SOFIADIGITAL

DVB WHITEPAPER

Modern hybrid DVB playout – the best option for flexibility and versatility

Sofia Digital's Sofia Backstage® Product family is a fully software-based DVB head-end with extended end-user offering, technical improvements and hybrid TV support. Sofia Digital's products are based on validated standards like DVB and HbbTV.

Digital Video Broadcasting

over 1 billion DVB receivers deployed

Digital Video Broadcasting (DVB) was established in 1993, and their first international open standards were ratified in 1994, starting from DVB-C (cable) and DVB-S (satellite). In 1997 came DVB-T (terrestrial). Recently, these standards have been substituted with the more efficient DVB-S2, T2 and C2 standards. They were introduced specifically to support high-definition digital TV broadcasting, using more advanced modulation technologies and video compression with HEVC.

On this spread we highlight the numerous benefits of switching to digital transmission.

DIGITAL SWITCH-OVER ADVANTAGES

The benefits on the services side are clear: with the same bandwidth used previously for analog transmission, the digital transmission can handle 20 times more channels both for radio and television. The digital transmission signal can also contain data and applications. The saved bandwidth is typically used for new purposes like expanding mobile Internet coverage and capacity.

DVB networks can be either Multi Frequency Networks (MFN) or Single Frequency Networks (SFN). In MFN networks, transmitters use different frequencies in different areas, but in an SFN network, transmitters use the same transmission frequency, from a regional SFN up to an area as large as a single country. Transmitters that are part of an SFN need to be very accurately synchronized with other transmitters in the network. Regional broadcasting is also a feature used in many countries utilizing digital transmissions, typically for targeted TV advertising, local news and specific alerts that can be inserted locally and broadcasted to better serve the public.

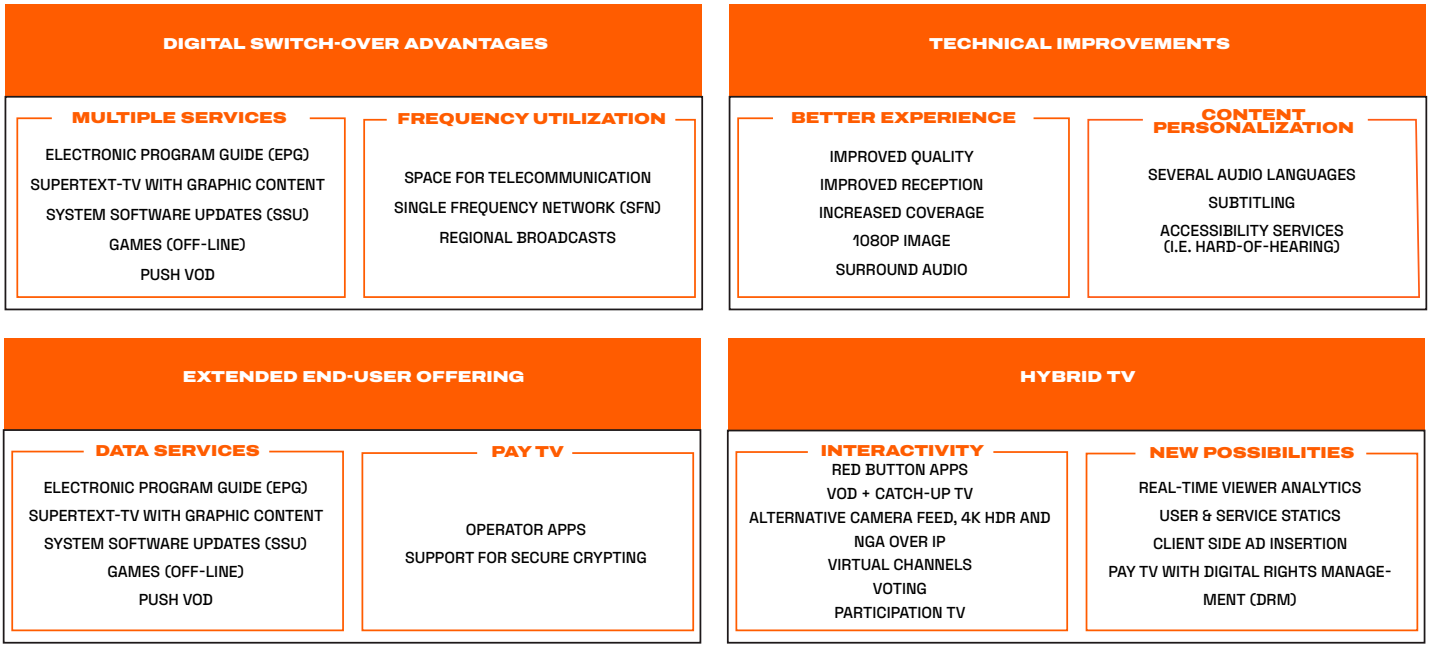
TECHNICAL IMPROVEMENTS

Digital broadcasting packs a punch when it comes to technical features. Not only is the required bandwidth usage more efficient, but the quality of the transmission is also better. The image quality is improved, and services not seen in analog can be introduced, like surround audio and several audio and subtitling languages. Many countries have also implemented additional accessibility services, for example to better serve hard-of-hearing and visually impaired audiences.

EXTENDED END-USER OFFERING

Data services and interactivity are two promises of digital transmissions. A typical service is an electronic program guide (EPG) which is transmitted using EIT in the broadcast and can be viewed with a Smart TV's own EPG user interface. Enhanced teletext magazines and news can also be pushed through a carousel without the need of a return channel (over OTT), as the (hybrid) player can be included in the carousel stream. System software updates are also a commonly requested feature, enabling the updating of television terminals' software over the broadcast. One can also include games in their service bouquet using the carousel. Push video-on-demand (VOD) is a service where the broadcaster uploads a number of videos to the audience terminals' local hard-drives, for example during the night, and viewers can watch these videos as if they were using a normal VOD service. Push VOD is typically used in areas with poor internet connectivity.

On the pay TV side, the operator may adopt DVB scrambling and offer premium content in up to 4k



resolution and, with the latest developments in HbbTV Operator applications (OpApps), provide an option for operators to use their viewers' existing television sets as terminals instead of operator-specific set-top boxes. The OpApp technology provides a way to implement an operator-specific look and feel and services for televisions, overriding their native user interface. This includes a deal between the operator and the television manufacturer.

HYBRID TV

Hybrid television, or hybrid broadcast broadband television (HbbTV), enables broadcasters and operators to build their own TV applications as part of their regular broadcast services. The remote control of the modern TV receiver has four color buttons that can be programmed to manage these services. The Red button service is typically the starting point for offering these applications and offering the customized user interface for branding the services.

OTT-based VOD services are being implemented at a rapidly growing pace to respond to the competition from players like HBO, YouTube, Netflix and Amazon Prime. At the same time, broadcasters have their own Catch-up TV services, like the BBC iPlayer, which enables watching previous episodes of a TV series or a show. Some shows offer extra materials over the Internet that one can easily switch to.

Hybrid TV services can also be used to unleash Next Generation Audio (NGA) and 4K + HDR services that can be simulcasted over OTT alongside the regular transmission and made easily available with the click of a button. NGA options include Dolby AC4 and MPEG-H Audio already adopted in the latest TV specifications, such as the Scandinavian-based NorDig Unified Specification Book. Many broadcasters have also opted for virtual channels for offering niche and long-tail content, delivered through an IP connection and included in the TV channel lineup and discoverable from the EPG like regular broadcasted channels, providing a seamless user experience for the viewer. These channels can be added, for example, when there are major sports events to provide more coverage for the event or as additional premium channels available for subscribers, enabling additional revenue. Digital rights management (DRM) allows subscription-based pay TV in hybrid television. Hybrid solutions typically support the currently common MPEG encryption with MPEG DASH, allowing the use of various DRM systems, such as Marlin, PlayReady and/or Widevine.

