Safeguarded Snapshots

Safeguarded Copy is now Safeguarded snapshot:

In IBM Storage Virtualize 8.7, the functionality previously called *Safeguarded Copy* is now referred to as *Safeguarded snapshot*.

Redbook: Data Resiliency Designs: A Deep Dive into IBM Storage Safeguarded Snapshot

JLR – Cyber attack

The attack began on August 31

complete shutdown of production lasting for five weeks.

Damage: -

Financial: -

JLR Losses from production - £485m

JLR additional costs of addressing the attack - £196m

Supply chain disruption £??m

Government loan to stabilise – £1.5 billion

Estimated total economic impact - £1.9 billion

Reputation:-

Severe…

Grand operational planning (the '00')

All new EV models delayed at least 6 months

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Web: abpfoodgroup.com

About Me

Started work in 1985. Out of work for 2 hours 20 minutes. (Food 32 / 41 Years)

- Associated British Foods (Food 5 Years)
- Rank Hovis McDougal (RHM) -> Tomkins (Food **10 Years***)
  - Food Hygiene / Safety
  - Set up ERP / Later KPI measurement and Management Information Systems
  - Technical / Hygiene trouble shooter for group
- Bestfoods -> Unilever Bestfoods (Food **3 Years***)
- Outsourced Procurement / Manufacturing efficiency (Non-Food **5 Years***)
- ABP UK (Food **3 Years***)
- Rexel UK / Northern Europe (Non-Food **4 Years***)
- ABP Food Group (Food **11 Years***)

* = IBM I / Power systems

About Me

The usual disclaimer.

I have produced this pack to try and assist anybody trying to us Safeguarded Copy / or, after V8.7 Safeguarded Snapshot.

I have tried to make the information accurate and not have any recommendations or suggestions that will cause harm.

Please take all reasonable care and check in the reference materials I have included links to. There is no prize for 1st over the cliff. ** Try restoring BOTH thin and thick snapshots – read the redbook.

About ABP

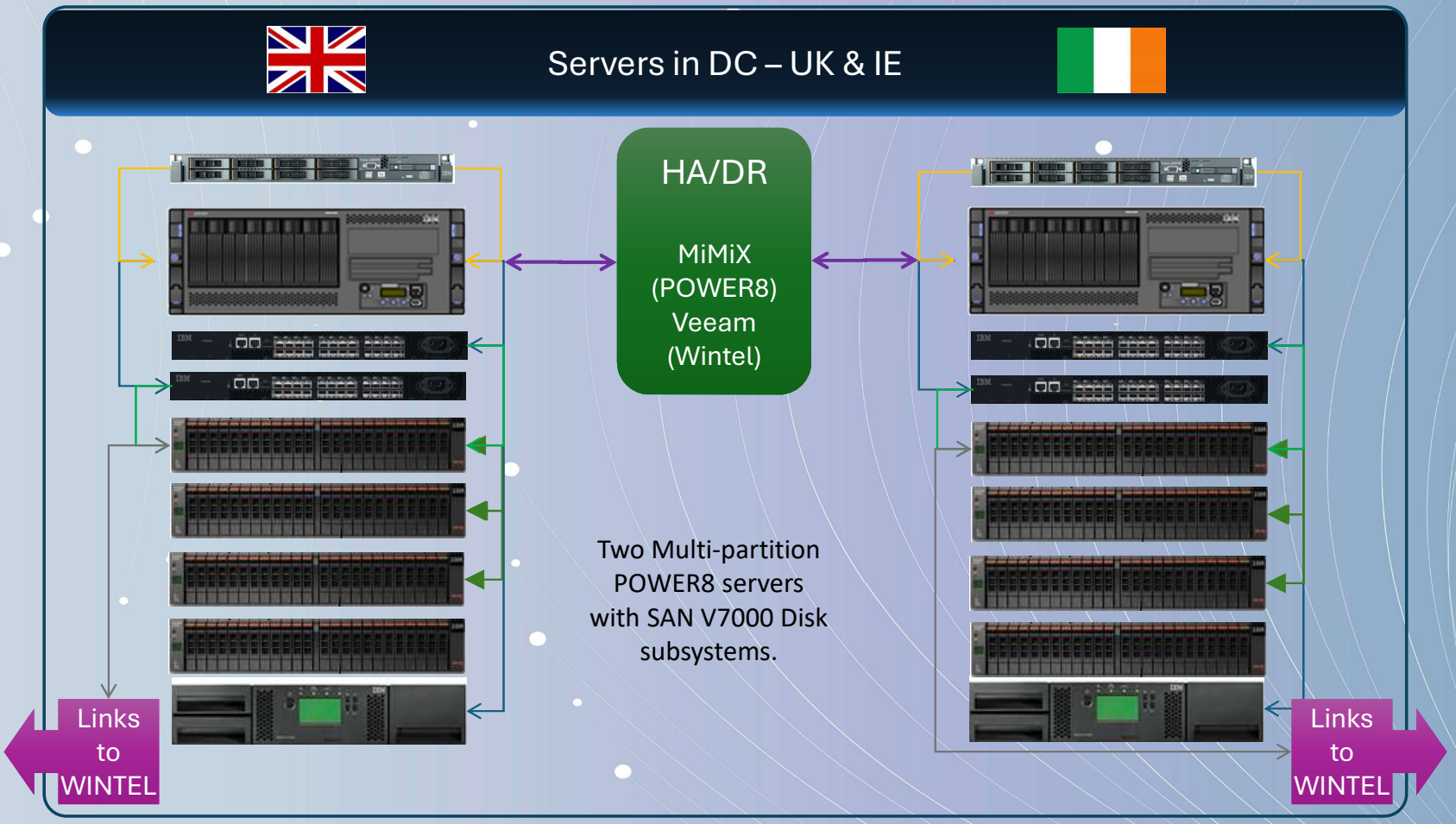
One of Europe's leading food processors, ABP Food Group

- Beef / Lamb / Proteins / Renewables / Pet Food
- Established 1954 and is **privately owned** (72 years)
- > 45,000 Farmers – paid on the day of delivery
- > 50 locations in 9 countries
- >14,000 Colleagues
- >€ 5bn

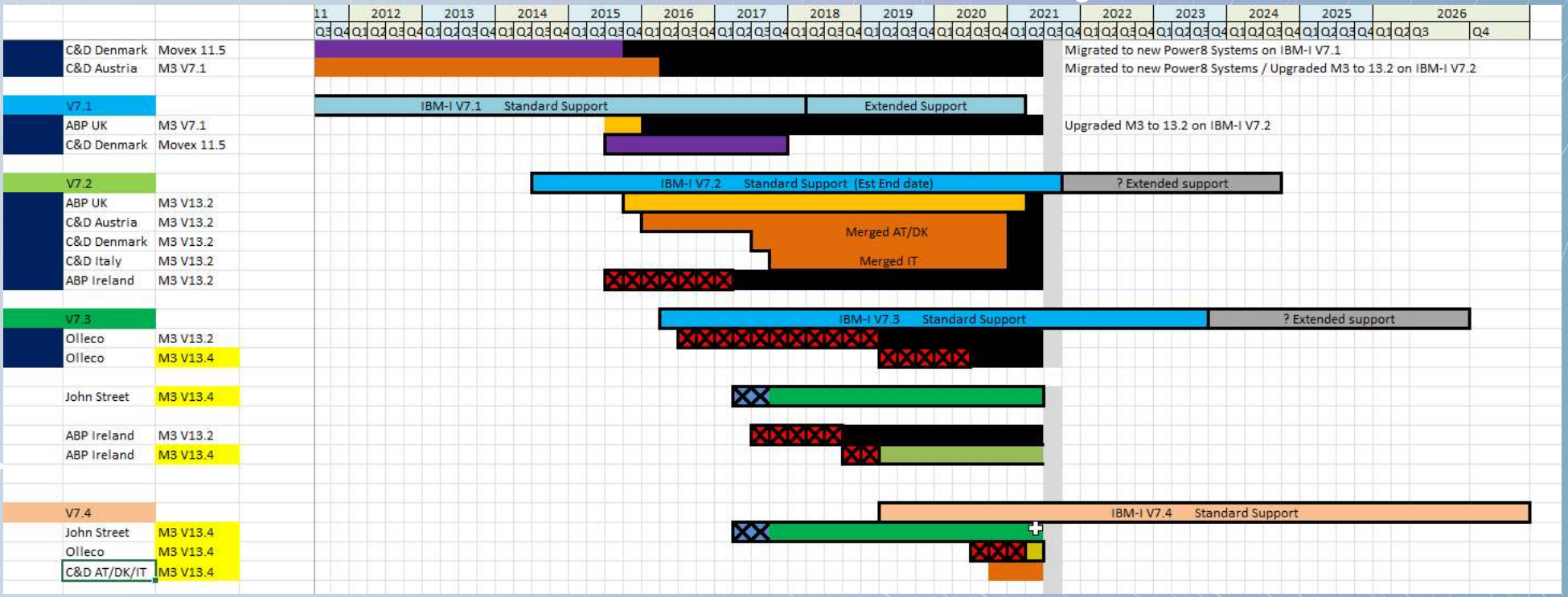
2015 - I rejoined ABP

- ABP Divisions (Beef / Lamb / Proteins / Renewables / Pet Food) operate independently in a federated structure.
- The main board authorised an approach to consolidate three aged and unsupported IBM systems with a single platform and common ERP
- Data segregation was an absolute requirement

2015 – new hardware



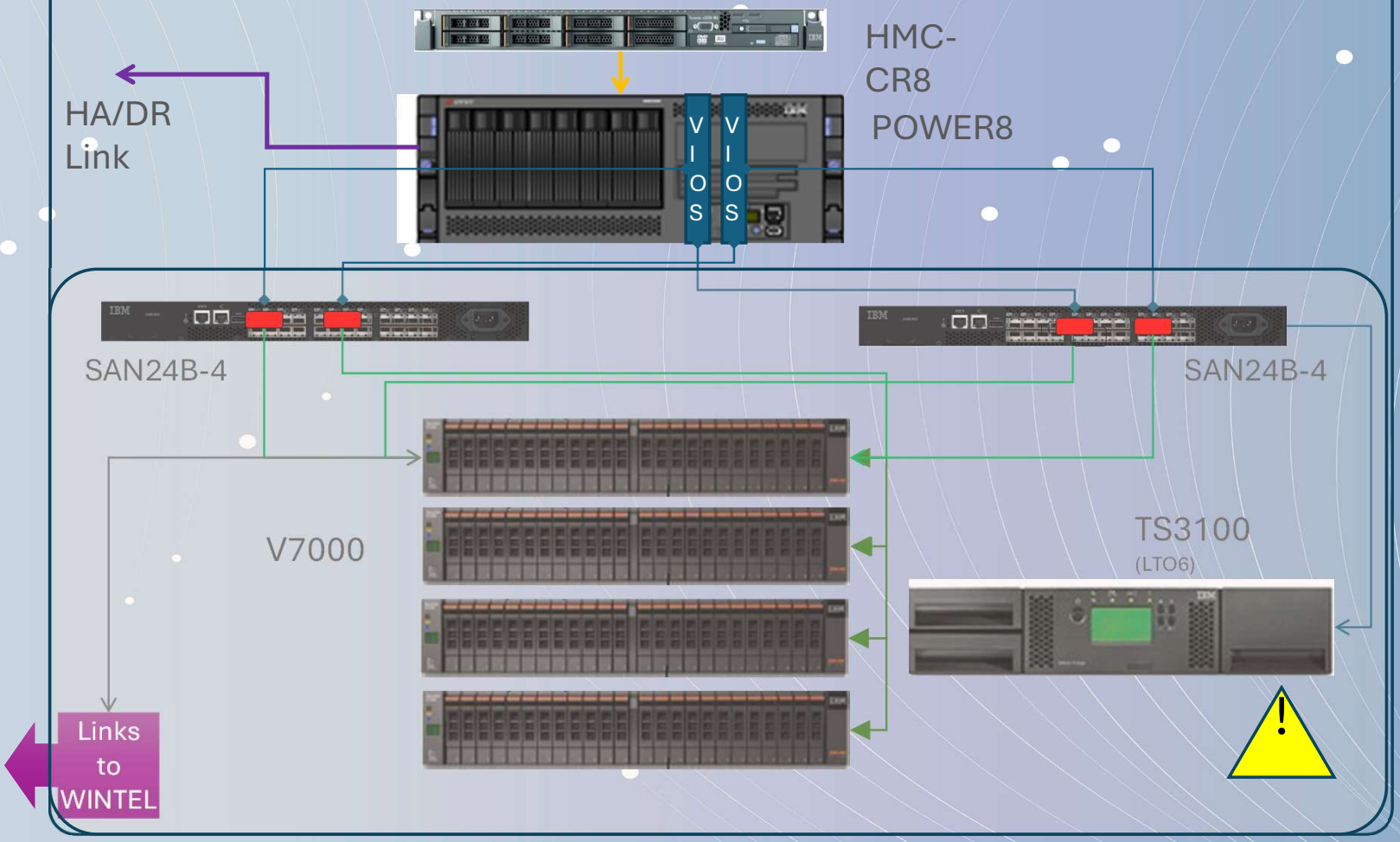
2015 – 2021 : ERP updates, rollouts, hardware upgrades & O/S updates



The awareness of Cyber Attacks

- 2019 – no reliable estimate but generally recognised as increasing
- 2020 111 M incidents
- 2021 227 M incidents
- 14 May 2021 – Major attack on the Irish Health Service

2021 - Scope for replacement



iUG had discussed the FlashSystems

Steve Bradshaw had spoken about the unbelievable performance

They sounded too good to be true

But experience has proven his assessments to be sound and reliable

He had told us the same database queries on V7R2 compared to V7R1 were upto 15 times faster using the same hardware and database.

On that basis I had changed the roadmap for ABP to use V7R2 rather than keep everybody back at V7R1 until ERP was standard.

Reading the blurb on the FlashSystems, two factors really stood out as needing proof.

FlashSystems performance

Ransomware recovery

IBM offered a no obligation opportunity to test real hardware, in the configuration you believe you want, without any obligation.

So we did a POC

The POC showed us

- The I/O was so fast that we couldn’t max it out
  - Instead we hit the BUS limit on the POWER9 system hosting the LPAR
- We were able to recover Safeguarded copies and start the systems without any adverse effects.
- It did what it said on the tin.

What the POC could not show us

- We couldn't establish the precise level of compression and deduplication; No customer data could be loaded (T&Cs), but we could see it was there was little impact on the storage for the TBs loaded. Spoiler – it was 3.7:1 (73%)

- With multiple systems each using multiple volumes I had an open question around the number of volume / generation / copies. Safeguarded copy had a limit of 4096.
- Question – with faster voumes, could I reconfigure the LPARS to have fewer, larger volumes allowing more copy generations?

What we bought:

UK

2 x FS5200s

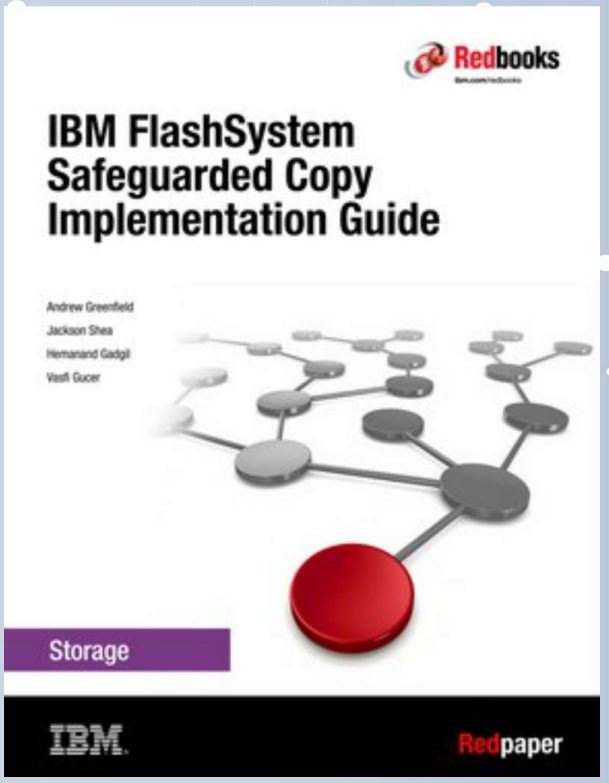
IE

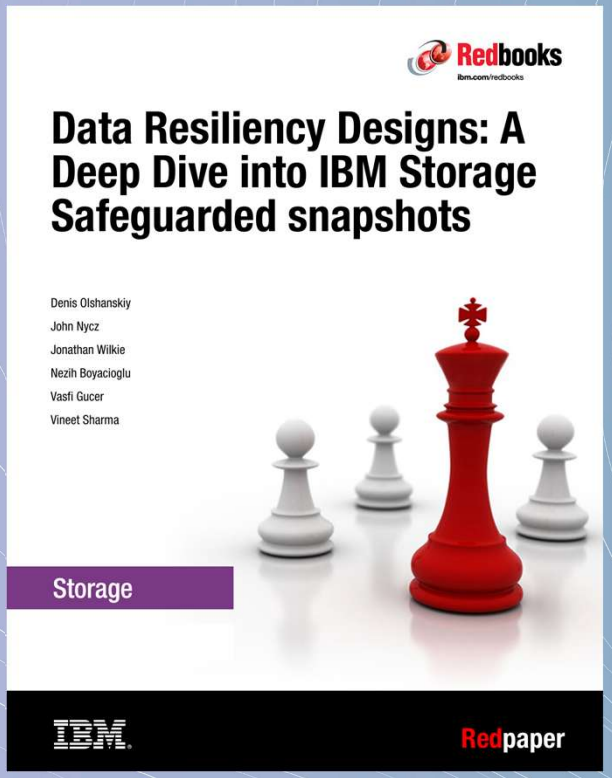
2 x FS5200s

Planning the implementation.

- The migration was reasonably uneventful. I didn’t want LPM.
- Once the basic move was completed, I referred to the literature. To understand how to implement Safeguarded copy.
- Now I would recommend the two redbooks shown on the next slide. There are links to three additional books

IBM FlashSystem Safeguarded Copy Implementation Guide (redp5654)
Data Resiliency Designs: A Deep Dive into IBM Storage Safeguarded Copy (redp5737)
IBM Storage DS8000 Safeguarded Copy: Updated for DS8000 Release 10.1 (redp5506)
Ensuring Business Continuity with Policy-Based Replication and Policy-Based HA (sg248569)
IBM Storage DS8000 Safeguarded Copy: Updated for DS8000 Release 10.1 (redp5506)





Planning the implementation.

- I wanted to get one system set up with Safeguarded copy.
  - I did this and set a copy once a day to be retained for 1 week.
  - The system had 64 volumes.
- There was no negative impact.
- And the point of this was that with ¼ of the number of volumes, frequency can be increased and retention extended.

Volume count reduction (4096 limit)

- I took performance graphs of the system for a one week period
- I expanded volumes 1-32, and then drained volumes 49-64 still on-line, and available in case I caused an issue.
- Performance over the subsequent week showed no negative impact, even on the busiest days.
- I drained volumes 33-48.
- Performance over the subsequent week showed no negative impact, even on the busiest days.
- Further expansion and more gradual reductions were undertaken

Volume count reduction (4096 limit)

- On my systems, running our ERP and processes, Flash systems can use one quarter of the number of volumes compared to the traditional spinning / SSD.

- This was the result of cautious trials, supported by performance taken across a full weekly cycle

Planning considerations (1)

- You no longer need a separate storage pool assigned to SG Copy
- Read the Red Books and make notes
- Data Resiliency Designs: A Deep Dive into IBM Storage Safeguarded Copy (redp5737)

- Start small – don't go mad. It's a learning process. Check things work as you expect. Some examples in the 2nd half.

- Safeguarded snapshots (new name) will not break your system .
  - There are risks if you continue to use a separate storage pool that runs out of capacity… Read the book. If you use the main storage pool, the system will keep things working.

Planning considerations (2)

- Confirm the scope and plan for all of it and avoid last minute changes
- If Wintel environments are associated with IBM i, look into Flashsystem grid. This allows synchronous copies across all the linked platforms… Red Books
- Develop your process and document it.
- New equipment has AI support – but you need to understand what it is proposing

Planning considerations (3) Recovery

- Have a dummy LPAR you can attach the recovered volumes to. TEST on a separate VLAN. I used a verification LPAR created during the migration process
- If you are taking SG snapshots of Wintel or combined IBM i and Wintel, have the necessary hardware to test the restore process.
- Develop the procedures if you face an attack. Spoiler ..You will see that the system can initiate a Safeguarded snapshot if an attack is detected.
- Assign responsibilities for the actions. One person can't own it all
- Consider how to establish the last safe copy and the process to return to production

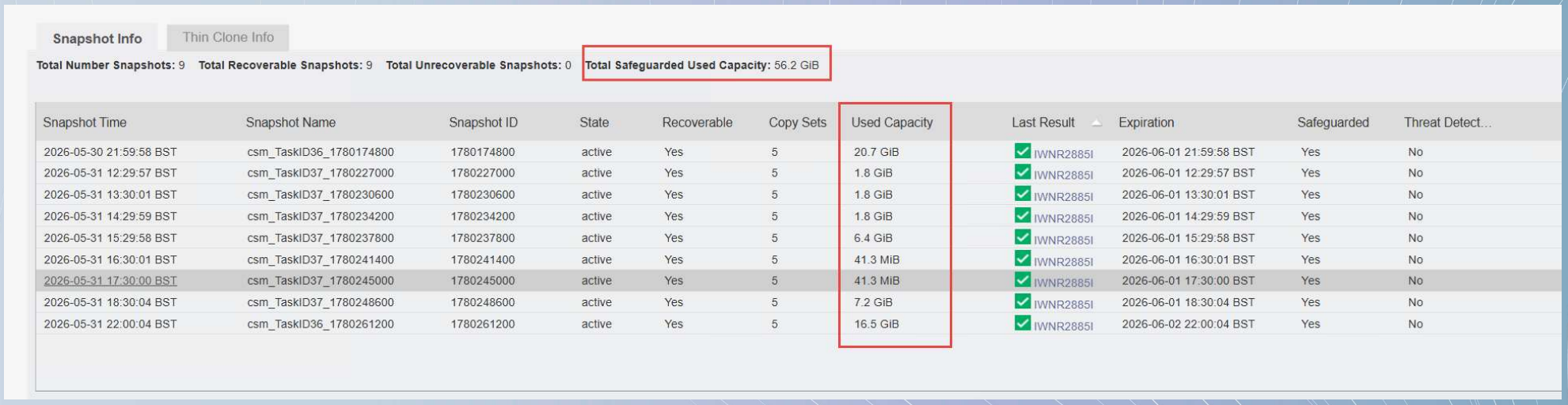
Long term impact

- This is a dashboard of a SAN running three production systems. After 4.5 years of storage growth, SG Copies (old name on V8.6) taken every 3 hours and every day.

