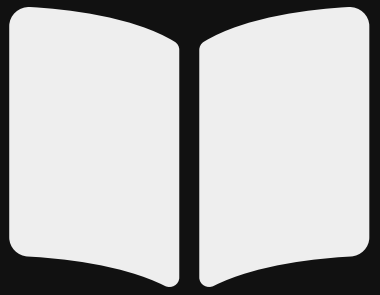
Jan Galinski @ Holisticon AG

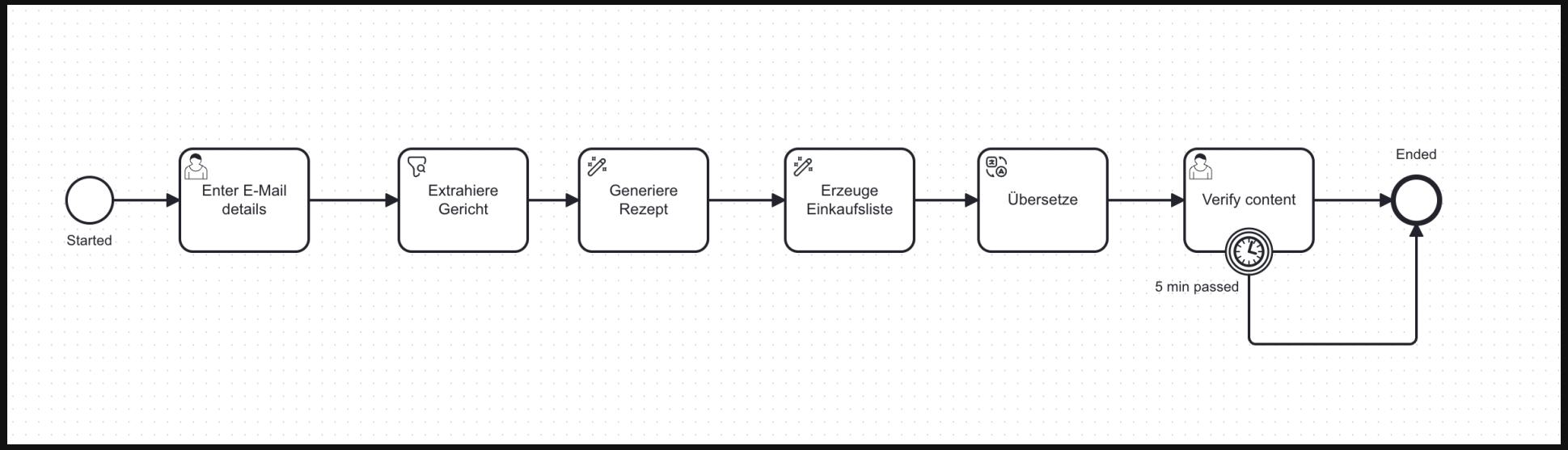
Code Generation with Kotlin Poet

Backend Applications & Services



Let's start with a story

Girls & Boys Day 2023



ChatGPT powered "what to cook for dinner?" process

https://github.com/holunda-io/camunda-8-connector-gpt

How can we ...

- ... reduce manual coding?
- ... ensure high quality?

