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DVB & DIGITAL TV SOFTWARE STANDARDS

Introduction

Digital TV is now one of the world's largest emerging consumer technology markets. What does it all mean you may ask? What are the consumer benefits? What are the future software & hardware technology trends, business opportunities; how does it integrate into the Digital Home and Internet based TV. (IPTV)

There are concerns and uncertainties with reference to software standards for Application Programming Interface (API) or sometimes referred to as Middleware for set top boxes and televisions.

This paper is designed to hopefully help address; explain the issues and different Digital TV software standards.

What is Digital TV?

Digital TV is the merging of computer technology with broadcast technology to create a new exciting medium for TV broadcasters around the world. This new broadcast platform allows greater economies of scale, lower TV channel costs, reduced broadcast cost and allows TV broadcasters to offer a greater choice of TV channels and the opportunity to create new revenue generating business models.

The consumer benefits are better picture quality and definition, better sound quality, choice of TV camera angles to view a football match or TV programme, access to a range of multimedia style entertainment, interactive shopping, voting, more TV channels and all operational from a normal TV remote control device.

A Digital set top box is in essence a low power, low memory, closed systems or box computer, which runs both embedded software applications and broadcast software applications.

Digital TV Groups & Sample Broadcast Definitions

Digital Terrestrial Group (www.dtg.org.uk) responsible for DVB-T standards in the UK.

Digital Video Broadcasting (DVB) www.DVB.org Responsible for MHP standards.

ETSI European Telecommunications Standards Institute (www.esti.org)

The DVB software standard is based on the 'D' Book for the UK specification and the 'E' book standard for European Broadcast software standards, available from the DTG web site
.
DVB variations are listed below; represent the different broadcast TV platforms, these being:

DVB-T is Terrestrial
DVB-S is Satellite
DVB-C is Cable and
DVB-DSL is Broadband
DVB-H for Mobile handheld devices i.e. mobile phones

One of the key components of Digital TV receiver devices and broadcast head end equipment, now and in the future is software, which is fundamental to the whole process of DVB Broadcasts.

What is Internet Protocol Television (IPTV)?

Internet Protocol Television (IPTV) is another application of WEB based technology and utilising broadband (DSL) transmission speeds to broadcast for example Video-on- demand, VoDSL, Digital Television and Video conferencing.

VoDSL is video streaming of content via Broadband & RTSP.

