NVIDIA 3D VISION STREAMING SUPPORT FOR HTML5 AND SILVERLIGHT

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WhitePaper
How-To Guide for Web Developers

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OVERVIEW

Since the release of the blockbuster movie *Avatar*, we have witnessed an explosion in consumer interest for all kinds of 3D content and displays. In 2009, NVIDIA® introduced NVIDIA 3D Vision™ shutter glasses for 120 Hz displays, resulting in the birth of high-quality, full-resolution 3D PCs.

Until now, the main content driving the growth of the 3D PC has been PC games converted into stereoscopic 3D by NVIDIA's API and drivers. Today, over 500 games are compatible with NVIDIA 3D Vision and can be played in 3D on a range of desktop and notebook PC systems.

Now in 2011, we are experiencing a second wave of stereoscopic 3D content made up of stunning photographs and videos that can be viewed by standalone applications or posted on the web and viewed from within your web browser.

On April 12, 2011, NVIDIA addressed the growing interest in stereoscopic 3D by announcing the availability of the NVIDIA 3D Vision plug-in for the popular Microsoft Media Platform (MMP) Player Framework (formerly known as Silverlight Media Framework). For the first time, web developers and 3D content providers are able to easily build their own 3D Vision video streaming websites. (For more information or to download the 3D Vision plug-in, visit: http://www.3dvisionlive.com/3dapps)

NVIDIA is now adding the capability to stream 3D WebM-encoded videos in HTML5 to a Firefox 4 browser. WebM is a new open-media file format designed for the web. WebM files consist of video streams compressed with the VP8 video codec and audio streams compressed with the Vorbis audio codec. The WebM file structure is based on the Matroska media container. More information can be found at: http://www.webmproject.org/about/

With the 3D Vision plug-in and support for 3D WebM, NVIDIA provides developers with two options for streaming stereoscopic 3D video to a 3D Vision PC browser:

▶ HTML5.
▶ Microsoft Media Platform (MMP)

Both technologies are of the highest quality, and offer developers broad flexibility to stream full color, high-definition (HD) 3D videos on the web. Table 1 lists the range of available 3D video streaming options at this time.

Table 1. Website Streaming Options

Feature	Microsoft Silverlight	HTML5
Internet Explorer	✔	
Mozilla Firefox	✔	✔
Google Chrome	✔	
YouTube		✔
Digital Rights Management	✔	
Web Player Customization	✔	✔
Adaptive Bit Rate Streaming	✔	✔
Embeddable in a website	✔	✔

This paper addresses the exciting developments that enable thousands of websites to stream stereoscopic 3D video to 3D PCs everywhere around the world. It explains how web developers can set up their websites to stream stereoscopic content using either Microsoft Silverlight or HTML 5 technology, and the required steps to make these websites compatible with NVIDIA 3D Vision-equipped PCs.

3D VISION HARDWARE REQUIREMENTS AND SUPPORTED SYSTEMS

To view stereo content on a PC, you will need the following:

▶ NVIDIA Display Drivers - Release 275 or later
Click here to download

▶ NVIDIA 3D Vision wireless glasses

▶ 3D Displays
Visit here for a full list of 3D Vision-Ready displays, notebooks, and projectors.

> 💬 **Note:** If you have a HDMI 1.4 3D TV and a GeForce PC, you can purchase 3DTV Play software. Find out more here: (www.nvidia.com/3dtv).

▶ NVIDIA GPUs

- GeForce - Visit here for list of supported GPU's

- Quadro – Visit here for list of supported GPU's

▶ Browser

- Silverlight with 3D Vision support:
  – Internet Explorer 7 or newer
  – Firefox 3.6 or newer
  – Chrome

- HTML5 with 3D Vision support:
  – Firefox 4 or newer

▶ CPU - Intel® Core2 Duo or AMD Athlon X2 CPU or higher

▶ Memory

- 1GB of system memory. (2GB is recommended)

- 100 MB free disk space

▶ Operating System
Microsoft® Windows® Vista 32-bit/64-bit or Microsoft Windows 7 32-bit/64-bit
(HTML5 requires Windows 7 32bit/64bit)

▶ Browser Plug-in
For Silverlight Streaming: Microsoft Silverlight v4.0.50401 or underline newer

▶ Bandwidth
- Six mbps+ recommended for best quality (1080p)
- One mpbs minimum requirement

For more information on 3D-capable systems, go to NVIDIA's Website [1].

