TDMF
Online data migration Procedure from EMC to IBM DASD while keeping EMC DR consistency groups active

Version 1.1

Author: Edgar Strubel
Certified Consulting IT Specialist

IBM Systems Lab Services and Training September 2015

Change control

<table>
<thead>
<tr>
<th>Version</th>
<th>Date</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.9</td>
<td>04/10/2014</td>
<td>First release</td>
</tr>
<tr>
<td>1.0</td>
<td>09/29/2015</td>
<td>Final Version</td>
</tr>
<tr>
<td>1.1</td>
<td>10/23/2015</td>
<td>Final Version (update)</td>
</tr>
</tbody>
</table>
Figures

Figure 1 system overview................................................................. 9
Figure 2 Example: MASTER JCL.................................................. 16
Figure 3 Example: AGENT JCL..................................................... 16
Figure 4 Example: JCL - TDMF Batch monitor ......................... 17
Figure 5 Example: Monitor JCL for session 01....................... 18
Figure 6 Example: Input for Monitor session 01........... 18
Figure 7 Example: JCL syscom report for session 01 .......... 20
Figure 8 Example: System Communication report -: GTDRPTSC for session 01........ 20

Acknowledgements

The author would like to say “thank you” to Mitch Hogg, Michael Russo, Rick Fernandez and Trino Canton for their insights, discussions and support that led to the creation of this document and to ensure its accuracy.

A Note to the Reader

This White Paper assumes a familiarity with the general concepts of the IBM Data Migration Software in a z/OS environment. Additionally, the reader will find it helpful to be familiar with the Transparent Data Migration Facility (TDMF®) which is used for Online Data Migration at the Storage systems discussed in this document.

For readers unfamiliar with these topics and for additional information, please refer to references listed in the section on page 6.
Trademarks and special notices

© Copyright IBM Corporation 2015. All rights Reserved.

References in this document to IBM products or services do not imply that IBM intends to make them available in every country.

For more information, please visit us at www.ibm.com

© 2015 IBM Corporation. IBM, the IBM logo, z/OS, Softek, and TDMF for z/OS are registered or common law trademarks of IBM Corporation in the United States, other countries, or both.

All other trademarks and product names are the property of their respective owners.

The information in this document may be superseded by subsequent documents.

Any customer examples described are presented as illustrations.

All statements regarding IBM future direction and intent are subject to change or withdrawal without notice, and represent goals and objectives only. Contact your local IBM office or IBM authorized reseller for the full text of the specific Statement of Direction.

Any references in this information to non-IBM websites are provided for convenience only and do not in any manner serve as an endorsement of those websites. The materials at those websites are not part of the materials for this IBM product and use of those websites is at your own risk.
Abstract

Local Online Data Migration in a z/OS® environment

TDMF® (Transparent Data Migration Facility) is used to move z/OS mainframe disk volumes without any impact on active applications or production. TDMF is independent of any hardware microcode, so it can be used to move volumes between different vendor’s storage equipment.

Essential business applications require 24-by-7 availability incl. DR (disaster recovery), therefore migration windows can become a key obstacle in meeting service-level requirements.

TDMF provides the operational flexibility necessary for today’s IT infrastructure. Migrations can be run in parallel to the production system, because TDMF sessions can be managed while they are active.

This Best Practices paper describes a scenario in a z/OS® environment using TDMF with a special procedure to migrate online data from EMC® to IBM while keeping a DR consistency group active until the cut over.
Software products overview

IBM Transparent Data Migration Facility
(abbr.: TDMF)

Softek Transparent Data Migration Facility (TDMF®) z/OS® is an end-to-end, host-based software that can enable local or global DASD data migration for IBM z/OS mainframes across multivendor storage arrays. TDMF can be used to reduce the impact on storage subsystems when large databases or applications or whole systems are migrated, providing continuous application availability, reduced risk of data loss and high data integrity.

See IBM link for more details:

EMC Symmetrix Remote Data Facility - Consistency Group
(abbr.: SRDF CGroup)

An SRDF CGroup is a composite group that is created with special properties to allow RDF devices in separate RDF groups to maintain dependent write consistency. The RDF groups within the consistency group can exist within a single Symmetrix array or they can be spread across multiple Symmetrix arrays.

