



## Writing C Rules Using RuleChecker Tcl Verifier

Before using this information, be sure to read the general information under “Notices” section, on page 9.

This edition applies to **VERSION 6.6, IBM Rational LOGISCOPE** (product number 5724V81) and to all subsequent releases and modifications until otherwise indicated in new editions.

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# About this manual

## Audience

This reference manual is intended for **IBM® Rational® Logiscope™** users such as software developers, project managers or quality engineers who want to use the Logiscope toolset within the **Microsoft Visual C++ .NET** environment.

## Overview

This manual is a complement to the **Rational Logiscope** documentation.

- Section 1 explains what is the content of the integration.
- Section 2 explains how to install the integration.
- Section 3 tours the available functionalities of the integration.

## Conventions

The following typographical conventions are used in this manual:

<i>italics</i>	names of textual elements (filename), notes, documentation titles.
<code>typewriter</code>	screen and file examples.

## Contacting IBM Rational Software Support

If the self-help resources have not provided a resolution to your problem, you can contact IBM® Rational® Software Support for assistance in resolving product issues.

**Note.** If you are a heritage IBM Rational customer, you can go to <http://support.IBM.Rational.com/toolbar> and download the IBM Rational IBM Rational Software Support browser toolbar. This toolbar helps simplify the transition to the IBM Rational IBM Rational product online resources. Also, a single reference site for all IBM Rational IBM Rational support resources is located at: <http://www.ibm.com/software/rational/support/IBM.Rational/>

## Prerequisites

To submit your problem to IBM Rational Software Support, you must have an active Passport Advantage® software maintenance agreement. Passport Advantage is the IBM comprehensive software licensing and software maintenance (product upgrades and technical support) offering. You can enroll online in Passport Advantage from <http://www.ibm.com/software/lotus/passportadvantage/howtoenroll.html> .

- To learn more about Passport Advantage, visit the Passport Advantage FAQs at [http://www.ibm.com/software/lotus/passportadvantage/brochures\\_faqs\\_quickguides.html](http://www.ibm.com/software/lotus/passportadvantage/brochures_faqs_quickguides.html) .
- For further assistance, contact your IBM representative

To submit your problem online (from the IBM Web site) to IBM Rational Software Support, you must additionally:

- Be a registered user on the IBM Rational Software Support Web site. For details about registering, go to <http://www-01.ibm.com/software/support/> .
- Be listed as an authorized caller in the service request tool.

### ***Submitting problems***

To submit your problem to IBM Rational Software Support:

- 1) Determine the business impact of your problem. When you report a problem to IBM, you are asked to supply a severity level. Therefore, you need to understand and assess the business impact of the problem that you are reporting.

Use the following table to determine the severity level.

<b>Severity</b>	<b>Description</b>
<b>1</b>	The problem has a <i>critical</i> business impact. You are unable to use the program, resulting in a critical impact on operation. This condition requires an immediate solution.
<b>2</b>	The problem has a <i>significant</i> business impact. The program is usable, but it is severely limited
<b>3</b>	The problem has a <i>some</i> business impact. The program is usable, but less significant features (not critical to operation) are unavailable.
<b>4</b>	The problem has a <i>minimal</i> business impact. The problem causes little impact on operations or a reasonable circumvention to the problem was implemented.

- 2) Describe your problem and gather background information, When describing a problem to IBM, be as specific as possible. Include all relevant background information so that IBM Rational Software Support specialists can help you solve the problem efficiently. To save time, know the answers to these questions:

- What software versions were you running when the problem occurred?

To determine the exact product name and version, use the option applicable to you:

- Start the IBM Installation Manager and select **File > View**

**Installed Packages.** Expand a package group and select a package to see the package name and version number.

- Start your product, and click **Help > About** to see the offering name and version number.
  - What is your operating system and version number (including any service packs or patches)?
  - Do you have logs, traces, and messages that are related to the problem symptoms?
  - Can you recreate the problem? If so, what steps do you perform to recreate the problem?
  - Did you make any changes to the system? For example, did you make changes to the hardware, operating system, networking software, or other system components?
  - Are you currently using a workaround for the problem? If so, be prepared to describe the workaround when you report the problem.
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For more information about opening a service request, go to <http://www.ibm.com/software/support/help.html> .

