

OVERVIEW CARD

NI TestStand™ System and Architecture

NI TestStand is flexible test management software that offers the following major features:

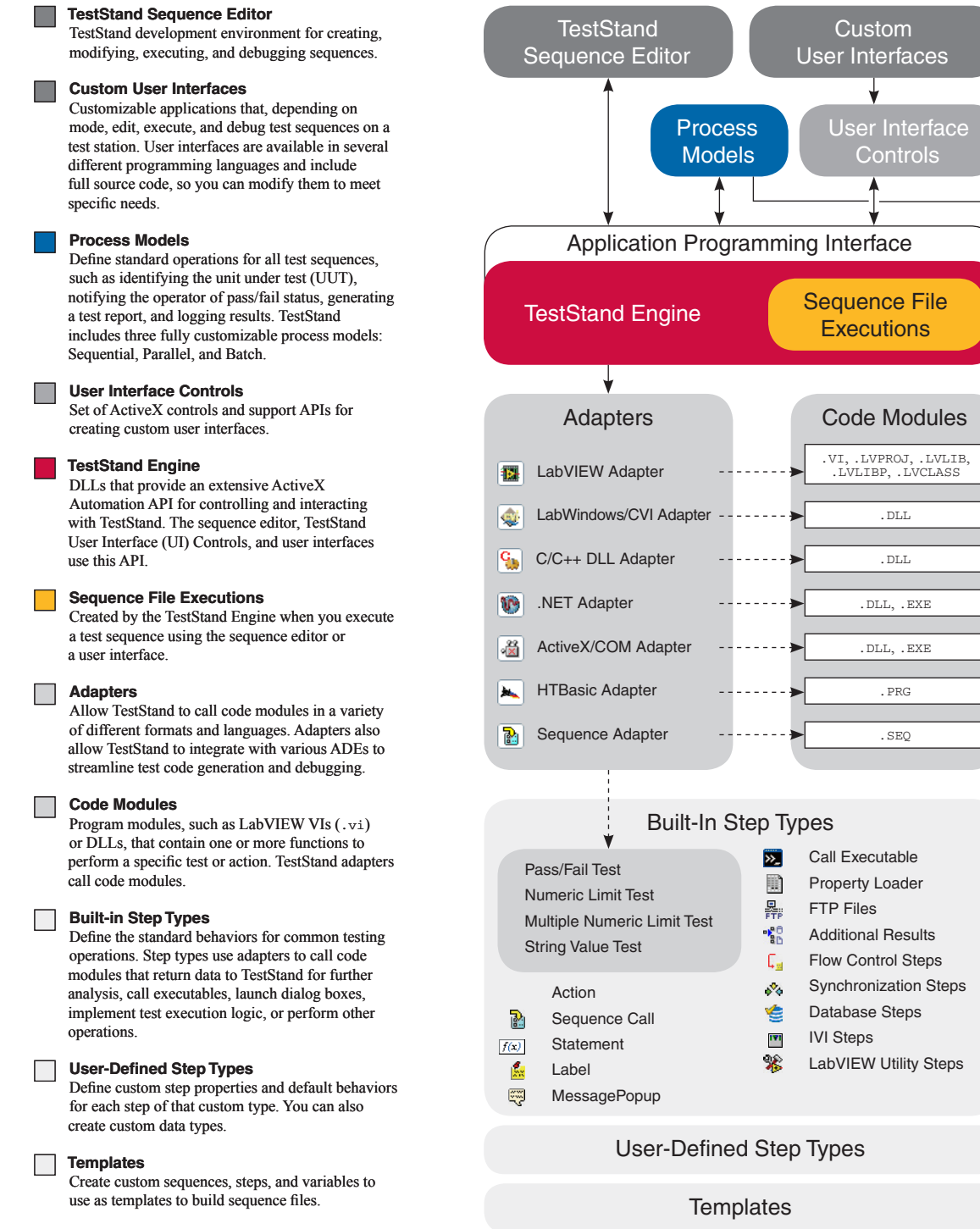
- Out-of-the-box configuration and components that provide a ready-to-run, full-featured test management environment.
- Numerous methods for modifying, configuring, and adding new components, which provide extensibility so you can create a test executive that meets specific requirements without altering the core TestStand Engine. You can upgrade to newer versions of TestStand without losing the customizations.
- Sophisticated sequencing, execution, and debugging capabilities, and a powerful TestStand Sequence Editor that is separate from the user interfaces.
- User interface controls for creating custom user interfaces and sequence editors. You can also create custom user interfaces in any programming language that can host ActiveX controls or control ActiveX Automation servers.
- Example user interfaces with source code for LabVIEW, LabWindows™/CVI™, Microsoft Visual Basic .NET, C#, and C++ Microsoft Foundation Classes (MFC).
- An open language interface that provides support for many application development environments (ADEs). You can create code modules in a variety of ADEs and call pre-existing modules or executables.
- A comprehensive application programming interface for building multi-threaded test systems and other sophisticated test applications.
- Integration with third-party source code control providers.
- Deployment tools to help you transfer a test system from development to production.