See EMC White paper for more details:
Scope of this Best Practices paper

This Best Practices paper describes a Migration Scenario in an IBM z/OS SYSPLEX environment from EMC storage systems with active EMC SRDF CGROUP to an IBM storage environment under GDPS Metro Mirror control using the TDMF parameter PROMPT and a specially developed REXX procedure to handle these prompts.

It was a crucial client requirement that SRDF Disaster Recovery Site must be up and active during the migration copy phase. Deactivating the CG and that for just a short time the DR site will be offline during the migration ending sequence before GDPS MM took over the part of DR capabilities is activated.

This paper will not go into any detail for other related activities but will concentrate on the actual data migration methodology and process.

The paper does not provide introductions to IBM TDMF or EMC SRDF CGROUP.

The reader should be familiar with handling TDMF in a z/OS environment.

The following web page provides technical information about TDMF:


The paper does also not describe the installation of an application such as TDMF or EMC SRDF CGROUP.
TDMF Definitions and Characteristics (Migration)

- Data migration is the copying of data from one device (the source) to another device (the target) and redirecting (swap) the server I/O to the new storage device.
- A migration (pair) is the logical relationship between a source and target device.
- The user initiates and controls all migrations. The user identifies the “from” (source) volumes and the “to” (target) volumes.
- Multiple volume migrations may be established during any one session.
- The migration tool is dynamically activated and terminated.
- Applications remain unaware that migration is underway. The data is continuously and fully accessible for read and write activity.
- After migration (copy) and synchronization are complete, the takeover of the target device is non-disruptive. In the case of migration, the volumes (source / target pairing) are swapped; leaving the source device in an offline state, and the target volume is the new active volume.
- The tool supports a multiple system shared data environment.
- The tool ensures complete physical data integrity.
Hardware and Software Setup

Hardware overview

Figure 1 illustrates the z/OS environment prepared for migration (simplified):

- IBM CPC systems with logical partitions (LPARs) running z/OS operating systems
- The EMC Storage System with active SRDF CGroup
- The IBM Storage System with prepared GDPS MM.

Figure 1 system overview
The list of software products

- z/OS system 1.13
- various application software
- various db2 systems
- EMC SRDF CGroup Software
- IBM TDMF 5.4 installed and updated
- IBM GDPS MM 3.11 installed, tested and active

Conceptual background

Client requirements

This disk data migration method is to provide conformity with Group standards for mainframe disk to be under GDPS/PPRC control.

The additional capacity on the IBM target disk provides spare capacity for future growth.

The migration also provides a platform to be able to test and demonstrate zSeries production disaster recovery in the future following subsequent changes.

This is an enabler for the role swap of zSeries production services to the secondary location.

Dedicated EMC disk storage will be replaced by IBM disk storage.

The current disk consistency manager EMC/SRDF will be replaced with GDPS/MM (PPRC).

Invocation of disaster recovery will be via GDPS panels and Flash copy jobs – or via TPC for Replication

- There will be no IPL’s or system outages while performing the migration of the data
- Productions systems continue to run with NO performance impact
- Minimal Disaster Recovery Data (DR) aging during the migration
- DB2 data must be migrated first (incl. db2 catalogs)
- TDMF Version 5.4 (client installed license) has to be used for the migration
  (NO groups) → see Inhibitors and solution Item 2 and Item 3 for more details

Based on the above parameters, there are many sub projects that need to be completed prior to the actual migration of the data. These consist of items such as new storage system installation and GDPS MM implementation and tests. This paper will not go into any detail for these other related activities but will concentrate on the actual data migration methodology and process.
The Inhibitors and the solution

Once agreement is reached on the migration technique, there are some inhibitors that needed to be overcome.

