

EXTERNAL EXCEPTIONS

ExternalException

- Problem: We need a way of sending exceptions from other threads/processes to another thread so that it can cancel the potentially long running process
- Solution:
 - Add a exception container that holds 'external' exceptions.
 - 'External' processes register exceptions to the container.
 - Other threads periodically polls that container and aborts if there is an 'external exception'

TimeoutExternalException

- Problem: We may want certain operations to timeout if it does not finish in a given amount of time
- Solution:
 - Use a timer that injects a time based ExternalException.

Error Handling Framework

ExternalException

The exception that gets serialized

***ExternalExceptionListener**

interface for receiving exceptions

***ExternalExceptionCheckable**

interface for polling if exception has been received

ExternalExceptionSnare

receives and holds exactly one exception (others dropped)

ExternalExceptionDispatcher

Implements listener and checkable. One per threadgroup per node.

TimeoutExceptionInjector

A thread that can be started with a ref to a dispatcher which will issue an external exception after specified time has elapsed.

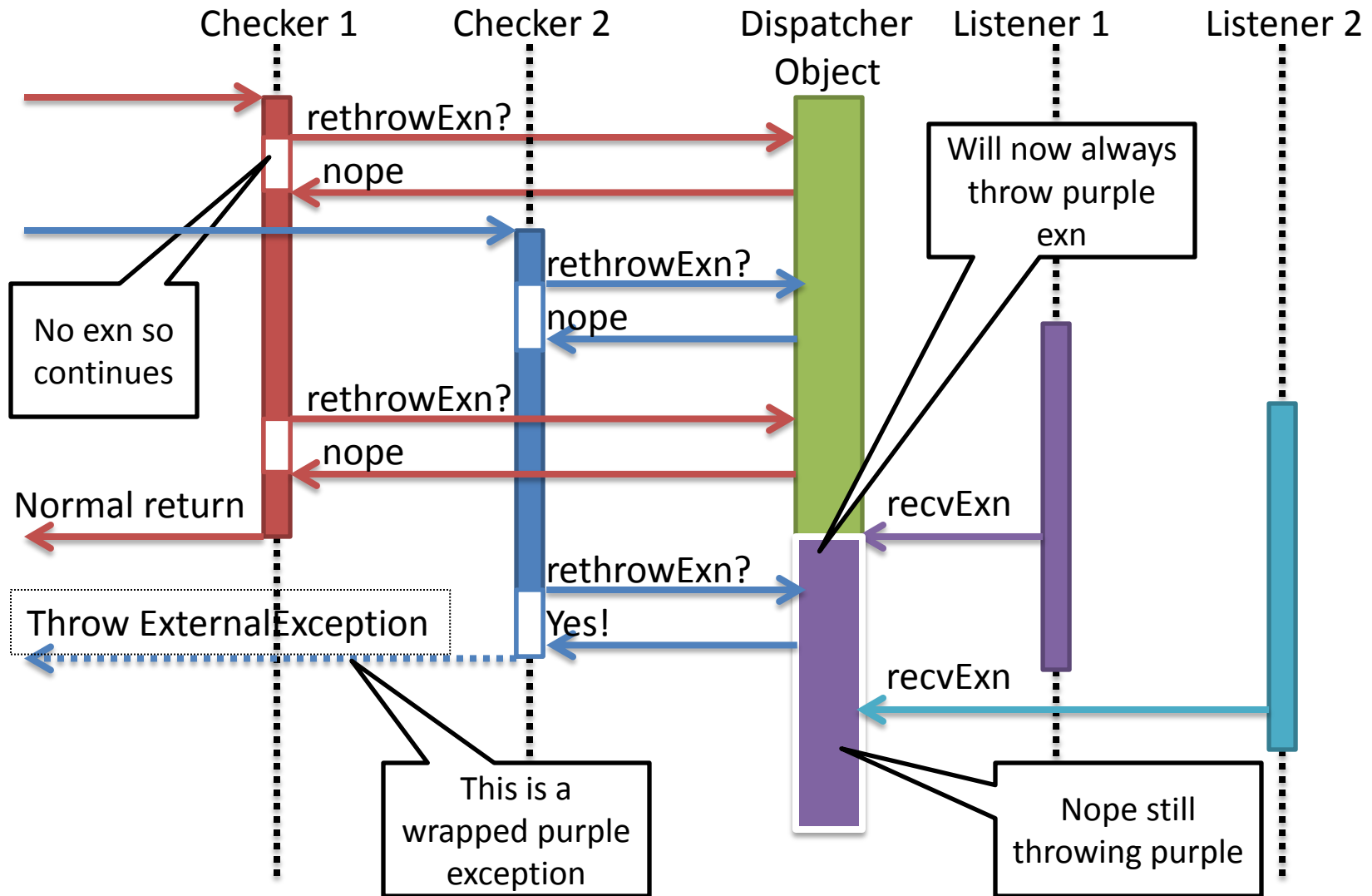
TimeoutExternalException

Subclass of ExternalException

ExternalExceptionSerializerUtil

Handles exception serialization of exception stack trace to protobuf and back

Lifecycle



Thread interrupt vs ExternalException

- Threads interrupt
 - Cooperative mechanism (non-preemptive)
 - Errors issued on threads and interrupted state is bound to a specific **thread**.
 - If multiple threads are involved, need to have a tree structure and to issue interrupts to “subthreads”
 - Usage: add throws InterruptedException to method signature
- ExternalException
 - Cooperative mechanism (non-preemptive)
 - Exception is issued and bound to a thread-safe **ExternalExceptionHandler**
 - Can alert multiple threads or groups of threads (cooperatively)
 - Usage: add **ExternalExceptionCheckable** to method argument list.