



C# - What's new and cool?

Christian Nagel
<https://csharp.christiannagel.com>



Christian Nagel

- Training
 - Coaching
 - Consulting
 - Development
-
- Microsoft MVP
 - www.cninnovation.com
 - csharp.christiannagel.com
 - [@christiannagel](https://twitter.com/christiannagel)



Topics

- C# Language Enhancements
- What's new?
- What's coming?
- How does it help?

Auto Default Struct

C# 10 added

- struct records
- *with* expressions with structs
- custom parameterless constructors

C# 11 enhanced

- auto default struct



Required Modifier

- Nullable reference types solves problems
- Constructors adds complexity
- required: Initialize with *constructor* or *object initializer*
- Modifier for properties and fields
- *SetsRequiredMembers* Attribute on constructor

Interface Enhancements

C# 8 added implementation in interfaces

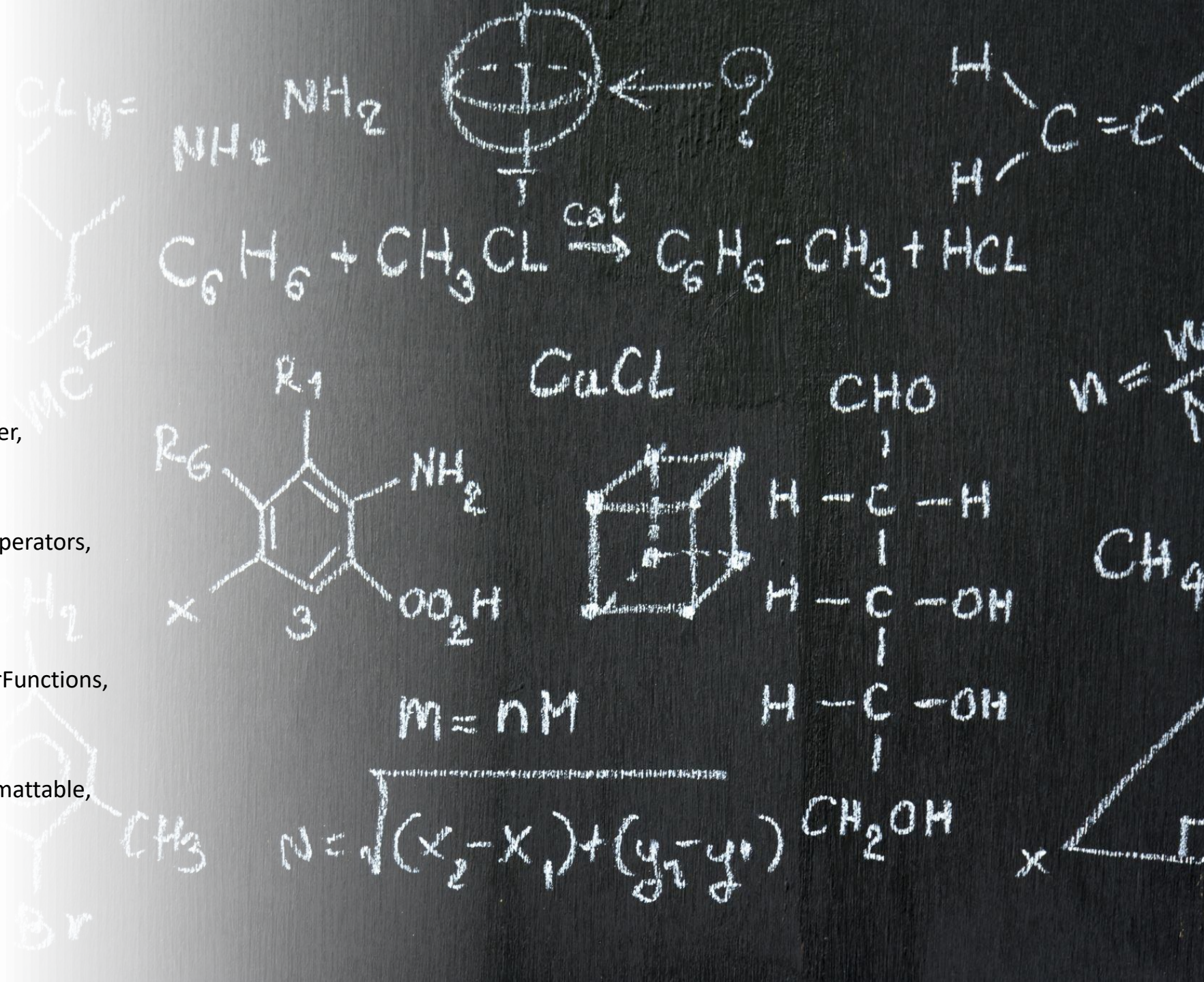
- Versioning
- Mixin functionality

C# 11 adds static members

- Constraints with generic types

Generic Math

- Numeric interfaces
 - INumber, IMinMaxNumber, IAdditiveIdentity, IBinaryInteger, IFloatingPoint...
- Operator interfaces
 - IAdditionOperators, IBitwiseOperators, IIncrementOperators...
- Function interfaces
 - IExponentialFuncations, ILogarithmicFunctions, IPowerFunctions, ITrigonometricFunctions...
- Parsing and formatting interfaces
 - IParsable, ISpanParsable, IFormattable, ISpanFormattable



