RESILIENCE

@StefanSeegers

Source: https://cs.wikipedia.org/wiki/Dominový_efekt#/media/File:Toppledominos.jpg

TIMEOUTS

Source: https://commons.wikimedia.org/wiki/File:Hourglass_in_red_leather_covered_case,_second_of_two_views._Wellcome_L0011338.jpg

WHY TIMEOUTS?

- Occupy resources for limited time
- Fault isolation
- Do not wait forever

OCCUPY RESOURCES

- Reasonable Timeout values
- Unblock Threads and Resources
- Limit Retries
- Delay retries?

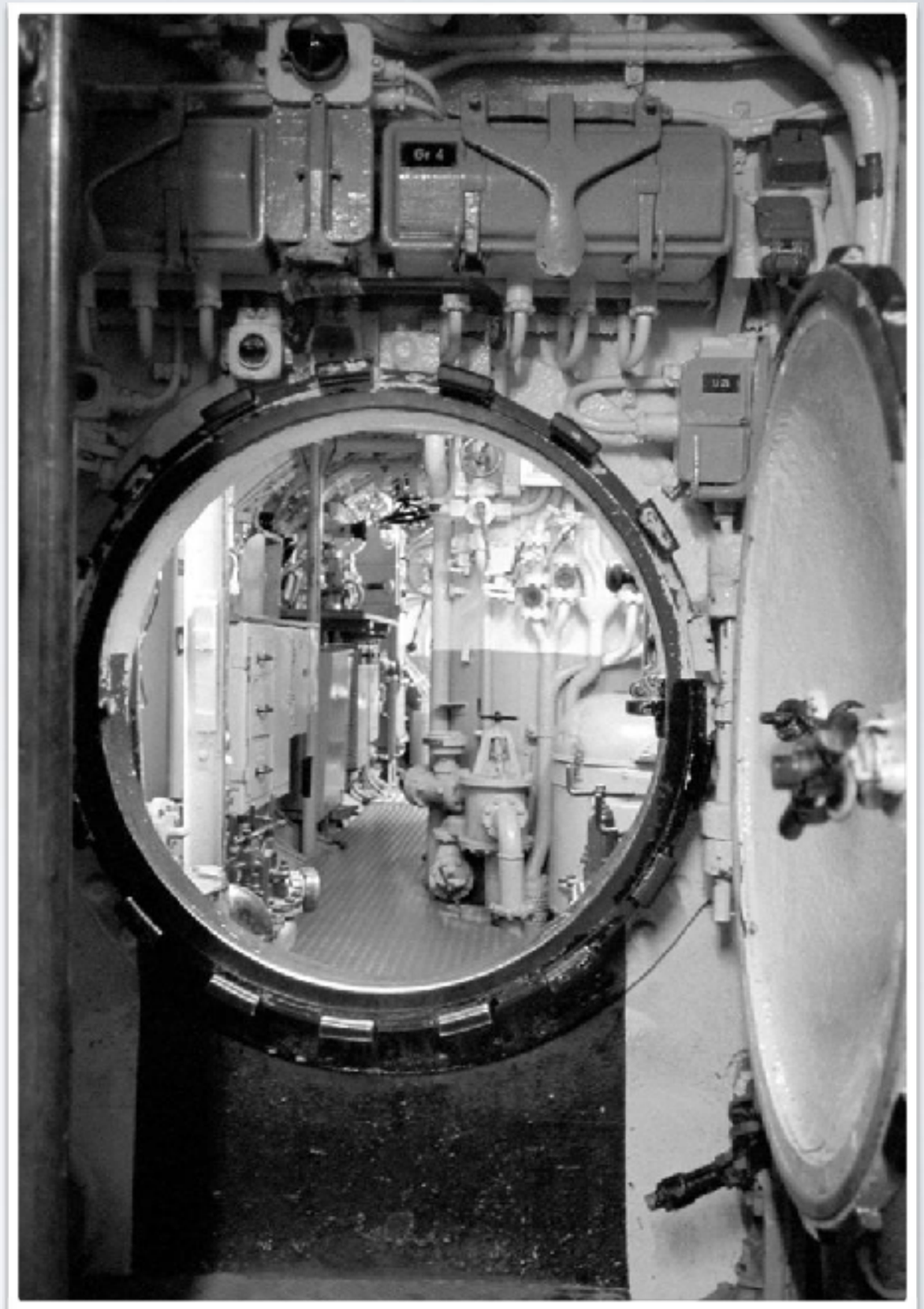
WAIT FOREVER?

