

# A Review on Server-Side Development with Kotlin

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**Abstract:** When we type in a URL in any browser, lots of code is at work behind the scenes which are mainly driven to process our request and bring us the desired response. What does the magic here is called server-side script which provides a seamless experience to the users and help solving modern day problems. There are many server-side languages working towards this end goal. The language you choose for your site depends on a mix of your site's requirements and the development team. This paper discusses the power of Kotlin as a server-side programming language and some renowned frameworks used for server-side development using Kotlin. The main intention of this paper is to draw attention of the developer's community to the power of Kotlin as a server-side programming language.

**IndexTerms –** *Kotlin, Server-Side Development, Java, Asynchronous Programming, Framework.*

## I. INTRODUCTION

Kotlin is an open-source programming language that enables us to build simple, reliable, and efficient software. We all know the recent popularity of Kotlin for developing Android Applications after Google announced Kotlin as the official programming language for developing android applications and as such not enough attention has been given to server-side development i.e., many developers are missing out on the boilerplate savings, simplicity and in general the power of Kotlin language to build highly scalable, robust, and responsive web applications.

Kotlin is no doubt a highly suitable language for developing server-side applications, allowing web developers to write highly expressive and expensive code while maintaining full compatibility with existing Java-based applications or Java based tech-stacks. Developer experience is also something that cannot be overlooked when we talk about Kotlin. Kotlin with its very concise nature brings in a great delight to the developers as writing less code to get the work done is something that is always going to be appreciated by the entire developer's community.

The goal of this paper is to highlight key features of Kotlin for server-side development, some of them can also be viewed as unique features of Kotlin as a programming language which can really prove to be a game changer, fulfilling the modern needs of the developer's community. The paper also discusses some of the most commonly used frameworks for server-side development using Kotlin.

## II. LITERATURE SURVEY

The official documentation of the Kotlin language gives us a glimpse of how powerful in general the Kotlin is and its several unique features which can turn out to be a game changer the documentation also has a dedicated section which discusses Kotlin's abilities to fit for server-side development, it also shows a list of companies using Kotlin for their backend development [1].

A Review on Kotlin and Android Studio Java: Mr. NiketKenya has highlighted the unique features of Kotlin and its superiority over Java in certain cases by discussing a comparative study of Java and Kotlin [2].

The comparative study by Madhuleena Mukherjee, Shubham Bose, AditiKundu, and Asst. Prof. Madhurima Banerjee has a study highlighting the difference between Java and Kotlin, the authors could clearly be seen favoring Kotlin language, even though the study mainly focuses on the suitability of Kotlin for Android applications development, the strength of Kotlin language highlighted could be inferred to be a game changer for server-side development [3].

The YouTube video published on Jun 14, 2019, by the GOTO Conferences, highlights the strength of Kotlin for server-side development in general as well the usage of Coroutines with Kotlin to achieve productivity of new level when it comes to development at the server side [4].

Several blog posts highlighting the topmost suitable frameworks for Server-Side Development using Kotlin also give a gist of how developers are gradually realizing the power of Kotlin and possibilities of productivity we can achieve with the same [7].

## III. WHY KOTLIN FOR SERVER-SIDE DEVELOPMENT

Kotlin as a language brings in a lot of powerful features which helps us overcome several modern-day problems. Most importantly the concise nature of Kotlin is something that draws our attention. Following are some of the unique features of Kotlin language which would help us understand and appreciate why Kotlin is so underrated when it comes to choosing a language for server side development.

### Null safety

We all know about the very common problem we all face with most of the Object-Oriented Programming languages, including Java i.e., Null Pointer Exception, it is also a very common reason for applications to crash. Kotlin's type system is itself aimed at removing the Null Pointer Exception. Kotlin allows us to declare variables as nullable or nullable, for instance if a variable is declared to be non-nullable throws compiler error whenever it is assigned a null value.

