otlin meets Gadsu

Christoph Pickl

Kotlin Vienna Meetup – 2017-01-31

Agenda

1. **Introduction to Gadsu**
2. Kotlin in the wild
3. Code "*Schmankerln*"
4. Lessons Learned

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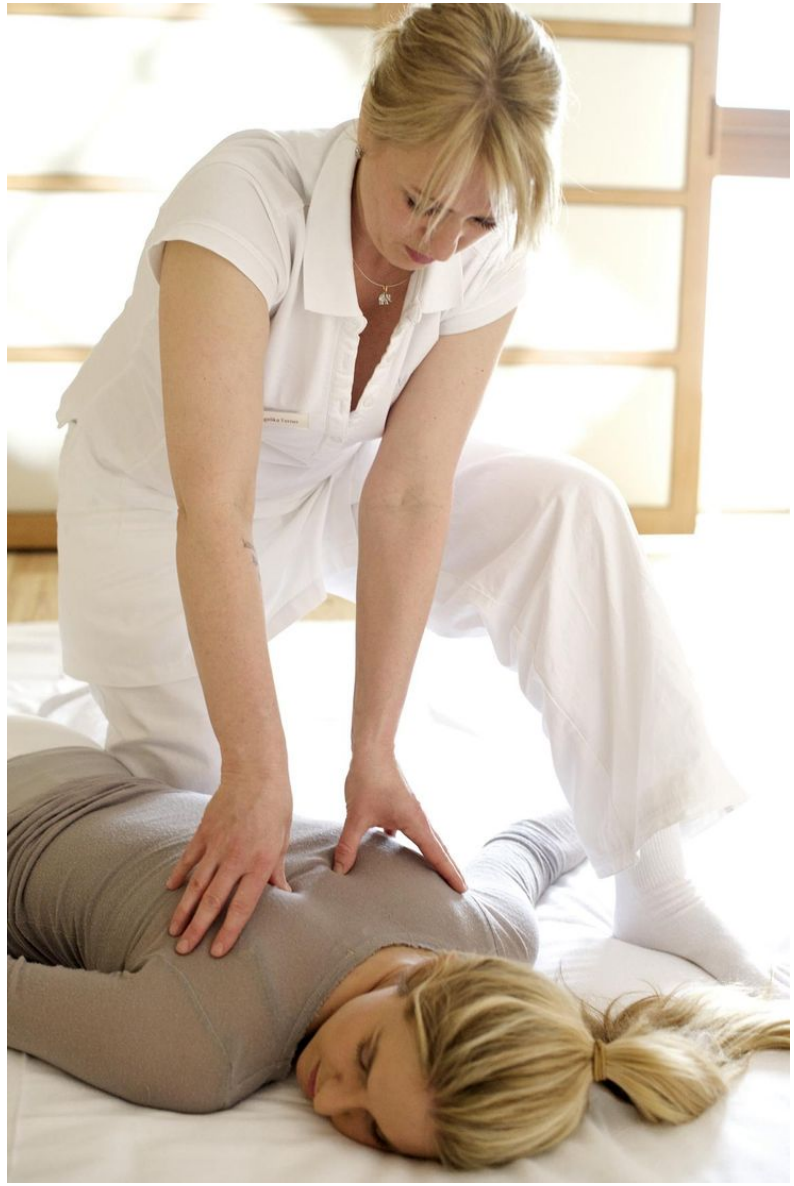
2. Kotlin in the wild
3. Code "*Schmankerln*"
4. **Lessons Learned**

Introduction to Gadsu

This is a cat.



This is Shiatsu . . .

. . . so is this.

Gadsu is . . .

Gadsu is . . .

Gadse

Gadsu is . . .

Gadse

\+ Shiat**su**

Gadsu is . . .

Gadse

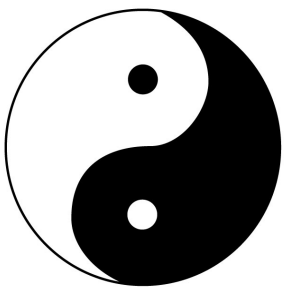
\+ Shiat**su**

= **Gadsu**

Shiatsu is . . .

- Massage, Physiotherapy, Bodywork
- Acupuncture, Meridiantherapy
- Nervous system stimulation

- Based on the **T**raditional **C**hinese **M**edicine
  - Concept of **Qi** flowing through the body and everything
  - Every aspect of the human grouped into **5 Elements**
  - Body and mind seen as a unit, not separated from each other



Taiji Symbol, Theory of Yin and Yang

Gadsu can . . .