- Client's perspective?

- „Hope is not a design method“

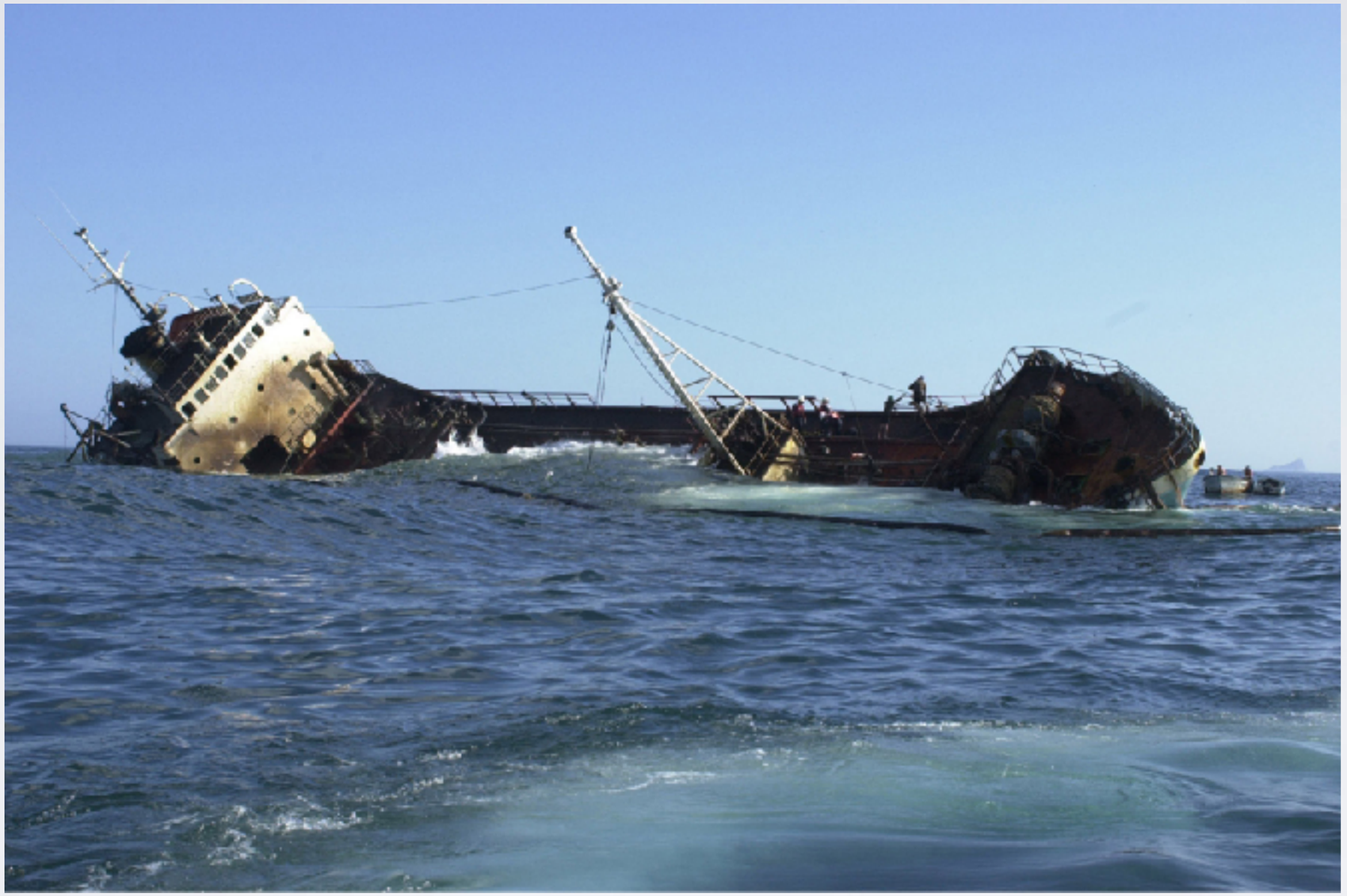
Source: Michael Nygard in Release it! https://pragprog.com/book/mnee/release-it

