

Running a Disaster Recovery Test with Shared Tapes and Backups

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June 2023

Agenda

The environment

The challenge

The solution

Summary and reference information

The environment

Assumptions

Backups of z/VM system are written to tape or virtual tape

Tape subsystem (TS7700) is configured as a grid with 2+ clusters and volume replication

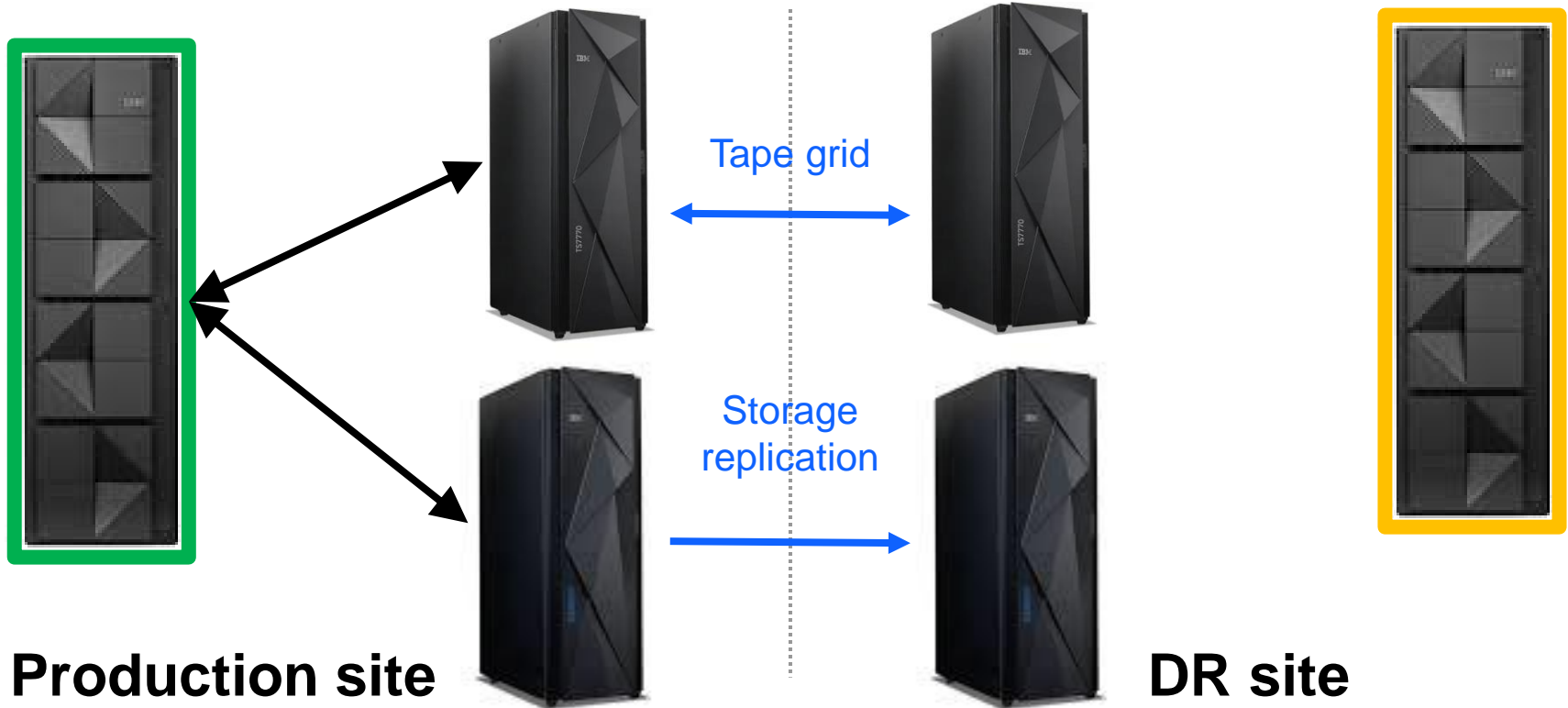
At least one TS7700 cluster is at the DR site

