NetApp Knowledge Base

Slowness on NFS clients with little or no latency from ONTAP

https://kb.netapp.com/Advice_and_Troubleshooting/Data_Storage_Software/ONTAP_OS/Slowness_on…

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Applies to

ONTAP 9

Issue

- High latency or a sudden drop in throughput during peak load on NFS clients would be observed.
- Oracle DB reports high wait time on DB commits.
- It cannot be attributed to a CPU/Memory/Disk bottleneck on the storage controllers via CLI or monitoring tools.
- From ONTAP 9.8, Event Log error messages similar to the following:

> Fri Jan 01 01:47:19 +0100 [NETAPP03: kernel: nblade.execsOverLimit:error]: The number of in-flight requests from client

> with source IP 10.20.30.40 to destination LIF 10.20.30.50 (Vserver 7) is greater than the maximum number of in-flight
> requests allowed (128). The client might see degraded performance due to request throttling.

Cause

- Many modern NFSv3 clients use dynamic values for RPC slot tables
  - The client will send as many as possible concurrent operations on a single TCP thread —up to 65,336.
- When a NFSv4.x session is set up, the client and server negotiate the maximum requests allowed for the session
  - Despite the value default of 180 for the NFS server, ONTAP still has a per-connection limit of 128 exec contexts per CID.
- ONTAP allows only 128 concurrent operations per TCP connection
  - If a client sends more than 128, ONTAP will enact a NFS flow-control whereby NFS operations are blocked until execution contexts (`exec_ctx`) are freed
  - NFS flow-control allows an NFS server such as ONTAP to limit network communication with an NFS client is sending too much data.
- Under rare circumstances, bursts of I/Os from both Oracle DNFS clients and Linux NFS clients can exceed the limits ONTAP can protect itself.
  - The NFS client lags in its processing of inbound data while continuing to send requests for more data.
- If a QoS throttle is set too low, a lot of requests will be blocked at the NFS layer, this will eventually saturate a NFS connection, then all the other requests using the same NFS connection will be impacted, even including the requests targetting at different volumes using the same NFS connections.
  - No high latency will be observed from the QoS layer, but high latency could be seen from NFS layer.
  - Migrating the data LIFs to a different node makes no difference.
- This can lead to performance and stability problems with NFS connectivity.

Solution

- For NFSv3 see: kernel: nblade.execsOverLimit:error error message found in event logs for NFSv3 clients
- For NFSv4 see: kernel: nblade.execsOverLimit:error error message found in event logs for NFSv4 clients
- Another possible option is to use the `nconnect` option available for some Linux distributions that can perform multiplexing of NFSv3 and 4 over the same TCP connection.

    - This option provides more available concurrent sessions and better overall performance.
- If it's caused by improper QoS settings, it could be alleviated by tune the QoS throttle settings.

Additional Information

- Reference: NFS in ONTAP Best Practices and Implementation Guide
- NetApp EMS log reports "`nblade.execsOverLimit`" error starting ONTAP 9.8