**Question 1**

In this report I have conducted research based off the scenario of which type of database, that being the relational database, or the NoSql database, is more suited or compatible with the key challenges that databases have when large pools of social media come into play when storing or changing the structure or layout in regards to the added features.

**Definition of the recommended database type**

The type of database that I have chosen for this report, based of the scenario, would have to be the NoSql. The NoSql database type are basically what you call non-relational databases, and what they provide would be non-tabular format, they are much more flexible as they can adapt to the changes the user inputs or the new features, those new features would be documents, key-value pairs, graphs. This in general would offer more flexibility, scalability not to mention adaptability with the ongoingh new features that presents itself in the scenario. These benefits of using the NoSql databases are much greater than just using any other type of Sql database, that being the relative databases. The NoSql database also provides horizontal scaling, which allows for handling massive amounts of data by distributing it across multiple servers. (Geeksforgeeks, 2018)

**Detailed motivation**

The Motivational aspect as to why I have chosen the NoSql database, based of the scenario would one be the scalability aspect. Due to the scenario stating that social media in general generates millions of data, interactions and just keeps growing, with the help of the NoSql database type it would help with this issue as it will allow the use of horizontal scaling. This method of scaling can help with containing the new interactions of users inputing their data, as the NoSql can allow for new servers to be put into place thus helping keep the interaction of user inputing their data more efficiently, thus not reducing the performance or better yet not degrading the data input as with the new servers being added it can handle the new input of interactions of data input, thus making the relational databases seem inadequate to handle a large splurge of new interactions of data as it will struggle with scalability. (InterSystems, 2025)

Furthermore, there is another key feature that NoSql has been proven to be the better database in this case than relational database. (Zhang and Zhang, n.d.)That is the different types of structures that being the handling Unstructured and Semi-Structured Data, the key element that the NoSql has that can solve this problem would be its ability to be flexible. As we can see in the above scenario that social media has many different formats, and these formats would be, images, text, videos, reactions, comments as well as live streams, all of these formats are different from each other. Thus having the NoSql in place would disregard all the differences between each format allowing them to be in the database synchronised, with the features of the NoSql as it is document-based and key-value stores, (Zhang and Zhang, n.d.)thus allowing for flexibility in the schemes allowing different types of data to be stored and retreieved effectively. (InterSystems, 2025)

The final aspect or key feature that the NoSql has no issue with or is in general more suited to handle, performance wise, would be the ability to handle real-time performance or analytics. With social media being the prime data input into the database it would need real-time data analytics to be able to see the latest trends, the biggest streams the ups and downs of streams, what the media likes and dislikes. The NoSql has the resources to be able to provide fast, smooth readings of data as well as create a good user experience, with the help of column-family and in-memory stores as this is what NoSql uses when working with real-time analytics. (InterSystems, 2025)

**What kinds of data that would be stored in the NoSql ?**

The first type of data that would be used in the NoSql database would most likley be User profiles, user profiles is crucial in social media, as it can help you as the user create your own personel account that will allow you to view the content that you only want to see that is related to the searches you give. In the database itself when creating the user profile, it would store your email, username and password, bio(GeeksforGeeks, 2024) and your preferences as to what you would like to see on social media. The second data type would be user interaction as this is data that will be captured when the user types in their own comments on stream or a video, the user vcan even like or dislike the video or share the video(GeeksforGeeks, 2024), I can even link this to the real-time engagement metric aspect that the NoSql database provides. The last data type that relates to social media would be the trending data as in data related to what is trending on social media, such as topic that has caught the attention of a lot of people on social media and have shared it across the platform, trending could also have or could include hashtags or not even a video it could just be a post that could be a single picture that could go viral about news or something exciting that a lot of people would want to comment, hashtag or share the post across the platform creating a trend. This also links in with real-time analytics as it could show In real-time what the top trending video, post or comment is on social media.

**Four types of the recommended database**

The four different types of databases that form the NoSql would be the Document-Based database. This type of database is allowing the use of different types of dcoumentation, such as JSON, BSON, or XML format, thus allowing the compliance with different documentation to form a hierarchal data structure in the NoSql. (MongoDB,2025) In the database itself the documents can each have their own personel field depending on what format they have to be able to have a variety of different post formats such as images, text and videos. (GeeksforGeeks, 2022)

The Second time of database within the NoSql would be the Key-Value Store. (MongoDB,2025) This type of database allows the more frequently selected or most accessed data in the database to be stored as a collection of key-value pairs, this is basically storing the frequently active data in a cache so that it can be accessed easily and the user wont have to go and find it again an example would be to store the user session information and preference settings, this will also allow easy access for users on social media.

The third type of database that can or is used in the NoSql would be the Column-Family Database. (MongoDB,2025) The use of columns when recording data in the database, as it will allow more efficiency when it comes to reading data in real-time analytics as it will be able to read the data at high speeds due to its column based format. An example of a column based format that they use in Facebook would be Fakebook and Twitter as the Column-Family database can handle many reads and writes at a time.

The fourth and final type of database that is going to be mentioned would be the Graph Databases. (MongoDB,2025) How the graph database works is that it is able to combine or, handle in the same graph, differengt types of relationshsips such as friend connections or followers as well as recommendations that are in social media that are two separate entities. The way that the graph database is able to do this is by using a feature known as edges and nodes, the advantage of using the graph database would be it flexibility as it can handle new data being processed with chnaging its structure to be able to suit the new data. It can also adapt to having change the data schema as it can adapt to the new use cases.

**The three Vs of big data**

The first of the Vs would be Volumn in general Volumn speaks of how much but in this case we can see that in accordance with the scenario it means that how much data inflow or the amount of data that is generated daily on social media platfoms and I would say that it is a lot, examples of these would include posts, videos, image and user interaction such as likes and comments. (Lutkevich, 2023)That is why we need to use the Nosql database as it is great when it comes to scalability as this database will be able to manage the growth efficiently.

The second V would be Velocity, Velocity is related to speed but in this case; social media is constantly changing at a fast rate, bringing in new data constantly at such a fast rate, these are called data updates and these occur in real-time, based off the scenario it is likes, comments, videos and shares. This data that is being processed and stored in the database must happen at such a fast rate, so that the user experience will be smooth and up to standard for the user. (Lutkevich, 2023)

The third and final V would be Variety, now in social media the database is going to be containing different forms of data that are completely different from each other, that being different formats, different structures or even unstructred data like user profiles, documents, videos and images this is why the NoSql offers flexibility as it will be able to process these different types of data accordingly. (Lutkevich, 2023)

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