

# Investigating GraphQL and evaluating the benefits in web service applications

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July 2025

## 0.1 What is GraphQL and how does it work?

Graph Query Language (GraphQL) is both a runtime and a query language developed to run on the server side for Application Programming Interfaces (API) to let clients request exactly the data they specify [1]. GraphQL uses a schema to define the data model and is strongly typed where each field has a data type belonging to that field and ensures that all fields are related to each other and follow through a graph related relationship [2]

## 0.2 Why may GraphQL be better or worse than REST

GraphQL helps provide a custom way in defining attributes in what the client is requesting data from the server. Compared to REST, a key advantage of GraphQL is it fetches all the related data in one request, therefore lowering requests made over the network as opposed to making individual HTTP requests to API endpoints in REST which can result in over-fetching data that may not be required [1].

That said, GraphQL may pose a challenge in slowing down development due to configuring GraphQL with all the data models and how they relate to each other. As well as writing create, read, update, delete endpoints per a data model defined. In addition to that, security or authorisation to prevent unauthorised access without set permissions from accessing these endpoints is also required [1].

A study has found that 22 participants had taken part in a controlled experiment that required to develop eight queries using REST and GraphQL to try and query a web service. This resulted in the participants taking significantly less time using GraphQL to write queries when being compared to using REST. Specifically, it took six minutes for GraphQL and nine minutes for REST queries to be written. This indicates that writing queries with GraphQL is substantially simpler to write queries to a web service with [3].

### 0.3 How does GraphQL help build or improve web services

GraphQL helps improve web services as it offers supporting tools for testing and writing queries, such as auto completion of features, thus reducing the time to write the query. An advantage for developers is GraphQL has a well-known syntax, used in other industry languages. GraphQL is also focused on applying objects, schemas, queries, interfaces and types through its syntax, which developers are aware of. The author states that participants found GraphQL simple to use, even without prior experience [3]. That said it can be much easier to build / improve web services due to requiring no experience in GraphQL.

## References

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- [3] G. Brito and M. T. Valente, “Rest vs graphql: A controlled experiment,” in *2020 IEEE international conference on software architecture (ICSA)*. IEEE, 2020, pp. 81–91.