

Side-effects

- Inevitably your stream may have to perform some side-effects (HTTP call, db lookup/write)
- Lose guarantees/properties of Kafka (eg, processing guarantees, notion of time)
- Side effects + replaying messages = :(
- Get out of jail card: idempotent/append only calls

Pushing side-effects to the edge

```
(-> (.stream "payments")  
  (groupByKey)  
  (aggregate  
    (constantly [])  
    (fn [_ _ v aggregate]  
      (conj aggregate v))))  
(toStream)  
(to "notifications"))
```