Features:

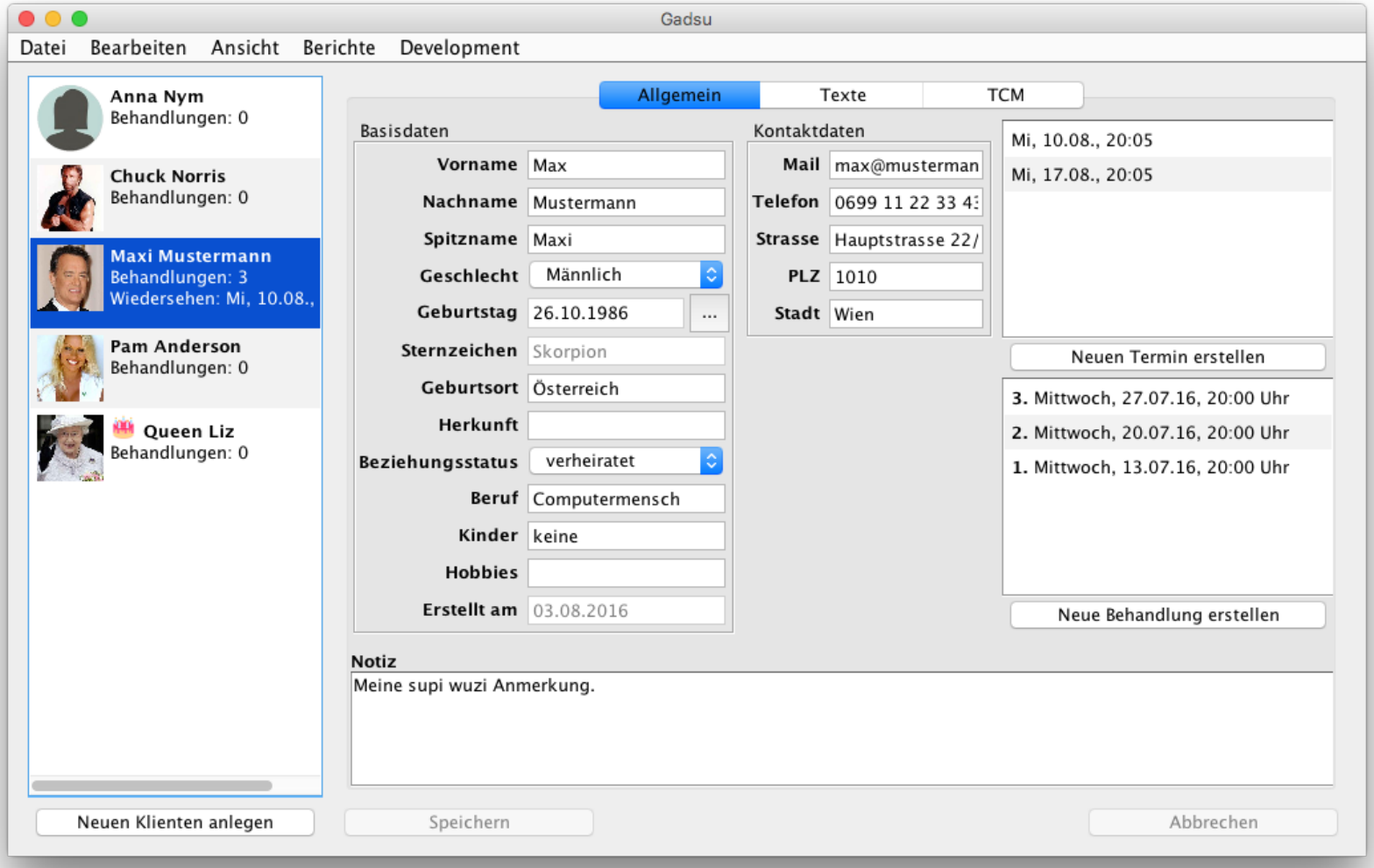
- Client database
- Manage medical records
- Generate reports
- Google integration
- Auto update, auto backup

Roadmap:

- Pain indicator, 5 Elements
- Statistics
- TCM intelligence
- Doodle integration
- Invoicing

Technology Stack

- Gradle
- Swing
- Guice
- Spring JDBC
- HSQLDB + Flyway
- Jasper, Pdfbox
- Freemarker
- TestNG, Mockito, Hamcrest
- UISpec4J
- *Initial implementation used Kotlin 0.6* ;)