Disaster recovery architecture includes DASD replication to cold or warm DR site

DR test involves halting DASD replication and bringing up system at DR site

Production continues to run at production site during DR test

DASD or disk replication for disaster recovery or high availability

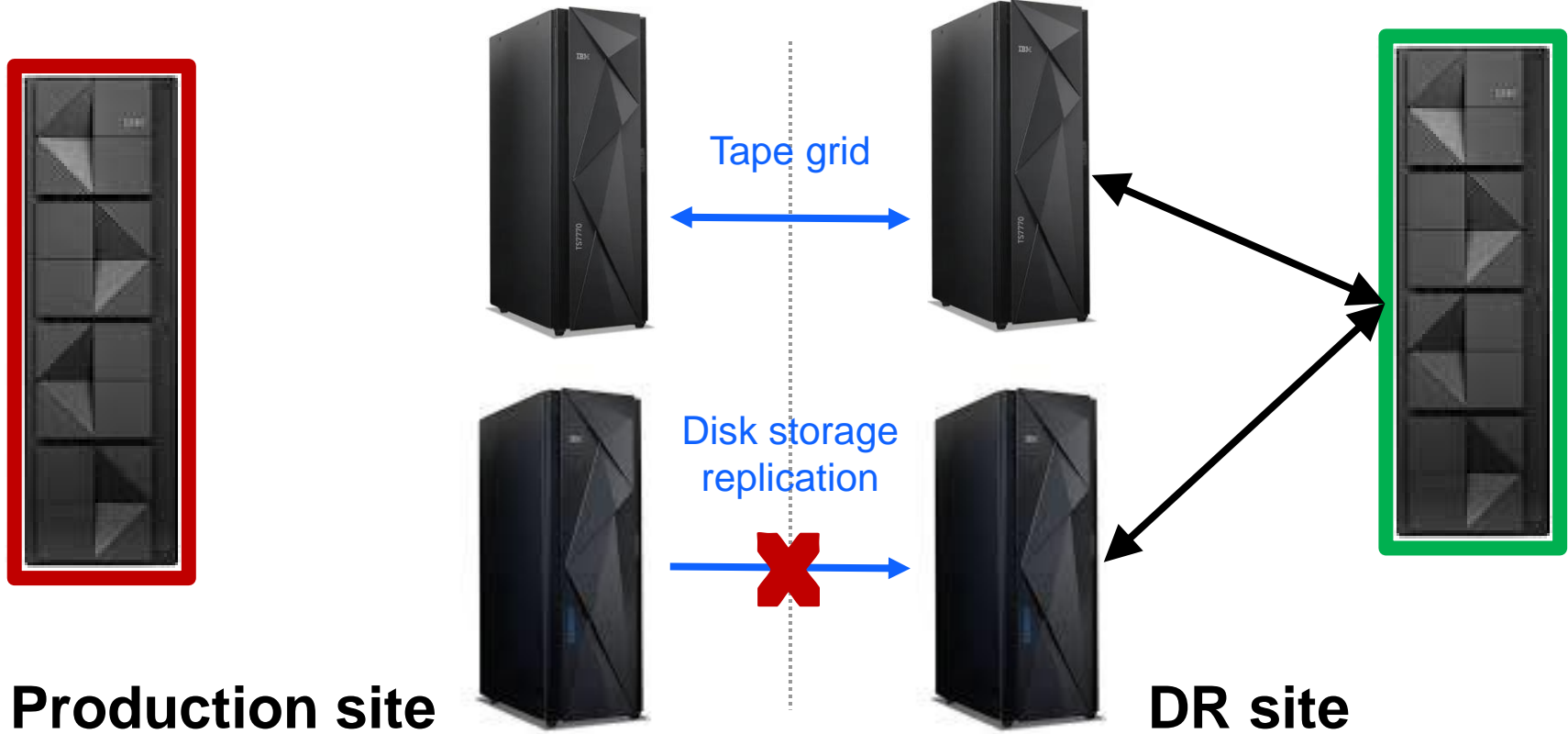


Production site

- Backups written to tape

DR site

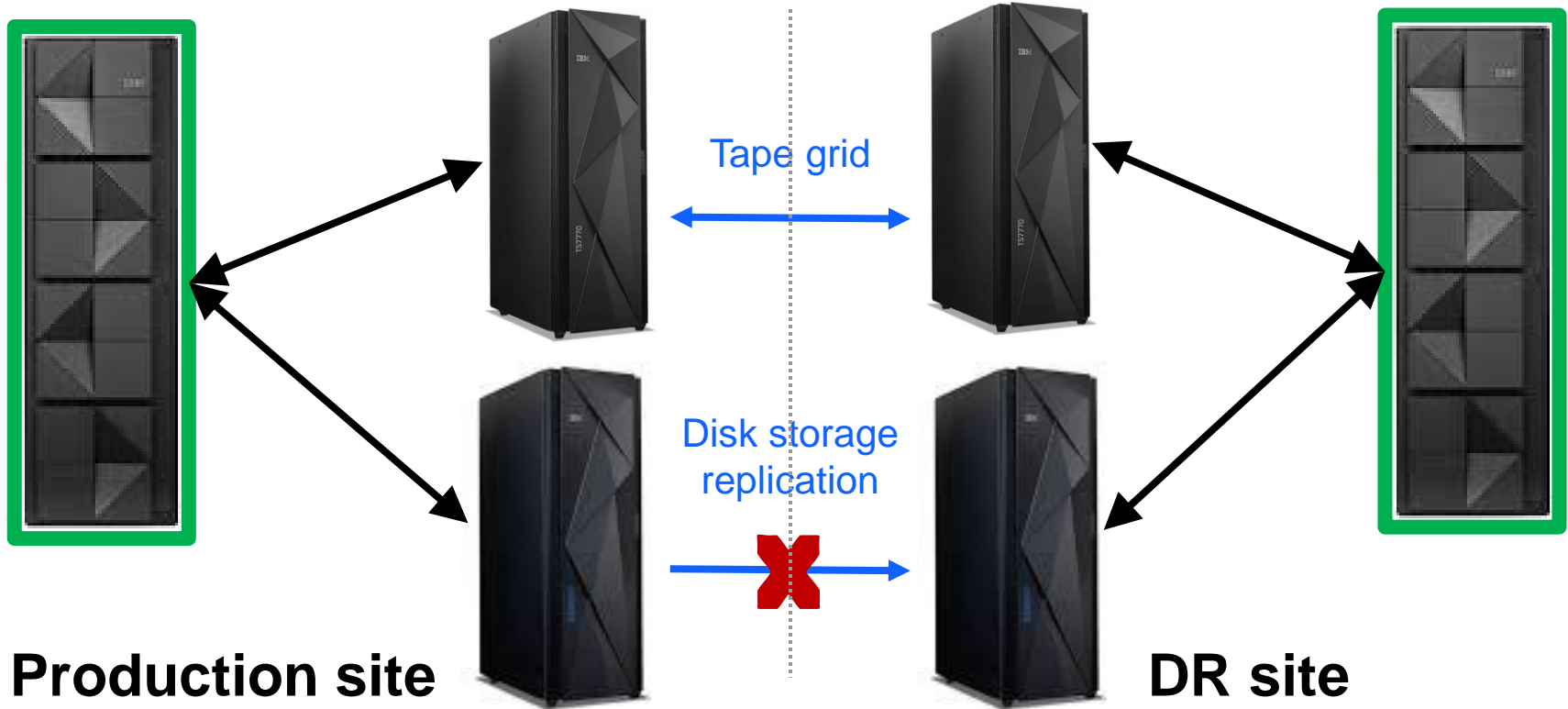
Real disaster recovery scenario



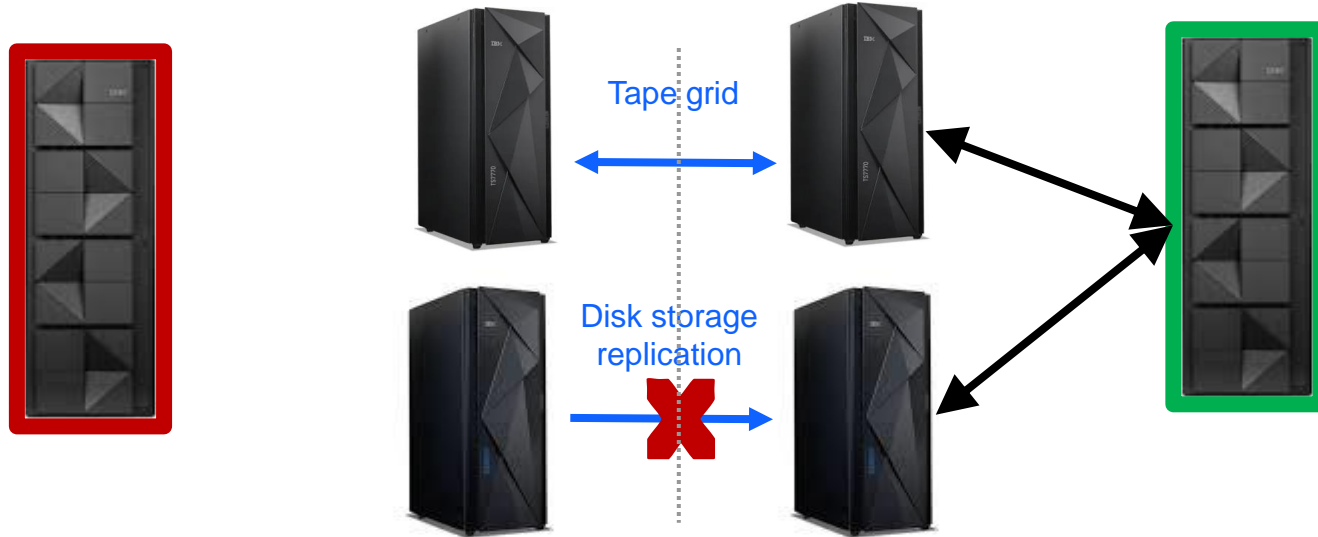
Production site

DR site

Disaster recovery test scenario



