Windows® Phone

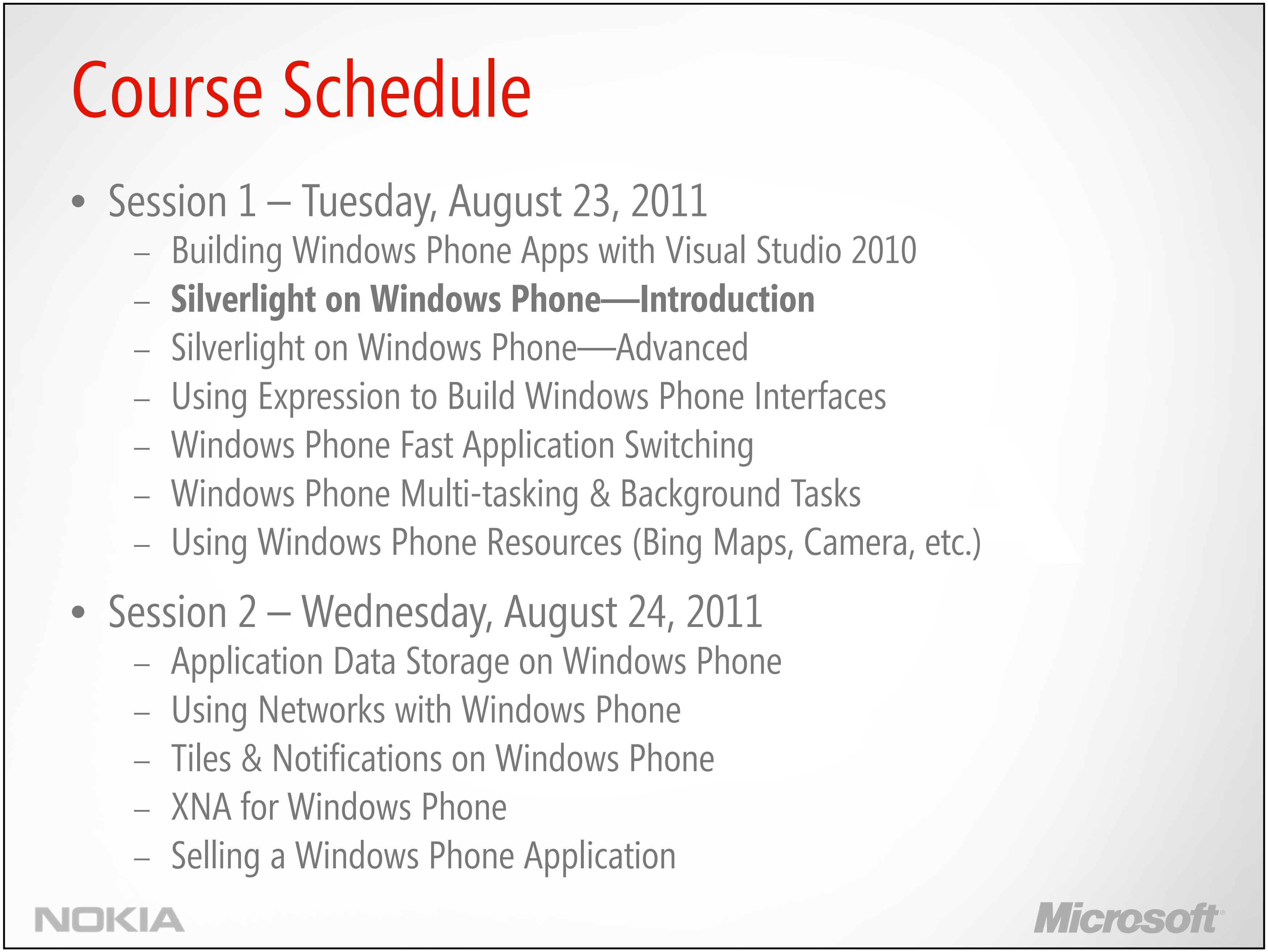
An Introduction to Silverlight

Rob S. Miles | Microsoft MVP | University of Hull, UK
Andy Wigley | Microsoft MVP | Appa Mundi

Session 2.0

NOKIA
2
Phone
People
3
Messaging
9
Linked Inbox

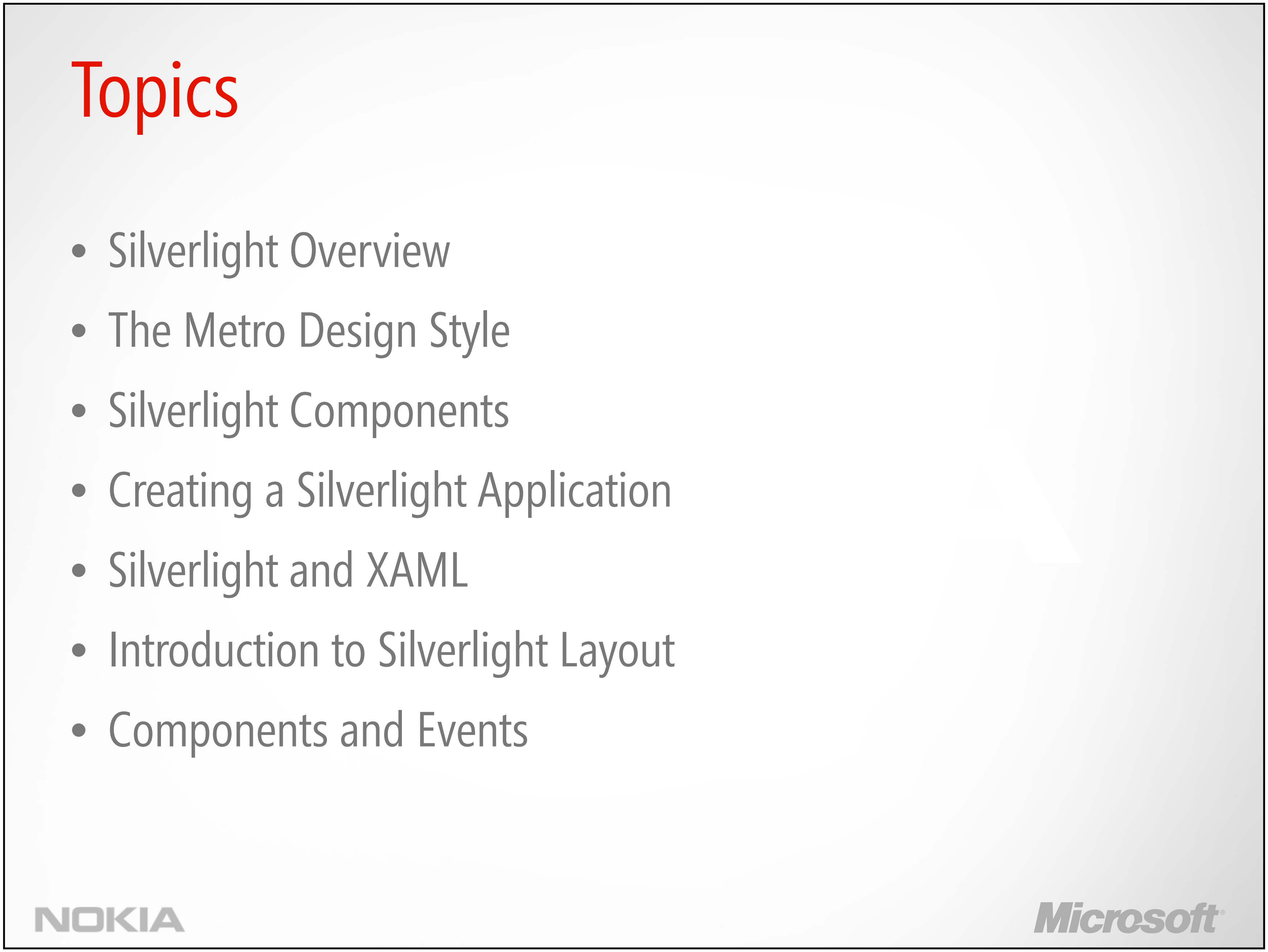
©2011 Microsoft Corporation. All rights reserved. Microsoft, Windows, Windows Vista, Windows Azure, Hyper-V and other product names are or may be registered trademarks and/or trademarks in the U.S. and/or other countries. The information herein is for informational purposes only and represents the current view of Microsoft Corporation as of the date of this presentation. Because Microsoft must respond to changing market conditions, it should not be interpreted to be a commitment on the part of Microsoft, and Microsoft cannot guarantee the accuracy of any information provided after the date of this presentation.
MICROSOFT MAKES NO WARRANTIES, EXPRESS, IMPLIED OR STATUTORY, AS TO THE INFORMATION IN THIS PRESENTATION.



Course Schedule

- Session 1 – Tuesday, August 23, 2011
  - Building Windows Phone Apps with Visual Studio 2010
  - **Silverlight on Windows Phone—Introduction**
  - Silverlight on Windows Phone—Advanced
  - Using Expression to Build Windows Phone Interfaces
  - Windows Phone Fast Application Switching
  - Windows Phone Multi-tasking & Background Tasks
  - Using Windows Phone Resources (Bing Maps, Camera, etc.)
- Session 2 – Wednesday, August 24, 2011
  - Application Data Storage on Windows Phone
  - Using Networks with Windows Phone
  - Tiles & Notifications on Windows Phone
  - XNA for Windows Phone
  - Selling a Windows Phone Application

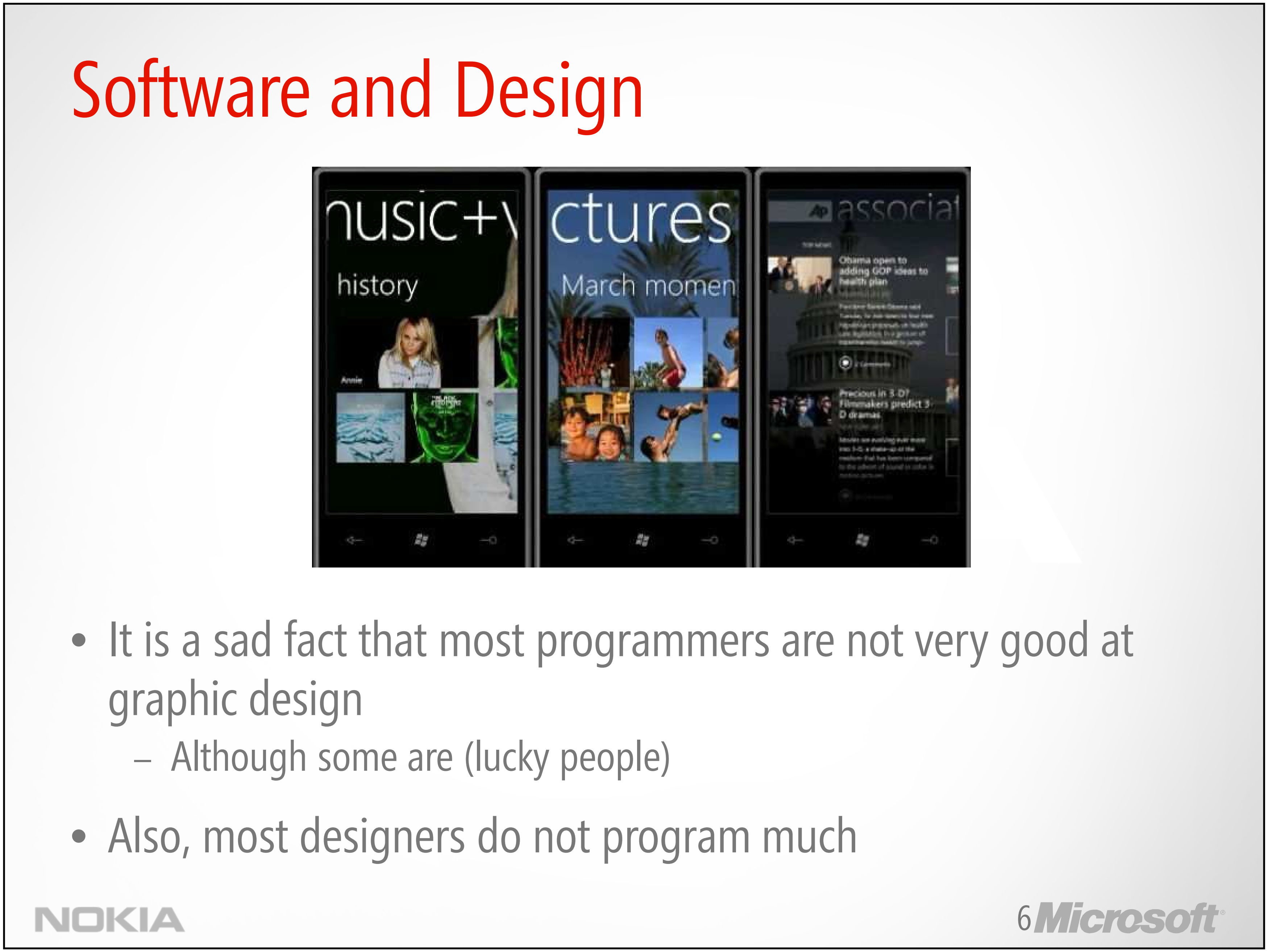
©2011 Microsoft Corporation. All rights reserved. Microsoft, Windows, Windows Vista, Windows Azure, Hyper-V and other product names are or may be registered trademarks and/or trademarks in the U.S. and/or other countries.
The information herein is for informational purposes only and represents the current view of Microsoft Corporation as of the date of this presentation. Because Microsoft must respond to changing market conditions, it should not be interpreted to be a commitment on the part of Microsoft, and Microsoft cannot guarantee the accuracy of any information provided after the date of this presentation.
MICROSOFT MAKES NO WARRANTIES, EXPRESS, IMPLIED OR STATUTORY, AS TO THE INFORMATION IN THIS PRESENTATION.



Topics

- Silverlight Overview
- The Metro Design Style
- Silverlight Components
- Creating a Silverlight Application
- Silverlight and XAML
- Introduction to Silverlight Layout
- Components and Events

©2011 Microsoft Corporation. All rights reserved. Microsoft, Windows, Windows Vista, Windows Azure, Hyper-V and other product names are or may be registered trademarks and/or trademarks in the U.S. and/or other countries.
The information herein is for informational purposes only and represents the current view of Microsoft Corporation as of the date of this presentation. Because Microsoft must respond to changing market conditions, it should not be interpreted to be a commitment on the part of Microsoft, and Microsoft cannot guarantee the accuracy of any information provided after the date of this presentation.
MICROSOFT MAKES NO WARRANTIES, EXPRESS, IMPLIED OR STATUTORY, AS TO THE INFORMATION IN THIS PRESENTATION.

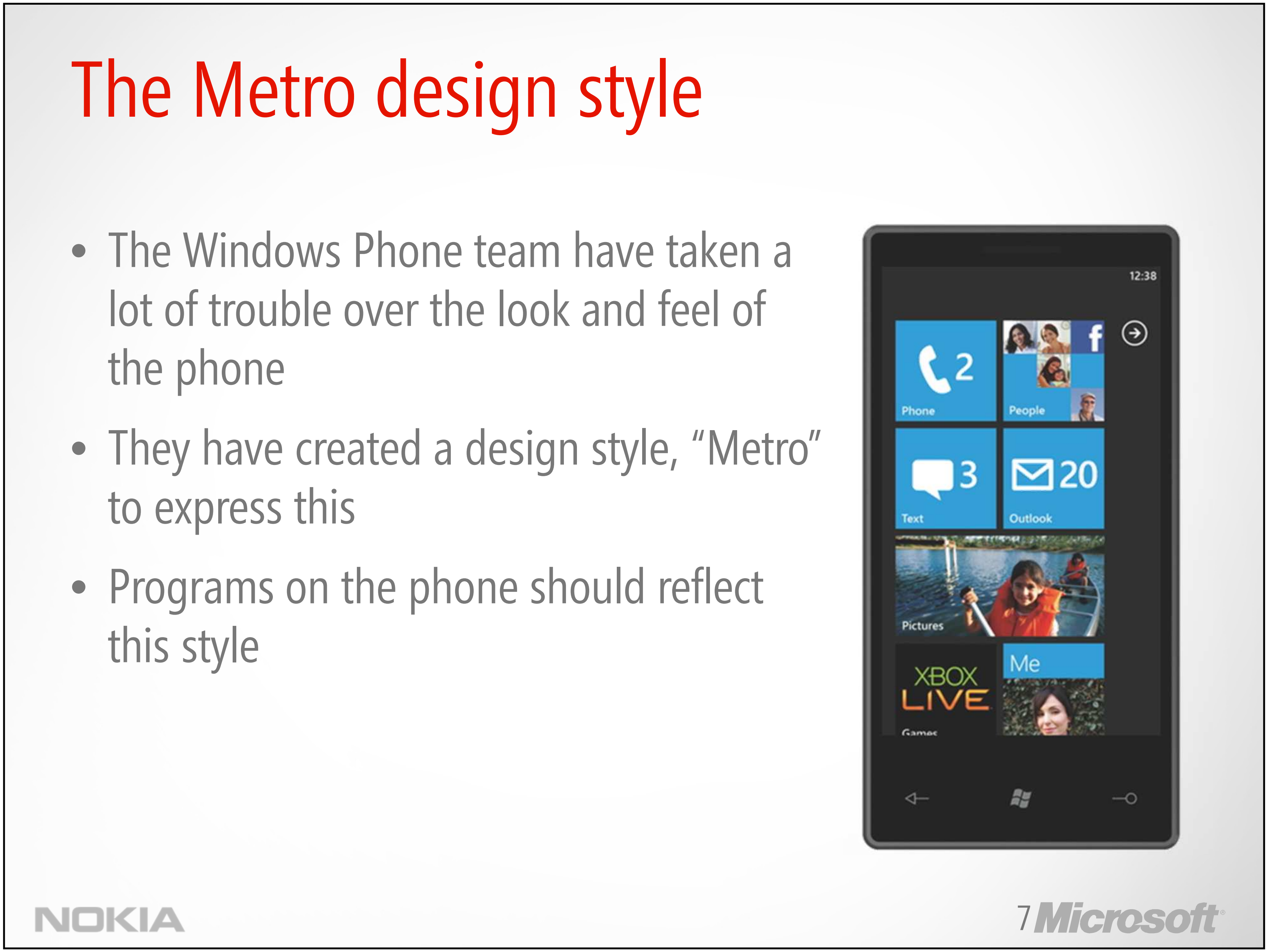


music+v
history
Annie
ctures
March momen
associat
Obama open to adding GOP ideas to health plan
Precious in 3-D? Filmmakers predict 3-D dramas

Software and Design

- It is a sad fact that most programmers are not very good at graphic design
  - Although some are (lucky people)
- Also, most designers do not program much

