# Promises VS Observable:

**Both Promises and Observables help us dealing with asynchronous operations. They can call certain callbacks when these asynchronous operations are done.**

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| **Promise** | **Observable** |
| promise emits a single value | Emits multiple values over a period of time |
| Ex: const numberPromise = new Promise((resolve) => {  resolve(5);  resolve(10);  });  numberPromise.then(value => console.log(value));  // still prints only 5 | const numberObservable = new Observable((observer) => {  observer.next(5);  observer.next(10);  });  numberObservable.subscribe(value => console.log(value));  // prints 5 and 10 |
| A promise is Not Lazy | Observable is Lazy. The "Observable" is slow. It isn't called until we are subscribed to it. |
| A Promise cannot be cancelled | An Observable can be cancelled by using the unsubscribe() method |
|  | An addition Observable provides many powerful operators like map, foreach, filter, reduce, retry, retryWhen etc. |
| having one pipeline | Multiple PipeLines |
| Cannot be **retried**(Promises should have access to the original function that returned the promise to have a retry capability, which is a bad practice) | Helps you run functions asynchronously, and use their return values in a continuous sequence (**multiple times**) when executed. |
| Provides Operators: filter, map , reduce, retry | No operators |

# Why Subject?

 An RxJS Subject is a special type of Observable that allows **values to be multicasted to many Observers**. While plain Observables are unicast (each subscribed Observer owns an independent execution of the Observable), Subjects are multicast.

## Internal Implementation:

* Internally to the Subject, subscribe does not invoke a new execution that delivers values. It simply registers the given Observer in a list of Observers, similarly to how addListener usually works in other libraries and languages.
* Every Subject is an Observer. It is an object with the methods next(v), error(e), and complete(). To feed a new value to the Subject, just call next(theValue), and it will be multicasted to the Observers registered to listen to the Subject.

### Example

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* Used to multicast for multiple Observer listening, So all subscribed subject will be listened to it.
* This is called a multicasting

## Behavior Subject:

BehaviorSubjects are useful for representing "values over time". For instance, an event stream of birthdays is a Subject, but the stream of a person's age would be a BehaviorSubject.

## Replay Subject:

A ReplaySubject records multiple values from the Observable execution and replays them to new subscribers.