

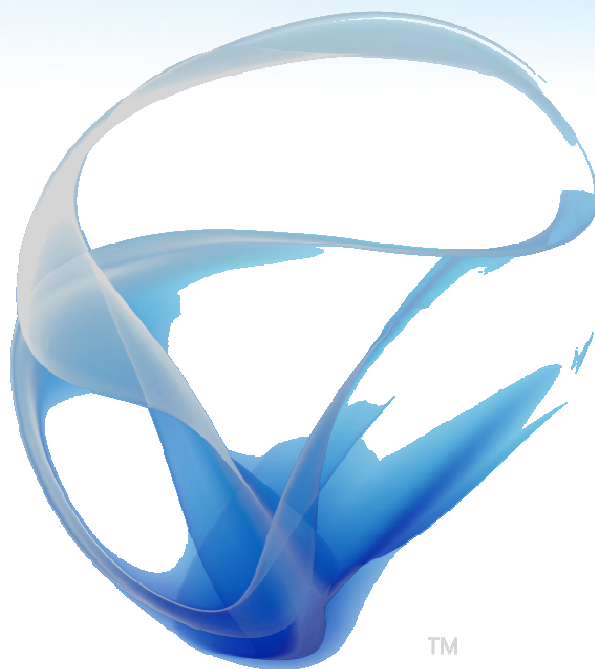


Microsoft®
Silverlight™

Groking Silverlight

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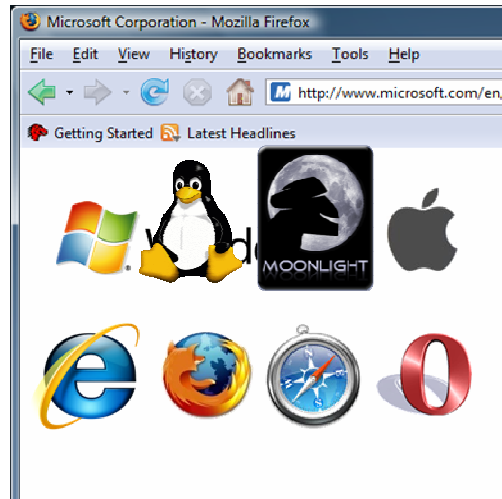
Josh Holmes
Microsoft
UX Architect Evangelist
josh.holmes@microsoft.com
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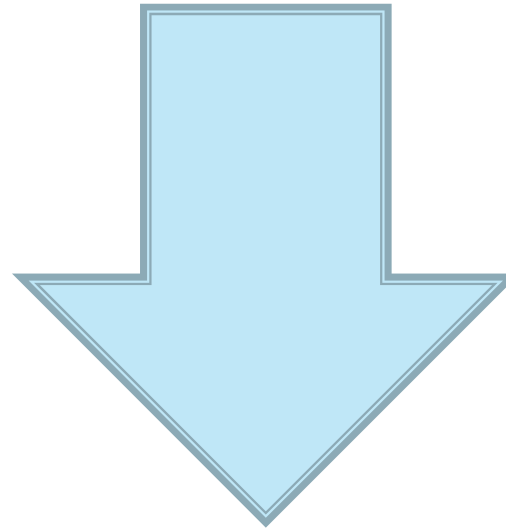
TM

Microsoft®
Silverlight™

What is Silverlight?



Plug-in with cross browser & OS support



< 4Mb Download (2)
< 8Mb on Mac

```
<MediaElement  
x:Name='myMediaPl  
ayBack'  
Canvas.Left='532'  
Canvas.Top='184'  
AutoPlay='false'  
Height='185'  
Width='350'  
Opacity='0'>
```

Extends browser capability with XAML



Microsoft®
Silverlight™

cross-browser, cross-platform, cross-device

for building and delivering the next generation of

.NET based

media experiences and rich interactive applications

for the Web



What Silverlight Brings



Compelling Cross-Platform User Experiences

Immersive media experiences & RIA

Seamless, fast installation for end users

Consistent experiences on Mac / Windows

Flexible programming model with collaborative tools

Integration with Web technologies

Based on the .NET Framework

Role specific tools for designers / developers

Efficient, lower cost delivery, and more capable media

HD to Mobile w/ SMPTE VC-1

Broad media ecosystem

Tools for live and on-demand publishing

A continuum of experience

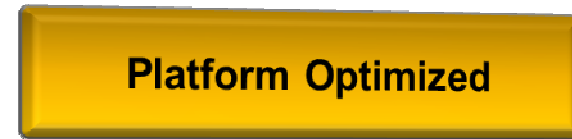
Ubiquity



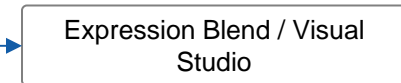
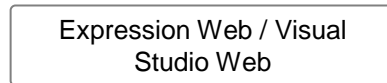
Richness



