

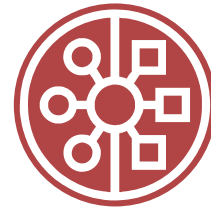


# QKIT Overview

## Compiler Qualification Kit



Safety Multicore Development Suite



# QKIT

## TOOL QUALIFICATION



Toolchain Standard Compliant Qualification. Automated.

# HighTec Core Products

Development & Consulting



**COMPILER**

BUILD TOOL



**PXROS-HR**

REAL-TIME OS



**QKIT**

TOOL QUALIFICATION



**CONSULTING**

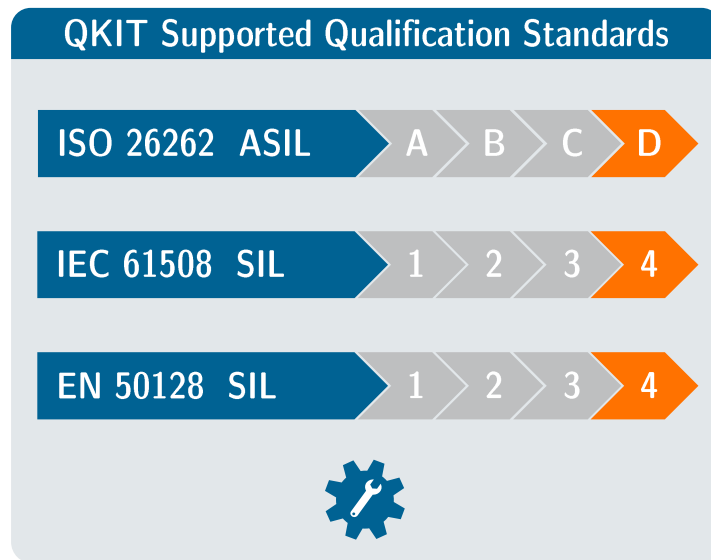
DESIGN & SUPPORT



Safety Multicore Development Suite

# Compiler Qualification Kit Overview

For Safety Critical Applications

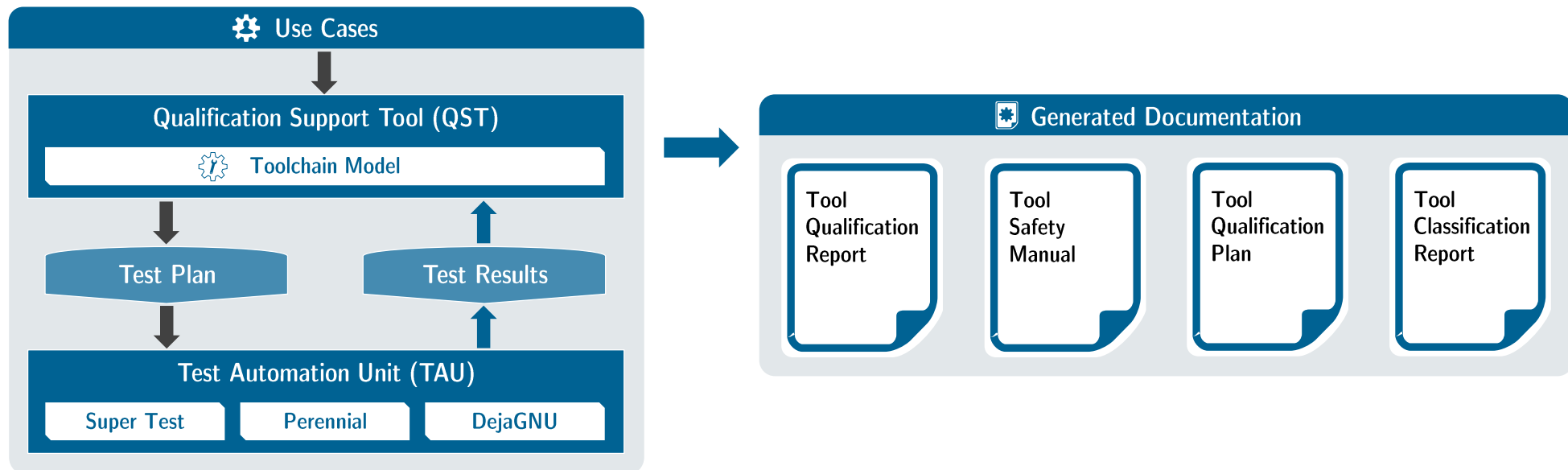


- Enables to perform standard compliant qualification in a simple way
- Significantly reduces effort for test and document generation process
- Transparent and traceable validation flow
- Flexible and extensible due to model-based approach