- Storage is achieving phenomenal capacity savings

Latest version of Copy Service Manager CSM

- The latest version shows the capacity used for SG Snapshots. This will help you plan the impact of an implementation



Snapshot Info | Thin Clone Info

Total Number Snapshots: 9 **Total Recoverable Snapshots:** 9 **Total Unrecoverable Snapshots:** 0 **Total Safeguarded Used Capacity:** 56.2 GiB

Snapshot Time	Snapshot Name	Snapshot ID	State	Recoverable	Copy Sets	Used Capacity	Last Result	Expiration	Safeguarded	Threat Detect...
2026-05-30 21:59:58 BST	csm_TaskID36_1780174800	1780174800	active	Yes	5	20.7 GiB	IWNR2885I	2026-06-01 21:59:58 BST	Yes	No
2026-05-31 12:29:57 BST	csm_TaskID37_1780227000	1780227000	active	Yes	5	1.8 GiB	IWNR2885I	2026-06-01 12:29:57 BST	Yes	No
2026-05-31 13:30:01 BST	csm_TaskID37_1780230600	1780230600	active	Yes	5	1.8 GiB	IWNR2885I	2026-06-01 13:30:01 BST	Yes	No
2026-05-31 14:29:59 BST	csm_TaskID37_1780234200	1780234200	active	Yes	5	1.8 GiB	IWNR2885I	2026-06-01 14:29:59 BST	Yes	No
2026-05-31 15:29:58 BST	csm_TaskID37_1780237800	1780237800	active	Yes	5	6.4 GiB	IWNR2885I	2026-06-01 15:29:58 BST	Yes	No
2026-05-31 16:30:01 BST	csm_TaskID37_1780241400	1780241400	active	Yes	5	41.3 MiB	IWNR2885I	2026-06-01 16:30:01 BST	Yes	No
2026-05-31 17:30:00 BST	csm_TaskID37_1780245000	1780245000	active	Yes	5	41.3 MiB	IWNR2885I	2026-06-01 17:30:00 BST	Yes	No
2026-05-31 18:30:04 BST	csm_TaskID37_1780248600	1780248600	active	Yes	5	7.2 GiB	IWNR2885I	2026-06-01 18:30:04 BST	Yes	No
2026-05-31 22:00:04 BST	csm_TaskID36_1780261200	1780261200	active	Yes	5	16.5 GiB	IWNR2885I	2026-06-02 22:00:04 BST	Yes	No

Other uses for SG Snapshots

- Attach to a dummy LPAR and upgrade O/S
  - Gives timing and shows any missing or problem PTFs
- Ad-hoc recovery of recently corrupted / deleted production data
- Verification/Testing of archive or similar processes

A brief diversion of the latest

Spec-sheet Summary - FlashSystem 2026

	FlashSystem grid			
	 FlashSystem C200	 FlashSystem 5600	 FlashSystem 7600	 FlashSystem 9600
Type of media	NVMe	NVMe	NVMe	NVMe
Rack Units	2U	1U	2U	2U
Drive slots	24 drive slots	12 drive slots	32 drive slots	32 drive slots
Physical / Effective	1.1PB / 2.3 PBe	403TB / 2.42 PBe	1.22PB / 7.29 PBe	2.43PBu / 11.88 PBe
Achieved with	FCM 4 – 46 TB (XL)	FCM 5 – 52.8 TB (XL)	FCM 5 – 52.8TB (XL)	FCM 5 – 105.6 TB (XXL)
CPU info per system	4x10 core	2x12 core Ice Lake D	2x16 core AMD Epyc	2x48 core AMD Epyc
CPU cores per system	40 cores	24 cores	32 cores	96 cores
High-speed bus	PCIe Gen 4	PCIe Gen 4	PCIe Gen 5	PCIe Gen 5
Max Cache Hit IOPs	1.5M	2.6M	4.33M	6.37M
Max 70/30/50 IOPs 16KB	-	388K	700K	1.75M
Max Read Miss Bandwidth	23GB/s	30GB/s	60GB/s	86GB/s
Max HBA slot per system	4	4	8	8
Max FC ports/system	16 – 32Gb FC ports	32 - 32Gb FC ports 12 - 64Gb FC ports	32 - 32Gb FC ports 12 - 64Gb FC ports	32 - 32Gb FC ports 12 - 64Gb FC ports
Mac Ethernet ports/system	8 -10BgE on-board 8 – 25GbE ports	4 - 25GbE on-board 16 – 25GbE ports	32 – 25GbE ports	32 – 25GbE ports

FCM5

- New Enterprise Datacenter Form Factor (EDSFF)
- Latest 2Tb QLC NAND Flash Technology
- Increased Raw Capacity
- Increased Effective Capacity
- Increased Performance
- Increased Computational Offload
- Increased Security
- Increased Data Reduction
- Same FlashCore Reliability

E3.L 1T Form Factor

*FCM 2XL is capable of 6:1 addressability, however FlashSystem DRAID addressability is restricted to 4.8:1
**Requires DRAID code changes to support max DRAID geometry

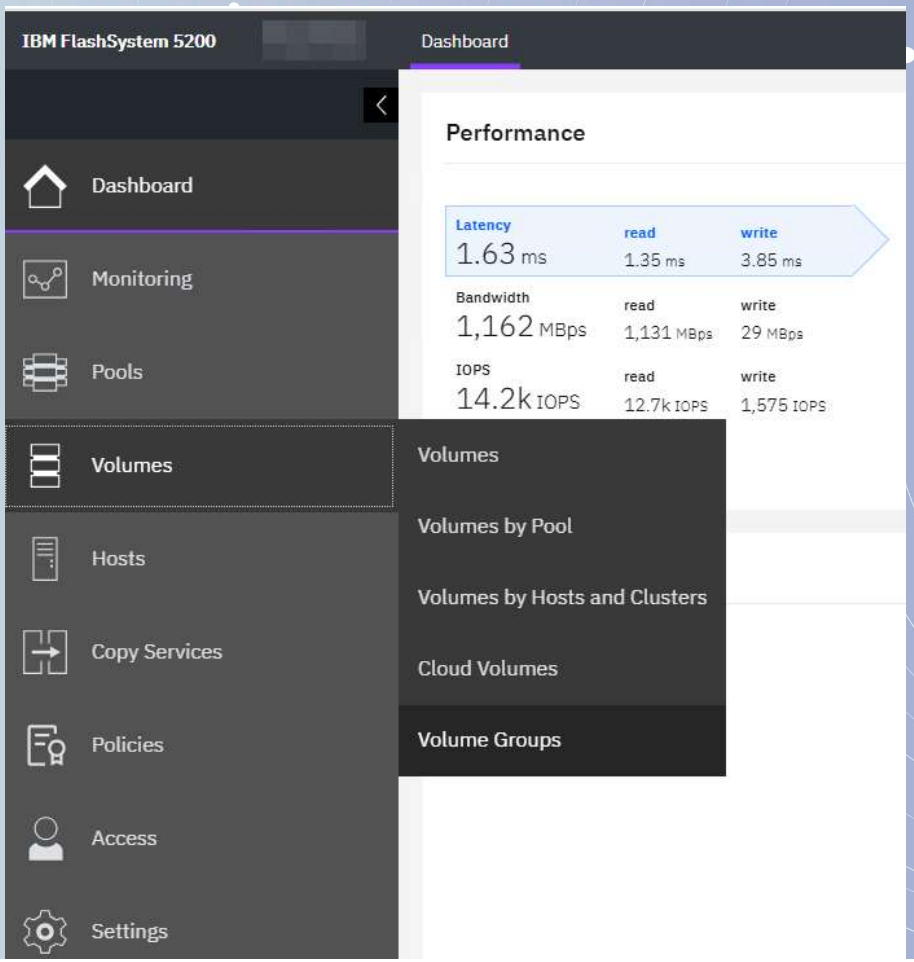
Capacity Points in TB	Small	Medium	Large	XL	2XL
Form Factor	1T	1T	1T	1T	1T
RAW Capacity	6.6	13.2	26.4	52.8	105.6
Physical Capacity (1:1)	5.6	11.2	22.4	44.8	89.6
Max Data Reduction	6:1	6:1	6:1	6:1	6:1*
Effective Capacity	33.6	67.2	134.4	268.8	438.0*
Platform Support	x600	x600	x600	x600	9600

Coffee

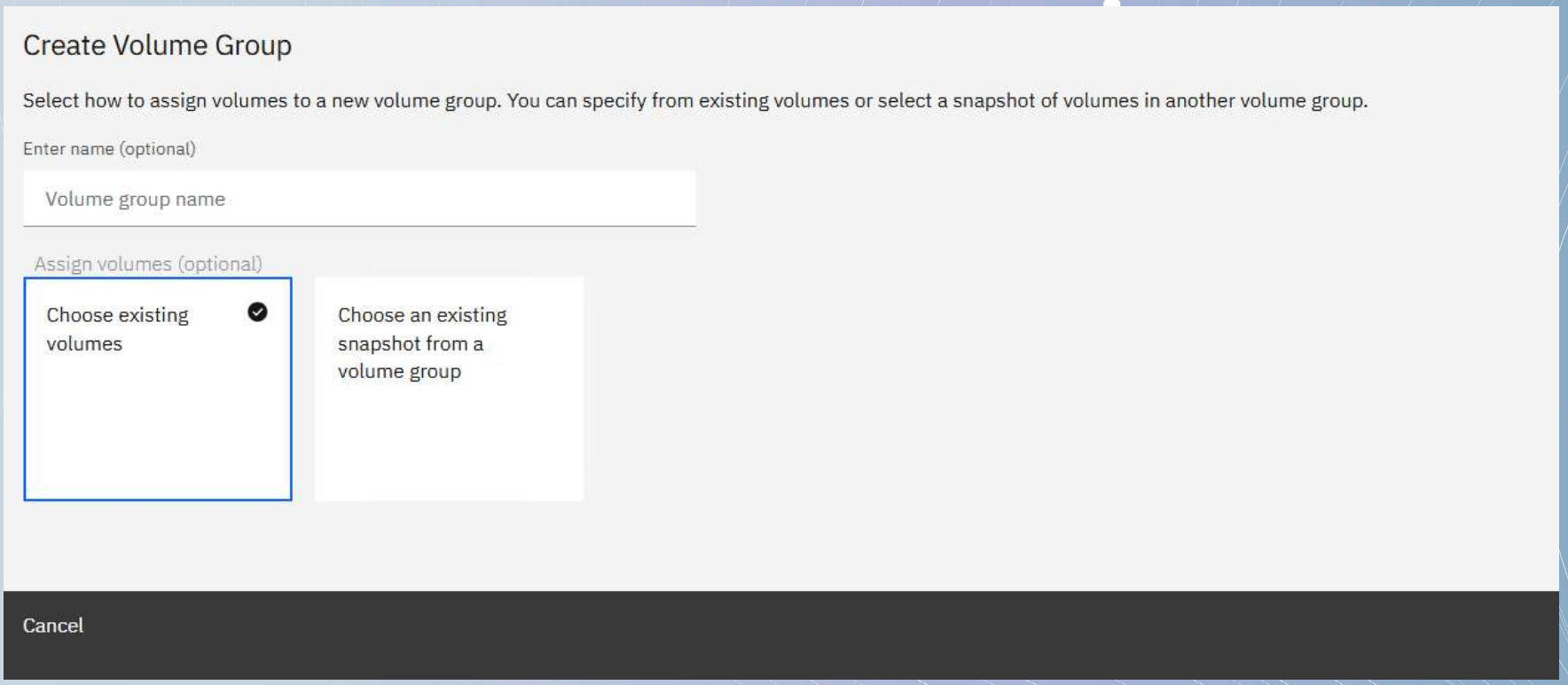
In this half I’ll look at the mechanics

- Assuming you already have an LPAR on the SAN.

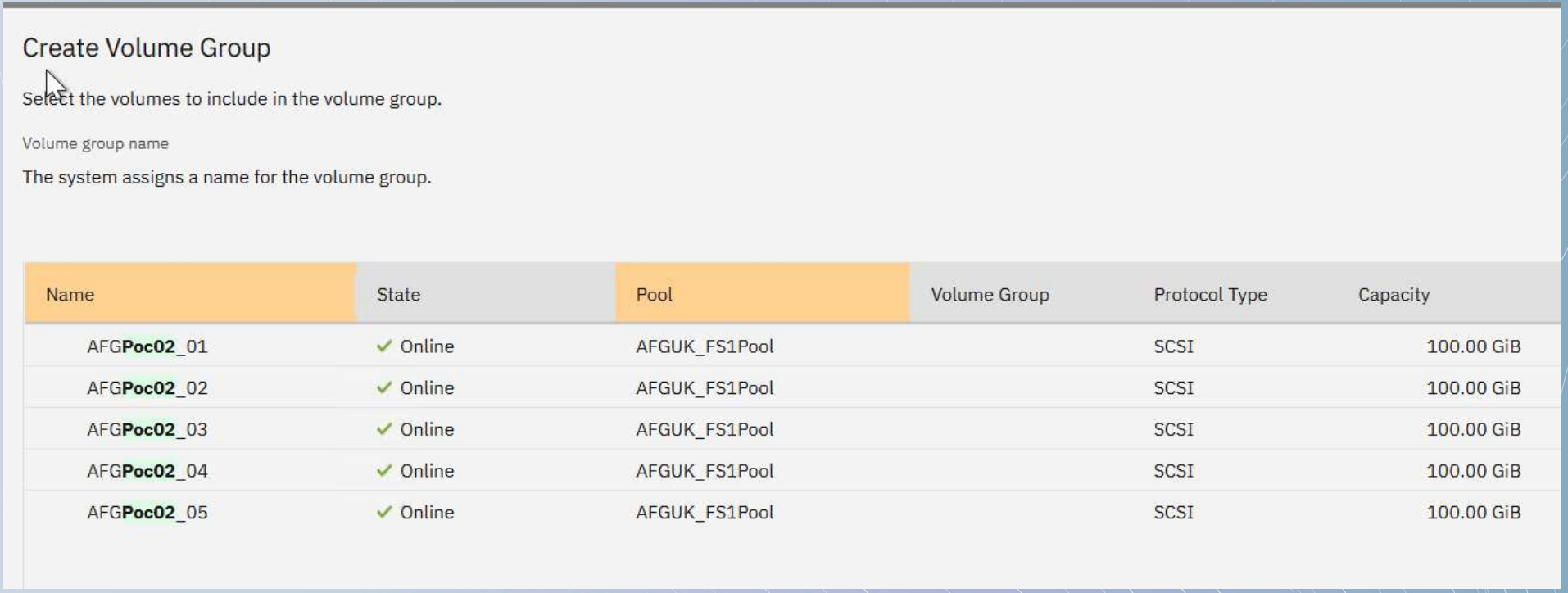
On the SAN, Create a volume group

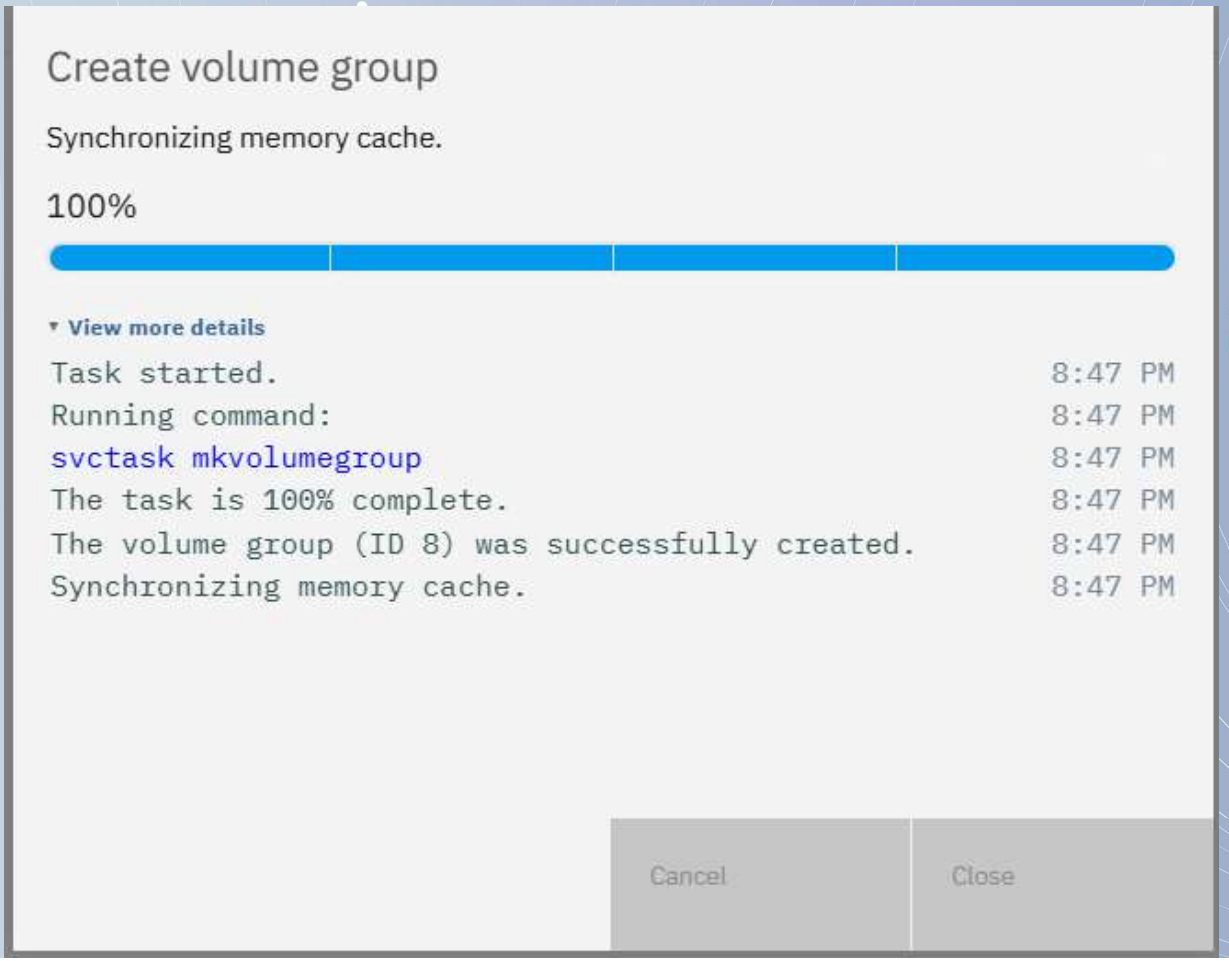


Create a volume group

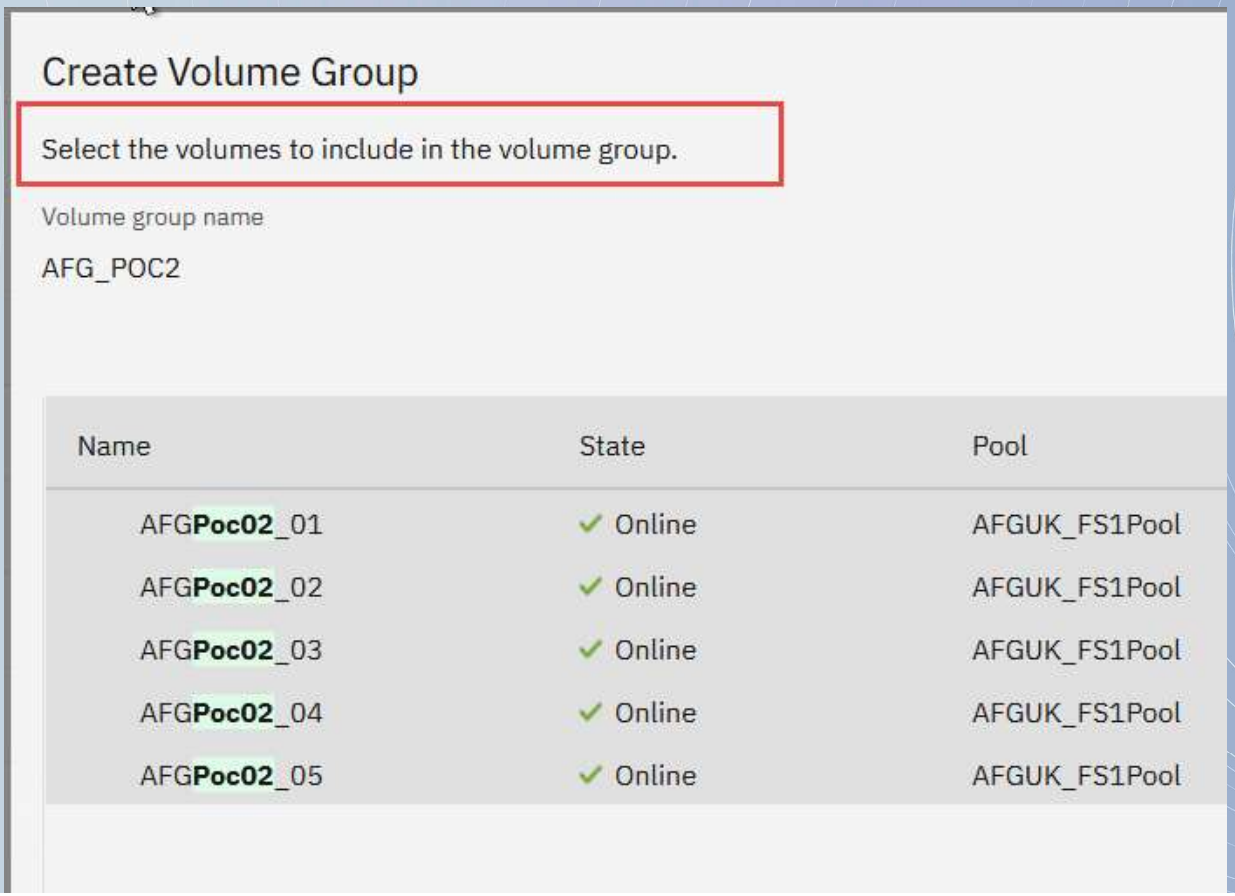


I gave it a name, but didn't screenshot that

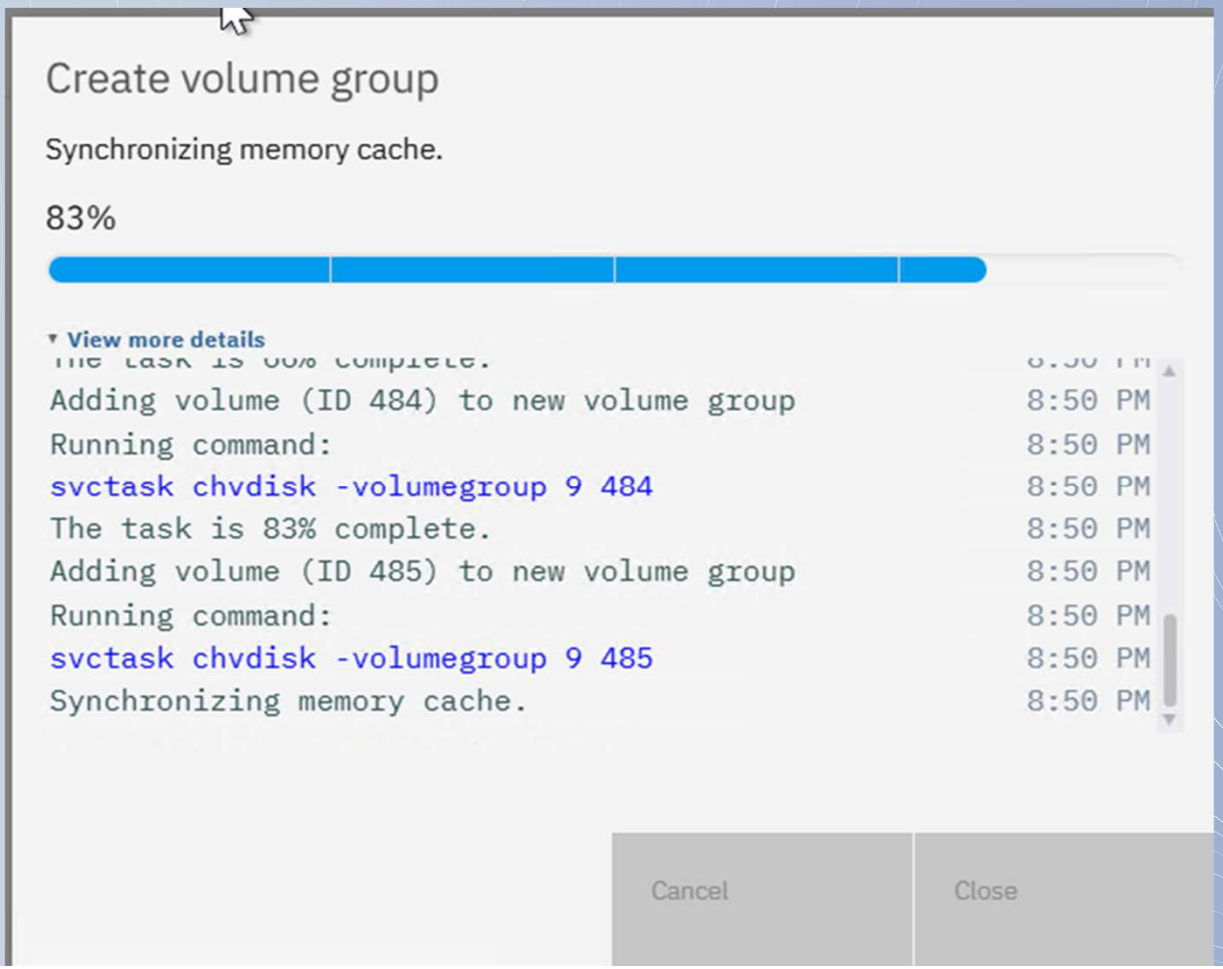



Create volume group
Synchronizing memory cache.
100%
View more details
Task started. 8:47 PM
Running command: 8:47 PM
svctask mkvolumegroup 8:47 PM
The task is 100% complete. 8:47 PM
The volume group (ID 8) was successfully created. 8:47 PM
Synchronizing memory cache. 8:47 PM
Cancel
Close