HTML5 STREAMING OF 3D VISION

To verify that you have all the necessary software components and drivers installed to view stereo HTML5 content, run the 3D Vision Live Detection Page [3]. If all checks pass, as seen in Figure 1, the viewer is then capable of viewing HTML5 stereo content served through YouTube or any other content provider.
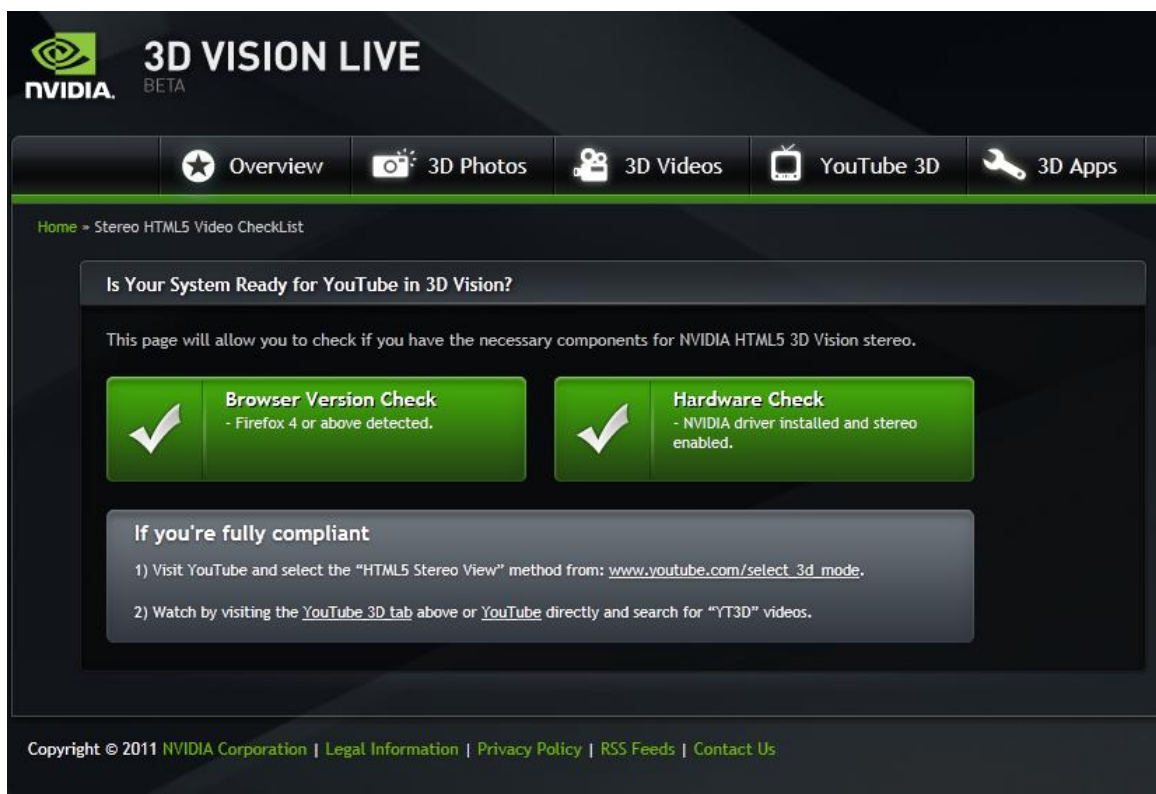

Figure 1.   3D Vision Live Detection Page.

HTML5 BASED SOLUTIONS

Stereoscopic 3D content can be viewed on any website that either uses NVIDIA's JavaScript-based API, or serves 3D WebM content. All that is needed is to fulfill the hardware requirements and pass the checklist on the 3D Vision detection page, as shown in Figure 1.