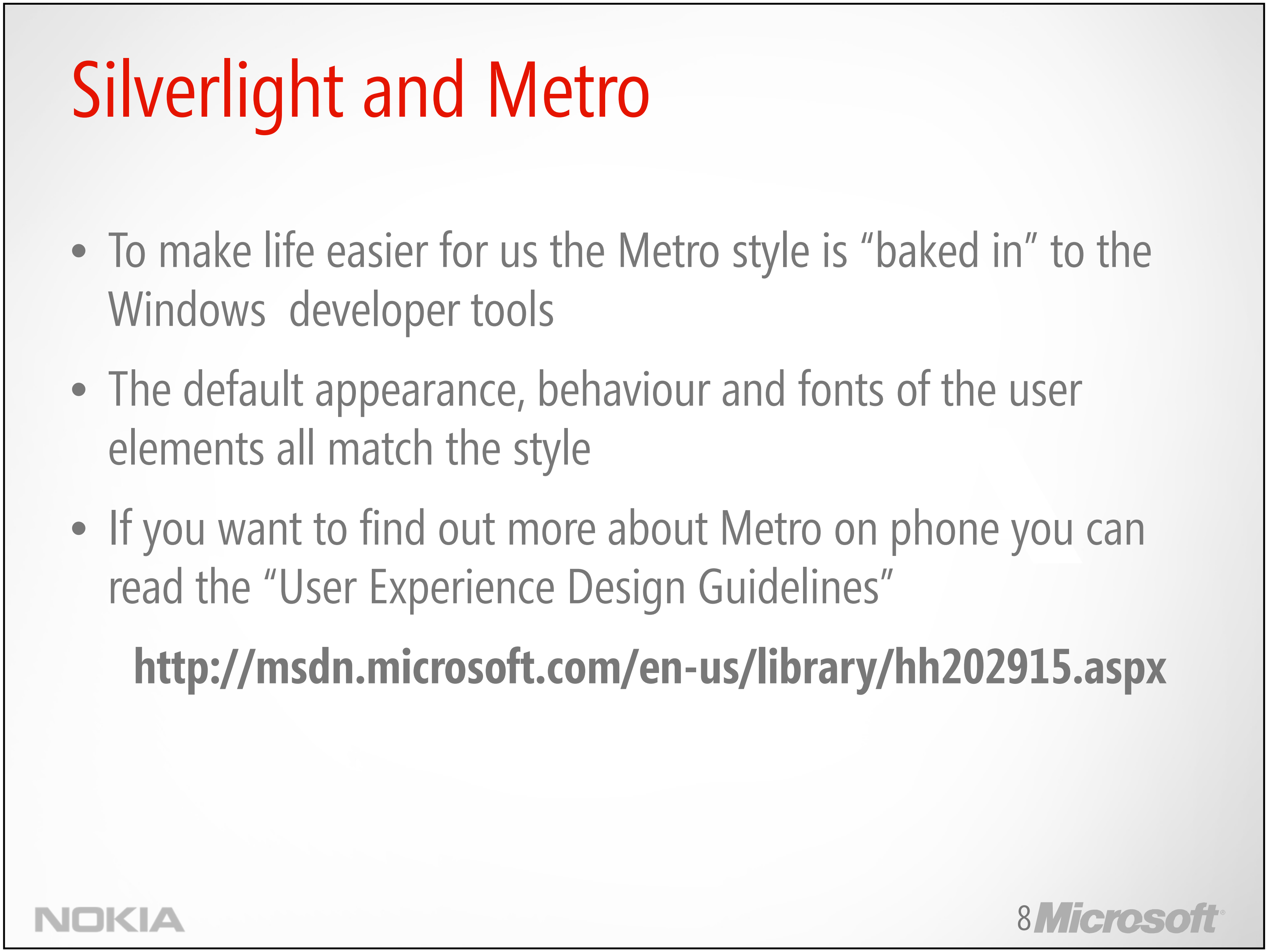
©2011 Microsoft Corporation. All rights reserved. Microsoft, Windows, Windows Vista, Windows Azure, Hyper-V and other product names are or may be registered trademarks and/or trademarks in the U.S. and/or other countries.
The information herein is for informational purposes only and represents the current view of Microsoft Corporation as of the date of this presentation. Because Microsoft must respond to changing market conditions, it should not be interpreted to be a commitment on the part of Microsoft, and Microsoft cannot guarantee the accuracy of any information provided after the date of this presentation.
MICROSOFT MAKES NO WARRANTIES, EXPRESS, IMPLIED OR STATUTORY, AS TO THE INFORMATION IN THIS PRESENTATION.



The Metro design style

- The Windows Phone team have taken a lot of trouble over the look and feel of the phone
- They have created a design style, “Metro” to express this
- Programs on the phone should reflect this style

©2011 Microsoft Corporation. All rights reserved. Microsoft, Windows, Windows Vista, Windows Azure, Hyper-V and other product names are or may be registered trademarks and/or trademarks in the U.S. and/or other countries.
The information herein is for informational purposes only and represents the current view of Microsoft Corporation as of the date of this presentation. Because Microsoft must respond to changing market conditions, it should not be interpreted to be a commitment on the part of Microsoft, and Microsoft cannot guarantee the accuracy of any information provided after the date of this presentation.
MICROSOFT MAKES NO WARRANTIES, EXPRESS, IMPLIED OR STATUTORY, AS TO THE INFORMATION IN THIS PRESENTATION.



Silverlight and Metro

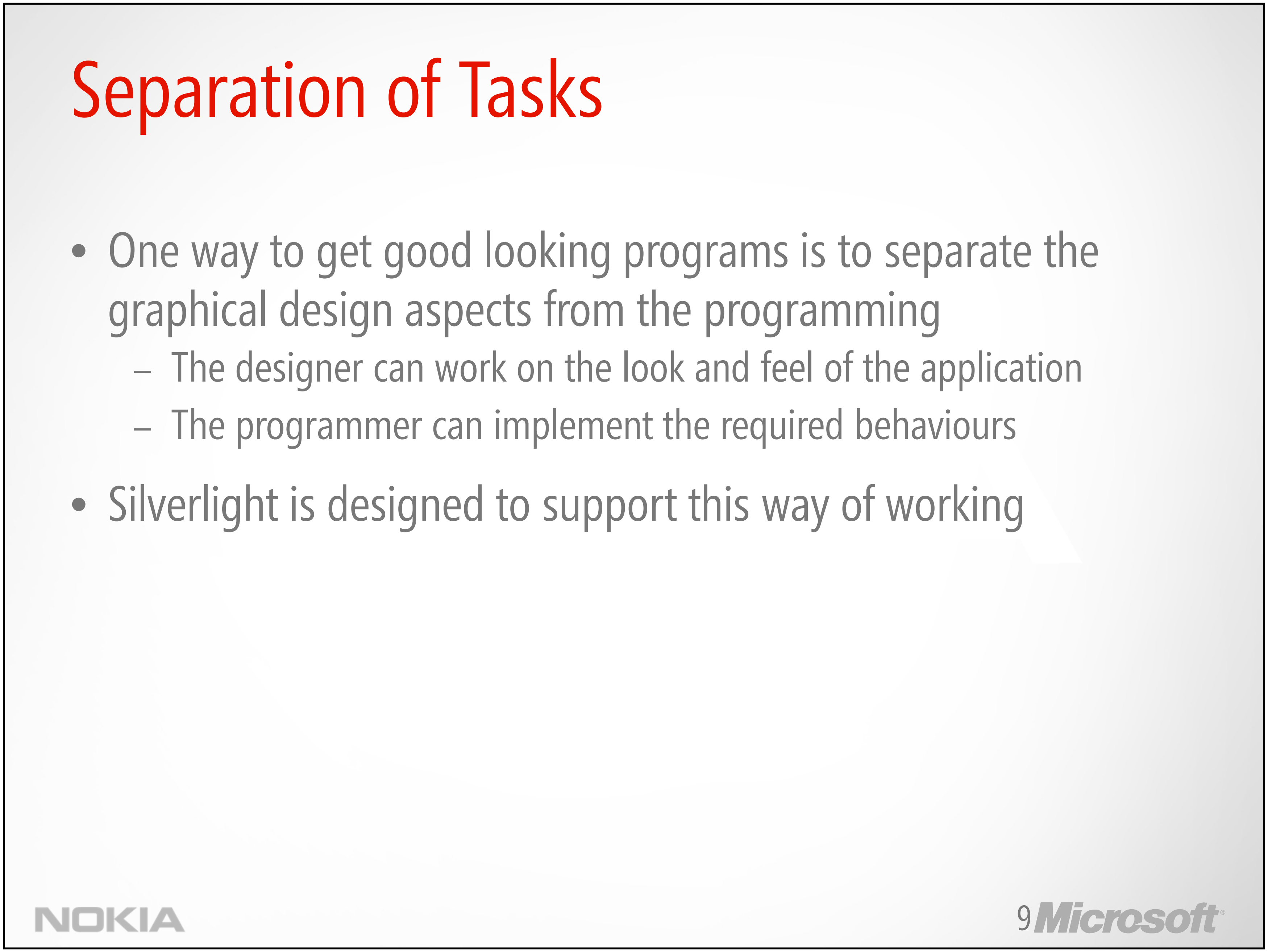
- To make life easier for us the Metro style is “baked in” to the Windows developer tools
- The default appearance, behaviour and fonts of the user elements all match the style
- If you want to find out more about Metro on phone you can read the “User Experience Design Guidelines”

http://msdn.microsoft.com/en-us/library/hh202915.aspx

NOKIA

8 Microsoft

©2011 Microsoft Corporation. All rights reserved. Microsoft, Windows, Windows Vista, Windows Azure, Hyper-V and other product names are or may be registered trademarks and/or trademarks in the U.S. and/or other countries.
The information herein is for informational purposes only and represents the current view of Microsoft Corporation as of the date of this presentation. Because Microsoft must respond to changing market conditions, it should not be interpreted to be a commitment on the part of Microsoft, and Microsoft cannot guarantee the accuracy of any information provided after the date of this presentation.
MICROSOFT MAKES NO WARRANTIES, EXPRESS, IMPLIED OR STATUTORY, AS TO THE INFORMATION IN THIS PRESENTATION.



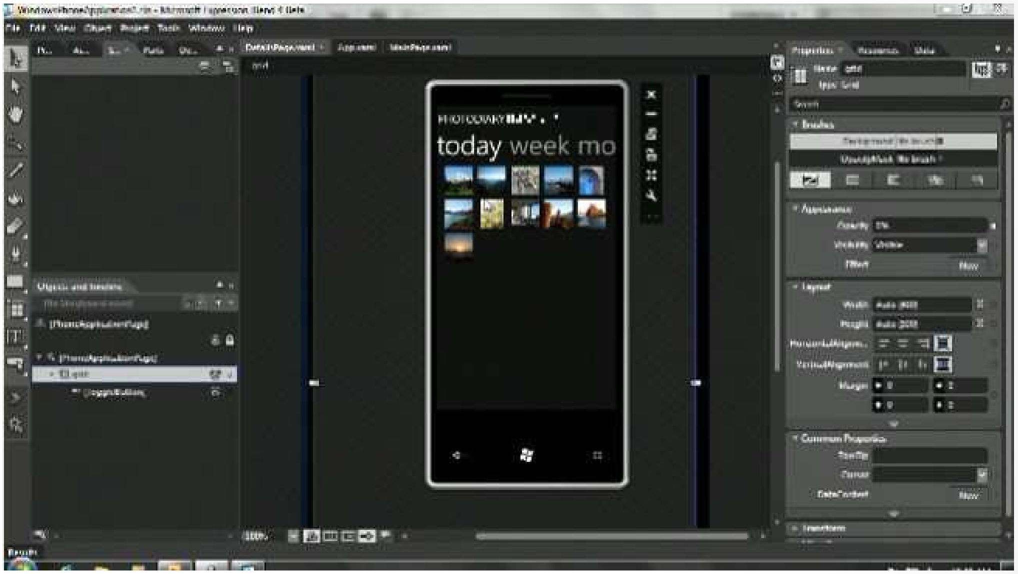
Separation of Tasks

- One way to get good looking programs is to separate the graphical design aspects from the programming
  - The designer can work on the look and feel of the application
  - The programmer can implement the required behaviours
- Silverlight is designed to support this way of working

9

©2011 Microsoft Corporation. All rights reserved. Microsoft, Windows, Windows Vista, Windows Azure, Hyper-V and other product names are or may be registered trademarks and/or trademarks in the U.S. and/or other countries.
The information herein is for informational purposes only and represents the current view of Microsoft Corporation as of the date of this presentation. Because Microsoft must respond to changing market conditions, it should not be interpreted to be a commitment on the part of Microsoft, and Microsoft cannot guarantee the accuracy of any information provided after the date of this presentation.
MICROSOFT MAKES NO WARRANTIES, EXPRESS, IMPLIED OR STATUTORY, AS TO THE INFORMATION IN THIS PRESENTATION.

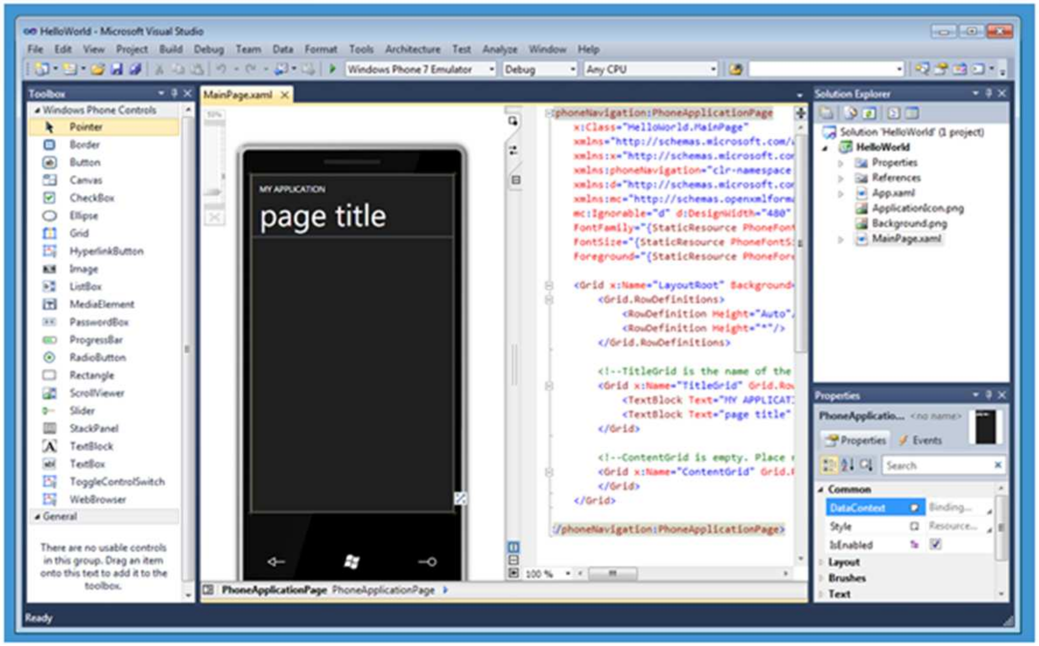
Tools for the Job: Graphical Design



- A Silverlight designer can use the “Expression Blend” to specify the appearance of the user interface
  - A version of Blend for the phone is supplied as part of the phone SDK

©2011 Microsoft Corporation. All rights reserved. Microsoft, Windows, Windows Vista, Windows Azure, Hyper-V and other product names are or may be registered trademarks and/or trademarks in the U.S. and/or other countries.
The information herein is for informational purposes only and represents the current view of Microsoft Corporation as of the date of this presentation. Because Microsoft must respond to changing market conditions, it should not be interpreted to be a commitment on the part of Microsoft, and Microsoft cannot guarantee the accuracy of any information provided after the date of this presentation.
MICROSOFT MAKES NO WARRANTIES, EXPRESS, IMPLIED OR STATUTORY, AS TO THE INFORMATION IN THIS PRESENTATION.

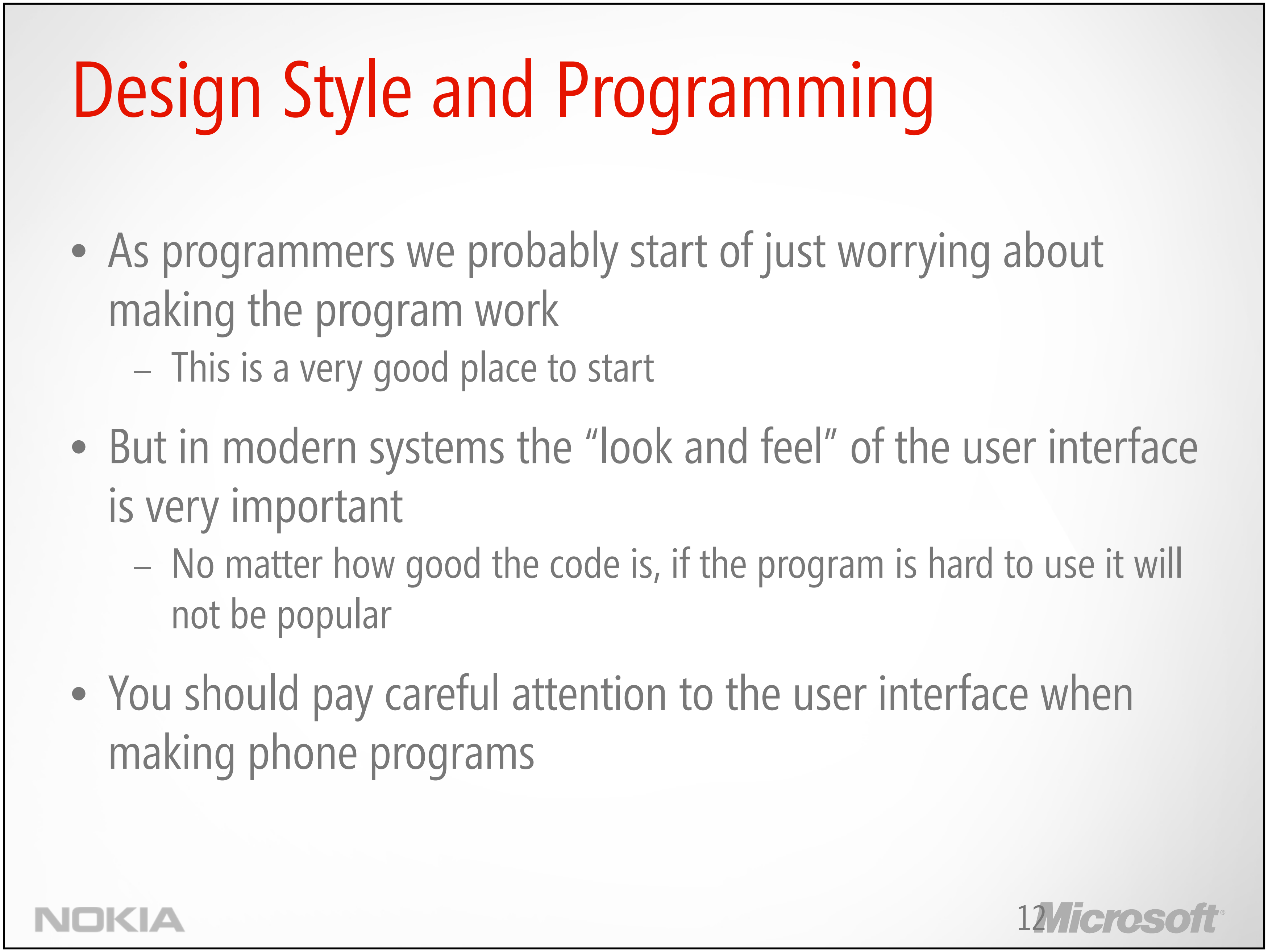
Tools for the Job: Code Creation



```
<phoneNavigation:PhoneApplicationPage
    x:Class="HelloWorld.MainPage"
    xmlns="http://schemas.microsoft.com/
    xmlns:x="http://schemas.microsoft.co
    xmlns:phoneNavigation="clr-namespace
    xmlns:d="http://schemas.microsoft.co
    xmlns:mc="http://schemas.openxmlform
    mc:Ignorable="d" d:DesignWidth="480"
    FontFamily="{StaticResource PhoneFon
    FontSize="{StaticResource PhoneFontS
    Foreground="{StaticResource PhoneFor

    <Grid x:Name="LayoutRoot" Background
        <Grid.RowDefinitions>
            <RowDefinition Height="Auto"
            <RowDefinition Height="*"/>
        </Grid.RowDefinitions>

        <!--TitleGrid is the name of the
        <Grid x:Name="TitleGrid" Grid.Ro
            <TextBlock Text="MY APPLICAT
            <TextBlock Text="page title"
        </Grid>

        <!--ContentGrid is empty. Place
        <Grid x:Name="ContentGrid" Grid.
        </Grid>
    </Grid>

</phoneNavigation:PhoneApplicationPage>
```

- A Developer can take the user interface design and use Visual Studio build the program to make it work
  - Visual Studio provides a design environment but it is not as advanced as Expression Blend

©2011 Microsoft Corporation. All rights reserved. Microsoft, Windows, Windows Vista, Windows Azure, Hyper-V and other product names are or may be registered trademarks and/or trademarks in the U.S. and/or other countries.
The information herein is for informational purposes only and represents the current view of Microsoft Corporation as of the date of this presentation. Because Microsoft must respond to changing market conditions, it should not be interpreted to be a commitment on the part of Microsoft, and Microsoft cannot guarantee the accuracy of any information provided after the date of this presentation.
MICROSOFT MAKES NO WARRANTIES, EXPRESS, IMPLIED OR STATUTORY, AS TO THE INFORMATION IN THIS PRESENTATION.