Participation TV, like Voting, is a highly requested feature for game and music shows, allowing hybrid TV users to interact and cast their vote for their favorite players or artists during the show, which creates a deeper bond to the show in question and retains viewers in the live TV experience.

By enabling real-time viewer analytics, broadcasters can gain improved advertisement revenues and plan their services better. Many broadcasters have also opted for pre-, mid- and post-roll advertisements for their non-subscription viewers, enabling increased revenue streams.

DVB ADAPTED ALMOST GLOBALLY

As of 2019, services using the DVB standards are available on every continent, with well over 1 billion DVB receivers deployed. DVB-S and DVB-S2 are used in virtually every country in the world. DVB-C is also very widely used. At least 149 countries have adopted and/or deployed either DVB-T or DVB-T2. In Europe, as well as in Australia, South Africa and India, DVB is used throughout.

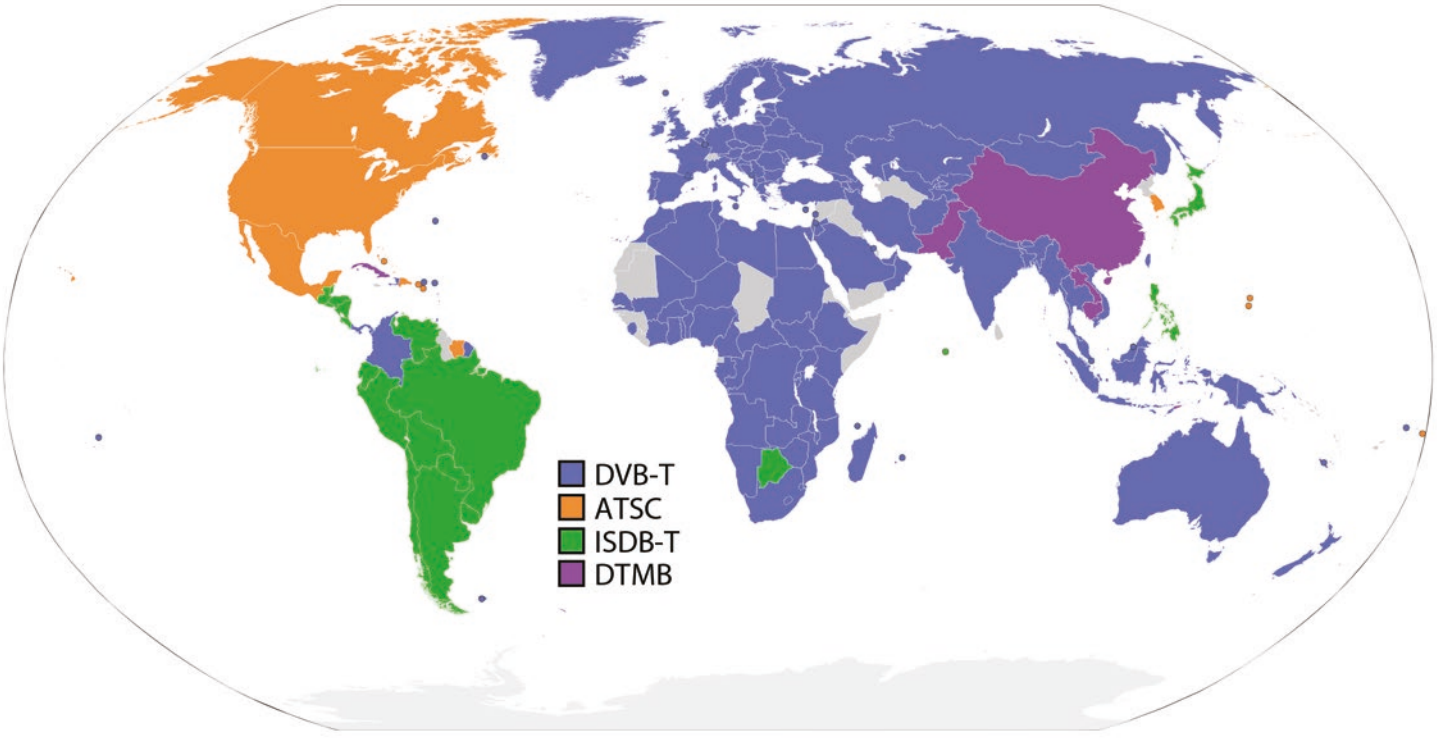
Most of the countries still using analog TV broadcasting have committed to shutting down the analog TV signal in a given timeline, as successful DTTV deployment and ASO are the keys for national frequency regulation, allowing more efficient future spectrum allocation.

A significant benefit for operators and broadcasters with digital broadcast technology combined with optional OTT-based hybrid services is to minimize the churn of viewers (because most of the DVB compliant devices have a built-in standard way to implement this) and thus improved ARPU for operators and broadcasters.

OTT SERVICES AND INTERACTIVE TV VIA HBBTV GAINING POPULARITY

DVB technology also offers a way to add new value-added applications to the broadcast services. The most successful technology for this is called Hybrid Broadcast Broadband TV (HbbTV), a standard for the delivery of broadcast TV and broadband TV to Smart TVs and other connected receivers through a customized user interface, creating a standard way to add more content and OTT services to the DVB platform. Interactive services and applications implemented using HbbTV offer new ways of promoting the broadcasters' brands and creating a platform for accessing commercial services previously possible only with proprietary set-top boxes. The most common examples are enhanced EPG and Catch-up TV services with enhanced and targeted advertisements – possibilities for extra revenue.

HbbTV has lately gained more and more interest (see deployment map below). There are already over 50 million HbbTV capable devices in Europe alone. People are updating their TV sets to big screens (46-80 inches), and because all major brands' TV sets have built-in HbbTV, the penetration of HbbTV enabled households is growing steadily even without any marketing. Due to the success of the "Big Screen" among OTT viewers, some operators have also been interested in utilizing



HbbTV technology to replace their old proprietary set-top boxes with a standardized solution offered by the modern TV set. These Smart TV receivers will be the main way of using the new hybrid services because there are no add-on costs to end-users, and operators do not need to supply extra set-top boxes anymore, as pure software-based services can be activated on demand.