SERVING STEREOSCOPIC 3D CONTENT

To serve videos in stereo with 3D Vision, NVIDIA requires two-eye views that would be presented to the user as stereo. As such, we accept Left-Right, Right-Left, Top-Bottom and Bottom-Top content.

A sample 3D screenshot is shown in Figure 2.

Figure 2.   Sample of a Left-Right image.

CONTENT PROVIDERS AND DEVELOPERS

Website providers can serve their own 3D WebM content by exposing JavaScript APIs that allow a description of what content is being played.

▶ Any HTML5 video can be played in stereo as long as we are provided with the format of the video being played.

The following download package contains a simple Javascript library that will allow a website operator to perform various stereo related operations. (http://www.3dvisionlive.com/sites/default/files/apps/3dvHTML5Instructions.zip)

▶ Summary of available functions:

- **NvIsDriverPresent:** Provides a boolean value that specifies if a stereo driver has been installed on the system.

- **NvGetDriverVersion:** Returns the version of the NVIDIA driver installed on the user's system. NVIDIA assigns version numbers to each driver release and this will provide an integer number of the driver version. Eg – 275.00 will be represented as 27500.

- **NvIsStereoCapable:** Provides a Boolean value that specifies if the user's system has a stereo capable NVIDIA graphics card.

- **NvIsStereoEnabled:** Provides a boolean value that specifies if the user has stereo currently enabled on the system.

A sample implementation of these functions and how to use them is found in the package. The sample makes use of the VideoJS [4] library to display HTML5 videos. However, the concepts can be applied to any HTML5 video library available online. Developers of other libraries can ideally bake this functionality into their library to allow users the ability to choose the type of content being played and have it processed in stereo automatically.

YOUTUBE

NVIDIA has partnered with YouTube to provide end users stereoscopic 3D content that allows anyone with an HDMI1.4 TV (with valid 3DTV Play License) or an NVIDIA 3D Vision system to view the content in high-quality stereoscopic 3D.

You can view stereo on any 3D HTML5-based video that YouTube offers. Some sample videos are featured in playlists offered at 3D Vision Live [5].

Please note that the NVIDIA HTML5 stereo view must be selected from the YouTube 3D Mode Page [6]. In addition, Firefox versions 4 and above are the only browsers that support this functionality at this time.

EMBED YOUTUBE

As a website operator, it is easy to serve YouTube-based stereoscopic 3D content by embedding it as you would any other video using the *iframe* tag, as shown in the following code sample:

```
<iframe title="YouTube video player" width="640" height="390"
src="http://www.youtube.com/embed/QhGdBzSqjFw" frameborder="0"
allowfullscreen>
</iframe>
```

Detailed information is available on YouTube's API blog post [7].Note that the video has to be an HTML5 video for NVIDIA stereo to kick in. In addition, the user has to select the NVIDIA HTML5 stereo view from the YouTube 3D Mode Page [6].

It is also possible to stream 3D video playlists to an iframe-based YouTube video player, a sample of which is hosted here [8]. The source is available for reference via svn [9]. A sample 3D video playlist is also available for testing. If on the sample iframe player, the tags "**playlists/AC2862A908DE92C1?v=2**" are entered, you can browse through the various 3D clips of the sample 3D video playlist (see Figure 3).

Figure 3. Sample iframe-based YouTube Video Player with 3D Video Feed

NUMBERED REFERENCES

▶ (1) http://www.nvidia.com/object/3d-vision-requirements.html
▶ (2) http://www.matroska.org/news/stereo_3d.html
▶ (3) http://www.3dvisionlive.com/3dv-html5-detection
▶ (4) http://videojs.com/
▶ (5) http://www.3dvisionlive.com/yt3d
▶ (6) http://www.youtube.com/select_3d_mode
▶ (7) http://apiblog.youtube.com/2010/07/new-way-to-embed-youtube-videos.html
▶ (8) http://gdata-samples.googlecode.com/svn/trunk/ytplayer/iframe/index.html
▶ (9) http://code.google.com/p/gdata-samples/source/browse/#svn%2Ftrunk%2Fytplayer%2Fiframe
▶ (10) http://www.google.com/support/youtube/bin/answer.py?hl=en&answer=157640
▶ (11) http://www.google.com/support/youtube/bin/answer.py?answer=55744
▶ (12) http://code.google.com/apis/youtube/iframe_api_reference.html
▶ (13) http://www.webmproject.org/code/#webminspector_webm_file_inspector
▶ (14) http://www.webmproject.org/tools/encoder-parameters/

