

The AMP Solution

Altech Multimedia Services and Solutions

This document looks at the benefits and advantages to be gained by utilizing the features and functionality of the AMP Solution.



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The Hybrid/OTT (HOTT) Environment

Hybrid STBs are rapidly being deployed by Pay-TV operators worldwide to help them deliver advanced services and manage bandwidth scarcity in broadcast networks. In 2010, only 40 percent of STBs worldwide featured hybrid functionality and even so, most had that functionality software-disabled as operators were unable to deliver the necessary content over IP. By 2016, hybrid box penetration will exceed 60 percent as operators engage in IP-based video-on-demand (VoD) and advertising solutions, along with interactive content.

Since the introduction of integrated Hybrid OTT and live TV services, Pay-TV operators are able to add and expand video services less expensively than before by exploiting the advantages of Adaptive Bit Rate (ABR) encoding and digital video broadcast. By integrating the program guides for OTT and live digital channels from Cable, IPTV, Satellite or Free-to-Air (FTA), Pay-TV operators can now offer both live TV sources with OTT content depending on local market demands. Hybrid OTT markets have developed faster in Europe, often due to the need to integrate bundled Free-to-Air digital channels into one service. [Ref 1]

HbbTV[®]

Hybrid Broadcast Broadband TV or HbbTV, is a major new pan-European initiative aimed at harmonising the broadcast and broadband delivery of entertainment to the end consumer through connected TVs and set-top boxes.

Through the adoption of HbbTV, consumers will be able to access new services from entertainment providers such as broadcasters, online providers and CE manufactures – including catch-up TV, video on demand (VoD), interactive advertising, personalisation, voting, games and social networking as well as program-related services such as digital text and EPGs.

The HbbTV specification is based on existing standards and web technologies including OIPF (Open IPTV Forum), CEA, DVB and W3C.

The standard provides the features and functionality required to deliver feature rich broadcast and internet services. Utilizing standard Internet

Salient Points

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By 2016, hybrid box penetration will exceed 60 percent as operators engage in IP-based VoD and advertising solutions, along with interactive content.

The AMP Solution has all the necessary building blocks to ensure that operators are able to remain competitive with a complete ecosystem of components to facilitate a migration to the Hybrid OTT space.

HbbTV is the preferred standard in Hybrid OTT allowing a standardized interface for applications along with implicit HTML5 and CE-HTML support.

Whether it is the HbbTV streamer for the Head End, a web portal or the HbbTV compliant MW – AMP has it all.

With support for Nagra, Conax, Verimatrix, Irdeto and Cisco (NDS) CA Systems, AMP software time to market is greatly reduced.

technology it enables rapid application development. It defines minimum requirements simplifying the implementation in devices and leaving room for differentiation. [Ref 2]

Something for everyone

Hybrid OTT services allow Pay-Tv operators the flexibility to grow new audiences from the younger demographic that likes the freedom of OTT TV with access to games, VoD, applications etc. while attracting audiences who still prefer linear content. AMP allows for extended viewing experiences with the provision of a web portal along with managed content provision. Want to view recorded content or your media outside the home environment? No problem, the AMP Solution allows access to your recorded content where ever you are with our *connectTV* solution.

Beyond the TV

The concept of connected TV relates to streamed content available to the consumer over multiple delivery platforms including tablets, PCs and mobiles across a network.

In a recent study conducted by Frank N. Magid Associates it was noted that control is increasingly in the hands of the viewer as connected TV is taking over the reins when it comes to streaming films or television shows. Streaming devices and services are giving people access to what they want, when they want, and viewers are streaming on a connected device at a record pace during primetime hours and more than half of adults surveyed prefer connected TV over other streaming devices in the home – including PC, tablet and mobile phone.

This shifting landscape reinforces that there is a tremendous opportunity here for advertisers to engage consumers and really drive brand awareness by targeting the increasingly influential connected TV medium. The AMP Solution caters for targeted advertising along with a specialized implementation of the connected TV theme extending beyond the realm of the home network. [Ref 3]

The AMP Ecosystem

The AMP Solution Set includes the full end-to-end spectrum from the head-end (with strategic partnerships for HbbTV Streamers, Broadcast monitoring systems and PVO D Carousels) to web portals for additional feature rich content, to the home. In the home environment the AMP Middleware supports standards like HbbTV, MHEG5, CI+ and DLNA. AMP features HTML5 and Native UI options, a Recommendation Engine, Home Automation, Audience Monitoring, Security Monitoring, *connectTV* remote applications for Android and iOS and more.

With the global increase in broadband connectivity, it is unsurprising to see operators leveraging the additional content-stream in to the homes of the consumer with a solution facilitated by AMP.

