Understanding Key Classes in the Project Reactor API

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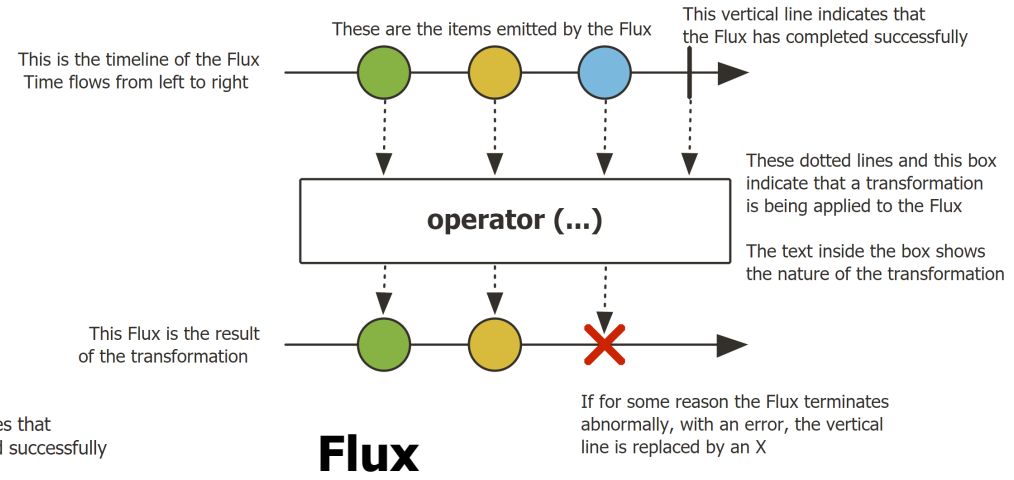
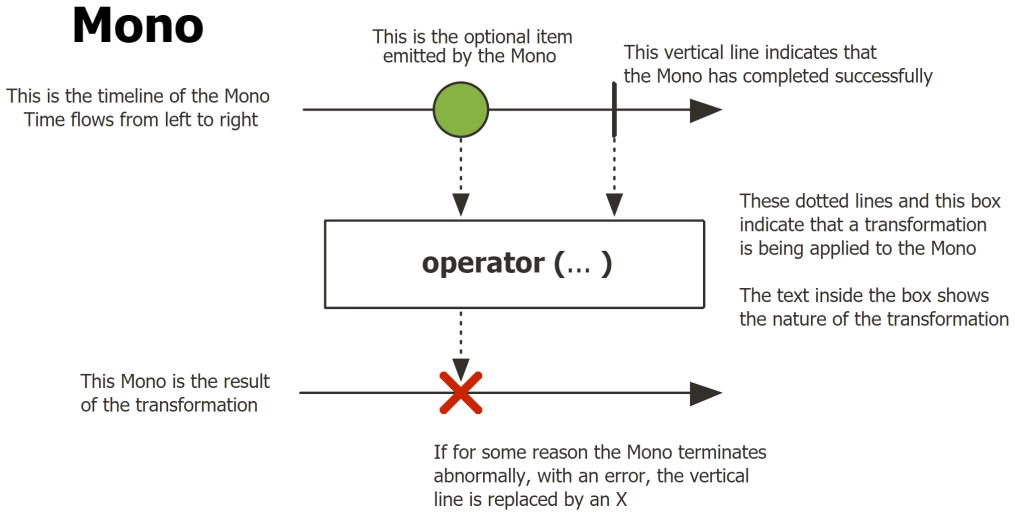
Learning Objectives in this Part of the Lesson