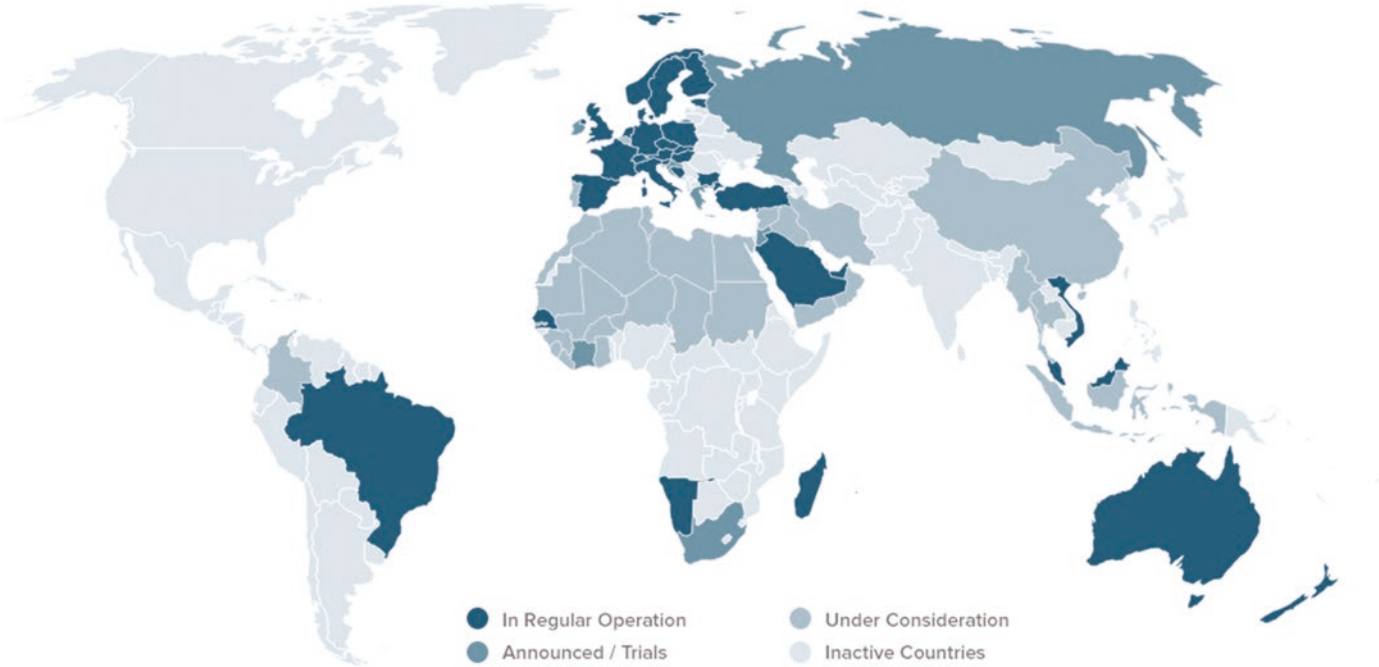
FROM HARDWARE-BASED SOLUTION TO FLEXIBLE END-TO-END SOFTWARE SOLUTION

Traditionally, the digital television transmission systems "head-end room" required a lot of hardware in the operator's premises – being costly, occupying space, consuming a lot of electricity and generating heat. Now solutions tend towards virtualization; running systems on-site or even off-site, meaning that the server is located somewhere in a cloud, and no local server space is needed at all. Modern servers can run several independent virtual servers, and at the same time, software-based services offer a more scalable and cost-effective approach compared to pure hardware-based products.

Keeping a system up to date with a software-based solution is easy and cost effective. As there is no need to change hardware, one simply upgrades the software to comply with the latest features, security patches and other possible new requirements. Software updates will enhance the usability of the solution, provide new features and can even reduce the power usage of the system.

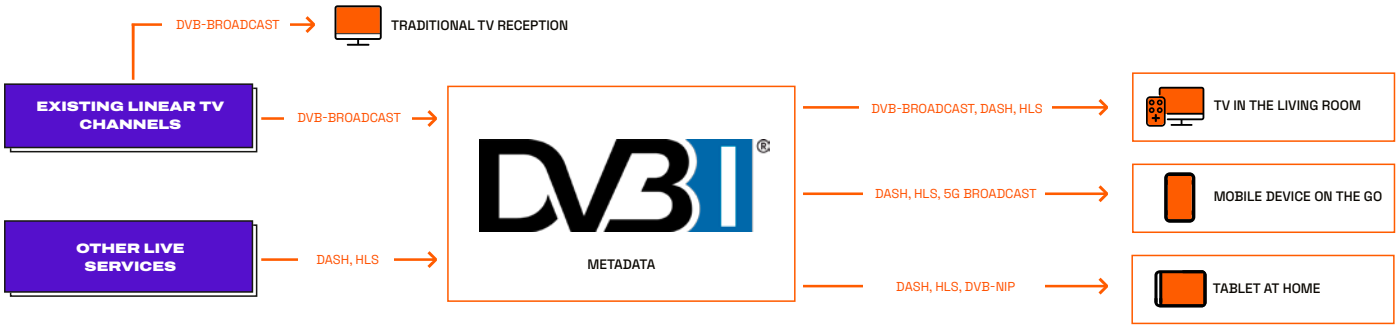
The software-based DVB service management solution makes the DVB networking configuration available in one user interface that is accessible by any modern HTML browsers. The system administrators can use the tools with their Windows, Linux, Android or Apple devices anywhere without any installations of client-side administration tools or applications on their desktops.

One can reduce the head-end applications environment and utility bills by more than 50% of traditional non-integrated HW-based service management tools.



SOFIA BACKSTAGE® DVB-I

DVB-I is an advanced metadata standard that integrates broadcast TV with IP-based delivery, providing a unified viewing experience across devices.



Streaming video services are often deployed as applications. While this has allowed innovative services to foster outside the traditional broadcast industry, there are drawbacks.

Users see content segregated into independent apps and subscriptions, where broadcast and streaming content are heavily separated. Features like accessibility and more relevant advertising appear in staggered fashion with an uneven user experience.

Broadcasters must provide and maintain applications for multiple platforms, with the apps fighting for attention in the already crowded OTT space in the TV App stores.

Manufacturers need to support and certify a variety of applications, which offer often different behavior, while the apps solve the same problem multiple times.

Regulators lose control of safeguarding the prominence, provenance and value of existing public TV services.

As an open standard, DVB-I does for IP services what DVB-T/C/S do for broadcast. Services are signaled in a standardized manner, without a specific app. A receiver can present an integrated hybrid list of services and content.

With DVB-I, linear and non-linear services can be combined, together with enhanced features and possibilities like accessibility, HDR, 4K and access to EPGs and broadcaster content libraries using HbbTV.

Using a DVB-I Service List Registry, access to a vast array of services and service lists filtered on country, language, genre, and so on is achieved.

Users do not have to know or care whether a service arrives via broadcast or IP, whether it is linear or non-linear.

Broadcasters can deploy new services and features like accessibility to a wide range of devices at once, and can maintain the visibility of their services.

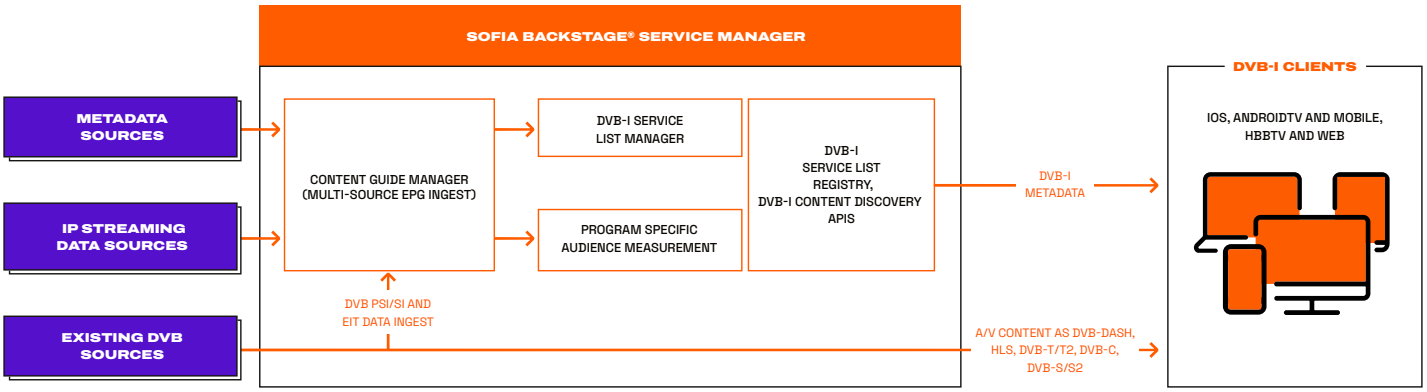
Manufacturers can create a single consistent user experience for DVB-I and broadcast services and have confidence in rolling out new TV models.

