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# Silverlight Migration Guide

Upgrading Your Windows Media Player Online Experiences

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*Microsoft Silverlight is a cross-browser, cross-platform and cross-device plug-in for delivering the next generation of .NET-based media experiences and rich internet applications for the Web.*

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## Introduction

For the past decade Windows Media technologies have been used for delivery of video and audio content over the Internet and within enterprise networks. The Windows Media-based ecosystem core advantages – low cost and scalable streaming servers, industry approved DRM protection, and high quality audio and video delivery – have ensured its continued popularity in the ever competing marketplace.

As the Internet has continued to evolve, we have seen higher demands placed on not just the core delivery of media content, but also on the quality of the user experience. This has in turn led to an evolution of web media players into Rich Interactive Applications (RIA). Microsoft Silverlight, a technology based on the eXtensible Application Markup Language (XAML) and .NET, provides a powerful development platform for building these modern, rich, interactive media experiences on the Web.

One of Silverlight's core features is its support for the Windows Media ecosystem. Silverlight envelops the core technologies that make up Windows Media: the Advanced Systems Format (ASF) file specification, Windows Media Video (WMV) and Windows Media Audio (WMA) codecs, Windows Media Services (WMS) streaming, and Windows Media Digital Rights Management (WM DRM). In addition, Silverlight also embraces Windows Media-related technologies such as the SMPTE VC-1 video codec (based on WMV9) and PlayReady Digital Rights Management (DRM), an evolution of Windows Media DRM (WMDRM) 10.

With a strong emphasis on backwards compatibility, Silverlight is the logical choice for content providers, web application developers, designers and service providers with existing Windows Media infrastructures who wish to create rich, interactive media experiences on the Web. New capabilities such as support for cross-platform experiences, adaptive streaming for the highest quality delivery with the lowest cost of ownership, and protected advertising-based scenarios provide additional incentive to upgrade to Silverlight.

## Benefits of Microsoft Silverlight

With Silverlight 2, content providers and developers can:

### Deliver better cross-platform experiences than Windows Media Player

- **Same user experience on Windows and Mac OS**  
Microsoft Silverlight offers identical features and functionality on both platforms.
- **Compatible with Internet Explorer, Safari and Firefox browsers**  
A 4.5MB download installs the Silverlight plug-in for all supported browsers.
- **Support for Linux and mobile devices**  
Novell has released an open source implementation of Silverlight 1 for Linux called [Moonlight](#) 1.0 and is actively working on Moonlight 2.0, a Silverlight 2 implementation, scheduled for release in 2009. In the mobile space, Microsoft has announced Silverlight for Windows Mobile, while Nokia has announced an implementation for the S60 software platform that runs on Symbian OS.

- **Silverlight DRM protection on Windows and Mac**

Using Silverlight DRM, powered by Microsoft PlayReady DRM technology, content can be protected for Windows and Mac users, while also providing backwards compatibility with WMDRM 10 encrypted content.

### Deploy and support at lower cost

- **Easy installation**

Silverlight plug-in installation is easier and simpler than upgrading Windows Media Player. Silverlight doesn't require any additional system updates and doesn't make any changes to the underlying operating system.

- **Enterprise deployment**

Administrators can roll out Silverlight updates via Windows Update or Microsoft System Center Configuration Manager (formerly known as Systems Management Server).

- **No operating system dependencies**

Everything needed to run Silverlight applications is contained in the Silverlight plug-in, including the .NET common language runtime, codecs and DRM client. This makes customer issues easier to troubleshoot and support because it removes or minimizes dependencies on host operating system components, codecs, hardware, drivers, etc.

- **Cutting-edge adaptive streaming**

IIS7 Smooth Streaming delivers video and audio content over HTTP networks to Silverlight applications which are able to dynamically throttle the video quality based on available bandwidth and CPU power.

- **Cost-effective media delivery via Windows Server**

The IIS7 Media Pack brings bit-rate throttling to progressive downloads, significantly reducing bandwidth requirements and lowering Web server delivery costs. Windows Media Services 2008 provides advanced streaming media support, enabling massively scalable live and on-demand broadcasts with industry-leading reliability and Total Cost of Ownership (TCO).

- **Transparent DRM**

The Silverlight DRM client individualization process is completely silent and unobtrusive. Application developers can take full control over the DRM license acquisition process and seamlessly integrate any authentication dialogs into their application's user interface. PlayReady license servers ensure improved scalability and easier deployment over Windows Media Rights Manager servers.

### Take full control of the media experience

- **Unparalleled interaction with high-resolution content through Deep Zoom technology**

Using the mouse wheel or on-screen controls users can seamlessly pan across and zoom into high-resolution, interactive images without having to download massive image files.

- **Customizable user interfaces (skins)**

Silverlight makes it easy to create a custom look and feel for your media player application. Silverlight application user interfaces are written in XAML (eXtensible Application Markup

Language), making them easy to edit even with the simplest authoring tools or even generate dynamically server-side.

- **Graphics and subtitle overlays**

Silverlight offers support for popular image formats and XAML vector graphics, and offers fine control over presentation of closed captions and other timed text content.

- **Customizable full screen experience**

Full screen mode isn't reserved only for video playback. Silverlight allows full screen integration of other media assets such as ads, controls and real-time data displays.

