Ktor

Ruslan Ibragimov / ibragimov.by

Ktor

VS

Конкуренты

spring
by Pivotal

Bootique

VS

Spark

VERT.X

Конкуренты

Можно использовать с Kotlin

spring
by Pivotal™

Bootique

Spark

VERT.X

Можно использовать с Kotlin

Асинхронные

🔄 spring by Pivotal

🔄 Bootique

Spark

🔄 VERT.X

Асинхронные

spring by Pivotal

Bootique

Spark

VERT.X

Корутины

spring
by Pivotal

Bootique

Spark

VERT.X

Корутины

VS

spring by Pivotal

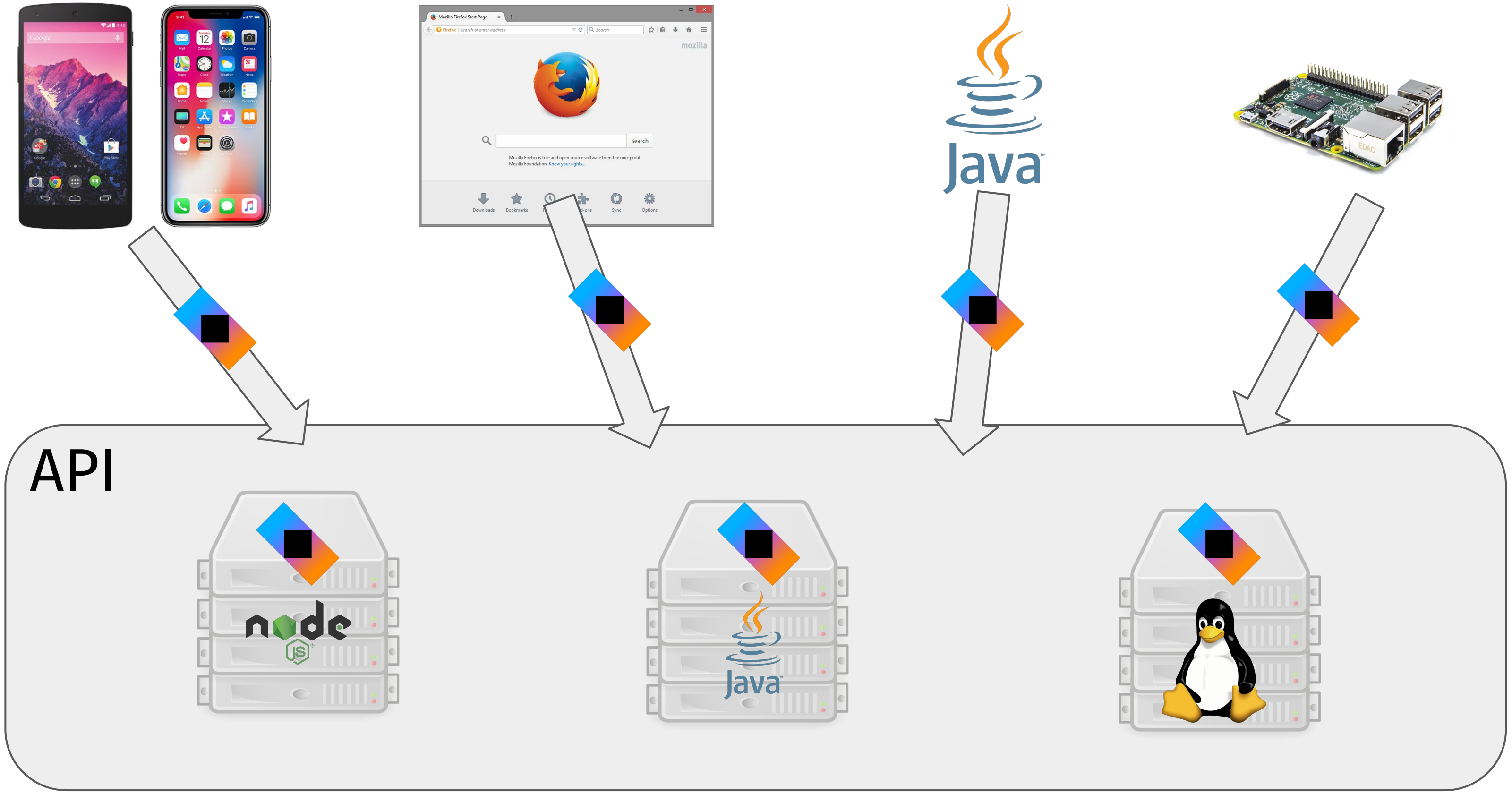
Bootique

Spark

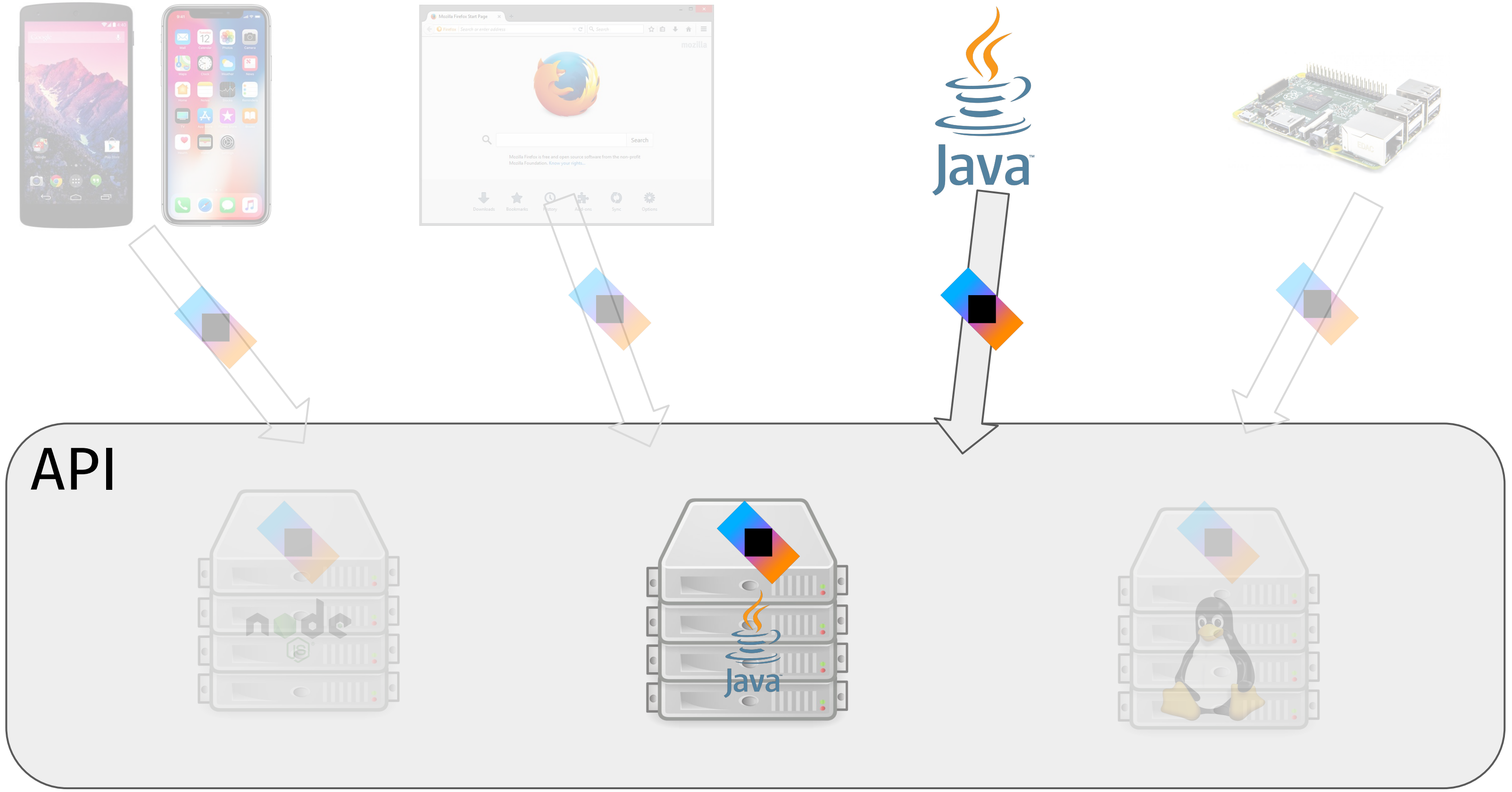
VERT.X

Конкуренты

One more thing…



Мультиплатформа



Java, Java, Java-Java Jing-Jing-Jing

Hello, World!

Gradle

```
buildscript {
  repositories {
     jcenter()
  }

  dependencies {
     classpath("org.jetbrains.kotlin:kotlin-gradle-plugin:$kotlinVersion")
  }
}
```

Gradle

```
apply plugin: "kotlin"

compileKotlin {
  kotlinOptions.jvmTarget = "1.8"
}

compileTestKotlin {
  kotlinOptions.jvmTarget = "1.8"
}

kotlin.experimental.coroutines = "enable"
```

Gradle

```
repositories {
  jcenter()
  maven { url "https://dl.bintray.com/kotlin/kotlinx" }
  maven { url "https://dl.bintray.com/kotlin/ktor" }
}

dependencies {
  compile("org.jetbrains.kotlin:kotlin-stdlib-jdk8:$kotlinVersion")
  compile("io.ktor:ktor-server-netty:$ktorVersion")
}
```

Main

```
fun main(args: Array<String>) {
   embeddedServer(Netty, 8080) {
      routing {
         get("/") {
            call.respondText("I am Groot!", ContentType.Text.Html)
         }
      }
   }.start(wait = true)
}
```

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Main

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}
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    routing {
      get("/") {
        call.respondText("I am Groot!", ContentType.Text.Html)
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  }.start(wait = true)
}
```

Application::class