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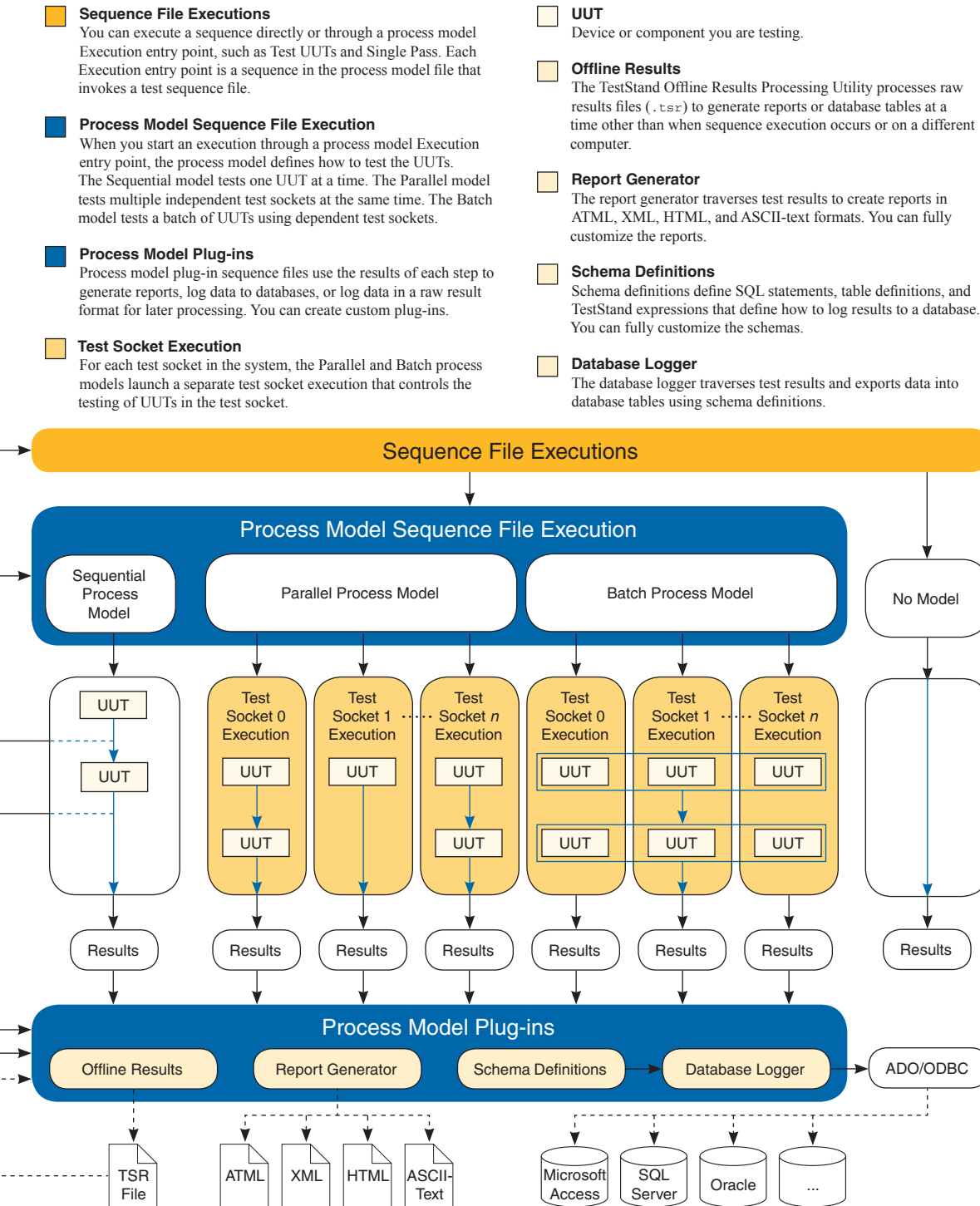
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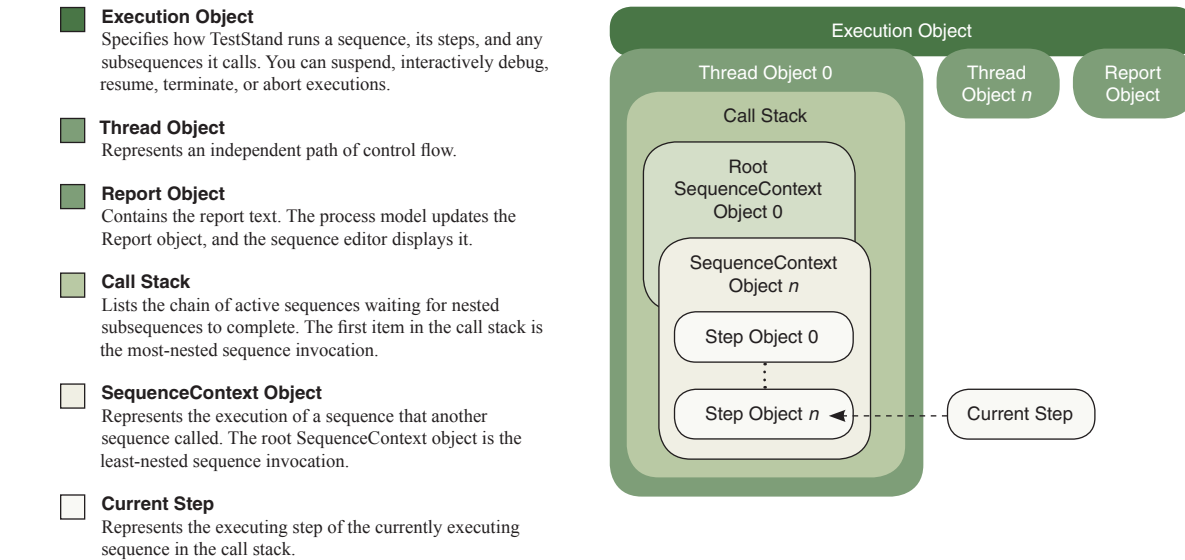
Architecture Overview



