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Information technology — Coding of audio-visual objects —

Part 5: Reference software

AMENDMENT 4: IPMPX reference software extensions

Technologies de l'information — Codage des objets audiovisuels —

Partie 5: Logiciel de référence

AMENDEMENT 4: Extensions du logiciel de référence IPMPX

Reference number
ISO/IEC 14496-5:2001/Amd.4:2004(E)

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Amendment 4 to ISO/IEC 14496-5:2001 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 29, *Coding of audio, picture, multimedia and hypermedia information*.

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Information technology — Coding of audio-visual objects —

Part 5:
Reference software

AMENDMENT 4: IPMPX reference software extensions

1 Scope

Add the following lines to Clause 5:

IM1/IPMPNull	IPMP-H (Hooks) sources
IM1/IPMP	
IM1/Lib	
IM1/BinaryMessagesLib	IPMP-X (eXtensions) sources
IM1/IPMP_DESTool	
IM1/IPMP_DummyTool	
IM1/IPMP_MasterTool	
IM1/IPMP_RELTool	
IM1/IPMPXFull	

Add the following lines to Annex C (Providers of reference software):

Panasonic Singapore Laboratories (PSL)

Central Research Laboratories Ltd (CRL)

Multimedia Architectures

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Add the following paragraphs (till the end of this document) just before Annex C (Providers of reference software) and rename the existing Annex C as Annex D:

Annex C
(informative)

Guidance of IPMP software

C.1 Introduction

C.1.1 How to get the codes

This annex identifies, describes and explains the provided reference software that implements the MPEG-4 IPMP Extension specifications found in ISO/IEC 14496-1 and ISO/IEC 14496-13.

The reference software, which is based on IM1, includes all the normative parts of the MPEG-4 IPMP Extension standard, and some informative part as well. The reference software can be retrieved from MPEG CVS server under path "MPEG-4/System2".

C.1.2 How to compile

To retrieve the reference software from MPEG CVS server, open WinCVS, click on the parent directory of MPEG-4/ directory. Then, go to menu Remote/Checkout Module and in the Checkout settings dialog, under "Module name and path on the server", enter MPEG-4/System2 (warning: this is case sensitive!).

Please go to MPEG-4/Systems2/IM1/Docs/ and read _ReadmeFirst.doc which is necessary for you compile IM1. Follow all the steps, one after another. This will help you configure your machine correctly, download whatever missing software required by players in order to compile BifsEnc, Mp4Enc, Im1Player, IM1-2D, Osmose, Player3D with MPEG-J support.

As for IPMP-X portion, a simple **user notes document** can be found in IPMP-X directory under IM1 directory to provide the initial guidance.

C.1.3 Source codes directory

Please follow the user notes document under IPMP-X directory when you operate on the source codes.

IM1/IPMP-H contains most of IPMP Hooks related files, including the following three sub-directories.

- /IPMPNull
- /IPMP
- /Lib

IM1/IPMP-X contains most of IPMPX related files, including the following sub-directories.

- /BinaryMessagesLib MPEG-4 messages libraries and messages bitstreams
- /Include:
- /IPMP_DESTool DES decryption tool
- /IPMP_DummyTool Dummy tool
- /IPMP_MasterTool Master tool, working with REL tool
- /IPMP_RELTool REL tool
- /IPMPXFull IPMPX Framework