Regulators have a tool and a global standardized specification to address the challenge of ever diversifying media landscape.

Operators maintain their relevance in enabling a new delivery and metadata environment for their broadcaster clients while increasing their infrastructure utilization.

OTT providers can leverage the common standard and reduce cost while expanding reach with linking linear and non-linear content.

DVB-I fits also to 5G and DVB-NIP networks. DVB-I does not rely on any characteristic of the physical network. It acts as the service discovery solution of television services, working on top of 5G and DVB-NIP.



DVB-I AS A METADATA SPECIFICATION ENABLES SEAMLESS INTEGRATION BETWEEN BROADCAST AND IP SOURCES LIKE LIVE DASH AND HLS. IT SUPPORTS THE TRADITIONAL WAY OF LINEAR TV WATCHING WITH CHANNEL LISTS, EPGS, AND LCNS. IT CAN ALSO WORK WITHOUT BROADBAND CONNECTION OR IN A PURE IP ENVIRONMENT.

THE BROADCAST TO HYBRID TO IP CHALLENGE, SOLVED

Many operators and broadcasters struggle with integrating legacy broadcast systems with modern IP delivery, leading to fragmented user experiences and operational inefficiencies.

Sofia Digital's DVB-I Service Manager provides a comprehensive, user-friendly tool that manages service lists, metadata and integrates seamlessly across multiple delivery methods (broadcast and IP).

The DVB-I Service Manager is a complete solution for managing DVB-I service lists and metadata, designed to streamline commercial DVB-I operations while ensuring continuity of existing broadcast solutions. It allows for efficient management and integration of DVB-I services, service lists and programming information based on TV-Anytime standards.

BUSINESS VALUE OF DVB-I SERVICE MANAGER

Scalability

Supports thousands of services and integrates easily with CDN and broadcast systems, enabling easy expansion as your service grows.

Flexibility

Deployable as a SaaS or on-premises solution, supporting all major cloud providers and integrating into existing broadcast and IP infrastructure.

Ease of use

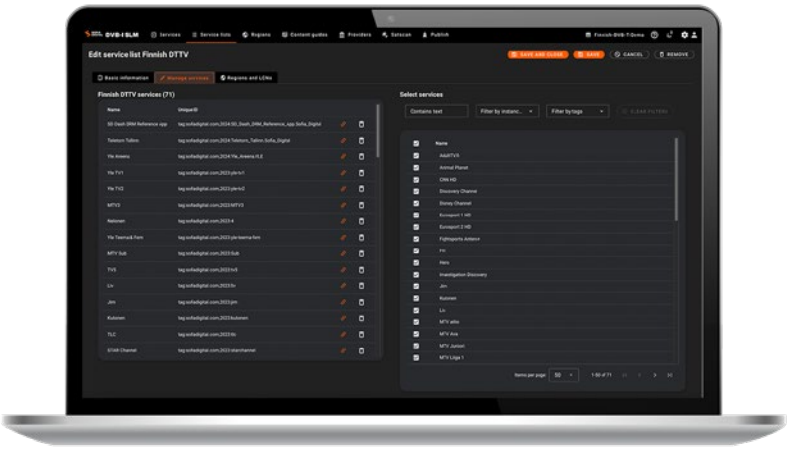
Modern UI/UX, increasing operator productivity by streamlining the management and organization of complex service lists efficiently.

Reliability

Proven stability with 24/7 operation capabilities, ensuring uptime for business-critical environments.

DVB-I CLIENTS ENRICH THE RECEIVER BASE

Sofia Digital's DVB-I Client offering includes Android, HbbTV and Mobile progressive web implementations and AndroidTV, TizenOS, WebOS and other common SmartTV implementations. Sofia Digital is following the DVB-I specification work closely and is always ready to implement new features that come from the DVB project or as extensions to the base spec.



SOFIA DIGITAL AND DVB-I

The DVB Project commissioned a DVB-I Reference Client from Sofia Digital in 2020. The app was delivered as an HbbTV Operator Application and as an Android mobile Application.

In 2021, Sofia Digital continued its co-operation with DVB and created the reference implementation for the Central Service List Registry. This background gave Sofia Digital a solid foundation to develop its own DVB-I Backstage products.

SOFIA BACKSTAGE®

AWARD WINNING PLATFORM FOR ALL YOUR NEEDS

Sofia Digital's award-winning technology is powering transmissions in many countries throughout Europe and Asia. TV services made with the Sofia Backstage® Platform are used by millions of TV viewers.

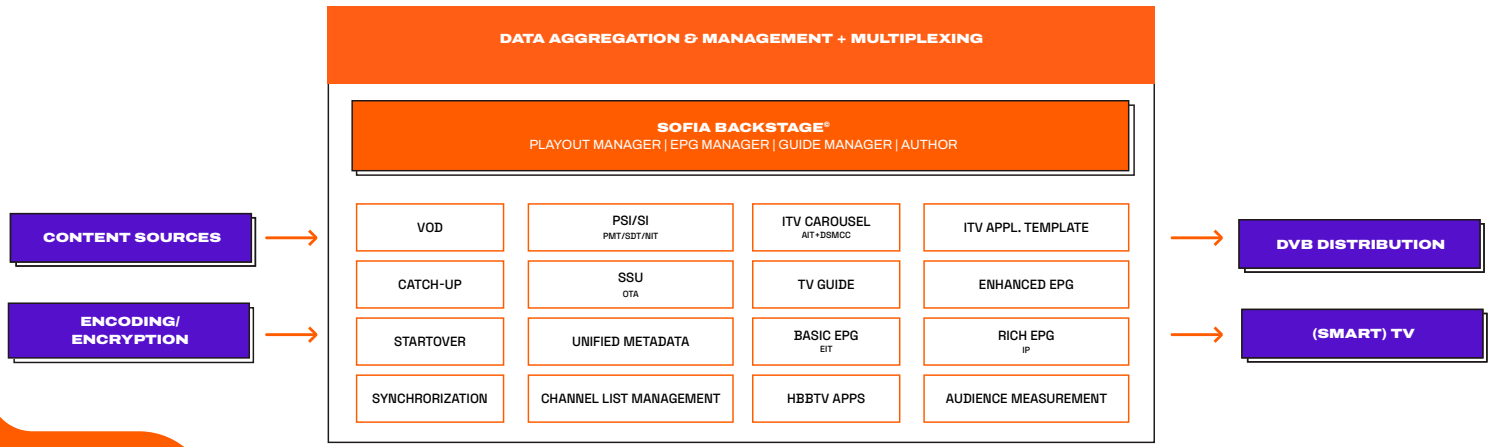
As part of the Sofia Backstage family, the Guide Manager is a solution for collecting, managing, editing and scheduling the metadata of TV/radio programs. The Sofia Backstage® Guide Manager enables metadata harmonization and automation from multiple different TV and video metadata sources into a unified JSON format.

Supported formats can be added easily if the system pre-integrated metadata formats are not enough. Supported platforms used by the TV industry include APIs to interface, for example, with Gracenote, Kaltura, Ooyala, Vimond Media and Sofia Backstage. Additional input formats can be added by using almost any EPG data source in XML, JSON or Excel file formats or web APIs.

The Guide Manager allows broadcasters, content providers or operators to build completely new unified TV services to integrate online video content with linear TV content, for example direct access to past episodes and extra video clips, trailers of TV series, enriching the linear EPG data with online data, as well as offering direct access to replay (with start-over feature) of the currently running TV program.

