



Welcome to

4. Messaging, MQ systems

KEA System Integration F2020 10 ECTS

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Slides are available as PDF, [kramse@Github](https://github.com/kramse)
4-Messaging-system-integration.tex in the repo [security-courses](https://github.com/kramse/security-courses)

Plan for today



- Messaging, MQ systems
- Publish-Subscribe
- Enterprise Integration Patterns
- The Aggregator and Splitter EIPs
- The Routing Slip EIP
- The Dynamic Router EIP
- The Load Balancer EIP

Exercises

-
-

Reading Summary



EIP ch 3-4, Camel ch 5
and read this

Browse / skim this:

Today's Agenda - approximate time plan



- 45m
- 45m
- 10:00 Break 15m
- 45m
- 45m
- 11:45 Lunch Break
- 45m
- 45m
- 14:00 Break 15m
- 45m

Goals for today



Today's goals:

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-
-

Photo by Thomas Galler on Unsplash

Messaging, MQ systems



Publish-Subscribe



Enterprise Integration Patterns



EIP book chapters

Chapter 5

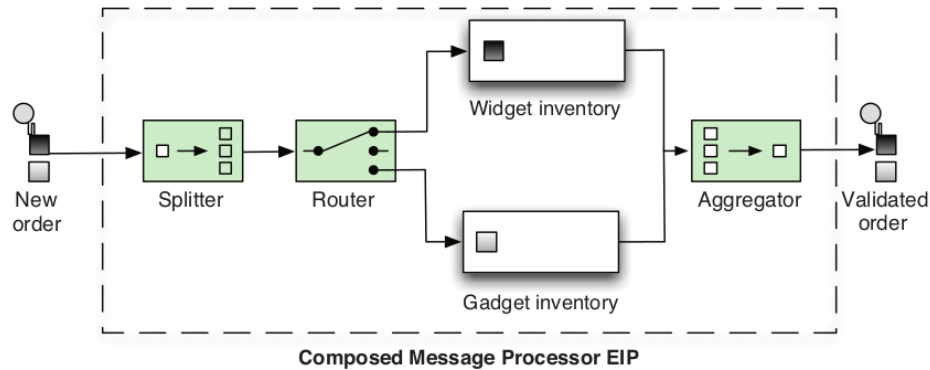


Figure 5.1 The Composed Message Processor EIP splits up the message, routes the submessages to the appropriate destinations, and reaggregates the response back into a single message.

- 5.1 Introducing enterprise integration patterns
- The Aggregator and Splitter EIPs
- The Routing Slip and Dynamic Router EIPs
- The Load Balancer EIP

5.2 The Aggregator EIP



Figure 5.2 The Aggregator stores incoming messages until it receives a complete set of related messages. Then the Aggregator publishes a single message distilled from the individual messages.

- Using the Aggregator EIP
- Completion conditions for the Aggregator
- Using persistence with the Aggregator
- Using recovery with the Aggregator

