

XTTS, Cross Platform Incremental Transportable Tablespace

Most Important Note

Specia Note: For Very Large Database like 500 Terabytes and Least Down Time

You want to achieve parallelism [**Step 2.2 & Step 2.3**]

Doing it at the same time for 3 different schemas like user_x, user_y, user_z

Create 3 separate directories, and unzip **rman_xttconvert_VER4.3.zip** in each of the directory

So you get 3 xtt.properties files, you can trigger for each of the schemas at the same time in parallel and separately, they should have self-consistent and independent tablespaces.

/home/oracle/userx_xtt

/home/oracle/usery_xtt

/home/oracle/userz_xtt

Because the below parameters in the xtt.properties can have value for one location only

1. src_scratch_location
2. dest_scratch_location
3. dest_datafile_location

This is the secret of least down time, for a very large database **like 500TB, yes Terabytes**

Table of Contents

XTTS, Cross Platform Incremental Transportable Tablespace	0
Most Important Note	0
XTTS, Cross Platform Incremental Transportable Tablespace	2
Disclaimer.....	2
Oracle Metalink Documents Referred.....	2
Notes.....	2
Environment.....	3
Prerequisites	4
Known Issues.....	6
ACTION	8
Step 2.1 - Run the backup on the source system.....	10
Step 2.2 - Transfer the following files to the destination system Backups created from source src_scratch_location to destination dest_scratch_location	14
Step 2.3 - Restore the datafiles on the destination system.	14
Phase 3 - Roll Forward Phase	16
Step 3.1 - Create an incremental backup of the tablespaces being transported on the source system.	16
Step 3.2 - Transfer incremental backups and res.txt to the destination system.	19
Step 3.3 - Apply the incremental backup to the datafile copies on the destination system.	20
Phase 4 - Final Incremental Backup.	21
Option1.A: Alter source tablespace(s) to READ ONLY in the source database	23
On the source system, logged in as the oracle user with the environment (ORACLE_HOME and ORACLE_SID environment variables) pointing to the source database, alter the tablespaces being transported to READ ONLY.	23
Option1.B: Create the final incremental backup of the tablespaces being transported on the source system.	24
Option1.C: Transfer incremental backups and res.txt to the destination system	28
Option1.D: Apply last incremental backup to destination datafiles	29
Phase 5 - Transport Phase: Export Metadata and Plug-in Tablespaces into Destination Database.....	30
Option1.B: Transfer the export file to destination directory used by datapump.....	31
Option1.C: Run datapump import using the export file on destination to plug in the tablespaces.	31
Step 6.2 Check tablespaces for corruption	33
Step 6.3 - Alter the tablespace(s) READ WRITE in the destination database.....	34

XTTS, Cross Platform Incremental Transportable Tablespace

Disclaimer
<i>This is just an experiment to validate and practice to gain the knowledge</i>
<i>I am not saying this would work for you; decision of implementation goes to you</i>
<i>Please attempt at your own risk</i>
<i>This is a simulated, ideal and pristine set up, so a lot of issues would not show up</i>
<i>Purpose of this document is to let the reader know, the outcome of the simulation</i>

Oracle Metalink Documents Referred
V4 Reduce Transportable Tablespace Downtime using Cross Platform Incremental Backup (Doc ID 2471245.1)
XTTS Creates Alias on Destination when Source and Destination use ASM (Doc ID 2351123.1)
Known Issues for Cross Platform Transportable Tablespaces XTTS (Doc ID 2311677.1)

Notes
Source is Little Endian, and Target is Little Endian, I did not find resources to simulate a Big Endian. Conversion looks ok, and no issues found during this simulation
If your source and target both are using ASM, obvious production scenario, then please check this
Document ID : 2471245.1 Section : Known Issues Bullet point number : 2
Which says the below. <i>If using ASM in both source and destination, see XTTS Creates Alias on Destination when Source and Destination use ASM(Note 2351123.1)</i>

Environment		
	Source	Target
OS	\$ cat /etc/release Oracle Solaris 10 1/13 s10x_u11wos_24a X86 Copyright (c) 1983, 2013, Oracle and/or its affiliates. All rights reserved. Assembled 17 January 2013	\$ cat /etc/redhat-release Red Hat Enterprise Linux Server release 7.9 (Maipo)
Endian	\$ python Python 2.6.4 (r264:75706, Jun 26 2012, 21:27:36) [C] on sunos5 Type "help", "copyright", "credits" or "license" for more information. >>> from sys import byteorder >>> print(byteorder) little >>> *** The script does the endian format conversion automatically; no exclusive steps are there for it. May be you can look in metalink documents if you have doubt or concern that this conversion phase may not go smoothly.	[oracle@Target_host ~]\$ python Python 2.7.5 (default, May 27 2020, 06:51:48) [GCC 4.8.5 20150623 (Red Hat 4.8.5-44.0.1)] on linux2 Type "help", "copyright", "credits" or "license" for more information. >>> from sys import byteorder >>> print(byteorder) little
Database version	Release 11.2.0.1.0 Production	Oracle Database 19c Enterprise Edition Release 19.0.0.0.0 - Production Version 19.3.0.0.0
Schemas	Schemas : Tablespaces : Size ----- user_p : user_p_tbsp : 1GB user_x : user_x_tbsp : 1GB user_y : user_y_tbsp : 1GB user_z : user_z_tbsp : 1GB *** All of these 4 schemas are populated from the HR schema	Schemas ----- user_p user_x user_y user_z
File System	Local Disk Based	ASM
Cluster	Stand Alone	Stand Alone
Dataguard	No	No
Container	None Container	Container

Prerequisites

1. The current version does NOT support Windows as either source or destination.
 - a. Source is Solaris 10 and Target is Oracle Linux 7.9
2. Cross platform is only possible with Enterprise Edition
 - a. Both source and target databases are of Enterprise Edition.
3. The source database's COMPATIBLE parameter must not be greater than the destination database's COMPATIBLE parameter.
 - a. show parameter compatible
 - b. Source is 11.2.0.0.0
 - c. Target is 19.0.0
4. The source database must be in ARCHIVELOG mode. Yes, it is in Archive log Mode
5. Before running XTTs scripts, set NLS_LANG=AMERICAN_AMERICA.WE8ISO8859P1. Other NLS_LANG settings may cause errors.
 - a. show parameter NLS_LANG
 - b. In Source : AMERICAN
 - c. In Target : AMERICAN
6. RMAN configuration
 - a. RMAN on the source system must not have DEVICE TYPE DISK configured with COMPRESSED.
 - b. RMAN on the source system must not have BACKUP TYPE TO COPY. The source must have BACKUP TYPE TOBACKUPSET.
 - c. RMAN on the source system must not have default channel configured to type SBT. I.e., this procedure can only be used with DISK channels.
 - d. RMAN on the source system must not have ANY channel configuration limitations. For example, MAXSETSIZE, MAXPIECESIZE, etc.
 - e. RMAN> show all
 - i. RMAN configuration parameters for database with db_unique_name SOL10DB11G are:
 - ii. CONFIGURE RETENTION POLICY TO REDUNDANCY 1; # default
 - iii. CONFIGURE BACKUP OPTIMIZATION OFF; # default
 - iv. CONFIGURE DEFAULT DEVICE TYPE TO DISK; # default
 - v. CONFIGURE CONTROLFILE AUTOBACKUP OFF; # default
 - vi. CONFIGURE CONTROLFILE AUTOBACKUP FORMAT FOR DEVICE TYPE DISK TO '%F'; # default
 - vii. CONFIGURE DEVICE TYPE DISK PARALLELISM 1 BACKUP TYPE TO BACKUPSET; # default
 - viii. CONFIGURE DATAFILE BACKUP COPIES FOR DEVICE TYPE DISK TO 1; # default
 - ix. CONFIGURE ARCHIVELOG BACKUP COPIES FOR DEVICE TYPE DISK TO 1; # default
 - x. CONFIGURE CHANNEL DEVICE TYPE DISK FORMAT '/u01/app/oracle/backup/%U';

- xi. CONFIGURE MAXSETSIZE TO UNLIMITED; # default
- xii. CONFIGURE ENCRYPTION FOR DATABASE OFF; # default
- xiii. CONFIGURE ENCRYPTION ALGORITHM 'AES128'; # default
- xiv. CONFIGURE COMPRESSION ALGORITHM 'BASIC' AS OF RELEASE 'DEFAULT'
OPTIMIZE FOR LOAD TRUE ; # default
- xv. CONFIGURE ARCHIVELOG DELETION POLICY TO NONE; # default
- xvi. CONFIGURE SNAPSHOT CONTROLFILE NAME TO
'/u01/app/oracle/product/11.2.0.1/db_1/dbs/snapcf_sourcehostdb11g.f'; #
default

7. The set of tablespaces being moved must all be online, and contain no offline data files.

Tablespaces must be READ WRITE.