Real disaster recovery scenario



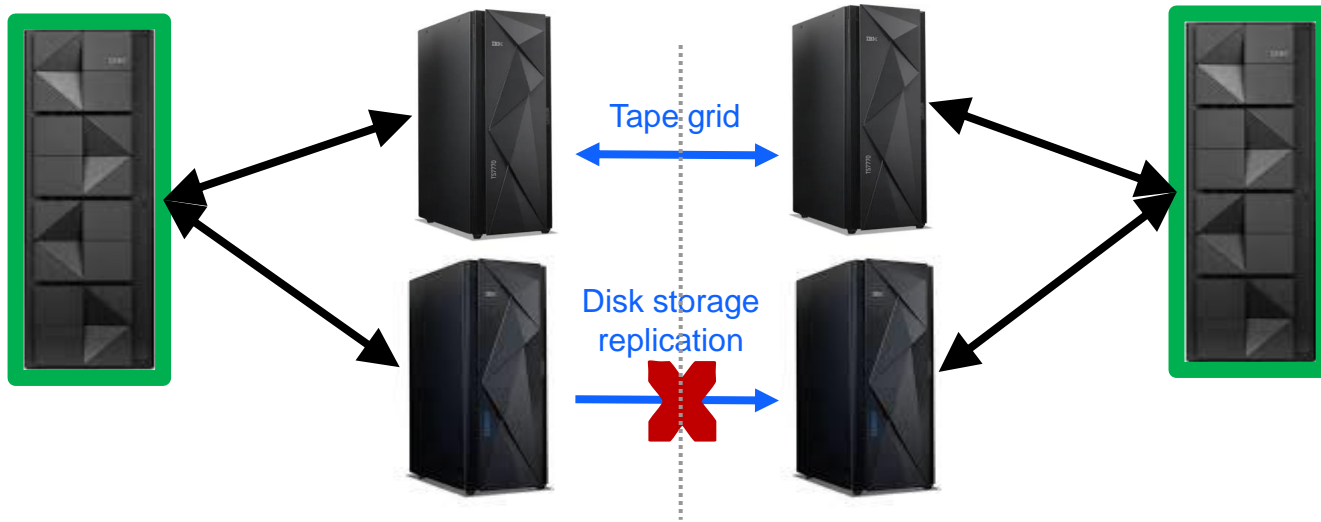
Production site

- System no longer running
- Backups no longer running
- No updates to or from tape grid
- No backup or tape expiration processing
- Production workload running at DR site

DR site

- Production workload running here
- Backups running as scheduled
- Updates to and from tape grid
- Backup and tape expiration running as scheduled
- Recovery from backups taken in production must be possible
- DR site is the “source of truth”

Disaster recovery test scenario



