

Index maintenance and statistics

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Common solution

This is the common solution article related to index maintenance and statistics related issues that's displayed to customers in the Azure portal when creating a support ticket.

Learn how to resolve index and statistics related issues in Azure SQL Database

Changes over time to data in a SQL database can contribute to index fragmentation and outdated or stale statistics, resulting in query executions requiring more data page reads, higher overall resource consumption and longer completion times. Regular maintenance of indexes and updating statistics helps to improve database performance.

Use the following diagnostics insights and guidance to resolve index and statistics related issues.





Diagnostics

We're running checks to identify missing indexes, redundant indexes, duplicate indexes and analyze configuration settings on your SQL database. The diagnosis takes approximately a couple of minutes to complete.

<Diagnostics results displayed to customer>

Reducing index fragmentation

The methods to reduce index fragmentation are to reorganize or rebuild the indexes.

Method	Details
Index Reorganize 	<p>Defragments the leaf-level of clustered and non-clustered indexes by physically reordering the leaf-level pages to match the logical order of the leaf nodes.</p> <ul style="list-style-type: none"> - Less resource intensive than rebuilding an index. Therefore the preferred index maintenance method to start with. - Always an online operation. - Basic T-SQL command: <code>ALTER INDEX ... REORGANIZE</code> <p>For examples, see index reorganize .</p>
Index Rebuild 	<p>Drops and re-creates the index.</p> <ul style="list-style-type: none"> - More resource intensive than a index reorganize. - Can be performed online or offline. The offline index rebuild usually takes less time than an online rebuild, but it holds object-level locks for the duration of the operation, blocking queries from accessing the table or view. - Basic T-SQL command: <code>ALTER INDEX ... REBUILD</code> <p>For examples, see index rebuild .</p>

Updating statistics

SQL Database by default automatically updates statistics on tables with more than 500 records, and those with over 20% of the rows modified. When the amount of changes is less than the 20% threshold, statistics can become outdated or stale, leading to inaccurate cardinality estimations and sub-optimal query-execution plans. Update statistics manually using this T-SQL script:

```
-- This script will update all the statistics on all the tables in your database.

-- Remove the comments from EXEC sp_executesql in order to have the commands update statistics (instead of onl

SET NOCOUNT ON
GO

DECLARE updatestats CURSOR FOR
SELECT table_schema, table_name
FROM information_schema.tables
where TABLE_TYPE = 'BASE TABLE'
OPEN updatestats

DECLARE @tableSchema NVARCHAR(128)
DECLARE @tableName NVARCHAR(128)
DECLARE @Statement NVARCHAR(300)

FETCH NEXT FROM updatestats INTO @tableSchema, @tableName
WHILE (@@FETCH_STATUS = 0)
BEGIN
SET @Statement = 'UPDATE STATISTICS ' + '[' + @tableSchema + ']' + '.'
+ '[' + @tableName + ']' + ' WITH FULLSCAN'

PRINT @Statement -- comment this line to prevent it from printing whenever you're ready to execute the command


--EXEC sp_executesql @Statement -- remove the comment at the beginning of this line to run the commands


FETCH NEXT FROM updatestats INTO @tableSchema, @tableName
END

CLOSE updatestats
DEALLOCATE updatestats

GO
SET NOCOUNT OFF
GO
```

Download a maintenance script and automate the process





To download a script for maintenance of index and statistics, refer to the article [How to maintain Azure SQL Indexes and Statistics](#) .

To automate the process, Azure Automation can be used to configure a [runbook to perform scheduled index and statistics maintenance](#) .

Maintenance frequency

How often you should perform index and statistics maintenance depends on the workload and amount of updates, inserts, and delete operations performed on the database. There can be a requirement to perform maintenance daily, or more often on a weekly basis, or perhaps even less frequently.

Resources

- [Indexes](#) 
- [Index fragmentation and page density](#) 
- [Guidelines for online index operations](#) 
- [Adaptive index defragmentation](#) 

How good have you found this content?

