

Kresil

Kotlin Resilience

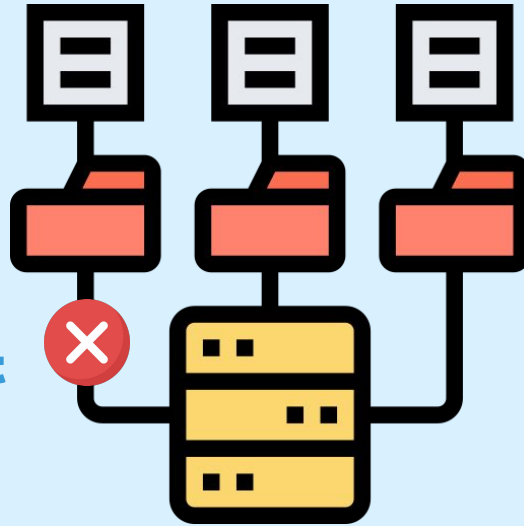
Kotlin Multiplatform library for fault-tolerance



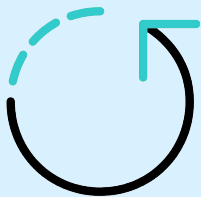
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Resilience in Distributed Systems

If failure is inevitable, what can be done?



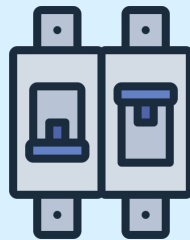
Resilience Mechanisms



Retry - Repeats failed executions



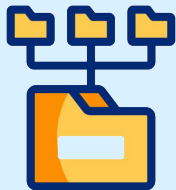
Rate Limiter - Limits executions/period



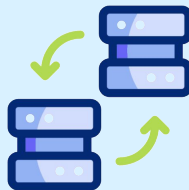
Circuit Breaker - Temporarily blocks possible failures



Time Limiter - Limits duration of execution



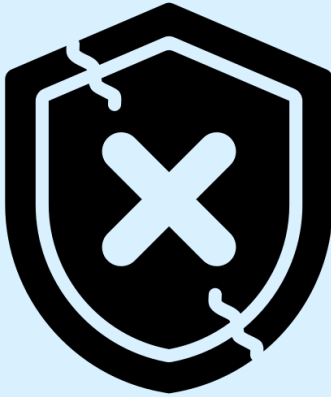
Cache - Memorizes a successful result



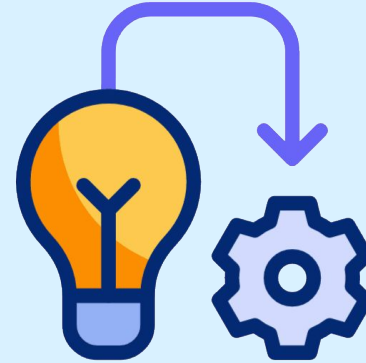
Fallback - Defines an action to fallback on failure

And many more...

Resilience Types



Reactive - Mitigates
impact from failures



Proactive - Prevents
failures from happening

Existing Solutions



Resilience4j



POLLY



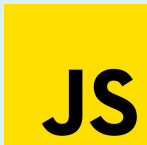
**Netflix's
Hystrix**



Kotlin Multiplatform



Kotlin/JS



Kotlin/Native



Kotlin/Android



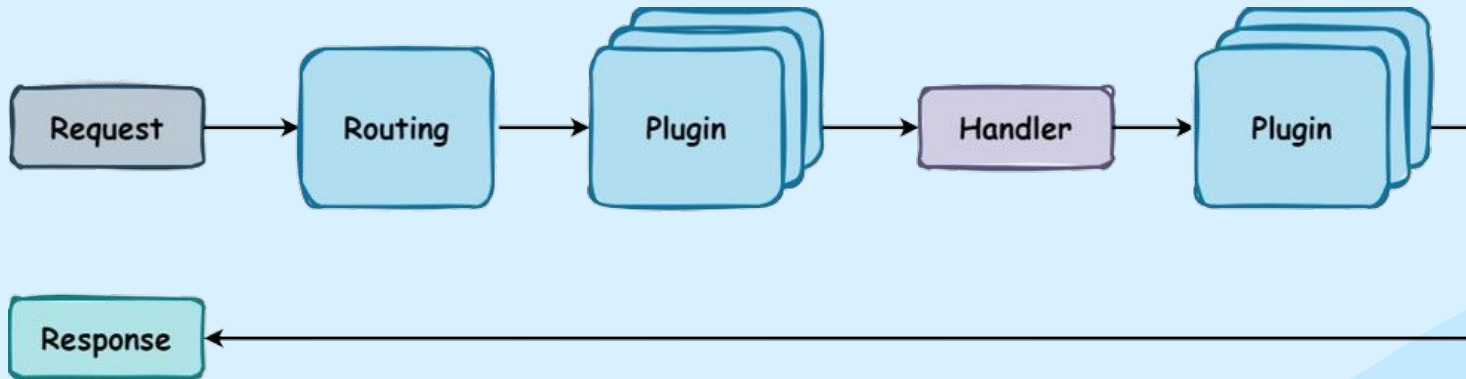
Kotlin/JVM





Ktor Framework

- **Built with Kotlin Multiplatform;**
- **Enables asynchronous server and client development;**
- **Based on the coroutines system;**
- **Modular**