- **Video interactivity**

Video and image brushes add an unprecedented level of interactivity to video playback. Video in Silverlight is treated as just another object; it can be scaled, rotated, flipped, layered, etc.

### Easily design and develop applications

- **Professional design environment**

Expression Blend 2 can be used to easily and intuitively design Silverlight and WPF (Windows Presentation Foundation) applications.

- **Best of breed development and debugging environment**

Visual Studio 2008 supports developing Silverlight applications in C#, Visual Basic, JavaScript, IronPython, IronRuby, and other .NET-compatible languages.

- **Easier collaboration between designers and developers**

Silverlight projects can be imported simultaneously into Expression Blend and Visual Studio, allowing designers and developers to share the same project files and work in parallel for optimal efficiency.

- **Format openness and interoperability**

Silverlight has no proprietary binary exchange format – it's entirely based on XAML, .NET and JavaScript. The Silverlight XAML vocabulary specification, released under the Microsoft Open Specification Promise (OSP), enables third-party ISVs to create products that can read and write XAML for Silverlight. [Eclipse Tools for Silverlight](#) is an example of an open source design and development environment for building Silverlight applications.

- **A thriving ecosystem of .NET and Windows Media partners, developers, and vendors**

Millions of developers use .NET technologies (approximately 50% of professional developers) and our successful Visual Studio Industry Partner program (270+ VSIP partners, 25 Visual Studio Team Server VSTS partners, 800+ VSIP packages, 10,000 Visual Studio Add-Ins). Over 180 partners are now members of the Silverlight Partner Initiative, ensuring the right CDNs, ASPs, ISVs and Agencies are ready to enable Silverlight experiences.

### Reach out to new markets

- **Multi-channel deployment of Web applications to the desktop and devices through .NET**

Silverlight (on the Web and mobile) and WPF (on the desktop) use a single programming and design model. Developers can now "Learn once, apply everywhere".

- **Monetization of media assets via protected content and advertising-enabled scenarios**

Silverlight supports content protection techniques, including DRM, to protect media content and

advertising schemes. Web Playlists in IIS7 enable dynamic delivery of rich media and video advertising, ensuring that ads are not skipped and links to content are protected.

## Windows Media Support in Silverlight 2

- **File format:**
  - ASF (\*.wmv, \*.wma, \*.asf)
- **Video codecs:**
  - VC-1 (aka WMV9) – Advanced, Main and Simple profiles
  - WMV7, WMV8
- **Audio codecs:**
  - WMA Standard
  - WMA Professional (stereo output only)
  - MP3
- **Delivery methods:**
  - WMS HTTP streaming (from Windows Server 2003 and Windows Server 2008)
  - HTTP progressive download (from any HTTP 1.0/1.1 web server)

WMV Screen and WMA Voice codecs are not supported in Silverlight. Owners of content encoded with these codecs are advised to re-encode their content with VC-1 and WMA Professional codecs, respectively, to ensure successful delivery to Silverlight applications.

## New Media Features in Silverlight 2

While Silverlight is compatible with Windows Media content, it also enables new media features:

- **IIS7 Smooth Streaming**  
Cutting-edge HTTP based adaptive streaming which changes the delivery bit rate and video resolution based on CPU and network conditions. This offers the lowest TCO and highest scalability compared to traditional streaming.
- **Deep Zoom**  
Innovative and interactive way of efficiently presenting high resolution images.
- **Silverlight DRM, Powered by PlayReady**  
Stronger industry-standard AES encryption, more efficient license lookup and storage, and backwards compatibility with WM DRM encryption.

## New Media Features in Silverlight 3

- **H.264/AAC/MP4**  
Silverlight 3 will support progressive download playback of standard MPEG-4 (.mp4) files using the H.264 and AAC-LC codecs. These will also be supported in Windows 7, but Silverlight will provide down-level and cross-platform support (Windows XP, Windows Vista, Windows Server 2008, Mac OS X).

## Silverlight Migration Path

Because Silverlight is a client technology that's backwards compatible with Windows Media, migrating your website from a Windows Media Player ActiveX control to a Silverlight application requires minimal changes or no changes at all on the server back-end.

The "classic" Windows Media workflow consists of the following platform components:

- **Encoder:** Windows Media Encoder 9 Series (or third-party encoder)
- **Server:** Windows Server 2003
  - Windows Media Services 9 Series
  - Internet Information Services 6
- **DRM license server:** Windows Media Rights Manager 10.1
- **Client:** Windows Media Player 9, 10 or 11



Figure 1 – "Classic" Windows Media workflow

Content is encoded with Windows Media Encoder 9 Series or third-party encoder. Content is delivered over the Internet or any IP network through a Web server (IIS6 or another HTTP server) or through Windows Media Services 9 Series. If the content is DRM protected, a Windows Media Rights Manager 10 SDK is running on a Windows Server 2003 in the cloud to deliver DRM licenses to the client.

Even though Silverlight is fully compatible with Windows Media technologies such as Windows Media Encoder 9 Series, Windows Media Services 9 and IIS6, it is recommended to update these components

to Expression Encoder 2, Windows Media Services 2008 and IIS7 with Media Pack to achieve the best performance and scalability.

