Verifysoft TECHNOLOGY

Software Testing Solutions for your Productivity and Quality

- Code Coverage
- Software Complexity Measurement
- Static Code Analysis
- Dynamic Code Analysis
- Safety-critical Embedded

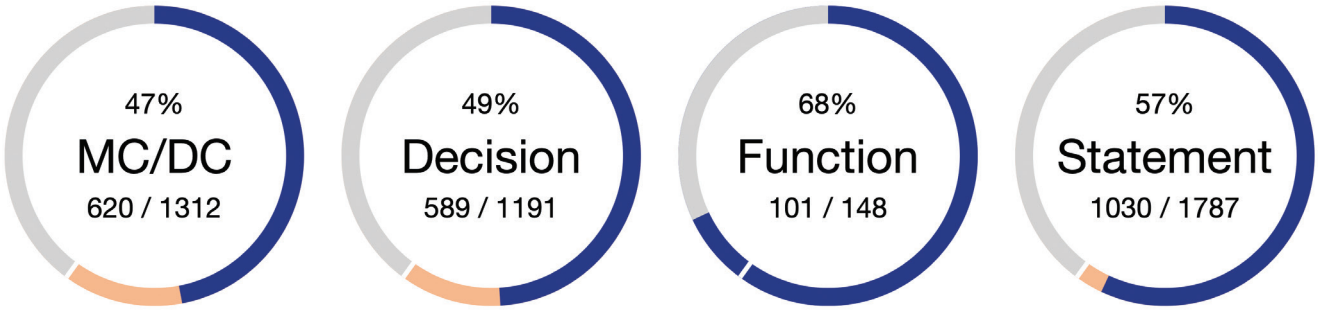
Testwell CTC++ Code Coverage Analyser

Code coverage for the highest requirements of safety standards

Testwell CTC++ analyzes which parts of your source code have been tested. Testwell CTC++ supports all coverage levels and is used by leading companies for safety-critical projects.

Coverage levels

Testwell CTC++ provides all coverage levels required by standards for safety-critical software development: function coverage, statement coverage, decision or equivalently branch coverage and modified condition/decision coverage (MC/DC). Condition and multicondition coverage can also be determined.

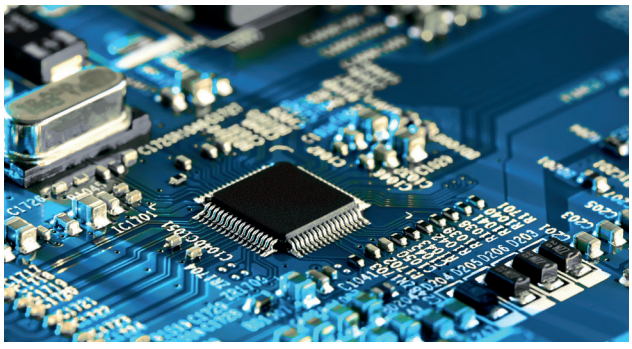


Desktop applications

- ✓ Low impact on the build process
- ✓ Scalable for large projects
- ✓ Compiler-independent
- ✓ For Windows, Linux, macOS

Embedded software

- ✓ Low memory requirements
- ✓ Testing on any target
- ✓ With any cross compiler
- ✓ Customizable runtime layer



Easy to use

- ✓ Generic build integration
- ✓ Very fast execution
- ✓ Seamless integration into many IDEs
- ✓ Ease of integration by modular architecture

Programming languages

- ✓ C, C++
- ✓ Add-Ons for Java and C#

Working method

Coverage measurement is performed with Testwell CTC++ in three independent phases:

Instrumentation

During compilation, Testwell CTC++ automatically instruments a copy of the source code by injecting measurement code. This creates an instrumented version of the program or test executable – fully automatically during the build process or on the basis of a simple, one-time build configuration.

Testing

Any type of tests can be executed as usual: Unit tests, integration tests or complete system tests. The coverage measurement data are written to a file. When performing tests on a target, this write-out is fully adjustable, e.g. the data can be transferred directly to the host computer.