- a. All data files are online
- b. All tablespaces are online

```
set line 500
set pagesize 500
col tablespace_name format a20
col file_name format a60
select
  tbspc.tablespace_name TBSP_NAME
, tbspc.status TBSP_STATUS
, ddf.file_name FILE_NAME
, ddf.status DATA_FILE_STATUS
, ddf.ONLINE_STATUS DATAFILE_ONLINE_STATUS
from dba_tablespaces tbspc, dba_data_files ddf
where tbspc.tablespace_name = ddf.tablespace_name
and tbspc.tablespace_name like '%_TBSP'
order by tbspc.tablespace_name;
```

TBSP_NAME	TBSP_STAT	FILE_NAME
DATA_FILE	DATAFIL	
-----	-----	-----
USER_P_TBSP	ONLINE	/u01/app/oracle/oradata/sourcehostdb11g/sol10db11g/user_p_tbsp AVAILABLE ONLINE .dbf
USER_X_TBSP	ONLINE	/u01/app/oracle/oradata/sourcehostdb11g/sol10db11g/user_x_tbsp AVAILABLE ONLINE .dbf
USER_Y_TBSP	ONLINE	/u01/app/oracle/oradata/sourcehostdb11g/sol10db11g/user_y_tbsp AVAILABLE ONLINE .dbf
USER_Z_TBSP	ONLINE	/u01/app/oracle/oradata/sourcehostdb11g/sol10db11g/user_z_tbsp AVAILABLE ONLINE .dbf

- 8. Although preferred destination system is Linux (either 64-bit Oracle Linux or a certified version of RedHat Linux), this procedure can be used with other Unix based operating systems. However, any non-Linux operating system must be running 12.1.0.1 or higher in both destination and source.
 - a. Not Applicable in this scenario
- 9. The Oracle version of source must be lower or equal to destination. Therefore, this procedure can be used as an upgrade method.
 - a. Source is 11g and Target is 19C

10. Transportable tablespace restrictions WILL apply. Minimum version for source and destination is 11.2.0.3. Earlier 11.2 versions will likely function the same, however were not tested. As suggested, test the procedure before relying on it for a production environment.
 - a. The source database version is 11.2.0.1.0, which earlier than 11.2.0.3.0 so I am testing
11. ASM can only be used for final location of datafiles in destination, backups cannot be placed on ASM with this version. The backup location of destination MUST be a device with read/write privileges. I.e., cannot be a READONLY device. This can cause ORA-19624 on the backupset conversion.
 - a. Here backups will be stored in a disk locally, NAS/NFS with read/write permission can also be used.

12. The source and target database must use a compatible character set and national character set.

- a. `select * from database_properties where PROPERTY_NAME in ('NLS_CHARACTERSET', 'NLS_NCHAR_CHARACTERSET');`
- b. In Source
 - i. `NLS_CHARACTERSET : AL32UTF8`
 - ii. `NLS_NCHAR_CHARACTERSET : AL16UTF16`
- c. In Target
 - i. `NLS_CHARACTERSET : AL32UTF8`
 - ii. `NLS_NCHAR_CHARACTERSET : AL16UTF16`

13. The tablespace must be in READ WRITE at the first backup

14. `select TABLESPACE_NAME,STATUS from dba_tablespaces where TABLESPACE_NAME like '%_TBSP';`

TABLESPACE_NAME	STATUS
USER_P_TBSP	ONLINE
USER_X_TBSP	ONLINE
USER_Y_TBSP	ONLINE
USER_Z_TBSP	ONLINE

15. All steps in this procedure are run as the oracle user that is a member of the OSDBA group. OS authentication is used to connect to both the source and destination databases.
 - a. Yes, the same will be attempted
16. Although NOT recommended, a standby database can be used for this procedure. See Using XTTs in a Data Guard Environment (Doc ID 2853054.1)
 - a. Source is a standalone database, and this is not part of this experiment
17. A Snapshot Standby database is NOT supported for this procedure.
 - a. Not attempting the same here
18. No datafiles should be dropped from the tablespaces being migrated once the migration begins. This can especially be a problem if the datafile number is reassigned to an added datafile to a migrated tablespace.
 - a. This recommendation is considered

Known Issues

1. If your source database is running 12c or higher, un-comment the `usermantransport` parameter in the `xtt.properties`. This parameter should ONLY be used for an 12c and higher source.

i.e.,:

usermantransport=1 <== remove the '#'

Regardless of the destination version, the value of this parameter in the destination's xtt.properties must be the SAME as the source.

- a. Not Applicable source is 11g
2. If using ASM in both source and destination, see XTTS Creates Alias on Destination when Source and Destination use ASM(Note 2351123.1)
 - a. A production scenario for sure
 - b. Here only target is using ASM
3. If using ASM for datafiles, an error deleting file system file using ASMCMD can be ignored. (unpublished Bug 29268792, currently open)
 - a. I did not see it, in my case
4. The existence of a GLOGIN.sql, in either source or destination, can cause syntax errors.
 - a. \$ORACLE_HOME/sqlplus/admin/glogin.sql ,
 - b. If the script is there it should be an empty file
 - c. For my test case scripts are there and I did not see any issues while doing the tests
5. For other known issues, see other issues within Known Issues for Cross Platform Transportable Tablespaces XTTS (Note2311677.1).
6. You cannot use this procedure for a TDE tablespace.
 - a. Not Applicable
7. This procedure has only been tested with English language.
 - a. Language is English
 - b.
8. Be aware of open bug 30777480 which can cause an issue if the CDB's tablespace number (TS#) is the same as the tablespace id (TS#) belonging to a tablespaces being transported. You may receive an error RMAN-20201 'datafile not found in the recovery catalog's on the datafile number.
9. Backup creation parallelism is defined by RMAN configuration for DEVICE TYPE DISK PARALLELISM. For incremental backups (after Level 0), parallelism is on the tablespace level.
 - a. CONFIGURE DEVICE TYPE DISK PARALLELISM 1 BACKUP TYPE TO BACKUPSET; # default, so no impact on this POC
10. If the target database character set is not compatible with source database character set the following error may occur at tablespace plug-in (phase 5):
ORA-39123: Data Pump transportable tablespace job aborted
ORA-19736: cannot plug a tablespace into a database using a different national character set
V4 Transport Tablespaces with Reduced Downtime using Cross Platform Incremental Backup
 - a. ----- Not Applicable in this POC

ACTION

Step 1.1 - Doing it for only one schema as a test,

Schemas : Tablespaces : Size

user_p : user_p_tbsp : 1GB

Step 1.2 - Identify tablespaces to be transported

Schemas : Tablespaces : Size

user_p : user_p_tbsp : 1GB

Step 1.3 - Install xttconvert scripts on the source system

On the source system, as the oracle software owner, download and extract the supporting scripts

```
rman_xttconvert_VER4.3.zip
bash-3.2$ pwd
/export/home/oracle/xtt
bash-3.2$ ls -ltr
total 82
-rw-r--r-- 1 oracle oinstall 41929 Mar  8 13:17 rman_xttconvert_VER4.3.zip
bash-3.2$
bash-3.2$
bash-3.2$ unzip rman_xttconvert_VER4.3.zip
Archive:  rman_xttconvert_VER4.3.zip
  inflating: xtt.newproperties
  inflating: xtt.properties
  inflating: xttcnvrtbkupdest.sql
  inflating: xttddbopen.sql
  inflating: xttdriver.pl
  inflating: xttprep.tmpl
  extracting: xttstartupnomount.sql
```

Step 1.4 – Find source database platform ID

```
select PLATFORM_ID from V$DATABASE;
it is 20 for this test case
```

Step 1.5 – Modify source xtt.properties

tablespaces

Comma separated list of tablespaces to transport from source database to destination database.

Do NOT use quotes

Specify tablespace names in CAPITAL letters.

Be sure there are NO space between the names

tablespaces=USER_P_TBSP

Source database platform ID

=====

##

platformid

Source database platform id, obtained from V\$DATABASE.PLATFORM_ID

platformid=20

Make sure this directory is created already in source

SOURCE system file locations

=====

##

src_scratch_location

Location where datafile copies and incremental backups are created on the source system.

##

This location may be an NFS-mounted filesystem that is shared with the

destination system, in which case it should reference the same NFS location

as the dest_scratch_location property for the destination system.

##src_scratch_location=/src_backups/

src_scratch_location=/u01/app/oracle/backup/

Make sure this directory is created already in destination

dest_scratch_location

This is the location where datafile copies and backups are placed on the destination system.

transferred manually from the source system. This location must have

sufficient free space to hold copies of all datafiles and backups being transported.

##

This location may be a DBFS-mounted filesystem.

##

This location may be an NFS-mounted filesystem that is shared with the

source system in which case it should reference the same NFS location

as the src_scratch_location for the source system.

dest_scratch_location=/u01/app/oracle/backup/

Make sure this directory is created already in destination, if not using ASM

DESTINATION system file locations

=====

##

dest_datafile_location

##

This is the FINAL location of the datafiles to be used by the destination database.

Be sure there are NO TRAILING space

Location where the converted datafile copies will be written in the destination.

If using ASM, this should be set to the disk group name:

```
## dest_datafile_location=+DATA
dest_datafile_location=+FRADATA
```

usermantransport=1 -

It is recommended this be set if the source database is running 12c or higher.

This causes new 12c (and higher) functionality to be used when this parameter is set.

