.NET Developer Conference 2015

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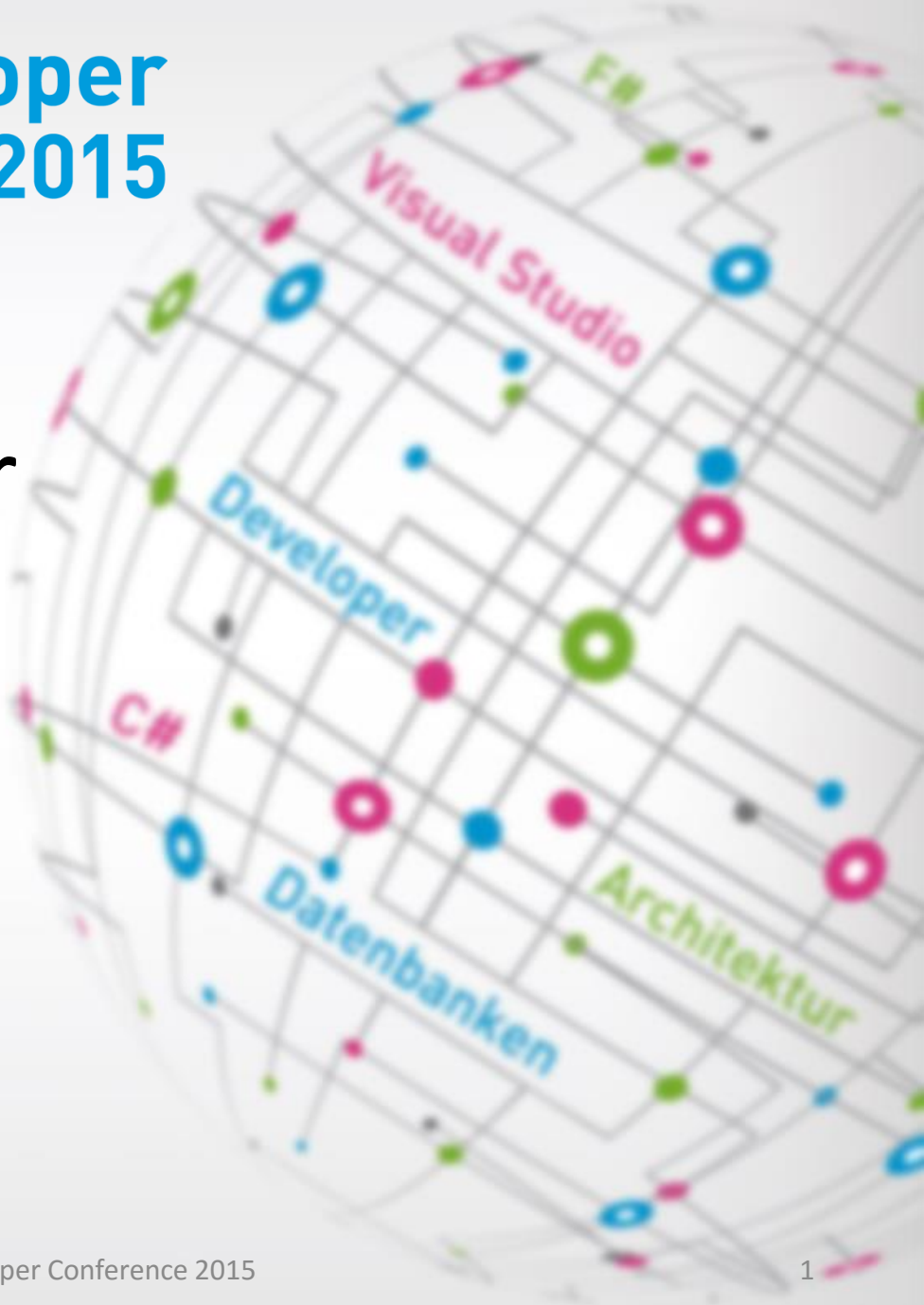
Der Traum der perfekten API

Florian Rappl



Architecture and Design

IS THERE A PERFECT API?

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- IT consultant
- Theoretical particle physics
- Microsoft MVP
- CodeProject MVP
- Library author and contributor

What is an API?