1. Amount of virtual storage needed by TDMF to migrate e.g. 6,500+ volumes simultaneously.
   The values used here are taken from a real customer migration project
   a. TDMF’s V5.4 release or higher is required. V5.4 moves most of the tables TDMF uses “above the bar” which drastically reduced the ECSA requirements for a migration of this size. A migration of this size on older software versions would require approximately 160 MB of ECSA which would usually be a show stopper for the project; TDMF V5.4 reduces ECSA to only 32MB.

2. When performing a TDMF PROMPT SWAP, if the volumes are in a GROUP, the entire GROUP is quiesced by preventing further write activity to all volumes in the group, and then all volumes are swapped. Using groups would seem to pose a threat to performance since production should be active during the migration in large GDPS environments.
   a. In the reference example we discussed using small groups of like data volumes, but identifying them in a 6,500+ volume pool did not seem possible. After many discussions it was decided that we would perform the migrations without any groups.

3. Using TDMF PROMPT without grouping volumes would mean that each volume must be swapped by either issuing a command from a console or through the TDMF Real-time Monitor. Performing the swap of 6,500+ volumes in this manner is not practical, so an automation technique that would allow the SWAP commands at the volume level to be issued was developed.
   a. IBM TDMF development and IBM Lab Services have developed a new REXX procedure to perform these activities; this procedure has already been tested in large environments. Using the TDMF Batch Monitor facility, the REXX procedure reads an input file containing a list that is comprised of records whose fields include the TDMF master job name and volume. The EXEC queries the volume status to ensure it is Waiting PROMPT, and then it issues the PROMPT command to swap the volume, pause and query the volume once again, and then go onto the next one. The pause is injected to minimize the possibility of getting a task busy response from the TDMF master address space.

4. TDMF per default does not support volume migration out of an active EMC SRDF CGroup
   a. Several tests in TEST and DEVELOPMENT systems demonstrated a way to use TDMF with active EMC SRDF CGroup and migrate to IBM storage keeping EMC DR Site consisted
      - EMC software load library MUST NOT be part of the system link-lib concatenation.
      - EMC SRDF CGroup software must be started with JOB steplib DD statement for the EMC loadlib.
   b. It must be ensured that nobody stops running TDMF sessions or single volumes within a session before a “gold” copy is made and EMC software has been ended. This control is best exercised by restricting the number of users who can use TDMF at the system.

5. Based on the number of sharing LPAR’s, 7, the maximum number of volumes that can be in any one TDMF session comes out to be (2048 / 7) or 292. To avoid testing the limits, it is recommended that the TDMF jobs are setup with a maximum of 200 volumes per session (as
was the case in the reference example). In the reference example 6488 volumes were migrated which meant 61 master sessions were created which were run on 2 of the 7 LPAR’s. This meant a total of 427 TDMF jobs including Masters and Agents were submitted and ran.

a. In general terms, Initiators need to be allocated to accommodate running this many jobs for about a week without interfering with production scheduling.

b. WLM was given a mask to ensure the (427) TDMF jobs receive the highest batch performance class available (SYSSTC). This is done to prevent excessive volume suspensions throughout the update process.

c. It may be necessary to install additional physical memory (defined) to the LPARs running the migration to keep all the TDMF session running in parallel.

**The Result**

In the reference example, after testing the whole migration procedure on the test and development environment in cooperation with the customer, the migration was given the green light to move forward with the production system. 10 days prior to cutover, the 61 TDMF master jobs, 366 TDMF agents were started one after the other and the copying begun. The CONCURRENT parameter was used to limit to maximal number of active copies per master session.

This was done so that the primary control units were not overwhelmed and production was safe from performance impact caused by the copy activity and also to avoid performance impacts at source storage and the physical shared SRDF/PPRC links.

The first pass of the copy of the entire environment, except the special volumes was completed in approximately 9 days without any impact to production. At that time and for the rest of the week TDMF continued to run, monitoring and applying updates in its normal fashion when using the PROMPT option. During the week the TDMF masters were monitored for terminated volumes due to high activity. It was observed that some few high activity production volumes were terminated, some 180 volumes in total out of the 6,488. The production volumes were restarted as soon the batch load was observed to be going down. (Before midnight in this case)

As is preferential in such cases, the client allowed remote access to the systems so the off hour monitoring could be done from the remote location (e.g. hotel).