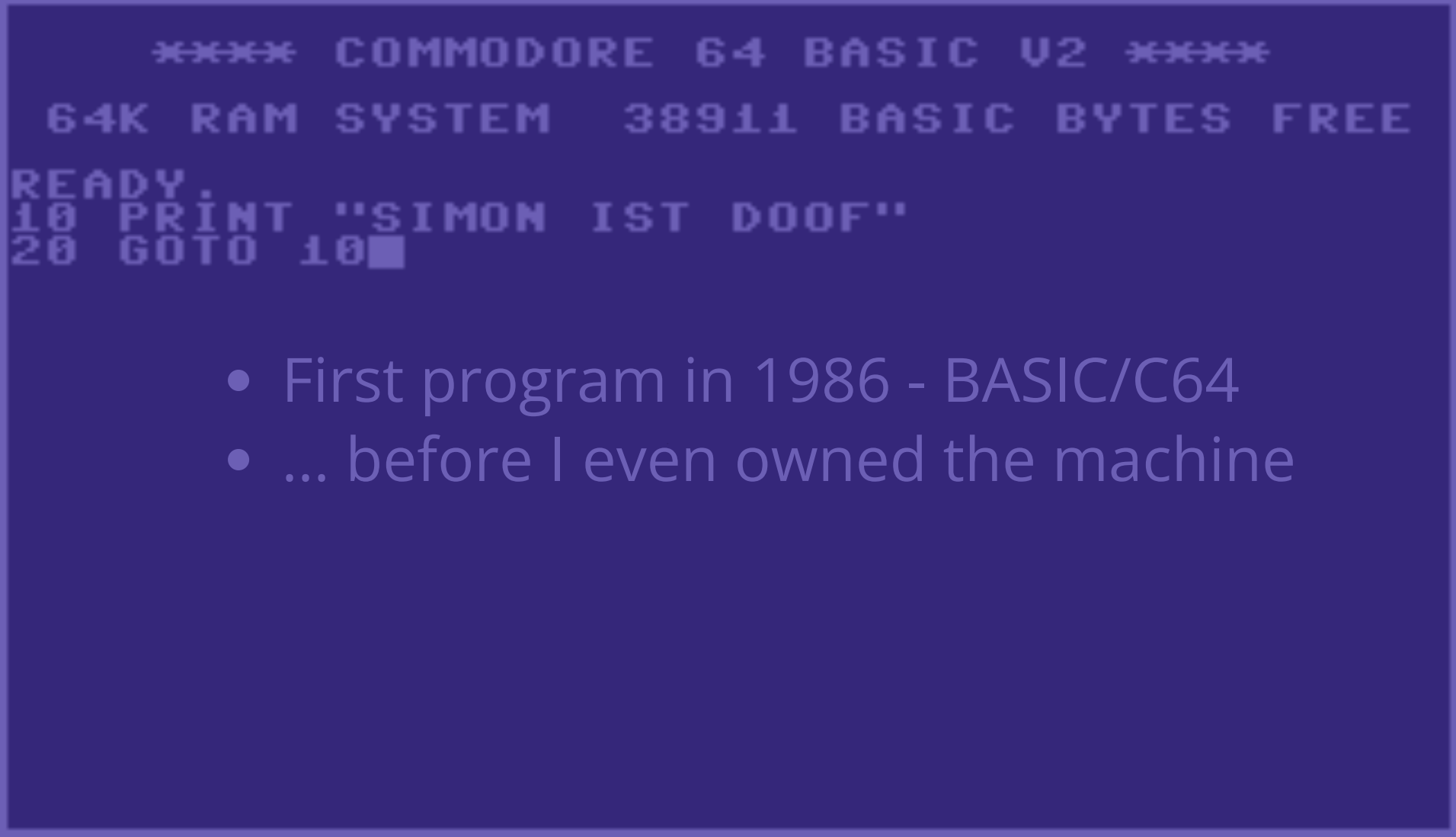
Abstract

AI code generation is a challenge for our daily work. But do we want to rely on some chat comments for professional software development? There must be a middle way between manual coding and c&p from the internet.

Luckily there is: meta-programming. In short: write software that writes software. We will have a look at practical implementations using the Kotlin Poet language model lib and maven plugin infrastructure.

Let there be code.

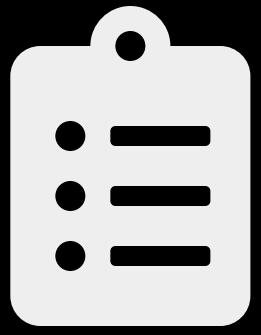
About me



- First program in 1986 - BASIC/C64
- … before I even owned the machine

- Senior Consultant @HolisticonAG
- 20+ years of industry experience
- Kotlin - Fan
  - … Backend/Spring Boot - no Android
  - … prefers maven over gradle
  - … uses light mode

