An Analysis of the costs of Storing Data on the Ethereum Blockchain

One can store arbitrary data in the Ethereum blockchain in 2 ways:

- as part of a transaction data value
- as part of the logs

Transaction data is accessible by contracts and external services, such as user interfaces.

Log data is only accessible by external services, and not accessible by contracts.

Both data are held in the blockchain.

Table 1: Transaction data storage costs

Gtxdatazero	4
Gtxdatanonzero	68
Gtransaction	21000

Table. 2: Log data storage costs

Glog	375
Glogdata	8
Glogtopic	375

What is the minimum cost to store zero byte of data in a transaction and in a log?

Transaction:

Minimum Cost of a Transaction =

Gtransaction + Gtxdatazero =
21000 + 4 =
21004

Log:

Minimum Cost of Log Entry =

Glog + Glogtopic + Glogdata =
375 + 375 + 8
758

What is the price to store 1k of compressed or encrypted data in a transaction and a log?

Transaction:

Gtransaction + (0.1 * Gtxdatazero + 0.9 * Gtxdatanonzero) * 1024 =
21000 + (0.1 * 4 + 0.9 * 68) * 1024 =
46067 (truncated)

Log:

Glog + 1024 * Glogdata + Glogtopic =
375 + 1024 * 8 + 375 =
8942

What are the cost savings between transaction and log data storage.

8942 / 46067 * 100% =
19.41%

Conclusion:

It is 1/5 the cost to store data in logs as opposed to in transaction data.

The trade off is that the log data is not accessable to contracts.

The benefit is that the data is stored in the blockchain.

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