Before the TDMF sessions were completed, the customers made a “gold” copy, see Figure 1 and then stopped the EMC SRDF CGroup software.

The automation SWAP jobs were created in relation to the TDMF sessions; DB2 (32 sessions) had to be finished first.

From earlier tests it was known that 10 swap sessions running in parallel would not be a problem. After the first swap sessions ended new jobs were started, so at the end 10 jobs running concurrently till the bulk of DB2 volumes (4,500) were done and each swap (with injected waits) would take an average of 6 to 9 seconds. After 1 hour 45 min. all DB2 volumes were done.

Next all DB2 volumes in GDPS environment were activated using a prepared GEOPARM list. After GDPS Metro Mirror was active with the new volumes the migration was set forth with the special volumes.

TDMF jobs were setup and submitted to perform the copies of the previously identified special volumes (i.e. IPL, IODF, JES Spool & checkpoint, SMS, work) these volumes were copied and ended automatically one volume at a time (parameter NOPROMPT). After these were all complete, the TDMF jobs to copy and swap the Couple data sets and the PLPA/COMMON volumes for each system were started and then all volumes in GDPS which had completed the migration were activated.
All together the entire swap process finished within 3 hours’ time.

During the entire swap process, dedicated performance personnel were monitoring DASD response time and other performance metrics, no performance degradation was detected.

## Data Migration

This section describes the migration scenario in detailed steps. There must be a very close contact to the client system programmer and storage admin department during this phase.

### Prerequisites before migration started

The prerequisites are nearly the same as a normal local migration, some more details here in this list:

- System assurance has to be done before the migration (PTFs, PSP, volume lists ...)
- New IBM storage systems must be implemented into the existing environment incl. Metro Mirror
- GDPS must be installed and tested.
- Used Main storage size must be checked (potentially some main storage must be added/defined to single LPARs)
- Use TDMF memory calculation tool to calculate memory usage for the TDMF sessions.
- EMC Software must be started with Step-lib DD statement.
  
  EMC Load Libraries must NOT be in the link lib concatenation.
- Certain number if Initiators (JES) must be defined in each LPAR to run the TDMF master / agent jobs.
- TDMF target volumes have to be removed from GDPS GEOPARM data set.
  
  TDMF does not support volume pairs if one volume (source or target only is active in a GDPS environment)
  
  Two additional GEOPARM data sets have to be defined:
    
    - DB2 volumes (all, incl. DB2 catalog volumes)
    - All volumes controlled by GDPS Metro Mirror

Note:

Link to TDMF memory calculation tool


Look for TDMF_zOS_V540_Storage_Requirements.xls
**TDMF Installation Setup**

TDMF 5.4 installation must be checked and latest updates installed

TDMF 5.4 must be available to all LPARs which are part of the migration

TDMF System Communication Data Sets (Volumes) must be defined and initialized

**Migration Volume List**

At the beginning a volume list (all volumes online to the sysplex), reduced by number of volumes not to be moved (empty volumes, old data volumes not part of the migration) is generated.

Location of special volumes like XCF data set volumes

XCF couple ds volumes – must be placed to special target volumes not mirrored, prerequisite of GDPS

DB2 volumes to be marked and placed into separate sessions, as these have to be moved first. Also the target device addresses has to be defined for each single source volume.

System volumes like IPL, IODF, SPOOL, CATALOGs, PLPA, COMMON and LOCAL page data sets must also be marked for special handling. These special volumes are handled in the same way as at a normal local migration and should not be part of the REXX auto answer tool.

The volume list must kept up to date during the migration, as it often happens that some volumes are added to different storage groups while the migration is running.
TDMF Migration JCL Creation (MASTER / AGENTS)

Different groups must be built, because of memory usage master sessions running at different LPARs, be aware of the Agents.

In a live production system the migration consultant should be prepared to handle new volumes added into a storage group. A good practice here is to create some dummy sessions (master, agents and syscom DS).