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<http://www-01.ibm.com/software/support/isa/faq.html>

- **By phone:** For the phone number to call in your country or region, go to the IBM directory of worldwide contacts at <http://www.ibm.com/planetwide/> and click the name of your country or geographic region.
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If the problem you submit is for a software defect or for missing or inaccurate documentation, IBM Rational Software Support creates an Authorized Program Analysis Report (APAR). The APAR describes the problem in detail. Whenever possible, IBM Rational Software Support provides a workaround that you can implement until the APAR is resolved and a fix is delivered. IBM publishes resolved APARs on the IBM Rational Software Support Web site daily, so that other users who experience the same problem can benefit from the same resolution.

## **Bibliography**

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Tcl and the Tk Toolkit - Addison-Wesley Professional Computing Series  
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[TCL03] BRENT WELCH, KEN JONES, JEFFREY HOBBS

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## 1. Overview

The integration allows access **IBM® Rational® Logiscope™** functionalities from Microsoft Visual C++ .NET graphical environment.

This integration is available for C and C++ Visual C++ projects.

A Visual C++ project shall be considered as a C project if it contains only C source files. A Visual C++ project containing at least one C++ source file shall be considered as a C++ project.

Once the integration is installed it is possible to:

- Build and visualize *QualityChecker* results (e.g. source code metrics, components complexity rating) from the Microsoft Visual C++.NET graphical environment.
- Check rules and visualize violations from the Microsoft Visual C++.NET graphical environment.
- Build instrumented binaries (for test coverage analysis) from the Microsoft Visual C++.NET graphical environment.
- Launch Logiscope **Studio** for a more comprehensive use of Logiscope modules.
- Edit the configuration file for default settings (for instance the set of rule to check).

The integration has been developed and tested with :

- Microsoft Visual C++ .NET 2003 (Microsoft Development Environment 2003 Version 7.1.3088).
- Microsoft Visual C++ .NET 2005 (Microsoft Development Environment 2005 Version 8.0.50727.42).

### Known Limitations:

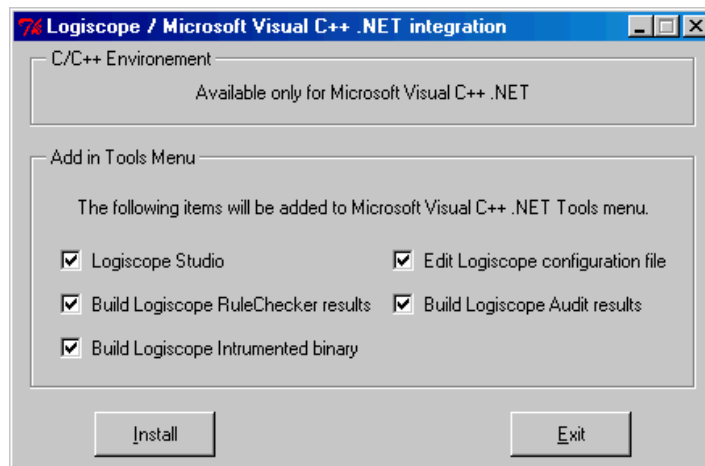
- The Logiscope integration does not work properly when running 2 distinct instances of Microsoft Visual C++.NET in parallel.

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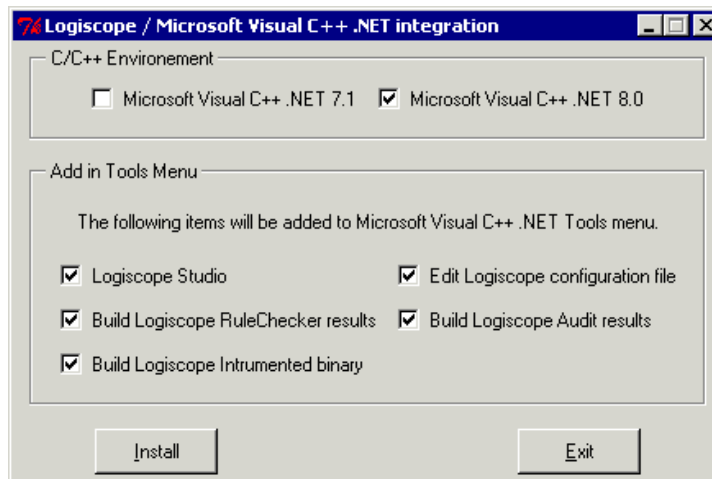
### 2. Installation

Before using the **IBM Rational Logiscope Microsoft Visual C++ .NET** integration, you have first to install it.