5.2.1 Using the Aggregator EIP

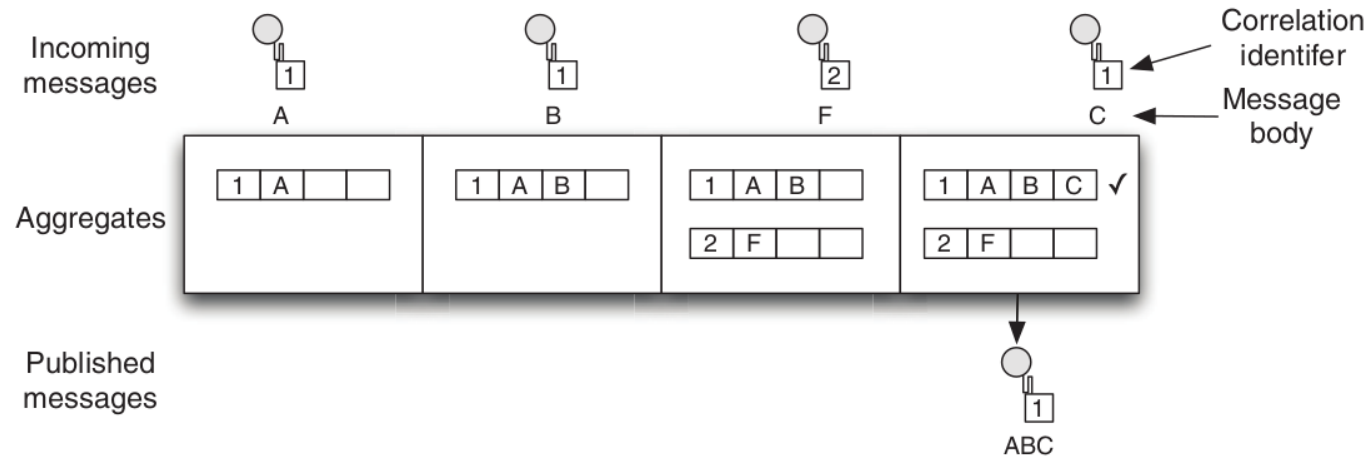


Figure 5.3 The Aggregator EIP in action, with partial aggregated messages updated with arriving messages

5.2.4 Using recovery with the Aggregator

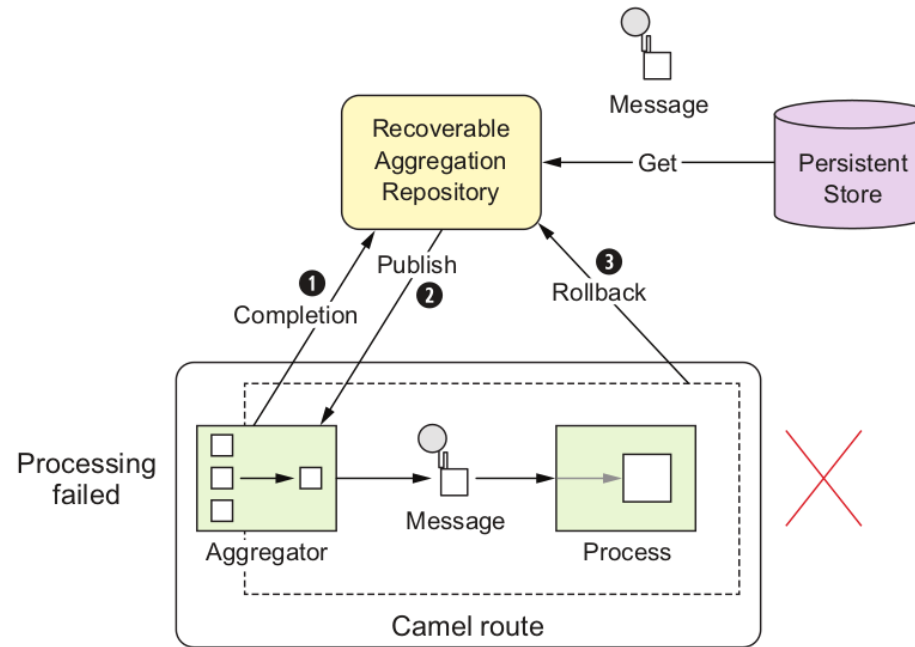


Figure 5.4 An aggregated message is completed ①, it's published from the Aggregator ②, and processing fails ③, so the message is rolled back.