AMP Middleware

Core features of the Middleware residing on the STB System are listed below along with a description of the system architecture.

Key features of the AMP software stack

- The AMP software stack is based on the Linux Operating System has been used on various versions of Linux (ST, NXP, NEC, BCM ...)
- Middleware (not supporting Hybrid TV features) is also available for OS21 and eCoS, and due to a highly flexible firmware layer it is also portable to other operating systems.
- It supports DVB-S/S2, DVB-T/T2, DVB-C as well as IP-Streaming
- Various country specific implementations and extensions for example: Middle East satellite market, Dutch cable market, Nordig DVB-T / T2 and DVB-C, Austria DVB-S2, France DVB-T, UK MHEG-5 have been implemented.
- CI / CA systems support: CI, CI+, Irdeto CA, Conax CAS 5, Cisco(NDS), Nagra and Verimatrix
- DRM support: Microsoft PlayReady, Verimatrix, SecureMedia

The middleware itself resides on the Linux DVB API. If this API is available and suitable support for PVR is provided, porting of the middleware onto a new platform is simplified, leading to quicker time to market.

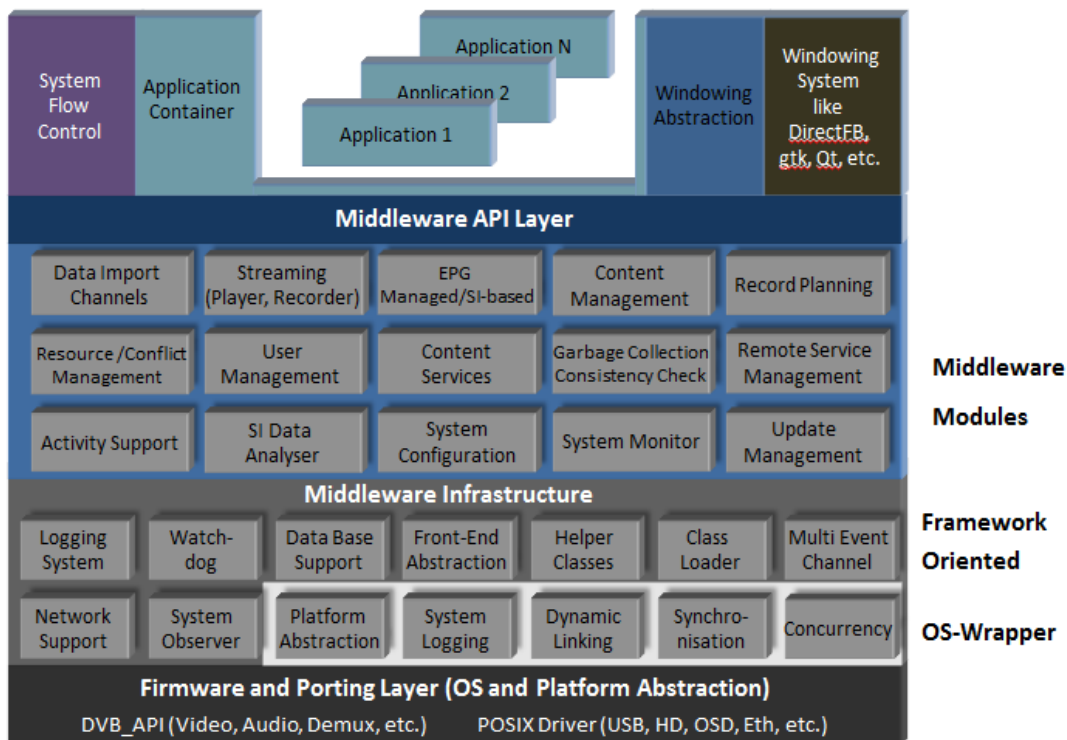


Figure 1: The AMP Middleware Architecture Diagram.

Standard STB Features:

- DVB Engine: Methods for channel search, channel lists, favourite lists etc. for DVB-S/S2, DVB-C, DVB-T/T2.
- EPG handling: Accumulation of DVB-SI EPG according to different rule sets in flash and memory (optionally)
- Managed EPG handling: Support of different forms of Managed EPG provided via IP to the STB.
- Software update from USB device, OTA (DSM-CC) or from IP server (Internet)
- Videotext decoder.
- Graphical user interface management based on directFB graphics engine with support for both native user interfaces and HTML5 based user interfaces on high end platforms.

