



Windows  
Phone

Silverlight Games  
on  
Windows Phone



Rob Miles & Andy Wigley  
Windows Phone 7 Jump Start  
Microsoft Corporation

---

---

---

---

---

---

---

# Agenda

Silverlight for Casual Games

A look at the Puzzle Sample Application

Getting an update behavior in Silverlight

A look at the Pattern Match Silverlight Game

Sounds in Silverlight

2

Windows Phone Jump Start

---

---

---

---

---

---

---



Windows  
Phone

Silverlight for Casual  
Games

---

---

---

---

---

---

---

## Casual Games

- Players love Casual Games
  - Simple gameplay
  - Easy to pick up and put down
- Phone platforms are a great place to play them
- Silverlight is a great way to create casual games



4

Windows Phone Jump Start

---

---

---

---

---

---

---

## A Look at Windows Phone Puzzle

## Demo



5

Windows Phone Jump Start

---

---

---

---

---

---

---

## Silverlight game ideas

- Silverlight would be a great place to create
  - Word Games
  - Turn based strategy games
  - Pictorial games
- If this is what you want to write, there may be no need to learn XNA at all
  - ...although XNA is fun...

6

Windows Phone Jump Start

---

---

---

---

---

---

---



# Adding Silverlight Game Update

---

---

---

---

---

---

---

## Making Silverlight move

- At the moment our games just respond to user input
- Many games are not like that
- The game world runs in front of the player in real time
- We need to have a way of getting our games to “tick” in the same way



8

Windows Phone Jump Start

---

---

---

---

---

---

---

## A Look at Pattern Match

# Demo



9

Windows Phone Jump Start

---

---

---

---

---

---

---

## Getting a "tick"

- You can use threads to get game to tick
  - However this is a bit of a pain because you have to use the Dispatcher to perform actions on the game objects
- A better way is to bind a method to the Rendering event
- This runs each time a Silverlight frame is rendered

10

Windows Phone Jump Start

---

---

---

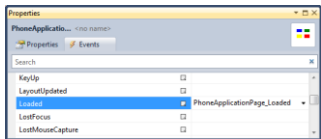
---

---

---

---

## Initialising the game



- The game engine must get control when the game starts
- To do this I bind an event to the Loaded event of the MainPage object

11

Windows Phone Jump Start

---

---

---

---

---

---

---

## Page Loaded Event

```
1. private void PhoneApplicationPage_Loaded(  
2.     object sender, RoutedEventArgs e)  
3. {  
4.     initialiseGame();  
5. }
```

- This is the event handler for the loaded method
- It calls the initialiseGame event
- This will set up the game and start it running

12

Windows Phone Jump Start

---

---

---

---

---

---

---

## A game initialise method

```
1. private void initialiseGame()
2. {
3.     loadHighScore();
4.     messageTextBlock.Text = "Press Start to begin";
5.     stateOfGame = gameState.attact;
6.     startButton.IsEnabled = true;
7.     CompositionTarget.Rendering +=
8.         new EventHandler(CompositionTarget_Rendering);
9. }
```

- The initialiseGame method sets up the game
- It loads the high score and sets the initial game state

---

---

---

---

---

---

---

---

## Binding to Rendering

```
1. private void initialiseGame()
2. {
3.     loadHighScore();
4.     messageTextBlock.Text = "Press Start to begin";
5.     stateOfGame = gameState.attact;
6.     startButton.IsEnabled = true;
7.     CompositionTarget.Rendering +=
8.         new EventHandler(CompositionTarget_Rendering);
9. }
```

- This statement binds the rendering event to my Update method

---

---

---

---

---

---

---

---

## Rendering Event Handler

```
1. void CompositionTarget_Rendering(object sender, EventArgs e)
2. {
3.     gameTick();
4. }
```

- When the rendering event fires my gameTick method is called
- This updates the game and triggers any changes of state

---

---

---

---

---

---

---

---

## Calculating Update Speed

```
1. private DateTime lastTick;
2. private void gameTick()
3. {
4.     DateTime now = DateTime.Now;
5.     TimeSpan interVal = now - lastTick;
6.     lastTick = now;
7.     Update(interVal);
8. }
```

- Silverlight will redraw the screen as fast as it can
- Our game must work out the intervals between each tick and pass this to the Update method