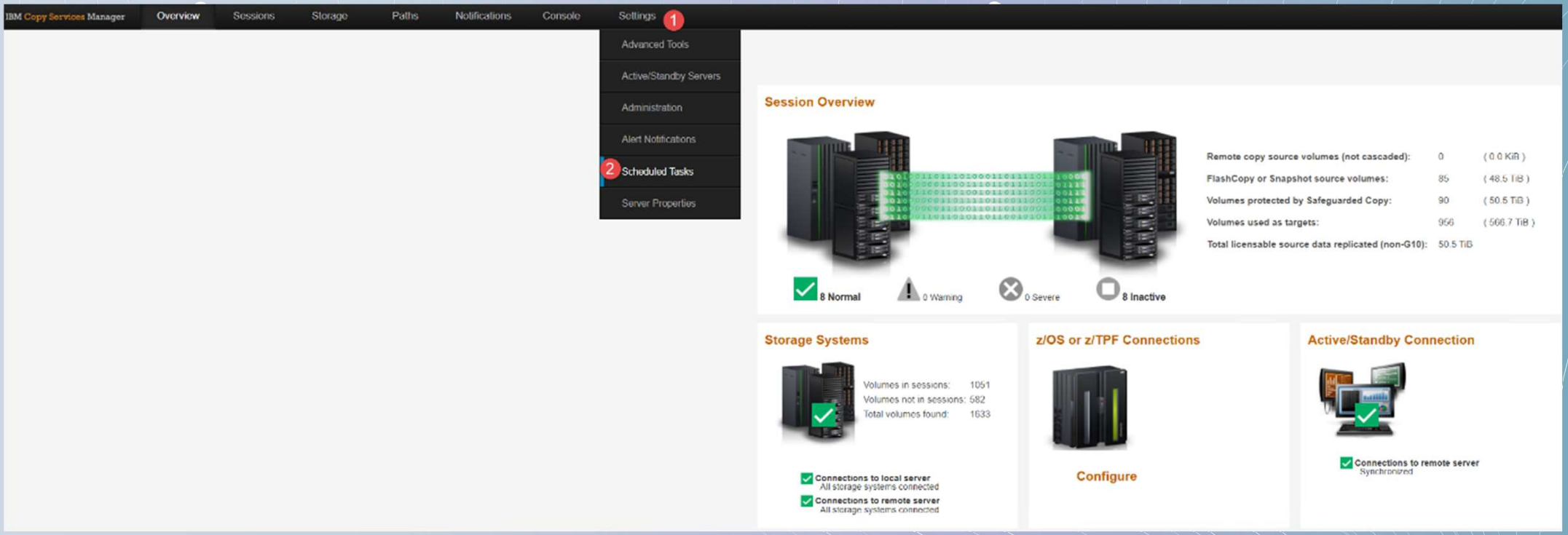
And that did absolutely nothing…



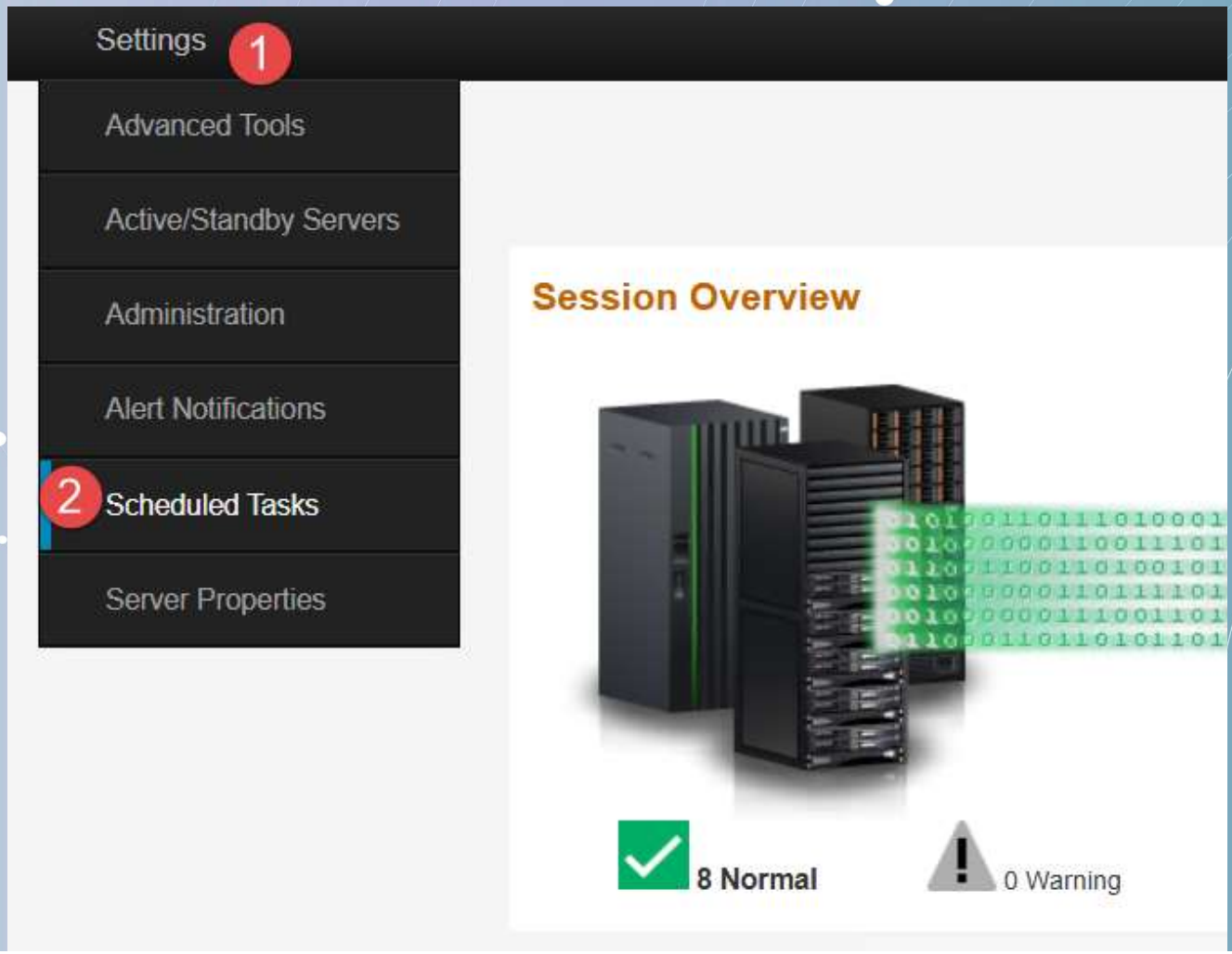
This time it shows volumes being added



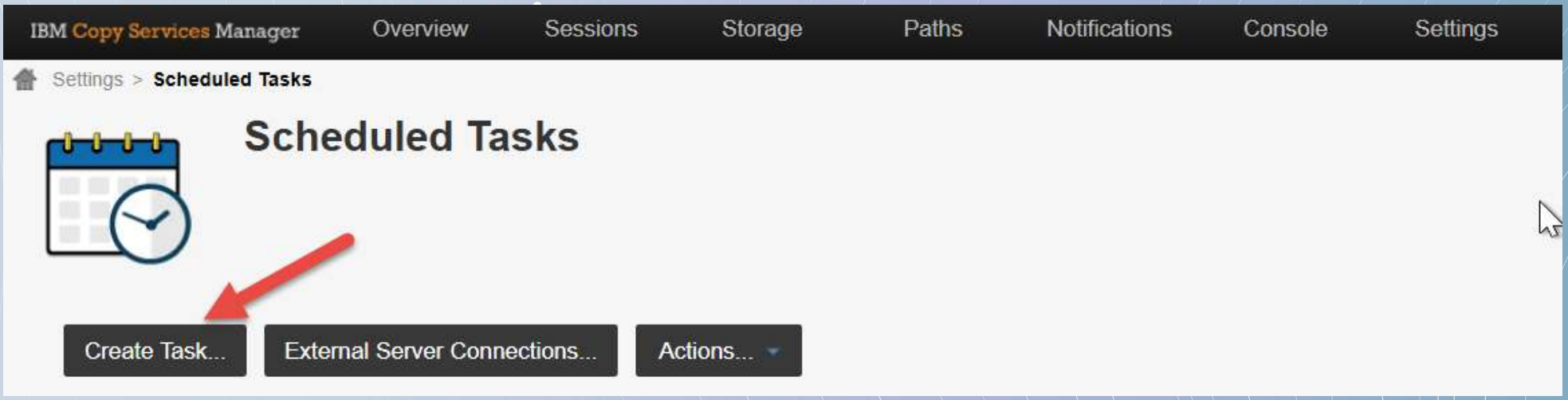
Copy Service Manager



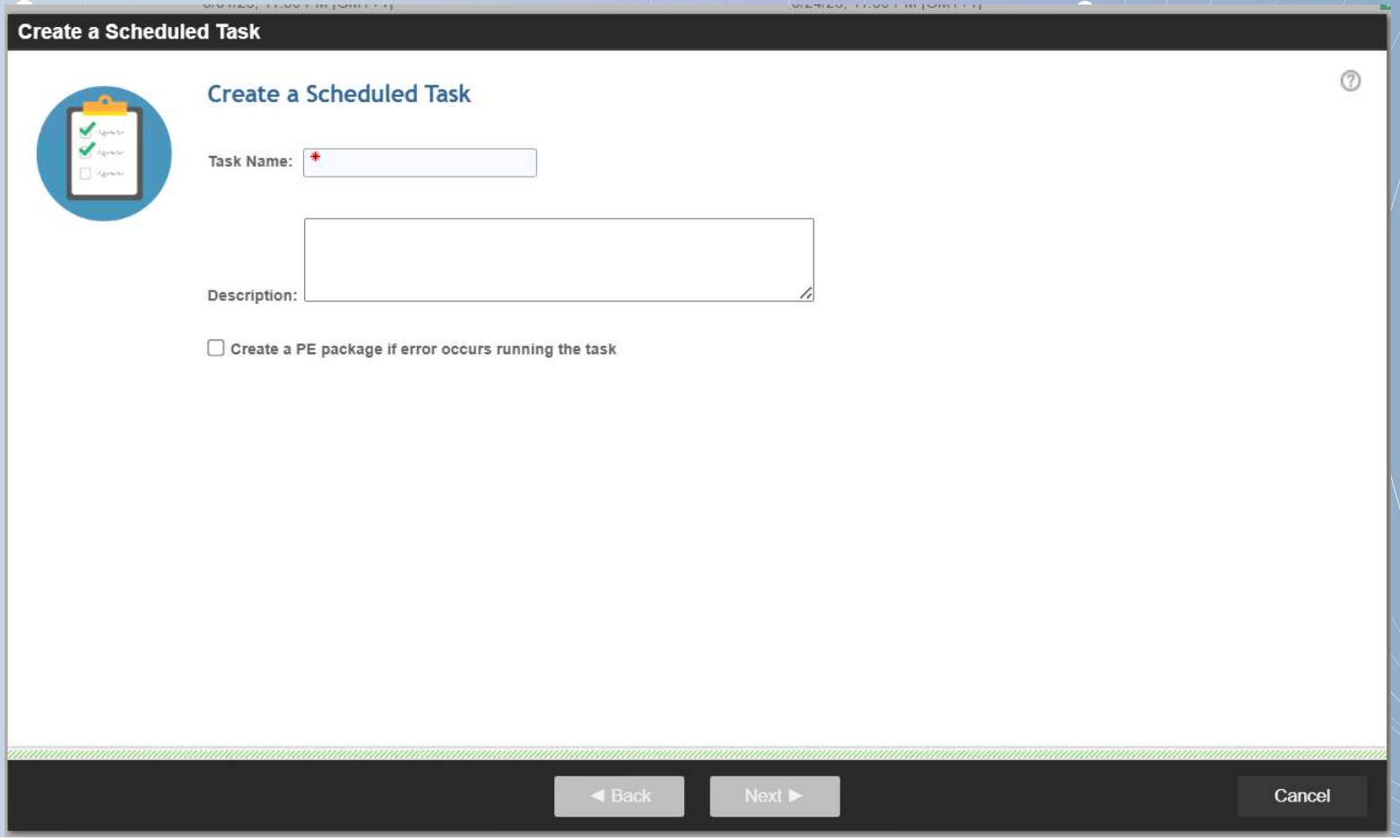
Copy Service Manager



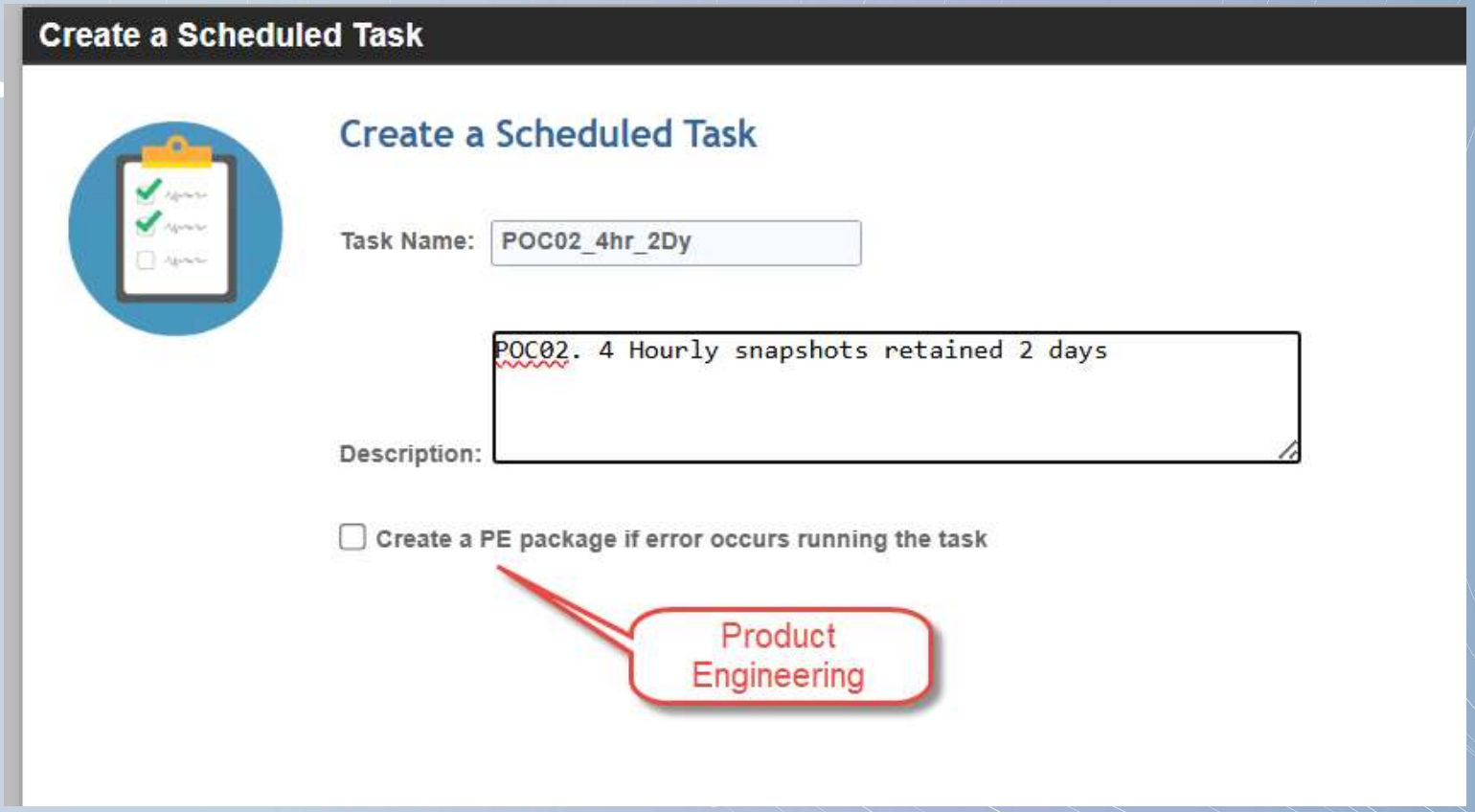
Scheduled Task –> [Create Task]