SILVERLIGHT STREAMING OF 3D VISION

The NVIDIA 3D Vision plug-in for *Microsoft Media Platform (MMP) Player Framework* (formerly known as Silverlight Media Framework) enables website developers to build their own 3D Vision video streaming website.

This portion of the document describes how the NVIDIA 3D Vision plug-in can be integrated into MMP-based players to playback 3D Vision compatible videos.

This plug-in is based on the IS3DPlug-in MMP Player Framework (SMF) plug-in interface.

Following are five simple steps involved in enabling 3D Vision-based video playback on your website. Further sections in this document cover details of this process.

▶ Get the MMP Player Framework
▶ Add Player asset to control
▶ Reference NVIDIA Plug-in
▶ HTML Modifications
▶ Playlist Specification

PREREQUISITES

IIS7 Host Server

▶ IIS7 is required for hosting the player website.

▶ Install IIS7 on the server as per http://learn.iis.net/page.aspx/85/installing-iis-7/

IIS7 Hosting Smooth Streaming Videos

▶ IIS Media Services are required for hosting smooth streaming videos.

▶ Install IIS Media Services from http://www.iis.net/media

(Refer to the *IIS Smooth Streaming Deployment Guide* for more details if required http://www.microsoft.com/downloads/en/details.aspx?FamilyID=B3752C16-B213-4A30-A54D-1A0491D45EA7&amp%3Bdisplaylang=en)

MMP Player Framework (formerly SMF)

The NVIDIA 3D Vision plug-in is based on the latest Microsoft Media Platform Player Framework (formerly known as Silverlight Media Framework) supporting the IS3D Plug-in interfaces (version 2.5 onwards).

It can be downloaded from http://smf.codeplex.com/

INTERFACES

NVIDIA 3D Vision MMP Player Framework plug-in interface configuration is shown in Table 2.

Table 2.   MMP Plug-in Interface Configuration

Plug-in	
Plug-in Interface Type	IS3DPlugin
Plug-in Class Name	NVStereo3DPlugin
Plug-in Namespace	Nvidia.NVStereo3DPlugin
Playlist Properties	S3DProperties • S3DContent ....Pair supported • S3DFormat ....Side-by-Side and Top-and-Bottom supported • S3DEyePriority.............Left-First and Right-First supported • S3DSubsamplingModes ...Not supported • S3DSubsamplingOrders...Not supported • S3DLeftEyePAR ....2.0 supported • S3DRightEyePAR...........2.0 supported
Methods/Events	Refer interface documents for IS3DPlugin methods/events*

Other Methods	• NVStereo3DPlugin
	  Current: Provides plug-in access to application
	• Custom Smooth Streaming Bit rate settings
	  ↳ In Browser mode:
	    Specified in nvstream.js supporting component
	  ↳ Out of Browser mode:
	    NVStereo3DPlugin.Current.CustomBitrateSettings
	    (long lMinStartupBitrate, long lRampupAggressiveness)
	    lMinStartupBitrate : minimum bit rate in bps at startup
	                         (recommended value 1500000)
	    lRampupAggressiveness : currently ignored
	                            (recommended value 0)
	    This method could be called if required from OOB player's
	    OnMediaPluginLoaded()

Assembly Name	NVStereo3DPlugin.dll**
Supporting components	nvstream.js**
System Requirements	NVIDIA 3D Vision capable system with latest NVIDIA drivers***

*   MMP Player Framework (SMF): http://smf.codeplex.com/

** NVIDIA 3D Vision plug-in/components: http://www.3dvisionlive.com/apps or mailto: 3DVisionLive@nvidia.com

*** NVIDIA drivers: http://www.nvidia.com/

INTEGRATION STEPS

NVIDIA 3D Vision plug-in based solution can be integrated into a website as per the following steps:

Step 1: Get the MMP Player Framework

The new MMP Player Framework (SMF) version provides support for Stereoscopic 3D plug-in interface (version 2.5 onwards). The assemblies from this framework should be referenced and used in the player. The NVIDIA® 3D Vision plug-in does not work with older versions of SMF.

