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Agenda

- **Intro : Traditional UI developments.**
- **MVVM in Deep :**
 - What is MVVM?
 - Model / View Model / View.
 - Classes interaction.
- **MVVM and other patterns.**
- **MVVM Advantages /Disadvantages.**
- **Conclusion & Recommendations.**

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Traditional UI Development

```

using Microsoft.Phone.Shell;
using PhoneApp2.Resources;

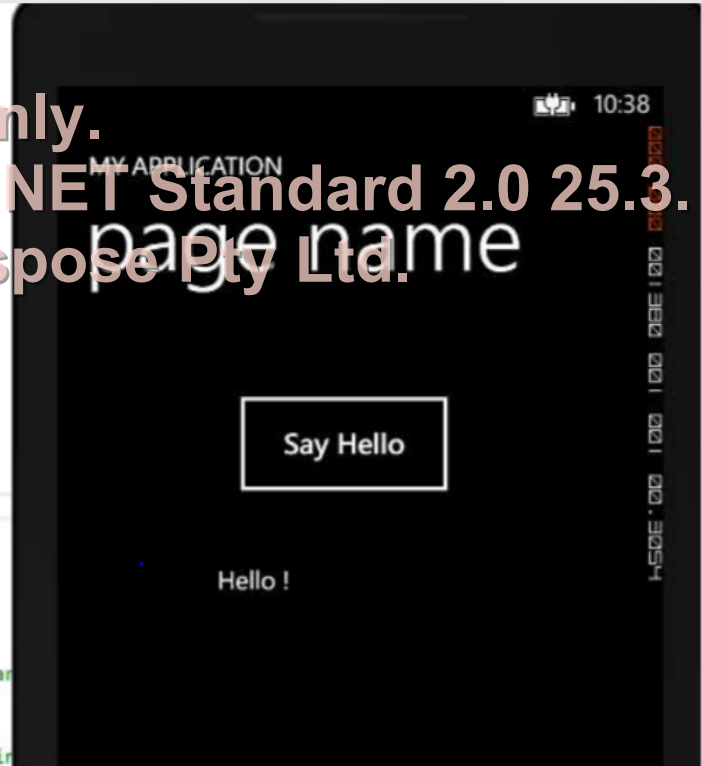
namespace PhoneApp2
{
    public partial class MainPage : PhoneApplicationPage
    {
        // Constructor
        public MainPage()
        {
            InitializeComponent();

            // Sample code to localize the ApplicationBar
            //BuildLocalizedApplicationBar();
        }

        private void Button_Click(object sender, RoutedEventArgs e)
        {
            helloTxt.Text = " Hello !";
        }

        // Sample code for building a localized ApplicationBar
        //private void BuildLocalizedApplicationBar()
        //{
        //    // Set the page's ApplicationBar to a new instance of ApplicationBar
        //    ApplicationBar = new ApplicationBar();

        //    // Create a new button and set the text value to the localized string
    
```



