DVBSCENE
DVB
SEPTEMBER 2026
ISSUE 68



NEW ZEALAND PUTS DVB-I ON THE MAP

Filecasting in DVB Native IP
DVB-I Book Germany published
Understanding server-guided ad insertion

DVBSCENE

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On the cover: New Zealand puts DVB-I on the map. Freeview NZ is launching one of the world's first nationwide DVB-I platforms, building on its existing HbbTV investment to fold broadcast and broadband into a single, seamless viewing experience. On pages 8–9, Technical Lead Tim Diprose explains how a relatively small market got there through close industry collaboration and what other territories can learn from the journey. Image: FrankRamspott, istock

Published by the DVB Project Office, c/o European Broadcasting Union, 17a Ancienne Route, CH-1218 Grand Saconnex, Switzerland.

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Embracing diversity, erasing complexity



Emily Dubs
Head of Technology, DVB Project

Whether speaking 10,000 km east at ABU DBS in Kuala Lumpur, walking the NAB floor 10,000 km west, or presenting at an ITU workshop just down the street in Geneva, I have found myself returning to the same realization: our media distribution landscape is growing richer, more diverse, and undeniably more complex. Yet "fragmentation" is often the only word people hear.

A flurry of new technologies are emerging to address evolving market needs, while new network types – such as 3GPP's 5G Broadcast – continue to enter the delivery mix. Some countries feel compelled to pick a single dominant model for future distribution, but shouldn't an evolved media-delivery ecosystem rely on a dynamic *mix of infrastructures* instead? Rather than choosing sides, it makes far more sense to find avenues where different networks can interoperate rather than compete.

Interactive fixed broadband delivers personalized streaming and monetization, while high-power DTT fulfills a public-service mandate with universal reach, high resilience, and environmental sustainability. Cellular networks and 5G Broadcast open direct pathways to mobile audiences, while satellite ties it all together by covering remote regions and feeding base stations. Each network brings distinct strengths in coverage, resilience, and economics. Embracing this multi-network reality makes complete sense, provided that the underlying complexity remains invisible to end users and straightforward for operators.

This is where DVB's foundational approach helps embrace diversity, working to maximize network commonalities and provide the practical bridges needed to connect services smoothly across different pipes.

DVB-I sits at the heart of this strategy at the service layer, acting as the secret sauce that unifies broadcast, broadband, and mobile streams into a single interface. As highlighted throughout this issue – from Freeview NextGen's nationwide DVB-I launch in New Zealand and imminent developments in Germany to real-world trial insights from Italy – open service discovery is moving rapidly from concept to commercial reality.

Yet discovery is only part of the story. To make heterogeneous networks commercially viable, we must also harmonize the lower levels of the stack and unify transport protocols, packaging formats, codec profiles, and security mechanisms. In these pages, you will see how our community is actively tackling these challenges, for example through the work on filecasting, where teams working on internet streaming (DVB-MABR) and satellite delivery (DVB-NIP) have joined forces to establish a single, unified protocol for non-real-time file delivery.

Looking ahead, as displays may expand beyond traditional screens and AI-driven workflows might shift us from streaming pixels to rendering dynamic media at the edge, open standards will become even more vital. DVB's mission remains unchanged: facilitating transition towards next-generation ecosystems while keeping complexity hidden behind open, harmonized frameworks, so technical diversity can drive commercial value and operational flexibility without fragmenting the user experience.

A defining year for DVB-I

Peter MacAvock (Peng Cheng Laboratory), Chair of the DVB Promotion & Communications Module



We knew 2026 would be critical for DVB-I. It's the DVB solution that carries television's core technologies into the internet age, providing the backbone for a standards-based approach to service discovery and selection. The initial driver for deployment has been the need to modernize the DTT and satellite platforms that so many people still rely on for live television.

DVB-I, for some, is seen as a competitor to streaming platforms. It is not. Rather, it brings streaming's flexibility and personalization to broadcast services at precisely the moment they need modernizing to keep pace. IBC2026 will showcase the launch of national DVB-I platforms in New Zealand and Germany. Several technical innovations in the specs will also be on show, some of them covered in this edition of DVB Scene. Beyond these launches and the mature market trial in Italy, extensive testing is under way in Australia, China, Finland, France, Ireland and Spain.

THEO'S VISION

It's a very different world to the one that gave birth to DVB and its unique approach. In the mid-1990s, consumer electronics was dominated by European and Japanese companies, pay-TV was still emerging, and many consumers still had bulky CRT standard-definition sets in their living rooms. Internet access, still rare, was dial-up.

DVB was chaired at the time by Theo Peek, a Philips board member who believed strongly that Europe's technology borders had to come down if its electronics industry was to survive. Theo passed away earlier this year. The European consumer electronics giants he sought to defend had already disappeared long before Theo left us. He remained proud of the organization he helped found and lead, and prouder still that it had outlasted many of the industry players who created it.

Growing from its European roots, DVB is now a worldwide technology provider, serving media markets across increasingly diverse regions, with technologies that meet commercial needs as they arise. The technology itself is consistent, but the regulatory environments differ, shaped by how each market has evolved over time. DVB now offers a wide range of options for operators and markets to choose from.

Recent outputs from our Promotion & Communications Module are designed to provide guidance on those choices: a non-technical explainer on DVB-I and a guide to the "toolbox" approach used for some DVB specifications can together help stakeholders match the solution to the market.

Are there other areas where you feel guidance is needed? Let us know!

NEW DVB MEMBERS

Find out how to join the DVB Project by visiting: dvb.org/join

AdMongrel builds television advertising and audience measurement technology for broadcasters, advertisers, and platform operators. *"We are excited to contribute to the development of the global standards driving the digital transformation of the broadcast industry. Our focus is on creating innovative hybrid measurement and advertising solutions that seamlessly bridge traditional broadcast and IP streaming, enabling broadcasters to maximize the value of both technologies."* **Atila Madakbas,** CEO
https://www.admongrel.com

Freeview Australia is a joint venture of the country's major free-to-air broadcasters – ABC, SBS, Seven, Nine, and Ten – and began testing DVB-I earlier in 2026. *"Freeview Australia has joined DVB to actively contribute to the evolution of DVB-I, ensuring the standard reflects the needs of free-to-air broadcasters operating in diverse markets. We look forward to collaborating with global partners, sharing learnings from our implementation journey, and contributing an Antipodean perspective to what is becoming a truly global movement."* **Dean Dezius**, General Manager
https://www.freeview.com.au

Ocean Blue Software is a software engineering company specializing in smart TV and broadcast technology, with over 20 years' experience serving TV operators, device manufacturers, and silicon partners. *"We're pleased to join DVB and support the industry's move towards DVB-I for delivering broadcast services over IP. Working with the DVB community, we're building scalable, memory-efficient client solutions and test harnesses to validate DVB-I service lists and URLs – giving manufacturers confidence in metadata integrity."* **Paul Martin**, CEO
https://www.oceanbluesoftware.co.uk

VISIONETICS International specializes in supporting broadcasters, operators, and media professionals in their transition to full digital distribution and monitoring. *"I started working with DVB standards in 1994, with the implementation of the first French digital pay-TV bouquet – and I've been close to DVB technology ever since. Today I am proud to be part of FAVN, preparing a French DVB-I pilot for a hybrid DTT/SAT/IP solution. Joining the DVB Project is a natural next step for us; we are eager to contribute our practical experience to the development of open standards."* **Eric Hautefeuille**, Founder
https://visionetics.fr/



Remo Vogel speaking at DVB World 2026 in Amsterdam

Michiel Ton

The openness of television is now a choice, not a given

Remo Vogel, Chair of the DVB Project

I'll start with an invitation: if you disagree with my perspective, here or in other forums, please challenge it and give me direct feedback. DVB is built by its Members, and these industry conversations only work if we tackle them together, as stakeholders who don't shy away from disagreement.

