High storage usage

Last updated by | Hamza Aqel | Mar 8, 2023 at 2:31 AM PST

This is part of GT, to update please refer to haaqel@microsft.com

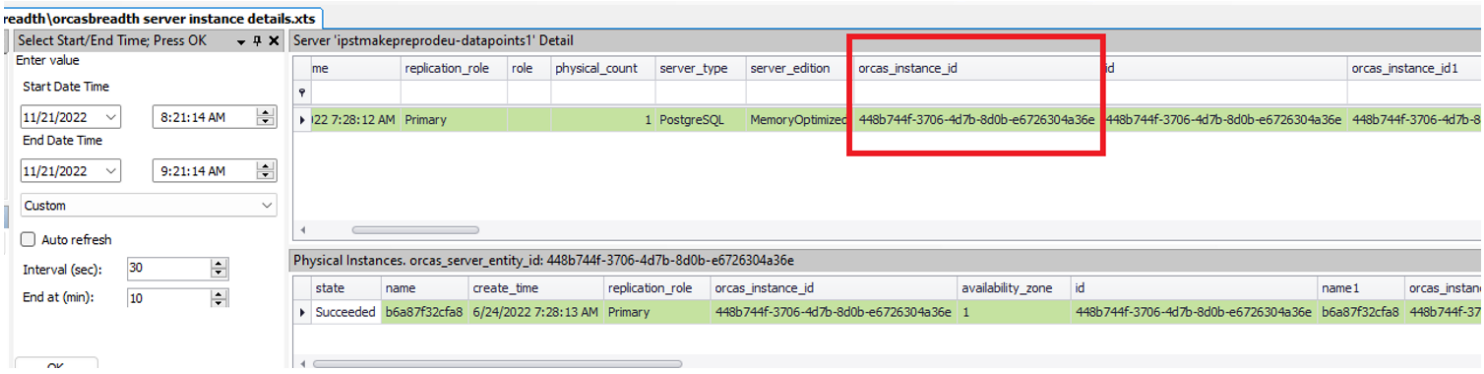
Contents

Some customers are reporting that the storage consumption is increasing, and they need to know why that is happening, this TSG will check some corners on the customer server to see if there is any service issue related to that:

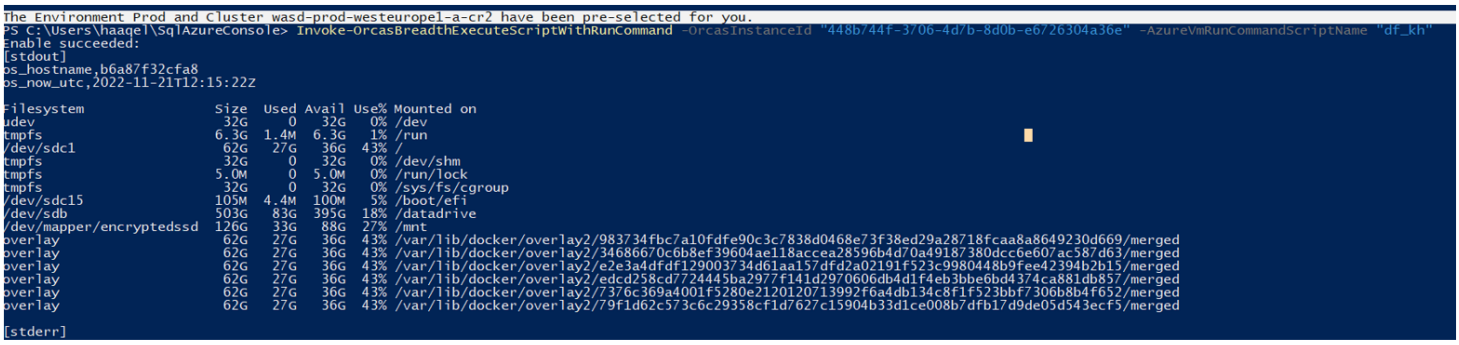
Check customer storage consumption

Take a look on the customer storage, most of the cases are related to the WAL size, so we will check first around this area if there is a problem there:

