DTVKit

DVB-NIP & ATSC 3.0

IP Video and The Future of Broadcast

WHITEPAPER

This Whitepaper Will Explain How:

1

DVB-NIP and ATSC 3.0 enable broadcast TV to meet the needs of consumers who expect to view content when they want on whichever device they choose.

Both standards use IP technology to deliver advanced services but do not necessarily require a broadband connection to do so.

2

DVB-NIP and ATSC 3.0 differ in their origins.

ATSC 3.0 was designed from the ground up as a new standard to deliver terrestrial broadcast services, including 4K UHD TV in markets including the USA. DVB-NIP is built on existing DVB standards work to deliver linear and non-linear, multiscreen video using broadcast technology, and is platform-agnostic.

3

DVB-NIP could be applied to a range of use cases.

These include as an upgrade path for satellite broadcasting in emerging markets, for media delivery in hospitality and education, and as an energy-efficient primary distribution technology for live event programming.

DVB-NIP and ATSC 3.0 can bring benefits both for consumers and broadcasters.

They enable consumers to view content on-demand and interactive services on a range of devices, as well as enabling the transmission of formats such as 4K UHD TV. For broadcasters, they reduce the cost and complexity of delivering content by enabling them to format video only once for delivery to multiple end points.

4

DVB-NIP and ATSC 3.0 face several challenges that could stand in the way of widespread adoption.

These include the need for broadcasters to continue to deliver content to large bases of legacy devices using older technology, expensive licensing requirements in the case of ATSC 3.0 and a long-term decline in the use of broadcast technology in favour of OTT streaming. This could potentially disincentivise broadcasters from investing in large-scale rollouts of new generation one-to-many technologies.

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DVB-NIP & ATSC 3.0

The Next Generation of Broadcast TV Technology

Growing demand for on-demand TV and the desire to consume both linear and on-demand video on a range of screens, along with **interest in higher-quality formats** such as Ultra HD TV, present big challenges to broadcasters and the one-to-many infrastructure they have historically been associated with.

DVB-NIP and ATSC 3.0 – two recent IP-centric video delivery standards – **have emerged to help broadcasters stay relevant in this new environment.**

DVB-NIP & ATSC 3.0

What Are They and What Do They Do?

DVB-NIP and ATSC 3.0 (also known by its US brand extension NextGen TV) are **technical software standards** designed to enable broadcast TV to evolve to meet the needs of a new generation of consumers who expect to be able to **view content where, when and how they want.**

Both standards use **IP to deliver video, audio and interactive services**. (While in most cases broadcasters are now expected to use a combination of **over-the-air and internet delivery to provide maximum flexibility to consumers,** DVB-NIP and ATSC 3.0 do not necessarily require a broadband return path to work.)

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ATSC 3.0

UHD TV and Interactive Services

ATSC 3.0 is the more established of the two standards and is being progressively deployed across the USA.

In addition to the USA, **ATSC 3.0 underpins the deployment of the next generation of TV in South Korea** and is to be used in **Brazil to serve as the basis for the country's ambitious TV 3.0 initiative.**

Several other markets may also adopt the technology, including India, where the ATSC 3.0 standard **may underpin a platform to be used to deliver TV service to a mobile-centric consumer.**

ATSC 3.0 Enables TV Stations to Deliver

- 1080P FULL **HD**
- 4K ULTRA **HD**
- OVER THE AIR
- HDR
- WIDE COLOUR GAMUT (WCG)
- HIGH FRAME RATE (HFR)
- DOLBY ATMOS™
- dts X

ATSC 3.0 can also support the delivery of a range of interactive services.

End users need a compatible TV or set-top box to receive ATSC 3.0 TV signals.

