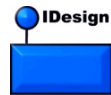


Fundamentals of Windows Presentation Foundation

Brian Noyes
www.idesign.net

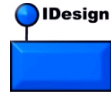
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About Brian

- n Microsoft Regional Director / Solution Architect MVP
- n Writing
 - ı Data Binding in Windows Forms 2.0, Addison-Wesley, January 2006
 - ı Smart Client Deployment with ClickOnce, Addison-Wesley, Dec 2006
 - ı MSDN Magazine, CoDe Magazine, The Server Side.NET, asp.netPRO, Visual Studio Magazine
- n Speaking
 - ı Microsoft TechEd US, Europe, Malaysia, Visual Studio Connections, DevTeach, DevEssentials, VSLive!, INETA Speakers Bureau, MSDN Webcasts
- n Participate in Microsoft design reviews
- n E-mail: brian.noyes@idesign.net
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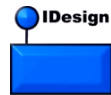
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Agenda

- n Overview of WPF
- n Basic Application Structure
- n Data Binding

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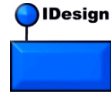


WPF Overview

What is it?

- n New Windows UI Framework
 - ┆ Alternative to Windows Forms / ASP.NET?
- n Runtime capabilities part of .NET 3.0
- n Design tools part of Visual Studio "Orcas"
 - ┆ Code named Cider
 - ┆ Shipping in 2007?
- n Expressions
 - ┆ New design tools suite for WPF

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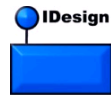


WPF Features

Why do you need it?

- n State of the art graphics
 - ı DirectX under the covers
 - ı Controls, 2D, 3D graphics
 - ı Rich Media Integration (images, audio, video)
 - ı Animation
 - ı Visual Styling

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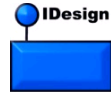
WPF Features

What is different about it?

- n Not tied to the hardware
 - ı Logical pixels
 - ı Blurred line between Windows and graphics
 - ı Takes advantage of high end graphics cards
- n Raised abstraction level
 - ı Elemental composition
 - ı Data contexts
 - ı Resources

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WPF Features

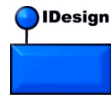


What is different about it?

- n Declarative programming model – XAML
- n Documents and content first class citizens
 - ı Word/PDF/etc.
 - ı Video/Audio
- n Interop with Windows Forms
 - ı Host Windows Forms controls in WPF apps
 - ı Host WPF controls in Windows Forms apps

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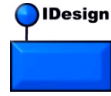
WPF Features



What's the same?

- n .NET Framework 2.0
 - ı WPF is just class libraries
 - ı WPF elements are objects
 - ı The rest of the framework is there for the logic in your app
 - ı Partial classes – combine compiled markup and code into a single class
- n Markup – code separation
 - ı Similar to ASP.NET

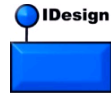
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WPF Application Types

- n Windows Application
 - ┆ Runs on the client desktop as a normal Windows Application
 - ┆ Equivalent to a Windows Forms Windows Application
- n XAML Browser Application
 - ┆ Runs in IE
 - ┆ Transparent browser experience for the user
 - ┆ Dynamically deployed application via ClickOnce (behind the covers)
 - ┆ Limited security context – Can only really do better graphics in the browser or call back to site the app was launched from
- n **Both require .NET 3.0 installed on the client**

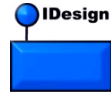
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Agenda

- n Overview of WPF
- n [Basic Application Structure](#)
- n Data Binding

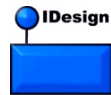
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Structural Overview

- n Compositional Model
 - | Application
 - | Main Window / Start Page
 - | Framework Elements
 - U Windows
 - U Controls
 - U Geometries

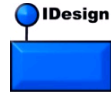
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The Application

- n Entry point for a WPF application
- n Application base class
- n Programmatic or XAML based
- n Can have its own resources
- n Handle Startup event to have “entry point” initialization code

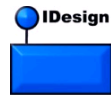
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Windows

- n Top level windows in your app
 - ┆ Windows, dialogs, page (browser based apps)
- n Derive from Window base class
- n Fill with content
 - ┆ Controls
 - ┆ Documents
 - ┆ Graphics
- n NavigationWindow – provides page navigation experience even for Windows apps

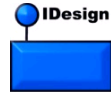
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Controls

- n Built-in controls
 - ┆ Button, TextBox, ComboBox, etc.
- n Containers
 - ┆ Grid, StackPanel, DockPanel, Canvas
- n Custom
 - ┆ Container controls
 - ┆ Self-rendering
- n Managed through properties
 - ┆ Dependency properties
 - ┆ Attached properties
- n Controls only lock down the behavior of the control, not the presentation

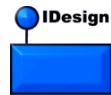
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XAML

- n eXtensible Application Markup Language
- n Declarative syntax for UI layout and interaction
- n Primarily the static aspects of your UI
 - ┆ Can be initialized to dynamic data sources
- n Uses partial classes – compiled to BAML
- n Put dynamic aspects (programmatic code) in code behind file
- n IntelliSense in Visual Studio 2005
- n Cider designer in Visual Studio “Orcas”

