**H-Store: A High-Performance, Distributed Main Memory Transaction Processing System**

**Summary:** This paper discusses about a highly distributed based Database – H-Store. The paper discusses about the internals of H-store system along with the detailed overview of the various design decisions. Additionally, authors describe the demonstration system concepted to perform in-depth study of the execution behavior.

**Introduction:** The paper is mainly focused on designing a memory-based database system that could work over multiple machines within a local area cluster. Additionally, the paper tries to investigate the operating environment along with non-trivial properties of OLTP transactions.

**Literature Review:** Most of the memory-based database systems in today’s world are carrying a baggage of R database which may or may not be required for target applications. Although modifications in the old RDBMS is possible, it is recommended to build a new OLTP system.

**Implementation:** The paper describes H-store system as a row-store based relational database where each instance is cluster of two or more nodes within a domain where each node has a number of sites working independently on a single assigned processor on the same machine environment. A relation has partitions replicated on multiple sites. OLTP applications make calls to execute stored procedures identified by unique names and the instance of these procedures are the transactions invoked by OLTP. H-Store has an administrator with a cluster deployment framework that takes as input a set of stored procedures, a database schema, a sample workload, and a set of available sites in the cluster. The framework outputs a list of unique invocation handlers that are used to reference the procedures at runtime.

The paper discusses about two types of transactions that occur within the system: single-sited (executed on single-site) transactions and One-shot (cannot be executed on a single site) transactions. The paper further talks about various physical layouts that depends on a number of factors.

**Methods:** The paper carries out an experiment on H-store executing a cluster to investigate the affect of the database properties in the performance of OLTP systems. They have used the TPC-C benchmark’s set of transactions, database schema, and pre-generated data as target domain. The demonstration executes in two distinct operational modes: (1) a pre-generated workload with fixed parameter values or (2) a randomly generated workload mode with randomized values. The experiment uses three parameters for checking performance: Table Representation, Data Partitioning, K-Safety.

**Results:** With table replication, execution time of transactions shortened while data replication allows concurrent transactions. K-safety took care of the larger databases that cannot simply reside in memory.

**Discussion:** The experiment used different physical database layouts to instantiate a new H-Store cluster. These were done manually however, it would be more efficient if the process of selecting layout becomes automated using some machine learning techniques.

**Conclusion:** The demonstration presented in this work provides insight on the development of a distributed main memory OLTP database and allows for the further study of the challenges inherent in this operating environment.