Generating reports

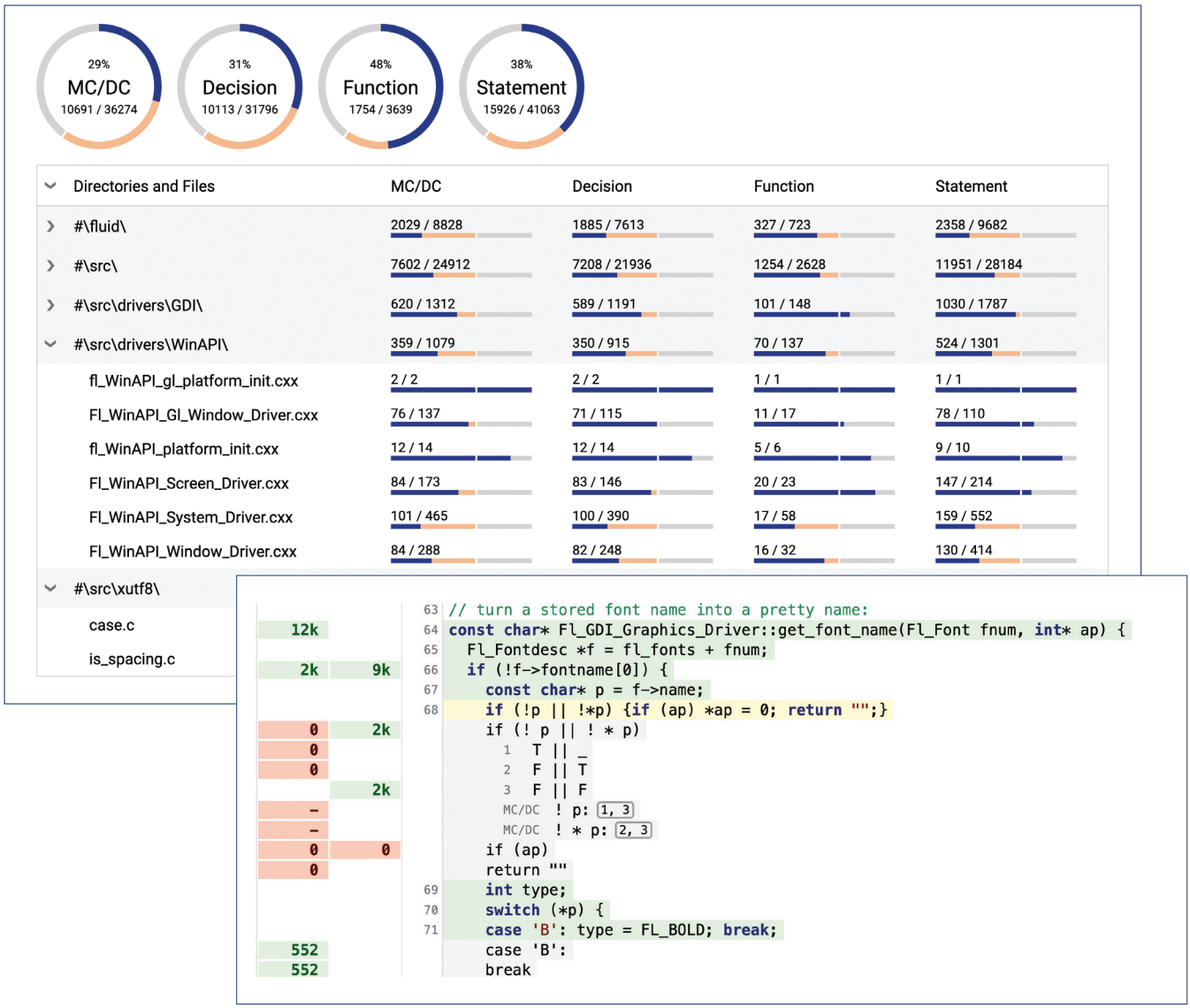
In the third phase, Testwell CTC++ generates coverage reports based on the raw data. Data from different builds and different tests can be combined. A structured HTML report and any text-based exchange formats are available as output formats.

Functional safety

- ✓ Suitable for safety-critical development according to:
  - ✓ ISO 26262
  - ✓ DO 178-C
  - ✓ EN 50657 / EN 50128
  - ✓ IEC 61508
  - ✓ IEC 62304
  - ✓ IEC 60880
  - ✓ ISO 25119 / DIN EN 16590
- ✓ Qualification support
- ✓ TÜV-certified
  - ✓ ISO 26262
  - ✓ IEC 61508
  - ✓ EN 50128
  - ✓ IEC 62304

Coverage reports

Testwell CTC++ provides a comprehensive HTML report that is adaptable to the user's needs and to the type and size of the project.