# Main Components of the QKIT

## QKIT Architecture

- › Qualification Support Tool QST contains toolchain model
- › Test Automation Unit TAU integrates different test suites



# Qualification Support Tool

## Toolchain Model and Test Generator



- › Contains an extensive model of the tool
  - › Toolchain structure, its tools, artifacts and features
  - › Potential errors, known bugs and mitigation measures
  - › Test cases for errors with not known mitigation measures
- › For each specified Use Case QST computes
  - › List of measures to mitigate potential errors
  - › List of tests proving that no non-mitigable errors can occur
  - › Resulting Tool Confidence Level (TCL)

# Test Automation Unit

## Test Suites Integration



- › Integrates different standard test suites
  - › SuperTest Rembrandt Release for massive testing against different language standards
  - › Perennial Validation Suite
  - › The DejaGNU test suite for GNU GCC
- › Supports easy extension for other customized tests

# Tool Safety Manual

## Generated Documents



- Description of methods
- Requirements tracing to standards
- Tool, usage and operation dependent safety guidelines
- List of measures to mitigate potential errors of the selected Use Case



# Tool Classification Report

## Generated Documents



- Resulting Tool Confidence Level (TCL)
- Description of the TCL derivation method
- List of TCL for each component of the toolchain
- Determination of TCL for each use case and for each of the components (Compiler, Linker...)

# Tool Qualification Plan

## Generated Documents



- Use Cases and features with qualification needs
- Validation goals, requirements of standards and how they are to be satisfied
- Qualification environment
- Planned qualification process

# Tool Qualification Report

## Generated Documents



- Use Cases and features that have been qualified
- Test environment
- Test results and analysis for test cases with not PASS result
- Executed qualification process

# QKIT GUI

## Use Case Selection and Modification

**Qualification Summary for Qualification of GCC**  
Summarizes the qualification that can be started now by creating the qualification documents of GCC in Compile Assemble Link With Optimization

Target Directory: C:\QST\HDPQKit\workspace\Qualification

Names of Use Cases: Compile Assemble Link With Optimization

Number of Features: 8

Number of selected Checks: 21

Number of selected Restrictions: 2

Number of Tests: 12

Name:	Path:
Tool Classification Report	C:\QST\HDPQKit\workspace\Qualification\Validation\Documentation\TC
Tool Qualification Plan	C:\QST\HDPQKit\workspace\Qualification\Validation\Documentation\TQ
Tool Safety Manual	C:\QST\HDPQKit\workspace\Qualification\Validation\Documentation\TS
Tool Test Path	C:\QST\HDPQKit\workspace\Qualification\Validation\TestPath.txt
Tool Test Plan	C:\QST\HDPQKit\workspace\Qualification\Validation\TestExecution.txt
Toolchain Model	C:\QST\HDPQKit\workspace\Qualification\QKit\Model\Model.tca

Buttons: ? Save < Back Next > Finish Cancel

**Feature Selection**  
Please select for each use case which features it uses

Tool GCC (TCL3)  
Use Case Compile Assemble Link With Optimization (TCL3)

- ☐ Feature Merge Constants
- ☐ Feature Merge Jumping To A Jump Instru
- ☐ Feature Omit Frame Pointer
- ☒ Feature Optimization Level
  - ☐ Feature Optimization Level 0
  - ☐ Feature Optimization Level 1
  - ☒ Feature Optimization Level 2
  - ☐ Feature Optimization Level 3
- ☐ Feature Optimize For Size
- ☐ Feature Optimize Even Against IEEE and A

Compile Assemble Link With Optimization

Description:  
gcc -Wall -Werror -O2 -mcpu=tc1796

Buttons: ? Save < Back Next > Finish Cancel

# Questions?

Let Us Hear You!



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