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From Wikipedia:

„An application programming interface (API) is a set of routines, protocols, and tools for building software applications. […] An API defines functionalities that are **independent** of their respective implementations, which allows definitions and implementations to **vary without compromising** the interface.“

What is an API?

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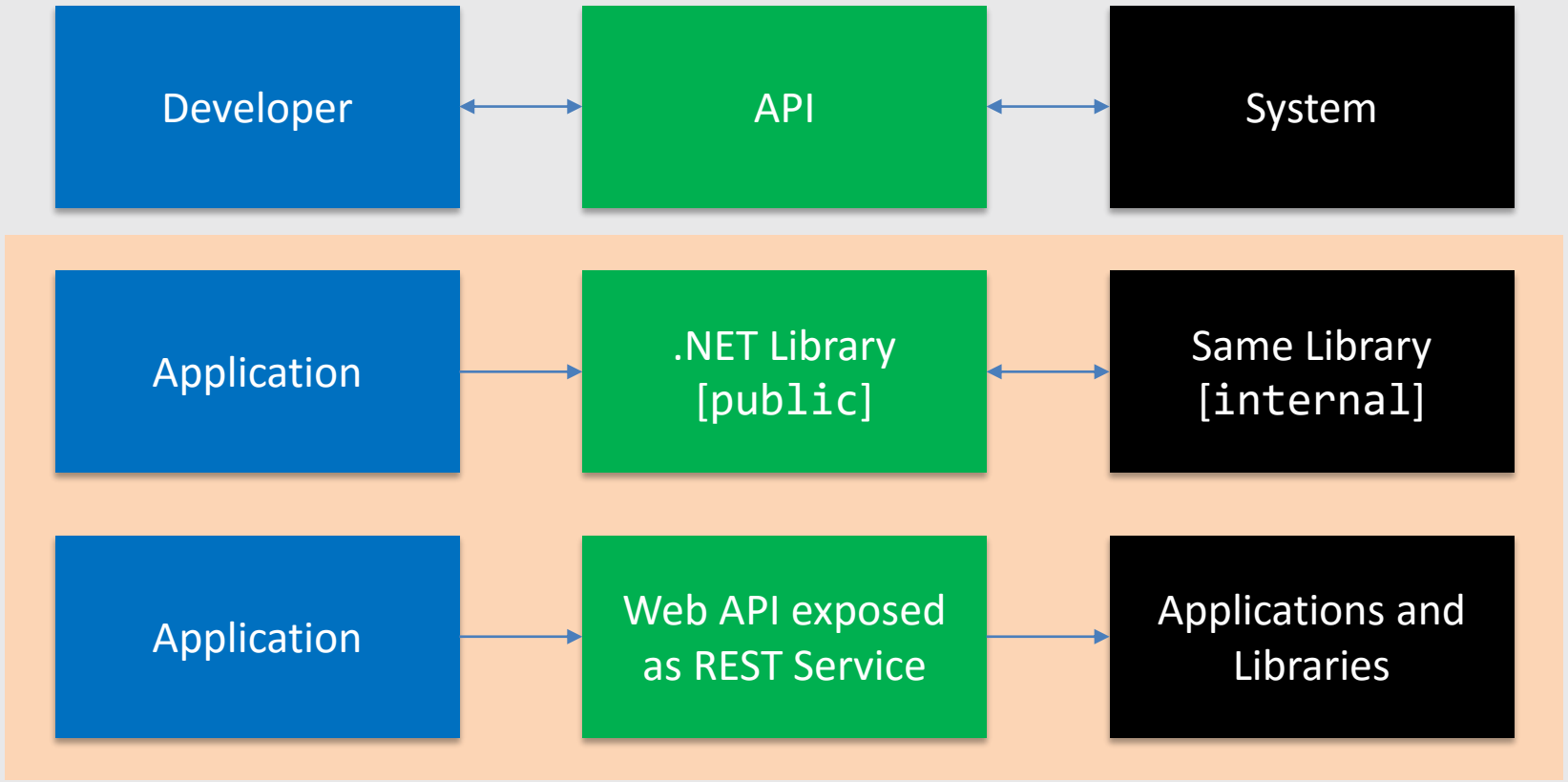

Reasons

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- Why do we need good API design?
  - Reduce cost of development
  - Improve API adoption
  - Separation of concerns

A good API ...

