Fault Tolerant Web Service Requests with Polly

LEARNING THE BASICS OF THE POLLY FRAMEWORK

Bryan Hogan
SOFTWARE ARCHITECT

@bryanjhogan NoDogmaBlog.bryanhogan.net

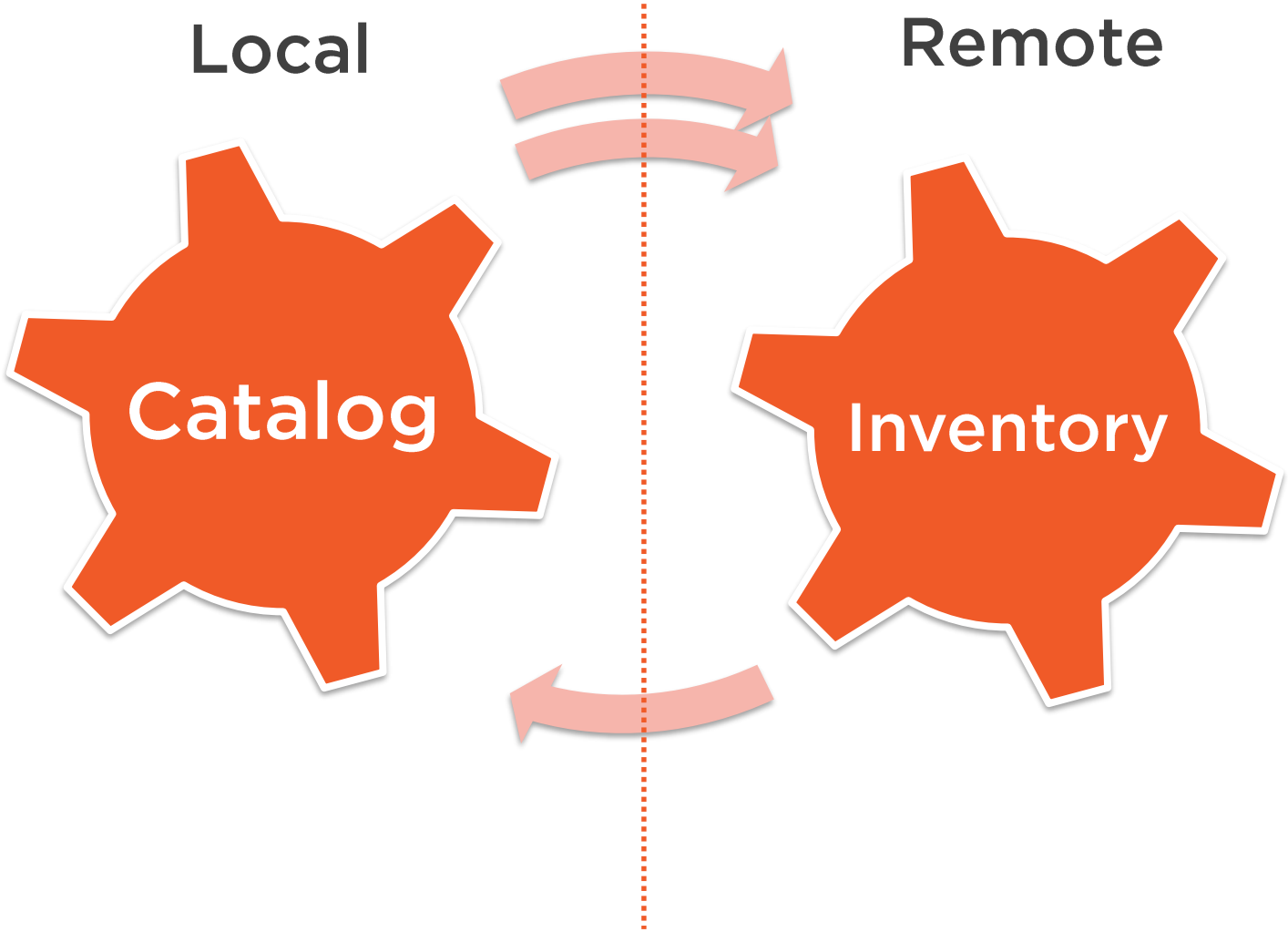
Introduction

Resiliency

Transient failures

Longer outages

Calling Remote Services



Why you need Polly

Retries, Fallbacks, Timeouts

Reusing policies

Unit testing

Combining policies

Finer control of policy

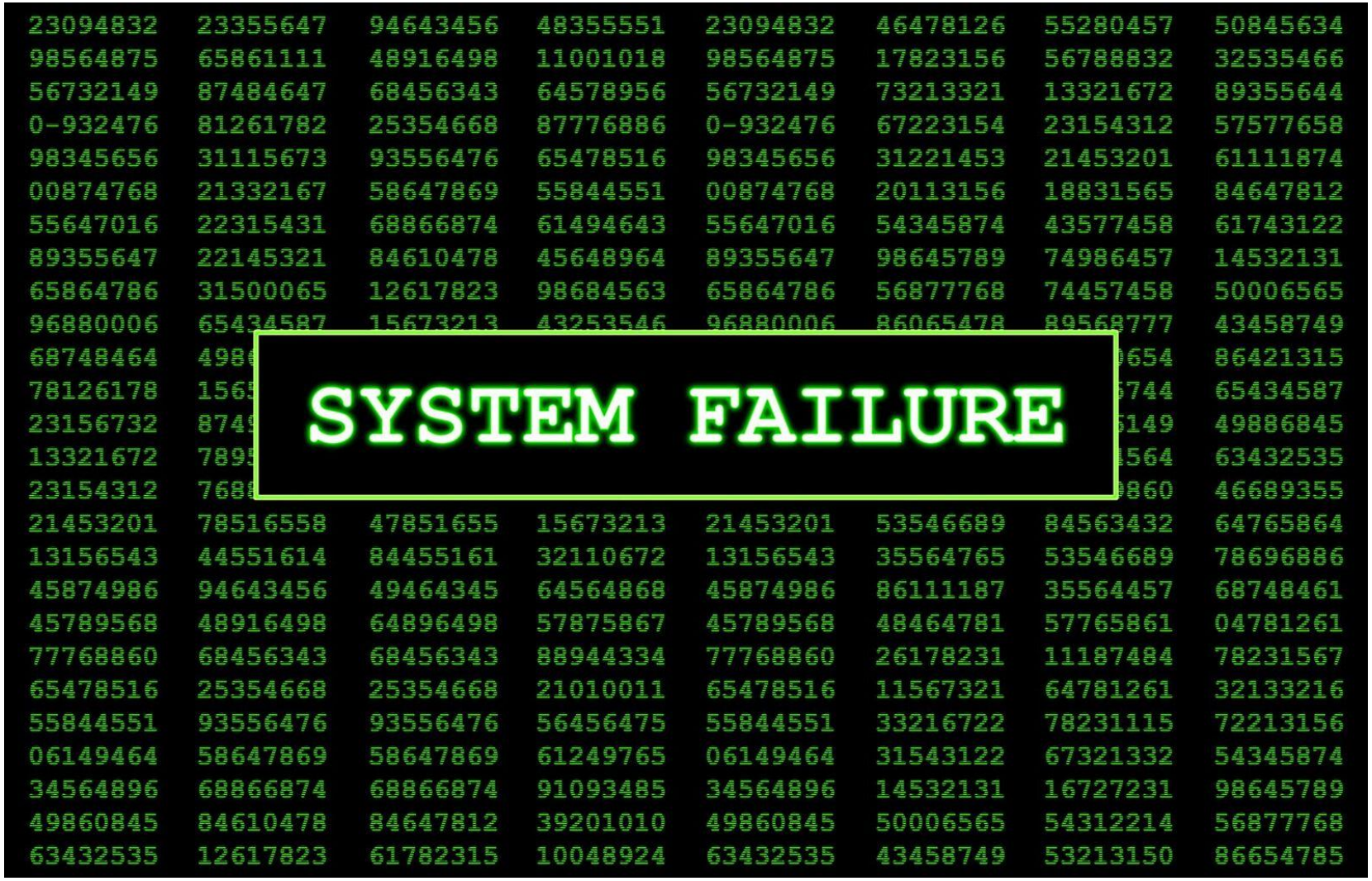
Caching

Stopping all requests

Application stability

Course Overview

Why Web Service Requests Fail



Why Web Service Requests Fail

Why Web Service Requests Fail

Server Error in '/' Application.

Object reference not set to an instance of an object.

Description: An unhandled exception occurred during the execution of the current web request. Please review the stack trace for more information about the error and where it originated in the code.