- Understand key classes in the Project Reactor API





Key Classes in the Project Reactor API

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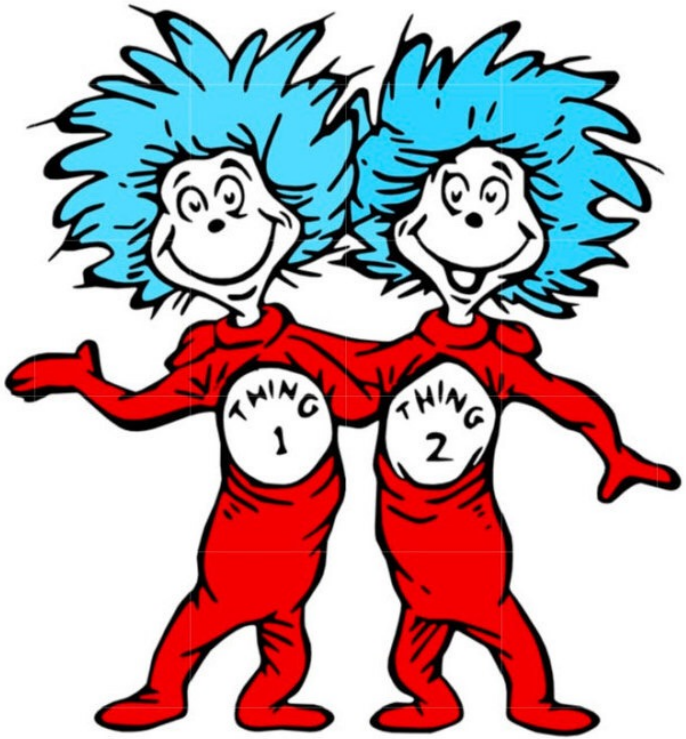

Key Classes in the Project Reactor API

- There are two key classes in the Project Reactor API
  - **Mono**
    - Completes successfully or with failure, may or may not emit a single value

Class Mono<T>

java.lang.Object
    reactor.core.publisher.Mono<T>

Type Parameters:

T - the type of the single value of this class

All Implemented Interfaces:

Publisher<T>, CorePublisher<T>

Direct Known Subclasses:

MonoOperator, MonoProcessor

```
public abstract class Mono<T>
extends Object
implements CorePublisher<T>
```

A Reactive Streams `Publisher` with basic rx operators that completes successfully by emitting an element, or with an error.

The recommended way to learn about the `Mono` API and discover new operators is through the reference documentation, rather than through this javadoc (as opposed to learning more about individual operators). See the "which operator do I need?" appendix.

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

Key Classes in the Project Reactor API

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      - Similar to a Java Completable Future or an async Optional<T>

```
BigFraction unreducedFraction =
  makeBigFraction(...);

Mono
   .fromCallable(() -> BigFraction
        .reduce(unreducedFraction))
   .subscribeOn
       (Schedulers.single())
   .map(result ->
        result.toMixedString())
   .doOnSuccess(result ->
                System.out.println
                 ("big fraction = "
                 + result + "\n"));
```

See stackoverflow.com/questions/54866391/mono-vs-completablefuture

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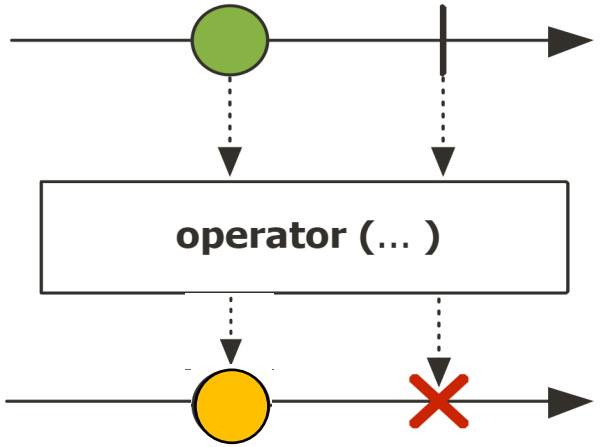
    - Can be documented via a "marble diagram"



See projectreactor.io/docs/core/release/reference/#howtoReadMarbles

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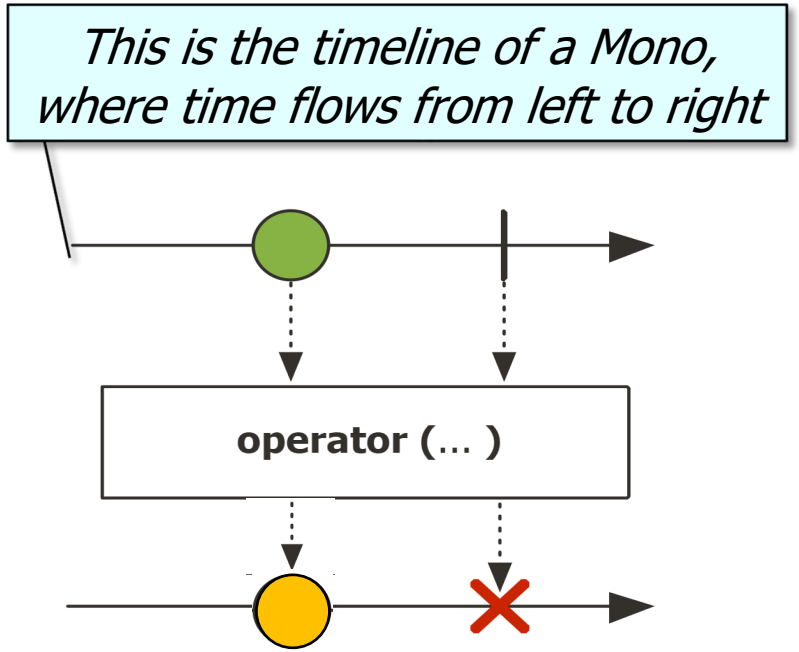

