

# Silverlight 4 Unleashed

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## Introduction

### Honing Your Basic Skills

What Can You Learn from *Silverlight 2 Unleashed*?

### About Code in This Book

Adding a Reference to a Namespace

Setting the Right Project as Startup

Using the var Keyword

Happy Coding!

## Chapter 1

### Three Years of Silverlight

#### Discovering Silverlight 4

Learning Silverlight Is Betting on the Future

How Can They Be So Fast?

How About Compatibility with Older Versions?

#### Cross-Browser and Cross-Platform Compatibility

Windows and Macintosh

Linux

#### Alternatives to Silverlight

In the Web Browser

Out of the Browser

Legacy Technologies

#### A Short History of Silverlight

Silverlight 1.0

Silverlight 2

Silverlight 3

And Silverlight 4[el]

#### Previewing the Future of Silverlight

#### Installing Silverlight 4 as a User

Opening a Silverlight 4 application

What to Do If Silverlight Is Not Installed?

#### Exploring Silverlight 4 Demos

Deep Zooming the Matterhorn

Getting Involved Socially with Sobees

Navigating with Bing Maps Streetside and PhotoSynth

Visualizing information with the Pivot viewer

Drawing on the web with Fantasia

How Can You Get Involved?

Summary

## Chapter 2

Setting Up and Discovering Your Environment

Installing Visual Studio

Visual Studio 2010

Visual Web Developer Express

Installing the Silverlight Tools for Visual Studio

Verifying the Installation

Inspecting the Application

Unpacking an XAP File

Using the Visual Studio Designer

Implementing Hello Silverlight

Checking the Properties Editor

Adding Some Text

Using Design Time Width and Height

Saving the Application

Installing Expression Blend

Creating a New Silverlight Application

Opening Hello Silverlight

Adding an Effect

Creating a Pulse Animation

Triggering the Storyboard

Testing the Application

Summary

## Chapter 3

Extending Your Application with Controls

Extending XAML

Mapping a Prefix to a CLR Namespace

Why Is a Prefix Not Always Needed?

Adding a Namespace to Any Element

Defining Your Own URI and Mapping CLR Namespaces

What's a Control?

User Controls

Custom Controls

Summary

Chapter 4

Investigating Existing Controls

Reviewing the Basics

Show Me Some Code!

Changes in Existing Controls

Mouse Wheel Support

Localizing for Right-to-Left Languages

Getting a Control Template's Current State

Adding SelectedValue and SelectedValuePath

Adding Command and CommandParameter

Presenting and Editing Text with the RichTextBox

Zooming with the Viewbox

Opening a ChildWindow

Finding More Information

Where to Find Additional Controls?

Do You Really Need a Control?

The Silverlight Toolkit

Third-Party Providers

Summary

Chapter 5

Understanding Dependency Properties

Inheriting DependencyObject

Threading

Accessing a Dependency Property's Value

Using a DependencyObject as Data Item

Registering Dependency Properties

Defining Metadata

Initializing Dependency Objects

Understanding Attached Properties

Using Attached Properties for Values

- Registering an Attached Property
- Using Custom Attached Properties in XAML
- Implementing an Attached Behavior
- Building on Attached Behaviors with Blend Behaviors
- Adding a New Property with Snippets
  - Installing the Snippets for Silverlight
  - Using the Snippets
- Calculating a Dependency Property's Value
  - Getting the Property's Base Value
  - Reading the Local Value
- Summary

## Chapter 6

Working with data: Binding, grouping, sorting and filtering

- Diving into Data Bindings
  - Understanding a binding's elements
  - Setting the Source
  - Refining the Path
  - Flowing in Two Directions
  - Converting the Values
  - Changing the Format
  - Handling Special Cases
  - Property Trigger
  - Validating Input
- Using the Visual Studio Binding Dialog
- Using the Expression Blend Binding Dialog
- Debugging Data Bindings
  - Checking the Output Tab
  - Creating a Test Converter
- Grouping, Filtering and Sorting Data
  - Working with the CollectionViewSource
  - Using a PagedCollectionView
  - Binding Directly to the Source
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## Chapter 7

Understanding the Model-View-ViewModel Pattern

About Design Patterns

Separating the Concerns

Why Is Separation Good?