```
fun main(args: Array<String>) {
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        routing {
            get("/") {
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            }
        }
    }.start(wait = true)
}
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Application::class

```
fun main(args: Array<String>) {
    embeddedServer(Netty, 8080) { this: Application
        this.routing {
            get("/") {
                call.respondText("I am Groot!", ContentType.Text.Html)
            }
        }
    }.start(wait = true)
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```

Application::class

Application это Pipeline (точнее несколько Pipeline'ов)

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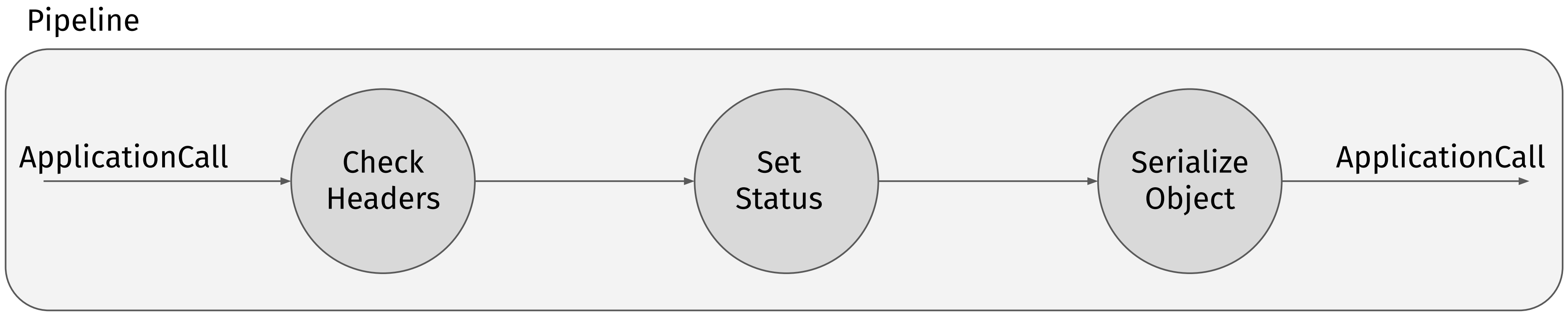
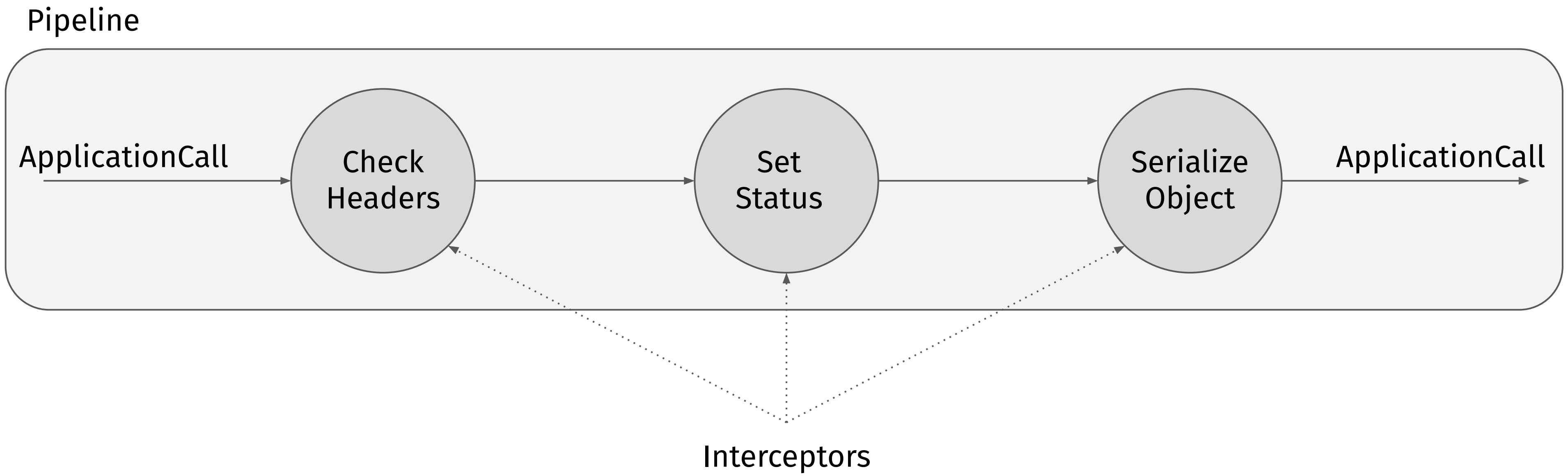
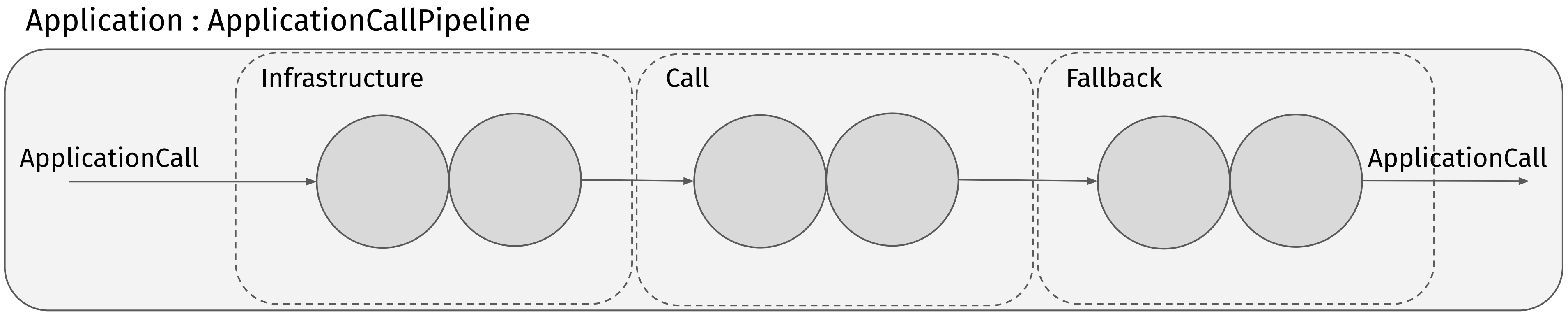


Application::class

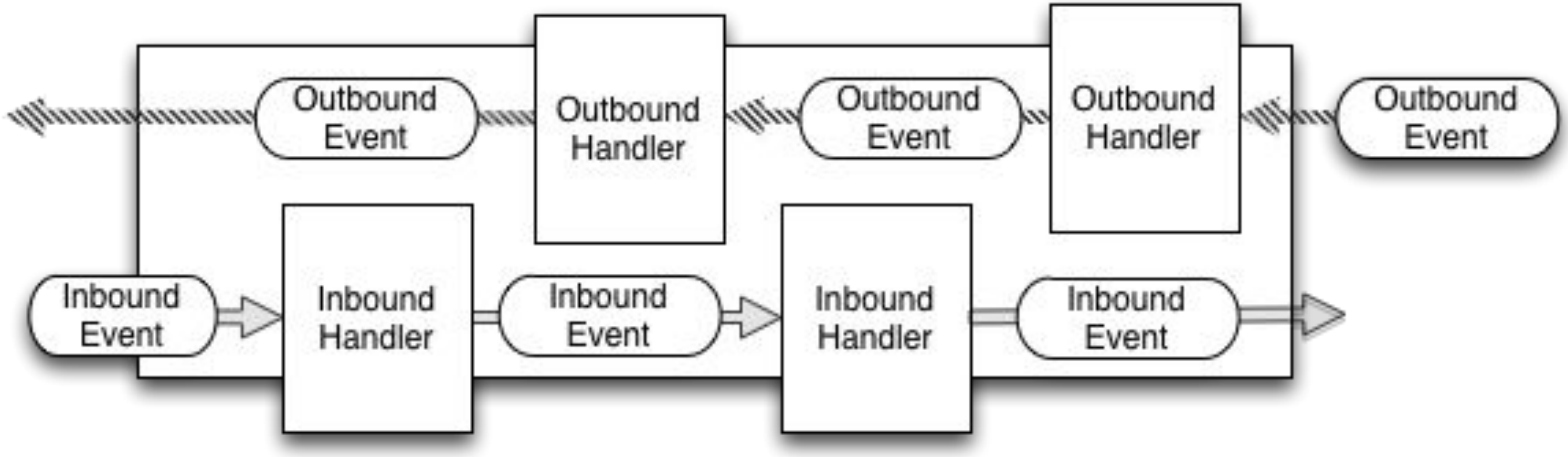
Application это Pipeline (точнее несколько Pipeline'ов)