Exception Details: System.NullReferenceException: Object reference not set to an instance of an object.

Source Error:

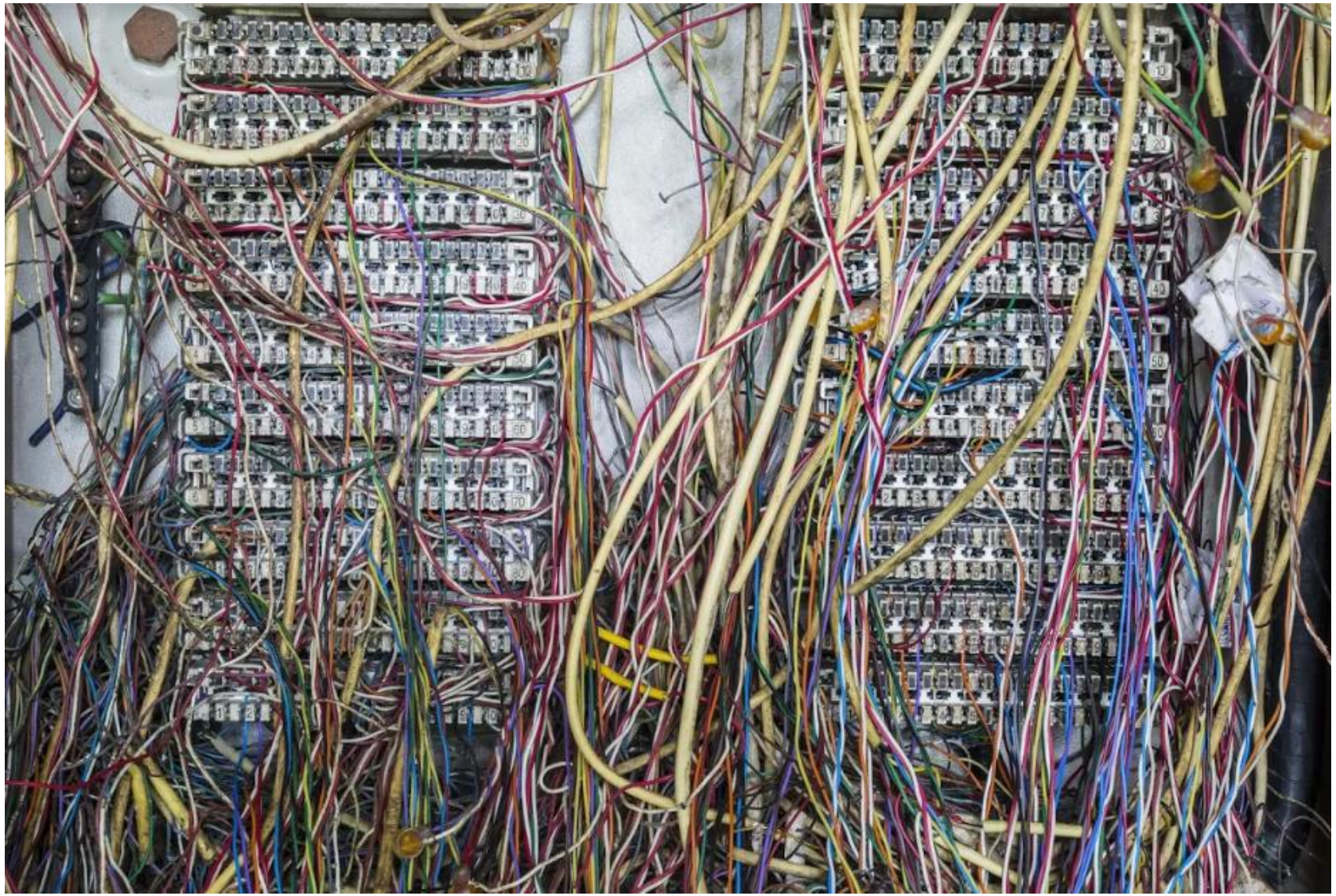
```
An unhandled exception was generated during the execution of the current web request. Information regarding the origin and location of the exception can be identified using the exception stack trace below.
```

Stack Trace:

```
[NullReferenceException: Object reference not set to an instance of an object.]
   WebApplication1.Contact.Page_Load(Object sender, EventArgs e) +59
   System.Web.Util.CalliEventHandlerDelegateProxy.Callback(Object sender, EventArgs e) +51
   System.Web.UI.Control.OnLoad(EventArgs e) +95
   System.Web.UI.Control.LoadRecursive() +59
   System.Web.UI.Page.ProcessRequestMain(Boolean includeStagesBeforeAsyncPoint, Boolean includeStagesAfterAsyncPoint) +678
```

