MATHEMA

Marathon laufen ohne Schuhe

Libs ohne die ich nicht mehr programmieren will

Tim Bourguignon - 21 Mai 2014

About me

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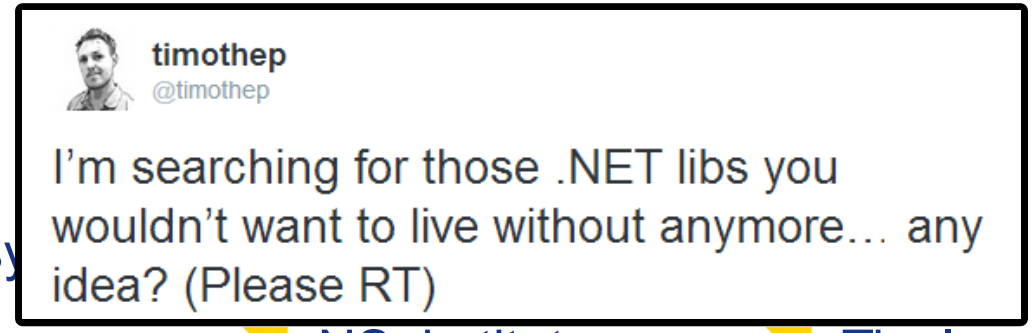
Why this talk?

- Life outside Microsoft products?
  - Microsoft embraces OpenSource
  - Andreas Håkansson, OpenSource MVP 2014
    - Author of the Nancy Framework (@thecodejunkie)
  - Too much talk about the big projects
  - World class (small) libraries
  - Projects moving things forward
  - Tools saving our developers lives
    - Which ones?

My very own retrospective

- Autofac
- RhinoMocks
- ServiceStack
- Ninject



- FakeItEasy
- Json.Net
- JsonFx
- Moq
- NancyFx
- NSubstitute
- RestSharp
- TinyIoc

“Our” life saving libs

- Autofac
- AutoPoco
- CsQuery
- Dapper
- EmitMapper
- FakeItEasy
- Json.Net
- JsonFx
- Moq
- NancyFx
- NDatabase
- NEST
- Ninject
- NLog
- NodaTime
- Nowin
- NSubstitute
- Owin.*
- Purify
- RestSharp
- RhinoMocks
- ServiceStack
- SimpleAuthentication
- SimpleValidator
- Spring.Rest
- T4
- TinyIoc
- Windsor

Short-list

- NodaTime
- Json.NET & JsonFx
- RestSharp
- TinyIoC

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NodaTime

NodaTime

- Port of JodaTime (Java)
  - Author: Jon Skeets
  - www.nodatime.org
  - Nuget: nodatime
  - License Apache 2.0

What's wrong with DateTime anyway?

- Two classes to rule them all
  - DateTime
  - TimeSpan
- How to express:
  - A Date only?
    - „May 21st“
  - A Time period?
    - „May 21st – 23rd 2014“
- Works but...

Image: https://www.flickr.com/photos/ijonas/4800123114

NodaTime, Instant

- An „instant“ on the global timeline since the Unix epoch
  - Since „Jan. 1, 1970 Midnight UTC“
- 10,000 ticks in a millisecond

```
var now = SystemClock.Instance.Now;
Console.WriteLine(now.Ticks); // 140010071087960 83
```

NodaTime, Partial

- Part of a local date/time
  - Not enough to represent a specific instant in time
  - For anyone who has had problems mixing date-only and date-time values, the LocalDate type will be appreciated

```
var myBirthday = new LocalDate(1983, 04, 19);
var noon = new LocalTime(12,0,0);
```

DateTimeZone, CalendarSystem

DateTimeZone + CalendarSystem

```
var now = SystemClock.Instance.Now;

var dtzp = DateTimeZoneProviders.Tzdb;

var berlinTz = dtzp["Europe/Berlin"];

var berlinNow = new ZonedDateTime(now, berlinTz);
//2014-05-08T22:42:08 Europe/Berlin (+02)
```

- “Offset” „-02“ depends on what country you’re in, what calendar you’re using, the DaylightSavingTime etc.

