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

How Vert.x & Java 21 Made Me Stop Complaining

Thomas Gebert

Who Am I?

• Software Engineer in New York City.

Who Am I?

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

 If you are at this conference, you probably have an opinion of Java

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

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

• Java is bloated and verbose.

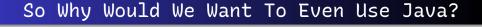
- Java is bloated and verbose.
- Encourages bad practices.

- Java is bloated and verbose.
- Encourages bad practices.
- Java progammers…

• IO is blocking by default

- IO is blocking by default
- synchronized is evil.

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



 A metric ton of well-tested and supported libraries and guides online.

- A metric ton of well-tested and supported libraries and guides online.
- Relatively portable, even still.

- 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.

- 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.

You should use Clojure if you can!

- You should use Clojure if you can!
- Java is inescapable.

- 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.

- 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 incrementatal patches to a Java codebase.

- 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 incrementatal patches to a Java codebase.
- Many of us are stuck in this hell.

• In 2024 I took a job doing Java full-time.

- In 2024 I took a job doing Java full-time.
- They were unreceptive to my plees to use Clojure, no matter how much I complained.

- In 2024 I took a job doing Java full-time.
- They were unreceptive to my plees 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.

- In 2024 I took a job doing Java full-time.
- They were unreceptive to my plees 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!

- In 2024 I took a job doing Java full-time.
- They were unreceptive to my plees 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!

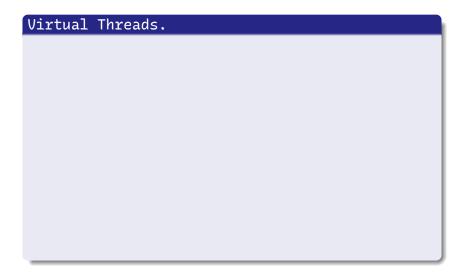
 Since Java 8 and Java 11, there has been a much higher emphasis on functional programming concepts and updated syntax to facilitate it.

- 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.

- 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.

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.



Virtual Threads.

• Virtual Threads are what should have been in Java twenty years ago.

- Virtual Threads are what should have been in Java twenty years ago.
- Roughly analogous to goroutines in Go.

- 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.

- 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.

- 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.

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

```
ZGC
```

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

ZGC

Low-latency garbage collector.

* (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.

* (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.



Records

• Much simpler than a class.

Records

- Much simpler than a class.
- Doesn't require its own dedicated file.

Records

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

Records

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

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

Basically Algebraic Data Types

- Basically Algebraic Data Types
- Can be recursive.

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

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

Pattern Matching

Pattern Matching

• FINALLY! FINALLY!

Pattern Matching

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

Pattern Matching

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

• Java New IO.

- Java New IO.
- Gives fine-grained control over IO, both blocking and non-blocking.

- Java New IO.
- Gives fine-grained control over IO, both blocking and non-blocking.
- Not new at all, but underutilized.

- 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.

• (In a hand-wavey way) a port of Node.js to Java.

- (In a hand-wavey way) a port of Node.js to Java.
- High performance.

- (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.

Vert.x Primitives.

• TODO Placeholder

Vert.x Primitives.

• TODO Placeholder

Vert.x MessageBus.

Vert.x MessageBus.

Vert.x MessageBus.

Vert.x Backpressure.

Vert.x Backpressure.

Vert.x Backpressure.

Vert.x basic concurrency example

Vert.x basic concurrency example

Vert.x basic concurrency example



Vert.x distributed concurrency example

Vert.x distributed concurrency example

Disruptor

Disruptor

• TODO Placeholder

Disruptor

• TODO Placeholder

Disruptor Example

• Java 21 isn't that bad.

- Java 21 isn't that bad.
- Convince your employers to upgrade if you want to reclaim your sanity.

- 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.

- thomas@gebert.app
- blog.tombert.com