Production site

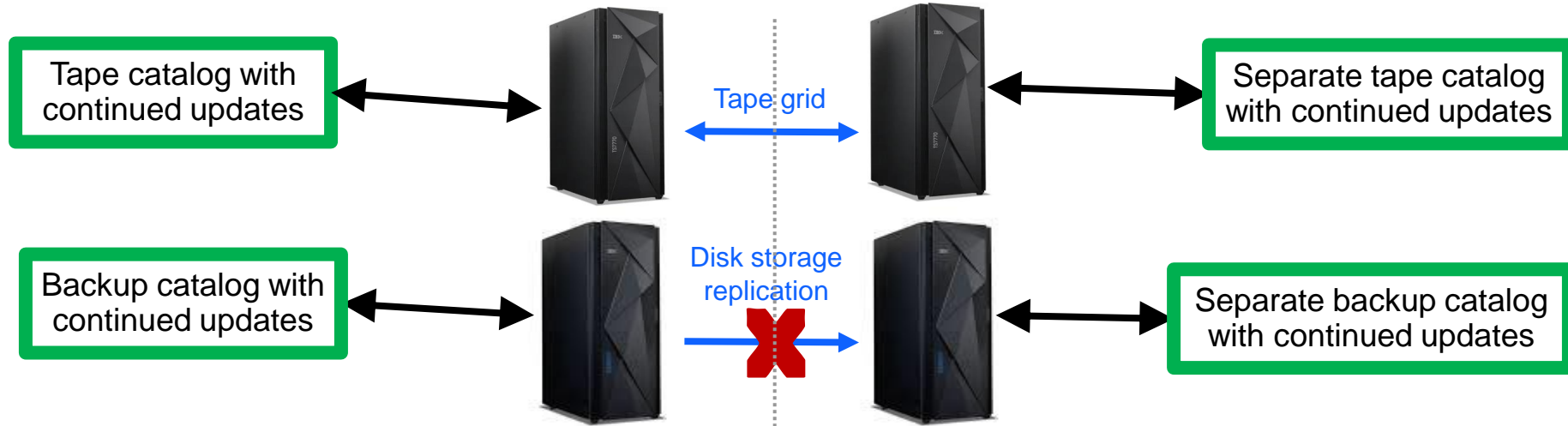
- System continues to run production workload
- Production site is the “source of truth”
- Backups running as scheduled
- Updates to and from tape grid
- Backup or tape expiration running as scheduled

DR site

- Production-like workload running here
- Backups running as scheduled
- Updates to and from tape grid
- Backup and tape expiration running as scheduled
- Recovery from backups taken in production must be possible
- Temporary environment – updates to tape grid must be reset when done

The challenge

Disaster recovery test scenario



Production site

- System continues to run production workload
- Production site is the “source of truth”
- Backups running as scheduled
- Updates to and from tape grid
- Backup or tape expiration running as scheduled

DR site

- Point in time copy of production workload running here
- Scheduled production activity continues to run but separate from real production – no DASD replication
- Systems diverge
- Temporary environment – not the source of truth and updates to tape grid must be reset when done