NodaTime, Interval

- Specific time interval, retains start and end instants

```
// 2014-05-21T08:00:00Z – 2014-05-23T17:00:00Z

var tz = DateTimeZoneProviders.Tzdb.GetSystemDefault();

var localBeginDateTime = LocalDateTime.FromDateTime(
                          new DateTime(2014, 05, 21, 8, 0, 0));

ZonedDateTime zonedBeginDateTime =
                      localBeginDateTime.InZoneStrictly(tz);

// Same for endTime...

var karlsruheEntwicklerTageInterval = new Interval(
                              zonedBeginDateTime.ToInstant(),
                              zonedEndDateTime.ToInstant());
```

NodaTime, Period

- Time period defined in terms of fields
- Inexact in milliseconds (unlike Duration)

```
var fourthieth = new LocalDate(2023, 4, 19);
var today = berlinNow.LocalDateTime.Date;

//P3257D
Period period = Period.Between(
                today, fourthieth, PeriodUnits.Days);
//P8Y11M
Period between = Period.Between(
                today, fourthieth, PeriodUnits.YearMonthDay);
```

NodaTime, Wrap-up

- Date and time manipulations are horribly complex
- „DateTime“ & „TimeSpan“ do not make it easier to manipulate
- NodaTime is more verbose, but decouples the concepts for more clarity
- Video: „The problem with Time&Timezones“ (Computerphile)
  - https://www.youtube.com/watch?v=-5wpm-gesOY

Json.NET & JsonFx

Json.NET & JsonFx

- Json Manipulation Libraries
  - Json.NET
    - http://james.newtonking.com/json
    - Author: Newtonsoft
    - Nuget: Newtonsoft.Json
    - License MIT

  - JsonFx
    - https://github.com/jsonfx/jsonfx
    - Author: Stephen M. McKamey
    - Nuget: JsonFx
    - License MIT

Json.NET

- Most downloaded on Nuget
- Jack-of-all-trade
- Json and .NET hand-in-hand

Json.NET Serialisation

Just serialize

```
Product product = new Product();
product.Name = "Apple";
product.ExpiryDate = new DateTime(2008, 12, 28);
product.Price = 3.99M;
product.Sizes = new string[] { "Small", "Medium", "Large" };

string output = JsonConvert.SerializeObject(product);

//{
//  "Name": "Apple",
//  "ExpiryDate": "2008-12-28T00:00:00",
//  "Price": 3.99,
//  "Sizes": [ "Small",
//             "Medium",
//             "Large" ]
//}
```

Json.NET Deserialisation

Just deserialize

```
string json = @"{
        'Name': 'Bad Boys',
        'ReleaseDate': '1995-4-7T00:00:00',
        'Genres': [ 'Action', 'Comedy' ]
        }";
Movie m = JsonConvert.DeserializeObject<Movie>(json);
string name = m.Name; // Bad Boys
```

JsonSerializerSettings

```
const string json = @"{ ""Date"" : ""09/12/2013"" }";

var obj = JsonConvert.DeserializeObject<MyObject>(json,
    new IsoDateTimeConverter { DateTimeFormat = "dd/MM/yyyy" });

DateTime date = obj.Date;
```

Json.NET Linq to Json

Dynamic Style

```
JObject jobj = JObject.Parse(@"{
        'CPU': 'Intel',
        'Drives': ['DVD read/writer','500 gigabyte hard drive']
    }");

Assert.AreEqual("Intel", jobj["CPU"]);

// JObject of type IEnumerable<KeyValuePair<string, Jtoken>>
```

Json.NET Schema Validation

Simply validate

```
const string schemaJson = @"{
    'description': 'A person', 'type': 'object',
    'properties': {
        'name': {'type':'string'},
        'hobbies': {
            'type': 'array',
            'items': {'type':'string'}
    }}}";
JsonSchema schema = JsonSchema.Parse(schemaJson);
JObject person = JObject.Parse(@"{ 'name': 'James',
    'hobbies': ['.NET', 'Reading', 'Xbox', 'LOLCATS']}");
Assert.IsTrue(person.IsValid(schema));
```

Schema generation

- http://sixgun.wordpress.com/2012/02/09/using-json-net-to-generate-jsonschema/

JsonFx

- Not as good
- Not as complete
- One killer feature
  - Deserialize to „dynamic“

