

Kafka intern: Das Kafka-Wire-Protokoll



ABOUT ME


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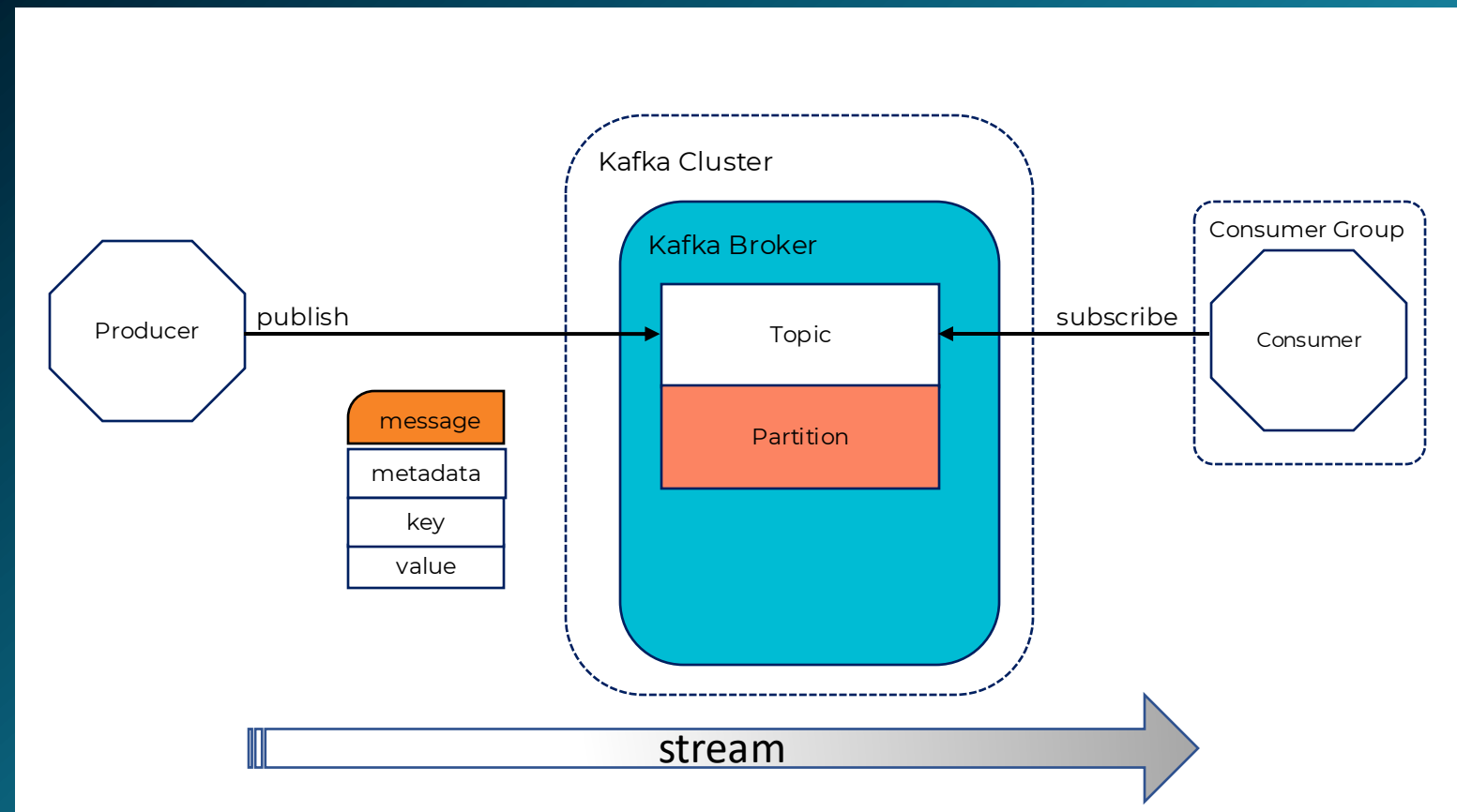
Alles rund um Event-Streaming