DVB-NIP

Updating DVB for the Multiscreen Era

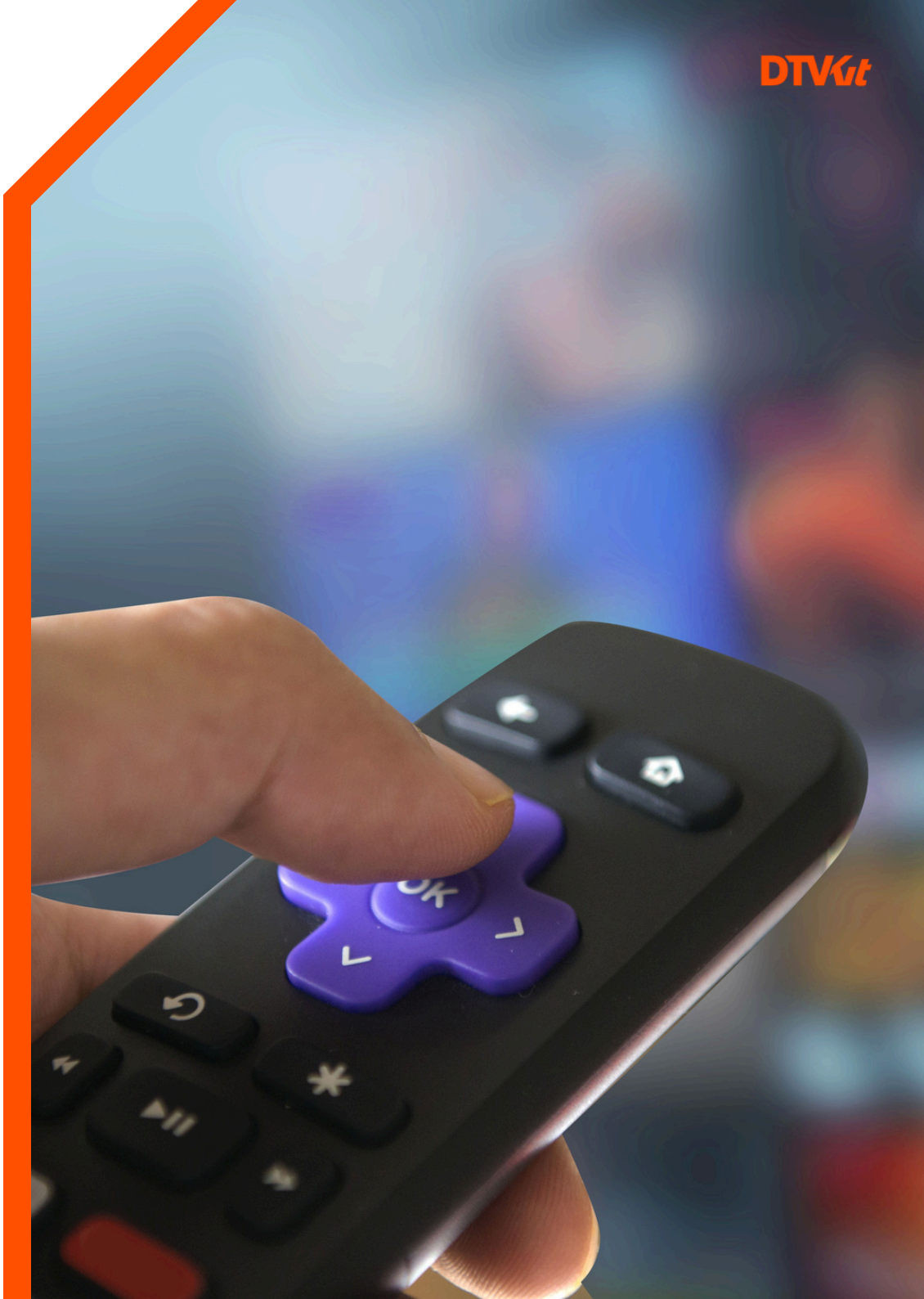
DVB-NIP (which stands for Native IP) is a more recent standard **designed to update DVB to meet the needs of a modern audience habituated to non-linear, multiscreen consumption of content**, and the media organisations that serve those consumers.

The standard is IP-based and does not rely on the MPEG-2 Transport Stream layer that underpins standards such as:

DVB T DVB S DVB C

DVB T2 DVB S2

It enables media providers to operate a single OTT infrastructure to reach all devices and, because it uses DRM (Digital Rights Management) rather than Conditional Access System for security, it is mobile-friendly.



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ATSC 3.0 & DVB-NIP

What Are The Differences?

ATSC 3.0 was designed from the ground up to replace the standard that underpins over-the-air broadcasts in the US.

Currently – ATSC 1.0 – was first deployed almost 30 years ago and is also used in several international markets such as Korea.

ATSC 3.0 is already being used (under the NextGen TV brand) to deploy IP-based TV services across several US broadcast markets.

VS

DVB-NIP is at an earlier stage and commercial deployments have yet to start.