Version Information: Microsoft .NET Framework Version:4.0.30319; ASP.NET Version:4.7.2046.0

Why Web Service Requests Fail



Why Web Service Requests Fail

Why Web Service Requests Fail

```
Pinging 192.168.1.2 with 32 bytes of data:
Reply from 192.168.1.7: Destination host unreachable.
Reply from 192.168.1.1: Destination host unreachable.
Reply from 192.168.1.1: Destination host unreachable.
Reply from 192.168.1.1: Destination host unreachable.

Ping statistics for 192.168.1.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
```


POLLy

Polly Strategies

Reactive

Responds to a current problem

Proactive

Monitors for potential problems and acts ahead

Reactive Strategies

Retry

Retries Immediately

Wait and Retry

Wait before resending request

Circuit Breaker

Stops all request to a faulty service

Fallback

Return a default value

Proactive Strategies

Timeout

End a request when you want

Caching

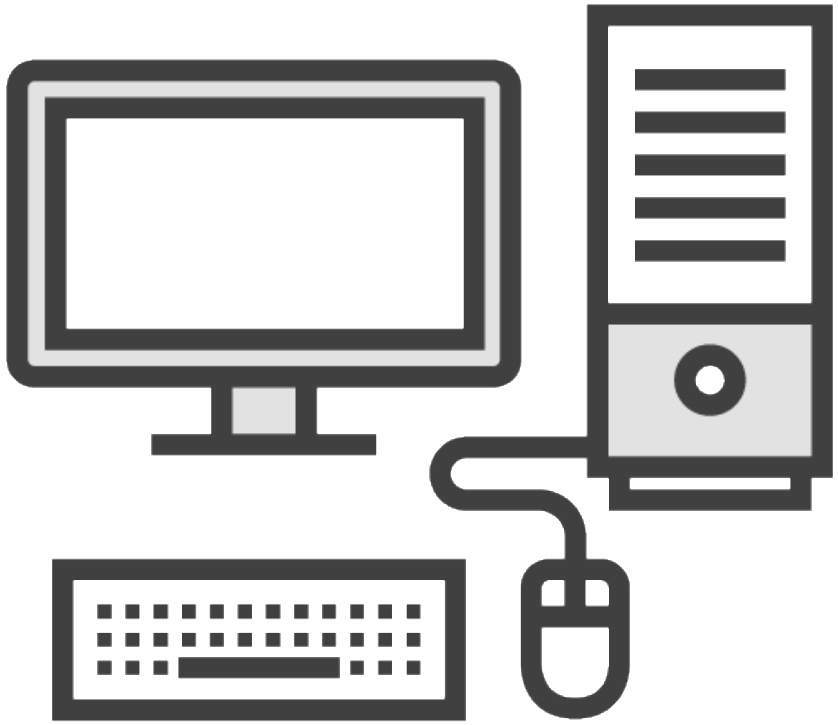
Store a previous response

Bulkhead isolation

Prevent faults from bringing whole system down

Quick Demo

Prerequisites and Tools to Follow Along



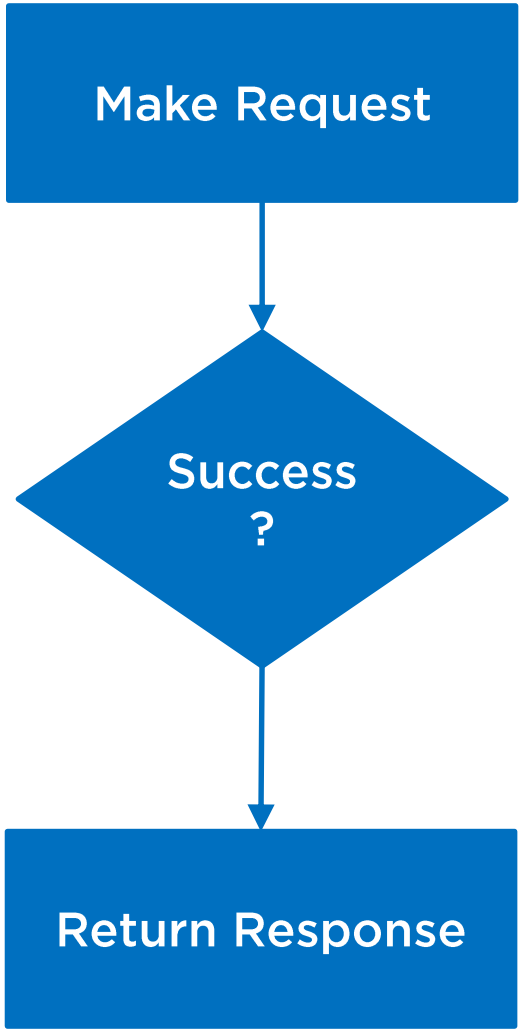
- Visual Studio 2017
- Polly >= 5.5
- .NET Core 2
- Fiddler

What is a Resilience Framework?