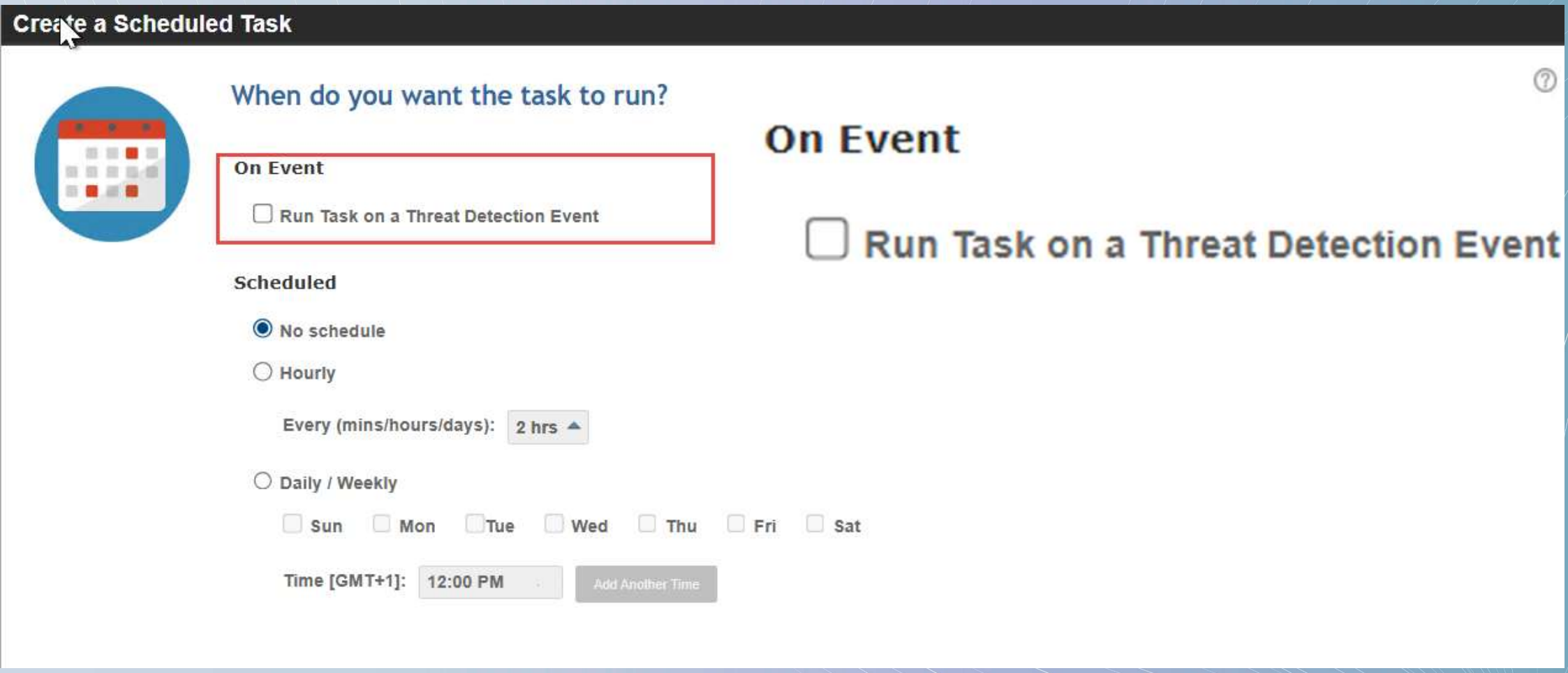
Create a Scheduled Task



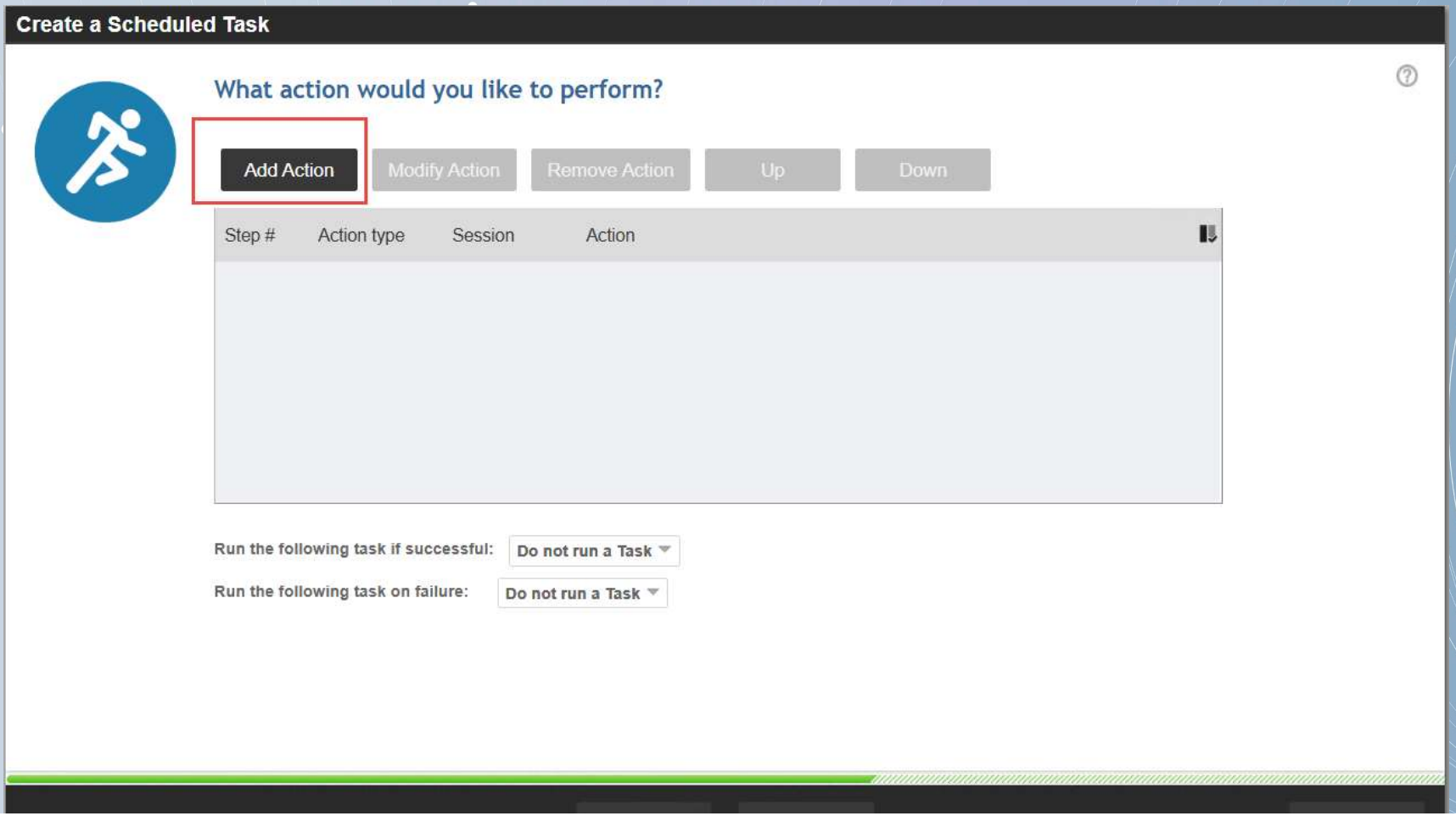
Create a Scheduled Task

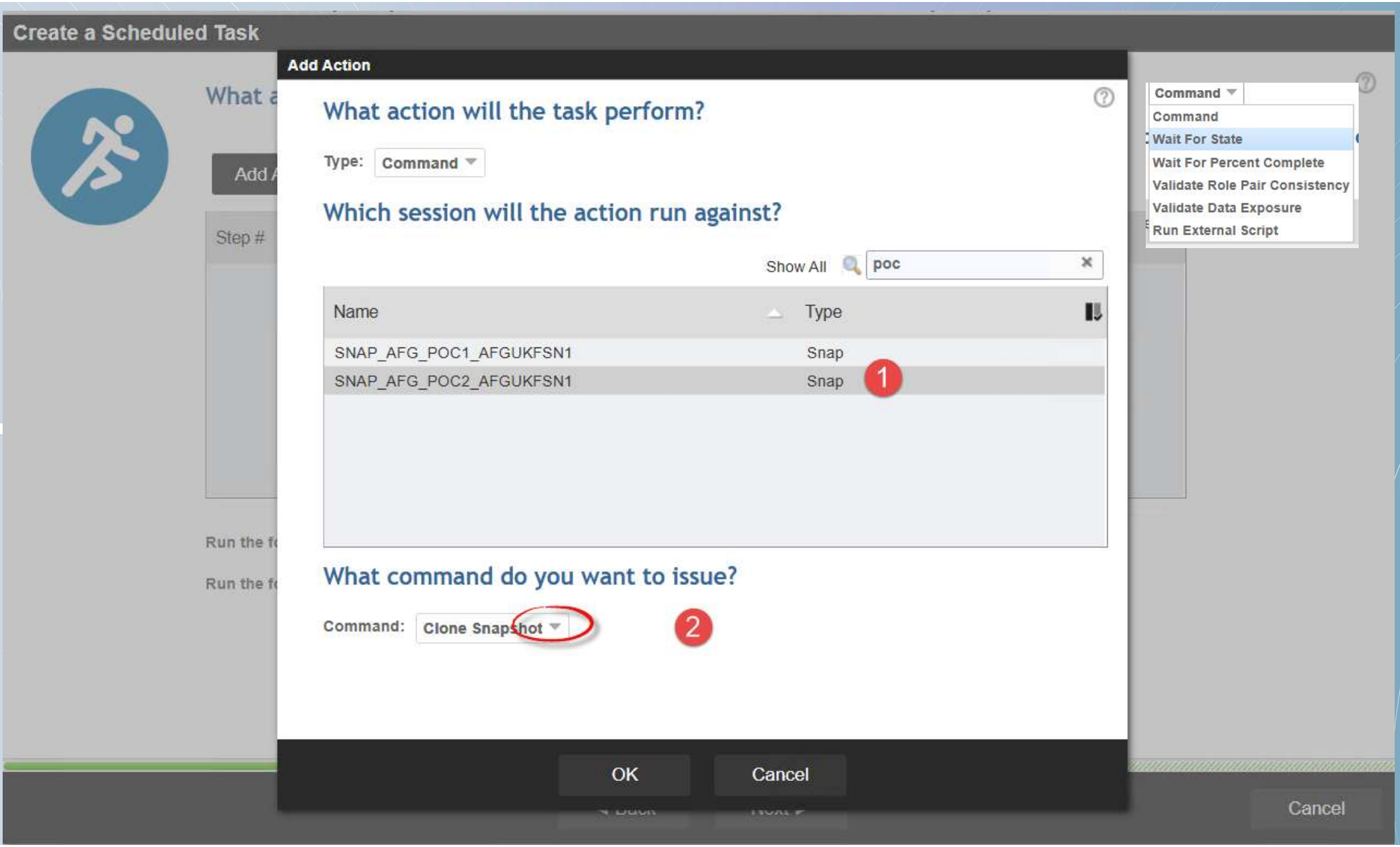


Scheduled Task

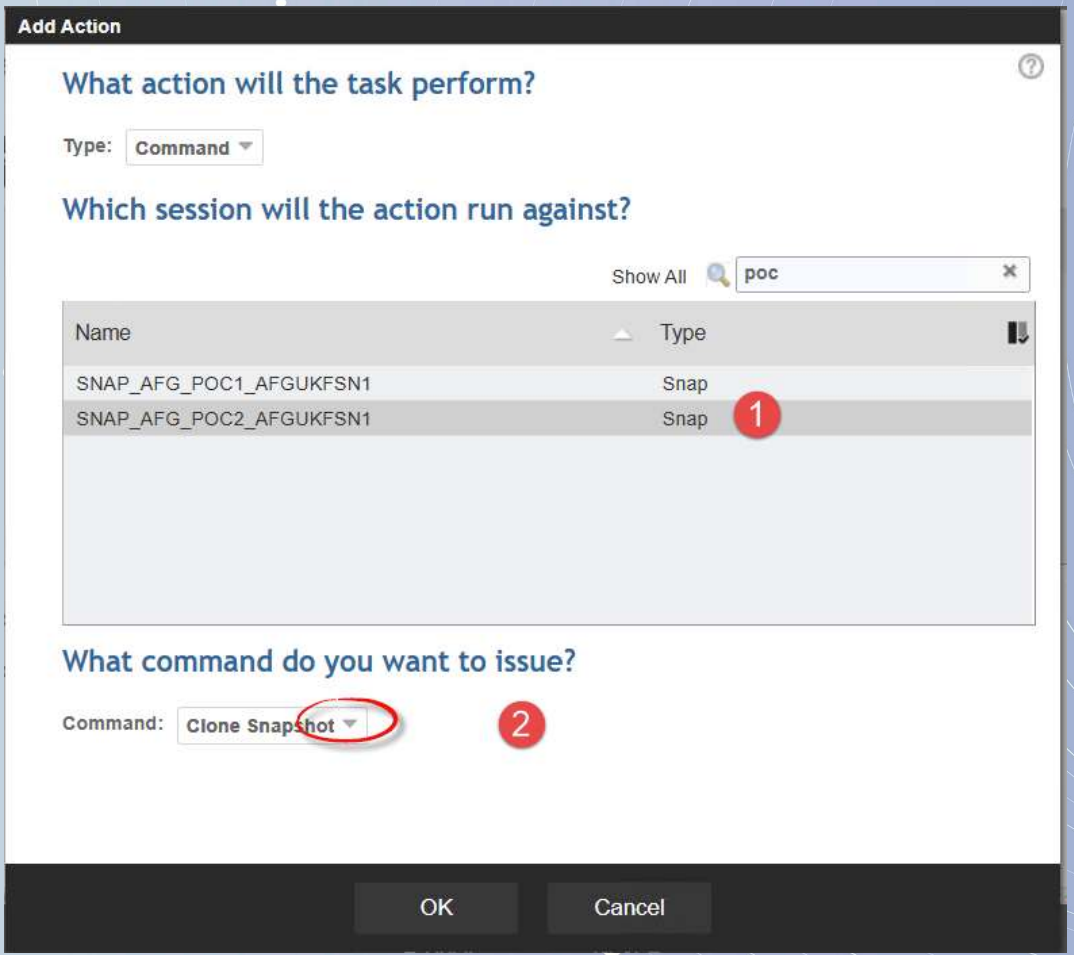


Create a Scheduled Task –> Add Action

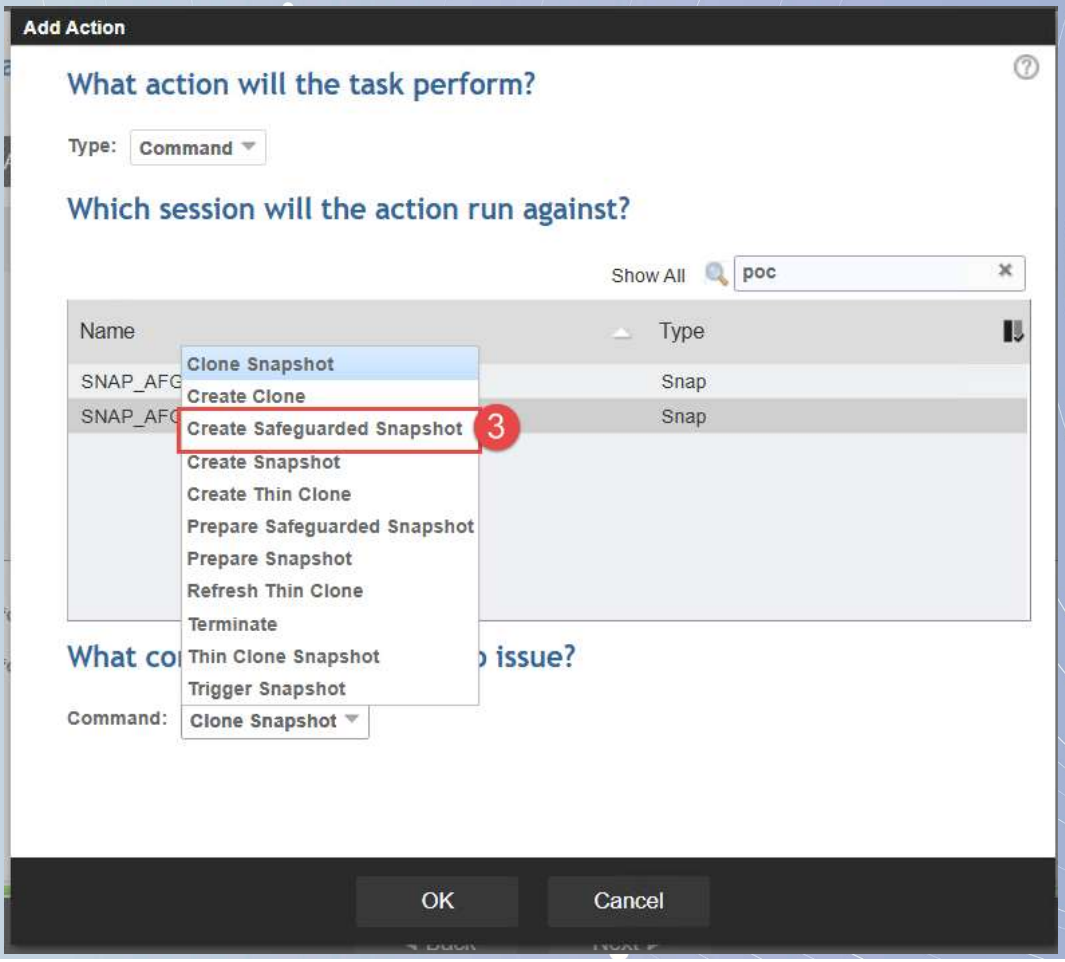



Create a Scheduled Task
Add Action
What action will the task perform?
Type: Command
Which session will the action run against?
Show All
poc
Name
Type
SNAP_AFG_POC1_AFGUKFSN1
Snap
SNAP_AFG_POC2_AFGUKFSN1
Snap
1
What command do you want to issue?
Command: Clone Snapshot
2
OK
Cancel
Command
Command
Wait For State
Wait For Percent Complete
Validate Role Pair Consistency
Validate Data Exposure
Run External Script
Step #
Cancel

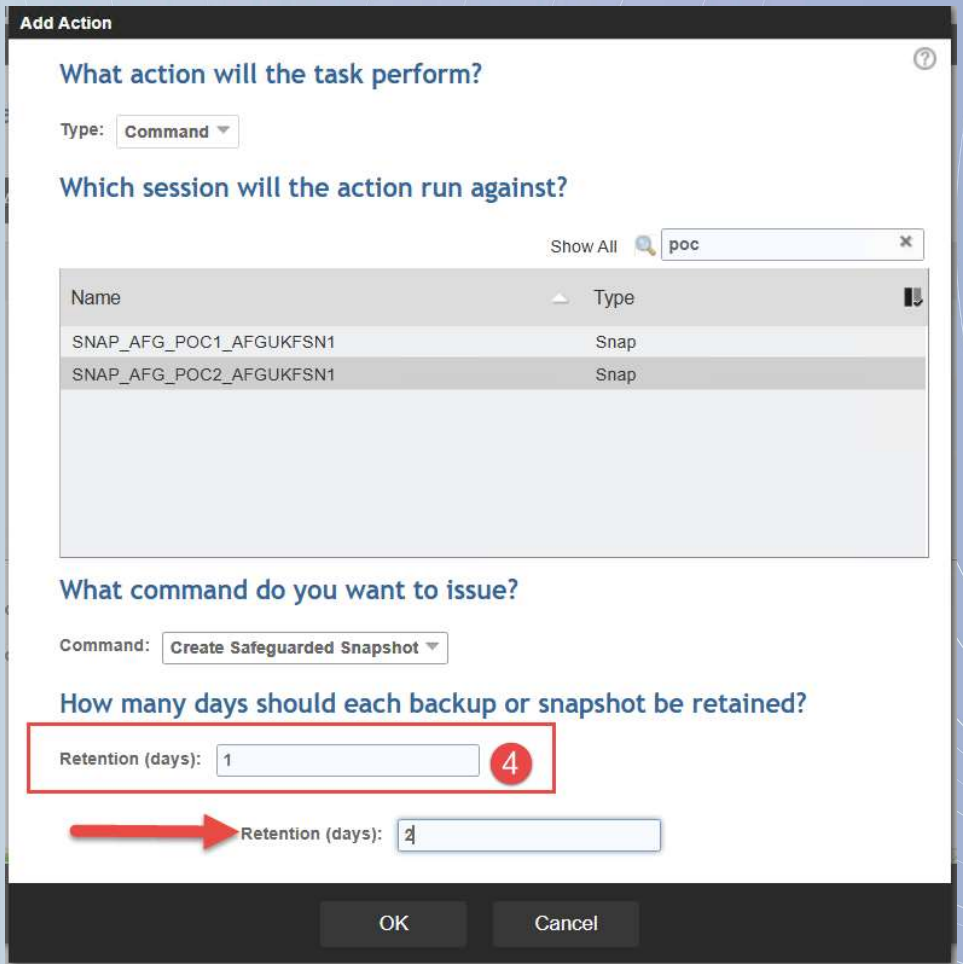
Choose the session [1] and dropdown [2]



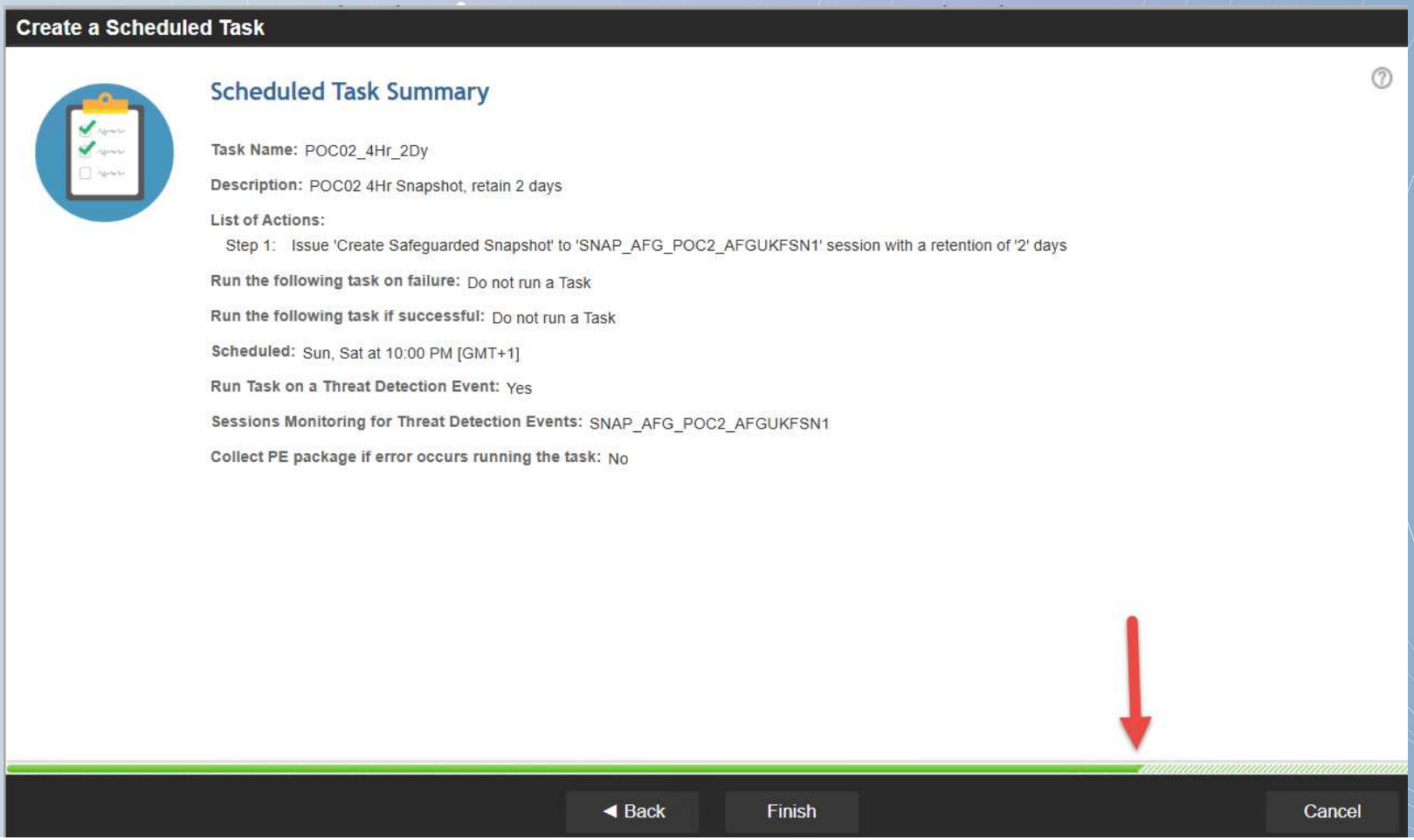
Option {Create Safeguarded Snapshot}



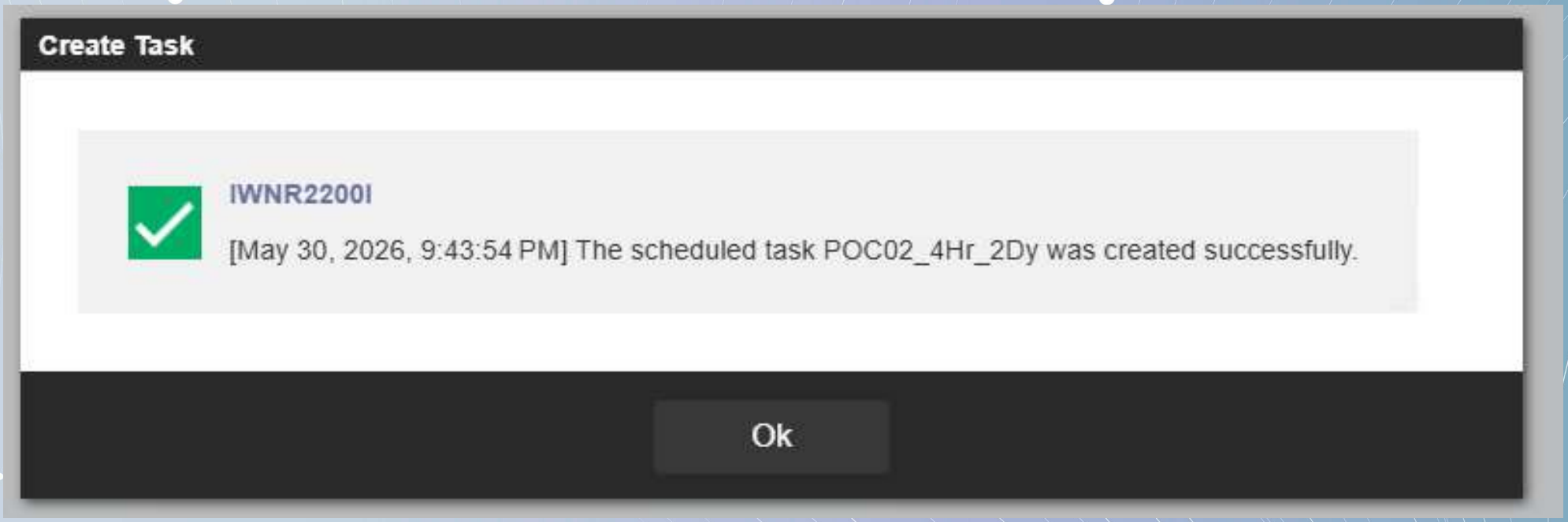
Change the retention days [4] to value 2 days



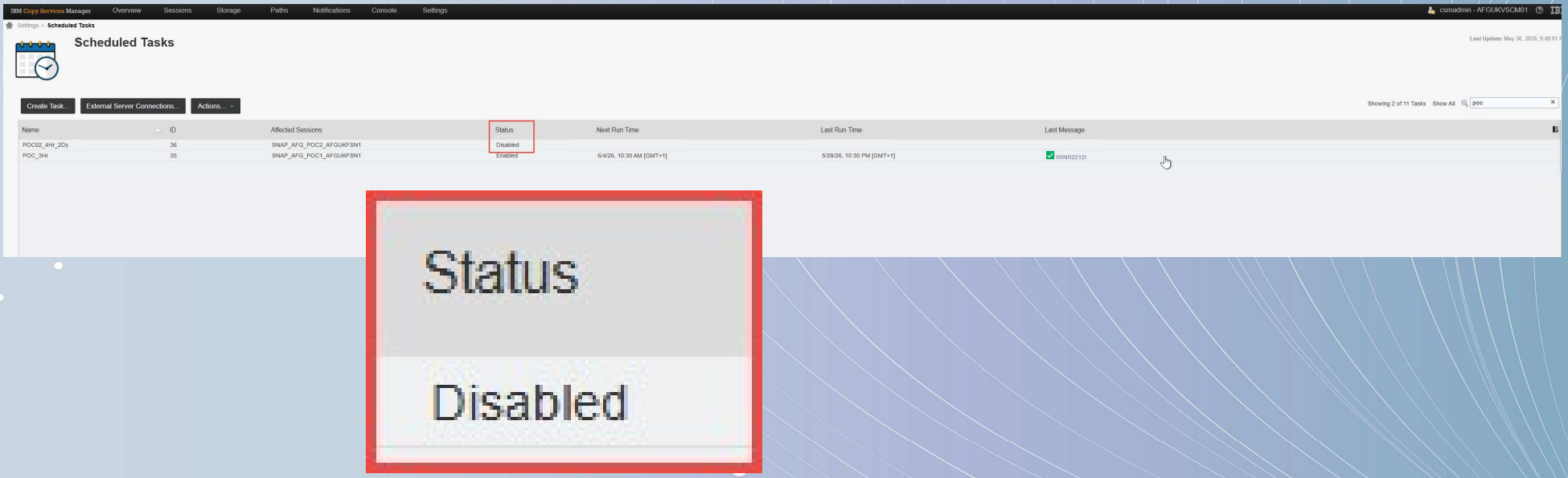
Summary – note the progress bar. [Finish]



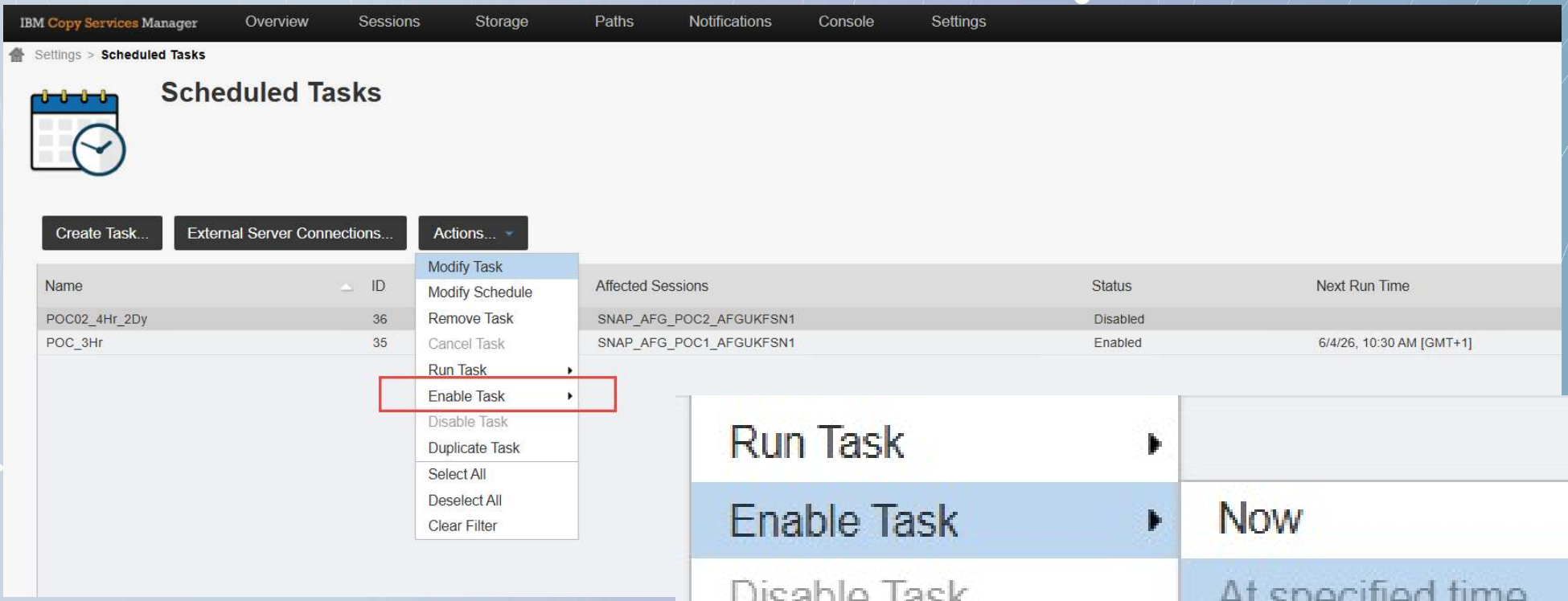
Confirmation… always reassuring



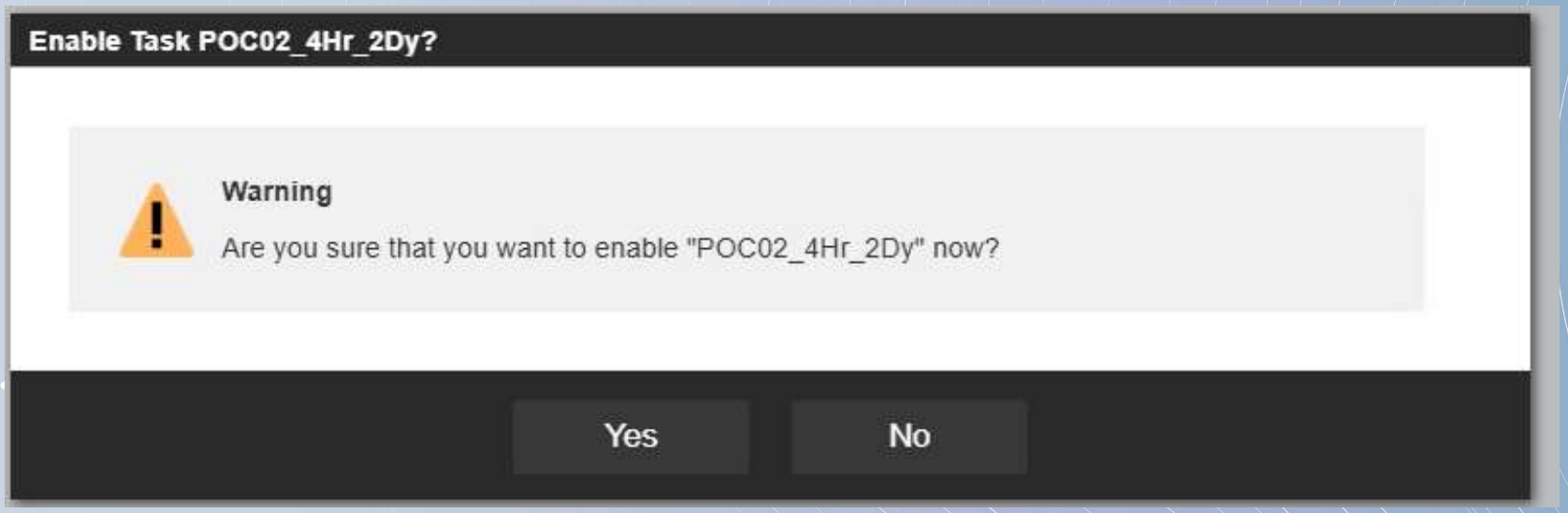
The new task exists but is safely disabled.



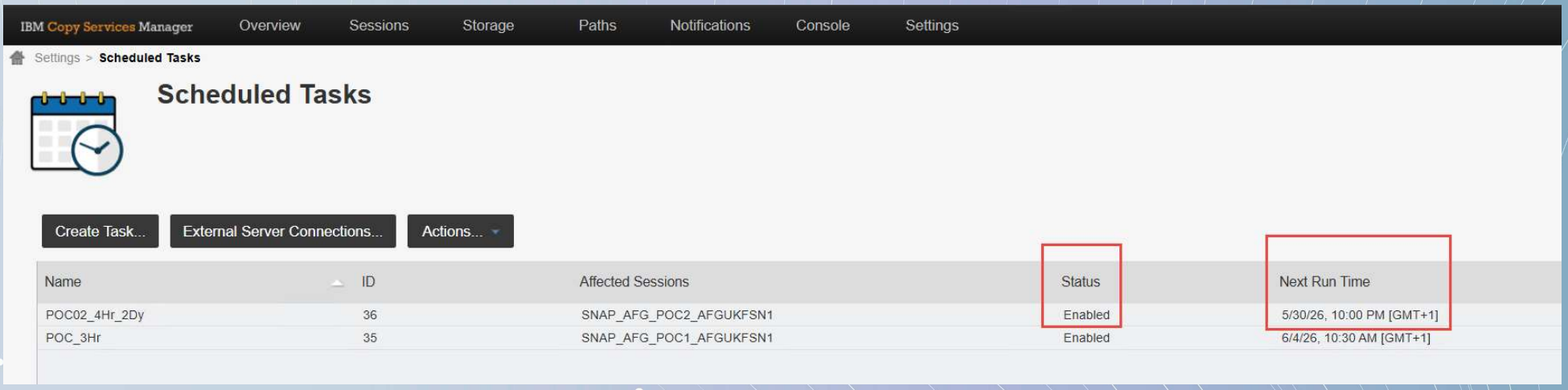
Enable the task



Just in case you want to back out !