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- … is easy to understand
- … feels familiar, yet fresh
- … is simple to extend and adjust
- … avoids being misused
- … tends to be unobtrusive

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Powerful, yet dead simple.

Easy to understand

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- Prefers domain language
- Is consistent / transitive
- Documented
- Avoids side-effects

Do **not** invent words!

`Push()` => `Pop()`

```
///<summary>
```

`CheckUser()` should **not** start a session!

Familiar, yet fresh

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- Follows
  - language conventions — Potential case-problems
  - framework design — `ITransport`
  - best practices — Avoid `out` parameters
- Makes use of patterns — Dependency Injection
- Reuses framework elements — `Uri`, `DateTime`, …

Extensible

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- No artificial constraints
- General input (parameters)
- Most specific output (return value)
- Allow customization
- Not limited to very specific scenarios

➔ FCoI and SOLID

Avoids misuse

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- Guides the user `Serial.Check(ProcessorId processorId)`
- Clean Code Good, clear names
- Throws as soon as possible

```
if (arg == null)
{
        throw new ArgumentNullException(nameof(arg));
}
```

Unobtrusive

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- No (fixed) dependencies — Be agile!
- Minimum configuration — Coding by convention
- Adjustable resources — Don‘t start your own thread pool!
- Easy to integrate / desintegrate
  - Mainly expose interfaces
  - Prefer framework elements
  - Allow custom types

Some case studies.

jQuery

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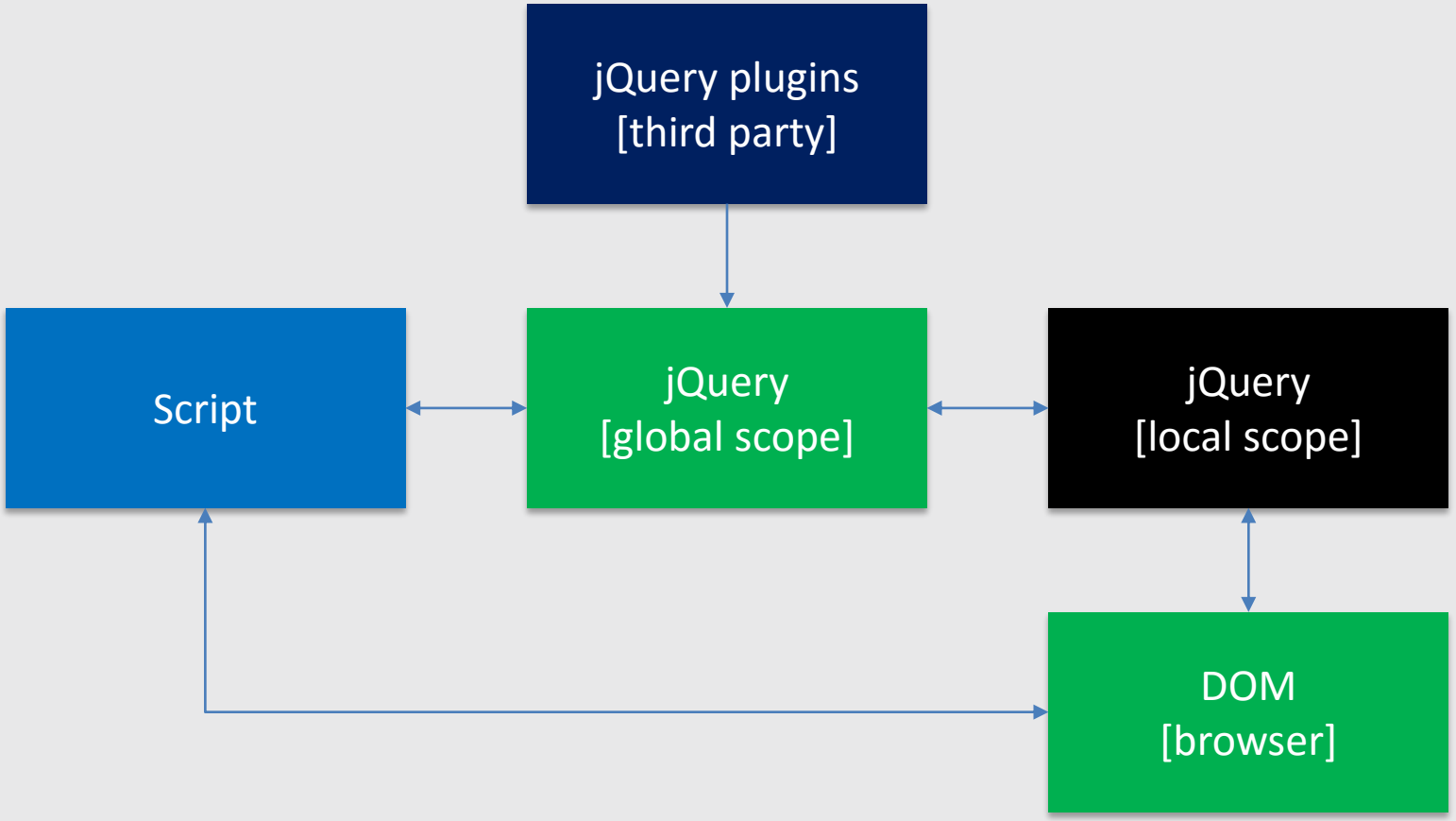