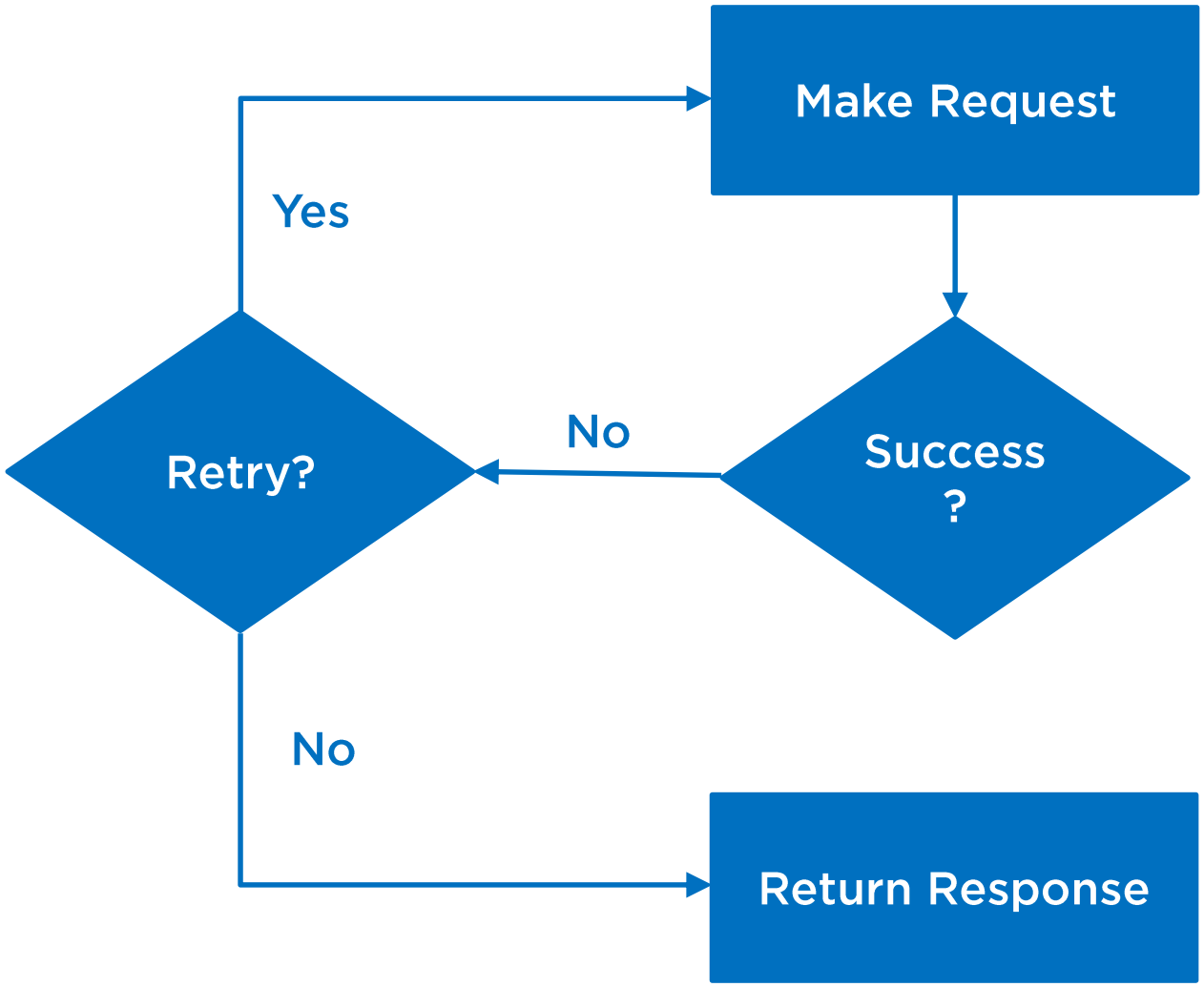
Recovery if possible

Graceful degradation if no other option

Retry Policy in Action



Retry Policy in Action



A Quick Note on Policy Interfaces

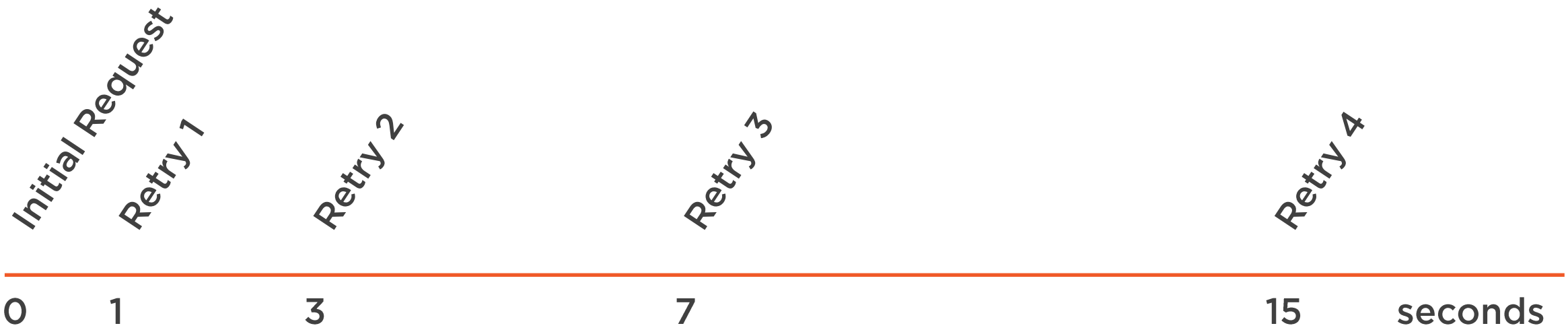
IAsyncPolicy

VS.

