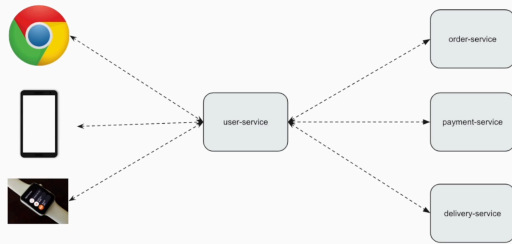


# What is Reactive programming?

Thursday 30 January 2025 19:20

In this lecture, let's talk about reactive stream specification and what is reactive programming.

## IO - Microservices Communication



- Tech Giants like Twitter, Microsoft, etc, they all realized applications are getting more complex now.
  - Now people use smartphones, smartwatch, etc and they are all connected to the internet and they want updates immediately. They want notifications.
  - So the typical request and response style communication is not helping that much because we cannot keep on sending the request to the remote server asking for constant updates. We cannot keep on sending requests every second. It is simply not efficient.
  - Instead, the server should notify the client in case of updates - Streaming response.
  - Similarly, things like, what kind of movies the user is browsing, what kind of tweets the user interacts - the server wants to monitor these kind of things.
  - So the client has to send a stream of requests to the server
  - Hence, this is a very complex interaction model - communication pattern. So the typical request response style communication will not help much for this.
  - So we need a better programming model
- 
- So around year 2014, they all came up with a brand new specification for this. Its called reactive stream specification

## Reactive Streams

- Reactive Streams is an initiative to provide a standard for asynchronous stream processing with non-blocking back pressure. This encompasses efforts aimed at runtime environments (JVM and JavaScript) as well as network protocols.
- It defines the standard for asynchronous stream processing with non-blocking back pressure. These are the main keywords or principles here.
- For reactive programming, these are the keywords,
  - Asynchronous
  - Non-blocking
  - Back pressure
  - Stream processing

What is Reactive programming?

- Reactive programming is a programming paradigm to process stream of messages in a non-blocking and asynchronous manner, while handling backpressure.
  - It will simplify the non-blocking asynchronous communication.
  - It is based on the Observer design pattern
- 
- Object oriented programming like Java does not have the tools to simplify the non-blocking async IO calls
  - This is where Reactive programming comes into picture.
  - So the reactive programming is for IO calls.
  - Reactive programming **complements** Object oriented programming by providing powerful tools and abstractions to handle asynchronous IO calls and handle complex data flows in modern applications.