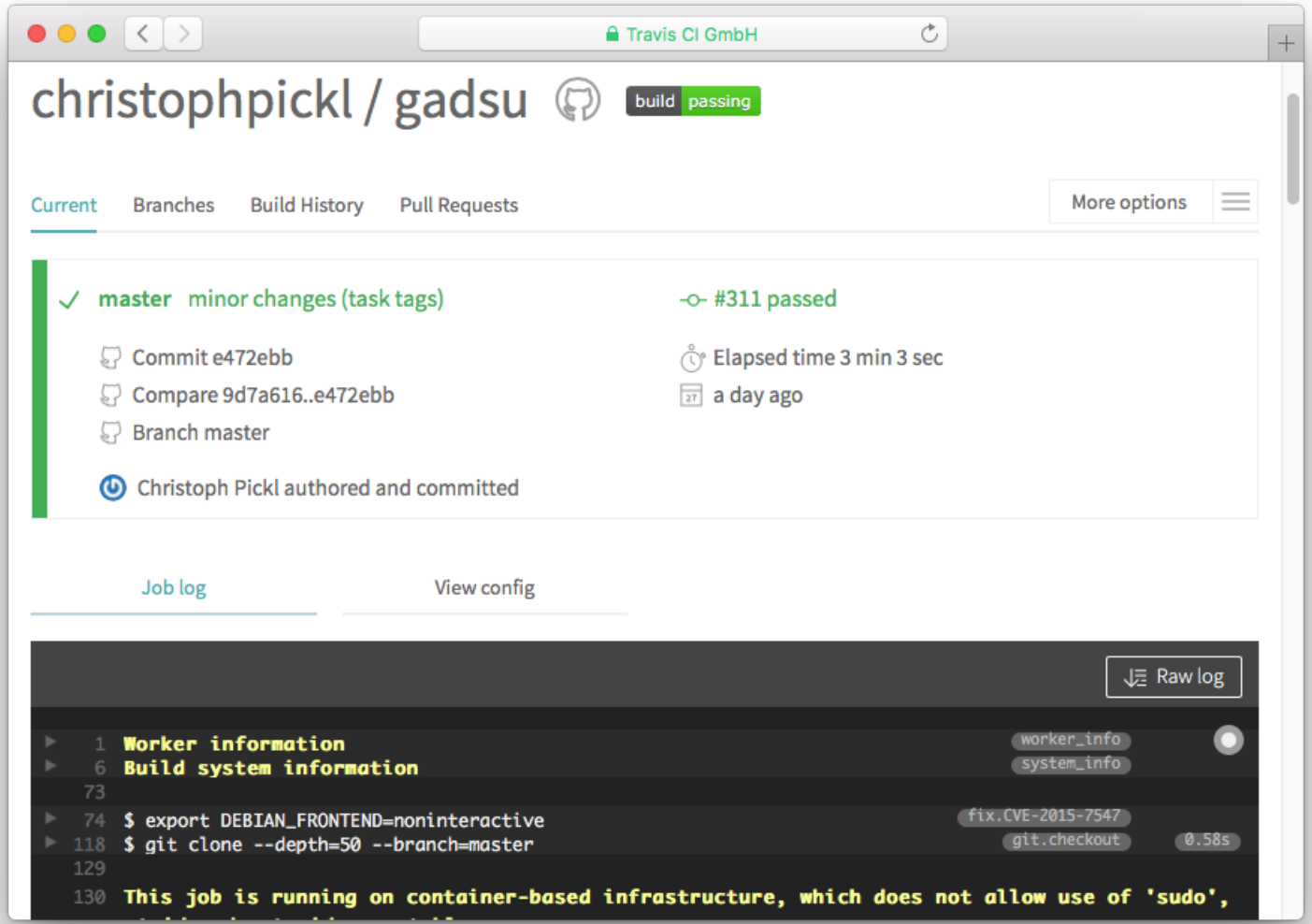
Gadsu got something like 35,000 LoC.