Applications of the technology are expected to include its use to feed hotspots and public venues with high-quality linear TV, the delivery of TV services to ships, planes and hospitality markets, and the use of bi-directional satellite networks to deliver interactive video services.

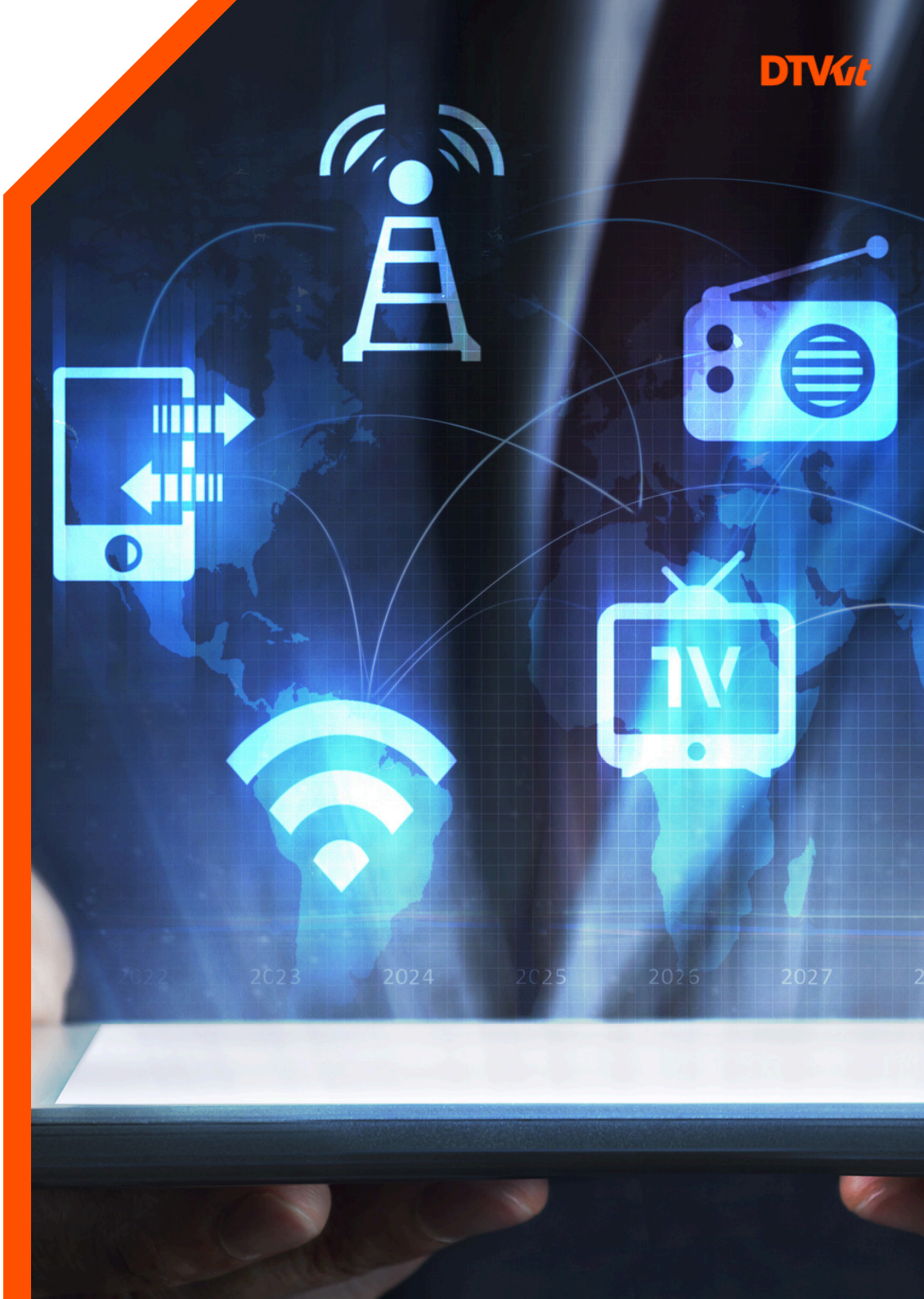
It may also have a wider application in delivering consumer TV services, particularly in emerging markets.

What Problems Do These Technologies Solve?

