Azure PostgreSQL Point In Time Restore(PITR)

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This TSG is part of GT project , please contact EEE haaqel@microsoft.com before any updates

PITR- Point-in-time restore

Monday, November 11, 2019
2:24 PM

Scenario:

If the customer asks about a specific point-in-time restore operation, please follow this doc.

Data to collect:

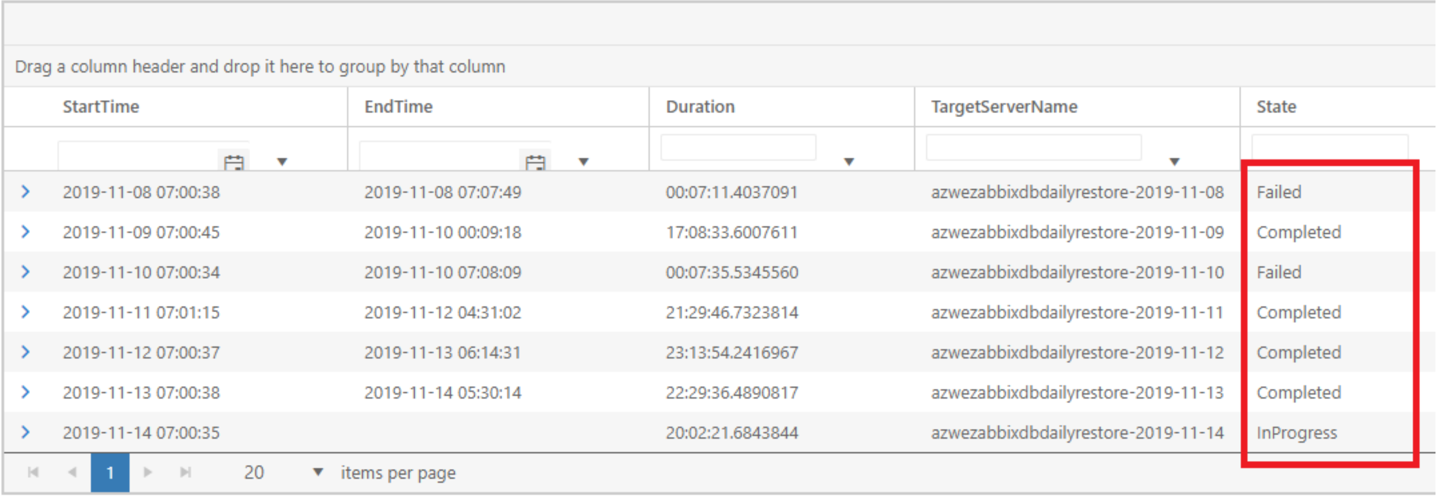
Collect ***source server name*** and ***target server name*** from the customer.

Steps:

For Postgres:

1. Find out the current state of the restore operation.

In ASC website, click Resource Explorer, select the ***source server name*** and pick Restore Tab.
In the "Azure Database for Postgres Restored List" table, find out the ***state*** of the row matching your ***target server name***.
If the state is ***Completed***, no further action is needed. If the state is ***InProgress***, go to step 2. If the state is ***Failed***, go to step 3.



Drag a column header and drop it here to group by that column

StartTime	EndTime	Duration	TargetServerName	State
2019-11-08 07:00:38	2019-11-08 07:07:49	00:07:11.4037091	azwezabbixdbdailyrestore-2019-11-08	Failed
2019-11-09 07:00:45	2019-11-10 00:09:18	17:08:33.6007611	azwezabbixdbdailyrestore-2019-11-09	Completed
2019-11-10 07:00:34	2019-11-10 07:08:09	00:07:35.5345560	azwezabbixdbdailyrestore-2019-11-10	Failed
2019-11-11 07:01:15	2019-11-12 04:31:02	21:29:46.7323814	azwezabbixdbdailyrestore-2019-11-11	Completed
2019-11-12 07:00:37	2019-11-13 06:14:31	23:13:54.2416967	azwezabbixdbdailyrestore-2019-11-12	Completed
2019-11-13 07:00:38	2019-11-14 05:30:14	22:29:36.4890817	azwezabbixdbdailyrestore-2019-11-13	Completed
2019-11-14 07:00:35		20:02:21.6843844	azwezabbixdbdailyrestore-2019-11-14	InProgress

2. If it's in progress, go to Properties tab and find out the storage type. Below shows which table on Restore tab you should check as per storage type.