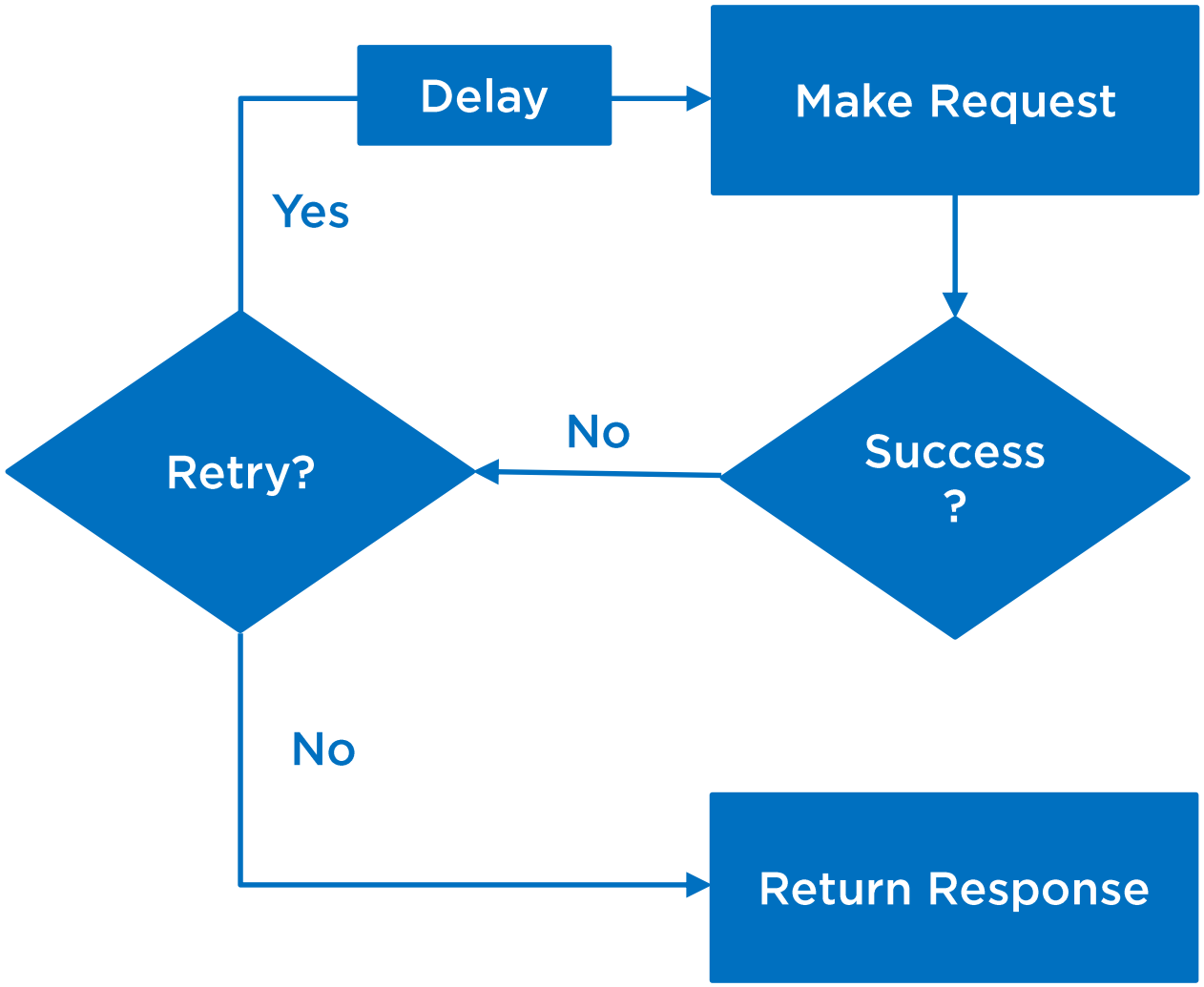
RetryPolicy

Retry, Retry, Retry, Retry...