The new framework supporting Stereoscopic 3D plug-in interface can be downloaded from http://smf.codeplex.com/

Step 2: Add Player Asset to Control

Add MMP Player Framework (SMF) player asset to your controls.

For example:

```
<UserControl
...
xmlns:smf="..."
...
<Grid
...
<smf:SMFPlayer x:Name="mySMF">
            ...
      ...
...
```

Alternatively, you could derive your custom player class from the SMF player class and add the custom player asset above.

Step 3: Reference NVIDIA Plug-in

Include the NVIDIA® 3D Vision plug-in assembly with the player references alongside other MMP Player Framework (SMF) assemblies. The NVIDIA® 3D Vision plug-in would then be a part of the player XAP package.

> 💬 **Note:** We recommend that other stereoscopic 3D plug-ins are not included in the references. If included, proper care must be taken to enable/disable the correct stereoscopic 3D plug-in that would be used to playback stereoscopic 3D content.

Step 4: HTML Modifications

1. In the HTML page set "enableGPUAcceleration" and "enablehtmlaccess" to true

```
...
<param name="enableGPUAcceleration" value="true" />
<param name="enablehtmlaccess" value="true" />
...
```

2. Include nvstream.js from the HTML page

```
<script type="text/javascript" src="nvstream.js"></script>
```

This nvstream.js should be included in the website package that gets deployed since this is referenced from the HTML page as above.

3. Include references for browser plug-ins from the HTML page

```
<body>
...
<embed id="embed1" type="application/mozilla-3DV-streaming-plugin"
hidden='true' width='10' height='10'></embed>
<object classid="clsid:57B83450-FD6E-4A1E-8B53-1320576F8054"
id="IEStereoVideoPlugin"
height='0' width='0' style="visibility: hidden; display: none">
</object>
...
```

4. Explicitly specify width and height for the Silverlight application (and NOT set them to 100%). For Example:

```
<object data="data:application/x-silverlight-2,"
type="application/x-silverlight-2" width="1280" height="574">
```

Step 5: Playlist Specification

Specify the supported S3DProperties with each playlist item in the HTML playlist. For example:

```
<PlaylistItem>
...
<S3DProperties>
<S3DFormat>SideBySide</S3DFormat>
<S3DEyePriority>LeftFirst</S3DEyePriority>
<S3DLeftEyePAR>2.0</S3DLeftEyePAR>
<S3DRightEyePAR>2.0</S3DRightEyePAR>
</S3DProperties>
...
</PlaylistItem>
```

The playlist item S3DProperties can also be specified in the XAML or using JavaScript.

> **Note:** For MMP Player Framework (SMF) related Stereoscopic 3D documentation refer http://smf.codeplex.com/.

LIMITATIONS

The NVIDIA® 3D Vision plug-in has the following limitations:

▶ **Dynamic Browser Window Scaling**
 - Dynamic Browser window scaling is not supported.
 - The player should be configured so that the video window inside the browser does not resize if the browser window is resized.
 - This can be configured by specifying explicitly width and height in the HTML page for the Silverlight application rather than setting them to 100%.
   For Example:
   ```
   <object data="data:application/x-silverlight-2,"
   type="application/x-silverlight-2" width="1280" height="574">
   ```

▶ **Aspect Ratio**
 The stretch mode used is Fill and hence the aspect ratio of the video may not be maintained.

APPENDIX A:
ENCODING SMOOTH STREAMING CONTENT

Microsoft Expression Encoder 4 could be used to encode the smooth streaming content using the following typical presets:.