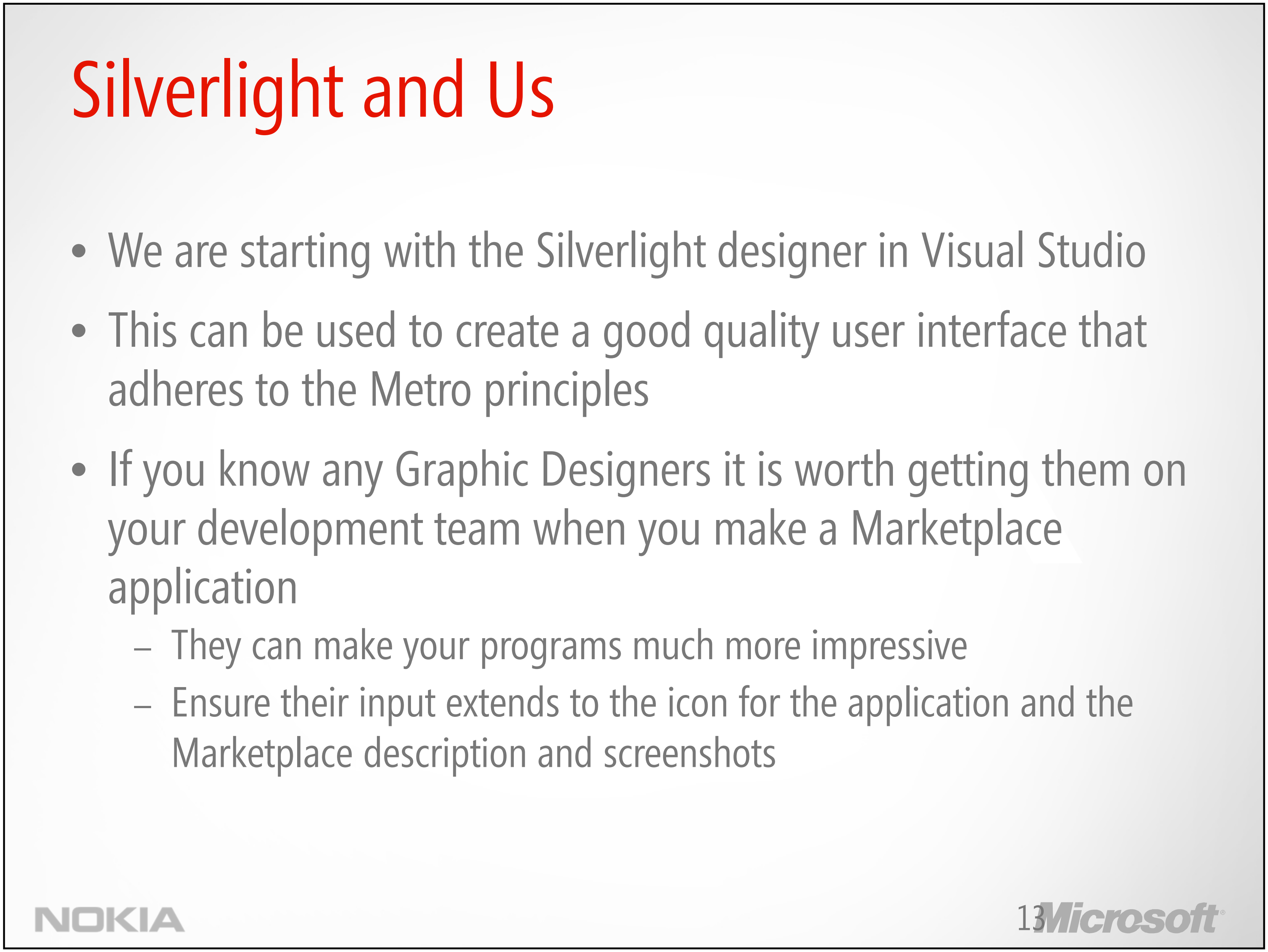


Design Style and Programming

- As programmers we probably start of just worrying about making the program work
  - This is a very good place to start
- But in modern systems the “look and feel” of the user interface is very important
  - No matter how good the code is, if the program is hard to use it will not be popular
- You should pay careful attention to the user interface when making phone programs

12

©2011 Microsoft Corporation. All rights reserved. Microsoft, Windows, Windows Vista, Windows Azure, Hyper-V and other product names are or may be registered trademarks and/or trademarks in the U.S. and/or other countries.
The information herein is for informational purposes only and represents the current view of Microsoft Corporation as of the date of this presentation. Because Microsoft must respond to changing market conditions, it should not be interpreted to be a commitment on the part of Microsoft, and Microsoft cannot guarantee the accuracy of any information provided after the date of this presentation.
MICROSOFT MAKES NO WARRANTIES, EXPRESS, IMPLIED OR STATUTORY, AS TO THE INFORMATION IN THIS PRESENTATION.



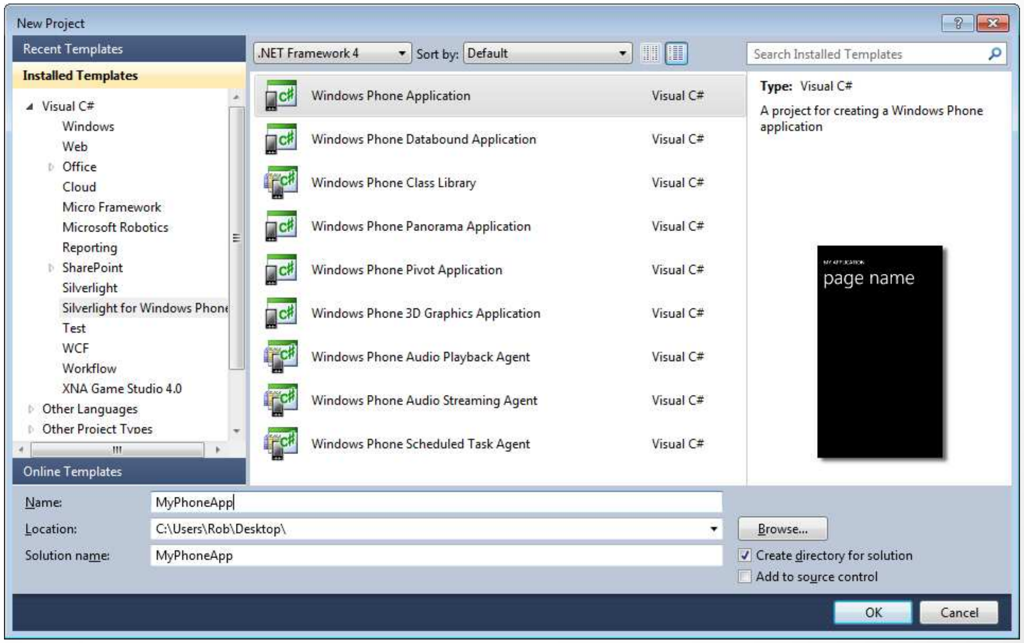
Silverlight and Us

- We are starting with the Silverlight designer in Visual Studio
- This can be used to create a good quality user interface that adheres to the Metro principles
- If you know any Graphic Designers it is worth getting them on your development team when you make a Marketplace application
  - They can make your programs much more impressive
  - Ensure their input extends to the icon for the application and the Marketplace description and screenshots

©2011 Microsoft Corporation. All rights reserved. Microsoft, Windows, Windows Vista, Windows Azure, Hyper-V and other product names are or may be registered trademarks and/or trademarks in the U.S. and/or other countries.
The information herein is for informational purposes only and represents the current view of Microsoft Corporation as of the date of this presentation. Because Microsoft must respond to changing market conditions, it should not be interpreted to be a commitment on the part of Microsoft, and Microsoft cannot guarantee the accuracy of any information provided after the date of this presentation.
MICROSOFT MAKES NO WARRANTIES, EXPRESS, IMPLIED OR STATUTORY, AS TO THE INFORMATION IN THIS PRESENTATION.

Metro Templates and Components

- Metro provides a set of project templates
- Each of them maps onto a particular style of application



.NET Framework 4 | Sort by: Default

Windows Phone Application	Visual C#
Windows Phone Databound Application	Visual C#
Windows Phone Class Library	Visual C#
Windows Phone Panorama Application	Visual C#
Windows Phone Pivot Application	Visual C#
Windows Phone 3D Graphics Application	Visual C#
Windows Phone Audio Playback Agent	Visual C#
Windows Phone Audio Streaming Agent	Visual C#
Windows Phone Scheduled Task Agent	Visual C#

Type: Visual C#

A project for creating a Windows Phone application

Name: MyPhoneApp

Location: C:\Users\Rob\Desktop\

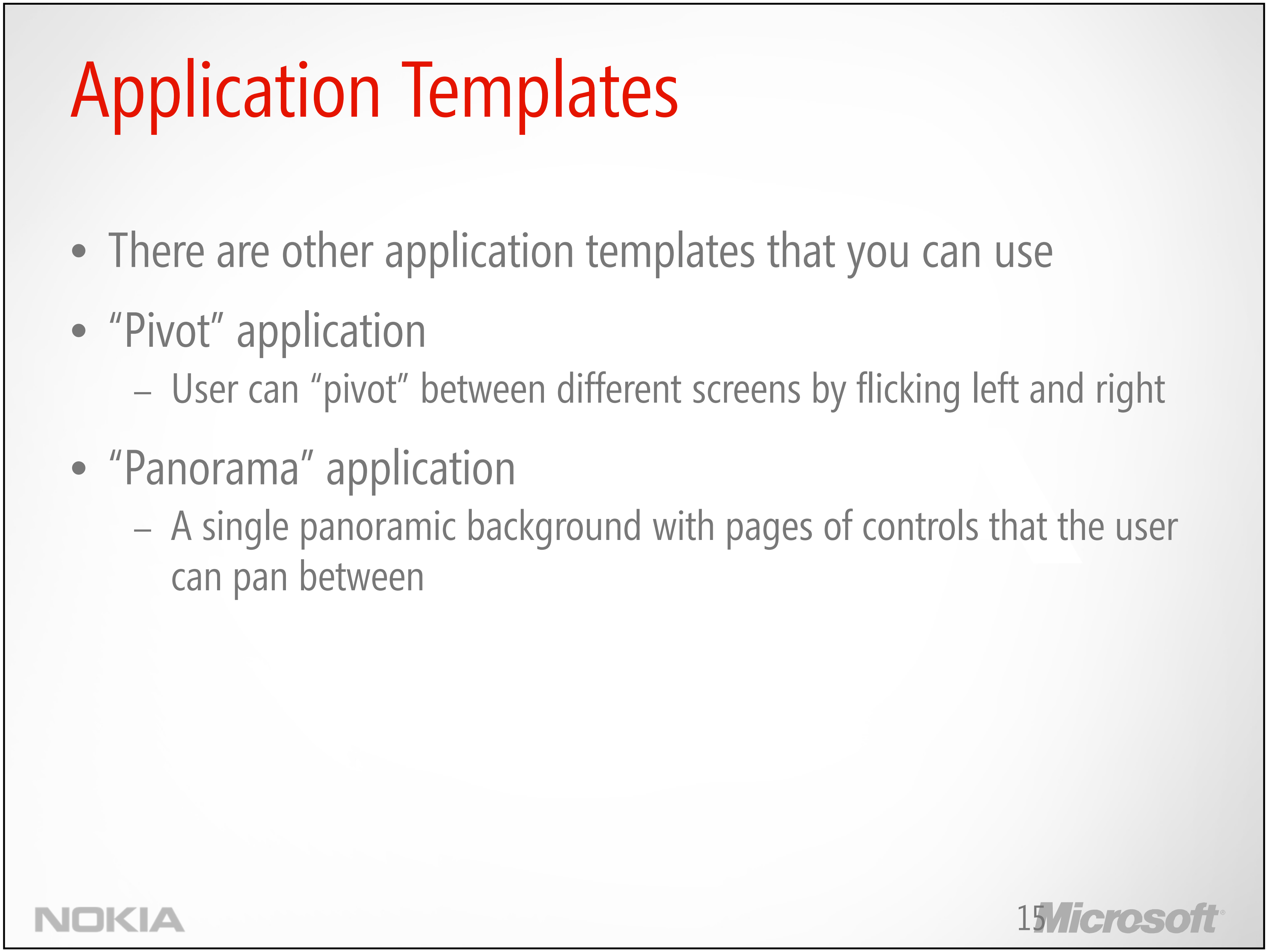
Solution name: MyPhoneApp

☑ Create directory for solution

□ Add to source control

14

©2011 Microsoft Corporation. All rights reserved. Microsoft, Windows, Windows Vista, Windows Azure, Hyper-V and other product names are or may be registered trademarks and/or trademarks in the U.S. and/or other countries.
The information herein is for informational purposes only and represents the current view of Microsoft Corporation as of the date of this presentation. Because Microsoft must respond to changing market conditions, it should not be interpreted to be a commitment on the part of Microsoft, and Microsoft cannot guarantee the accuracy of any information provided after the date of this presentation.
MICROSOFT MAKES NO WARRANTIES, EXPRESS, IMPLIED OR STATUTORY, AS TO THE INFORMATION IN THIS PRESENTATION.

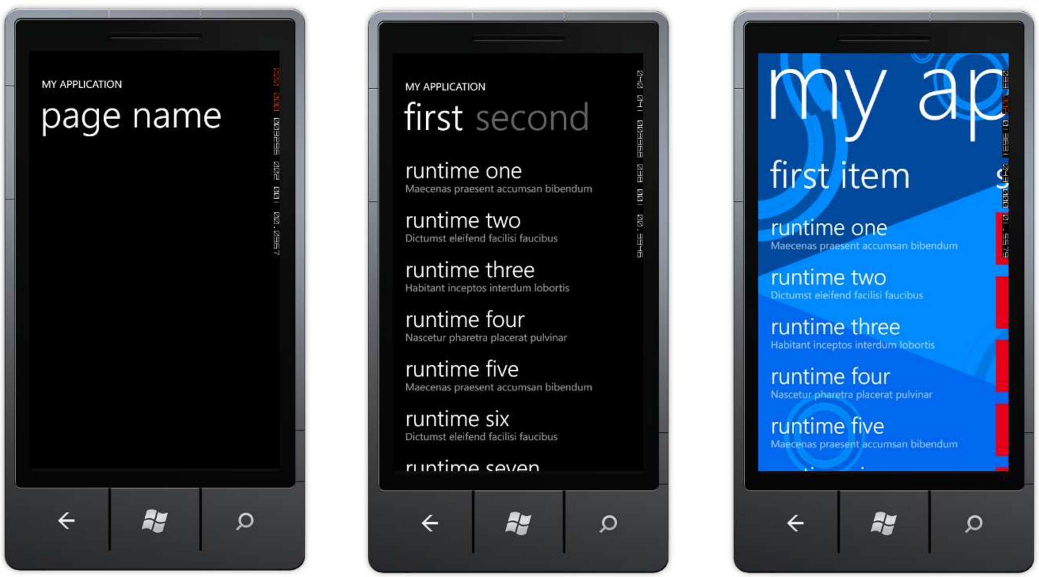


Application Templates

- There are other application templates that you can use
- "Pivot" application
  - User can "pivot" between different screens by flicking left and right
- "Panorama" application
  - A single panoramic background with pages of controls that the user can pan between

©2011 Microsoft Corporation. All rights reserved. Microsoft, Windows, Windows Vista, Windows Azure, Hyper-V and other product names are or may be registered trademarks and/or trademarks in the U.S. and/or other countries.
The information herein is for informational purposes only and represents the current view of Microsoft Corporation as of the date of this presentation. Because Microsoft must respond to changing market conditions, it should not be interpreted to be a commitment on the part of Microsoft, and Microsoft cannot guarantee the accuracy of any information provided after the date of this presentation.
MICROSOFT MAKES NO WARRANTIES, EXPRESS, IMPLIED OR STATUTORY, AS TO THE INFORMATION IN THIS PRESENTATION.