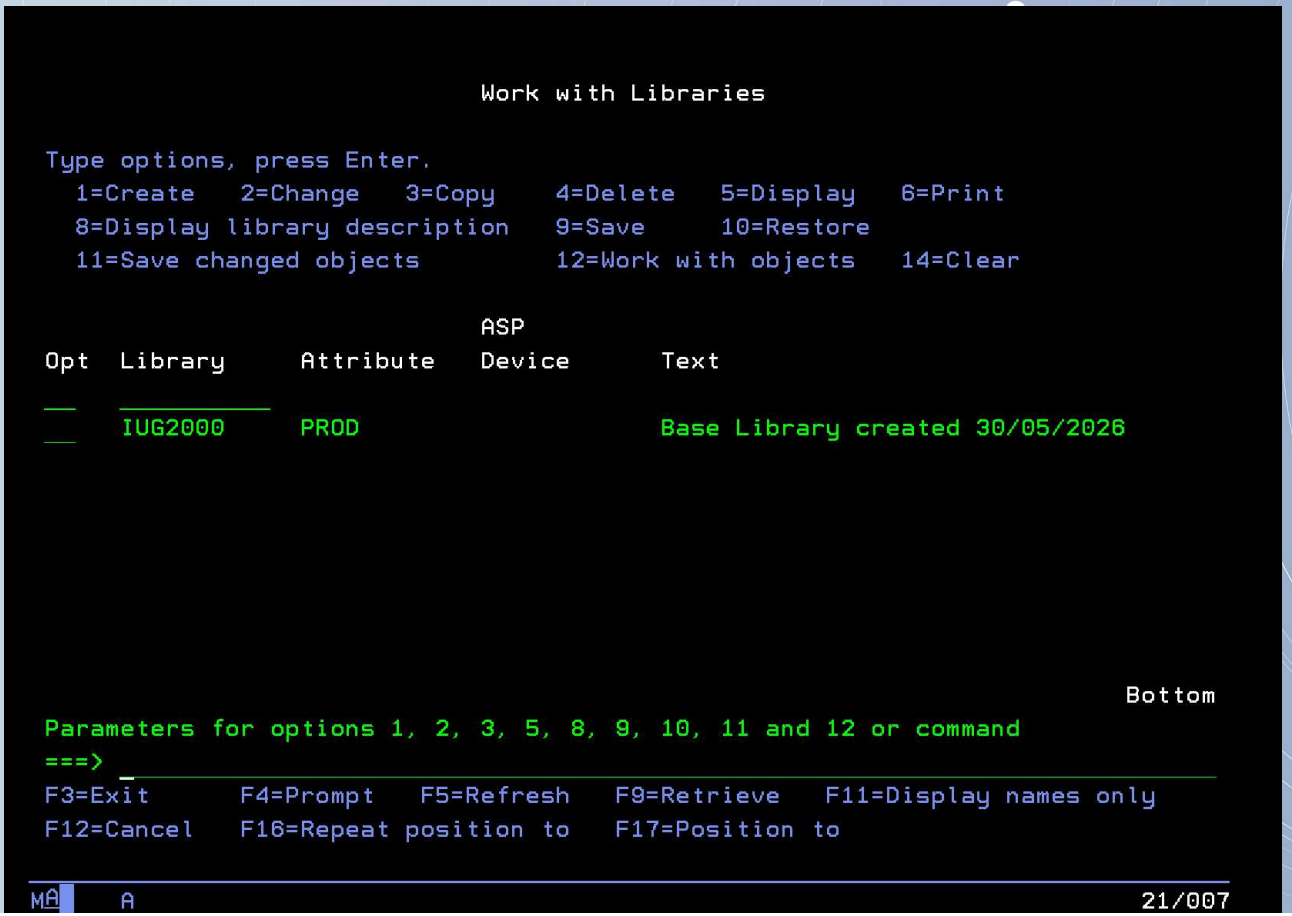


Now it is enabled and the run time is filled in

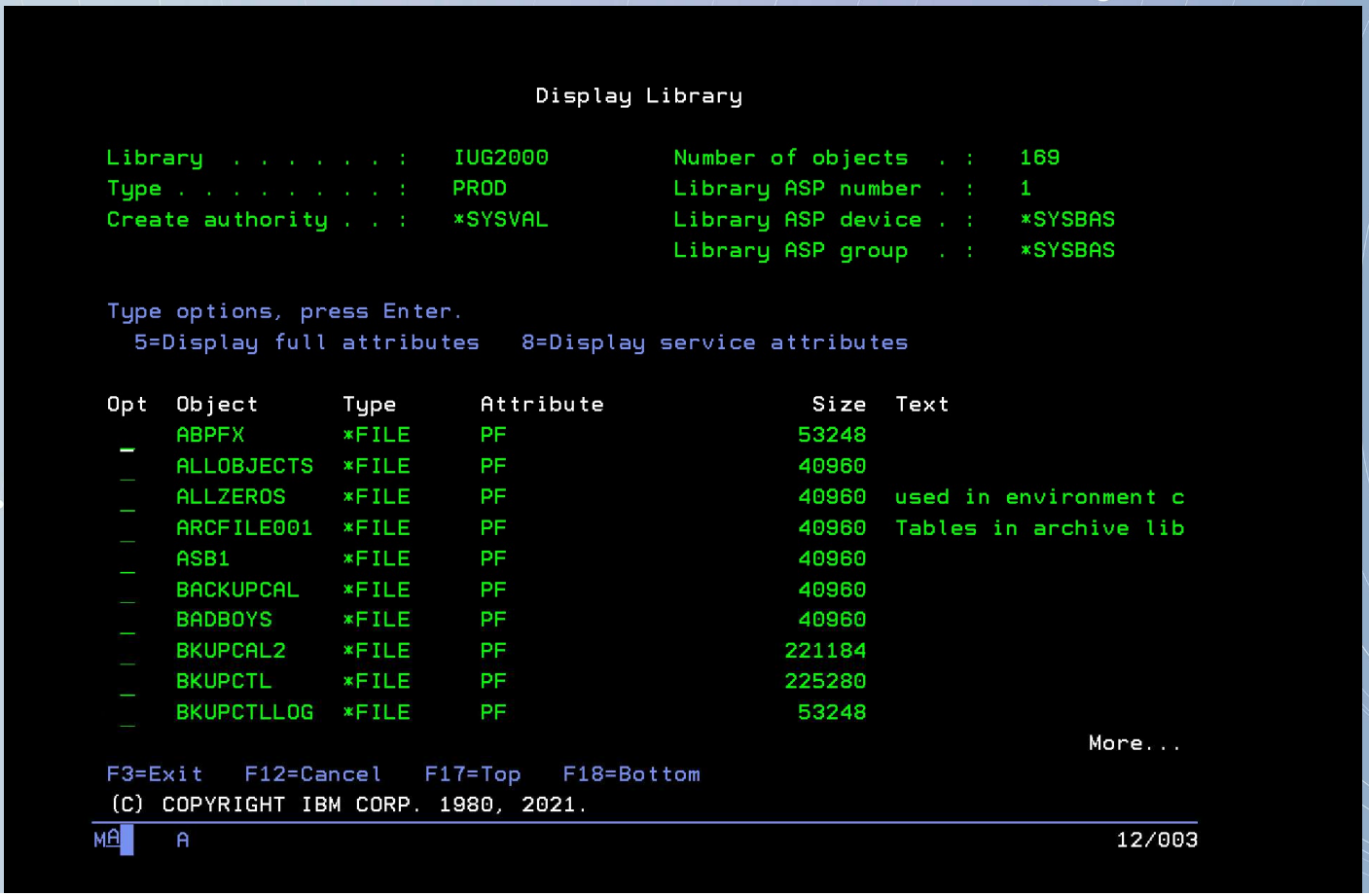


And now for something completely different

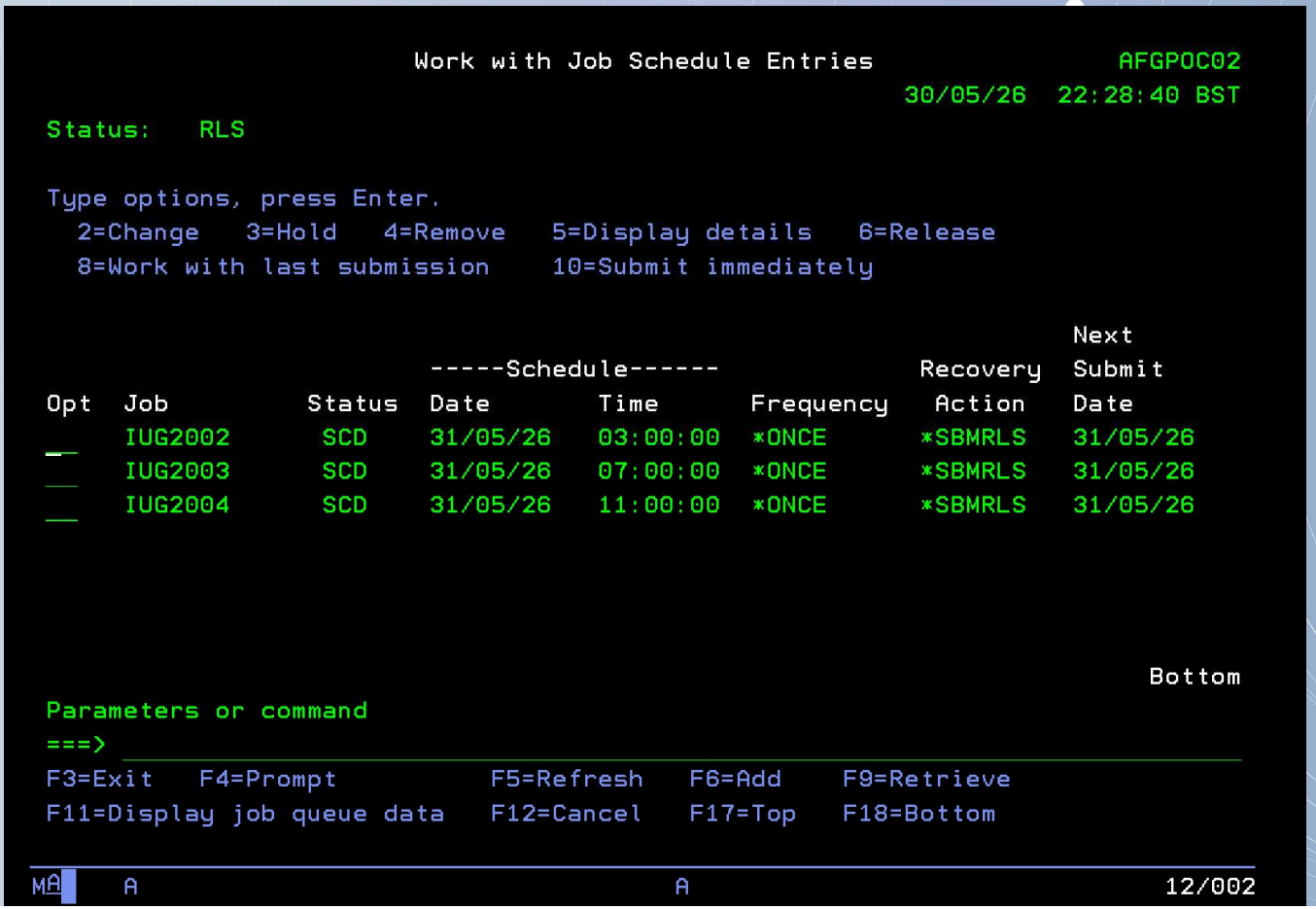
I created a library



I added tables



I created a schedule to create new libraries



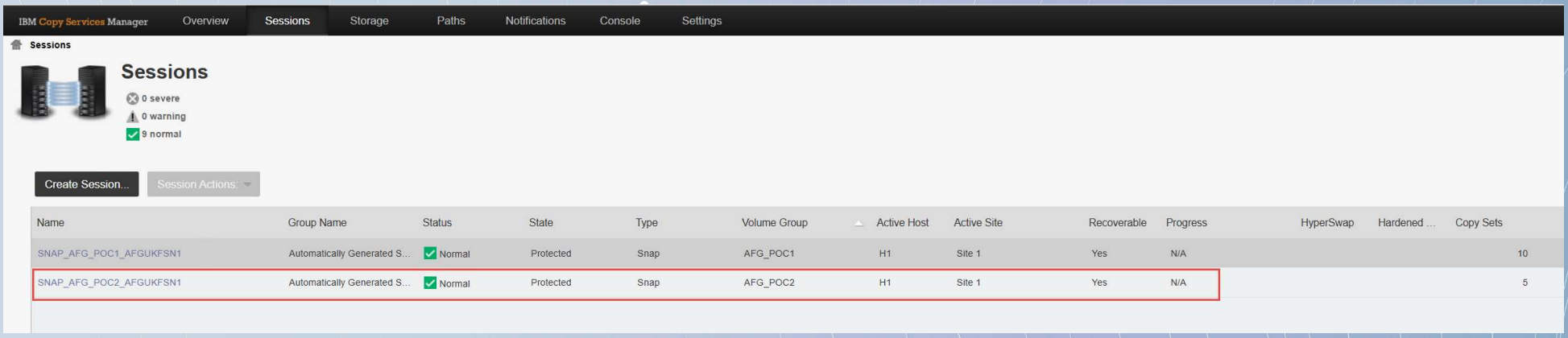
Meanwhile

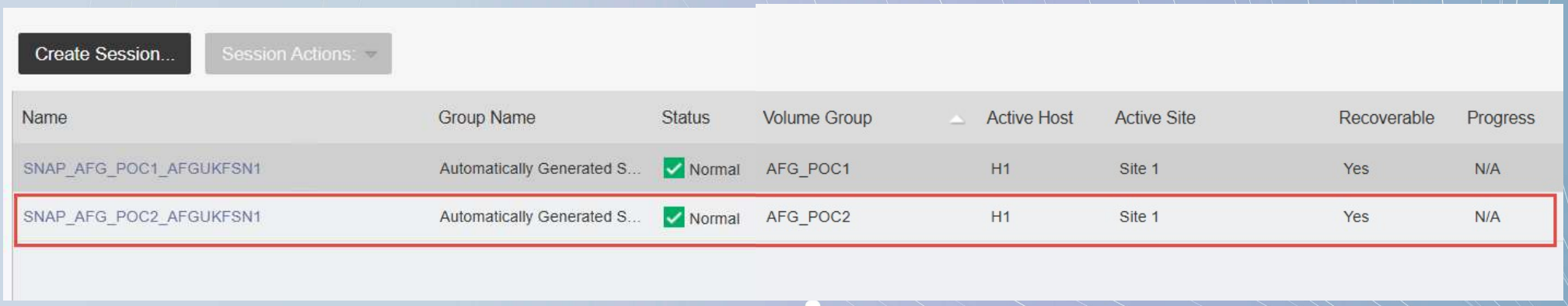
While I was setting up the JOBSCDE to create copies of IUG2000

The schedule ran, so I manually created IUG2001.

- IUG2000 existed for snapshot #1
- IUG2001 exists in time for snapshot #2
- IUG2002 exists in time for snapshot #3
- IUG2003 exists in time for snapshot #4
- IUG2004 exists in time for snapshot #5
- **….or so I thought (I will explain in a bit)**

On the CSM - Session shows a recoverable copy





IBM Copy Services Manager | Overview | Sessions | Storage | Paths | Notifications | Console | Settings

Sessions > **SNAP_AFG_POC2_AFGUKFSN1**

SNAP_AFG_POC2_AFGUKFSN1

Session Actions:

Status	Normal
State	Protected
Session Type	Snapshot
Active Host	H1
Recoverable	Yes
Description	Automatically created SnapshotSVC session(modify)
Copy Sets	5 (view)
Group Name	Automatically Generated Session

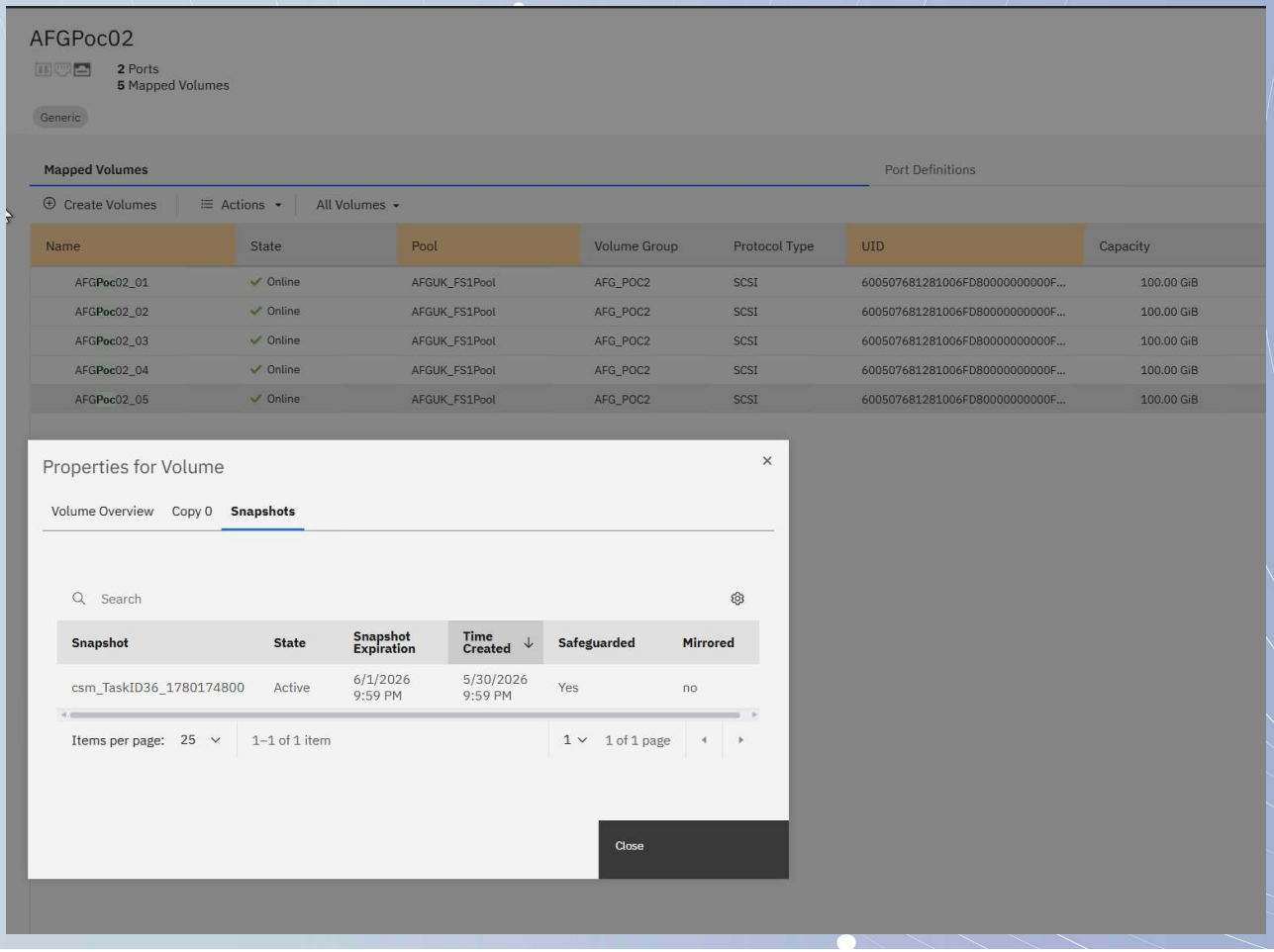
Snapshot Schedule	[Sun, Sat] 10:00 PM [GMT+1]
Last Recoverable Snapshot	2026-05-30 21:59:58 BST
Volume Group Name	AFG_POC2

Snapshot Info | Thin Clone Info

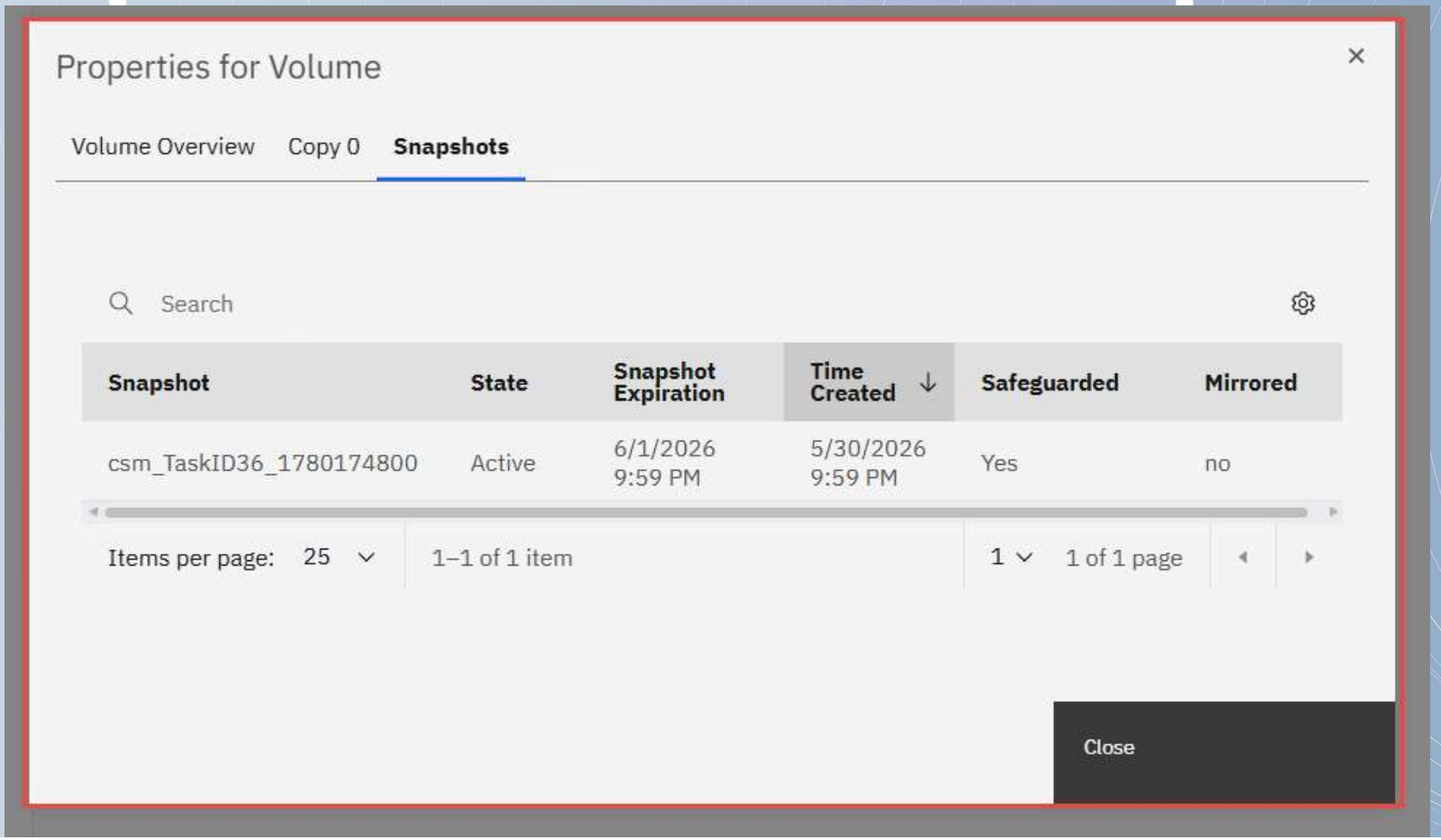
Total Number Snapshots: 1 **Total Recoverable Snapshots:** 1 **Total Unrecoverable Snapshots:** 0

Snapshot Time	Snapshot Name	Snapshot ID	State	Recoverable	Copy Sets	Last Result	Expiration	Safeguarded	Threat Detect...
2026-05-30 21:59:58 BST	csm_TaskID36_1780174800	1780174800	active	Yes	5	IWNR2885I	2026-06-01 21:59:58 BST	Yes	No

SAN: Volume properties shows snapshots

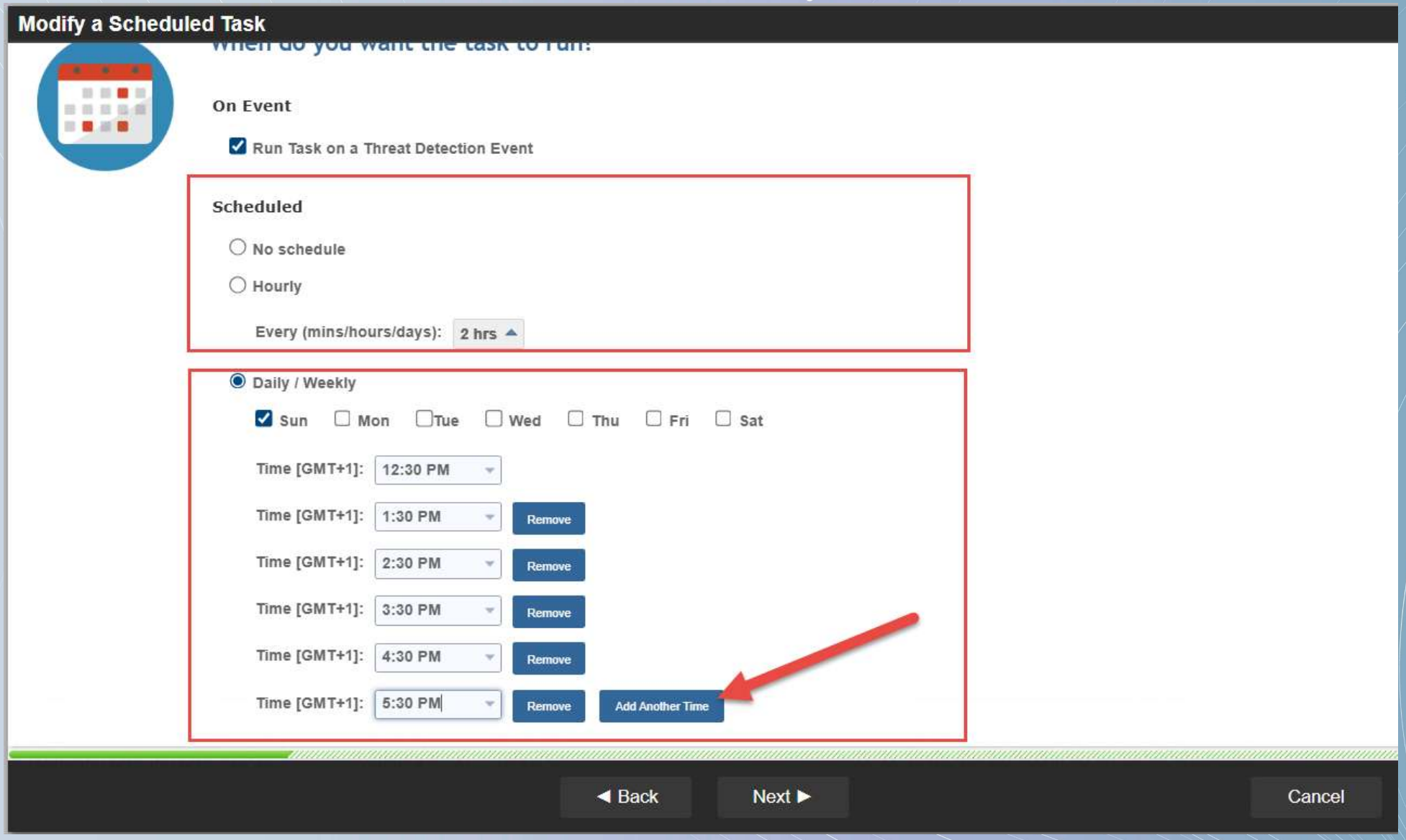


Volume properties show SG Snapshot(s)

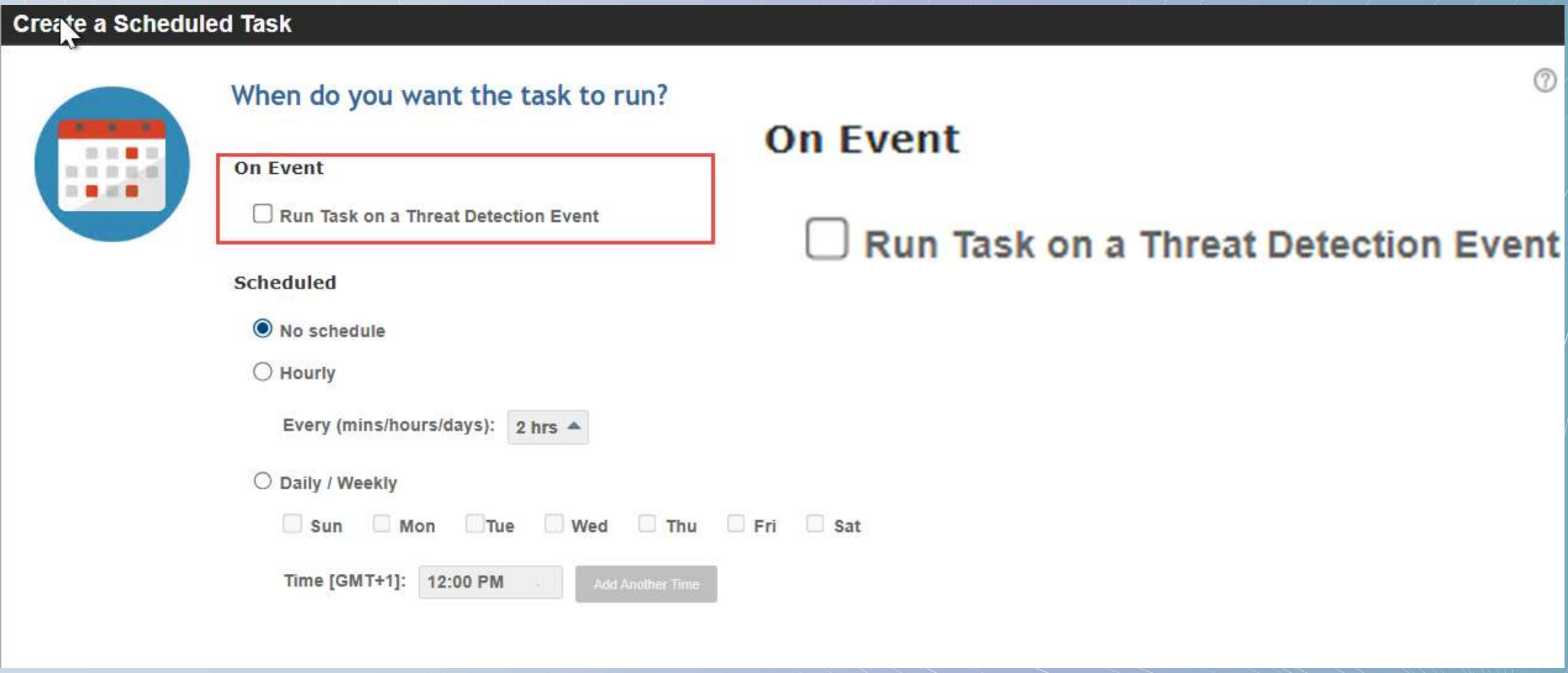


The following day….