▶ 3D_1080p24_H264_5400kbps_8levels_EE4_Balanced.xml

▶ 3D_1080p24_H264_5400kbps_8levels_EE4_Quality.xml

▶ 3D_1080p30_H264_6000kbps_8levels_EE4_Balanced.xml

▶ 3D_1080p30_H264_6000kbps_8levels_EE4_Quality.xml

▶ 3D_1080p24_VC1_5400kbps_8levels_EE4_Balanced.xml

▶ 3D_1080p24_VC1_5400kbps_8levels_EE4_Quality.xml

▶ 3D_1080p30_VC1_6000kbps_8levels_EE4_Balanced.xml

▶ 3D_1080p30_VC1_6000kbps_8levels_EE4_Quality.xml

These presets files are included in the NVIDIA plug-in download package

APPENDIX B: CODE SNIPPETS

XAML CODE SNIPPET

```
<UserControl x:Class="NV3DVSamplePlayer.MainPage"
    xmlns="http://schemas.microsoft.com/winfx/2006/xaml/presentation"
    xmlns:x="http://schemas.microsoft.com/winfx/2006/xaml"
    xmlns:d="http://schemas.microsoft.com/expression/blend/2008"
    xmlns:mc="http://schemas.openxmlformats.org/markup-
compatibility/2006"
    xmlns:smf="clr-
namespace:Microsoft.SilverlightMediaFramework.Core;assembly=Microsoft.S
ilverlightMediaFramework.Core"
    xmlns:smfm="clr-
namespace:Microsoft.SilverlightMediaFramework.Core.Media;assembly=Micro
soft.SilverlightMediaFramework.Core"
    xmlns:plugins3d="clr-
namespace:Microsoft.SilverlightMediaFramework.Plugins.Primitives.S3D;as
sembly=Microsoft.SilverlightMediaFramework.Plugins"
    mc:Ignorable="d"
    d:DesignHeight="300" d:DesignWidth="400">

    <Grid x:Name="LayoutRoot" Background="White">
        <smf:SMFPlayer x:Name="mySMF">
            <smf:SMFPlayer.Playlist>
            </smf:SMFPlayer.Playlist>
        </smf:SMFPlayer>
    </Grid>
</UserControl>
```