Storage Type on Properties tab	Table Name on Restore tab	Expected log output
File Share	Azure Database for Postgres Restoring Progress for Basic Server	<<basic.xlsx>>
Premium Blob (XIO)	Azure Database for Postgres Restoring Progress for Standard Server	<<standard.xlsx>>
Premium File Share	Azure Database for Postgres Restoring Progress for PFS Server	<<pfs.xlsx>>

Check the according table. If there is no new log generated in the last hour, go to step 4. Otherwise, the restore operation is running normally.
The expected log outputs are attached in basic/standard/pfs excel files. You can compare the actual log with them for confirmation.

3. If it failed, run below Kusto query to find out whether failure occurred at the backend.

For PFS:

```
MonElasticServerRestoreRequests
| where source_elastic_server_name == {SourceServerName} and target_elastic_server_name == {TargetServerName} and event_type == 'Failed'
| project request_id = toupper(request_id)
| join kind = leftouter (MonManagement
    | where new_state == 'WaitingForInstanceCreation' and state_machine_type == 'ElasticServerStateMachine'
    | distinct request_id
    | extend ReachBackend = true)
  on request_id
| project request_id, FailedAtBackend = (ReachBackend == true)
```

If failure occurred at the backend, go to step 4. Otherwise, run below Kusto query to find out any exception in management service.

```
MonManagement
| where request_id == toupper({RequestId})
| where isnotempty(action) and isnotempty(old_state) and isnotempty(new_state)
| summarize min(originalEventTimestamp), max(originalEventTimestamp), make_set(exception) by state_machine_type, action, old_state, new_state
```

