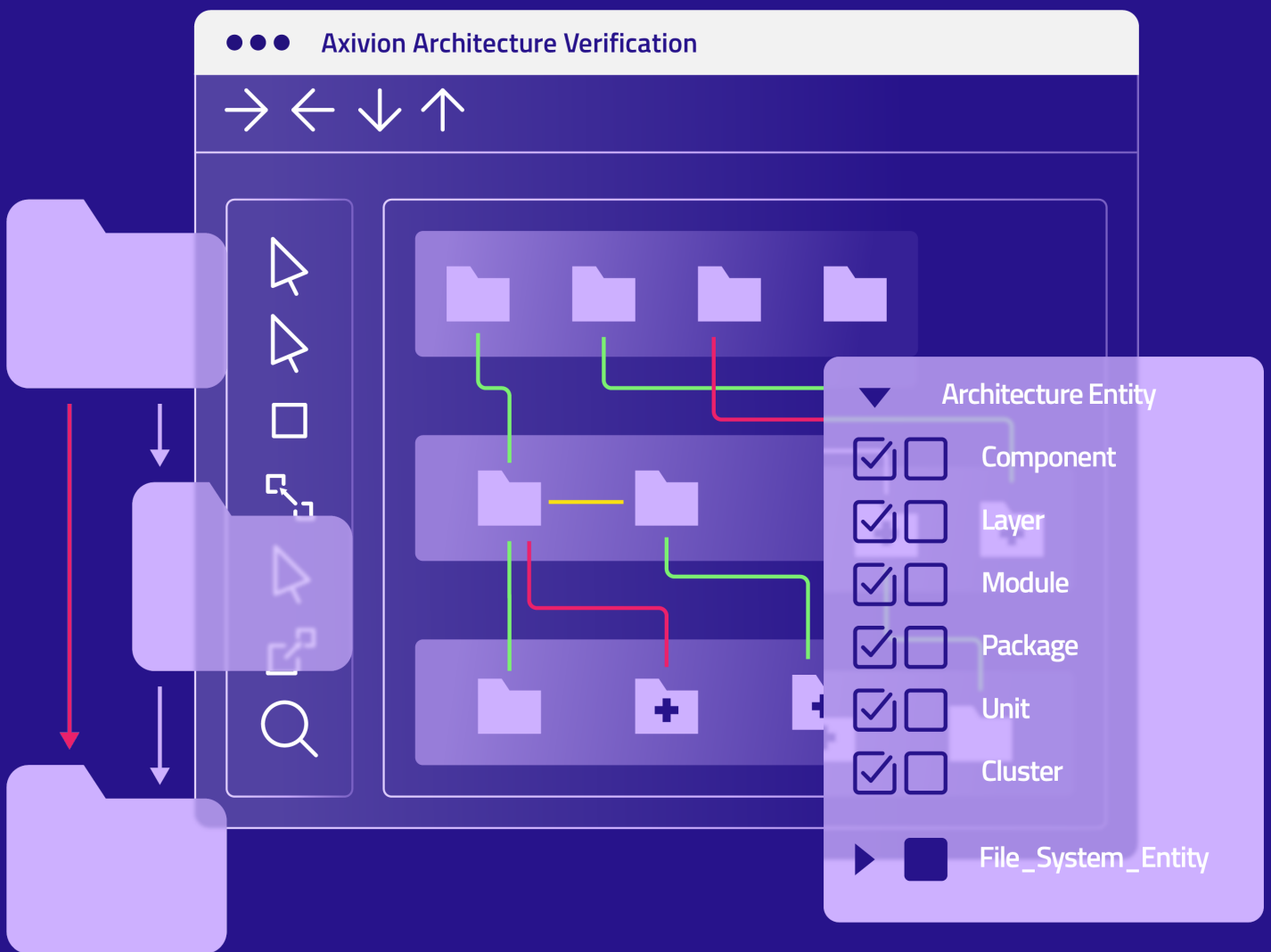


# Axivion Architecture Verification

Crafting the Perfect Foundation for Future-Proof Software.



