

ASP.NET CORE LOGGING UND DOKUMENTATION



- Quellen mit Beispielen zum Skript finden sie unter [florianwachs/AspNetWebservicesCourse \(github.com\)](https://github.com/florianwachs/AspNetWebservicesCourse)

LOGGING

WARUM IST LOGGING SO WICHTIG

- In der Produktionsumgebung lässt es sich meist schwer debuggen
- Snapshots sind meist aufwändig zu erstellen
- Gutes Logging bietet meist zumindest einen Anhaltspunkt wo die Analyse beginne sollte (Stacktrace)

LOGGING

```
var builder = WebApplication.CreateBuilder(args);

// Standard mäßig werden folgende Logger konfiguriert (defaults)
// Console
// Debug
// EventSource
// EventLog (nur auf Windows)

// Die Konfiguration kann aber beliebig angepasst werden
// ConfigureOnlyConsole(builder);

var app = builder.Build();
```

LOGGING

```
void ConfigureOnlyConsole(WebApplicationBuilder builder)
{
    builder.Logging.ClearProviders();
    builder.Logging.AddConsole();
}
```

Konfiguration

Die Default Konfiguration für das Logging lässt sich vollständig anpassen.
ClearProviders() entfernt alle defaults

LOGGING

```
app.MapGet("/", IndexRouteHandler);  
app.MapGet("/structural", StructuralLoggingRouteHandler);  
  
app.Run();
```

```
string IndexRouteHandler ILoggerFactory loggerFactory)  
{  
    var logger = loggerFactory.CreateLogger(nameof(IndexRouteHandler));  
  
    return "Hello World";  
}
```

Logger erzeugen

Eine Instanz eines Loggers lässt sich über eine LoggerFactory erzeugen. Der Logger erhält einen Namen, üblicherweise die Klasse in der er verwendet wird. Damit werden Logmeldungen angereichert.

LOGGING

```
string ConcreteDiHandler(ILogger<Program> logger)
{
    logger.LogInformation("Berechne komplexe Nachricht");

    return "Hello World";
}
```

Logger erzeugen

Über das DI-System kann auch direkt eine konkrete Instanz für einen Typ erzeugt werden. Als „Typ“ wird meist die umgebende Klasse verwendet.

LOGGING

```
public class ValuesController : Controller
{
    private ILogger Logger { get; set; }

    // Logger manuell über Factory erzeugen
    public ValuesController(ILoggerFactory logger)
    {
        Logger = logger.CreateLogger<ValuesController>();
    }

    // Oder Logger vom DI-System erzeugen lassen
    public ValuesController(ILogger<ValuesController> logger)
    {
        Logger = logger;
    }
}
```

Logger erzeugen

Hier ein Beispiel für einen ApiController

LOGLEVEL

- LogTrace
 - Für maximal möglichen Informationsgehalt.
- LogDebug
 - Sollte Informationen enthalten die einen Mehrwert während der Entwicklungsphase bieten
- LogInformation
 - Geben Auskunft über aktuelle Abläufe innerhalb der Applikation
- LogWarning => Standard-LogLevel für Produktion
 - Für abnormales / unerwartetes Verhalten welches aber nicht den Ablauf der Applikation stoppt
- LogError
 - Für Fehler welche die aktuell ausgeführte Tätigkeit betreffen
- LogCritical
 - Für die schlimmsten Fälle welche sofortiges eingreifen erfordern, wie z.B.: Applikationscrash, Systemausfall