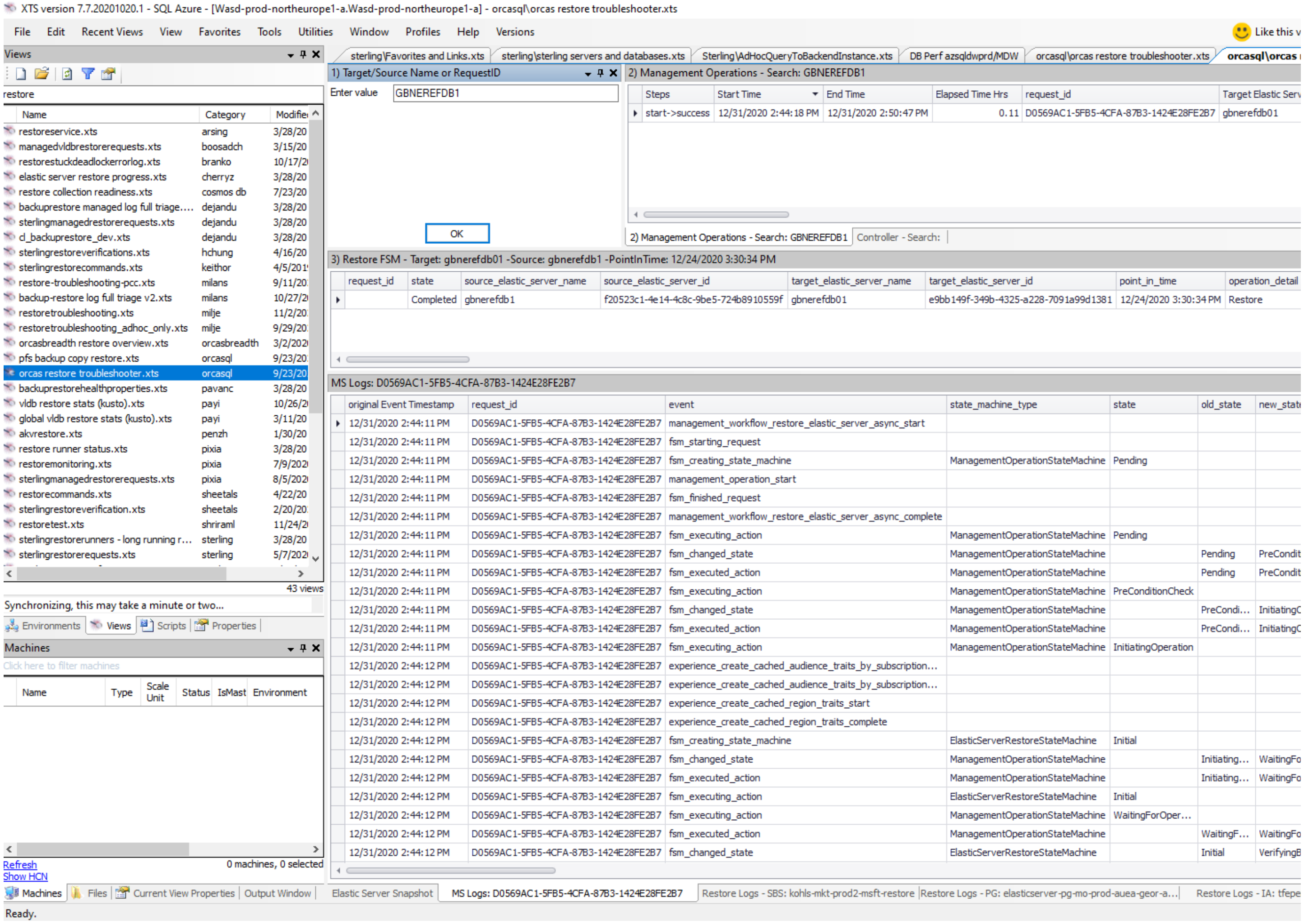
For SBS:

```
MonRestoreEvents
| where LogicalServerName == "<Target ServerName>"
|project originalEventTimestamp, logical_server_name, AppName, restore_database_progress, backup_file_name, uncompressed_backup_size, message, stac
```

There might be exceptions or actions taking hours to complete. Then go to step 4.

4. Search the server name in ICM tickets. If there is already a live-site ticket on restore operation of the same server, contact the acknowledged engineer for update. Otherwise, create a CRI ticket with all the information you've figured out.

orcas restore troubleshooter.xts view


XTS version 7.7.20201020.1 - SQL Azure - [Wasd-prod-northeurope1-a.Wasd-prod-northeurope1-a] - orcasql\orcas restore troubleshooter.xts
File
Edit
Recent Views
View
Favorites
Tools
Utilities
Window
Profiles
Help
Versions
Like this v
Views
sterling\Favorites and Links.xts
sterling\sterling servers and databases.xts
Sterling\AdHocQueryToBackendInstance.xts
DB Perf azsqldwprd/MDW
orcasql\orcas restore troubleshooter.xts
orcasql\orcas
1) Target/Source Name or RequestID
Enter value
GBNEREFDB1
OK
2) Management Operations - Search: GBNEREFDB1
Controller - Search:
43 views
Synchronizing, this may take a minute or two...
Environments
Views
Scripts
Properties
Machines
Click here to filter machines
Refresh
Show HCN
0 machines, 0 selected
Machines
Files
Current View Properties
Output Window
Elastic Server Snapshot
MS Logs: D0569AC1-5FB5-4CFA-87B3-1424E28FE2B7
Restore Logs - SBS: kohls-mkt-prod2-msft-restore
Restore Logs - PG: elasticserver-pg-mo-prod-auea-geor-a...
Restore Logs - IA: tfepe
Ready.

