Kresil Kotlin Resilience

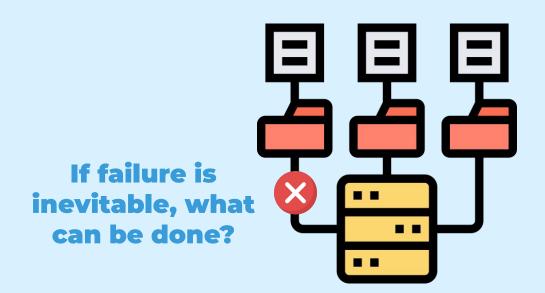
Kotlin Multiplatform library for fault-tolerance with Ktor Integration





Supervisor: Prof. Pedro Félix Author: Francisco Engenheiro - 49428 BSc in Computer Science and Engineering

Resilience in Distributed Systems



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







Kotlin Multiplatform



Kotlin/JS



Kotlin/Native







Kotlin/Android



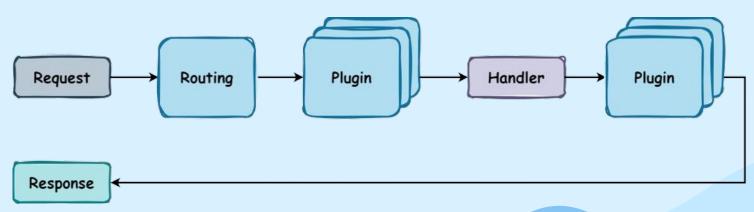
Kotlin/JVM





Ktor Framework

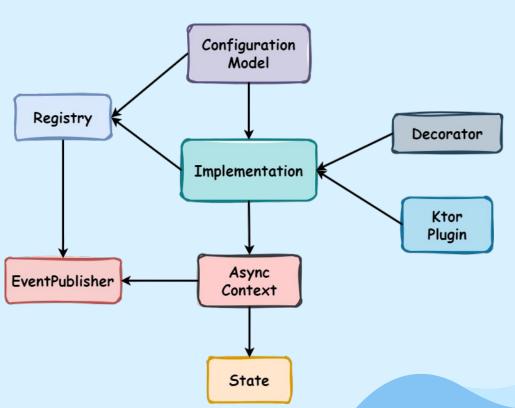
- Built with Kotlin Multiplatform;
- Enables asynchronous server and client development;
- Based on the coroutines system;
- Modular



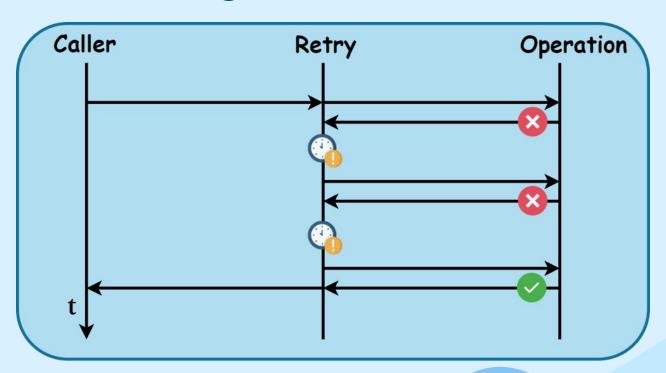
Mechanism Configuration

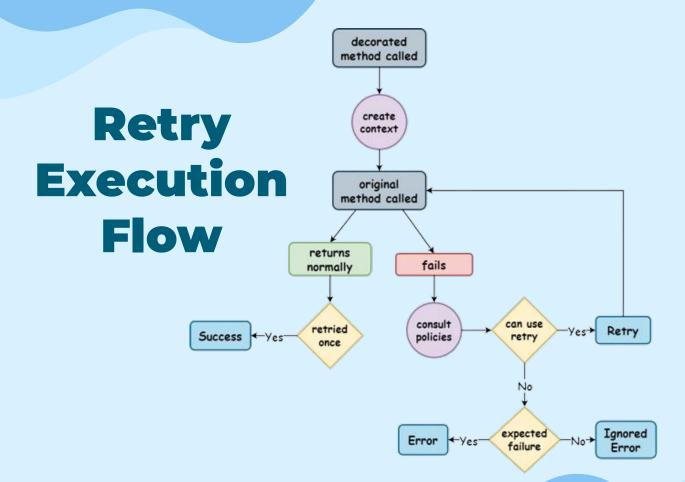


Mechanism Model



Retry Mechanism





Retry Implementation Features



Supported Operations:

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



- 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



























Strategy for Kresil Mechanisms



Ktor Plugin



Ktor Plugin