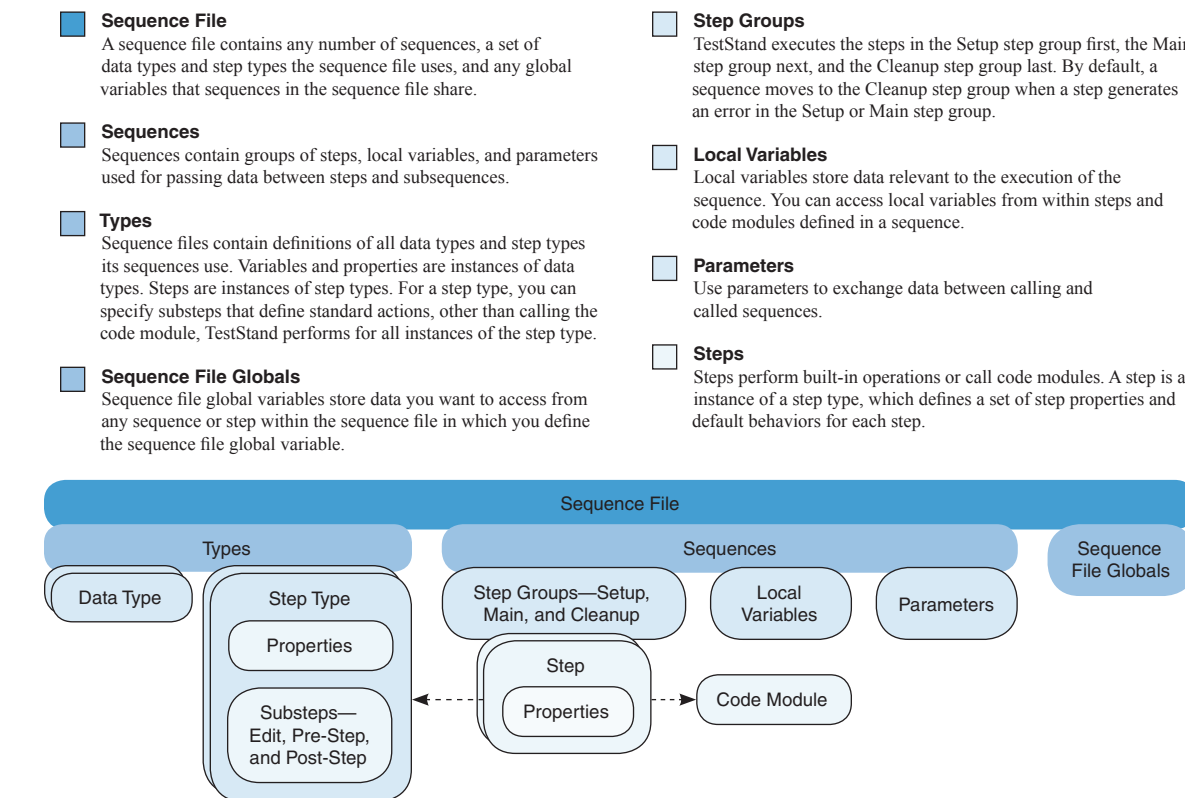
Sequence File Execution Flow



Execution Object Structure



Sequence File Structure



User Interface Overview

TestStand includes separate user interface applications developed in LabVIEW, LabWindows/CVI, Visual Basic .NET, C#, and C++ MFC. Because TestStand also includes the source code for each user interface, you can fully customize the user interfaces. You can create custom user interfaces using any programming language that can host ActiveX controls or control ActiveX servers. With the user interfaces in Editor Mode, you can modify sequences and create and modify sequence variables, sequence parameters, step properties, and so on. With the user interfaces in Operator Mode, you can start multiple concurrent executions, set breakpoints, and single-step through sequences.

Sequence View
Lists the currently open sequence files and executions.

Execution View
Lists steps in the sequence and step group for the sequence file you select in the list bar.

Report View
Displays the report for the execution you select.

Sequence File Window
Displays step types and templates you can insert into sequence files.

Insertion Palette
Displays step types and templates you can insert into sequence files.

Sequence File Window
Displays step types and templates you can insert into sequence files.

Step Settings Pane
Specifies the settings for the step, such as code module parameters, switching, flow control, and post actions.

Analysis Results Pane
Displays the analysis results for the current TestStand Sequence Analyzer project and for each sequence file and workspace file you analyze.

Variables Pane
Displays globals, variables, parameters, and properties, including the values, that steps can access at run time.

Templates List
Organizes custom sequences, steps, and variables you can use as templates for building sequence files.

Workspace Pane