Next Generation



Consistent design and development story



Where to apply it

Web + Standards

Rich Web

Ultimate Experience

ASP.NET AJAX Extensions

Silverlight

.NET 3.0

HTML + AJAX

CSS / DHTML

AJAX + .NET,
JavaScript, DL Support

XAML

.NET

XAML

Consistent design and development story

Expression Web / Visual
Studio Web

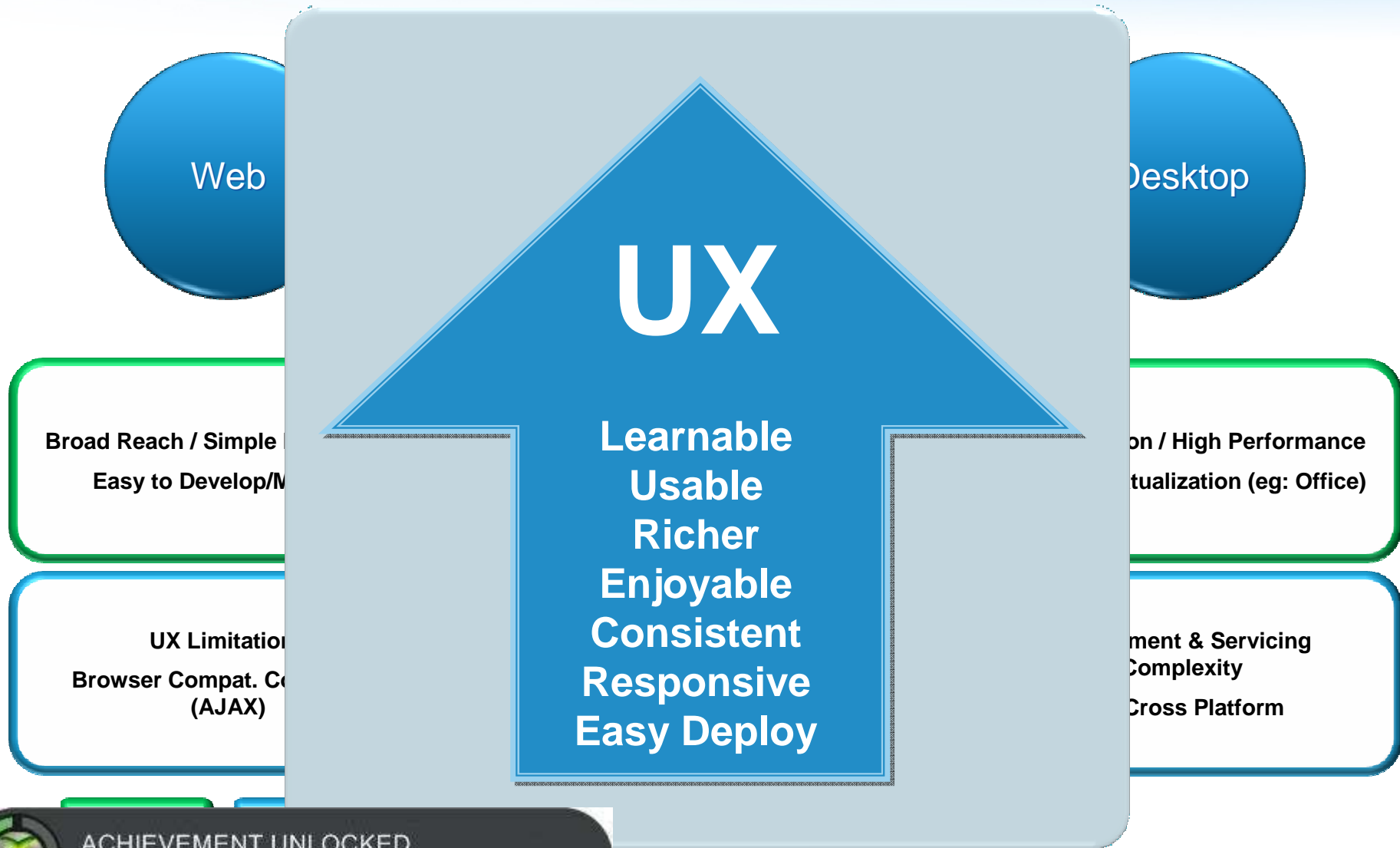
Expression Blend / Visual
Studio

Developer / Designer productivity and collaboration

Friction free deployment and adoption

