

Performance optimization, debugging and scalability

Course code: GOC2126

The course is intended for developers on the .NET (Core) platform who want to get into the details of .NET and C # applications and learn how to write the most fast applications, use the right constructs or optimize memory consumption. At the same time also for the detection and diagnosis of these problems (post-mortem and current) using available tools. Emphasis is placed on the practical application of acquired knowledge. Students will be able to apply the acquired knowledge immediately after returning to the real world. The course is suitable for developers over the .NET Framework, .NET Core, .NET 5+, Xamarin, etc.

Affiliate	Duration	Course price	ITB
Praha	4	22 000 Kč	40
Brno	4	22 000 Kč	40
Bratislava	4	880 €	40

The prices are without VAT.

Course terms

Date	Duration	Course price	Type	Course language	Location
30.03.2026	4	22 000 Kč	Presence	CZ/SK	GOPAS Brno
04.05.2026	4	22 000 Kč	Presence	CZ/SK	GOPAS Praha
29.06.2026	4	880 €	Online	CZ/SK	Online
29.06.2026	4	22 000 Kč	Online	CZ/SK	Online

The prices are without VAT.

Required input knowledge

- The course assumes knowledge and experience with programming in C # at the level of course GOC2124 and GOC2125

Who is the course for?

- The course is designed for experienced developers who want to move a little further and better understand how memory is handled in .NET, what are the real possibilities of debugging, how code is executed, performance is measured or reflections are used, but also others advanced topics.

Teaching methods

- Expert explanation with practical examples, exercises on computers.

Studying materials

- Printed presentations of the subject matter.

Course syllabus

Working with memory in .NET

- Value vs. reference types
- Allocation and functioning of GC (SOH, LOH, POH)
- Heap, stack, unmanaged heap
- Hidden allocations
- Stackalloc
- Span, Memory
- Unsafe
- In, ref structs, readonly

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Performance optimization, debugging and scalability

- Passing parameters
- Measurement of memory consumption, memory leaks
- Profiles
- Finalization
- Strings
- WeakReference
- Pooling

Algorithm complexity

- Big O
- Work with collections

Debugging

- Debugging in Visual Studio and all options of the Visual Studio debugger
- Work with symbols
- WinDBG debugging
- ProcDump, dotnet dump
- Post mortem debugging
- Application dump and analysis application
- Application status / operation monitoring (dotnet monitor)

Code execution in a .NET environment

- JIT compilation, profile optimizations, ngen, ready to run
- Optimization in JIT, multicore JIT
- Tiered JIT, PGO
- Intrinsic, vectorization, SIMD
- CPU operation and the effect of instruction on performance
- Profiles

Code performance measurement

- Benchmarking and its limitations
- Correct vs. erroneous measurements
- Profiling
- BenchmarkDotNet
- Introduction to assembly

Reflection and its effective use

Code generation

- IL Emit
- Expressions
- Source Generators

Lazy initialization

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