HTML CODE SNIPPET

```html
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
"http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" >

<head>
    <title>NV3DVSamplePlayer</title>
    <style type="text/css">
    html, body {
        height: 100%;
        overflow: auto;
    }
    body {
        padding: 0;
        margin: 0;
    }
    #silverlightControlHost {
        height: 100%;
        text-align:center;
    }
    </style>
    <script type="text/javascript" src="Silverlight.js"></script>
    <script type="text/javascript">
        function onSilverlightError(sender, args) {
            var appSource = "";
            if (sender != null && sender != 0) {
              appSource = sender.getHost().Source;
            }

            var errorType = args.ErrorType;
            var iErrorCode = args.ErrorCode;

            if (errorType == "ImageError" || errorType == "MediaError")
{
                return;
            }

            var errMsg = "Unhandled Error in Silverlight Application "
+  appSource + "\n" ;

            errMsg += "Code: "+ iErrorCode + "     \n";
            errMsg += "Category: " + errorType + "        \n";
            errMsg += "Message: " + args.ErrorMessage + "     \n";

            if (errorType == "ParserError") {
                errMsg += "File: " + args.xamlFile + "     \n";
                errMsg += "Line: " + args.lineNumber + "     \n";
                errMsg += "Position: " + args.charPosition + "     \n";
            }
            else if (errorType == "RuntimeError") {
```

```
                if (args.lineNumber != 0) {
                    errMsg += "Line: " + args.lineNumber + "     \n";
                    errMsg += "Position: " +  args.charPosition + "
\n";
                }
                errMsg += "MethodName: " + args.methodName + "     \n";
            }

            throw new Error(errMsg);
        }
    </script>
    <script type="text/javascript" src="nvstream.js"></script>
</head>
<body>
    <embed id="embed1" type="application/mozilla-3DV-streaming-plugin"
hidden='true'
        width='10' height='10'></embed>
    <object classid="clsid:57B83450-FD6E-4A1E-8B53-1320576F8054"
id="IEStereoVideoPlugin"
        height='0' width='0' style="visibility: hidden; display: none">
    </object>

    <form id="form1" runat="server" style="height:100%">
    <div id="silverlightControlHost">
        <object data="data:application/x-silverlight-2,"
type="application/x-silverlight-2" width="1280" height="574">
            <param name="source"
value="ClientBin/NV3DVSamplePlayer.xap"/>
            <param name="onError" value="onSilverlightError" />
            <param name="background" value="white" />
            <param name="minRuntimeVersion" value="4.0.50826.0" />
            <param name="autoUpgrade" value="true" />
            <param name="enableGPUAcceleration" value="true" />
            <param name="enablehtmlaccess" value="true" />
            <param name="initparams" value="PlayerSettings =
          <Playlist>
                <AutoLoad>true</AutoLoad>
                <AutoPlay>true</AutoPlay>
                <DisplayTimeCode>false</DisplayTimeCode>
                <EnableCachedComposition>true</EnableCachedComposition>
                <EnableCaptions>false</EnableCaptions>
                <EnableOffline>true</EnableOffline>
                <EnablePopOut>true</EnablePopOut>
                <StartMuted>false</StartMuted>
                <Items>
                    <PlaylistItem>
                        <AudioCodec>WmaProfessional</AudioCodec>
                        <Description>NVIDIA 3dVision PC</Description>
                        <FileSize>4573677</FileSize>
                        <FrameRate>29.9700898503294</FrameRate>
                        <S3DProperties>
                            <S3DFormat>SideBySide</S3DFormat>
                            <S3DEyePriority>LeftFirst</S3DEyePriority>
```

```
                              <S3DLeftEyePAR>2.0</S3DLeftEyePAR>
                              <S3DRightEyePAR>2.0</S3DRightEyePAR>
                           </S3DProperties>
                           <IsAdaptiveStreaming>true</IsAdaptiveStreaming>

<MediaSource>http://hd.3dvisionlive.com/ondemand/videos/NVIDIA_3DV/NVID
IA_3DV_PC_1080p30.ism/Manifest</MediaSource>
                           <Title>NVIDIA 3dVision PC</Title>
                           <VideoCodec>H264</VideoCodec>
                        </PlaylistItem>
                  </Items>
               </Playlist>" />
            <a
href="http://go.microsoft.com/fwlink/?LinkID=149156&v=4.0.50826.0"
style="text-decoration:none">
                 <img src="http://go.microsoft.com/fwlink/?LinkId=161376"
alt="Get Microsoft Silverlight" style="border-style:none"/>
            </a>
        </object><iframe id="_sl_historyFrame"
style="visibility:hidden;height:0px;width:0px;border:0px"></iframe></di
v>
    </form>
</body>
</html>
```

APPLICATION STARTUP MODIFICATION CODE SNIPPET

```
...
public static MainPage MainPage { get; private set; }
...
...
private void Application_Startup(object sender, StartupEventArgs e)
{
MainPage = new MainPage();
        this.RootVisual = MainPage;

        MainPage.mySMF.LoadInitParams(e.InitParams);
}
...
```

FREQUENTLY ASKED QUESTIONS

HTML5 FAQS

Why is YouTube 3D not work on my Windows Vista 3D Vision/3DTV Play system?

The support for HTML5 YouTube 3D requires Windows 7, 32 or 64-bit.

How can I tell that a YouTube video is playing using HTML5 <video> tag?

On YouTube, if you right-click on the video window for a playing clip and view the menu options', they should have an option stating About HTML5.

I have selected the HTML5 viewing mode on YouTube, but still some 3D videos use the Flash Player. How do I correct this?

Channel and Ad support for HTML5 3D videos is currently unavailable on YouTube.

Sometimes the eye orientation for videos on YouTube appears to be inverted. Is there some way to fix this?

This is a result of user error during uploads where incorrect yt3d tags have been used to specify eye orientation.

Why do HTML5 3D YouTube videos not appear in 3D when played back in IE9 and Chrome browsers?