jQuery

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```
$("#button-container button").on("click", function (
event) {
  $("button.continue").html("Next Step...");
});

$.ajax({
  url: "/api/getWeather",
  data: { zipcode: 97201 },
  success: function (data) {
    $("#weather-temp").text(data + " degrees");
  }
});
```

jQuery

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- (Abstraction) Layer over the DOM
- Fluent API
- Very easy to extend
- Sometimes multiple ways to do things
- Can be misused (perf. hits) easily

OxyPlot

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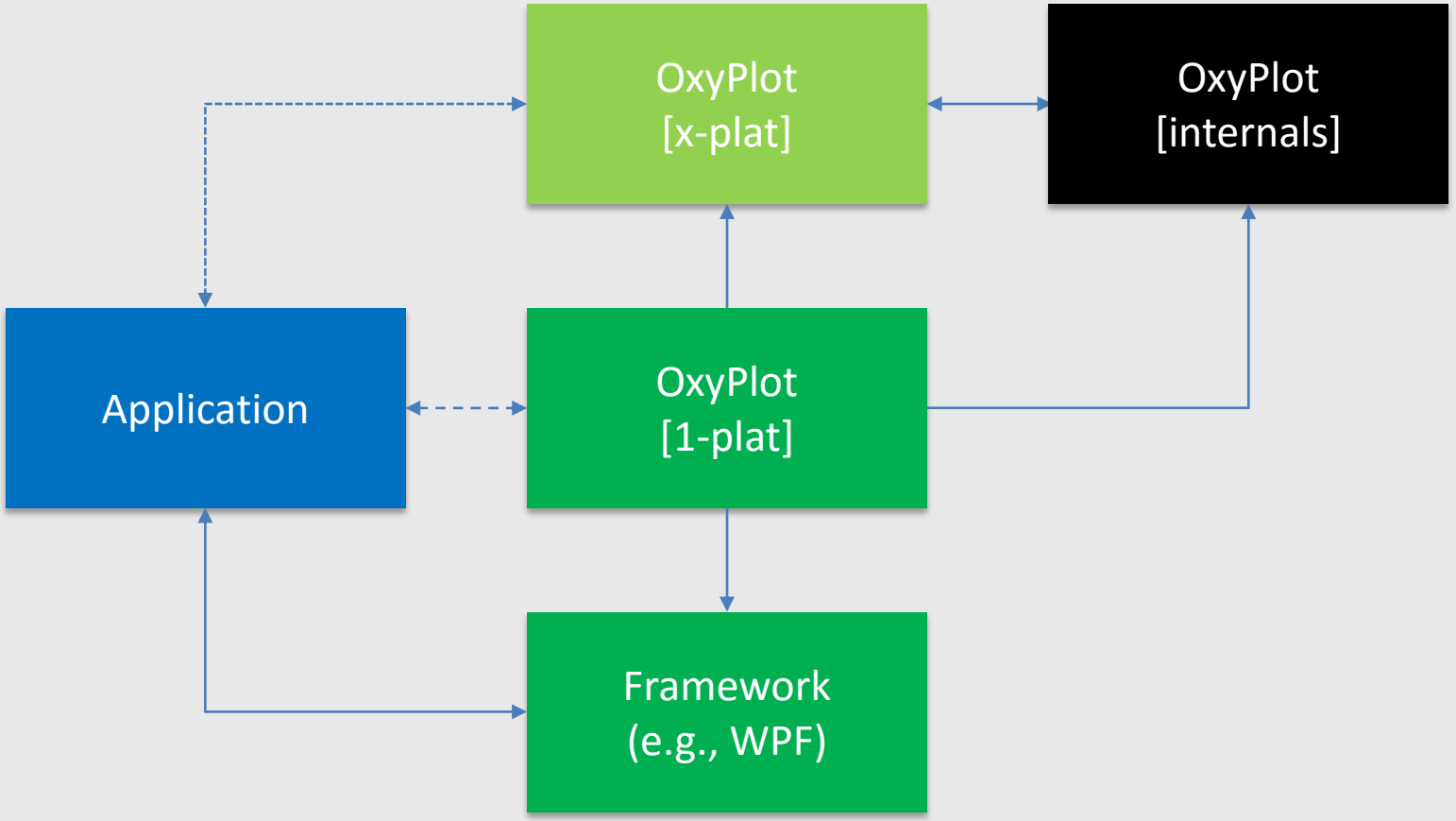

OxyPlot

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```
var model = new PlotModel { Title = "Simple example" };

var series1 = new LineSeries { Title = "Series 1",
MarkerType = MarkerType.Circle };
series1.Points.Add(new DataPoint(0, 0));
series1.Points.Add(new DataPoint(40, 15));

var series2 = new LineSeries { Title = "Series 2",
MarkerType = MarkerType.Square };
series2.Points.Add(new DataPoint(0, 4));
series2.Points.Add(new DataPoint(40, 5));

model.Series.Add(series1);
model.Series.Add(series2);
```