Silverlight DRM is designed to work optimally with PlayReady encryption and PlayReady licenses. Content encrypted with Windows Media DRM can be used with Silverlight applications, but licenses for such content must be served by PlayReady license servers in place of Windows Media Rights Manager 10 license servers. If you plan to deliver protected content to Windows Media Player, you will need to keep your Windows Media Right Manager 10 license server. For convenience, PlayReady license servers and Windows Media Rights Manager 10 license servers can optionally run on the same physical server.

In the remainder of this document we describe a typical migration path in four steps:

1. **Upgrade the client experience from a Windows Media Player ActiveX control to a Silverlight player application** while keeping all other existing components (encoding and serving) intact. (If your content is protected with WM DRM you'll have to perform step 2 concurrently.)
2. **Replace or supplement the Windows Media Rights Manager 10 SDK with the PlayReady Server SDK** in order to allow delivery of protected content to Silverlight clients.
3. **Replace Windows Media Encoder 9 with Expression Encoder 2 or another third-party encoding product** built on Microsoft's VC-1 Encoder SDK in order to improve video and audio quality.
4. **Deploy Windows Server 2008, enable IIS7, install Windows Media Services 2008 and install the IIS7 Media Pack extensions** in order to improve media streaming and web serving efficiency.

## Step 1 – Client Front-End Migration

If you have a complete Windows Media workflow that encodes packages and delivers audio/video content over the Internet or any IP network, you can easily access the same content from a Silverlight application in a web page.

### Client Migration Considerations

It is important to remember that Silverlight is not a standalone application like Windows Media Player. Silverlight is a plug-in intended to be run inside a Web browser. If you are interested in delivering media experiences that require local file playback, media library management, sync to devices, or offline DRM persistence, then building a Windows application based on Windows Media Player ActiveX or Windows Presentation Foundation (WPF) is the best option.

Silverlight will greatly enhance websites which are currently using the Windows Media Player ActiveX control, but be aware that some Windows Media features and scenarios are not supported in Silverlight:

- Multicast streaming
- Offline DRM (including license caching and pre-delivery)
- RTSP (UDP and TCP) streaming
- Certified Output Protection Protocol (COPP)
- Multi-channel (5.1) audio output
- Content library management
- Sync to device
- Proxy authentication
- Legacy Windows OS support (Windows 2000, 98, Me)

## Comparison: Silverlight 2 vs. Windows Media Player ActiveX

|             | Silverlight  | Windows Media Player   |
|-------------|--|--|
| <b>Pros</b> | <ul style="list-style-type: none"> <li>• Highly customizable, rich UI</li> <li>• Interactive video display</li> <li>• Windows, Mac and Linux</li> <li>• .NET support (C#, VB, Python)</li> <li>• Better dev &amp; design tools</li> <li>• More secure DRM (PlayReady)</li> <li>• Consistent playback experience</li> <li>• Smooth Streaming</li> </ul> | <ul style="list-style-type: none"> <li>• Fully featured Windows Media support</li> <li>• Can be embedded in Windows apps</li> <li>• Codec extensibility (DirectShow, MF)</li> <li>• Hardware assisted playback (DXVA)</li> <li>• Multicast and RTSP support</li> <li>• Offline scenarios, library management</li> <li>• Portable device integration</li> </ul> |
| <b>Cons</b> | <ul style="list-style-type: none"> <li>• Only runs in browsers</li> <li>• Partial WMP feature parity</li> <li>• No default player application</li> </ul>   | <ul style="list-style-type: none"> <li>• Windows only</li> <li>• Difficult to customize UI, controls</li> <li>• Static (non-interactive) video display</li> <li>• Only JScript, VBScript for web developers</li> <li>• Inconsistent playback experience (OS version, codecs, hardware, drivers)</li> </ul>   |

### Additional Considerations

**When is it appropriate to replace the WMP ActiveX with a Silverlight player application?** Silverlight is best suited for projects built on online connected experiences that involve streaming media or live broadcasts, and any projects requiring cross-platform support. Windows Media Player is best suited for projects requiring local file playback, media library management or sync to devices; and projects requiring offline DRM license persistence, such as “download-to-own” services.

**Partial migration options:** Developers can easily implement client-side JavaScript code in web pages which checks for presence of a Silverlight plug-in and falls back on WMP ActiveX in cases where Silverlight isn’t installed. It is possible to combine Silverlight and WMP ActiveX controls in the same web page, such as utilizing Silverlight for the user interface and utilizing WMP ActiveX for media playback (i.e. multicast streaming).

## Creating a Media Player Application with Silverlight

The basic Silverlight application consists of a XAML definition of its user interface and event-driven code (written in JavaScript or any .NET language) which controls the application's actions. The Silverlight control in charge of media playback is called `MediaElement`.

There are several ways to create your first Silverlight application that supports media playback. If you don't want to develop code, you can simply use Expression Blend or Expression Encoder's built-in player templates to generate fully-featured Silverlight players. By merely modifying the XAML descriptions the look and feel of the player can be extensively customized without requiring any changes to the underlying application code.

Here are the various options for creating a Silverlight player application:

- **Expression Encoder**
  - Ready-to-go Silverlight player templates
  - Free to copy and modify per user license agreement
- **Expression Blend**
  - Design from scratch or modify existing templates
- **Visual Studio**
  - Develop from scratch or modify existing code
- **3<sup>rd</sup> party templates and frameworks**
  - [Open Video Player](#)
  - [Codeplex](#) (Search for: Silverlight player)

## Client Migration Method 1 – Using Expression Encoder 2

By far the easiest method for creating basic Silverlight media player applications is with Expression Encoder 2 which ships with a variety of prebuilt Silverlight media player templates.