JOB Naming conventions

Naming conventions must be used to be able to run all the sessions in parallel. Good practice here is to construct the job name as shown here.

TDMLllnn

!   !   !
!   ++  \(\rightarrow\) Session number
!   +++  \(\rightarrow\) LPAR ID
+-------  \(\rightarrow\) FIX for Master Session

TDALllnn

!   !   !
!   ++  \(\rightarrow\) Session number
!   +++  \(\rightarrow\) LPAR ID
+-------  \(\rightarrow\) FIX for Agent Session

List of job names for session 01

<table>
<thead>
<tr>
<th>Job Name</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>TDAL0201</td>
<td>agent</td>
</tr>
<tr>
<td>TDAL0301</td>
<td>agent</td>
</tr>
<tr>
<td>TDAL0401</td>
<td>agent</td>
</tr>
<tr>
<td>TDAL0501</td>
<td>agent</td>
</tr>
<tr>
<td>TDAL0601</td>
<td>agent</td>
</tr>
<tr>
<td>TDAL0701</td>
<td>agent</td>
</tr>
<tr>
<td>TDMLL201</td>
<td>master</td>
</tr>
</tbody>
</table>
**TDMF Master Job**

A good practice here to avoid performance impacts and save CPU resources from the beginning use `OPT(MAXTRK=1)`

```plaintext
//TDMLL201 JOB 5179,CLASS=M,MSGCLASS=U,NOTIFY=STRUBEL,TIME=1440,
// REGION=0M
/* TDMF DATA MIGRATION - DO NOT CANCEL THIS JOB !!!
* EDGAR STRUBEL, IBM 0049-160-7435708
* IN CASE OF A PROBLEM CALL IMMEDIATELY
/*JOBPARM SYSAFF=FSL2
//******************************************************************************************
/* Master JOB TDMF running: FSL2
//******************************************************************************************
//LOCAL01 EXEC PGM=GTDMAIN,PARM=MASTER,REGION=0M
//STELIB DD DISP=SHR,DSN=SYS2.TDMF.GTDLLIB
//GTDKEY DD DISP=SHR,DSN=SYS2.TDMF.GTDLLIB
//SYSCOM DD DISP=SHR,DSN=TSS.LTDMF.LIVQ01.SYSCOM01
//SYSPRINT DD SYSOUT=* 
//SYSSNAP DD SYSOUT=* 
//SYSD * 
SESSION M(FSL2)  
AGENTS( LQ02 LQ03 LQ04 LQ05 LQ06 LQ07)  
OPT(FAST UNIDENT(I) PAC CHECKT ALLOWINV 
CONC(1 ACTIVE))  
MIGRATE AR1450 $N1940 $DD430 OPT(MAXTR(1))  
MIGRATE BR1450 $N19C2 $DD435 OPT(MAXTR(1))  
MIGRATE IDFQA0 $N1BC3 $D6ACC OPT(MAXTR(1))  
MIGRATE IDFQA1 $N1BC4 $D6ACF OPT(MAXTR(1))  
MIGRATE IDFQP0 $N1BC5 $DD43F OPT(MAXTR(1))  
MIGRATE IDFQP1 $N1BC6 $D6ACE OPT(MAXTR(1))
```

*Figure 2 Example: MASTER JCL*

**TDMF Agent Job**

```plaintext
//TDAL0201 JOB 5179,CLASS=M,MSGCLASS=U,NOTIFY=STRUBEL,TIME=1440,
// REGION=0M
/* TDMF DATA MIGRATION - DO NOT CANCEL THIS JOB !!!
* EDGAR STRUBEL, IBM 0049-160-7435708
* IN CASE OF A PROBLEM CALL IMMEDIATELY
/*JOBPARM SYSAFF=LQ02
//******************************************************************************************
/* AGENT JOB TDMF running: LQ02
//******************************************************************************************
//STEP01 EXEC PGM=GTDMAIN,PARM=AGENT,REGION=0M
//STELIB DD DISP=SHR,DSN=SYS2.TDMF.GTDLLIB
//GTDKEY DD DISP=SHR,DSN=SYS2.TDMF.GTDLLIB
//SYSCOM DD DISP=SHR,DSN=TSS.LTDMF.LIVQ01.SYSCOM01
//SYSPRINT DD SYSOUT=* 
//SYSSNAP DD SYSOUT=* 
```
TDMF Monitor JCL Creation / Report

To start the auto answer tool, batch monitor (GTDMON) has to be started first; in the example two monitor jobs were started, one in each LPAR with active TDMF master sessions running.

