

Module 3

"Data Binding Collections"



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Agenda

- ▶ **Data Binding to Collections**
- ▶ Data Templates, Grouping, and Sorting
- ▶ Change Notification



Binding Item Controls

- ▶ Item controls can be bound to a collection of objects
- ▶ **ItemsControl.**
 - **ItemsSource**
 - **DisplayMemberPath**
 - **IsSynchronizedWithCurrentItem**
 - Is **ItemControl.CurrentItem** synchronized with **ICollectionView.CurrentItem**?
 - **ItemTemplate**
- ▶ Can also just bind a single property to a list



Collection Views

- ▶ A collection view manages data currency for collection
 - Is automatically generated behind the scenes
 - Retrieve via `CollectionViewSource.DefaultView()`
 - ▶ `ICollectionView`
 - `CurrentPosition`, `CurrentItem`
 - `MoveCurrentTo`, `MoveCurrentToFirst`, `MoveCurrentToLast`, `MoveCurrentToNext`, `MoveCurrentToPrevious`, `MoveCurrentToPosition`
 - `IsCurrentBeforeFirst`, `IsCurrentAfterLast`
 - ▶ `ICollectionView`
 - `IList`
 - `IBindingList`
- `CollectionView`
`ListCollectionView`
`BindingListCollectionView`



Master-Detail Binding

- ▶ Master-Details view can be created by
 - Binding primary **ItemsControl** to master collection
 - Binding secondary **ItemsControl** to property (or relation) between master and details collection
 - Synchronizing on current items
- ▶ Remember to set **IsSynchronizedWithCurrentItem = true** on primary **ItemsControl**



Data Provider Classes

- ▶ **ObjectDataProvider**
 - ObjectType
 - ConstructorParameters
 - MethodName
 - MethodParameters
 - IsAsynchronous

- ▶ **XmlDataProvider**
 - Source, Document
 - XPath



DataGrid

▶ DataGrid

- Designed for quick and easy data binding
- Columns can be auto-generated from **ItemsSource**

- **IsReadOnly**

▶ Column types

- | | | |
|----------------------------------|---------------------|----------------------------|
| • DataGridtextColumn | TextBlock | TextBox |
| • DataGridHyperlinkColumn | HyperLink | |
| • DataGridCheckBoxColumn | CheckBox | CheckBox |
| • DataGridComboBoxColumn | TextBlock | ComboBox |
| • DataGridTemplateColumn | <i>CellTemplate</i> | <i>CellEditingTemplate</i> |

- ▶ Extra row details
- ▶ Column Freezing
- ▶ ...



Design-time Data

- ▶ XAML allows setting specific properties applying only to design-time

```
<Window ...  
  xmlns:d="http://schemas.microsoft.com/expression/blend/2008"  
  xmlns:mc="http://schemas.openxmlformats.org/markup-  
compatibility/2006"  
  mc:Ignorable="d">  
    <d:Window.DataContext>  
      <clr:Participants>  
        <clr:Participant FirstName="Jesper"  
                          LastName="Gulmann Henriksen"  
                          Company="Wincubate ApS" />  
      </clr:Participants>  
    </d:Window.DataContext>  
    ...  
</Window>
```



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Data Templates

- ▶ Data Templates are XAML-fragments determining how bound data is displayed
- ▶ **DataTemplate**
 - Can be set via **ContentControl.ContentTemplate** property
 - Can be set via **ItemsControl.ItemTemplate** property
 - Mutually exclusive with **DisplayMemberPath** property!
 - Can be defined
 - Directly in bound control
 - In **Resources**
- ▶ Data template can be automatically applied to all elements of a certain type
 - Set **DataTemplate.DataType**
 - Don't specify an **x:Key** for data template!



Hierarchical Data Templates

► **HierarchicalDataTemplate**

- Excellent for hierarchical data
 - e.g. file system etc.

► Use

- **HierarchicalDataTemplate** for internal nodes
- "regular" DataTemplate for leaf nodes

► Note:

- A "non-recursive" example is supplied in the additional resources



Sorting

- ▶ Bound data can be sorted through **ICollectionView**
- ▶ **ICollectionView**
 - **SortDescriptions**
 - **SortDescription** collection
- ▶ Specifically for **ListCollectionView**
 - **CustomSort**
 - **IComparer** implementation
- ▶ Note
 - The **SortDescription** class is defined in the **System.ComponentModel** namespace in **WindowsBase.dll**.



Grouping

- ▶ Bound data can be grouped through **ICollectionView**
- ▶ **ICollectionView**
 - **GroupDescriptions**
 - **PropertyGroupDescription** collection
- ▶ **ItemsControl**
 - **GroupStyle**
 - **HeaderTemplate**, **HeaderTemplateSelector**
 - **ContainerStyle**, **ContainerStyleSelector**
 - **Panel**
- ▶ Custom Grouping
 - Can be performed by implementing **IValueConverter** appropriately



Filtering

- ▶ Bound data can be filtered through **ICollectionView**
- ▶ **ICollectionView**
 - **Filter**
 - should be set to filtering predicate (of **object!**) in code
- ▶ This approach does not work for ADO.NET objects
 - These views are **BindingListCollectionView**
 - **CustomFilter** = *"ColumnName Operator Value"*



CollectionViewSource

- ▶ Collection views can similarly be created in XAML
 - Define a **CollectionViewSource** instance bound to data
 - Bind ItemsControl to the **CollectionViewSource** instance

```
<Window.Resources>  
    <clr:Participants x:Key="participants" />  
    <CollectionViewSource x:Key="cvs"  
        Source="{Binding Source={StaticResource participants}}" />  
</Window.Resources>
```

```
<ListBox ItemsSource="{Binding Source={StaticResource cvs}}"  
    DisplayMemberPath="FullName"/>
```

- ▶ Sorting can also be applied in XAML



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INotifyPropertyChanged

- ▶ Implement **INotifyPropertyChanged** to propagate modifications to a single element through data binding
 - **PropertyChanged** event
 - Raise event with CLR property name whenever it is changed



ObservableCollection<T>

- ▶ Implement collections by inheriting **ObservableCollection<T>**
 - Located in **WindowsBase.dll**!
- ▶ Automatically propagates adding and removal of elements to collection
- ▶ Handling change notifications overall
 - Implement **INotifyPropertyChanged** on single elements of type **T**
 - Inherit collection storage class from **ObservableCollection<T>**



Summary

- ▶ Complex Data Binding
- ▶ Data Templates, Grouping, and Sorting
- ▶ Change Notification





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