Rbaby to Rman

NYOUG
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Agenda

- Infrastructure to support
- Scripts
- 3 backup scenarios
- Recovery
- Managing archived redo
- Catalog cleanup
- Best practices

Do not cut any corners; do it right.

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To catalog or not to catalog

- metadata stored in control file(s)

- second copy in the recovery catalog instance

- lose <u>all</u> metadata if you (or a colleague) recreate the controlfile

- catalog objects can be useful for reporting success / failure / most recent backup

- does not require a separate license

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The catalog instance - 1

```
create database rcat noarchivelog
    maxlogfiles 16
    maxlogmembers 3
    maxdatafiles 100
    maxinstances 8
    maxloghistory 1363

logfile group 1 '…redo01.log'  size 10m,
        group 2 '…redo02.log'  size 10m,
        group 3 '…redo03.log'  size 10m

datafile '…system01.dbf' size 100m
autoextend on next 100m maxsize 2001m
```

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The catalog instance - 2

```
undo tablespace undotbs1 datafile
'…undotbs01.dbf' size 300m

default temporary tablespace loc_temp
tempfile '…loc_temp01.dbf' size 200m extent
management local uniform size 1m
character set we8iso8859p1;

create tablespace sysaux datafile
'…sysaux01.dbf' size 100m
autoextend on next 100m maxsize 2001m
extent management local autoallocate;
set echo off
```

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The catalog instance - 3

```
@?/rdbms/admin/catalog
@?/rdbms/admin/catproc
@?/rdbms/admin/catexp
@?/rdbms/admin/catsnap
@?/rdbms/admin/prvtsnap.plb
@?/rdbms/admin/catdefer
@?/rdbms/admin/prvtdefr.plb

conn system/manager
@?/sqlplus/admin/pupbld

conn / as sysdba
@?/rdbms/admin/utlrp
```

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The catalog instance - 4

```
create tablespace rman datafile
'…rman01.dbf' size 50m autoextend
on next 20m maxsize 2001m;

create user rman identified by rman;
grant create session, create table, create
view, create synonym, create procedure,
create trigger to rman;

alter user rman default tablespace rman
quota unlimited on rman temporary tablespace
loc_temp;
```

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The catalog instance - 5

```
grant select_catalog_role to rman;
grant select any dictionary to rman;
grant recovery_catalog_owner to rman;
...
...
rman target / catalog rman/rman@rcat
RMAN> create catalog;
...
...
RMAN> register database;
```

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tnsnames.ora

```
rcat =
(DESCRIPTION =
  (ADDRESS_LIST =
    (ADDRESS =
      (PROTOCOL = TCP)
      (HOST = a.b.c.d)(PORT = 1521)
    )
  (CONNECT_DATA =
    (SERVICE_NAME = rcat )
  )
)
```

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Database states

- Backup
  - open
  - mounted
- Recover mounted
  - database / tablespace / database
- Recover nomounted
  - restore controlfile / build standby

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Backup script - 1

```
run {
1)sql 'alter system archive log current';
2)change archivelog all crosscheck;
3)delete noprompt expired archivelog all;
```

1. stake in the ground; synch all database files to mark start of the backup

2. stat all archived redo logs with DELETED = 'N'

3. advance the logical pointer through V$ARCHIVED_LOG

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Backup script - 2

```
1)allocate channel ch1 type disk format
  '${BDIR}/%d_level${LVL}_${TS}_%s_U%U.bak';
2)set limit channel ch1 kbytes=2000000;
3)backup {as compressed backup} incremental
  level ${LEVEL} (database);
4)sql 'alter system archive log current';
```

1. format using environment variables
2. limit size of each piece to ~2Gb
3. *{database 10g}*
4. ending stake in the ground

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Backup script - 3

```
1)copy current controlfile to
  '${BDIR}/level${LVL}_${TS}_control.bak';
2)backup current controlfile for standby
  format '${BDIR}/%d_SCF_%U.bak';
3)release channel ch1;
4)resync catalog;
}
```

1. format using environment variables

2. never say never

3. cleanup (not required??)