LOGGING

```
app.MapGet("/", IndexRouteHandler);
```

```
app.Run();
```

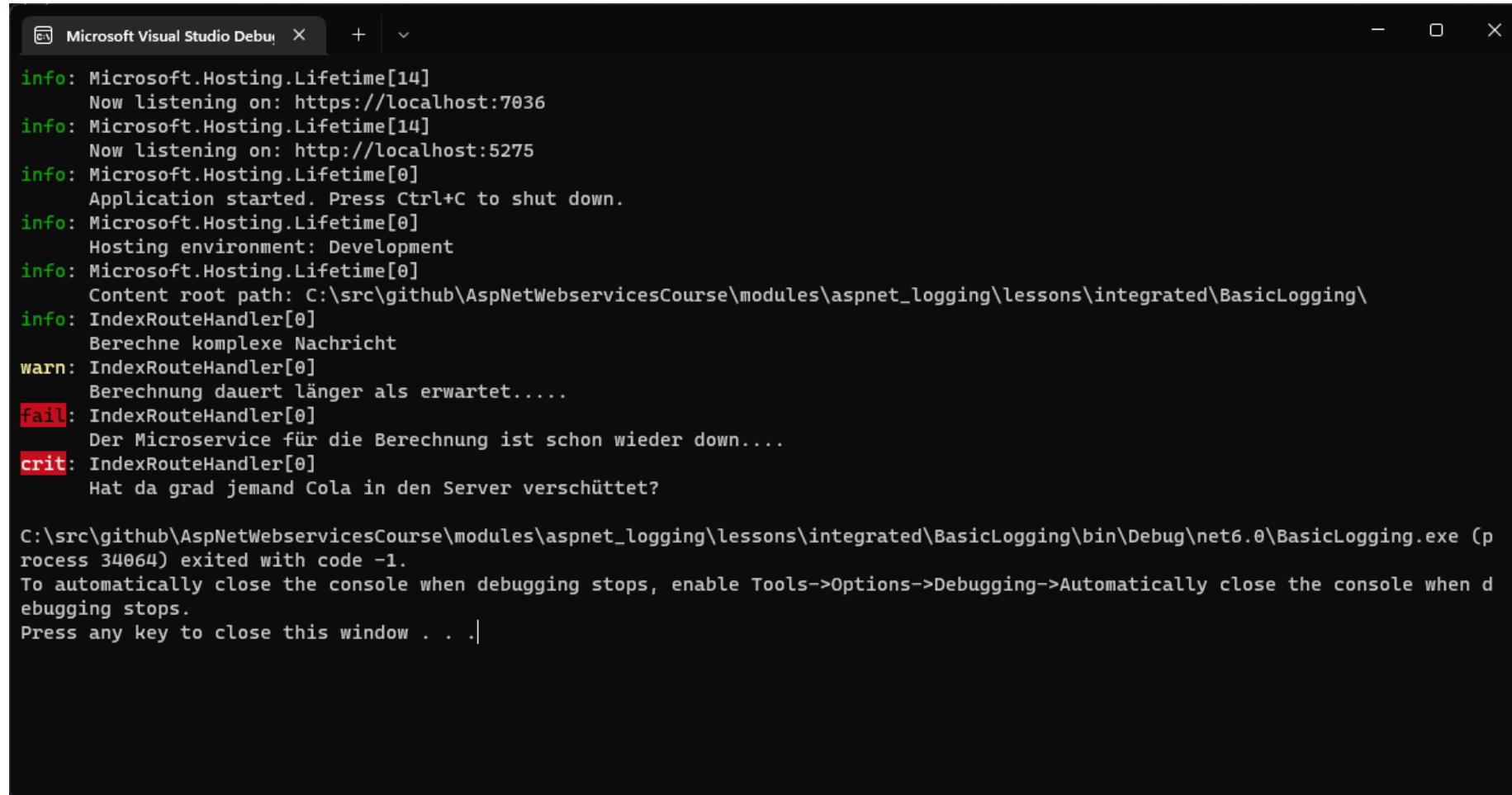
```
string IndexRouteHandler ILoggerFactory loggerFactory)
{
    var logger = loggerFactory.CreateLogger(nameof(IndexRouteHandler));
    logger.LogTrace("Im Handler der Index route");
    logger.LogDebug("Hoffentlich klappt es");
    logger.LogInformation("Berechne komplexe Nachricht");
    logger.LogWarning("Berechnung dauert länger als erwartet.....");
    logger.LogError("Der Microservice für die Berechnung ist schon wieder down....");
    logger.LogCritical("Hat da grad jemand Cola in den Server verschüttet?");

    return "Hello World";
}
```

```
info: Microsoft.Hosting.Lifetime[14]
      Now listening on: https://localhost:7036
info: Microsoft.Hosting.Lifetime[14]
      Now listening on: http://localhost:5275
info: Microsoft.Hosting.Lifetime[0]
      Application started. Press Ctrl+C to shut down.
info: Microsoft.Hosting.Lifetime[0]
      Hosting environment: Development
info: Microsoft.Hosting.Lifetime[0]
      Content root path: C:\src\github\AspNetWebservicesCourse\modules\aspnet_logging\lessons\integrated\BasicLogging\
info: IndexRouteHandler[0]
      Berechne komplexe Nachricht
warn: IndexRouteHandler[0]
      Berechnung dauert länger als erwartet.....
fail: IndexRouteHandler[0]
      Der Microservice für die Berechnung ist schon wieder down....
crit: IndexRouteHandler[0]
      Hat da grad jemand Cola in den Server verschüttet?
```

LOGLEVEL

LogLevel = Information



```
Microsoft Visual Studio Debug Console
info: Microsoft.Hosting.Lifetime[14]
      Now listening on: https://localhost:7036
info: Microsoft.Hosting.Lifetime[14]
      Now listening on: http://localhost:5275
info: Microsoft.Hosting.Lifetime[0]
      Application started. Press Ctrl+C to shut down.
info: Microsoft.Hosting.Lifetime[0]
      Hosting environment: Development
info: Microsoft.Hosting.Lifetime[0]
      Content root path: C:\src\github\AspNetWebServicesCourse\modules\aspnet_logging\lessons\integrated\BasicLogging\
info: IndexRouteHandler[0]
      Berechne komplexe Nachricht
warn: IndexRouteHandler[0]
      Berechnung dauert länger als erwartet....
fail: IndexRouteHandler[0]
      Der Microservice für die Berechnung ist schon wieder down....
crit: IndexRouteHandler[0]
      Hat da grad jemand Cola in den Server verschüttet?

C:\src\github\AspNetWebServicesCourse\modules\aspnet_logging\lessons\integrated\BasicLogging\bin\Debug\net6.0\BasicLogging.exe (p
rocess 34064) exited with code -1.
To automatically close the console when debugging stops, enable Tools->Options->Debugging->Automatically close the console when d
ebugging stops.
Press any key to close this window . . .|
```