BULKHEADS



Source: https://commons.wikimedia.org/wiki/File:VII_C_U-Boot_Druckschott.jpg

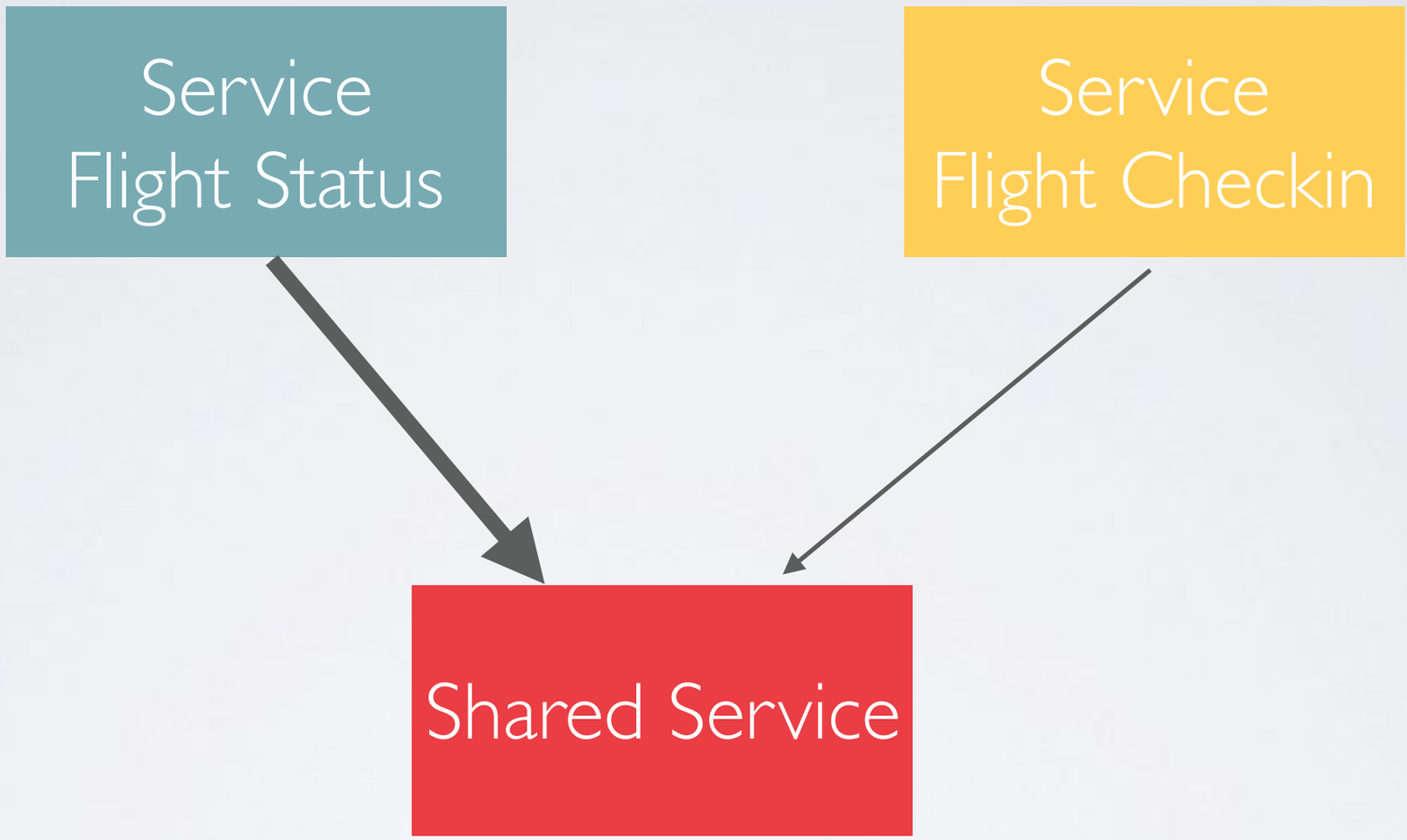
WHY BULKHEADS ?