Traditional UI Development

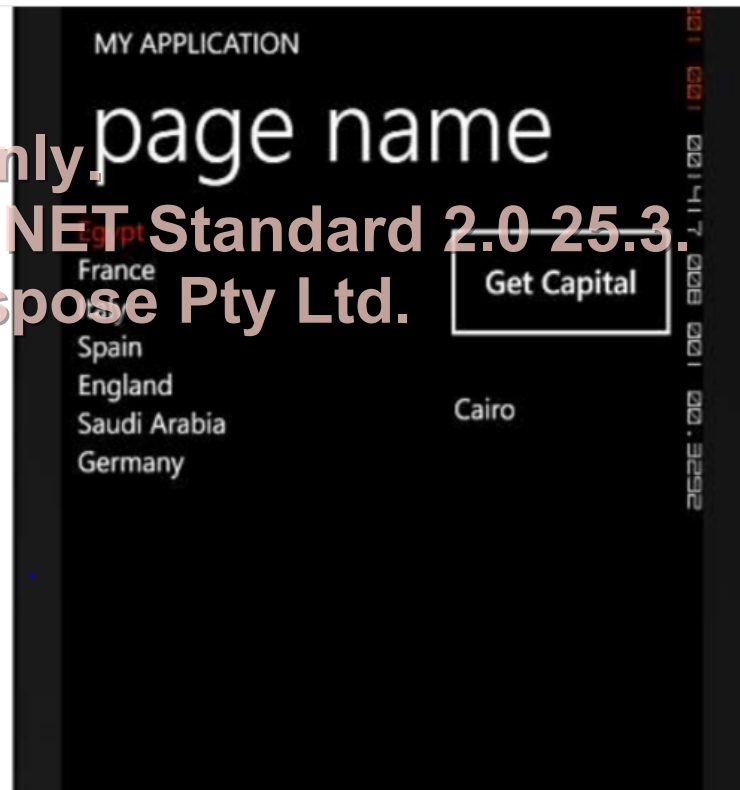
More work, more problems.

```
CountryService countryService;  
// Constructor  
public MainPage()  
{  
    InitializeComponent();  
    Loaded += MainPage_Loaded;  
    countryService = new CountryService();  
}  
  
void MainPage_Loaded(object sender, RoutedEventArgs e)  
{  
  
    List<CountryModel> Countries = countryService.GetCountries();  
    foreach (CountryModel country in Countries)  
    {  
        countriesList.Items.Add(country.Country);  
    }  
}  
  
private void Button_Click(object sender, RoutedEventArgs e)  
{  
    string CountryName = (countriesList.SelectedItem) as string;  
    capitaltxt.Text = countryService.GetCapitalName(CountryName);  
}
```

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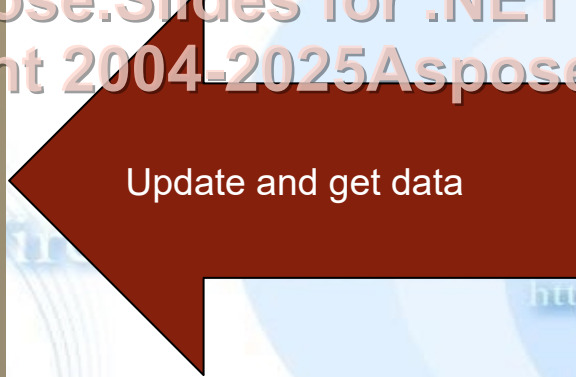
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Traditional UI Development

Constraints:

- Difficult to test . Evaluation only.

- Encourages using UI as data storage
- Complex classes and a huge mount of code.

- No code sharing.

- Very strong dependency between UI & Logic.

- Redesign UI.

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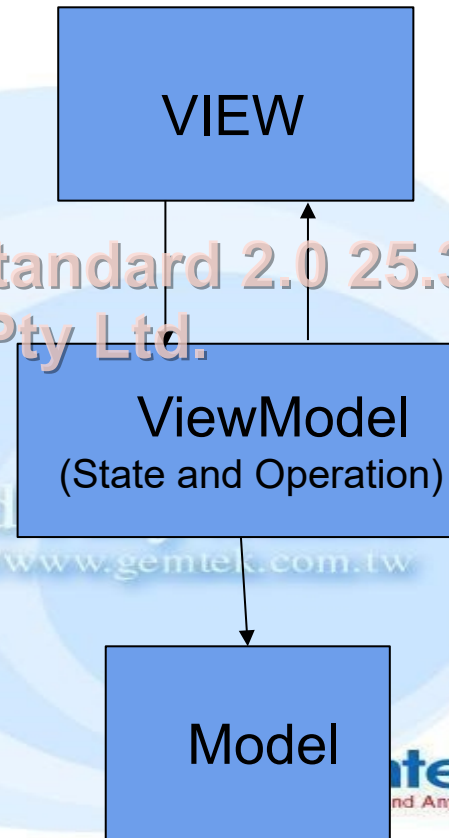
What is MVVM?