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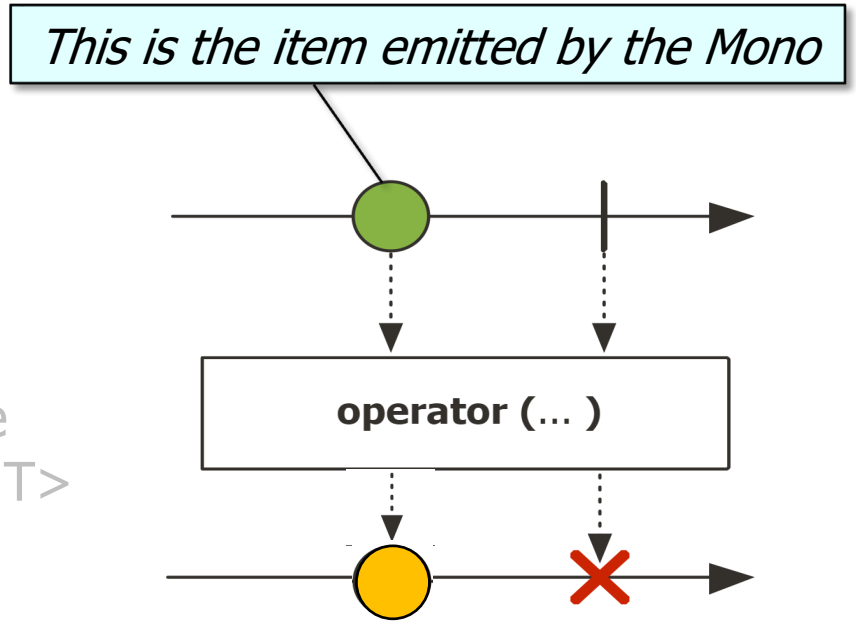

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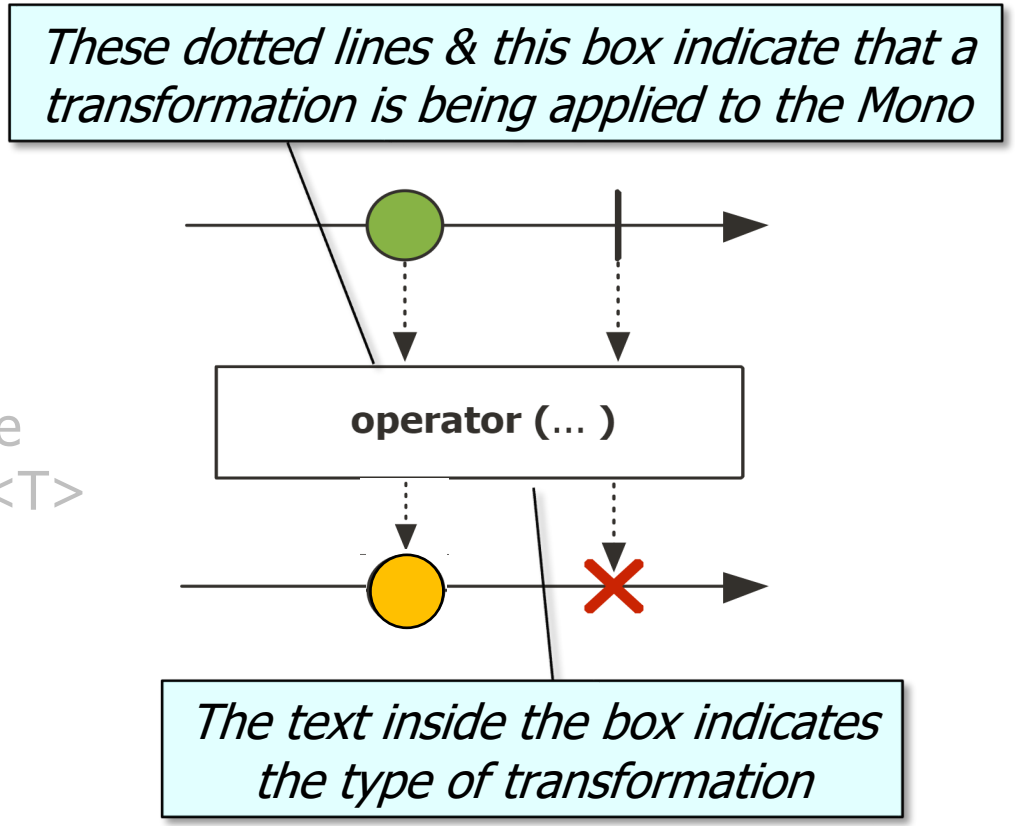