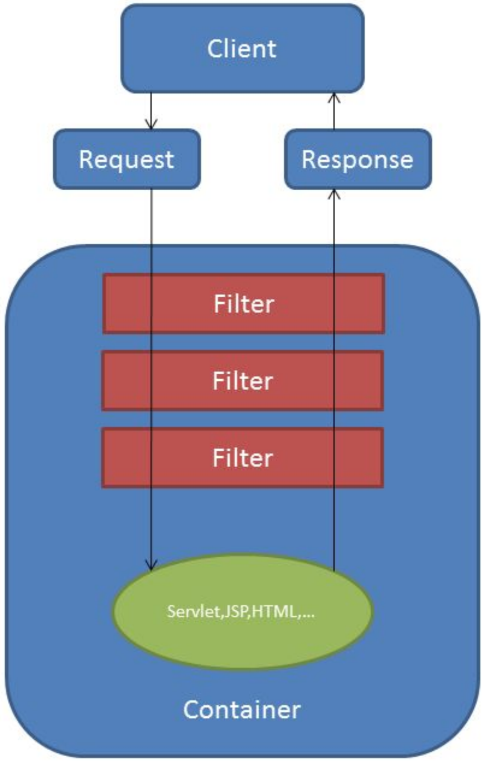
PipelinePhase



Netty ChannelPipeline



Servlet


Client
Request
Response
Filter
Filter
Filter
Servlet,JSP,HTML,...
Container

Pipelines

ApplicationCallPipeline

- ApplicationReceivePipeline
- ApplicationSendPipeline

Pipelines

ApplicationCallPipeline (ApplicationCall)

- ApplicationReceivePipeline (ApplicationReceiveRequest, ApplicationCall, IncomingContent)
- ApplicationSendPipeline (ApplicationCall, OutgoingContent)

Application::class

