

# Getting Started with the LabVIEW™ Desktop Execution Trace Toolkit for Windows

Version 1.0

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# Overview

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The LabVIEW Desktop Execution Trace Toolkit for Windows is a stand-alone application that acquires execution data from LabVIEW applications that run on the desktop. The toolkit displays the data it acquires, called trace data, as events in a table view that you can browse, save, and compare to other collections of trace data. For each execution event that occurs, the table view displays the type of event, the time the event occurs, the VI in which it occurs, and any additional details that are available.

You can use trace data to debug and optimize large LabVIEW applications, including those with multiple loops, client-server architectures, dynamically loaded VIs, and so on. The process of acquiring trace data from a running application is referred to as executing a trace session.

This manual uses an example LabVIEW project to show you how to configure, execute, and save trace sessions in which you acquire and analyze data from a running LabVIEW application.

## System Requirements

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To run the Desktop Execution Trace Toolkit, National Instruments recommends that your system meet the following requirements:

- Windows Vista/XP/2000
- LabVIEW 8.6.1 Base, Full, or Professional Edition, or later
- 512 MB of memory
- Pentium 4 processor or equivalent (Pentium III or Celeron 600 MHz minimum)

## Installing the Desktop Execution Trace Toolkit

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You can install the Desktop Execution Trace Toolkit from the LabVIEW 8.6.1 or later Platform DVDs or from the LabVIEW Desktop Execution Trace Toolkit for Windows installation CD.

### LabVIEW Platform DVDs

You can install all of your LabVIEW products—including LabVIEW and the Desktop Execution Trace Toolkit—using the LabVIEW 8.6.1 or later Platform DVDs. Refer to the *LabVIEW DVD Installation Instructions* or the *LabVIEW Release Notes*, which are available in your LabVIEW box, for information about the LabVIEW Platform DVDs.

# LabVIEW Desktop Execution Trace Toolkit for Windows Installation Media

Complete the following steps to install the Desktop Execution Trace Toolkit from the LabVIEW Desktop Execution Trace Toolkit for Windows installation media.



**Note** Some virus detection programs interfere with the installer. Disable any automatic virus detection programs before you install. After installation, check your computer for viruses and enable any virus detection programs you disabled.

1. Exit all programs before you run the Desktop Execution Trace Toolkit installer.
2. Log on as an administrator or as a user with administrator privileges.
3. Insert the LabVIEW Desktop Execution Trace Toolkit for Windows installation CD and follow the instructions that appear on the screen.
4. Activate the Desktop Execution Trace Toolkit using the NI License Manager.

## Launching the Desktop Execution Trace Toolkit

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After you install the Desktop Execution Trace Toolkit, you can launch the toolkit in any of the following ways:

- In the LabVIEW **Project Explorer** window, right-click **My Computer** and select **Trace Execution** from the shortcut menu. This method launches the toolkit and opens a trace connection to the application instance of the project.
- From a LabVIEW VI, select **Tools»Profile»Trace Execution**. This method launches the toolkit and opens a trace connection to the application instance in which you are developing the VI.
- In Windows, select **Start»All Programs»National Instruments»LabVIEW Desktop Execution Trace Toolkit»LabVIEW Desktop Execution Trace Toolkit**.

# Completing a Trace Session

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When you use the Desktop Execution Trace Toolkit to capture trace data from a LabVIEW application, you are completing a trace session.

## Opening a Trace Connection

To begin a trace session, you must open a trace connection between the Desktop Execution Trace Toolkit and the LabVIEW application instance in which the application you want to debug runs. Complete the following steps to open an example project and open a trace connection to the application instance of the project.

1. In LabVIEW, select **Help»Find Examples** to launch the NI Example Finder.
2. Navigate to **Toolkits and Modules»Desktop Execution Trace** and double-click **Desktop Execution Trace Toolkit.lvproj** to open the example project.
3. In the project, right-click **My Computer** and select **Trace Execution** from the shortcut menu to launch the Desktop Execution Trace Toolkit and open a trace connection to the project.

## Configuring a Trace Session

After you open a trace connection, you can configure the types of execution events you want to trace by selecting execution events to capture.

Complete the following steps to configure the trace session for the trace connection you opened in the previous section.