- I still only had one snapshot – what went wrong?

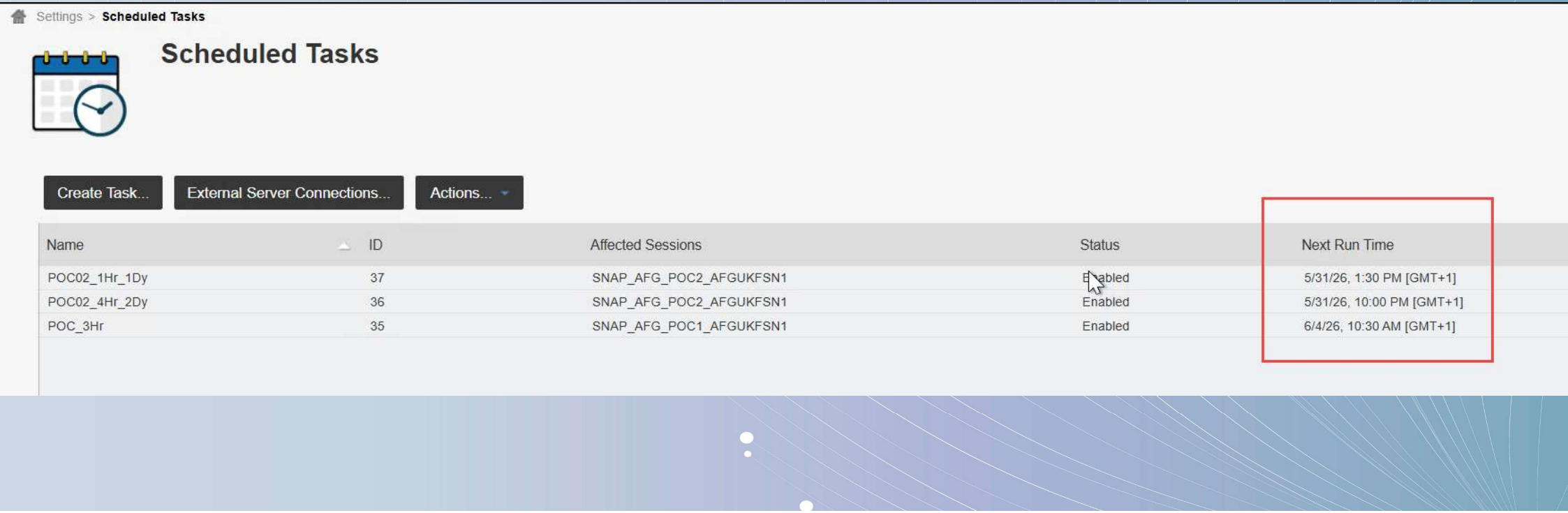

Modify a Scheduled Task
When do you want the task to run?
On Event
Run Task on a Threat Detection Event
Scheduled
No schedule
Hourly
Every (mins/hours/days):
2 hrs
Daily / Weekly
Sun
Mon
Tue
Wed
Thu
Fri
Sat
Time [GMT+1]:
12:30 PM
Time [GMT+1]:
1:30 PM
Remove
Time [GMT+1]:
2:30 PM
Remove
Time [GMT+1]:
3:30 PM
Remove
Time [GMT+1]:
4:30 PM
Remove
Time [GMT+1]:
5:30 PM
Remove
Add Another Time
◄ Back
Next ►
Cancel

Scheduled Task

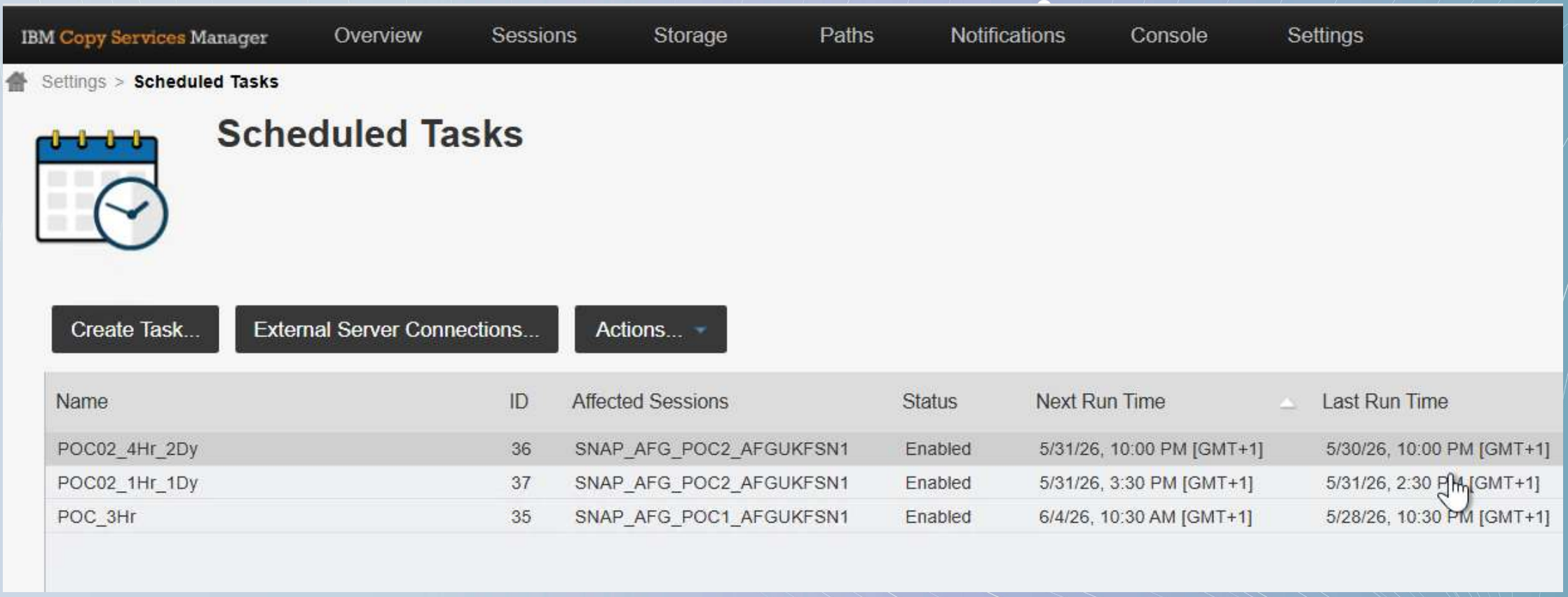


Once the Schedule was altered

- The next run time was starting next week, not today.
- Corrected by [Scheduled tasks –> Actions -> Disable /Enable]



The scheduled task shows the last run time.



And the Sessions shows the detail

Sessions > **SNAP_AFG_POC2_AFGUKFSN1**

Last Update: M

SNAP_AFG_POC2_AFGUKFSN1

Session Actions:

Status	Normal
State	Protected
Session Type	Snapshot
Active Host	H1
Recoverable	Yes
Description	Automatically created SnapshotSVC session(modify)
Copy Sets	5 (view)
Group Name	Automatically Generated Session
Snapshot Schedule	2 Scheduled Tasks
Last Recoverable Snapshot	2026-05-31 15:29:58 BST
Volume Group Name	AFG_POC2

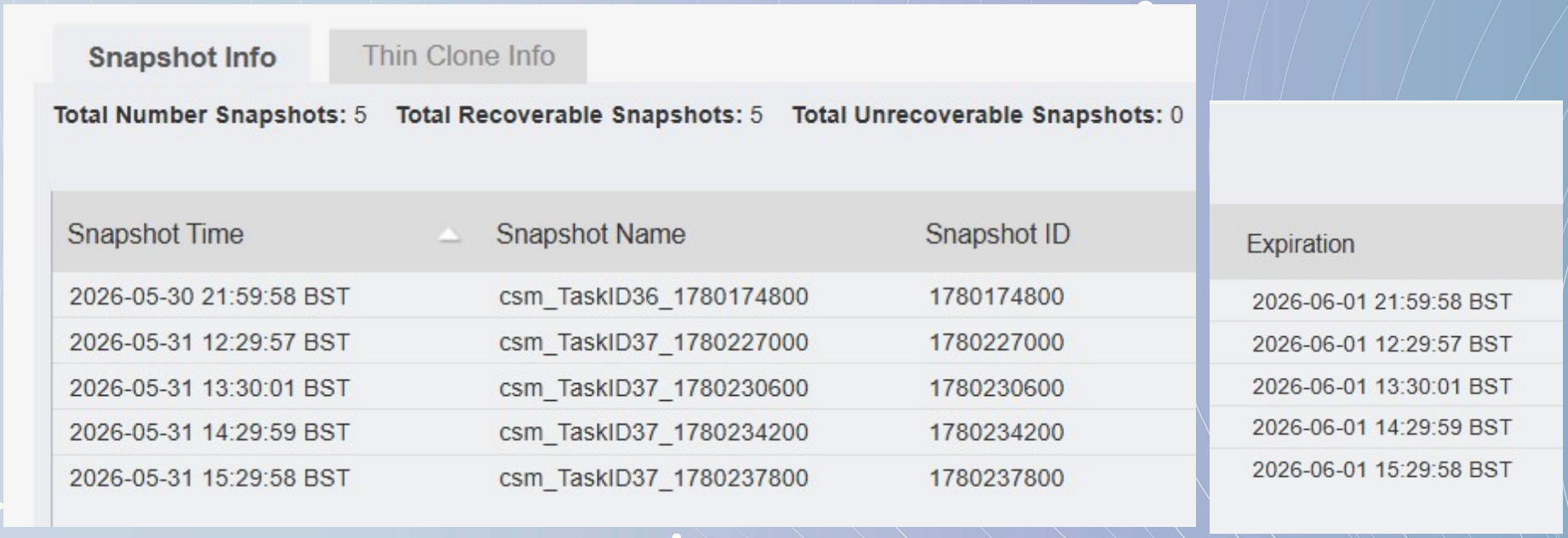
Snapshot Info | Thin Clone Info

Total Number Snapshots: 5 **Total Recoverable Snapshots:** 5 **Total Unrecoverable Snapshots:** 0

Filter...

Snapshot Time	Snapshot Name	Snapshot ID	State	Recoverable	Copy Sets	Last Result	Expiration	Safeguarded	Threat Detect...
2026-05-30 21:59:58 BST	csm_TaskID36_1780174800	1780174800	active	Yes	5	IWNR2885I	2026-06-01 21:59:58 BST	Yes	No
2026-05-31 12:29:57 BST	csm_TaskID37_1780227000	1780227000	active	Yes	5	IWNR2885I	2026-06-01 12:29:57 BST	Yes	No
2026-05-31 13:30:01 BST	csm_TaskID37_1780230600	1780230600	active	Yes	5	IWNR2885I	2026-06-01 13:30:01 BST	Yes	No
2026-05-31 14:29:59 BST	csm_TaskID37_1780234200	1780234200	active	Yes	5	IWNR2885I	2026-06-01 14:29:59 BST	Yes	No
2026-05-31 15:29:58 BST	csm_TaskID37_1780237800	1780237800	active	Yes	5	IWNR2885I	2026-06-01 15:29:58 BST	Yes	No

Additional “Safeguarded Snapshots”

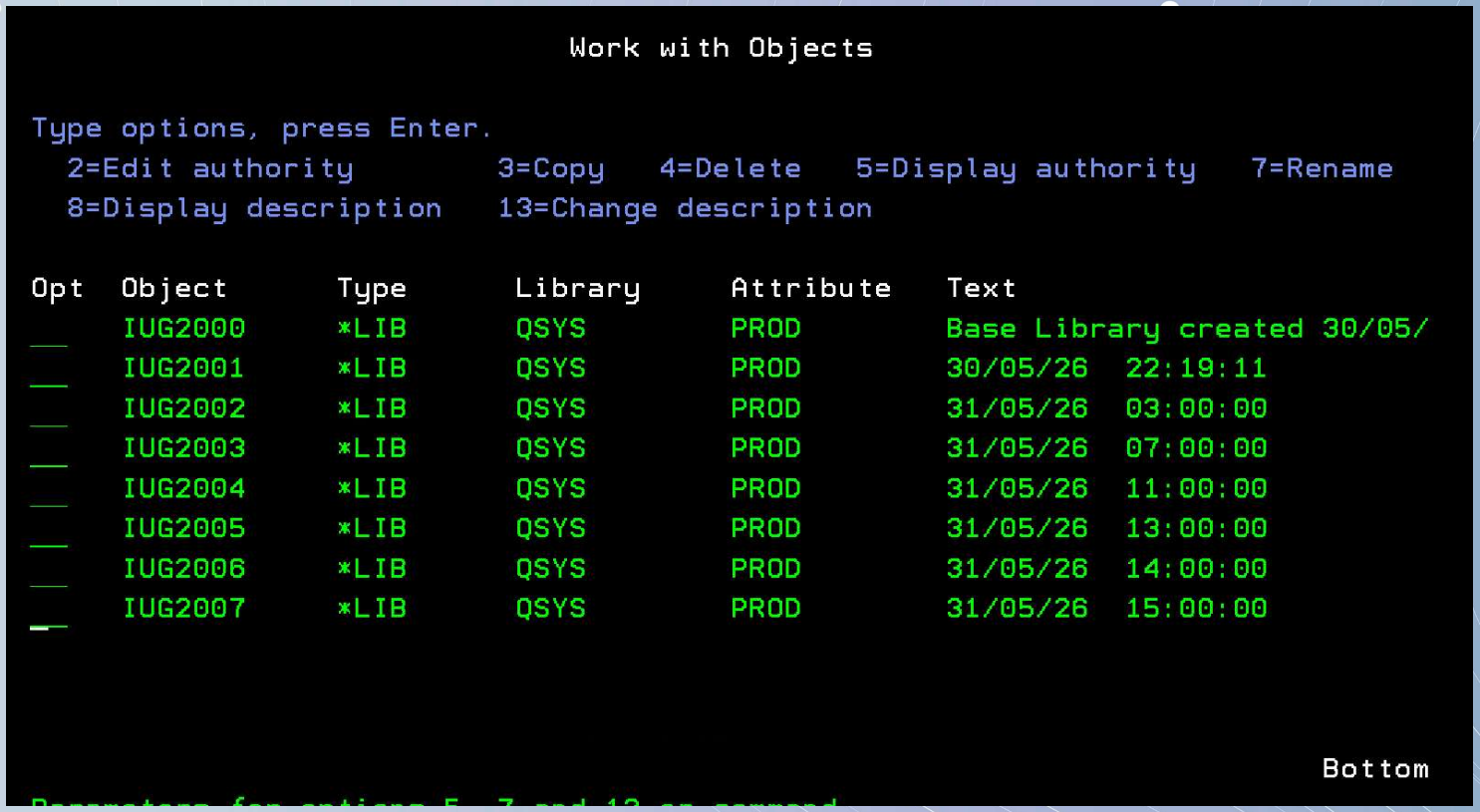


Snapshot Info | Thin Clone Info

Total Number Snapshots: 5 **Total Recoverable Snapshots:** 5 **Total Unrecoverable Snapshots:** 0

Snapshot Time	Snapshot Name	Snapshot ID	Expiration
2026-05-30 21:59:58 BST	csm_TaskID36_1780174800	1780174800	2026-06-01 21:59:58 BST
2026-05-31 12:29:57 BST	csm_TaskID37_1780227000	1780227000	2026-06-01 12:29:57 BST
2026-05-31 13:30:01 BST	csm_TaskID37_1780230600	1780230600	2026-06-01 13:30:01 BST
2026-05-31 14:29:59 BST	csm_TaskID37_1780234200	1780234200	2026-06-01 14:29:59 BST
2026-05-31 15:29:58 BST	csm_TaskID37_1780237800	1780237800	2026-06-01 15:29:58 BST

We have snapshots and libraries created at various times.



Recovery of snapshot @ 13:30

Snapshot Schedule 2 Scheduled Tasks
Last Recoverable Snapshot 2026-05-31 15:29:58 BST
Volume Group Name AFG_POC2

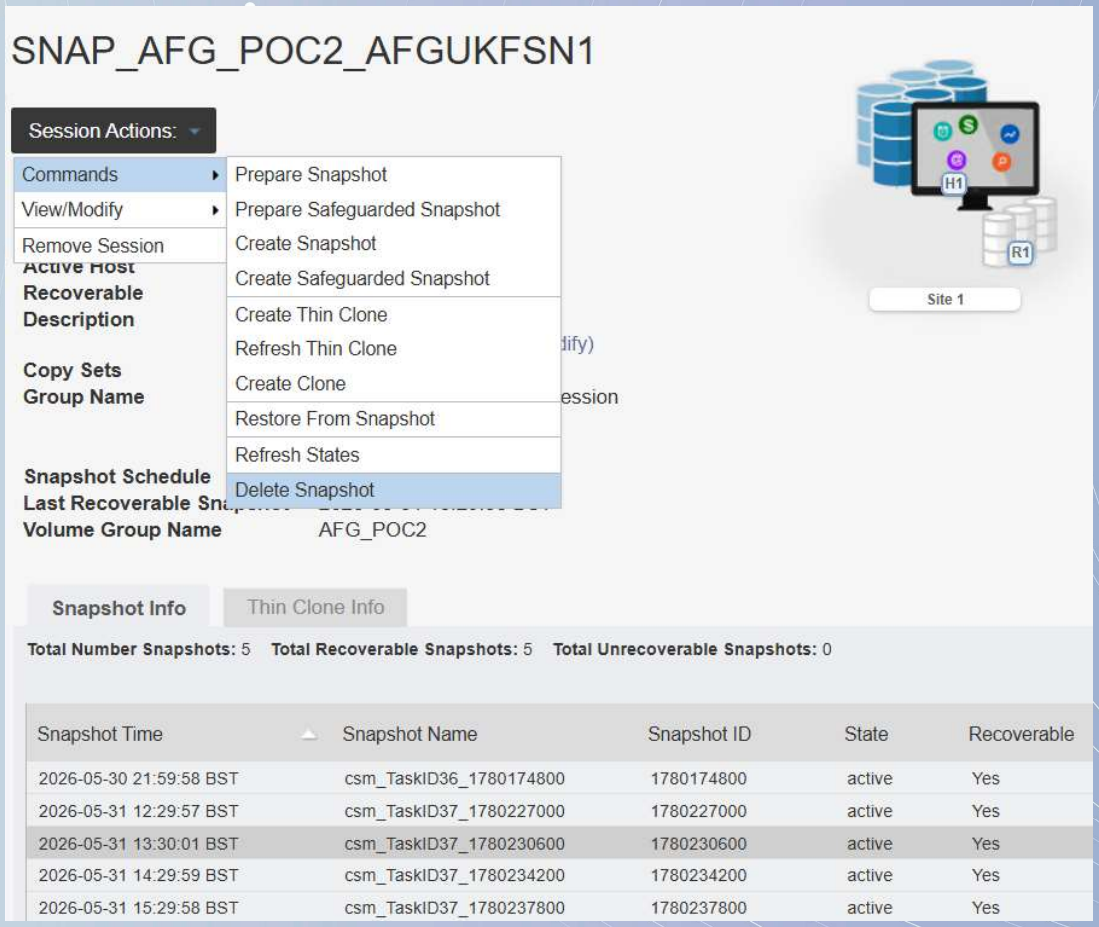
Snapshot Info | Thin Clone Info

Total Number Snapshots: 5 **Total Recoverable Snapshots:** 5 **Total Unrecoverable Snapshots:** 0

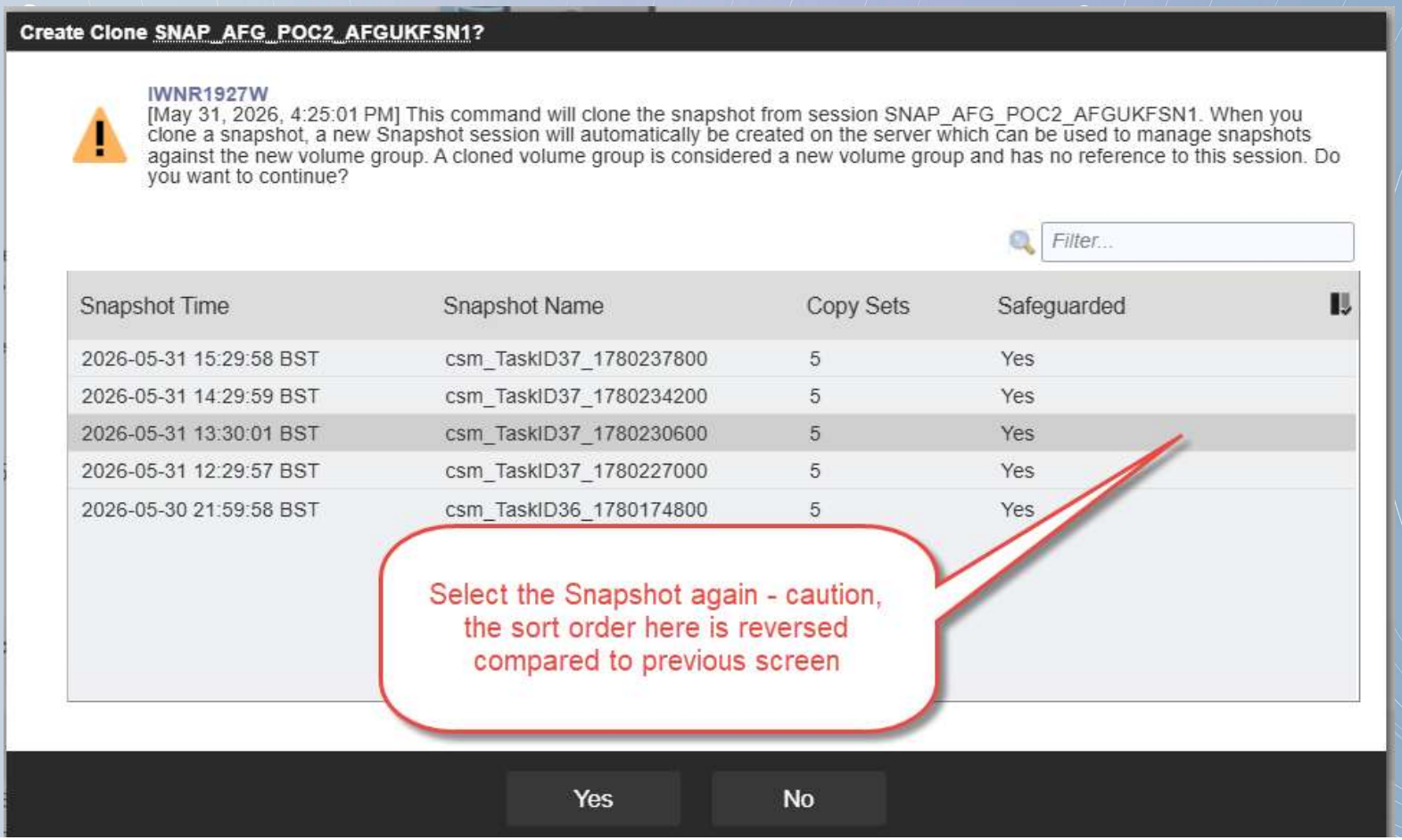
Snapshot Time	Snapshot Name	Snapshot ID	State	Recovera
2026-05-30 21:59:58 BST	csm_TaskID36_1780174800	1780174800		
2026-05-31 12:29:57 BST	csm_TaskID37_1780227000	1780227000		
2026-05-31 13:30:01 BST	csm_TaskID37_1780230600	1780230600		
2026-05-31 14:29:59 BST	csm_TaskID37_1780234200	1780234200		
2026-05-31 15:29:58 BST	csm_TaskID37_1780237800	1780237800		

```
                              Work with Objects

Type options, press Enter.
  2=Edit authority       3=Copy    4=Delete    5=Display authority    7=Rename
  8=Display description  13=Change description

Opt  Object      Type      Library     Attribute   Text
     IUG2000 ✓   *LIB      QSYS        PROD        Base Library created 30/05/
     IUG2001 ✓   *LIB      QSYS        PROD        30/05/26  22:19:11
     IUG2002 ✓   *LIB      QSYS        PROD        31/05/26  03:00:00
     IUG2003 ✓   *LIB      QSYS        PROD        31/05/26  07:00:00
     IUG2004 ✓   *LIB      QSYS        PROD        31/05/26  11:00:00
     IUG2005 ✓   *LIB      QSYS        PROD        31/05/26  13:00:00
     IUG2006 ✗   *LIB      QSYS        PROD        31/05/26  14:00:00
     IUG2007 ✗   *LIB      QSYS        PROD        31/05/26  15:00:00

                                                                   Bottom
```