NOTE: regardless of the destination version, the value of this parameter in the destination's xtt.properties must be the SAME as the source

Here database is 11g so we are not setting it in source.

will also be not setting it in target to make the target same as source for this parameter.

```
## usermantransport
```

```
## -----
```

```
## This should be set if using 12c or higher.
```

```
#usermantransport=1
```

```
## END
```

Step 1.6 - Copy xttconvert scripts and xtt.properties to the destination system

As the oracle software owner copy all xttconvert scripts and the modified xtt.properties file to the destination system.

```
[oracle@source_host]$ scp -r /export/home/oracle/xtt
oracle@target_host:/home/oracle/xtt
```

Step 1.7 - Set TMPDIR environment variable

In the shell environment on both source and destination systems, set environment variable TMPDIR to the location

Where the supporting scripts exist. Use this shell to run the Perl script xttdriver.pl as shown in the steps below. If TMPDIR is not set, output files are created in and input files are expected to be in /tmp.

```
[oracle@source_host]$ export TMPDIR=/export/home/oracle/xtt
```

```
[oracle@target_host]$ export TMPDIR=/home/oracle/xtt
```

Step 2.1- Run the backup on the source system

On the source system, logged in as the oracle user with the environment (ORACLE_HOME and ORACLE_SID environment variables) pointing to the source database, run the backup as follows:

```
[oracle@source_host]$ $ORACLE_HOME/perl/bin/perl xttdriver.pl --backup --debug
```

3

```
bash-3.2$ export TMPDIR=/export/home/oracle/xtt
bash-3.2$
bash-3.2$ echo $ORACLE_SID
sourcehostdb11g
```

```

bash-3.2$
bash-3.2$ echo $ORACLE_HOME
/u01/app/oracle/product/11.2.0.1/db_1
bash-3.2$
bash-3.2$ pwd
/export/home/oracle/xtt
bash-3.2$
bash-3.2$ ls -ltr
total 522
-rw-r--r-- 1 oracle oinstall 1390 May 24 2017 xttcnvrtbkupdest.sql
-rw-r--r-- 1 oracle oinstall 52 May 24 2017 xttstartupnomount.sql
-rw-r--r-- 1 oracle oinstall 11710 May 24 2017 xttprep.tmpl
-rw-r--r-- 1 oracle oinstall 71 May 24 2017 xttbopen.sql
-rw-r--r-- 1 oracle oinstall 5169 Feb 19 2019 xtt.newproperties
-rw-r--r-- 1 oracle oinstall 180408 Jul 7 2019 xttdriver.pl
-rw-r--r-- 1 oracle oinstall 41929 Mar 8 13:17
rman_xttconvert_VER4.3.zip
-rw-r--r-- 1 oracle oinstall 5350 Mar 10 03:20 xtt.properties
bash-3.2$

```

bash-3.2\$ \$ORACLE_HOME/perl/bin/perl xttdriver.pl --backup --debug 3

```

=====
trace file is
/export/home/oracle/xtt/backup_Mar10_Mon_03_37_09_890//Mar10_Mon_03_37_09_890_.log
=====

```

```

-----
Parsing properties
-----

```

```

Key: platformid
Values: 20
Key: src_scratch_location
Values: /u01/app/oracle/backup/
Key: parallel
Values: 3
Key: rollparallel
Values: 2
Key: dest_scratch_location
Values: /u01/app/oracle/backup/
Key: dest_datafile_location
Values: +FRADATA
Key: tablespaces
Values: USER_P_TBSP
Key: getfileparallel
Values: 4

```

```

-----
Done parsing properties
-----

```

```

-----
Checking properties
-----

```

```

ARGUMENT tablespaces
ARGUMENT platformid
ARGUMENT backupformat

```

```

-----
Done checking properties
-----

```

```

ORACLE_SID : sourcehostdb11g
ORACLE_HOME : /u01/app/oracle/product/11.2.0.1/db_1

```

```
RMAN> #PLAN:USER P TBSP:::997982
```

```

2> #CONVERT:host 'echo ts::USER_P_TBSP';
3> #CONVERT: convert from platform 'Solaris Operating System (x86-64)'
4> #CONVERT: datafile
5> backup as copy tag 'prepare' datafile
6> #CONVERT: '/u01/app/oracle/backup//USER_P_TBSP_6.tf'
7> 6
8> #PLAN:6
9> #CONVERT: format '+FRADATA/%N_%f.dbf'
10> #CONVERT: parallelism 3;
11> format '/u01/app/oracle/backup//%N_%f.tf';
12>
RMAN-03090: Starting backup at 10-MAR-25
RMAN-06009: using target database control file instead of recovery catalog
RMAN-08030: allocated channel: ORA_DISK_1
RMAN-08500: channel ORA_DISK_1: SID=37 device type=DISK
RMAN-08580: channel ORA_DISK_1: starting datafile copy
RMAN-08522: input datafile file number=00006
name=/u01/app/oracle/oradata/sourcehostdb11g/sol10db11g/user_p_tbsp.dbf
RMAN-08586: output file name=/u01/app/oracle/backup/USER_P_TBSP_6.tf tag=PREPARE
RECID=2 STAMP=1195357054
RMAN-08581: channel ORA_DISK_1: datafile copy complete, elapsed time: 00:00:25
RMAN-03091: Finished backup at 10-MAR-25

```

Recovery Manager complete.

TABLESPACE STRING :''''

Prepare source for Tablespaces:

'''' /u01/app/oracle/backup/

xttpreparesrc.sql for '''' started at Mon Mar 10 03:37:43 2025

xttpreparesrc.sql for ended at Mon Mar 10 03:37:43 2025

/export/home/oracle/xtt/backup_Mar10_Mon_03_37_09_890//xttprepare.cmd

Recovery Manager: Release 11.2.0.1.0 - Production on Mon Mar 10 03:37:43 2025

Copyright (c) 1982, 2009, Oracle and/or its affiliates. All rights reserved.

RMAN-06005: connected to target database: SRC_DB_UNQ_NAME (DBID=123456789)

RMAN>

Recovery Manager complete.

Done with prepare phase

```

/ as sysdba
size of tablespace 3
No. of tablespaces per batch 1
TABLESPACE STRING : 'USER_P_TBSP'
Prepare newscn for Tablespaces: 'USER_P_TBSP'

```

```

TABLESPACE STRING :''''
Prepare newscn for Tablespaces: ''''

```

```

New /export/home/oracle/xtt/xttplan.txt with FROM SCN's generated
scalar(orl
XXX: adding here for 1, 0, USER_P_TBSP
XXX: adding proper here for index 0, b4 added 'USER_P_TBSP'
,

```

```

XXX: adding proper here for index 0, added 'USER_P_TBSP'

```

Number of tb arrays is 1

```

::USER_P_TBSP:::SCN:::9982546=998254,USER_P_TBSP,+FRADATA/USER_P_TBSP_6.dbf
::USER_P_TBSP:::SCN:::998254
/export/home/oracle/xtt/newfile.txt: ::USER_P_TBSP:::SCN:::998254

```

```

/export/home/oracle/xtt/newfile.txt: 6=998254,USER_P_TBSP,+FRADATA/USER_P_TBSP_6.dbf
/export/home/oracle/xtt/backup_Mar10_Mon_03_37_09_890//xttnewdatafiles.txt.added:
::USER_P_TBSP:::SCN:::998254
/export/home/oracle/xtt/backup_Mar10_Mon_03_37_09_890//xttnewdatafiles.txt.added:
6=998254,USER_P_TBSP,+FRADATA/USER_P_TBSP_6.dbf
Writing new 6=998254,USER_P_TBSP,+FRADATA/USER_P_TBSP_6.dbf

Writing1 new 6, +FRADATA/USER_P_TBSP_6.dbf

Added fname here 1:/u01/app/oracle/backup//USER_P_TBSP_6.tf
YYY: ::USER_P_TBSP:::SCN:::998254

=====
No new datafiles added
=====

```

Step 2.2- Transfer the following files to the destination system
Backups created from source **src_scratch_location** to destination
dest_scratch_location.

NOTE: Only one location is allowed for these parameters.

The res.txt file from source \$TMPDIR to destination \$TMPDIR:

In the example below, scp is used to transfer the level=0 backup created by the previous step from the source system to the destination system.

```

[oracle@source_host]$ scp /u01/app/oracle/backup/* oracle@target_host:/u01/app/oracle/backup
[oracle@source_host]$ scp /export/home/oracle/xtt/res.txt oracle@target_host:/home/oracle/xtt

-----Done

```

Step 2.3- Restore the datafiles on the destination system.

On the destination system, logged in as the oracle user with the environment (ORACLE_HOME and ORACLE_SID environment variables) pointing to the destination database, run the restore as follows:

```

[oracle@target_host]$ $ORACLE_HOME/perl/bin/perl xttdriver.pl --restore --debug 3

```

Datafiles will be placed on the destination system in the defined **dest_datafile_location**.