Wait and Retry - Backoffs



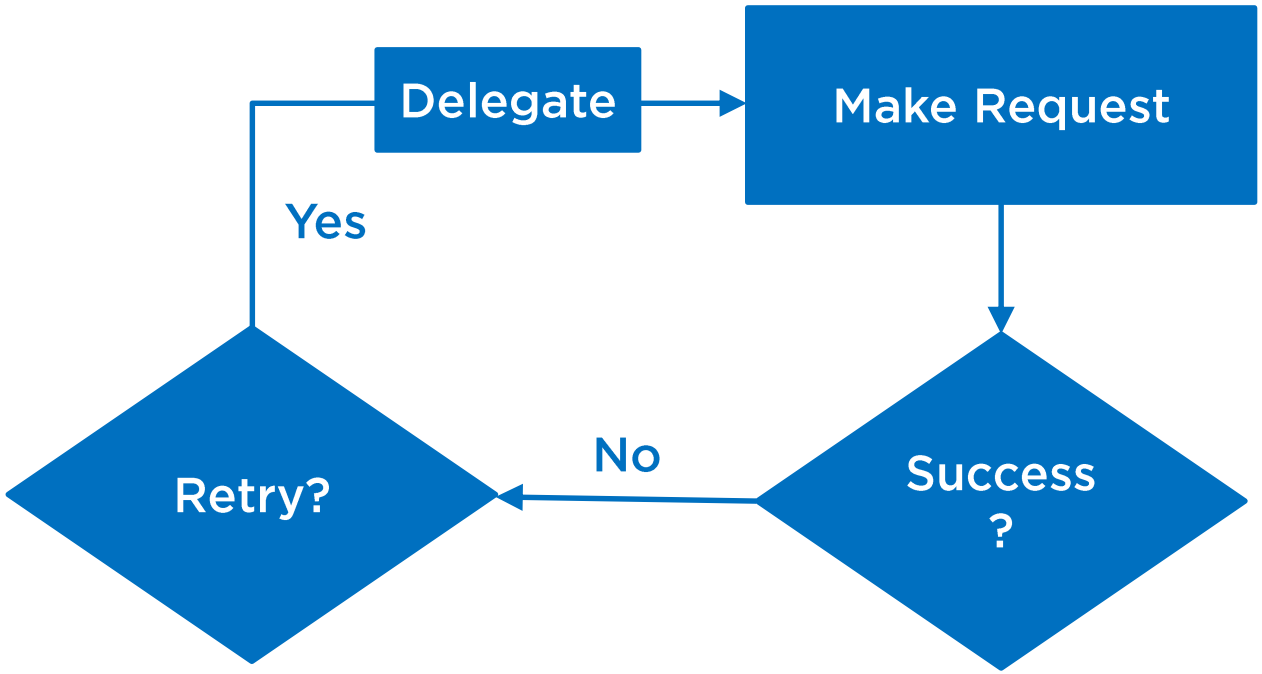
Wait and Retry Policy in Action

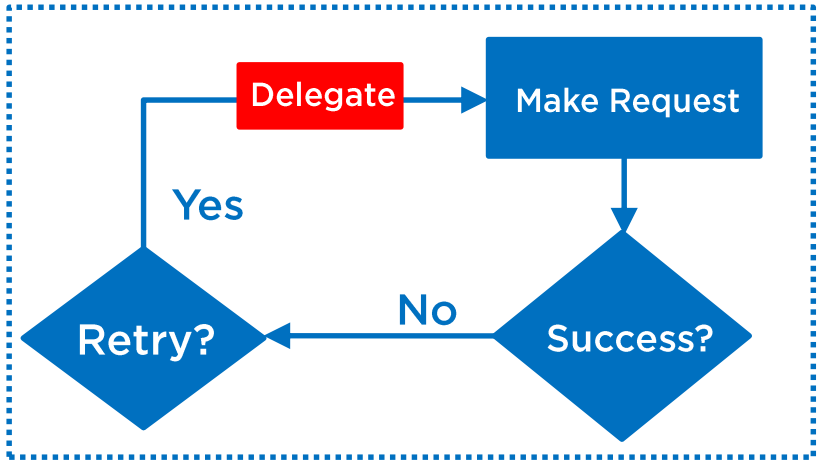


Idempotence

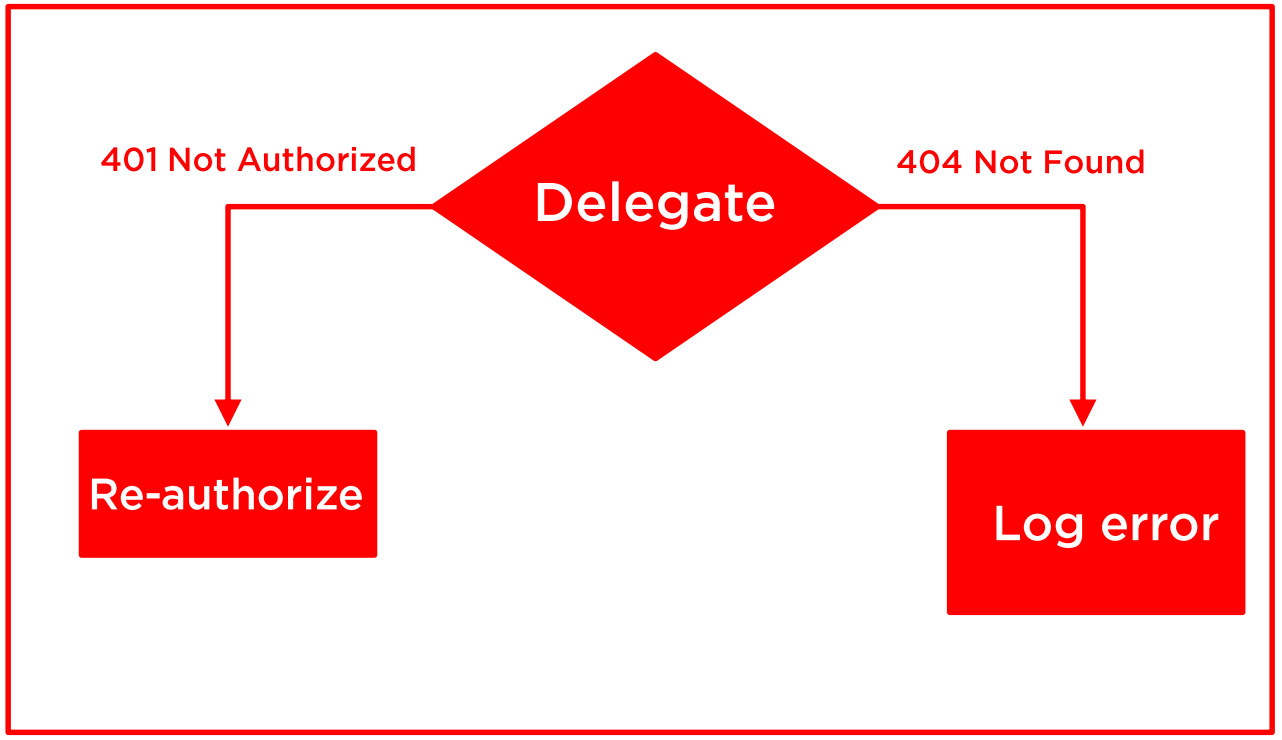
Delegates

Delegates

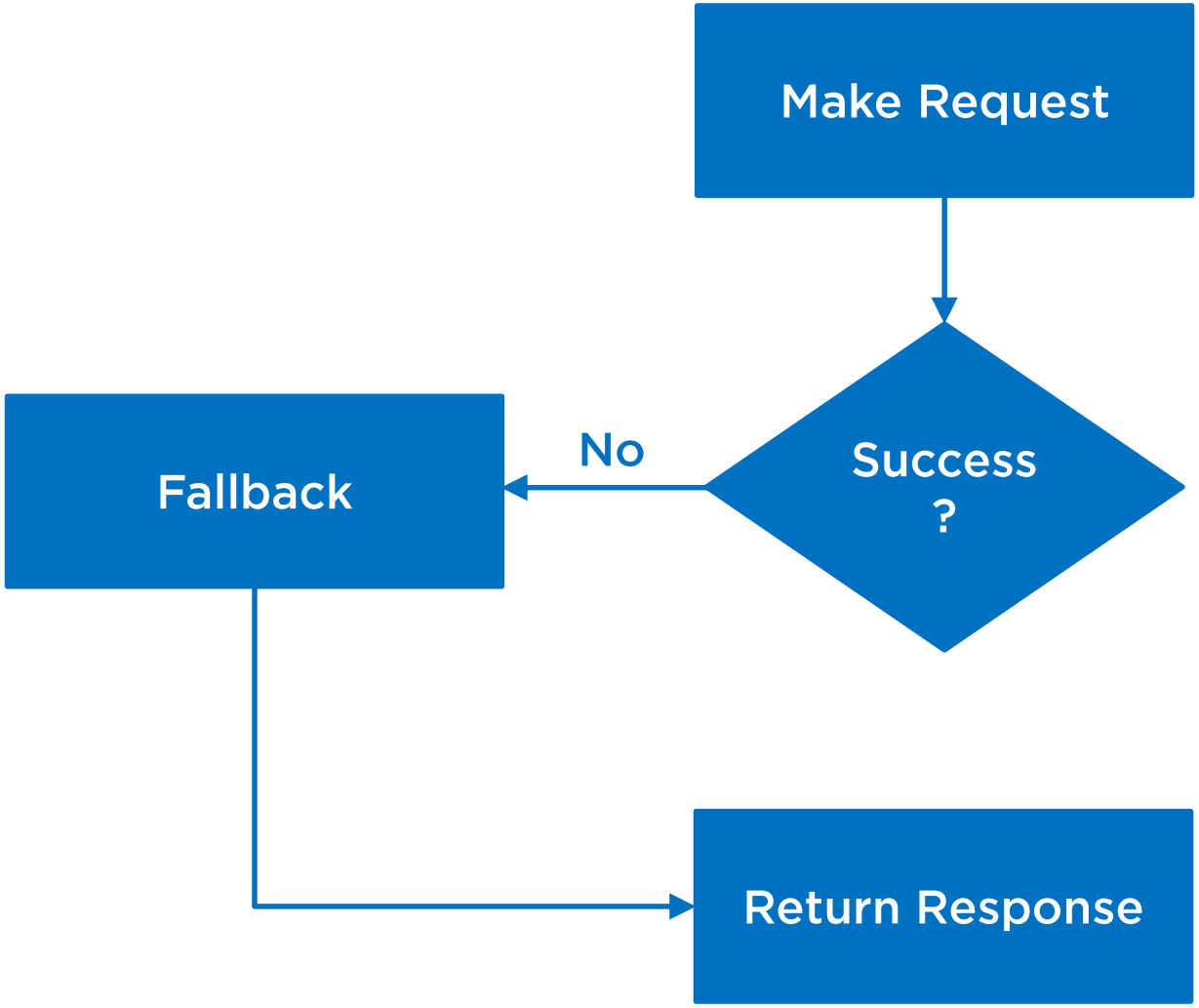