To generate a Silverlight media player application with Expression Encoder 2, simply start by importing an existing .wmv video into the **Media Content** panel. In the **Encode** panel set the **Video** and **Audio profiles** both to *Source profile*. This will instruct Expression Encoder to simply copy the imported .wmv into the output folder without any recompression in order to save time.

As a final step in setting up the encoding job, choose one of several player templates in the **Job Output** panel (see Figure 2 below) under the **Output** tab. When you finally hit the **Encode** button, Expression Encoder will automatically generate a Silverlight player application (.xap) and a sample HTML page (*Default.html*) that loads the chosen Silverlight player application and queues up your imported video file (.wmv).

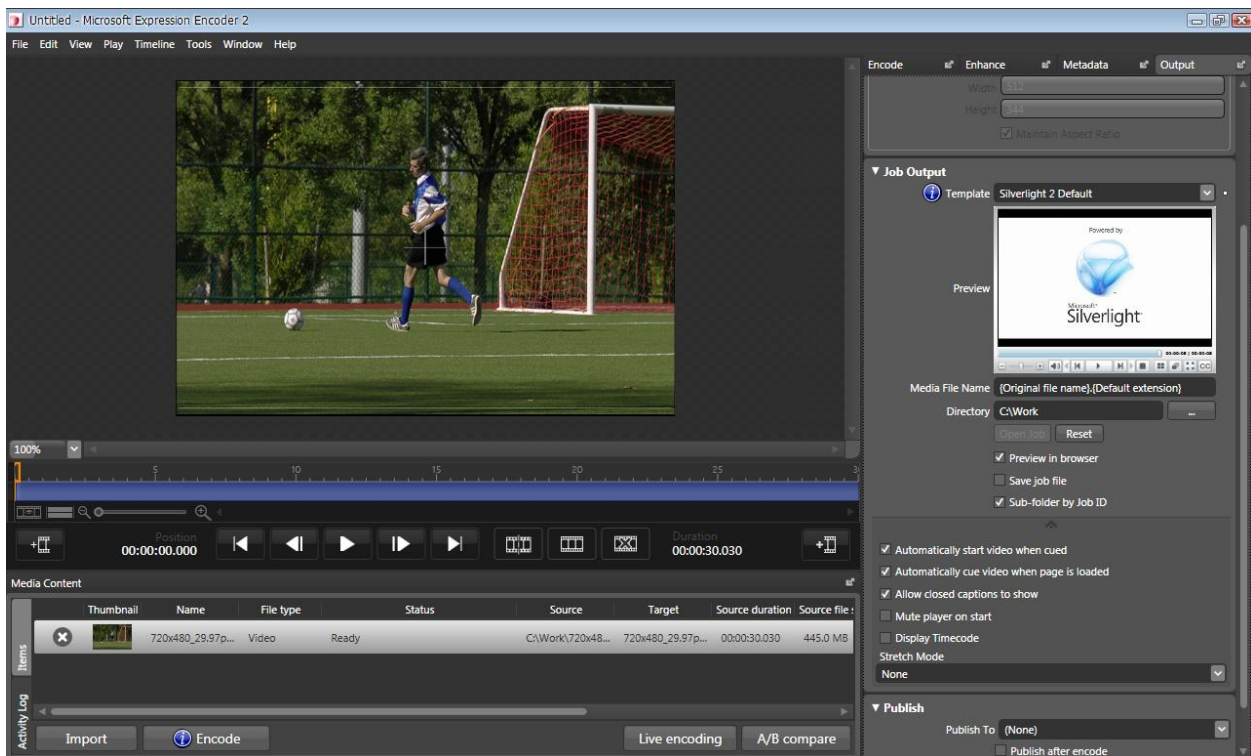


Figure 2 – Selecting a template in Expression Encoder 2

You can easily repurpose this Silverlight player by editing the HTML code inside *Default.html* to point to a different local or online media source.

```
<body>
  <!-- Runtime errors from Silverlight will be displayed here.
  This will contain debugging information and should be removed or hidden when debugging is completed -->
  <div id='errorLocation' style='font-size: small;color: Gray;'></div>

  <div id="silverlightControlHost">
    <object data="data:application/x-silverlight-2," type="application/x-silverlight-2" width="100%" height="100%">
      <param name="source" value="MediaPlayerTemplate.xap"/>
      <param name="onerror" value="onSilverlightError" />
      <param name="initparams" value=
'autoplay=True,autoload=True,enablecaptions=False,muted=False,stretchmode=0,displaytimecode=False,playlist=<playlist><playlistItems><playlistItem
title="Die&20Hard&204" description="" mediaSource="mms://myserver.com/video.wmv" adaptiveStreaming="False" thumbSource="" frameRate="24"
width="432" height="240" ></playlistItem></playlistItems></playlist' />
      <a href="http://go2.microsoft.com/fwlink/?LinkId=124807" style="text-decoration: none;">
        
      </a>
    </object>
    <iframe style='visibility:hidden;height:0;width:0;border:0px'></iframe>
  </div>
</body>
```

Figure 3 – Editing generated HTML code to use a different media source

The Silverlight 2 player templates included with Expression Encoder 2 SP1 feature a rich user interface with interactive player controls and built-in support for playlists, closed captions, Smooth Streaming playback, and many other features.