NOTE: Only one location is allowed for this parameter.

```

[oracle@Target_host backup]$ pwd
/u01/app/oracle/backup
[oracle@Target_host backup]$
[oracle@Target_host backup]$ echo $ORACLE_SID
LINUX19DB
[oracle@Target_host backup]$
[oracle@Target_host backup]$ echo $ORACLE_HOME
/u01/app/oracle/product/19.3.0/db1
[oracle@Target_host backup]$
[oracle@Target_host backup]$
[oracle@Target_host backup]$ echo $ORACLE_PDB_SID
LINUX19PDB
[oracle@Target_host backup]$

```

```

[oracle@Target_host backup]$

[oracle@Target_host xtt]$ $ORACLE_HOME/perl/bin/perl xttdriver.pl --restore --
debug 3

=====
trace file is
/home/oracle/xtt/restore_Mar10_Mon_23_44_50_58//Mar10_Mon_23_44_50_58_.log
=====

-----
Parsing properties
-----

Key: dest_datafile_location
Values: +FRADATA
Key: platformid
Values: 20
Key: dest_scratch_location
Values: /u01/app/oracle/backup/
Key: parallel
Values: 3
Key: rollparallel
Values: 2
Key: tablespaces
Values: USER_P_TBSP
Key: src_scratch_location
Values: /u01/app/oracle/backup/
Key: getfileparallel
Values: 4

-----
Done parsing properties
-----

-----
Checking properties
-----

ARGUMENT tablespaces
ARGUMENT platformid
ARGUMENT backupformat

-----
Done checking properties
-----

ORACLE_SID : LINUX19DB
ORACLE_HOME : /u01/app/oracle/product/19.3.0/db1
190000

#0:::6,20,USER_P_TBSP_6.dbf,0,997982,0,0,0,USER_P_TBSP,USER_P_TBSP_6.dbf

-----
Performing convert for file 6
-----

/home/oracle/xtt/restore_Mar10_Mon_23_44_50_58//rman_convert_USER_P_TBSP_6.cmd

Recovery Manager: Release 19.0.0.0.0 - Production on Mon Mar 10 23:44:53 2025
Version 19.3.0.0.0

Copyright (c) 1982, 2019, Oracle and/or its affiliates. All rights reserved.

RMAN-06005: connected to target database: LINUX19DB:LINUX19PDB (DBID=987654321)

RMAN> convert from platform 'Solaris Operating System (x86-64)' datafile
'/u01/app/oracle/backup//USER_P_TBSP_6.tf' format '+FRADATA/USER_P_TBSP_6.dbf' ;
2>

```



```

RMAN-03090: Starting conversion at target at 10-MAR-25
RMAN-06009: using target database control file instead of recovery catalog
RMAN-08030: allocated channel: ORA_DISK_1
RMAN-08500: channel ORA_DISK_1: SID=43 device type=DISK
RMAN-08589: channel ORA_DISK_1: starting datafile conversion
RMAN-08506: input file name=/u01/app/oracle/backup/USER_P_TBSP_6.tf
RMAN-08588: converted datafile=+FRADATA/user_p_tbsp_6.dbf
RMAN-08590: channel ORA_DISK_1: datafile conversion complete, elapsed time:
00:00:36

RMAN-03091: Finished conversion at target at 10-MAR-25

Recovery Manager complete.

YYY:

```

Phase 3- Roll Forward Phase

[This phase can be repeated, so doing it once, the next incremental will be done as the cut off simulation]

During this phase an incremental backup is created from the source database, transferred to the destination system, converted to the destination system endian format, then applied to the converted destination datafile copies to roll them forward.

This phase may be run multiple times. Each successive incremental backup should take less time than the prior incremental backup, and will bring the destination datafile copies more current with the source database.

The data being transported (source) is fully accessible during this phase.

NOTE: Multiple backups can be executed against the source without applying them to the destination.

The backup files and the res.txt must be copied before the '--restore' is executed at the destination.

NOTE: The script will shut down and startup, in NOMOUNT, the destination database before the --restore.

Step 3.1- Create an incremental backup of the tablespaces being transported on the source system.

On the source system, logged in as the oracle user with the environment (ORACLE_HOME and ORACLE_SID environment variables) pointing to the source database, run the create incremental step as follows:

```
[oracle@source_host]$ $ORACLE_HOME/perl/bin/perl xttdriver.pl --backup --debug 3
```

```
bash-3.2$ $ORACLE_HOME/perl/bin/perl xttdriver.pl --backup --debug 3
```

```

=====
trace file is
/export/home/oracle/xtt/backup_Mar10_Mon_04_20_21_896//Mar10_Mon_04_20_21_896_.log
=====

-----
Parsing properties
-----

Key: platformid
Values: 20
Key: src_scratch_location
Values: /u01/app/oracle/backup/
Key: parallel
Values: 3
Key: rollparallel
Values: 2
Key: dest_scratch_location
Values: /u01/app/oracle/backup/
Key: dest_datafile_location
Values: +FRADATA
Key: tablespaces
Values: USER_P_TBSP
Key: getfileparallel
Values: 4

-----
Done parsing properties
-----

-----
Checking properties
-----

ARGUMENT tablespaces
ARGUMENT platformid
ARGUMENT backupformat

-----
Done checking properties
-----

ORACLE_SID : sourcehostdb11g
ORACLE_HOME : /u01/app/oracle/product/11.2.0.1/db_1
112000

PRIMARY

Running on PRIMARY

-----
Backup incremental
-----

scalar(ori
XXX: adding here for 1, 0, USER_P_TBSP
XXX: adding proper here for index 0, b4 added 'USER_P_TBSP'
,

XXX: adding proper here for index 0, added 'USER_P_TBSP'

Number of tb arrays is 1

::USER_P_TBSP::SCN::9982546=998254,USER_P_TBSP,+FRADATA/USER_P_TBSP_6.dbf
::USER_P_TBSP::SCN::998254
/export/home/oracle/xtt/newfile.txt: ::USER_P_TBSP::SCN::998254
/export/home/oracle/xtt/newfile.txt:
6=998254,USER_P_TBSP,+FRADATA/USER_P_TBSP_6.dbf

```

/export/home/oracle/xtt/backup_Mar10_Mon_04_20_21_896//xttnewdatafiles.txt.added:
::USER_P_TBSP:::SCN:::998254

/export/home/oracle/xtt/backup_Mar10_Mon_04_20_21_896//xttnewdatafiles.txt.added:
6=998254,USER_P_TBSP,+FRADATA/USER_P_TBSP_6.dbf

Writing new 6=998254,USER_P_TBSP,+FRADATA/USER_P_TBSP_6.dbf

Writing1 new 6, +FRADATA/USER_P_TBSP_6.dbf

Added fname here 1:/u01/app/oracle/backup//USER_P_TBSP_6.tf
YYY: ::USER_P_TBSP:::SCN:::998254

=====
No new datafiles added
=====

/ as sysdba
size of tablespace 1
No. of tablespaces per batch 1
TABLESPACE STRING : 'USER_P_TBSP'
Prepare newscn for Tablespaces: 'USER_P_TBSP'
USER_P_TBSP:::998254 6
TABLESPACE STRING : ''
Prepare newscn for Tablespaces: ''

Starting incremental backup

/export/home/oracle/xtt/backup_Mar10_Mon_04_20_21_896//rmanincr.cmd

04:20:22 2025

Recovery Manager: Release 11.2.0.1.0 - Production on Mon Mar 10

reserved.

Copyright (c) 1982, 2009, Oracle and/or its affiliates. All rights

(DBID=123456789)

RMAN-06005: connected to target database: SRC_DB_UNQ_NAME

RMAN> set nocfau;
2> host 'echo ts::USER_P_TBSP';
3> backup incremental from scn 997982
4> tablespace 'USER_P_TBSP' format
5> '/u01/app/oracle/backup/%U';
6>

RMAN-03023: executing command: SET NOCFAU

RMAN-06009: using target database control file instead of recovery

catalog

ts::USER_P_TBSP
RMAN-06134: host command complete

RMAN-03090: Starting backup at 10-MAR-25

RMAN-08030: allocated channel: ORA_DISK_1
RMAN-08500: channel ORA_DISK_1: SID=37 device type=DISK
RMAN-06518: backup will be obsolete on date 17-MAR-25
RMAN-06520: archived logs will not be kept or backed up
RMAN-08008: channel ORA_DISK_1: starting full datafile backup set
RMAN-08010: channel ORA_DISK_1: specifying datafile(s) in backup set
RMAN-08522: input datafile file number=00006

name=/u01/app/oracle/oradata/sourcehostdb11g/sol10db11g/user_p_tbsp.dbf

RMAN-08038: channel ORA_DISK_1: starting piece 1 at 10-MAR-25

RMAN-08044: channel ORA_DISK_1: finished piece 1 at 10-MAR-25

RMAN-08530: piece handle=/u01/app/oracle/backup/023jvfc9_1_1

tag=TAG20250310T042025 comment=NONE

RMAN-08540: channel ORA_DISK_1: backup set complete, elapsed time:

00:00:16

```

RMAN-12016: using channel ORA_DISK_1
RMAN-06518: backup will be obsolete on date 17-MAR-25
RMAN-06520: archived logs will not be kept or backed up
RMAN-08008: channel ORA_DISK_1: starting full datafile backup set
RMAN-08010: channel ORA_DISK_1: specifying datafile(s) in backup set
RMAN-08011: including current control file in backup set
RMAN-08038: channel ORA_DISK_1: starting piece 1 at 10-MAR-25
RMAN-08044: channel ORA_DISK_1: finished piece 1 at 10-MAR-25
RMAN-08530: piece handle=/u01/app/oracle/backup/033jvfc9_1_1
tag=TAG20250310T042025 comment=NONE
RMAN-08540: channel ORA_DISK_1: backup set complete, elapsed time:
00:00:01

RMAN-03091: Finished backup at 10-MAR-25

Recovery Manager complete.

