"The database was the hardest problem – we needed it to be able to read and write from all datacenters, and handle any consistency problems. Maintaining consistency in the face of the distances and failures was not going to be trivial," says Ibrahim Hamouda, CEO of Sphinx Information Technology.

The operations team had experience with different MySQL Replication topologies, including masterslave replication with one updateable master, or circular replication with multiple updateable masters.

Although circular replication was a potential solution for a multi-datacenter setup, it was very fragile. Any problems with any of the nodes in the ring would cause the whole replication scheme to break. Also, since replication was asynchronous, serving writes from multiple locations might lead to conflicts (eventual consistency). Since data integrity could not be
guaranteed, circular replication was not a realistic solution.

**SOLUTION**

The team ran evaluations on two multi-master solutions for MySQL: MySQL Cluster and Galera Cluster for MySQL.

Each solution were evaluated for its ability to span across at least 2 data centers and provide strong consistency of data. The datacenters were in Calgary and Vancouver, i.e., about 1000 km apart with a latency of approximately 20 milliseconds. This ensured different power and network backbones on the grid. A third datacenter located in Africa will be added during 2013.

Galera was chosen as it performed better in a cross-region multi-datacenter setup. In this case the certification-based replication was better adapted to WAN latencies than MySQL Cluster's twophase commit protocol. Also, since Galera uses the InnoDB storage engine transparently, there was no need to spend time to optimize application performance by migrating their existing InnoDB tables and tune queries for the MySQL Cluster's NDB storage engine.

Using the Severalnines Configurator and ClusterControl, the operations team were quickly able to set up the different clusters. The team also leveraged a whole toolset from loading data, benchmarking and cluster management to speed up the evaluation.

“It would have taken us much longer without these tools, and thankfully, our ops team could instead concentrate on finding the right clustering solution for our requirements”, says Ibrahim Hamouda. “A cross-region multi-datacenter database infrastructure translates into a powerful competitive advantage for our global clients who require geolocality and cannot afford any downtime. This is a game changer for us.”

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