

Ceph 云存储中基于混合文件系统的读写性能优化方法

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摘要: 针对 Ceph 云存储底层 OSD 节点使用不同单一文件系统会造成集群在读、写不同大小文件性能上的较大差异这一问题, 本文提出一种在 Ceph 集群中混合使用文件系统方法来优化集群读、写性能. 通过采用层次分析法综合考虑不同文件系统在读、写不同大小文件时候各自的优势, 构造层次结构模型, 给出每个层次的判断矩阵并进行一致性检验, 通过求解判断矩阵最大特征值对应的归一化特征向量, 最后确定了底层 OSD 节点使用不同文件系统的比例. 在真实环境中对所提出的方法进行实验测试, 结果表明所提出的方法能够较好的改善当前 Ceph 集群使用单一文件系统带来的不足, 优化了集群读、写不同大小文件速度性能.

关键词: Ceph; 云存储; 文件系统; 层次分析法

Optimization of Ceph Reads and Writes Performance Based on Hybrid File System

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Abstract: The cluster of Ceph cloud storage will have a greater performance differences in reading and writing different sizes of documents, when the underlying OSD nodes use different single file systems. To solve this problem, this paper proposes a hybrid file system approach in the Ceph cluster to optimize the performance of reading and writing. Through the use of analytic hierarchy process (AHP), this method considers the advantages of different file systems in reading and writing different size files, constructs a hierarchical model, gets the judgment matrix of each level and carries out the consistency test. Then, the normalized feature corresponding to the maximum eigenvalue of the judgment matrix is worked out to determine the proportion of the underlying OSD nodes using different file systems. By testing in the real environment, the result shows that this method can make up the shortcomings of the current Ceph cluster using a single file system, achieve the purpose of optimizing the speed performance in reading and writing different size of files.

Key words: Ceph; cloud storage; file system; analytic hierarchy process

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