```

```

-----
Done backing up incrementals
-----

```

```

/ as sysdba
size of tablespace 3
No. of tablespaces per batch 1
TABLESPACE STRING : 'USER_P_TBSP'
Prepare newscn for Tablespaces: 'USER_P_TBSP'

```

```

TABLESPACE STRING : ''
Prepare newscn for Tablespaces: ''

```

```

New /export/home/oracle/xtt/xttplan.txt with FROM SCN's generated

```

Step 3.2- Transfer incremental backups and res.txt to the destination system.

Transfer the incremental backup(s) (between src_scratch_location and dest_scratch_location) and the res.txt(between the \$TMPDIRs) from the source to the destination. The list of incremental backup files from current backup can be found in the incrbakups.txt file on the source system.

```

[oracle@source_host]$ scp `cat incrbakups.txt` oracle@target_host:/dest_scratch_location
[oracle@source_host]$ scp res.txt oracle@target_host:/home/oracle/xtt

```

```

bash-3.2$ pwd
/export/home/oracle/xtt
bash-3.2$
bash-3.2$ ls -ltr incrbakups.txt
-rw-r--r-- 1 oracle oinstall 37 Mar 10 04:20 incrbakups.txt
bash-3.2$
bash-3.2$ cat incrbakups.txt
/u01/app/oracle/backup//023jvfc9_1_1
bash-3.2$
bash-3.2$
bash-3.2$ scp `cat incrbakups.txt` oracle@target_host:/u01/app/oracle/backup
oracle@target_host's password:
023jvfc9_1_1 100%
| *****
*****| 40960 00:00
bash-3.2$

```

```

bash-3.2$ scp /export/home/oracle/xtt/res.txt
oracle@target_host:/home/oracle/xtt
oracle@target_host's password:

```

```

res.txt 100%
| *****
*****| 152 00:00

```

If the src_scratch_location on the source system and the dest_scratch_location on the destination system refer to the same NFS storage location, then the backups do not need to be copied as they are available in the expected location on the destination system.

However, the res.txt file MUST be copied after the LAST incremental backup before it can be applied on destination (step 3.3).

Step 3.3- Apply the incremental backup to the datafile copies on the destination system.

On the destination system, logged in as the oracle user with the environment (ORACLE_HOME and ORACLE_SID environment variables) pointing to the destination database, run the roll forward datafiles step as follows:

```
[oracle@target_host]$ $ORACLE_HOME/perl/bin/perl xttdriver.pl --restore --debug 3
```

The roll forward step connects to destination database and applies the incremental backups on the tablespaces' datafiles for each tablespace being transported.

NOTE: Although multiple backups can be executed against the source without being applied on the destination, the res.txt must be copied after the last backup and before the '--restore' is executed at the destination.

```
[oracle@Target_host xtt]$ $ORACLE_HOME/perl/bin/perl xttdriver.pl --restore --debug 3
```

```

=====
trace file is
/home/oracle/xtt/restore_Mar11_Tue_00_19_59_727//Mar11_Tue_00_19_59_727_.log
=====

-----
Parsing properties
-----

Key: dest_scratch_location
Values: /u01/app/oracle/backup/
Key: tablespaces
Values: USER_P_TBSP
Key: getfileparallel
Values: 4
Key: platformid
Values: 20
Key: parallel
Values: 3
Key: dest_datafile_location
Values: +FRADATA
Key: rollparallel
Values: 2
Key: src_scratch_location
Values: /u01/app/oracle/backup/

-----
Done parsing properties
-----

```

```

-----
Checking properties
-----

ARGUMENT tablespaces
ARGUMENT platformid
ARGUMENT backupformat

-----
Done checking properties
-----

ORACLE_SID   : LINUX19DB
ORACLE_HOME  : /u01/app/oracle/product/19.3.0/db1
190000

6

YYY: USER_P_TBSP_6.dbf::6::1=023jvfc9_1_1

-----
Start rollforward
-----

ROLLFORWARD: Starting DB in nomount mode
ORACLE instance started.
Total System Global Area 1124073328 bytes
Fixed Size                  9133936 bytes
Variable Size               335544320 bytes
Database Buffers            771751936 bytes
Redo Buffers                 7643136 bytes
rdfno 6

BEFORE ROLLPLAN

datafile number : 6

datafile name   : +FRADATA/USER_P_TBSP_6.dbf

AFTER ROLLPLAN

sqlplus -L -s "/" as sysdba"
@/home/oracle/xtt/restore_Mar11_Tue_00_19_59_727//xxttconv_023jvfc9_1_1_6.sql
/u01/app/oracle/backup//023jvfc9_1_1 /u01/app/oracle/backup/ 20

CONVERTED BACKUP PIECE/u01/app/oracle/backup//xib_023jvfc9_1_1_6
PL/SQL procedure successfully completed.
Entering RollForwardAfter applySetDataFile
Done: applyDataFileTo
Done: applyDataFileTo
Done: RestoreSetPiece
Done: RestoreBackupPiece

PL/SQL procedure successfully completed.

-----
End of rollforward phase
-----

```

Phase 4- Final Incremental Backup.

During this phase the source data is made READ ONLY

And the destination datafiles are made consistent with the source database by creating and applying a final incremental backup.

After the destination datafiles are made consistent, the normal transportable tablespace steps are performed to export object metadata from the source database and import it into the destination database.

The data being transported is accessible only in READ ONLY mode until the end of this phase.

There are two options for this phase if you are running 12c and higher. If you are running 11g, only option #1 is available.

AS WE ARE EXPERIMENTING, lets create a table and insert a record in it, before putting the tablespace into read only mode.

```
SQL> select object_name, object_type from dba_objects where owner='USER_P' order by 2,1;
```

OBJECT_NAME	OBJECT_TYPE
-----	-----
COUNTRY_C_ID_PK	INDEX
DEPT_ID_PK	INDEX
DEPT_LOCATION_IX	INDEX
EMP_DEPARTMENT_IX	INDEX
EMP_EMAIL_UK	INDEX
EMP_EMP_ID_PK	INDEX
EMP_JOB_IX	INDEX
EMP_MANAGER_IX	INDEX
EMP_NAME_IX	INDEX
JHIST_DEPARTMENT_IX	INDEX
JHIST_EMPLOYEE_IX	INDEX
JHIST_EMP_ID_ST_DATE_PK	INDEX
JHIST_JOB_IX	INDEX
JOB_ID_PK	INDEX
LOC_CITY_IX	INDEX
LOC_COUNTRY_IX	INDEX
LOC_ID_PK	INDEX
LOC_STATE_PROVINCE_IX	INDEX
REG_ID_PK	INDEX
ADD_JOB_HISTORY	PROCEDURE
SECURE_DML	PROCEDURE
DEPARTMENTS_SEQ	SEQUENCE
EMPLOYEES_SEQ	SEQUENCE
LOCATIONS_SEQ	SEQUENCE
COUNTRIES	TABLE
DEPARTMENTS	TABLE
EMPLOYEES	TABLE
JOBS	TABLE
JOB_HISTORY	TABLE
LOCATIONS	TABLE
REGIONS	TABLE
SECURE_EMPLOYEES	TRIGGER
UPDATE_JOB_HISTORY	TRIGGER
EMP_DETAILS_VIEW	VIEW

34 rows selected.

```
SQL> create table user_p.DUMMY_COUNTRIES tablespace user_p_tbsp as select * from
ser_p.COUNTRIES;
```

Table created.

```
SQL> select object_name,object_type from dba_objects where owner='USER_P' order by 2,1;
```

OBJECT_NAME	OBJECT_TYPE
-----	-----
COUNTRY_C_ID_PK	INDEX
DEPT_ID_PK	INDEX
DEPT_LOCATION_IX	INDEX
EMP_DEPARTMENT_IX	INDEX
EMP_EMAIL_UK	INDEX
EMP_EMP_ID_PK	INDEX
EMP_JOB_IX	INDEX
EMP_MANAGER_IX	INDEX
EMP_NAME_IX	INDEX
JHIST_DEPARTMENT_IX	INDEX
JHIST_EMPLOYEE_IX	INDEX
JHIST_EMP_ID_ST_DATE_PK	INDEX
JHIST_JOB_IX	INDEX
JOB_ID_PK	INDEX
LOC_CITY_IX	INDEX
LOC_COUNTRY_IX	INDEX
LOC_ID_PK	INDEX
LOC_STATE_PROVINCE_IX	INDEX
REG_ID_PK	INDEX
ADD_JOB_HISTORY	PROCEDURE
SECURE_DML	PROCEDURE
DEPARTMENTS_SEQ	SEQUENCE
EMPLOYEES_SEQ	SEQUENCE
LOCATIONS_SEQ	SEQUENCE
COUNTRIES	TABLE
DEPARTMENTS	TABLE
DUMMY_COUNTRIES	TABLE
EMPLOYEES	TABLE
JOBS	TABLE
JOB_HISTORY	TABLE
LOCATIONS	TABLE
REGIONS	TABLE
SECURE_EMPLOYEES	TRIGGER
UPDATE_JOB_HISTORY	TRIGGER
EMP_DETAILS_VIEW	VIEW

