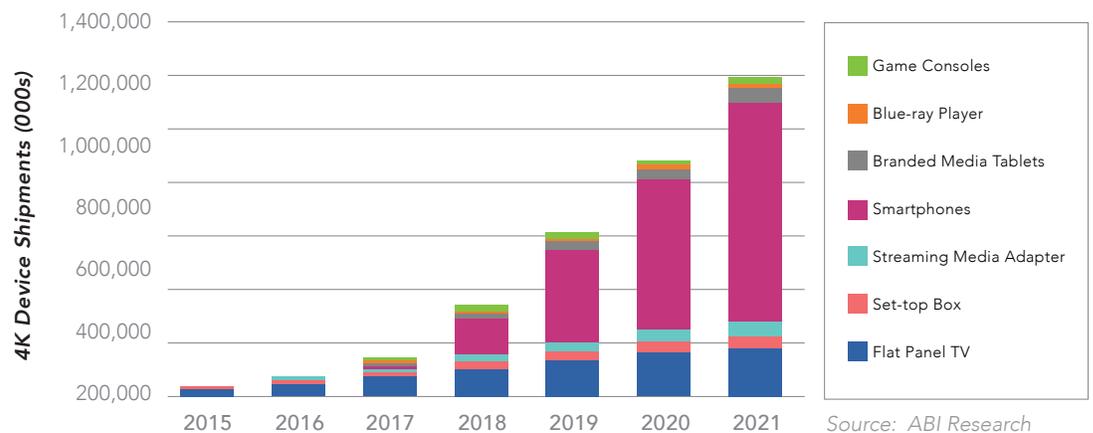
¹² <http://www.streamingmedia.com/Articles/Editorial/Featured-Articles/The-State-of-4K-and-HDR-2017-117304.aspx>

¹³ <https://www.grandviewresearch.com/press-release/global-4k-tv-market>

Today, 4K/UHD content is seen as a premium offering albeit an expensive one with a digital copy of a 4K/UHD movie costing US \$30. BT Sport was a pioneer of 4K/UHD broadcasts. In OTT, Netflix and Amazon were also early to the market to deliver 4K/UHD content with hits such as Stranger Things and House of Cards. Today, most major broadcasting companies and content providers are providing 4K/UHD content. AT&T has a DirecTV dedicated 4K/UHD channel including 4K Major League Baseball broadcasts, PGA tournaments, and UFC fights. Other notable 4K/UHD and HDR content includes the 2018 Winter Olympics, Warner Brothers, BBC's Planet Earth, Hulu and YouTube.

Movies and TV shows display four times the resolution with 4K/UHD as compared to HD content¹⁴, and therefore, it has become the studios' most valuable content requiring robust content protection.

4K device shipments by device type - World markets, Forecast: 2015 to 2021



By 2021, a large number of popular media devices supporting 4K/UHD playback are forecasted to be in the hands of consumers. (Source = ABI Research)

How to Secure Premium 4K/UHD Content

The high resolution and image quality of 4K/UHD television content is on par with high quality digital cinema. This means that 4K/UHD television files are very valuable property and have to be protected accordingly. MovieLabs, a research and development organization focusing on movie and television technologies, has published Enhanced Content Protection specification (<https://movielabs.com/solutions-specifications/enhanced-content-protection-ecp/>) to provide a guideline for 4K/UHD content protection requirements.

¹⁴ 3840x2160 vs. 1920x1080

The MovieLabs 4K/UHD content protection specifications require video playback device makers to support:

- A TEE (trusted execution environment) that must take care of content decryption, and handling of any cryptographic material e.g., device keys, content keys etc. as well as other security processes.
- A SVP (secure video path) where the decrypted buffer is securely transmitted to the rendering element of the device e.g. display
- Hardware descrambler
- HDCP 2.2 or higher
- Watermarking

The SoC (System on Chip) platforms that power modern digital devices are advancing their security features to support these requirements. Intertrust's DRM solution, ExpressPlay™, takes advantage of SoC implemented security features such as TEE and SVP. ExpressPlay also supports watermarking to offer the highest level of content protection for premium content distribution.

Conclusion

Media companies today are under immense pressure from competition and declining subscriber rates of their traditional services. Traditional broadcasters must bridge the old TV models with new OTT consumption demands while investing in heightened security for high quality 4K/UHD content. As the legacy inventor of DRM, Intertrust is uniquely positioned to solve these current pain points that broadcast providers face. Our ExpressPlay XCA™ product blends both CA and DRM into a single unified infrastructure. It offers a disruptive, card-less conditional access system (CAS) that uses open standard Marlin DRM to let broadcasters and network operators deliver content to a set-top-box (STB) or smart TV via DVB (digital video broadcasting) channels. It requires no dedicated hardware in devices or external modules such as conditional access modules (CAM) and supports both DVB broadcast-only devices, broadband, and hybrid broadcast and broadband devices. ExpressPlay CA supports multiple use cases that include typical CA scenarios, IPTV (Internet Protocol TV) platforms, and OTT services. With ExpressPlay XCA, video service operators can have an economical content protection solution that both covers their current streams while giving them the flexibility to quickly address the OTT future.

**Our open standards technology is flexible,
cost efficient and frees the operator from
proprietary products.**

“We designed ExpressPlay XCA to support broadcasters to bring the power and cost efficiency of DRM to the conditional access world. Given our footprint in connected TVs and set top boxes, we can deliver a seamless, secure experience that scales and grows with broadcasters’ needs,”

-Talal Shamoon, Intertrust