

What's New in Cantata 9.1?

Cantata 9.1 is available from October 2020. This release further extends the AutoTest capability to provide automatic test generation for C++ code, adds HTML certified test results output, and includes various other productivity and flexibility enhancements.

This document details all the most important changes in Cantata version 9.1.

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Introduction

Cantata 9.1 is available from October 2020. This release further extends the AutoTest capability to provide automatic test generation for C++ code, and adds HTML certified test results output.

Cantata 9.1 also contains several other productivity and flexibility enhancements as well as fixes. The full set of changes are documented in the Release Notes which track all changes in Cantata since version 4.1. The most important changes in this release are highlighted in the sections below.

Enhanced AutoTest Support for C++

The Cantata AutoTest feature has been enhanced to provide even more automatic test generation for C++ code. The enhancements include support for:

- All C++ language features in C++11 and C++14 (for g++ based compilers)
- Run-time Type Information

These enhancements build on the C++ support included in Cantata 9.0 for:

- C++ concrete & abstract base classes
- Overloading and inheritance
- Namespaces and classes
- Exception handling
- Templates when explicitly instantiated within the given code
- Mixed C & C++ code bases

Cantata AutoTest parses C++ source code to determine all possible paths through the code as defined by a structural code coverage metric target (i.e. 100% function Entry-points, 100% Statements, 100% Decisions, or 100% Unique Cause MC/DC). An algorithm creates test case vectors that exercise all required code paths, using powerful Cantata white-box capabilities to set data, parameters and control function call interfaces.

6X Faster GUI

As Cantata users expand the scope of the test projects to ever larger and more complex projects, the amount of data loading required in the Cantata Eclipse GUI increases. In Cantata 9.1 the Eclipse GUI has been optimised to accelerate data loading across the various synchronised test views in the IDE.

We use a benchmark Eclipse workspace consisting of a C++ project of 135 source files to generate a Cantata test script using default settings for sample source files.

In Cantata 9.0 this took 30 seconds, in Cantata 9.1 only 5 seconds (6 times faster). While speed performance will always vary according to the development environment and computing power, this benchmark illustrates the acceleration advantage of staying up to date with Cantata versions.

Cantata Certified Test Report in HTML format

HTML is a practical and user-friendly format for sharing test results over company network and between collaborative working tools. Until this release, only the plain ASCII text Cantata Test Results (.CTR) files could be used as certification evidence artefacts, because the XML and HTML reports were produced by Eclipse plug-in; ancillary tools not part of the certified Cantata Core Product.

Cantata 9.1 now provides both command line and GUI conversion of the Cantata Test Results (.CTR) files from ASCII text format to HTML using a new certified Cantata Core Product executable. This formats the test results into single HTML file, which can be submitted as certification evidence of test results in compliance with all the software safety standards supported by Cantata.

The HTML format CTR file provides expandable / collapsible sections to drill into the detailed results of test cases, and colours the results of checks, warnings and errors for easy identification.

Cantata Test Harness 9.1 (c) 2020 QA Systems GmbH

Test Description: values_check
 Configuration: x86-Win32-gcc8.2-bundled
 Test Started: Fri Sep 04 18:00:46 2020
 Test Ended: Fri Sep 04 18:00:46 2020

Overall Result: FAIL

0 Script Errors	4 Checks Failed	16 Checks Passed	0 Checks Warned	0 Call Sequence Failures
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✓ Test case: 1: low_value_check Result: **FAILED**

default case

FAILED: Check
returnValue = 2

Expected:	2
Actual:	1

PASSED: Check
checked_status = expected_checked_status

Value:	1431655765
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Call sequence matched:

> Test case: 2: high_value_check Result: **PASSED**

> Test case: 3: values_check Result: **PASSED**

> Test case: COVERAGE RULE SET Result: **FAILED**

EXPORT_COVERAGE: coverage data written to "atest_values_check.cov"

Test Case	Script Errors	Checks Failed	Checks Passed	Checks Warned	Call Sequence Failures	Test Result
1: low_value_check	0	1	4	0	0	FAIL
2: high_value_chec	0	0	5	0	0	PASS
3: values_check	0	0	5	0	0	PASS
COVERAGE RULE SET	0	3	2	0	0	FAIL
Other	0	0	0	0	0	PASS
TOTALS	0	4	16	0	0	FAIL