restore

Name	Category	Modifie
restoreservice.xts	arsing	3/28/20
managedvldbrestorerequests.xts	boosadch	3/15/20
restorestuckdeadlockerrorlog.xts	branko	10/17/2
elastic server restore progress.xts	cherryz	3/28/20
restore collection readiness.xts	cosmos db	7/23/20
backuprestore managed log full triage....	dejandu	3/28/20
sterlingmanagedrestorerequests.xts	dejandu	3/28/20
cl_backuprestore_dev.xts	dejandu	3/28/20
sterlingrestoreverifications.xts	hchung	4/16/20
sterlingrestorecommands.xts	keithor	4/5/201
restore-troubleshooting-pcc.xts	milans	9/11/20
backup-restore log full triage v2.xts	milans	10/27/2
restoretroubleshooting.xts	milje	11/2/20
restoretroubleshooting_adhoc_only.xts	milje	9/29/20
orcasbreadth restore overview.xts	orcasbreadth	3/2/202
pfs backup copy restore.xts	orcasql	9/23/20
orcas restore troubleshooter.xts	orcasql	9/23/20
backuprestorehealthproperties.xts	pavanc	3/28/20
vldb restore stats (kusto).xts	payi	10/26/2
global vldb restore stats (kusto).xts	payi	3/11/20
akvrestore.xts	penzh	1/30/20
restore runner status.xts	pixia	3/28/20
restoremonitoring.xts	pixia	7/9/202
sterlingmanagedrestorerequests.xts	pixia	8/5/202
restorecommands.xts	sheetals	4/22/20
sterlingrestoreverification.xts	sheetals	2/20/20
restoretest.xts	shriraml	11/24/2
sterlingrestorerunners - long running r...	sterling	3/28/20
sterlingrestorerequests.xts	sterling	5/7/202

Name	Type	Scale Unit	Status	IsMast	Environment

2) Management Operations - Search: GBNEREFDB1

Steps	Start Time	End Time	Elapsed Time Hrs	request_id	Target Elastic Serv
start->success	12/31/2020 2:44:18 PM	12/31/2020 2:50:47 PM	0.11	D0569AC1-5FB5-4CFA-87B3-1424E28FE2B7	gbnerefdb01

3) Restore FSM - Target: gbnerefdb01 -Source: gbnerefdb1 -PointInTime: 12/24/2020 3:30:34 PM

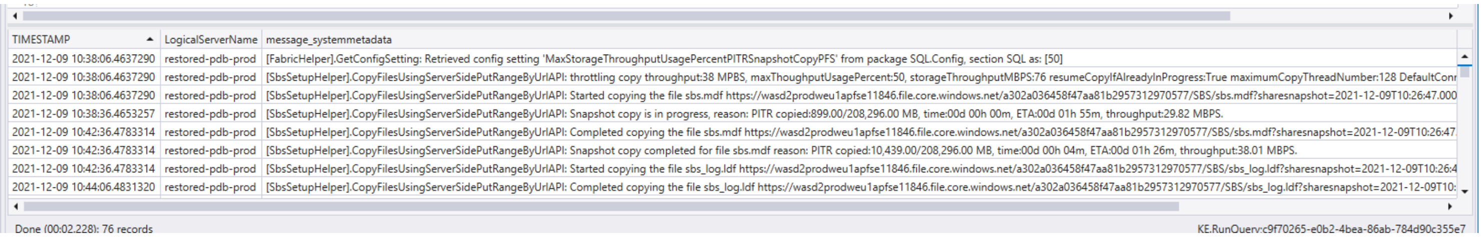
request_id	state	source_elastic_server_name	source_elastic_server_id	target_elastic_server_name	target_elastic_server_id	point_in_time	operation_detail
	Completed	gbnerefdb1	f20523c1-4e14-4c8c-9be5-724b8910559f	gbnerefdb01	e9bb149f-349b-4325-a228-7091a99d1381	12/24/2020 3:30:34 PM	Restore