Let's have a look . . .

otlin in the wild

build.gradle

```
apply plugin: "kotlin"
buildscript {
  ext.kotlin_version = '1.0.6'
  dependencies {
    classpath "org.jetbrains.kotlin:kotlin-
      gradle-plugin:$kotlin_version"
  }
}
dependencies {
  compile "org.jetbrains.kotlin:kotlin-
    stdlib:$kotlin_version"
  compile "org.jetbrains.kotlin:kotlin-
    reflect:$kotlin_version"
}
```



travis-ci.org

.travis.yml

```
language: kotlin
```

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sudo: false
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  - "chmod +x gradlew"
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before_install:
  - "chmod +x gradlew"
  - "export DISPLAY=:99.0"
  - "sh -e /etc/init.d/xvfb start"
```

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script:
  - "./gradlew test ..."
```

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  - "sh -e /etc/init.d/xvfb start"
script:
  - "./gradlew test ..."
notifications:
  email:
    - "MLtravis@gadsu.com"
```


codecov.io
gh : christophpickl / gadsu
Docs
Support
Sign up
#87 implemented most of the confirmer logic
39.11%
christophpickl a day ago
9d7a616
master
Diff
Files
Builds
Graphs
Showing 9 of 14 changed files with 56.00% of changed lines covered. View details
... / kotlin / at / cpickl / gadsu / mail / module.kt
1
1
0
0
100%
@@ -12,6 +12,7 @@
12 12
13 13 bind(GMailApi::class.java).to(GMailApiImpl::class.java).`in`(Scopes
14 14 bind(MailSender::class.java).to(MailSenderImpl::class.java).`in`(Sc
15 + bind(AppointmentConfirmationer::class.java).to(AppointmentConfirmat
15 16
16 17 bind(MailView::class.java).to(MailSwingView::class.java).`in`(Scope
17 18 bind(MailController::class.java).asEagerSingleton()
@@ -18 +19 @@

codecov.io

Codecov

Gradle Configuration:

```
plugins {
  id 'jacoco'
  id 'com.github.kt3k.coveralls'
}
```

Codecov

Gradle Configuration:

```
plugins {
  id 'jacoco'
  id 'com.github.kt3k.coveralls'
}
jacocoTestReport {
  reports {
    xml.enabled = true
}}
```

Codecov

Gradle Configuration:

```
plugins {
  id 'jacoco'
  id 'com.github.kt3k.coveralls'
}
jacocoTestReport {
  reports {
    xml.enabled = true
}}
```

Travis Configuration:

```
script:
  - "./gradlew ... jacocoTestReport ..."
```

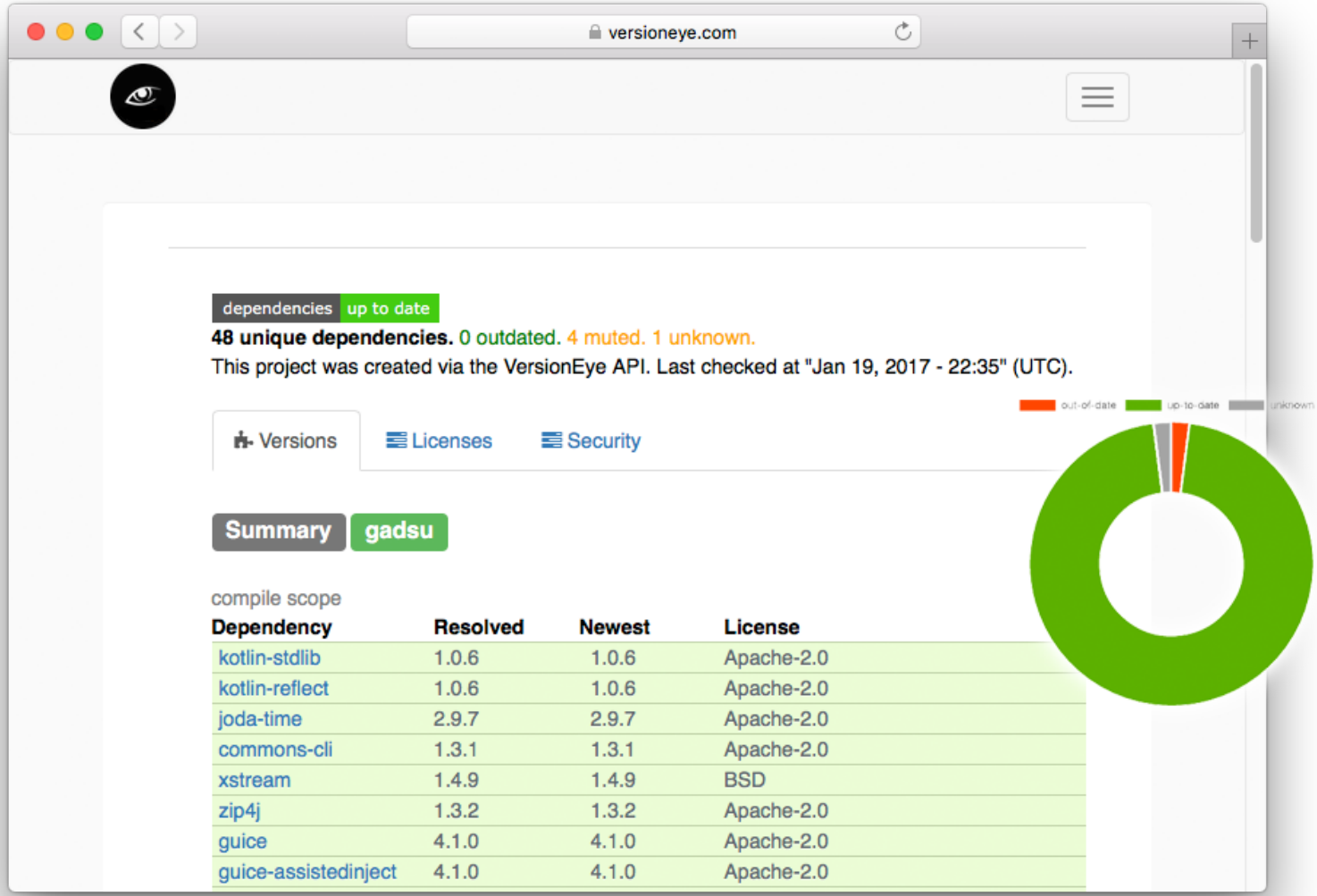
Codecov

Gradle Configuration:

```
plugins {
  id 'jacoco'
  id 'com.github.kt3k.coveralls'
}
jacocoTestReport {
  reports {
    xml.enabled = true
}}
```

Travis Configuration:

```
script:
  - "./gradlew ... jacocoTestReport ..."
after_success:
  - bash <(curl -s https://codecov.io/bash)
```



versioneye.com

VersionEye

Gradle Configuration:

```
plugins {
  id "org.standardout.versioneye"
    version "1.4.0"
}
```

VersionEye

Gradle Configuration:

```
plugins {
  id "org.standardout.versioneye"
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}
```

Gradle Properties:

```
versioneye.projectid=572880644a0f...00b78206
```

VersionEye

Gradle Configuration:

```
plugins {
  id "org.standardout.versioneye"
    version "1.4.0"
}
```

Gradle Properties:

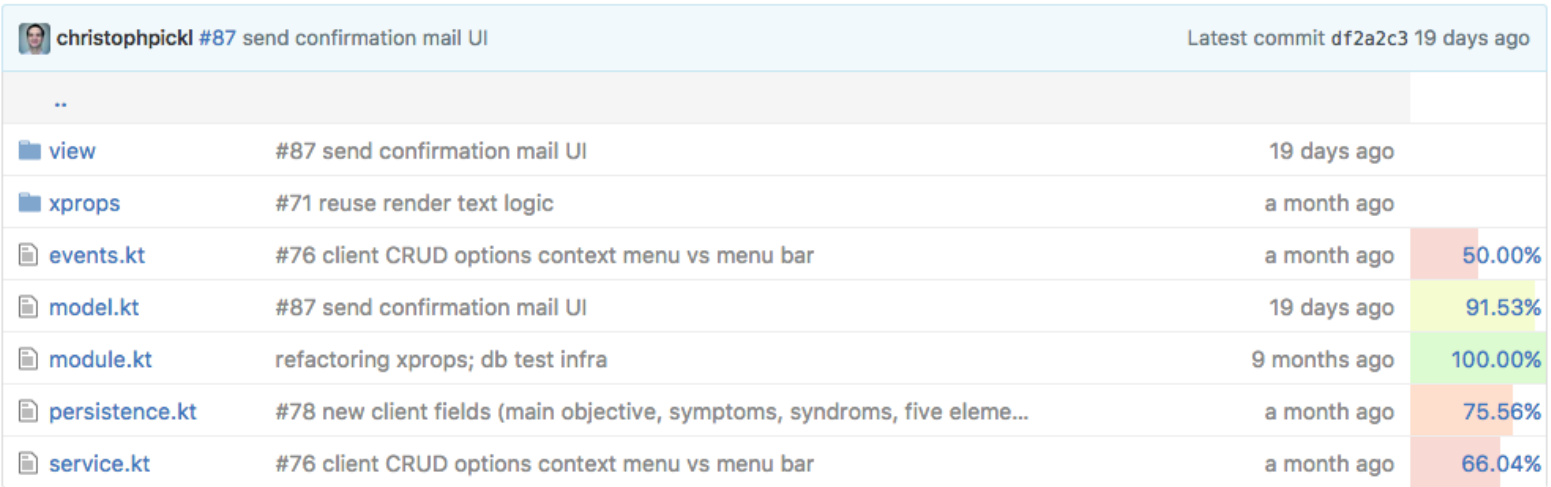
```
versioneye.projectid=572880644a0f...00b78206
```

Travis Configuration:

```
script:
  - "./gradlew ... versioneye-update ..."
```

VersionEye GitHub Integration

Display coverage data via the Codecov Browser Extension:



christophpickl #87 send confirmation mail UI — Latest commit df2a2c3 19 days ago

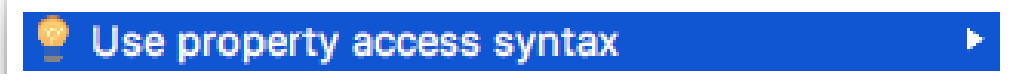
..			
view	#87 send confirmation mail UI	19 days ago	
xprops	#71 reuse render text logic	a month ago	
events.kt	#76 client CRUD options context menu vs menu bar	a month ago	50.00%
model.kt	#87 send confirmation mail UI	19 days ago	91.53%
module.kt	refactoring xprops; db test infra	9 months ago	100.00%
persistence.kt	#78 new client fields (main objective, symptoms, syndroms, five eleme...	a month ago	75.56%
service.kt	#76 client CRUD options context menu vs menu bar	a month ago	66.04%

```
47  // extension methods
48  fun ImageIcon.toMyImage(): MyImage = ImageIconImage(this)
49  fun BufferedImage.toMyImage(): MyImage = ImageIconImage(ImageIcon(this))
50  fun File.toMyImage(): MyImage = FileImage(this)
51  fun String.toMyImage(): MyImage = ClasspathImage(this)
52  fun ByteArray.toMyImage(): MyImage = this.readBufferedImage().toMyImage()
53
54  val Gender.defaultImage: MyImage get() =
55      when(this) {
56          Gender.MALE -> MyImage.DEFAULT_PROFILE_MAN
57          Gender.FEMALE -> MyImage.DEFAULT_PROFILE_WOMAN
58          else -> MyImage.DEFAULT_PROFILE_ALIEN
59      }
```

IntelliJ support is quite good

- Auto convert from Java to Kotlin
- False unused warning on companion extensions : (
- TODO3
- Automatic replace

```
val text = JTextField()
val width = text.getWidth()
```



Code Schmankerln

Extension Methods #1

The *neutral* **domain object**:

```
package at.cpickl.gadsu.client

data class Client(
  val id: String,
  val name: String
)
```

Extension Methods #2

Persistence specific functionality:

```
package at.cpickl.gadsu.persistence

data class ClientDbo(
  val TXT_ID: String,
  val TXT_NAME: String
)
```

Extension Methods #2

Persistence specific functionality:

```
package at.cpickl.gadsu.persistence

data class ClientDbo(
  val TXT_ID: String,
  val TXT_NAME: String
)
fun Client.toDbo() =
        ClientDbo(id, name)
```

Extension Methods #2

Persistence specific functionality:

```
package at.cpickl.gadsu.persistence

data class ClientDbo(
  val TXT_ID: String,
  val TXT_NAME: String
)
fun Client.toDbo() =
        ClientDbo(id, name)

class ClientRepo {
    fun save(client: Client) {
        saveSomewhere(client.toDbo())
    }
}
```

Extension Methods #3

Add a **fluent API** to an existing classes:

```
fun <T : JComponent> T.bold(): T {
  font = font.deriveFont(Font.BOLD)
  return this
}
```

Extension Methods #3

Add a **fluent API** to an existing classes:

```
fun <T : JComponent> T.bold(): T {
  font = font.deriveFont(Font.BOLD)
  return this
}

val myLabel = JLabel("text").bold()
val myTextField = JTextField("text").bold()
val myTextArea = JTextArea("text").bold()
```

Extension Properties #1

Possible replacement of common **test factories**:

```
package at.cpickl.gadsu.test

val Client.Companion.testee1: Client
  get() = Client(
    id = "",
    name = "Max Muster"
)
```

Extension Properties #1

Possible replacement of common **test factories**:

```
package at.cpickl.gadsu.test

val Client.Companion.testee1: Client
  get() = Client(
    id = "",
    name = "Max Muster"
)
```

Sadly requires to have some *placeholder*:

```
package at.cpickl.gadsu.client

data class Client( ... ) {
    companion object {}
}
```

Extension Properties #2

Use those testees in your **tests**:

```
package at.cpickl.gadsu.test

@Test class ClientIT {

  @Inject lateinit var repo: ClientRepo

  fun `reference test scoped testee`() {
    repo.save(
      Client.testee1.copy(name = "Otto")
    )
    // ... assertions ...
  }
}
```

Function done right

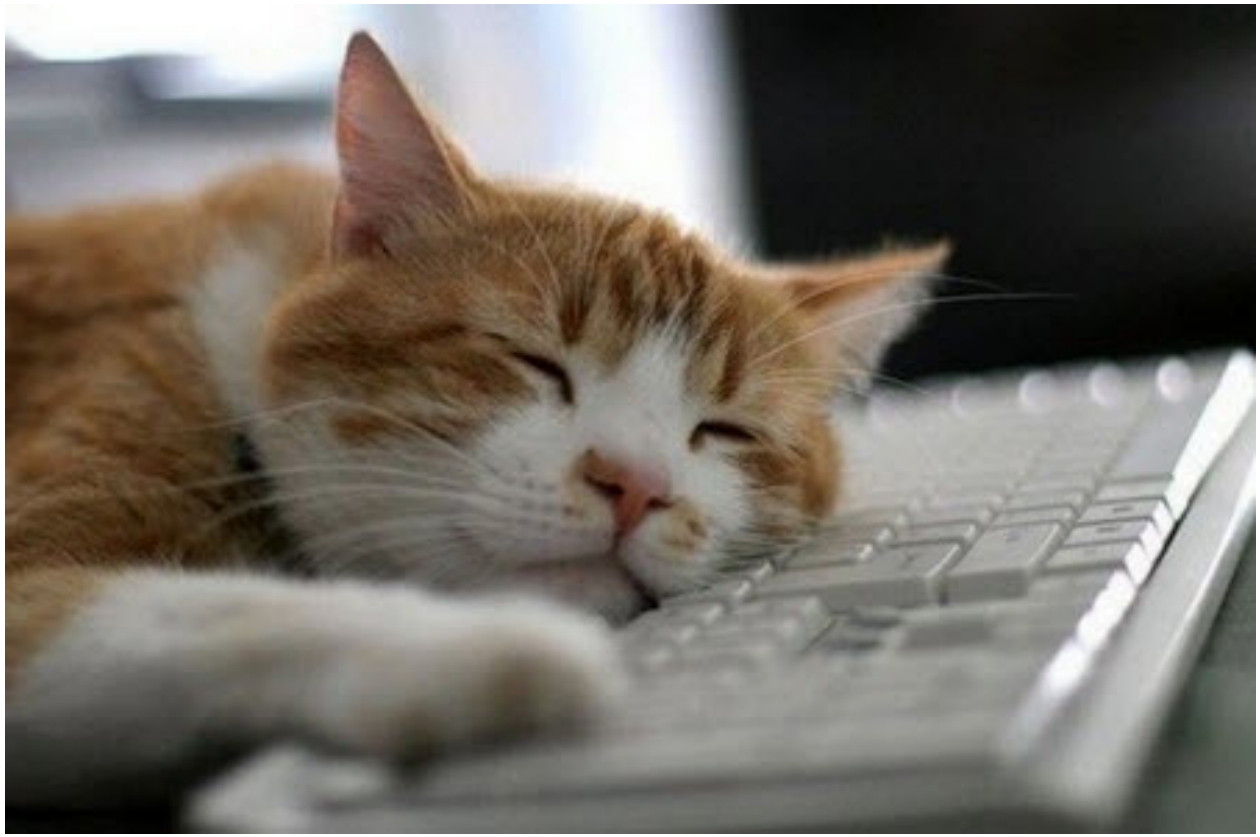
TODO TODO TODO TODO TODO TODO TODO

Java 8

```
Collection, filter, map, STREAM!, collector
```

Kotlin (implicit `it` variable)