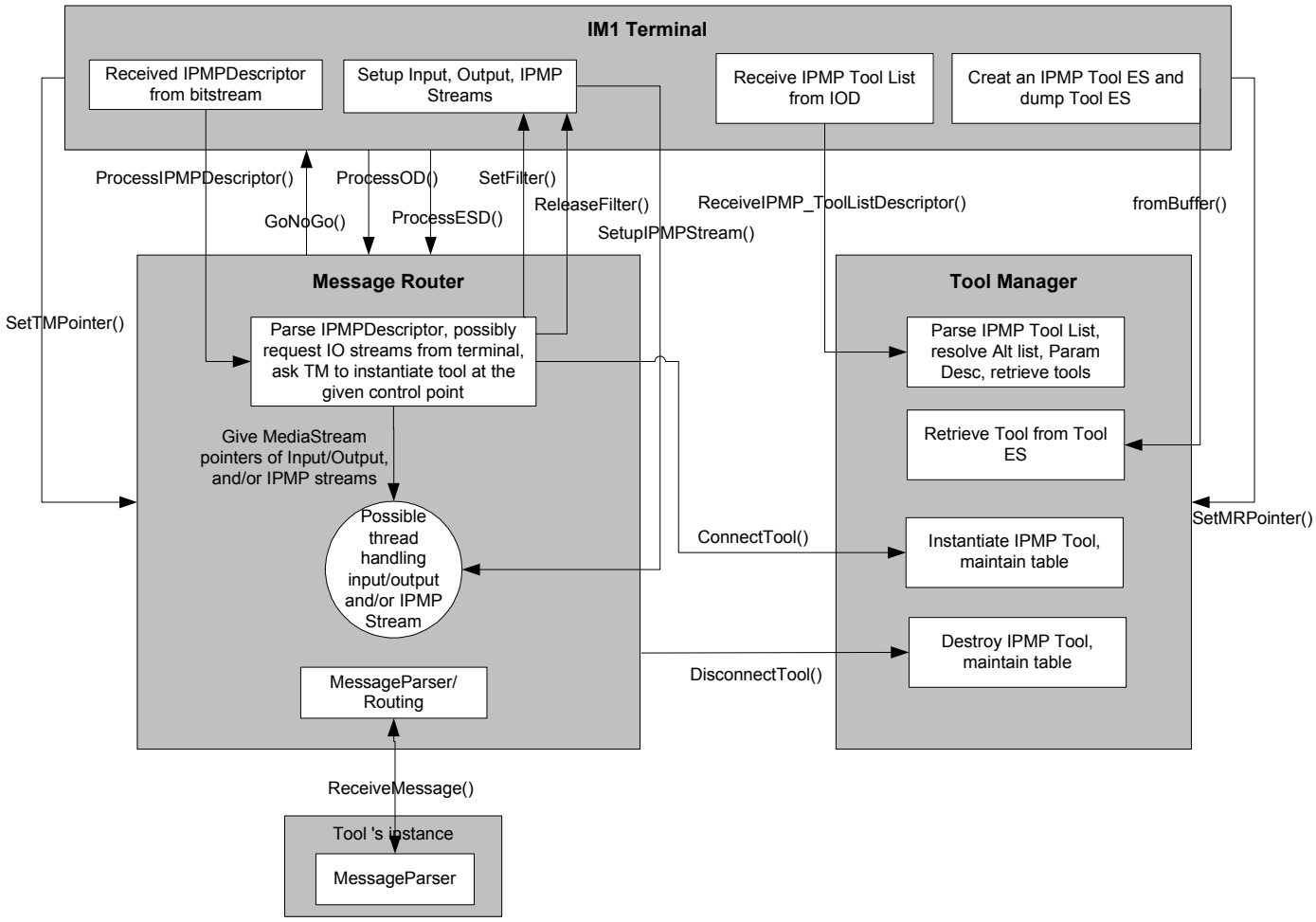
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- /Lib
- /TestFiles
  - t2.723 audio stream file (used by all test cases)
  - t1.263 video stream file (used by all test cases)
  - Six sets of testing files (.txt, .scr .mp4 and .trif), including *simple* (non-ipmp), *ipmpx_REL* (with REL tool), *ipmpx_Dummy* (with dummy tool), *ipmpx_REL-Dummy* (with both dummy tool and REL tool), *ipmpx_Dummy(TES)* (with dummy tool carried in IPMP Tool ES), *ipmpx_IPMPS_DES* (with DES tool working with IPMP Stream)
  - Some license files and user query files in .xml format, at least including conditionBothLicense.xml, exampleInput2.xml, exampleInput2.xml and exampleInput_illegal.xml (used by *ipmpx_REL* and *ipmpx_REL-Dummy*)
  - DESDLL.dll for DES Encryption & Decryption (used by *ipmpx_IPMPS_DES*)
  - DESKey_IPMPS.bin IPMP Stream file (used by *ipmpx_IPMPS_DES*)
  - DESKeysFile.txt containing two hundred 128 bit keys (used by *ipmpx_IPMPS_DES*)
  - ToolAU-Dummy.bin IPMP Tool Elementary Stream file (used by *ipmpx_Dummy(TES)*)

The IPMP.dsw under IM1/_WorkSpaces associates to IPMP related codes. Please use that to open IM1-core projects and IPMP related projects.

