



Ktor: Kotlin Backend Framework

Metas Kerdwat(Oak)

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- Ktor is a Kotlin framework for building asynchronous servers
- Created by JetBrains - the organization that created Kotlin
- It has a plugin for creating templates in IntelliJ
- It has a lot of build-in functionality such as Authorization, Data Parsing, or Error Handling



Ktor

Simplest example

```
fun main() {  
    embeddedServer(factory = Netty, port = 8080) { this: Application  
        routing { this: Routing  
            get(path: "/") { this: PipelineContext<Unit, ApplicationCall>  
                call.respondText(text: "Hello World", ContentType.Text.Plain)  
            }  
        }  
    }.start(wait = true)  
}
```

Setting up

```
fun Application.module() {  
    install(DefaultHeaders)  
    install(CallLogging)  
    install(ContentNegotiation) { gson() }  
    install(StatusPages) { /* Handling errors */ }  
    install(Authentication) { /* Handling authentication */ }  
    routing { /* Handling routing */ }  
}
```

Many pluggable features

Error Handling

```
fun Application.installStatusPages() = install(StatusPages) { this: StatusPages.Configuration
    exception<AuthenticationException> { this: PipelineContext<Unit, ApplicationCall>
        call.respond(HttpStatusCode.Unauthorized, Message(it.toString()))
    }
    exception<AuthorizationException> { this: PipelineContext<Unit, ApplicationCall>
        call.respond(HttpStatusCode.Forbidden, Message(it.toString()))
    }
    exception<MissingParameterException> { this: PipelineContext<Unit, ApplicationCall>
        call.respond(HttpStatusCode.BadRequest, Message(it.msg))
    }
    exception<Throwable> { cause ->
        call.respond(HttpStatusCode.InternalServerError, Message(message: cause.message ?: cause.toString()))
    }
}
```

Authentication: Basic

```
fun Application.installAuthentication() = install(Authentication) { this: Authentication.Configuration
    basic( name: "BASIC_AUTH") { this: BasicAuthenticationProvider
        validate { credential ->
            if (credential.name == "admin" && credential.password == "root") {
                ^validate UserIdPrincipal(credential.name)
            } else {
                ^validate null
            }
        }
    }
}
```

It supports ORM

```
object Libraries : Table() {  
    val id: Column<Int> = integer( name: "id").autoIncrement().primaryKey()  
    val name: Column<String> = varchar( name: "name", length = 50).default( defaultValue: "")  
    val version: Column<String> = varchar( name: "version", length = 20).default( defaultValue: "")  
}
```

Example of performing a Select

```
fun selectAll(): List<LibraryItem> = Libraries  
    .selectAll()  
    .toList()  
    .map { row ->  
        LibraryItem(  
            id = row[Libraries.id],  
            name = row[Libraries.name],  
            version = row[Libraries.version]  
        )  
    }  
}
```

Goals

Create a CRUD web API for the **New Releases Notifier** made by Luong

Achievement and Progress

- Finish CRUD API
- Could not deploy to Heroku yet

Achievement and Progress

POST localhost:8080/libraries GET localhost:8080/libraries PUT localhost:8080/libraries DEL

localhost:8080/libraries

POST localhost:8080/libraries

Params Authorization Headers (1) Body Pre-request Script Tests

none form-data x-www-form-urlencoded raw binary JSON (application/json)

```
1 {  
2   "name": "android.arch.core.common",  
3   "version": "1.1.1"  
4 }
```

Body Cookies Headers (5) Test Results

Pretty Raw Preview JSON

```
1 {  
2   "message": "Create android.arch.core.common successfully"  
3 }
```

POST localhost:8080/libraries GET localhost:8080/libraries PUT localhost:8080/libraries

localhost:8080/libraries

GET localhost:8080/libraries

Params Authorization Headers Body Pre-request Script

none form-data x-www-form-urlencoded raw bin.

Body Cookies Headers (5) Test Results

Pretty Raw Preview JSON

```
1 [  
2   {  
3     "id": 2,  
4     "name": "android.arch.core.common",  
5     "version": "1.1.1"  
6   }  
7 ]
```

Achievement and Progress

POST localhost:8080/libraries ● GET localhost:8080/libraries ● PUT localhost:8080/libraries ●

PUT localhost:8080/libraries

Params Authorization Headers (1) Body ● Pre-request Script Tests

☐ none ☐ form-data ☐ x-www-form-urlencoded ☒ raw ☐ binary JSON (application)

```
1 {
2   "id": 2,
3   "name": "edited",
4   "version": "99.999"
5 }
```

Body Cookies Headers (5) Test Results

Pretty Raw Preview JSON ▾

```
1 {
2   "message": "Update library successfully"
3 }
```

POST localhost:8080/libraries ● GET localhost:8080/libraries ●

localhost:8080/libraries

GET localhost:8080/libraries

Params Authorization Headers Body Pre-reqs

☒ none ☐ form-data ☐ x-www-form-urlencoded ☐ raw

Body Cookies Headers (5) Test Results

Pretty Raw Preview JSON ▾

```
1 [
2   {
3     "id": 2,
4     "name": "edited",
5     "version": "99.999"
6   }
7 ]
```

Achievement and Progress

DEL localhost:8080/libraries/2

POST localhost:8080/libraries

localhost:8080/libraries/2

DELETElocalhost:8080/libraries/2

ParamsAuthorizationHeadersBodyPre-requests

☒ none ☐ form-data ☐ x-www-form-urlencoded ☐ raw

BodyCookiesHeaders (5)Test Results

PrettyRawPreviewJSON

```
1 {
2   "message": "Delete library 2 successfully"
3 }
```

DEL localhost:8080/libraries/2

GET localhost:8080/libraries

localhost:8080/libraries

GETlocalhost:8080/libraries

ParamsAuthorizationHeadersBodyPre-requests

☒ none ☐ form-data ☐ x-www-form-urlencoded ☐ raw

BodyCookiesHeaders (5)Test Results

PrettyRawPreviewJSON

```
1 []
```

Conclusion

- Ktor is a backend framework that is suitable for those who have knowledge about the backend already
- The documentation is ok, could be better
- Kotlin knowledge is needed obviously

Next Steps

- Integrate backend service with Luong's project if possible

Thanks!

Contact Nimble

nimblehq.co

hello@nimblehq.co

Bangkok

399 Interchange 21 Sukhumvit Road, Unit
#2402-03, Klong Toei, Wattana, Bangkok
10110, Thailand

Singapore

28C Stanley St, Singapore 068737

Hong Kong

20th Floor, Central Tower
28 Queen's Road, Central, Hong Kong