OxyPlot

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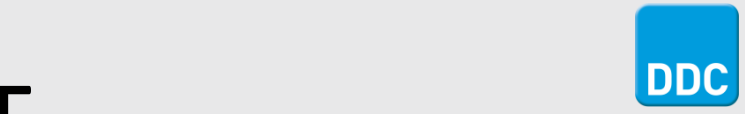
- .NET x-plat plotting library
- Easy to extend
- Simple for trivial scenarios
- Hard for complicated scenarios
- Misuse is possible, but not easy

Json.NET



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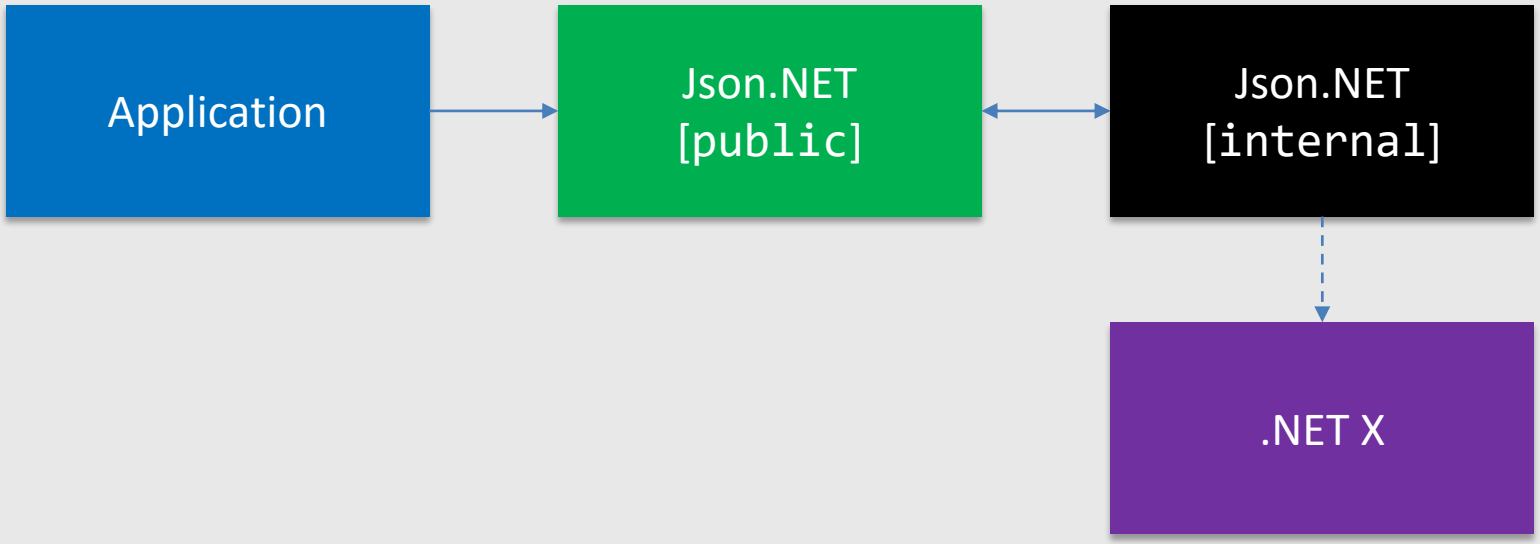