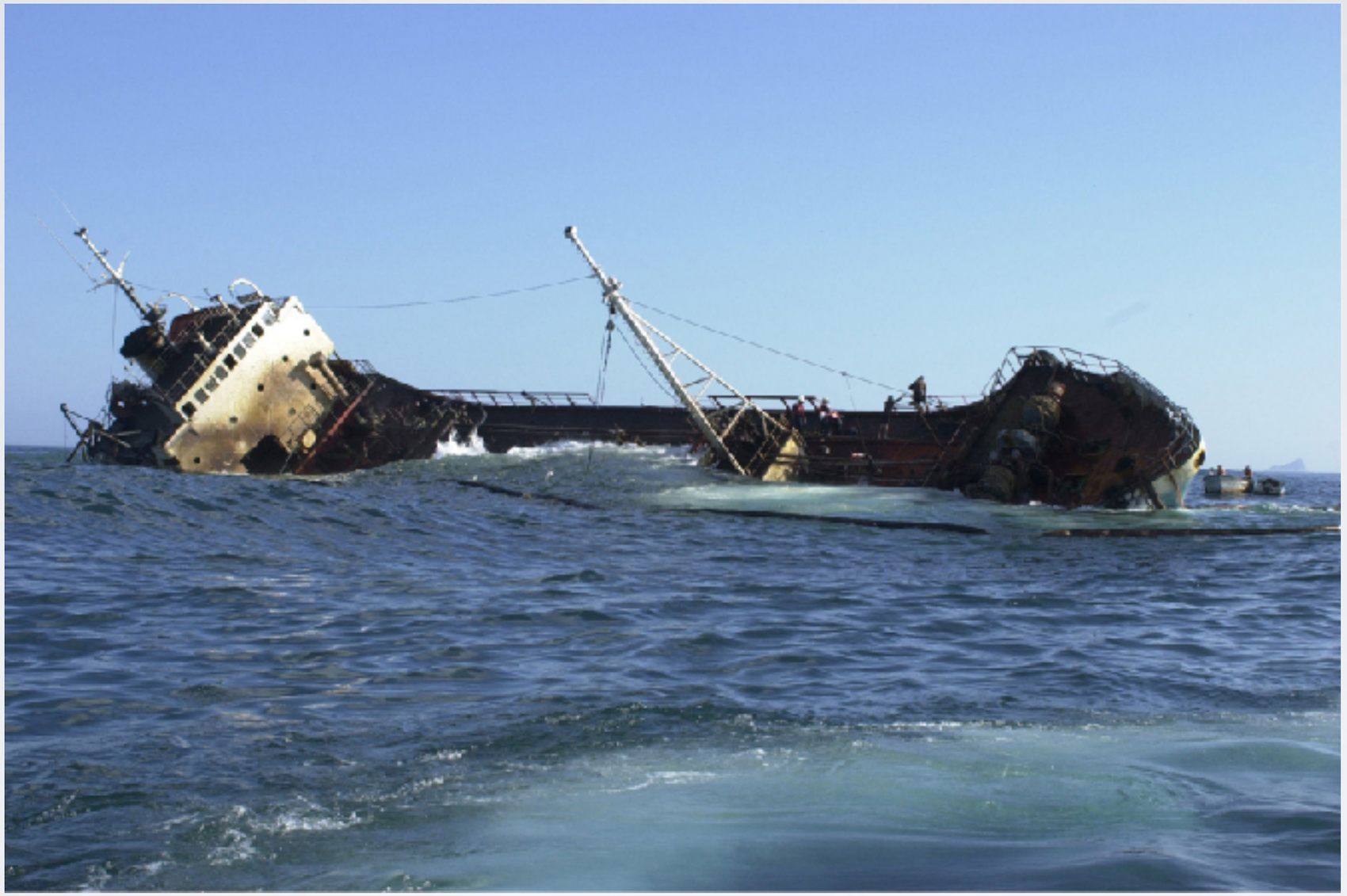
Source: https://commons.wikimedia.org/wiki/File:Tanker_Jessica_aground_in_Galapagos.jpg

BULKHEADS IN IT?

