

Always Encrypted related Performance Issues

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Contents

- [Performance issues with Always Encrypted](#)
- [Always Encrypted v1 \(no enclave\) Perf Impacts:](#)
- [Always Encrypted v2 \(enclave\) Perf Impacts:](#)

Performance issues with Always Encrypted

Always Encrypted adds new possible ways for perf issues to happen.

Always Encrypted v1 (no enclave) Perf Impacts:

Please review the limitations in the [documentation](#)  for types of queries which are disallowed when using Always Encrypted.


- **Parameter Sizes**

One of the most common performance issues we have seen with AE v1 is due to parameter sizes which become lobbs after encryption. Encryption in AE adds several bytes to the size of the value. For example a value of size > 7935 will become a lob (> 8k bytes) after encryption. Lobbs are treated differently by the SQL engine, often adversely affecting query plans.

A common occurrence is when using Entity Framework and Always Encrypted together. EF specifies string parameters as varchar(8000) or nvarchar(4000). After encryption these would become lobbs so sometimes queries with these parameter types don't use indexes as expected. The workaround is to specify a parameter with size <7935 bytes.

Always Encrypted v2 (enclave) Perf Impacts:

AE v2 generally has the same issues as v1 for perf as well as a couple other cases.

See the [documentation](#)  for details. Broadly speaking it extends the parameter size limitations in AE v1 to indexes over randomized enclave enabled columns.

There are also potential performance issues due to the limited nature of the enclave resources (limited threads/memory). To check if a workload is bottlenecked on the enclave check the wait stats (Use ASC, perf troubleshooter).

High AETM_HOST_WORKER_SLEEP wait stats is an indication that the workload is spending a lot of time waiting on the enclave to complete computations. If the workload is bottlenecked on the enclave there are not many workarounds due to current enclave sizes.

****How good have you found this content?****