OUR THIRD ERA

At DVB World in March this year, I shared my perspective on where DVB stands today. I see DVB as being in its third era. The first was defined by the revolutionary introduction of digital broadcasting. The second focused on enhancing the viewing experience through HD and UHD services. Today, we are in the third era, working to bridge the transition between traditional broadcast systems and IP-based delivery.

Since DVB World, we have continued to discuss and refine this mission statement:

> *"We develop interoperable specifications that enable a managed transition to IP-based television, sustaining an open media ecosystem for the benefit of society."*

This statement reflects what is already unfolding across our industry. The shift to IP-based television is no longer a debate; it is an operational reality. When we speak about a managed transition, we are not talking about discarding our past broadcast achievements. On the contrary, we are building on the strengths that broadcasting has delivered over decades. The key word is managed. By that, I mean that we must have the tools and standards to actively shape this transformation – according to our industry's specific requirements, priorities, and timescales – rather than simply reacting to external forces and market pressures.

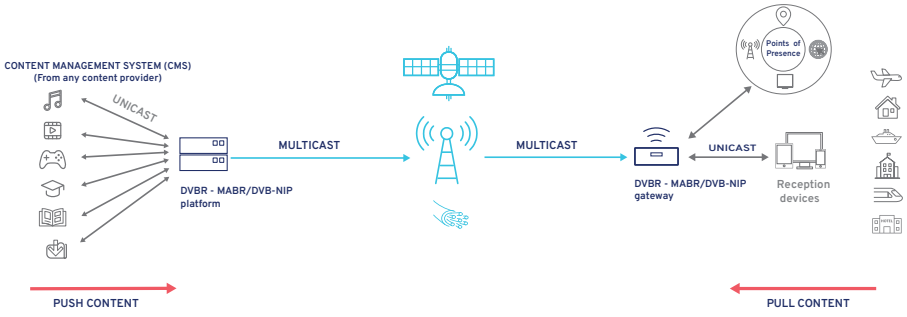
DVB has repeatedly demonstrated the value of open, interoperable standards. As television moves into an IP-centric world, the risk of fragmentation re-emerges: proprietary platforms, operating systems, and technology silos pulling the ecosystem apart. It is our responsibility to ensure that television remains open and interoperable rather than a fragmented collection of individual solutions.

SHARED COMMITMENT

By being a Member of DVB, you are helping to shape this mission and supporting our collective effort to achieve it. We may not always agree on every detail, and that diversity of perspectives from different industry stakeholders and constituencies is one of our strengths. Working together in this shared mission matters, and that shared commitment is why we invest significant time, expertise, and resources into developing, validating, and promoting DVB specifications.

Ultimately, this is about more than technology. An open and interoperable television ecosystem supports media plurality, broad audience reach, consumer choice, and sustainable competition. These are benefits that extend beyond our industry and into society as a whole.

We must actively contribute to the ongoing development of DVB standards while accelerating their deployment in real-world products and services. To achieve this, we need streaming platforms, TV operating system developers, device manufacturers, broadcasters, and content providers at the same table. By combining our expertise, we can create scalable and interoperable solutions that prevent fragmentation and deliver value across the entire ecosystem. If we succeed, DVB's third era will not simply be about adapting television to IP; it will be ensuring that television retains the openness, scale, and reliability that have made it such a powerful medium for decades.



Push/pull concept for filecasting in DVB services: providers push content into the network; and a service provider client application pulls what it needs, according to the end-user's or service's context.

Filecasting: when broadcast learns to deliver anything

Régis Moulin (Eutelsat) and Guillaume Bichot (Broadpeak)

Most people equate broadcast with live television. Yet that same one-to-many efficiency that carries a sports final can carry anything that ships as a file. Inside the DVB Project, the TM-MCAST and TM-NIP working groups are turning that into a standardized capability called filecasting. The motivation is simple: a broadcast network reaches every receiver in its footprint at a fixed cost, however many are receiving.

Linear video is only the most visible use case. Think of video-on-demand, audio streaming, software and game updates, CDN pre-positioning, digital magazines, e-learning – even mirrored websites, and applications no producer has yet imagined. At the wire level these are just files of very different natures and volumes. The challenge is to make such content easy to publish and consume, and to keep the network agnostic to what it carries – a 200 KB page or a 60 GB game build alike.

HOW IT WORKS

DVB already had the right foundation. DVB-MABR (Multicast ABR) encapsulates unicast streams into IP multicast, turning unpredictable on-demand traffic into a steady, flat-bandwidth flow that a broadcast channel can carry. DVB-NIP (Native IP) wraps a full IP chain around it, so ordinary devices – smart TVs, set-top boxes, gateways – receive familiar OTT formats. Filecasting extends this from media segments to files of any kind.

The concept is a clean division of labour. Providers 'push' content into the network; a service provider client application 'pulls' what it needs, according to the end-user's or service's context.

The pivot is the catalogue. Rather than firing files blindly at receivers, the provider's content management system (CMS) casts a catalogue: a manifest of what is available, its characteristics and where to find it. It is the entry point of the client application – the first thing it acquires and reads, from which it decides which items suit its context and pulls exactly those.

Under the hood the system has two halves. On the transmit side, one or more carousels loop continuously, casting providers' files over IP multicast channels. On the receive side, the multicast gateway subscribes to the right channel(s) in response to the terminal's HTTP request and forwards traffic to that same terminal. Crucially, that gateway keeps no local storage: the tasks of reassembling whole files and adapting the bitrate between broadcast and in-home links fall to an HTTP-friendly protocol being specified between the gateway and the terminal – matching, at least, the performance of a pure unicast download.

TWO PHASES

In a first phase, the groups have focused on this new DVB-MABR interface. It is deliberately content-blind: whatever the nature or volume of the material, any compliant gateway can fulfil the service within its own hardware envelope, regardless of CPU or RAM. The intelligence sits with the client, which knows the requirements and carries the logic to deliver them. Whether an API is needed at the platform's ingest remains open, but is judged non-critical.

A second phase would look to scale up the approach, standardizing filecasting across multiple multicast networks: in DVB-S2/S2X or T2, the number of multicast networks scales with the number of broadcast frequencies, so catalogues and files must be orchestrated coherently across all of them.

Filecasting reframes broadcast as a general-purpose, cost-flat delivery layer for the IP world. By standardizing the DVB-MABR interface, DVB lets operators offload almost any bulk content onto spectrum they already own, reaching audiences the broadband internet serves poorly or not at all.

> "Filecasting reframes broadcast as a general-purpose, cost-flat delivery layer for the IP world."

Régis Moulin, Product Manager at Eutelsat's Video Business Unit, co-chairs the DVB-TM-NIP group. He has 30 years' experience in digital television distribution. **Guillaume Bichot** is Broadpeak's Chief Technology Officer and heads exploration on advanced topics related to media streaming. He co-chairs DVB-TM-MCAST group.





DVB-I Book Germany paves the way for market launch

Veit Olischläger (BLM) and Thomas Schierbaum (bmt)

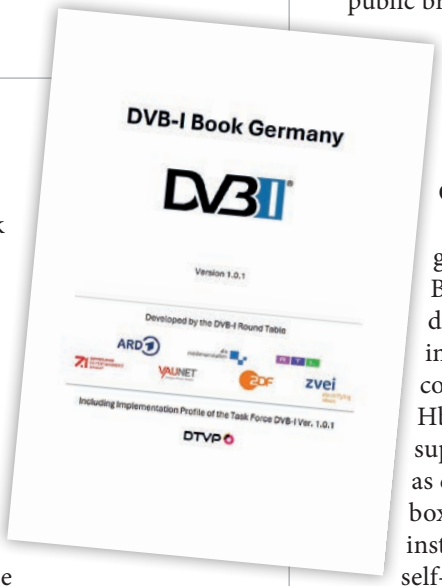
The publication of the DVB-I Book Germany Version 1.0 in May 2026 represented a major milestone in Germany's transition towards a new generation of television distribution. Developed through an unprecedented industry-wide collaboration, the document establishes the technical, regulatory and organizational framework required for the commercial launch of DVB-I services in Germany, currently targeted for autumn 2026.