about.me/jangalinski



Agenda

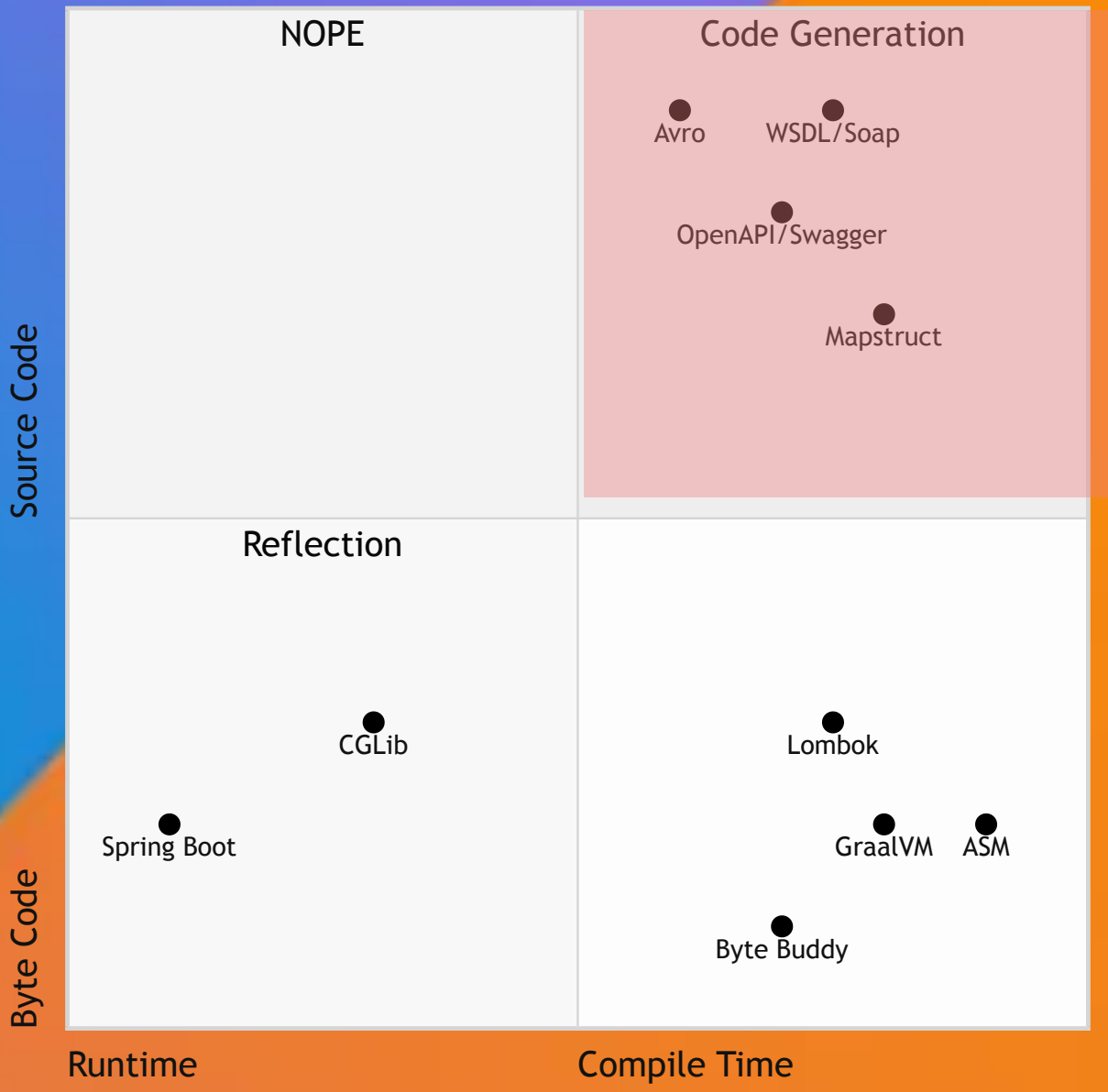
- What is Meta Programming?
- How does it work? - Live Coding
- Where to go from here?

image: https://www.filipinotravel.com.ph/lake-taal/

Metaprogramming is a *programming technique* in which computer programs have the ability to *treat ~~other~~ programs as their data*.

Metaprogramming can be used to *move computations from run-time to compile-time*, to *generate code* using compile time computations, and to *enable self-modifying code*.

Types of Meta Programming



Types of Source Code Generators

- Annotation Processing
  - *mapstruct*
- Command Line Console
  - *open-api*
- Build Plugins (maven, gradle)
  - *open-api*
  - *avro*

Tools for Source Code Generation

- Well … create an ASCII file
- Popular: Template Engines
  - *mustache*
  - *velocity*
- Language Model API
  - ~~*sun code model*~~
  - *spoon*
  - or: **Kotlin Poet**

I don't like templates

```
{{#useBeanValidation}}
    {{>beanValidation}}
    {{>beanValidationModel}}
{{/useBeanValidation}}
{{#swagger2AnnotationLibrary}}
  @Schema({{#example}}example = "{{#lambdaRemoveLineBreak}}
  {{#lambdaEscapeDoubleQuote}}{{{.}}}{{/lambdaEscapeDoubleQuote}}
  {{/example}}required = true,
  {{#isReadOnly}}readOnly = {{{isReadOnly}}},{{/isReadOnly}}descr
{{#swagger1AnnotationLibrary}}
  @ApiModelProperty({{#example}}example = "{{#lambdaRemoveLineBre

@get:JsonProperty("{{{baseName}}}", required = true){{#isInherite
```

Kotlin Poet

Here's a `HelloWorld` file:

```
class Greeter(val name: String) {
  fun greet() {
    println("""Hello, $name""")
  }
}

fun main(vararg args: String) {
  Greeter(args[0]).greet()
}
```