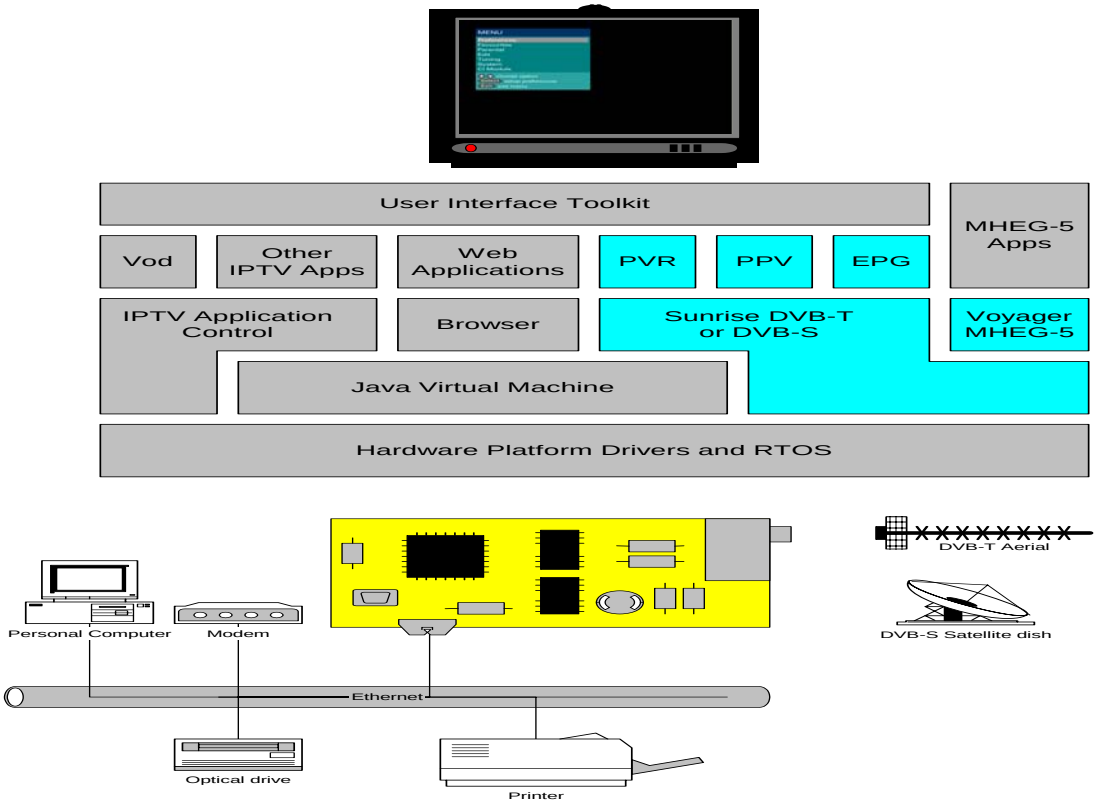
Internet protocol TV (IPTV) is the broadcasting via for example the industry standard: Real Time Streaming Protocol (RTSP) stream video TV or Video based content via broadband internet connections. This is a revolutionary market opportunities for Telco's (i.e. BT) content providers, film studios, electronic publishers (Reed Elsevier) and a host of independent TV producers to produce digital television content which can be viewed on a pay-per-view basis, without the large fixed cost commitment of buying satellite or terrestrial bandwidth.

Voice over Internet Protocol telephony (VOIP) is another example of an internet application, which will in time become a standard product on all IP set top boxes.

IP STB Hardware & Software Explained

The IP set top box (STB) TV hardware device, which for example can consists of: a Hybrid set top box consisting of: a hard disk, RF tuner, pc chipset architecture (i.e. AMD, Intel) a broadband modem, Digital Video Broadcasting (DVB) chipset architecture (i.e. Philips, ST, Conexant), physical memory , flash memory Broadband (DSL) high speed telephone transmission (1MB – 8MB line speed) deliver a new experience to consumers and with two way communication capability for fast rapid interactivity via the Internet.

A number of Consumer Electronics companies will also offer an IP STB with a single chip solution; it remains to be seen if this will provide enough horsepower to drive both the DVB and IP software application and systems software.



The Digital Connected Home.

IPTV forms part of the jigsaw for the Connected Digital Home. The Digital Home is essentially consumer electronic devices i.e. a Digital TV set top box or IP STB connected seamlessly to a wireless and connected Home Computer Network.

This allows multi-media content consisting of for example: Music, Video, audio, pictures, text, data, and security checking and control procedures to flow throughout a normal household via the Home Network.
Utisiling wired and communication standards such as Bluetooth.