4. catalog synch with the physical structure
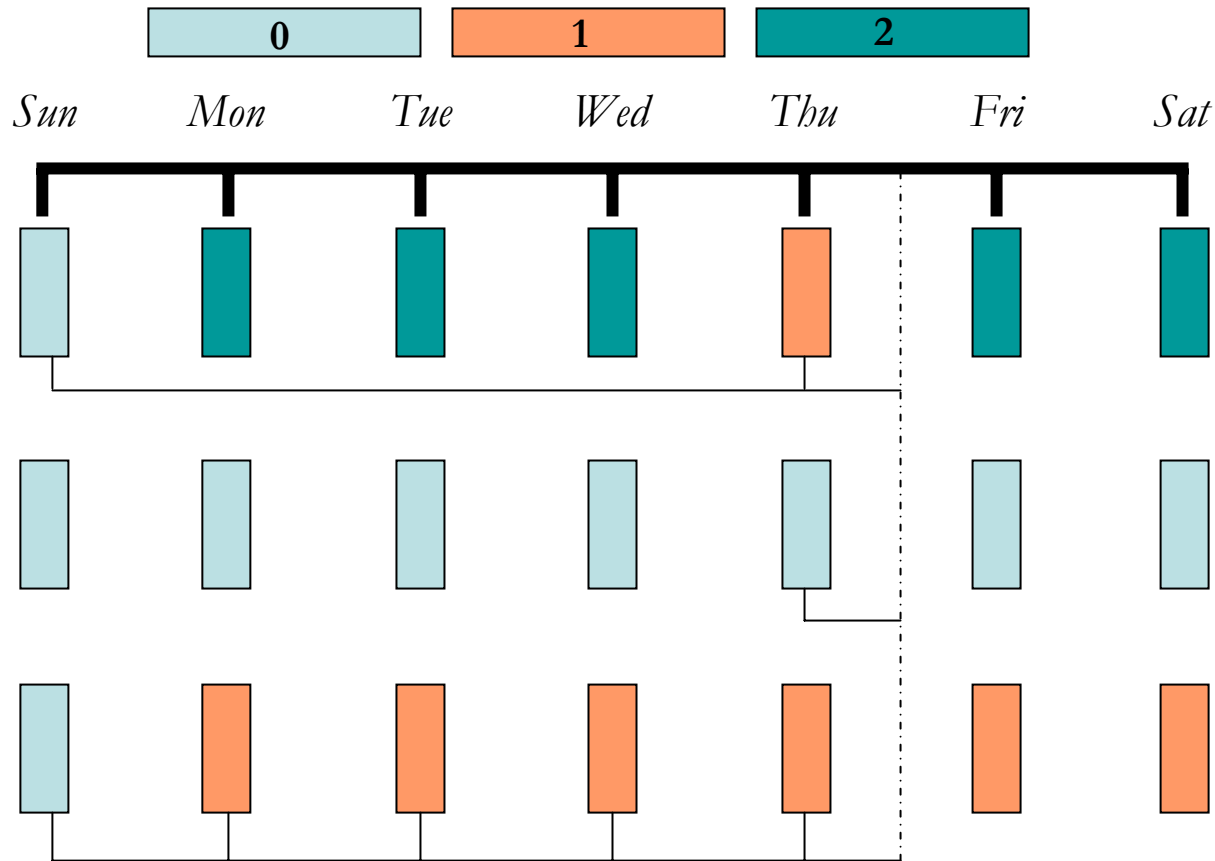
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By database

- the whole kit and caboodle
- inclusions in backup determined by incremental level (0 → 4)
- each level backs up what has changed since most recent peer or lower level
- the heart of block level incremental
- frequency once or twice a week very common