# Axivion Architecture Verification

- ☑ Ensures the code conforms to the defined architecture.
- ☑ Detects deviations early and stops architectural violations from spreading across the codebase.
- ☑ Allows reverse-engineering of architecture for existing projects or you to use your existing model.
- ☑ Enables reliable impact analysis – for daily development and large-scale modifications.
- ☑ Preserves a clean software architecture that supports long-term software maintainability.
- ☑ Facilitates faster and more effective onboarding of new team members.
- ☑ Proves Freedom from Interference and Software Segregation.

## Why Verify Your Architecture?

Software architecture and design need to match with the code for you to be sure you can use the software architecture as a guide and baseline for discussing the impact of new features. Only then is a long-term targeted and planned development of your products possible.

Axivion Architecture Verification ensures your code complies with your architecture. In addition to the functional architecture, the tool also reviews and checks safety and security architecture specifications for compliance, e.g. Freedom from Interference.

## All the Features you Need in one Solution

### Architecture Checks

**Create and maintain a long-lasting foundation for your software.**

With just a few simple steps you can ensure your code matches the intended software architecture - not only during development, but also throughout the entire product lifecycle.

### Architecture Recovery & Archaeology

**Nothing is lost forever when using Axivion Architecture Verification.**

Axivion helps you reveal a software's true architecture and create accurate documentation; no matter whether only partial information is available (recovery) or none at all (archaeology).

### Architecture Export

**Extract architecture from the code and export it to Enterprise Architect.**

Axivion Architecture can extract the architecture from your code and generate files for you to export to Enterprise Architect. They can be modified and re-imported into Axivion.

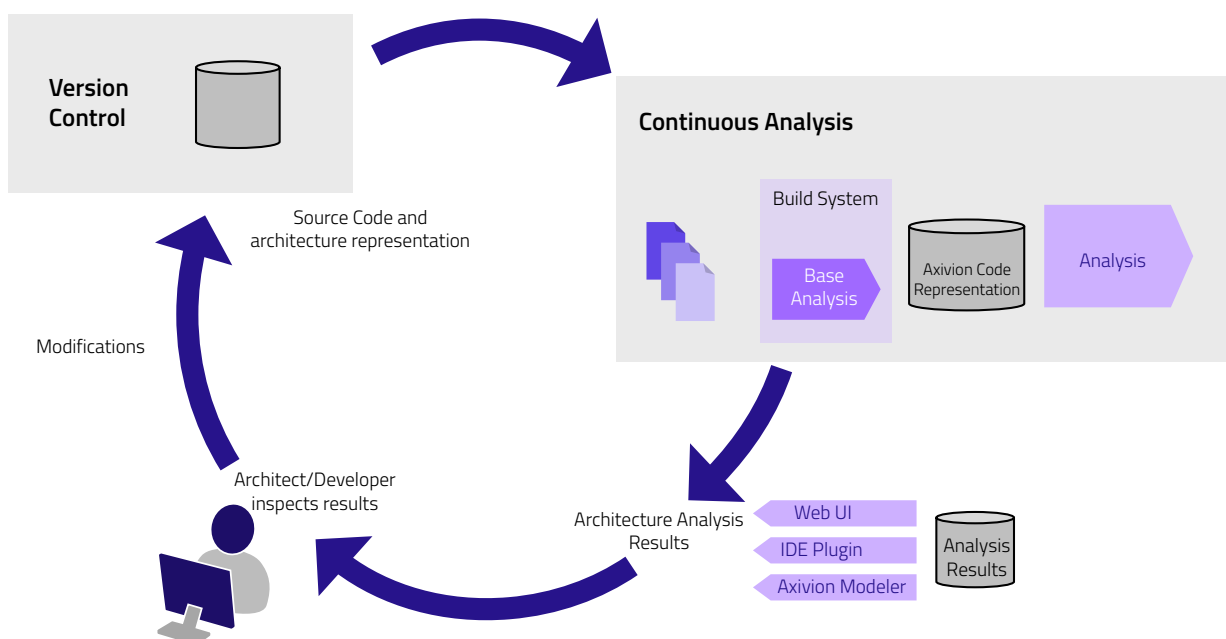
# Seamless Integration Into Your Workflow

Ease of use is key when implementing new tools. Axivion Architecture Verification adapts to your needs and seamlessly integrates into your existing development environment.

The extensive customization options make sure the architecture verification follows your rules and workflows. During the entire set-up process our dedicated experts will support you to ensure the results exceed your expectations.