MS Logs: D0569AC1-5FB5-4CFA-87B3-1424E28FE2B7

original Event Timestamp	request_id	event	state_machine_type	state	old_state	new_stat
12/31/2020 2:44:11 PM	D0569AC1-5FB5-4CFA-87B3-1424E28FE2B7	management_workflow_restore_elastic_server_async_start				
12/31/2020 2:44:11 PM	D0569AC1-5FB5-4CFA-87B3-1424E28FE2B7	fsm_starting_request				
12/31/2020 2:44:11 PM	D0569AC1-5FB5-4CFA-87B3-1424E28FE2B7	fsm_creating_state_machine	ManagementOperationStateMachine	Pending		
12/31/2020 2:44:11 PM	D0569AC1-5FB5-4CFA-87B3-1424E28FE2B7	management_operation_start				
12/31/2020 2:44:11 PM	D0569AC1-5FB5-4CFA-87B3-1424E28FE2B7	fsm_finished_request				
12/31/2020 2:44:11 PM	D0569AC1-5FB5-4CFA-87B3-1424E28FE2B7	management_workflow_restore_elastic_server_async_complete				
12/31/2020 2:44:11 PM	D0569AC1-5FB5-4CFA-87B3-1424E28FE2B7	fsm_executing_action	ManagementOperationStateMachine	Pending		
12/31/2020 2:44:11 PM	D0569AC1-5FB5-4CFA-87B3-1424E28FE2B7	fsm_changed_state	ManagementOperationStateMachine		Pending	PreCondit
12/31/2020 2:44:11 PM	D0569AC1-5FB5-4CFA-87B3-1424E28FE2B7	fsm_executed_action	ManagementOperationStateMachine		Pending	PreCondit
12/31/2020 2:44:11 PM	D0569AC1-5FB5-4CFA-87B3-1424E28FE2B7	fsm_executing_action	ManagementOperationStateMachine	PreConditionCheck		
12/31/2020 2:44:11 PM	D0569AC1-5FB5-4CFA-87B3-1424E28FE2B7	fsm_changed_state	ManagementOperationStateMachine		PreCondi...	InitiatingC
12/31/2020 2:44:11 PM	D0569AC1-5FB5-4CFA-87B3-1424E28FE2B7	fsm_executed_action	ManagementOperationStateMachine		PreCondi...	InitiatingC
12/31/2020 2:44:11 PM	D0569AC1-5FB5-4CFA-87B3-1424E28FE2B7	fsm_executing_action	ManagementOperationStateMachine	InitiatingOperation		
12/31/2020 2:44:12 PM	D0569AC1-5FB5-4CFA-87B3-1424E28FE2B7	experience_create_cached_audience_traits_by_subscription...				
12/31/2020 2:44:12 PM	D0569AC1-5FB5-4CFA-87B3-1424E28FE2B7	experience_create_cached_audience_traits_by_subscription...				
12/31/2020 2:44:12 PM	D0569AC1-5FB5-4CFA-87B3-1424E28FE2B7	experience_create_cached_region_traits_start				
12/31/2020 2:44:12 PM	D0569AC1-5FB5-4CFA-87B3-1424E28FE2B7	experience_create_cached_region_traits_complete				
12/31/2020 2:44:12 PM	D0569AC1-5FB5-4CFA-87B3-1424E28FE2B7	fsm_creating_state_machine	ElasticServerRestoreStateMachine	Initial		
12/31/2020 2:44:12 PM	D0569AC1-5FB5-4CFA-87B3-1424E28FE2B7	fsm_changed_state	ManagementOperationStateMachine		Initiating...	WaitingFo
12/31/2020 2:44:12 PM	D0569AC1-5FB5-4CFA-87B3-1424E28FE2B7	fsm_executed_action	ManagementOperationStateMachine		Initiating...	WaitingFo
12/31/2020 2:44:12 PM	D0569AC1-5FB5-4CFA-87B3-1424E28FE2B7	fsm_executing_action	ElasticServerRestoreStateMachine	Initial		
12/31/2020 2:44:12 PM	D0569AC1-5FB5-4CFA-87B3-1424E28FE2B7	fsm_executing_action	ManagementOperationStateMachine	WaitingForOper...		
12/31/2020 2:44:12 PM	D0569AC1-5FB5-4CFA-87B3-1424E28FE2B7	fsm_executed_action	ManagementOperationStateMachine		WaitingF...	WaitingFo
12/31/2020 2:44:12 PM	D0569AC1-5FB5-4CFA-87B3-1424E28FE2B7	fsm_changed_state	ElasticServerRestoreStateMachine		Initial	VerifyingB