1. In the Desktop Execution Trace Toolkit, click the **Configure** button, shown at left, to display the **Configure Trace Session** dialog box.
2. Ensure that checkmarks appear in the checkboxes for the events you want to trace. Selecting only the events you want to trace reduces the amount of data the toolkit must process and that you must analyze. For this example, you can use the default configuration.
3. Click the **OK** button to apply the configuration settings and close the **Configure Trace Session** dialog box.

## Executing a Trace Session

After you open a trace connection and configure the trace data you want to acquire, you are ready to execute a trace session and capture the trace data. Complete the following steps to execute a trace session.



1. In the Desktop Execution Trace Toolkit, click the **Start** button, shown at left, to begin tracing data.
2. In the LabVIEW **Project Explorer** window, expand the **Tests** folder and double-click **Desktop Execution - Generate Trace Events.vi** to open the VI.
3. Click the **Run** button to run the VI. The Desktop Execution Trace Toolkit begins tracing the execution events that occur as the VI runs and displays the events in the table view.

By default, the table view displays each event in the order it occurs, the time each event occurs, the VI that triggers the event, the type of the event, and details about the event. Right-click a column header to select the columns you want to show or hide in the table view.

You can select an event from the table view to display additional details about the event in the **Event Details** section at the bottom of the table.

4. Click the buttons on the front panel of the Desktop Execution - Generate Trace Events VI to see how the Desktop Execution Trace Toolkit captures data about the type of event the button triggers. For example, click the **Load Dynamic VI** button to see the events that occur when the parent VI loads a subVI dynamically.
5. (Optional) Double-click an event in the table view of the Desktop Execution Trace Toolkit to highlight where the event occurs on the LabVIEW block diagram.
6. Click the **Stop** button on the front panel of the Desktop Execution - Generate Trace Events VI to stop the VI.
7. In the Desktop Execution Trace Toolkit, click the **Stop** button, shown at left, to stop tracing data and complete the trace session.



If you are tracing an application that you expect to generate a large number of events, you can improve performance by only displaying trace data in the table view after the trace session is complete. Right-click the table view and select **Display Refresh Off** from the shortcut menu to disable automatic refreshing of the table view. In this mode, the table view waits until you stop the trace session to display the trace data.

You also can improve performance by disabling table highlighting. By default, the Desktop Execution Trace Toolkit highlights different event types using different background colors for the event types. Select **Tools»Options** to display the **Options** dialog box, and select **Table Highlight** from the **Category** list to display the **Table Highlight** page.

Place a checkmark in the **Disable Highlighting** checkbox and click the **OK** button to disable table highlighting.

## Filtering a Trace Session

Executing a trace session even on a small application can capture hundreds of execution events. You can make the table view easier to read by filtering the events that the table view displays. For example, you can filter events that occur in specific VIs. Complete the following steps to filter VI events.

1. Click the **Start** button to start a new trace session using the same example project from the previous exercise.
2. In LabVIEW, click the **Run** button to run the Desktop Execution - Generate Trace Events VI.
3. In the Desktop Execution Trace Toolkit, double-click the new trace session that appears in the **Trace Data** view. A new tab appears in the table view and displays trace data for the current trace session.
4. In the Desktop Execution - Generate Trace Events VI, click the **Load Dynamic VI** button to load the Strip Chart SubVI. In the table view of the Desktop Execution Trace Toolkit, the **VI** column shows events occurring in the Strip Chart SubVI.
5. Click the **Configure Filter** button, shown at left, that appears at the top right of the table view to display the **Configure Displayed Events** dialog box. The **Category** list displays the different sources of trace events.
6. Without removing the checkmark from the checkbox next to the item, select **VIs** from the **Category** list to display the **VIs** page of the dialog box.
7. In the **VIs** list, remove the checkmark from the **Desktop Execution - Strip Chart SubVI.vi** checkbox and click the **OK** button to filter the events that occur in the subVI. The table view updates so that the filtered events no longer appear.
8. Click the **Stop** button on the front panel of the Desktop Execution - Generate Trace Events VI to stop the VI.
9. In the Desktop Execution Trace Toolkit, click the **Stop** button to stop tracing data and complete the trace session.



Filtering events prevents those events from appearing in the table view. However, the Desktop Execution Trace Toolkit continues to trace filtered events. You can use the **Configure Displayed Events** dialog box to specify events to filter or display at any time. The table view updates to match the new configuration settings each time you click the **OK** button in the **Configure Displayed Events** dialog box. You also can click the **Clear Filter** button, shown at left, to stop filtering events.