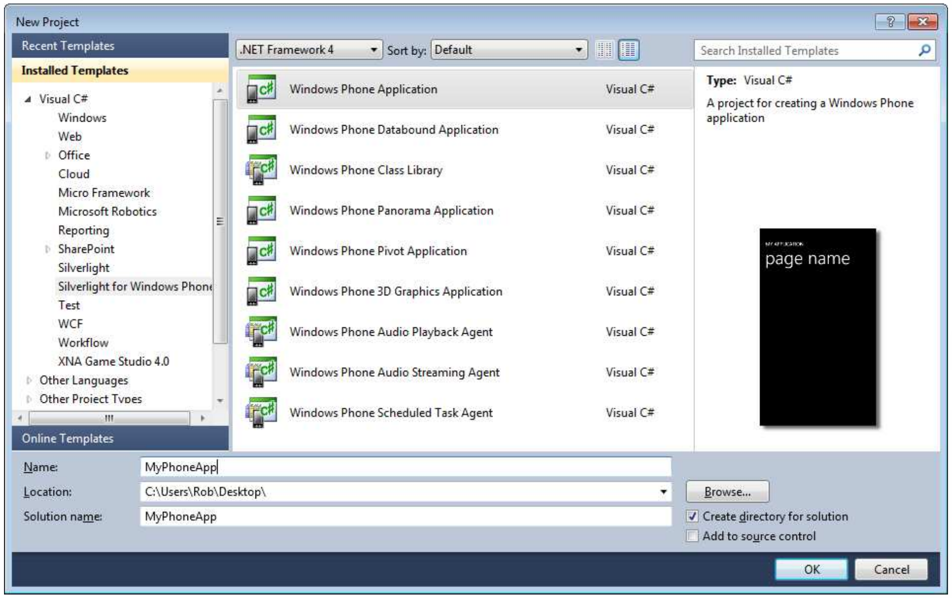
Application Types


MY APPLICATION
page name
MY APPLICATION
first second
runtime one
Maecenas praesent accumsan bibendum
runtime two
Dictumst eleifend facilisi faucibus
runtime three
Habitant inceptos interdum lobortis
runtime four
Nascetur pharetra placerat pulvinar
runtime five
Maecenas praesent accumsan bibendum
runtime six
Dictumst eleifend facilisi faucibus
runtime seven
my ap
first item
runtime one
Maecenas praesent accumsan bibendum
runtime two
Dictumst eleifend facilisi faucibus
runtime three
Habitant inceptos interdum lobortis
runtime four
Nascetur pharetra placerat pulvinar
runtime five
Maecenas praesent accumsan bibendum

- Three application types provide quite different user experiences
- Select the one that you feel is the most appropriate

©2011 Microsoft Corporation. All rights reserved. Microsoft, Windows, Windows Vista, Windows Azure, Hyper-V and other product names are or may be registered trademarks and/or trademarks in the U.S. and/or other countries.
The information herein is for informational purposes only and represents the current view of Microsoft Corporation as of the date of this presentation. Because Microsoft must respond to changing market conditions, it should not be interpreted to be a commitment on the part of Microsoft, and Microsoft cannot guarantee the accuracy of any information provided after the date of this presentation.
MICROSOFT MAKES NO WARRANTIES, EXPRESS, IMPLIED OR STATUTORY, AS TO THE INFORMATION IN THIS PRESENTATION.

Metro Templates and Components



Windows Phone Application	Visual C#
Windows Phone Databound Application	Visual C#
Windows Phone Class Library	Visual C#
Windows Phone Panorama Application	Visual C#
Windows Phone Pivot Application	Visual C#
Windows Phone 3D Graphics Application	Visual C#
Windows Phone Audio Playback Agent	Visual C#
Windows Phone Audio Streaming Agent	Visual C#
Windows Phone Scheduled Task Agent	Visual C#

Type: Visual C#

A project for creating a Windows Phone application

Name: MyPhoneApp

Location: C:\Users\Rob\Desktop\

Solution name: MyPhoneApp

☑ Create directory for solution

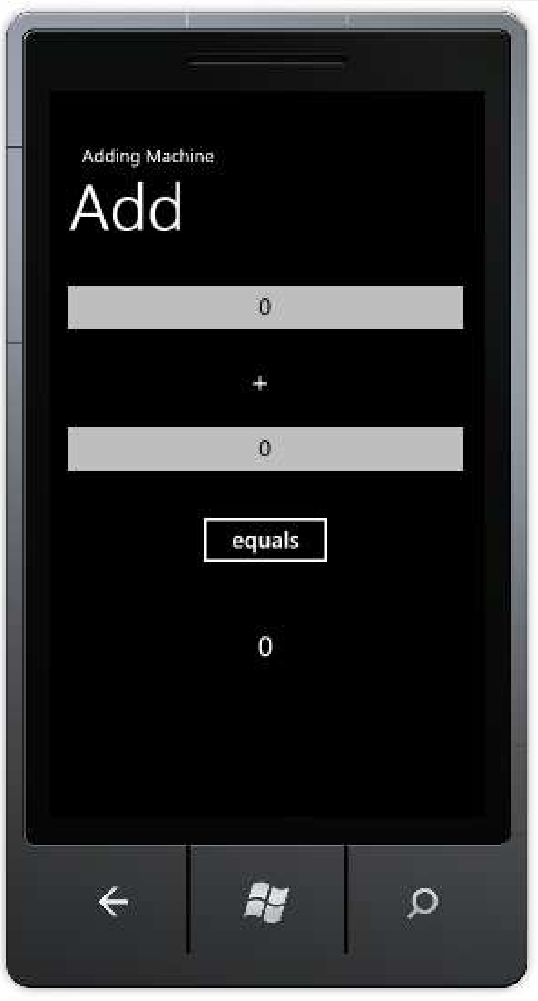
□ Add to source control

- This is the template for a standard application
- This is a single page, although you can add others if required

©2011 Microsoft Corporation. All rights reserved. Microsoft, Windows, Windows Vista, Windows Azure, Hyper-V and other product names are or may be registered trademarks and/or trademarks in the U.S. and/or other countries.
The information herein is for informational purposes only and represents the current view of Microsoft Corporation as of the date of this presentation. Because Microsoft must respond to changing market conditions, it should not be interpreted to be a commitment on the part of Microsoft, and Microsoft cannot guarantee the accuracy of any information provided after the date of this presentation.
MICROSOFT MAKES NO WARRANTIES, EXPRESS, IMPLIED OR STATUTORY, AS TO THE INFORMATION IN THIS PRESENTATION.

The Silverlight Adding Machine

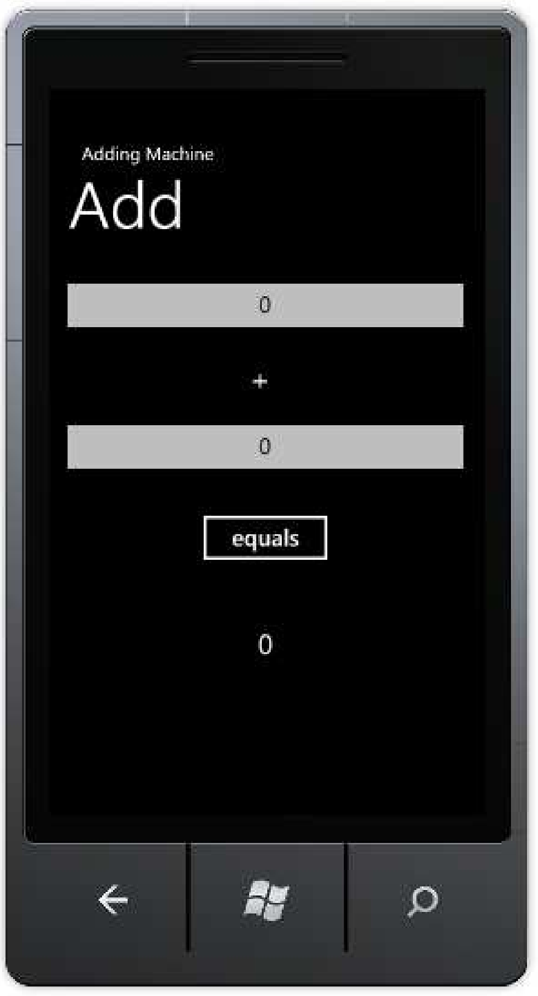
- This is a very simple calculator
  - All it can do is add two numbers
- The user types the numbers into the text boxes and presses the equals button
- The answer is displayed at the bottom of the screen



©2011 Microsoft Corporation. All rights reserved. Microsoft, Windows, Windows Vista, Windows Azure, Hyper-V and other product names are or may be registered trademarks and/or trademarks in the U.S. and/or other countries.
The information herein is for informational purposes only and represents the current view of Microsoft Corporation as of the date of this presentation. Because Microsoft must respond to changing market conditions, it should not be interpreted to be a commitment on the part of Microsoft, and Microsoft cannot guarantee the accuracy of any information provided after the date of this presentation.
MICROSOFT MAKES NO WARRANTIES, EXPRESS, IMPLIED OR STATUTORY, AS TO THE INFORMATION IN THIS PRESENTATION.

Silverlight and Objects

- Silverlight is implemented using objects to represent the elements on a User Interface
- Each of the items on the screen of the application shown is graphical rendering of a software object



Adding Machine

Add

0

+

0

0

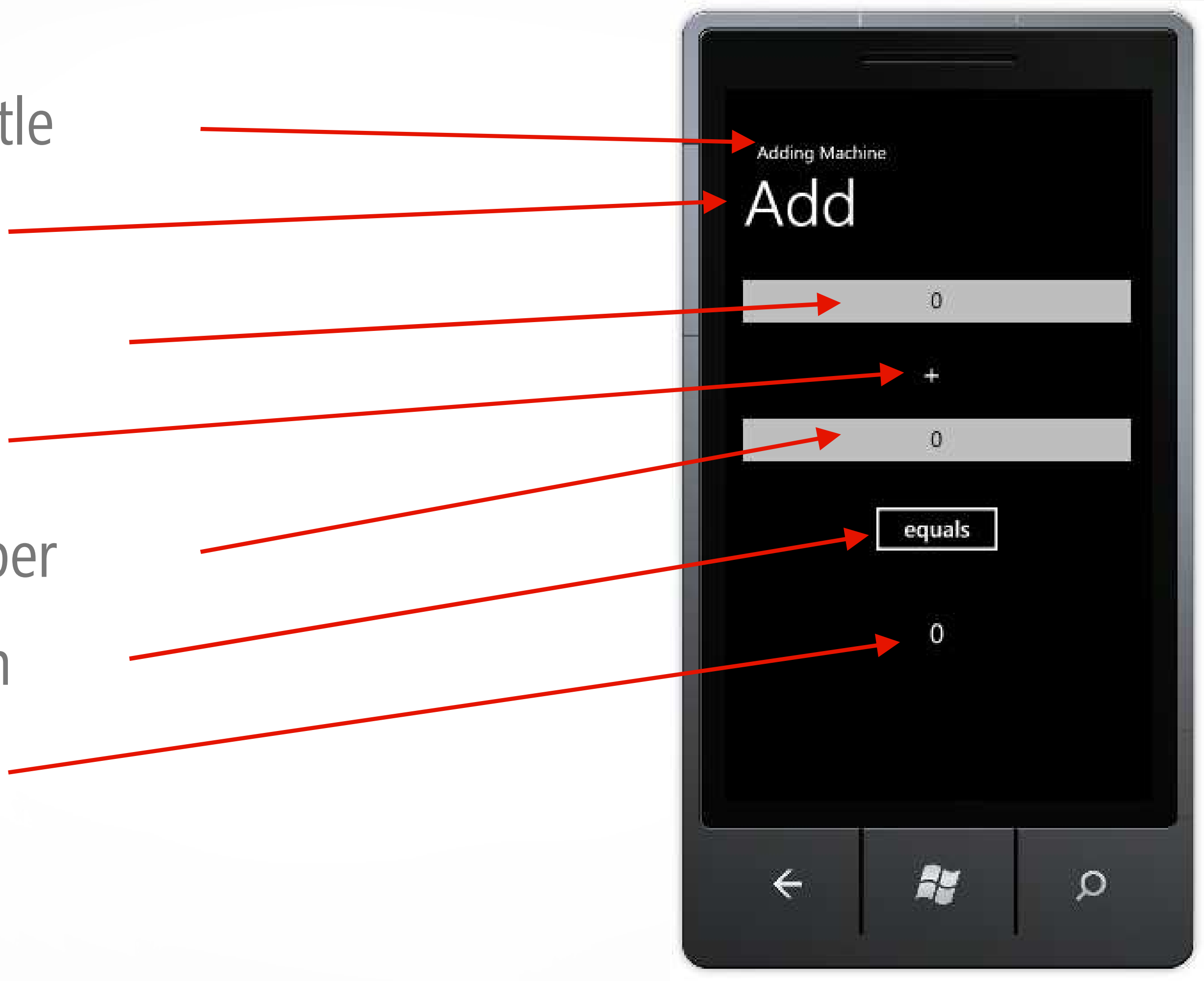
NOKIA

Microsoft

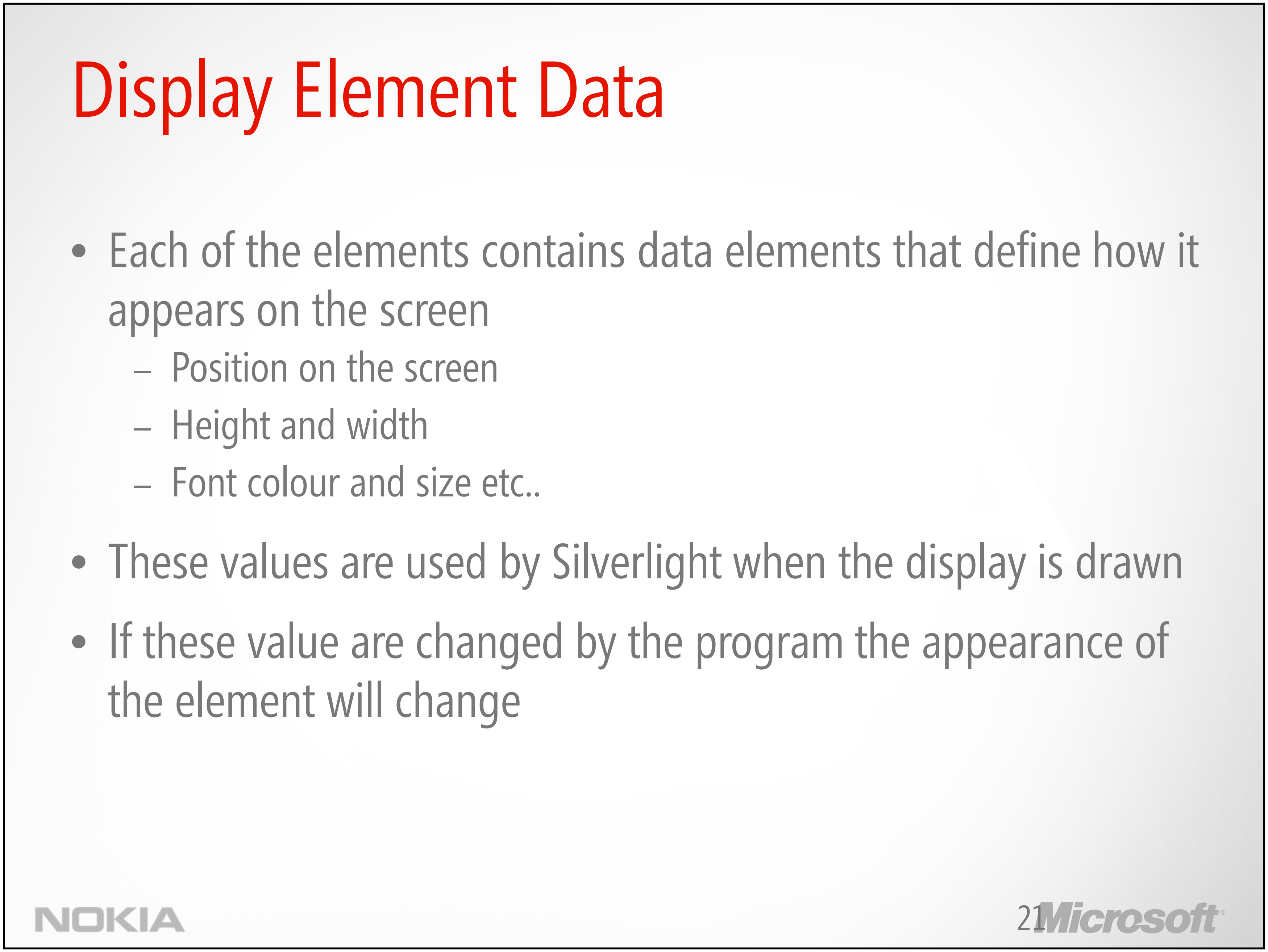
©2011 Microsoft Corporation. All rights reserved. Microsoft, Windows, Windows Vista, Windows Azure, Hyper-V and other product names are or may be registered trademarks and/or trademarks in the U.S. and/or other countries.
The information herein is for informational purposes only and represents the current view of Microsoft Corporation as of the date of this presentation. Because Microsoft must respond to changing market conditions, it should not be interpreted to be a commitment on the part of Microsoft, and Microsoft cannot guarantee the accuracy of any information provided after the date of this presentation.
MICROSOFT MAKES NO WARRANTIES, EXPRESS, IMPLIED OR STATUTORY, AS TO THE INFORMATION IN THIS PRESENTATION.

