

LabVIEW Real-Time Application Development Course

Overview

The LabVIEW Real-Time course delivers hands-on training for developing robust, reliable, and deterministic measurement and control systems. At the end of the course, you will be able to implement a LabVIEW Real-Time system. This course is the fastest way to learn robust system architectures, real-time programming techniques, and time-saving development tips.

Duration

Classroom: Three (3) Days

Online: Four (4) Days

Audience

- LabVIEW Real-Time Module users preparing to develop applications to target RT series real time hardware
- Users developing deterministic closed-loop control systems or maximizing reliability of measurement systems
- Users developing applications for deployment in industrial environments or remote locations
- Users and technical managers evaluating LabVIEW Real-Time or NI Developer Suite in purchasing decisions

Prerequisites

- LabVIEW Core 1, or equivalent experience

Suggested Next Courses

- LabVIEW FPGA
- LabVIEW Core 2
- LabVIEW Core 3
- Data Acquisition and Signal Conditioning

NI Products Used During the Course

- LabVIEW Professional Development System
- LabVIEW Real-Time Module
- LabVIEW Execution Trace Toolkit
- CompactRIO Integrated Controller
- CompactRIO Thermocouple Input Module
- CompactRIO Sourcing Digital Output Module

Registration

Register online at ni.com/training or call (800)433-3488 Fax: (512)683-9300 email info@ni.com

Outside North America, contact your local NI Office.
Worldwide Contact Info: ni.com/global

Part Number

910733-xx
-01 NI Corporate or Branch
-11 Regional
-21 Onsite (at your facility)
-69 Online

After attending this course, you will be able to:

- Determine if a real-time solution is appropriate for a given problem
- Choose the best target hardware for a given real-time application
- Implement a deterministic and reliable application
- Understand how to reduce the jitter in a real-time application
- Choose an appropriate communication method
- Benchmark your application
- Deploy your application

LabVIEW Real-Time Application Development Course Outline

Introduction to Real-Time

This lesson introduces the concepts of real-time development. You learn how to determine whether an application requires a real-time operating system or a standard operating system. You also learn about the hardware architecture of a LabVIEW Real-Time system.

Topics include:

- Real-time concepts including determinism and jitter
- Real-time operating systems
- Real-time hosts and targets
- RT input and output hardware

Configuring Your Hardware

This lesson describes how to setup real-time hardware and software. You also learn about the LabVIEW project and its relation to Real-Time targets. You receive hands-on experience in configuring a CompactRIO Real-Time system. Topics include:

- Overview of hardware setup and installation
- Configuring RT targets in Measurement and Automation Explorer
- Using the LabVIEW Project
- Configuring Real-Time targets through the LabVIEW Project
- Running VIs on a Real-Time target

Real-Time Architecture

This lesson describes how to design a real-time application. You learn about the general architecture of a real-time application, multithreading, priorities, methods for passing data between threads, and how to improve the determinism of an application. Topics include:

- Multithreading
- Understanding and using priority levels
- Using sleep to ensure processor time
- Determining which methods to use to pass data between threads

Timing Applications and Acquiring Data

During this lesson, you implement the data acquisition and timing portion of a real-time application. You learn about using software to time an application and using hardware to time an application. Topics include:

- Using software for timing including the timed loop
- Using hardware for timing
- Event response in an application

Communication

During this lesson, you implement the communication portion of a real-time application. You learn about communicating with an application on a real-time target from the host computer. You also learn about various communication techniques such as front panel communication, network-published shared variables, TCP, and UDP. Topics include:

- Communicating with applications on an RT target
- Choosing a network communication protocol
- Programming efficient and reliable network communication

Verifying Your Application

This lesson introduces methods for verifying the application, timing, and memory behavior of your application. You apply these methods to a real-time application. Topics include:

- LabVIEW debugging tools
- Benchmarking your application
- Verifying correct timing behavior
- Verifying memory usage
- Verifying overall behavior with the Execution Trace Tool

Deploying Your Application

This lesson describes how to deploy an application for use. Topics include:

- Introduction to deployment
- Creating a build specification
- Communicating with deployed applications
- System replication