Market drivers favouring adoption of ATSC 3.0 and DVB-NIP include changing consumer habits – namely, the growing importance of anytime viewing of content on-demand, demand (particularly from a younger demographic) for video to be made available on a range of devices other than the traditional TV screen, and demand for better picture quality on new larger TV screens.

ATSC 3.0 technology enables TV viewers with compatible equipment to watch local news and weather on-demand, for example. They can also start to receive services that are already available in Europe thanks to the Hybrid Broadcast Broadband TV (HbbTV) standard, such as start-over TV.

While ATSC 3.0 does not require TVs to be connected to the internet, users connecting their devices to the web will benefit from a much larger set of applications.



Benefits to Broadcasters

In addition to the 'pull' factors of changing consumer habits, adoption of these new broadcast technologies could be driven by 'push' factors – notably pressure from government to make the spectrum currently used for broadcast available for other purposes in the future.

DVB-NIP and ATSC 3.0 can also benefit broadcasters by **reducing the cost and complexity of serving different end devices and non-linear viewing.** By removing the need to reformat video for multiple devices and for on-demand viewing, **ATSC 3.0 and DVB-NIP enable broadcasters to format once for distribution across multiple end points,** reducing infrastructure costs significantly.

ATSC 3.0 also gives broadcasters the ability **to measure viewership of programmes more accurately.** This capability can be used to **deliver targeted advertising enabling them to more effectively monetise their services.**

As IP-based standards, A**TSC 3.0 and DVB-NIP bring content security into play – an important facilitating factor in the rollout of UHD TV** as well as an enabler of the deployment of premium services – in a way that does not involve the use of CI+ CAMs or set-top boxes.

Unlike ATSC 3.0, **DVB-NIP comes without the need to pay royalties for the use of its open-source technology** (although adopters will pay royalties if they encode content in HEVC for example).

Whereas ATSC 3.0 is exclusively a terrestrial standard, DVB-NIP is also network-agnostic. In fact, it is more likely t**o be adopted in the near term by satellite providers keen to ensure that satellite remains relevant for TV**, than as a replacement for existing terrestrial broadcast standards.

DVB-NIP & ATSC 3.0

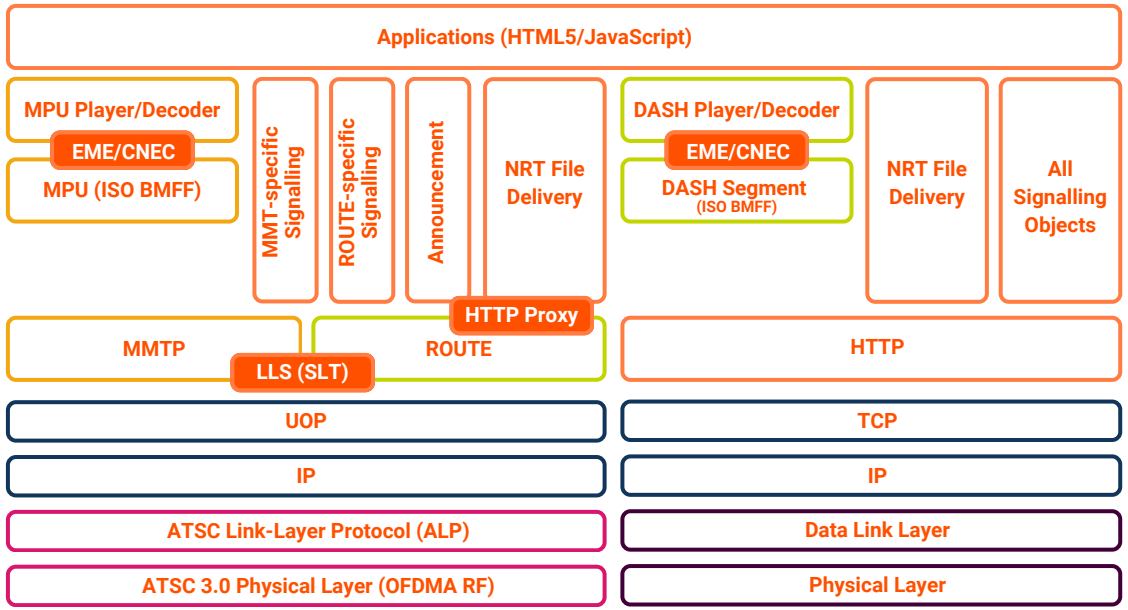
How do they work?