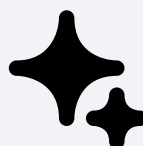
Daily reports make it easy to identify any new issues and let you directly access the affected part of the code to make the necessary changes.

Thanks to the delta analysis developers can directly see which issues in the code are new. When reviewing longer periods of time (e.g. multiple sprints or even the entire project history) smart filtering options help focus on specific types of issues.



## Key Features

- Verification and identification of deviations
- Integrated Modeler
- Interfaces to UML Tools
- AUTOSAR XML Import (ARXML)
- Export to Enterprise Architect
- Architecture Reconstruction
- Architecture views for safety and security



### Need Axivion to be part of your AI-powered workflows?

No problem. Simply activate our Model Context Protocol (MCP) Connector and use your preferred LLM. Your AI agent can now access the Axivion documentation and the findings from the analysis to help developers understand and fix bugs faster. Connecting the agent to other sources (e.g. the internet, internal servers) is up to your discretion.

**Note:** Axivion Architecture Verification does not use AI for the analysis, thus making it suitable for developing software for safety-critical environments.

# Simple Set-Up in Just a Few Steps

## The initial set-up is easier than you may think.

With Axivion Architecture Verification creating and maintaining a reliable architecture can be done with ease. And once you have set it up, it automatically finds deviations early on and thus allows for corrections to be made before they affect the architecture.

## Create your architecture model

You start by creating a model of your architecture. For this simply import any existing machine-readable model of your architecture via the interface, use the integrated modeler or reverse-engineer the architecture automatically.

## Create your code model

Extract your code model from your source code. The code model represents entities (e.g. source files) and classes or functions as well as the dependencies between them. Axivion can automatically construct your code model by analyzing your source code project.

## Map the code to your architecture

Now establish how your code elements correspond to architecture components, by assigning the code elements to the architecture elements. Depending on your product structure and architecture model, this can be done:

- manually (e.g. with the Gravis modeler)
- automatically with Axivion by naming convention and hierarchical information or
- by using information given in the model (e.g. tagged values)

## Interpret the dependencies

During this step you will interpret the dependencies within the architecture model and specify what they mean; in other words how to interpret architecture dependencies to match code dependencies. A simple example would be: Component A is allowed to call functions in component B. Of course, especially for UML models, far more advanced interpretations of dependencies (required/provided interfaces) are possible.

# Software Architecture Recovery and Archaeology

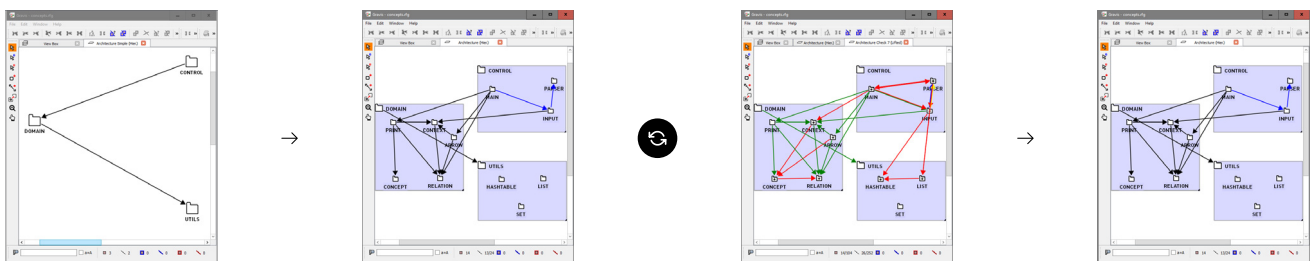
Very often an accurate architecture model is not available to give you a basis for architecture checks. Axivion Architecture Verification can help you create the architecture model for your project.

No matter whether parts of the model exist (CASE-tool, XML, XML etc.), you only have documentation (Word, PowerPoint etc.) or you do not have documentation at all (either for a live project or post project) - we will ensure that you have an accurate and reliable model of your entire software architecture. This is particularly useful if you have to embed 3<sup>rd</sup>-party code as it allows you to easily explain what the software is about and how changes would affect it.

You can use the integrated Axivion modeler to create architectural sketches, which can then be directly and interactively mapped to the actual implementation, then checked and then, lastly, adapted based on the insights gained. These steps can be iterated until the intended architecture is established as a basis for further development.