Disaster recovery

Real DR

- Run production at DR site only
- Requires read/write access to production tape volumes
- Requires expiration of backups and tape volumes as you would in production
- One running copy of backup and tape solutions and their catalogs

DR test

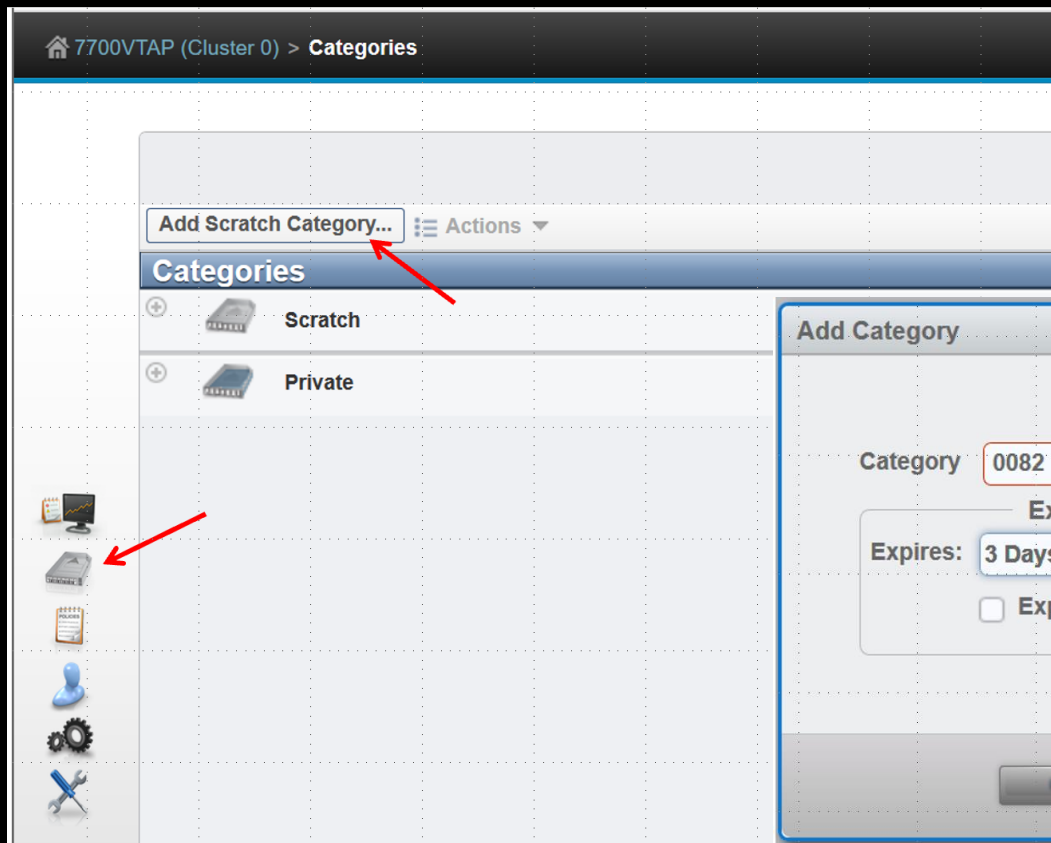
- Run production and DR test copy of production concurrently
- Requires read access to production tape volumes to demonstrate ability to run recovery
- Requires read/write access to DR test tape volumes to demonstrate ability to run backups
- Requires no expiration of production volumes
 - Real production may have changed expiration dates
- Two running copies of backup and tape solutions and their catalogs, both updating the tape grid
 - Catalogs will diverge
 - Only the production copy remains valid