JsonFx

Remember Json.NET example?

```
JObject jobj = JObject.Parse(@"{
    'CPU': 'Intel', 'Drives': [ 'DVD read/writer',
                    '500 gigabyte hard drive' ] }");

Assert.AreEqual("Intel", jobj["CPU"]);
```

With JsonFx

```
var reader = new JsonFx.Json.JsonReader();

string input = @"{ 'CPU': 'Intel',
    'Drives': [ 'DVD read/writer', '500 gigabyte hard drive']}";
dynamic output = reader.Read(input);

Assert.AreEqual(output.CPU, "Intel");
Assert.AreEqual(output.Drives[0], "DVD read/writer");
```

Json.NET & JsonFx, Wrap-up

- Json.NET
  - Solid library
  - Is defacto the .NET standard
- JsonFx
  - (At least) one killer feature
- Who said Json wasn't made for C#?

RESTSharp

RESTSharp

- Simple REST and HTTP API Client for .NET
  - http://restsharp.org/
  - Nuget: RestSharp
  - Author: John Sheehan
  - Current maintener: Phil Haack (and searching for a replacement)
  - License Apache 2.0

(Classic) HttpWebRequest

- The standard way using the BCL

```
WebRequest request = WebRequest.Create(url);
WebResponse response = request.GetResponse();
Stream dataStream = response.GetResponseStream();
StreamReader reader = new StreamReader(dataStream);
string responseFromServer = reader.ReadToEnd();
Console.WriteLine(responseFromServer);
reader.Close();
response.Close();
```

- Artificially complicated
  - Stream manipulations
  - „Transactions“

RESTSharp

- Specialized objects
  - RestClient
  - RestRequest

```
var client = new RestClient("url");
var request = new RestRequest("/", Method.GET);
```

RESTSharp Request Parameters

Manipulate the request parameters

```
// adds to POST or URL querystring based on Method
request.AddParameter("name", "value");

// replaces matching token in request.Resource
request.AddUrlSegment("id", "123");

// add parameters for all properties on an object
request.AddObject(new MyInt{myInt = 42});

// add files to upload (works with compatible verbs)
// may throw a FileNotFoundException
request.AddFile("MyFile", "path");
```

Headers

```
// easily add HTTP Headers
request.AddHeader("header", "value");
```

RESTSharp Request Execution

Synchron

```
var client = new RestClient("http://example.com");

// execute the request
IRestResponse response = client.Execute(request);
var content = response.Content; // raw content as string
```

Asynchron

```
// easy async support
client.ExecuteAsync(request, response =>
    Console.WriteLine(response.Content));
```

RESTSharp Deserialize Result

Deserialize on the fly

```
var client = new RestClient("url");
var request = new RestRequest("/", Method.GET);

// return content type is sniffed
//   but can be explicitly set via RestClient.AddHandler();
IRestResponse<Person> response = client.Execute<Person>(request);
var name = response.Data.Name;
```

With async as well

```
// async with deserialization
var asyncHandle = client.ExecuteAsync<Person>(request, resp =>
                        Console.WriteLine(resp.Data.Name));

asyncHandle.Abort();
```

RESTSharp Save File / Stream

Direct download

```
var client = new RestClient("url");
var request = new RestRequest("/", Method.GET);

client.DownloadData(request).SaveAs("path");
```

Streaming

```
string tempFile = Path.GetTempFileName();
using (var writer = File.OpenWrite(tempFile))
{
    var client = new RestClient("baseUrl");
    var request = new RestRequest("Assets/LargeFile.7z");
    request.ResponseWriter = (responseStream) =>
            responseStream.CopyTo(writer);
    var response = client.DownloadData(request);
}
```

(New) HttpClient

- For .NET 4.5 (and greater) only
  - Leaner, RestSharp-y syntax

```
var client = new HttpClient();
var response = await client.GetAsync("url");
var content = response.Content;
var result = await content.ReadAsStringAsync();
```

RESTSharp, Wrap-up

- Why RESTSharp when there's HttpClient?
  - „Very good question! System.Net.HttpClient is only available for .NET 4.5. There’s the Portable Class Library (PCL) version, but that is encumbered by silly platform restrictions."