Manages projects for source code control (SCC) integration and deployment. TestStand integrates with third-party SCC packages to add files, obtain the latest versions of files, and check files in and out. Use TestStand project (.tproj) files to organize sequence files and code module files in folders.

Sequence Hierarchy Window
Displays a graph of the sequence call and callback relationships among sequence files and sequences to more easily visualize, navigate, and maintain test sequences.

Types Window
Contains definitions of custom data types and step types all sequence files can use.

User Manager Window
Administers users for the test station, groups to which users belong, login names, passwords, and privileges.

TestStand Sequence Editor Overview

You can use the fully customizable TestStand development environment to create, modify, execute, and debug sequences. You can also use the sequence editor to modify step types, data types, process models, and process model plug-ins. You can customize the environment by docking, auto-hiding, and floating panes to optimize development tasks.

Step Types List
Displays step types and step types.

Insertion Palette
Displays step types and templates you can insert into sequence files.

Sequences Pane
Displays the sequences in the sequence file.

Steps Pane
Displays the steps in the sequence you select on the Sequences pane.

Step
Performs built-in operations or calls code modules.

Breakpoints
Suspends an execution before executing the step.

Execution Pointer
Points to the currently executing step at the call stack level you select.

Windows
Displays the sequence files, executions, and other windows open in the sequence editor.

Sequence File Window
Displays sequences and other items in a sequence file.

Templates List
Organizes custom sequences, steps, and variables you can use as templates for building sequence files.

Step Settings Pane
Specifies the settings for the step, such as code module parameters, switching, flow control, and post actions.