Architecture redocumentation produces the same results as importing an architecture model: At the end of the process, a validated architecture is available again. This enables entry into the process of continuous architecture verification and allows legacy and 3<sup>rd</sup>-party code to meet the same high quality standards as newly developed code.

## Describe hypothesis - check, adapt and refine it - validate the architecture

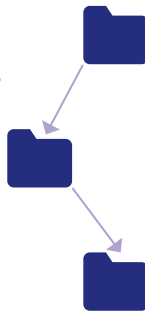


# Verify Your Architecture - Every Day

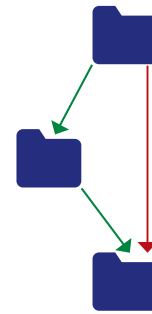
## Analyze your architecture

Now you are all set and can let Axivion verify your architecture. It will analyze your code and identify

- Convergences
- Divergences
- Absences



Your defined software architecture;  
i.e. what it should look like

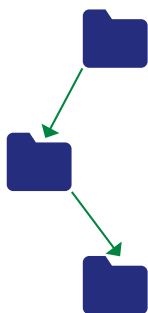


What the architecture verification reveals;  
i.e. what it actually looks like

## What to do with the results

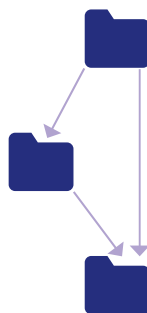
When it comes to detecting deviations from the intended software architecture, nothing beats an automated process for exhaustive and reliable results. But it requires human intelligence to decide how to react to these findings. These are your options:

### Correct the deviation in the source code



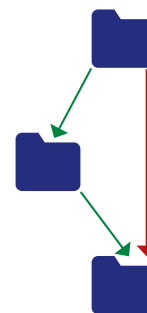
If this deviation is a mistake, the code should be corrected so it matches the architecture again.

### Update the architecture specifications



If this deviation actually makes sense, you should update the architecture accordingly.

### Accept the deviation temporarily



If this deviation is something you can accept temporarily, leave it and deal with it later.

## Continuous Analysis of Your Code

Axivion Architecture Verification is not meant to give you just a single snapshot of your current architecture. It is designed to be part of your continuous software analysis and development process.

Once you have set up Axivion Architecture Verification, it easily integrates into the daily review process. Simply look at the deviations which are automatically detected and make the necessary changes as needed. This ensures your code always matches your software architecture.

Eliminating the error-prone manual verification and replacing it with reliable and precise diagnostic information, allows developers to tackle any findings at an early stage. This avoids costly adjustments at a later stage and helps you understand the impact of any changes you plan to make to your software.

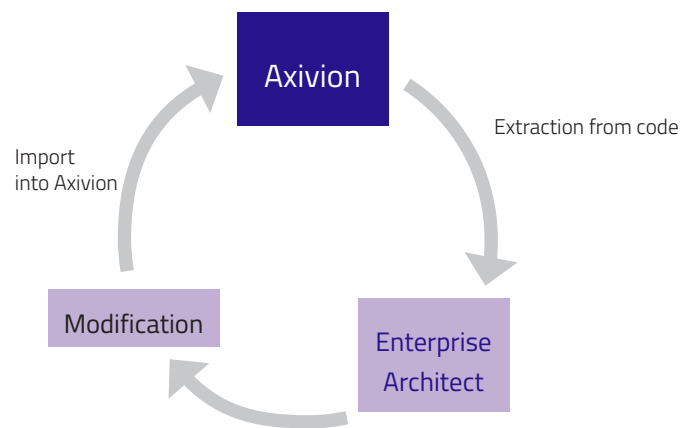
The result: A reliable software architecture for longer lifecycles.

# Architecture Export to Enterprise Architect

Axivion already supports various ways of importing architecture (via UML tools, AUTOSAR XML (ARXML) or any other machine-readable format). But Axivion also offers an Architecture Export to Enterprise Architect (EA) feature. This is useful for developers required to use Enterprise Architect, who do not want to recreate the architecture manually as well as for those who prefer the EA user interface to modify the architecture.

All necessary elements, such as components, functions, attributes, information flow and dependencies are extracted from the code and an architecture model of the current project is created. This file can then be opened with Enterprise Architect.

If needed, the architecture model can also be modified in Enterprise Architect and then re-imported into Axivion to be used to verify the architecture.



