**INTRODUCTION**

rENIAC NoSQL Data Engine is a transparent proxy that is placed between the Cassandra clients and Cassandra database nodes. It caches data in local storage and responds to queries by serving data either from its local storage or fetching it from the backend database when the data does not exist in the local storage. rENIAC NoSQL Data Engine leverages Xilinx® Alveo™ to speed up query acceleration and data access. Xilinx Alveo acceleration provides consistently lower latency and higher throughput as it is not subject to delays due to garbage collection and compaction. This Solution can be deployed on-prem or in the public cloud.

**PRODUCT OVERVIEW**

rENIAC NoSQL Data Engine has been designed to work without requiring any changes to the client code or the database, and with minimal configuration. The rENIAC NoSQL Data Engine nodes are listening for incoming queries on the configured port. For read queries, the Engine parses the query and looks for the data in the local storage. If found, it returns the result to the client. If not found, it obtains the data from the database cluster, stores a copy in the local storage and returns the result to the client.

For insert, update and delete operations, the proxy forwards the query to the database cluster. When the database has successfully processed the query, the proxy forwards the response to the client and updates its copy of the data.

The Data Engine generates metrics and log messages that are useful in understanding its performance. The Data Engine sends metrics and logs to a metrics service which is responsible for displaying in a console window, in a browser and also for storing the data on disk.

**SOLUTION OVERVIEW**

rENIAC Distributed Data Engine

- Leverages off the shelves servers/CPU + FPGA + SSD
- Deployed as a network service with no software change
- Leading edge technology using FPGAs, SSDs and CPUs

- Apache Cassandra NoSQL
- 2 -4x higher TPS performance
- Up to 50% lower TCO
- Sub 1ms latency @ 99th percentile
- Up to 10x lower predictable latency
Database Acceleration
Xilinx Alveo Accelerated Apache Cassandra
NoSQL, MySQL*, MariaDB*

About rENIAC Distributed Data Engine

Distributed Data Engine, deployed as-a-network-service, allows disaggregation of transaction and data storage scaling. To handle high volume of transactions, Data Proxy’s unique architecture attaches tiered storage class memory directly to it’s low latency network stack to process large number of transactions without querying the DB for every request. The Proxy’s runtime plug-in software enables seamless integration with any existing DBs and ensures no application code change is required.

PERFORMANCE

- **1ms** latency @ 99th percentile
- **2.1x** higher TPS performance (4x on roadmap)
- **3.6x** lower predictable latency
- **Up to 50%** lower TCO

*Performance testing completed with Cassandra Stress Test on Xilinx Alveo U250 + Intel Xeon Silver 4116 CPU vs. CPU-only architecture based on Intel Xeon Silver 4116 CPU. Result: throughput increase of up to 2.1x, latency lowered by 3.6x.

- Compaction runs 2.5x faster with deployment of rENIAC Data Proxy + Cassandra
- More IOPS are available for compaction when using rENIAC Data Engine
- By inference, SLA will be better maintained & less disk overhead is needed to run compaction

Takethe NEXT STEP

Learn more about Alveo accelerators
Learn more about rENIAC, Inc.: www.reniac.com
Reach out to the team at info@reniac.com to learn more.