35 rows selected.

```
SQL> select tablespace_name from dba_segments where segment_name='DUMMY_COUNTRIES' and
owner='USER_P';
```

TABLESPACE_NAME

USER_P_TBSP

Option1.A: Alter source tablespace(s) to READ ONLY in the source database

On the source system, logged in as the oracle user with the environment (ORACLE_HOME and ORACLE_SID environment variables) pointing to the source database, alter the tablespaces being transported to READ ONLY.

```
SQL> set line 500
SQL>          set pagesize 500
          col tablespace_name format a20
          col file_name format a60
```



```

select
  tbsp.tablespace_name TBSP_NAME
, tbsp.status TBSP_STATUS
, ddf.file_name FILE_NAME
, ddf.status DATA_FILE_STATUS
, ddf.ONLINE_STATUS DATAFILE_ONLINE_STATUS
from dba_tablespaces tbsp, dba_data_files ddf
where tbsp.tablespace_name = ddf.tablespace_name
and tbsp.tablespace_name = 'USER_P_TBSP'
order by tbsp.tablespace_name;SQL> SQL> SQL> 2 3 4 5 6 7 8
9 10

```

```

TBSP_NAME          TBSP_STAT FILE_NAME
DATA_FILE DATAFIL
-----
USER_P_TBSP        ONLINE
/u01/app/oracle/oradata/sourcehostdb11g/sol10db11g/user_p_tbsp AVAILABLE ONLINE
                        .dbf

```

```
SQL> alter tablespace USER_P_TBSP read only;
```

Tablespace altered.

```

SQL> set line 500
SQL>      set pagesize 500
      col tablespace_name format a20
      col file_name format a60
      select
        tbsp.tablespace_name TBSP_NAME
      , tbsp.status TBSP_STATUS
      , ddf.file_name FILE_NAME
      , ddf.status DATA_FILE_STATUS
      , ddf.ONLINE_STATUS DATAFILE_ONLINE_STATUS
      from dba_tablespaces tbsp, dba_data_files ddf
      where tbsp.tablespace_name = ddf.tablespace_name
      and tbsp.tablespace_name = 'USER_P_TBSP'
      order by tbsp.tablespace_name;SQL> SQL> SQL> 2 3 4 5 6 7 8
9 10

```

```

TBSP_NAME          TBSP_STAT FILE_NAME
DATA_FILE DATAFIL
-----
USER_P_TBSP        READ ONLY
/u01/app/oracle/oradata/sourcehostdb11g/sol10db11g/user_p_tbsp AVAILABLE ONLINE
                        .dbf

```

Option1.B: Create the final incremental backup of the tablespaces being transported on the source system.

On the source system, logged in as the oracle user with the environment (ORACLE_HOME and ORACLE_SID environment variables) pointing to the source database, run the backup as follows:

```
[oracle@source_host]$ $ORACLE_HOME/perl/bin/perl xttdriver.pl --backup --debug 3
```

```
bash-3.2$ $ORACLE_HOME/perl/bin/perl xttdriver.pl --backup --debug 3
```

```

=====
                                trace file is
/export/home/oracle/xtt/backup_Mar10_Mon_05_05_02_786//Mar10_Mon_05_05_02_786_.log
=====

-----
-----
-----
Parsing properties
-----
-----

Key: platformid
Values: 20
Key: src_scratch_location
Values: /u01/app/oracle/backup/
Key: parallel
Values: 3
Key: rollparallel
Values: 2
Key: dest_scratch_location
Values: /u01/app/oracle/backup/
Key: dest_datafile_location
Values: +FRADATA
Key: tablespaces
Values: USER_P_TBSP
Key: getfileparallel
Values: 4

-----
-----
Done parsing properties
-----
-----

-----
-----
Checking properties
-----
-----

ARGUMENT tablespaces
ARGUMENT platformid
ARGUMENT backupformat

-----
-----
Done checking properties
-----
-----

ORACLE_SID : sourcehostdb11g
ORACLE_HOME : /u01/app/oracle/product/11.2.0.1/db_1
112000

PRIMARY

Running on PRIMARY

-----
-----
Backup incremental
-----
-----

scalar(orl
XXX: adding here for 1, 0, USER_P_TBSP

```

```

XXX: adding proper here for index 0, b4 added

'USER_P_TBSP'
,
XXX: adding proper here for index 0, added 'USER_P_TBSP'

Number of tb arrays is 1

::USER_P_TBSP:::SCN:::10004756=1000475,USER_P_TBSP,+FRADATA/USER_P_TBSP_6.dbf
::USER_P_TBSP:::SCN:::1000475
/export/home/oracle/xtt/newfile.txt:
::USER_P_TBSP:::SCN:::1000475
/export/home/oracle/xtt/newfile.txt:
6=1000475,USER_P_TBSP,+FRADATA/USER_P_TBSP_6.dbf

/export/home/oracle/xtt/backup_Mar10_Mon_05_05_02_786//xttnewdatafiles.txt.added:
::USER_P_TBSP:::SCN:::1000475

/export/home/oracle/xtt/backup_Mar10_Mon_05_05_02_786//xttnewdatafiles.txt.added:
6=1000475,USER_P_TBSP,+FRADATA/USER_P_TBSP_6.dbf
Writing new
6=1000475,USER_P_TBSP,+FRADATA/USER_P_TBSP_6.dbf

Writing1 new 6, +FRADATA/USER_P_TBSP_6.dbf

Added fname here
1:/u01/app/oracle/backup//USER_P_TBSP_6.tf
YYY: ::USER_P_TBSP:::SCN:::1000475

=====
No new datafiles added

=====
/ as sysdba
size of tablespace 1
No. of tablespaces per batch 1
TABLESPACE STRING : 'USER_P_TBSP'
Prepare newscn for Tablespaces: 'USER_P_TBSP'
USER_P_TBSP:::1000475 6
TABLESPACE STRING : ''
Prepare newscn for Tablespaces: ''

-----
Starting incremental backup
-----

/export/home/oracle/xtt/backup_Mar10_Mon_05_05_02_786//rmanincr.cmd

Recovery Manager: Release 11.2.0.1.0 - Production on Mon
Mar 10 05:05:03 2025

Copyright (c) 1982, 2009, Oracle and/or its affiliates.
All rights reserved.

RMAN-06005: connected to target database:

SRC_DB_UNQ_NAME (DBID=123456789)

RMAN> set nocfau;
2> host 'echo ts::USER_P_TBSP';
3> backup incremental from scn 998254
4> tablespace 'USER_P_TBSP' format
5> '/u01/app/oracle/backup/%U';
6>
RMAN-03023: executing command: SET NOCFAU

```

```

of recovery catalog

RMAN-06009: using target database control file instead

ts::USER_P_TBSP
RMAN-06134: host command complete

RMAN-03090: Starting backup at 10-MAR-25

RMAN-08030: allocated channel: ORA_DISK_1
RMAN-08500: channel ORA_DISK_1: SID=37 device type=DISK
RMAN-06518: backup will be obsolete on date 17-MAR-25
RMAN-06520: archived logs will not be kept or backed up
RMAN-08008: channel ORA_DISK_1: starting full datafile

backup set

in backup set

RMAN-08010: channel ORA_DISK_1: specifying datafile(s)

RMAN-08522: input datafile file number=00006
name=/u01/app/oracle/oradata/sourcehostdb11g/sol10db11g/user_p_tbsp.dbf
MAR-25
RMAN-08038: channel ORA_DISK_1: starting piece 1 at 10-
MAR-25
RMAN-08044: channel ORA_DISK_1: finished piece 1 at 10-
RMAN-08530: piece
handle=/u01/app/oracle/backup/043jvi01_1_1 tag=TAG20250310T050505 comment=NONE
RMAN-08540: channel ORA_DISK_1: backup set complete,
elapsed time: 00:00:17

RMAN-12016: using channel ORA_DISK_1
RMAN-06518: backup will be obsolete on date 17-MAR-25
RMAN-06520: archived logs will not be kept or backed up
RMAN-08008: channel ORA_DISK_1: starting full datafile

backup set

in backup set

RMAN-08010: channel ORA_DISK_1: specifying datafile(s)

RMAN-08011: including current control file in backup set
RMAN-08038: channel ORA_DISK_1: starting piece 1 at 10-
MAR-25
RMAN-08044: channel ORA_DISK_1: finished piece 1 at 10-
MAR-25
RMAN-08530: piece
handle=/u01/app/oracle/backup/053jvi0i_1_1 tag=TAG20250310T050505 comment=NONE
RMAN-08540: channel ORA_DISK_1: backup set complete,
elapsed time: 00:00:01

RMAN-03091: Finished backup at 10-MAR-25

Recovery Manager complete.

-----
Done backing up incrementals
-----

/ as sysdba
size of tablespace 3
No. of tablespaces per batch 1
TABLESPACE STRING : 'USER_P_TBSP'
Prepare newscn for Tablespaces: 'USER_P_TBSP'
DECLARE*
ERROR at line 1:
ORA-20001: TABLESPACE(S) IS READONLY OR,
OFFLINE JUST CONVERT, COPY
ORA-06512: at line 284

#####
Warning:
-----
Warnings found in executing
/export/home/oracle/xtt/backup_Mar10_Mon_05_05_02_786//xttpreparenextiter.sql