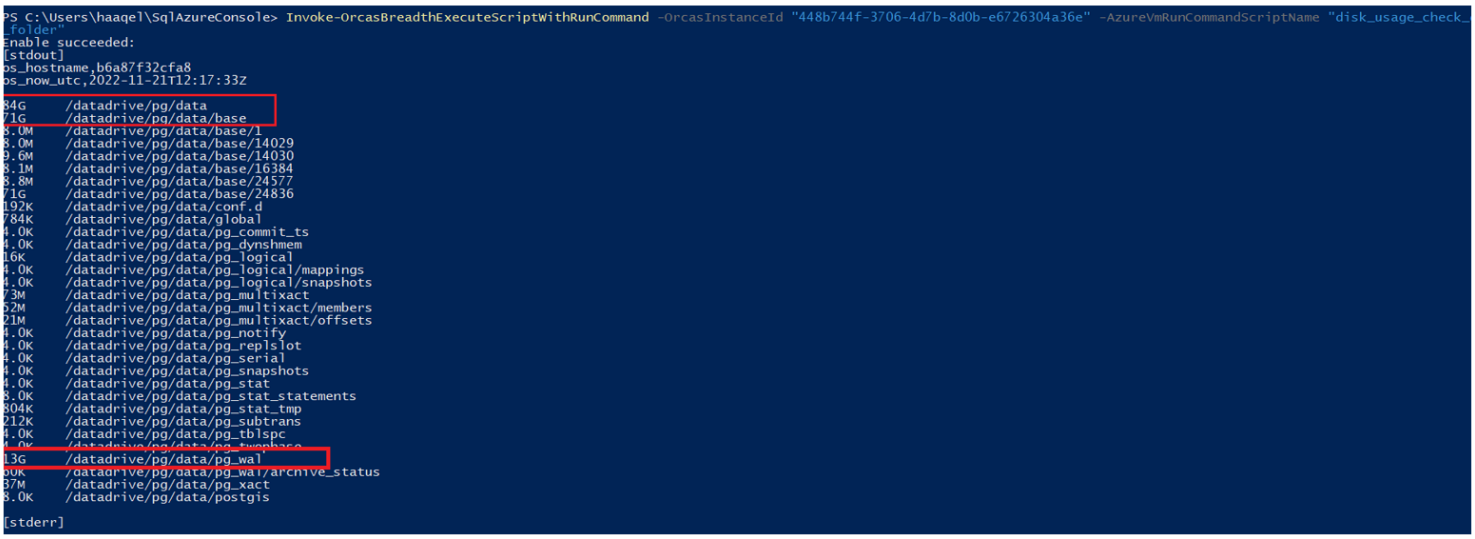
Before running the below command(s), you need to get the orcas_instance_id from ASC properties tab or from XTS view orcasbreadth\orcasbreadth server instance details.xts



Invoke-OrcasBreadthExecuteScriptWithRunCommand -OrcasInstanceId "448b744f-3706-4d7b-8d0b-e6726304a36e" -AzureVmRunCommandScriptName "df_kh"



Invoke-OrcasBreadthExecuteScriptWithRunCommand -OrcasInstanceId "448b744f-3706-4d7b-8d0b-e6726304a36e" -AzureVmRunCommandScriptName "disk_usage_check_data_folder"