```
fun main(args: Array<String>) {
  embeddedServer(Netty, 8080) { this: Application
    this.routing {
      get("/") {
        call.respondText("I am Groot!", ContentType.Text.Html)
       }
    }
  }.start(wait = true)
}
```

Application.intercept

```kotlin
fun main(args: Array<String>) {
  embeddedServer(Netty, 8081) {
    intercept(ApplicationCallPipeline.Infrastructure) {
      // log request headers
      call.request.headers
        .forEach { name, values -> println("$name: ${values.joinToString()}") }
    }

    //...
  }.start(wait = true)
}
```

Application.intercept

```
fun main(args: Array<String>) {
  embeddedServer(Netty, 8081) {
    intercept(ApplicationCallPipeline.Infrastructure) {
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      call.request.headers
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    }

    //...
  }.start(wait = true)
}
```

Application.intercept

```
fun main(args: Array<String>) {
  embeddedServer(Netty, 8081) {
     intercept(ApplicationCallPipeline.Infrastructure) {
        // log request headers
        call.request.headers
           .forEach { name, values -> println("$name: ${values.joinToString()}") }
     }

     //...
  }.start(wait = true)
}
```

ApplicationCall::class

```
fun main(args: Array<String>) {
  embeddedServer(Netty, 8081) {
    intercept(ApplicationCallPipeline.Infrastructure) {
      // log request headers
       call.request.headers
         .forEach { name, values -> println("$name: ${values.joinToString()}") }
    }

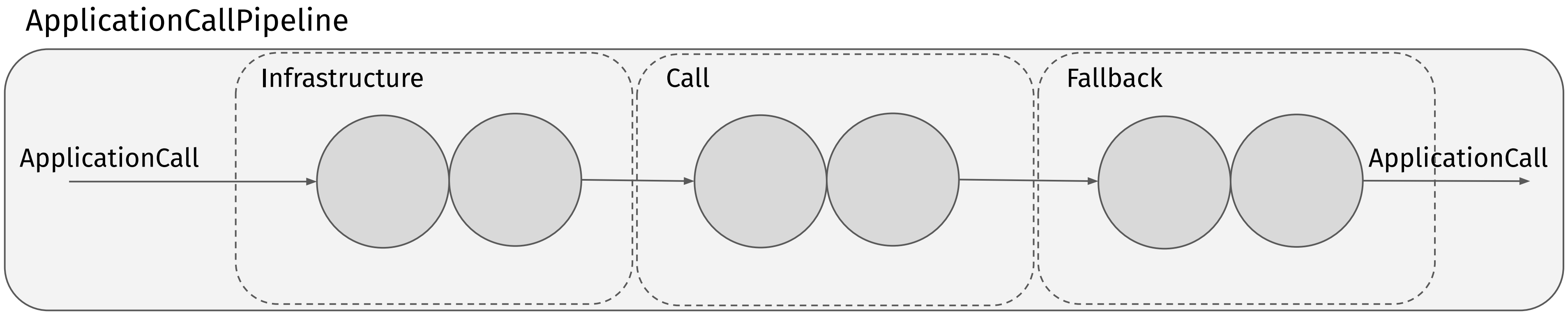
    //...
  }.start(wait = true)
}
```

ApplicationCall::class

ApplicationCall

- ApplicationRequest
- ApplicationResponse
- Attributes

Application



Feature

- Роутинг
- Аунтентификация
- Логирование запросов
- Проставление заголовков
- CORS
- Метрики
- Сессии
- и т.д.
- см. ApplicationFeature

Feature

