



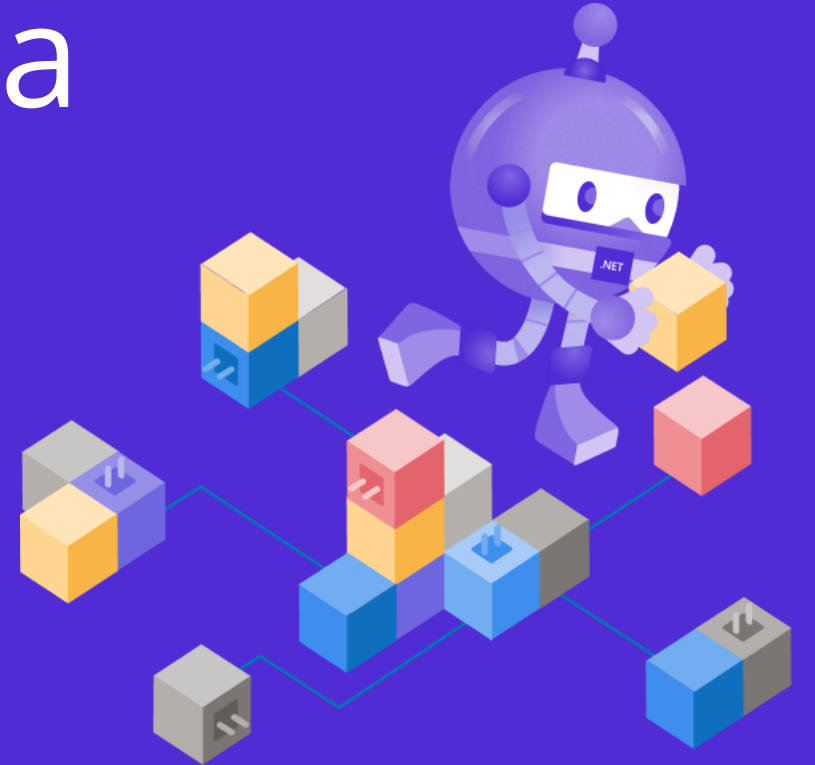
# .NET Üzerinde Yüksek Performanslı Uygulama Geliştirme

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# Measure

- Profiling
  - Visual Studio Profiling
  - PerfView
  - dotTrace
  - dotMemory
- Benchmarking

# BenchmarkDotNet

```
BenchmarkDotNet=v0.12.1, OS=Windows 10.0.19042
Intel Core i9-8950HK CPU 2.90GHz (Coffee Lake), 1 CPU, 12 logical and 6 physical cores
.NET Core SDK=5.0.100
[Host] : .NET Core 3.1.9 (CoreCLR 4.700.20.47201, CoreFX 4.700.20.47203), X64 RyuJIT
DefaultJob : .NET Core 3.1.9 (CoreCLR 4.700.20.47201, CoreFX 4.700.20.47203), X64 RyuJIT
```