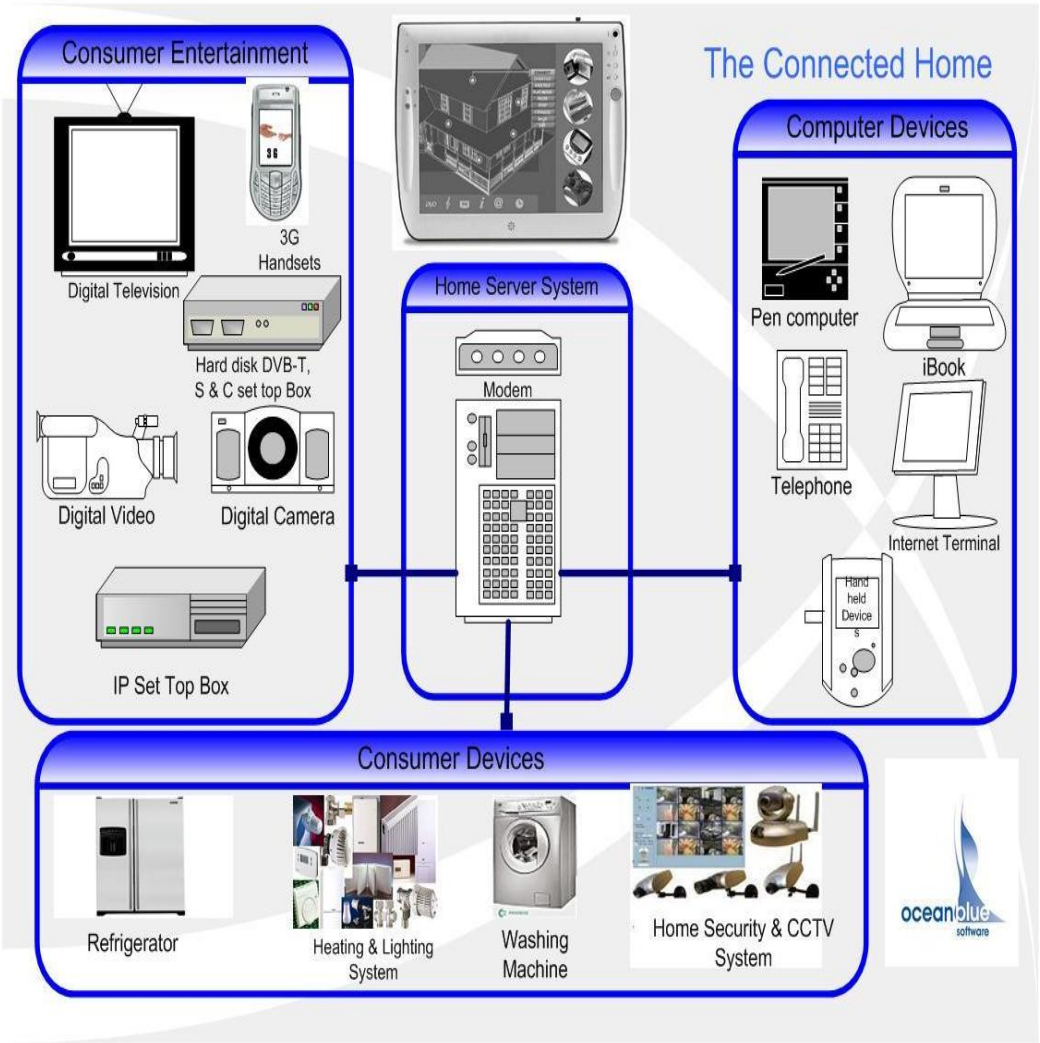


Diagram above highlights Ocean Blue's View of the Future Digital Connected Home.

Zigbee Standards.

It is worth mentioning the emergence of the Zigbee Alliance.
The ZigBee Alliance is an association of companies working together to enable reliable, cost-effective, low-power, wirelessly networked, monitoring and control products based on an open global standard.
For further information see www.zigbee.org

There is more information on the Connected/Digital Home on **www.oceanbluesoftware.co.uk**

What is an API?

An application program interface (API) is built in programmer's tool kit for requesting data objects or services resident on a particular operating system. Using the API, a programmer writing an application can make requests of the operating system.

A number of countries have already defined an API/Middleware software standard for Digital terrestrial broadcasting. For example in the UK, the DVB-T standard as defined by the Digital terrestrial Group (DTG) is MHEG-5 and DSM-CC[1] , which are both Open ISO standards and ETSI [2] . Italy has recently adopted the Digital Video Council (DVB) Multi-media Home platform (MHP)[3] Open standard of Java for Digital broadcasting.

Multimedia and Hypermedia Information Coding Expert Group (MHEG)

This group is developing, in conjuction with the International Organisation of Standardization, several standards, which deal with the coded representation of multimedia/hypermedia information.