Classic Separation Patterns

History of MVVM

Developing Expression Blend

Presentation Model for WPF and Silverlight

Architecture of MVVM

Translating to Silverlight

Binding the View to the View-model

Understanding the Data Context

Inheriting the Data Context

Binding to the View

Building a Sample Application

The Model's Interface

Building a CustomerViewModel

Calling the Service in the MainViewModel

Binding to Results

Testing the Application

Bridging the Separation

Implementing a ViewModelBase Class

Using Commands

Sending Messages

Using an MVVM Framework

What Could Be Better?

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Chapter 8

Using Data Controls

Filtering and Paging with the PagedCollectionView

Preparing the Sample

Building the PagedCollectionView

Filtering Data

Paging Through Data

Optimizing Data Handling

Implementing Custom Sorting

Adding a DataPager Control

- Customizing the Display

Validating Data Input

- Using Interface-Based Validation

- Validating with Data Annotations

- Validating Before or After the Data Is Set

- Validating on the Client and on the Server

Reviewing the DataGrid

- Using the DataGrid with Automatic Columns

- Choosing Between DataGrid and ListBox

Editing Data in the DataForm

- Adding a Description

- Validating the Input

- Committing Changes Manually

- Defining Fields Manually

- Getting more information

- Making a Simple Property Editor

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Chapter 9

Connecting to the Web

- Getting Information from Cross-Domain Servers

  - Checking Whether a Policy File Exists

  - Working Around Cross-Domain Restrictions

- Placing Simple Calls

  - Informing the User

  - Learning with a Sample

  - Downloading Strings

  - Detecting Errors, Checking the Result

  - Opening a Resource for Reading

  - Uploading a String

  - Opening a Resource for Writing

  - Accessing Headers

- Sending Complex Messages

  - Posting a File to the Server with HttpWebRequest

- Discovering the New Networking Stack

- Using the Client HTTP Stack

- Using Other HTTP Methods

- Using the CookieContainer

- Handling Responses

- Handling XML Responses

- Handling JSON Responses

- Communicating with WCF

- Setting Up a Service

- Connecting the Client Application

- Updating the Code on the Server

- Publishing the Service

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- Chapter 10

- Creating resources, styles and templates

- Working with resources in XAML

- Using local resources

- Merging dictionaries

- Resolving resources

- Working with resources in Blend

- Merging a resource dictionary

- Creating new resources

- Selecting a resource for a property

- Using the resources panel

- Cleaning up unused resources

- Using the Pistachio tool

- Styling a control

- Using implicit styles

- Creating a hierarchy of styles

- Creating a new style in Blend

- Templating a control

- Copying a template in Blend

- Creating a custom easing function

- Making a control in Blend

- Applying a theme

- Summary

## Chapter 11

### Mastering Expression Blend

#### What Is Blend, Exactly?

- Working as a Tool for Integrators

- Editing XAML Markup

#### Making an Application Blend

- Why Is Some Code Not Executed?

- Why Does Some Code Fail?

- Detecting the Cause of an Exception

- Isolating Code in Design Mode

- Creating Design Time Data in Blend

- Understanding the Design-Time Data Context

#### Using Blend Behaviors

- Behavior, Trigger, or Action?