Silverlight Display Elements

- Application title
- Page title
- First number
- Plus text
- Second number
- Equals button
- Result text



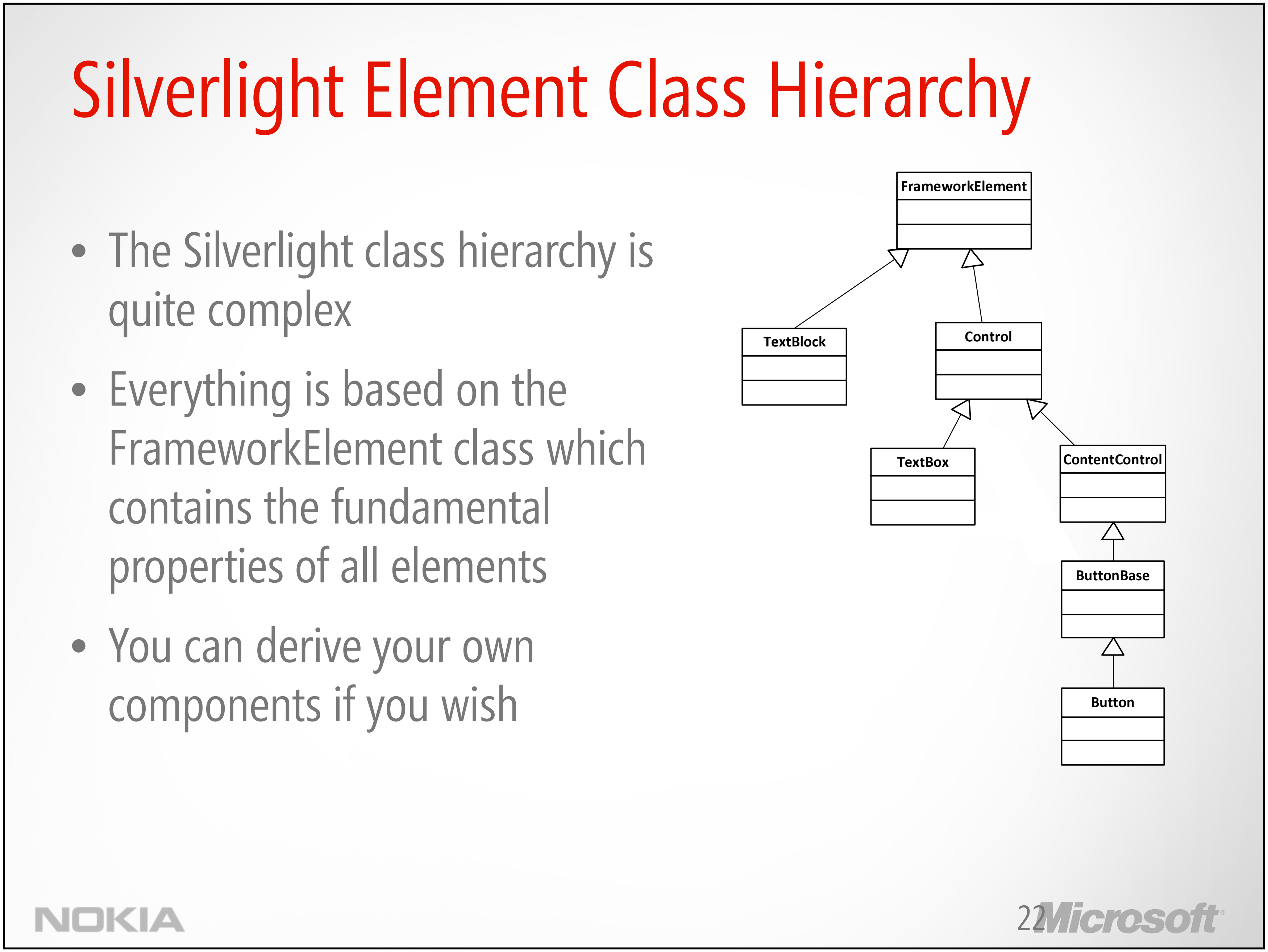
©2011 Microsoft Corporation. All rights reserved. Microsoft, Windows, Windows Vista, Windows Azure, Hyper-V and other product names are or may be registered trademarks and/or trademarks in the U.S. and/or other countries. The information herein is for informational purposes only and represents the current view of Microsoft Corporation as of the date of this presentation. Because Microsoft must respond to changing market conditions, it should not be interpreted to be a commitment on the part of Microsoft, and Microsoft cannot guarantee the accuracy of any information provided after the date of this presentation.
MICROSOFT MAKES NO WARRANTIES, EXPRESS, IMPLIED OR STATUTORY, AS TO THE INFORMATION IN THIS PRESENTATION.



Display Element Data

- Each of the elements contains data elements that define how it appears on the screen
  - Position on the screen
  - Height and width
  - Font colour and size etc..
- These values are used by Silverlight when the display is drawn
- If these value are changed by the program the appearance of the element will change

©2011 Microsoft Corporation. All rights reserved. Microsoft, Windows, Windows Vista, Windows Azure, Hyper-V and other product names are or may be registered trademarks and/or trademarks in the U.S. and/or other countries.
The information herein is for informational purposes only and represents the current view of Microsoft Corporation as of the date of this presentation. Because Microsoft must respond to changing market conditions, it should not be interpreted to be a commitment on the part of Microsoft, and Microsoft cannot guarantee the accuracy of any information provided after the date of this presentation.
MICROSOFT MAKES NO WARRANTIES, EXPRESS, IMPLIED OR STATUTORY, AS TO THE INFORMATION IN THIS PRESENTATION.



Silverlight Element Class Hierarchy

- The Silverlight class hierarchy is quite complex
- Everything is based on the FrameworkElement class which contains the fundamental properties of all elements
- You can derive your own components if you wish

FrameworkElement

TextBlock

Control

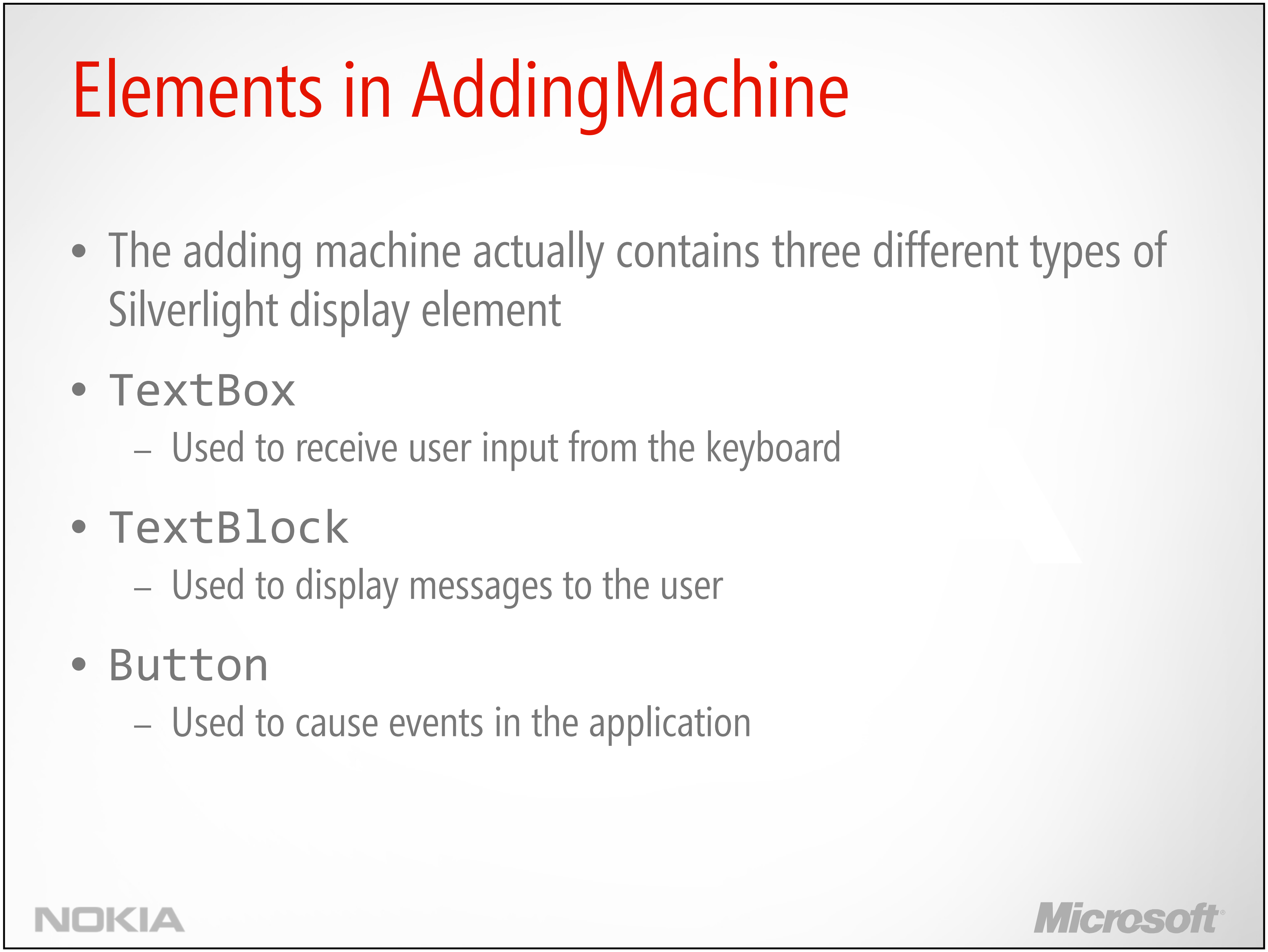
TextBox

ContentControl

ButtonBase

Button

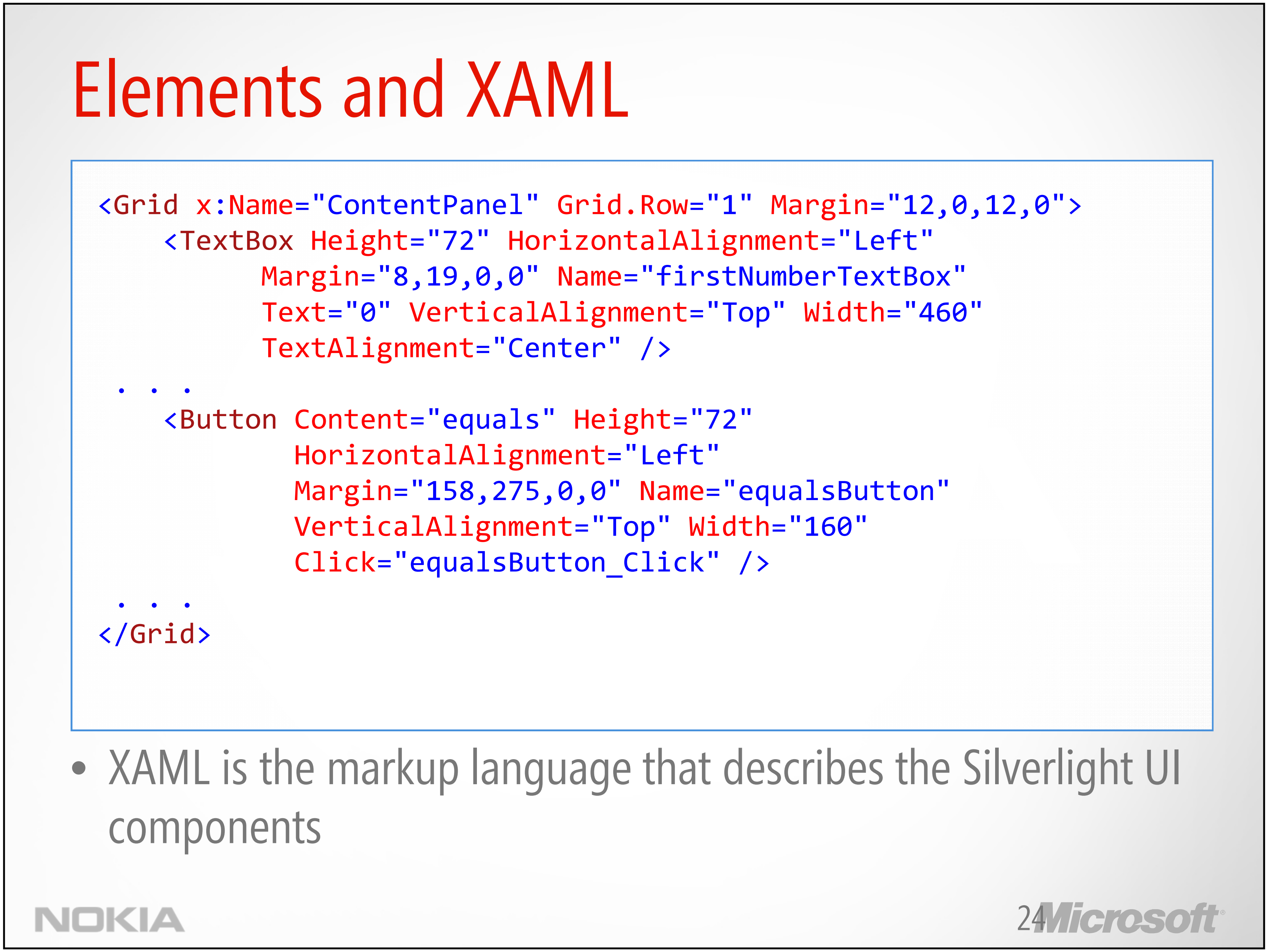
©2011 Microsoft Corporation. All rights reserved. Microsoft, Windows, Windows Vista, Windows Azure, Hyper-V and other product names are or may be registered trademarks and/or trademarks in the U.S. and/or other countries.
The information herein is for informational purposes only and represents the current view of Microsoft Corporation as of the date of this presentation. Because Microsoft must respond to changing market conditions, it should not be interpreted to be a commitment on the part of Microsoft, and Microsoft cannot guarantee the accuracy of any information provided after the date of this presentation.
MICROSOFT MAKES NO WARRANTIES, EXPRESS, IMPLIED OR STATUTORY, AS TO THE INFORMATION IN THIS PRESENTATION.



Elements in AddingMachine

- The adding machine actually contains three different types of Silverlight display element
- `TextBox`
  - Used to receive user input from the keyboard
- `TextBlock`
  - Used to display messages to the user
- `Button`
  - Used to cause events in the application

©2011 Microsoft Corporation. All rights reserved. Microsoft, Windows, Windows Vista, Windows Azure, Hyper-V and other product names are or may be registered trademarks and/or trademarks in the U.S. and/or other countries.
The information herein is for informational purposes only and represents the current view of Microsoft Corporation as of the date of this presentation. Because Microsoft must respond to changing market conditions, it should not be interpreted to be a commitment on the part of Microsoft, and Microsoft cannot guarantee the accuracy of any information provided after the date of this presentation.
MICROSOFT MAKES NO WARRANTIES, EXPRESS, IMPLIED OR STATUTORY, AS TO THE INFORMATION IN THIS PRESENTATION.

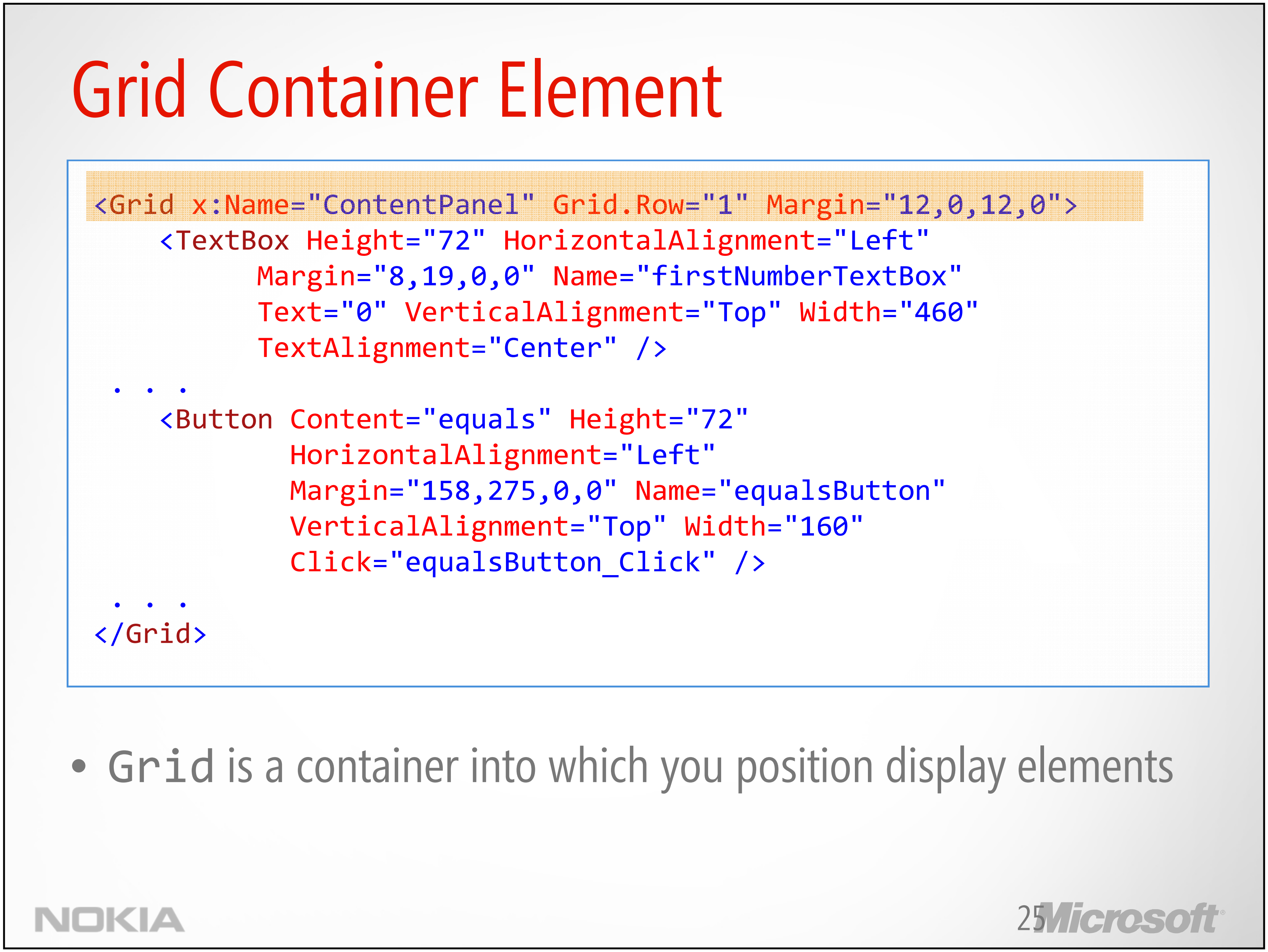


Elements and XAML

```
<Grid x:Name="ContentPanel" Grid.Row="1" Margin="12,0,12,0">
    <TextBox Height="72" HorizontalAlignment="Left"
          Margin="8,19,0,0" Name="firstNumberTextBox"
          Text="0" VerticalAlignment="Top" Width="460"
          TextAlignment="Center" />
 . . .
    <Button Content="equals" Height="72"
            HorizontalAlignment="Left"
            Margin="158,275,0,0" Name="equalsButton"
            VerticalAlignment="Top" Width="160"
            Click="equalsButton_Click" />
 . . .
</Grid>
```

- XAML is the markup language that describes the Silverlight UI components

©2011 Microsoft Corporation. All rights reserved. Microsoft, Windows, Windows Vista, Windows Azure, Hyper-V and other product names are or may be registered trademarks and/or trademarks in the U.S. and/or other countries.
The information herein is for informational purposes only and represents the current view of Microsoft Corporation as of the date of this presentation. Because Microsoft must respond to changing market conditions, it should not be interpreted to be a commitment on the part of Microsoft, and Microsoft cannot guarantee the accuracy of any information provided after the date of this presentation.
MICROSOFT MAKES NO WARRANTIES, EXPRESS, IMPLIED OR STATUTORY, AS TO THE INFORMATION IN THIS PRESENTATION.