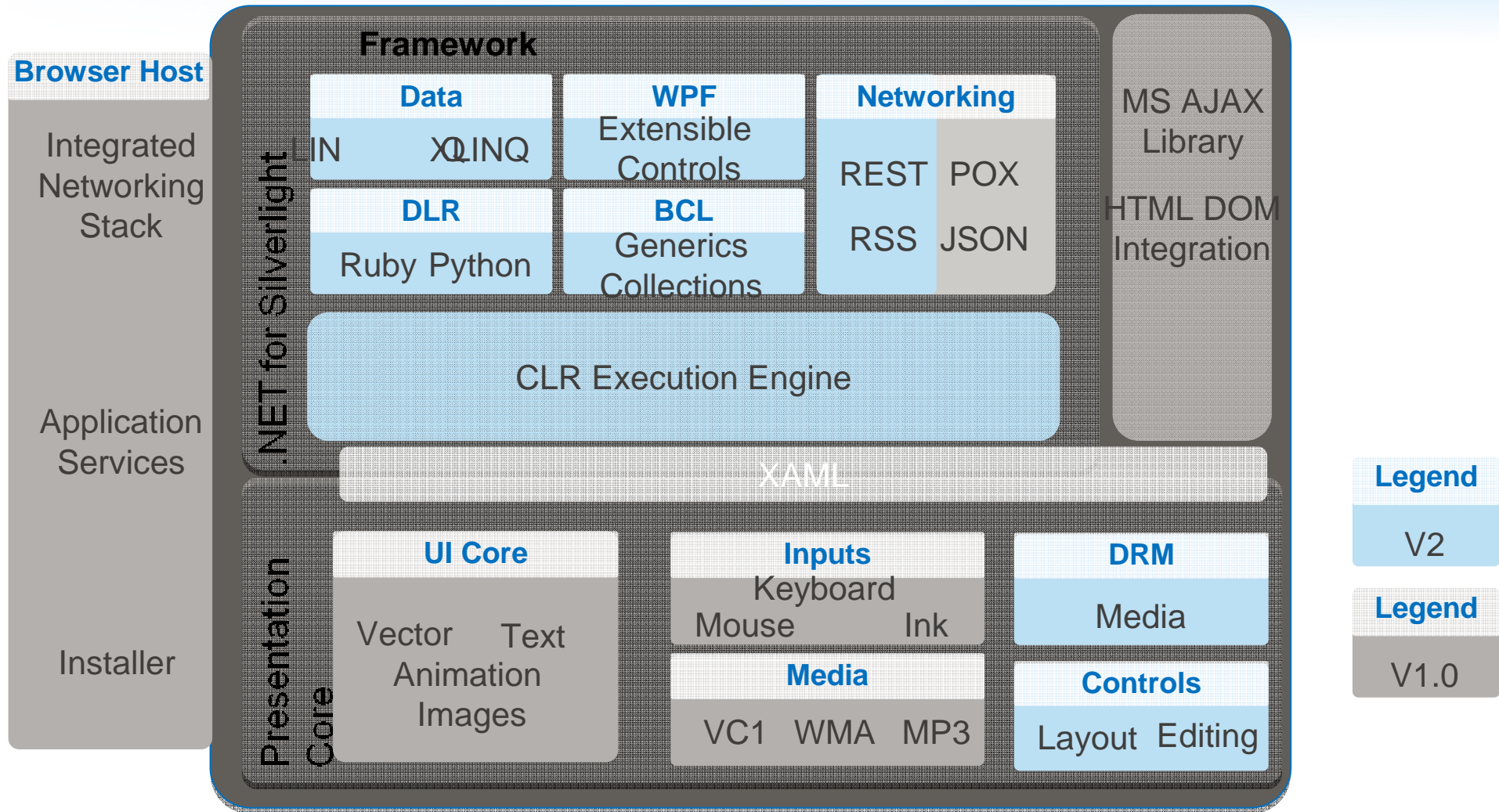
Ecosystem – controls, content, solutions integrators, community

UX Opportunity Across Client Application Categories



ACHIEVEMENT UNLOCKED
You have unlocked knowledge of UX

Silverlight Architecture



Microsoft® Expression® Studio 2

Whether you are designing **rich standards-based websites**, **ultimate experiences on the desktop**, or **managing digital assets and content**, Expression professional design tools give you the flexibility and freedom to bring your vision to reality.