Json.NET

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```
Product product = new Product();
product.Name = "Apple";
product.Expiry = new DateTime(2008, 12, 28);
product.Sizes = new string[] { "Small" };
string json = JsonConvert.SerializeObject(product);

Movie m = JsonConvert.DeserializeObject<Movie>(json);
```

Json.NET

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- .NET JSON serializer / deserializer
- Balanced extensibility
- Many side-effects
- Simple for most scenarios
- Nearly impossible to misuse

Design Guidelines

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- Gather requirements
- SPI – Write at least 3 plugins before release
- Expect to evolve API
- Maximize Information Hiding
- Document religiously
- Minimize mutability

Common Trends

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1. Provide “just enough” functionality
2. User-centered design approach
3. Do not break existing applications with API changes

Iterative & User-Centered

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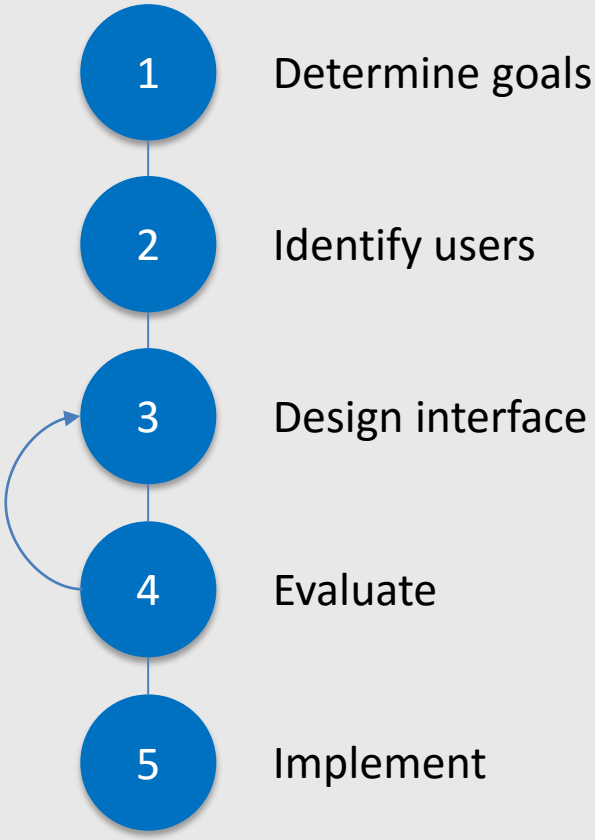

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What can we learn?

Lessons

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- Simple things need to be really simple
- Coherent design decisions
- We need at least minimal extensibility
- Limit possible ways to guide users
- One scenario, unlimited possibilities

Conclusions

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- There is not one perfect API
- We know the basic recipe for a good API
- Overall design is mostly aesthetics
- Most importantly:
  - Mix technological superior design with creativity
  - Be consistent, always

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Don‘t be afraid to iterate until you find the perfect API

(but do so by using *semver*)

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