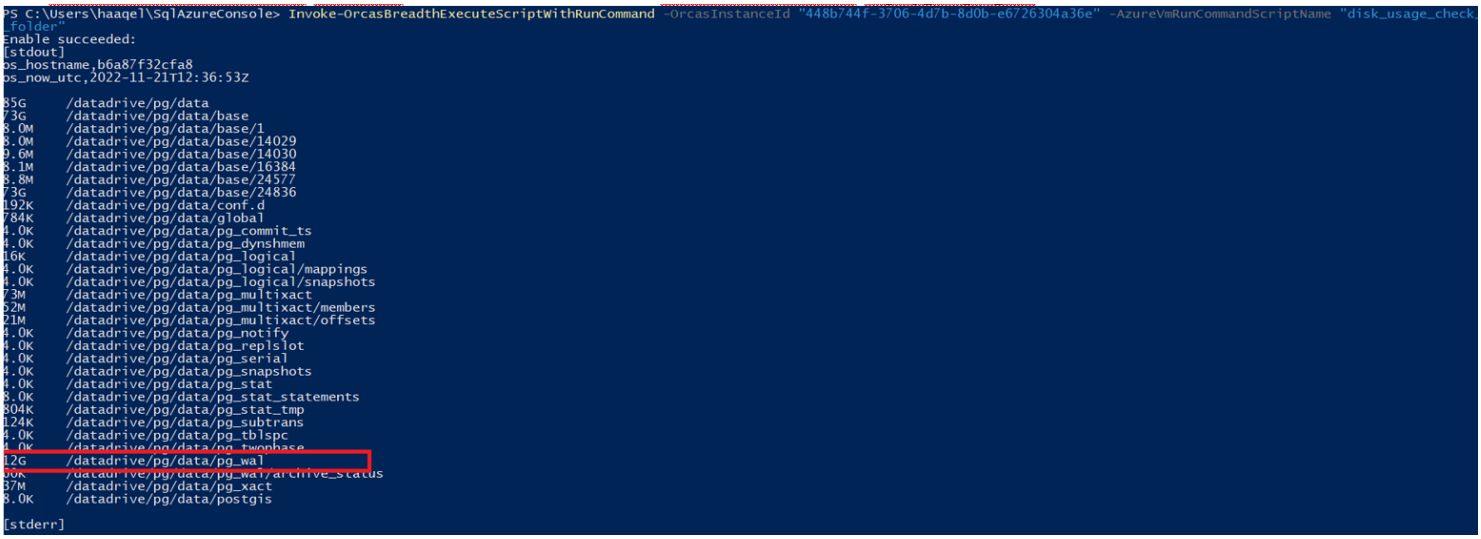
Notes:

[1] From `df_kh` , we know disk usage percentage.
[2] From `disk_usage_check_data_folder` , we know if data (tables) folder usage high or pg_wal folder usage is high

Case 1: Wal upload/archival is fine but we have a high workload

Rerun the above command after 15 mins for example:

Invoke-OrcasBreadthExecuteScriptWithRunCommand -OrcasInstanceId "448b744f-3706-4d7b-8d0b-e6726304a36e" -AzureVmRunCommandScriptName "disk_usage_check_data_folder"



If the upload is working, we should have a decrease in the WAL size folder as in the above, before was 13GB and after re-execute it is 12GB, and you can check the below too to confirm:

let STARTTIME_ARG = datetime('xxxx-xx-xx xx:xx:xx');

let ENDTIME_ARG = datetime('xxxx-xx-xx xx:xx:xx');

let SERVERNAME_ARG = 'pgflexservername';

MonOBPgSqlXlogFileCount

| where TIMESTAMP >= STARTTIME_ARG and TIMESTAMP <= ENDTIME_ARG

| where LogicalServerName == SERVERNAME_ARG

| order by TIMESTAMP desc | project TIMESTAMP, LogicalServerName, Ready_count, Done_count, File_count

TIMESTAMP	LogicalServerName	Ready_count	Done_count	File_count
2022-11-21 12:27:20.0000000	pgflexservernam	1	475	1246
2022-11-21 12:22:20.0000000	pgflexservername	1	325	1096
2022-11-21 12:17:20.0000000	pgflexservername	0	467	1254
2022-11-21 12:12:20.0000000	pgflexservername	1	317	1104
2022-11-21 12:07:20.0000000	pgflexservername	0	459	1267

As long as Ready_count is always below 2 and we have Done_count, so the upload is working, all of that is an indication that we have a high workload which you can check too:

let STARTTIME_ARG = datetime('xxxx-xx-xx xx:xx:xx');

let ENDTIME_ARG = datetime('xxxx-xx-xx xx:xx:xx');