Configurable report layout

- ✓ Desired coverage levels in any combination
- ✓ Selectable report levels with drill-down: directories, source files, functions

Optional source code view

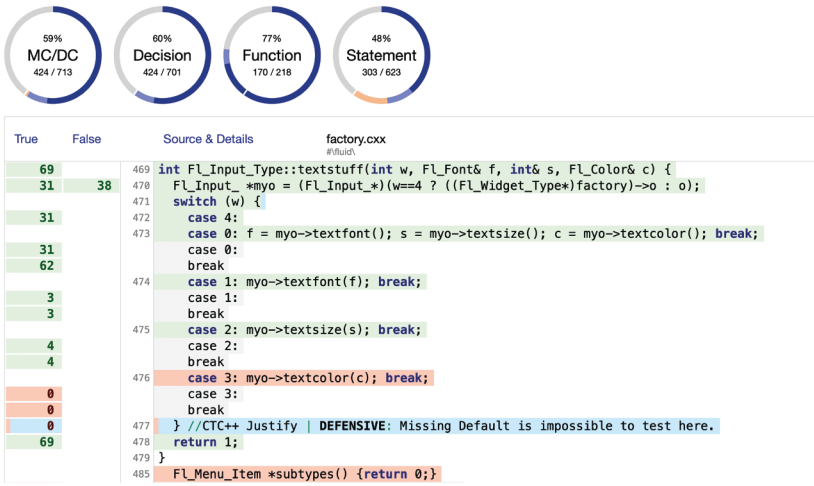
- ✓ Highlighting of executed and not executed lines
- ✓ Display of all coverage counters
- ✓ Compact visualization of complex coverage measures like MC/DC
- ✓ Visibility of missing test cases

Justification of missing coverage

Justifications can be used to record the reasons when full coverage cannot be achieved.

Testwell CTC++ derives which code parts are covered by a justification.

- ✓ Own categorization of justifications
- ✓ Recording in comments or in companion files
- ✓ Clear distinction between tested and justified code
- ✓ Recognition of over-justification

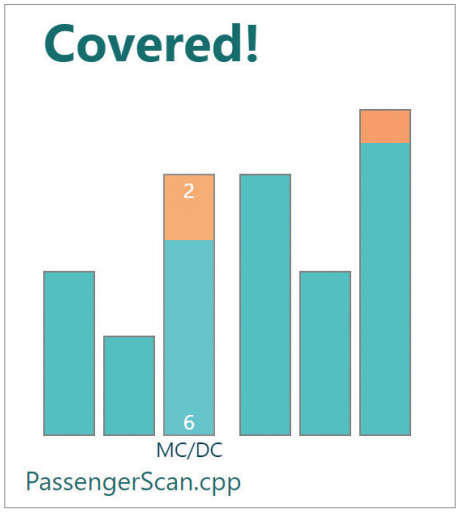


Coverage data in any form

Create template-based reports in any form. With a simple template language for data export, Testwell CTC++ supports structured reports such as HTML reports as well as the export of single text files.

	A	B	C	D
1		MC/DC		
2	Function	Hits	Total	Ratio
3	hasAdmission	6	8	75%
4	calcPrice	9	10	90%
5	main	6	6	100%
6	TicketApp::showInstruction	3	6	50%
7	TicketApp::switch2BatchMode	2	2	100%
8	TicketApp::ask4Input	3	4	75%
9	TicketApp::reportPrice	3	4	75%

Classic exchange formats like CSV, XML, JSON



Overall result as a badge or on dashboards

```
# Coverage Report: Coaster as Markdown

This report was generated at 2024-03-04 09:44:08 using
    `ctcreport -template example_markdown -o coverage.md`

## Coverage in Total
- 54% MC/DC (48 / 88)
- 85% Statement (60 / 70)

## Coverage per Source File
### Directory C:\CoasterCode\
#### PassengerScan.cpp:
- 75% MC/DC (6 / 8)
- 100% Statement (3 / 3)

#### PriceCalculation.cpp:
- 90% MC/DC (9 / 10)
- 100% Statement (5 / 5)
```

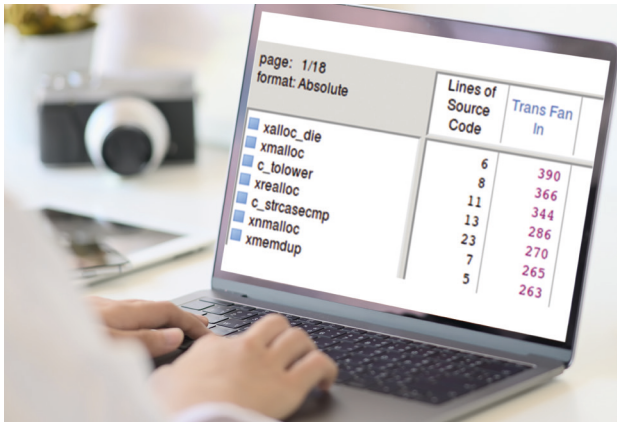
Text reports, e.g. in Markdown, for easy archiving and management in a repository

Imagix 4D

For visualization and verification of programs
Easily understand and evaluate unknown source code

Imagix 4D is a tool to understand, document and improve complex, third party or legacy source code written in **C, C++ and Java.** Imagix 4D automates the analysis of control fow and dependencies. It detects problems in data usage and task interactions. With Imagix 4D you increase productivity, improve quality, and reduce risk.