Workshops, Meetups, Konferenzen

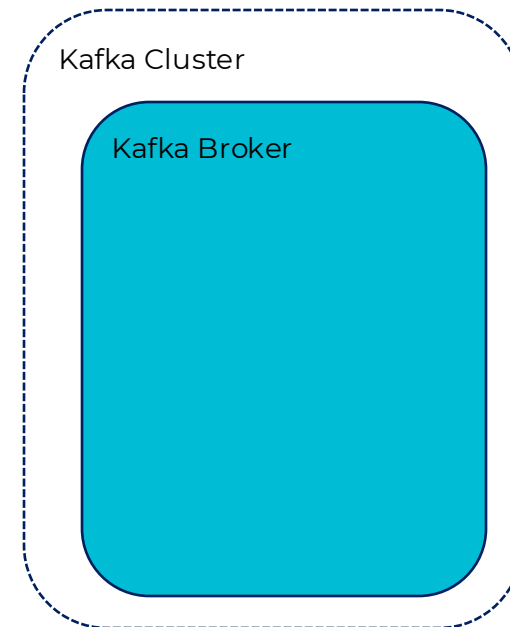
✉ tiffland@thinkport.digital

 <https://www.linkedin.com/in/thomas-iffland/>

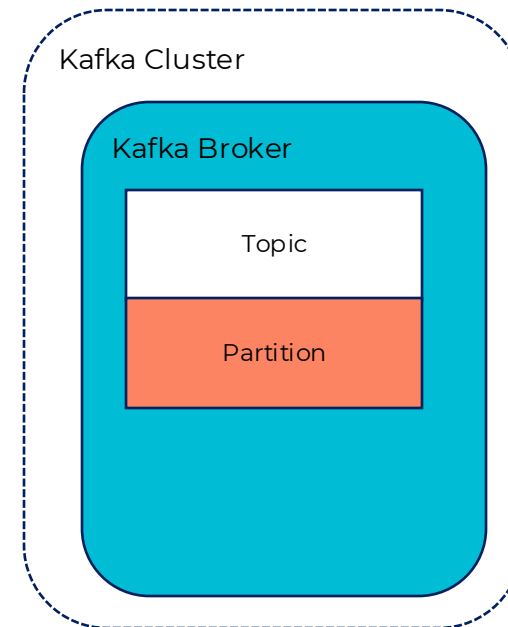
Was ist Apache Kafka?



