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The DVB MHP Internet Access profile

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The Internet Access profile allows manufacturers to incorporate “built-in” applications, such as web browsers and email clients, which enable an MHP to access Internet-based services. The motivation for the profile is to allow broadcasters to achieve a high degree of integration between their broadcast services and their Internet services. This paper gives an overview of the Internet Access profile and discusses possible applications

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THE DVB MHP INTERNET ACCESS PROFILE

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ABSTRACT

The DVB Multimedia Home Platform (MHP) is an open standard platform for interactive digital television and multimedia services. DVB has recently completed the specification for an Internet Access profile for the MHP. This is the third in a series of hierarchical profiles that are not intended to supersede each other but are expected to co-exist in the marketplace and offer a range of capabilities suited to different products and application areas.

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INTRODUCTION

The remarkable rise in the popularity of the Internet has been enabled by the growth in ownership of the personal computer (PC). However, there is still a significant proportion of the population for whom a PC is either unaffordable or daunting due to its technical complexity. This has led to the emergence of systems that aim to reduce the cost and complexity of Internet Access by providing a simple integrated device using a television as the display device.

Unfortunately, the characteristics of television displays are not ideally suited to the display of most web pages. However, good results can be obtained if the content provider takes these characteristics into account and provides appropriately formatted content. The use of dark backgrounds with carefully selected fonts, line widths and layout can improve results considerably. In response to the growing use of these devices many content providers, including the BBC, are providing specially formatted content on their web sites, often re-purposing existing content and services using automated content production systems to minimise costs.

During the same period in which these low cost Internet Access devices have emerged, set-top boxes (STBs) have been under development to support interactive digital television. Both share very similar hardware requirements and there is obviously the opportunity to develop a multifunction platform that can provide access to both interactive TV and Internet services. Broadcasters frequently use their television programmes and interactive TV services to promote their Internet services and vice versa. However, the current reality is that a pen and paper is often necessary to move between television and the Internet! A multifunction platform that supports interactive TV and Internet Access could enable the user to move seamlessly between the two domains.

Some systems have already addressed this possibility by embedding Internet URLs in the broadcast stream. However, DVB has taken this concept further in the Internet Access profile by providing a flexible interface between MHP applications and Internet services.

MHP OVERVIEW

In July 2000, the DVB consortium completed the standardisation of an open standard platform for interactive digital TV and multimedia services called the Multimedia Home Platform. The technical specification of the MHP has been developed against a comprehensive set of commercial requirements that address the needs of both commercial and public sector broadcasters.

The primary goal of the MHP is to enable the birth of horizontal markets for digital television and multimedia services, where there is open competition between content providers, network operators or platform manufacturers at each level in the delivery chain. It addresses this goal by specifying an interoperable application format, independent of any specific operating system or hardware technology, which allows MHP applications developed by different broadcasters to run on any MHP compliant receiver.

A further goal of the MHP is to exploit the potential for convergence between broadcasting, the Internet and consumer electronics. The Internet Access profile has been developed to address this goal.

DVB has adopted Java as the interoperable application format for the MHP, providing content developers with a high degree of control and flexibility for their applications. It has developed a version called DVB-J that includes the core of the standard Java language and provides extensions appropriate to the broadcast TV environment. These extensions include a new application model, a security framework, and a broadcast data transport system for the delivery of MHP applications (also known as "Xlets").

Prototype MHPs were demonstrated at IFA '99 and products are expected to be launched during 2001.

MHP PROFILES

The first MHP specification (1) included the definition of two profiles. The first, the Enhanced Broadcast profile is the baseline profile of the MHP. It is intended for use in broadcast only systems where there is a unidirectional flow of data to the receiver. The second profile is called the Interactive Broadcast profile and provides support for a bi-directional data channel using any of the return channel systems currently defined by DVB.

The recently completed MHP 1.1 specification includes the definition of a new profile called the Internet Access profile and a new optional content format called DVB-HTML. The Internet Access profile is intended to provide access to the most common types of Internet services, as currently found on the Internet i.e. WWW, Email, and Usenet news. DVB-HTML on the other hand is a tightly specified X-HTML based content format designed for broadcast use.

