

To discuss this course and customizations:  
Call: +1 434-509-6890 or Email: [sales@cloudcontraptions.com](mailto:sales@cloudcontraptions.com)

# Building Powerful Desktop Apps with WPF

---

## Class Duration

35 hours of live training delivered over 5 days.

## Student Prerequisites

- Professional C# programming experience
- Basic WPF and XAML familiarity (layout, simple bindings), or completion of [WPF with MVVM and C#](#)
- Familiarity with Git

## Target Audience

C# developers who know their way around basic WPF and need to ship complete, professional desktop applications: the kind with demanding data grids, custom controls, rich visuals, background processing, and real deployment requirements. Ideal for teams building or modernizing line-of-business desktop tools, engineering and scientific applications, and internal products with long lifespans. Developers new to WPF should start with [WPF with MVVM and C#](#); this course picks up where it ends and covers the rest of what production desktop applications demand.

## Description

This hands-on course covers the full lifecycle of a serious WPF application on .NET 10: architecting with the Generic Host, dependency injection, configuration, and logging; mastering the demanding parts of the UI layer (the ItemsControl family, DataGrid at scale, custom and attached properties, control templating, and fully custom controls); and bringing applications to life with WPF's graphics, animation, and media capabilities. From there the course turns to what production apps actually need: robust data and service integration, application services like dialogs and notifications, Windows integration and native interop, performance profiling and memory-leak hunting, accessibility, migrating .NET Framework-era WPF applications to modern .NET, and finally packaging, deployment, and update strategies. Participants work on a realistic application throughout, with agentic AI coding



To discuss this course and customizations:  
Call: +1 434-509-6890 or Email: [sales@cloudcontraptions.com](mailto:sales@cloudcontraptions.com)

assistants integrated into the workflow for control scaffolding, performance investigation, and refactoring, always under the developer's review.

## Learning Outcomes

- Architect WPF applications on .NET 10 with the Generic Host: dependency injection, configuration, and logging.
- Build sophisticated data-heavy UI with the ItemsControl family, DataGrid, and UI virtualization.
- Create custom controls, attached properties, and reusable control libraries.
- Apply WPF's graphics stack (geometry, brushes, animation, and media) to build rich, responsive visuals.
- Integrate data and services robustly: async patterns, local storage, REST APIs, and background processing.
- Implement application services: dialogs, notifications, settings, and single-instance behavior.
- Interoperate with the Windows platform: Win32 and WinRT APIs, native libraries, and shell integration.
- Diagnose and fix performance problems: startup time, rendering, binding overhead, and memory leaks.
- Upgrade .NET Framework WPF applications to modern .NET using the GitHub Copilot app modernization agent.
- Package and deploy desktop applications with MSIX, ClickOnce, and self-contained deployment, including update strategies.
- Apply agentic AI coding assistants across the workflow: scaffolding controls, investigating performance, and generating tests for review.

## Training Materials

Comprehensive courseware is distributed online at the start of class. All students receive a downloadable MP4 recording of the training.

## Software Requirements

A Windows machine with Visual Studio 2026 (Community edition is sufficient), the .NET 10 SDK, and Git. Access to an agentic AI coding assistant is required; a free tier is sufficient.

To discuss this course and customizations:  
Call: +1 434-509-6890 or Email: [sales@cloudcontraptions.com](mailto:sales@cloudcontraptions.com)

## **Training Topics**

### **Architecting the Modern WPF Application**

- WPF on .NET 10: capabilities and Fluent theming
- Generic Host: dependency injection, configuration, logging
- Solution structure for long-lived applications
- Application lifetime, startup, and shutdown
- Agentic AI coding assistants in desktop development

### **Advanced Layout and UI Composition**

- Layout system internals: measure and arrange
- Adaptive and resizable interfaces
- User controls and composition strategies
- Regions, docking, and shell patterns
- Multi-window applications

### **The ItemsControl Family in Depth**

- ItemsControl, ListBox, ListView, TreeView
- DataGrid: columns, editing, and validation at scale
- UI and data virtualization
- Grouping, sorting, and live shaping
- Drag-and-drop interactions

### **Custom Controls and Templating**

- Dependency properties and attached properties
- Control templates and the lookless control model
- Building custom controls vs. user controls
- Template parts, visual states, and theming support
- Packaging reusable control libraries

### **Graphics, Animation, and Media**

- Shapes, geometry, and drawing primitives
- Brushes, effects, and bitmap caching
- Storyboards and animation
- Media playback and imaging
- When to reach beyond WPF's renderer

### **Data and Service Integration**

- Async patterns for responsive UI

To discuss this course and customizations:  
Call: +1 434-509-6890 or Email: [sales@cloudcontraptions.com](mailto:sales@cloudcontraptions.com)

- Local data: SQLite and EF Core
- REST and gRPC service clients
- Background work: hosted services and progress reporting
- Caching and offline tolerance

### **Application Services**

- Dialog and window services done testably
- Settings and user preference persistence
- Toast notifications and system tray integration
- Single-instance applications and IPC
- File system integration and recent-file lists

### **Windows Integration and Interop**

- Calling Win32 and WinRT APIs
- P/Invoke and native library integration
- Shell integration: jump lists, file associations
- Clipboard, printing, and screen capture

### **Performance and Diagnostics**

- Startup time: measurement and reduction
- Rendering performance and visual tree cost
- Binding performance at scale
- Memory leaks: detection and the usual suspects
- Profiling tools and AI-assisted diagnosis

### **Accessibility and Polish**

- UI Automation and screen reader support
- Keyboard navigation and focus management
- High contrast and theme awareness
- Localization readiness

### **Modernizing from .NET Framework**

- Migration paths from .NET Framework 4.8
- The GitHub Copilot app modernization agent
- API compatibility and the Windows Compatibility Pack
- Incremental modernization for large applications

### **Packaging, Deployment, and Updates**

- MSIX packaging and distribution



To discuss this course and customizations:  
Call: +1 434-509-6890 or Email: [sales@cloudcontraptions.com](mailto:sales@cloudcontraptions.com)

- ClickOnce for internal deployment
- Self-contained vs. framework-dependent deployment
- Update strategies and versioning
- Crash reporting and telemetry