DVB-NIP and ATSC 3.0 are both designed to enable video services to be formatted one time for delivery to TVs and other devices such as mobile phones, thus saving server space, energy and bandwidth.

Both standards make use of recent advances in compression to **deliver TV and interactive services more efficiently over limited bandwidth.**

However, there are significant differences between the two standards. **ATSC 3.0 is inherently not backward compatible with ATSC 1.0 because of a wholesale switch over to IP delivery of content.**

DVB-NIP in contrast extends DVB core standards with an additional IP 'native' transport pipe that can be carried alongside the legacy MPEG-2 TS stream.

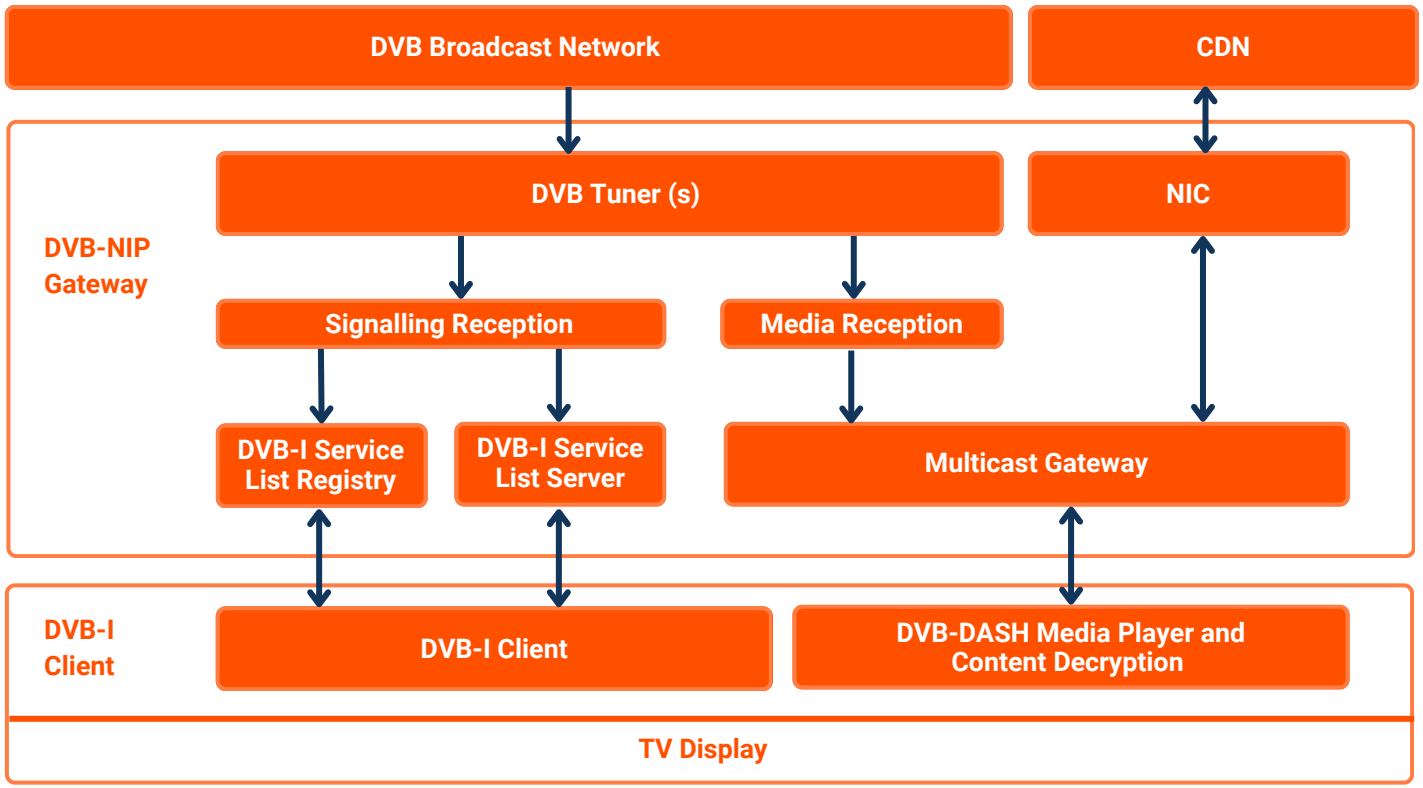


DVB-NIP & ATSC 3.0

How do they work?

