



TRAINING IN REAL-TIME
EMBEDDED DEVELOPMENT

Course WDF-501 : WDF KMDF Driver Development

Course Description:

A five day course on the development of WDM KMDF Driver Development, presented in partnership with Windows device driver specialists, Datronic®. The course includes a workshop with hands on labs and practical samples.

WDF - Microsoft Windows Driver Foundation
KMDF - Kernel-Mode Driver Framework from Microsoft

Overview:

A five day course to supply the basic knowledge for modifying existing device drivers or writing complete new drivers.

Course Objectives:

- WDF KMDF Device Driver Development for Windows XP, W2K3, Vista and Longhorn Server.
- Basics for device driver development on Microsoft Windows platforms.

Delegates will learn:

The students gain a thorough knowledge about the device driver architecture of the Microsoft Windows operating systems and their kernel mode components. In addition to this delegates learn concepts and backgrounds of device driver development using the DDK and lots of practical tips and tricks.

Pre-requisites:

- Very good knowledge of C and/or C++
- Basic knowledge of Microsoft Visual Studio
- Basic knowledge of Windows system programming
- Basic knowledge of Windows system administration

Who Should Attend:

Experienced application programmers, system software and driver developers, who need a thorough introduction to low level and hardware related software development on Microsoft Windows Platforms.

Duration:

Five days

Course Materials:

- Delegate Handbook

Related Courses:

- WDM-501 WDM Driver Development
- AWDM-501 Advanced WDM Driver Development
- NDIS-501 NDIS Network Driver Development
- MSDN-2450 Developing Embedded Solutions for Microsoft Windows CE .NET. (v4.2)
- MSDN-2450N Building Embedded Solutions using Windows CE 5.0
- MSDN-2545 Embedded Solutions for Windows XP Embedded
- MSDN-2530 Introduction to Microsoft Windows CE .NET

Course Outline:

Day 1:

- Overview Windows Operating System Architecture
- Kernel Mode Components
- DDK Development Environment
- Driver Debugging Host/Target
- Device Installation and .INF Files
- Setup Api / important Registry Keys
- Class Installers, Class Coinstallers, Device Coinstallers
- KMDF Components and Environment
- Building and Installing KMDF Drivers
- DDK Debugging Host/Target

Day 2:

- Introduction to WDF Driver Model and Objects Model
- Structure of a simple Kernel-Mode WDF Driver
- Framework objects, Methods, Properties and Events
- Device Objects and Driver Roles
- Packet driven IO Model and Framework Request Objects
- Handling read, write and device control request
- Canceled and Suspended Requests
- Self-Managed I/O
- Framework Queue Objects
- Integrated I/O Queuing and Cancellation

Day 3:

- Virtual Memory Management Overview
- Buffered IO and Direct IO
- Framework Memory Object
- Plug'n'Play Basics, the Device Tree and Driver Layering
- KMDF support on Filter, Functional, Physical and Control device objects
- Plug'n'Play State Transitions in Function Drivers
- Framework Integrated Plug'nPlay Request Handler
- Framework Integrated Power Management Request Handler
- Accessing Plug'n'Play Hardware Resources
- Device Enumeration and Startup
- Device Power Down and Removal

Day 4:

- Windows Interrupt Architecture and Thread Scheduling
- Interrupt Objects, Interrupt Service Routines and Deferred Procedure Calls (DPCs)
- Execution Levels (Default Execution Level, Passive Execution Level)
- Synchronization Scopes (Device, Queue, None)
- KMDF Wait Locks and Spin Locks

Day 5:

- Power Management Concepts
- Operating System Directed Power Management (OSDPM) Basics
- System Power States, Device Power States and Power Policy Owner
- Power Management Request Handler
- KMDF Power Policy
- PREfast, Static Driver Verifier (SDV) and Driver Verifier
- Frameworks Verifier, In Flight Recorder and Debugger Extensions

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