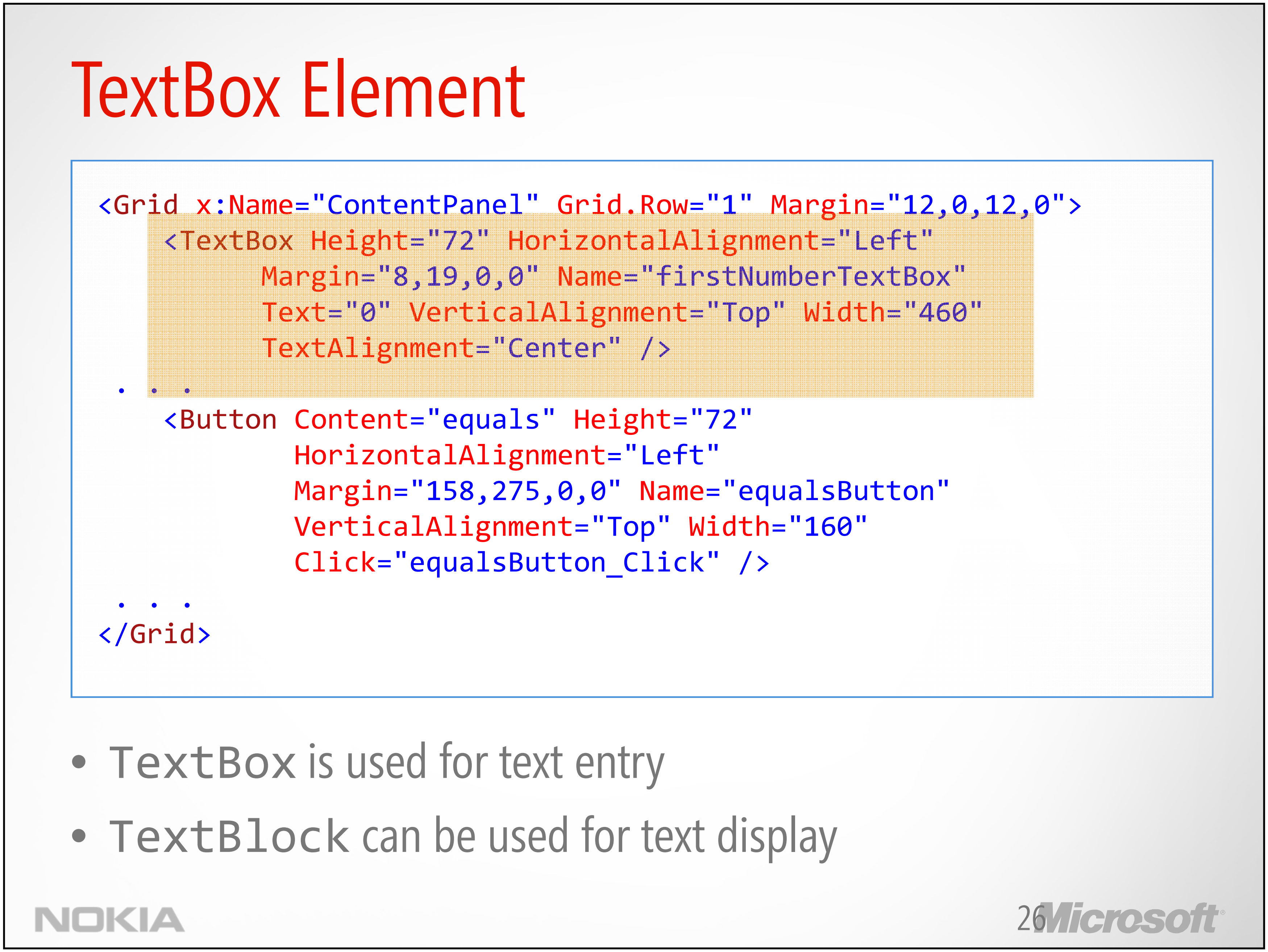


Grid Container Element

```
<Grid x:Name="ContentPanel" Grid.Row="1" Margin="12,0,12,0">
    <TextBox Height="72" HorizontalAlignment="Left"
          Margin="8,19,0,0" Name="firstNumberTextBox"
          Text="0" VerticalAlignment="Top" Width="460"
          TextAlignment="Center" />
 . . .
    <Button Content="equals" Height="72"
            HorizontalAlignment="Left"
            Margin="158,275,0,0" Name="equalsButton"
            VerticalAlignment="Top" Width="160"
            Click="equalsButton_Click" />
 . . .
</Grid>
```

- `Grid` is a container into which you position display elements

©2011 Microsoft Corporation. All rights reserved. Microsoft, Windows, Windows Vista, Windows Azure, Hyper-V and other product names are or may be registered trademarks and/or trademarks in the U.S. and/or other countries.
The information herein is for informational purposes only and represents the current view of Microsoft Corporation as of the date of this presentation. Because Microsoft must respond to changing market conditions, it should not be interpreted to be a commitment on the part of Microsoft, and Microsoft cannot guarantee the accuracy of any information provided after the date of this presentation.
MICROSOFT MAKES NO WARRANTIES, EXPRESS, IMPLIED OR STATUTORY, AS TO THE INFORMATION IN THIS PRESENTATION.



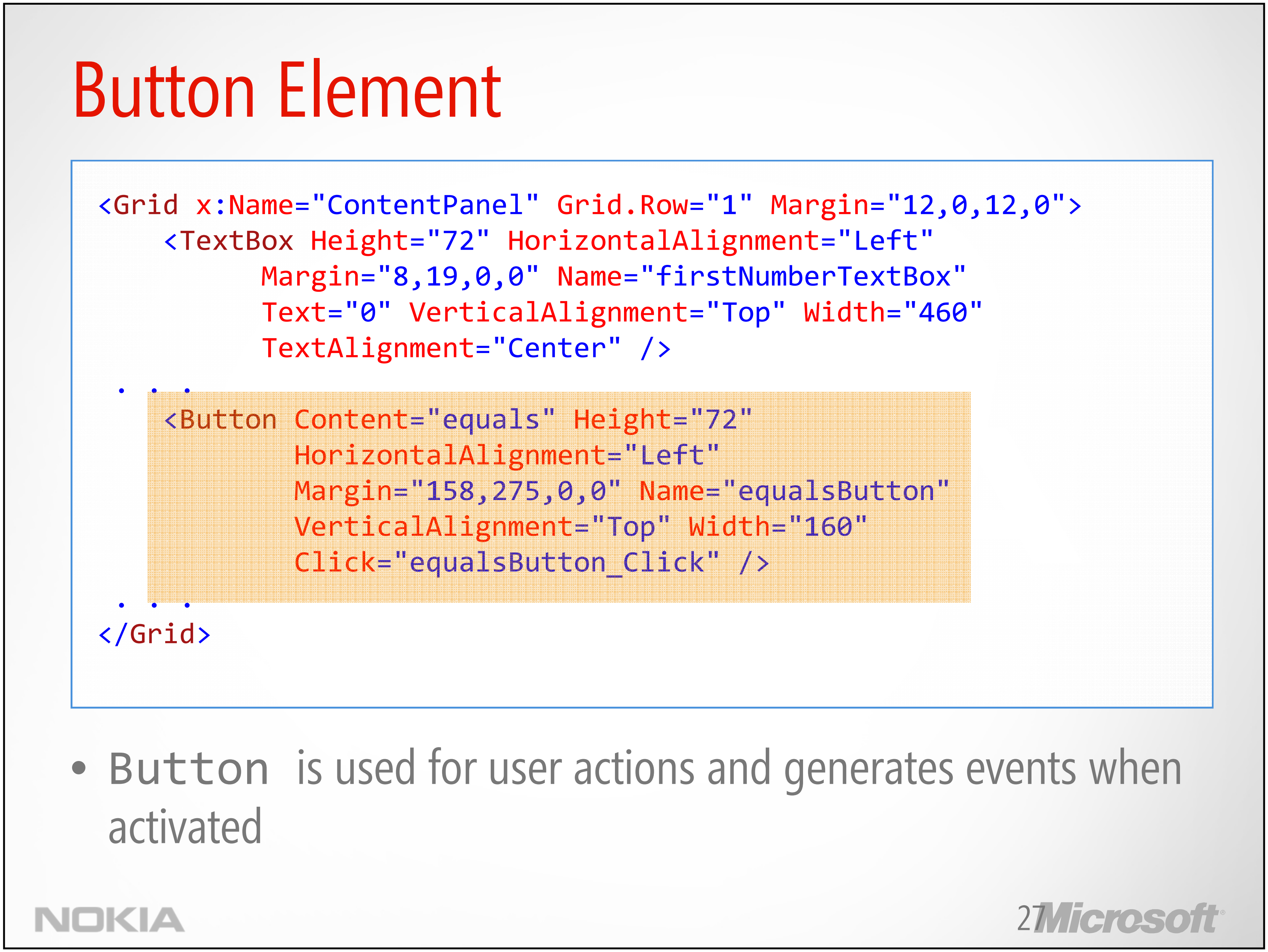
TextBox Element

```
<Grid x:Name="ContentPanel" Grid.Row="1" Margin="12,0,12,0">
    <TextBox Height="72" HorizontalAlignment="Left"
          Margin="8,19,0,0" Name="firstNumberTextBox"
          Text="0" VerticalAlignment="Top" Width="460"
          TextAlignment="Center" />
  . . .
    <Button Content="equals" Height="72"
            HorizontalAlignment="Left"
            Margin="158,275,0,0" Name="equalsButton"
            VerticalAlignment="Top" Width="160"
            Click="equalsButton_Click" />
  . . .
</Grid>
```

- TextBox is used for text entry
- TextBlock can be used for text display

26

©2011 Microsoft Corporation. All rights reserved. Microsoft, Windows, Windows Vista, Windows Azure, Hyper-V and other product names are or may be registered trademarks and/or trademarks in the U.S. and/or other countries.
The information herein is for informational purposes only and represents the current view of Microsoft Corporation as of the date of this presentation. Because Microsoft must respond to changing market conditions, it should not be interpreted to be a commitment on the part of Microsoft, and Microsoft cannot guarantee the accuracy of any information provided after the date of this presentation.
MICROSOFT MAKES NO WARRANTIES, EXPRESS, IMPLIED OR STATUTORY, AS TO THE INFORMATION IN THIS PRESENTATION.

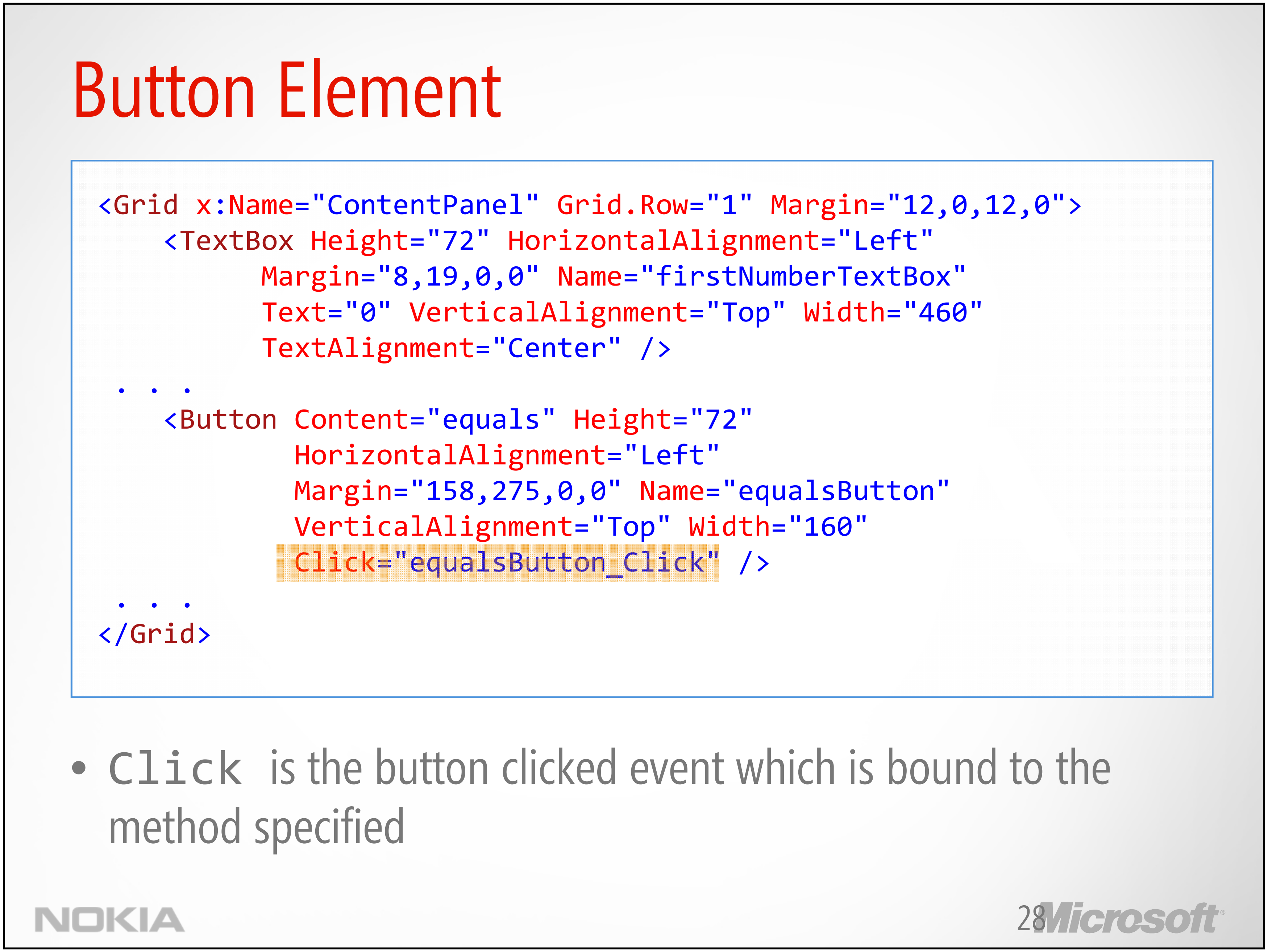


Button Element

```
<Grid x:Name="ContentPanel" Grid.Row="1" Margin="12,0,12,0">
    <TextBox Height="72" HorizontalAlignment="Left"
          Margin="8,19,0,0" Name="firstNumberTextBox"
          Text="0" VerticalAlignment="Top" Width="460"
          TextAlignment="Center" />
  . . .
    <Button Content="equals" Height="72"
            HorizontalAlignment="Left"
            Margin="158,275,0,0" Name="equalsButton"
            VerticalAlignment="Top" Width="160"
            Click="equalsButton_Click" />
  . . .
</Grid>
```

- `Button` is used for user actions and generates events when activated

©2011 Microsoft Corporation. All rights reserved. Microsoft, Windows, Windows Vista, Windows Azure, Hyper-V and other product names are or may be registered trademarks and/or trademarks in the U.S. and/or other countries.
The information herein is for informational purposes only and represents the current view of Microsoft Corporation as of the date of this presentation. Because Microsoft must respond to changing market conditions, it should not be interpreted to be a commitment on the part of Microsoft, and Microsoft cannot guarantee the accuracy of any information provided after the date of this presentation.
MICROSOFT MAKES NO WARRANTIES, EXPRESS, IMPLIED OR STATUTORY, AS TO THE INFORMATION IN THIS PRESENTATION.

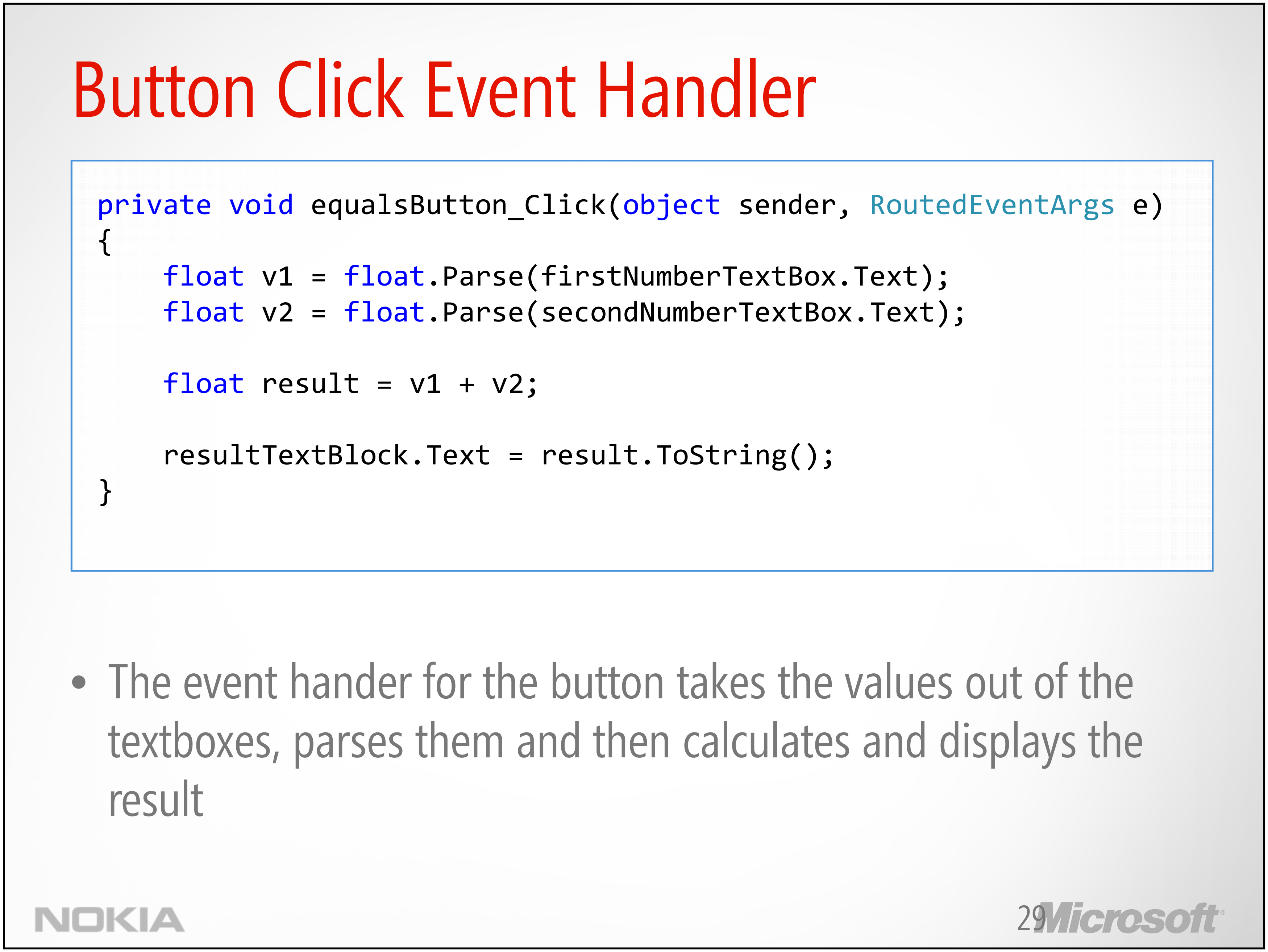


Button Element

```
<Grid x:Name="ContentPanel" Grid.Row="1" Margin="12,0,12,0">
    <TextBox Height="72" HorizontalAlignment="Left"
          Margin="8,19,0,0" Name="firstNumberTextBox"
          Text="0" VerticalAlignment="Top" Width="460"
          TextAlignment="Center" />
 . . .
    <Button Content="equals" Height="72"
            HorizontalAlignment="Left"
            Margin="158,275,0,0" Name="equalsButton"
            VerticalAlignment="Top" Width="160"
            Click="equalsButton_Click" />
 . . .
</Grid>
```

- `Click` is the button clicked event which is bound to the method specified

©2011 Microsoft Corporation. All rights reserved. Microsoft, Windows, Windows Vista, Windows Azure, Hyper-V and other product names are or may be registered trademarks and/or trademarks in the U.S. and/or other countries.
The information herein is for informational purposes only and represents the current view of Microsoft Corporation as of the date of this presentation. Because Microsoft must respond to changing market conditions, it should not be interpreted to be a commitment on the part of Microsoft, and Microsoft cannot guarantee the accuracy of any information provided after the date of this presentation.
MICROSOFT MAKES NO WARRANTIES, EXPRESS, IMPLIED OR STATUTORY, AS TO THE INFORMATION IN THIS PRESENTATION.