The solution

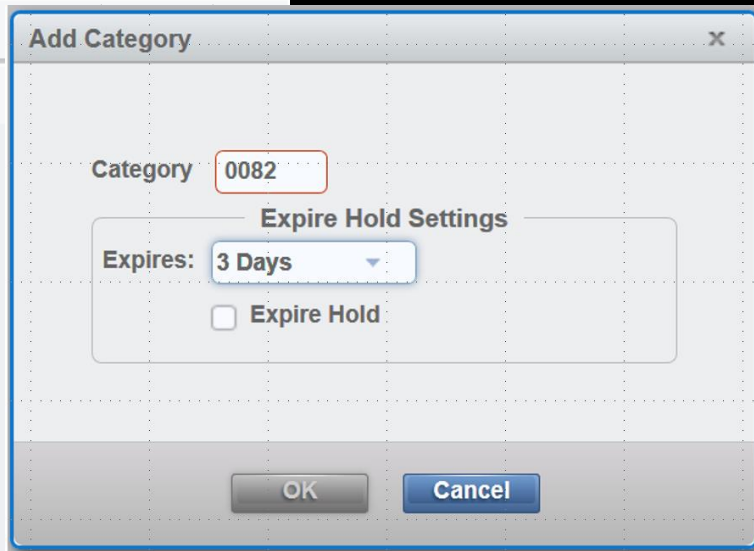
Steps to perform one time in production environment

- No need to repeat for each DR test
- All updated files will be replicated to DR at the start of each DR test

TS7700: separate scratch category



Create a separate scratch category specifically for z/VM use during DR test



TS7700: separate tape volsers

Virtual Volumes

Virtual Volume Details

Insert Virtual Volumes

Modify Virtual Volumes

Delete Virtual Volumes

Virtual Volume Search

"" (#7700C): Virtual Volume Details

View tutorial

Volser of Virtual Volume: []

Get D

Virtual Volumes

Virtual Volume Details

Insert Virtual Volumes

Modify Virtual Volumes

Delete Virtual Volumes

Virtual Volume Search

"" (#7700C): Insert Virtual Volumes

Refresh Last Refresh: Jun 20, 2020, 5:30:55 PM

Current availability across entire grid:

Currently Inserted:	7,191
Maximum Allowed:	1,000,000
Available Slots:	992,809

Show inserted volume ranges between 000000 and ZZZZZZ Show

Insert a new virtual volume range:

*Starting volser: Quantity

Ending volser *

Media type:

Cartridge System Tape

Enhanced Capacity Cartridge System Tape

Set Constructs

Storage Groups: Management Classes: Storage Classes: Data Classes:

SGVM MCVM1 SCVM DCVM6GB

Insert

Add a separate range of tape volsers specifically for z/VM use during DR test

Tape Manager: updates to configuration file (SYS CONFIG)

Define a separate pool of tape devices for Tape Manager to use at DR test (optional but recommended)

```
Devpool,  
3590D,  
ATL,  
VMSYSATL,  
770-77F
```

User defined

Unique for DR test environment

Same library name (grid name) as production

Unique range for DR test environment

Define a separate media category for devices and volumes for Tape Manager to use at DR test

```
Define_Media DRPOOL,  
DevPool 3590D,  
Mode RW,  
ScrSel RANDOM,  
VolCat VOL,  
ScrCat SCRATCH2,  
ExpHold 3
```

User defined

Unique for DR test environment

Must match Devpool setting

Must match TS7700 settings

RMS maps SCRATCHn categories to 008n in the tape library

Tape Manager

Update expiration processing time to be at least one hour after typical DR test start time

- Allows time for other steps before expiration processing starts - avoids expiring real production volumes
- Expirations can run during a DR test that lasts more than 24 hours – just need to perform other steps in DR before first expiration processing occurs
- See ExpStart value in Tape Manager configuration file (SYS CONFIG)

Add the DR test volser range of scratch tapes to Tape Manager. Example:

```
TAPCMD TAPEADD VOL valid-validn POOL SYS MEDIA DRPOOL ATL VMSYSATL SCRCAT SCRATCH2
```

Create new a tape pool in Tape Manager to be used by Backup and Restore Manager during DR test. Example:

```
TAPCMD POOLDEF BKRAADMIN DRPOOL MEDIA DRPOOL RETNMAX days FREEPOOL SYS
```