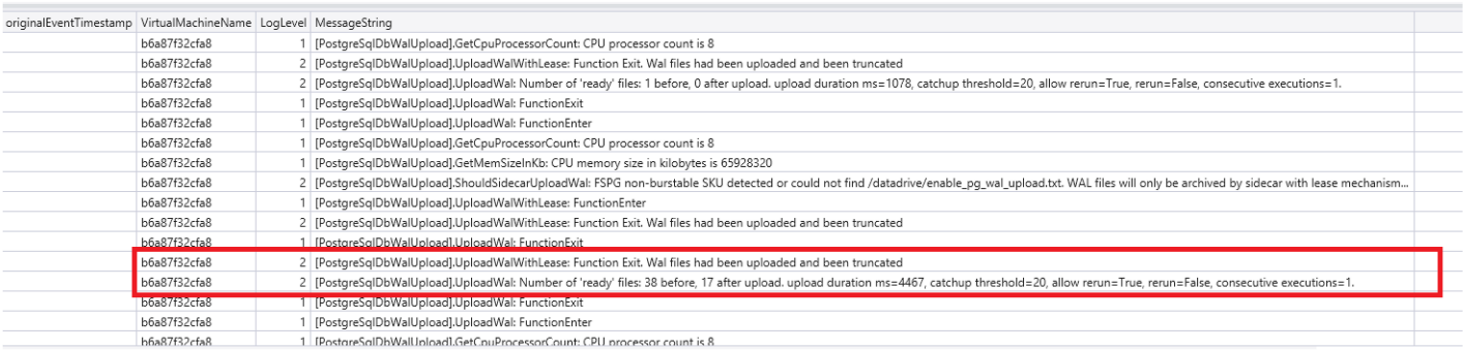
let SERVERNAME_ARG = 'pgflexservername';

```
MonOBPgSqlTransactionStats
| where TIMESTAMP >= STARTTIME_ARG and TIMESTAMP <= ENDTIME_ARG
| where LogicalServerName == SERVERNAME_ARG
| summarize sum(Tup_inserted), sum(Tup_updated), sum(Tup_deleted), sum(Commits) by TIMESTAMP
```

TIMESTAMP	sum_Tup_inserted	sum_Tup_updated	sum_Tup_deleted	sum_Commits
2022-11-21 09:02:10.0000000	273994147	571265485	10614	478192929
2022-11-21 09:17:10.0000000	273994147	571265604	10614	478195145
2022-11-21 09:22:10.0000000	273994147	571265644	10614	478196034
2022-11-21 09:57:20.0000000	273994147	571265922	10614	478201638
2022-11-21 10:02:20.0000000	273994148	571265962	10614	478202332
2022-11-21 10:07:20.0000000	273994148	571266003	10614	478203235
2022-11-21 10:12:20.0000000	273994148	571266041	10614	478204053
2022-11-21 10:17:20.0000000	473993982	571266793	12368	478204881
2022-11-21 10:37:20.0000000	481749245	571267008	12375	478362969
2022-11-21 10:47:20.0000000	485887000	571267124	12380	478447171
2022-11-21 11:12:20.0000000	496669411	571267399	12390	478666478
2022-11-21 11:17:20.0000000	498842511	571267440	12390	478710664
2022-11-21 11:22:20.0000000	501038063	571267496	12392	478755299
2022-11-21 11:27:20.0000000	503183666	571267556	12395	478798933
2022-11-21 11:42:20.0000000	509641871	571267712	12400	478930293
2022-11-21 12:07:20.0000000	520293727	571267950	12405	479146977
2022-11-21 12:12:20.0000000	522452679	571268006	12407	479190872
2022-11-21 12:27:20.0000000	529000635	571268166	12412	479324014
2022-11-21 12:37:20.0000000	533297185	571268244	12412	479411431
2022-11-21 12:42:20.0000000	535471738	571268303	12415	479455629

```
let STARTTIME_ARG = datetime('xxxx-xx-xx xx:xx:xx');

let ENDTIME_ARG = datetime('xxxx-xx-xx xx:xx:xx');

let SERVERNAME_ARG = 'pgflexservername';
```

```
OBvmagentsidecarpgsql

| where TIMESTAMP >= STARTTIME_ARG and TIMESTAMP <= ENDTIME_ARG

| where LogicalServerName == SERVERNAME_ARG

| project originalEventTimestamp, VirtualMachineName, LogLevel, MessageString

| where MessageString contains "Found" and MessageString contains "WAL files" or MessageString contains "PostgreSqlDbWalUpload"

| where MessageString !contains "Number of 'ready' files: 0 before"

| where MessageString !contains "Found 0"

| order by originalEventTimestamp asc
```