1. Launch the installer from the Microsoft Windows Start menu: IBM Rational / IBM Rational Tools / IBM Rational Logiscope 6.6 / Visual C++ .NET Integration / Installation
2. One of the following windows appears:
  - If only one version of Visual C++ .NET is installed on the computer:



- If more than one version of Visual C++ .NET is installed, choose the Visual C++ .NET environments in which you want to install the integration:



3. Choose the options you want to install (by default everything is installed):
  - **Logiscope Studio** : if checked, the corresponding menu item “Logiscope Studio” will be added into the Tools menu of Visual C++ .NET, which will allow you to start Logiscope Studio from Visual C++ .NET environment.
  - **Edit Logiscope configuration file** : if checked, the corresponding menu item will be

added into the Tools menu of Visual C++ .NET, which will allow you to edit the configuration file directly within Visual C++ .NET. The configuration file is used to set default values which are used to create Logiscope projects.

- **Build Logiscope RuleChecker results** :if checked, the corresponding menu item will be added into the Tools menu of Visual C++ .NET, which will allow you to check rules on a Visual C++ project directly from Visual C++ .NET environment.
- **Build Logiscope QualityChecker results** : if checked, the corresponding menu item will be added into the Tools menu of Visual C++ .NET, which will allow you to make a quality analysis of a Visual C++ project directly from Visual C++ .NET environment.
- **Build Logiscope Instrumented binary** : if checked, the corresponding menu item will be added into the Tools menu of Visual C++ .NET, which will allow you to build an instrumented binary, for coverage analysis, from a Visual C++ project directly from the Visual C++ .NET environment.

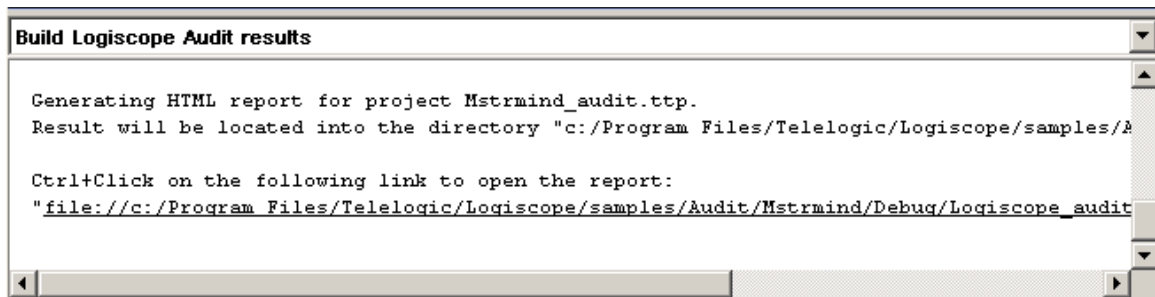
4. Click on Install for the integration to be installed.

## 3. Using Logiscope from Visual C++

### 3.1. Building Logiscope QualityChecker Results

Before using this functionality, the project must be cleaned in order to force a full rebuild, or new Configuration created for the project (to do so use the Configuration Manager of Microsoft Visual C++). The configuration may be called Logiscope.

Once this has been done, activate the menu “Tools/Build Logiscope QualityChecker Results” from Visual C++. The build starts and Logiscope is activated. Logiscope creates a new Logiscope project during the build and produces the *QualityChecker* results. Once the build is finished the following text appears within the output window of Visual C++:



The directory where the *QualityChecker* report has been generated is indicated, and a link to this report is available, using Ctrl+Click on the link will open the *QualityChecker* report of the project in a Microsoft Visual C++ .Net window.