The DVB-I Book Germany was developed by the DVB-I Round Table, launched in 2024 and bringing together key stakeholders from across the media ecosystem. Participants include ARD, ZDF, RTL Deutschland, Seven.One Entertainment Group, VAUNET, ZVEI and the Bundesnetzagentur (Federal Network Agency), while BLM, the Bavarian Regulatory Authority for New Media, serves as moderator. Activities are coordinated by a DVB-I Project Office, operated by bmt.

LAUNCH INGREDIENTS

In more than 130 working sessions involving around 40 experts, dedicated working groups addressed a broad range of topics essential for a successful DVB-I launch. These included the definition of product requirements, the governance and operation of a joint service list for Germany, principles for non-discriminatory access to the service list, receiver self-certification procedures, and the development of a comprehensive roadmap.

A key component of the DVB-I Book Germany is the Technical Implementation Profile, developed by the DVB-I Task Force of the Deutsche TV-Plattform (DTVP). Based on DVB A177 Revision 6, the profile provides practical implementation guidance for device manufacturers. Integrated into the DVB-I Book Germany, it establishes a clear link between technical, organizational, and regulatory requirements for all stakeholders, including service providers, the service list operator, the service list registry operator, and receiver manufacturers.



An important chapter of the DVB-I Book Germany describes the operation of a joint service list, which is intended to provide users with a consistent and intuitive channel discovery experience across DVB-I-enabled devices. The chapter covers operational procedures, the service list registry, logical channel numbering (LCN), listing order principles, access policies, onboarding and offboarding processes, and a process for reordering the service list in response to anticipated changes.

"PUBLIC VALUE" STATUS

The structure of the service list is based on several guiding principles. Dedicated content containers for television and radio support straightforward navigation and content discovery. A prominent position at the beginning is reserved for services with "public value" status, reflecting their contribution to media pluralism and diversity of opinion in the intended reception area. Additional principles ensure fair and non-discriminatory listing of further programmes while accommodating free-to-air television services, pay-TV offerings, temporary pop-up channels and radio services.

Given that the service list falls within the scope of Germany's platform regulation under the State Media Treaty, clear eligibility criteria have been established. In principle, any private or public broadcasting programme may apply to be listed provided it holds public value status, is licensed under a German State Media Authority, or is otherwise permissible in Germany.

Beyond service list governance, the DVB-I Book Germany also defines requirements and implementation guidelines covering core DVB and HbbTV functionalities, supported device types such as connected TVs, set-top boxes and streaming devices, installation procedures, self-certification, protection requirements for the service list and individual offerings, metadata handling, data privacy, accessibility features, access points – such as content guides and harmonized HbbTV colour keys – and advanced functionalities including addressable TV and audience measurement.

The publication demonstrates a remarkable consensus among public and private broadcasters, content providers, device manufacturers and regulatory bodies – including the information towards the Bundeskartellamt (German Federal Cartel Office).

With the market launch aimed for autumn 2026, the next steps include finalizing contractual frameworks for the service list provider, service providers and device manufacturers, to enable the onboarding of television and radio services and the start of receiver self-certification activities. Ultimately, the DVB-I Book Germany aims to lay the foundations for an interoperable, user-friendly and competition-law-compliant television ecosystem for a future-oriented, horizontal TV market.

The DVB-I Book Germany is available at: www.bmt-online.de/en/dvb-i-in-germany

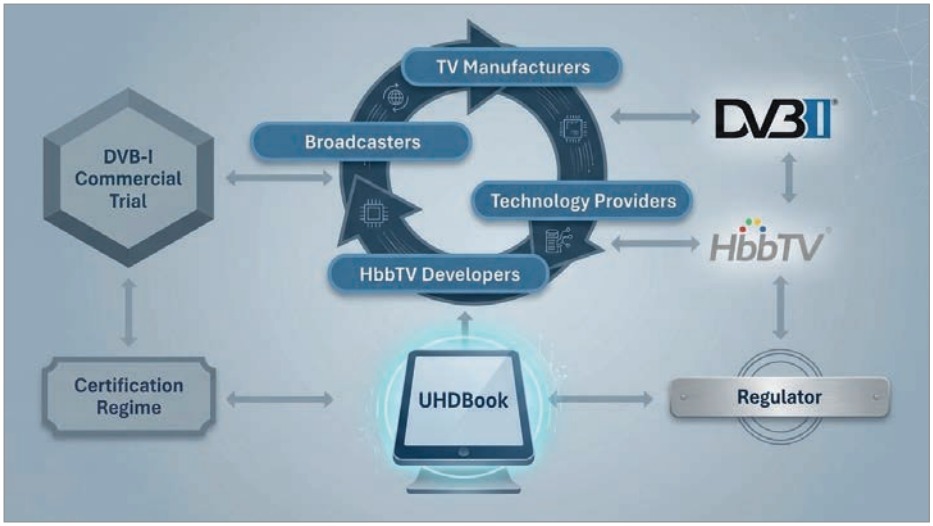



Veit Olischläger is Head of Technology, Media Economics and Public Relations at BLM, the Bavarian Regulatory Authority for New Media. **Thomas Schierbaum** is Business Development and Marketing Manager at Bayerische Medien Technik GmbH (bmt).

DVB-I lessons learned in Italy, beyond the technology

Stefano Braghieri (Mediaset)

Mediaset was among the first companies to start exploring DVB-I, towards the end of 2019. That work in Italy, which informed contributions to the relevant DVB working groups, saw many ideas emerging, with some making their way into the DVB-I specification, some being abandoned, and others re-emerging later. We launched a DVB-I proof of concept (PoC) and then a DVB-I Market Trial, bringing in additional stakeholders like other broadcasters, TV set manufacturers and the media regulator, each with their own interests and point of view. Quite aside from the technical challenges, this experience has taught me valuable lessons about introducing new technology in the real world.



Collaboration among stakeholders is critical to the success of DVB-I

1. Broadcasters and TV manufacturers: from conflict to common ground. The DVB-I PoC and trial activities have demonstrated that collaboration between broadcasters and manufacturers is not only possible but genuinely fruitful for all involved. Earlier in my career, when I worked for a set-top box manufacturer, relations between the two sides were often strained – and sometimes worse. With DVB-I, I have witnessed a determined effort from all parties to reach agreement on the required functionalities, while each safeguards its own interests. This new era of collaboration is embodied in the DVB-I Implementers Task Force, where members actively contribute to the positive evolution of DVB-I and HbbTV.

2. Differences between the television and mobile ecosystems. The advent of DVB-I has increased the involvement in DVB's work of entities that lack a complete knowledge or even awareness of the television ecosystem. Collaborating in the presence of this knowledge gap turned out to be very challenging. TV sets have specific constraints and limitations, including for commercial reasons, meaning that different requirements need to be considered in comparison with digital devices. Allowing for different device types in a single specification places additional demands on the specification work.

3. Fear of change. As DVB-I moves towards widespread deployment, misunderstandings and even misinformation have acted as a drag on progress. There are understandable fears of the disruption that DVB-I might bring to the highly regulated broadcast ecosystem. DVB-I is based on the open internet ecosystem that has grown under substantial deregulation over the past 30 years, raising questions about competitive asymmetries that hybridizing these two worlds would entail. Also, the idea persists that well-established business models could not be maintained after the introduction of DVB-I. This raises the need for a regulated approach towards the introduction of DVB-I.

4. Working within the regulations.. It is natural that countries with a regulated television system require that the introduction of DVB-I takes place in accordance with existing rules. A lot of effort has been applied to demonstrating that the introduction of DVB-I, when appropriately regulated, will not disrupt already running systems. Moreover, DVB-I can underpin a legislative framework that addresses growing limitations in some countries in the spectrum available for terrestrial broadcasting under radiofrequency allocations.