And this is

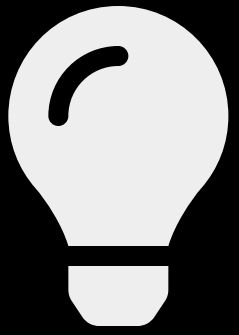
```
val gre
val fil
  .addT
    Typ
```

Kotlin Poet

https://square.github.io/kotlinpoet/

```
      PropertySpec.builder("name", String::class)
        .initializer("name")
        .build()
    )
    .addFunction(
      FunSpec.builder("greet")
        .addStatement("println(%P)", "Hello, \$name")
        .build()
    )
    .build()
)
.addFunction(
  FunSpec.builder("main")
    .addParameter("args", String::class, VARARG)
    .addStatement("%T(args[0]).greet()", greeterClass)
    .build()
```

Demo Time



Conclusion

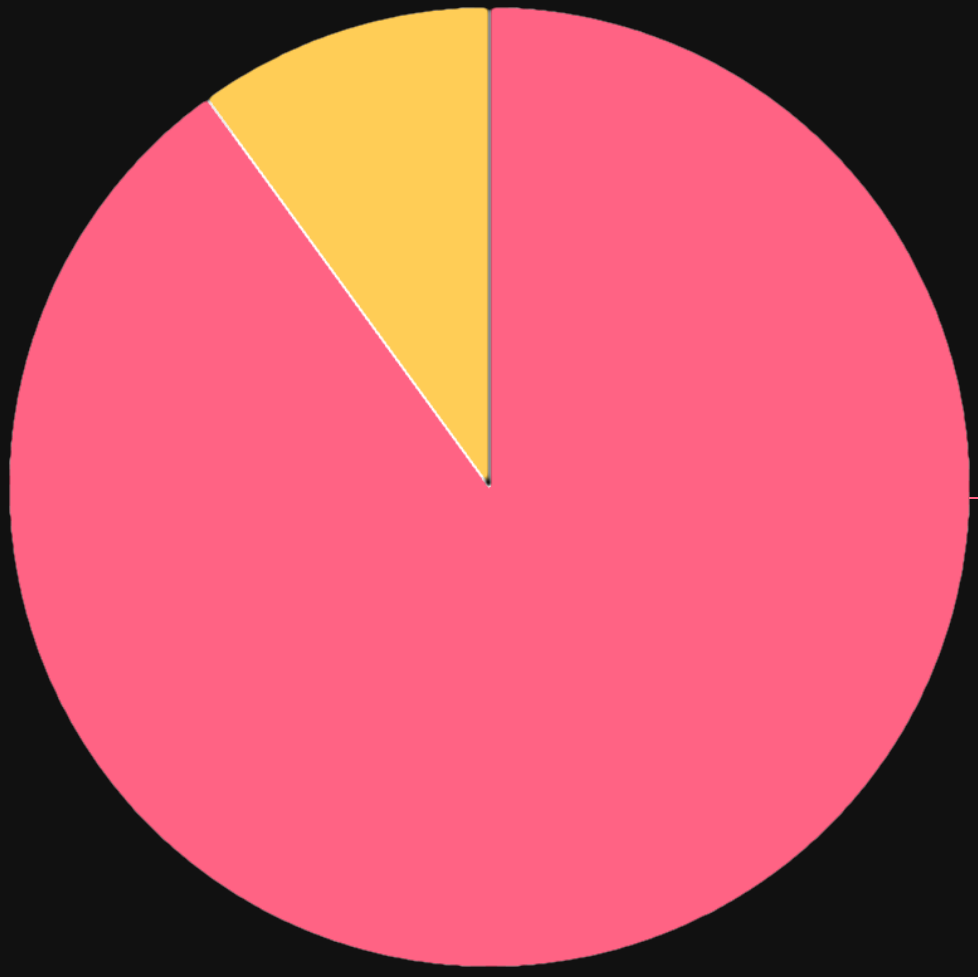
Considerations

- Creating and maintaining a code generator is not free of cost
- Carefully choose and analyse your use case/scenario
- Your code base can benefit from
  - Less Boilerplate code
  - unified way of approaching problems
  - reduce mental overload

Best practices

- Generator implementation should be independent of generator type
- API of generated code is more important than readability
- Avoid increase of build time by cashing/hashing
- *Use dedicated project sub-modules for code generation*

Should you use Kotlin Poet for code generation?



YES!

Also YES!
(but in yellow)

QUESTIONS?

→	**Some useful Links**
presentation & demo	github.com/jangalinski/talk-kotlin-poet
kotlin poet @square	square.github.io/kotlinpoet
obsidian.md - advanced slides	mszturc.github.io/obsidian-advanced-slides
c64 emulator/js	c64emulator.111mb.de