5. Check Instance Agent Logs for snapshot copy progress:

```
MonRdmsInstanceAgent
| where TIMESTAMP >= ago(3d)
| where LogicalServerName == "restored-pdb-prod"  //target server
| where message_systemmetadata contains  "[SbsSetupHelper].CopyFilesUsingServerSidePutRangeByUrlAPI: Started copying the file"
or message_systemmetadata contains "[SbsSetupHelper].CopyFilesUsingServerSidePutRangeByUrlAPI: Completed copying the file "
or message_systemmetadata contains "[AzureFileCopyManager].CopyFileWithPutRangeAsyncOptimizeThrougput: Checkpointed copying file"
or message_systemmetadata contains "throughput"
| project TIMESTAMP,LogicalServerName,message_systemmetadata,AppTypeName
```



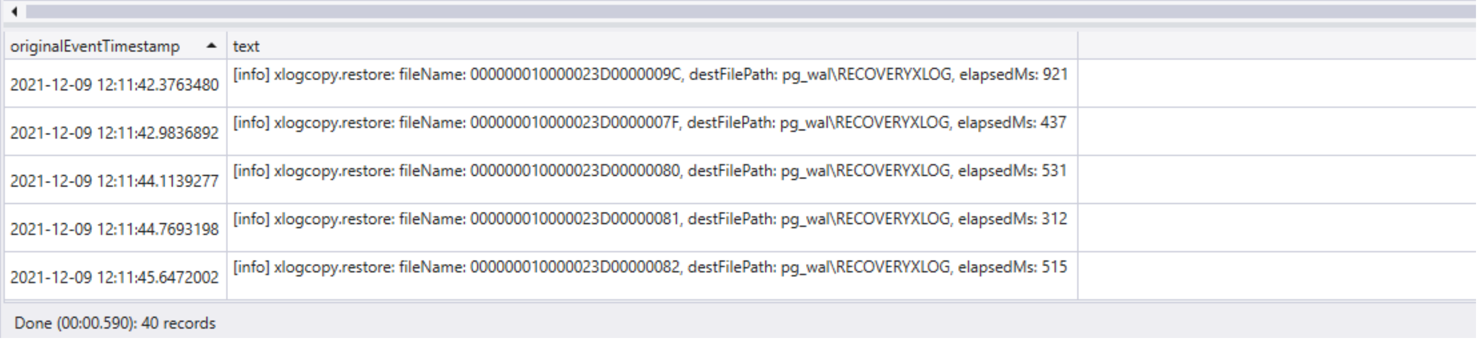
TIMESTAMP	LogicalServerName	message_systemmetadata
2021-12-09 10:38:06.4637290	restored-pdb-prod	[FabricHelper].GetConfigSetting: Retrieved config setting 'MaxStorageThroughputUsagePercentPITRSnapshotCopyPFS' from package SQL.Config, section SQL as: [50]
2021-12-09 10:38:06.4637290	restored-pdb-prod	[SbsSetupHelper].CopyFilesUsingServerSidePutRangeByUrlAPI: throttling copy throughput:38 MPBS, maxThoughputUsagePercent:50, storageThroughputMBPS:76 resumeCopyIfAlreadyInProgress:True maximumCopyThreadNumber:128 DefaultConr
2021-12-09 10:38:06.4637290	restored-pdb-prod	[SbsSetupHelper].CopyFilesUsingServerSidePutRangeByUrlAPI: Started copying the file sbs.mdf https://wasd2prodweu1apfse11846.file.core.windows.net/a302a036458f47aa81b2957312970577/SBS/sbs.mdf?sharesnapshot=2021-12-09T10:26:47.000
2021-12-09 10:38:36.4653257	restored-pdb-prod	[SbsSetupHelper].CopyFilesUsingServerSidePutRangeByUrlAPI: Snapshot copy is in progress, reason: PITR copied:899.00/208,296.00 MB, time:00d 00h 00m, ETA:00d 01h 55m, throughput:29.82 MBPS.
2021-12-09 10:42:36.4783314	restored-pdb-prod	[SbsSetupHelper].CopyFilesUsingServerSidePutRangeByUrlAPI: Completed copying the file sbs.mdf https://wasd2prodweu1apfse11846.file.core.windows.net/a302a036458f47aa81b2957312970577/SBS/sbs.mdf?sharesnapshot=2021-12-09T10:26:47