5. A certification regime is needed. The successful integration of DVB-I in an existing controlled and tested broadcast environment demands a solid certification regime that ensures only certified terminals are entitled to provide users with access to services that are discoverable via DVB-I service lists. No matter how reliable technical standards and their related profiling can be in enabling safe coexistence with established broadcast ecosystems, a certification regime must be established. Indeed, although self-certification against existing test protocols is feasible, the difficulty of managing pervasive software updates for TV devices already in the market – should technical issues emerge – makes a formal certification regime strongly recommended.

Stefano Braghieri has almost 30 years of experience in broadcast technologies in various capacities, from writing code to standards development and testing. He has been with Mediaset since 2011, working on support for new technologies and product innovation. Owner of the Mediaset DVB-I PoC since 2020.



New Zealand's journey to the nationwide launch of DVB-I services

In his opening remarks at DVB World 2026 last March, DVB Chair Remo Vogel shared a statement from Freeview New Zealand, announcing the launch of a nationwide DVB-I platform later in the year. To learn more about the project, DVB Scene put some questions to **Tim Diprose**, Technical Lead at Freeview New Zealand.

Tim leads the company's technical strategy and delivery of next-generation television services, including DVB-I, HbbTV, streaming platforms and device certification. He has played a leading role in Freeview's transition from traditional broadcast to hybrid broadcast/IP delivery, working closely with broadcasters, manufacturers and international standards bodies.

What gave Freeview NZ the confidence to move early, and what made the New Zealand market a good fit for this kind of step?

We were fortunate to start from a strong position. Freeview already manages the national channel line-up, logical channel numbers and EPG data across both our DVB-T and DVB-S platforms, and we had already invested in a nationwide live streaming platform and HbbTV services. DVB-I therefore felt like a natural evolution rather than a completely new platform.

New Zealand is also well suited to DVB-I because we have a relatively small broadcasting market, strong relationships with broadcasters and manufacturers, and high broadband connectivity. That allowed us to focus on building the service list registry (SLR), integrating it with our existing HbbTV platform and working closely with TV manufacturers as they implemented DVB-I. Rather than replacing broadcast, our objective has been to create a single hybrid television experience that combines broadcast and IP services seamlessly.

Who were the most important stakeholders in making Freeview NextGen a reality?

This has very much been an ecosystem project. Our technical partner Switch played a critical role in developing the SLR and extending our existing HbbTV application to support DVB-I. Our broadcasters worked closely with us to provide streaming services, and in several cases, migrating to DVB-DASH delivery.

The TV manufacturers involved in our pilot and committing to launch with us were equally important, implementing DVB-I and HbbTV functionality while participating in an extensive programme of interoperability testing.

Internally, the Freeview team brought together product, operations and certification activities to ensure the platform could be delivered as a unified service. It has been a highly collaborative effort across the entire broadcast ecosystem.

How was the national broadcasting regulator involved in the project?

DVB-I has primarily been an industry-led initiative rather than a regulatory programme. As New Zealand's free-to-air platform operator, Freeview has worked closely with broadcasters, manufacturers and technology partners to develop the service within the existing regulatory framework.

Unlike many broadcast technology transitions, DVB-I didn't require a regulatory mandate. It was driven by industry collaboration and open standards, allowing Freeview, broadcasters and manufacturers to innovate within the existing broadcasting framework.

DVB-I supports a broader industry objective of maintaining universal access to free-to-air television as viewing habits evolve. It demonstrates how open standards can help broadcasters continue to reach audiences across both broadcast and broadband networks while preserving viewer choice and competition.

What was the hardest problem you've had to solve?

The biggest challenge was that everyone was developing at the same time. We were building a nationwide SLR and extending our HbbTV platform to support app-controlled media playback (ACMP) and digital rights management (DRM), while manufacturers were simultaneously implementing their own DVB-I clients and adopting the latest HbbTV 2.0.4 Annex O functionality.

That meant interoperability couldn't simply be verified against a finished implementation. We spent a great deal of time testing, identifying issues, refining implementations and passing updates between all parties. It required close collaboration, patience and a shared commitment to making the standards work consistently across different devices.

How critical was it to have receiver support confirmed before you could commit to a launch date?

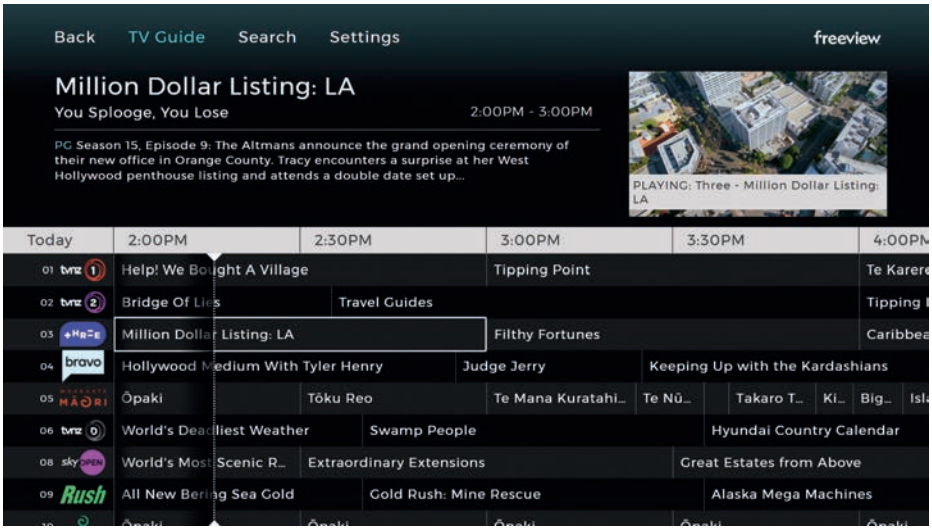
Having commitment from manufacturers was absolutely essential. A nationwide platform is only successful if consumers can actually buy compatible televisions, so we engaged manufacturers early and treated certification as an ongoing partnership rather than a final compliance exercise.

Open communication proved particularly important. Standards continue to evolve, software changes late in development, and priorities shift within organizations, so maintaining regular engagement and a shared understanding of the long-term value of DVB-I helped us work through challenges as they arose.

The DVB-I spec includes both mandatory and optional elements. Is your approach centred on the mandatory elements or have some of the optional features been important for your deployment?

Our implementation is largely based on the mandatory elements of the DVB-I specification, providing a solid and interoperable foundation. However, we also chose to mandate a small number of optional capabilities where they simplified our platform architecture and improved the user experience.

For example, we adopted linked applications and ACMP because they allow our existing HbbTV application to manage DRM, media playback and future enhancements in a consistent way across all services. At the same time, features such as playlist channels and instant setup



DVB-I will provide the underlying service list for Freeview New Zealand's HbbTV guide (above) – the same familiar experience across every platform, now enhanced with premium features like linked VOD and restart

have been intentionally deferred until we've gained more operational experience and can deliver them in a way that adds genuine value for viewers.

How have you handled managing a service list that brings together metadata from multiple broadcasters?

Fortunately, this was an area where Freeview already had considerable operational experience. We have long operated a central metadata ingestion platform for New Zealand broadcasters, supplying programme information to our DVB-T and DVB-S services and, more recently, our streaming platform. That existing operational capability significantly reduced the complexity of introducing DVB-I.

The main additional work involved integrating broadcaster streaming services into the DVB-I ecosystem and, for several broadcasters, migrating from HLS to DVB-DASH to align with the standard. Building on an established operational platform allowed us to focus on interoperability rather than recreating existing workflows.

Do you have targets for uptake of the platform in the early years?

Our immediate focus is less about achieving a specific adoption target and more about ensuring the platform is widely available on new TV sets entering the New Zealand market. As DVB-I becomes a standard feature on certified devices, adoption will naturally grow through normal television replacement cycles.