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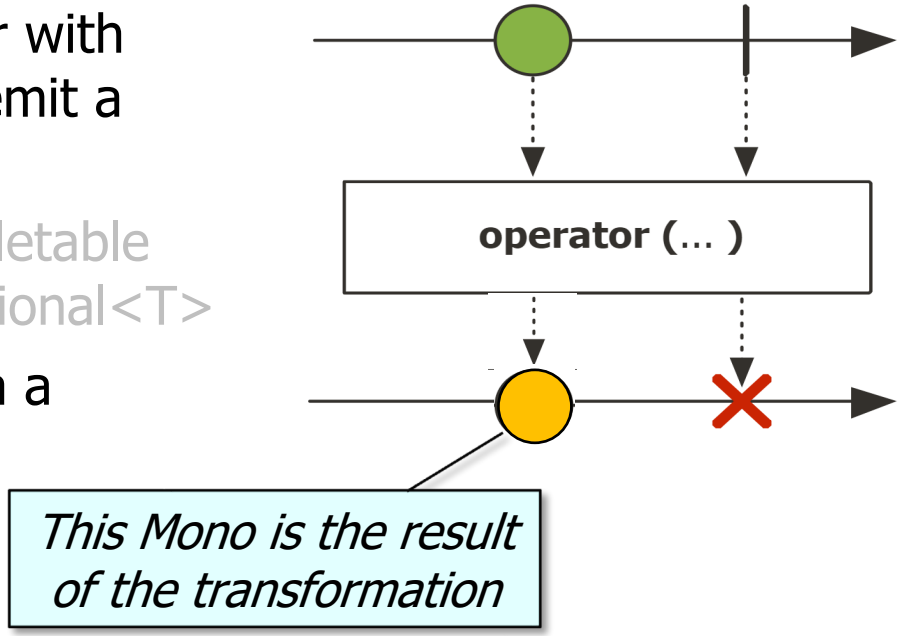

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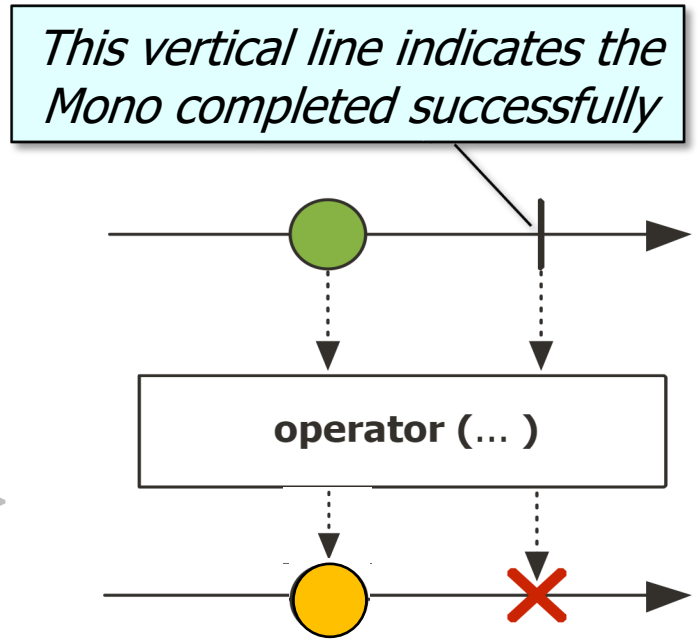