## Client Migration Method 2 – Using Expression Blend 2

Expression Blend allows you to design new Silverlight applications or modify existing ones.

For example, to create a brand new Silverlight media player application, start by creating a new Silverlight project in Expression Blend. Once the default blank project canvas has been created, import a Windows Media (\*.wmv, \*.wma, \*.asf) file by dragging and dropping it onto the layout surface. The XAML code will be generated automatically. You can use the mouse to position and resize the MediaElement control.

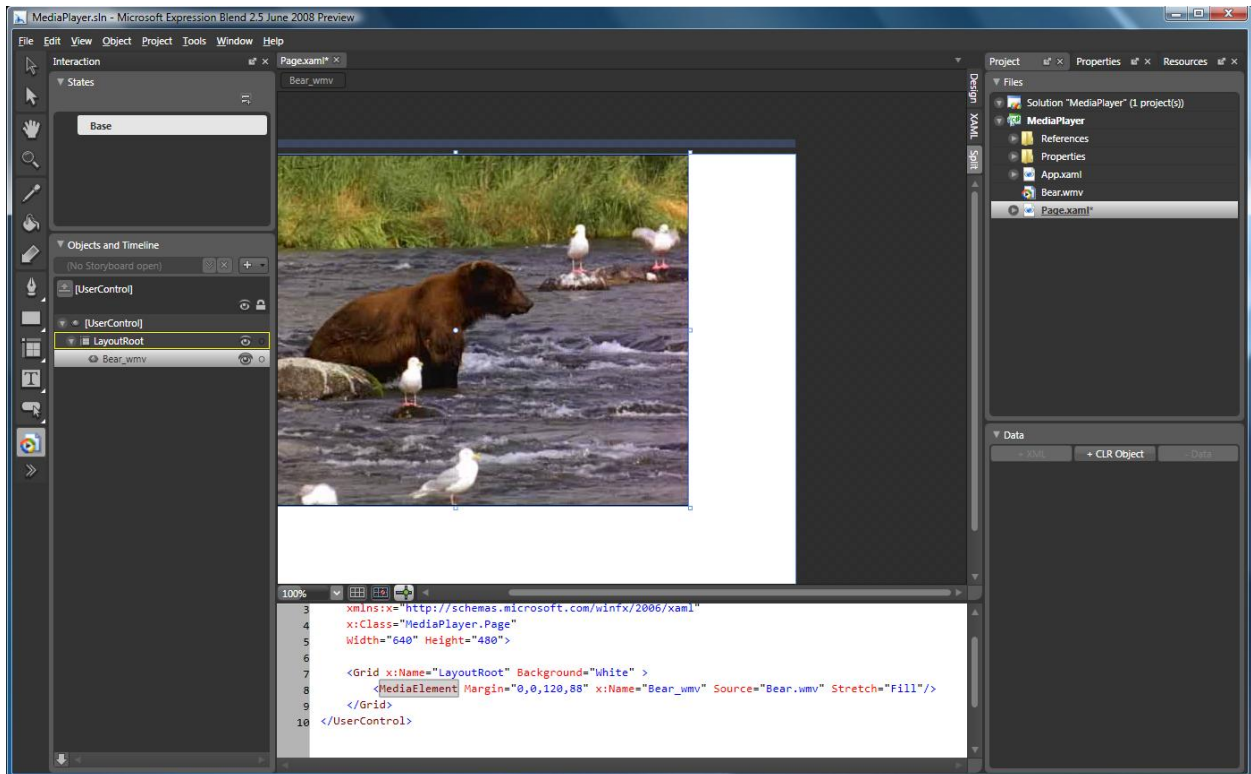


Figure 4 – Creating application controls in Expression Blend automatically generates XAML code

When you select the newly created `MediaElement` object and click on the **Properties** tab, the **Media** section of the **Properties** panel will list all playback properties of the `MediaElement` that can be modified without writing any functional code, such as `AutoPlay` property or audio volume.

You can press **F5** to build the project and launch the new Silverlight application in a browser window.

## Client Migration Method 3 – Using Visual Studio 2008 with Silverlight Tools

While it is easy to create simple media players using just Expression Blend, building more advanced media players with play controls, playlist iteration, subtitle overlays and other features requires using Visual Studio 2008 to write functional code in JavaScript or a .NET programming language.

To create a Silverlight application in Visual Studio 2008, you will need to first install [Silverlight Tools for Visual Studio 2008](#). Once Silverlight Tools are installed, you will be able to create new projects in Visual Studio from a Silverlight Application template. When you create a new Silverlight Application project Visual Studio will automatically generate *Page.xaml* and *Page.xaml.cs* – representing the XAML and C# source code of your Silverlight application, respectively.

You can now add media functionality to your Silverlight application by adding the `MediaElement` control to *Page.xaml*.