Over time, we expect viewers to become less conscious of how television is delivered. Whether a service arrives via broadcast or broadband should become largely invisible to the viewer, with the platform simply selecting the best available delivery method. That creates a much more resilient and flexible viewing experience while maintaining the familiarity of traditional linear television.

We see DVB-I as a long-term evolution rather than a short-term product launch. As more households rely solely on broadband and connected TVs, DVB-I ensures free-to-air television remains easy to discover and access. Success will ultimately be measured by maintaining and growing the reach of free-to-air television, regardless of the underlying delivery technology.

How does a shift towards IP-delivered viewing change the business model for Freeview?

DVB-I allows Freeview to reach audiences who increasingly expect television to work over broadband, whether or not an aerial is connected. That helps our shareholders and service providers maintain the reach of free-to-air television while making live television much easier to discover on connected devices, where it can otherwise become buried among hundreds of applications.

It also lowers the barrier for broadcasters wishing to launch new services. An IP-only channel can be introduced at a significantly lower cost than a traditional broadcast service, creating opportunities for new content providers while ensuring viewers continue to experience a single, unified television platform.

What can other platforms and territories learn from the New Zealand experience?

DVB-I is a lot different to a typical broadcast technology project and requires a different mindset. You have to be prepared to start with many unknowns, learn along the way, and accept a minimum viable product that may not have all the functionality expected for broadcast from day one.

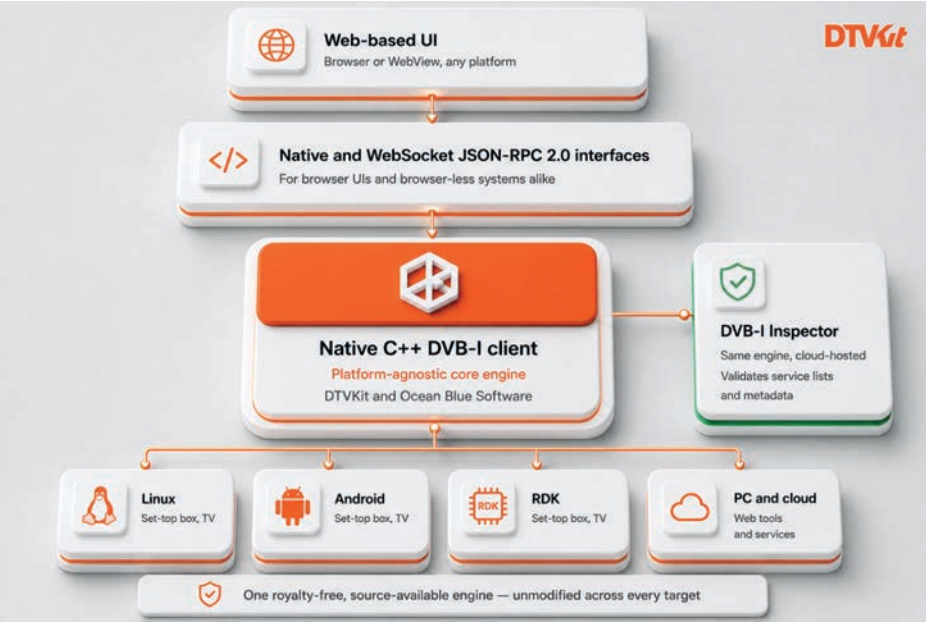
One of the biggest lessons is to start by defining an achievable minimum viable product rather than trying to implement every feature. DVB-I is a very capable standard, but it is important to establish a stable, interoperable platform before introducing more advanced capabilities.

Another key lesson is the importance of collaboration. Working closely with manufacturers, broadcasters and technology partners from the beginning allowed us to solve issues together while implementations were still evolving.

Finally, building on our existing HbbTV investment rather than replacing it allowed us to deliver a richer user experience while keeping the implementation practical for manufacturers. We consciously evaluated each feature and whether to implement it in DVB-I or via HbbTV. I think that balance between standards compliance, interoperability and operational simplicity has been one of the strengths of the New Zealand approach.



Tim Diprose, Technical Lead at Freeview New Zealand



DTVKit's DVB-I architecture: one native C++ DVB-I engine, shared unmodified across Linux, Android, RDK and cloud

Advancing DVB-I readiness: shared-source client integration and validation approaches

Jason Nash (DTVKit)

As DVB-I moves from specification to deployment, manufacturers need practical, low-risk ways to evaluate the standard and prototype real services. With this in mind, DTVKit, a not-for-profit software organization dedicated to providing open, royalty-free software to the global digital television industry, has collaborated with Ocean Blue Software to create a production-ready DVB-I client, and Android reference integration, to support interoperable rollouts.

PLATFORM AGNOSTIC

Rather than implement the DVB-I client in JavaScript, we chose a native C++ approach. This delivers performance and memory efficiency advantages on resource-constrained TV and set-top box hardware. The implementation is platform agnostic, running unmodified on Linux, Android, RDK and embedded targets.

The DVB-I client can be integrated in two ways, giving manufacturers the flexibility to build web-based apps and user interfaces, or to use the client in streamlined, lightweight systems that do not require a browser environment. (Both a native interface and a WebSocket JSON-RPC 2.0 interface are provided.)

Beyond native integration on TV platforms, the stack's decoupled architecture allows it to run on standard PC or cloud infrastructure, making it well suited to delivering web-based tools and services, without requiring any changes to the core implementation. The DVB-I Inspector developed by Ocean Blue Software is an example of this.

For the reference integration, the project deliberately avoided tying itself to any one operating system in favour of a generic, flexible model compatible with all leading TV platforms: a web-based user interface communicating with the DVB-I engine. Although first demonstrated on DTVKit's Android reference set-top box, the integration will work on RDK, Linux or any platform capable of hosting a browser or web view. (An Android-specific route, using TIF – TV Input Framework – and a native Java application, was considered but the project ultimately adopted a more portable architecture to maximize compatibility across TV platforms.)

Interoperability depends on more than a correct client. The aforementioned DVB-I Inspector, a commercial tool, is built on the same core native C++ engine, a real-world demonstration of the engine in production use, and a practical resource for verifying DVB-I Service Lists and metadata independently, catching schema and content issues before deployment.

DISTRIBUTION MODEL

DTVKit's distribution model is an important part of the adoption model. As a not-for-profit, member-governed organization, DTVKit provides the DVB-I client to its members in full source-code form, royalty-free, with no obligation on members to report their deployments. Members pool funding through fees rather than per-unit licensing, giving manufacturers, chipset vendors and integrators unrestricted access to a production-ready implementation without the cost or commercial disclosure that often accompanies adopting a new broadcast standard, lowering the barrier to DVB-I evaluation and rollout.

DTVKit works with service partners who can provide integration and support services under separate commercial agreements to help members bring products to market.

Together, the native client, the platform-agnostic reference integration, the membership distribution model, and independent validation tooling give manufacturers a faster, lower-cost route to evaluate and deploy DVB-I. If you would like to learn more, please come and visit us at IBC2026 on the Ocean Blue Software stand (1.B25).



Jason Nash is Technical Director at DTVKit, leading its technical vision. He has over 25 years in broadcast, spanning chipset vendors, set-top box manufacturing, and software services.

DVB-I in an era of expensive memory

Paul Martin (Ocean Blue Software)

For the past decade, the consumer electronics industry has operated under the assumption that memory is a low-cost commodity. That perspective is now obsolete. The explosive growth of AI infrastructure within data centres is driving memory prices to between four and eight times their historical base. This is placing a growing burden on device manufacturers to optimize how memory is used inside their operating systems. Technologies like DVB-I and HbbTV are all consumers of product memory. Last year, moving from 1GB to 1.5 GB of RAM might have been a minor engineering decision. Today, it can influence product positioning, profitability, and competitiveness across an entire range of devices. Every megabyte matters.

