Architecture for Dynamic Schema Evolution in Heterogeneous Database Environments: A Prototype System and Its Evaluation

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Abstract

Dynamic schema evolution is the process of evolving a database schema by incorporating changes in a timely manner, without loss of existing data, and without significantly affecting the day-to-day operations of the database. Systems that manage schema evolution are described in the literature, but address schema evolution single, stand-alone, object-oriented databases. Organizations typically use an integrated set of multiple different databases for satisfying their complex data needs. Managing schema evolution in such heterogeneous data environments (HDE) has not been dealt with. A logical architecture for managing dynamic schema evolution in a HDE is proposed in this paper. The architecture incorporates a graph-theoretic framework that is based on a set of requirements identified for dynamic schema evolution in a HDE. Its implementation in a prototype software system (SEMAD) is described. Implications for automating dynamic schema evolution are examined using SEMAD. An exploratory case study for evaluating the usefulness of SEMAD (to database administrators) in dynamically managing schema changes in a HDE is also presented.

several such repositories and organizations to link these in an attempt to integrate and share knowledge and across the organization. The methodology and mechanisms to manage dynamic schema evolution in a HDE are being applied to manage changes in knowledge repositories.

REFERENCES