For example, your *Page.xaml* might contain code like this:

```
<TextBlock Height="30" Width="120" x:Name="MediaStateText" />
<MediaElement x:Name="MediaPlayer" Source="mms://myserver/xbox.wmv"
    CurrentStateChanged="UpdateMediaState" Width="320" Height="240"/>
```

*Page.xaml.cs* would then need to implement a function called *UpdateMediaState()* that performs an action every time `MediaElement` changes the current media playback state. The code might look something like this:

```
private void UpdateMediaState(object sender, RoutedEventArgs e)
{
    MediaStateText.Text = MediaPlayer.CurrentState.ToString();
}
```

For additional information on writing Silverlight applications with `MediaElement` controls, please consult the [Audio and Video in Silverlight 2 Overview](#) document.

## Client Migration Method 4 – Using a Third-Party Player or Framework

### Open Video Player Initiative

<http://www.openvideoplayer.com/>

Open Video Player is a community site dedicated to sharing best practices around video player development. You can [download](#) player source code, reference [plug-ins](#) for advertising technologies as well as get advice from a [community](#) of designers, developers and content owners.

### Silverlight 2 Video Player on Codeplex

<http://www.codeplex.com/sl2videoplayer>

There are many Silverlight 2 video players on CodePlex, including this one built by [Joel Neubeck](#) using the standard MediaElement and a few of the new system controls (ToggleButton, Slider and Button). The goal of the project was to build a resizable video player without using custom user controls, but instead leveraging controls styles and templates.

## Step 2 – Content Protection Migration

### Silverlight DRM, Powered by PlayReady

Silverlight DRM is a compact, cross-platform version of the PlayReady client used exclusively by the Silverlight plug-in. A Silverlight-based service that offers protected content uses the PlayReady Server SDK (or the WM Rights Manager 10 SDK) to package (encrypt) the Windows Media Audio (WMA) and Windows Media Video (WMV) content. When a consumer attempts to play that content a license is requested and obtained from a license acquisition server built on the PlayReady Server SDK.

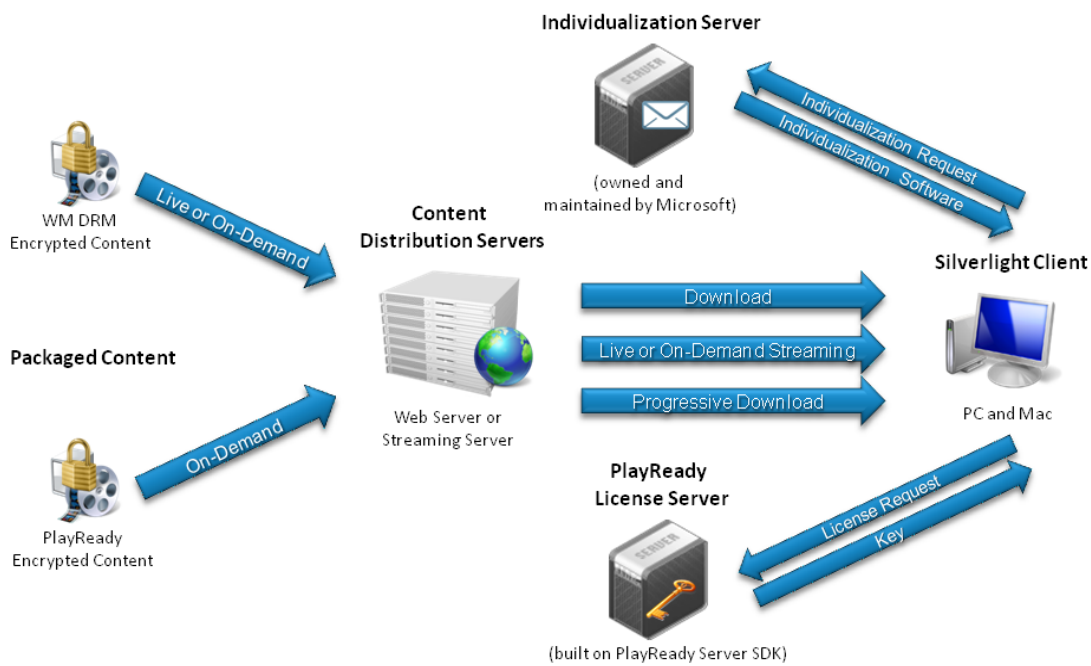


Figure 5 – Silverlight DRM Encryption and License Workflow

The Silverlight plug-in includes a DRM client component which upon first use is individualized through an online service hosted by Microsoft. Individualization binds the runtime client to the computer on which the client was initially installed. Every Silverlight user receives an individualized DRM component and a different set of certified license keys. This significantly reduces the risk of global security breaches. If a specific version of the Silverlight DRM client becomes compromised, it can be barred from acquiring licenses for new digital media files until a new, fixed version of the DRM component is downloaded.

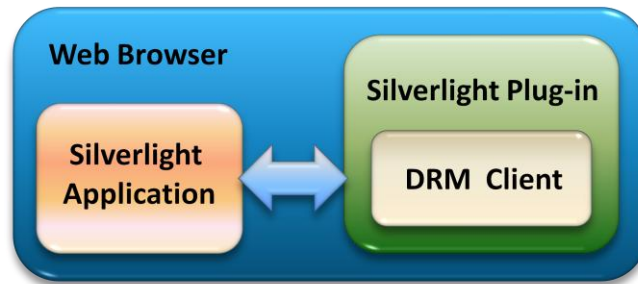


Figure 6 – Silverlight DRM Client

## Why PlayReady?

PlayReady is an evolution of Windows Media DRM. This technology brings:

- Industry standard cryptography: Advanced Encryption Standard (AES) and 256-bit ECC keys
- Support for a wide variety of content types – ready for future H.264 and AAC support
- Improved license lookup and storage times
- More efficient license store

A Silverlight 2 application can play both Windows Media DRM and Playready AES encrypted content but in order to enable these scenarios, a PlayReady license server has to be deployed (Silverlight cannot acquire a license from a Windows Media Rights Manager Server).