```
routing {
  get("/") {
     call.respondText("I am Groot!"), ContentType.Text.Html)
  }
}
```

Feature

```
install(Routing) {
  get("/") {
     call.respondText("I am Groot!", ContentType.Text.Html)
  }
}
```

Feature

```
fun main(args: Array<String>) {
  embeddedServer(Netty, 8081) {
     install(DefaultHeaders)
     install(CallLogging)

      //..
  }.start(wait = true)
}
```

Features

```
intercept(ApplicationCallPipeline.Infrastructure) {
  // log request headers
  call.request.headers
     .forEach { name, values -> println("$name: ${values.joinToString()}") }
}
```

Features

```
class HeaderLoggingFeature(configuration: Configuration) {
  val exclusions = configuration.exclusions

  class Configuration {
     var exclusions: List<String> = listOf()
  }

  fun log(call: ApplicationCall) {
     call.request.headers
       .filter { name, _ -> !exclusions.contains(name) }
       .forEach { name, values -> println("$name: ${values.joinToString()}") }
  }

  companion object Feature : ApplicationFeature<ApplicationCallPipeline, HeaderLoggingFeature.Configuration, HeaderLoggingFeature> {
     override val key = AttributeKey<HeaderLoggingFeature>("HeaderLoggingFeature")

     override fun install(pipeline: ApplicationCallPipeline, configure: Configuration.() -> Unit): HeaderLoggingFeature {
        val configuration = HeaderLoggingFeature.Configuration().apply(configure)
        val feature = HeaderLoggingFeature(configuration)

        pipeline.intercept(ApplicationCallPipeline.Infrastructure) {
          feature.log(call)
        }
       return feature
     }
  }
}
```

Features

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class HeaderLoggingFeature(configuration: Configuration) {
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Features

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        val feature = HeaderLoggingFeature(configuration)

        pipeline.intercept(ApplicationCallPipeline.Infrastructure) {
          feature.log(call)
        }
       return feature
     }
  }
}
```

Features

```
intercept(ApplicationCallPipeline.Infrastructure) {
  // log request headers
  call.request.headers
     .forEach { name, values -> println("$name: ${values.joinToString()}") }
}

install(HeaderLoggingFeature)

install(HeaderLoggingFeature) {
  exclusions = listOf("User-Agent")
}
```

Features

```
intercept(ApplicationCallPipeline.Infrastructure) {
  // log request headers
  call.request.headers
     .forEach { name, values -> println("$name: ${values.joinToString()}") }
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install(HeaderLoggingFeature)

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Features

```
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     .forEach { name, values -> println("$name: ${values.joinToString()}") }
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install(HeaderLoggingFeature)

install(HeaderLoggingFeature) {
  exclusions = listOf("User-Agent")
}
```

Application и организация кода

```
fun main(args: Array<String>) {
   embeddedServer(Netty, 8080) {
      routing {
         get("/") {
            call.respondText("I am Groot!", ContentType.Text.Html)
         }
      }
   }.start(wait = true)
}
```

Application и организация кода

```
fun main(args: Array<String>) {
  embeddedServer(Netty, 8080) { this: Application
     this.routing {
        get("/") {
           call.respondText("I am Groot!", ContentType.Text.Html)
         }
     }
  }.start(wait = true)
}
```

Application и организация кода

```
fun Application.myApp() {
  routing {
    get("/") {
      call.respondText("I am Groot!", ContentType.Text.Html)
    }
  }
}

fun main(args: Array<String>) {
  embeddedServer(Netty, 8081) {
    myApp()
  }.start(wait = true)
}
```

Application и организация кода

