Architecture of Mobile Distributed Database Systems

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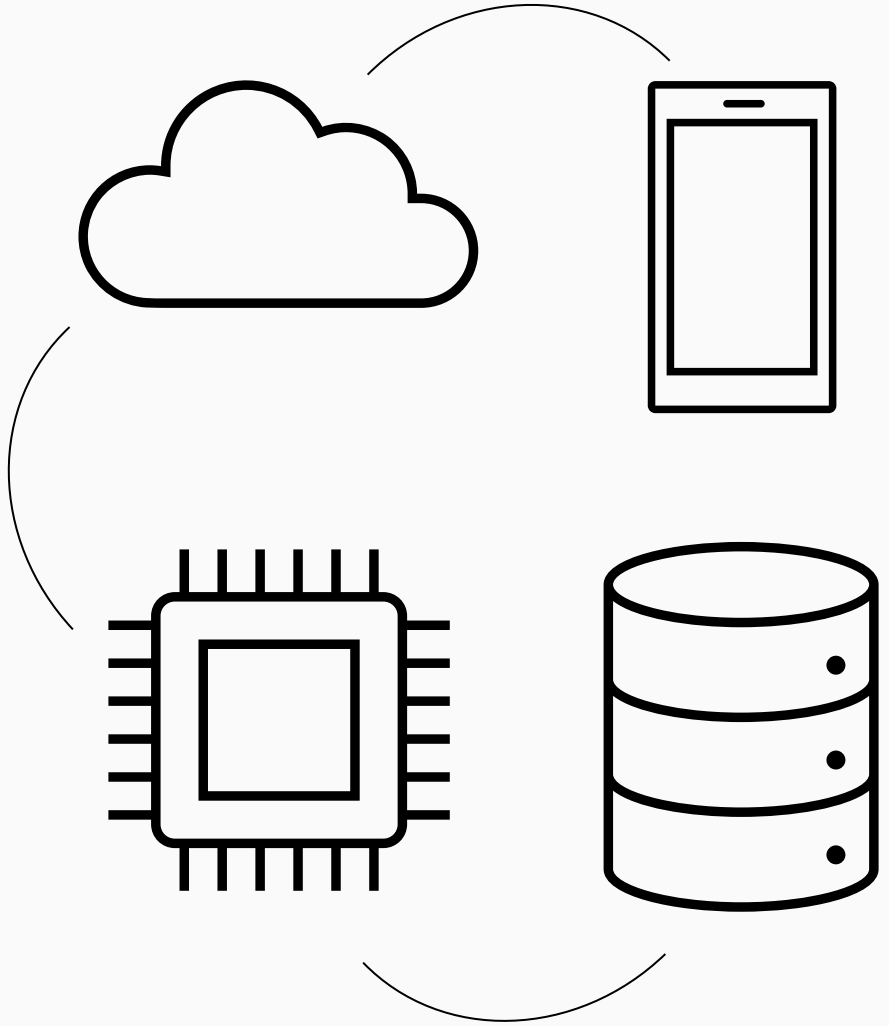
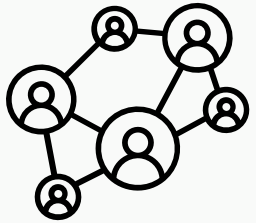
Introduction

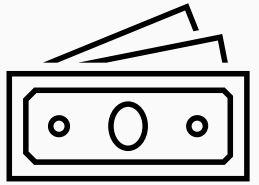
- Mobility for distributed databases (MDDS) querying is a topic of interest and an emerging trend in database technology.
- This is important with smaller mobile devices being created each day capable of fetching and querying databases.
- The architecture will underline the services, performance, heuristic approach, limitations, and applications of MDDS.



Research Question(s)

- How different does client-server, collaborating server, middleware, and warehouse architecture operate in mobile distributed database systems?
- Are there particular issues in data management and integrity that arise?
- What is a good performance metric between MDDS and DDS?
- What are the applications of MDDS?



Literature Review

- Analysis is done on the architecture of mobile distributed database by Mourlin & Farinone (2019), Ali & Bagchi (2018), Heuer & Lubinski (1996), Dumont et al. (2016), Walker (2022). SOAP and REST services are compared in **Figure 1.**
- Performance of MDDS is surveyed using Ali & Bagchi (2018), Swaroop & Shanker (2010), Zvara et al. (2019), Dumont et al. (2016). The unique set of requirements for batch processing, performance improvements, communication costs, and network topology is highlighted.

SOAP vs REST Services

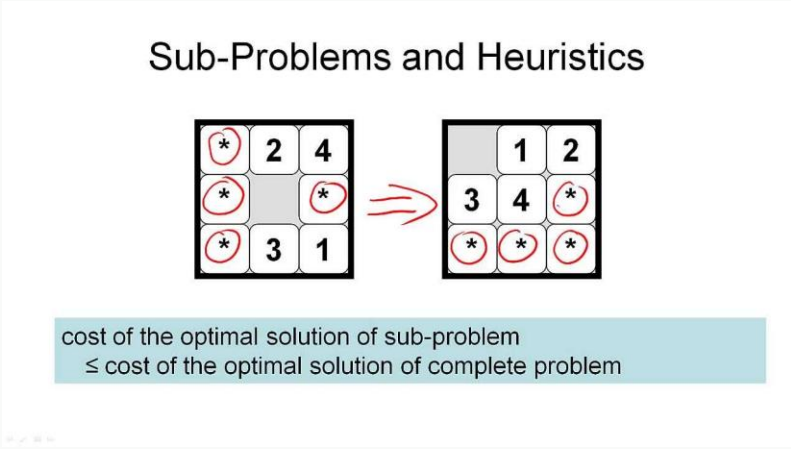
Figure 1

Table Comparison between SOAP and REST Services (Dumont et al., 2016; Walker, 2022):

SOAP	REST
Protocol with a web-service description language (WSDL) file containing instructions and location.	Architectural style with the following constraints: Client-server, stateless, cacheable, layered system, uniform interface.
Requires a considerable amount of bandwidth and data transfers.	Low amount of bandwidth for requests that contain JSON messages.
Compatible with XML.	Compatible with JSON, .txt, HTML, XML, and more.
Service interface provided by WSDL that is exposed to client applications.	Service interface provided by uniform service locators accessing hardware components.
Not compatible with REST within SOAP.	Compatible with SOAP within REST.

Literature Review (Cont'd)

- Heuristic approaches in MDDS is emphasized in the articles presented by Singh & Shanker (2017) and Ali & Bagchi (2018).
- Heuristic methods in mobile systems make for a degree of uncertainty within the wireless mediums for priority systems and the constant communication between server and mobile clients during transaction execution.



Open Education Edinburgh. (2014). *4.9. AIPLAN - Pattern Databases* [Video]. YouTube. https://www.youtube.com/watch?v=HZWV4uOJWk8

Research Methods

- Utilizing student access to library and my own membership privileges from IEEE & ACM to gather information using the UMGC Library, IEEE Xplore, and ACM Digital Library.
- Articles are reviewed and compared in conjunction with how they answer the research question.

Discussion/Conclusion

- Mobile distributed database systems involve e-commerce with transactions that run on various sites of an online provider; online multimedia and music service providers use unstructured data to optimize services.
- Zhou (2017) ran an experiment comparing DDS and MDDS when the test table data is more than 1 million and the concurrent number is 100. The distributed system has a shorter concurrent query time, and system response rate indicating wireless.
- Mobile distributed database systems pose more performance problems than stationary database systems, but they have a lot of growth potential.

Key References

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