## Ensuring DRM Compatibility

Windows Media Player clients don't support PlayReady DRM yet and thus still require WM Rights Manager 10 license servers. If you need to deliver protected content to both WMP and Silverlight clients, it is recommended that you use WM DRM 10 (Cocktail) encryption and deploy both types of license servers (one WM Rights Manager and one PlayReady Server). This will allow you to encode and encrypt your content only once, but deliver twice.

PlayReady Server SDK can run on Windows Server 2003 x86 or Windows Server 2008 x64.

## Silverlight 2 DRM considerations

Silverlight 2 supports the following scenarios:

- Direct License Acquisition (DLA) over the network
- "Play" right policy
- Playback of progressively downloaded content (HTTP), on-demand streamed content and live streams (WMS)
- Windows Media (ASF) file format

The following DRM features are not supported in Silverlight 2:

- License caching (limited to life of media source)
- Offline license storage
- Certified Output Protection Protocol (COPP)
- Indirect license acquisition (ILA) and license pre-delivery
- License expiration
- License chaining

### Migration from Windows Media DRM to Silverlight DRM, Powered by PlayReady

Silverlight 2 is able to play and decrypt the same WM DRM-encrypted content that is played in Windows Media Player, but a PlayReady license server must be deployed to provide licenses to Silverlight clients. So the migration requires deploying a PlayReady server and copying the keys and other secret information from the Windows Media Rights Manager (WORM) Server to the PlayReady Server.

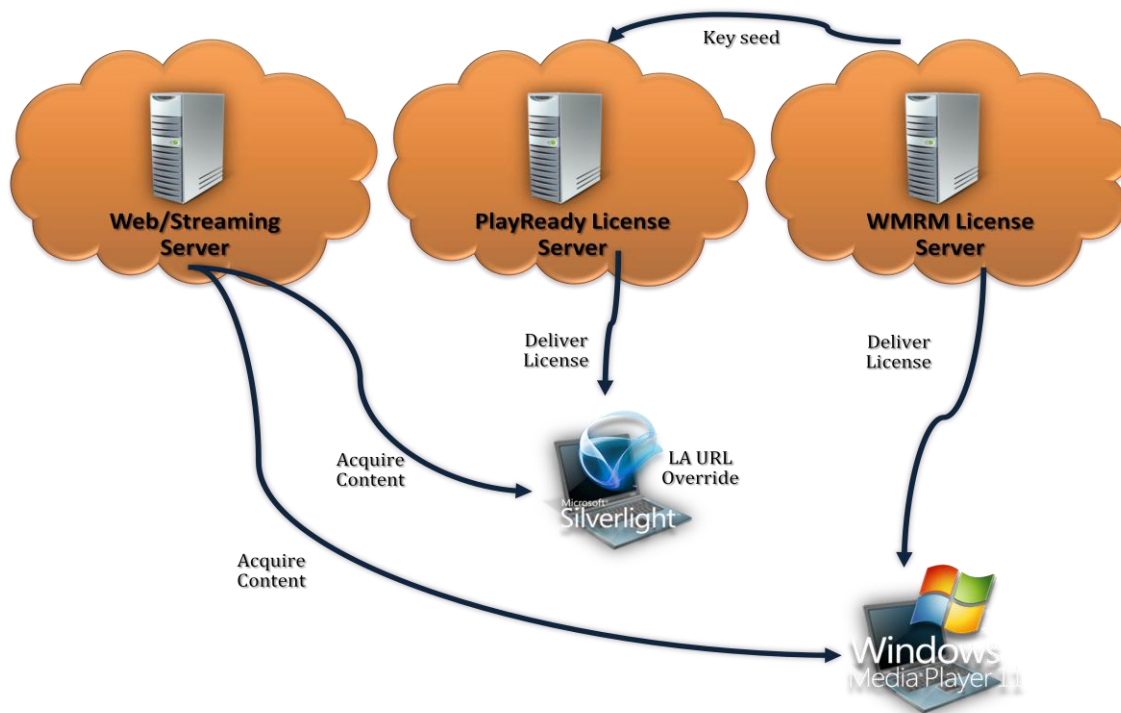


Figure 7 – Windows Media DRM and PlayReady DRM working together

You must keep your WORM server online if you are planning to provide licenses to Windows Media Player clients. You can remove your WORM server only if you plan on delivering protected content exclusively to Silverlight clients.

To license PlayReady Server Technology, please refer to <http://www.microsoft.com/PlayReady>

## Step 3 – Encoder Update

### Migrating from Windows Media Encoder to Expression Encoder

Windows Media Encoder 9 can be used to generate content for Silverlight. However, unless you need to do live WM DRM encryption or if some application is using Windows Media Encoder SDK to remotely control your live encoders, we recommend you update your encoder to Expression Encoder 2 or later. This will improve the compressed video and audio quality and will expose new features.