Broadcasters are right to adopt DVB-I, as it provides richer service discovery and metadata. DVB-I delivers substantial benefits: Service Lists, Content Guides, accessibility metadata, and the ability to accommodate multiple delivery mechanisms. However, this modern television experience introduces new processing and memory requirements. Arguably, a well-defined DVB-I client can use less memory, at the expense of more API calls.

Metric	C++	JavaScript
Memory use *before* parsing service list URL	4.29 MB	53.3 MB
Memory use *after* parsing service list URL	6.55 MB	66.32 MB
Response time	3 ms	59 ms

The same 90-service list parsed two ways. C++ peaks at 6.55 MB against JavaScript's 66.32 MB, a difference of nearly 60 MB per device, in a market where every megabyte now carries a cost.

WHERE CODE EXECUTES

At Ocean Blue Software, we evaluated native C++ and JavaScript implementations across a 90-service deployment, while also assessing where WebAssembly (WASM) fits within a hybrid architecture. The results were revealing. Memory consumption is not determined by the DVB-I specification itself but by the application design, technology and architecture. A common approach is to implement service-list processing entirely in JavaScript, loading large XML structures into browser memory and constructing substantial runtime object hierarchies. While this approach simplifies deployment, it can significantly increase memory consumption.

Software architecture is strategically important. The optimal solution is found by determining 'where' code best executes. Native code is best for controlling memory allocation, object lifetime, and execution behaviour in a deterministic way. Engineers can explicitly manage resources and minimize overheads hidden within managed runtimes. Modern television ecosystems require deployment flexibility. WASM is attractive. Some C++ functionality can be cross-compiled into WASM and delivered directly within operator applications.

DEPLOYMENT FLEXIBILITY

Native C++ remains the most effective environment for controlling memory allocation, object lifetime and execution behaviour. DVB-I also allows app designers to make decisions on how much metadata to retrieve from the server and store locally, providing engineers with control over the performance versus local storage trade-offs. Engineers can explicitly manage resources and minimize overheads that are often hidden within managed runtimes. At the same time, modern television ecosystems increasingly require deployment flexibility. This is where WASM becomes particularly attractive.

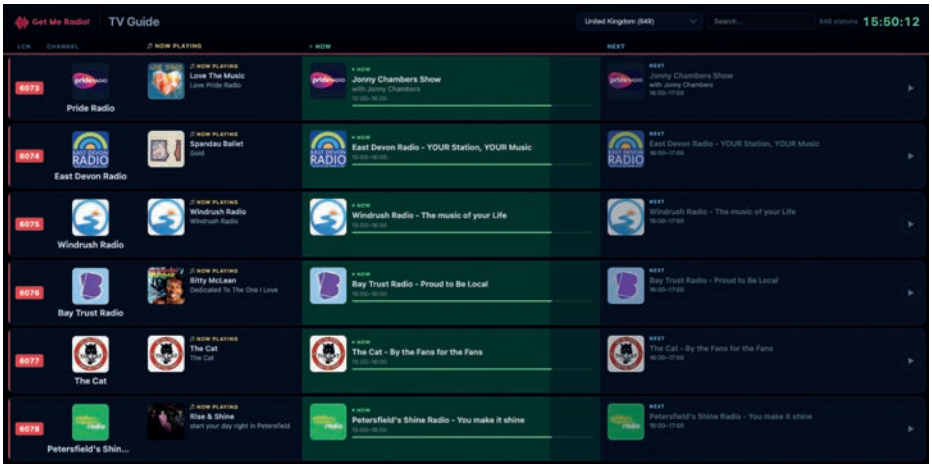
DVB-I's adoption, alongside service-discovery frameworks like the Metadata Delivery Service (MDS) used by Freely in the UK, offers a critical opportunity for better memory management. As the industry shifts to IP-delivered services, with a focus on interoperability and user experience, the strategic implementation of a C++ architecture ensures that DVB-I features are delivered with minimal memory consumption. By leveraging native C++, app designers can explicitly manage resources, allowing DVB-I to enable more frequent data requests while holding less in memory, fundamentally making memory-consumed-per-feature an increasingly important metric.

"The explosive growth of AI infrastructure within data centres is driving memory prices to between four and eight times their historical base. This is placing a growing burden on device manufacturers to optimize how memory is used inside their operating systems."

Paul Martin, CEO of Ocean Blue Software Ltd., has more than 30 years of experience in the television industry. He brings extensive expertise in broadcast technology and software innovation, and is a co-founder of DTVKit and the Open Red Button project.



Radio meets DVB-I between sessions at DVB World



The end result is a DVB-I service list for each country, presenting radio stations alongside their LCNs, logos, now-playing artist and title information, and now/next programme data

Gavin Watson (Codecom Technologies Ltd.)

I'm not sure I've ever turned down a road trip, so when Raj Patel (Yotta Media) told me he was driving over to Amsterdam to exhibit at DVB World 2026, I didn't need much persuading.

As a first-time attendee, I was looking forward to learning more about DVB-I – and, of course, the road trip.

It was a well-organized but packed event, so I had to carefully choose which unconference sessions to attend based on my existing knowledge of DVB and what I hoped to learn during the two days.

While attending the conference sessions on the first day, I realized I kept noting down two words that were being mentioned repeatedly across different presentations: "metadata" and "content". It dawned on me that I already had access to a huge amount of both metadata and content that could be leveraged using a platform we already own and operate: Get Me Radio!, a radio station aggregation platform featuring more than 7,700 radio stations, all providing content and rich metadata.

SELF-CHALLENGE

In between many interesting conversations with other attendees, I decided to see whether it would be possible to quickly set up a JSON-to-XML converter and get a DVB-I-compliant service list up and running during DVB World.

After a few attempts, a refresher in XML, quite a bit of coffee, and several checks against the DVB specifications, I had a working service list. With help from Matthew Huntington (who I know from my time at Freesat and who was showcasing the DVB-I UI Competition on the booth next door during the event), who kindly validated my efforts, I was able to create a DVB-I-compliant service list containing all UK radio stations available on the Get Me Radio! platform.

Using content and metadata already available within the platform, including logos, schedules (now/next), now-playing information and cover art, I was able to create a metadata-rich DVB-I service list for radio stations.

AFTER AMSTERDAM

Following DVB World, I continued working on the project, determined to build a complete service list covering all 7,700+ stations across the 147 countries represented on the Get Me Radio! platform.

I was also able to create a full electronic programme guide (EPG) for all stations. David Bustin at Cabot Communications, who has been involved in early DVB-I implementation, was very helpful with carrying out some validations. I also created a player interface displaying station content, schedules, now-playing metadata and cover art. I even developed a DVB-I validator for the service lists being generated.

In addition, I was able to leverage a service offered through autopo.st that uses audio fingerprinting technology to identify tracks played on audio streams by matching audio fingerprints against a database of known recordings. This proved particularly useful for stations that do not provide now-playing metadata.

The end result is a DVB-I service list for each country, presenting radio stations alongside their LCNs, logos, now-playing artist and title information, and now/next programme data. I'm currently running this on infrastructure at our own datacentre and monitoring reliability of both the service lists themselves and the metadata content.

NEXT STEPS?

The technology works. The metadata exists. The question now is how broadcasters, platform operators and service providers can make best use of this kind of rich source of content and metadata. I'd be keen to discuss this with service list providers or even content providers to see how these service lists may fit into the larger DVB-I ecosystem.

DVB World 2027 · Amsterdam · 16–17 March

Gavin turned up as a first-timer and left having built a working DVB-I radio service list between sessions. What might you walk away with?

Same venue. Two inspiring days. See you there.



Gavin Watson is Director of Codecom Technologies Ltd and has more than 30 years' experience in media, broadcasting and technology. He is the founder of Get Me Radio! and autopo.st, and Co-Founder of Yotta Data Center. His work focuses on broadcast technology, software development and digital media innovation.