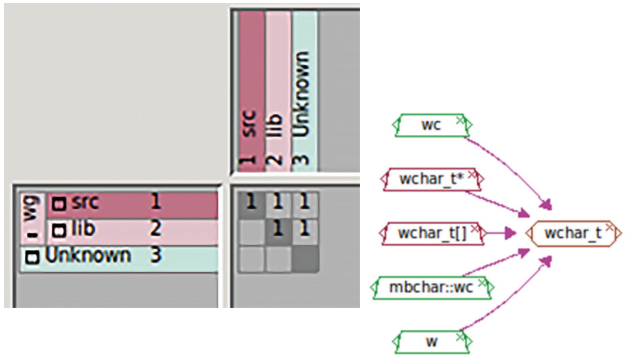
Improve quality by uncovering bugs and vulnerabilities

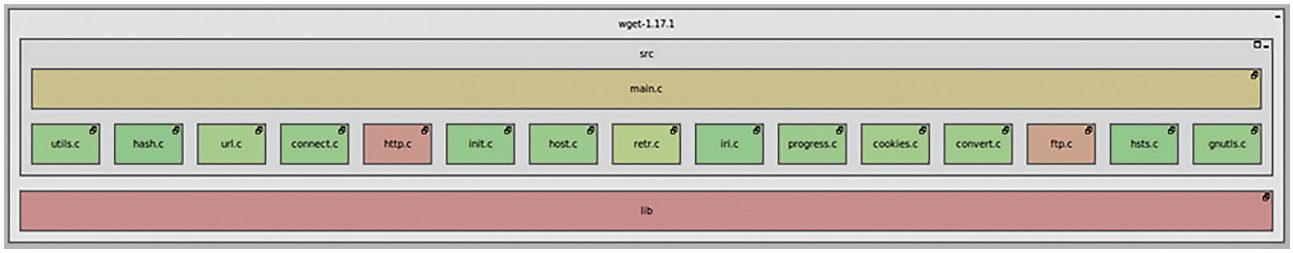


- ✓ Automated checkers find anomalies in the sourcecode
- ✓ Over 100 metrics (including McCabe Cyclomatic and Essential Complexity, Halstead Complexity, Maintainability Index, HIS Metrics etc.) to identify critical modules in a matter of seconds
- ✓ Semi-automated reviews assist in performing efficient qualitative analyses compliant to CWE or to your own requirements

Keep control even for large projects

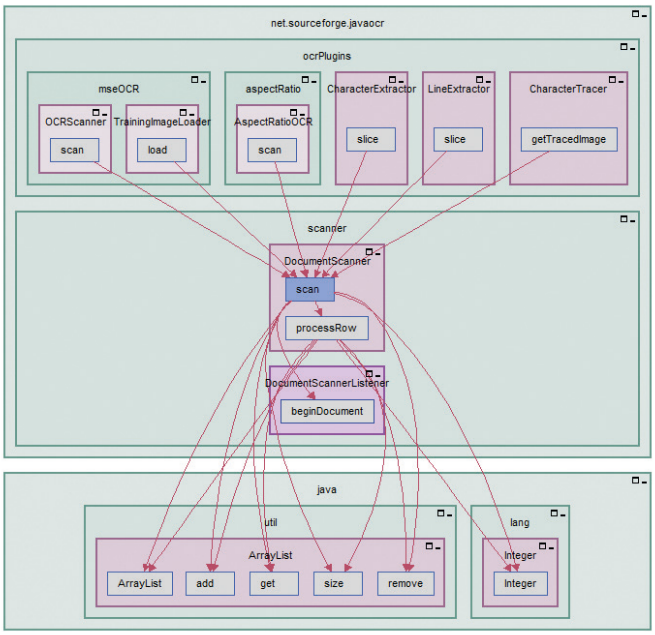
- ✓ Meaningful diagrams provide views from a global perspective up to granular characteristics of a single data type
- ✓ Δ-Analyses enable a detailed change tracking of revisions
- ✓ Checks of the existing architecture are compliant to structural requirements based on comprehensive architecture diagrams