Microsoft
Expression Web



The professional
Web
design tool

Microsoft
Expression Design

Microsoft
Expression Blend

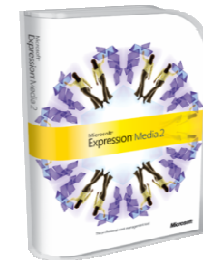


The professional
Interactive
design tool



The professional
Media
Encoding tool

Microsoft
Expression Media

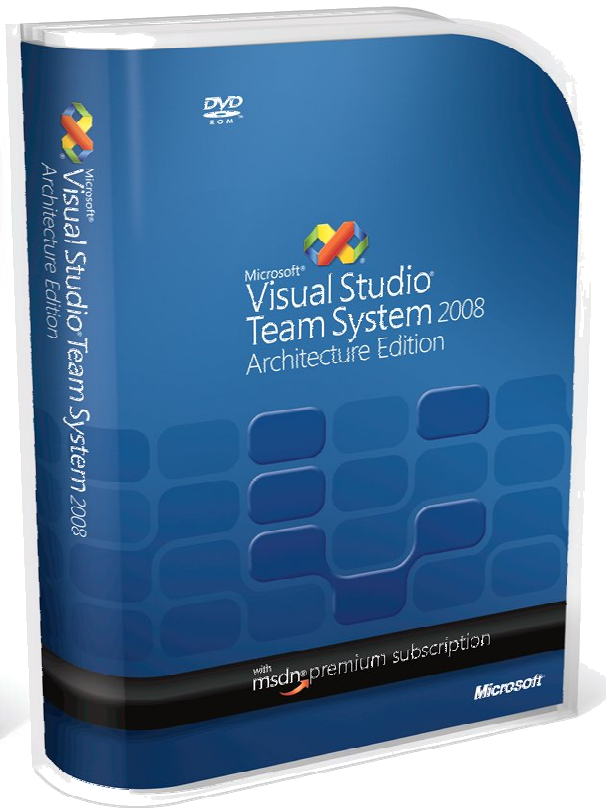
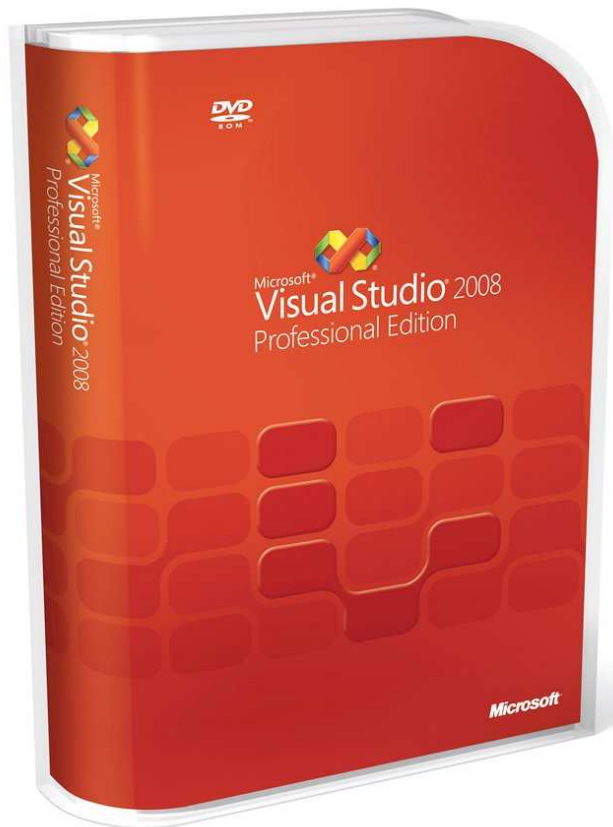


The professional
Asset
Management
tool

Microsoft
Expression®



Microsoft® Visual Studio® 2008



+ Silverlight tools
for Visual Studio



Deployment

- Any web server can serve Silverlight content
- File extension – MIME type mappings
 - .xap –application/x-silverlight-app
 - .xaml –application/xaml+xml
 - .dll –application/x-msdownload [Optional]
 - .pdb –application/x-msdownload [Optional]
- IIS7 will come pre-configured for Silverlight 2.0 apps

Building My Application



XML

- Convert XML data to .NET objects
 - Options:
 - LINQ to XML
 - XMLReader
 - XML Serialization

Controls

Rich Library of Provided Controls

Common



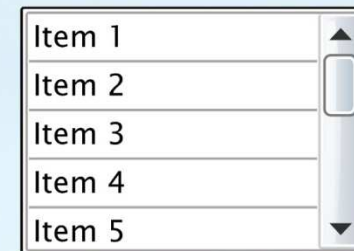
- Button*
- Calendar*
- CheckBox*
- DatePicker*
- GridSplitter*
- HyperlinkButton*
- Image*
- MultiScaleImage*
- OpenFileDialog*
- Popup*
- RadioButton*
- RepeatButton*
- ScrollViewer*
- Slider*
- TextBlock*
- TextBox*
- ToolTip*
- WatermarkedTextBox*

Layout

- Canvas*
- Grid*
- Popup*
- StackPanel*

Data

- DataGrid*
- ListBox*



	Color	Size	CheckBox
	Red	Small	<input type="checkbox"/>
▶	Green	Medium	<input checked="" type="checkbox"/>
	Blue	Large	<input checked="" type="checkbox"/>
	Orange	Medium	<input type="checkbox"/>

Accessibility

- 1.0 minimal Accessibility support
 - We only provide some root “alt” information
 - No focus and keyboard support
- 2.0 Accessibility greatly improved
 - Full keyboard support
 - Decorate UI elements in XAML with Accessibility info
 - Add accessibility to custom controls
 - Accessibility reader support (AT)
 - Accessibility tree exposition for UIA
- Note
 - UIA on Windows
 - OS X does not support accessible plug-ins

Layout

- Layout containers
 - Canvas, Grid, StackPanel, Border
- Layout properties
 - Width, MinWidth, MaxWidth, ActualWidth
 - Height, MinHeight, MaxHeight, ActualHeight
 - Margin and Padding
- Layout extensibility

Text

- Now supports East Asian Languages
 - Extended system font support
 - Proper East Asian line breaking
 - IME Support
- Improve TextBlock Animations
 - Designer/Developer can turn off optimizations
- TextBlock API Enhancements
 - LineHeight
 - Center and Right alignment
- Enable specifying font via URI

HTML DOM Integration

- Silverlight apps are browser apps
- Interacting with the browser host is critical
 - Interact with HTML elements and script objects through .NET code
 - Expose .NET objects to javascript

Data Binding

- Property Binding
 - One way, two way and one time
 - Use “DataContext” property
 - Supports value converters
- Collection/List Binding
 - Support data templates (repeater)
 - Use “ItemsSource” property