PVR Features:

- Media Player for playback of media from DVB sources, HDD, external PC (SMB) or internet using FFmpeg format and container conversion methods (HLS streaming). Support is included for bookmarks.
- Content management for recordings on integrated HDD, USB HDD, eSATA HDD and also on NAS systems and Windows and Linux shares.
- Content management takes care of the fill level of the HDD and performs automatic content deletion according to rules. An integrated garbage collector takes care of HDD consistency.
- Smart content referencing (CRID=Content Reference ID) keeps track of content that is no longer used by any application and deletes it (for time-shift and multiple requests for the same recording)
- Advanced conflict management and resource management algorithms for multi-tuner support.
- Integrated support for scrambled channels and channels on different bands. The number of tuners can be scaled.
- Advanced recording planning for EPG series, genres series and keyword series supporting multiple priority levels.

Home Networking Features:

- Communication methods for TCP/IP, SMB, IP over DVB communication.
- UPnP library integration (client, control and server), DLNA
- Support for NAS (Network Attached Storage) devices is included.
- SAT>IP Server Integration according to Astra specification. SAT>IP access to live streams is integrated into conflict management.

Other Web Features:

- Other Integrated Software modules include an embedded web server, ftp server, SQL database (SQLite)
- Integrated web browsers include: Opera, Ekioh, NetFront and ANT.
- VAST 2.0 integration for targeted advertising support

Connected TV Features / SmartTV Features

- Opera Devices web browser and plugin for communication to middleware. Plugin allows all necessary HbbTV features (channel change, EPG access ...) as well as some specific features.
- YouTube Leanback 2015 is supported by AMP
- Integration of all necessary media players for complete SmartTV web portal supporting streaming of H.264 video, AAC audio, MP3 audio, WMA audio and other formats.
- Streaming protocols such as HTTP, MPEG-DASH, HLS, RTP / RTSP are also supported.
- HbbTV integration is achieved by using AMP's proprietary DSM-CC object carousel and an AIT parser with an Opera devices browser for the user interface.
- AMP has integrated Axel Springer *watchmi* theme channels for streaming media and automatic recording. This system is currently made available on the Altech SetOne Genius HD platform. *watchmi* channels are non-linear TV channels that use content from Axel Springer Media house that collect a huge amount of audio / video information. These channels are integrated with the linear DVB channels to provide a unique TV experience for mixing linear and non-linear content in such a way that the user does not see any difference between a live broadcast channel and an online broadband channel. The overall *watchmi* theme channels are connected to an online ad server system to insert ads at pre-defined times.

- AMP has an integrated Audience measurement system as well as an external server backend that is used to upload the overall AMS data. This server system can be connected to a datamining system to extract knowledge out of the accumulated data.

ConnectTV: Serving your content across the internet – wherever you are.

The *connectTV* functionality provided by AMP allows transparent access to STB / PVR systems installed at user's homes using a rendezvous server system. This out-of-home access can be supported for PCs, smartphones, tablets and also other set top boxes for peer-to-peer communication. This functionality includes scheduling and management of recordings and timers from the EPG via an Android or iOS application on your mobile device and extends to streaming of content via the management server to the device.

Streaming of transcoded content has the following options:

- Stream recorded transcoded content from the PVR (multiple simultaneous users supported).
- Stream live content directly from the STB at home over the net. This is made possible by a USB transcoder plug-in hardware module.



Figure 2: ConnectTV functionality: Remote user control of the STB and streaming of content to the remote user outside of the home network across the internet.

User interface based on SVG or HTML5 interfaced to AMP using OIPF / HbbTV

The AMP middleware supports various browsers to run SVG or HTML5 applications. These applications are either downloaded via HbbTV or are pre-installed on the STB itself to run the overall UI and application software of the STB system. In this way, the application logic and UI presentation and the AMP middleware itself are very well distinguished.

AMP provides for such an integration the well-defined interfaces defined by OIPF / HbbTV. This allows for an independent application developer to use SVG or HTML5 and to run this on the AMP middleware. In this way, the UI and application development is fully independent of the underlying AMP middleware. Thus shorter time to market is possible in this way. On the other hand it is possible that a network operator has his own UI / application done and can easily port that to AMP middleware using the standard interfaces OIPF / HbbTV.

The AMP implementation provides large number of extension compared to the defined OIPF interface to ease and to support the STB application integration. Also all specific features and functionalities of AMP described in this paper are accessible using the JavaScript API that extends standard OIPF / HbbTV.

Home Control and Home Automation

The AMP middleware software stack provides all the necessary means and functionalities to run home media services on home premises devices such as STB, tables and smartphones. In addition to that, AMP provides a number of interfaces and building blocks that allow to integrate Home Control and Home Automation system and technologies.

