Reactive Programming

With Spring Framework 5

What is Reactive Programming?

Reactive Programming

- Reactive Programming is an asynchronous programming paradigm focused on streams of data.
- “Reactive programs also maintain a continuous interaction with their environment, but at a speed which is determined by the environment, not the program itself. Interactive programs work at their own pace and mostly deal with communication, while reactive programs only work in response to external demands and mostly deal with accurate interrupt handling. Real-time programs are usually reactive.” - Gerad Berry, French Computer Scientist

Common Use Cases

- External Service Calls
- Highly Concurrent Message Consumers
- Spreadsheets
- Abstraction Over Asynchronous Processing
- Abstract whether or not your program is synchronous or asynchronous

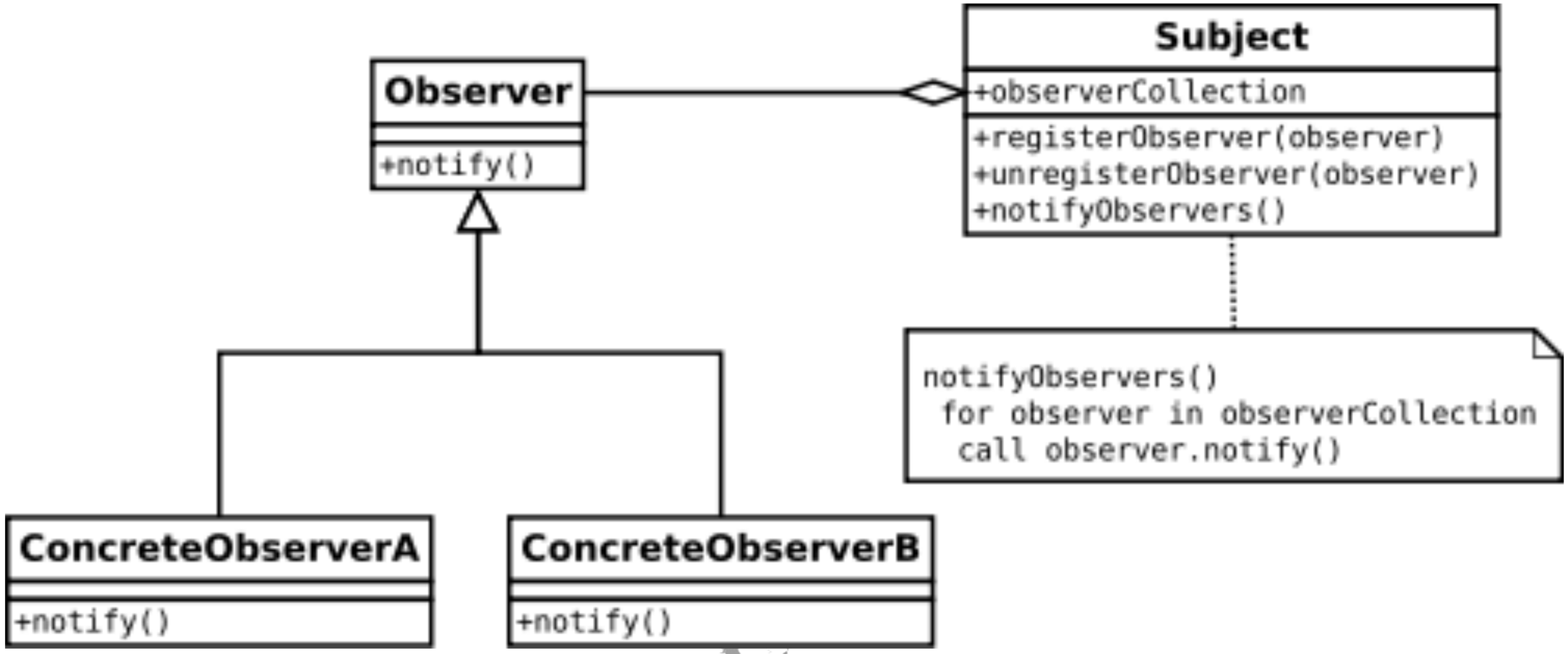
Features of Reactive Programming

- Data Streams
- Asynchronous
- Non-blocking
- Backpressure
- Failures as Messages