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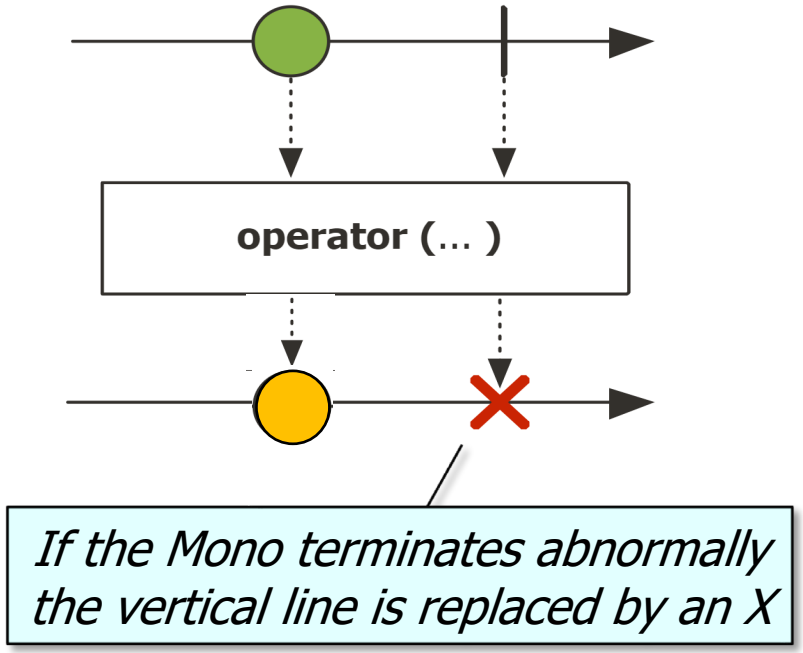

Key Classes in the Project Reactor API

- There are two key classes in the Project Reactor API
  - **Mono**
    - Completes successfully or with failure, may or may not emit a single value
      - Similar to a Java Completable Future or an async Optional<T>
      - Can be documented via a "marble diagram"
    - Provides a wide range of operators
- Factory method operators
- Transforming operators
- Action operators
- Concurrency & scheduler operators
- Combining operators
- Suppressing operators
- Blocking operators
- etc.

Key Classes in the Project Reactor API

- There are two key classes in the Project Reactor API
  - Mono
  - **Flux**
    - Emits an indefinite # of events (0 to infinite) & may complete successfully or w/failure

Class Flux<T>

java.lang.Object
    reactor.core.publisher.Flux<T>

Type Parameters:

T - the element type of this Reactive Streams Publisher

All Implemented Interfaces:

Publisher<T>, CorePublisher<T>

Direct Known Subclasses:

ConnectableFlux, FluxOperator, FluxProcessor, GroupedFlux

```
public abstract class Flux<T>
extends Object
implements CorePublisher<T>
```

A Reactive Streams Publisher with rx operators that emits 0 to N elements, and then completes (successfully or with an error).

The recommended way to learn about the Flux API and discover new operators is through the reference documentation, rather than through this javadoc (as opposed to learning more about individual operators). See the "which operator do I need?" appendix.

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

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  - **Flux**
    - Emits an indefinite # of events (0 to infinite) & may complete successfully or w/failure
    - Similar to an async Java stream
      - i.e., completable futures used with a Java stream

```
Flux
   .create
      (bigFractionEmitter)
   .take(sMAX_FRACTIONS)
   .flatMap(unreducedFraction ->
         reduceAndMultiplyFraction
          (unreducedFraction,
           Schedulers.parallel()))
   .collectList()
   .flatMap(list ->
           BigFractionUtils
             .sortAndPrintList
                (list, sb));
```

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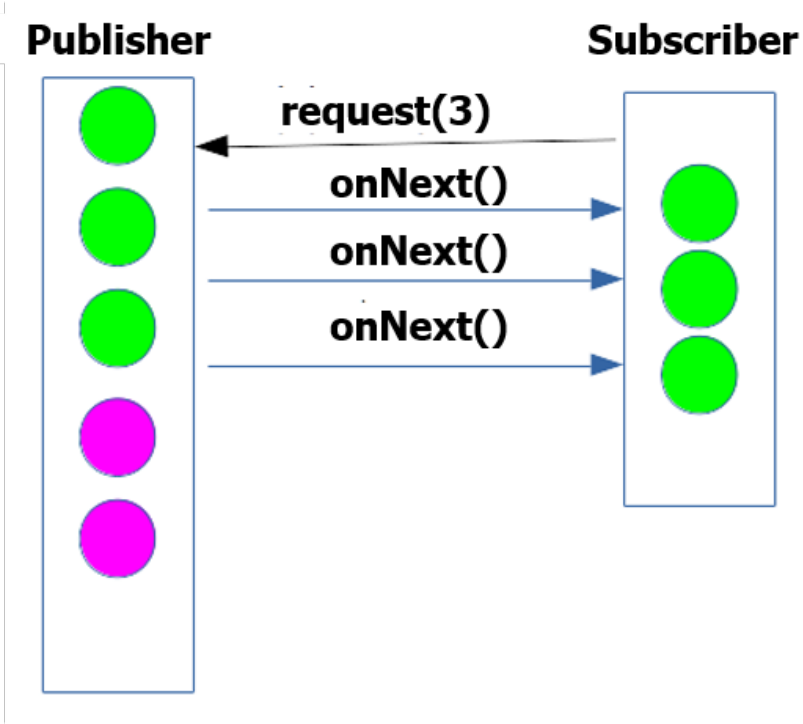
  - **Flux**
    - Emits an indefinite # of events (0 to infinite) & may complete successfully or w/failure
    - Similar to an async Java stream
    - Supports backpressure
      - The subscriber indicates to the publisher how much data it can consume