- Error in System A may not interfere with System B or the whole System
- Minimize Damage
- Prevent Chain Reactions
- Isolation Pattern


Service
Flight Status
Service
Flight Checkin
Shared Service

ALL FLIGHTS CANCELLED

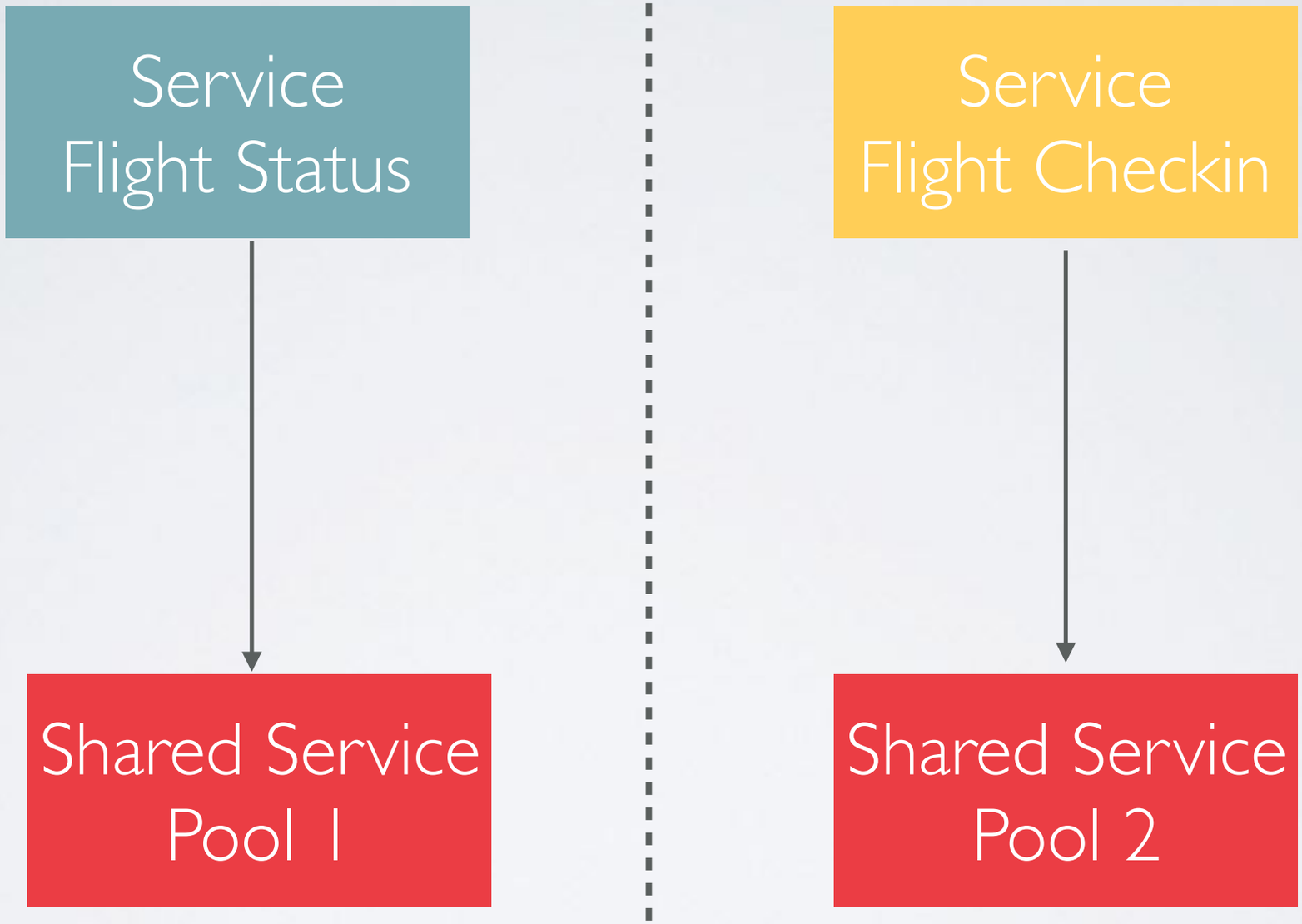


Source: https://commons.wikimedia.org/wiki/File:Tanker_Jessica_aground_in_Galapagos.jpg

HIDDEN DEPENDENCY!

SEPARATE WITH BULKHEADS!

Dedicated Pools!



Service Pool

PATTERNS

- Several Servers
- Dedicated Servers
- Dedicated Resource Pools
- Split into several Services

JEE RESOURCE POOLS

- HTTP Thread Pool
- Managed Thread Factories

  Threads for JEE
- Managed Executor Services

  Submitting Tasks for JEE
- JDBC Pools

BUILD YOUR OWN

Source: https://pixabay.com/de

READ DATA

Do you have enough memory?