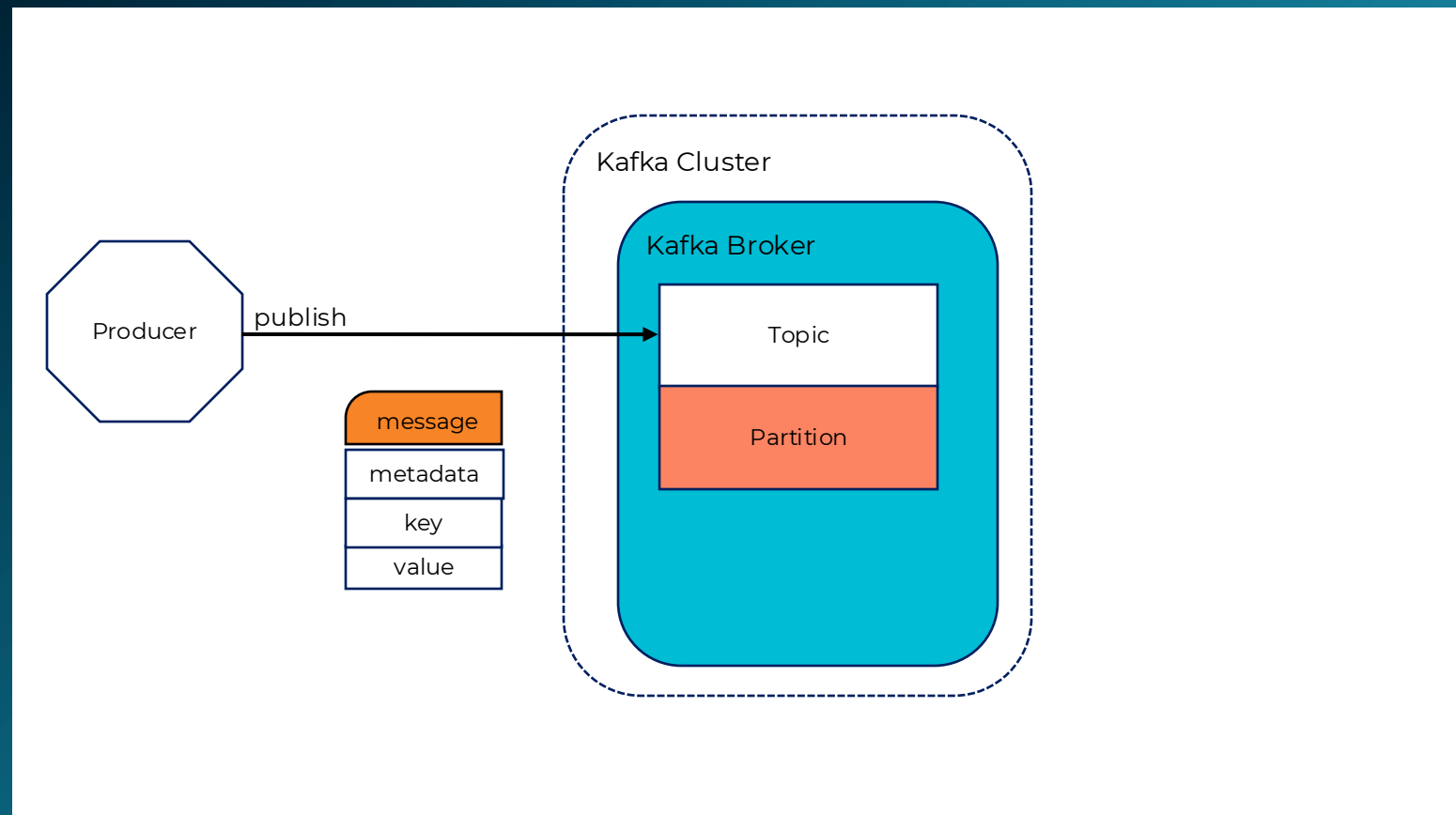
Cluster & Broker



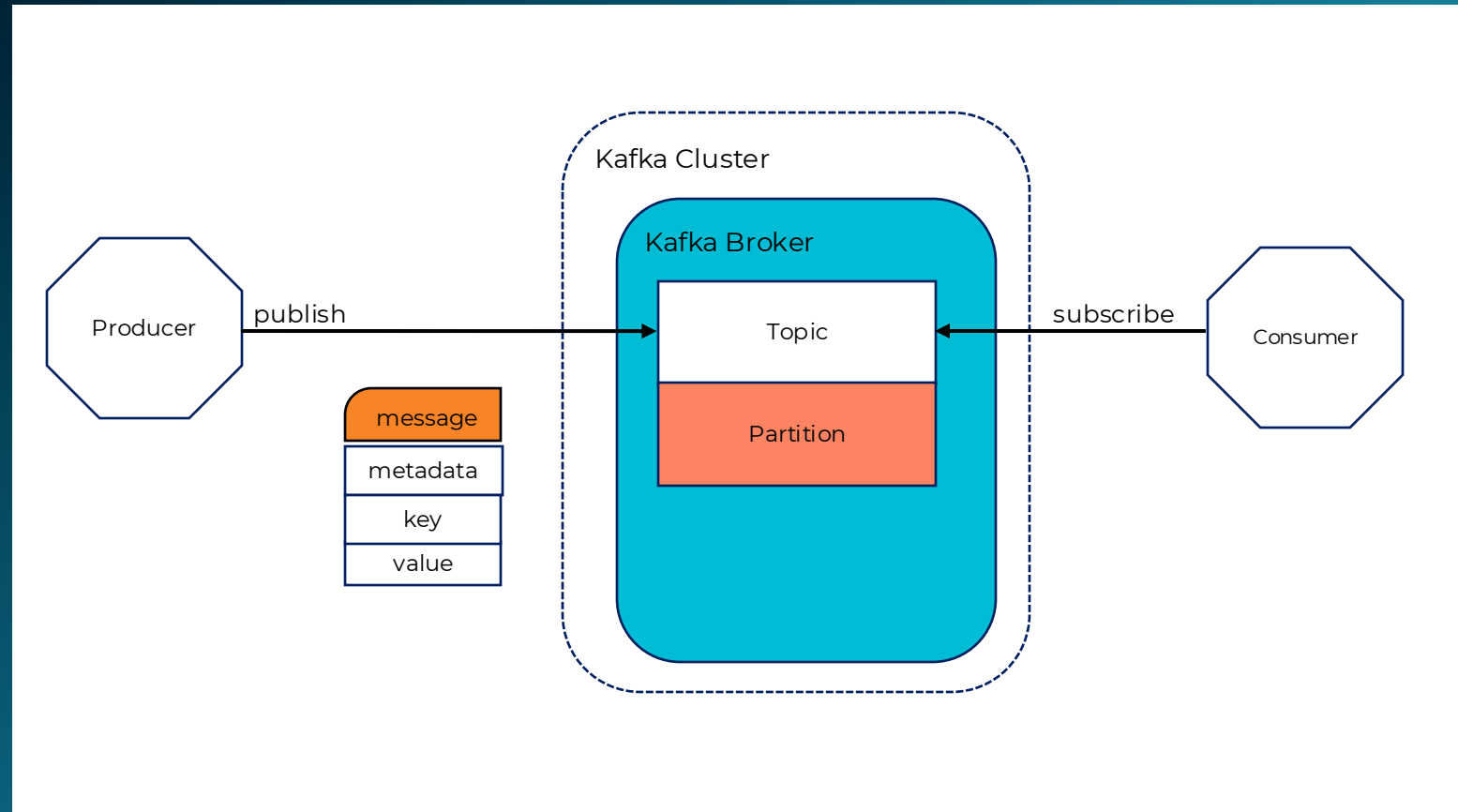
Topic & Partition



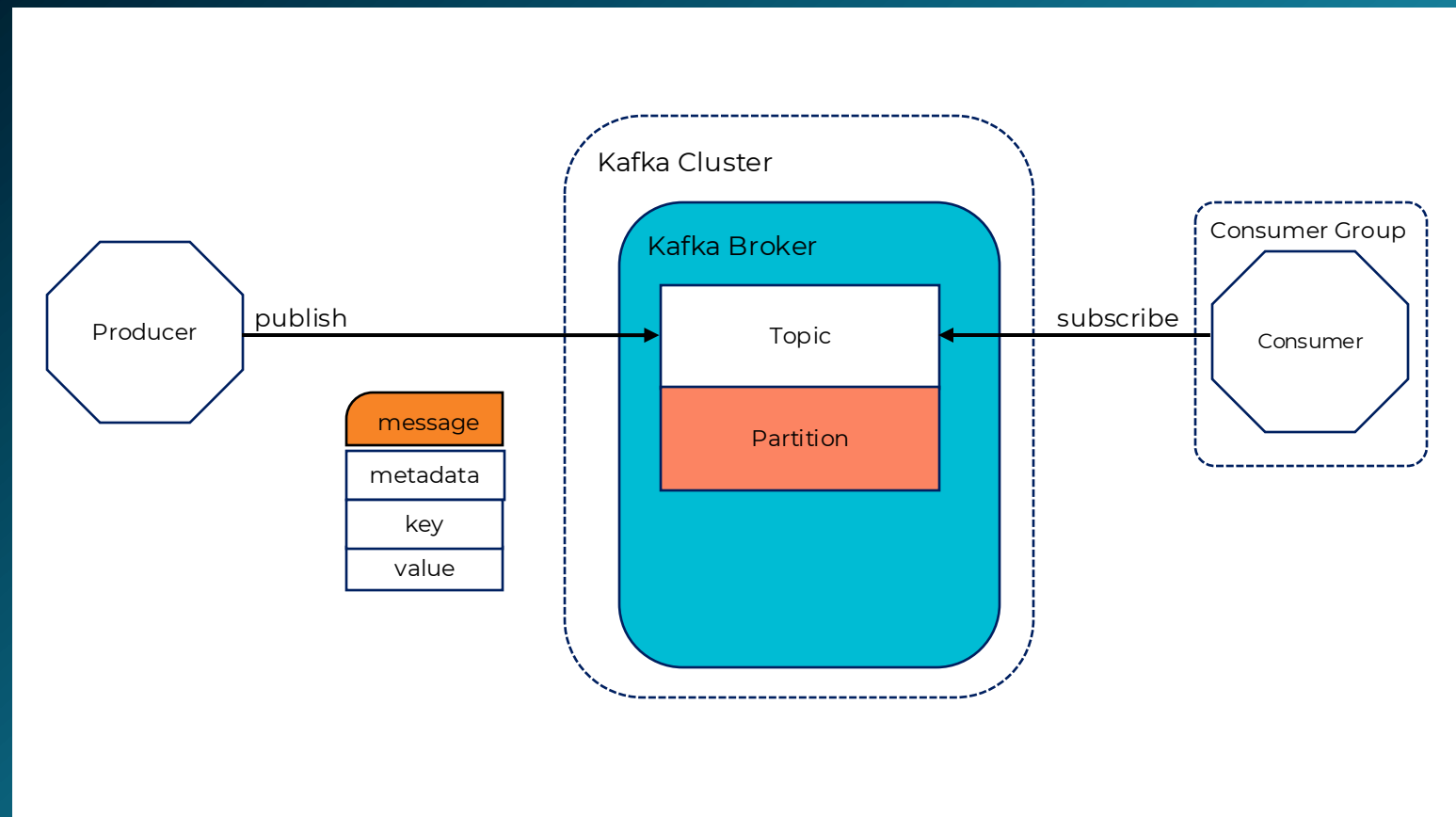