LOGLEVEL

LogLevel = Trace

```
C:\src\github\AspNetWebser... x + v
dbug: Microsoft.Extensions.Hosting.Internal.Host[1]
      Hosting starting
dbug: Microsoft.AspNetCore.Server.Kestrel.Core.KestrelServer[0]
      Using development certificate: CN=localhost (Thumbprint: 8222E37DE50E8D8F3CD5C51BF1A95EE32A83A43C)
info: Microsoft.Hosting.Lifetime[14]
      Now listening on: https://localhost:7036
info: Microsoft.Hosting.Lifetime[14]
      Now listening on: http://localhost:5275
dbug: Microsoft.AspNetCore.Hosting.Diagnostics[13]
      Loaded hosting startup assembly BasicLogging
dbug: Microsoft.AspNetCore.Hosting.Diagnostics[13]
      Loaded hosting startup assembly Microsoft.AspNetCore.Watch.BrowserRefresh
dbug: Microsoft.AspNetCore.Hosting.Diagnostics[13]
      Loaded hosting startup assembly Microsoft.WebTools.BrowserLink.Net
info: Microsoft.Hosting.Lifetime[0]
      Application started. Press Ctrl+C to shut down.
info: Microsoft.Hosting.Lifetime[0]
      Hosting environment: Development
info: Microsoft.Hosting.Lifetime[0]
      Content root path: C:\src\github\AspNetWebServicesCourse\modules\aspnet_logging\lessons\integrated\BasicLogging\
dbug: Microsoft.Extensions.Hosting.Internal.Host[2]
      Hosting started
dbug: Microsoft.AspNetCore.Server.Kestrel.Transport.Sockets[6]
      Connection id "0HMHK3CEF5IOH" received FIN.
dbug: Microsoft.AspNetCore.Server.Kestrel.Connections[39]
      Connection id "0HMHK3CEF5IOH" accepted.
dbug: Microsoft.AspNetCore.Server.Kestrel.Connections[1]
      Connection id "0HMHK3CEF5IOH" started.
dbug: Microsoft.AspNetCore.Server.Kestrel.Https.Internal.HttpsConnectionMiddleware[1]
      Failed to authenticate HTTPS connection.
      System.IO.IOException: Received an unexpected EOF or 0 bytes from the transport stream.
         at System.Net.Security.SslStream.ReceiveBlobAsync[TIOAdapter](TIOAdapter adapter)
         at System.Net.Security.SslStream.ForceAuthenticationAsync[TIOAdapter](TIOAdapter adapter, Boolean receiveFirst, Byte[] reAuthenticationData, Boolean isApm)
         at Microsoft.AspNetCore.Server.Kestrel.Https.Internal.HttpsConnectionMiddleware.OnConnectionAsync(ConnectionContext context)
dbug: Microsoft.AspNetCore.Server.Kestrel.Connections[2]
      Connection id "0HMHK3CEF5IOH" stopped.
dbug: Microsoft.AspNetCore.Server.Kestrel.Transport.Sockets[7]
      Connection id "0HMHK3CEF5IOH" sending FIN because: "The Socket transport's send loop completed gracefully."
dbug: Microsoft.AspNetCore.Server.Kestrel.Connections[39]
      Connection id "0HMHK3CEF5IOI" accepted.
dbug: Microsoft.AspNetCore.Server.Kestrel.Connections[1]
      Connection id "0HMHK3CEF5IOI" started.
dbug: Microsoft.AspNetCore.Server.Kestrel.Https.Internal.HttpsConnectionMiddleware[3]
      Connection 0HMHK3CEF5IOI established using the following protocol: Tls13
trce: Microsoft.AspNetCore.Server.Kestrel.Http2[49]
      Connection id "0HMHK3CEF5IOI" sending SETTINGS frame for stream ID 0 with length 18 and flags NONE.
trce: Microsoft.AspNetCore.Server.Kestrel.Http2[49]
      Connection id "0HMHK3CEF5IOI" sending WINDOW_UPDATE frame for stream ID 0 with length 4 and flags 0x0.
trce: Microsoft.AspNetCore.Server.Kestrel.Http2[37]
      Connection id "0HMHK3CEF5IOI" received SETTINGS frame for stream ID 0 with length 24 and flags NONE.
trce: Microsoft.AspNetCore.Server.Kestrel.Http2[49]
      Connection id "0HMHK3CEF5IOI" sending SETTINGS frame for stream ID 0 with length 0 and flags ACK.
trce: Microsoft.AspNetCore.Server.Kestrel.Http2[37]
      Connection id "0HMHK3CEF5IOI" received WINDOW_UPDATE frame for stream ID 0 with length 4 and flags 0x0.
trce: Microsoft.AspNetCore.Server.Kestrel.Http2[37]
      Connection id "0HMHK3CEF5IOI" received HEADERS frame for stream ID 1 with length 478 and flags END_STREAM, END_HEADERS, PRIORITY.
trce: Microsoft.AspNetCore.Server.Kestrel.Http2[37]
      Connection id "0HMHK3CEF5IOI" received SETTINGS frame for stream ID 0 with length 0 and flags ACK.
info: Microsoft.AspNetCore.Hosting.Diagnostics[1]
      Request starting HTTP/2 GET https://localhost:7036/ - -
dbug: Microsoft.AspNetCore.Hosting.Diagnostics[0]
      Wildcard detected, all requests with hosts will be allowed.
trce: Microsoft.AspNetCore.Hosting.Diagnostics[2]
      All hosts are allowed.
dbug: Microsoft.AspNetCore.Routing.Matching.DfaMatcher[1001]
      1 candidate(s) found for the request path '/'
dbug: Microsoft.AspNetCore.Routing.EndpointRoutingMiddleware[1]
      Request matched endpoint 'HTTP: GET / => IndexRouteHandler'
info: Microsoft.AspNetCore.Routing.EndpointMiddleware[0]
      Executing endpoint 'HTTP: GET / => IndexRouteHandler'
trce: IndexRouteHandler[0]
      Im Handler der Index route
dbug: IndexRouteHandler[0]
      Hoffentlich klappt es
info: IndexRouteHandler[0]
      Berechne komplexe Nachricht
warn: IndexRouteHandler[0]
      Berechnung dauert länger als erwartet.....
err: IndexRouteHandler[0]
      Der Microservice für die Berechnung ist schon wieder down....
err: IndexRouteHandler[0]
      Hat da grad jemand Cola in den Server verschüttet?
|
```