```
Collection, filter, map
```



Sometimes I feel so lazy . . .

Lazy in Java

Given there is a *very expensive* `expensiveInit()` method:

Lazy in Java

Given there is a *very expensive* `expensiveInit()` method:

```
public class NaiveSingleton {
  private Object lazyField = null;

  public Object getLazyField() {
    if (lazyField == null) {
      lazyField = expensiveInit();
    }
    return lazyField;
  }
}
```

Lazy in Java8

```
public class Java8 {
  private Supplier<Object> lazyField=() -> {
    Object value = expensiveInit();
    lazyField = () -> value;
    return value;
  };

  public Object getLazyField() {
    return lazyField.get();
  }
}
```

Lazy in Kotlin

```
class LazyKotlin {
  val lazyField by lazy {
    expensiveInit()
  }
}
```

Lazy in Kotlin

```
class LazyKotlin {
  val lazyField by lazy {
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}

// part of stdlib:
fun <T> lazy(initializer: ()->T): Lazy<T> =
  SynchronizedLazyImpl(initializer)
```

Lazy in Kotlin

```
class LazyKotlin {
  val lazyField by lazy {
    expensiveInit()
  }
}

// part of stdlib:
fun <T> lazy(initializer: ()->T): Lazy<T> =
  SynchronizedLazyImpl(initializer)
```

Thanks to type inference, we don't need to specify types explicity.

Class Delegation

Given the existing classes:

```
interface Step {
  fun take()
}
```

Class Delegation

Given the existing classes:

```
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  fun take()
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class StepImpl : Step {
  override fun take() {}
}
```

Class Delegation

Given the existing classes:

```
interface Step {
  fun take()
}

class StepImpl : Step {
  override fun take() {}
}
```

We now want some new service to implement this interface, but **delegate** all its methods to the `StepImpl` implementation.

Reimplement in Java

```
public class MyService implements Step {

  private final Step step;

  public MyService(Step step) {
    this.step = step;
  }

  @Override public void take() {
    step.take();
  }
}
```

Delegate by Kotlin

```
class MyService(step: Step) : Step by step
```

Delegate by Kotlin

```
class MyService(step: Step) : Step by step
```

Standard delegates in Kotlin:

- lazy
- observable
- map properties

Lessons Learned

Tooling infrastructure grows

- Mostly same as for Java
- Build system support (gradle with kotlin coming!)
- Static code analysis tools missing
- Syntax highlighting mostly missing

Kotlin is a great language

- Null handling is a MUST!
- Extension methods (for better auto completion)
- (Constructor) Properties
- Lambdas done properly
- (Local) Type inference
- Named and default arguments
- Compact syntax: No semicolon, new
- Data classes

Kotlin is a great language . . . but!

- Data classes are still somehow restricted in their usage (v1.1)
- Paradigm shift of final-by-default clashes with existing libs
- Requires developers to be more disciplined
  - Several classes in one (big) file gets common
  - Explicit type declaration for documentation
  - Overuse of single-expression functions
  - Overuse of functionals like `apply{}`

Apply – Who is this?

```
class MainPanel : JPanel() {
  init {
    val subPanel = JPanel()
    subPanel.background = Color.RED
    add(subPanel)
  }
}
```

Apply – Who is this?

```
class MainPanel : JPanel() {
  init {
    val subPanel = JPanel()
    subPanel.background = Color.RED
    add(subPanel)
  }
}
```

We can refactor this to get rid of the **variable reference**.

Apply – This is not this anymore!

```
class MainPanel : JPanel() {
  init {
    JPanel().apply {
      background = Color.RED
      add(this)
    }
  }
}
```

Apply – This is not this anymore!

```
class MainPanel : JPanel() {
  init {
    JPanel().apply {
      background = Color.RED
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  }
}
```

```
IllegalArgumentException: adding container's parent to itself
```

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IllegalArgumentException: adding container's parent to itself
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The solution is to use: `this@MainPanel.add(this)`

Apply – This is not this anymore!

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class MainPanel : JPanel() {
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```

```
IllegalArgumentException: adding container's parent to itself
```

The solution is to use: `this@MainPanel.add(this)`

But what happens if there are **two nested** `JPanels`?!

Links

- Visit the website:
  https://github.com/christophpickl/gadsu
- LaTeX sources of the slides:
  https://github.com/christophpickl/gadsu_meetup
- Kotlin-Vienna Usergroup:
  https://www.meetup.com/Kotlin-Vienna