C.2 Details of MPEG-4 IPMP Extension Reference Software

C.2.1 Architecture



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C.2.2 Interfaces among IM1 Terminal, Message Router, IPMP Tool Manager, IPMP Tool:

MPEG-4 IPMPX standardizes a set of IPMP messages, but not the interfaces that pass the messages. The exact interfaces depend on the actual industrial domain. The interfaces that are implemented in the reference software are not normative.

IM1 Terminal:

```
// GoNoGo is called by the MR (Message Router) with a true if processing the stream
    // may begin and a false if processing must stop.
    bool GoNoGo(bool go);

    // Called by the MR to create a control point.
    bool SetFilter( Filter* filter, int controlPoint );

    // Called by the MR to release a control point.
    bool ReleaseFilter( Filter* filter );
```

Message Router (implemented in IPMPXFull)

```
    // setting TM (Tool Manager)'s pointer, so that MR can use this to access TM's member functions
    bool SetTMPointer(TM_Interface * tmPointer);

    // Called by the Terminal to process an IPMPDescriptor.
    bool ProcessIPMPDescriptor(IPMP_Descriptor* descriptor);

    // Called by the Terminal to process an Object Descriptor.
    bool ProcessObjectDescriptor( ObjectDescriptor* pOD);

    // Called by the Terminal to process an Elementary Stream Descriptor.
    bool ProcessESDescriptor( ESDescriptor* pESD);

    // Called by the Terminal to remove an IPMPDescriptor.
    bool RemoveIPMPDescriptor(IPMP_Descriptor* descriptor);

    // Called by the Terminal to notify MR that an Object Descriptor was removed
    bool RemoveObjectDescriptor( ObjectDescriptor* pOD);

    // Called by the Terminal to notify MR that an Elementary Stream Descriptor was removed
    bool RemoveESDescriptor( ESDescriptor* pESD);

    // Called by the Terminal to create a sink for an IPMP stream.
    bool SetUpIPMPStream(ObjectDescriptor *pOD, ES_Descriptor* pESD, MediaStream* ipmpStream);

    //Called by the Terminal to destroy a sink for an IPMP stream that was previously created by the Terminal
    bool RemoveIPMPStream(ES_Descriptor *pESD);

    // messaging interface
    bool ReceiveMessage(IPMP_ToolMessageBase* msg);
```

IPMP Tool Manager (implemented in IPMPXFull)

```
    // setting message router's pointer, so that TM can use this to access MR's member functions
    bool SetMRPointer(MR_Interface * tmPointer);

    // Called by the MR to indicate a tool is no longer needed.
    bool DisconnectTool(void* toolPtr );

    // Called by the MR to request a tool be instantiated.
    void* ConnectTool(ES_Descriptor *pESD, IPMP_Descriptor* descriptor);
```


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```
// Called by the Terminal to pass a tool elementary stream.
bool ReceiveToolES(MediaStream * tool_ES, ES_Descriptor * tool_ESD);

//Called by the Terminal to initialize all IPMP Tools from .dll files
bool Init_AvailableIPMPTools();

//Called by the Terminal when a Tool elementary stream is removed
RemoveToolES(ES_Descriptor *pESD)

// Called by the Terminal to pass the tool list.
bool ReceiveIPMP_ToolListDescriptor( IPMP_ToolListDescriptor* toolList ) ;
```

IPMP Tool

```
// messaging interface
bool ReceiveMessage(IPMP_ToolMessageBase* msg);

//processing IPMPX Messages
bool ProcessMessage ( IPMP_MessageFromTool*base, IPMP_Data_BaseClass*msg);

//processing media data going through this tool filter (only for controlPoint !=0)
bool ProcessData(LPBYTE, int, DWORD);
```

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