Button Click Event Handler

```
private void equalsButton_Click(object sender, RoutedEventArgs e)
{
    float v1 = float.Parse(firstNumberTextBox.Text);
    float v2 = float.Parse(secondNumberTextBox.Text);

    float result = v1 + v2;

    resultTextBlock.Text = result.ToString();
}
```

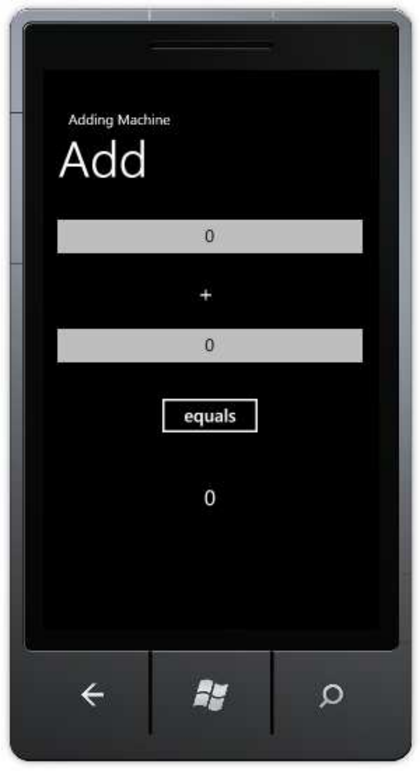
- The event hander for the button takes the values out of the textboxes, parses them and then calculates and displays the result

©2011 Microsoft Corporation. All rights reserved. Microsoft, Windows, Windows Vista, Windows Azure, Hyper-V and other product names are or may be registered trademarks and/or trademarks in the U.S. and/or other countries.
The information herein is for informational purposes only and represents the current view of Microsoft Corporation as of the date of this presentation. Because Microsoft must respond to changing market conditions, it should not be interpreted to be a commitment on the part of Microsoft, and Microsoft cannot guarantee the accuracy of any information provided after the date of this presentation.
MICROSOFT MAKES NO WARRANTIES, EXPRESS, IMPLIED OR STATUTORY, AS TO THE INFORMATION IN THIS PRESENTATION.

Windows Phone

Demo

Demo 1: The Silverlight Adding Machine

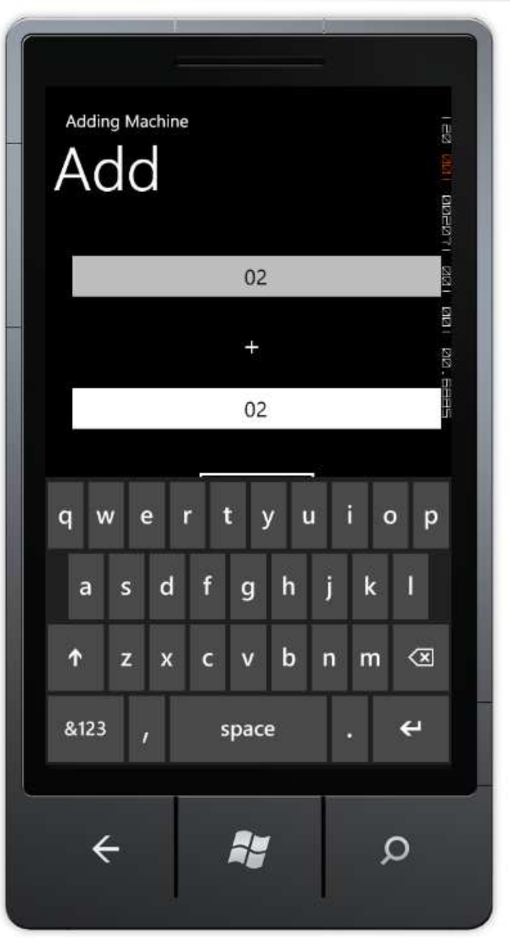


30

©2011 Microsoft Corporation. All rights reserved. Microsoft, Windows, Windows Vista, Windows Azure, Hyper-V and other product names are or may be registered trademarks and/or trademarks in the U.S. and/or other countries.
The information herein is for informational purposes only and represents the current view of Microsoft Corporation as of the date of this presentation. Because Microsoft must respond to changing market conditions, it should not be interpreted to be a commitment on the part of Microsoft, and Microsoft cannot guarantee the accuracy of any information provided after the date of this presentation.
MICROSOFT MAKES NO WARRANTIES, EXPRESS, IMPLIED OR STATUTORY, AS TO THE INFORMATION IN THIS PRESENTATION.

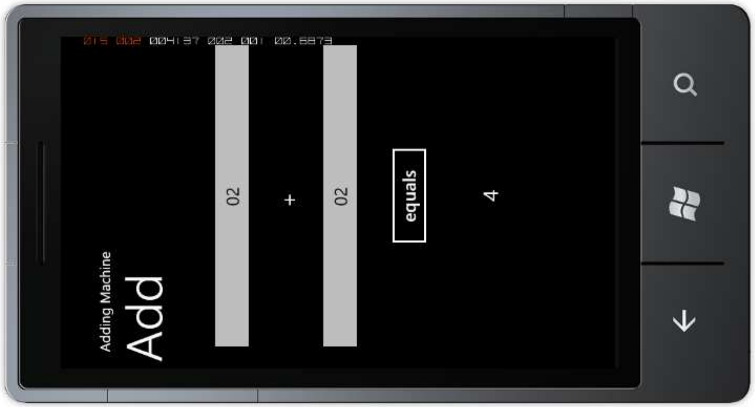
Phone UI Design – Keyboard Use

- It is best if the user can still press the equals button when the keyboard is displayed
- This means the equals button should be moved up the screen



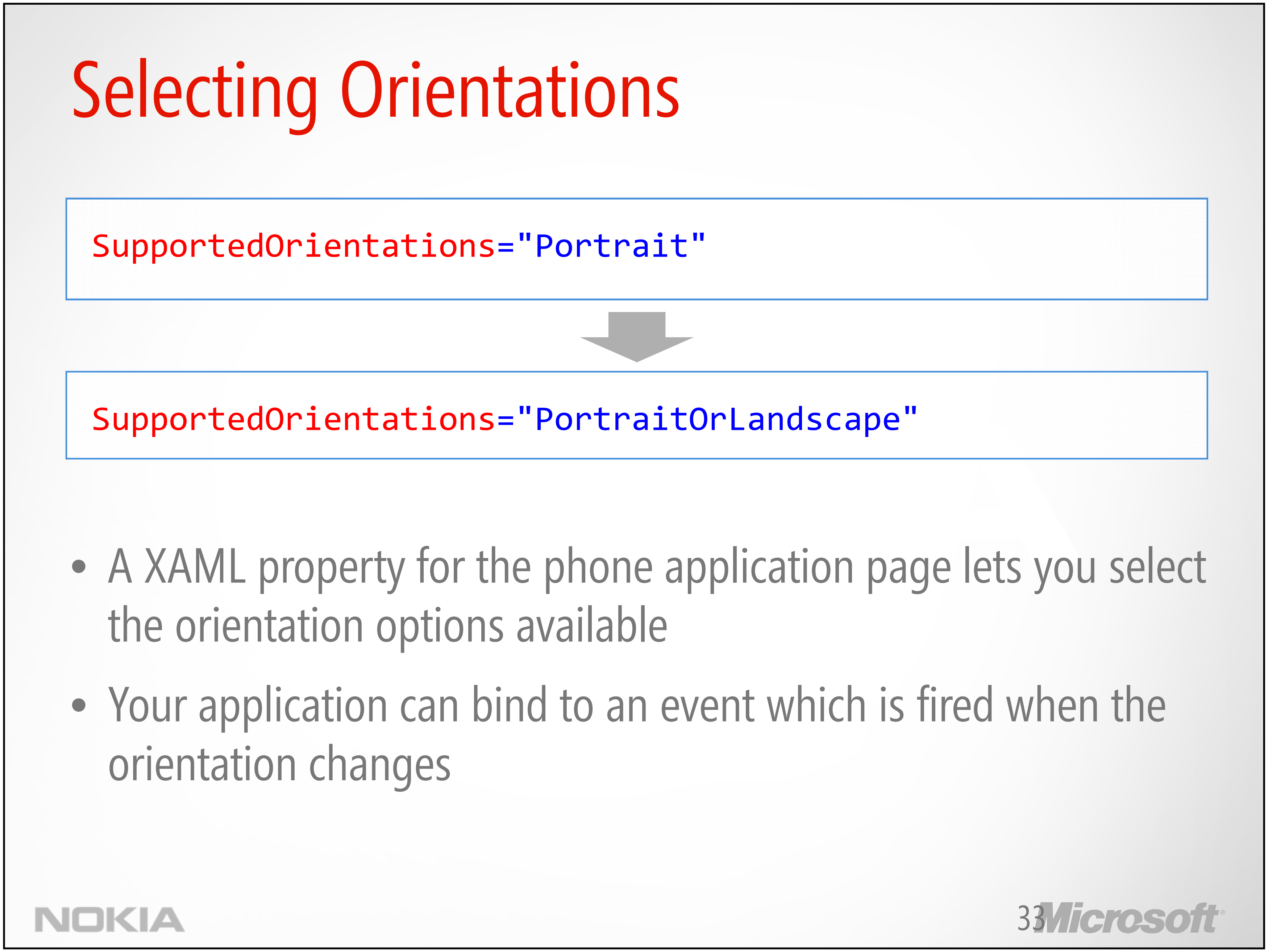
©2011 Microsoft Corporation. All rights reserved. Microsoft, Windows, Windows Vista, Windows Azure, Hyper-V and other product names are or may be registered trademarks and/or trademarks in the U.S. and/or other countries.
The information herein is for informational purposes only and represents the current view of Microsoft Corporation as of the date of this presentation. Because Microsoft must respond to changing market conditions, it should not be interpreted to be a commitment on the part of Microsoft, and Microsoft cannot guarantee the accuracy of any information provided after the date of this presentation.
MICROSOFT MAKES NO WARRANTIES, EXPRESS, IMPLIED OR STATUTORY, AS TO THE INFORMATION IN THIS PRESENTATION.

Phone UI Design – Orientation



- This application does not work in landscape mode at the moment
- Not all applications do, or need to
- You can configure applications to support portrait or landscape

©2011 Microsoft Corporation. All rights reserved. Microsoft, Windows, Windows Vista, Windows Azure, Hyper-V and other product names are or may be registered trademarks and/or trademarks in the U.S. and/or other countries.
The information herein is for informational purposes only and represents the current view of Microsoft Corporation as of the date of this presentation. Because Microsoft must respond to changing market conditions, it should not be interpreted to be a commitment on the part of Microsoft, and Microsoft cannot guarantee the accuracy of any information provided after the date of this presentation.
MICROSOFT MAKES NO WARRANTIES, EXPRESS, IMPLIED OR STATUTORY, AS TO THE INFORMATION IN THIS PRESENTATION.



Selecting Orientations

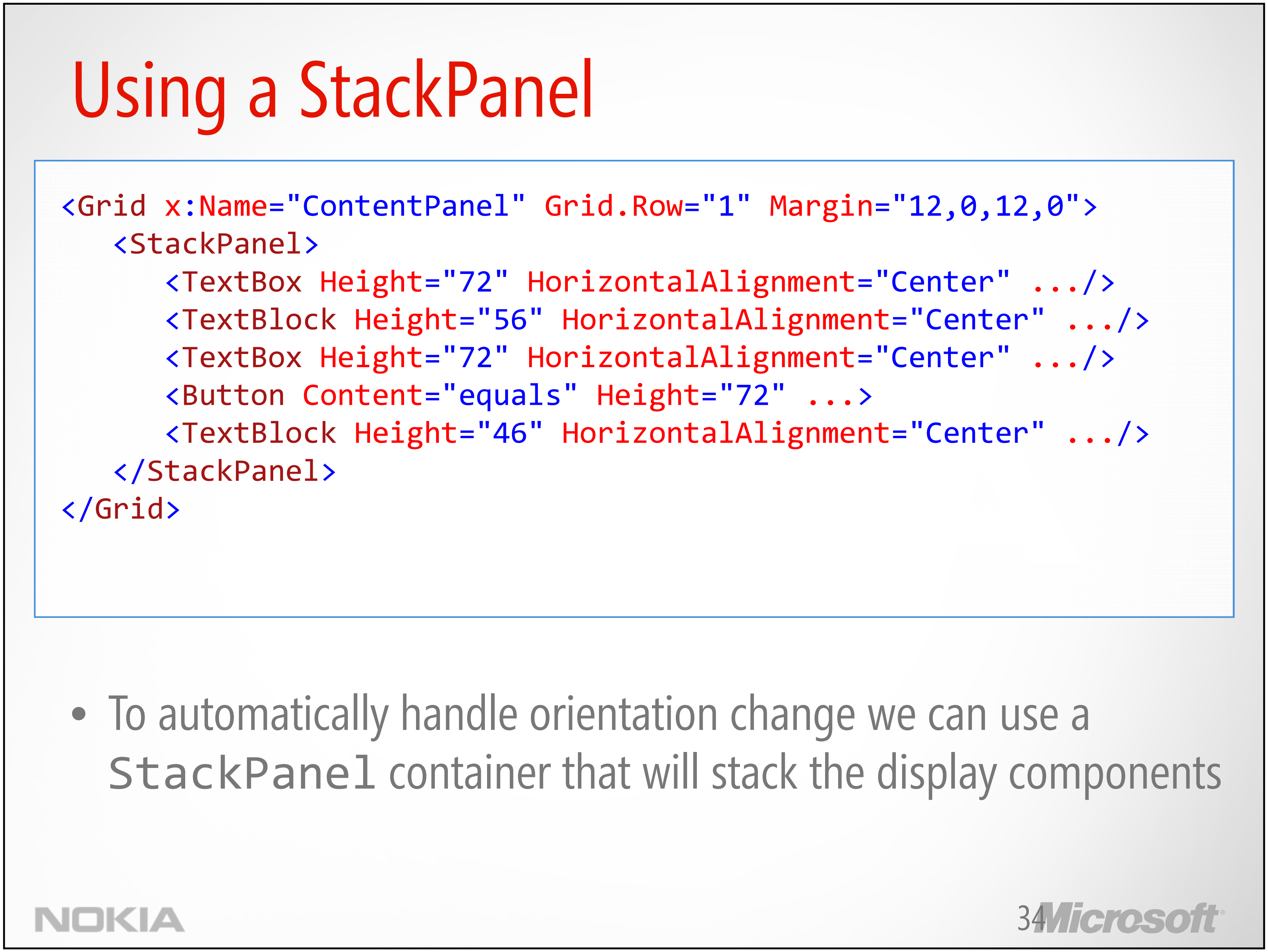
```
SupportedOrientations="Portrait"
```

```
SupportedOrientations="PortraitOrLandscape"
```

- A XAML property for the phone application page lets you select the orientation options available
- Your application can bind to an event which is fired when the orientation changes

33

©2011 Microsoft Corporation. All rights reserved. Microsoft, Windows, Windows Vista, Windows Azure, Hyper-V and other product names are or may be registered trademarks and/or trademarks in the U.S. and/or other countries.
The information herein is for informational purposes only and represents the current view of Microsoft Corporation as of the date of this presentation. Because Microsoft must respond to changing market conditions, it should not be interpreted to be a commitment on the part of Microsoft, and Microsoft cannot guarantee the accuracy of any information provided after the date of this presentation.
MICROSOFT MAKES NO WARRANTIES, EXPRESS, IMPLIED OR STATUTORY, AS TO THE INFORMATION IN THIS PRESENTATION.



Using a StackPanel

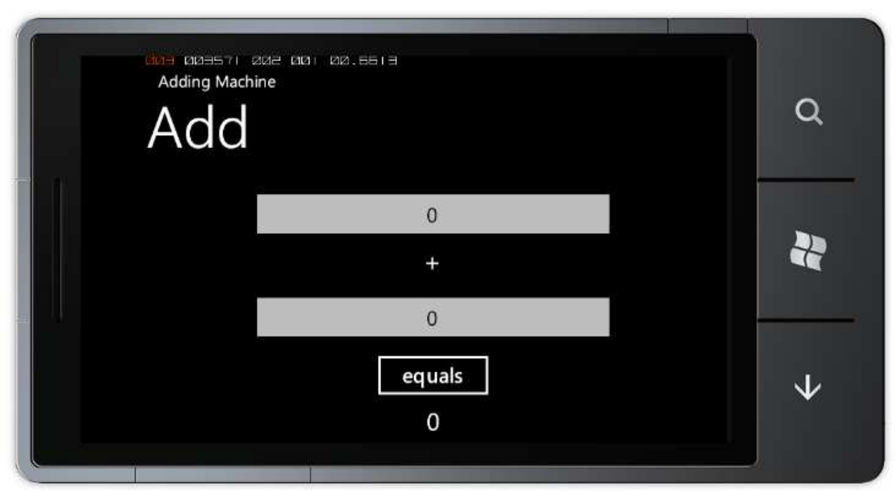
```
<Grid x:Name="ContentPanel" Grid.Row="1" Margin="12,0,12,0">
   <StackPanel>
      <TextBox Height="72" HorizontalAlignment="Center" .../>
      <TextBlock Height="56" HorizontalAlignment="Center" .../>
      <TextBox Height="72" HorizontalAlignment="Center" .../>
      <Button Content="equals" Height="72" ...>
      <TextBlock Height="46" HorizontalAlignment="Center" .../>
   </StackPanel>
</Grid>
```

- To automatically handle orientation change we can use a `StackPanel` container that will stack the display components

©2011 Microsoft Corporation. All rights reserved. Microsoft, Windows, Windows Vista, Windows Azure, Hyper-V and other product names are or may be registered trademarks and/or trademarks in the U.S. and/or other countries.
The information herein is for informational purposes only and represents the current view of Microsoft Corporation as of the date of this presentation. Because Microsoft must respond to changing market conditions, it should not be interpreted to be a commitment on the part of Microsoft, and Microsoft cannot guarantee the accuracy of any information provided after the date of this presentation.
MICROSOFT MAKES NO WARRANTIES, EXPRESS, IMPLIED OR STATUTORY, AS TO THE INFORMATION IN THIS PRESENTATION.