## Update method

```
1. private void Update(TimeSpan interval)
2. {
3.     switch (stateOfGame)
4.     {
5.         case gameState.attact:
6.             //Attract Update
7.             case gameState.instructions:
8.                 // Instructions Countdown
9.             case gameState.showingButton:
10.                // Showing the button for the player
11.            }
12. }
```

- The game itself is a state machine

## Attract Mode Update

```
1. if (testUpdateTime(interval, flashInterval))
2. {
3.     // Update randomly flashing buttons
4.     int oldLitButton = litButtonNo;
5.     while (oldLitButton == litButtonNo)
6.     {
7.         litButtonNo = attractRand.Next(gameButtons.Length);
8.     }
9. }
```

- I use a method called testUpdateTime to see if a given interval has passed
- If it has I pick another button to light up

## Working out Intervals

```
1. private int currentWait = 0;
2. private bool testUpdateTime(
3.     TimeSpan timeStamp, int updateDelay)
4. {
5.     currentWait += timeStamp.Milliseconds;
6.     if (currentWait < updateDelay) return false;
7.     currentWait -= updateDelay;
8.     return true;
9. }
```

- Returns true if the given delay has passed
- It then moves on to time the next interval

19

Windows Phone Jump Start

---

---

---

---

---

---

---

## Changing Flash Speed

### Demo



20

Windows Phone Jump Start

---

---

---

---

---

---

---

## Using Interval Values

- You can also use the interval values to control the distance that things move across the screen after each update
- This makes your game appear to run at the same speed irrespective of the platform
- On a higher performance device you will just get smoother visuals

21

Windows Phone Jump Start

---

---

---

---

---

---

---



# Adding Sound to Silverlight

---

---

---

---

---

---

---

## Silverlight Sounds

- Sound adds a lot to a game
- Players expect background sounds and spot effects when objects interact
- Silverlight on Windows Phone can play a single media stream but it does not support sound effects
- To get sounds you use XNA to play the sounds for you

23

Windows Phone Jump Start

---

---

---

---

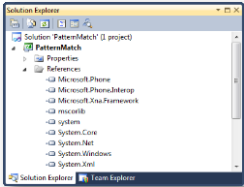
---

---

---

## Adding XNA to a Silverlight Game

- The first thing to do is add the reference to the XNA Framework to the solution



24

Windows Phone Jump Start

---

---

---

---

---

---

---



# Adding XNA to a Silverlight Game

- Next you add the namespaces so you can easily use the objects

```
using System;  
using System.Collections.Generic;  
using System.Linq;  
using System.Net;  
using System.Windows;  
using System.Windows.Controls;  
using System.Windows.Documents;  
using System.Windows.Input;  
using System.Windows.Media;  
using System.Windows.Media.Animation;  
using System.Windows.Shapes;  
using Microsoft.Phone.Controls;  
using Microsoft.Xna.Framework;  
using Microsoft.Xna.Framework.Audio;
```

25

Windows Phone Jump Start

---

---

---

---

---

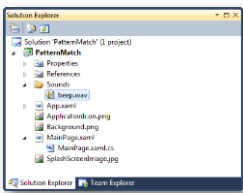
---

---

---

# Adding Sound Resources

- Now you can add the sound itself
  - wav files work well
- Create a folder in your solution to keep things tidy



26

Windows Phone Jump Start

---

---

---

---

---

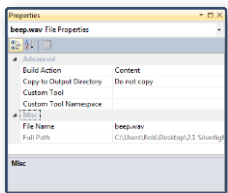
---

---

---

# Adding Sound Resources

- Now you need to set the properties of the sound item
- Make sure the build action is set to Content



27

Windows Phone Jump Start

---

---

---

---

---

---

---

---

## Loading a SoundEffect

```
SoundEffect beep =  
    SoundEffect.FromStream(  
        TitleContainer.OpenStream("Sounds/beep.wav"));
```

- This code runs at the start of the game
- It creates a SoundEffect value from our game content
- You can create multiple sound effect values for multiple sounds

28

Windows Phone Jump Start

---

---

---

---

---

---

---

## Playing a SoundEffect

```
beep.Play();
```

- Plays a sound effect

```
beep.Play(volume, pitch, pan);
```

- Plays a sound effect with extra properties:
  - volume between 0.0 and 1.0
  - pitch between -1 (octave low) and 1 (octave high)
  - Pan between -1 (left) and +1 (right)

