Difference between Bandwidth and Bit rate

People who use the internet, whether mobile or fixed, often use terminologies like bandwidth and bit rate to refer to the speeds they are getting. They even use these terms interchangeably sometimes which is maybe understandable but not accurate. While these two terms are inter-related in a way, they are not the same. Let's have a look below.

What is bandwidth?

The bandwidth of a signal refers to the range of frequencies which represent that signal. Any information-carrying signal e.g. a mobile signal is transmitted over a range of frequencies where the difference between the higher and the lower frequencies within this range determines the bandwidth. The bandwidth is measured in Hertz (Hz).

So, when any information signal such as a voice call over the mobile network is transmitted, it uses a frequency channel which has a specific frequency assigned to it. The receiver (e.g. a mobile phone) can then use that frequency to receive that signal.

The bandwidth of a channel determines how much capacity is available on that channel to send or receive information (data). The required capacity for a certain channel is dependent on the amount of data being transmitted (upload) or received (download). For example, if you are streaming a video on YouTube you will end up consuming a lot more data than say updating a post on Facebook. As a result, the required capacity and bandwidth for video streaming would be a lot higher than those for updating a post.

What is bit rate?

The term bit rate refers to the quantity of data being transferred from one location to the other in a certain amount of time. The data is measured in bits and the time, in this context, is measured in seconds. That leads us to the unit of bit rate which is 'bits per second' or 'bps'. Since there are usually lots of bits per second for the kind of data we use nowadays (e.g. video streaming etc.), it is a common practice to express the bit rate in 1000s (kilo) or 1000000s (Mega) of bits. In the mobile telecom industry at this point in time (Jan 2020), it is a common practice to measure the bit rate in Mega-bits per second (Mbps). For the internet users, the bit rate is seen mostly as the upload and download speeds they get when using the internet.