

# Compilerbau - Tama Compiler Overhaul

## Students



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**Introduction:** Triamec Motion AG manufactures ultra-precision servo drives that can be programmed using the C# programming language and the Tama framework. These servo drives run dedicated software, known as a low level virtual machine, to ensure platform independency. The Tama compiler translates code from the C# programming language into the special bytecode format that is understood by the servo drives.

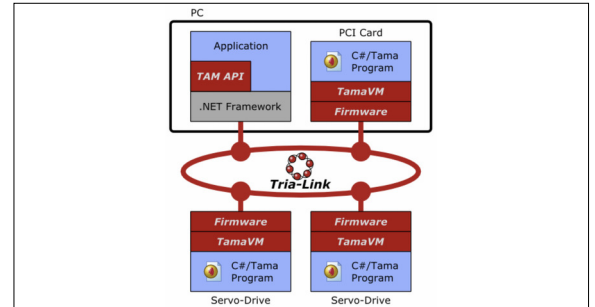
**Problem:** The Tama compiler internally uses Microsoft's deprecated CCI library to perform this translation step. This library is heavily relied upon, making it's deprecation an operational risk. In this project, our main goal was to replace the unmaintained CCI library with a modern, actively maintained alternative. Additionally, optimizations of the virtual machine were to be looked into. Improving the virtual machine's performance will allow customers to run more complex programs using less resources.

**Result:** After evaluating several options, we chose to replace the CCI library with ILSpy. ILSpy is a modern, actively maintained and well documented .NET decompiler with an active community. This library ensures the Tama compiler will be able to support newer versions of .NET in the future.

Besides successfully replacing CCI, we also implemented a computed goto performance optimization in the virtual machine, resulting in an overall performance increase averaging 16%. There is still potential for further performance gains, for example by implementing a template-based just-in-time (JIT) compiler in the virtual machine.

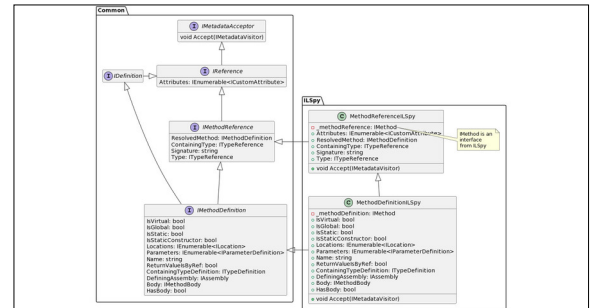
## Tama programming on Triamec products

Triamec Motion AG



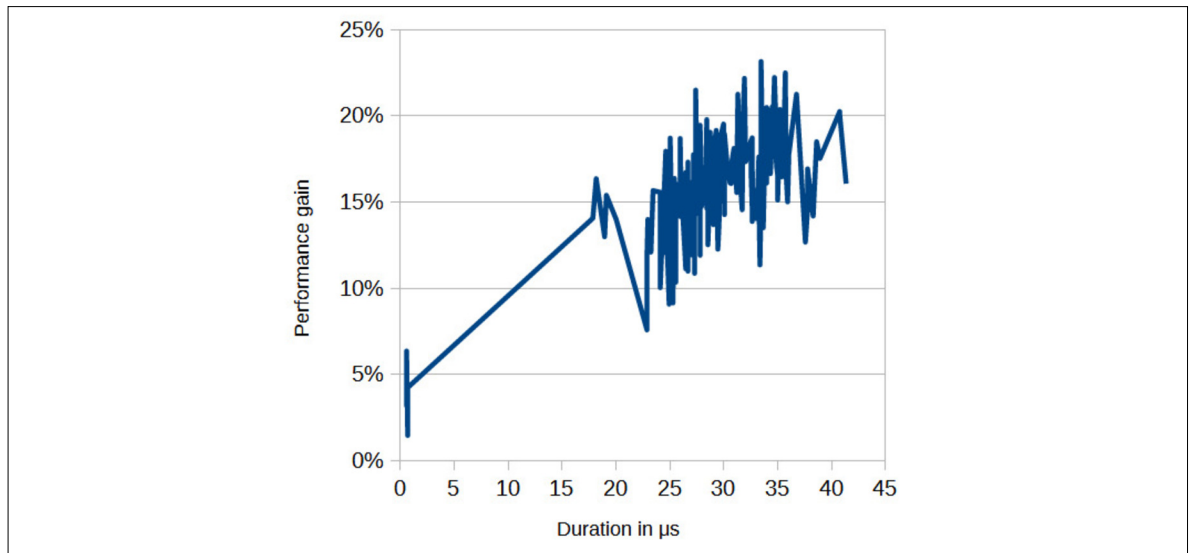
## Excerpt of new class model

Own presentation



## Relative performance gain in relation to task execution time.

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