Materialized Views in a Distributed Event Stream Processing Environment

Materialized Views over Heterogeneous Structured Data Sources in a Distributed Event Stream Processing Environment

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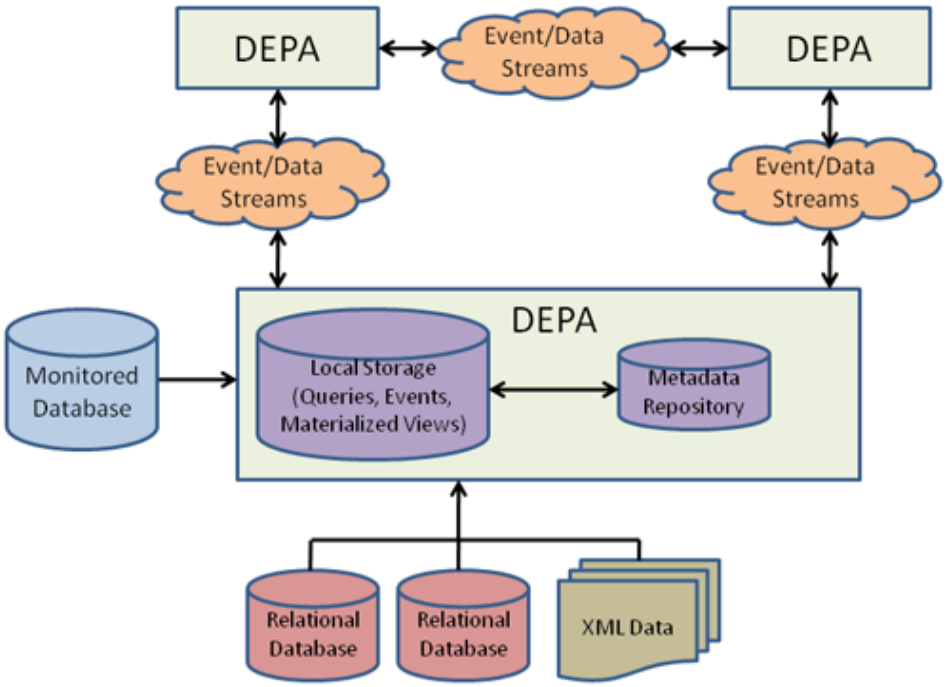
Summary



Software systems are becoming increasingly complex, requiring the coordination of heterogeneous structured data sources in a loosely-coupled distributed environment with support for handling events and streaming data. Some sample systems include homeland security, criminal justice, supply chain management, health care, and consumer monitoring systems to support marketing, personalization, and fraud detection. Such software systems involve query expressions over the data for detecting events, monitoring conditions, handling streams, and querying data. This research analyzes the dependencies among these filtering query expressions over structured data sources defined in different language components over relational or data-centric XML to detect common subexpressions as candidates for materialized views. When views are materialized, the results of the computed view are stored so that subsequent access to the view can efficiently retrieve information to avoid the cost of recomputing the entire view on subsequent references. This performance improvement is even more critical with distributed data sources. However, the materialized view must be updated if any data source that it depends on has changed. To avoid the recomputation of the entire view, an incremental view maintenance algorithm uses the change to incrementally compute updates to the materialized view. Using state-of-the-art commercial and open-source components, a prototype environment that supports a distributed event stream processing environment provides a research and evaluation platform to explore the identification, specification, and incremental evaluation of materialized views over heterogeneous, distributed structured data sources.

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