And with recovery

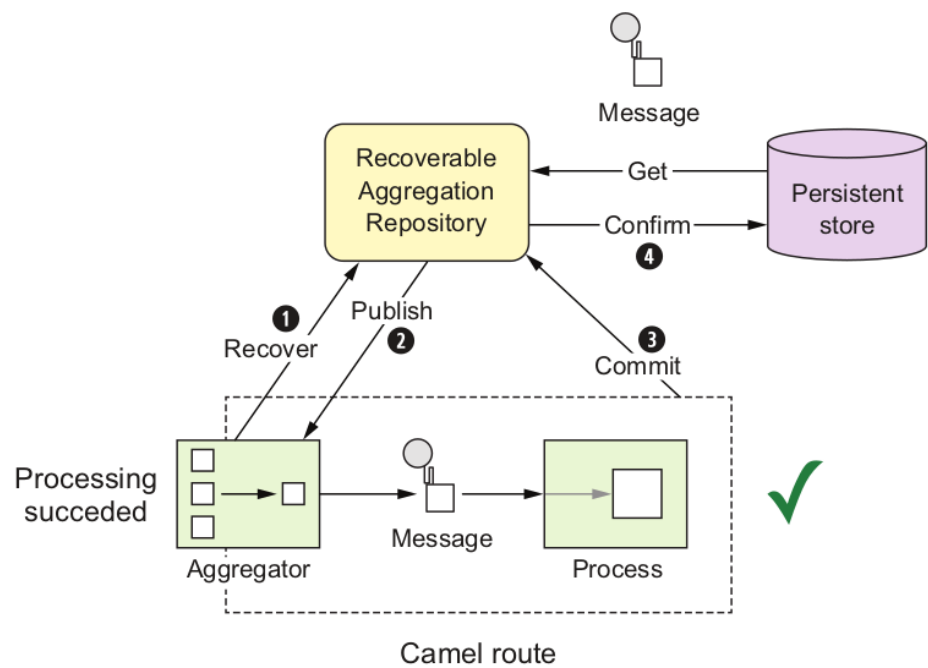


Figure 5.5 The **Aggregator** recovers failed messages ①, which are published again ②, and this time the messages completed ③ successfully ④.

5.3 The Splitter EIP

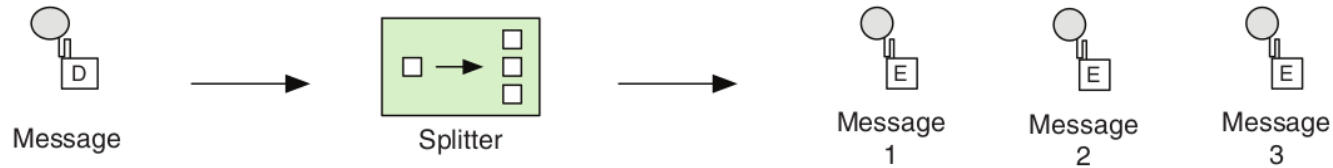
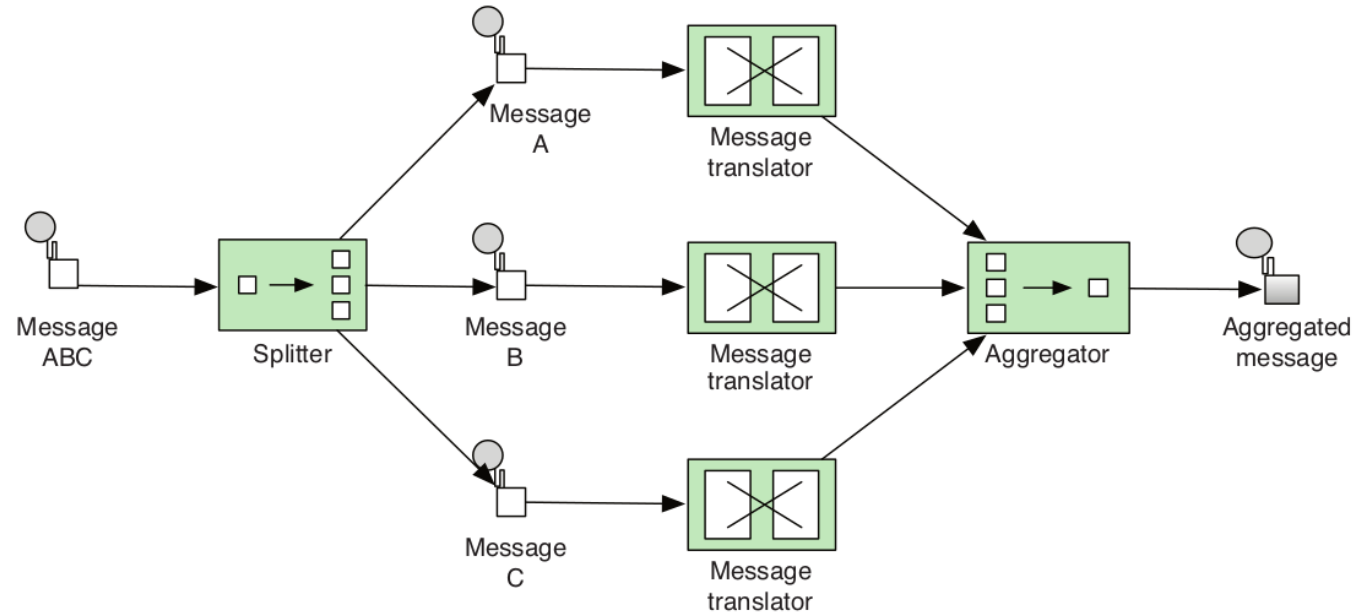


Figure 5.6 The Splitter breaks the incoming message into a series of individual messages.