MHEG defines the term multimedia as a representation of several media types, such as audio, video, text, and graphics.

The MHEG-5 profile for the UK DVB-T standard has been designed with low cost (zapper) set top boxes in mind. Therefore, for an operational API/Middleware MHEG-5 requires and demands minimum system support or resources.

MHEG-5 applications consist of both multimedia and hypermedia objects. The applications reside at the broadcasters head end and are transmitted via a broadcast stream to a set top box or television (the receiving device).

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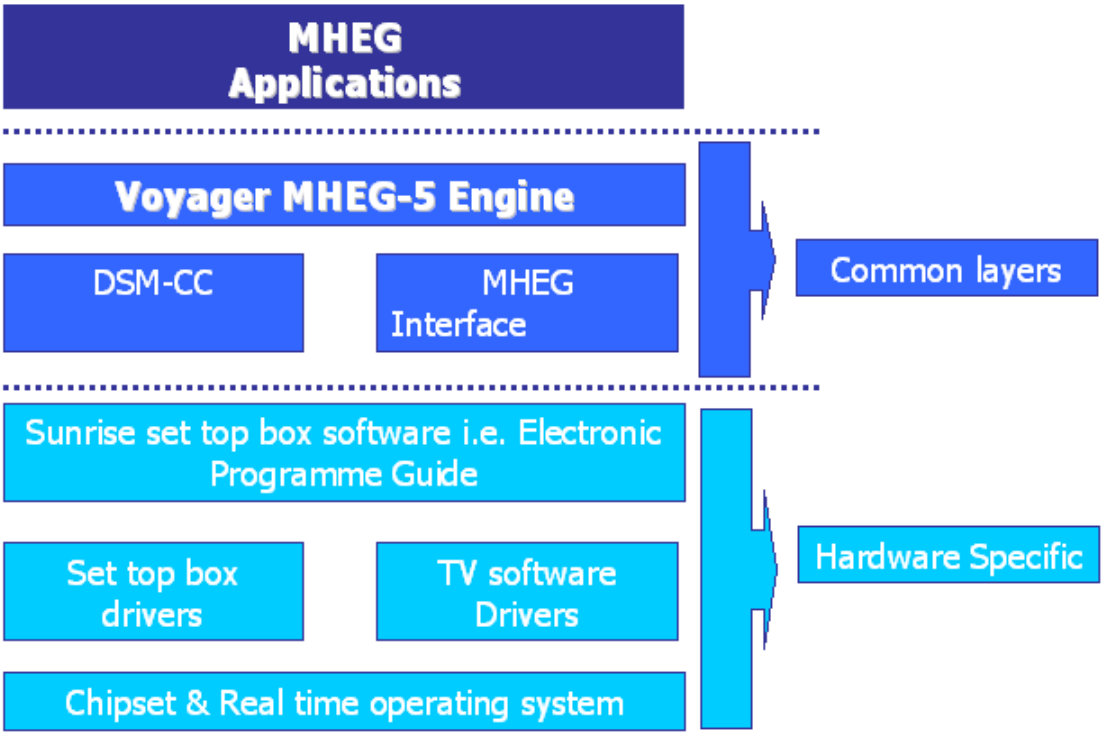
[1] ISO/IEC 13522-5 MHEG-5 International standard and ISO/IEC 13818-6 DSM-CC International standard. DTG D- Book standard

[2] ETSI European Telecommunications Standards Institute(see www.estsi.org)

[3] DVB MHP Java (see www.dvb.org)

The receiving device has an MHEG-5 compliant engine embedded into its software. When the engine receives a transmitted MHEG application, the application is run and presented to the user by utilising resources of the receiver.

The MHEG-5 engine typically calls upon the receiving devices functionality for graphical On Screen Display (OSD), stream control and DVB Service Information (SI).