Data Templates

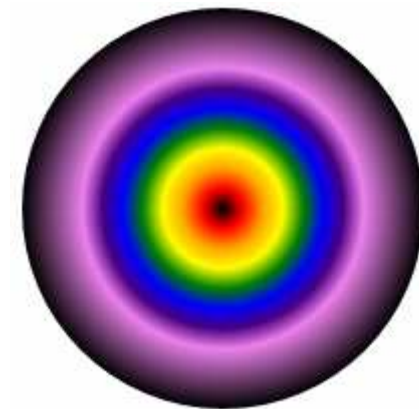
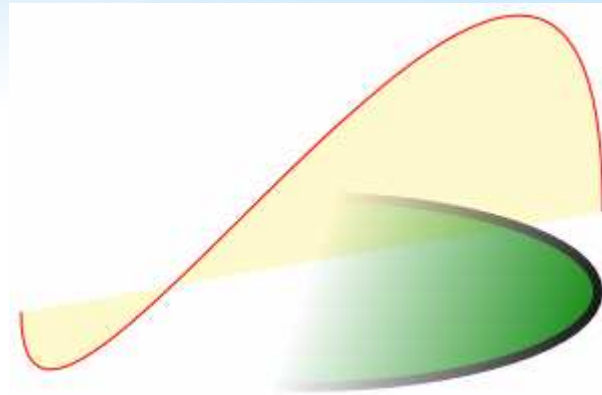
- Data Template
 - A view/visual for a data object (.NET object)
 - Maps data object properties to view/visual properties (via data binding)
- ItemsControl
 - Base list binding control
 - Supports data templating
 - For each item in ItemsSource property
 - Instantiates a DataTemplate
 - Maps data object properties to UI component properties

XAML - Silverlight Graphics

- Shapes
 - Rectangle, Ellipse, Line, Polygon, PolyLine, Path, etc.
- Brushes
 - SolidColorBrush, LinearGradientBrush, RadialGradientBrush, etc.
- TextBlock
- Image
- Transforms
 - RotateTransform, ScaleTransform, TranslateTransform, etc.
- Animation
 - EventTrigger, Storyboard, DoubleAnimation, etc.
- MediaElement
- And much more...

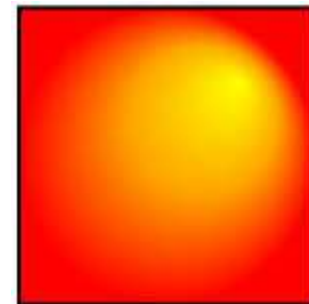
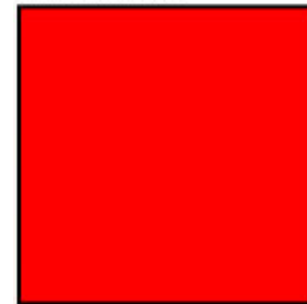
Shapes

- Rectangle
- Ellipse
- Line
- Polygon
- PolyLine
- Path
- And many more...



Brushes

- Determines how objects are painted
 - For painting objects (e.g. Fill)
 - Brush options include:
 - Solid color brush
 - Gradient brush
 - Image brush
 - Video brush



Video Brush

Text

- `<TextBlock />`

A graphic with the text "Hello XAML!" in a stylized font. "Hello" is in red, "X" is in green, and "AML!" is in blue. The text is tilted upwards to the right.

```
<TextBlock>Hello</TextBlock>
```

Hello

```
<TextBlock FontSize="18">Hello</TextBlock>
```

Hello

```
<TextBlock  
  FontFamily="Courier New">Hello</TextBlock>
```

Hello

```
<TextBlock TextWrapping="Wrap" Width="100">  
  Hello there, how are you?  
</TextBlock>
```

Hello there, how
are you?

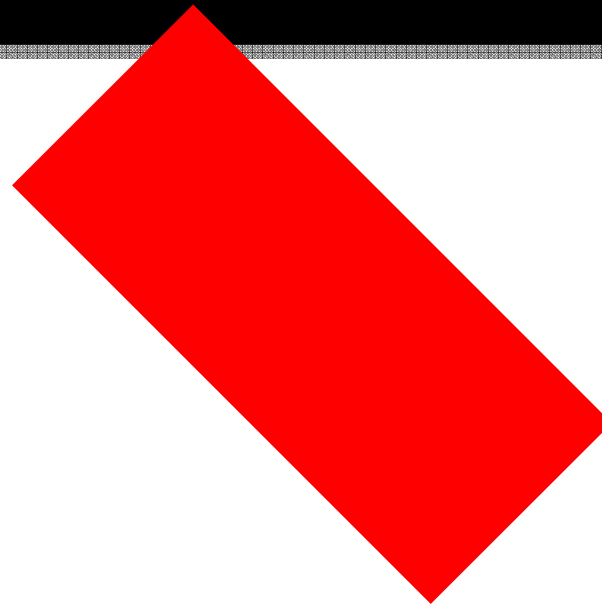
```
<TextBlock>  
  Hello there,<LineBreak/>how are you?  
</TextBlock>
```

Hello there,
how are you?