LOGLEVEL

```
{
  "Logging": {
    "IncludeScopes": false,
    "LogLevel": {
      "Default": "Debug",
      "System": "Information",
      "Microsoft": "Information"
    }
  }
}
```

LogLevel

Das Logging-Framework erlaubt unterschiedliche LogLevel pro (Teil-) Kategorie. Die Kategorie entspricht meist dem Namespace.

LOGGING PROVIDER

- Debug-Window
- Console
- EventSource (ETW auf Windows)
- EventLog (Windows)

3RD PARTY LOGGING PROVIDER

- Das Logging-System von ASP.NET Core ist erweiterbar.
- **Serilog**
- Log4net
- Nlog

PROBLEME VON „NORMALEM“ LOGGING

- Output ist Text
- Zum Parsen werden meist reguläre Ausdrücke verwendet
- Queries gegen Logfiles nur nach Aufbereitung / Parsen der Logfiles möglich
- Die „Semantik“ eines Logeintrags geht verloren
- Problem verschlimmert sich je mehr Logfiles analysiert werden müssen

SEMANTIC LOGGING

- Zeig mir alle Meldungen die Produkt 123 betreffen
- Zeige mir alle fehlgeschlagenen Login-Versuche des Users „Chuck“
- Zeig mir alle Requests deren Laufzeit 500ms überstieg
- Wie oft wurde Operation X heute aufgerufen

PROBLEME VON „NORMALEM“ LOGGING

- Log ohne Semantik

```
2017-05-17 19:00:53.706 +02:00 [Information] Request starting HTTP/1.1 GET http://localhost:24976/api/values
2017-05-17 19:00:54.092 +02:00 [Information] Request finished in 406.5738ms 404
2017-05-17 19:01:00.383 +02:00 [Information] Request starting HTTP/1.1 GET http://localhost:24976/api/books
ModelState is Valid
2017-05-17 19:01:05.052 +02:00 [Warning] No book was found by the provided Id 200.
2017-05-17 19:01:05.064 +02:00 [Information] Executing HttpStatusCodeResult, setting HTTP status code 404
2017-05-17 19:01:05.069 +02:00 [Information] Executed action "AspNetCore.Logging.Serilog.Controllers.BooksController.GetBookById
(AspNetCore.Logging.Serilog)" in 119.036ms
2017-05-17 19:01:05.075 +02:00 [Information] Request finished in 209.2111ms 404
2017-05-17 19:01:07.371 +02:00 [Information] Request starting HTTP/1.1 POST http://localhost:24976/api/books/200 application/json
163
2017-05-17 19:01:07.393 +02:00 [Information] Request finished in 23.5851ms 404
2017-05-17 19:01:08.807 +02:00 [Information] Request starting HTTP/1.1 POST http://localhost:24976/api/books/200 application/json
163
2017-05-17 19:01:08.826 +02:00 [Information] Request finished in 19.98ms 404
2017-05-17 19:01:16.080 +02:00 [Information] Request starting HTTP/1.1 POST http://localhost:24976/api/books application/json 163
2017-05-17 19:01:16.214 +02:00 [Information] Executing action method
"AspNetCore.Logging.Serilog.Controllers.BooksController.CreateBook (AspNetCore.Logging.Serilog)" with arguments
(["AspNetCore.Logging.Serilog.Models.Book"]) - ModelState is Invalid
2017-05-17 19:01:18.550 +02:00 [Error] The supplied data for book creation is invalid (Book { Id: 1, Isbn: "", Title: "", Price:
30, Authors: ["Troelson"], ReleaseDate: 05/16/2015 20:37:28 }) with Errors "The Isbn field is required.;The Title field is
required.".
2017-05-17 19:01:18.568 +02:00 [Information] Executing ObjectResult, writing value "Microsoft.AspNetCore.Mvc.ControllerContext".
2017-05-17 19:01:18.583 +02:00 [Information] Executed action "AspNetCore.Logging.Serilog.Controllers.BooksController.CreateBook
(AspNetCore.Logging.Serilog)" in 2487.6788ms
2017-05-17 19:01:18.592 +02:00 [Information] Request finished in 2512.2555ms 400 application/json; charset=utf-8
```