## Interoperability with Java

The fact that the compiler supports both Java and Kotlin language even together adds an additional value to Kotlin to be undertaken and continue with your existing application developed using Java, which is very common as we are all aware of how popular Java is. By the addition of some unique features of Kotlin, the application developers can feel a huge relief to carry forward with Kotlin.

## Data Classes

Let us consider a class in our application which solely stores data, which is very common in almost all applications irrespective of domain. This could be done in the simplest manner with Kotlin, where we do not need to write Pojo classes like we do in most other programming languages.

It is as simple as writing.

```
data class Programmer (val name: String, val age: Int)
```

It is also to be noted that, when we mark a class as a data class, the compiler automatically creates

- a. getters and setters (for the constructor parameters)
- b. equals()
- c. copy()
- d. hashCode()
- e. toString()

## Extension Function

When we want to add some extra functionality to an existing class, we can either inherit a class or use design patterns such as a *Decorator*. Kotlin allows us to do this with an option other than these two i.e., by extension function.

e.g.: `fun MyClass.newFeature() = "new feature"`

The above declaration does not add a new function to the existing class but merely creates a new function which is callable independently with a dot-notation.

## Coroutines

We all know how asynchronous programming can improve the performance and responsiveness of an application, in most general use cases asynchronous programming provides responsive UI in the client application while running a resource or computationally expensive task in the backend. Kotlin supports asynchronous programming by providing us something called Coroutines.

## Lazy Loading

Object Oriented Programming is something that is extensively used for application development, having said that the object initialization is something that comes into picture when an application is running, sometimes an object initialized might not even be used based on how user interacts with the application, so the object initializer is redundant, Kotlin beautifully solves this problem with something called lazy loading, where the objects are initialized only if it is used and initialized only once, during the subsequent use the object is accessed from the cache memory.

Along with the features discussed above which mainly focuses on Kotlin's abilities for server-side development, several other features such as clean and simple code syntax, single type system(debatable), operator overloading, immutability etc. add a lot of value to Kotlin as a language for all the modern needs of a developer.

## IV. POPULAR FRAMEWORKS

Frameworks make our life a lot simpler when we talk about server-side development. Frameworks by providing several libraries which in general automate some of the most common tasks or workflows we encounter while backend programming. Following are some of the popular frameworks that could be used for server-side development using Kotlin which would help us embrace Kotlin for server-side development.

### a. Ktor

Ktor is by far one of the most popular choices when it comes to a framework pairing with Kotlin, it is an open source, asynchronous framework used for creating microservice applications and web applications. The fact that it is multiplatform, Ktor applications could be deployed anywhere.

**b. Spring**

Spring does not require an introduction; the whole programming community is aware of how Spring helps us avoid writing tons of code. The fact that Spring is so much loved, it is evident that we have a very large Spring community. Having said that, Kotlin not only supports Spring Framework but also there are some additional Features specific to Kotlin which can help us reach new heights of productivity with Kotlin.

**c. Dropwizard**

Dropwizard is also a framework that supports both Java and Kotlin, if fast development and high performance is your prime focus then Dropwizard is something that will not disappoint you when paired with Kotlin for your application.

**d. Javalin**

Javalin is also a framework which is renowned as an incredibly lightweight web framework for developing Kotlin and Java Applications. If the prime focus of your application is to finish tasks rapidly then Javalin is something that one should checkout.

**VI. CONCLUSION**

To summarize, Kotlin is no doubt gaining popularity in the application developer's community but some of the features discussed above along with several other unique features of Kotlin not only makes it a special programming language in general but can also boost the productivity when it comes to server-side development, by a significant amount. Having discussed all the merits of Kotlin for server-side development.

It is also noteworthy that just like all other programming languages, Kotlin also has some limitations in various areas such as compilation speed for larger applications turns out to be more than Java. But these limitations should not hinder the developer's community to appreciate the uniqueness of Kotlin and the productivity it adds to the server-side development and embrace it

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