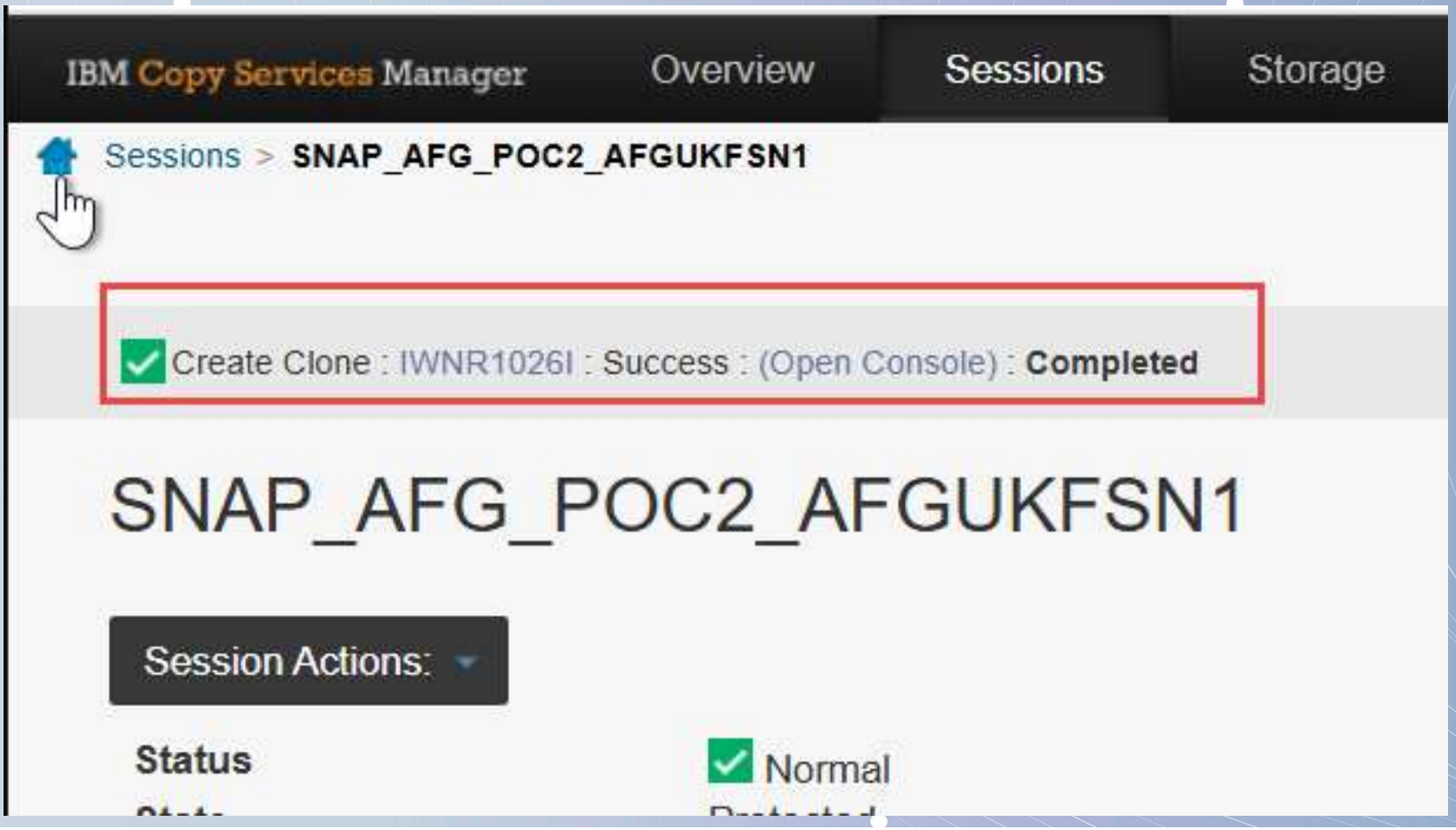
Session-> {Select} -> [Session Actions] ...Commands -> Create Clone



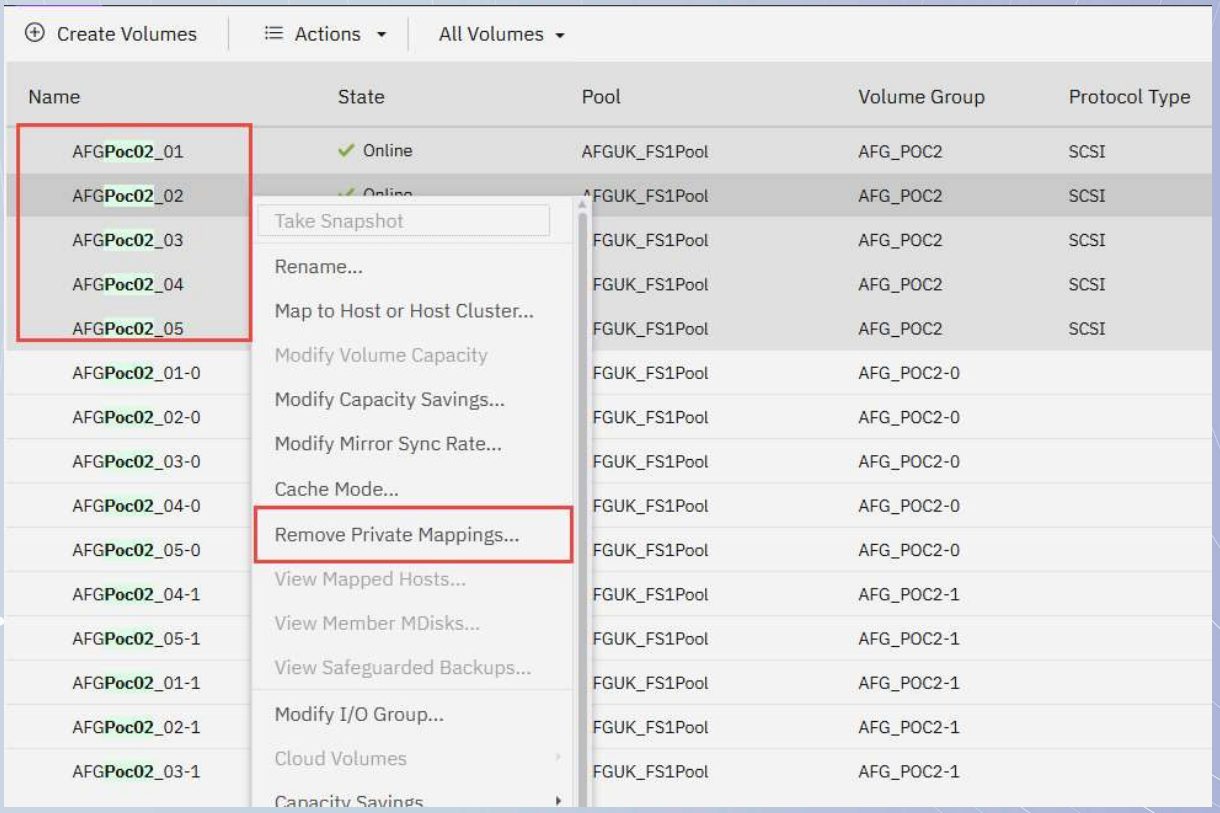
Create clone of SNAP – choose carefully



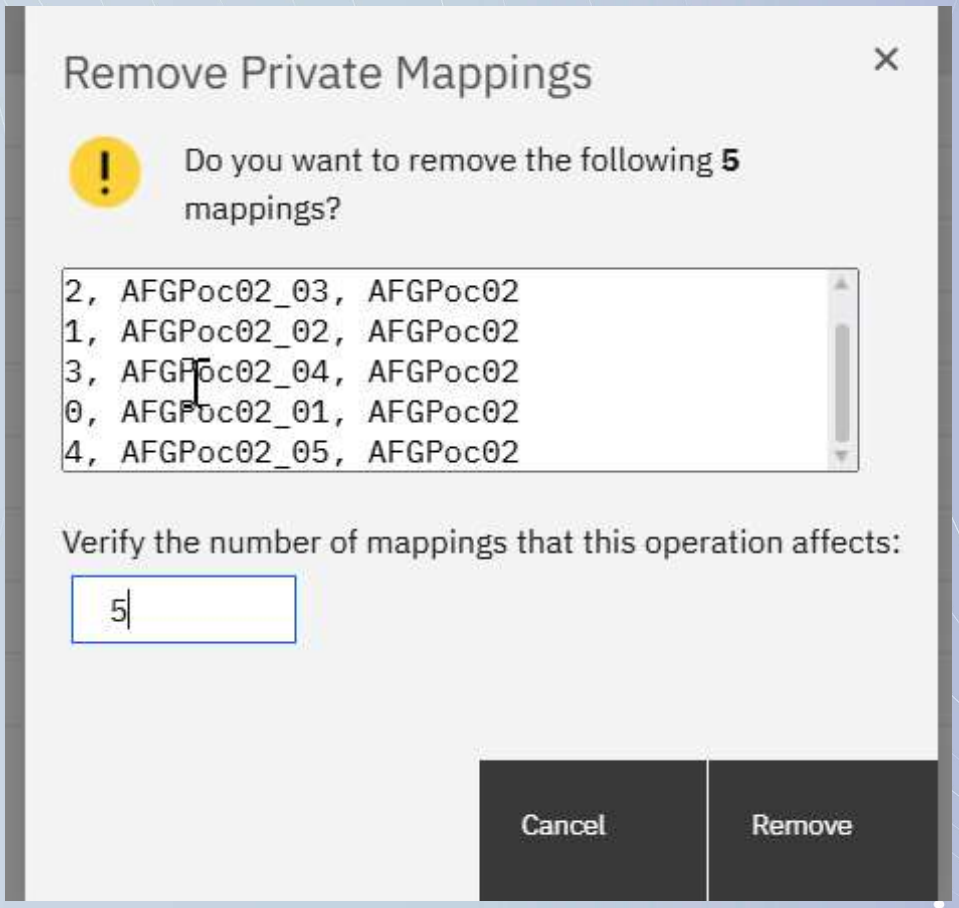
Create clone – completed in a few seconds

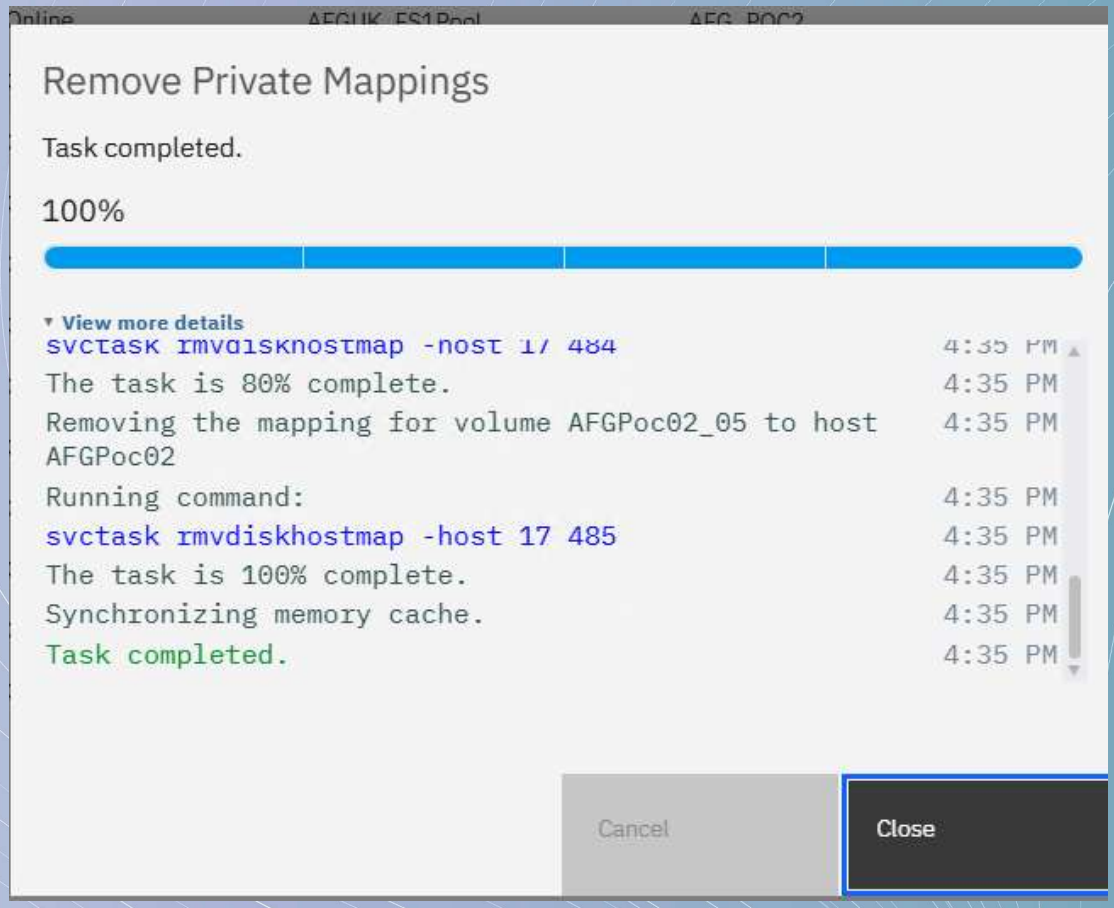


Original volumes & cloned SG Snapshot vols.

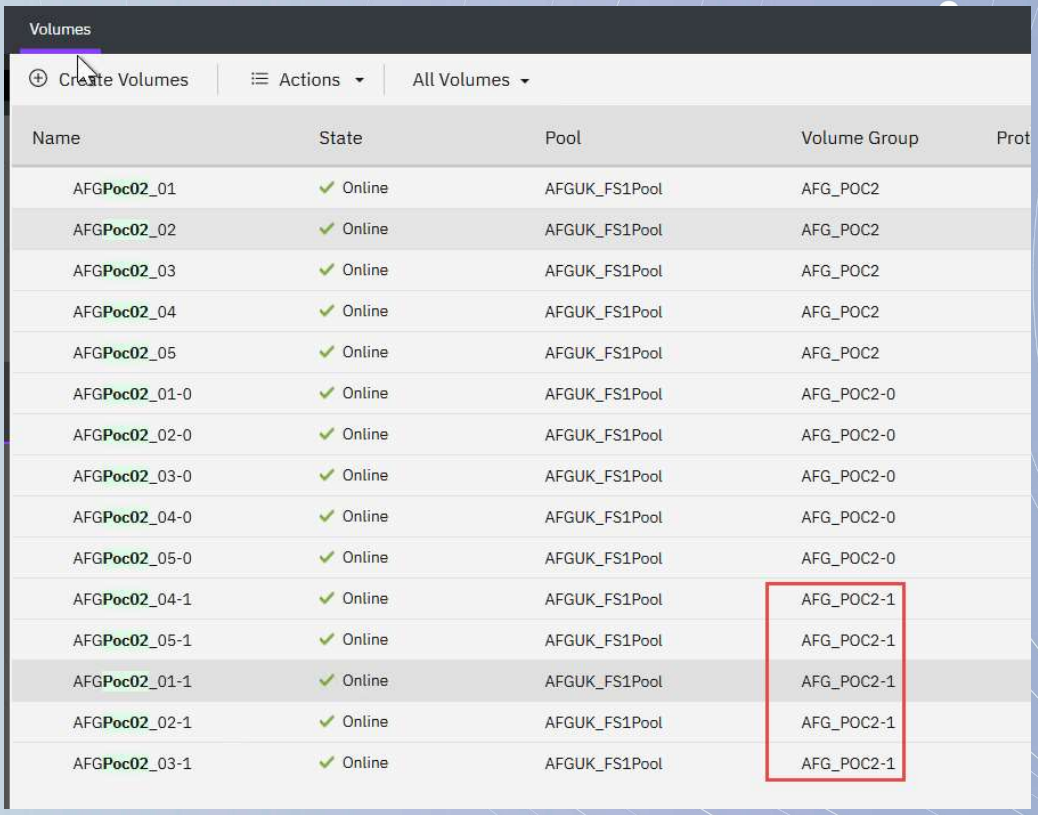


Original volumes & cloned SG Snapshot vols.



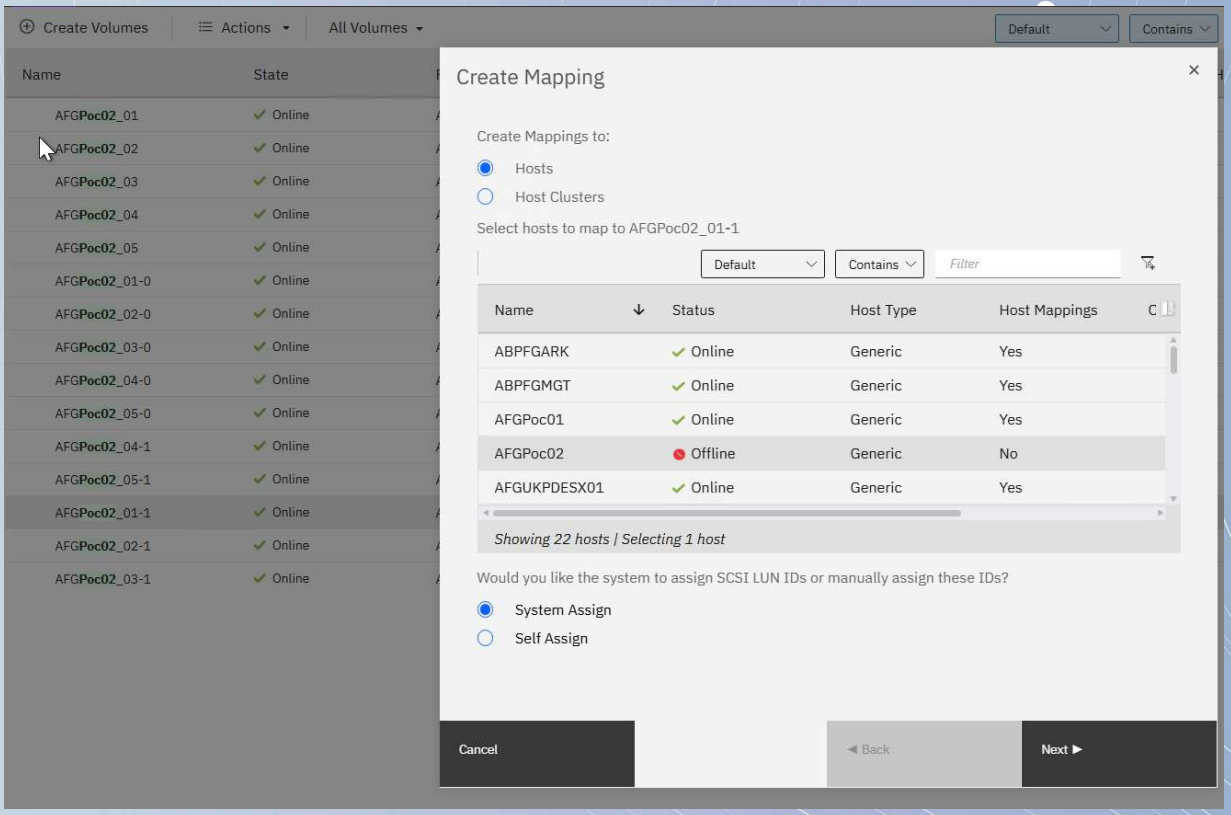


These are the volumes I want to map to host

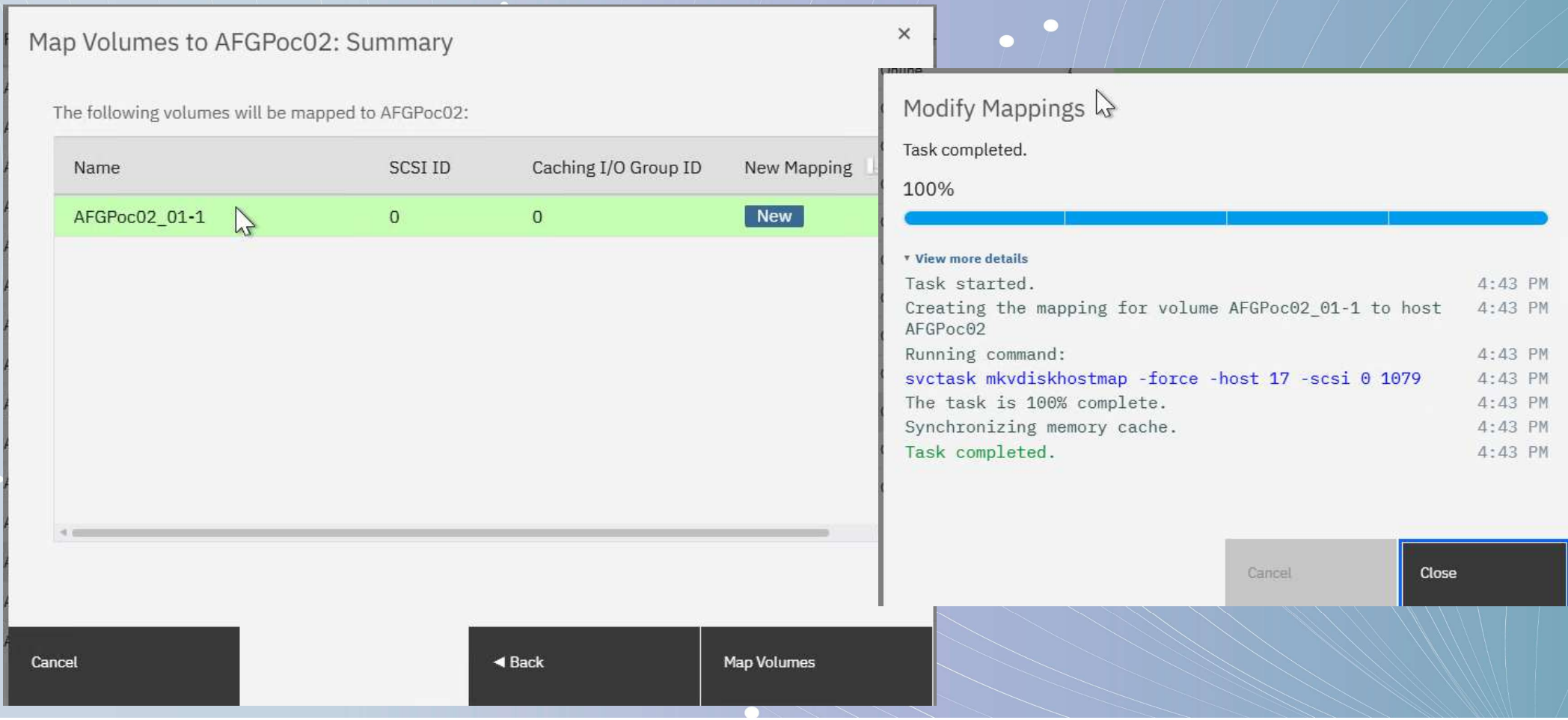


Name	State	Pool	Volume Group	Prot
AFGPoc02_01	Online	AFGUK_FS1Pool	AFG_POC2	
AFGPoc02_02	Online	AFGUK_FS1Pool	AFG_POC2	
AFGPoc02_03	Online	AFGUK_FS1Pool	AFG_POC2	
AFGPoc02_04	Online	AFGUK_FS1Pool	AFG_POC2	
AFGPoc02_05	Online	AFGUK_FS1Pool	AFG_POC2	
AFGPoc02_01-0	Online	AFGUK_FS1Pool	AFG_POC2-0	
AFGPoc02_02-0	Online	AFGUK_FS1Pool	AFG_POC2-0	
AFGPoc02_03-0	Online	AFGUK_FS1Pool	AFG_POC2-0	
AFGPoc02_04-0	Online	AFGUK_FS1Pool	AFG_POC2-0	
AFGPoc02_05-0	Online	AFGUK_FS1Pool	AFG_POC2-0	
AFGPoc02_04-1	Online	AFGUK_FS1Pool	AFG_POC2-1	
AFGPoc02_05-1	Online	AFGUK_FS1Pool	AFG_POC2-1	
AFGPoc02_01-1	Online	AFGUK_FS1Pool	AFG_POC2-1	
AFGPoc02_02-1	Online	AFGUK_FS1Pool	AFG_POC2-1	
AFGPoc02_03-1	Online	AFGUK_FS1Pool	AFG_POC2-1	

