Needs of data management and multi-model databases

Database Systems Lab
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Database Systems Lab – Mission Statement

• Understand the need of data management and scalable strategies for a variety of traditional and emerging database applications.

• Development of new indexing and query processing algorithms

• Disruptive storage paradigms with new storage media

• Scale-out platforms for data services
Why Database Systems?

• Present at the core of most contemporary infrastructure for banking and commercial acts.

• Relational database systems (RDBMS’s) serve as the engine and repositories of records for online transactions (OLTP) and online analytics (OLAP)

• However, explosion in unstructured data shows traditional RDBMS is not enough.
Traditional bigdata analysis and its limits

- Data scientists want to find the upcoming bottleneck with current traffic data, road network data and the navigation application data.
  - Traffic data is in a traditional relational model
  - Navigation application data is in a graph model
  - Road network data is in the JSON format
MxMDB Project (2020.03 ~ 2024.02)

• Single DBMS that can use multiple data models (Relational, JSON, Array, Graph) with multiple storage engines.

• Supports multi-model query processing for casual users.
  • Inter model foreign key to manage multiple models efficiently.

• Intuitive API to maintain database and enable effective analysis.
Expected benefits from MxMDB
MxMDB – Challenges

• Multi-model query and inter-model foreign key are not well or formally defined.

• Different models across multiple storage engines make it difficult to maintain consistency.

• Not all storage engines are open-sourced and each uses different language.
Other projects

• Construction and Demonstration of Fine Particle Monitoring System using Scanning LIDAR (2019 ~)
  • Visualization and monitoring system with an efficient storage for multi-dimensional and spatial data on fine particles.

• Predicting Potential Drug-Drug Interactions via Big Data Analysis and Machine Learning (2019 ~)
  • System for predicting potential drug-drug interactions (DDI)

• Big Data Big Computing Engine for High-Performance Computer (2016 ~)
  • Big Data Big Computing (BDBC) engine for massive application programs based on high-performance computing.
  • Overcome the limitations of large-scale computations such as long-running time and massive memory consumption.