The **M**odel **V**iew **V**iew**M**odel.

Introduced by Microsoft in 2006.

Not a design pattern it is an architectural pattern.

It is a specialization of the presentation model pattern.



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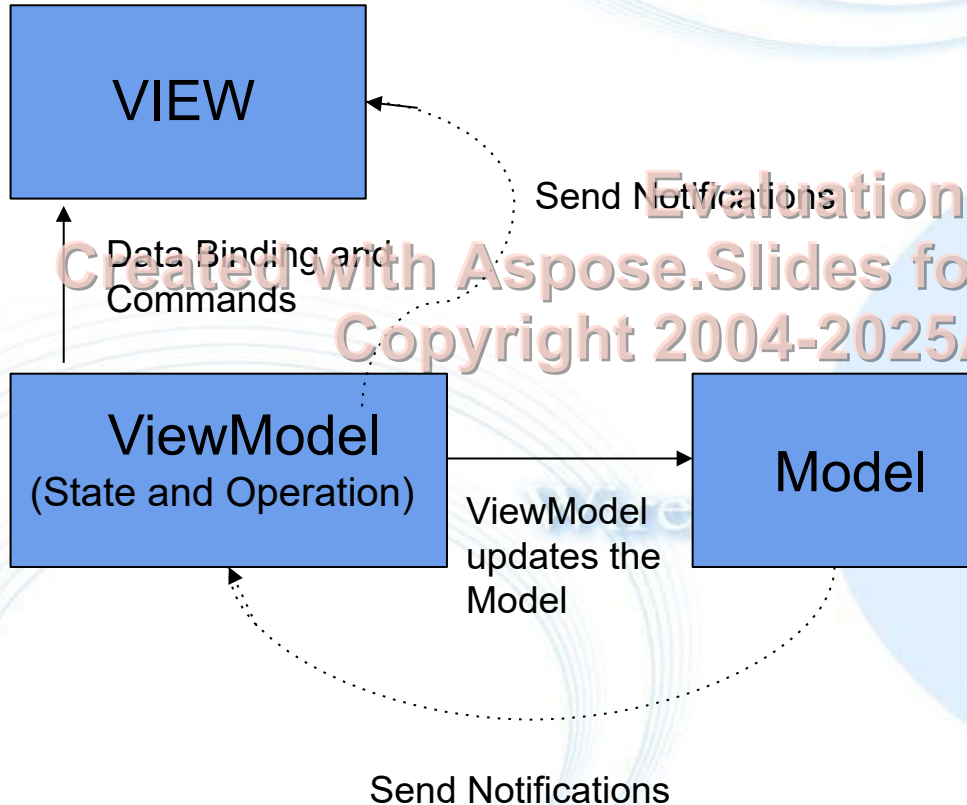
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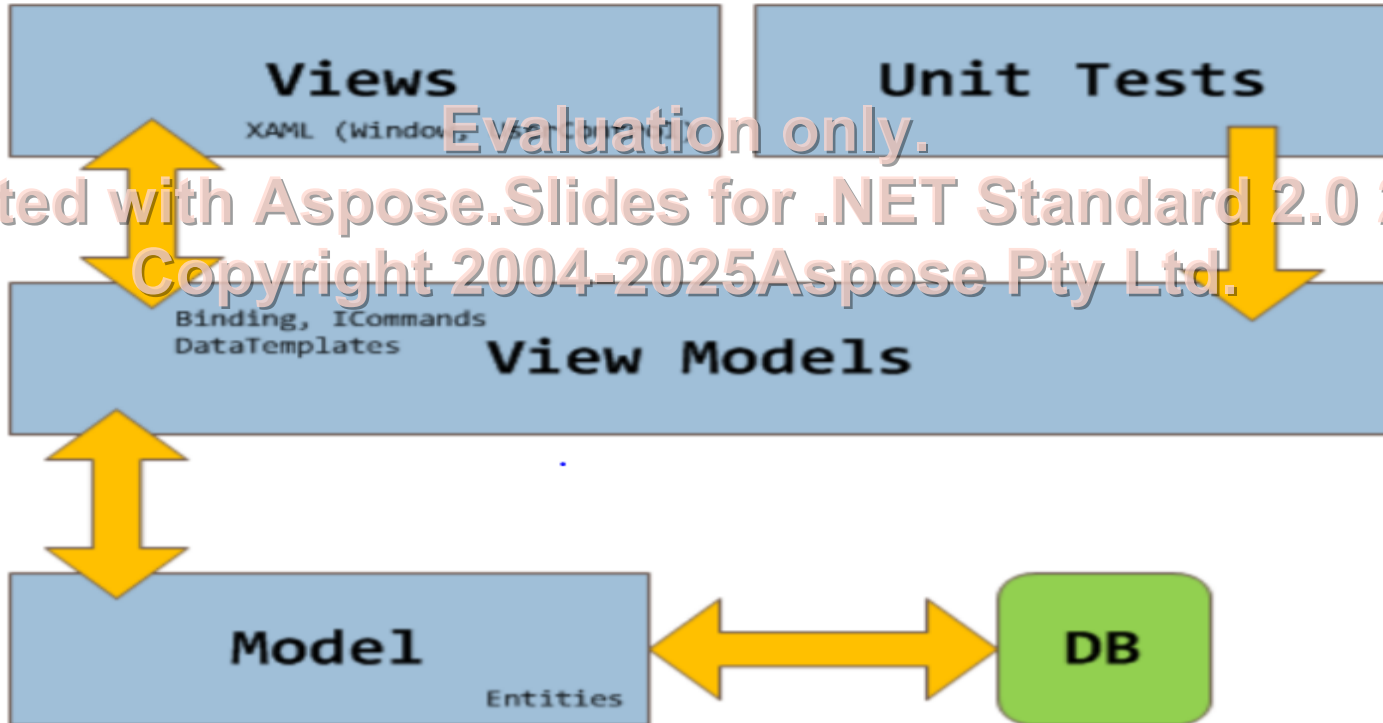
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What is MVVM?



