

L'anatra

Library for interoperability between C# and Java

Author: Mgr. Kateřina Průšová - Supervisor: Mgr. Pavel Ježek, Ph.D.



FACULTY
OF MATHEMATICS
AND PHYSICS
Charles University

The thesis enables to utilize methods implemented in Java programming language from C# code.

That can be beneficial for instance for companies that have parts of their proprietary code bases implemented in Java and are motivated to integrate it with another system implemented in C#.

The solution runs both CLR and JVM in one process and manages communication between them, which avoids an overhead of inter-process communication. The emphasis was put on providing intuitive API and attempts to mitigate user errors at compile time by emitting compiler diagnostics. The solution is based on the combination of .NET Platform Invoke, Java Native Interface, Foreign Function API from the current OpenJDK project Panama, and Incremental Source Generators.

The example below demonstrates that the existing Java library Apache PDFBox can, thanks to the solution presented by this thesis, be used from a C# code (on the right). Moreover, its usage from C# code strongly resembles usage directly from Java (on the left).

```
1  static String ReadPdfAsText(String path)
2  |   throws IOException {
3  |   File pdfFile = new File(path);
4  |   PDDocument pdf =
5  |   |   Loader.loadPDF(pdfFile);
6  |   PDFTextStripper stripper =
7  |   |   new PDFTextStripper();
8  |   String pdfContent = stripper.getText(pdf);
9  |   pdf.close();
10 |   return pdfContent;
11 |   }
```

```
1  public static string? ReadPdfAsText(string filePath)
2  |   {
3  |   FileProxy file = new FileProxy(filePath);
4  |   PDDocumentProxy pdf =
5  |   |   LoaderProxy.LoadPDF(file);
6  |   PDFTextStripperProxy stripper =
7  |   |   new PDFTextStripperProxy();
8  |   string? pdfContent = stripper.GetText(pdf);
9  |   pdf.Close();
10 |   return pdfContent;
11 |   }
```