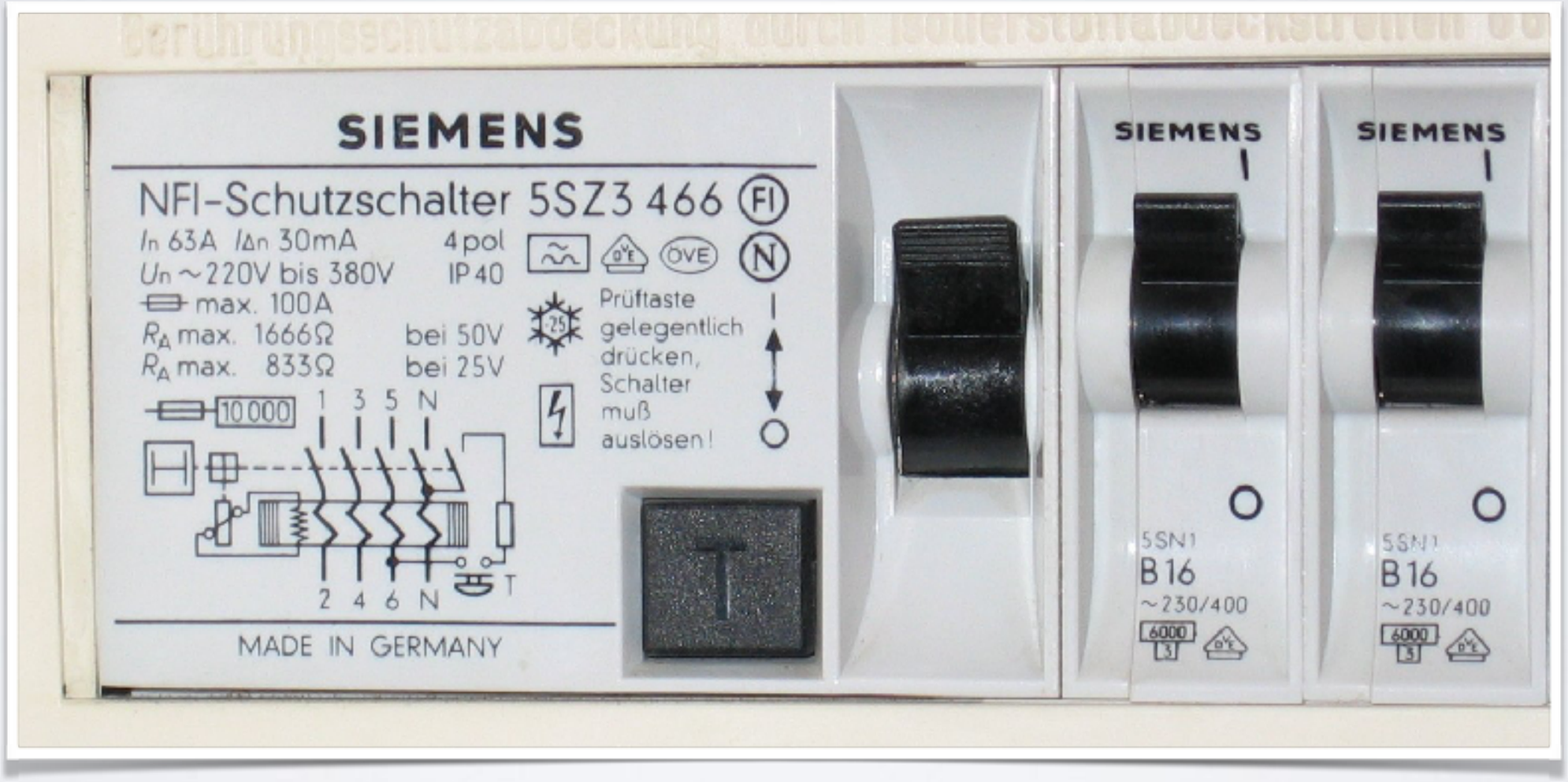
```
public vo                ist<String> aCollection) {

    hile (externalSystem.hasMoreData()) {
        String data = externalSystem.readData();
        aCollection.add(data);
    }
}
```

