



Fachbereich Informatik und Medien

Apache Camel Anwendung - Erdbebendaten

Systemintegration 1. Semester Master Informatik
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1 Introduction / Motivation / Project

Systemintegration is the part of a software architectur. It helps to connect components or subsystems together. Certain patterns are used in the industry today. Using and learning EIP (“Enterprise Integration Pattterns”) with Apache Camel is the goal of this Project.

The Example for this project is all about earthquake data from around the world. The Application is able to read earthquake data from various rss Feeds and processes it. During the processing the data will be in form of XML and Java Objects. The data will be enriched, splitted, sorted, aggregated, normalized, marshalled umarshalled and finally provided again in form of a restful service.

The specified task is as follows:

1. Read Earthquake Data continously from those two RSS Streams
 - <http://geofon.gfz-potsdam.de/db/eqinfo.php?fmt=rss>
 - <http://earthquake.usgs.gov/eqcenter/catalogs/eqs1day-M2.5.xml>
2. enrich this data with other related information like the weather in this area at this time. Data can be from here: <http://www.programmableweb.com>.
3. sort the earthquakes by the earthparts where they appear
4. if the earthquake has a strength of more than “M 5.5” than send an formated warning email to an email adress.
5. provide this data via a Restful interface in form of a list of the earthparts with an xlink to detailed information of the earthquakes.

2 Information Collection and Normalization

The Normalizer [HW03] (Pic. 2.1) routes each message type through a custom Message Translator so that the resulting messages match a common format. The different message formats are collected in one channel (“*direct : collectorChannel*”) and then routed according to their xml format. The Routing is accomplished with a xpath condition which routes the messages to the specified Message Translators [HW03] (Pic. 2.2). Here The Translator is implemented with a XSLT formatter <http://www.w3.org/TR/xslt>. The relative source code is listed in 2.1

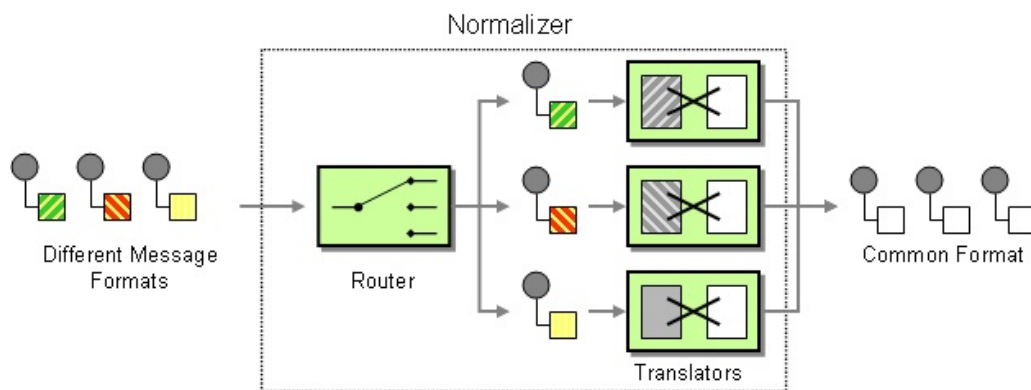


Abbildung 2.1: Normalizer Pattern [HW03]

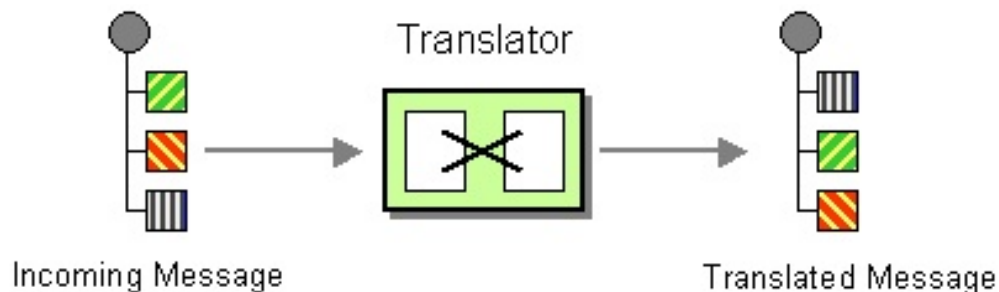


Abbildung 2.2: Translator Pattern [HW03]



