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TITLE : MPEG systems and B-ISDN

PURPOSE : Discussion

1. Introduction

Work being done within MPEG systems is aimed at providing complete end to end delivery of multiple MPEG services. The syntax so described will be suitable for use on systems for which no such functionality currently exists. However B-ISDN, upon which MPEG video and audio streams will be transported, already possess some of the functionality being designed into the MPEG systems layer.

This document proposes that only a minimum MPEG-2 systems syntax is required for B-ISDN. Only MPEG specific functions not provided by B-ISDN are required in this case.

2. MPEG-2 and Broadband ISDN layered protocol models

Figure 1 illustrates the overlap of the layers of the B-ISDN Protocol Reference Model (PRM) and an MPEG-2 layered protocol model. The diagram attempts to show that some of the functionality required of the MPEG-2 systems duplicates that provided by B-ISDN. The exact relationship between layers of the two models is not clear. *min_sys* refers to MPEG-2 specific functions not provided by the AAL.

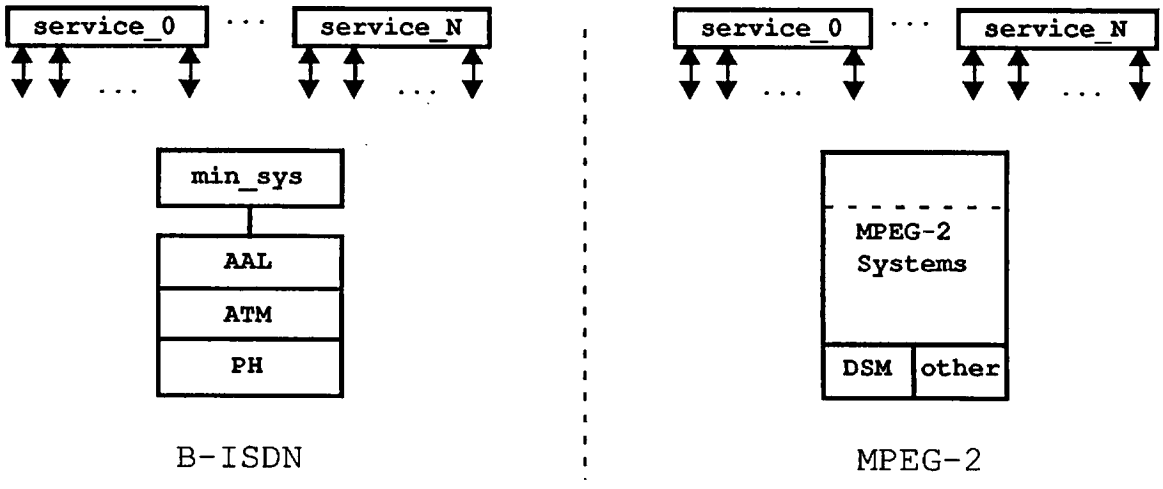

Figure 1. Comparison of B-ISDN and MPEG-2 protocol models.

Definition of a layered MPEG-2 protocol model will assist in determining interaction between the two systems.

The B_ISDN PRM is based on the principles of the layered OSI model [1]. The exact relationship between the lower layers of the PRM and the OSI model is a matter for further study.

3. ATM Adaptation Layer

In B-ISDN services are classified in order to minimise the number of different AAL protocols. AAL protocols are designed to be generic for each service classification. The AAL appropriate for real time, variable bit rate services is AAL type 2 [MPEG92/324]. The AAL type 2 has not yet been specified. This gives some flexibility as to how much functionality is placed in the AAL type 2. Three scenarios regarding the functionality of the AAL type 2 are

all encompassing AAL - all functions required to transport MPEG-2 video are included in the AAL. In this case *min_sys* is null.

generic AAL - the AAL only contains functions considered to be generic over a number of different standards/applications. In this case *min_sys* provides the additional MPEG-2 specific functions.

null AAL - the AAL is null and *min_sys* contains all MPEG-2 functionality, excluding functions belonging to the ATM layer.

4. MPEG-2 systems functions

4.1. Multiplexing

The MPEG systems meeting report states that two layers of multiplexing have been adopted, being a *Program Stream* and a *Transport Stream*. The Program Stream is based upon MPEG1. The Transport Stream is a packet multiplex system that resembles the B-ISDN ATM layer.

Within CCITT it has not been decided at what level the components of a multimedia call will be multiplexed. Cell level multiplexing is advocated for its flexibility, with a possible increase in cost of network resources. In a layered multipoint video call cell level mutiplexing of interworking layers allows routing of signals only to where they are required.

The issue here is that MPEG-2 systems may require different multiplexing arrangements than might be required within B-ISDN. One system should not constrain the other.

4.2. Directory

The B-ISDN parallel of the MPEG-2 systems directory format, defined in MPEG93/188, is call signalling. In B-ISDN the setup and release of virtual channels are controlled by the network through signalling virtual channels. In this case there is no requirement to send a directory as in band information to the receive terminal. Such a directory may be required however, if many services are broadcast on one virtual channel.

4.3. Conditional Access

It is not clear whether encryption and scrambling is the only means to implement conditional access on B-ISDN. B-ISDN call signalling could manage access to a particular service provided on one virtual channel. Again, if many services were broadcast on one virtual channel then it may be required.

5. Conclusion

Adoption of the complete MPEG-2 systems layer on B-ISDN may make the use of MPEG-2 on B-ISDN over complicated. Current proposals suggest that use of the MPEG-2 systems layer would require adaptation to suit B-ISDN.

It is proposed that a layered MPEG-2 systems protocol model be defined. This will allow the service in a lower layer to be provided by further MPEG-2 systems layers, or an appropriate B-ISDN layer. Such a model may help the specification of the AAL type 2 to proceed.

References

[1] CCITT SGXVIII Draft Recommendation I.321, "B-ISDN Protocol Reference Model and its Application", May 1990.