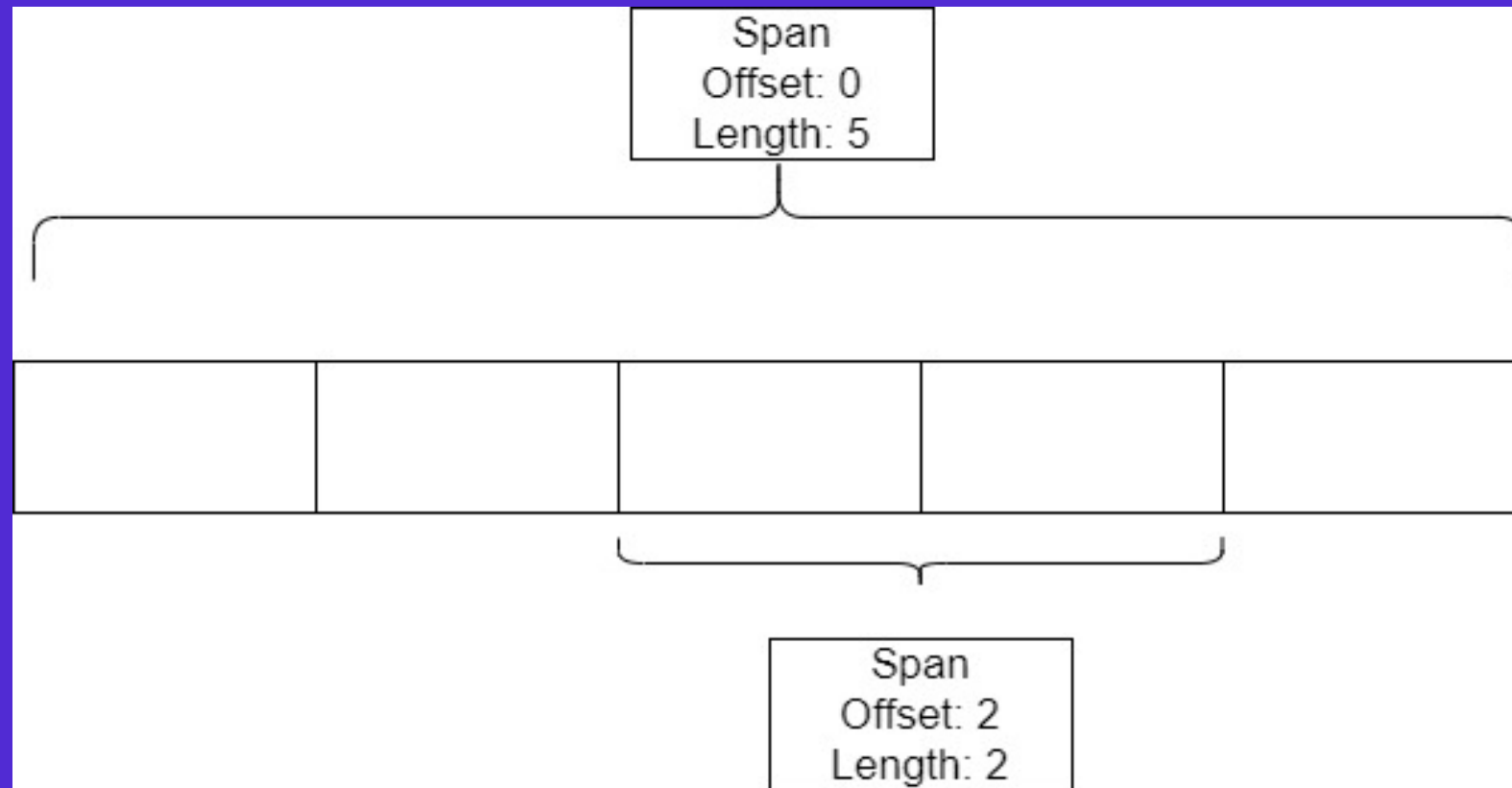
Method	Mean	Error	StdDev	Gen 0	Gen 1	Gen 2	Allocated
-----	-----:	-----:	-----:	-----:	-----:	-----:	-----:
Sha256	38.11 us	0.703 us	0.657 us	-	-	-	112 B
Md5	16.71 us	0.294 us	0.338 us	-	-	-	80 B

- <https://github.com/dotnet/BenchmarkDotNet>

# Span<T>

- .NET Core 2.1
- Provides a type- and memory-safe representation of a contiguous region of arbitrary memory.
  - Heap (Arrays, Strings)
  - Stack (stackalloc)
  - Native/Unmanaged

# Span<T>



# Span Limitations

- Ref struct
- Cannot be boxed
- Cannot be a field in a class
- Cannot be captured by lambda expressions

# Memory<T>

- Can live on the heap
- Slightly slower

# Object Pooling

- Microsoft.Extensions.ObjectPool nuget package



# Array Pool

- System.Buffers namespace
- Pool large arrays (85000 bytes)

# ValueTask

- Similar to Task<T>
- Use if a method completes synchronously for most of the time
- Limitations
  - Do not await multiple times
  - Do not store anywhere!!!
  - Cannot be used with the Task Combinators(WhenAll,WhenAny etc.)

# Stackalloc

- Allocates a block of memory on the stack
- C# 7.2, you can use with the `Span<T>`, `ReadOnlySpan<T>`
- `StackoverflowException!!!`
- 1K bytes limit in .NET Runtime.

# Stackalloc

```
const int MaxStackLimit = 1024;  
Span<byte> buffer = inputLength <= MaxStackLimit ? stackalloc byte[inputLength] : new byte[inputLength];
```

# System.Text.Json APIs

- More efficient and allocates less
- Based on `Span<T>`, `ReadOnlySpan<T>`
- Some features missing compared to `Newtonsoft.Json`
- You can write converters for unsupported scenarios.

# Thanks

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