Listing 2.1: Normalizer and Translator Source Code

```
1 from(
2     "http://geofon.gfz-potsdam.de/db/eqinfo.php?fmt=rss&
      splitEntries=false")
3     .log("retrieve")
4     .to("direct:collectorChannel");
5
6 from(
7     "http://earthquake.usgs.gov/eqcenter/catalogs/eqs1day-M2
      .5.xml?fmt=rss&splitEntries=false")
8     .log("retrieve")
9     .to("direct:collectorChannel");
10
11 from("direct:collectorChannel")
12     .choice()
13     .when().xpath("/rss/channel/item/pubDate")
14         .to("xslt:data/xsl/transformation2.xsl")
15         .setHeader("visited", constant(true))
16         .log("true: has /rss/channel/item/pubDate")
17         .to("direct:normalizedMsg")
18     .otherwise()
19         .to("xslt:data/xsl/transformation.xsl")
20         .setHeader("visited", constant(true))
21         .log("false: has not /rss/channel/item/pubDate")
22         .to("direct:normalizedMsg");
```

3 Aggregating Information Sources

“The Aggregator is a special filter that receives a stream of messages and identifies messages that are correlated. Once a complete set of messages has been received, the Aggregator collects information from each correlated message and publishes a single, aggregated message to the output channel for further processing.” [HW03]

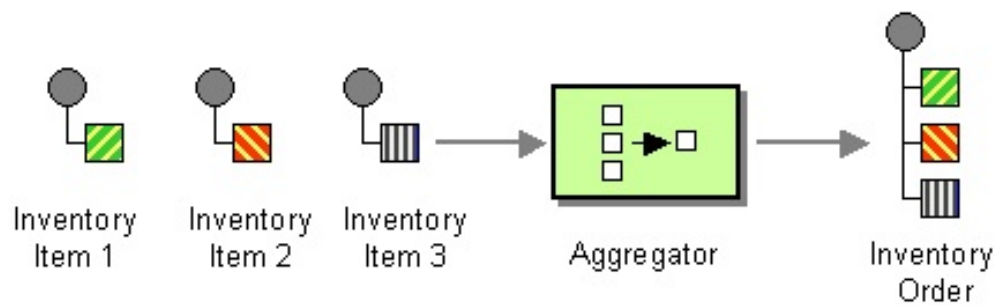


Abbildung 3.1: Aggregator Pattern [HW03]

Camel provides a method named *aggregate* with two parameters, first the identifier (the message header which was defined before in chapter 2) of the messages to aggregate and second the strategy (as a Object: *SpecialAggregationStrategy* which implements *org.apache.camel.processor.aggregate.AggregationStrategy*). Code listing 3.1 shows the implementation in this project for the normalized messages from Chapter 2. Code listing 3.2 shows the strategy which is fairly simple.

Listing 3.1: Aggregator

```
1 from("direct:normalizedMsg")
2   .aggregate(header("visited"), new XMLAggregationStrategy())
3   .completionSize(2).delay(3000)
4   .to("direct:filterBiggestEarthquakes")
5   .to("direct:UnmarshallMergedSources");
```

Listing 3.2: Aggregation Strategy

```
1 import org.apache.camel.Exchange;
```



```
2 import org.apache.camel.processor.aggregate.AggregationStrategy;
3
4 public class XMLAggregationStrategy implements
    AggregationStrategy {
5
6     public Exchange aggregate(Exchange oldExchange, Exchange
        newExchange) {
7         if (oldExchange == null) {
8             return newExchange;
9         }
10        String oldBody = oldExchange.getIn().getBody(String.class);
11        String newBody = newExchange.getIn().getBody(String.class);
12        String body = oldBody + newBody;
13
14        body = body
15            .replaceAll("<\\?xml version=\"1\\.0\" encoding=\"UTF
                -8\"\\?>",
16                "")
17            .replaceAll("</earthquakes>(.*?)<earthquakes>", "")
18            .replaceAll(
19                "</earthquakes><earthquakes xmlns:geo=\"http://www\\.
                w3\\.org/2003/01/geo/wgs84_pos#\">",
20                "").replaceAll("</earthquakes><earthquakes>", "");
21
22        oldExchange.getIn().setBody(body);
23        return oldExchange;
24    }
25 }
```

4 Enrich Data with related Information

5 Sortierung und speicherung der Daten

6 Emailbenachrichtigung

7 REST Schnittstelle zu den Daten

7.1 Liste der Erdbeben je Erdteil mit xlink

7.2 Detailinformationen zu einem Erdbeben

Literaturverzeichnis

- [HW03] HOHPE, G. ; WOOLF, B.: *Enterprise integration patterns: Designing, building, and deploying messaging solutions*. Addison-Wesley Longman Publishing Co., Inc. Boston, MA, USA, 2003. – ISBN 0321200683

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