Home Control and Home Automation systems are usually based on low power devices that connect a central gateway to a number of actors and sensors within the users home. The gateway provides the interface to an IP network. AMP integrates technologies that use approaches developed in the openHAB community that allows to integrate a huge amount of actors and sensors from a large variety of vendors that are active in this market. The integration of openHAB into the AMP ecosystem allows for the cost efficient implementation of powerful Home Control and Home Automation systems. These cover popular standards such as ZigBee, ZWave, Low Power Bluetooth and much more. Using the open approach of openHAB, it is also assure that emerging standards in this fast moving area are integrated at a fast pace.

Using the connectTV technology of AMP middleware it is assured that the Home Control solutions being integrated in AMP are also accessible via mobile devices from anywhere. Thus, AMP provides all necessary security and functionality features to perform transparent access to actors and sensors in the users home controlled from the Home Gateway / STB system.

Device management/Remote diagnostics

Software updates, user support, troubleshooting and other remote operations can be performed using the web interface to all installed STB systems from a support hotline. This web interface allows the remote diagnostics team to send control commands to the STB to start diagnostic routines on the device.

Recommender Engine integration:

- **AMP** incorporates the APRICO recommender engine and is a licensed owner of the APRICO embedded recommender engine for local recommendations based on Axel Springer EPG data (other EPG data can be used on request). The recommender engine is running on the STB in this case.
- **AMP** has integrated the *watchmi* online recommender system (requires external license from Axel Springer AG) that provides similar functionality to the embedded recommender but as a SAAS service.

External systems that interface with the AMP middleware

Push VoD server system

The Push VoD server resides at the satellite uplink (play-out station) and is directly connected to the IP encapsulator. The Push VoD server sends a UDP IP stream to the IP encapsulator that generates a suitable IP stream out of this so that this can be forwarded as an IP-over-DVB stream via satellite to all receiving STB devices. The Push VoD server allows the submission of arbitrary files and collection of files for the satellite uplink. It generates the necessary information to perform forward error correction and handles the overall protocol.

Web Portal

With access to the second largest amount of content behind Samsung, Altech Multimedia can provide a web portal skinned for a specific operator with feature rich content customized for the area of operation.

Key features include:

- Access to over 35 video on demand services in Europe exclusively.
- Portal is operational with every browser-chipset-combination.
- Direct support for Linux and Android operating systems.
- Seamless video on demand integration.
- An integrated search function for simpler operation and access to content.

Solution Tiers:

Altech Multimedia offers the following solution options ranging from simple portal design to hosting and management:

- Portal design.
- Portal design along with hosting.
- Design and hosting with content provision and management.

References

1. <http://advanced-television.com/2011/11/08/hybridott-providing-new-opportunities-for-pay-tv-operators/>
2. <http://www.hbbtv.org/>
3. <http://advanced-television.com/2013/11/18/connected-tv-streaming-going-mainstream/>

Conclusion

The AMP Solution from Altech Multimedia is an all-inclusive yet componentized end-to-end offering extending from the head-end to the end-user's home, covering the spaces in between. When considering the move from Broadcast to Hybrid Broadcast and Broadband, the AMP Solution has all you need:

- Existing Conditional Access integrations with Cisco, Irdeto and Verimatrix
- PVoD Carousel System and STB client
- Web Portal Design, Hosting and Management
- HbbTV
- DLNA
- SAT>IP
- HLS and MS Smooth Streaming Support
- MS PlayReady DRM and Verimatrix DRM
- Recommendation Engine, Broadcast Edge Monitoring, Audience Monitoring, Remote Diagnostics
- **ConnectTV** Remote Mobile Applications (Android/iOS)

Altech Multimedia System Integration and Support Services can assist in porting AMP Middleware to your platform. Whatever the need might be, the Altech Multimedia team will have a solution.

About Altech Multimedia

Altech Multimedia is a world leading provider of products, professional services and competitive solutions to the digital Broadcast, Broadband and Telecommunications Industries. Altech Multimedia solutions include a number of innovative world-first applications that are currently deployed in several digital television networks around the world and in addition to being device independent, Altech Multimedia offerings are available as either stand-alone or complimentary solutions that integrate seamlessly with existing systems.

Through its eight operating companies Altech Multimedia has a global footprint. Technical development and support centres exist in South Africa, India, China and Australia with sales support offices in South Africa, Australia, India, Europe, Latin America and the Middle East. Altech Multimedia boasts a Blue-Chip client base and an award winning product portfolio as well as an enviable reputation amongst its partners and peers as one of the most technologically capable businesses in the industry.

Driven by innovation and grounded by experience, our products reflect the leading edge of digital technology evolution. Each product is thoughtfully created to empower our partners to maximise their unique business imperatives.

Altech Multimedia's solutions and services offering includes systems integration and application development across multiple multimedia platforms, thus expanding its ambit beyond the well-established Set-top Box business.

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