Furthermore, Windows Media Encoder 9 has reached the end of life in its Microsoft product cycle. WME9 customers are strongly advised to begin migration to Expression Encoder or 3<sup>rd</sup> party enterprise encoding tools at their earliest convenience.

We continue to partner with professional encoding tool vendors to provide the best Windows Media and Silverlight support including Anystream, Envivio, Digital Rapids, Inlet, Rhonet (Harmonic), Tarari, Telestream, Viewcast, Winnov and others. Products from these vendors that are built on the latest Microsoft VC-1 Encoder SDK offer superior video quality, performance and configurability.

Expression Encoder 2 offers a number of advantages over Windows Media Encoder 9:

#### Improved quality

- Better video compression (based on Microsoft VC-1 Encoder SDK)
- Better pre-processing tools
- Improved de-interlacing and scaling algorithms
- Better performance on multi-core CPUs
- Fully multi-threaded: can use more than 4 CPU cores for decoding, preprocessing and encoding

#### Improved workflow

- Simple editing (leader and trailer addition, audio overlay, watermarking)
- A/B comparison (for comparing various quality settings)
- Smooth Streaming support
- Silverlight 2 templates
- WebDAV publishing
- H.264/AAC encoding (for mobile and Silverlight 3)
- Rich input format support: MPEG-2, QuickTime (MOV, MP4, 3GPP), AVI, WMV, AviSynth

## Step 4 – Server Infrastructure Planning

### Windows Media Services

Silverlight supports streaming from Windows Media Services in both Windows Server 2003 and Windows Server 2008. It is recommended that you update your streaming servers to Windows Server 2008 in order to take advantage of the following WMS 2008 improvements:

- Better scalability and performance
- Lower entry-level cost (can be installed on entry-level Web Server edition)
- Available for headless server core installation
- Cache/proxy plug-in for easy replication of media content across a network, including branch offices

Silverlight only supports the HTTP protocol. In order to be able to stream to Silverlight clients, you will need to enable the HTTP protocol in Windows Media Services (this protocol is disabled by default).

Furthermore, if the IIS web service is running on the same machine, you will need to either use different ports for IIS HTTP and WMS HTTP, or bind the services to different IPs/Network Interface Cards.

### Internet Information Services

As with the streaming service, it is recommended that you update your Web server to Windows Server 2008 / Internet Information Services 7.0. Migrating to IIS 7.0 will increase the performance and scalability of the Web server. Also, IIS7 is required if you want to install [the IIS 7.0 Media Pack](#) . This will enable you to:

- Save bandwidth costs by throttling the download speed to the data rate at which the data is consumed
- Decrease network traffic by metering your media deliveries
- Increase scalability by more efficiently utilizing CPU and bandwidth to support more concurrent users
- Monetize media assets with Web playlists that personalize content and prevent ad skipping
- Deliver multiple media formats from a single server, including .wmv, .flv and .mp4 files
- Secure on-demand media assets with SSL (Secure Socket Layer) delivery
- Support IIS7 Smooth Streaming for on-demand and live delivery via adaptive streaming

For more information on these valuable IIS 7.0 Media Pack extensions please see:

- [Web playlists](#)
- [Bit rate throttling](#)

As Windows Server continues to evolve, most Windows Media Services features will eventually migrate to Internet Information Services. This will ultimately lower the entry-level cost for media delivery as well as provide a single, unified management console for web and media delivery services.

## Conclusions

Migrating from Windows Media to a Silverlight experience is straightforward thanks to Silverlight's compatibility with Windows Media technologies. The most important task is to replace the Windows Media Player client front-end with a Silverlight application that can consume existing Windows Media content, thus immediately providing cross-browser and cross-platform client support. Delivery of protected content will also require deployment of DRM license servers based on the PlayReady Server SDK. Updating your encoding tools or content delivery servers is recommended but optional.



Figure 8 – The new Windows Media workflow optimized for Silverlight

## For More Information

More information on Microsoft Silverlight, Expression Studio, Visual Studio, Windows Server 2008 and Windows Media can be found at the following locations:

|   |   |
|---|---|
| <b>Microsoft Silverlight Home Page</b>          | <a href="http://www.microsoft.com/silverlight">http://www.microsoft.com/silverlight</a>   |
| <b>Microsoft Expression Home Page</b>           | <a href="http://www.microsoft.com/expression">http://www.microsoft.com/expression</a>   |
| <b>MSDN Developer Center</b>                    | <a href="http://msdn.microsoft.com/silverlight">http://msdn.microsoft.com/silverlight</a>   |
| <b>Microsoft Silverlight community</b>          | <a href="http://www.silverlight.net">http://www.silverlight.net</a>   |
| <b>Windows Media</b>                            | <a href="http://www.microsoft.com/windowsmedia">http://www.microsoft.com/windowsmedia</a>   |
| <b>Windows Media Services 2008</b>              | <a href="http://www.microsoft.com/windows/windowsmedia/forpros/server/server.aspx">http://www.microsoft.com/windows/windowsmedia/forpros/server/server.aspx</a> |
| <b>Internet Information Services 7.0 (IIS7)</b> | <a href="http://iis.net/media">http://iis.net/media</a>   |

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