Pattern Matching Enhancements

- List Patterns
 - Apply a pattern on any element in the sequence
 - Discard pattern to match any element
 - Slice pattern to match zero or more elements
- Matching on `Span<T>`

Strings – UTF8

- The .NET string type is *UTF-16*
- Internet uses *UTF-8*
- **u8** suffix to define UTF-8 Strings

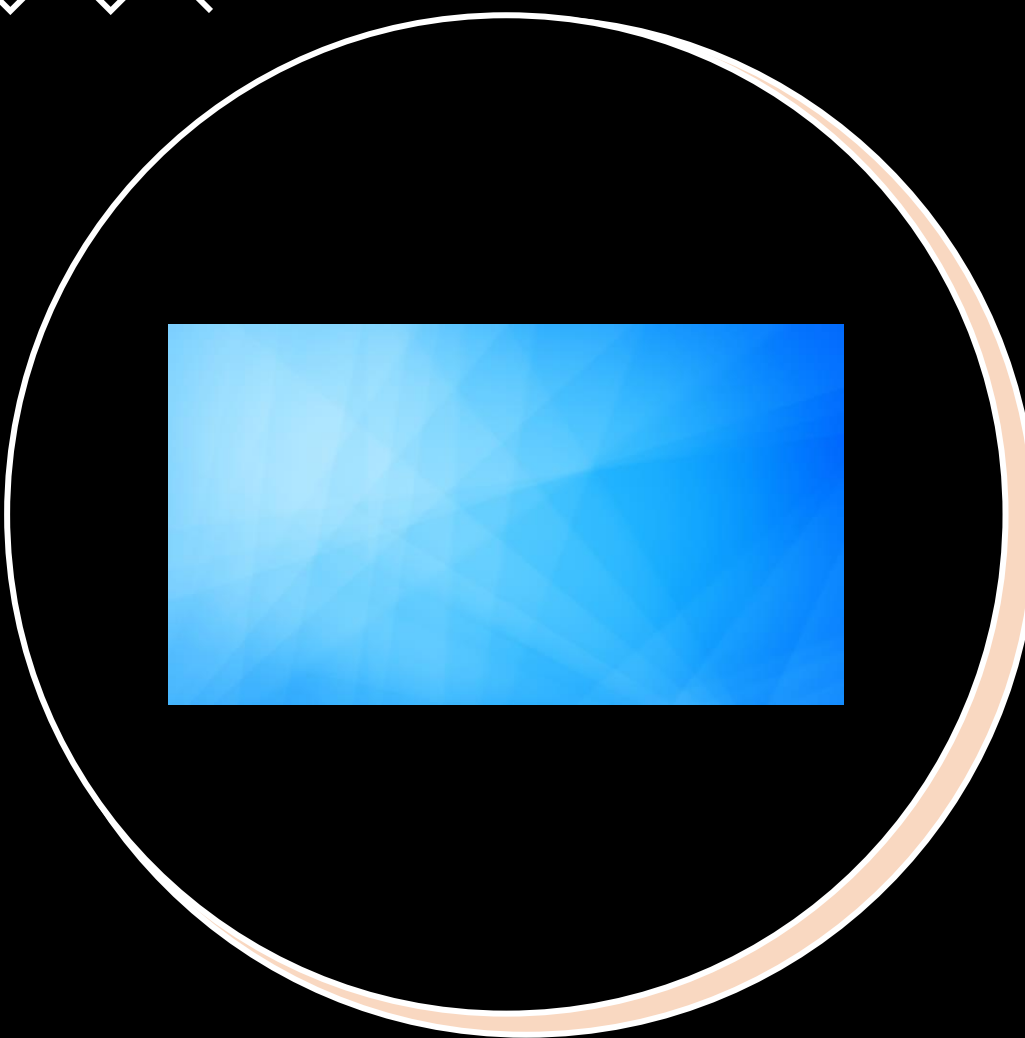

```
ReadOnlySpan<byte> s1 = "hello"u8;
```