Authorize system programmer user IDs and Backup Manager service machines to the DR test tape pool. Example:

```
TAPCMD POOLACC BKRAADMIN DRPOOL USER userid1 userid2 TAPE
```

```
TAPCMD POOLACC BKRAADMIN DRPOOL USER BKRBKUP BKRCATLG BKRWRK01 BKRWRK02 BKRWRK03 BKRWRK04 TAPE
```

Backup and Restore Manager

Updates to configuration file (BKRSYSTEM CONFIG)

- Add statements to use DR tape pool for backups during DR test
- Comment out the statements so they are not used in production but easily activated when DR test starts

```
* EUM_Pool_Owner = BKRADMIN  
* EUM_Pool_Name = DRPOOL
```

Must match tape pool
defined in Tape Manager

Review all backup jobs to confirm they do not override the tape pool to be used

Automation and operational monitoring

Provide an easy, quick or automated way to

- Suspend or deactivate any monitors that will automatically restart backup and tape servers if they are logged off
- Suspend or deactivate any schedules that run expiration processing of backups

Steps to perform one time in DR testing environment

On TS7700 tape library

Add DR test tape volume categories to “Write Protect Exclusion” list

- 0082
 - Scratch category to use for DR test
 - Must match what is configured in Tape Manager
- FFFF
 - Private category to use for DR test
 - Must match what is configured in Tape Manager
- 002E
 - Required for reporting errors in TS7700

Allows backups (and any other tape work) to be performed during DR test

**Steps to perform
each time when
DR test begins**

On TS7700 tape library

Enable write protection and flash

- Generally prevents DR test from writing to production tape volumes

Tape management

- If expiration processing will run within the next hour, modify its start time
- Put all tapes in production tape pools on hold
 - Not subject to expiration processing

```
TAPCMD TAPEMOD POOL BKRADMIN BKRPOOL HSTAT HOLD
```

- Repeat for any other production tape pools that have non-scratch tapes
- This only effects the DR test environment
 - Real production running separately with no changes

Automation

- Temporarily
 - Turn off or suspend any automation that will restart the backup servers
 - Turn off automation or scheduling that runs expiration processing of backups

Backups

- Temporarily
 - Shut down all backup servers
- Update configuration file
 - Uncomment the lines added which specify DR test tape pools
 - Comment out the lines specifying production tape pools
- Restart backup servers

Verification

Can be done on first DR test

Once confident with procedures, may not need to do this every time

Verify tape operations

- Mount a tape from the DR volser range with DFSMSRMS/VM

```
VMLINK DFSMS 1B5  
DFSMSRM MOUNT VOL nnnnnn VDEV 181  
DET 181
```

- Change the category of a tape volume in library

```
DFSMSRM SET VOLCAT nnnnnn TARGET VOL
```

- Mount a tape with Tape Manager

```
TAPCMD TAPEMNT VOL nnnnnn
```

**Steps to perform
at the end of or after
each DR test**

Tape Management

On TS7700 tape library

Mark all tapes written during DR test as free again

```
TAPCMD TAPEMOD POOL BKRADMIN DRPOOL STATUS FREE
```

Repeat for any other tape pools used during DR test

Not required for the backup or tape catalog

Required for the library to put them back into (DR test's) scratch category (0082)

Disable write protection and flash

- Returns tape grid to its original state

Summary

Disaster recovery testing is not the same as a real disaster recovery scenario

Real DR has one production system (can be multiple LPARs) running with one (set of) tape catalogs and one (set of) backup catalogs

DR test has two systems running

- Both think they are production
- Each has its own backup and tape catalogs that diverge from their common starting point
- Both talk to the same tape grid
- Conflicts can arise, production data can be lost
- Must configure the system to
 - Protect production data
 - Allow testing of backup and restore functions during DR test

References

White paper:

<https://www.ibm.com/support/pages/node/6840349>

Contact:

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Website:

www.ibm.com/products/infrastructure-suite-zvm-and-linux

THANK YOU!

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