- Components to be swapped
- Internal implementation to be changed without affecting the others
- Components to be worked on independently
- Isolated unit testing

What is MVVM?



Model

- Non-visual classes that encapsulate the application's data and business logic.

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- Can't See View Model or View.

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- Should not contain any use case–specific or user task–specific behavior or application logic.
- Notifies other components of any state changes.
- May provide data validation and error reporting

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ViewModel

- Non-visual class encapsulates the presentation logic required.

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Can't see View (no direct Reference)

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- Coordinates the view's interaction with the model.
- May provide data validation and error reporting.
- Notifies the view of any state changes.

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View

- Visual element defines the controls and their visual layout and styling.

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- Can see all others components

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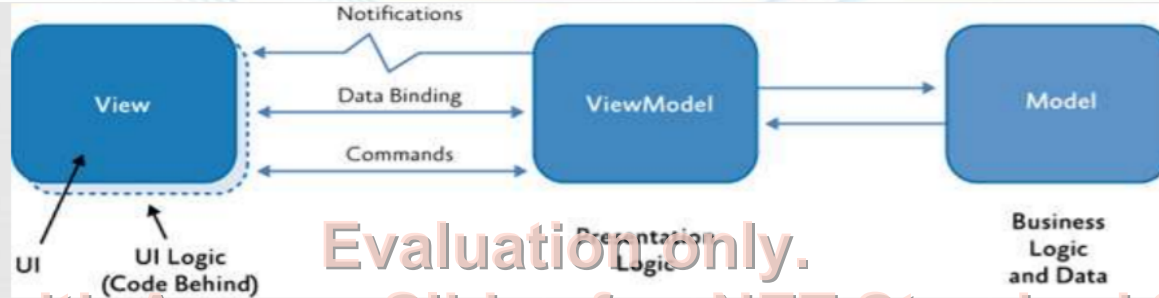
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- Defines and handles UI visual behavior, such as animations or transitions.