DVB-NIP adds **DVB-GSE (Generic Stream Encapsulation)** complementing the legacy **DVB-MPE (Multiprotocol Encapsulation).**

GSE improves bandwidth utilisation enabling more content to be delivered over existing infrastructure.

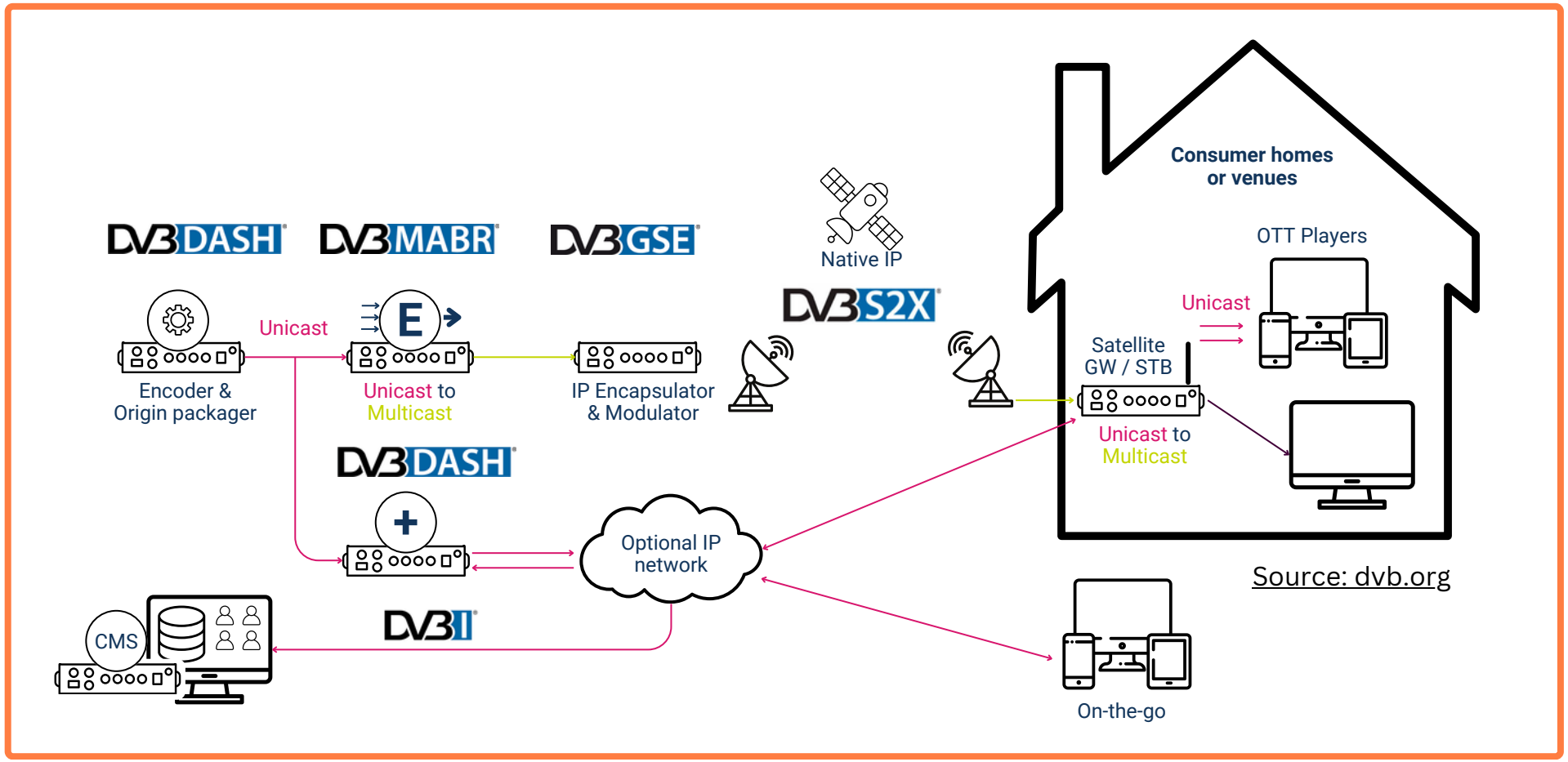


Source: ETSI TS 103 876 V1.1.1 (2024-09)

DVB-NIP & ATSC 3.0

How do they work?