TSSMON01 started at LPAR: FSL2

```plaintext
//TSSMON01 JOB 5179,CLASS=M,MSGCLASS=U,NOTIFY=TSSESP,TIME=1440,
// REGION=0M
//* TDMF DATA MIGRATION - DO NOT CANCEL THIS JOB !!!
//* EDGAR STRUBEL, IBM 0049-160-7435708
//* IN CASE OF A PROBLEM CALL IMMEDIATELY
/*JOBPARM SYSAFF=FSL2
//TDMFMON EXEC PGM=GTDBMON
//STEPLIB DD DISP=SHR,DSN=SYS2.TDMF.GTDLLIB
//SYSPRINT DD SYSOUT=* 
//SYSUDUMP DD SYSOUT=* 
/*
```

Figure 4 Example: JCL - TDMF Batch monitor

TSSMON02 started at LPAR: LQ02

JCL is the same, just with another job name.

For each TDMF master session a separate monitor session with a proper input data set incl. master job name and volume list was started, see Figure 5 & 6

The REXX procedure is checking the status of each volume pair from the top, as long the status is “AWAITING PROMPT” it is sending the prompt to the session via batch monitor and ends this volume pair. After some seconds next volume is checked and ended. Status of the TDMF sessions is visible through the TDMF Online Monitor. A retry count of 3 is defined for each volume pair. If a volume pair do not have correct status after retry count is reached you must answer the prompt by manual line command (“P”) to the volume pair using the TDMF Monitor Menu Item 2.

For AUDIT purpose the output of each session was stored in a separate output data set

TSS.TDMF.LIVQ01.MONOUT.MONSES01
**Member: MONSES01**

Input Parameter:
Procedure name (REXX), monitor name (job name) and the command for TDMF batch monitor

```
//MONSES01 JOB 5179,CLASS=M,MSGCLASS=U,NOTIFY=STRUBEL,TIME=1440,
// REGION=0M
//* TDMF DATA MIGRATION - DO NOT CANCEL THIS JOB !!!
//* EDGAR STRUBEL, IBM 0049-160-7435708
//* IN CASE OF A PROBLEM CALL IMMEDIATELY
//*JOBPARM SYSAFF=FSL2
//ISUCMD EXEC PGM=IKJEFT01,DYNAMNBR=5
//SYSEXEC DD DISP=SHR,DSN=STRUBEL.TDMF.TOOL.WORK
//MASTVOL DD DISP=SHR,DSN=STRUBEL.TDMF.LIVQ01.MONITOR.CNTL(SESS01)
//SYSTSIN DD *
```

**Figure 5 Example: Monitor JCL for session 01**

**Member: SESS01**

Member sess01 was created in relation to the master session 01 and contains the Master session job name and the source volid

```
*Master Volid
TDMLL201 AR1450
TDMLL201 BR1450
TDMLL201 IDFQA0
TDMLL201 IDFQA1
TDMLL201 IDFQP0
TDMLL201 IDFQP1
```

**Figure 6 Example: Input for Monitor session 01**
**TDMF Status JCL Creation / Report**

After the migration finished, a report for each migration session against the system communication data set was generated, to double check all volumes were migrated without any problems.

For AUDIT purpose the output of each session should be stored in a separate data set:
- TSS.TDMF.LIVQ01.MONOUT.TDRPTS01
- TSS.TDMF.LIVQ01.MONOUT.TDRPTS02
- TSS.TDMF.LIVQ01.MONOUT.TDRPTS03
- TSS.TDMF.LIVQ01.MONOUT.TDRPTS04
- TSS.TDMF.LIVQ01.MONOUT.TDRPTS05
- TSS.TDMF.LIVQ01.MONOUT.TDRPTS06

...  