Producer & Message



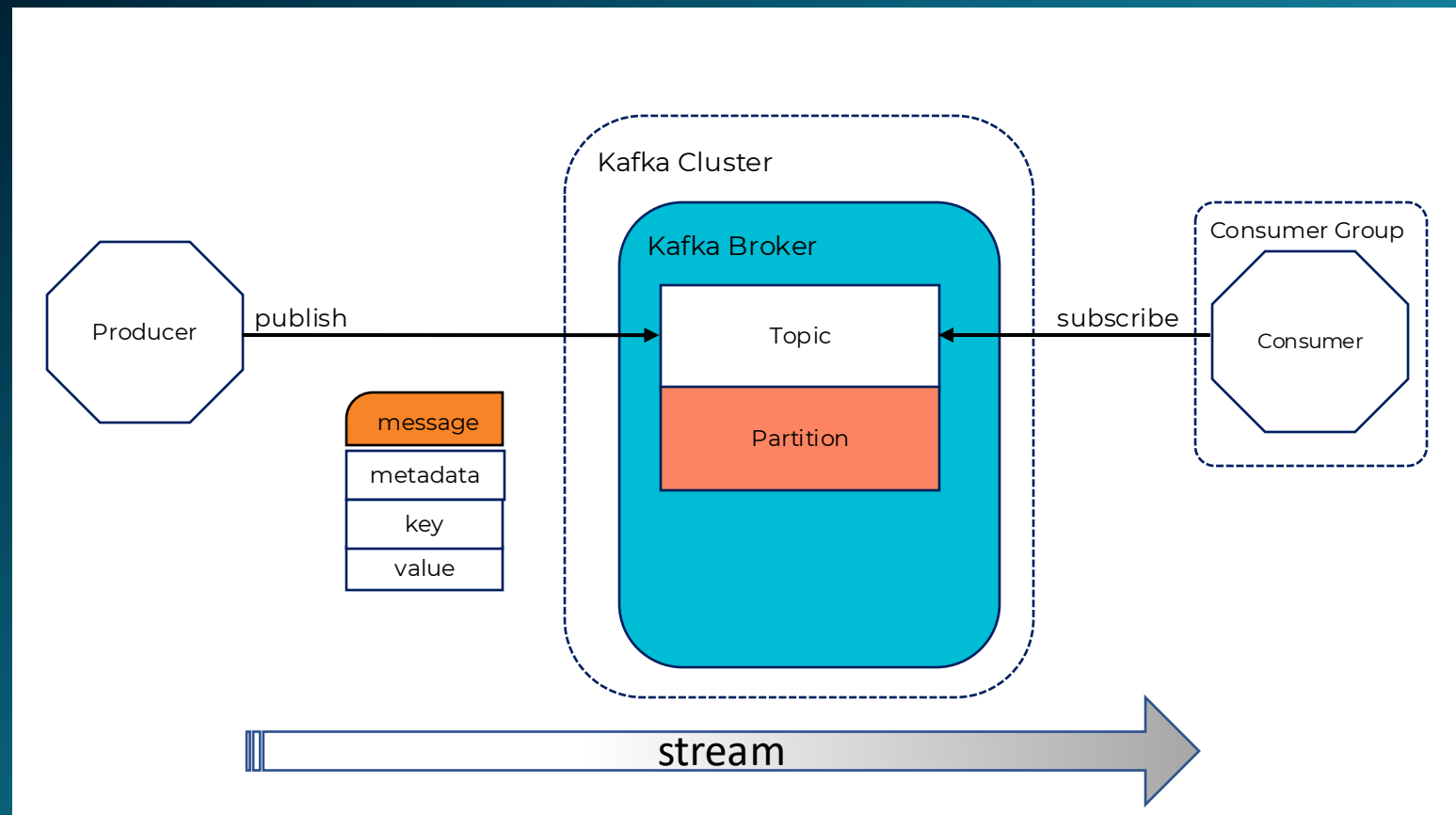
Consumer



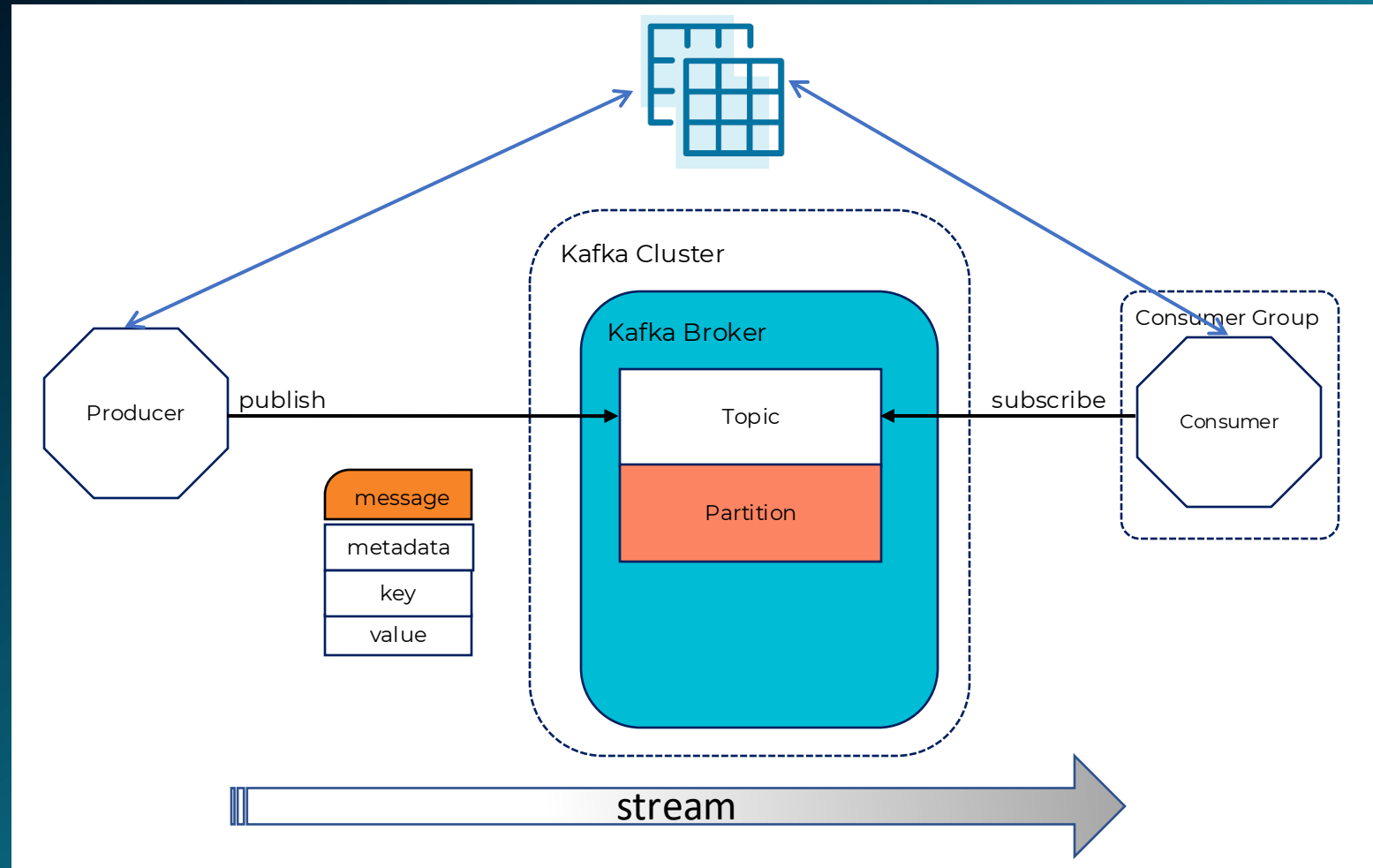
Consumer Group



Stream