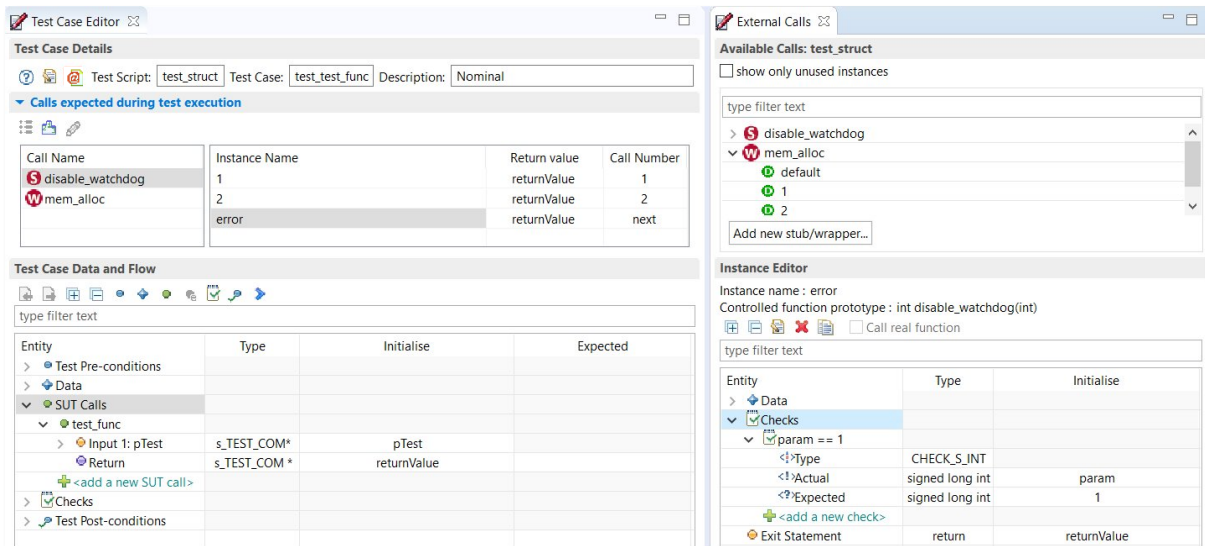
Example Cantata CTR file in HTML

CTR Format Changes

Cantata 9.1 now includes the full source file path names in the code coverage section of the .CTR file, making it easier to identify the executed code when multiple source files with the same name are tested. The full (previously truncated) test case name is also now reported in the .CTR file summary block, and where that summary is output to the console.

Easier Control of Calls in GUI

In Cantata 9.1 the display and selection of Cantata controlled (stubbed or wrapped) function / methods calls has been relocated to the top of Test Case Editor for easier management of calls expected during test case execution. Controlled call instance configuration is in a separate External Calls view for improved visibility and instance management across the whole test script.



New layout of Test Case Editor and Cantata controlled Externals Calls management view

More Flexible Inclusion / Exclusion for Code Coverage

In previous versions of Cantata, code coverage on the Software Under Test (SUT) could only be configured by selecting matching function names. To support the growing adoption of Cantata for integration and system testing of larger code bases, Cantata 9.1 makes that more flexible by allowing SUT selection for coverage on the same pattern matching basis for files and directories. This file-based selection is simpler for excluding header files from code coverage. The directory and file-based inclusion / exclusion selection can be by both absolute and relative paths.

To aid reporting clarity, the code coverage results in Cantata 9.1 can be set to report (in the .CTR file) code coverage grouped by file or line number of file order, overriding the default reporting of coverage by the order in which the SUT was executed.

Updated Eclipse Version Support

As with every version of Cantata, support for platforms has been updated.

Cantata is tightly integrated with leading Integrated Development Environments which are Built-on-Eclipse®, and toolchains available as Eclipse-Ready® plug-ins.

Cantata 9.1 is built on the Eclipse 2019-12 release (Eclipse 4.14) and is also available to install as an Eclipse-Ready plug-in set for versions from Luna (4.4) up to Eclipse 2019-12 (4.14).

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