Transformations

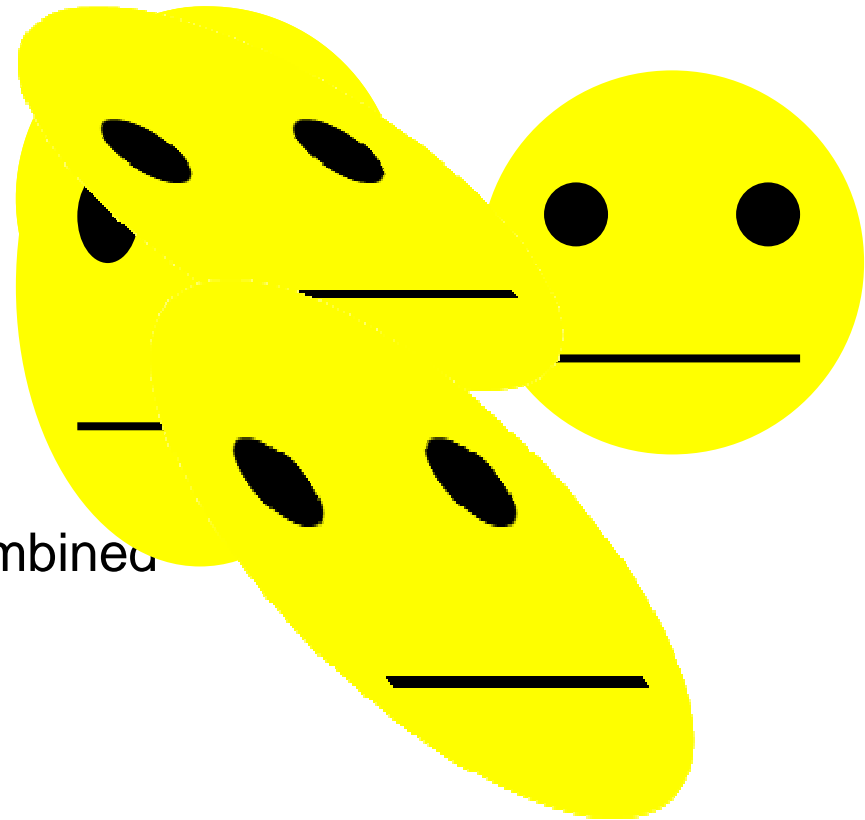
- Used to make changes to an object

```
<Rectangle.RenderTransform>  
  <RotateTransform CenterX="25" CenterY="100"  
    Angle="45" />  
</Rectangle.RenderTransform>
```



Types of Transformations

- `<RotateTransform />`
 - Rotation
- `<ScaleTransform />`
 - Resizes/Stretch
- `<SkewTransform />`
 - Skews
- `<TranslateTransform />`
 - Moves
- `<MatrixTransform />`
 - Scale, Skew and Translate Combined



Transform Groups

- Power in Transforming Groups of Objects

```
<TextBlock FontSize="24" Text="Silverlight Transforms"  
  Foreground="#FF3A2AEA" >  
  <TextBlock.RenderTransform>  
    <TransformGroup>  
      <ScaleTransform ScaleX="-1" ScaleY="5" />  
      <TranslateTransform X="450" Y="400" />  
      <SkewTransform AngleY="-45" />  
      <RotateTransform Angle="15" CenterY="250" />  
    </TransformGroup>  
  </TextBlock.RenderTransform>  
</TextBlock>
```

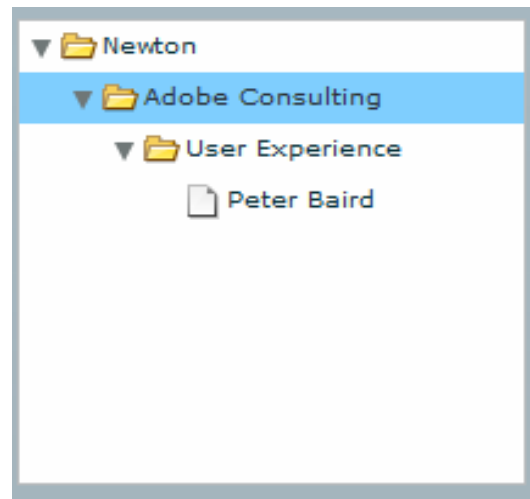


Styling / Skinning

- Customize the look of an application without changing it's behavior
- 3 levels of customization:

Styling / Skinning

- Customize the look of an application without changing it's behavior
- 3 levels of customization:
 - Styling: Setting properties like fonts and colors



Styling / Skinning

- Customize the look of an application without changing it's behavior
- 3 levels of customization:
 - Skinning: Replacing visuals for known parts



Styling / Skinning

- Customize the look of an application without changing it's behavior
- 3 levels of customization:
 - Deep customization: Change parts and layout

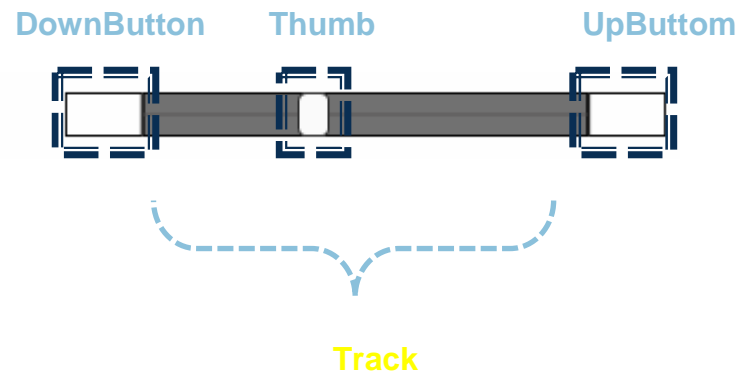


Styling / Skinning

- Silverlight UI customization is designed to easily enable the styling and skinning models
- Easy for designers and developers to understand
- Designed for toolability
- Skins can be easily ported to WPF