Support for these browsers is coming soon.

Why can't I view 3D videos when Aero theme is off?

NVIDIA HTML5 3D requires that Aero theme be turned on when viewing these videos.

What 3D file formats' does YouTube support for uploads?

More information about these can be obtained from the YouTube help pages (10)(11) .

Does YouTube 3D work with 3DTV Play?

Yes, as long as a compatible HDMI 1.4 3D resolution is set via the NVIDIA Control Panel.

I have embedded YouTube 3D video on my site using iframe tag but the video is not playing in 3D.

Ensure that you have selected the HTML5 viewing mode on YouTube.

How can I serve a playlist of YouTube 3D videos on my site?

A good starting point is to look at the sample iframe video player provided by Google (8)(9). Also, the iframe API reference should be helpful (12).

How do I know that the WebM file I am hosting is a 3D WebM file?

You can use the webminspector (13) to check for presence of valid StereoMode tags.

Can I create my own 3D WebM clips?

Yes, you can use the reference encoder (14) in VP8 SDK to create 3D WebM clips.

MICROSOFT MEDIA PLATFORM FAQs

What are the client side user software requirements?
If Silverlight runtime is not installed on the client user machine, install Silverlight prompt will automatically show up when the player website is opened for the first time. This is not a heavy install and should take only a few seconds.

What are the client side user hardware requirements?
The client side user machine should be NVIDIA® 3D Vision capable. Refer http://www.3dvisionlive.com/content/3d-vision-live/3dvision-system-requirements.html for details.

Why does display momentarily flash when video playback is launched?
When video playback is launched, the system goes into NVIDIA® 3D Vision mode which requires display mode setting changes. This causes the momentary flash.

Can this plug-in be used with playback of smooth streaming, progressive and local file?
Yes.

What are the typical minimum and maximum smooth streaming encoded bit rates?
Typically the minimum encoded bit rate is 600 kbps and the maximum is 6 Mbps.

Why does the video quality vary?
The video quality depends on network connection bandwidth and CPU load. The video quality (bit rate) will decrease/increase based on this.

Why is the bit rate not maximum in windowed mode?
The lower bit rates are encoded at smaller dimensions of width height, while the higher bitrates are encoded at larger dimensions of width height. In windowed mode the size of the video window places restrictions on the maximum encoded dimensions that can be used (and thus on the maximum bit rate that can be used). The maximum encoded dimensions that can be used is usually some percentage higher than the video window dimensions.

Client machine has a very good internet connection speed, still why does the bit rate not reach maximum?
Apart from the internet connection speed, the bit rate selection also depends upon CPU load.

Client machine has a very good internet connection speed and CPU utilization is also low, why does the bit rate not reach maximum?

Other processes running on the machine could affect. Disable anti-virus software and check again.

For my new website based on the NVIDIA® 3D Vision plug-in, why am I seeing Side by Side video instead of 3D video?

▶ Check that system is NVIDIA® 3D Vision capable.
   http://www.3dvisionlive.com/content/3d-vision-live/3dvision-system-requirements.html

▶ Perform the following:
   - Right-click on desktop and select **NVIDIA Control Panel**.
   - Go to **Stereoscopic 3D** page.
   - Make sure **Stereoscopic 3D** is enabled. If it is not, enable it.
   - Run the **Test Stereoscopic 3D...** test application and check if this can be seen in Stereo 3D.

▶ Open www.3dvisionlive.com in the browser and check if the videos there can be seen in stereoscopic 3D.

▶ Check if valid **S3DProperties** are specified in the playlist item.

For my new website based on the NVIDIA® 3D Vision plug-in, the stereoscopic 3D effect does not seem to be proper?

Check whether the video is a 3D video and not a 2D video. Check if the S3DFormat is specified properly according to the source (Side-By-Side or Top-and-Bottom). Check if the S3DEyePriority is specified properly according to the source (Left-First or Right-First).

What user system requirements for Silverlight Streaming?

See section *3D Vision Hardware Requirements and Supported Systems* on page 5.

www.nvidia.com