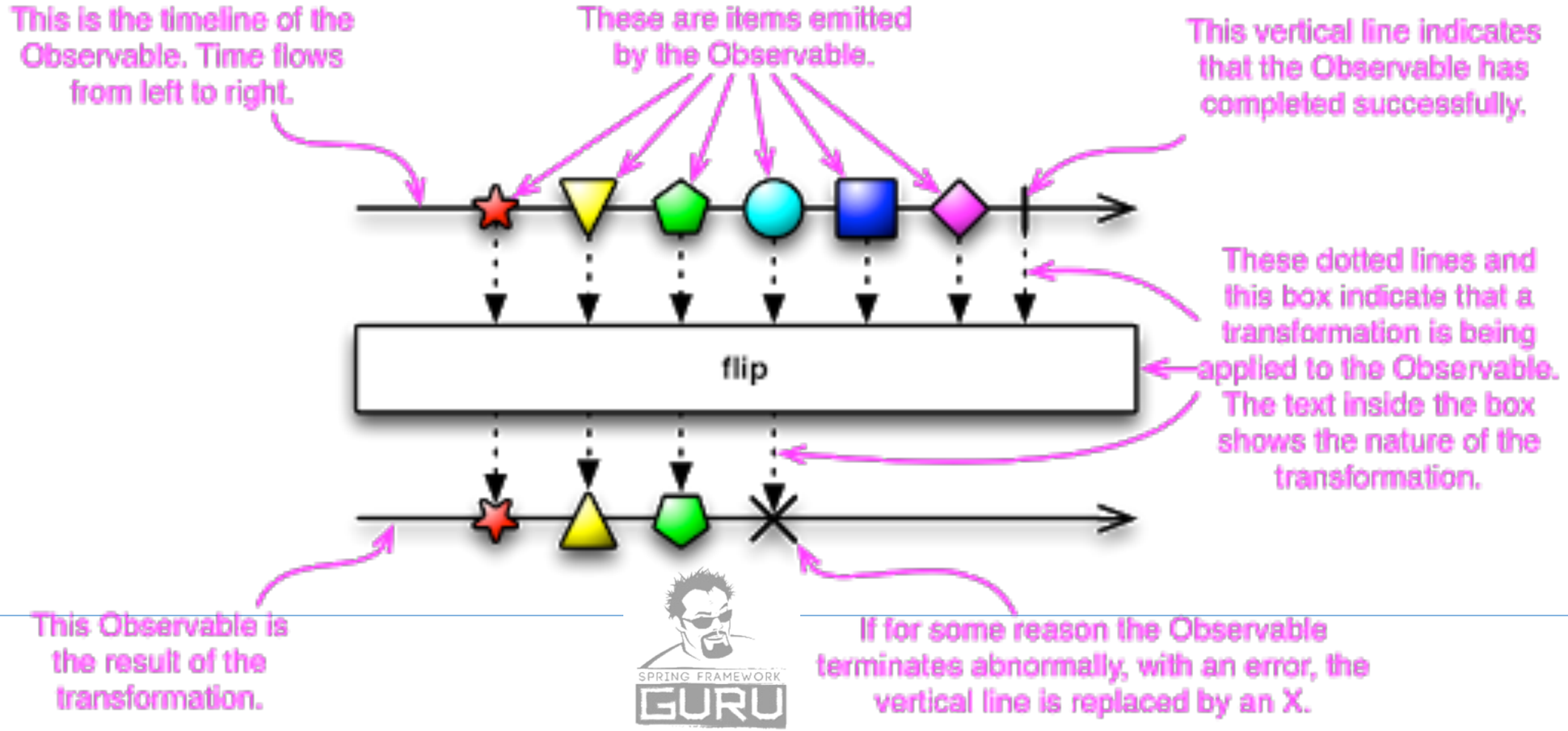
Asynchronous

- Events are captured asynchronously.
- A function is defined to execute when an event is emitted.
- Another function is defined if an error is emitted.
- Another function is defined when complete is emitted.
- This can be a difficult paradigm to adjust to when first getting started!