2021-12-09 10:42:36.4783314	restored-pdb-prod	[SbsSetupHelper].CopyFilesUsingServerSidePutRangeByUrlAPI: Snapshot copy completed for file sbs.mdf reason: PITR copied:10,439.00/208,296.00 MB, time:00d 00h 04m, ETA:00d 01h 26m, throughput:38.01 MBPS.
2021-12-09 10:42:36.4783314	restored-pdb-prod	[SbsSetupHelper].CopyFilesUsingServerSidePutRangeByUrlAPI: Started copying the file sbs_log.ldf https://wasd2prodweu1apfse11846.file.core.windows.net/a302a036458f47aa81b2957312970577/SBS/sbs_log.ldf?sharesnapshot=2021-12-09T10:26:4
2021-12-09 10:44:06.4831320	restored-pdb-prod	[SbsSetupHelper].CopyFilesUsingServerSidePutRangeByUrlAPI: Completed copying the file sbs_log.ldf https://wasd2prodweu1apfse11846.file.core.windows.net/a302a036458f47aa81b2957312970577/SBS/sbs_log.ldf?sharesnapshot=2021-12-09T10:

Done (00:02.228): 76 records

KE.RunQuery:c9f70265-e0b2-4bea-86ab-784d90c355e7

6. Check PG Sandbox logs for archive log restore progress:

```
MonRdmsPgSqlSandbox
| where LogicalServerName == "restored-pdb-prod" //target server
| where TIMESTAMP >= ago(3d)
| where text contains "xlogcopy.restore"
| project originalEventTimestamp, text
```



originalEventTimestamp	text
2021-12-09 12:11:42.3763480	[info] xlogcopy.restore: fileName: 000000010000023D0000009C, destFilePath: pg_wal\RECOVERYXLOG, elapsedMs: 921
2021-12-09 12:11:42.9836892	[info] xlogcopy.restore: fileName: 000000010000023D0000007F, destFilePath: pg_wal\RECOVERYXLOG, elapsedMs: 437
2021-12-09 12:11:44.1139277	[info] xlogcopy.restore: fileName: 000000010000023D00000080, destFilePath: pg_wal\RECOVERYXLOG, elapsedMs: 531
2021-12-09 12:11:44.7693198	[info] xlogcopy.restore: fileName: 000000010000023D00000081, destFilePath: pg_wal\RECOVERYXLOG, elapsedMs: 312
2021-12-09 12:11:45.6472002	[info] xlogcopy.restore: fileName: 000000010000023D00000082, destFilePath: pg_wal\RECOVERYXLOG, elapsedMs: 515

Done (00:00.590): 40 records

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