**Note** If you do not want the Desktop Execution Trace Toolkit to trace a specific type of event at all, you must deselect that event type in the **Configure Trace Session** dialog box mentioned in the *Configuring a Trace Session* section.

## Saving or Exporting a Trace Session

After you complete a trace session, you can save the session to view at a later time. Select **File»Save Trace** or right-click the trace session name in the **Trace Data** view and select **Save Trace** from the shortcut menu to save the trace session. Select **File»Load Trace** to load a saved trace session.

The Desktop Execution Trace Toolkit saves trace sessions as trace tool data (.ttt) files that the toolkit recognizes and can reload in the table view. Only the Desktop Execution Trace Toolkit recognizes this file format. However, you can export trace sessions to text (.txt) files that you can view in any text editor. Right-click a display in the table view or a trace session name in the **Trace Data** view and select **Export Trace** from the shortcut menu to export a trace session to a text file.



**Tip** You can use the **General** page of the **Options** dialog box to configure the appearance of the text file. Select **Tools»Options** to display the **Options** dialog box, and select **General** from the **Category** list to display the **General** page.

## Comparing Trace Sessions

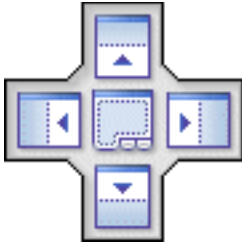
Each application instance in the **Trace Data** view has a default tab that updates to show new trace data each time you execute a trace session. However, you can split a single tab into multiple displays to display multiple trace sessions on a single tab. Complete the following steps to display the two trace sessions you completed in this chapter on one tab in the table view.

1. With either tab visible, right-click the table view and select **Split Display»Horizontal** from the shortcut menu. The tab splits into two displays.
2. By default, a new display contains the same data as the display from which you create it. Right-click one of the displays and select **Clear Display** from the shortcut menu to clear the display.
3. In the **Trace Data** view, select the trace session that does not currently appear on the tab and drag it the display you cleared. The display updates to show the data from that trace session.

You also can view multiple trace sessions at once by creating separate, floating windows for tabs. After you create a floating window, you can dock the window so it appears in a fixed location in the application window. Right-click a tab name and select **Float** from the shortcut menu to display the tab in a separate, floating window.



**Note** You cannot float the first or default tab for an application instance.



Grab the title bar of the floating window and drag the window to display docking icons, shown at left. While dragging the window, move the cursor over one of the docking icons and release the mouse button to dock the window at the highlighted location.

## Advanced Debugging Options

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The Desktop Execution Trace Toolkit offers the following advanced debugging options.



- **Tracing User-Defined Trace Events**—If you install the Desktop Execution Trace Toolkit on a computer with LabVIEW 8.6.1 or later, the Generate User-Defined Trace Event function, shown at left, appears on the **Functions** palette in LabVIEW. When this function executes, the **Event** column of the Desktop Execution Trace Toolkit table view displays a **User Defined** trace event. The **Details** column displays any values you wire to the inputs of the function. For example, if you execute a trace session on a LabVIEW application that writes a string to a file, you can wire the string to the **trace string** input of the Generate User-Defined Trace Event function. When the function executes, the **Details** column of the table view displays the exact string that the application writes.

Refer to the *LabVIEW Help* for more information about the Generate User-Defined Event function.

- **Debugging LabVIEW Stand-Alone Applications and Shared Library Files**—You also can use the Desktop Execution Trace Toolkit to debug stand-alone applications and shared library files that you build using the LabVIEW Application Builder. Refer to the *LabVIEW Desktop Execution Trace Toolkit Help*, accessible in the toolkit by selecting **Help»Launch Help**, for information about debugging LabVIEW built applications and shared library files.



# Related Documentation

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The following document contains information that you may find helpful as you use the Desktop Execution Trace Toolkit:

- *LabVIEW Desktop Execution Trace Toolkit for Windows Help*—This help file contains information about the Desktop Execution Trace Toolkit environment, including views, menus, buttons, and dialog boxes. This help file also includes step-by-step instruction for completing trace sessions. In the toolkit, select **Help»Launch Help** to access this help file.
- *LabVIEW Help*—This help file contains information about LabVIEW palettes, menus, tools, VIs, and functions. This help file also includes step-by-step instructions for using LabVIEW features. In LabVIEW, select **Help»Search the LabVIEW Help** to access this help file.

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