SEMANTIC LOGGING

- Log mit Semantik

```
{
  "Timestamp": "2017-05-17T19:01:58.1796327+02:00",
  "Level": "Error",
  "MessageTemplate": "The supplied data for book creation is invalid ({@Book}) with Errors {Errors}.",
  "RenderedMessage": "The supplied data for book creation is invalid (Book { Id: 1, Isbn: \"\", Title: \"\", Price: 30, Authors: [\\\"Troelson\\\"], ReleaseDate: 05/16/2015 20:37:28 }) with Errors \\\"The Isbn field is required.;The Title field is required.\\\".",
  "Properties": {
    "Book": {
      "_typeTag": "Book",
      "Id": 1,
      "Isbn": "",
      "Title": "",
      "Price": 30,
      "Authors": [ "Troelson" ],
      "ReleaseDate": "2015-05-16T20:37:28.3436361+02:00"
    },
    "Errors": "The Isbn field is required.;The Title field is required.",
    "SourceContext": "AspNetCore.Logging.Serilog.Controllers.BooksController",
    "ActionId": "56d7134f-25ae-4f20-a0f5-4b390908e337",
    "ActionName": "AspNetCore.Logging.Serilog.Controllers.BooksController.CreateBook (AspNetCore.Logging.Serilog)",
    "RequestId": "0HL4T8PK97VEP",
    "RequestPath": "/api/books",
    "Release": "0.0.1-beta-nightmare"
  }
}
```

SEMANTIC LOGGING

The screenshot shows the Seq logging tool interface. The top bar includes navigation icons and the address bar shows 'localhost:5341/#/events'. The main area displays a list of log events with timestamps and descriptions. A specific error event is expanded, showing details such as the action name, book data, and the error message: 'The supplied data for book creation is invalid (Book{"Id":1,"Isbn":"","Title":"","Price":30,"Authors":["Troelson"],"ReleaseDate":"2015-05-16T20:37:28.3436361+02:00", "_typeTag": "Book"}) with Errors The Isbn field is required.;The Title field is required..'. The right sidebar contains sections for 'SIGNALS' (None, Errors, Exceptions, Warnings) and 'QUERIES' (Available Properties, Count by Hour, Latest as Table, Space by Event Type). The bottom status bar indicates 'Seq 4.0.58 Single-User License' and 'Copyright © 2017'.

17 May 2017 18:50:19.078 Request finished in 72.2613ms 404

17 May 2017 18:50:19.071 Executed action.AspNetCore.Logging.Serilog.Controllers.BooksController.GetBookById (AspNetCore.Logging.Serilog) in 51.227000000000004ms

17 May 2017 18:50:19.066 Executing HttpStatusCodeResult, setting HTTP status code 404

17 May 2017 18:50:19.055 No book was found by the provided Id 200.

17 May 2017 18:50:19.048 Executing action method.AspNetCore.Logging.Serilog.Controllers.BooksController.GetBookById (AspNetCore.Logging.Serilog) with arguments ("200") -...

17 May 2017 18:50:19.006 Request starting HTTP/1.1 GET http://localhost:24976/api/books/200 application/json

17 May 2017 18:49:01.546 Request finished in 4373.7321ms 400 application/json; charset=utf-8

17 May 2017 18:49:01.538 Executed action.AspNetCore.Logging.Serilog.Controllers.BooksController.CreateBook (AspNetCore.Logging.Serilog) in 4230.7713ms

17 May 2017 18:49:01.521 Executing ObjectResult, writing value Microsoft.AspNetCore.Mvc.ControllerContext.

17 May 2017 18:48:59.892 The supplied data for book creation is invalid (Book{"Id":1,"Isbn":"","Title":"","Price":30,"Authors":["Troelson"],"ReleaseDate":"2015-05-16T20:37:28.3436361+02:00", "_typeTag": "Book"}) with Errors The Isbn field is required.;The Title field is required..

Id Level (Error) ActionName E9177 Retain Raw JSON

✗ ActionId df011457-62ea-499b-805e-adea7a96a124

✓ ActionName.AspNetCore.Logging.Serilog.Controllers.BooksController.CreateBook (AspNetCore.Logging.Serilog)

✓ Book {Id: 1, Isbn: "", Title: "", Price: 30, Authors: [...], ReleaseDate: "2015-05-16T20:37:28.3436361+02:00", _typeTag: "Book"}

✓ Errors The Isbn field is required.;The Title field is required.

✓ Release 0.0.1-beta-nightmare

✓ RequestId 0HL4T8HRHN4A5

✓ RequestPath /api/books

✓ SourceContext.AspNetCore.Logging.Serilog.Controllers.BooksController

17 May 2017 18:48:57.492 Executing action method.AspNetCore.Logging.Serilog.Controllers.BooksController.CreateBook (AspNetCore.Logging.Serilog) with arguments ("AspNetC...