The Sofia Backstage Playout Manager handles the complete DVB broadcast signal and metadata generation, together with powerful EIT optimization options. It is a highly flexible system, allowing to extend the signaling with custom descriptors and tables. Furthermore, data and object carousels can be defined and signaled to allow OTA updates of existing receivers or other data services for customized applications. The system scales from an engineer's test bench to a fully redundant 100% high availability system capable of running an entire country's DVB metadata system. At its core the Playout Manager runs a compact software multiplexer which can create and manage a virtually unlimited number of different transport streams and input/output signals.

The combination of the Guide Manager and the Playout Manager offers a unified and easy-to-learn solution, creating a pipeline from the various content service providers to the final signal at the TVs and set-top-boxes in the TV households. The solution is also future proof, as Sofia Digital is constantly following and participating in new developments of the DVB standard family. With Sofia Backstage, the move from traditional DVB-C/T/S to DVB-I is seamless.

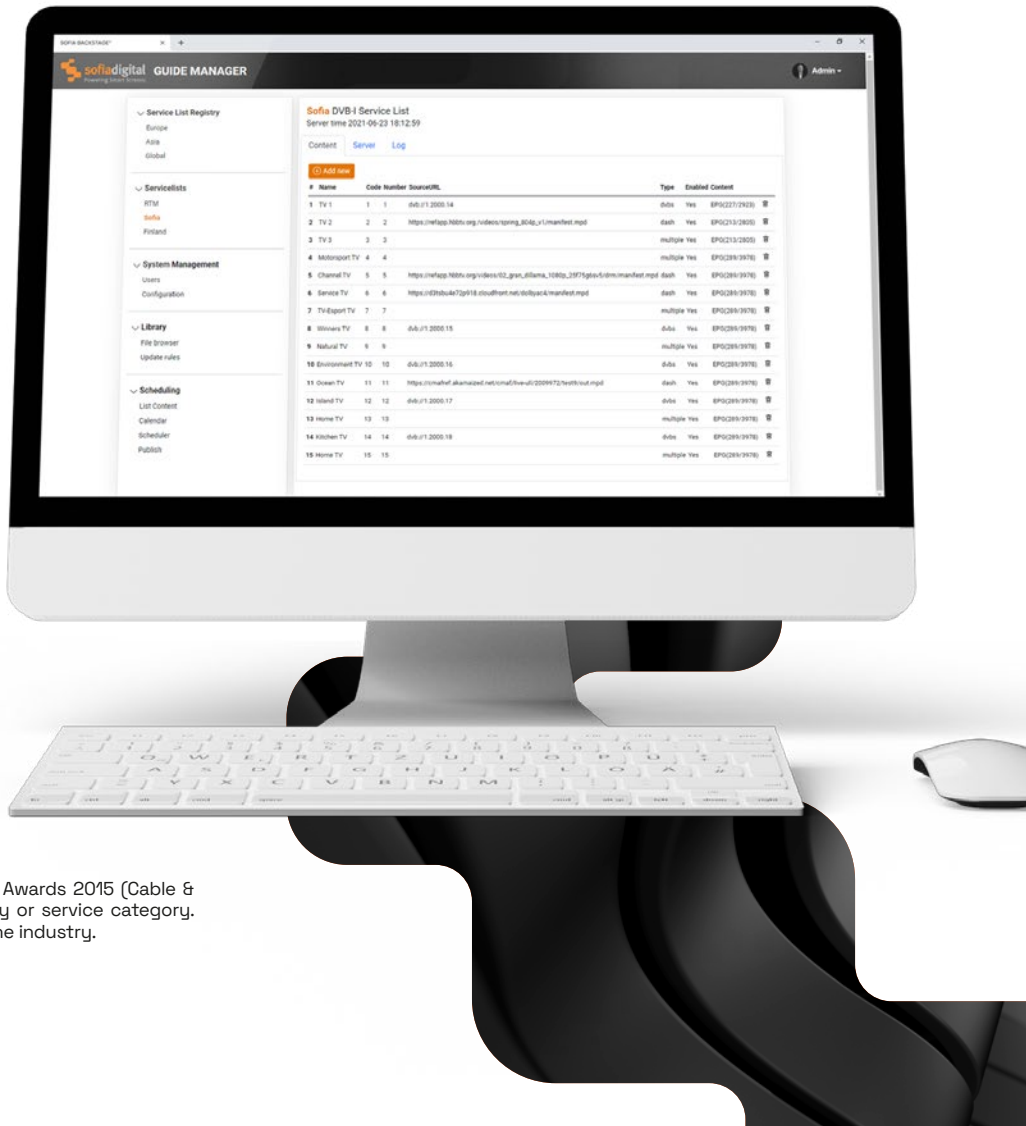


BENEFITS OF THE SOFIA BACKSTAGE® ARE:

- Fully software-based architecture, can be installed on a server, reducing the overall investment and hardware requirements
- Most versatile system on the market based on customer feedback
- Easy-to-use browser-based user interface with all the configurations in the same interface
- Tested heavily in production by multiple customers, capable of virtually non-existent downtime
- Compatibility – any system which claims DVB compatibility will work with Sofia systems as well
- Scalability – the system can be scaled up when requirements increase simply by adding features and server hardware
- Add interactive services as you grow, operators can also create content/applications
- Based on validated standards – you can use any 3rd party HbbTV application
- Spare hardware parts and hot/cold stand-by server are easily available

THE FEATURES OF SOFIA BACKSTAGE® INCLUDE:

- Web-based system administration with automation, scheduling and user management
- AIT insertion and DSM-CC generation with stream events
- Automated PSI-SI generation including PMT, SDT, NIT, TDT, EIT (p/f, sch act/oth) & AIT
- Complete EPG workflow integration for Basic and Rich EPG services
- DVB-ASI, TS-over-IP or RF support with any DekTec DVB adapter product
- Support for IP, Terrestrial, Cable and Satellite delivery systems
- SSU signaling
- Integrates the HbbTV signaling and applications insertion with all other TV services
- Sofia Digital HbbTV application suite and Authoring tools for interactive services
- Download and upload MPEG transport stream files
- DSM-CC carousel insertion with stream events support



CSI AWARDS 2015 WINNER

Sofia Backstage® has also been awarded at the CSI Awards 2015 (Cable & Satellite International), in the Best HbbTV technology or service category. This award is peer reviewed and highly respected in the industry.

SOFIA BACKSTAGE®
DVB Head-End

SOFIA BACKSTAGE® DVB HEAD-END PRODUCT FAMILY FOR ALL DVB SERVICES

Sofia Backstage® DVB Head-End is based on the award-winning Sofia Backstage® software powering transmissions in many countries throughout Europe and Asia. It is a complete and modern software-based solution including tools to manage DVB services in any broadcast network.

The solution scales from field pilots and trials to full-scale production use. Sofia Backstage® for DVB includes components to generate all essential PSI/SI information, including full EPG data as well as insertion of the HbbTV application AIT data and DSM-CC carousel files into the TV transmission.

Sofia Digital's Sofia Backstage® product family is your go-to selection when contemplating acquiring DVB solutions. The product family has a product tailored for your needs, as follows.

DVB PLATFORM OFFERING

Sofia Digital offers two different levels of solutions, server setup for critical operational use with 1+0 or 1+1 configuration with an option for additional high-availability support.

The same core software can also be delivered as lightweight/portable for testing and evaluation use.

Full DVB head-end Server solutions for critical operational use:

Sofia Backstage® Product/ Configuration	**Notes & Special Features**
HbbTV Server	AIT insertion + DSM-CC carousels, delivered together with a virtual application server
Playout Manager C/T, T2/S, S2	Licensed for a certain number of multiplexes in a network
EPG Manager	EIT insertion, can be also delivered with HbbTV based rich and mini EPGs
Guide Manager	Guide Manager provides EPG and video metadata integration

Portable configurations are easy to set up and affordable solutions for demonstrations, application development, proofs of concept, technical evaluation and similar purposes listed in the table below.

