Implementasi Real-Time Change Data Capture untuk Learning Analytics Menggunakan Write-Ahead Logging dan Distributed Stream Processing = Real-Time Change Data Capture Implementation for Learning Analytics Using Write-Ahead Logging and Distributed Stream Processing

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Abstrak

Data aktivitas pembelajaran seperti pada learning management system dapat digunakan untuk memantau kegiatan belajar. Penyajian data kegiatan pembelajaran secara real-time membantu pengambilan keputusan yang lebih cepat. Penelitian ini merancang dan mengimplementasikan sistem real-time change data capture menggunakan write-ahead logging dan distributed stream processing untuk learning analytics di Fakultas Ilmu Komputer Universitas Indonesia (Fasilkom UI). Data yang disajikan berasal dari learning management system dan sistem presensi berbasis smart card. Dengan real-time change data capture menggunakan Debezium, data dapat disajikan secara real-time dan ringan dalam membebani sistem sumber data. Sistem menggunakan Apache Kafka sebagai message queue dan Apache Flink untuk melakukan distributed stream processing. Data disajikan dalam dashboard visualisasi menggunakan Grafana. Aktivitas pembelajaran yang disajikan secara real-time pada dashboard dapat digunakan untuk melihat pola kegiatan belajar mahasiswa dan membantu pengambilan keputusan.

.....Learning activity data such as the learning management system can be used to monitor learning activities. Presentation of learning activity data in real time helps faster decision making. This research design and implement a real-time data capture change system using write-ahead logging and distributed stream processing for learning analytics at the Faculty of Computer Science, University of Indonesia (Fasilkom UI). Data comes from learning management systems and presence-based systems smart card. With real-time change data capture using Debezium, data can be presented in real-time while not overloading the data sources. The system uses Apache Kafka as a message queue and Apache Flink to do distributed stream processing. Data is presented in a visualization dashboard using Grafana. Learning activities data that are presented on the real-time dashboard can be used to see patterns of student learning activities and assist decision making.