During the build the following files/directories are created:

- *<project\_name>\_audit.ttp* located into the project directory is the Logiscope project corresponding to the Visual C++ project being processed.
- *<target\_directory>/Logiscope\_audit* is the Logiscope repository containing intermediate files produced by Logiscope.
- *<target\_directory>/Logiscope\_audit/audit\_c* for C project or *<target\_directory>/Logiscope\_audit/audit\_cpp* for C++ project is the Logiscope repository containing the HTML report.

### 3.2. Building Logiscope RuleChecker Results

Before using this functionality, the project must be cleaned in order to force a full rebuild, or new Configuration created for the project (to do so use the Configuration Manager of Microsoft Visual C++). The configuration may be called Logiscope.

Once this has been done, activate the menu “Tools/Build Logiscope RuleChecker Results” from Visual C++. The build starts and Logiscope is activated. Logiscope creates a new Logiscope project during the build and produces the RuleChecker results. Once the build is finished the following text appears in the output window of Visual C++:

```

Build Logiscope RuleChecker results
samples\Audit\Mstrmind\machine.c(189) : Portability_13_NoTab: Use of tabulation.
samples\Audit\Mstrmind\machine.c(190) : Portability_13_NoTab: Use of tabulation.
samples\Audit\Mstrmind\machine.c(191) : Portability_13_NoTab: Use of tabulation.
samples\Audit\Mstrmind\machine.c(192) : Portability_13_NoTab: Use of tabulation.
samples\Audit\Mstrmind\machine.c(196) : Portability_13_NoTab: Use of tabulation.
samples\Audit\Mstrmind\machine.c(204) : Portability_1_C++Keywords: C++ keywords not authc
samples\Audit\Mstrmind\machine.c(210) : Portability_13_NoTab: Use of tabulation.
samples\Audit\Mstrmind\machine.c(230) : Portability_13_NoTab: Use of tabulation.

```

Each violation of a rule is listed and a double click on it opens the source file on the appropriate line allowing immediate modification of the source file.

Scrolling down to the end of the output window will show the following text:

```

Build Logiscope RuleChecker results
C:\Program Files\Telelogic\Logiscope\samples\Audit\Mstrmind\machine.c(92) : Portability_1
C:\Program Files\Telelogic\Logiscope\samples\Audit\Mstrmind\machine.c(93) : Portability_1
C:\Program Files\Telelogic\Logiscope\samples\Audit\Mstrmind\machine.c(94) : Portability_1

Ctrl+Click on the following link to open the report:
"file://c:/Program Files/Telelogic/Logiscope/samples/Audit/Mstrmind/Debug/Logiscope_rule/

```

A link to the rule violations report is available, using Ctrl+Click on the link will open the *RuleChecker* report of the project in a Microsoft Visual C++ .Net window.

During the build the following files/directories are created:

- *<project\_name>\_rule.ttp* located into the project directory is the Logiscope project corresponding to the Visual C++ project being processed.
- *<target\_directory>/Logiscope\_rule* is the Logiscope repository containing intermediate files produced by Logiscope.
- *<target\_directory>/Logiscope\_rule/rchk\_c* for C project or *<target\_directory>/Logiscope\_rule/rchk\_cpp* for C++ project is the Logiscope repository containing the html report.

### 3.3. Building Logiscope Instrumented binary

Before using this functionality, the project must be cleaned in order to force a full rebuild, or a new Configuration created for the project (to do so use the Configuration Manager of Microsoft Visual C++). The configuration may be called Logiscope.

Once this has been done, activate the menu “Tools/Build Logiscope Instrumented binary” from Visual C++. The build starts and Logiscope is activated. Logiscope creates a new Logiscope project during the build and produces an instrumented binary for coverage analysis.

During the build the following files/directories are created:

- *<project\_name>\_test.ttp* located in the project directory is the Logiscope project corresponding to the Visual C++ project being processed.

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- `<target_directory>/<target_name>` is the instrumented binary build. Please refer to TestChecker documentation for its usage.