DVB-NIP notably also **uses DVB-I for service discovery and programme metadata, as well as DVB-AVC and DVB-DASH for encoding and packaging,** and can utilise DVB-MABR for multicast distribution. The standard uses DVB-S2X and DVB-T2 bearers for physical transport, as well as some DVB-HB (Home Broadcast) technologies for in-home distribution.



DVB-NIP

The Role of DVB-I

The most important existing standard underpinning DVB-NIP is DVB-I. Unlike an MPEG-2 Transport Stream, OTT adaptive bit-rate unicast streams, whether delivered using HLS or MPEG-DASH, do not come with headers containing service information about the channels, such as the name of the channel and EPG data.

Instead, **bi-directional broadband networks enable client devices such as set-top boxes or mobile phones to receive XML files** with this information.

Unidirectional satellite or terrestrial networks lack this crucial return path. Instead, **DVB-I enables the transmission of EPG data and other information alongside the OTT video stream.**

Neither **DVB-NIP nor ATSC 3.0 are backward-compatible with legacy TVs and set-top boxes.**

The DVB-NIP standard does however have an optional mode that uses DVB-MPE (rather than the slightly lower overhead DVB-GSE) **to deliver IP streams within an MPEG-2 Transport Stream,** allowing, for example, delivery over DVB-S2 via the same satellite transponder used for broadcast distribution.

One of the key advantages of DVB-NIP is that it can **reduce CDN costs for a broadcaster or media company,** with CDN functionality effectively transferred to an end device such as a set-top box, which **de-encapsulates the multicast stream and distributes the unicast streams within for consumption.**

What challenges do they face?

Both ATSC 3.0/NextGen TV and DVB-NIP face challenges on several fronts.

Broadcasters in the USA, whether currently deploying NextGen TV or not, are highly unlikely to switch off legacy ATSC 1.0 services soon, as this is a move that could potentially disenfranchise millions of viewers. That means they have only limited spectrum available to launch NextGen TV services for the foreseeable future.

This has led local broadcasters to cooperate by sharing spectrum to deliver their services over a single frequency. The shortage of spectrum for ATSC 3.0 **means that broadcasters are to some extent restricted when it comes to launching over-the-air UHD TV services.**

This challenge deprives ATSC 3.0 of a clear, easily defined, marketable selling point, forcing TV manufacturers and broadcasters to try to communicate a range of less easily categorisable benefits to consumers.

While ATSC 3.0 (and DVB-NIP) could in theory also enable broadcasters to deliver live and on-demand services direct to mobile phone users, **in practice this would require additional hardware capability in the handset,** something that mobile phone companies may not wish to promote as it could compromise their own position as gatekeeper.

One challenge standing in the way of the widespread penetration of NextGen TV-capable screens **is the licensing terms for the technology,** something that led LG to suspend production of its most recent generation (2024) of NextGen TV-enabled devices.

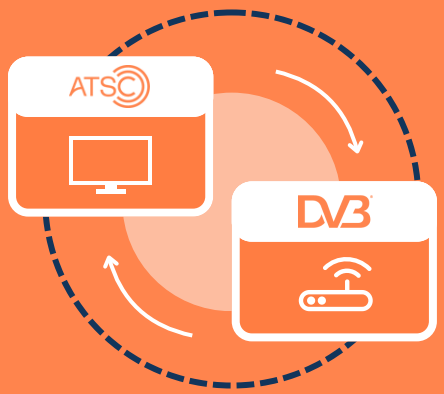
However, in general **manufacturer support for the technology has been consistent,** with Samsung incorporating it into its top range of TVs and Sony deploying it across all categories of screen.

Backward compatibility

As already mentioned, neither ATSC 3.0 nor DVB-NIP are backwards-compatible with previous generations of client device, and so require consumers to invest in a new TV set or a set-top converter.

In the case of ATSC 3.0, a combination of more widespread availability of compatible TVs, **the natural turnover of devices, and the availability of low-cost converter boxes could help overcome this hurdle,** but the speed and extent at which the technology is adopted remains to be seen.

DVB-NIP is also not compatible with previous generations of set-top box. A DVB-MPE stream needs to be de-encapsulated at the point of the end device, and the OTT unicast streams within need to be buffered to ensure smooth channel change times. All of this requires a device with greater processing power than legacy boxes possess – even if they could in theory be software-upgraded.



