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Libraries : creating and consuming

.NET CCCP S4

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Agenda

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2. DEMO: making a library from scratch.
3. Making a library from scratch.
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Why Libraries

- Separation of concerns.
- Reusability (don't reinvent the wheel).
- Small and maintainable.
- Share internally or with the whole world.
    - Most programming languages have a central repository.
        - Java: https://mvnrepository.com/ (command: mvn, gradle, …)
        - Node: https://www.npmjs.com/ (command: npm, yarn, ...)
        - **.NET**: https://www.nuget.org/packages (command: dotnet add package)

Why Libraries

Main difference between a library and a framework?

The key difference can be summarized in a word: IoC — Inversion Of Control.

- When you use a feature from a library *you are in control*.
- With a framework the control is inverted; *the framework uses you.*
  - The Hollywood Principle: “Don’t call Us, We’ll call You”.
- Both have advantages and disadvantages.

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Making a library from scratch.

DEMO

Making a library from scratch: *create*

- Create a library by executing the command:
  - **dotnet new classlib -o my-library-name**

- Add code and tests just like in any other program.

- Create a package by adding the following meta data to the xmltag PropertyGroup in the file *solutionname.csproj*

```
<TargetFramework>netcoreapp3.1</TargetFramework>
<PackageId>name-your-package</PackageId>
<Version>version-of-your-package</Version>
<Authors>your-name</Authors>
```

Making a library from scratch: *package*

- Pack the source folder into a library: **dotnet pack**

- A nupkg file is created in bin/Debug
    - Optionally (move this file in a general library folder)

- When updating the source, make sure to update the version!
    - Cache problems.

Making a library from scratch: *test*

- Test the library by creating quickly creating a program.
    - **dotnet new console –o testapp**

- Point out the local source.
    - In the testapp.csproj file under the property-group tag add:

```
<RestoreSources>$(RestoreSources);absolute-path-to mysolution/library/bin/Debug;https://api.nuget.org/v3/index.json</RestoreSources>
```

- Add the package.
    - From the test app root folder execute:
    - **dotnet add package my-library-name**
- In program.cs import the library by adding the statement **using library_namespace;**

Making a library from scratch: *reference*

Leho document: reference_create_a_library.pdf

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Transform existing code into a library

DEMO: transform the password app into a library.

Transform existing code into a library

1. Replace the contents of the csproj file with the following content:

```
<Project Sdk="Microsoft.NET.Sdk">
  <PropertyGroup>
    <TargetFramework>netcoreapp3.1</TargetFramework>
    <PackageId>my-lib-name</PackageId>
    <Version>1.2.1</Version>
    <Authors>Matthias Blomme</Authors>
    <RootNamespace>my-root-namespace</RootNamespace>
  </PropertyGroup>
</Project>
```

2. Execute **dotnet pack** on the root folder.

3. The library is now ready to import (see previous slides).

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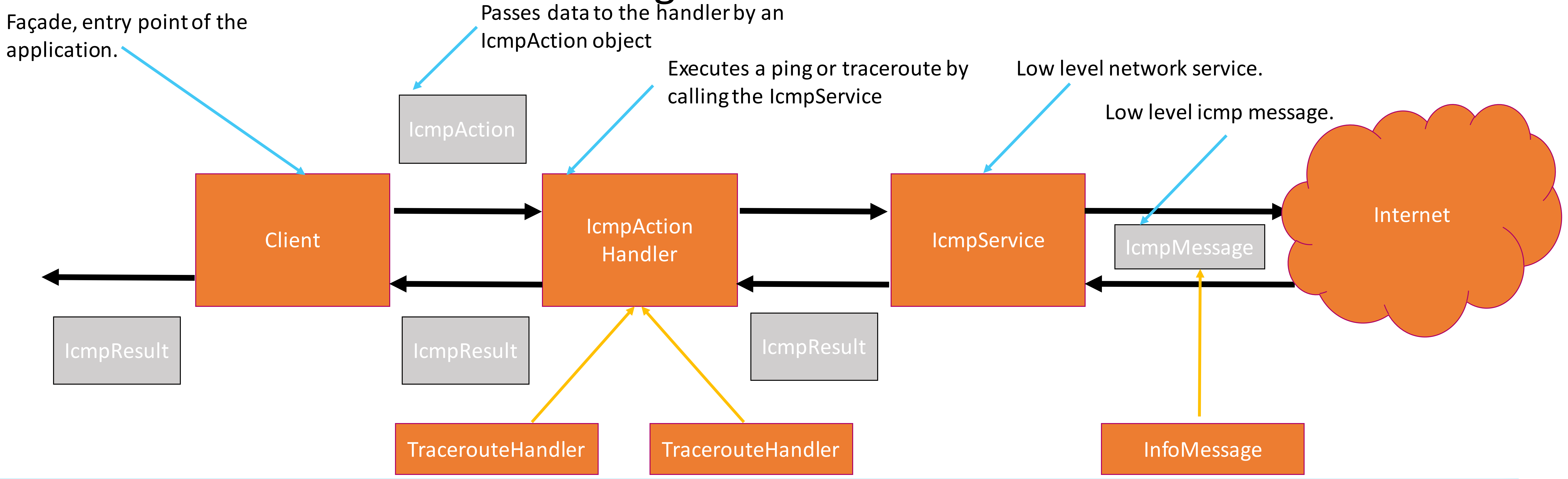
Presenting the traceroute app.

DEMO

Presenting the traceroute app.

- A simple ping & traceroute command line tool written in **dot net core**.
    - In Howest only traceroute and ping of start.howest.be is available.
- Let's make it more fancy in some of the next lessons.
- ICMP = Internet Control Message Protocol


Façade, entry point of the application.
Passes data to the handler by an IcmpAction object
Executes a ping or traceroute by calling the IcmpService
Low level network service.
Low level icmp message.
IcmpAction
Client
IcmpAction Handler
IcmpService
IcmpMessage
Internet
IcmpResult
IcmpResult
IcmpResult
TracerouteHandler
TracerouteHandler
InfoMessage

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Lab part I: convert the traceroute app into a library.

Instructions:

https://op-gitlab.howest.be/TI/2019-2020/s4-.net-technology/cccp-ibc/exercises/traceroute

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Lab part II: create a console app that uses the traceroute library.

Instructions:

https://op-gitlab.howest.be/TI/2019-2020/s4-.net-technology/cccp-ibc/exercises/traceroute