- Using the Splitter, Using beans for splitting, Splitting big messages, Aggregating split messages, When errors occur during splitting

Aggregating split messages



There can be multiple reasons for doing the split, to process messages and then aggregate them.

5.4 The Routing Slip EIP

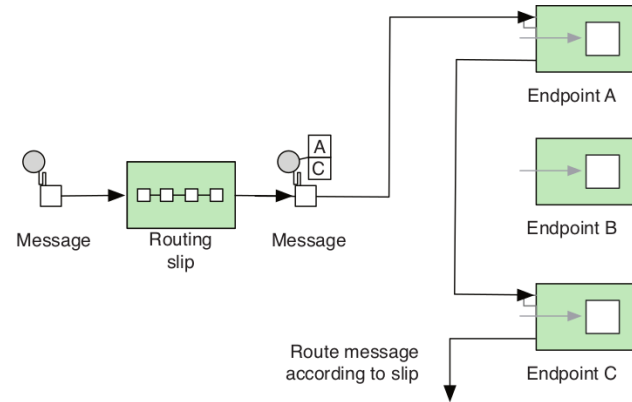


Figure 5.11 The incoming message has a slip attached that specifies the sequence of the processing steps. The Routing Slip EIP reads the slip and routes the message to the next endpoint in the list.

- Using the Routing Slip EIP, Using a bean to compute the routing slip header, Using an Expression as the routing slip, Using @RoutingSlip annotation

5.5 The Dynamic Router EIP



- Using the Dynamic Router, Using the @DynamicRouter annotation

5.6 The Load Balancer EIP

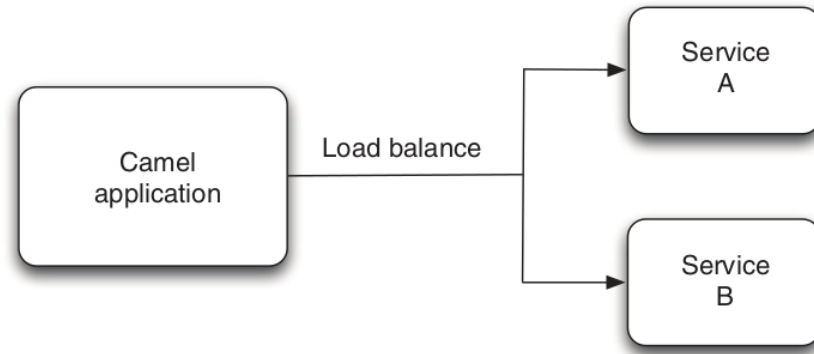


Figure 5.12 A Camel application load-balances across two services.

- Introducing the Load Balancer EIP, Using load-balancing strategies, Using the failover load balancer, Using a custom load balancer
- The EIP book doesn't list the Load Balancer, which is a pattern implemented in Camel.
- Nginx is a very popular HTTP routing engine and load balancer for HTTP(S)

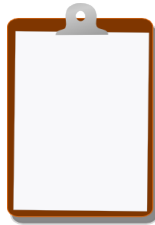
Nginx Load Balancer



```
http {  
    upstream myapp1 {  
        least_conn;  
        server srv1.example.com;  
        server srv2.example.com;  
        server srv3.example.com;  
    }  
  
    server {  
        listen 80;  
  
        location / {  
            proxy_pass http://myapp1;  
        }  
    }  
}
```

Example from: http://nginx.org/en/docs/http/load_balancing.html

For Next Time



Think about the subjects from this time, write down questions

Check the plan for chapters to read in the books

Visit web sites and download papers if needed

Retry the exercises to get more confident using the tools