The purpose of open standards & Interoperability

Open software standards allows greater competition, third part companies can design plug in and add-on products, such as authoring tools and games. An important factor and major benefit of open standards software layers is that of interoperability of software applications across different Digital TV reciever devices. Interoperatbility is the ability to develop software applications on the basis of write once and run anywhere provided the Digital TV receiver device has a compliant MHEG-5 engine

Digital Interactive TV.

The term “Press Red” on a TV remote control is now a common term in the UK for activating the resident and broadcast software applications.

Example MHEG-5 applications and interactivity is as follows:

- Cartoon Graphics
- Predefined Text Pages
- Electronic Programming Guides (EPG’s)
- Style and function buttons for interactive hot spots
- Linked pages of information, i.e. weather data
- Photographs
- Resizing of Video in a window.
- Graphic illustrations
- Digital Multimedia Teletext
- Selective viewing of News & Information
- Games
- Digital Multimedia teletext
- Interactive applications for education
- Multi stream News presentation
- Video on Demand
- Home-Shopping
- Interactive & enhanced Advertising
- On-Screen Information
- Voting/Polling

*Exa*mples *multi-media broadcasting of MHEG-5 content containing a combination of pictures, audio, video, images and text.*

Digital TV World Standard

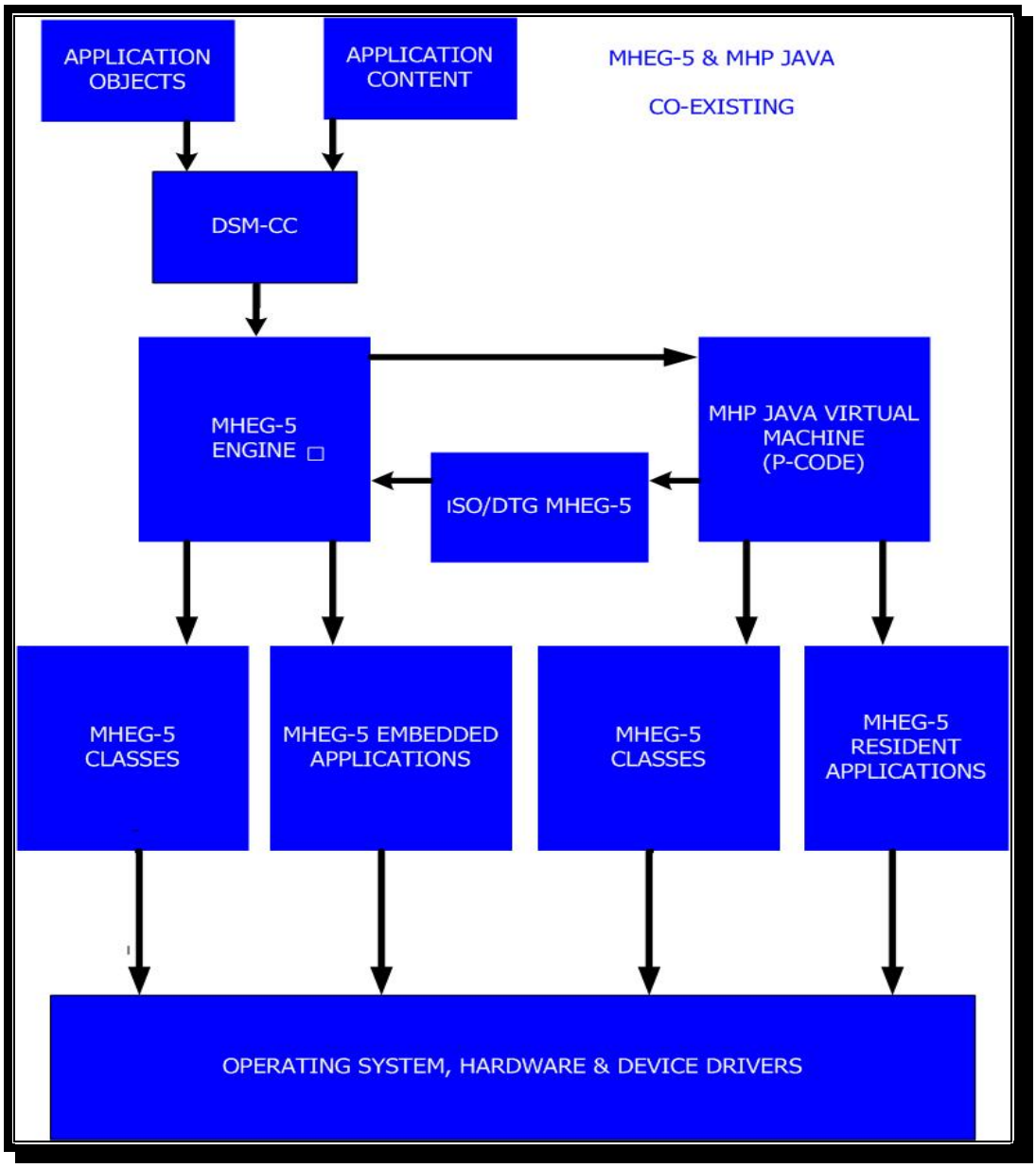
The historic Digital TV standards group and now defunct Digital Audio Visual Council (DAVIC) selected Java TV Virtual machine (VM) and MHEG-6 as the world software standard for Digital TV. ETSI is now playing apart in assisting in the defining of European Digital TV standards.