originalEventTimestamp	VirtualMachineName	LogLevel	MessageString
	b6a87f32cfa8	1	[PostgreSqlDbWalUpload].GetCpuProcessorCount: CPU processor count is 8
	b6a87f32cfa8	2	[PostgreSqlDbWalUpload].UploadWalWithLease: Function Exit. Wal files had been uploaded and been truncated
	b6a87f32cfa8	2	[PostgreSqlDbWalUpload].UploadWal: Number of 'ready' files: 1 before, 0 after upload. upload duration ms=1078, catchup threshold=20, allow rerun=True, rerun=False, consecutive executions=1.
	b6a87f32cfa8	1	[PostgreSqlDbWalUpload].UploadWal: FunctionExit
	b6a87f32cfa8	1	[PostgreSqlDbWalUpload].UploadWal: FunctionEnter
	b6a87f32cfa8	1	[PostgreSqlDbWalUpload].GetCpuProcessorCount: CPU processor count is 8
	b6a87f32cfa8	1	[PostgreSqlDbWalUpload].GetMemSizeInKb: CPU memory size in kilobytes is 65928320
	b6a87f32cfa8	2	[PostgreSqlDbWalUpload].ShouldSidecarUploadWal: FSPG non-burstable SKU detected or could not find /datadrive/enable_pg_wal_upload.txt. WAL files will only be archived by sidecar with lease mechanism...
	b6a87f32cfa8	1	[PostgreSqlDbWalUpload].UploadWalWithLease: FunctionEnter
	b6a87f32cfa8	2	[PostgreSqlDbWalUpload].UploadWalWithLease: Function Exit. Wal files had been uploaded and been truncated
	b6a87f32cfa8	1	[PostgreSqlDbWalUpload].UploadWal: FunctionExit
	b6a87f32cfa8	2	[PostgreSqlDbWalUpload].UploadWalWithLease: Function Exit. Wal files had been uploaded and been truncated
	b6a87f32cfa8	2	[PostgreSqlDbWalUpload].UploadWal: Number of 'ready' files: 38 before, 17 after upload. upload duration ms=4467, catchup threshold=20, allow rerun=True, rerun=False, consecutive executions=1.
	b6a87f32cfa8	1	[PostgreSqlDbWalUpload].UploadWal: FunctionExit
	b6a87f32cfa8	1	[PostgreSqlDbWalUpload].UploadWal: FunctionEnter
	b6a87f32cfa8	1	[PostgreSqlDbWalUpload].GetCpuProcessorCount: CPU processor count is 8

On that case we can let the customer knows that his workload is generating these WALs, and it will be minimized when that high workload decreases.

Case 2: Inactive replication slot

When the customer has inactive replication slot, the WAL files will keep building up due to that slot, so we can check if the customer has any and recommend to drop these slots:

```
let STARTTIME_ARG = datetime('xxxx-xx-xx xx:xx:xx');

let ENDTIME_ARG = datetime('xxxx-xx-xx xx:xx:xx');

let SERVERNAME_ARG = 'pgflexservername';

MonOBPgSqlReplicationStats

| where TIMESTAMP >= STARTTIME_ARG and TIMESTAMP <= ENDTIME_ARG

| where LogicalServerName == SERVERNAME_ARG

| where Active == 0

| distinct Slot_name, Slot_type, Active
```

Slot_name	Slot_type	Active
mon_slot	logical	False

Or you can run the below CAS command:

Invoke-OrcasBreadthExecuteScriptWithRunCommand -OrcasInstanceId "8d6606f9-0ade-4d04-b60a-bff64212c3bf" -AzureVmRunCommandScriptName "docker_exec_psql_pg_replication_slots"

```
Enable succeeded:
[stdout]
          slot_name           |    plugin     | slot_type | datoid | database | temporary | active | active_pid | xmin | catalog_xmin | restart_lsn | confirmed_flush_lsn | wal_status
fe_wal_size
------------------------------+---------------+-----------+--------+----------+-----------+--------+------------+------+--------------+-------------+---------------------+-----------
------------
 azure_asyncreplica_eadbff284033 |               | physical  |        |          | f         | t      |        121 |      |              | 19/780DFAB8 |                     | reserved
 mon_slot                        | test_decoding | logical   |  14030 | postgres | f         | f      |            |      |       977903 | 19/780A4B78 | 19/780A4BB0         | reserved
(2 rows)
```

In that case, ask the customer to drop the inactive replication slot:

From the customer side, he can execute from his end:

select * from pg_replication_slots where not active;

select pg_drop_replication_slot('slot_name') FROM pg_replication_slots WHERE NOT active;

select * from pg_replication_slots where not active;

```
postgres=> select * from pg_replication_slots where not active;
 slot_name |    plugin     | slot_type | datoid | database | temporary | active | active_pid | xmin | catalog_xmin | restart_lsn | confirmed_flush_lsn | wal_status | safe_wal_size
-----------+---------------+-----------+--------+----------+-----------+--------+------------+------+--------------+-------------+---------------------+------------+---------------
 mon_slot  | test_decoding | logical   |  14030 | postgres | f         | f      |            |      |       977986 | 19/79000580 | 19/790005B8         | reserved   |
(1 row)

Time: 2.707 ms
postgres=> SELECT pg_drop_replication_slot('mon_slot') FROM pg_replication_slots WHERE NOT active;
 pg_drop_replication_slot
--------------------------

(1 row)

Time: 9.875 ms
postgres=> select * from pg_replication_slots where not active;
 slot_name | plugin | slot_type | datoid | database | temporary | active | active_pid | xmin | catalog_xmin | restart_lsn | confirmed_flush_lsn | wal_status | safe_wal_size
-----------+--------+-----------+--------+----------+-----------+--------+------------+------+--------------+-------------+---------------------+------------+---------------
(0 rows)
```

Case 3: Archival/upload is not working due to Blob Lease Renew Issue

If the cases ##1 and ##2 did not help and the WAL folder is keep increasing, there is a possibility that the WAL upload is not working for some reason, one of the reasons is due to Blob lease renew issue, to check that you can use the below query:

let STARTTIME_ARG = datetime('xxxx-xx-xx xx:xx:xx');

let ENDTIME_ARG = datetime('xxxx-xx-xx xx:xx:xx');

let SERVERNAME_ARG = 'pgflexservername';

OBvmagentsidecarpgsql

| where TIMESTAMP >= STARTTIME_ARG and TIMESTAMP <= ENDTIME_ARG

| where LogicalServerName == SERVERNAME_ARG

| project TIMESTAMP, VirtualMachineName, LogLevel, MessageString,LogicalServerName

| where MessageString contains "cancellation in lease renew"

| extend lease_failed_wal_file_v1 = extract("UploadWalFiles: Failed to upload file for ([0-9A-Fa-f]+) due to cancellation in lease renew", 1, MessageString)

```
| extend lease_failed_wal_file_v2 = extract("\\[Archive\\].UploadWalFiles: Failed: ([\\w\\.]+) ", 1, MessageString)

| extend lease_failed_wal_file = iff(isnotempty(lease_failed_wal_file_v1), lease_failed_wal_file_v1, lease_failed_wal_file_v2)

| summarize min(TIMESTAMP), max(TIMESTAMP) by lease_failed_wal_file, MessageString

| order by lease_failed_wal_file asc
```

lease_failed_wal_file	MessageString
0000000100000000F00000021	[Archive].UploadWalFiles: Failed: 0000000100000000F00000021 | PostgreSQL | Failed to upload due to cancellation in lease renew : System.Threading.Tasks.TaskCanceledException: The operation was canceled. at Azure.Core.CancellationHelper.ThrowOperationCanceledException(Exception innerException, CancellationToken cancellationToken) at Azure.Core.CancellationHelper.ThrowIfCancellationRequested(CancellationToken cancellationToken) at Azure.Core.Pipeline.ResponseBodyPolicy.ThrowIfCancellationRequestedOrTimeout(CancellationToken originalToken, CancellationToken timeoutToken, Exception inner, TimeSpan timeout) at Azure.Core.Pipeline.ResponseBodyPolicy.ProcessAsync(HttpMessage message, ReadOnlyMemory`1 pipeline, Boolean async) at Azure.Core.Pipeline.HttpPipelineSynchronousPolicy.<ProcessAsync>g__ProcessAsyncInner|4_0(HttpMessage message, ReadOnlyMemory`1 pipeline) at Azure.Core.Pipeline.RedirectPolicy.ProcessAsync(HttpMessage message, ReadOnlyMemory`1 pipeline, Boolean async) at Azure.Core.Pipeline.RetryPolicy.ProcessAsync(HttpMessage message, ReadOnlyMemory`1 pipeline, Boolean async)
0000000100000000F00000022	[Archive].UploadWalFiles: Failed: 0000000100000000F00000022 | PostgreSQL | Failed to upload due to cancellation in lease renew : System.Threading.Tasks.TaskCanceledException: The operation was canceled. at Azure.Core.CancellationHelper.ThrowOperationCanceledException(Exception innerException, CancellationToken cancellationToken) at Azure.Core.CancellationHelper.ThrowIfCancellationRequested(CancellationToken cancellationToken) at Azure.Core.Pipeline.ResponseBodyPolicy.ThrowIfCancellationRequestedOrTimeout(CancellationToken originalToken, CancellationToken timeoutToken, Exception inner, TimeSpan timeout) at Azure.Core.Pipeline.ResponseBodyPolicy.ProcessAsync(HttpMessage message, ReadOnlyMemory`1 pipeline, Boolean async) at Azure.Core.Pipeline.HttpPipelineSynchronousPolicy.<ProcessAsync>g__ProcessAsyncInner|4_0(HttpMessage message, ReadOnlyMemory`1 pipeline) at Azure.Core.Pipeline.RedirectPolicy.ProcessAsync(HttpMessage message, ReadOnlyMemory`1 pipeline, Boolean async) at Azure.Core.Pipeline.RetryPolicy.ProcessAsync(HttpMessage message, ReadOnlyMemory`1 pipeline, Boolean async)

