SAMPLE

Video Edit with resizing using C++ AMP

1 Introduction

This sample demonstrates how to build the video edit pipeline using AMD's hardware-accelerated Media Foundation Transforms (MFTs). This sample also demonstrates how to write and use a custom MFT for resizing using C++ AMP.

2 Using the sample

2.1 Location

`$<installDirectory>\samples\mediaFoundation\videoEditAmp\`

2.2 Contents

Package contents

Folder: `$<installDirectory>\samples\mediaFoundation\videoEditAmp\src\`

File name	Description
`VideoEditMain.cpp`	Sample's Main file (Has entry point)
`VideoEditConfig.cpp`	Contains functions to parse configuration file
`TranscodeSession.cpp`	Contains functions to build topology
`MftTransform.cpp`	Contains implementation of custom MFT (Resizer using C++ AMP)
`MftResizer.cpp`	Class used for resizing functionality using C++ AMP
`MftDllMain.cpp`	DLL functions
`CopyRGshader.hlsl`	HLSL file for Compute shader
`CopyRshader.hlsl`	HLSL file for Compute shader

Folder:
`$<installDirectory>\samples\mediaFoundation\videoEditAmp\inc\`

File name	Description
`VideoEditApi.h`	Header file for video edit sample
`TranscodeSession.h`	Header file for transcoding session class
`VideoEditConfig.h`	Header file for configuration parsing functions
`MftTransform.h`	Header file for custom MFT class declaration
`MftTransform.def`	Definition file for custom MFT DLL
`MftResizer.h`	Header file for resizer class
`MftAmpMFT.h`	Header file for custom MFT DLL specific functions
`CopyRshader.h`	Header file generated from HLSL compute shader
`CopyRGshader.h`	Header file generated from HLSL compute shader
`MftAmpTransform.h`	Header file for custom MFT class declaration

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Folder:
`$<installDirectory>\samples\mediaFoundation\videoEditAmp\config\`

File name	Description
`exampleConfig.cfg`	Configuration file for H.264 encoder and resizer configuration parameters

Folder:
`$<installDirectory>\samples\mediaFoundation\videoEditAmp\docs\`

File name	Description
`MediaSDK_MFT_videoEditAmp.pdf`	Sample documentation

Folder:
`$<installDirectory>\samples\mediaFoundation\videoEditAmp\build\windows\`

File name	Description
`mftResizerAmpVs12.vcxproj`	Visual Studio 12 project file for building custom resizer MFT
`mftResizerAmpVs12.vcxproj.filters`	Visual Studio 12 project filter file
`videoEditAmpVs12.vcxproj`	Visual Studio 12 project file for transcoding sample
`videoEditAmpVs12.vcxproj.filters`	Visual Studio 12 project filter file
`videoEditAmpVs12.sln`	Visual Studio 12 solution file

2.3 Parameters

Encoder-specific configuration parameters

Parameter name	Default value	Supported range	Remarks
`encGOPSize`	20		Max number of frames in a GOP (0=auto)
`encMeanBitrate`	3000000		Bitrate of encoded video (bits per second)
`encMaxBitrate`	4000000		Maximum bitrate of encoded video (used only for VBR) in bits per second
`encBufferSize`	2000000		VBR buffer size
`encNumBFrames`	1	0 - 3	Specifies the number of B frames to be inserted
`encCompressionStandard`	77	For supported values, see http://msdn.microsoft.com/en-us/library/windows/desktop/dd318776(v=vs.85).aspx	Compression standard

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Parameter name	Default value	Supported range	Remarks
encRateControlMethod	1	eAVEncCommonRateControlMode_CBR = 0, eAVEncCommonRateControlMode_PeakConstrainedVBR = 1, eAVEncCommonRateControlMode_UnconstrainedVBR = 2, eAVEncCommonRateControlMode_Quality = 3	For more details, see http://msdn.microsoft.com/en-us/library/windows/desktop/dd388772(v=vs.85).aspx
encLowLatencyMode	0	1 - True 0 - False	Specifies whether the output stream should be structured so that the encoded stream has a low decoding latency.
encQualityVsSpeed	60	0 - Low quality faster encoding 100 - Higher quality, slower encoding	
encCommonQuality	50	0 to 100 0 - low quality 100 - highest quality	This parameter is used only when encRateControlMethod is set to eAVEncCommonRateControlMode_Quality. in this mode the encoder selects the bit rate to match the quality settings.