```

```
#####
DECLARE*
ERROR at line 1:
ORA-20001: TABLESPACE(S) IS READONLY OR,
OFFLINE JUST CONVERT, COPY
ORA-06512: at line 284
TABLESPACE STRING :'''
Prepare newscn for Tablespaces: '''

New /export/home/oracle/xtt/xttplan.txt with FROM SCN's
generated
```

***** As mentioned in the metalink document the warning can be ignored.

Option1.C: Transfer incremental backups and res.txt to the destination system

```
bash-3.2$ pwd
/export/home/oracle/xtt
bash-3.2$
bash-3.2$
bash-3.2$ ls -ltr
total 544
-rw-r--r-- 1 oracle oinstall 1390 May 24 2017
xttcnvrtdbkupdest.sql
-rw-r--r-- 1 oracle oinstall 52 May 24 2017
xttstartupnomount.sql
-rw-r--r-- 1 oracle oinstall 11710 May 24 2017 xttprep.tmpl
-rw-r--r-- 1 oracle oinstall 71 May 24 2017 xttbopen.sql
-rw-r--r-- 1 oracle oinstall 5169 Feb 19 2019 xtt.newproperties
-rw-r--r-- 1 oracle oinstall 180408 Jul 7 2019 xttdriver.pl
-rw-r--r-- 1 oracle oinstall 41929 Mar 8 13:17
rman_xttconvert_VER4.3.zip
-rw-r--r-- 1 oracle oinstall 5350 Mar 10 03:20 xtt.properties
-rw-r--r-- 1 oracle oinstall 43 Mar 10 03:37
xttnewdatafiles.txt
-rw-r--r-- 1 oracle oinstall 198 Mar 10 03:37 rmanconvert.cmd
drwxr-xr-x 2 oracle oinstall 512 Mar 10 03:37
backup_Mar10_Mon_03_37_09_890
drwxr-xr-x 2 oracle oinstall 1024 Mar 10 04:20
backup_Mar10_Mon_04_20_21_896
-rw-r--r-- 1 oracle oinstall 79 Mar 10 05:05 newfile.txt
-rw-r--r-- 1 oracle oinstall 27 Mar 10 05:05 xttplan.txt.new
-rw-r--r-- 1 oracle oinstall 32 Mar 10 05:05 tsbkupmap.txt
-rw-r--r-- 1 oracle oinstall 37 Mar 10 05:05 incrbakups.txt
-rw-r--r-- 1 oracle oinstall 232 Mar 10 05:05 res.txt
-rw-r--r-- 1 oracle oinstall 27 Mar 10 05:05 xttplan.txt
drwxr-xr-x 2 oracle oinstall 1024 Mar 10 05:05
backup_Mar10_Mon_05_05_02_786
bash-3.2$ cat incrbakups.txt
/u01/app/oracle/backup//043jvi01_1_1
bash-3.2$
bash-3.2$

[oracle@source_host]$ scp `cat incrbakups.txt`
oracle@target_host:/dest_scratch_location
[oracle@source_host]$ scp res.txt oracle@target_host:/home/oracle/xtt

bash-3.2$ scp `cat incrbakups.txt` oracle@target_host:/u01/app/oracle/backup
oracle@target_host's password:
```

```

043jvi01_1_1          100%
| *****
*****| 90112          00:00
bash-3.2$
bash-3.2$ scp res.txt oracle@target_host:/home/oracle/xtt
oracle@target_host's password:
res.txt                100%
| *****
*****| 232          00:00
bash-3.2$

```

Option1.D: Apply last incremental backup to destination datafiles

The final incremental backup must be applied to the destination datafiles:

```
[oracle@target_host]$ $ORACLE_HOME/perl/bin/perl xttdriver.pl --restore --debug 3
```

This step will apply the last incremental backup to the datafiles on the destination.

```

[oracle@Target_host xtt]$ $ORACLE_HOME/perl/bin/perl xttdriver.pl --restore --debug 3
=====
trace file is
/home/oracle/xtt/restore_Mar11_Tue_00_50_59_723//Mar11_Tue_00_50_59_723_.log
=====

-----
-----
Parsing properties
-----

Key: dest_scratch_location
Values: /u01/app/oracle/backup/
Key: dest_datafile_location
Values: +FRADATA
Key: getfileparallel
Values: 4
Key: tablespaces
Values: USER_P_TBSP
Key: rollparallel
Values: 2
Key: src_scratch_location
Values: /u01/app/oracle/backup/
Key: platformid
Values: 20
Key: parallel
Values: 3

-----
Done parsing properties
-----

-----
Checking properties
-----

ARGUMENT tablespaces
ARGUMENT platformid
ARGUMENT backupformat

```

```

-----
Done checking properties
-----

ORACLE_SID   : LINUX19DB
ORACLE_HOME  : /u01/app/oracle/product/19.3.0/db1
190000

6

YYY: USER_P_TBSP_6.dbf::6::1=043jvi01_1_1

-----

Start rollforward
-----

ROLLFORWARD: Starting DB in nomount mode
ORACLE instance started.
Total System Global Area 1124073328 bytes
Fixed Size                  9133936 bytes
Variable Size               335544320 bytes
Database Buffers            771751936 bytes
Redo Buffers                 7643136 bytes
rdfno 6

BEFORE ROLLPLAN

datafile number : 6

datafile name   : +FRADATA/USER_P_TBSP_6.dbf

AFTER ROLLPLAN

sqlplus -L -s "/" as sysdba"
@/home/oracle/xtt/restore_Mar11_Tue_00_50_59_723//xxttconv_043jvi01_1_1_6.sql
/u01/app/oracle/backup//043jvi01_1_1 /u01/app/oracle/backup/ 20

CONVERTED BACKUP PIECE/u01/app/oracle/backup//xib_043jvi01_1_1_6
PL/SQL procedure successfully completed.
Entering RollForwardAfter applySetDataFile
Done: applyDataFileTo
Done: applyDataFileTo
Done: RestoreSetPiece
Done: RestoreBackupPiece

PL/SQL procedure successfully completed.

-----

End of rollforward phase
-----

```

Phase 5- Transport Phase: Export Metadata and Plug-in Tablespaces into Destination Database

Run datapump export on source database

Perform the tablespace transport by running transportable mode Data Pump export on the source database to export the object metadata being transported into a dump file. The below example assumes a directory

(data_dump) already exists in the source. For example:

```
cat user_p.par
```

```
dumpfile=xttdump.dmp
directory=data_dump
exclude=TABLE_STATISTICS,INDEX_STATISTICS
transport_tablespaces=user_p_tbsp
transport_full_check=yes
logfile=tts_export.log
```

```
expdp parfile=user_p.par
```

```
Export: Release 11.2.0.1.0 - Production on Mon Mar 10 05:28:25 2025
```

```
Copyright (c) 1982, 2009, Oracle and/or its affiliates. All rights reserved.
```

```
Username: / as sysdba
```

```
Connected to: Oracle Database 11g Enterprise Edition Release 11.2.0.1.0 - 64bit Production
With the Partitioning, OLAP, Data Mining and Real Application Testing options
Starting "SYS"."SYS_EXPORT_TRANSPORTABLE_01":  /***** AS SYSDBA parfile=user_p.par
Processing object type TRANSPORTABLE_EXPORT/PLUGTS_BLK
Processing object type TRANSPORTABLE_EXPORT/TABLE
Processing object type TRANSPORTABLE_EXPORT/GRANT/OWNER_GRANT/OBJECT_GRANT
Processing object type TRANSPORTABLE_EXPORT/INDEX
Processing object type TRANSPORTABLE_EXPORT/CONSTRAINT/CONSTRAINT
Processing object type TRANSPORTABLE_EXPORT/COMMENT
Processing object type TRANSPORTABLE_EXPORT/CONSTRAINT/REF_CONSTRAINT
Processing object type TRANSPORTABLE_EXPORT/TRIGGER
Processing object type TRANSPORTABLE_EXPORT/POST_INSTANCE/PLUGTS_BLK
Master table "SYS"."SYS_EXPORT_TRANSPORTABLE_01" successfully loaded/unloaded
*****
Dump file set for SYS.SYS_EXPORT_TRANSPORTABLE_01 is:
/u01/app/oracle/dump/xttdump.dmp
*****
Datafiles required for transportable tablespace USER_P_TBSP:
/u01/app/oracle/oradata/sourcehostdb11g/sol10db11g/user_p_tbsp.dbf
Job "SYS"."SYS_EXPORT_TRANSPORTABLE_01" successfully completed at 05:29:19
```

Option1.B: Transfer the export file to destination directory used by datapump

Option1.C: Run datapump import using the export file on destination to plug in the tablespaces.