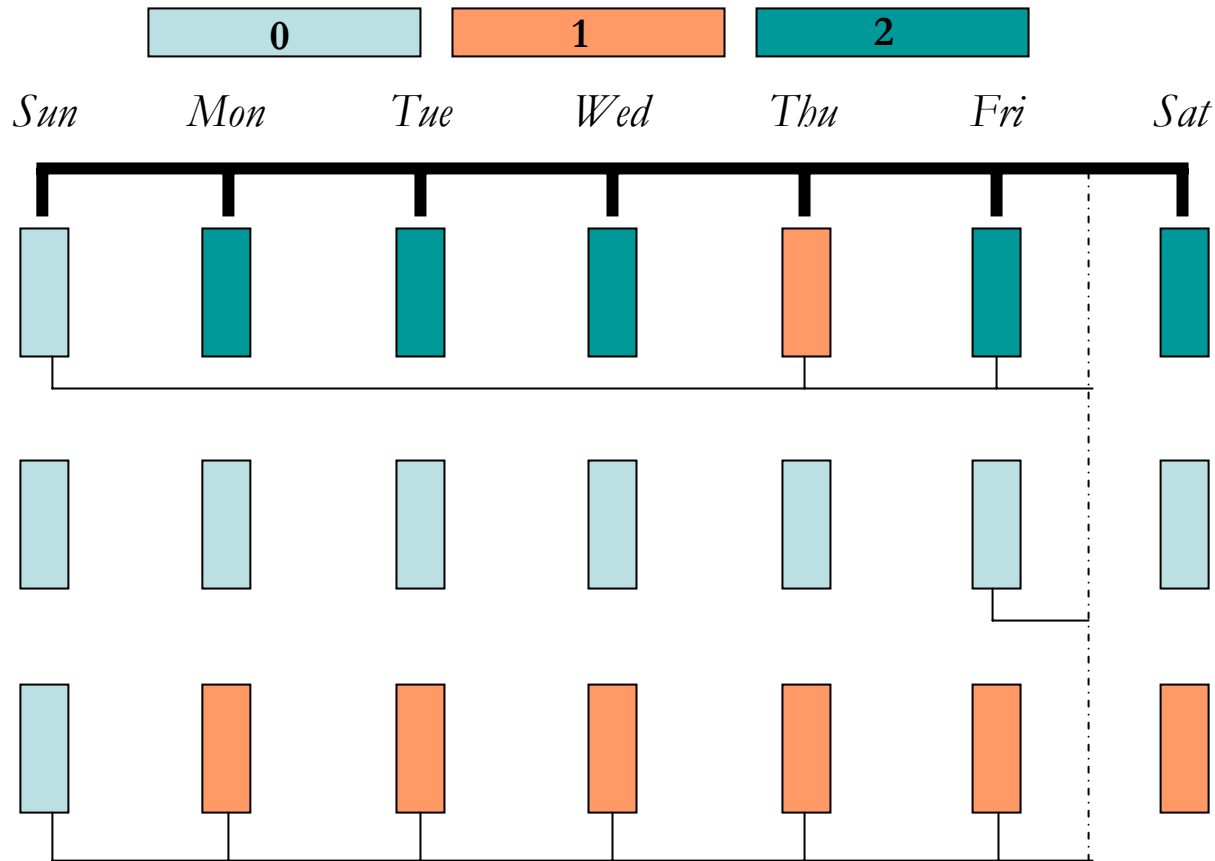*Michael S. Abbey — Rbaby to Rman*

7-day week

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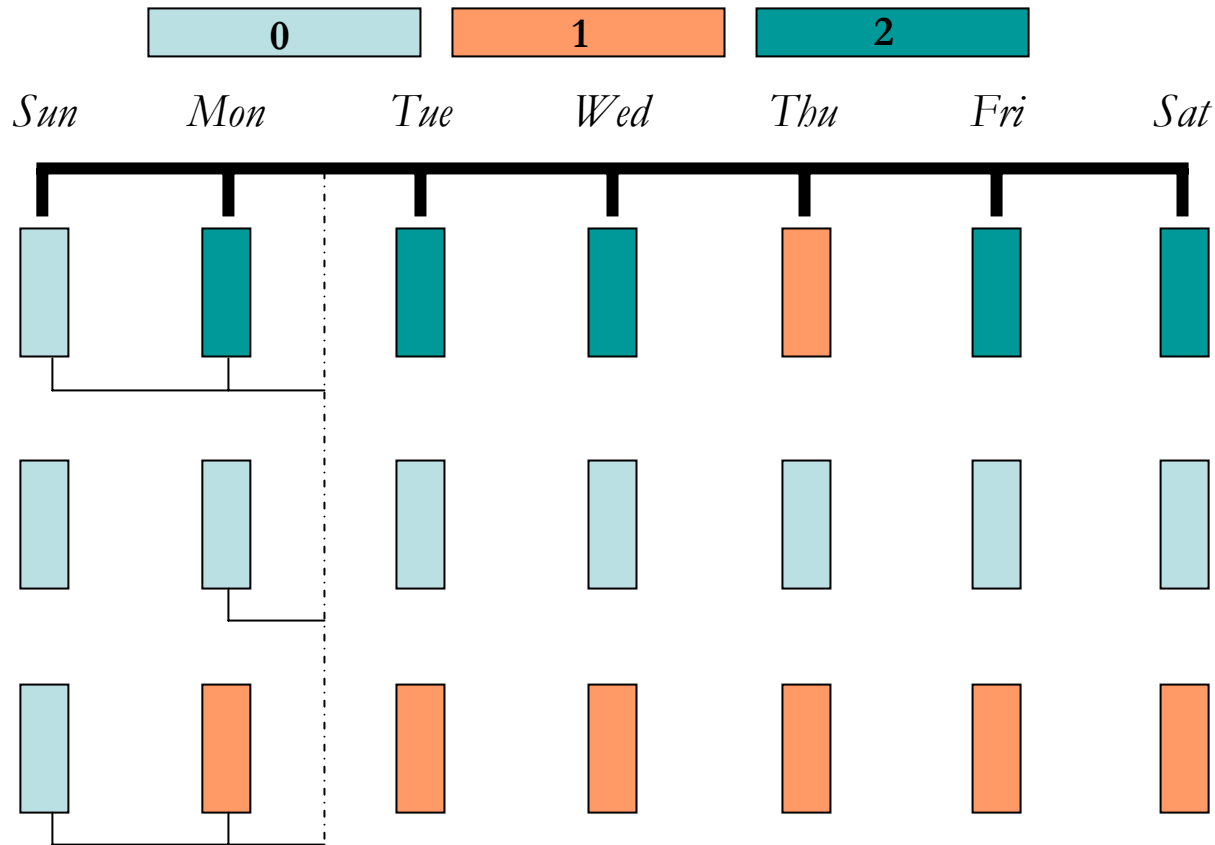
7-day week