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Dependency Properties

- n Defined on DependencyObject classes
 - ┆ All activities and workflows inherit
- n Special kind of property
 - ┆ Metadata
 - ┆ Data binding
 - ┆ Attached properties
- n Defined through static property + instance property
 - ┆ Naming convention
 - ┆ Attributes
- n Have greater scope than the lifetime of their defining object

Dependency Properties

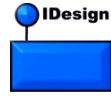
- n Static member on class
 - ┆ Calls `DependencyProperty.Register`
- n Instance property on class
 - ┆ Calls base class for get/set

```
public static DependencyProperty SomeConditionProperty =
DependencyProperty.Register("SomeCondition", typeof(bool),
typeof(WorkflowConsoleApplication1.Workflow1));

public bool SomeCondition
{
    get
    {
        return (bool) GetValue(SomeConditionProperty);
    }
    set
    {
        SetValue(SomeConditionProperty, value);
    }
}
```

Eventing

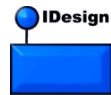
- n Event Driven
 - ┆ Routed Events
 - ┆ Bubbling, Tunneling, Direct
 - ┆ Routed Commands
 - ┆ Not associated with a single object
 - ┆ Raise their own events



Content model

- n Elements can be containers
- n Window/control content composed of other elements
- n Set through:
 - ┆ Content property
 - ┆ Specific properties (i.e. Text, Image)
 - ┆ Child control collections

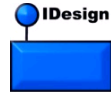
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Layout

- n Grid
 - ┆ Tabular layout – think HTML tables
 - ┆ Handles resizing
 - ┆ Container for other elements
 - ┆ Define through ColumnDefinition and RowDefinition objects
 - ┆ Add controls to grid through attached properties
 - ┆ Grid.Row, Grid.Column

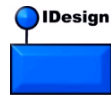
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Layout

- n StackPanel
 - | Vertical or Horizontal Alignment
 - | Can combine with Grid or DockPanel for complex layouts
 - | Works well for toolbar like layouts
- n WrapPanel
 - | Allows controls to flow to the next “line” (like the browser)
- n DockPanel
 - | Works like Dock property on individual controls in Windows Forms
 - | Use attached properties on contained controls
 - ↳ DockPanel.Fill, DockPanel.Left, etc.
- n Canvas
 - | Drawing palette
 - | Absolute positioning of elements

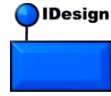
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Agenda

- n Overview of WPF
- n Basic Application Structure
- n **Data Binding**

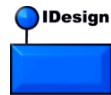
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WPF Data Sources

- n Objects or collections
- n Based on interfaces
 - ┆ IList, INotifyPropertyChanged, INotifyCollectionChanged, ICollectionView
- n Use ObservableCollection<T> for collections

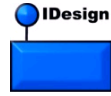
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Data Binding Overview

- n Bindings
 - ┆ Tie control properties to data source properties
 - ┆ Declarative through XAML or programmatic
- n Data Context
 - ┆ Set at an element level
 - ┆ Window, Grid, control, etc.
 - ┆ Data objects or collections flow from parent containers to child controls
 - ┆ Child controls decoupled from bound data
- n Master Details
 - ┆ Nest data contexts

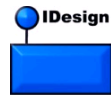
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Data Templates

- n Can specify a set of elements to be applied repeatedly based on available data items
 - ı Like an ASP.NET Repeater/DataList control
- n ItemControl
 - ı Container for repeating templates
- n Template bound to data items

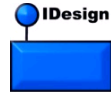
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Templates

- n Styles
 - ı Set combinations of properties
 - ı Tie to control type or named
 - ı Apply to individual elements
- n Data
 - ı Set up structure of elements for each data item in a bound container
- n Control
 - ı Change the presentation of a control to something completely different

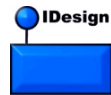
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Summary

- n Vast new framework for UI applications
- n Rich content / data binding model
- n Blurs the lines between different kinds of presentation applications
- n New programming model to learn
 - ┆ Routed events, dependency properties, attached properties
 - ┆ XAML/code separation
- n Tools are immature for immediate mainstream business application adoption instead of Windows Forms
 - ┆ Loss of productivity
- n If you have high end graphics needs or want to start presenting a more styled, dynamic, graphic experience for your users, WPF is it

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Resources

- n Essential Windows Presentation Foundation, Chris Anderson, Addison Wesley,
<http://www.simplegeek.com/book/>.
- n Programming Windows Presentation Foundation, Chris Sells and Ian Griffiths, O'Reilly & Associates,
<http://www.amazon.com/Programming-Windows-Presentation-Foundation-Chris/dp/0596101139>
- n Application = Code + Markup, Charles Petzold, MS Press,
<http://www.charlespetzold.com/wpf>.
- n Data Binding with Windows Forms 2.0, Brian Noyes, Addison Wesley,
<http://www.softinsight.com/databindingbook/>.
- n Smart Client Deployment with ClickOnce, Brian Noyes, Addison Wesley, Dec 2006,
<http://www.softinsight.com/clickoncebook/>.

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