APACHE PHOENIX: TRIALS AND TRIBULATIONS OF BUILDING AN OPEN SOURCE, DISTRIBUTED DATABASE

This talk will focus on the journey Apache Phoenix[1] has taken from a one-man implemented tool for easing the access of HBase data, to a collaborative, multi-company, multi-project distributed relational database layer.

- Apache Phoenix is a relational database layer on top of Apache HBase that supports:
    - SQL 92 for querying, DML, and DDL
    - Mix of OLTP and OLAP workloads
    - Compilation of SQL statements into parallelized, native store calls
    - Client embedded or remotable JDBC driver
    - Multi-tenancy through views and tenant-specific connections
    - Multiple secondary index implementations optimized for different workloads
    - Flashback queries leveraging immutability of underlying store
- Leverages many other projects as component parts:
    - Apache HBase[2], an LSM tree implementation of a distributed KeyValue store based on Google Bigtable[3].
    - Apache Calcite[4], a query planner and cost-based optimizer framework based on Volcano optimizer[5], which opens the door for federation across other Calcite consumers such as
        - Apache Hive[6] for HDFS data
        - Apache Drill[7] for JSON data
        - Apache Kylin[8] for materialized views
        - Standard RDBMS sources
    - Apache Calcite Avatica[9], a remotable JDBC driver plugin
    - Cask Tephra[10], a snapshot-isolation transaction provider for HBase.
    - Apache HTrace[11], a distributed tracing framework for monitoring and management

[1] Apache Phoenix: http://phoenix.apache.org/
[2] Apache HBase: http://hbase.apache.org/
[3] Bigtable: A Distributed Storage System for Structured Data: http://research.google.com/archive/bigtable.html
[4] Apache Calcite: https://github.com/apache/incubator-calcite/blob/master/README.md
[5] Volcano optimizer: http://www.seas.upenn.edu/~zives/03s/cis650/P209.PDF
[6] Apache Hive: https://hive.apache.org/
[7] Apache Drill: http://drill.apache.org/
[8] Apache Kylin: http://kylin.incubator.apache.org/
[9] Apache Calcite Avatica: https://github.com/apache/incubator-calcite/tree/master/avatica
[10] Cask Tephra: http://tephra.io/
[11] Apache HTrace: http://htrace.incubator.apache.org/

James is an architect at salesforce.com in the Big Data Group. He founded the Apache Phoenix project and leads the development effort. Prior to working at Salesforce.com, James worked at BEA Systems on projects such as a federated query processing system and an event driven programming platform and has worked at various other start-ups in the computer industry over the past 20+ years.