

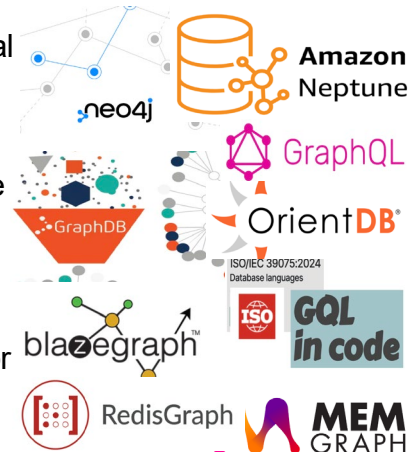
Seminar Sommer 2026

Graph Database Management

Prof. Dr. Steffen Staab
steffen.staab@ki.uni-stuttgart.de

Dr. Ratan Bahadur Thapa
ratan.thapa@ki.uni-stuttgart.de

Graph databases [1] are a powerful tool for managing and querying highly connected data. Unlike traditional relational databases, graph databases use nodes, edges, and properties to represent and store information. Nodes represent entities or discrete objects, such as individuals or products, in a graph data model, while edges define the relationships between these entities, hold data in properties, and are classified by labels. For example, in a social network, a node could represent a user, with properties such as "name" and "age," and it could be connected to other users by relationships like "FRIEND" or "FOLLOW," each with its own properties, such as "since" or "interaction_count."



Graph databases are widely adopted across various industries for applications such as social networks, recommendation systems, fraud detection, and network analysis. Leading technology companies such as LinkedIn, Facebook, Amazon, Bosch, Siemens, and Samsung leverage graph databases to enhance their services and deliver more personalized user experiences.

This seminar provides an overview of existing graph database technologies, covering fundamental concepts such as graph data modeling, query languages (e.g., Cypher, GQL, GraphQL, PGQL, SPARQL, etc.), and performance optimization, along with their real-world applications. Participants, based on their interests, will also have the opportunity to explore extended graph database-related research topics, such as distributed graph processing, and the integration of graph databases with other emerging data management technologies.

Target Group

The seminar is designed for master's students in the field of computer science and related study programs, such as software engineering and AI & data science. While no prior experience with graph databases is required, basic knowledge of relational databases is necessary.

Procedure

Following the introductory sessions, participants will choose a topic of interest and work on a technical report. The report will then be peer-reviewed by fellow participants. At the end, participants will submit the finalized report as part of the final assessment. The seminar will be conducted in English, and both the presentations and seminar reports must be delivered in English.

[1] Robinson, Ian, et al. "Graph Databases: New Opportunities for Connected Data," July 2015 <https://dl.acm.org/doi/10.5555/2846367>