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On Long-duration CAD Transactions

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Abstract

The conventional model of transactions is based on the notions of serializability and atomicity. This transaction model has served conventional data-processing applications well. However, it is not appropriate for a CAD environment. Transactions in a CAD environment are of long duration and represent interactive modifications to a complex design. Application of the standard techniques to ensure atomicity and serializability results in intolerably long waits or the undoing of a significant amount of work. In this paper, we first review a model of CAD transactions which allows a group of cooperating designers to arrive at a complex design without being forced to wait over a long duration, and which also allows a group of designers to collaborate on a design with another group by assigning subtasks. We then discuss concurrency control and recovery schemes that implement the model. We also propose a number of significant extensions to the current theory of concurrency control to achieve a high degree of parallelism among transactions, while preserving database consistency.

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