    Phill Haack
  - Those (platform restrictions) are slowly being solved...
- Still a very solid library
- Life saver in many occasions

TinyIoC

TinyIoC

- „An easy to use, hassle free, Inversion of Control Container for small projects, libraries and beginners alike“
  - https://github.com/grumpydev/TinyIoC
  - Deployed as a single „.cs“ file (no Nuget)
  - Author: Steven Robbins (@GrumpyDev)
  - Supports Windows, Mono, MonoTouch, PocketPC, Windows Phone 7 and MonoDroid
- Cornerstone of the Nancy Framework (nancyfx.org)

Inversion of Control

- „If you have an object that interacts with other objects, the responsibility of finding a reference to those objects should be moved outside of the object itself.“

```
public DateTime XDaysFromNow(int days)
{
    var now = DateTime.Now;
    return now.AddDays(days);
}
```

```
public DateTime AddDays(int days, DateTime date)
{
    return date.AddDays(days);
}
// You can still use DateTime.Now in the call,
//   but the dependency is now outside
this.AddDays(2, DateTime.Now);
```

- z.B. Factory

TinyIoC Container & Registration

Retrieve the container

```
// Lazy singleton as container
var container = TinyIoCContainer.Current;
```

No registration required for concrete types

```
// Creates an instance of MyConcreteType or make it singleton
var instance = container.Resolve<MyConcreteType>();
container.Register<MyConcreteType>().AsSingleton();
```

Explicit autoregister

```
// Register all concrete types and interfaces
container.AutoRegister();

// Creates an instance of the only type
//  implementing IMyInterface
var implementation = container.Resolve<IMyInterface>();
```

TinyIoC Constructor Injection

```
public interface ItoInject {}
public class ToInject: ItoInject{}

public class ToBuild
{
    public ToBuild(IToInject toInject)
    {
    }
}

// Call
var container = TinyIoCContainer.Current;
container.AutoRegister();
var instance = container.Resolve<ToBuild>();
```

TinyIoC Property Injection

- Properties are resolved and instanciated

```
internal class TestClassPropertyDependencies
{
    // Will be set if we can resolve and isn't already set
    public ITestInterface Property1 { get; set; }

    // Will be ignored
    public int Property2 { get; set; }

    // Will be set if we can resolve and isn't already set
    public TestClassDefaultCtor ConcreteProperty
        { get; set; }
}

var input = new TestClassPropertyDependencies();
container.BuildUp(input); // Properties are now set
```

TinyIoC

- No setup required
- Registration and resolution as simple as it gets
- Often no more than what you need

- Few help beside the doc and Stackoverflow

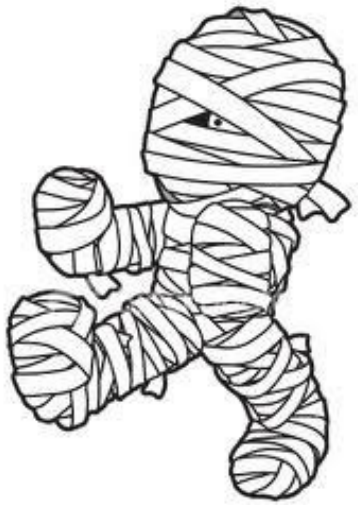

Image: teenlibrariantoolbox.com

Wrap Up

Barefoot? Really?

- NodaTime
  - Paracetamol for your complex time based projects
  - Nothing like what .NET offered until now
- Json.NET & JsonFx
  - A solid library tending to become a standard for .NET
  - A small contestant that can have some advantages
- RESTSharp
  - A better REST API for .NET
  - Slowly integrated into the Framework
- TinyIoC
  - Now you don't have any excuse not to IoC your prototypes

Go OpenSource

- Give small libs a chance
- OpenSource is the key
  - Producing libs we'll love
  - Helping the „bigger“ Frameworks improve
- Where to start?
  - http://up-for-grabs.net

- www.timbourguignon.fr
- tim.bourguignon@mathema.de

- Slides: https://github.com/Timothep/MarathonWOShoes