## Architecture as Code

As an alternative to creating your software architecture via graphical tools, Axivion offers the possibility of *architecture as code*, meaning the possibility to describe and map architecture as Python code, or more specifically, as an internal domain-specific language (DSL) embedded in Python.

Axivion provides a set of Python classes and methods which can be used to define the architecture and mapping declaratively. Using these libraries makes it easy to define general rules and then carve out exceptions; a pattern that will feel natural to any developer who has worked with namespace visibility or build system filters.

The advantage for developers: No additional tool is needed and the model is part of your existing codebase.

## Freedom from Interference: Architecture According to ISO 26262

It is state of the art to allow several safety-relevant functions with different ASILs or QM classification to coexist on a common hardware. However, this requires a suitable software architecture to be in place for corresponding software projects according to ISO 26262. Compliance with the safety architecture is the basis for Freedom from Interference.

Axivion Architecture Verification ensures the consistent use of the defined interfaces and the selected communication mechanisms. Deviations from the architecture are immediately highlighted in the source text. This includes, among other things, unspecified function calls, overwriting of data or, more generally, reference to declarations not defined as interfaces.

### Tool Qualification Kit

The Axivion Tool Qualification Kit includes tests to check and validate your architecture verification. It allows you to confirm the suitability of Axivion for use in environments with functional safety requirements.

# Basic Technical Specifications

**Note:** This is just a rough overview and refers to Axivion 7.12. Please contact us for a complete list of specifications.

## Supported languages and compilers

Languages | C, C++, CUDA C++, C#, Rust<sup>1)</sup>

## Supported operating systems

Host OS | Windows® 10/11 or Windows® Server® 2016/2019/2022/2025 in 64bit x86\_64 GNU/Linux® (minimum requirement is glibc2.28 or later), Linux ARM64 macOS® (minimum requirement is macOS 14 in 64 bit), macOS® ARM64

## Plugins

IDE | Qt Creator, CLion, Eclipse™, Eclipse-based (e.g. e<sup>2</sup> studio, Atollic TrueSTUDIO®, CodeWarrior®, DAVE™, STM32CubeIDE, TI Code Composer Studio™), Microsoft® Visual Studio®, Microsoft® Visual Studio Code®, Generic plugins

## Supported UML® tools

UML® Tools | IBM Rational Rhapsody, Sparx Enterprise Architect (via XMI or .qea-files), PlantUML

## Other

Supported browsers | Microsoft® Edge, Mozilla Firefox®, Google Chrome™

Requirements | Java® Runtime (17, 21, 25)

Add-on | Axivion Tool Qualification Kit

<sup>1)</sup>Limited support

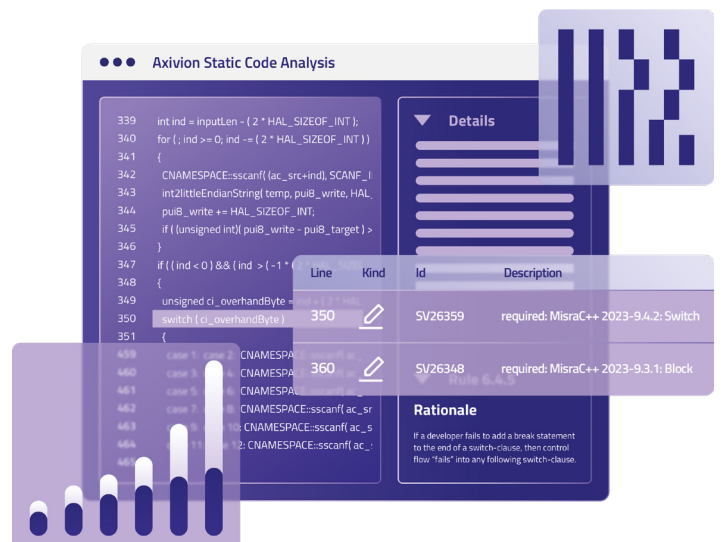
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## Why stop here?

Axivion Architecture Verification will create a solid foundation for your software project. By adding Axivion Static Code Analysis you get an in-depth analysis of your code and can ensure it meets even the highest standards.

Learn more about Axivion Static Code Analysis or schedule a meeting with one of our experts for a live demo:

[www.qt.io/axivion-sca](http://www.qt.io/axivion-sca)



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