Overview of Popular Implementations of the Java Reactive Streams API

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Learning Objectives in this Part of the Lesson

- Understand the key benefits & principles underlying the reactive programming paradigm
- Know the Java reactive streams API & popular implementations of this API

Project Reactor

See www.baeldung.com/rx-java & projectreactor.io

Popular Implementations of Java Reactive Streams

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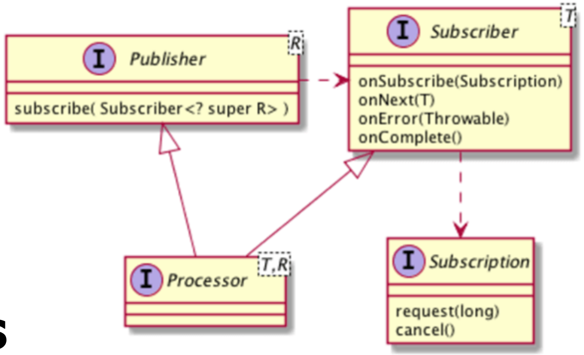
- The Java Flow API isn't very useful by itself



Useless Things

Popular Implementations of Java Reactive Streams

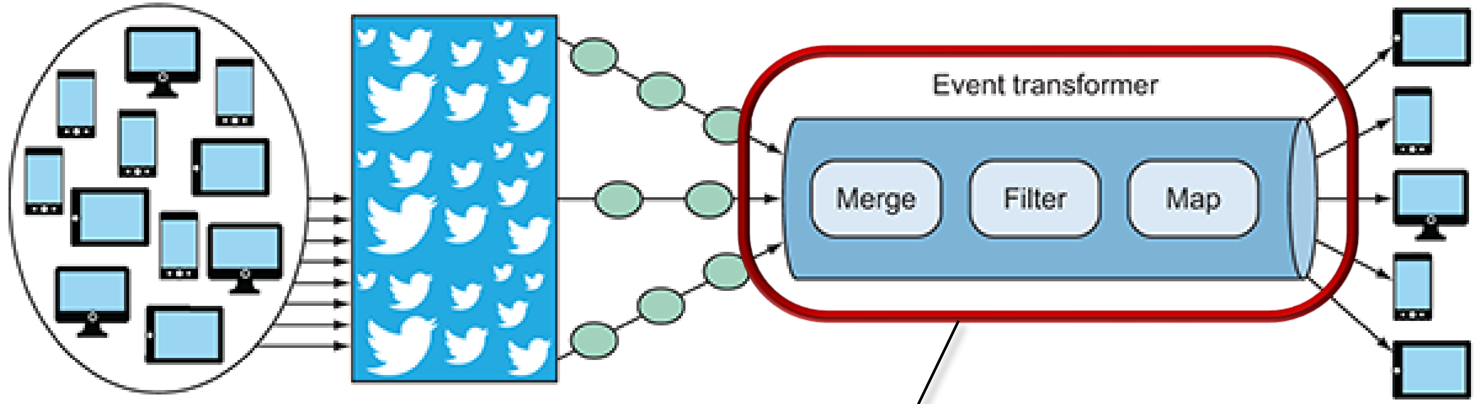
- The Java Flow API isn't very useful by itself
  - However, this API serves as an interoperable foundation implemented by other popular reactive programming frameworks

Project Reactor

See github.com/ReactiveX/RxJava/wiki & projectreactor.io

Popular Implementations of Java Reactive Streams

- Reactive streams implementations enable the insertion of event transformer operators between publishers & subscribers



Publishers

Subscribers

Data processed by a reactive app moves thru an "assembly line" (pipeline) of transformer operators

See projectreactor.io/docs/core/milestone/reference/#_from_imperative_to_reactive_programming

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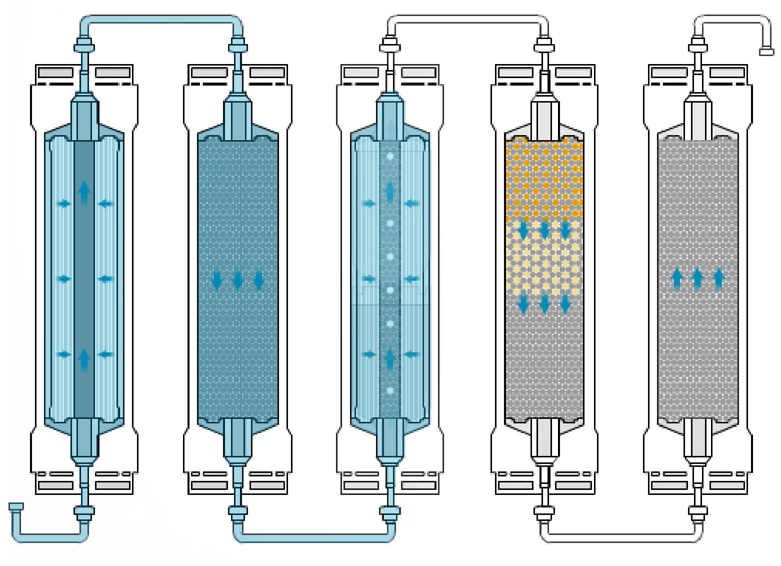

Input x

Aggregate operation (behavior f)

Output f(x)

Aggregate operation (behavior g)

Output g(f(x))

Aggregate operation (behavior h)

Output h(g(f(x)))

Transformer operators are similar to aggregate operations in Java Streams

See docs.oracle.com/javase/tutorial/collections/streams

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RxJava	Reactor	Purpose
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See www.nurkiewicz.com/2019/02/rxjava-vs-reactor.html

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See projectreactor.io/docs/core/release/api/reactor/core/publisher/Mono.html

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```
static Mono<Void> testFractionReductionSync() {
  ...
  return Mono
  .fromCallable(reduceFraction)
  .map(convertToMixedString)
  .doOnSuccess(printResult)
  .then(); ...
```

See github.com/douglascraigschmidt/LiveLessons/tree/master/Reactive/mono

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See projectreactor.io/docs/core/release/api/reactor/core/publisher/Flux.html

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```
static <T> Flux<T> generate(Supplier<T> supplier,
                            long count) {
  return Flux
  .create(sink -> {
     LongStream.rangeClosed(1, count)
               .forEach(i -> sink.next(supplier.get()));
     sink.complete(); }); ...
```

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See reactivex.io/RxJava/3.x/javadoc/io/reactivex/rxjava3/core/Single.html

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```
static Completable testFractionMultiplicationCallable2(){ ...
  return Single
    .fromCallable(call)
    .subscribeOn(Schedulers.single())
    .doOnSuccess(bigFraction -> printResult(bigFraction, sb));
```

See github.com/douglascraigschmidt/LiveLessons/tree/master/Reactive/Single

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```
Observable.range(1, sMAX_FRACTIONS)
          .subscribe(__ -> emitter
                     .onNext(makeBigFraction(sRANDOM, false)),
                     t -> emitter.onComplete(),
                     emitter::onComplete);
```

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```
Flowable<Double> rateF = Flowable
        .just("GBP:USA")
        .parallel()
        .runOn(Schedulers.from(ForkJoinPool.commonPool()))
        .map(this::queryExchangeRateFor)
        .sequential()
        .timeout(2, TimeUnit.SECONDS, sDEFAULT_RATE_F);
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End of Overview of Popular Implementations of the Java Reactive Streams API