XAML for the Winforms Developer

Philip Japikse (@skimedc)
Principal Architect, InterKnowlogy

Level: Intermediate
PHIL.ABOUT()

• Principal Architect, InterKnowlogy
  • http://interknowlogy.com
• Microsoft MVP, MCSD, MCDBA, CSM, CSP
• Lead Director, Cincinnati .NET User’s Group
• Co-host Hallway Conversations Podcast
  • www.hallwayconversations.com
• Founder, Agile Conferences, Inc.
  • www.dayofagile.org
WHAT IS WPF?

• Windows Presentation Foundation
• Next Generation Rich User Application Platform
  • Declarative UI (XAML)
• Based on DirectX (not GDI/GDI+)
  • Vector Based
  • Supports true Hardware Acceleration
  • Resolution Independence
• Leaps ahead with binding
  • Data and other Elements
WHAT ELSE IS IN WPF?

• Flexible flow layout model
• Styles and Templates
• OOTB document handling features
• True animation – not timer based
• A/V support (through WMP)
• Commands
• Routed Events
WHAT’S NEW IN .NET 4?

- DataGrid, DatePicker, Calendar
- Visual State Manager
- Layout Rounding
- Multi-Touch support
- Custom Dictionaries
- Behaviors*
- Animation Easing
- Binding String Format
WHAT’S NEW IN .NET 4.5

• Ribbon Control
• Improved Performance with large data
• Binding to Static Properties
• Accessing Collections on non-UI Threads
• Asynchronous Validation
• Delay Updating Data Source
• Retrieving Data Binding Info from Expression
• And more…
  • [http://tinyurl.com/wpf4-5](http://tinyurl.com/wpf4-5)
WHAT’S MISSING

• WPF – What’s missing
  • Visual Inheritance
  • MDI – complete lack of support
AGENDA

• Elements, Controls, and More
• Layout/Layout Containers
• Commands
• Custom Dictionaries
• Behaviors
• Binding
ELEMENTS, CONTROLS, AND MORE
ELEMENTS & CONTROLS

• Everything is an Element
  • Controls are elements that can:
    • Receive Focus
    • Accept User Input

• Content Controls
  • Hold a single element
    • Window (Special)
    • Labels, Buttons, CheckBox, RadioButton, ToolTips
    • ScrollViewer, Border, Expander

• Text Controls
  • TextBox, PasswordBox – Strings Only
  • RichTextBox – Sophisticated Content – FlowDocument
LIST CONTROLS

• List Controls (ItemsControl)
  • Selectors
    • ListBox, ComboBox, TabControl
  • Non-Selectors
    • Menus, ListView, GridView, TreeView, ToolBar

• Range Based Controls
  • ScrollBar, ProgressBar, Slider
EVENTS

• Routed Events replace usual .NET events
  • Direct
    • Originate in one element and don’t pass on
  • Bubbling
    • Travel up the element tree
  • Tunneling
    • Travel down the element tree
• Can add event handlers for child elements
  • <Grid Button.Click="ClickEvent" …

MENUS

• Use “_” instead of “&” for Hot-Key
• Beware for XAML order vs Grid Order
• Similar to WinForms except
  • MenuItem is a container control
  • Use <Separator> instead of “-”
LAYOUTS AND LAYOUT CONTAINERS
LAYOUT

• “Web”-like layout model with Flexible Flow
  • Gone are explicit sizing, absolute positioning, etc
  • Containers try to allocate element’s requested space
• Layout Process
  • Measure
    • Loop through all elements asking for preferred size
  • Arrange
    • Container places elements in appropriate position
LAYOUT CONTAINERS

• Standard
  • Grid
    • Most commonly used (default Window Panel)
  • StackPanel, WrapPanel, DockPanel
    • Used for UI Tweaks
• Canvas
  • Absolute (think WinForms) positioning
    • InkCanvas - Supports Digital Ink
• Specialized
  • UniformGrid, TabPanel, ToolBarPanel, ToolBarOverflowPanel
ATTACHED PROPERTIES

• Properties defined in one element used in another
  • Grid.Row/Grid.Column
• Translated into method calls
  • Grid.SetRow(control,x)
Layouts

DEMO
COMMANDS
COMMANDS

• WPF Command Model adds:
  • Delegates to the Appropriate Commands
  • Keeps state of control tied into state of Command
    • Can_Execute
• Consists of:
  • Commands – represents an application task
  • Command Bindings – links command to code
  • Command Sources – trigger the command
  • Command Target – element on which the command is being performed
Commands
CUSTOM DICTIONARIES
CUSTOM DICTIONARIES

• Enable by setting SpellCheck.IsEnabled="True"
• Text File (<name>.lex) for custom words
• Add as a resource, assign to the CustomDictionaries collection, copy to output directory
• Four languages supported
  • English, Spanish, German, French
Custom Dictionaries
BEHAVIORS
BEHAVIORS

• Introduced in Expression Blend v3
• Encapsulate functionality into reusable components
  • Drag & Drop
  • Pan and Zoom
  • Input Validation
  • Watermark Text
  • InvokeCommand
• Additional Behaviors are available from the Expression Gallery
  • http://msdn.microsoft.com/en-us/expression/jj873995
Behaviors
ELEMENT BINDING

• Allows for powerful UI constructs all defined in XAML
• Can bind elements value directly to another element
  ▸ No more coding “onChanged” events!
DATA BINDING

• Supports
  • IDataErrorInfo
  • INotifyPropertyChanged
  • INotifyCollectionChanged

• Can bind to *any* Dependency Property

• Choice of
  • Datasets
  • Data Objects
Data Binding
OBSERVABLES
OBSERVABLES

• Models
  • Leverage INotifyPropertyChanged
    • Beware of magic strings

• Collections
  • Leverage ObservableCollections
    • Implements
      • INotifyCollectionChanged
      • INotifyPropertyChanged
WHERE TO IMPLEMENT?

• Anemic Model
  • Implemented in ViewModel
  • “Cleaner” model
  • Lots of code duplication

• Anemic ViewModel
  • Implemented in Model
  • Less code duplication
  • Mixing of concerns?
VALIDATION
VALIDATION METHODS

• Raise an error on your data object
  • Normally errors are ignored on bindings
  • Set NotifyOnValidationError

• Use INotifyDataErrorInfo or IDataErrorInfo
  • INotifyDataErrorInfo is new in WPF 4.5

• Define validation at the binding level

• Note: Validation only occurs with TwoWay or OneWayToSource binding modes
VALIDATESONEXCEPTION

- Raises exceptions from bound property
- Sets Validation.HasError = True
- Creates ValidationError object
- If NotifyOnValidationException = true
  - WPF raises Validation.Error
IDATAERRORINFO

• Add an string indexer for the Item property
• Error property is not used by WPF
• Relies on INotifyPropertyChanged
• Requires ValidatesOnDataErrors in binding
INOTIFYDATAERRORINFO

• New in WPF 4.5
• Contains
  • ErrorsChanged event
  • HasError Boolean
  • GetErrors() method to return the errors
• Relies on INotifyPropertyChanged
CUSTOM VALIDATION RULES

• Derive from ValidationRule
• Add additional properties for custom configuration
• Override Validate()
  • Return new ValidationResult(true || false, [Error Message])
• Add to Binding.ValidationRules collection
Validation
QUESTIONS?
CONTACT ME

- skimedic@gmail.com
- www.skimedic.com/blog
- www.twitter.com/skimedic
- www.hallwayconversations.com

- www.about.me/skimedic