Sofia Backstage® Product/ Configuration	**Notes & Special Features**
HbbTV Playout Kit	Cost efficient way to demonstrate or test your HbbTV services on target devices
HbbTV Starter Kit	Compact installation including HbbTV application examples and Author for applications page development and applications management
Playout Starter Kit	Including all the above + EPG aggregation & generation + muxing + support for live inputs

*all above are lightweight setups, designed to be very mobile

The portable setups include

- 1) Mini-PC HW (Intel Compute Stick or NUC) with Sofia Backstage® software and
- 2) RF modulator (DekTec with RF out DVB-T2/S2/C or for simple DVB-T Hides USB-modulator)

Above mentioned Playout Manager server setups includes:

- Rack-mount PC server hardware (i.e. HPE, Dell with Xeon Silver CPU):
- Double redundant power units, RAID-1 technology (dual hard disks)
- Optional 1+1 physical server redundancy

SOFIA BACKSTAGE® SOFTWARE COMPONENTS:

- Playout Manager for DVB Network PSI/SI management and SI-tables generation
  - Channel lists management for complete network and each multiplex/TS
  - Services IDs, PIDs, bandwidth, live inputs and outputs with re-mux and mux
  - Dynamic PMT management for multi-language networks
  - Automatic or manual PID management/ remapping
- DVB TS player
  - Simple TS playout tool
- Sofia Backstage® configuration options:
  - EPG manager (EIT Schedule Actual + EIT Schedule Other)
  - HbbTV Inserter and carousel server
  - DVB-SSU option (OTA)
  - EIT transcoder (real-time modification)

Guide Manager for EPG metadata aggregation

- EPG data parser and “meditator”
- EPG source data upload tool
- EPG data aggregation and automation
- Support for multiple EPG languages and character encoding with UTF-8
- Rich EPG support
  - Enhanced EPG clients for HbbTV
  - Customized EPG client user interface
  - Catch-up TV integration with IPTS-recorder and transcoding service
  - CMS integration (various EPG data sources and formats like Excel, XML, JSON)

Sofia Digital also offers solutions for video services (e.g. reference/live recordings), called the Sofia Backstage® Studio.

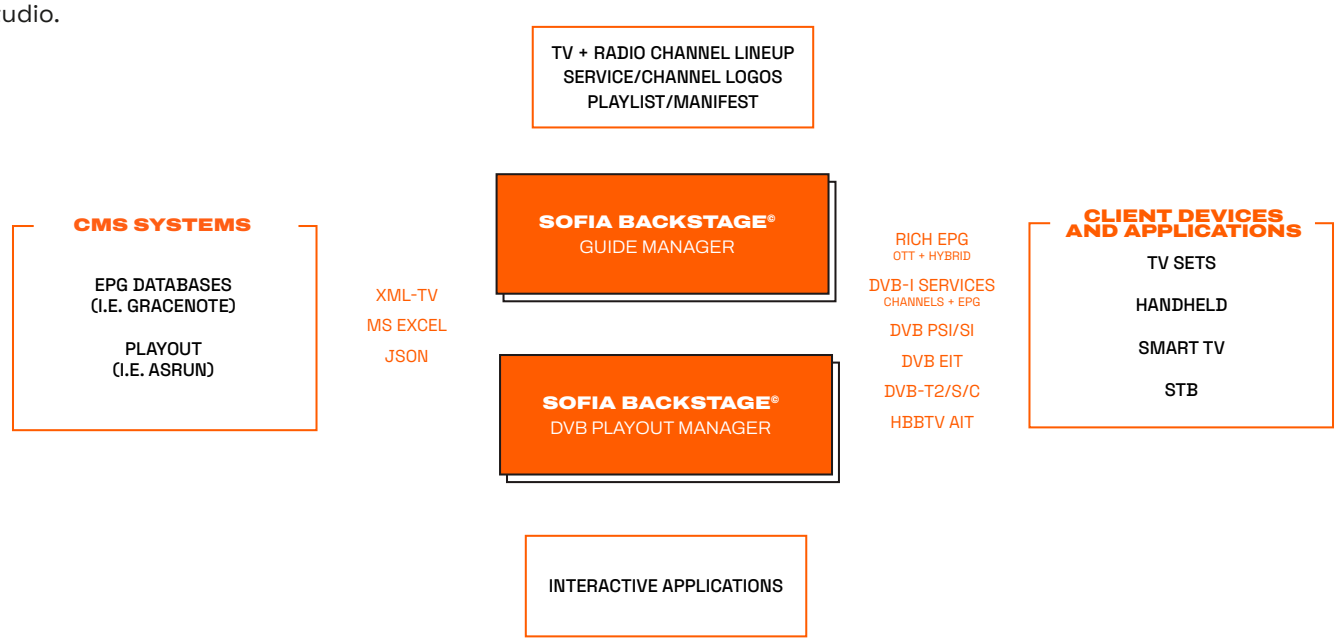
ASK FOR SOFIA BACKSTAGE® STUDIO MATERIALS FOR MORE INFORMATION

If your business falls into any of the previous categories and you are contemplating setting up a DVB network, Sofia Backstage® is the right solution for you.

Versatility of the Sofia Backstage® is based on the full software architecture enabling the setup of the whole DVB head-end into a server environment.

Typically, Sofia Backstage® is delivered preinstalled from the factory with selected features activated. The Sofia Backstage® can be installed into a single server or, when a redundant installation is needed, multiple servers. However, Sofia Backstage® is a highly robust system, and our existing customers have been running Sofia Backstage base broadcast solutions with zero percent downtime for many years.

Sofia Digital’s solution is flexible and adapts to new requirements without additional hardware. The fundamental idea to achieve flexibility is to offer new features or extra options only when the customer needs them. The software setup grows along with your requirements!



Why to select Sofia Digital as your partner?

SOFIA DIGITAL COMPANY ASSETS:

- Acknowledged know-how of digital broadcasting and internet technologies
- Pioneer in creating interactive value-adding services and applications for HbbTV and Smart TVs
- Knows end-user DVB devices thoroughly due to own commercial testing department and a laboratory of over 130 devices, covering virtually all SmartTV models from 2015 onwards.
- Remarkable hands-on experience from professional DVB management and other equipment in commercial use
- We are accustomed to delivering complex large-scale projects reliably, and we have a proven and acknowledged record of this!
- Sofia Digital is a member of the HbbTV Association (www.hbbtv.org)

WE KNOW CUSTOMERS' WIDE VARIETY OF EQUIPMENT, PREVIOUS INSTALLATIONS/ ENVIRONMENTS INCLUDE:

- **MyTV Malaysia for DVB-T2**
  Harmonic / Thomson, Cavena, Huawei, Skyline, Speedcast
- **SilistraTV for DVB-C Bulgaria**
  Teleste
- **RTM Malaysia for DVB-T2**
  Ateme
- **Yle, MTV and Digita, Finland**
  AppearTV, Ericsson, Cavena, Harmonic
- **Levira, Estonia for DVB-T2**
- **TRT, Turkey for DVB-T2**
- **Antenna Hungária for DVB-T2**

harmonic

TELESTE

ERICSSON

Appear tv

ateme

CAVENA
Subtitling Made Easy From Edgeware

NATIONAL BROADCASTER'S HBBTV – RTM (MY)

RTM (Radio Television Malaysia) has been working extensively together with Sofia Digital in designing and developing their HbbTV applications such as Superteks, EPG, MYKlik VOD and Catch Up and social media. The Superteks application allows viewers to view and get the latest local news, sports, international and other information via HbbTV while watching TV. MPEG-DASH has also been tested for the RTM HbbTV Trial to enable a high-quality experience in streaming media delivered over the Internet. In the near future, RTM plans to have MPEG-DASH VOD applications available for the viewers. This is another step in enhancing RTM's existing TV streaming channel MyKlik. Currently, Malaysian viewers with integrated televisions supporting HbbTV can already have the experience with HbbTV since it is already broadcasted on air with the help of Sofia Digital and the Malaysian DVB-T2 network operator MYTV Broadcasting who approved RTM to test the HbbTV trial in the live broadcast signal. After comprehensive trials, RTM's HbbTV applications are on the verge of operative use.