GOF OBSERVER PATTERN



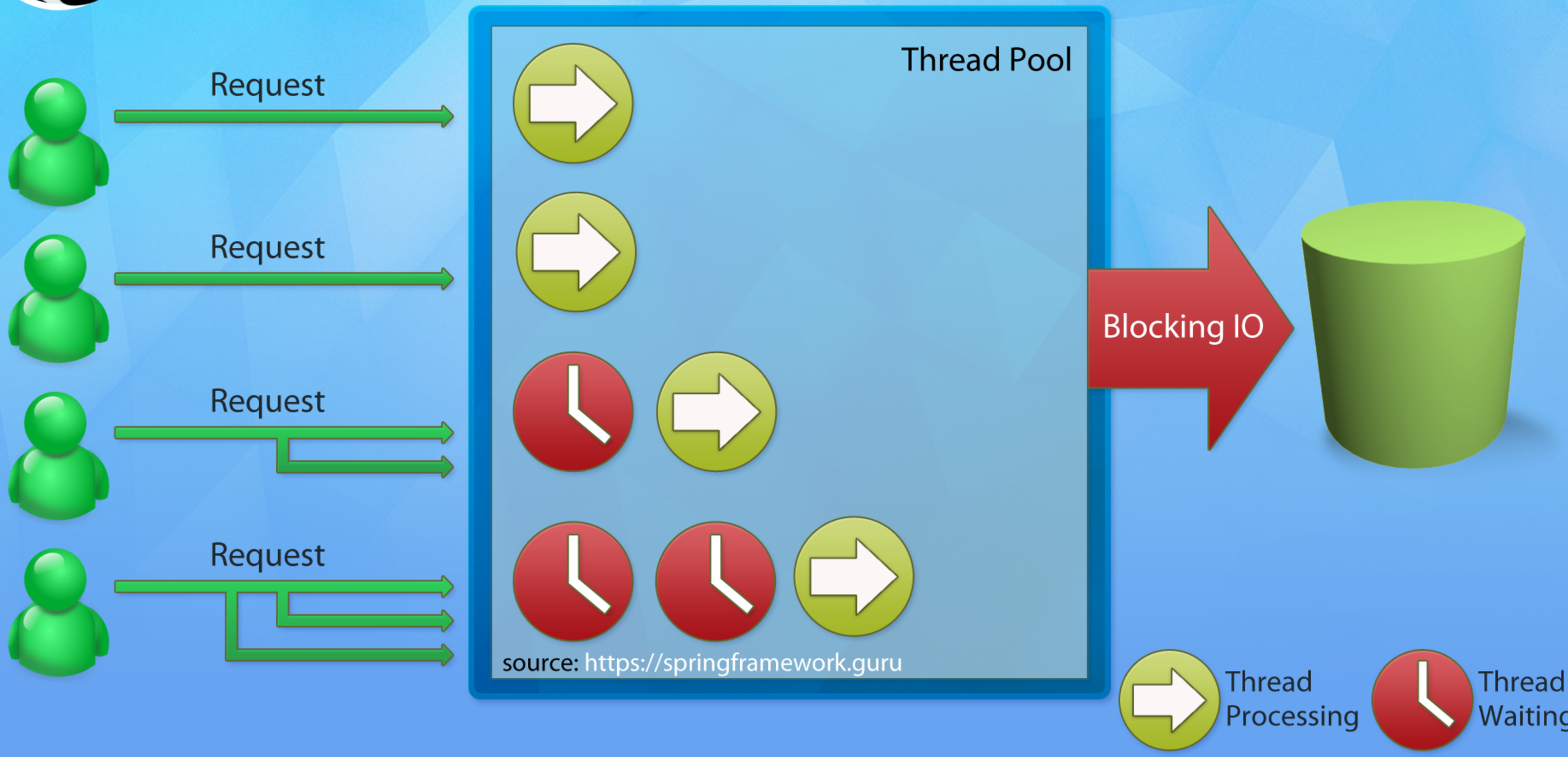
REACTIVEX OBSERVABLE



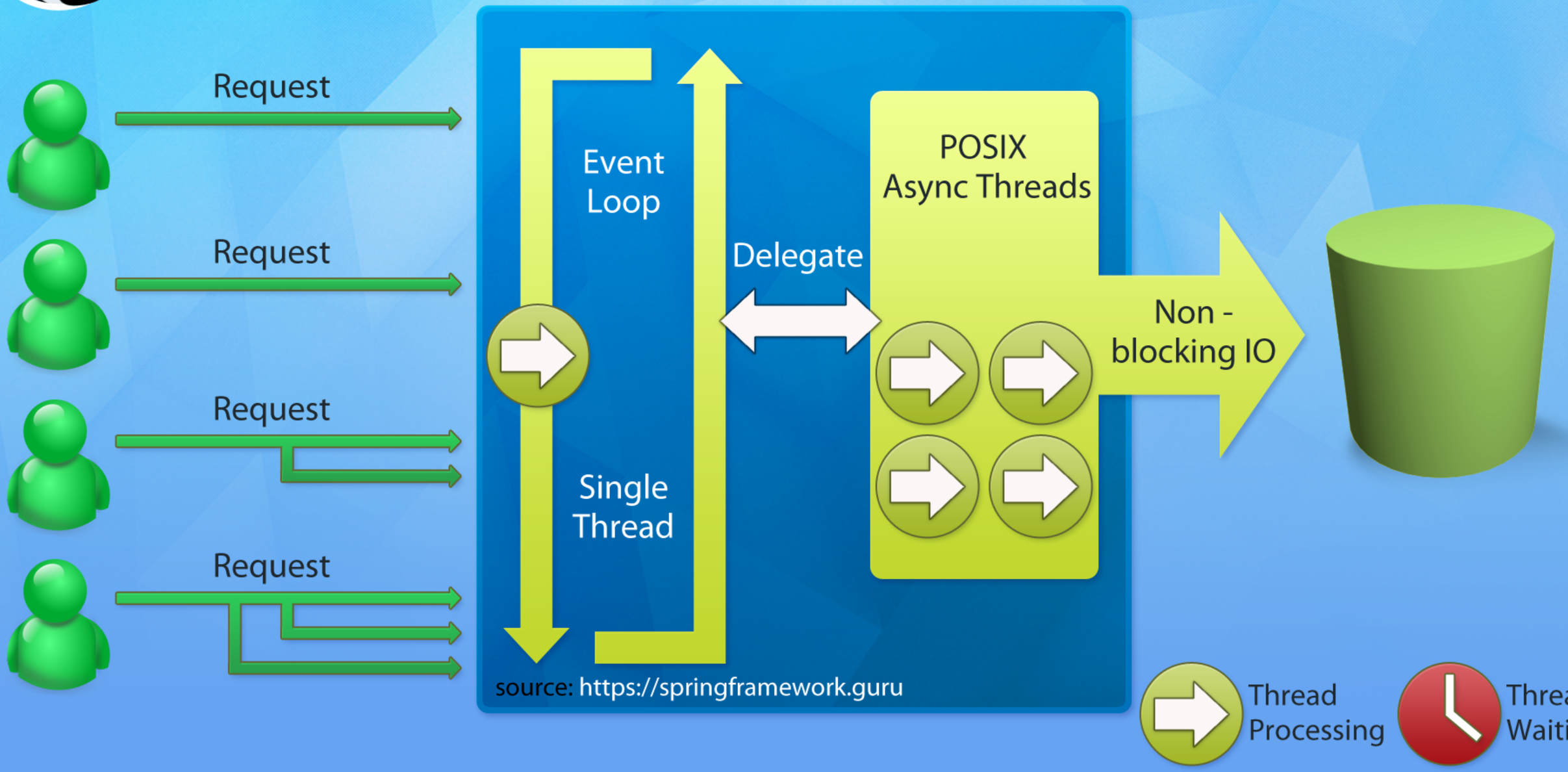
Non-Blocking

- The concept of using non-blocking is important.
- In Blocking, the code will stop and wait for more data (ie reading from disk, network, etc)
- Non-blocking in contrast, will process available data, ask to be notified when more is available, then continue.