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- Code behind may contain code that requires direct references to the specific UI controls.

Classes interaction.



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Interaction Ways

Data Binding

Commands

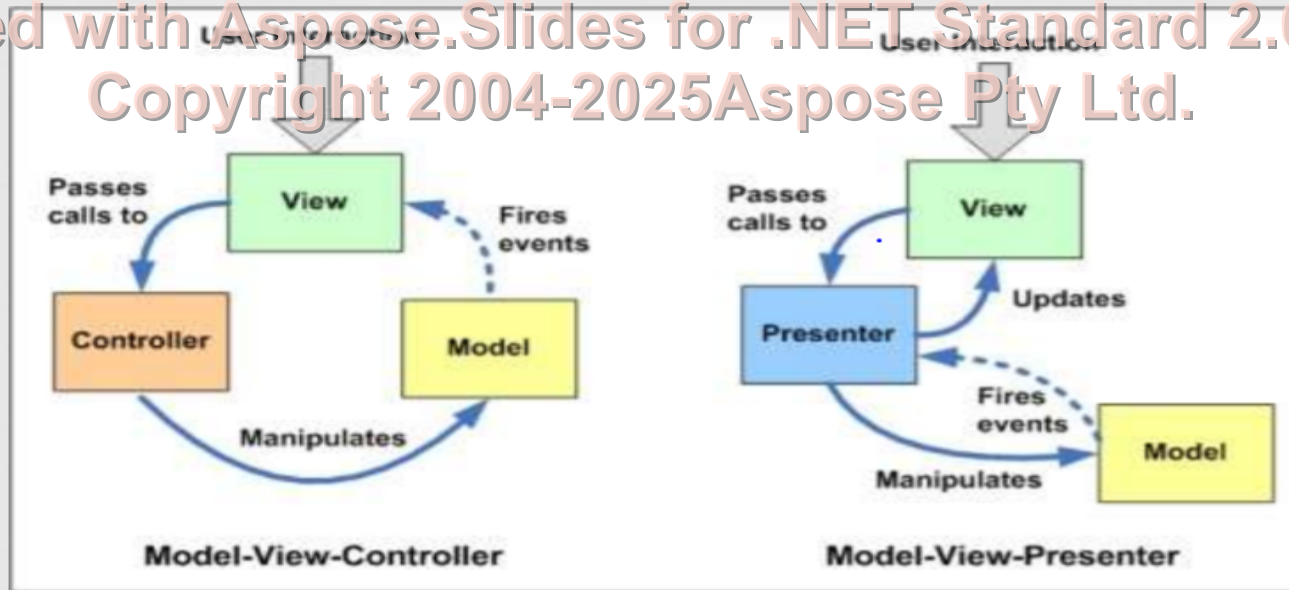
Notifications

MVVM and other patterns.

MVP vs. MVC vs. MVVM

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MVVM and other patterns.

MVP (Presenter)	MVC (Controller)	MVVM (View Model)
View communicates with the presenter by directly calling functions on an instance of the presenter.	View sends input events to the controller via a callback or registered handler.	View binds directly to the View Model.
The presenter communicates with the view by talking to an interface implemented by the view .	View receives updates directly from the model without having to go through the controller.	Changes in view are automatically reflected in View Model and changes and vice versa.
Use where binding via a data context is not possible.	Use where the connection between view and the rest of the program is not always available.	Use where binding via a data context is possible.

MVVM Advantages

- Separation of concerns.
- Can use unit tests.

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- Designers and developers can work synchronously.

- Easy to redesign the UI.

- Can share code easily.

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MVVM Disadvantages

- Harder to debug.

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- May affect performance.

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- More files to serve the architecture.

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The End

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