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7-day week

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By tablespace

- exactly the same code as database backup

- all files within the specified tablespace

- imbed the tablespace name in the backup set piece names

- same rules apply about what gets backed up; rules apply to all previous backup types, whether database or tablespace

By datafile

- same as tablespace
- file name or file number
- the best way to balance writing of information to multiple channels, each with their own filesystem

Database mounted or open for all three backup types.

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Backup

Recovery

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Two phase

1. restore
   - allocate 1 or more channels
   - disk or tape
   - pull files out of backup set pieces
2. recovery
   - apply archived redo logs
   - restore to `LOG_ARCHIVE_DEST_1` then apply

Restore

- `set until time '23-JUN-2007 22:11:00';`

  - may need to_date conversion as passed to rman

  - can be part of the `recover database` command as well

- `set until scn 333829323199;`

- equivalent of *time-based* and *change-based* recovery

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Renaming files

- `set newname for datafile ____ to 'file_name_and_location';`
  - file number
  - file name
- `switch datafile all;`
  - alter database rename file … equivalent
  - updates the control file

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Backing up archived redo

- should be prefixed by
  - `crosscheck archivelog al;`
  - `delete noprompt expired archivelog all;`
- many well-intentioned backups are derailed by the failure to find expected archived redo
- sequence numbers written during the backup required to make database consistent

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Backing up archived redo

- `delete input`
  - erases archived redo after successfully backed up
  - no longer available for a physical standby
- failed archived redo backup <u>not</u> fatal to database backups written during the same session
  - #1 cause for disks overflowing

Catalog cleanup

1. do not keep metadata in recovery catalog about backupset pieces that no longer exist

2. retention period should be physical retention period +1 or 2 days

3. be sure you do not prematurely erase catalog information before its time

4. no media cleanup, just metadata

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Catalog cleanup

```
1)crosscheck backup completed before
              'sysdate-15';
2)delete nomprompt expired backup;
```

1. stat backup set pieces on medium and, if not found, mark as *expired*

2. for all *expired* backup set pieces, wipe their corresponding catalog metadata

Standby caveats

- *delete input* on backup
  - may erase archived redo before sent to the standby
  - can erase archived redo before "all clear" received from the standby
- leaving out *delete input* puts you right back where you started—responsible for manual cleanup

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Standby solution

```
1)crosscheck archivelog all completed
  before 'sysdate-3';
2)delete noprompt expired archivelog all
  completed before 'sysdate-3';
```

1. avoid prematurely marking archived redo as *expired*

2. remove metadata about expired archived redo

Best practices

- comb your log file for RMAN-00569, the one catch-all error that means something went wrong

- use rman on your catalog database, in *nocatalog* mode

- resynch the catalog when the physical structure of the database changes

Best practices

- use SQL*Plus for the recovery phase
  - more flexible
  - *cancel-based* recovery
- let the size of your database determine the pattern of what levels run on what days
- *restore database validate;* on a regular basis

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Best practices

- be very conservative with deleting metadata … there is <u>no way</u> to re-catalog once deleted
- use persistent configuration using
  - *show all;*
  - *configure ….;* based on output
- turn on controlfile autobackup
  - more controlfile restore opportunities
  - restore to non-default location

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Controlfile autobackup

```
configure controlfile autobackup
on;
configure controlfile autobackup
   format for device type disk to
   '{backup directory/%f'
```

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The transition from rbaby to rman …

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fenderpbs

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