Multi Threaded Server

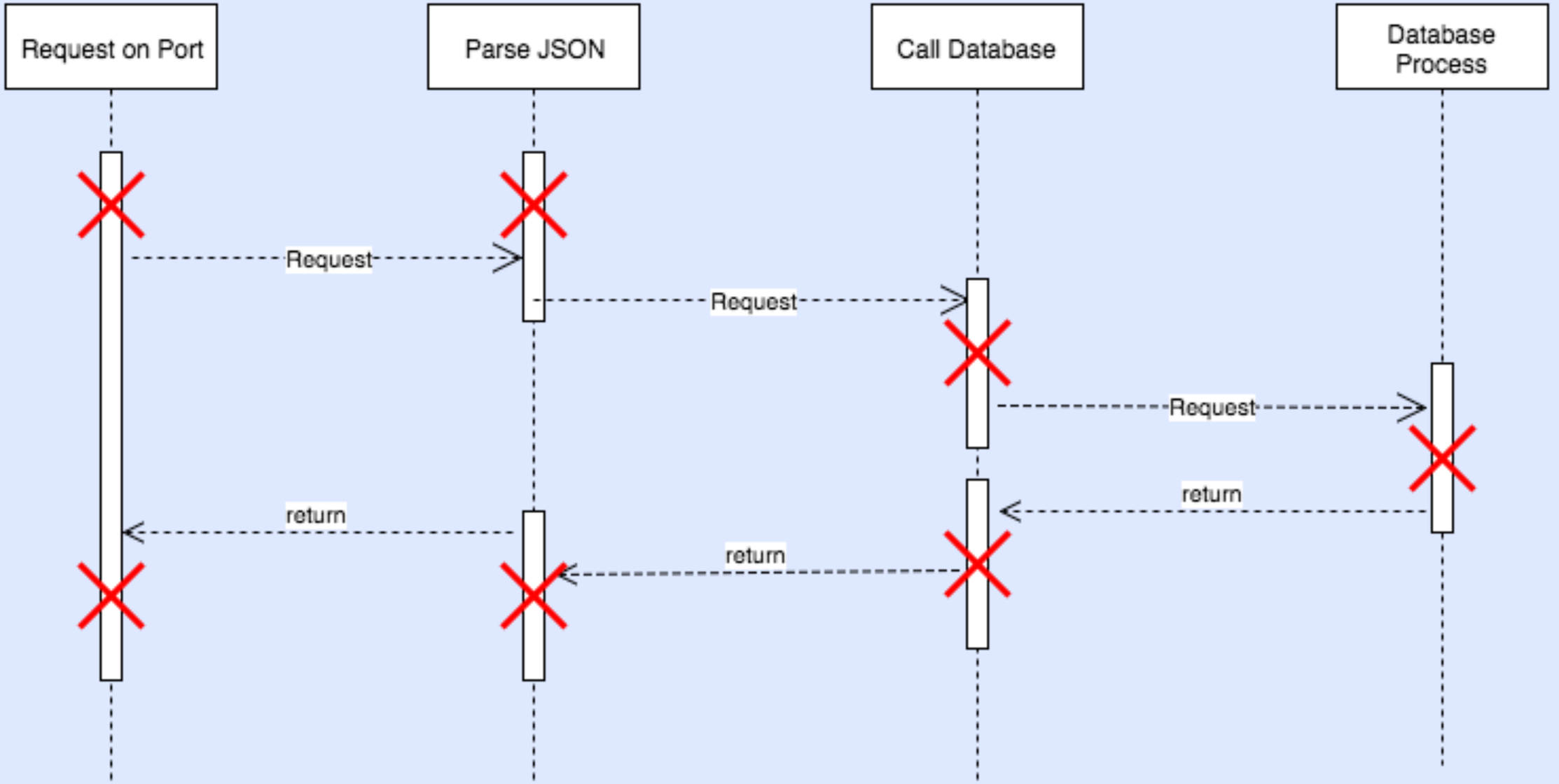


Node.js Server




Kennedy

Web Request


Request on Port
Parse JSON
Call Database
Database Process
Request
Request
Request
return
return
return

Back Pressure

- The ability of the subscriber to throttle data

Failures as Messages

- Exceptions are not thrown in a traditional sense.
- Would break processing of stream.
- Exceptions are processed by a handler function.

Summary

- Reactive Programming focuses on processing streams of data.
- Traditional CRUD applications are still alive and well.
- Reactive does not equal fast - many applications will see little if any improvement
- Performance benefit is more apparent with a system under load (vs individual transactions)

SPRING FRAMEWORK

GURU