Troubleshoot Performance issue on Secondary read replica

Last updated by | Radhika Shah | Sep 9, 2022 at 8:36 AM PDT

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Issue

As of Aug-2022, Query store is not available on secondary read-replicas for Azure SQL Managed Instance. Read-Replicas are available by default on Azure SQL Managed Instance **Business Critical tier** only.

Customers might encounter performance issues on their readable secondaries such as High CPU usage, deadlocks or even query timeouts. This TSG will focus on troubleshooting such performance issues on secondaries.

Investigation / Analysis / Troubleshooting

From Customer side

When connected to a read-only replica, Dynamic Management Views (DMVs) reflect the state of the replica, and can be queried for monitoring and troubleshooting purposes. A list of the DMVs is outlined here Monitoring and troubleshooting read-only replicas.

Since this is a readable secondary can we ask customer to execute below queries on readable secondary while issue is occurring:

```
select * From sys.dm_exec_session_wait_stats

sp_who2

SELECT sqltext.TEXT,
req.session_id,
req.status,
req.command,
req.cpu_time,
req.total_elapsed_time
FROM sys.dm_exec_requests req
CROSS APPLY sys.dm_exec_sql_text(req.sql_handle) AS sqltext
WHERE session_id = (SELECT @@SPID)  -- modify this value with customer's actual spid
```

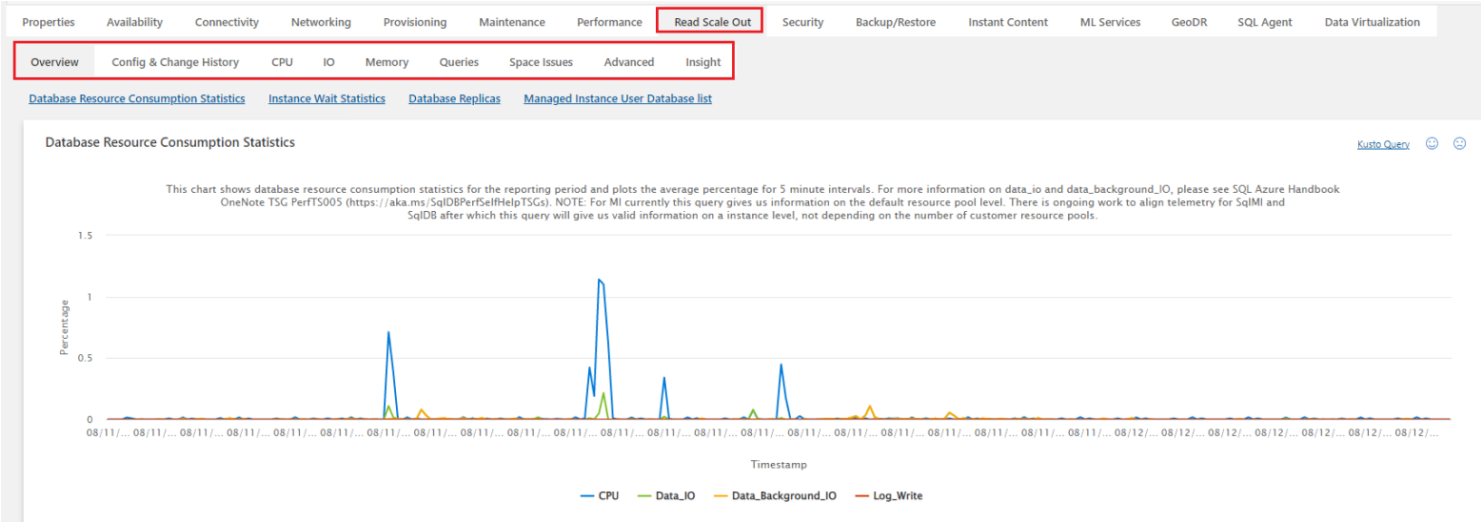
If the issue is intermittent and difficult to track and capture, there is an option to automate this monitoring and catch the issue.

Since sql agent can't be placed on secondary replica, customer could create linked server to readable secondary replica as outlined here: https://techcommunity.microsoft.com/t5/sql-server/create-linked-server-to-readable-secondary-replica-in-managed/ba-p/385979 Then, they could create sql agent job on primary replica to read over the linked server and write in primary replica. This data could be saved in tempdb, but a user db would be recommended. Sql agent should execute the query below:

```
SELECT sqltext.TEXT,
req.session_id,
req.status,
req.command,
req.cpu_time,
req.total_elapsed_time
FROM sys.dm_exec_requests req
CROSS APPLY sys.dm_exec_sql_text(req.sql_handle) AS sqltext
WHERE session_id = (SELECT @@SPID)  -- modify this value with customer's actual spid
```

From CSS side

Read-scale out tab on ASC Managed Instance Troubleshooter report can help with the investigation:



Engineers can check for queries impacted by High CPU usage, check the wait stats at the time of issue and hence further investigate the cause for timeouts or deadlocks on the database.

NOTE: DDL operations that customer executes heavily on primary may block customer read only queries on readable secondary.

For example: While investigating a deadlock issue on readable secondary, dominant wait types of LCK_M_SCH are noted. This wait type occurs when a thread is waiting to acquire a schema stability lock on a resource, and there is another lock in incompatible mode on the same resource granted to another thread.

If you take a look at lock compatibility matrix, you can see that only wait type incompatible with LCK_M_SCH_S is LCK_M_SCH_M.

This basically means that while customer is executing query which requires LCK_M_SCH_S, there is a schema modification operation in progress. You can further drill down to take a look at DDL operations that customer is executing on **Primary** in the timeframe that the deadlocks are occurring.

These DDL operations are performed by the customer, may be seen as an internal process on a readable secondary because customer executes these operations on primary and they are replicated internally on the secondary. You can further capture a deadlock report to confirm the same. Deadlock will be resolved by the server and the deadlock victim will timeout.

Mitigation

The mitigation for such performance issues needs to be applied on the Primary. For instance, the queries that consumed high CPU need to be tuned to update stats or add missing indexes on the Primary; To avoid deadlock issue, customer need to avoid ddl operations in parallel with workload queries which causes deadlock.

Internal Reference

ICM 229651826

ICM 222552336

Public Doc Reference

Monitoring and troubleshooting read-only replicas

How good have you found this content?