An example for the JCL and output see next page.  
These jobs were also automatically created in relation to the TDMF sessions.
Job: TDRPTS01

Figure 7 Example: JCL syscom report for session 01

Session report

A system communication report should be created for each session, in order to check that all volumes are migrated successfully.

```
READY
GTDRPTSC

SYSCOM DISK  DSN = TSS.LTDMF.LIVQ01.SYSCOM01
TDMF VERSION/RELEASE = V540
NUMBER OF SYSTEMS = 7 MASTER(FSL2) AGENTS(LQ02 LQ03 LQ04 LQ05 LQ06 LQ07)
NUMBER OF SRC VOLS = 6

<table>
<thead>
<tr>
<th>VOLUME STATUS</th>
<th>COUNT</th>
<th>VOLUME STATUS</th>
<th>COUNT</th>
<th>VOLUME STATUS</th>
<th>COUNT</th>
<th>VOLUME STATUS</th>
<th>COUNT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complete</td>
<td>6</td>
<td>Terminated</td>
<td>0</td>
<td>Inactive</td>
<td>0</td>
<td>Activation</td>
<td>0</td>
</tr>
<tr>
<td>Copy</td>
<td>0</td>
<td>Refresh</td>
<td>0</td>
<td>Suspended</td>
<td>0</td>
<td>Quiesce</td>
<td>0</td>
</tr>
<tr>
<td>Synchronize</td>
<td>0</td>
<td>Compare</td>
<td>0</td>
<td>Swap</td>
<td>0</td>
<td>Resume</td>
<td>0</td>
</tr>
<tr>
<td>Backed out</td>
<td>0</td>
<td>UNKNOWN</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SOURCE  TARGET  NEW  GROUP  MIGRATION  ERROR INFO
VOLSER  DEV# VOLSER  DEV# VOLSER  DEV# NAME  STATUS  TYPE  SMFID  MESSAGE
A1450    D430  $N1940  1940  $DD430  Complete  SWAP
B1450    D435  $N19C2  19C2  $DD435  Complete  SWAP
IDFQA0   6ACC  $N1BC3  1BC3  $D6ACC  Complete  SWAP
IDFQA1   6ACF  $N1BC4  1BC4  $D6ACF  Complete  SWAP
IDFQP0   D43F  $N1BC5  1BC5  $DD43F  Complete  SWAP
IDFQP1   6ACE  $N1BC6  1BC6  $D6ACE  Complete  SWAP

READY
END
```

Figure 8 Example: System Communication report -: GTDRPTSC for session 01
# Job List tracked by an EXCEL file

A own created EXCEL file was used to have an overview all the time during the copy phase

