

# From 'Java Sucks' to 'Java...Eh, Not Bad'

How Vert.x & Java 21 Made Me Stop Complaining

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# Who Am I?

- Software Engineer in New York City.
- There is nothing else interesting about me.

# Java.

- If you are at this conference, you probably have an opinion of Java
- Likely very negative.

# Why the Java Hate?

- Java is bloated and verbose.
- Encourages bad practices.
- Java programmers...

# Examples of (Historically) Bad Things In Java.

- IO is blocking by default
- synchronized is evil.
- Replace with concrete examples.

## So Why Would We Want To Even Use Java?

- A metric ton of well-tested and supported libraries and guides online.
- Relatively portable, even still.
- Lots of great tooling around the language in the form of IDEs and benchmarking tools available.
- (Can be) fast.

## Why Not Kotlin? Or Clojure?

- You should use Clojure if you can!
- Java is inescapable.
- A lot of companies still have tens of thousands of lines of Java that already exist.
- Many companies will find it infeasible to migrate to a better language, and would rather spend infinitely more money hiring dozens of engineers to write a million incremental patches to a Java codebase.
- Many of us are stuck in this hell.

# Modern Java

- In 2024 I took a job doing Java full-time.
- They were unreceptive to my pleas to use Clojure, no matter how much I complained.
- Eventually, I realized that I wasn't going to win this fight and instead I should at least figure out what Java 21 had to offer.
- Much to my astonishment, I actually enjoyed it!



## What Changed?

- Since Java 8 and Java 11, there has been a much higher emphasis on functional programming concepts and updated syntax to facilitate it.
- Java programmers have finally joined the 21st century and will occasionally use non-blocking IO.
- Concurrency is an even bigger part of the language, and a lot of the features from concurrent-first languages have been brought over.

# Java 21 New Features.

## Virtual Threads.

- Virtual Threads are what should have been in Java twenty years ago.
- Roughly analogous to goroutines in Go.
- Allow you to have blocking code inside the thread without it breaking the pool.
  - The JVM will park the thread upon seeing a blocking call. . . .
- Extremely lightweight, hundreds of thousands can easily be spun up guilt-free.
- Implements the same interfaces as regular threads and thus are drop-in replacement.
- TODO Example.

## Java 21 New Features\*

\* (Actually a Java 15 feature that I wasn't aware of until Java 21)

### ZGC

- Low-latency garbage collector.
- Pause times are generally sub-millisecond and almost never exceed ten milliseconds.
- Configurable, can be enabled or disabled per-project.

# Java 21 New Features.

## Records

- Much simpler than a class.
- Doesn't require its own dedicated file.
- Can be pattern-matched.
- TODO Example.

## Java 21 New Features\*

\* (Actually a Java 17 feature that I wasn't aware of until Java 21)

# Sealed Interfaces

- Basically Algebraic Data Types
- Can be recursive.
- Can be pattern matched.

# Java 21 New Features.

## Pattern Matching

- FINALLY! FINALLY!
- Can be done inside if statements and switch cases.
- TODO Example.

# Java NIO

- Java New IO.
- Gives fine-grained control over IO, both blocking and non-blocking.
- Not new at all, but underutilized.
- TODO Basic Node.js pipes example.



# Vert.x

- (In a hand-wavey way) a port of Node.js to Java.
- High performance.
- Provides constructs to handle local and distributed concurrency transparently.

# Vert.x Primitives.

- TODO Placeholder

# Vert.x MessageBus.

- TODO Placeholder

# Vert.x Backpressure.

- TODO Placeholder

# Vert.x basic concurrency example

- TODO placeholder

# Vert.x more complicated concurrency example.

- TODO placeholder

# Vert.x distributed concurrency example

- TODO placeholder

# RxJava

- `TODO Placeholder`



# RxJava Example

- `TODO Placeholder`

## Conclusion.

- Java 21 isn't that bad.
- Convince your employers to upgrade if you want to reclaim your sanity.
- Use libraries like Vert.x and Disruptor to make life simpler.

# Conclusion.

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