



Título: PopRing: A Popularity-aware Replica Placement for Key Value Store using Genetic Algorithm

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Resumo:

Distributed key-value stores (KVS) are a well-established approach for cloud data-intensive applications. Their success came from the ability to manage huge data traffic driven by the explosive growth of social networks, e-commerce, enterprise and so on. These systems evolved to take advantage of peer-to-peer and replication techniques to guarantee scalability and availability, but they were not designed to consider workloads with data access skew, mainly caused by popular data. In this work, we have analyzed the problem of replica placement on KVS on workloads with data access skew. We formally defined a KVS and our problem as a multi-objective optimization of the all three objectives such as load imbalance, replica placement maintenance and replica placement. Then, we have presented the PopRing approach based on genetic algorithm to solve the multi-objective optimization by using the scalarization method. We used OpenStack-Swift placement as the baseline and use the baseline to evaluate performance improvements of PopRing under different configurations. A conservative PopRing configuration reduced in 52% the load imbalance and in 32% the replica placement maintenance while requiring the reconfiguration (data movement) of only 6% of total system data.

Banca:

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