MAUD and DVB-MABR: how they fit together

Steve Appleby and Rory Turnbull (BT)

The rapid growth of internet-delivered television has created a significant challenge for network operators. Most streaming services rely on unicast delivery, in which a separate copy of the content is transmitted to every viewer. While unicast is flexible and well-suited to adaptive bitrate (ABR) streaming, it becomes inefficient when large audiences watch the same live event. Further, we note that the average viewed minutes of linear content is continuing to decline, as reported in Ofcom's Media Nations 2025 report. This means traffic patterns consist of a background pattern, with occasional large peaks. This requires network operators, content delivery networks (CDNs), and content providers to invest in capacity that is only occasionally used, resulting in poor resource utilization and uncertain costs.

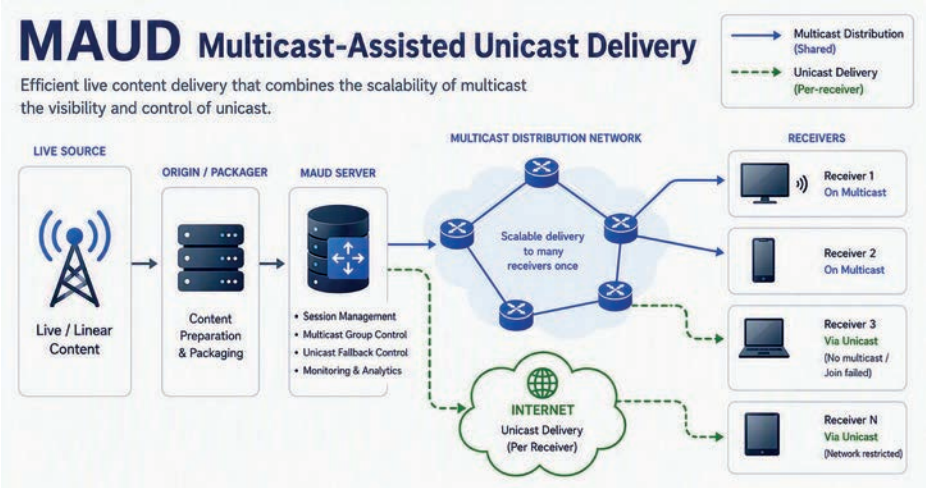
The problem is exacerbated as more television and live events transition from traditional broadcast platforms to internet-only delivery. The UK Government recently published a Green Paper setting out the UK's options. It indicates 2034 as a possible date to switch-off terrestrial television broadcast.

The use of multicast adaptive bitrate (MABR) technology, which combines multicast transport with existing HTTP-based streaming systems can help with efficient delivery. This has been standardized by the DVB Project as DVB-MABR (*Adaptive media streaming over IP multicast)*.

THREE PRINCIPLES

However, to be successful MABR must satisfy three principles: it should require minimal changes for content providers and player applications, preserve the operational visibility and control required by CDN operators, and minimize dependencies between content-provider configurations and multicast-system configurations.

BT's proposed implementation, called Multicast-Assisted Unicast Delivery (MAUD), has been designed as an extension to the DVB specification that supports these principles. MAUD introduces a root proxy at the ingress to the multicast network and an edge proxy, typically located on a home gateway, at the network edge. Unlike some existing MABR implementations, MAUD avoids any requirement to modify client applications or deploy service-discovery mechanisms. Instead, content requests are redirected transparently through the edge proxy, either by content-provider configuration or by CDN redirection. The client remains unaware that multicast is being used.



"These trials demonstrated traffic offload from unicast to multicast exceeding 80% [...] indicating substantial reductions in network and CDN load."

INVISIBLE MULTICAST

A key innovation in MAUD is the separation of content payloads from HTTP headers. Video payloads are distributed efficiently via multicast and stored in the edge proxy cache, while client requests are still forwarded to the CDN using modified HTTP HEAD requests. The edge proxy combines the multicast-delivered payload with the CDN-generated headers to create a complete response for the client. This approach preserves the CDN's ability to authenticate users, collect viewing analytics, enforce access controls, and maintain visibility of streaming sessions, while still achieving the efficiency benefits of multicast delivery.

Trials with a prototype of MAUD implemented by Broadpeak and EE TV, delivering live channels to both set-top boxes and smartphones, have shown encouraging results. These trials demonstrated traffic offload from unicast to multicast exceeding 80%, while subsequent testing with another content provider achieved approximately 90% offload, indicating substantial reductions in network and CDN load.

MAUD will evolve with various improvements and extensions. For example, we will extend MAUD's capabilities to support low-latency streaming (LL-DASH, LL-HLS), so that we can match broadcast latencies. We will also extend MAUD to carry emerging protocols, such as Media over QUIC and add features to allow the efficient delivery of personalized adverts.

Steve Appleby is Head of Video Delivery Research at BT, where he has worked on a wide array of topics including ground probing radar, signal processing and distributed AI. **Rory Turnbull** is Principal Research Professional at BT, with 30+ years in telecoms research, specializing in speech, audio and video coding, streaming, and mobile networks.





How SGAI blends the best of server-side and client-side ad insertion

Martin Gold (YouView)

DVB has developed specifications for addressable advertising, published as three parts of DVB-TA (for Targeted Advertising). Two parts cover signalling of replaceable ad spots and ad breaks, with Part 1 describing carriage methods for broadcast and Part 3 for DVB-DASH. Part 2 covers guidelines for interfacing with an ad decisioning service and for media preparation.

SSAI AND CSAI

Server-side ad insertion (SSAI) and client-side ad insertion (CSAI) are often used as broad terms covering both ad insertion (typically for VOD) and ad substitution (typically for linear channels). The DVB specifications use the more precise term "dynamic ad substitution" – DAS – when describing ad replacement. For broadcast ad substitution, the system design always requires client-side substitution, as the broadcast service cannot be personalized for individual clients. For unicast services, delivered using DASH in DVB systems, both server-side and client-side operation are possible. In the former case, the server systems delivering the streams will adjust the stream for each client or group of clients to provide the addressable advertising. The content manifest is edited (or "manipulated") by a server to reference the replacement (or inserted) A/V content segments for the targeted adverts. The client receives a stream for which no special operations are needed to play the stream with the replacement adverts, although the client will usually need to support multi-period DASH. There should also be ways of identifying some user characteristics to drive the targeting of the advertising. Identity information may be provided in the stream manifest requests.

For client-side operation on DASH content, the system approach is similar to the broadcast case. The client requests and receives addressable ad decisions and switches between playing the DASH content and the replacement (or inserted) adverts.

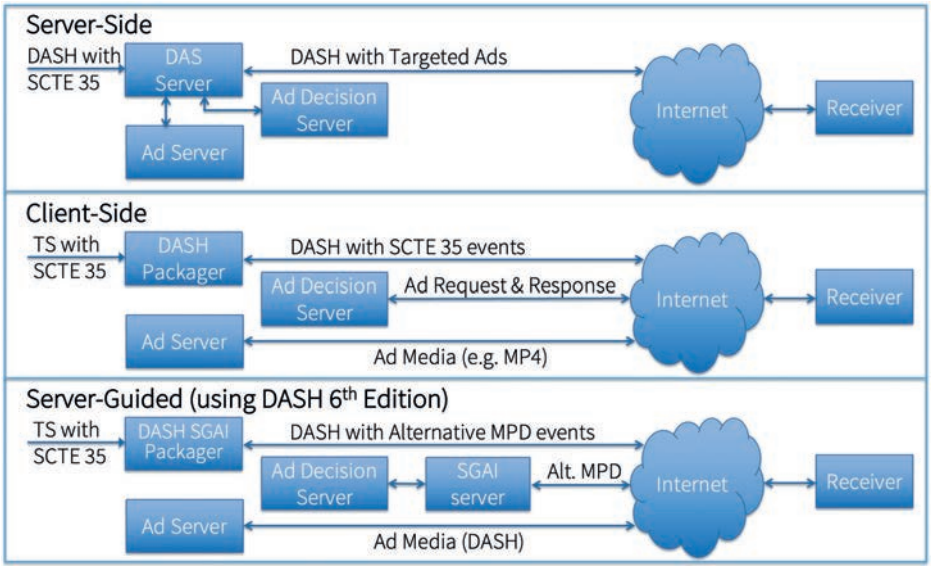
INTRODUCING SGAI

Server-guided ad insertion (SGAI) is a more recent development, and the term is used for methods that combine aspects of server-side and client-side operation. The manifest manipulation in SSAI is difficult to scale for large audiences. Client-side operation requires a more complex client app and may have performance issues for the splicing on some devices. SGAI aims to bring together the main advantages of SSAI and CSAI. It avoids the personalized manifest manipulation required in SSAI, as the same content stream is delivered to all devices. The ad content substitution is performed client-side, within the DASH player. The ad decisions are delivered to the client in a form related to the content manifest such that the player can perform the ad content substitution.