```
fun Application.myApp() {
  routing {
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        }
    }
}

fun main(args: Array<String>) {
    embeddedServer(Netty, 8081) {
        myApp()
    }.start(wait = true)
}
```

Тестирование

```
dependencies {
  compile("org.jetbrains.kotlin:kotlin-stdlib-jdk8:$kotlinVersion")
  compile("io.ktor:ktor-server-netty:$ktorVersion")

  compile("ch.qos.logback:logback-classic:1.2.1")

  testCompile("junit:junit:4.12")
  testCompile("io.ktor:ktor-server-test-host:$ktorVersion")
}
```

Тестирование

```
class AppKtTest {
  @Test fun testIsIAmGroot() {
     withTestApplication(Application::myApp) {
       with(handleRequest(HttpMethod.Get, "/")) {
          assertEquals(HttpStatusCode.OK, response.status())
           assertEquals("I am Groot!", response.content)
        }
     }
  }
}
```

Тестирование

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            assertEquals("I am Groot!", response.content)
         }
     }
  }
}
```

Autoreload

```
fun Application.myApp() {
  routing {
    get("/") {
      call.respondText("I am Groot!", ContentType.Text.Html)
    }
  }
}
```

Autoreload

```
ktor {
  deployment {
      port = 8080
      watch = [ ktor-bkug ]
  }

  application {
      modules = [ by.bkug.autoreload.AutoreloadKt.module ]
  }
}
```

Autoreload

io.ktor.server.netty.DevelopmentEngine

Autoreload

ApplicationEngineEnvironmentReloading

Autoreload

Demo?

Серверы

Netty (**ktor-server-netty**),

Jetty (ktor-server-jetty),

Tomcat (ktor-server-tomcat)

Servlet 3.0+ (ktor-server-servlet)

HTTP Клиент

Клиенты

Apache HTTP (**ktor-client-apache**),

Jetty (ktor-client-jetty)

Пример

```
fun Application.myApp() {
  val client = HttpClient(Apache)
}
```

Пример

```
fun Application.myApp() {
  val client = HttpClient(Apache)

  routing {
    get("/call") {
        val text = client.get<String>(
            host = "localhost",
            port = 8081,
            path = "/text"
        )

        call.respondText(text)
    }
  }
}
```

Пример

```
fun Application.myApp() {
  val client = HttpClient(Apache)

  routing {
      get("/call") {
          val text = client.get<String>(
              host = "localhost",
              port = 8081,
              path = "/text"
          )

          call.respondText(text)
      }
  }
}
```

Пример

```
val client = HttpClient(Apache) {
  install(JsonFeature)
}
```

Пример

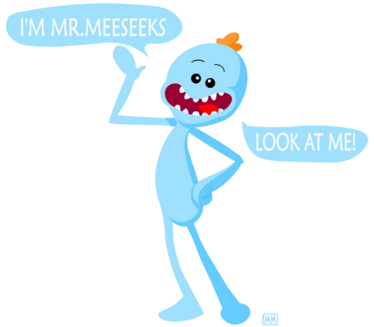
```
val user = client.get<User>(
  host = "localhost",
  port = 8081,
  path = "/json"
)
```

Пример

```
val user = client.get<User>(
  host = "localhost",
  port = 8081,
  path = "/json"
)
```

Про что еще можно было бы рассказать

- Продвинутый роутинг
- JSON
- Статические данные (HTML, JS, ...)
- ExceptionHandling
- IoC (DI)
- HTTP/2
- WebSockets
- Как добавить $server? (Undertow, ...)



Резюме

- Ktor - connected systems
- Application - Pipelines
- Pipeline - Interceptors
- Interceptors - Feature
- Авторелоад
- Тестирование
- Клиент

Вопросы?

- Ktor.io: ktor.io
- Awesome Kotlin: kotlin.link
- Belarus Kotlin User Group: bkug.by

COFFEE
TIME