This means that **DTH satellite service providers, with millions of legacy boxes in homes, are unlikely to rush to migrate to the new standard.** Simulcasting in DVB-S2 and DVB-NIP to address DVB-NIP boxes for new customers or as replacements alongside a deployed base of legacy boxes would also be expensive, as it would require additional transponder capacity.

DVB-NIP does give service providers the ability to reduce CDN costs and to provide a seamless multi-screen experience along with non-linear services. But making a commercial case for a mass-market rollout is likely to be challenging, especially in mature markets with pervasive high-speed broadband and a declining use of satellite.

In practice, **this means that DVB-NIP is probably more suited in the near term for greenfield applications** – such as hospitality and education. Other applications include its use in emerging markets, where it can be deployed to deliver content to a central location in villages for distribution as unicast streams to mobile phones, for example.

DVB-NIP & ATSC 3.0

What's Next?

Both ATSC 3.0 and DVB-NIP are designed to enable broadcast TV to accommodate changing consumption patterns and growing demand for non-linear and multi-devices viewing options, as well as demand for UHD TV services.

Broadcasters are competing for attention with global streaming giants. One possible outcome of the shift in consumption and the simultaneous pressure to re-use broadcast spectrum for mobile connectivity is that broadcast TV will wither away, to be replaced by an all-streaming world where all TV content is delivered over the web.

How quickly and how universally such a transition to streaming occurs is to some extent a matter of conjecture. Governments are keen to reap the financial rewards of reallocating broadcast spectrum through spectrum auctions but are nervous about inconveniencing or disenfranchising voters still accustomed to receiving free over-the-air TV – either as their main means of receiving TV or to feed secondary TV sets in the home.

It is therefore likely that broadcast technology will continue to be used for some time – particularly if it can be modified to adapt to changing consumption patterns.

While ATSC 3.0 is being deployed in the USA and other markets, the extent of the future application of DVB-NIP in existing DVB markets is not yet clear.

In the UK, a major digital-terrestrial TV market, **broadcasters have coalesced around the HbbTV OpApp-based Freely as the next iteration of free-to-view TV** – a hybrid system that combines legacy DVB broadcast with streaming in a seamless user experience. In other DVB-T/T2 markets, broadcasters have also invested in HbbTV-based systems.

DVB-NIP Recent Initiatives

In the near term, to achieve greater adoption, DVB-NIP will likely have to address use cases such as push-VOD, digital video recording and DRM over one-way networks.

1

DTVKit has launched new software to support both DVB-NIP and ATSC 3.0.

DVB-NIP has been implemented using an extension of DTVKit's DVB Core to support service discovery for both MPE and GSE. DTVKit's ATSC 3.0 solution is a Linux and Android based software stack, compatible with set-top box, television and gateway devices.

2

Long-standing DTVKit member and set-top manufacturer EKT demonstrated its DVB-NIP-based SKYflow end-to-end ecosystem at IBC 2024, in collaboration with ST Engineering iDirect, EasyBroadcast and Broadpeak.

3

The companies teamed up to show how SKYflow could take content from a headend via an EasyBroadcast Content Management System, encapsulated in DVB-GSE or DVB-MPE, using Multicast ABR technology from Broadpeak and modulation by ST Engineering iDirect for delivery to an EKT set-top box, where it was de-encapsulated.

*SKYflow remains the only fully deployed DVB-NIP system currently.

4

The boxes also received and interpreted the DVB-I metadata, channel lists and EPG information.

The content was distributed as unicast streams to mobile devices via a nanoCDN and dedicated Apple and Android apps. EKT also provided an HDMI dongle for distribution to a second TV screen.

5

The DTVKit DVB-NIP software will be supported by the organisation's white label development platform to enable its members to evaluate and develop prototypes. Being a DTVKit member means you can have full source code access to both of these as part of your membership.

DTVKit

Are you looking to integrate
DVB-NIP or **ATSC 3.0?**

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DTVKit

About DTVKit

"With a focus on flexibility and innovation, DTVKit helps drive the next generation of digital TV platforms."

DTVKit is a UK not-for-profit organisation collaborating across the consumer electronics industry to deliver the very best production-ready broadcast software for digital TV, enabling manufacturers to build customised TV solutions quickly and efficiently.

We have an ongoing commitment to enhancing our software components to provide members with source code access to the latest software, royalty free.