17 May 2017 18:48:57.224 Request starting HTTP/1.1 POST http://localhost:24976/api/books application/json 163

17 May 2017 18:47:59.813 Request finished in 481.1117ms 200 application/json; charset=utf-8

17 May 2017 18:47:59.796 Executed action.AspNetCore.Logging.Serilog.Controllers.BooksController.GetBooks (AspNetCore.Logging.Serilog) in 349.9175ms

17 May 2017 18:47:59.578 Executing ObjectResult, writing value Microsoft.AspNetCore.Mvc.ControllerContext.

17 May 2017 18:47:59.535 Executing action method.AspNetCore.Logging.Serilog.Controllers.BooksController.GetBooks (AspNetCore.Logging.Serilog) with arguments (null) - Model...

17 May 2017 18:47:59.328 Request starting HTTP/1.1 GET http://localhost:24976/api/books

17 May 2017 18:47:55.145 Request finished in 410.3364ms 404

17 May 2017 18:47:54.761 Request starting HTTP/1.1 GET http://localhost:24976/api/values

19 events scanned to today at 6:47 PM... complete.

Seq 4.0.58 Single-User License
Copyright © 2017
Enable update check

Tools wie Kibana oder Seq können semantische Logs verarbeiten und analysieren. Es können SQL ähnliche Abfragen durchgeführt werden.

SERIOLOG

SERilog|Installation

```
<PackageReference Include="Serilog.AspNetCore" Version="5.0.0" />  
<PackageReference Include="Serilog.Sinks.Console" Version="4.0.1" />  
<PackageReference Include="Serilog.Sinks.File" Version="5.0.0" />
```

SERilog|Sinks

- Sinks definieren das Ziel der Log-Aufrufe und deren Formatierung
- Sinks sind als NuGet-Pakete verfügbar
- Typische Sinks
 - Serilog.Sinks.Console
 - Serilog.Sinks.File
- [Weitere Sinks https://github.com/serilog/serilog/wiki/Provided-Sinks](https://github.com/serilog/serilog/wiki/Provided-Sinks)

SERilog|Konfiguration

Mit „Enrich-ern“ können den Logmeldungen zusätzliche Informationen mitgegeben werden. Auch die Enricher werden über NuGet-Pakete bereitgestellt.

```
Serilog.Enrichers.Environment => WithMachineName()  
                                ,WithEnvironmentUserName()  
Serilog.Enrichers.Process => WithProcessId()  
Serilog.Enrichers.Thread => WithThreadId()
```

```
void ConfigureSerilog(WebApplicationBuilder builder)  
{  
    // Default Logger entfernen  
    builder.Logging.ClearProviders();  
  
    // Serilog verwendet eine eigene Konfiguration, kann auch in der  
    // appsettings.json angegeben werden,  
    // hat jedoch ein anderes Format als die Default Logger  
    var logger = new LoggerConfiguration()  
        .WriteTo.Console()  
        .CreateLogger();  
  
    // Serilog als Logger  
    builder.Logging.AddSerilog(logger);  
}
```

An WriteTo werden die gewünschten Sinks registriert. Jedes Sink hat in der Regel eine sinnvolle Default-Konfiguration und zusätzlich weitere Konfigurationsmöglichkeiten. Bei machen Sinks müssen Authentifizierungsinformationen oder API-Keys hinterlegt werden damit sie korrekt funktionieren.

CreateLogger erzeugt aus der Konfiguration einen Logger, welcher als Basis für weitere Logger-Instanzen verwendet werden kann.

SERilog|Konfiguration

```
Log.Logger = new LoggerConfiguration()  
    .ReadFrom.Configuration(Configuration)  
    .CreateLogger();
```

```
{  
  "Serilog": {  
    "MinimumLevel": {  
      "Default": "Debug",  
      "Override": {  
        "System": "Information",  
        "Microsoft": "Information"  
      }  
    },  
    "Enrich": [ "FromLogContext" ]  
  }  
}
```

Für die Extension-Method Configuration() an ReadFrom wird das NuGet-Paket Serilog.Settings.Configuration benötigt

SERilog|Konfiguration

```
// Globalen Serilog-Logger konfigurieren
Log.Logger = new LoggerConfiguration()
    .ReadFrom.Configuration(Configuration)
    .WriteTo. ...("Log-{Date}.txt")
    .Enrich.WithProperty("Release", "0.0.1-beta-nightmare")
    .CreateLogger();
```

Konfigurationsdatei und Konfiguration
per Code können gemischt werden

```
{
  "Serilog": {
    "MinimumLevel": {
      "Default": "Verbose",
      "Override": {
        "System": "Information",
        "Microsoft": "Information"
      }
    },
    "WriteTo": [
      { "Name": "LiterateConsole" }
    ],
    "Enrich": [ "FromLogContext" ]
  }
}
```

OPEN API

Open API / SWAGGER

- Swagger / Open API definiert eine Tool-Chain zur automatisierten Beschreibung von APIs und deren Dokumentation
- Auf Basis des Swagger-Protokolls können automatisiert SDKs generiert werden
- NuGet: Swashbuckle.AspNetCore



[Home - OpenAPI Initiative \(openapis.org\)](https://openapis.org)