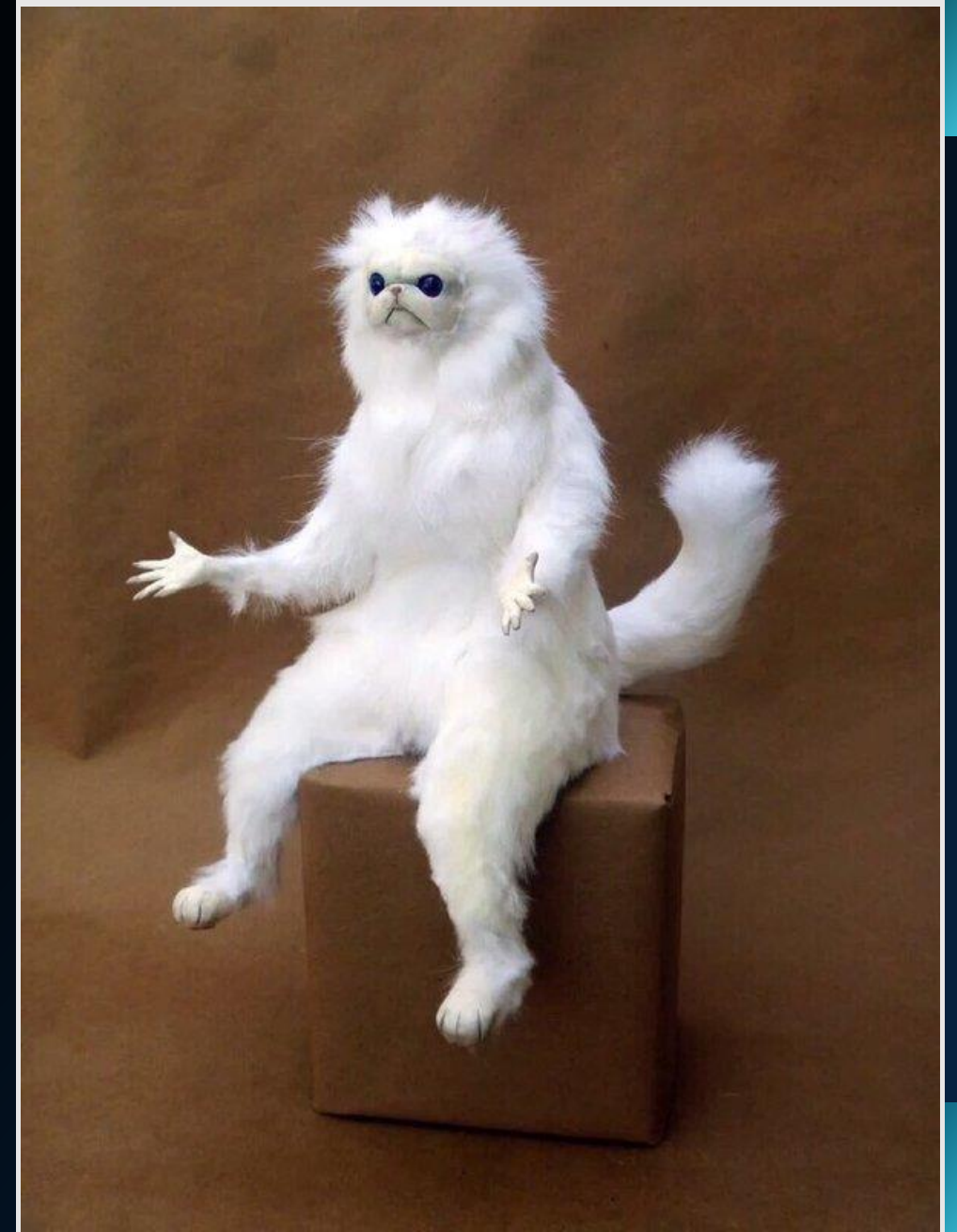
Schema Registry





Warum?

- Tieferes Verständnis
- „Kafka is dead, long live Kafka“:
 - Kora
 - RedPanda
 - Warpstream
 - AutoMQ
 - ...



Grundlegendes

- Kommunikation über binäres Protokoll per TCP
- Request/Response-Paare
- Bidirektionale Kompatibilität
- Unterstützt Batching
- Reihenfolge der Verarbeitung wird garantiert



Datentypen

Datentyp

Wertebereich

INT32

Vorzeichenbehafteter Integer-Wert
zwischen -2^{31} und $2^{31}-1$.