For example:

```
[oracle@target_host]$ cat manual_imp.par
dumpfile= xttdump.dmp
```



```
directory=data_dump
transport_datafiles='+FRADATA/USER_P_TBSP_6.dbf'
logfile=tts_import.log
```

```
[oracle@target_host]$ impdp parfile=manual_imp.par
```

**Before doing the import set the environment variable as below to point the import job to PDB
export ORACLE_PDB_SID=<PDB_NAME>**

```
[oracle@Target_host dump]$ impdp parfile=manual_imp.par
```

```
Import: Release 19.0.0.0.0 - Production on Tue Mar 11 01:43:42 2025
Version 19.3.0.0.0
```

```
Copyright (c) 1982, 2019, Oracle and/or its affiliates. All rights reserved.
```

```
Username: / as sysdba
Password:
```

```
Connected to: Oracle Database 19c Enterprise Edition Release 19.0.0.0.0 - Production
Master table "SYS"."SYS_IMPORT_TRANSPORTABLE_01" successfully loaded/unloaded
Starting "SYS"."SYS_IMPORT_TRANSPORTABLE_01": /***** AS SYSDBA parfile=manual_imp.par
Processing object type TRANSPORTABLE_EXPORT/PLUGTS_BLK
Processing object type TRANSPORTABLE_EXPORT/TABLE
Processing object type TRANSPORTABLE_EXPORT/GRANT/OWNER_GRANT/OBJECT_GRANT
ORA-39083: Object type OBJECT_GRANT failed to create with error:
ORA-01917: user or role 'OE' does not exist
```

```
Failing sql is:
GRANT SELECT, REFERENCES ON "USER_P"."COUNTRIES" TO "OE"
```

```
ORA-39083: Object type OBJECT_GRANT failed to create with error:
ORA-01917: user or role 'OE' does not exist
```

```
Failing sql is:
GRANT SELECT, REFERENCES ON "USER_P"."LOCATIONS" TO "OE"
```

```
ORA-39083: Object type OBJECT_GRANT failed to create with error:
ORA-01917: user or role 'OE' does not exist
```

```
Failing sql is:
GRANT SELECT ON "USER_P"."DEPARTMENTS" TO "OE"
```

```
ORA-39083: Object type OBJECT_GRANT failed to create with error:
ORA-01917: user or role 'OE' does not exist
```

```
Failing sql is:
GRANT SELECT ON "USER_P"."JOBS" TO "OE"
```

```
ORA-39083: Object type OBJECT_GRANT failed to create with error:
ORA-01917: user or role 'OE' does not exist
```

```
Failing sql is:
GRANT SELECT, REFERENCES ON "USER_P"."EMPLOYEES" TO "OE"
```

```
ORA-39083: Object type OBJECT_GRANT failed to create with error:
ORA-01917: user or role 'OE' does not exist
```

```
Failing sql is:
GRANT SELECT ON "USER_P"."JOB_HISTORY" TO "OE"
```

```

Processing object type TRANSPORTABLE_EXPORT/INDEX
Processing object type TRANSPORTABLE_EXPORT/CONSTRAINT/CONSTRAINT
Processing object type TRANSPORTABLE_EXPORT/COMMENT
Processing object type TRANSPORTABLE_EXPORT/CONSTRAINT/REF_CONSTRAINT
Processing object type TRANSPORTABLE_EXPORT/TRIGGER
Processing object type TRANSPORTABLE_EXPORT/POST_INSTANCE/PLUGTS_BLK
ORA-39082: Object type TRIGGER:"USER_P"."SECURE_EMPLOYEES" created with compilation warnings

ORA-39082: Object type TRIGGER:"USER_P"."UPDATE_JOB_HISTORY" created with compilation warnings

Job "SYS"."SYS_IMPORT_TRANSPORTABLE_01" completed with 8 error(s) at Tue Mar 11 01:44:12 2025
elapsed 0 00:00:19

```

Step 6.2 Check tablespaces for corruption

At this step, the transported data is READ ONLY in the destination database. Perform application specific validation to verify the transported data.

Also, run RMAN to check for physical and logical block corruption by running VALIDATE TABLESPACE as follows:

```
RMAN> validate tablespace TS1, TS2 check logical;
```

in Target PDB

```
SQL> select file_name from dba_data_files;
```

```

FILE_NAME
-----
+FRADATA/LINUX19DB/2FCB39CE06AC0B75E065524DE5264FBD/DATAFILE/system.275.1195194469
+FRADATA/LINUX19DB/2FCB39CE06AC0B75E065524DE5264FBD/DATAFILE/sysaux.276.1195194469
+FRADATA/LINUX19DB/2FCB39CE06AC0B75E065524DE5264FBD/DATAFILE/undotbs1.274.11951944
69
+FRADATA/LINUX19DB/2FCB39CE06AC0B75E065524DE5264FBD/DATAFILE/users.278.1195194543
+FRADATA/user_p_tbsp_6.dbf

```

```

SQL> set line 500
SQL> set pagesize 500
SQL> col tablespace_name format a20
SQL> col file_name format a60
select
SQL> 2  tbsp.tablespace_name TBSP_NAME
   3  ,tbsp.status TBSP_STATUS
,ddf.file_name FILE_NAME
   4   5  ,ddf.status DATA_FILE_STATUS
   6  ,ddf.ONLINE_STATUS DATAFILE_ONLINE_STATUS
from dba_tablespaces tbsp, dba_data_files ddf
where tbsp.tablespace_name = ddf.tablespace_name
   7   8   9  and tbsp.tablespace_name like '%_TBSP'
  10  order by tbsp.tablespace_name;

```

TBSP_NAME	TBSP_STAT	FILE_NAME	DATA_FILE	DATAFIL
USER_P_TBSP	READ ONLY	+FRADATA/user_p_tbsp_6.dbf	AVAILABLE	ONLINE

```
SQL> select owner,object_name,object_type from dba_objects where owner='USER_P' order by object_type;
```

OWNER	OBJECT_NAME	OBJECT_TYPE
-------	-------------	-------------

USER_P	COUNTRY_C_ID_PK	INDEX
USER_P	JHIST_EMP_ID_ST_DATE_PK	INDEX
USER_P	JHIST_JOB_IX	INDEX
USER_P	JHIST_EMPLOYEE_IX	INDEX
USER_P	JHIST_DEPARTMENT_IX	INDEX
USER_P	EMP_EMAIL_UK	INDEX
USER_P	EMP_EMP_ID_PK	INDEX
USER_P	EMP_DEPARTMENT_IX	INDEX
USER_P	EMP_JOB_IX	INDEX
USER_P	EMP_MANAGER_IX	INDEX
USER_P	REG_ID_PK	INDEX
USER_P	LOC_COUNTRY_IX	INDEX
USER_P	LOC_STATE_PROVINCE_IX	INDEX
USER_P	LOC_CITY_IX	INDEX
USER_P	LOC_ID_PK	INDEX
USER_P	DEPT_LOCATION_IX	INDEX
USER_P	DEPT_ID_PK	INDEX
USER_P	JOB_ID_PK	INDEX
USER_P	EMP_NAME_IX	INDEX
USER_P	JOBS	TABLE
USER_P	REGIONS	TABLE
USER_P	DUMMY_COUNTRIES	TABLE
USER_P	JOB_HISTORY	TABLE
USER_P	EMPLOYEES	TABLE
USER_P	COUNTRIES	TABLE
USER_P	DEPARTMENTS	TABLE
USER_P	LOCATIONS	TABLE
USER_P	UPDATE_JOB_HISTORY	TRIGGER
USER_P	SECURE_EMPLOYEES	TRIGGER

You can see DUMMY_COUNTRIES is present.

Step 6.3- Alter the tablespace(s) READ WRITE in the destination database

The final step is to make the destination tablespace(s) READ WRITE in the destination database.

```
SQL> show pdbs
```

CON_ID	CON_NAME	OPEN MODE	RESTRICTED
3	LINX19PDB	READ WRITE	NO

```
SQL>
```

```
SQL> alter tablespace USER_P_TBSP read write;
```

Tablespace altered.

```
SQL> set line 500
```

```
SQL> set pagesize 500
```

```
SQL> col tablespace_name format a20
```

```
col file_name format a60
```

```
SQL> SQL> select
```

```
tbasp.tablespace_name TBSP_NAME
```

```
2 3 ,tbasp.status TBSP_STATUS
```

```
4 ,ddf.file_name FILE_NAME
```

```
,ddf.status DATA_FILE_STATUS
```

```
,ddf.ONLINE_STATUS DATAFILE_ONLINE_STATUS
```

```
5 6 7 from dba_tablespaces tbasp, dba_data_files ddf
```

```
where tbasp.tablespace_name = ddf.tablespace_name
```

```
8 9 and tbasp.tablespace_name like '%_TBSP'
```

order by tbsp.tablespace_name; 10

TBSP_NAME	TBSP_STAT	FILE_NAME	DATA_FILE	DATAFIL
USER_P_TBSP	ONLINE	+FRADATA/user_p_tbsp_6.dbf	AVAILABLE	ONLINE