See jstobigdata.com/java/backpressure-in-project-reactor

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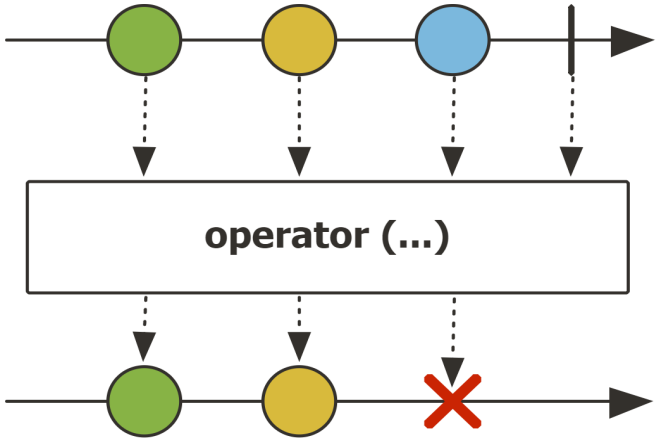

See medium.com/@jshvarts/read-marble-diagrams-like-a-pro-3d72934d3ef5

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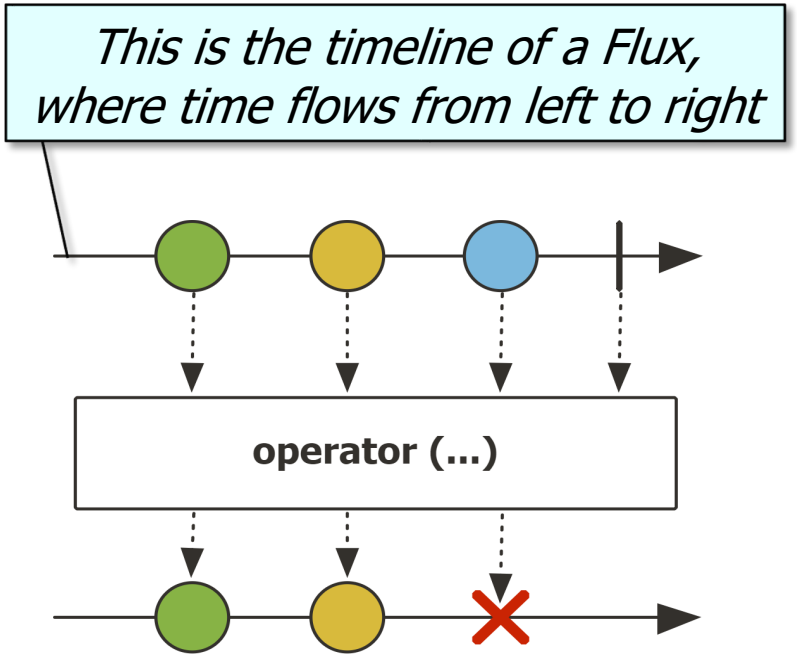