RTM has utilized the power of Sofia Backstage® Author when creating rich content effortlessly. Additionally, more complex interactive content with VOD and other video material has been created to attract end-users.

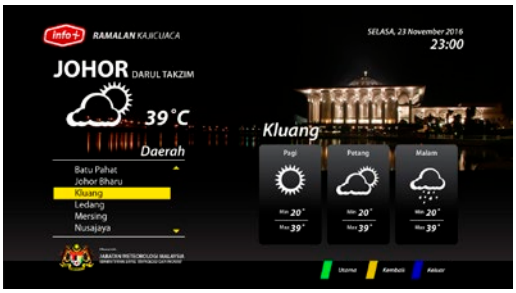
This RTM setup has been demonstrated heavily due to broad interest. Neighboring countries in particular have been very keen on the experiences and results.

NATIONAL DVB-T2 OPERATOR DEPLOYING HBBTV – MYTV (MY)

Sofia Digital worked as a part of an industry-wide coalition to provide the DVB-T2 headend infrastructure for the new Malaysian DVB-T2 network operator MYTV Broadcasting (MTVB). The platform provided by Sofia Digital includes the Guide Manager, which aggregates the incoming programming information metadata from the local commercial and public broadcasters, and the Playout Manager, which builds the necessary PSI/SI, DVB SSU (OTA) and EPG signaling for the whole nation-wide network. Also included is support for interactive services utilizing HbbTV in two-way and one-way modes. A single point of entry is provided for all broadcasters to enable up-to-date programming information and interactive applications.

The system was installed in early 2016 and has been running without interruption – 100% uptime – since. Local MTVB technical personnel handle the day-to-day tasks with the help of comprehensive support and a training package from Sofia Digital.

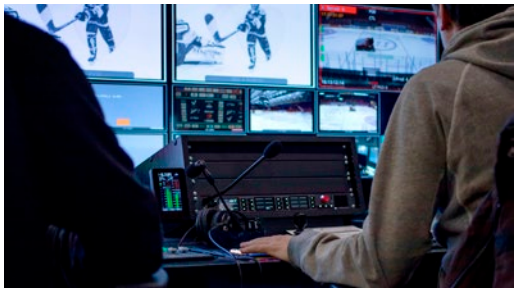
In Malaysia, the Analog switch off was completed successfully in 2019 by MyTV, as obligated by the government, after which digital channels are the only ones serving TV viewers.



MANAGING VIDEO CONTENT WITH METADATA – LIIGA (FIN)

Sofia Digital delivered the centralized Liiga (Finnish ice hockey Elite League) TV scheduling and metadata management to Telia in co-operation with Streamteam Nordic based on Sofia Digital's Sofia Backstage® server products. The Sofia Backstage® Guide Manager aggregates the metadata from various sources while also offering a graphical user interface to monitor, enter and update the data manually. The metadata includes Liiga match schedules for the team-specific TV channels' line-up and additional data like Liiga team logos, as well as connection to a real-time electronic game clock synchronized with each Ice Hockey Arena where the Liiga games are played.

Additionally, the Sofia Backstage® Media Manager is used as an image bank to manage all Liiga TV channels and applications related images and screenshots from video clips. Metadata hosted in Sofia Backstage® is also used for the contribution of additional video clips produced during and after each game. The system is designed in a way that allows easy further development, for example, pushing the video content to YouTube and other delivery channels.



Brief glossary related to digital TV broadcasting

AIT
Application Information Table; a DVB table that includes the application URL and other related data. Used to signal HbbTV application in broadcast.

ANDROID TV
Operating system (e.g. Smart TV) developed by Google, used in i.e. Sony, Philips, Sharp and Hisense TV's.

API
Application Programming Interface; set of rules that enables third parties to obtain and change information or data of the service. When making a digital TV or any service, some APIs (e.g. to CRM) usually need to exist to be able to communicate between different systems.

ASO
Analog switch-off; switching from analog transmission to digital.

ATSC
Advanced Television Systems Committee; an American set of standards for digital television transmission over terrestrial, cable and satellite networks. Used also eg. in South Korea. Latest standard version is ATSC 3.0, marketing name "NextGenTV", with support for more services, 4K UHD image and portable devices.

AVOD
Ad-based Video On-Demand; offers consumers access to a catalogue of on-demand content and contains advertisements.

CAM
Conditional Access Module; device that enables watching scrambled (purchased) services, CAM has a slot for a smart card. The module is inserted into the PC Card slot of a TV or an STB

CAS
Conditional Access System; system to prevent unauthorized viewing of e.g. video material by content protection achieved by encrypting (scrambling).

CATCH-UP
Feature that enables end-user to watch e.g. previous episodes of a series (via IP).

CDN
Content Delivery (/Distribution) Network; optimizes content (e.g. video) accessibility globally, by geologically distributed servers, usually including load balancing, analytics and artificial intelligence.

CI+
Common Interface Plus; specification that extends the original DVB Common Interface standard (DVB-CI). The Common Interface is the connection between the TV/STB tuner and the module that decrypts the TV signal (CAM).

CMAF
Common Media Application Format; standard intended to simplify delivery of HTTP-based streaming media and to especially avoid storing and encoding video data in several different formats.

CMP
Consent Management Platform; a system or process for allowing customers to determine what personal data they are willing to share with a broadcaster or operator (related to GDPR). E.g. end-user must comply with certain minimal policies to gain the right to use an application.

CMS
Content Management System; assists with storage and organization and makes it possible to share e.g. video assets on different platforms.

CRM
Customer Relationship Management; required for subscription-based services (i.e. VOD) for identifying the customer.

CSAI
Client-Side Ad Insertion; inserting (or stitching) the ad media at client side by making a call to an ad server at ad breaks. Enables highly personalized ads but is heavy for the server and susceptible to ad blockers.

CSR
Central Service List Registry; a service list collection, combining all the available service lists in a single repository. Service lists are required by all devices implementing the DVB-I, like smartphones, tablets, PC's, TV's or STB's to access any service. These service lists may be operated by, or on behalf of, various kinds of organizations, such as the manufacturer of the device, a national or regional regulator, or an operator or platform brand serving only their own clients.

CSS
Cascading Style Sheets; describes the presentation of an HTML document.

CTV
Connected TV; any television set used to stream video over the internet.

DAI
Dynamic Ad Insertion; server-side video ad technology that allows you to serve video ads into live linear programming and video on demand content.

DASH
Dynamic Adaptive Streaming over HTTP; an adaptive bitrate streaming technique that enables high quality streaming of media content over the internet using HTTP.
Read about DASH reference application

DRM
Digital Rights Management; controls the use and distribution of copyrighted works, commonly used systems in the area of video are e.g. PlayReady, Marlin and Widevine.

DSM-CC
Digital Storage Media Command and Control; toolkit for developing control channels associated with MPEG streams, enables e.g. interactive commercials.

DTH
Direct-to-home; can either refer to the communications satellites themselves that deliver service or the actual television service.

DTT/DTTV
Digital Terrestrial Television; specific abbreviation for digitalized terrestrial TV.