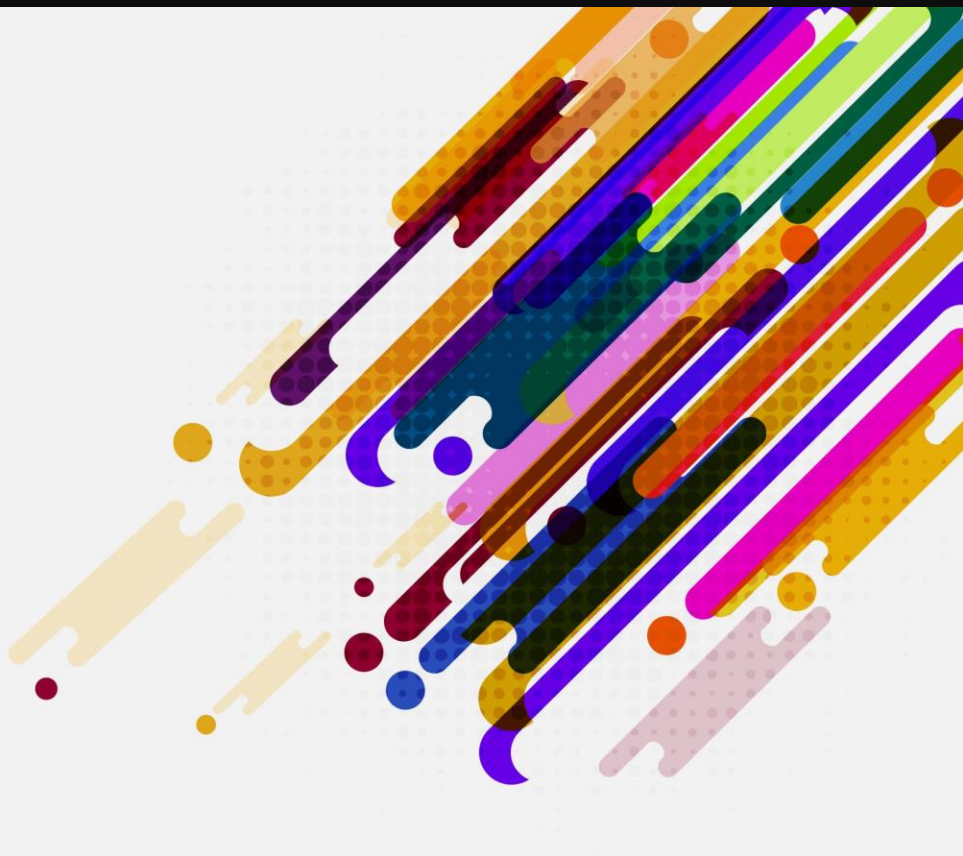
```
ReadOnlySpan<byte> bytesStatus404 =  
    new byte[] { (byte)'4', (byte)'0', (byte)'4' };
```

```
var bytesStatus404 = "404"u8;
```



Strings – Raw String Literals

- 
- Three or more quotes
 - span multiple lines
 - Indentation based on end quotes
 - Combine with interpolated strings
- 



.NET 7 Source Generators

- Logging
- Regex
- JSON Serialization
- Platform Invoke
- JavaScript Interop
- ...

Native AOT Deployment

- Self-contained
 - AOT compiled to native code
 - Quick startup, less memory
 - Can run where JIT is not allowed
-
- No dynamic loading
 - No reflection emit
 - No C++/CLI
 - Requires trimming
 - Compilation into a single file
 - Includes runtime-libraries

What's next with C#?

- Alias for any type
- Semi-auto properties (field keyword)
- **Primary constructors**
- params Span<T>
- lambda default parameters
- Collection literals
- Roles / Extensions
- Interceptors

C# 12 – Primary Constructors

- Productivity enhancements
- C# 9 – Primary constructors with class records
 - get/init accessors
- C# 10 – Primary constructors with struct records
 - get/set accessors
 - get/init accessors (readonly record struct)
- C# 12 – Primary constructors with classes and structs

Summary

- What's new with C#?
- Required...interfaces...pattern matching...strings...AOT...
- Directions going forward
- Source code:
<https://github.com/codebreakerapp/thrive2023>
- Blog: <https://csharp.christiannagel.com>

References

- My Blog
 - <https://csharp.christiannagel.com>
- .NET Blogs
 - <https://devblogs.microsoft.com/dotnet/>
- Microsoft Learn
 - <https://learn.microsoft.com/dotnet>
- GitHub Repos
 - <https://github.com/dotnet>



Thank you



YOUR OPINION COUNTS,
PLEASE FILL OUT THE SURVEY HERE:

bit.ly/tc23s