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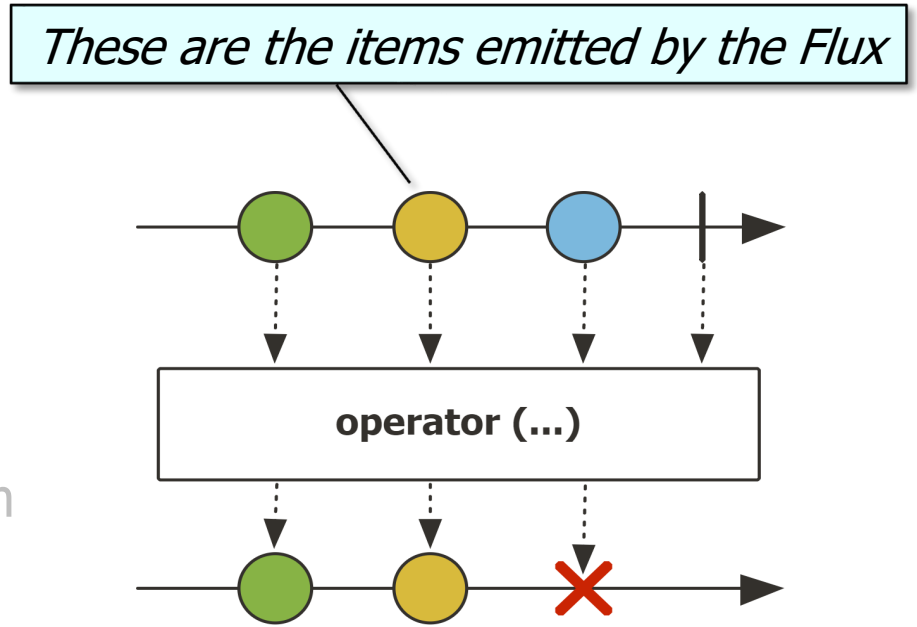

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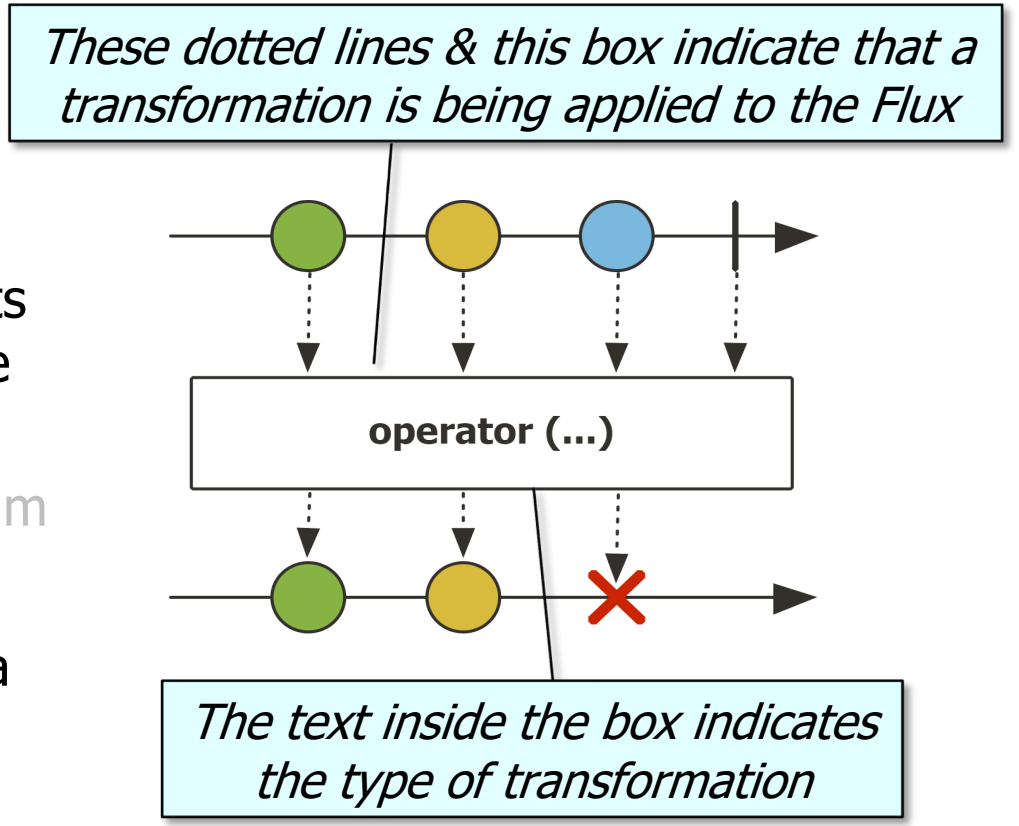