29

Windows Phone Jump Start

---

---

---

---

---

---

---

## Managing Playback

```
if (!beep.Play()) // Sound effect playback failed
```

- The Windows Phone can support multiple sounds at once, but there is a limit to this
- Play returns true if the playback succeeded
  - If a sound cannot be played the Play method will return false
- Later we will explore how to make looping sound effects in XNA using the SoundEffectInstance class

30

Windows Phone Jump Start

---

---

---

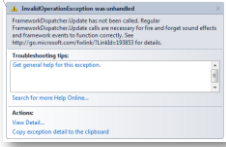
---

---

---

---

## Keeping XNA Awake



- The XNA framework is driven by repeated calls of Draw and Update methods (of which more later)
- In Silverlight these do not happen
- We need to update XNA to allow sound playback

31

Windows Phone Jump Start

---

---

---

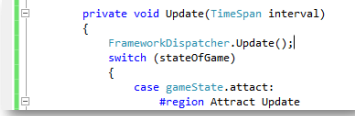
---

---

---

---

## Keeping XNA Awake



- The FrameworkDispatcher.Update() method must be called at regular intervals to keep XNA sound working
- I do it in the Update method for the game

32

Windows Phone Jump Start

---

---

---

---


---

---

---

## Sounds in Pattern Match

# Demo



33

Windows Phone Jump Start

---

---

---

---

---

---

---

# Review

Silverlight cannot be used for games

The Silverlight rendering event occurs sixty times a second

Silverlight programs can make use of XNA objects

Silverlight uses the XNA Content Manager to store sounds

The Windows Phone can only play one sound at a time

XNA sound playback must be repeatedly updated

34

Windows Phone Jump Start

---

---

---

---

---

---

---

# Review

Silverlight cannot be used for games

The Silverlight rendering event occurs sixty times a second

Silverlight programs can make use of XNA objects

Silverlight uses the XNA Content Manager to store sounds

The Windows Phone can only play one sound at a time

XNA sound playback must be repeatedly updated

35

Windows Phone Jump Start

---

---

---

---

---

---

---

# Review

Silverlight cannot be used for games

The Silverlight rendering event occurs sixty times a second

Silverlight programs can make use of XNA objects

Silverlight uses the XNA Content Manager to store sounds

The Windows Phone can only play one sound at a time

XNA sound playback must be repeatedly updated

36

Windows Phone Jump Start

---

---

---

---

---

---

---

# Review

Silverlight cannot be used for games

The Silverlight rendering event occurs sixty times a second

Silverlight programs can make use of XNA objects

Silverlight uses the XNA Content Manager to store sounds

The Windows Phone can only play one sound at a time

XNA sound playback must be repeatedly updated

37

Windows Phone Jump Start

---

---

---

---

---

---

---

# Review

Silverlight cannot be used for games

The Silverlight rendering event occurs sixty times a second

Silverlight programs can make use of XNA objects

Silverlight uses the XNA Content Manager to store sounds

The Windows Phone can only play one sound at a time

XNA sound playback must be repeatedly updated

38

Windows Phone Jump Start

---

---

---

---

---

---

---

# Review

Silverlight cannot be used for games

The Silverlight rendering event occurs sixty times a second

Silverlight programs can make use of XNA objects

Silverlight uses the XNA Content Manager to store sounds

The Windows Phone can only play one sound at a time

XNA sound playback must be repeatedly updated

39

Windows Phone Jump Start

---

---

---

---

---

---

---

# Review

Silverlight cannot be used for games

The Silverlight rendering event occurs sixty times a second

Silverlight programs can make use of XNA objects

Silverlight uses the XNA Content Manager to store sounds

The Windows Phone can only play one sound at a time

XNA sound playback must be repeatedly updated

40

Windows Phone Jump Start

---

---

---

---

---

---

---

---

# Coming Up Next...

Moving onto XNA on Windows Phone

XNA performance and capabilities

XNA game development strategies

Using the accelerometer in an XNA game

Using the touchscreen in an XNA game

Advanced XNA sound playback

Using the Guide for text input

Controlling media playback with XNA

41

Windows Phone Jump Start

---

---

---


---

---

---

---

---



Windows

Phone

© 2010 Microsoft Corporation. All rights reserved. Microsoft, Windows, Windows Vista and other product names and/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.

---

---

---

---

---

---

---

---

© 2010 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. 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.

14