Open API / SWAGGER

Swagger UI

pet Everything about your Pets

Find out more: <http://swagger.io>



POST	/pet/{petId}/uploadImage	uploads an image	✓	🔒
POST	/pet	Add a new pet to the store	✓	🔒
PUT	/pet	Update an existing pet	✓	🔒
GET	/pet/findByStatus	Finds Pets by status	✓	🔒
GET	/pet/findByTags	Finds Pets by tags	✓	🔒
GET	/pet/{petId}	Find pet by ID	✓	🔒
POST	/pet/{petId}	Updates a pet in the store with form data	✓	🔒
DELETE	/pet/{petId}	Deletes a pet	✓	🔒

Open API / SWAGGER

Swagger UI

pet Everything about your Pets Find out more: <http://swagger.io>

POST `/pet/{petId}/uploadImage` uploads an image

Parameters Try it out

Name	Description
petId * required integer(\$int64) (path)	ID of pet to update
additionalMetadata string (formData)	Additional data to pass to server
file file (formData)	file to upload

Keine Datei ausgewählt

Responses Response content type: **application/json**

Code	Description
200	successful operation

Example Value | Model

```
{  "code": 0,  "type": "string",  "message": "string"}
```

Open API / SWAGGER

Swagger UI

```
{
  swagger: "2.0",
  info: {
    description: "This is a sample server Petstore server. You can find out more about Swagger at [http://swagger.io](http://swagger.io) or on [irc.freenode.net, #swagger](http://swagger.io/irc/). For this sample, you can use the",
    version: "1.0.6",
    title: "Swagger Petstore",
    termsOfService: "http://swagger.io/terms/",
    contact: {
      email: "apiteam@swagger.io"
    },
    license: {
      name: "Apache 2.0",
      url: "http://www.apache.org/licenses/LICENSE-2.0.html"
    }
  },
  host: "petstore.swagger.io",
  basePath: "/v2",
  tags: [
    {
      name: "pet",
      description: "Everything about your Pets",
      externalDocs: {
        description: "Find out more",
        url: "http://swagger.io"
      }
    },
    {
      name: "store",
      description: "Access to Petstore orders"
    },
    {
      name: "user",
      description: "Operations about user",
      externalDocs: {
        description: "Find out more about our store",
        url: "http://swagger.io"
      }
    }
  ],
  schemes: [
```


OPEN API IN ASP.NET (SWAGGER)

Open API / SWAGGER

```
<ItemGroup>  
  <PackageReference Include="Swashbuckle.AspNetCore" Version="6.2.3" />  
</ItemGroup>
```

Open API / SWAGGER

```
var builder = WebApplication.CreateBuilder(args);

builder.Services.AddRouting(o =>
{
    o.LowercaseUrls = true; // Api Controller Namen klein ausgeben
});

builder.Services.AddEndpointsApiExplorer();
builder.Services.AddSwaggerGen(c =>
{
    c.SwaggerDoc("v1", new() { Title = "Jokes API", Version = "v1" });

    // C# XML-Kommentare für API-Beschreibung nutzen
    // ACHTUNG: Funktioniert nur für Controller aktuell
    var xmlFile = $"{Assembly.GetExecutingAssembly().GetName().Name}.xml";
    var xmlPath = Path.Combine(AppContext.BaseDirectory, xmlFile);
    c.IncludeXmlComments(xmlPath);
});

var app = builder.Build();

// Swagger Endpunkt nur in DEV aktivieren für interne APIs
if (app.Environment.IsDevelopment())
{
    app.UseSwagger();
    app.UseSwaggerUI();
}

app.Run();
```

Open API / SWAGGER

```
<PropertyGroup>  
  <GenerateDocumentationFile>true</GenerateDocumentationFile>  
  <NoWarn>$(NoWarn);1591</NoWarn>  
</PropertyGroup>
```

XML Kommentare auswerten

Damit XML-Kommentare in die Swagger-API generiert werden, muss in der *.csproj die Generierung aktiviert werden. Leider aktuell nur für Controller verfügbar, nicht Minimal API

Open API / SWAGGER

```
[Route("api/[controller]")]
[ApiController]
[Produces("application/json")]
public class BooksController : ControllerBase
{
    /// <summary>
    /// Returns a single book
    /// </summary>
    /// /// <remarks>
    /// Sample request:
    ///
    ///     GET /books/1
    ///
    /// </remarks>
    /// <param name="id">id of the book</param>
    /// <returns>the requested book</returns>
    [HttpGet("{id}")]
    public async Task<ActionResult<Book>> GetById(string id)
    {
        var book = await _bookRepository.GetById(id);
        if (book == null)
        {
            return NotFound();
        }

        return Ok(book);
    }
}
```

Open API / SWAGGER

```
/// <summary>
/// Updates a book partially by the provided properties
/// </summary>
/// <param name="id">id of the book to update</param>
/// <param name="doc">operations to perform</param>
/// <returns></returns>
/// <response code="200">The updated book</response>
/// <response code="400">If the validation fails</response>
/// <response code="404">no book found to update</response>
[HttpPatch("{id}")]
[ProducesResponseType(StatusCodes.Status200OK)]
[ProducesResponseType(StatusCodes.Status400BadRequest)]
[ProducesResponseType(StatusCodes.Status404NotFound)]
public async Task<ActionResult<Book>> PartialUpdate(...)
{
    var existing = await _bookRepository.GetById(id);
    if (existing == null)
    {
        return NotFound();
    }

    doc.ApplyTo(existing);
    var result = await _bookRepository.Update(existing);

    return Ok(result);
}
```

