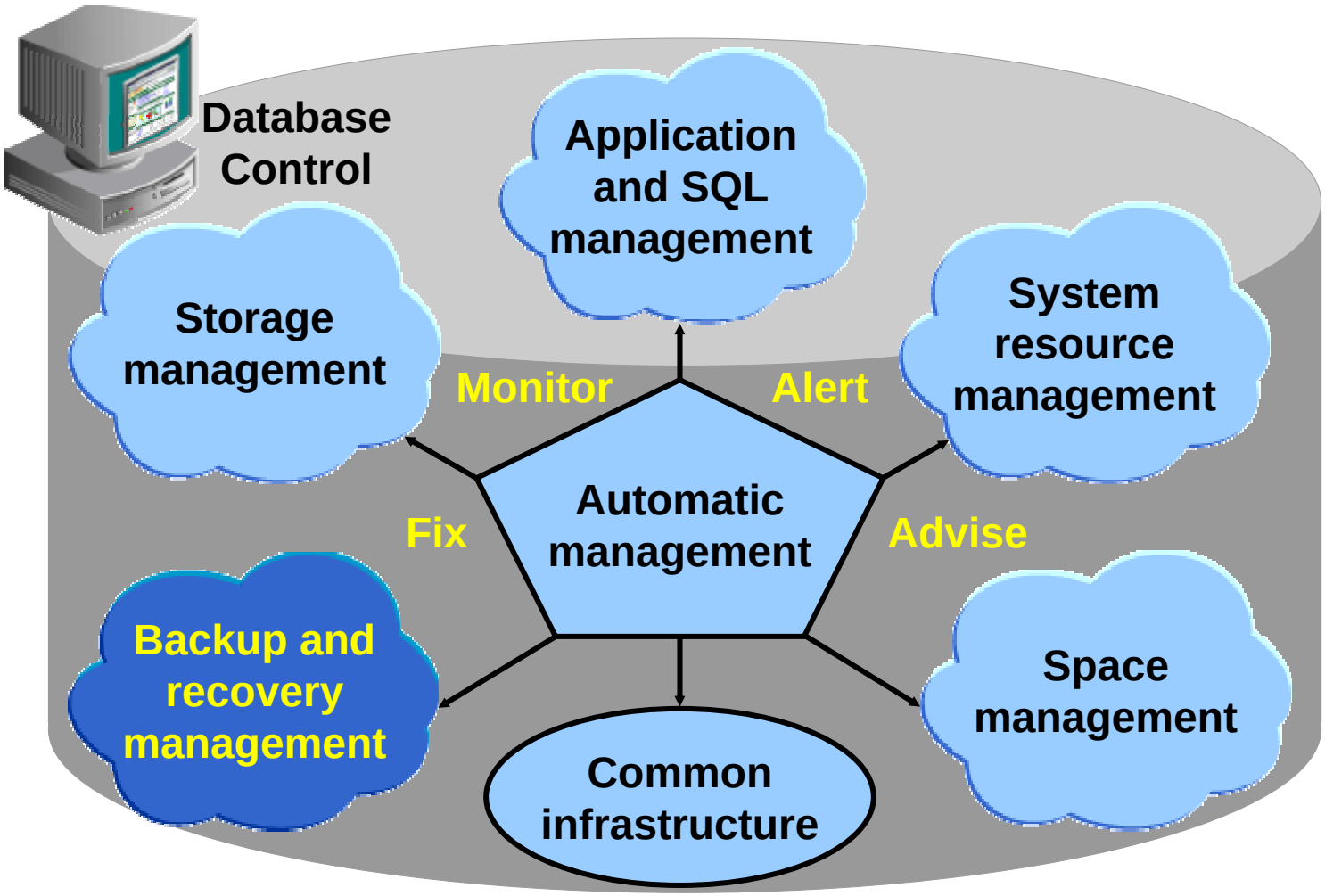
NYOUG 2005

10g R2 New Features

ORACLE

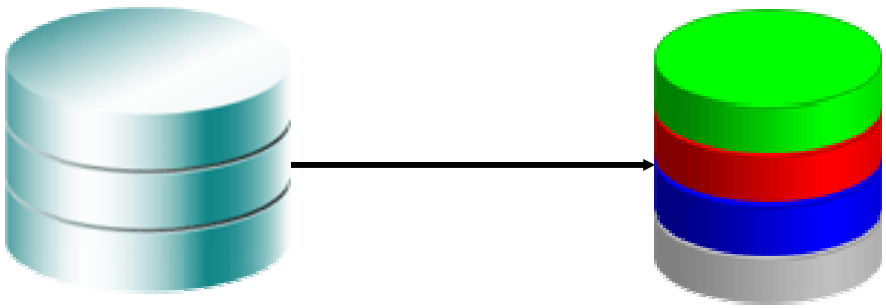
Oracle Database 10*g* Solution: Self-Managing Database



Flash Recovery Area

A flash recovery area is a unified storage location for all recovery files and recovery-related activities in an Oracle database.

- **It is a centralized location of control file backups, archive logs, flashback logs, and database backups .**
- **It can be defined as a directory, file system, or ASM disk group.**
- **It can be shared by more than one database.**