Styling / Skinning

- Model:
 - Control authors define parts of a control
 - Add metadata so tools can discover parts and customize them in a template
 - Templates are defined in XAML and are reusable



Open File Dialog

- Allows an end-user to choose a file
- Application gets access to a stream
- Supports multi-selection and file extension filtering
- Enables:
 - File uploading (w/ HttpRequest)
 - Viewing local images (w/ Image element)
 - Playing local media (w/ MediaElement)

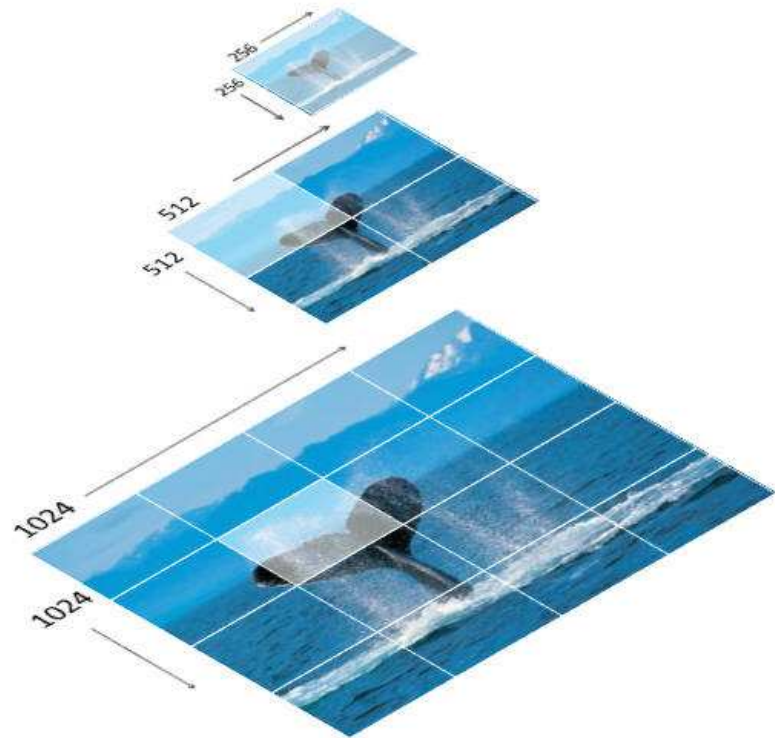
Deep Zoom

- Provides seamless viewing & zooming of huge images
- Loads only the data necessary to show the part of an image the user is viewing
- Effectively turns a large image into an efficiently scaling vector

Deep Zoom– How does it work?

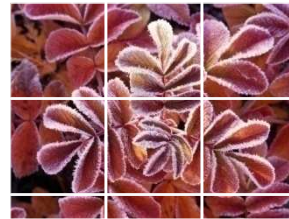
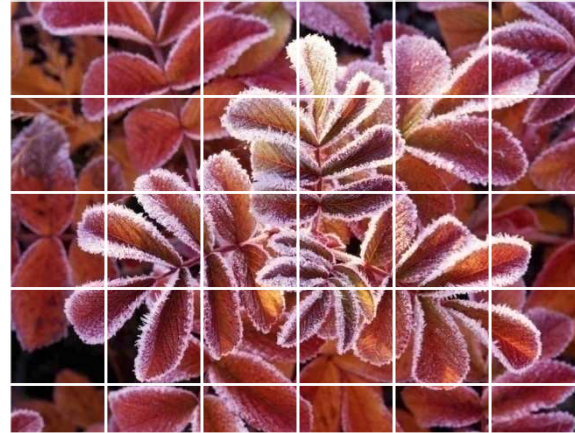
- Uses tiled image pyramids
- The overhead of pyramids is 33%:

$$\text{total pyramided imageSize} = \sum_{n=0}^{\infty} \frac{1}{4^n} = 1 + \frac{1}{3}$$



Deep Zoom – How does it work?

- Preprocessing tool breaks image into 256 x 256 tiles
- Then generates pyramids of tiles at lower resolutions



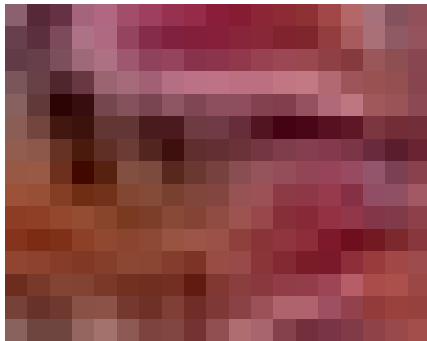
Deep Zoom– How does it work?

- When the image is displayed on the client the lowest resolution tiles are shown first
- Then as the higher quality tiles are downloaded, they are smoothly blended in



Deep Zoom– How does it work?