If you see such errors, you file an ICM and engage the engineering team to fix it.

Case 4: Archival/upload is not working due to other failures

Use the below query to check if there is any other failures in the upload process, and engage the engineering team if needed:

```
let STARTTIME_ARG = datetime('xxxx-xx-xx xx:xx:xx');

let ENDTIME_ARG = datetime('xxxx-xx-xx xx:xx:xx');

let SERVERNAME_ARG = 'pgflexservername';

OBvmagentsidecarpgsql

| where TIMESTAMP >= STARTTIME_ARG and TIMESTAMP <= ENDTIME_ARG

| where LogicalServerName == SERVERNAME_ARG

| project originalEventTimestamp, VirtualMachineName, LogLevel, MessageString,LogicalServerName

| where MessageString contains "UploadWalFiles" and MessageString contains "fail"

| order by originalEventTimestamp asc
```

originalEventTimestamp	VirtualMachineName	LogLevel	MessageString
			Headers: Server: Windows-Azure-Blob/1.0,Microsoft-HTTPAPI/2.0
	a06ccdba98d7	4	[Archive].UploadWalFiles: Failed: Lease 00000005000001B680000004E.lease | PostgreSQL | Fail acquire the lease with : Azure.RequestFailedException: There is already a lease present. RequestId:bfe64a66-001e-0101-199d-fd700a000000 Time:2022-11-21T11:34:10.2394226Z Status: 409 (There is already a lease present.) ErrorCode: LeaseAlreadyPresent Headers: Server: Windows-Azure-Blob/1.0,Microsoft-HTTPAPI/2.0
	fe1f2ee96050	4	[Archive].UploadWalFiles: Failed: Lease 00000005000001B7200000098.lease | PostgreSQL | Fail acquire the lease with : Azure.RequestFailedException: There is already a lease present. RequestId:407e3b92-301e-001e-50b2-fd16eb000000 Time:2022-11-21T14:09:29.6296829Z Status: 409 (There is already a lease present.) ErrorCode: LeaseAlreadyPresent Headers: Server: Windows-Azure-Blob/1.0,Microsoft-HTTPAPI/2.0

Case 5: High temporary files usage:

Our Product Group engineers have developed new workbooks for the Azure database for PostgreSQL flexible server that will aid the support engineers in resolving a variety of customer issues:

- High CPU.
- High Memory.
- High IOPs.
- Autovacuum/vacuum monitoring.
- Autovacuum blockers and Wraparound identification.
- High temporary file usage.

You can use the High temporary file usage to see if this is related or not:

Workbook Name	Link
High temporary file usage	https://ms.portal.azure.com/#@microsoft.onmicrosoft.com/resource/subscriptions/b1172cf5a-4917-ac31-6f06460ff9b2/resourceGroups/prod-internal-perf-workbooks/providers/microsoft.insights/workbooks/b1f4f9fd-9d92-4eb7-a388-711ccb482789/workbook