PROTECT YOUR APP

- Protect against infinite loop

- E.g. configurable counter to stop reading

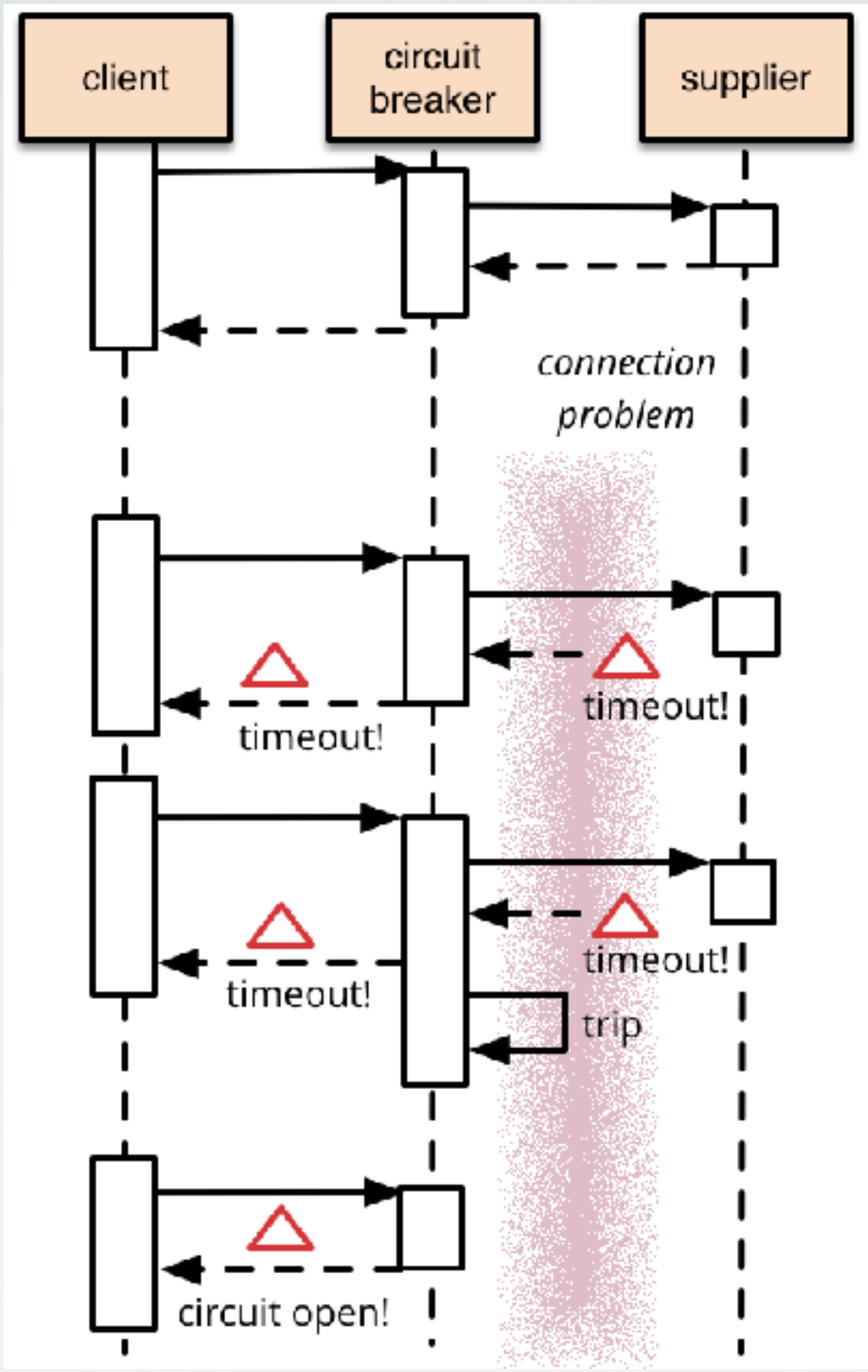
CIRCUIT BREAKER



Source: https://commons.wikimedia.org/wiki/File:Fischalter.jpg

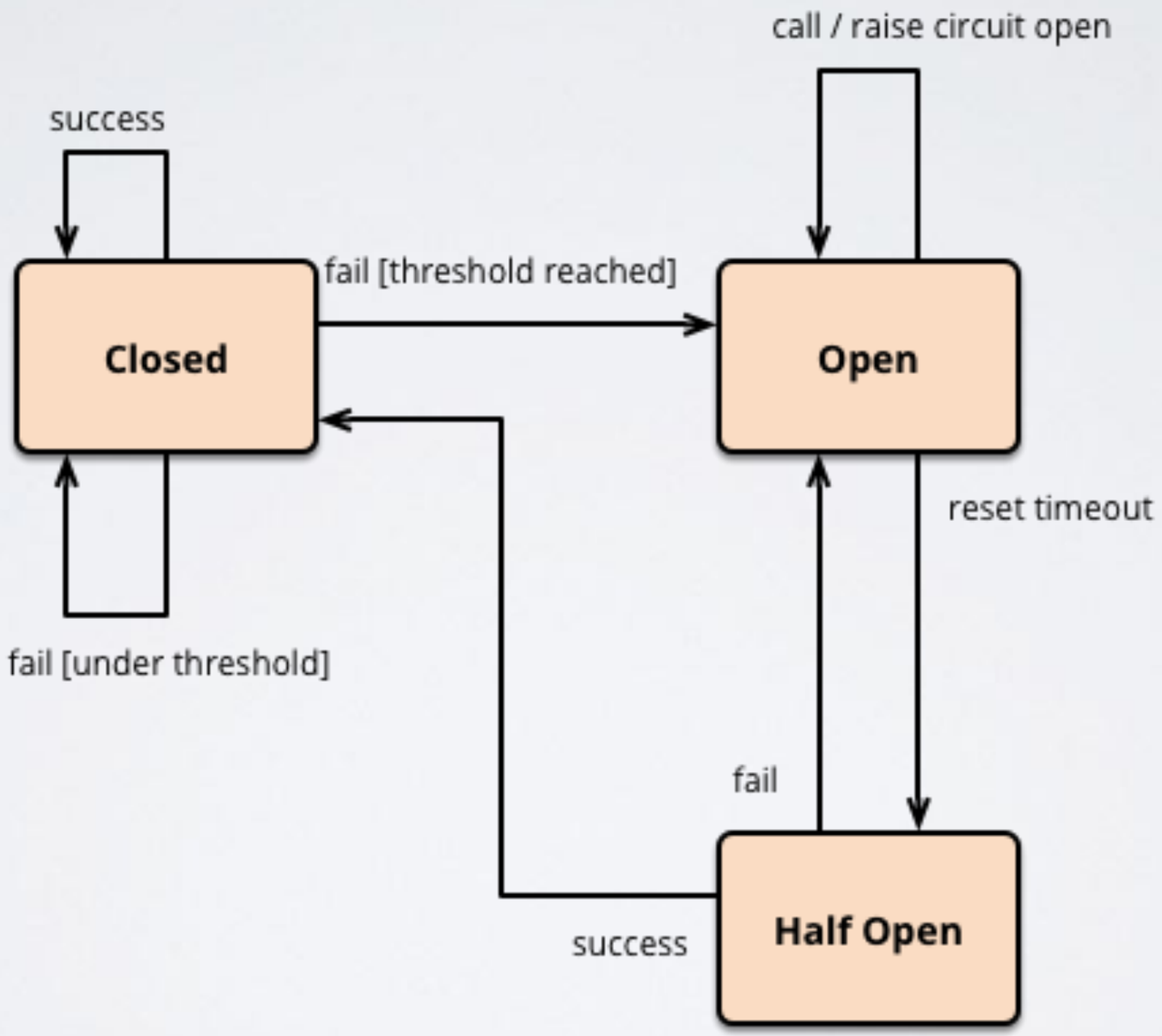
CIRCUIT BREAKER?

Protect from integration point problems!



Source: https://martinfowler.com/bliki/CircuitBreaker.html

STATE DIAGRAM



Source: https://martinfowler.com/bliki/CircuitBreaker.html

GUIDELINE

- Spend each integration point it's own circuit breaker
- Configure retry timeout and counter according to the nature of the system
- Dynamic config where feasible

BENEFITS

- Fail fast
- Latency control
- Protect resource pools
- Avoid cascading failures
- Don’t stress systems which are under trouble

CHANCES

- Downgrade of a service
- Self healing
- Monitoring Point

REFERENCES

- Release it!, Chapter 5
  https://pragprog.com/book/mnee/release-it

- https://martinfowler.com/bliki/CircuitBreaker.html

https://pragprog.com/book/mnee2/release-it-second-edition

May your system live
long and prosper!