

Diagnosing Storage-related Instance Issues



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Module Overview



Storage-related instance queries

Interpreting the results of these queries



I/O Usage by Database

**Shows which
databases are
generating I/O**

**Cumulative I/O
statistics since last
server restart**

**Includes all I/O
activity, not just
regular workload**



I/O Usage by Database



Shows total cumulative I/O activity for each database on the instance



Helps understand which database(s) are generating the most I/O activity



Once you identify the database, you can do more detailed analysis



Index and query tuning, along with data compression, can help reduce I/O activity



Demo



I/O Usage by Database



Volume Information

**Returns all
volumes that have
SQL Server
database files**

**Total size and
available space**

**Available space
can affect storage
performance**



Volume Information



Returns volume mount point, file system, and logical volume name



Returns total size, available space, and space free percentage



Returns compression, sparse files, and alternate streams attributes



Very important not to run out of space or even to just run low on available disk space



Demo



Volume Information



Drive-level Latency

Only volumes that have
SQL Server database files

Includes all activity since
last SQL Server service start

Drive-level read latency

Drive-level write latency



Drive-level Latency



All I/O activity against all SQL Server database files on each drive



Latency numbers from this query are typically higher than from other tools



Helps evaluate the relative performance of each drive



Look for other confirming evidence of I/O performance issues



Demo



Drive-level Latency



I/O Metrics by File

Returns cumulative I/O statistics for each SQL Server database file

Read and write latency

File size and location

Numbers of reads and writes



I/O Metrics by File



All I/O activity against all SQL Server database files on each drive



File-level latency helps confirm which database(s) may have storage issues



Common to see high write latency for tempdb data files



Common to see high read latency for user database data files



Demo



I/O Metrics by File



I/O Warnings

Returns 15-second I/O warnings from recent SQL Server error logs

15-second I/O warnings are significant events

Look for any patterns when you see these warnings

If there are no patterns, good evidence of generally poor storage performance



I/O Warnings



These I/O warnings are more difficult for storage admins to dismiss and ignore



Look for repeating patterns of the same drive, file, or time of day



Overlapping maintenance activity can temporarily over-stress the storage subsystem



Always look for things you can do to help reduce your I/O requirements



Demo



I/O Warnings



What We Covered



Storage-related instance queries

Interpreting the results of these queries