The Digital Video Broadcast group (DVB) who have now taken over the mantle from DAVIC; is promoting Java as the core Digital TV software for the Multimedia Home Platform (MHP) standard with optional plug in software modules such as MHEG.

The MHEG and MHP are both open software standards, which can co-exist, inside the same set top box. These software systems have both been designed with the reuse of software components in mind. For example, the DSM-CC data carousel is common to both MHP and MHEG. Data formats are also backward compatible; therefore, both MHP Java and MHEG can co-exist in the same receiver device and share common software processes and components such as DSM-CC the broadcast data carouse.

The diagram below illustrates the compatibility of MHEG & MHP Java as Open systems architecture co-existing together.

Diagram below highlights MHEG-5 and MHP Java APIs co-existing in Digital TV software Stack.



In addition, other API/middleware offerings such as Open TV, XML, will also offer integration to MHP Java.

Future Software Trends/ Software Migration & upward compatibility

The future of Java & MHP is unclear. Many countries are merely adopting a simple DVB-T, readily available, low cost solution such as MHEG or basic level Zapper (Ocean's Sunrise) layer software, which provides basic Digital TV pictures, sound and with no interactivity capability.

The notion of a universal software stack, which could be deployed in many and varied receiver devices including IPTV, DVB-T set top boxes, PCTV plug in cards and televisions with integrated digital tuners has not materialised.

The great success of Freeview set top boxes in the UK Digital Terrestrial market selling for less than £50, has highlighted the need for cheaper low cost Digital TV hardware & software in other emerging countries.

Therefore expensive high level Digital TV hardware & software system, which provides the same functionality as a Freeview system, are not popular in developing nations.

Legacy DVB-T receiver devices may not support (due to power & memory limitations) new universal software stacks of MHP Java & MHEG-5. Therefore, in the future the broadcasting of advanced interactive applications will be limited to receiver devices, which fully support the evolving software standards. Consumer may need to upgrade or purchase a new set top box.

IPTV and IP STBs offers the consumer the choice of triple play: Internet, telephony and Digital TV in one package unit. IP STBs also have the benefit of a hard disk and therefore PVR functionality to record, save, store and play broadcast TV content.

European Legislation

The EU government has recently chosen not to mandate any software API/middleware for European Digital TV broadcasting. This results in a *laissez faire policy* and approach to the European Digital TV market, where each country and broadcasters can determine their own Digital software standards and uninhibited by Government legislation.

References & Acknowledgements:
Ocean Blue Software (www.oceanbluesoftware.co.uk)
BBC for sample Interactive TV pictures (www.bbc.co.uk)
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Presented by Ocean Blue Software

www.oceanbluesoftware.co.uk