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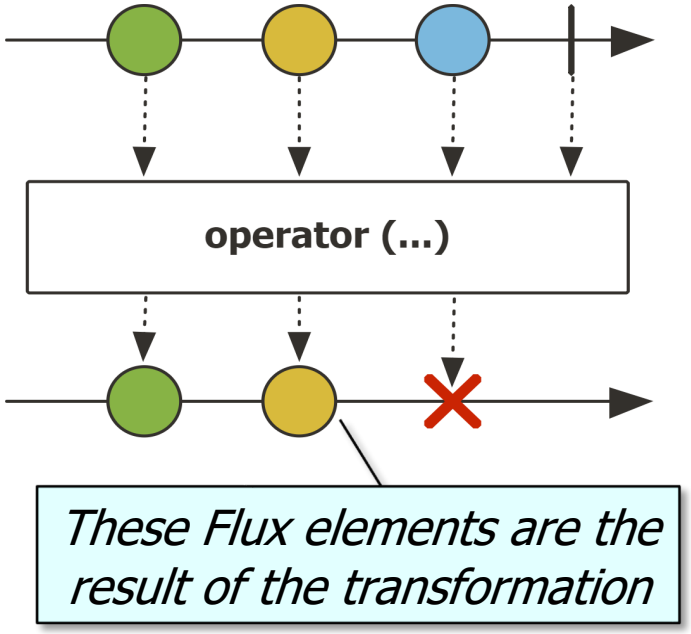

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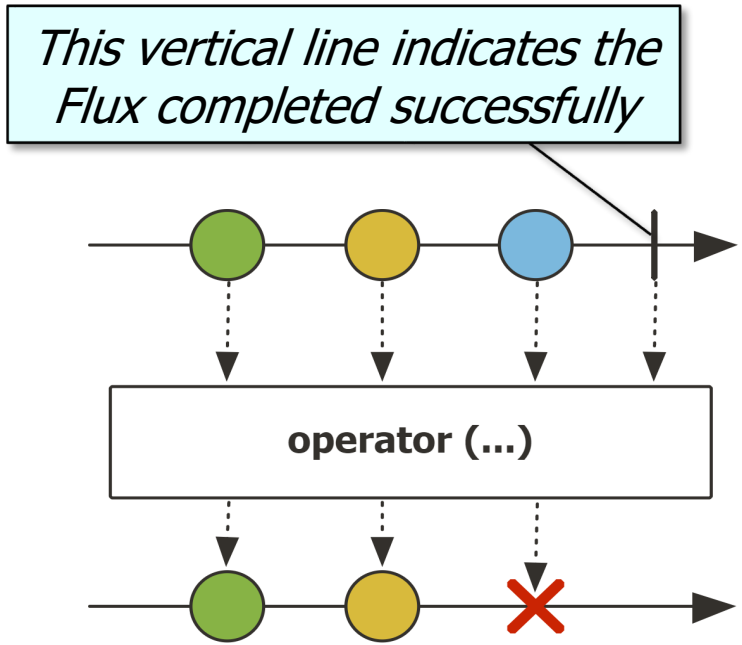

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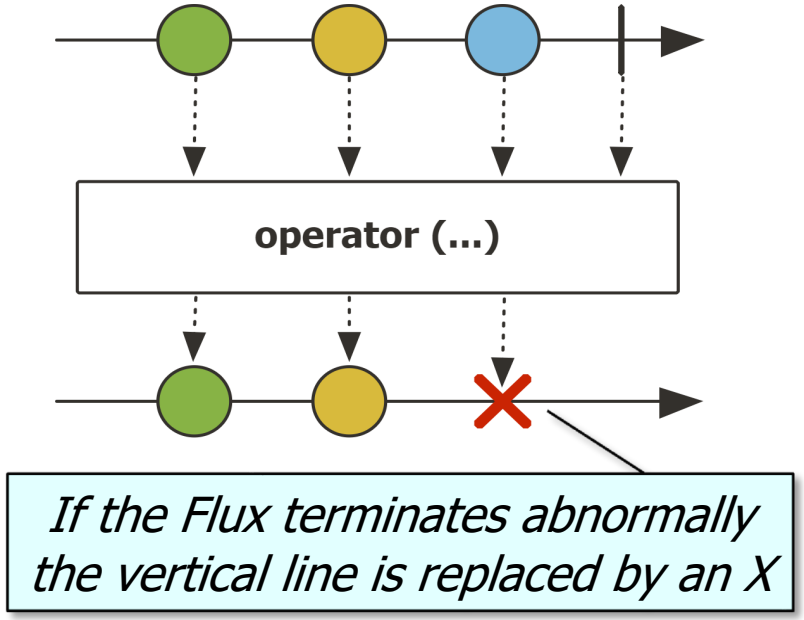

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End of Understanding Key Classes in the Project Reactor API