## Defined Sessions

<table>
<thead>
<tr>
<th>Sessions</th>
<th>ID</th>
<th>Vols / Session</th>
<th>Vols completed</th>
<th>counted vols</th>
<th>System/Symp</th>
<th>SYSVOL or special</th>
<th>Storage Groups</th>
<th>Session Cap (KiB)</th>
<th>completed Cap (KiB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Session 1</td>
<td>60</td>
<td>6</td>
<td>6</td>
<td>1111111111</td>
<td>JPL CURRENT, I SXFALT, XSSFPR</td>
<td>11.244</td>
<td>11.344</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Session 1</td>
<td>97</td>
<td>1</td>
<td>1</td>
<td>11111111</td>
<td>CQFTI</td>
<td>68</td>
<td>44</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Session 2</td>
<td>1</td>
<td>1</td>
<td>11111111</td>
<td>PLFA</td>
<td>PAGE.P0G3, SSSP06.P</td>
<td>2.838</td>
<td>2.838</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Session 3</td>
<td>1</td>
<td>1</td>
<td>11111111</td>
<td>PLFA</td>
<td>PAGE.P0G4, SSSP06A.P</td>
<td>2.838</td>
<td>2.838</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Session 3</td>
<td>1</td>
<td>1</td>
<td>11111111</td>
<td>PLFA</td>
<td>PAGE.P0G3, SSSP06P.P</td>
<td>2.838</td>
<td>2.838</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Session 3</td>
<td>1</td>
<td>1</td>
<td>11111111</td>
<td>PLFA</td>
<td>PAGE.P0G4, SSSP06A.P</td>
<td>2.838</td>
<td>2.838</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Session 3</td>
<td>1</td>
<td>1</td>
<td>11111111</td>
<td>PLFA</td>
<td>PAGE.P121, SSSP121.P</td>
<td>2.838</td>
<td>2.838</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Session 4</td>
<td>2</td>
<td>2</td>
<td>11111111</td>
<td>PLFA</td>
<td>PAGE.P122, SSSP122.P, PAGE.P123, SSSP123.P</td>
<td>5.076</td>
<td>5.076</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Session 4</td>
<td>2</td>
<td>2</td>
<td>11111111</td>
<td>PLFA</td>
<td>PAGE.P121, SSSP121.P</td>
<td>2.838</td>
<td>2.838</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Session 4</td>
<td>2</td>
<td>2</td>
<td>11111111</td>
<td>PLFA</td>
<td>PAGE.P122, SSSP122.P, PAGE.P123, SSSP123.P</td>
<td>5.076</td>
<td>5.076</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Session 4</td>
<td>2</td>
<td>2</td>
<td>11111111</td>
<td>PLFA</td>
<td>PAGE.P121, SSSP121.P</td>
<td>2.838</td>
<td>2.838</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Session 4</td>
<td>2</td>
<td>2</td>
<td>11111111</td>
<td>PLFA</td>
<td>PAGE.P122, SSSP122.P, PAGE.P123, SSSP123.P</td>
<td>5.076</td>
<td>5.076</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**Note:** The table above details the job list tracked by an EXCEL file during the data migration from EMC to IBM with active DR C-GROUP V1. The EXCEL file was used to maintain an overview throughout the copy phase. The columns represent the session ID, session details, and system/symp with corresponding storage groups and session cap/completed cap values in KiB.
## Some troubleshooting hints

### Memory usage of master sessions.

In the cited example, at the beginning of the migration it was seen that a master session used much more memory than calculated. The reason was the information the storage controller sent in relation to the logical paths. **Logical path data exceeds the default I/O buffer. Total entry’s = 262144**

To fix this problem there is an APAR available: APAR OA42731

<table>
<thead>
<tr>
<th>PROBLEM SUMMARY:</th>
</tr>
</thead>
<tbody>
<tr>
<td>* USERS AFFECTED: TDMF users.</td>
</tr>
<tr>
<td>* PROBLEM DESCRIPTION: UNIDENT(I) may not read all logical path data causing list of processors in message GTD2832I to be incomplete.</td>
</tr>
<tr>
<td>* RECOMMENDATION: To conserve storage, TDMF may not read all logical path data from a control unit when the UNIDENTIFIEDSYSTEMS(IGNORE) parameter is specified. This may cause the list of processors in message GTD2382I to be incomplete. Additionally, there is no indication when a device has a large number of logical path entries and TDMF obtains more than the default amount of storage to read them. The amount of storage may be increased when a value other than IGNORE is specified for the UNIDENTIFIEDSYSTEMS parameter.</td>
</tr>
</tbody>
</table>

| PROBLEM CONCLUSION: |
| Message GTD1163W will be produced when TDMF does not read all logical path data. Message GTD1165I will be produced when TDMF expands its default storage allocation for reading logical path data. |

Note:

If you use parameter “UNIDENT(IGNORE)”

!!! Double check if devices are defined and ONLINE to the LPARs part of the migration ONLY !!!

Don’t forget: You are responsible for the migration!
Contact Info:

If there is any question regarding this special procedure, do not hesitate to contact me:

Edgar Strubel  
Certified Consulting IT Specialist  
IBM Systems, Storage Platform

IBM Deutschland GmbH  
Gottlieb-Daimler-Str. 12  
68165 Mannheim  
Germany  
mobile: +49-160-7435708  
email: edgar.strubel@de.ibm.com