VARINT

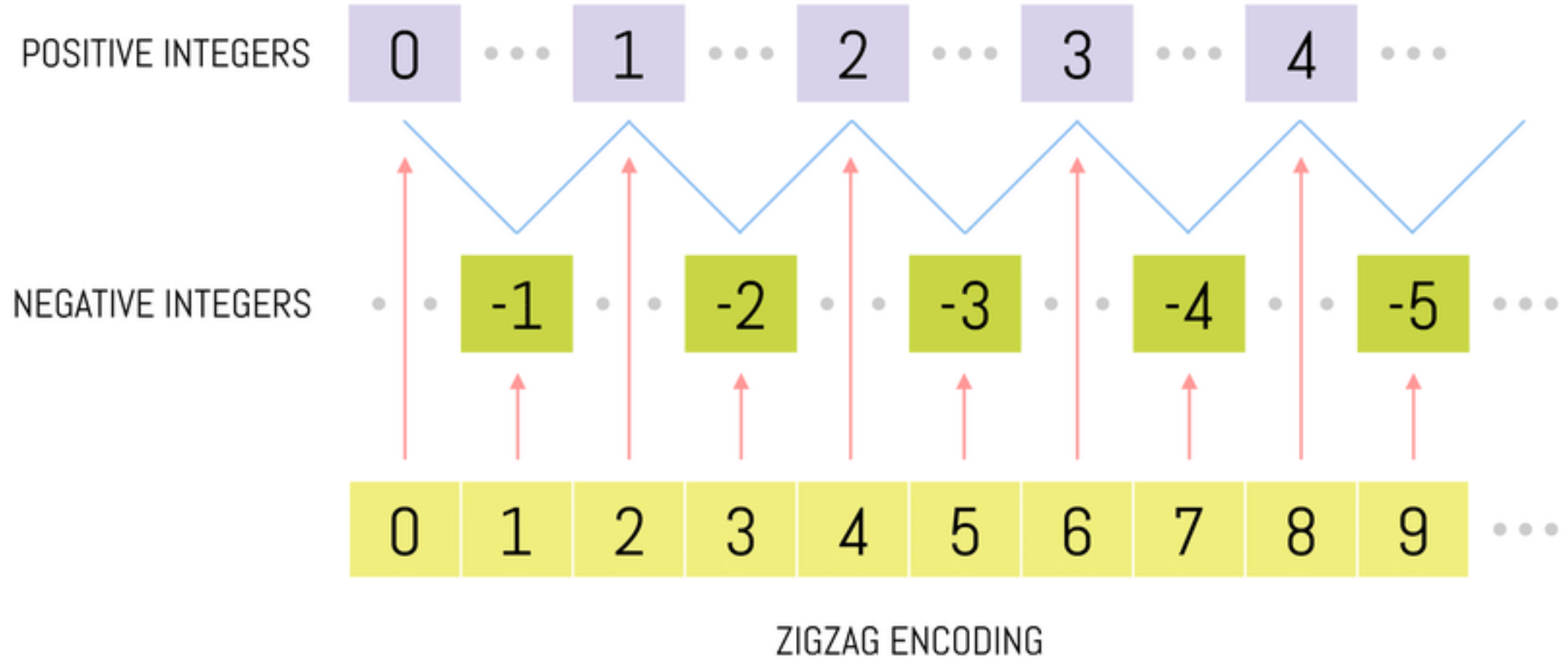
Vorzeichenbehafteter Integer-Wert
zwischen -2^{31} und $2^{31}-1$ im Zig-Zag-
Encoding enkodiert.

COMPACT_STRING

Zuerst Länge N+1 als VARINT. Danach N
Bytes UTF-8 kodierte Zeichenkette.

COMPACT_ARRAY

Zuerst Länge N+1 als VARINT. Danach N
Objekte.



VARINT

1	0	[0 00000000]		=	00000000
2	1	[0 00000001]		=	00000001
3	127	[0 11111111]		=	11111111
4	128	[1 00000000]	[0 00000001]	=	000000100000000
5	129	[1 00000001]	[0 00000001]	=	000000100000001
6	256	[1 00000000]	[0 00000010]	=	000001000000000
7	1024	[1 00000000]	[0 00010000]	=	000100000000000

<https://ivanyu.me/blog/2024/09/08/kafka-protocol-practical-guide/>

Request-Header

```
1 Request Header v2 => request_api_key request_api_version correlation_id  
   client_id _tagged_fields  
2   request_api_key => INT16  
3   request_api_version => INT16  
4   correlation_id => INT32  
5   client_id => NULLABLE_STRING
```


CreateTopics-Request

```
1 CreateTopics Request (Version: 7) => [topics] timeout_ms validate_only
   _tagged_fields
2   topics => name num_partitions replication_factor [assignments] [configs]
   _tagged_fields
3     name => COMPACT_STRING
4     num_partitions => INT32
5     replication_factor => INT16
6     assignments => partition_index [broker_ids] _tagged_fields
7       partition_index => INT32
8       broker_ids => INT32
9     configs => name value _tagged_fields
10      name => COMPACT_STRING
11      value => COMPACT_NULLABLE_STRING
12  timeout_ms => INT32
13  validate_only => BOOLEAN
```

ENOUGH TALK



LET'S CODE

Links & Weiteres

- Kafka Protocol Guide: <https://kafka.apache.org/protocol.html>
- Repo: <https://github.com/tiffland/kafka-wire-protocol-javaland>
- Artikel in Mai Ausgabe der JavaAktuell

Q&A