Many analyses and capabilities

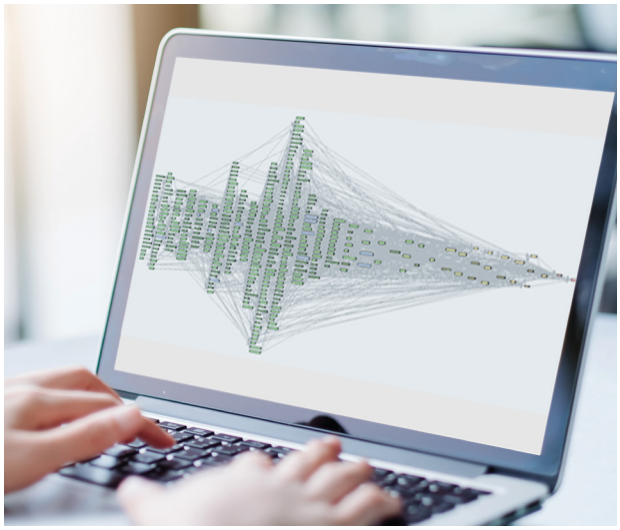
Imagix 4D combines a variety of useful tools and capabilities in order to assesssource code: Architecture diagrams, reports, delta analysis, profiler integration, visualization of Code Coverage measured by Testwell CTC++, function call diagrams, include hierarchy diagrams, bug finding, inheritance diagrams, control flow graphs, file call graphs, UML class diagrams, CWE compliance checks, metrics (variable, function, class, file, directory, architecture), design- and structure matrices, file editor, dependencies calculation tree, assignment calculation tree, diagram export, static source code analysis, symbol lists, grep based file search, concurrency analysis, include analysis.



Improve your software development cycle

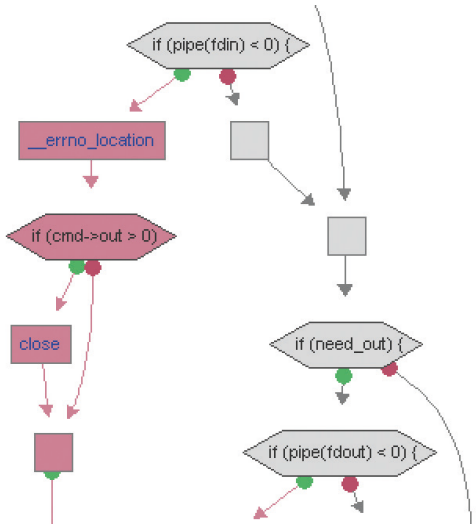
Speed up looking up information for specific symbols by effcient database queries

- ✓ Easily understand and evaluate unknown source code with Imagix 4D
- ✓ Automatically generated documents based on the present source code representing the recent state of the project



Benefit from the integration of Testwell CTC++

- ✓ Visualization of Code Coverage in control flow diagrams
- ✓ Understand the correlations between Tests and Test Coverage for a faster development of suitable test cases
- ✓ Function- and call-coverage reports complete the portfolio of Testwell CTC++



Improve your productivity and evaluate Imagix 4D now!

Testwell CMT++ CMTJava

Software complexity analysis for C, C++, C# and Java

Testwell CMT++ and Testwell CMTJava are tools for analysing complexity of C, C++, C# and Java source code. Both tools analyse source code and inform you immediately about the current internal quality of your software product, even those with large project sizes. Avoid software erosion by achieving a good internal code quality and see how maintainability and testability will be significantly improved.

Verifysoft

First-class tools worldwide since 2003 !

As an independent and solidly operating company, Verifysoft supports customers worldwide with highly specialized software for the quality assurance of their software products. We develop our core products under the TESTWELL brand with a highly skilled and effective team and also offer first-class complementary tools, seminars and services.

We understand our customers and are a reliable partner for them – also in the long term. At Verifysoft, the human being is our priority. We enjoy working in a good and fair working atmosphere for the benefit of our customers, colleagues and our social environment.

We have a long-term strategy. Customer satisfaction is more important to us than the „quick money“. For us, success is when customers and employees are satisfied.

We look forward to working with you.

More than 750 customers all over the world

Verifysoft TECHNOLOGY

Verifysoft Technology GmbH is specialized in the development, distribution and support of software testing and analysis tools. In addition to our own Testwell tools, we also distribute complementary tools from our partners. Verifysoft was founded in 2003 in Offenburg, Germany and has since been operating successfully as an independent company in the field of software quality.

With an international team, we support more than 750 customers in over 45 countries. Our development and support staff have many years of experience in the test tool sector. Find software defects and problems as early as possible before release and guarantee the highest software quality with tools from Verifysoft Technology.

Verifysoft Technology offers seminars and trainings around the topics „Software development and test“

Our seminars: **www.verifysoft.com/en_events**

Further Information and Tools at: **www.verifysoft.com**
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