DVB
Digital Video Broadcasting; international open standard for digital transmissions. The DVB Project (dvb.org) is the maintaining organisation. Remark: There are well over a billion DVB receivers deployed all over the world! And the number is increasing all the time...

DVB-C/C2
Digital Video Broadcasting, Cable; international open standard for digital transmissions. DVB-C is common in urban areas, but the newer DVB-C2 is not currently used.

DVB-HB
Digital Video Broadcasting, Home Broadcast; to enable consumption of traditional broadcast services (i.e., delivered via satellite, terrestrial or cable broadcast networks) by means of in-home networked devices, e.g., smartphones, tablets, Personal Computers, IP-enabled TV sets or Set-Top-Boxes, etc.

DVB-I
Digital Video Broadcasting, Internet; international open standard for digital transmissions. Delivers services over the Internet to devices with broadband access, device can also have a DVB tuner.

DVB-S/S2
Digital Video Broadcasting, Satellite; international open standard for digital transmissions. DVB-S broadcasting started the mid-1990s, and is still going strong.

DVB-T/T2
Digital Video Broadcasting, Terrestrial; international open standard for digital transmissions. DVB-T2 is more advanced and efficient and will gradually replace DVB-T.

EIT
Event Information Table; a DVB table holding program information, the start and end time with the program description, possible age restriction etc. The EPG consists of EIT data.

EPG
Electronic Program Guide; an application to show EIT information (e.g. title, description, rating) of broadcasted programs or other video assets, OR sometimes also meaning the actual TV program or video asset metadata.
Read about EPG Management product

FTA
Free-to-air; free/clear (no cost) channels available to everyone (versus encrypted/subscribed).

GDPR
General Data Protection Regulation; The European Union (EU) has enhanced individuals' control and rights over their personal data (since May 2018), this affects services where users must be identified. If e.g. a website holds user data of EU citizens (name, cookies etc.), the end-user must provide a valid consent for this purpose.

GOOGLE TV
The Google TV platform is the successor of Android TV. This could also be called rebranding or renaming due to the fact that the underlying software remains the same. There are nonetheless many changes, and now the focus will be on personalized content and tailored recommendations. The most noticeable change is the new user interface, which puts content first. It is predicted that from 2022 onwards all Google-based devices will be using Google TV instead of Android TV.

HBBTV
Hybrid Broadcast Broadband TV; standard for interactive services on top of DVB, widely used especially in Europe. HbbTV enables ample offering of services on TV.
Read how to enable HbbTV

HD(TV)
High Definition (Television); screen resolutions from 1280x720 up to 1920x1080.

HLS
HTTP Live Streaming; HTTP-based adaptive bitrate streaming communications protocol developed by Apple Inc. Adaptive streaming adapts to the available network bitrate and adjusts the image resolution.

HTML5
Hyper Text Markup Language version 5; the standard markup language for documents designed to be displayed in a web browser. Version 5 is more mobile-friendly, supports audio and video controls, vector graphics, canvas support, localStorage, track geolocation etc.

HYBRID TV
Combining interactive TV implemented using broadband (via IP) with broadcast (via tuner). HbbTV apps are considered Hybrid TV services.

IP
Internet Protocol; the principal protocol by which data is sent from one computer to another on the Internet.

ITV
Interactive TV; data services added to television using IP and thus making it interactive.

JAVASCRIPT
Programming language widely used in digital TV services, both in HbbTV and Smart TV. Used alongside HTML and CSS.

MHEG
Multimedia and Hypermedia Experts Group; nowadays usually found in the form "MHEG-5", which refers to interactive applications on TV based on the MHEG-5 standard, used especially in the United Kingdom.

MHP
Multimedia Home Platform; the first open middleware system standard (end of 1990s/early 2000s) designed by the DVB project for interactive digital television. HbbTV has substituted MHP in many areas, though MHP applications still exist in some countries.

MPEG
Moving Picture Experts Group; literally refers to the group of authorities, but more commonly to compression formats used in digital TV: MPEG-1, MPEG-2, MPEG-4 AVC, HEVC etc.

NETCAST
Proprietary firmware by LG Electronics that was preinstalled on their smart TVs between 2007 and 2014. Later replaced by WebOS.

NORDIG (GROUP)
Represents broadcasters and network operators in the Nordic countries and Ireland that have e.g. agreed on common minimum decoder requirements. A few other countries have also based their STB requirements on this specification.

NPVR
Network Personal Video Recorder; network-based digital video recorder stored at the provider's central location rather than at the consumer's private home (PVR).

OPAPP
Operator Application; a special HbbTV application that defines operator-specific appearance and functions without a separate STB, acts like "virtual STB" built on smart TV.

OTA
Over-the-air; delivery of new software, firmware, to TV or STB via broadcast.

OTT
Over-the-top; a platform or application to provide a set of TV and video services (VOD, start-over etc.) over IP, also to "companion screens" (tablets, mobile phones)

PSI/SI
Program Specific Information/Service Information; crucial data and metadata for digital transmissions. Specification for Service Information (SI) in DVB systems.

PVR
Personal Video Recorder; a type of STB that allows recording of TV programs. Presence of scheduled EPG data is essential with this.

SCTE-35 AND -104
Society of Cable and Telecommunications Engineers; non-profit professional association for the advancement of technology, standards and workforce education related to cable telecommunications engineering. "SCTE-35 markers" indicate where downstream systems can insert other content (usually advertisements or local programs). SCTE-104 is used in the head-end side, SCTE-35 in the transmitted signal.

SD(TV)
Standard Definition (Television); screen resolutions from 704×480 up to 720×576.

SMART TV
A modern digital TV with several built-in applications including a browser and normally also HbbTV support.

SSAI
Server-Side Ad Insertion; a way of stitching an ad directly into the video that is being streamed – at the server instead of the client. This eases the load on the server and makes ad blocking difficult, but the ads it enables are less personalized.

SSU
System software update; a method to update STB/Smart TV system software via broadcast.

START-OVER
Feature that provides a way to start an ongoing broadcast program from the beginning (via IP).

STB
Set-top box; integrated digital receiver, a device able to receive a digital TV signal and transform it into a clear TV picture.

SVOD
Subscription Video on Demand; consume as much video content as you want with a monthly payment.

TA / DVB-TA
Targeted Advertising; a method to better monetize service offering by serving personalized and targeted ads to consumers. DVB-TA is the DVB Project's specification for broadcasters who wish to dynamically substitute advertising in a linear broadcast over traditional DVB networks or IP networks.

TIZEN
Operating system (e.g. Smart TV's, smartwatches) used by Samsung since 2012. Most popular Smart TV platform globally (13%; 2020).

TS
(MPEG) Transport Stream, also known as multiplex or mux; comprised of video, audio and data/metadata, contains several TV/radio programs. The packet format used for DVB and HLS transport.

TVOD
Transactional Video on Demand; consumers purchase content on a pay-per-view basis, especially latest movies etc.

UHD
Ultra-high Definition TV (also known as 4K UHD); screen resolution 3840×2160. See also other resolutions

VOD
Video on Demand; service for providing a wide variety of video material (series, movies) to end-users, letting them decide when to watch. Subscription often required, but public broadcasters may offer service for free.

WEBOS
Operating system (e.g. Smart TV) initially developed by Palm Inc. (which was acquired by Hewlett-Packard) for mobile devices, later sold to and patents licensed to LG Electronics.

CHECK OUT OUR GLOSSARY ONLINE AT
https://abc.dtv.fi

Sofia Digital Oy
Sumeliuksenkatu 18 A
33100 TAMPERE FINLAND

tel. +358 10 850 55 50
sales@sofiadigital.com
www.sofiadigital.com

SofiaDigital
@sofiadigital
company/sofia-digital