

# Dynamic data auditing scheme for big data storage

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# Problems & Ideas

- Problems of auditing schemes for big data platform
  - the existing auditing schemes can't achieve dynamic auditing for big data platforms.
- Ideas:
  - We introduce a data structure, namely Data Block Index Table (DBIT), to support dynamic data operations such as inserting, modifying, appending, and deleting. With this data structure, our scheme achieves dynamic auditing on HDFS.
  - We design the auditing algorithm based on the MapReduce framework to audit data in parallel. It improves auditing efficiency in distributed data storage systems for big data platforms.

# Main Contributions

	our scheme	reference [4]	reference [8]	reference [13]
public verification	yes	no	yes	yes
privacy protection	yes	no	no	yes
dynamic auditing on HDFS	yes	no	no	no
size of verification block tags	$O(n)$	$O(n)$	$O(n)$	$O(n)$
communication	$O(1)$	$O(1)$	$O(n \log n)$	$O(s)$
SP computation	$O(n)$	$O(1)$	$O(n \log n)$	$O(n + s)$
TPA computation	$O(n)$	$O(1)$	$O(n \log n)$	$O(n + s)$
dynamic update	support	partially support	support	support
inserting operation	$O(1)$	not support	$O(\log n)$	$O(1)$
modifying operation	$O(1)$	not support	$O(\log n)$	$O(1)$
deleting operation	$O(1)$	$O(1)$	$O(\log n)$	$O(1)$
appending operation	$O(1)$	$O(1)$	$O(\log n)$	$O(1)$

$n$  is the number of data blocks and  $s$  is the number of sectors in a block.

Figure 1 Scheme Comparison

[4]G. Ateniese, R. D. Pietro, L. V. Mancini, and G. Tsudik. Scalable and Efficient Provable Data Possession. In: Proceedings of 4th Security and Privacy in Communication Networks Conference. 2008.

[8]Q. Wang, C. Wang, J. Li, K. Ren, and W. Lou. Enabling Public Verifiability and Data Dynamics for Storage Security in Cloud Computing. In: Proceedings of Computer Security Symposium, 2009, 355–370.

[13]Y. Zhu, G. -J. Ahn, H. Hu, S. S. Yau, H. G. An, C. -J. Hu. Dynamic Audit Services for Outsourced Storages in Clouds. IEEE Transactions on Services Computing. 2012, 6(2): 227–238.