- Adding a Blend Behavior in Code

- Creating a New Blend Behavior

#### Finding More Information

#### Summary

## Chapter 12

### Sketching the User Experience

#### Sketching as a Discovery Process

- Using Sketching/Wireframing Tools

- Other Kinds of Sketching

#### Discovering SketchFlow

- Creating a New SketchFlow Application

- Checking the Panels

- Creating and Connecting Screens

#### Building the UI

- Creating a Component Screen

- Using Sketch Controls

- Exploring the Sketch Controls

- Creating States and Transitions

- Building an Animation

#### Deploying the SketchFlow Application

#### Running the Prototype

Giving Feedback

Importing and Managing User Feedback

Importing and Exporting

Importing from Photoshop and Illustrator

Importing from PowerPoint

Exporting to Word

Integrating and Collaborating

Integrating into SharePoint

Integrating into Team Foundation Server

Summary

Chapter 13

Creating Line-of-Business Applications

Preparing the Server-Side

Prerequisites

Preparing the Server-Side Application

Creating the Silverlight Client

Bringing the Client and the Server Together

Adding a Domain Service

Inspecting the Domain Service Class

Inspecting the Metadata

Creating a New Server-Side Query

Working with the Visual Designer

Understanding the DomainDataSource

Calling a Query with Parameter

Sorting the Data

Adding a Pager

Refactoring the Application to MVVM

Adding a Viewmodel

Adapting the XAML Markup

Customizing the Columns

Localizing the User Interface

Adding a RelayCommand Class

Executing the CRUD Operations in Code

Displaying Messages from the View-model

Deleting an Order

- Validating the Values
- Filtering the Data
- Showing Feedback While Processing
- Sharing Code

Summary

## Chapter 14

Enhancing Line-of-Business Applications and Running Out of the Browser

- Enhancing LOB Applications

- Adding Paging
  - Showing Errors
  - Reconciling Data
  - Copying and Pasting Rows
  - Printing

- Taking Silverlight Out of the Browser

- Setting Up the Application
  - Uninstalling the Application
  - Debugging the OOB Application
  - Looking Under the Hood
  - Changing the Settings
  - Updating the Application
  - Installing from the Code
  - Saving Files
  - Working Offline

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## Chapter 15

Developing Navigation Applications and Silverlight for Windows Phone 7

- Navigating with Silverlight

- Should You Always Use a Navigation Application?
  - Creating a New Navigation Application
  - Accessing Navigation Information
  - Providing Custom Navigation
  - Adding Navigation to a Non-Navigation Application

- Developing with Silverlight for Windows Phone 7

- Getting Hardware
  - Targeting a Specific Audience

- Developing for Windows Phone 7
- Developing for a Uniform Hardware Platform
- Designing for the Phone
- Installing the Tools
- Selling Your Applications
- Building Compatible Applications for the Desktop and the Phone
- Continuing the Exploration

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## Chapter 16

### Using Effects and Recording Media

#### Creating Effects with Pixel Shaders

- Writing, Finding, and Compiling Shader Files
- Creating and Modifying Shaders with Shazzam
- Integrating Shaders in the Application
- Adding Properties and Animating Shaders
- Using Shaders for Transitions in the VSM

#### Accessing the Webcam and the Microphone

- Getting the List of Devices
- Enabling Access
- Displaying the Video Output
- Detecting Whether Other Applications Use the Device

#### Capturing Audio

- Converting to a WAV File
- Creating a Sink
- Using the SaveFileDialog
- Using the Sink and Adding Commands
- Wiring the Commands
- Testing Audio Recording

#### Writing to a Bitmap

- Saving the Picture to a PNG File
- Manipulating Pixels

#### Extending WriteableBitmap

#### Using the Open File Dialog

#### Learning About News in Media

Summary

## Chapter 17

### New Transforms, Right Click, HTML Browser, WebBrowserBrush and Isolated Storage

#### Transforming Elements in a Projection

- Setting Additional Properties

- Using a Matrix3DProjection

- Animating the PlaneProjection

#### Composing Transforms

#### Handling the Right-Click Event

- Handling a Routed Event

- Displaying a Context Menu

#### Hosting an HTML Browser (Out of Browser Only)

- Understanding the Limitations

- Building a Simple Web Browser

- Loading HTML Content from Memory

- Invoking JavaScript

#### Writing and Reading in the Isolated Storage

- Saving to the Isolated Storage

- Reading from the Isolated Storage

- Deleting Files

- Using the IsolatedStorageSettings

- Trusting the Isolated Storage or Not

#### Painting with HTML

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## Chapter 18

### Drag and Drop, Full Screen, Clipboard, COM Interop, Duplex Polling, Notification Windows and Splash Screens

#### Dragging and Dropping

- Dragging Files on the Silverlight Application

- Drag-and-Drop Restrictions

#### Working in Full Screen

- Getting Keyboard Support in Full-Screen Mode (Elevated Permissions)