The sixth edition of MPEG DASH includes several new or enhanced mechanisms to enable SGAI to be implemented within a player implementing the DASH standard. These features include:

- *Alternative MPD Events*: these events provide URLs for replacement content described by manifests available at the URLs.
- *List MPD*: a new type of manifest that can list a sequence of DASH manifests provided at the URLs given in the List MPD. The List MPD can describe an ad break as a sequence of adverts each with its own manifest.
- *RequestParam*: can be included in the Alternative MPD event to specify parameters specific to the client to be passed in an HTTP request for a replacement manifest.

DVB is currently working on commercial requirements to support SGAI within DVB specifications, which will require extension of DVB-DASH to profile additional features in the DASH 6th Edition, including those mentioned above.



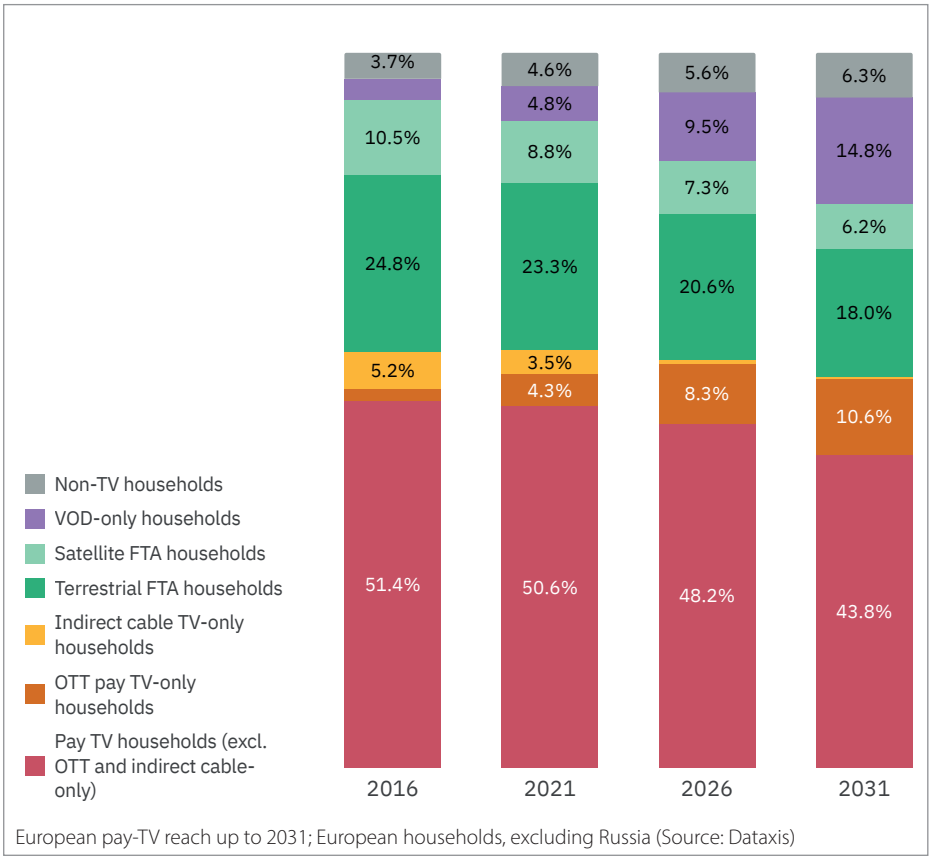
The key difference is where the ad swap happens: server-side edits each viewer's manifest before delivery, so the receiver just plays what it's sent; client-side leaves the receiver to fetch ad decisions and switch streams itself; and server-guided sends everyone the same stream but makes the swap in the DASH player, guided by an SGAI server. (Reporting flows are not shown.)



Martin Gold is a Principal Architect at YouView TV Ltd. He has participated in DVB for over 30 years while working for various organizations. He has contributed to the DVB-TA specifications and leads the YouView technical work on broadcast and SGAI-based unicast dynamic ad insertion.

Pay TV in Europe: past its peak, far from its fall

Ivan Mandon (Dataxis)



European pay-TV reach up to 2031; European households, excluding Russia (Source: Dataxis)

All eyes are on streaming and smart TVs, yet most households still rely on TV providers for their entertainment needs. How long will this last?

Close to 57% of European households will have a direct pay-TV subscription by the end of this year, up 1.7 points over the past five years, though it is expected to return roughly to its 2021 level by 2031. This relative stability at the continent level hides very different national situations, with strong cord-cutting in the UK, Benelux, and the Nordics, offset by growth in France, Italy, and Spain. These growth markets are expected to sustain incremental gains until 2031, with smaller markets such as Portugal, Greece, and Poland also proving dynamic.

OTT VS. SET-TOP BOX

Still marginal before the pandemic, OTT delivery of pay TV is no longer a niche alternative to cable, DTH satellite, and IPTV. Key national operators are choosing to switch their main platform to full streaming. Examples include O2 in the Czech Republic (Oneplay, born from the merger of several telco and BVOD brands), Telenor in Norway (replacing IPTV), and Deutsche Telekom in Germany (pushing streaming as bulk cable contracts are phased out). In France, the shift to 'naked broadband' offers is also moving growth from IPTV to OTT. Premium TV operators Canal+ and Sky are steadily converting DTH customers to OTT. Finally, standalone OTT platforms are gaining ground, such as Polsat Box Go in Poland, Kyivstar TV in Ukraine, TimVision in Italy, and Waipu.tv in Germany.

Households without a TV set have been steadily increasing since the early 2020s. But the bulk of this new kind of household are pure cord-cutters, who neither use free-to-air reception nor pay for a television aggregation service. This set-up is made easier by the growing presence of smart TVs and app-based on-demand content, which now provide alternative routes to linear channels through SVOD and AVOD platforms.

IMPACT ON FTA

The share of European households relying solely on satellite or terrestrial free-to-air has fallen from more than a third in 2016 to 28% today. More than 8 million households are expected to turn away from traditional free-to-air (FTA) within the next five years, not factoring in the DTT and satellite switch-off debates now emerging in a growing number of countries.

Broadcasters are the most directly affected, as households cutting their FTA access generally turn to a VOD-only set-up, an environment of smart TVs and dongles that sharply reduces their prominence. Regulators in multiple countries are drafting prominence rules to ensure national, vetted content providers remain easy to find. Broadcasters are doing their part by investing in their BVOD offerings, but this strategy has an adverse effect: proprietary platforms are competing with each other to be featured on smart TV OSs, or distributed on SVOD platforms, in an attempt to reach younger audiences.

Yet as broadcasters play the platform game, resources and tentpole content shift away from the linear ecosystem, further eroding their core business. The case of Freely in the UK shows a compelling way out of this prisoner's dilemma.

Against this backdrop, the stability of pay TV is good news, as operators are used to partnering with national players. However, under competitive pressure and the real-world shift in viewing habits, they too are increasingly channelling their efforts into SVOD.

Ivan Mandon is a Senior Analyst at Dataxis in charge of research and data analysis on the European television and OTT markets. He regularly publishes strategic insights covering TV distributors, streaming platforms, broadcasters, and content owners.





Our Members. And you?

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