Responses

Code	Description	Links
200	<div>The updated book</div> <div>Media type application/json</div> <div>Controls Accept header.</div> <div>Example Value Schema</div> <div><pre>{ "id": "string", "title": "string", "description": "string", "categories": [{ "id": "string", "name": "string" }], "author": { "id": "3fa85f64-5717-4562-b3fc-2c963f66afa6", "firstName": "string", "lastName": "string", "books": ["string"] } }</pre></div> <div>No links</div>	No links
400	<div>If the validation fails</div> <div>Media type application/json</div> <div>Example Value Schema</div> <div><pre>{ "type": "string", "title": "string", "status": 0, "detail": "string", "instance": "string", "additionalProp1": "string", "additionalProp2": "string", "additionalProp3": "string" }</pre></div> <div>No links</div>	No links
404	<div>no book found to update</div> <div>Media type application/json</div> <div>Example Value Schema</div> <div><pre>{ "type": "string", "title": "string", "status": 0, "detail": "string", "instance": "string", "additionalProp1": "string", "additionalProp2": "string", "additionalProp3": "string" }</pre></div> <div>No links</div>	No links

Open API / SWAGGER

Jokes API ^{v1}

/swagger/v1/swagger.json

Authors



GET /api/Authors Gets all authors

Books



GET /api/Books Returns all books

POST /api/Books Creates a new book

GET /api/Books/{id} Returns a single book

PUT /api/Books/{id} Complete update of a book

DELETE /api/Books/{id} removes a book

PATCH /api/Books/{id} Updates a book partially by the provided properties

Open API / SWAGGER

Books

GET /api/Books Returns all books

POST /api/Books Creates a new book

Parameters

Try it out

Name	Description
book <small>(body)</small>	<div>data for the book to create</div> <div>Example Value Model</div> <pre>{ "id": "string", "title": "string", "description": "string", "categories": [{ "id": "string", "name": "string" }], "author": { "id": "string", "firstName": "string", "lastName": "string", "books": [null] } }</pre> <div>Parameter content type application/json-patch+json</div>

Responses

Response content type application/json

Code	Description
201	<div>Success</div> <div>Example Value Model</div> <pre>{ "id": "string", "title": "string", "description": "string", "categories": [{ "id": "string", "name": "string" }] }</pre>

Open API / SWAGGER

```
1 {  
2   "swagger": "2.0",  
3   "info": {  
4     "version": "v1",  
5     "title": "Awesome Book API"  
6   },  
7   "host": "localhost:16388",  
8   "basePath": "/",  
9   "paths": {  
10    "/api/Books": {  
11      "get": {  
12        "tags": [  
13          "Books"  
14        ],  
15        "operationId": "ApiBooksGet",  
16        "consumes": [],  
17        "produces": [  
18          "text/plain",  
19          "application/json",  
20          "text/json"  
21        ],  
22        "responses": {  
23          "200": {  
24            "description": "Success",  
25            "schema": {  
26              "type": "array",  
27              "items": {  
28                "$ref": "#/definitions/Book"  
29              }  
30            }  
31          }  
32        }  
33      }  
34    }  
35  }
```

Der Swagger-Generator liefert ein maschinenlesbares JSON-File, welches die API beschreibt. Mit diesen Informationen kann für eine API automatisch ein Client generiert werden

Open API / SWAGGER MINIMAL API

```
void MapMinimalApi(WebApplication app)
{
    app.MapGet("api/v1/minimal/noinfo", () =>
    {
        return GenerateForecast();
    });

    app.MapGet("api/v1/minimal/fluent", () =>
    {

        return GenerateForecast();

    }).Produces<WeatherForecast>(contentType: "application/json")
    .WithTags("MinimalAPI");

    app.MapGet("api/v1/minimal/fluent/{id}", () =>
    {
        bool fail = Random.Shared.Next(1, 11) > 5;

        if (fail)
        {
            return Results.BadRequest(new ApiError("112", "OH NOOOOO, fehlender Infinity-Stein..."));
        }
        else
        {
            var forecast = GenerateForecast();
            return Results.Ok(forecast);
        }
    }).Produces<WeatherForecast>(contentType: "application/json")
    .Produces<ApiError>(statusCode: StatusCodes.Status404NotFound, contentType: "application/json")
    .WithTags("MinimalAPI");
}
```

Open API / SWAGGER MINIMAL API

AspNetOpenApi ^	
GET	/api/v1/minimal/noinfo ✓
MinimalAPI ^	
GET	/api/v1/minimal/fluent ✓
GET	/api/v1/minimal/fluent/{id} ✓

Open API / SWAGGER

- Swagger ist mit Minimal APIs in .NET 6 nicht optimal benutzbar
- Mit .NET 7 (aktuell Preview 4, 2022-05-17) kommen erste Verbesserungen
- <https://devblogs.microsoft.com/dotnet/asp-net-core-updates-in-dotnet-7-preview-4/#openapi-improvements-for-minimal-apis>