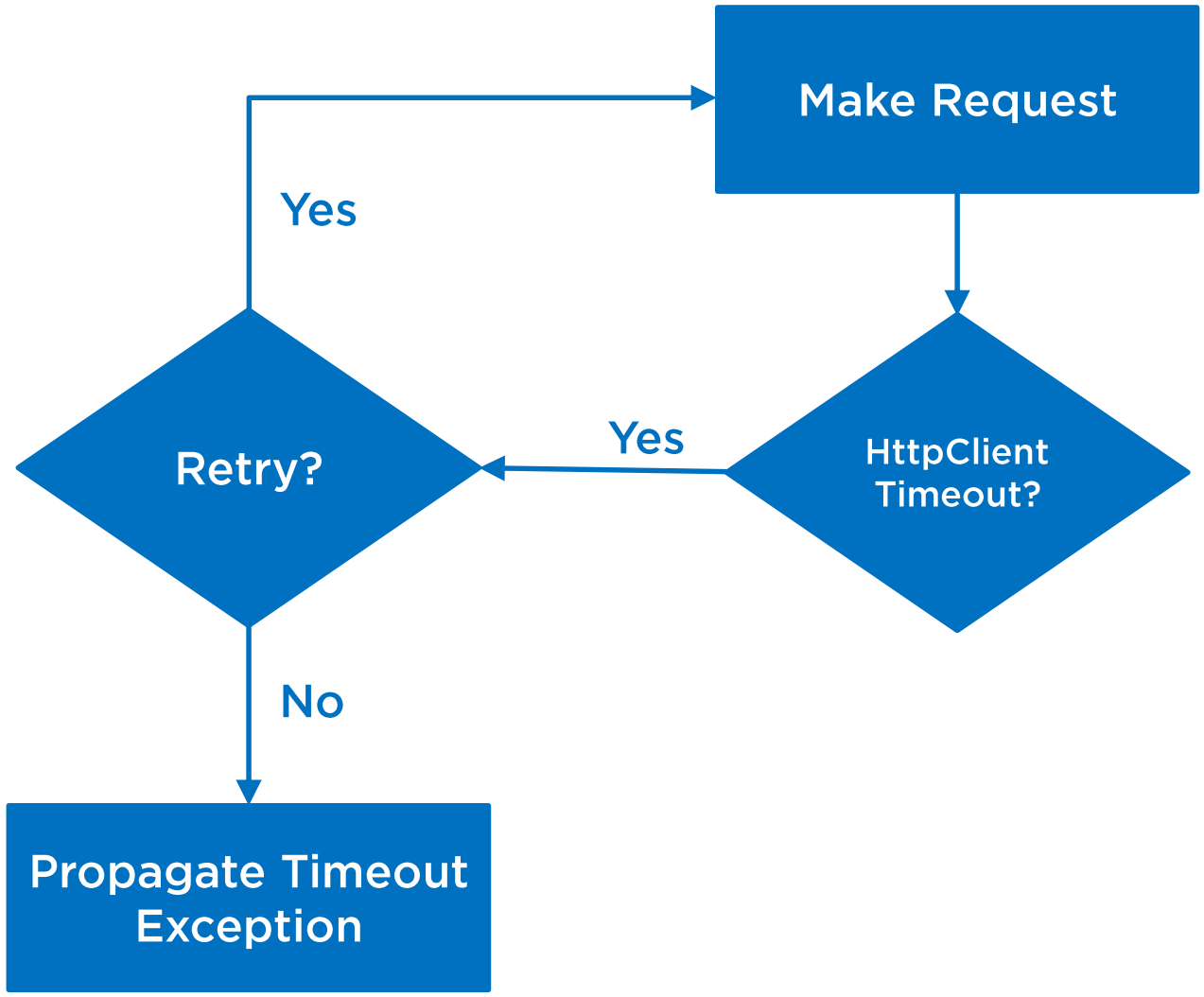
Reauthorization



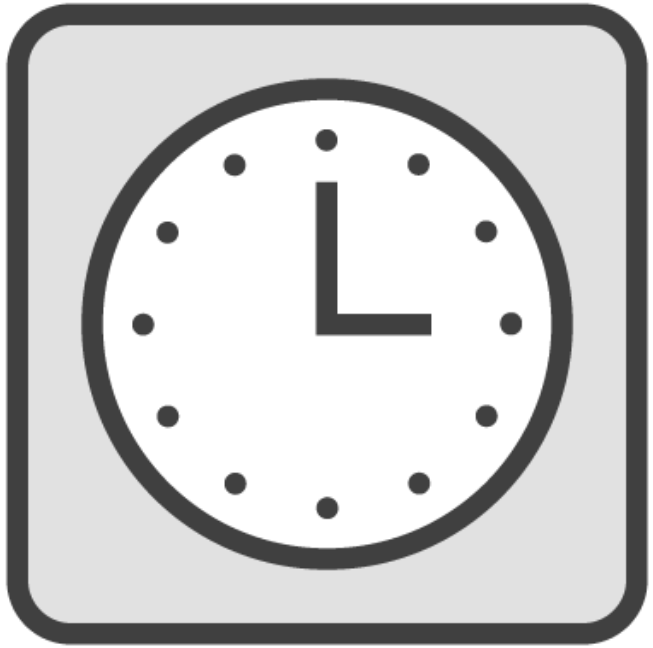
Fallback



HttpClient Timeout



HttpClient Timeout



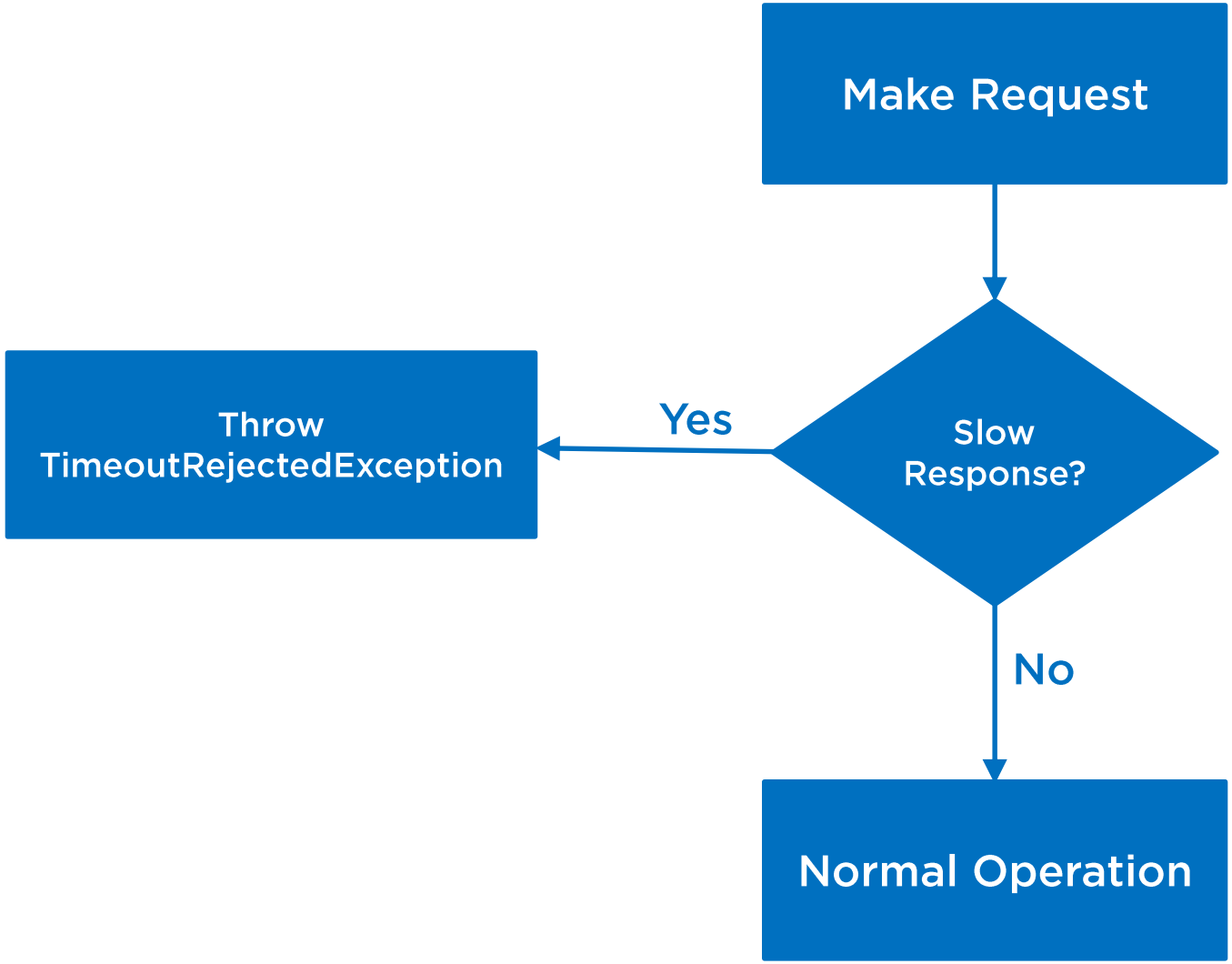
Polly Timeout

HttpClient

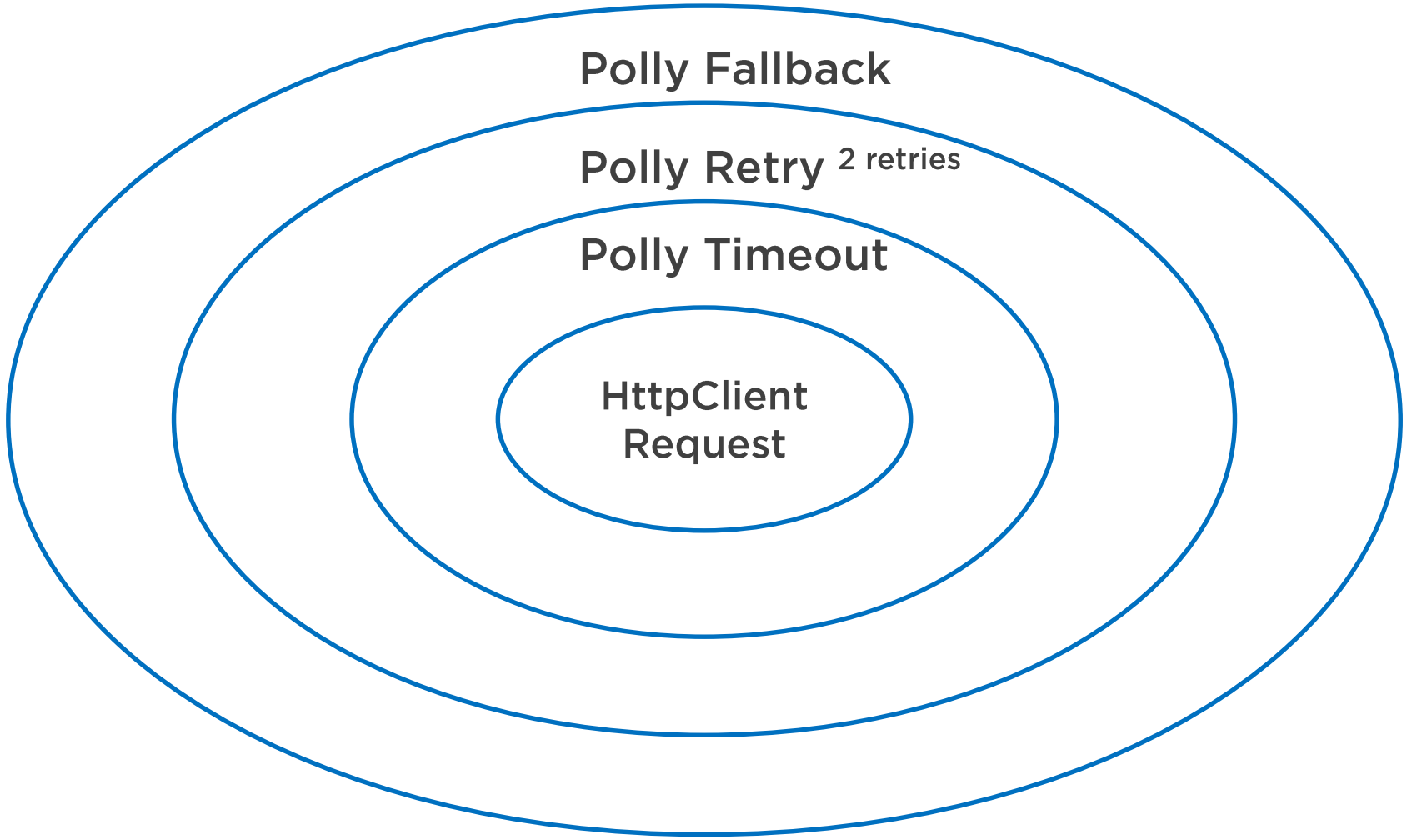
Preset Timeout

100 Seconds

Polly Timeout



Polly Timeout with Retry and Fallback



Polly Timeout with Retry and Fallback

Summary

- Why requests fail
- Resilience strategies
- Resilience framework
- Policies – retry, wait & retry, fallback, timeout
- Demos