Windows Phone

Demo

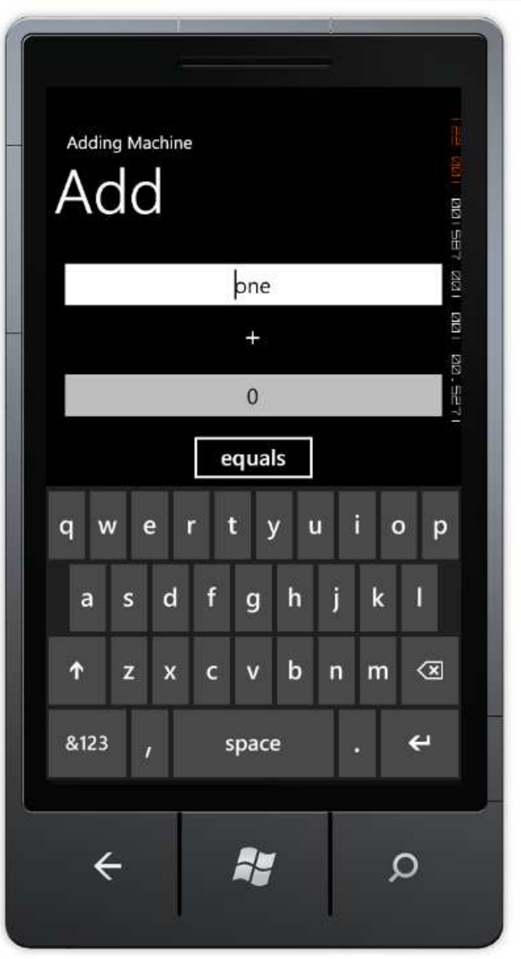


Demo 2: Orientation Handling

©2011 Microsoft Corporation. All rights reserved. Microsoft, Windows, Windows Vista, Windows Azure, Hyper-V and other product names are or may be registered trademarks and/or trademarks in the U.S. and/or other countries. The information herein is for informational purposes only and represents the current view of Microsoft Corporation as of the date of this presentation. Because Microsoft must respond to changing market conditions, it should not be interpreted to be a commitment on the part of Microsoft, and Microsoft cannot guarantee the accuracy of any information provided after the date of this presentation.
MICROSOFT MAKES NO WARRANTIES, EXPRESS, IMPLIED OR STATUTORY, AS TO THE INFORMATION IN THIS PRESENTATION.

Error Handling

- The present version of the program does not handle errors at all
- If the user enters stupid values these throw an exception which we presently don't catch



Adding Machine

Add

one

+

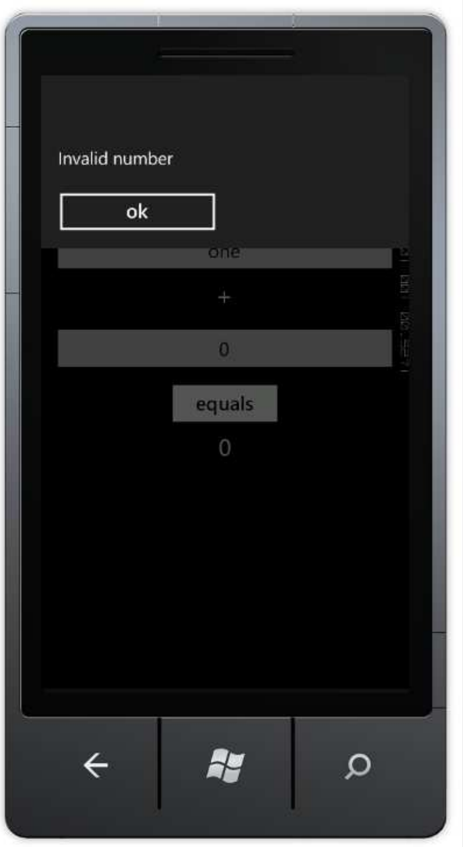
0

equals

©2011 Microsoft Corporation. All rights reserved. Microsoft, Windows, Windows Vista, Windows Azure, Hyper-V and other product names are or may be registered trademarks and/or trademarks in the U.S. and/or other countries.
The information herein is for informational purposes only and represents the current view of Microsoft Corporation as of the date of this presentation. Because Microsoft must respond to changing market conditions, it should not be interpreted to be a commitment on the part of Microsoft, and Microsoft cannot guarantee the accuracy of any information provided after the date of this presentation.
MICROSOFT MAKES NO WARRANTIES, EXPRESS, IMPLIED OR STATUTORY, AS TO THE INFORMATION IN THIS PRESENTATION.

Handling Errors

```
try
{
  v1 = float.Parse(firstNumberTextBox.Text);
  v2 = float.Parse(secondNumberTextBox.Text);
}
catch
{
    MessageBox.Show("Invalid number");
    return;
}
```


Invalid number

- A program can catch errors as on the desktop
- There is also a `MessageBox` mechanism as well

NOKIA 37 Microsoft

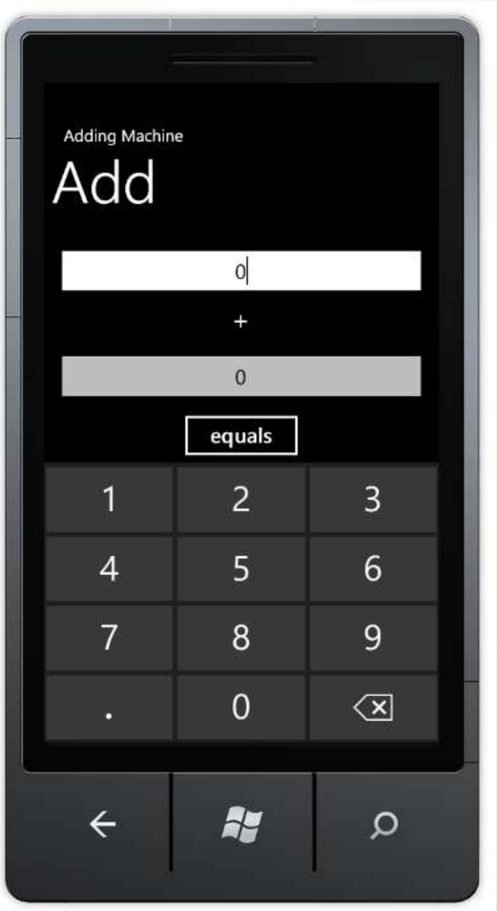
©2011 Microsoft Corporation. All rights reserved. Microsoft, Windows, Windows Vista, Windows Azure, Hyper-V and other product names are or may be registered trademarks and/or trademarks in the U.S. and/or other countries.
The information herein is for informational purposes only and represents the current view of Microsoft Corporation as of the date of this presentation. Because Microsoft must respond to changing market conditions, it should not be interpreted to be a commitment on the part of Microsoft, and Microsoft cannot guarantee the accuracy of any information provided after the date of this presentation.
MICROSOFT MAKES NO WARRANTIES, EXPRESS, IMPLIED OR STATUTORY, AS TO THE INFORMATION IN THIS PRESENTATION.

Published: 8/22/2011

Configuring the Input Scope

```
<TextBox InputScope="Number" ...
```

- If all you want from the user is a number it is dangerous to allow them to enter text as well
- You can add to the XAML to specify that the keyboard only accepts numbers



NOKIA

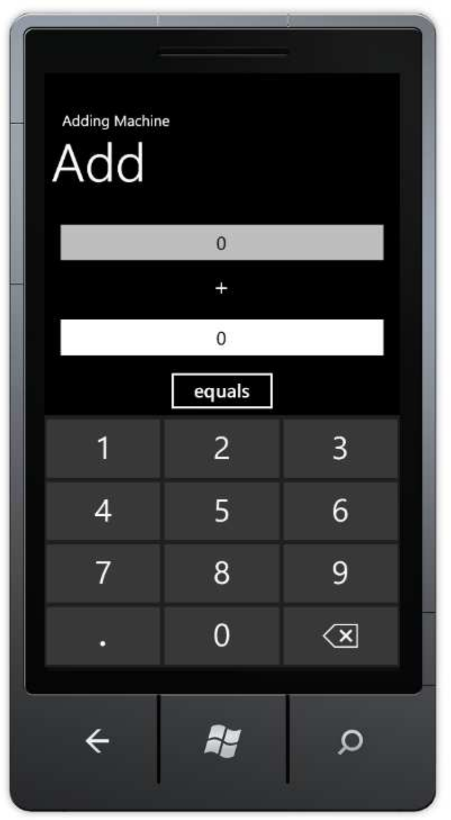
38 Microsoft

©2011 Microsoft Corporation. All rights reserved. Microsoft, Windows, Windows Vista, Windows Azure, Hyper-V and other product names are or may be registered trademarks and/or trademarks in the U.S. and/or other countries.
The information herein is for informational purposes only and represents the current view of Microsoft Corporation as of the date of this presentation. Because Microsoft must respond to changing market conditions, it should not be interpreted to be a commitment on the part of Microsoft, and Microsoft cannot guarantee the accuracy of any information provided after the date of this presentation.
MICROSOFT MAKES NO WARRANTIES, EXPRESS, IMPLIED OR STATUTORY, AS TO THE INFORMATION IN THIS PRESENTATION.

Windows Phone

Demo

Demo 3: Complete Adding Machine


Adding Machine

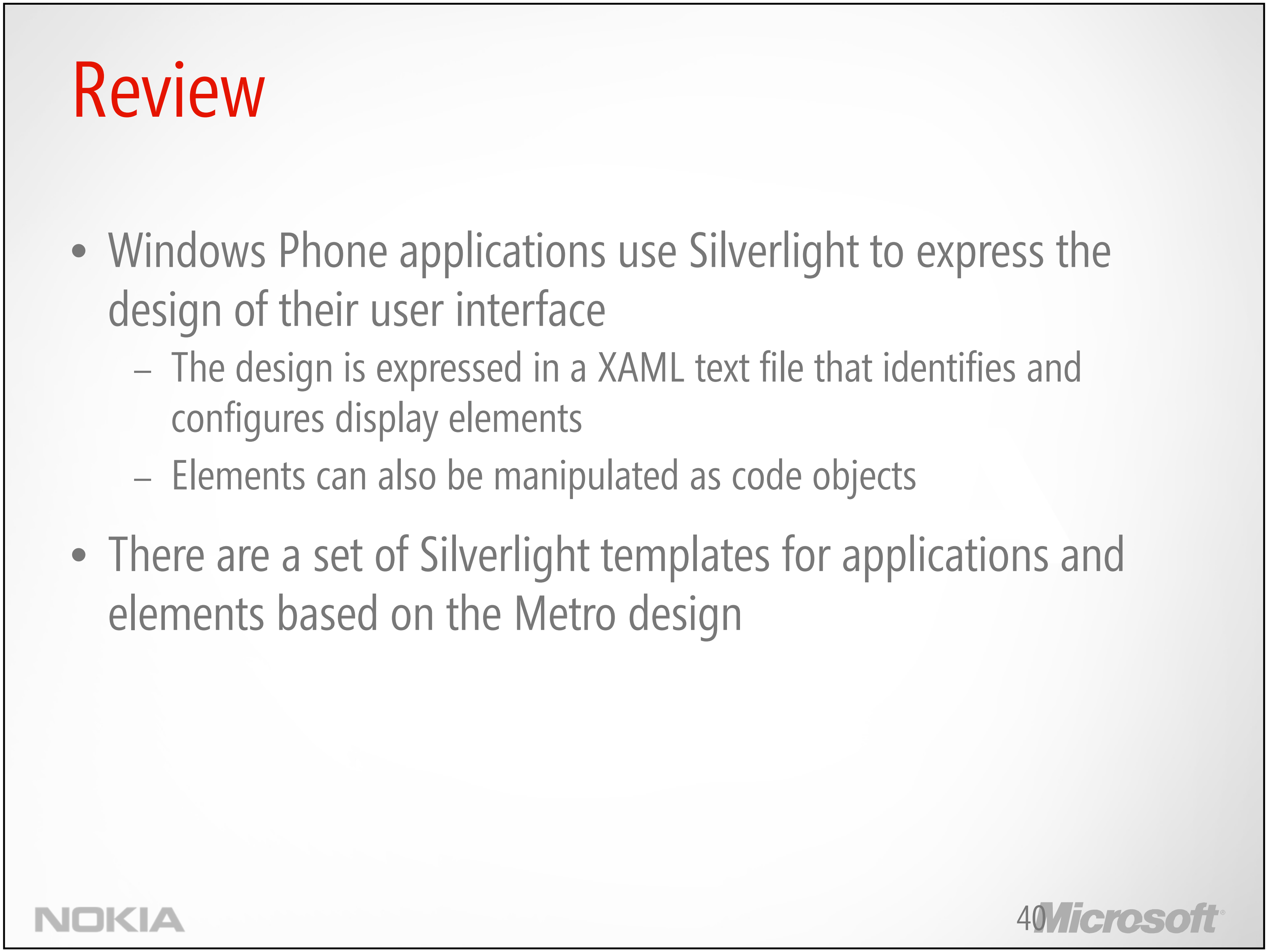
Add

0

+

0

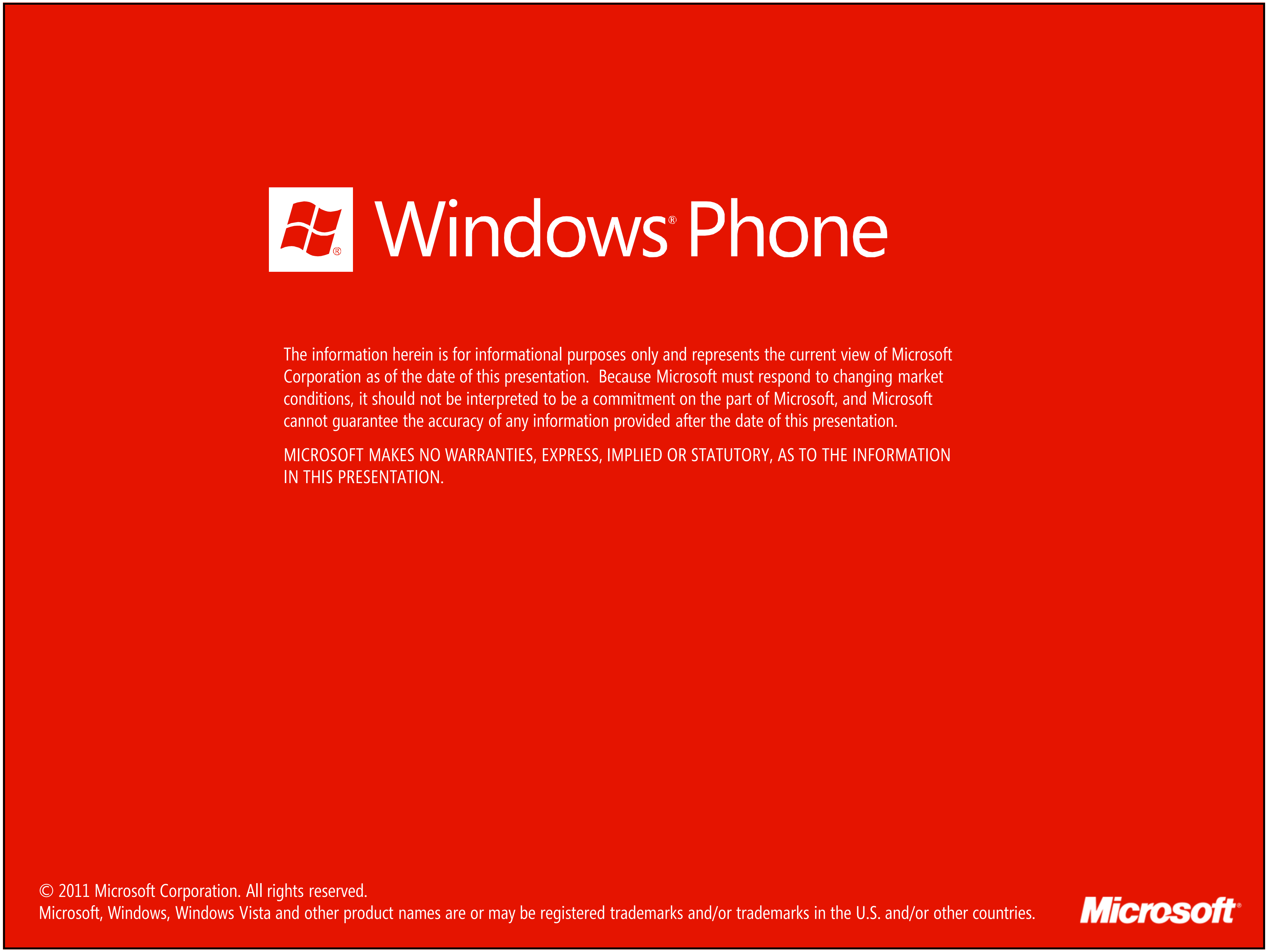
©2011 Microsoft Corporation. All rights reserved. Microsoft, Windows, Windows Vista, Windows Azure, Hyper-V and other product names are or may be registered trademarks and/or trademarks in the U.S. and/or other countries.
The information herein is for informational purposes only and represents the current view of Microsoft Corporation as of the date of this presentation. Because Microsoft must respond to changing market conditions, it should not be interpreted to be a commitment on the part of Microsoft, and Microsoft cannot guarantee the accuracy of any information provided after the date of this presentation.
MICROSOFT MAKES NO WARRANTIES, EXPRESS, IMPLIED OR STATUTORY, AS TO THE INFORMATION IN THIS PRESENTATION.



Review

- Windows Phone applications use Silverlight to express the design of their user interface
  - The design is expressed in a XAML text file that identifies and configures display elements
  - Elements can also be manipulated as code objects
- There are a set of Silverlight templates for applications and elements based on the Metro design

©2011 Microsoft Corporation. All rights reserved. Microsoft, Windows, Windows Vista, Windows Azure, Hyper-V and other product names are or may be registered trademarks and/or trademarks in the U.S. and/or other countries.
The information herein is for informational purposes only and represents the current view of Microsoft Corporation as of the date of this presentation. Because Microsoft must respond to changing market conditions, it should not be interpreted to be a commitment on the part of Microsoft, and Microsoft cannot guarantee the accuracy of any information provided after the date of this presentation.
MICROSOFT MAKES NO WARRANTIES, EXPRESS, IMPLIED OR STATUTORY, AS TO THE INFORMATION IN THIS PRESENTATION.



Windows® Phone

The information herein is for informational purposes only and represents the current view of Microsoft Corporation as of the date of this presentation. Because Microsoft must respond to changing market conditions, it should not be interpreted to be a commitment on the part of Microsoft, and Microsoft cannot guarantee the accuracy of any information provided after the date of this presentation.

MICROSOFT MAKES NO WARRANTIES, EXPRESS, IMPLIED OR STATUTORY, AS TO THE INFORMATION IN THIS PRESENTATION.

© 2011 Microsoft Corporation. All rights reserved.
Microsoft, Windows, Windows Vista and other product names are or may be registered trademarks and/or trademarks in the U.S. and/or other countries.

Microsoft®

©2011 Microsoft Corporation. All rights reserved. Microsoft, Windows, Windows Vista, Windows Azure, Hyper-V and other product names are or may be registered trademarks and/or trademarks in the U.S. and/or other countries.

The information herein is for informational purposes only and represents the current view of Microsoft Corporation as of the date of this presentation. Because Microsoft must respond to changing market conditions, it should not be interpreted to be a commitment on the part of Microsoft, and Microsoft cannot guarantee the accuracy of any information provided after the date of this presentation.
MICROSOFT MAKES NO WARRANTIES, EXPRESS, IMPLIED OR STATUTORY, AS TO THE INFORMATION IN THIS PRESENTATION.