- Using Full Screen on a Monitor While Working on Another

#### Copying to and from the Clipboard

#### Working with COM (Elevated Permissions)

- Understanding the Restrictions

- Communicating with Microsoft Office
- Communicating over Duplex Polling
  - Implementing the Server-Side Service
  - Unregistering a Client
  - Configuring the Service
  - Implementing the Client
  - Unsubscribing and Resubscribing
  - Testing the Application
- Displaying Notification Windows
  - Understanding the Restrictions
  - Adding a Notification Window
  - Queuing Notification Windows
  - Interacting with the Main Window
- Creating a Custom Splash Screen
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## Chapter 19

Authentication, Event to Command Binding, Random Animations, Multitouch, Local Communication and Bing Maps Control

- Logging In with Authentication
  - Creating a New Website
  - Adding and Managing Users
  - Configuring the Authentication Web Service
  - Checking the Access
  - Adding References to the Services
  - Implementing the Client
- Binding an Event to a Command
  - Executing a Command When a TextBox Loses Focus
- Building Random Animations
  - Creating the Base Animation in Blend
  - Randomizing the Animation
- Implementing Multitouch in Silverlight
  - Getting the Right Computer
  - Investigating Existing Elements
  - Using Multitouch Libraries
  - Scaling, Rotating, and Translating

- Implementing a Multitouch Application
- Using Multitouch in Windows Phone 7 Applications
- Finding more information

#### Enabling Local Communication

- Understanding the Restrictions
- Building a Receiver
- Building a Sender
- Testing the Application

#### Mapping with the Bing Maps Control

- Adding the Map
- Getting Location Information and Marking It
- Getting More Information

#### Summary

### Chapter 20

#### Building Extensible and Maintainable Applications

##### Inverting Dependencies with Unity

- Refactoring to Smaller and Simpler Classes
- Setting Up the Services
- Calling the Setup method and Wiring Up
- Discovering More About Unity

##### Composing an Application with MEF

- Exporting and Importing
- Downloading on Demand
- What About Prism?

##### Using an MVVM Framework

- Discovering the Components
- Sending Messages

#### Summary

### Chapter 21

#### Optimizing Performance

##### Improving the XAP Download Time

- Loading Content on Demand
- Caching Common Assemblies

##### Virtualizing the User Interface

- Virtualizing the ItemsControl

Unvirtualizing the ListBox

Simplifying the DataTemplate

Creating Items in Batches

Working in Threads

Accelerating the User Interface

Enabling Hardware Acceleration in the Browser

Enabling Hardware Acceleration Out of the Browser

Accelerating with Care

Accelerating in the Windows Phone 7

Using a Code Profiler

Avoiding Memory Leaks

Saving an Object on the Stack or the Heap

Collecting Garbage and Leaking Memory

Living a Shorter Life

Unregistering Event Handlers

Disposing Objects

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Summary

Chapter 22

Advanced Development Techniques

Using New C# and .NET Features

Using Modern Programming Syntax

Creating extension methods

Consuming Dynamic Objects

Using Named/Optional Parameters

Localizing Applications

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Making an Application Localizable

Using Tools

Downloading Resource Applications on Demand

Encrypting and Decrypting

Understanding the Encryption/Decryption Mechanism

Multithreading

What Is a Thread?

Using the ThreadPool

Dispatching Back to the UI Thread

Creating and Using a BackgroundWorker

Locking Critical Resources

Enhancing Multithreaded Code

Unit Testing the Application

Installing a Unit Test Framework

Adding Functionality with TDD

Using Code Coverage

Unit Testing Windows Phone 7 Applications

Summary

Conclusion