Analysis Results Pane
Displays the analysis results for the current TestStand Sequence Analyzer project and for each sequence file and workspace file you analyze.

Variables Pane
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User Manager Window
Administers users for the test station, groups to which users belong, login names, passwords, and privileges.

The sequence editor provides familiar LabVIEW, LabWindows/CVI, and Microsoft Visual Studio debugging tools, including breakpoints, single-stepping, stepping into or over function calls, tracing, a Variables pane, and a Watch View pane. In the sequence editor, you can start multiple concurrent executions, execute multiple instances of the same sequence, and execute different sequences at the same time. Separate Execution windows display each execution. In trace mode, the Execution window displays the steps in the currently executing sequence. When you suspend an execution, the Execution window displays the next step to execute and provides single-stepping options.

Breakpoints
Suspends an execution before executing the step.

Execution Pointer
Points to the currently executing step at the call stack level you select.

Windows
Displays the sequence files, executions, and other windows open in the sequence editor.

Sequence Files
Lists the sequence files currently open in the editor.

Executions
Lists the active executions of the sequence files.

Other
Lists other open windows in the TestStand environment.

Steps
Displays the steps in the current execution, including their status and settings.

Call Stack
Displays the threads, call stack, and steps an execution runs. When execution completes, the Execution window displays the report for the execution.

Threads
Lists the threads in the current execution.

Output
Displays output messages that expressions and code modules post to the TestStand Engine.

Watch View
Displays the values of specified variables, properties, and expressions during an execution.

Deployment Overview

Use the TestStand Deployment Utility to create a deployable image or a patch deployment of a TestStand system and an optional installer. The deployable image can contain sequence files, code modules, process models and supporting files, user interface applications, configuration files, and step types and supporting files the TestStand system uses. The installer can contain all files from a deployable image or contain only a subset of files to create a patch deployment for a previously deployed image.

Mode
Provides options for creating a full deployment or a patch deployment and for specifying related settings for each type of deployment.

System Source
Provides options for specifying the workspace file or directory that specifies which files to deploy and the location to create the deployment image.

Distributed Files
Lists the files included in the deployment and provides options for configuring the installer destination location and settings for each file.

Installer Options
Provides options for configuring the workspace file or directory that specifies which files to deploy and the location to create the deployment image.

Build Status
Displays progress and log information when analyzing files to include in a deployment and when building a deployment image and installer.

Documentation Overview

The *Guide to TestStand Documentation* topic in the *NI TestStand Help* contains links to all the TestStand documentation in electronic format and recommends the order in which you examine the documentation. You can access the *Guide to TestStand Documentation* topic in the following ways:

- Select **Help>Guide to Documentation** in the sequence editor.
- (Windows 8.1 or 8) Click the **NI Launcher** tile on the Start screen and select **TestStand>TestStand Documentation>TestStand Guide to Documentation**.
- (Windows 7 or earlier) Select **Start>All Programs>National Instruments>TestStand>TestStand Documentation>TestStand Guide to Documentation**.

NI TestStand Release Notes

Use this document to learn about system requirements, installation instructions, information about new features, and other changes since the previous version of TestStand.

Getting Started with TestStand

Use this manual to familiarize yourself with the TestStand environment and the basic features you use to build and run test sequences.

NI TestStand Help

Use this help file to learn more about TestStand concepts, the TestStand environment, the TestStand User Interface Controls and TestStand Engine APIs, the TestStand ActiveX Automation server, the TestStand example programs, and deploying TestStand systems.

NI TestStand VIs and Functions Help

Use this help file, accessible only from LabVIEW, to learn more about TestStand-specific VIs and functions.

NI TestStand User Interface Controls Reference Poster

Use this poster as a reference of the classes, properties, methods, and events found in the TestStand UI Controls API, as well as an illustration of the built-in connections between the TestStand UI Controls.

NI TestStand API Reference Poster

Use this poster as a reference of the classes, properties, methods, and events in the TestStand API, and as an illustration of API inheritance.

Example Programs

Use the TestStand example programs, located in the <TestStand Public>\Examples directory, to help you learn and understand key concepts and to use as a starting point for applications you create.

NI TestStand Advanced Architecture Series

Refer to the *NI TestStand Advanced Architecture Series* for more advanced concept and architecture information for experienced TestStand users with complex projects. Visit ni.com/info and enter the Info Code `rtaas` to locate the series.