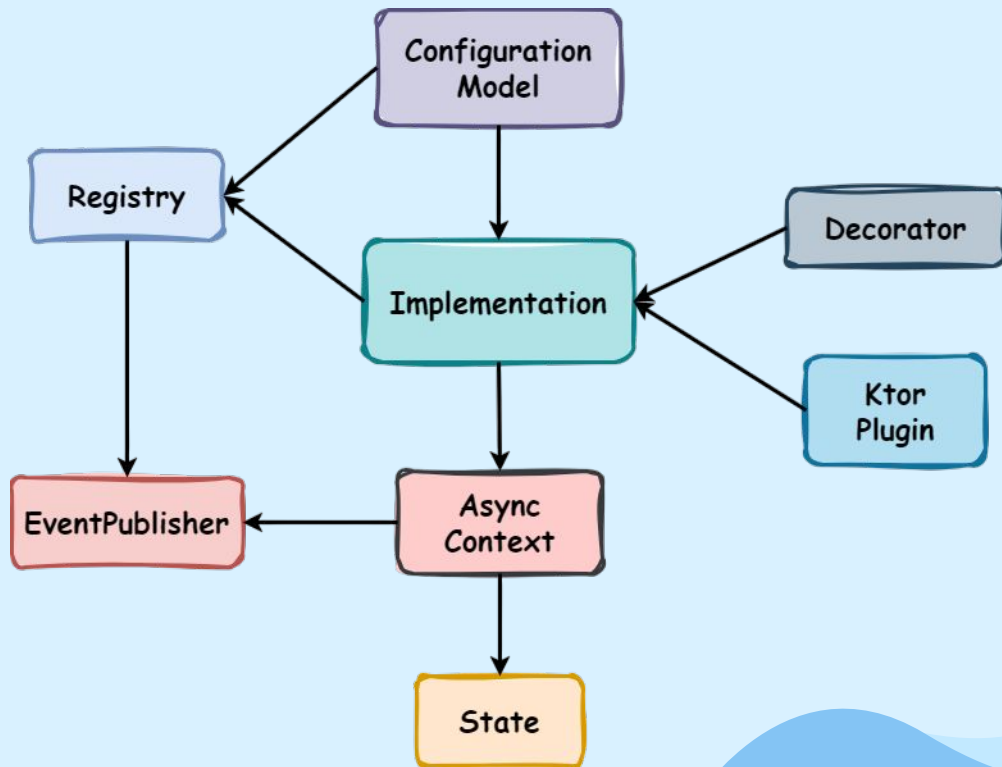


Mechanism Configuration

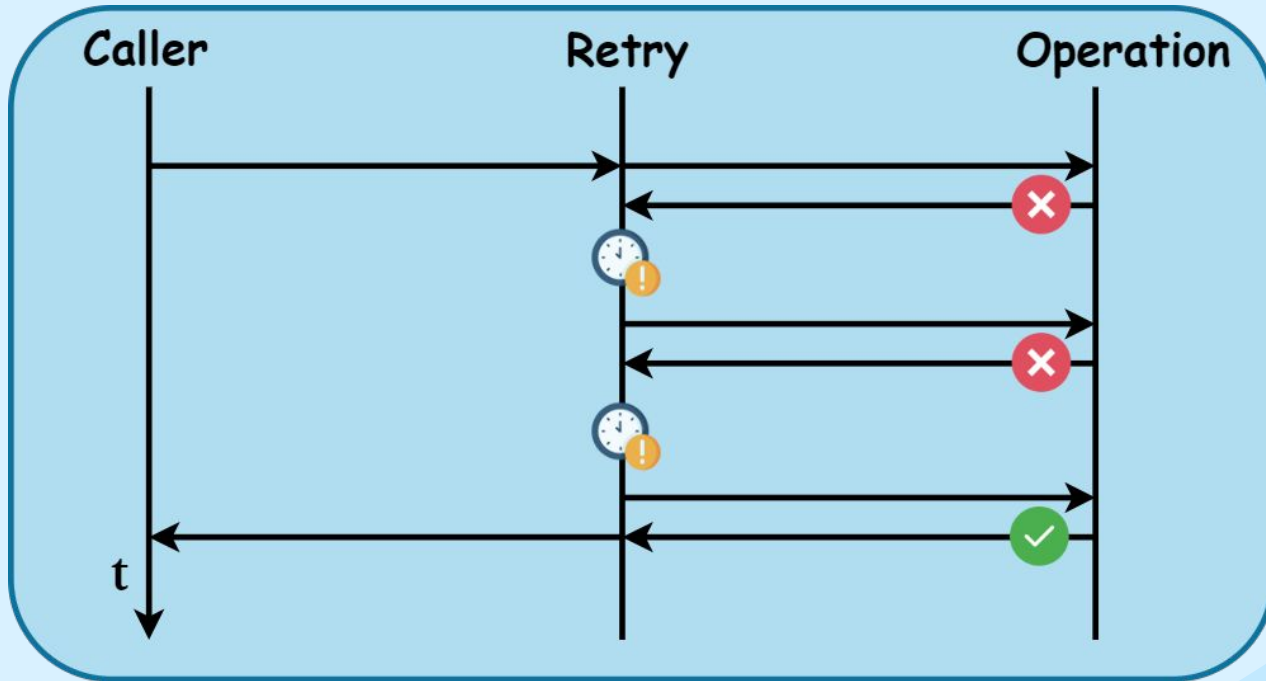


**Policies - Define
the mechanism
behaviour**

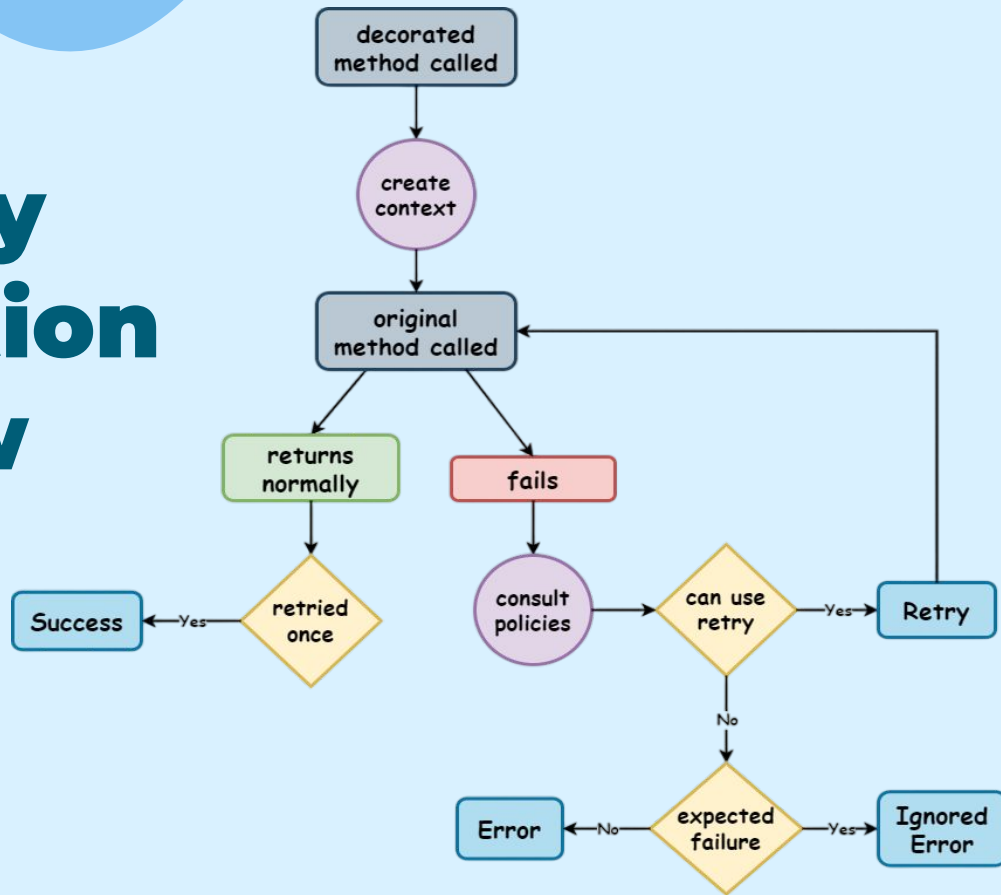
Mechanism Model



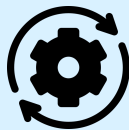
Retry Mechanism



Retry Execution Flow



Retry Implementation Features



Supported Operations:

- **Supplier<R>**
- **Function<I, R>**
- **BiFunction<A, B, R>**



Events:

- **Listeners for specific and undiscriminated events**
- **Uses Flows**
- **Supports cancellation**



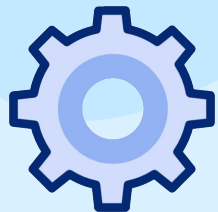
Delay Strategy Options:

- **No delay**
- **Constant delay**
- **Linear delay**
- **Exponential delay**



Others:

- **Exception Handler**
- **Monad for operation result representation**
- **And more ...**



Resilience4j

Ktor

Retry

Circuit Breaker

?



Retry Mechanism Study



Tests to understand core functionality



Design and Implementation Strategy for Kresil Mechanisms



Client and Server Pipelines



Custom Plugin API



HttpRequest Retry Plugin



Implementation



Tests



All targets support



Ktor Plugin



Implementation



Tests



All targets support



Ktor Plugin