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Deep Zoom– How does it work?

- When the image is displayed on the client the lowest resolution tiles are shown first
- Then as the higher quality tiles are downloaded, they are smoothly blended in



Deep Zoom in Silverlight

- Exposed through the MultiScaleImage
- Preprocessing tool outputs image tiles and XML description file
- Working with the Expression team to get this into the next version of Blend

Isolated Storage

- Cookies on steroids
- Provides 10MB of app specific local storage
- Can be expanded per app by prompting the user

Beta 2 Controls

- Canvas
- FileOpenDialog
- Grid
- Image
- ItemsControl
- MediaElement
- MultiScaleImage
- StackPanel
- TextBox
- TextBlock
- Tab
- Button
- Popup
- CheckBox*
- DataGrid*
- DateTimePicker*
- GridSplitter*
- Hyperlink*
- ListBox*
- Calendar*
- RadioButton*
- Slider*
- ToggleButton*
- Tooltip*
- WatermarkTextBox*

* ship in a separate library

Note: additional controls to follow between Beta 1 and final release



Networking

Security

- Silverlight lives in the browser Sandbox
- Developers cannot extend the sandbox
- Silverlight extends in a secure way
 - Local storage (isolated storage)
 - Similar to cookies
 - FileOpen dialog
 - Sockets
 - Beta 1: Site of origin, port restrictions
 - Beta 2: Cross Domain Policy aware
 - Cross domain HTTP(S) requests
 - Support Silverlight and Subset of Flash policy files
 - HTML DOM interaction (parameterized)

Security Cont...

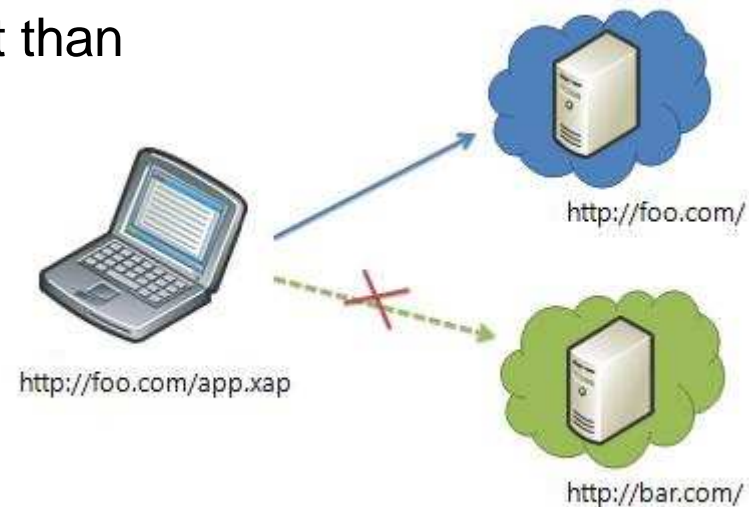
- Silverlight uses auth. Information in the browser
 - Login once for web pages and Silverlight
- Identity in WCF services
 - ASP.NET compatible mode
 - `HttpContext.Current.User`

Networking

- Capabilities
 - HTTP only
 - Verbs: GET/POST
 - Headers: Only on POST
 - Redirects:
 - Not allowed on policy file.
 - Final redirect URI must still be allowed by appropriate xdomain
 - URI: paths cannot contain “..”, “./” or % encodings
- Policy file approach
 - Retrieved once per session
 - 2 formats
 - Subset of Flash policy file (api.flickr.com, webservices.amazon.com, api.ebay.com)
 - Silverlight policy file (provide more security features)

Understanding Cookies and Cross-Site

- Cookies are on a domain level
 - bar.com cannot access foo.com cookies...
 - Same domain - http://foo.com is different than http://bar.foo.com or http://www.foo.com
 - Same protocol - http://foo.com is different than https://foo.com
 - Same port - http://foo.com is different than http://foo.com:8080
- foo.com should feel secure (ish) storing user data in cookies
- Prevent cross-site forgery
 - Exploits a sites trust for a user



Dos and Don'ts

- “Private” services (for your own app)
 - DO use browser-based authentication
 - Cookies, HTTP Auth, etc.
 - DO NOT enable public access via cross-domain policy file
- “Public” services (for 3rd-party apps)
 - DO NOT use browser-based authentication
 - DO publish cross-domain policy files
 - DO use “cross-domain-safe” authentication
 - E.g. URL signatures
- DO separate public services in their own domain
 - E.g. api.flickr.com vs. www.flickr.com

Networking stack: HTTP(S)

- Requests
 - Always Async on UI thread
 - Verbs: GET/POST
 - Headers:
 - Standard & custom headers
 - Cannot override certain headers (e.g. Accept, Connection, Host, Referer, etc)
- Responses
 - Headers: Only Content-Type
- Leverage hosting browser's capabilities for
 - Cookies
 - Caching
 - Authentication
 - Proxy Detection
 - Compression/Decompression

Dynamic Languages in Silverlight



Roadmap



ACHIEVEMENT UNLOCKED
You now know understand we are committed



Microsoft®
Silverlight™

Microsoft®

Your potential. Our passion.™

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