The three MHP profiles are not intended to supersede each other but are expected to co-exist in the marketplace. They provide a backwards-compatible hierarchy, as shown in Figure 1, supporting an increasing range of capabilities suited to different application areas and product types. DVB-HTML can be supported as an option in both the Interactive Broadcast

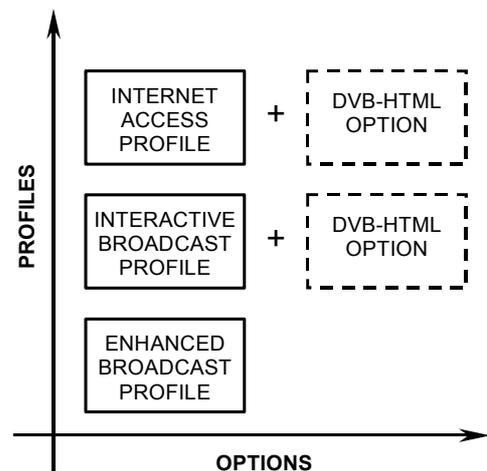


Figure 1 - Currently specified MHP profiles and their respective options

profile and the Internet Access profile. It is likely that further profiles and options will be defined in future DVB specifications, addressing new application areas e.g. Personal Video Recording.

THE INTERNET ACCESS PROFILE

The Interactive Broadcast profile includes full support for IP communication protocols, as used on the Internet. This allows the profile to support some Internet based services by downloading and running MHP applications that act as Internet clients. For example, the BBC demonstrated a news ticker application at IFA' 99 running on a prototype MHP supporting the Interactive Broadcast profile. Many other Internet services can be provided by DVB-J applications in this profile using a combination of data from remote servers and data from the broadcast stream.

The Internet Access profile takes this one step further by providing a set of "built-in" resident applications that provide access to specific Internet services. The profile requires that a web browser and an email client application are supported, with the option to include a Usenet newsgroup client and to provide support for streaming media services. Since these Internet client applications are permanently installed within the platform they can be implemented in a manufacturer specific way and are free from the constraints that apply to Xlets.

DVB Approach

The Internet is renowned for its rapid development and evolution, whereas the broadcast environment requires stable and well-defined emission formats. Interoperability problems in Internet services can be minimised by a bi-directional exchange of data between client and server during which the capabilities and limitations of the client are identified. However, in a broadcast system this exchange is not possible and content developers and platform manufacturers must agree a tightly defined and stable receiver specification.

To marry the dissimilar broadcast and Internet domains has therefore required a novel approach; DVB has specified the interface between the two domains in detail but has not prescribed the detailed characteristics and capabilities of the Internet client applications. This approach means that the implementation of the Internet clients is outside the scope of the MHP conformance regime, with the exception of the interface to MHP applications. The approach allows platform manufacturers to provide support for new Internet content formats without requiring formal extensions to the MHP specifications. It also allows a range of implementations to be made available at different cost levels e.g. implementations can use anything from a lightweight "micro browser" to the latest high specification web browser.

Interface Details

The interface specified in the Internet Access profile allows MHP applications to start Internet client applications and direct them to specific Internet content e.g. an MHP application can invoke a web browser and direct it to a specific web page. The interface also allows hyperlinks embedded within Internet content to invoke DVB services and their MHP applications. The transitions between DVB services and Internet clients that are supported by the profile are shown in Figure 2. If the optional Usenet news client application is supported then

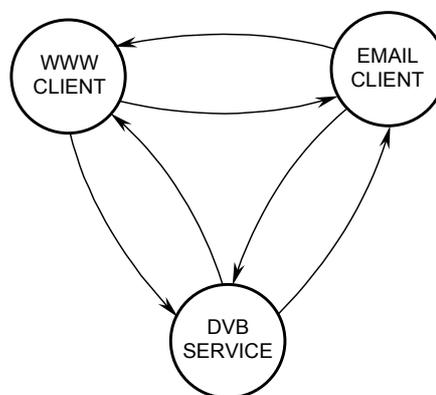


Figure 2 - Supported transitions between the service domains

equivalent transitions are also possible between this and MHP applications. In addition, the interface allows MHP applications to enter URLs for websites into a "bookmarks" or "favorites" list that can be invoked by the web browser at a later time, therefore making content easily accessible to the user without immediately interrupting the current broadcast service. Similarly, it is possible to enter email addresses into an address list that can be accessed by the email client application at a later time.

Although DVB has not specified the detailed characteristics of the Internet client applications, the Internet Access profile provides methods to allow MHP applications to discover the capabilities of the Internet clients provided by the platform on which they are running. This includes details of all the static and streaming Internet content formats that are supported. This information allows MHP applications to make appropriate decisions about what services should be offered to the user and where the Internet client applications should, or should not be directed.

Application Lifecycle Issues

As well as permitting a range of capabilities for the Internet client applications, the profile also allows some flexibility in the application lifecycle model. Some implementations may be able to run Internet client applications concurrently with MHP applications. In this case the invocation of a client application by an MHP application will not result in the termination of the MHP application. The user can therefore return to the MHP application at any time.