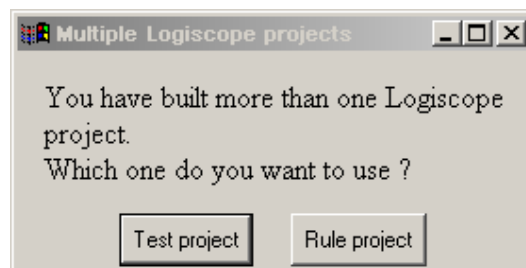
**Note:** The default instrumentation library which comes with the standard Logiscope distribution in the file `/instr/lib/vlgtc.lib` is compiled using the Multi-Threaded model (the Single-Threaded model is no longer supported by Visual C++ .NET 2005). If the application to instrument should be a Single-Threaded one you would need to build a new library using the source file `/instr/src/vlgtchk.c` and reference the newly built library using the configuration file (see 3.5 Edit Logiscope configuration file).

### 3.4. Launching Logiscope Studio

Once a Logiscope project has been built, a more comprehensive examination of Logiscope results may be achieved by launching Logiscope Studio. Logiscope Studio allows to go deeper in the exploitation of the produced Logiscope data and in turn to start Logiscope Viewer for a deep quality analysis or TestChecker for running tests and coverage analysis.

To start Logiscope Studio from Microsoft Visual C++ .NET graphical environment activate the menu “Tools/Logiscope Studio”.

If more than one Logiscope project have been built from the same Microsoft Visual C++ project, for instance a RuleChecker project and a TestChecker project, a dialog pops up to ask which one has to be open. This dialog looks like:



Click on the kind of project you want to open with Logiscope Studio.

### 3.5. Customizing the integration

To customize the integration, you can edit the configuration file in Microsoft Visual C++ .NET environment.

Mainly, this file used to setting up:

- the C or C++ dialect for parsing code;
- the default quality model used by *Logiscope QualityChecker* for quality evaluation, default is the `Logiscope.ref` file delivered with the standard Logiscope distribution in the Ref folder;
- the default rule set(s) used by *Logiscope RuleChecker* for rule checking;
- the default support library used by *Logiscope TestChecker* to instrument source code under test.

```

#####
# This file is used for Logiscope / VC++ .NET
# integration customization.
#####

# Note:
# Into this script the tcl variable $InstallDir refers
# to the current Logiscope installation directory

#####
# Logiscope QualityChecker C
#####
# Dialect:
set CAuditDefaultDialect msc70

# Quality Model:
set CAuditDefaultQualityModelFile [file join $InstallDir Ref Logiscope.ref]

#####
# Logiscope QualityChecker C++
#####
# Dialect / parser configuration file:
set CppAuditDefaultParserConfigFile MFC

# Quality Model:
set CppAuditDefaultQualityModelFile [file join $InstallDir Ref Logiscope.ref]

#####
# Logiscope RuleChecker C
#####
# Dialect:
set CRuleDefaultDialect msc70

# Rule set: (Default is the Portability.rsf file from the installation)
set CRuleDefaultRuleSetFile [file join $InstallDir util Portability.rsf]

#####
# Logiscope RuleChecker C++
#####

```

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```
# Dialect / configuration file:
set CppRuleDefaultParserConfigFile MFC

# Rule set:
set CppRuleDefaultRuleConfigFile [file join $InstallDir data audit_c++
RuleChecker.cfg]

#####
# Logiscope TestChecker C
#####
# Dialect
set CTestDefaultDialect msc70

# Support instrumentation library: to be linked with the instrumented binary
set CTestDefaultInstrumentationLib [file join $InstallDir instr lib vlgtc.lib]

# Location of the prototypes of instrumentation functions:
set CTestDefaultInclude "/I\"$::InstallDir/instr/include\" /I."

# set 0 or 1 to turn off or on MC/DC instrumentation
set CTestInstrumentMCDC 1

#####
# Logiscope TestChecker C++
#####
# Support instrumentation library: to be linked with the instrumented binary
set CppTestDefaultInstrumentationLib [file join $InstallDir instr lib
vlgtc.lib]

# Ignore file:
set CppTestDefaultIgnoreFile [file join $InstallDir util log_inst.ign]

# Alias file:
set CppTestDefaultAliasFile [file join $InstallDir util log_inst.al]

# Instrumentation Model:
set CppTestDefaultTclFile [file join $InstallDir util log_inst.tcl]

# Location of the prototypes of instrumentation functions:
set CppTestDefaultInclude "/I\"$::InstallDir/instr/include\" /I."
```



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