Resizer-specific configuration parameters

Parameter name	Default value	Supported range	Remarks
resizerProfile	1	0 - HD1080 (1920 x 1080) 1 - HD720 (1280 x 720) 2 - WVGA (800 x 480) 3 - VGA (640 x 480) 4 - QVGA (320 x 240)	

Common configuration parameters

Parameter name	Default value	Supported range	Remarks
useSWCodec	0	Enable=1 Disable=0	Enables/Disables the use of software Encoder and Decoder. If set to 0, hardware-based codecs are used to encode and decode the stream; otherwise software-based codecs are used.

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2.4 Compile

1. Ensure that the following tools are present:
   - Microsoft Visual Studio 2012
2. Open the following solution file:
   <*installDirectory*>\samples\mediaFoundation\videoEditAmp\build\windows\videoEditAmpVs12.sln
3. Build the sample:
   - Using Microsoft Visual Studio 2012 Professional Edition, open the videoEditAmpVs12.sln solution file.
     The following two projects are available:
     mftResizerAmpVs12.vcxproj, for building the custom MFT for resizing using C++ AMP
     videoEditAmpVs12.vcxproj, for building the transcoding application
   - To build the solution, select Build > Build Solution.
     The custom MFT DLL mftResizerAmp.dll and the executable videoEditAmp.exe are created in the following folder for 32-bit builds:
     <*installDirectory*>\samples\mediaFoundation\videoEditAmp\bin\x86\<*Debug/Release*>

     The custom MFT DLL mftResizerAmp.dll and the executable videoEditAmp.exe are created in the following folder for 64-bit builds:
     <*installDirectory*>\samples\mediaFoundation\videoEditAmp\bin\x86_64\<*Debug/Release*>

3 Run

The sample can be executed on an AMD platform that includes the VCE and UVD hardware blocks. AMD Catalyst Driver is required to execute the sample application.

On the command prompt, change to the directory that contains the executable, and execute the following command:
videoEditAmp.exe -i <input.avi> -o <output.asf> -c <configfile> -l <0, 1, or 2>

-l enables the logging. Setting "0" means no logging. "1" generates the log at the API level. "2" generates logs at the video edit session level.

The <*installDirectory*>\inc\ErrorCodes.h file contains information about the error codes. You can also print the Microsoft error code using the getMicrosoftErrorCode() API, as shown in VideoEditMain.cpp. The Microsoft-specific error codes can be understood from the Mferror.h file that Microsoft provides as part of its Windows kits.

The configuration file associated with this sample is located in the following folder:
<*installDirectory*>\samples\mediaFoundation\videoEditAmp\config\

Output.asf will have the encoded resized (as per the configuration) video.

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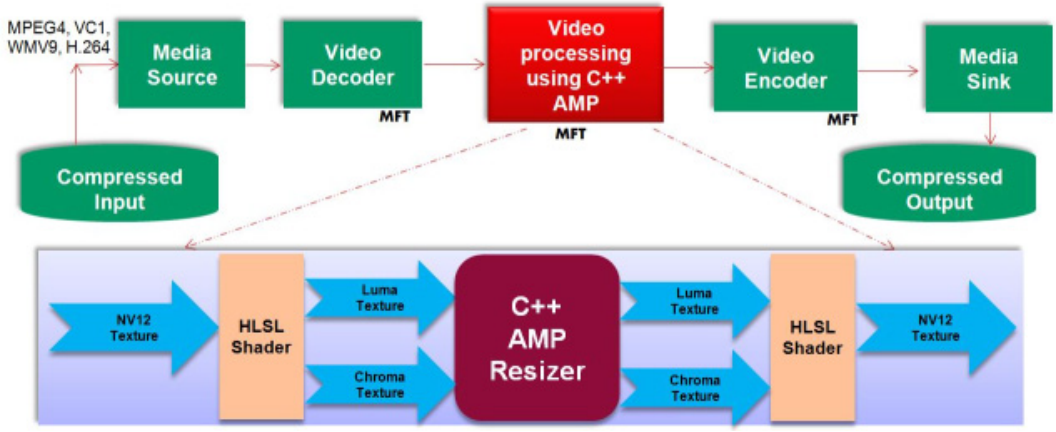
4 Implementation Details

The sample implements the following video edit pipeline. The decoded video frames are resized to the output resolution specified in the configuration file using the C++ kernel.



HLSL is used in the sample for optimally copying (before C++ AMP resizing) and merging (after C++ AMP resizing) the NV12 planes, because the NV12 format is not supported with C++ AMP.

5 Supported formats

The following file formats are supported:

- Input file/container formats: .avi, .mp4, .wmv
- Video decoders supported: H264, MPEG4 part II, VC1
- Output file/container format .asf
- Video encoder supported: H264

6 Known limitations

The sample is currently supported on the following platforms:

- Windows 8
- Windows 8.1

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