However, implementations that are not able to run Internet client applications concurrently with MHP applications are also permitted. In this case, the invocation of an Internet client application will lead to the termination of the MHP application. When the user terminates the Internet client application the profile specifies that the platform should return to the DVB service that was running when the client was launched and the service's default (autostart) MHP application should be reloaded and restarted.

MHP applications are able to determine whether the platform on which they are running is able to support concurrent Internet clients and can therefore make appropriate decisions about what functions to offer the user. One possible approach is for an MHP application to offer the user immediate access to Internet services only if it finds that concurrent Internet clients are supported. Otherwise it might only offer the facility to add "bookmarks" to Internet services for later use, since this can be done without launching the Internet client applications and will have no effect on the lifecycle of the MHP application.

IMPLEMENTATION AND SUGGESTED APPLICATIONS

The Internet Access profile is expected to find applications in Set-top boxes (STBs), Integrated Digital TVs and PC-based DVB receivers. In addition there is also the possibility of an implementation using a hybrid receiver system where a STB is linked to a PC (using a manufacturer dependent interface). In this case, interactive applications running on the STB and displayed on the television would be able to pass URLs and email addresses to Internet clients running on the PC, which the user might prefer to use for Internet Access.

Broadcasters must use the interface provided by the Internet Access profile responsibly, since their applications are broadcast to large number of receivers and there is the possibility that a large amount of traffic could be attracted to a popular web site, causing congestion. The MHP security model ensures that functions raising security concerns can only be used by authenticated MHP applications and then only after the user has granted permission to the specific broadcaster concerned (by a manufacturer dependent procedure).

Some possible applications are discussed here for each of the Internet clients supported by the profile.

WWW Browser

It is increasingly common for broadcasters to display URLs within television programmes and interactive TV services to direct viewers to programme related websites and information services. If MHP applications determine that they are running on a platform that implements the Internet Access profile they can provide a user interface that allows the user to bookmark or immediately view these sites. Hyperlinks embedded within the HTML documents on the web sites can allow the user to return to a specific DVB service using the DVB locator syntax defined in the MHP specification.

Email Client

It is also common for broadcasters to display email addresses within television programmes and interactive TV services, either to obtain feedback or to allow the viewers to request more information. An MHP application running on the Internet Access profile can allow the viewer to launch their email client, opening a new email message with the address, subject and message body specified by the application, ready for amendment and despatch by the user.

The support for a message body allows MHP applications to insert predefined text into the new email message. One possible application of this facility is to provide a form that can be completed by the user before the email message is despatched.

Usenet News Client

Some public Usenet newsgroups concern specific broadcast services and television programmes. They can therefore provide a forum for the broadcaster to provide information to interested viewers and to encourage discussion. If an MHP application determines that it is running on a platform that supports the optional Usenet news client it can direct the user to a particular newsgroup, news thread or to a specific news message.

Alternatively, it is possible to provide access to newsgroups and chat forums using the web browser and HTML based services.

Streaming Media Services

Internet streaming services are continuously evolving. Several proprietary formats are currently in popular use and it is not uncommon for service providers to support more than one format on their web sites. The Internet Access profile allows MHP applications to query the types of streaming formats that are supported by the platform on which they are running. This allows MHP applications to offer access to streaming media services that it knows the platform is able to support. Streaming media services can be invoked and displayed within MHP applications using the standard JMF media player provided in DVB-J.

FUTURE POSSIBILITIES

As the MHP and Internet services evolve there will be the potential to extend the functionality of the interface between them provided by the Internet Access profile. As the MHP may in the future address the storage of content and services, one possibility is that the scope of the references to DVB services that can be embedded in Internet content may be extended. For example, it may become possible to schedule the recording of a future television programme by selecting a hyperlink within a web based programme guide or within an email message.

CONCLUSIONS

With the completion of MHP 1.1, DVB has provided a new profile for the MHP that supports a flexible interface between MHP applications and Internet services. The Internet Access profile will allow platforms to be developed that support both interactive digital TV and Internet services. These platforms will allow broadcasters to provide a high degree of integration between their broadcast services and their Internet services.

If the Internet Access profile is a success it may result in wider public access to the Internet. It will also help to achieve a convergence between broadcast and Internet services and should make them more accessible and easier to use.

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1. ETSI Technical Specification TS 101 812 V1.1.1 (2000-07) "Digital Video Broadcasting (DVB); Multimedia Home Platform (MHP) Specification 1.0".

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