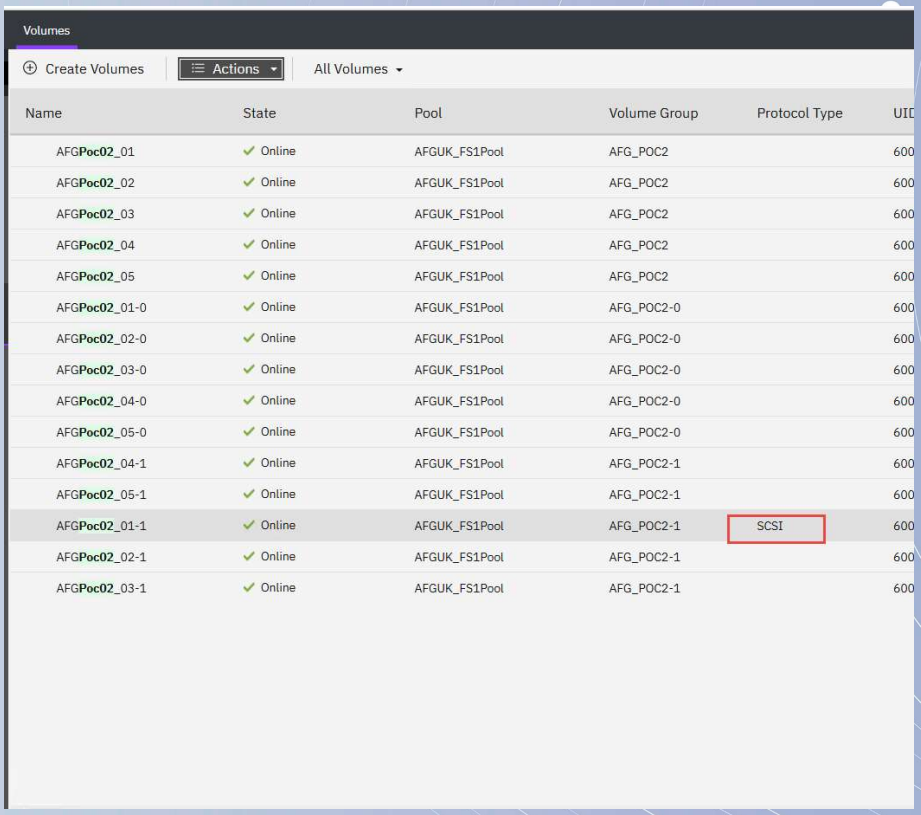
Select the host



I always add the load source volume 1st



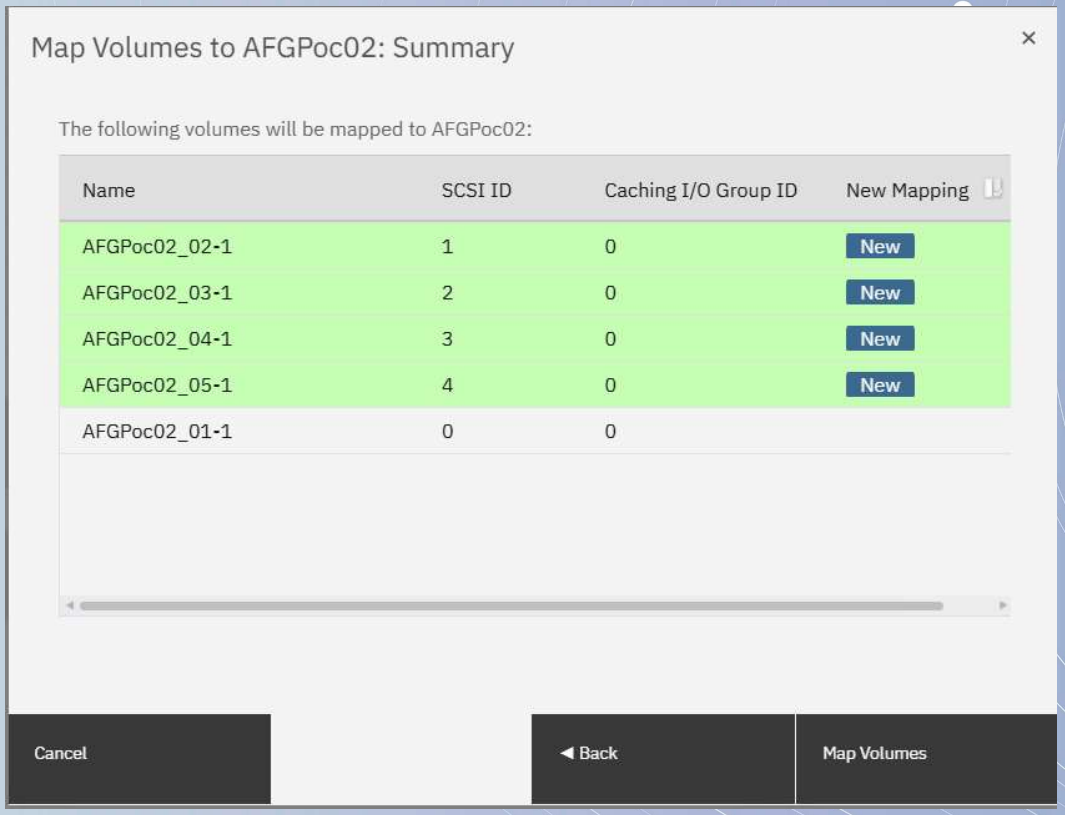
There it is. Now for the others



Select all other volumes & Map to Host

AFGPoc02_04-1	Online	AFGUK_FS1Pool	AFG_POC2-1	
AFGPoc02_05-1	Online	AFGUK_FS1Pool	AFG_POC2-1	
AFGPoc02_01-1	Online	AFGUK_FS1Pool	AFG_POC2-1	SCSI
AFGPoc02_02-1	Online	AFGUK_FS1Pool	AFG_POC2-1	
AFGPoc02_03-1	Online	AFGUK_FS1Pool	AFG_POC2-1	

Review and click map volumes.



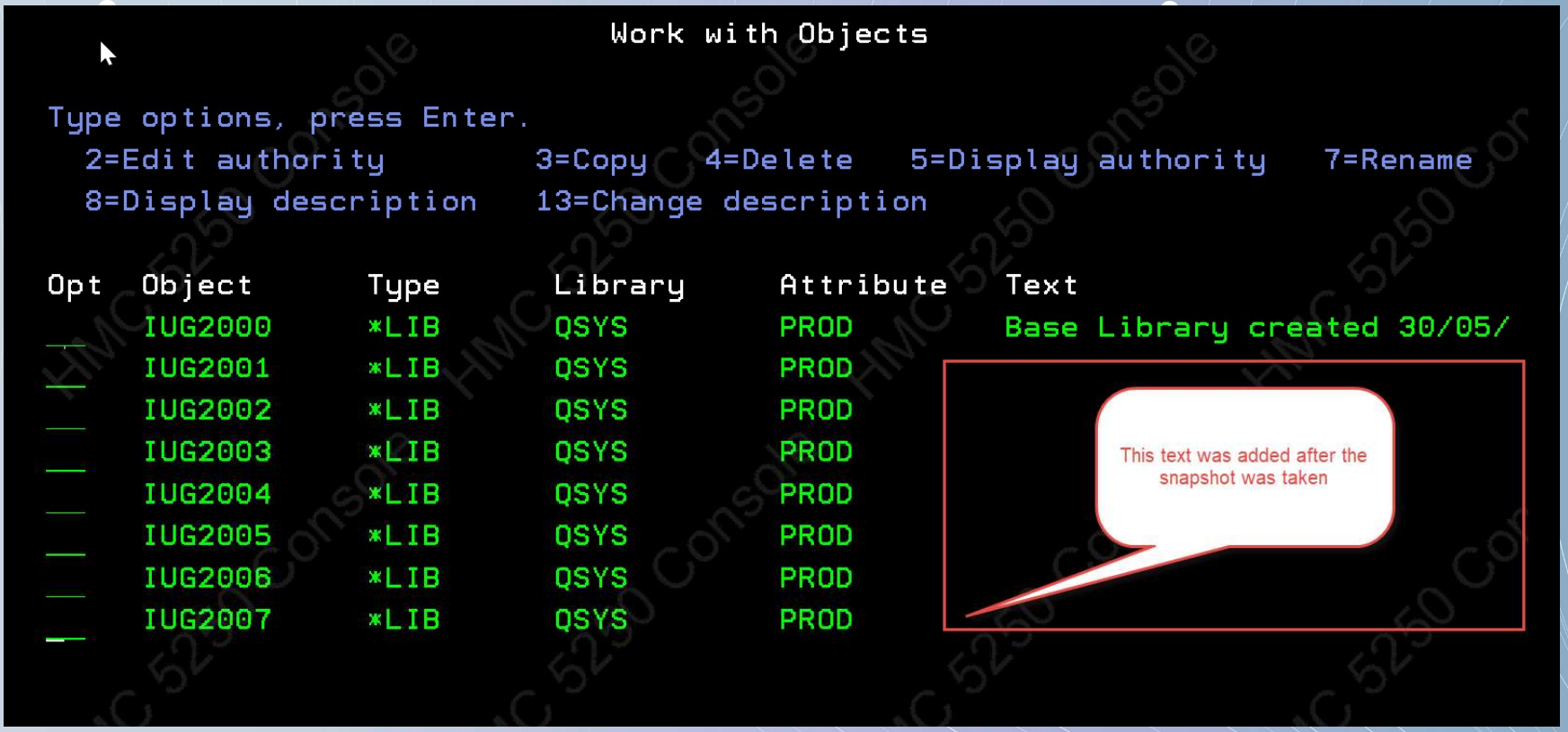
Ta daa

Volumes

Create Volumes | Actions | All Volumes

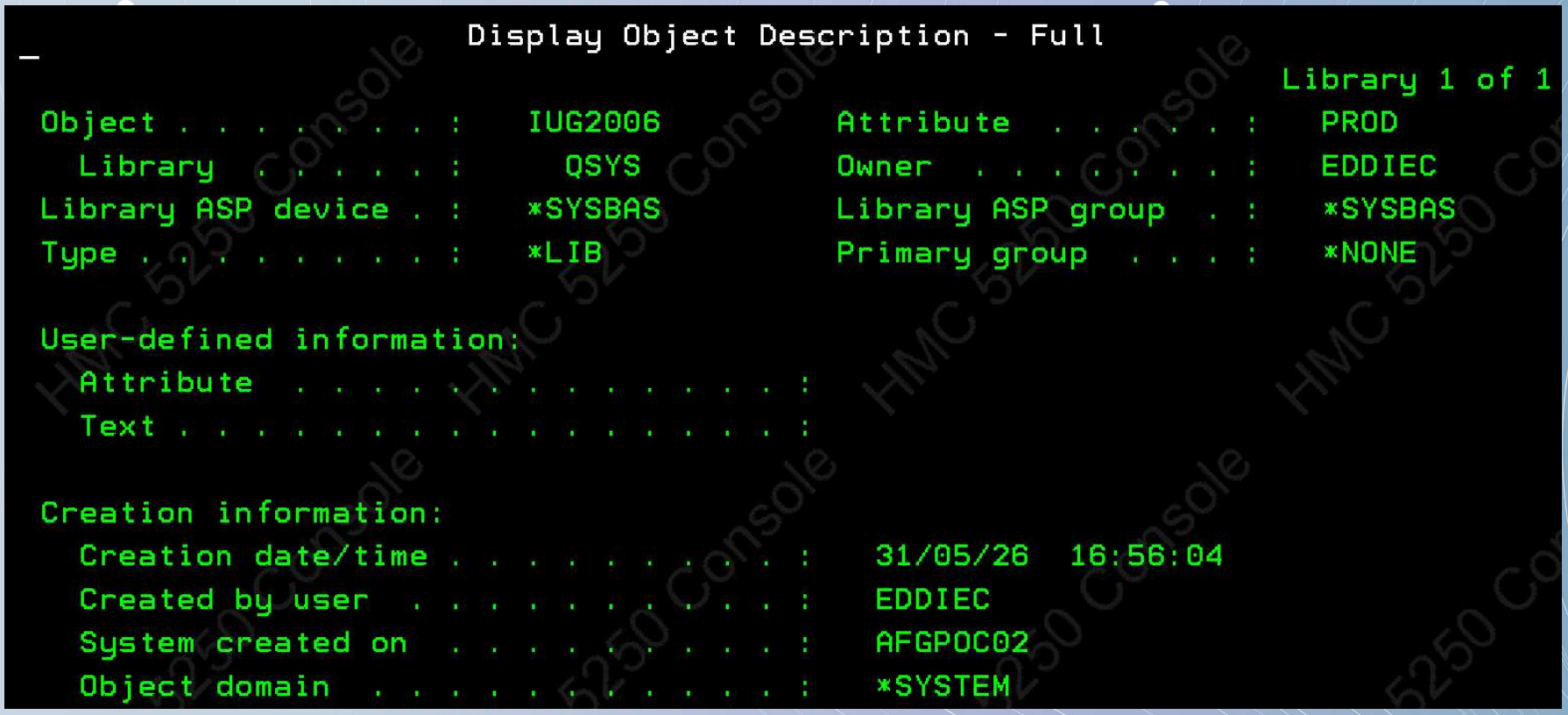
Name	State	Pool	Volume Group	Protocol
AFG**Poc02**_01	Online	AFGUK_FS1Pool	AFG_POC2	
AFG**Poc02**_02	Online	AFGUK_FS1Pool	AFG_POC2	
AFG**Poc02**_03	Online	AFGUK_FS1Pool	AFG_POC2	
AFG**Poc02**_04	Online	AFGUK_FS1Pool	AFG_POC2	
AFG**Poc02**_05	Online	AFGUK_FS1Pool	AFG_POC2	
AFG**Poc02**_01-0	Online	AFGUK_FS1Pool	AFG_POC2-0	
AFG**Poc02**_02-0	Online	AFGUK_FS1Pool	AFG_POC2-0	
AFG**Poc02**_03-0	Online	AFGUK_FS1Pool	AFG_POC2-0	
AFG**Poc02**_04-0	Online	AFGUK_FS1Pool	AFG_POC2-0	
AFG**Poc02**_05-0	Online	AFGUK_FS1Pool	AFG_POC2-0	
AFG**Poc02**_04-1	Online	AFGUK_FS1Pool	AFG_POC2-1	SCSI
AFG**Poc02**_05-1	Online	AFGUK_FS1Pool	AFG_POC2-1	SCSI
AFG**Poc02**_01-1	Online	AFGUK_FS1Pool	AFG_POC2-1	SCSI
AFG**Poc02**_02-1	Online	AFGUK_FS1Pool	AFG_POC2-1	SCSI
AFG**Poc02**_03-1	Online	AFGUK_FS1Pool	AFG_POC2-1	SCSI

Now to start the LPAR.. And the library name text is missing.

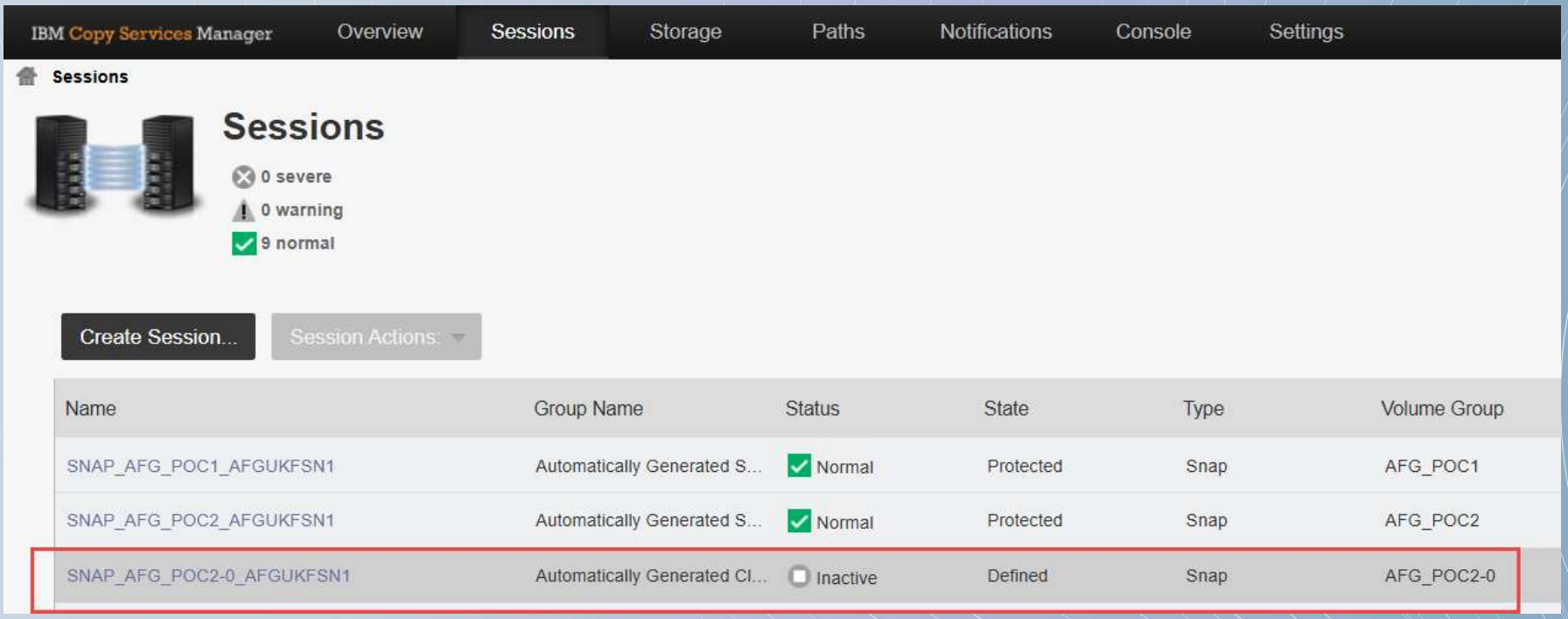


An explanation.

- The job scheduled entry created libraties without text.
- The text was added later, but the snapshot used for recovery was made before the test.
- The last two libraries were not present in the snapshot but have been added by the system, showing a different time than the original created time.


Display Object Description - Full
Library 1 of 1
Object . . . . . : IUG2006
Library . . . . . : QSYS
Library ASP device . : *SYSBAS
Type . . . . . : *LIB
Attribute . . . . . : PROD
Owner . . . . . : EDDIEC
Library ASP group . : *SYSBAS
Primary group . . . : *NONE
User-defined information:
Attribute . . . . . :
Text . . . . . :
Creation information:
Creation date/time . . . . . : 31/05/26 16:56:04
Created by user . . . . . : EDDIEC
System created on . . . . . : AFGPOC02
Object domain . . . . . : *SYSTEM

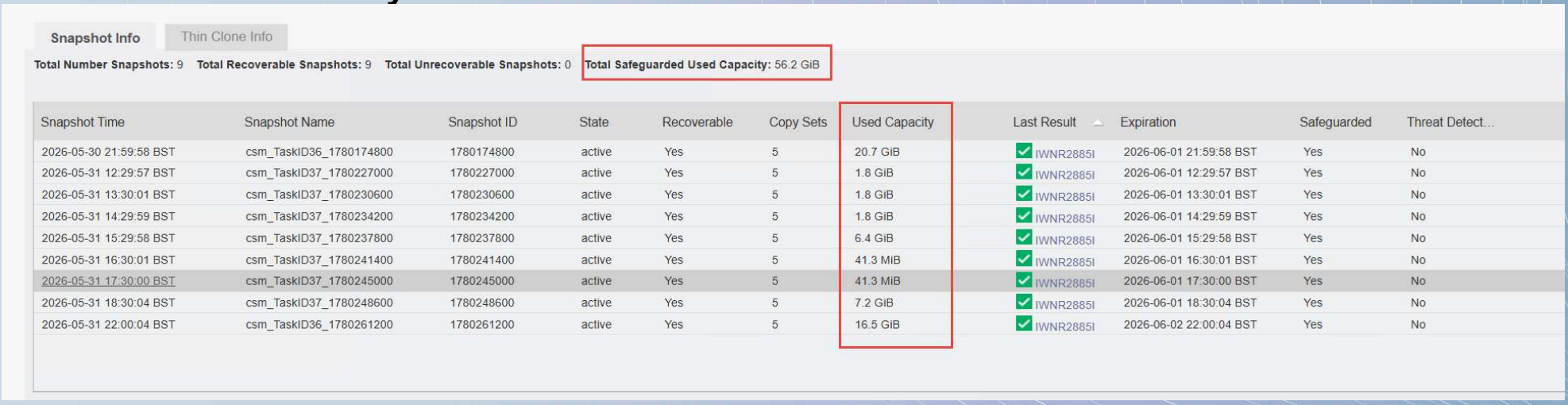
When the SG snapshot was recovered, we were advised that a separate volume group and session had been created. See below for the seeion.



A final word.

The new functionality in the software to make snapshots is fast and effective.

The Copy Services Manager makes it easier to track the capacity consumed by these functions



Snapshot Info | Thin Clone Info

Total Number Snapshots: 9 **Total Recoverable Snapshots:** 9 **Total Unrecoverable Snapshots:** 0 **Total Safeguarded Used Capacity:** 56.2 GiB

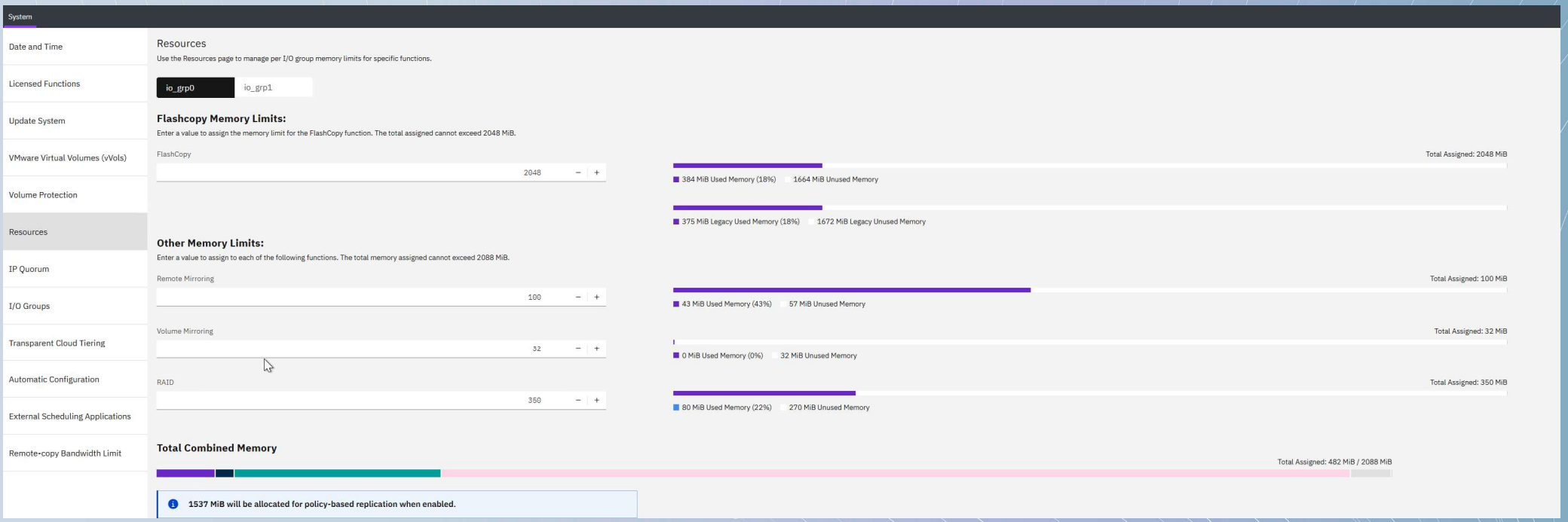
Snapshot Time	Snapshot Name	Snapshot ID	State	Recoverable	Copy Sets	Used Capacity	Last Result	Expiration	Safeguarded	Threat Detect...
2026-05-30 21:59:58 BST	csm_TaskID36_1780174800	1780174800	active	Yes	5	20.7 GiB	IWNR2885I	2026-06-01 21:59:58 BST	Yes	No
2026-05-31 12:29:57 BST	csm_TaskID37_1780227000	1780227000	active	Yes	5	1.8 GiB	IWNR2885I	2026-06-01 12:29:57 BST	Yes	No
2026-05-31 13:30:01 BST	csm_TaskID37_1780230600	1780230600	active	Yes	5	1.8 GiB	IWNR2885I	2026-06-01 13:30:01 BST	Yes	No
2026-05-31 14:29:59 BST	csm_TaskID37_1780234200	1780234200	active	Yes	5	1.8 GiB	IWNR2885I	2026-06-01 14:29:59 BST	Yes	No
2026-05-31 15:29:58 BST	csm_TaskID37_1780237800	1780237800	active	Yes	5	6.4 GiB	IWNR2885I	2026-06-01 15:29:58 BST	Yes	No
2026-05-31 16:30:01 BST	csm_TaskID37_1780241400	1780241400	active	Yes	5	41.3 MiB	IWNR2885I	2026-06-01 16:30:01 BST	Yes	No
2026-05-31 17:30:00 BST	csm_TaskID37_1780245000	1780245000	active	Yes	5	41.3 MiB	IWNR2885I	2026-06-01 17:30:00 BST	Yes	No
2026-05-31 18:30:04 BST	csm_TaskID37_1780248600	1780248600	active	Yes	5	7.2 GiB	IWNR2885I	2026-06-01 18:30:04 BST	Yes	No
2026-05-31 22:00:04 BST	csm_TaskID36_1780261200	1780261200	active	Yes	5	16.5 GiB	IWNR2885I	2026-06-02 22:00:04 BST	Yes	No

A final word.

On the SAN itself, the snapshot names are included in the volume copy. This is a vast improvement on the original naming convention.

Memory is used in operations. As part of the scrutiny to assess impact, conside the memory used <See next slide>

SAN: Settings->System->Resources



Thank you.