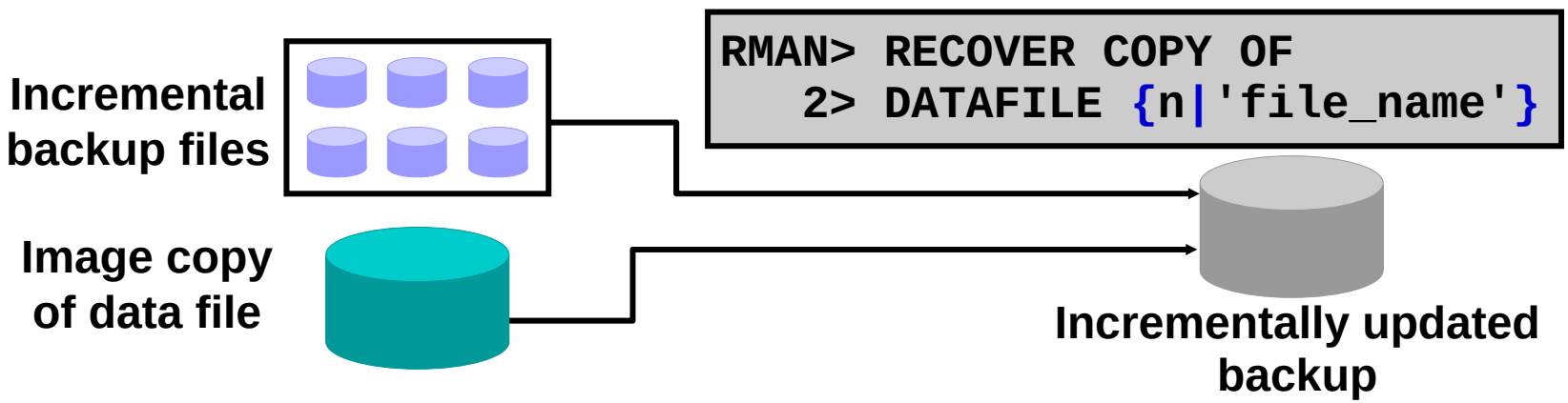


Database area **Flash recovery area**

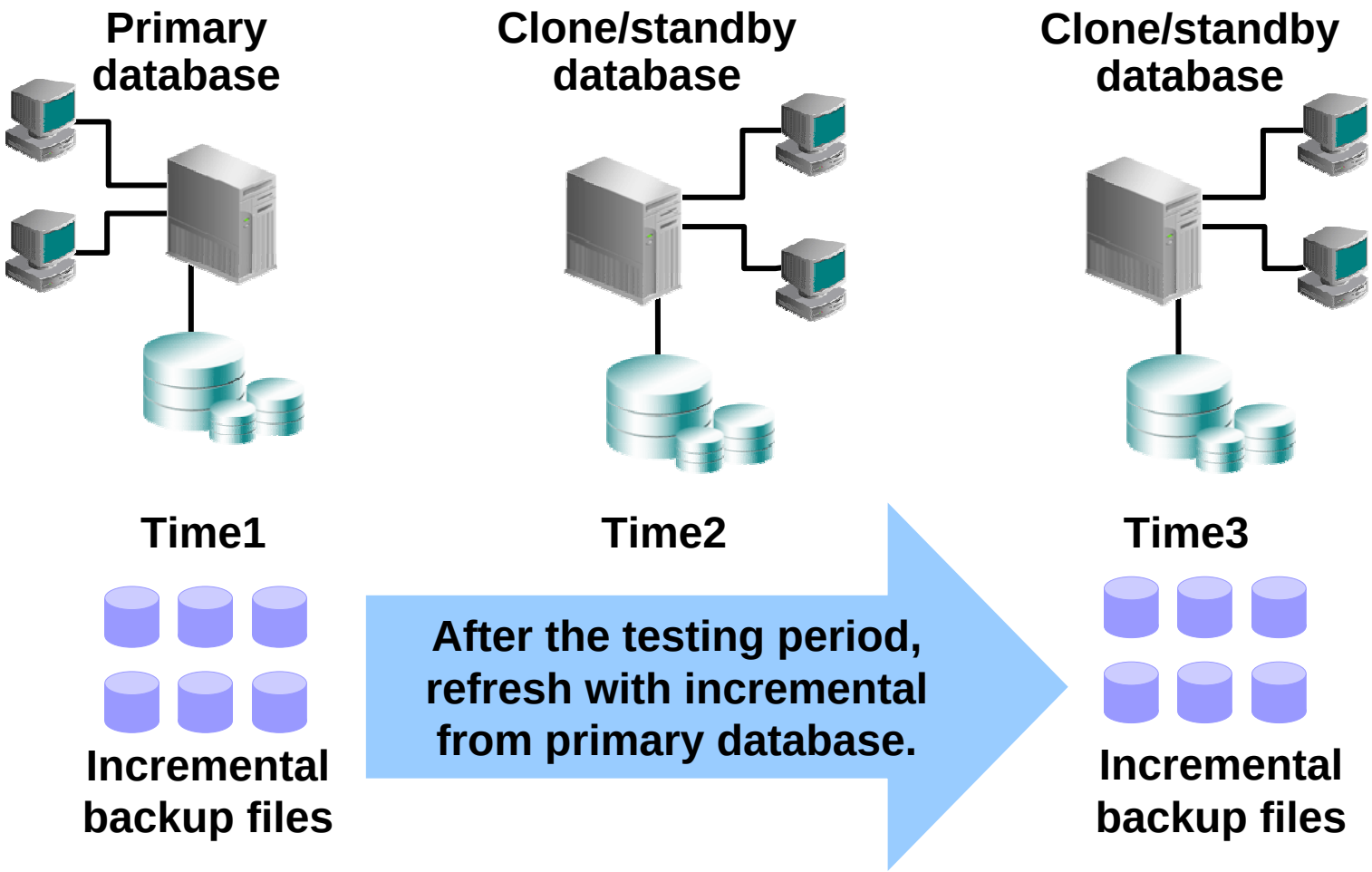
Incrementally Updated Backups

RMAN can now recover image copies by using incremental backup files:

- **Image copies are updated with all changes up to the incremental backup SCN.**
- **Incremental backup reduces the time required for media recovery.**
- **There is no need to perform an image copy after the incremental restoration.**



Incremental Roll Forward of a Database Copy



RMAN Channel Support for the Grid

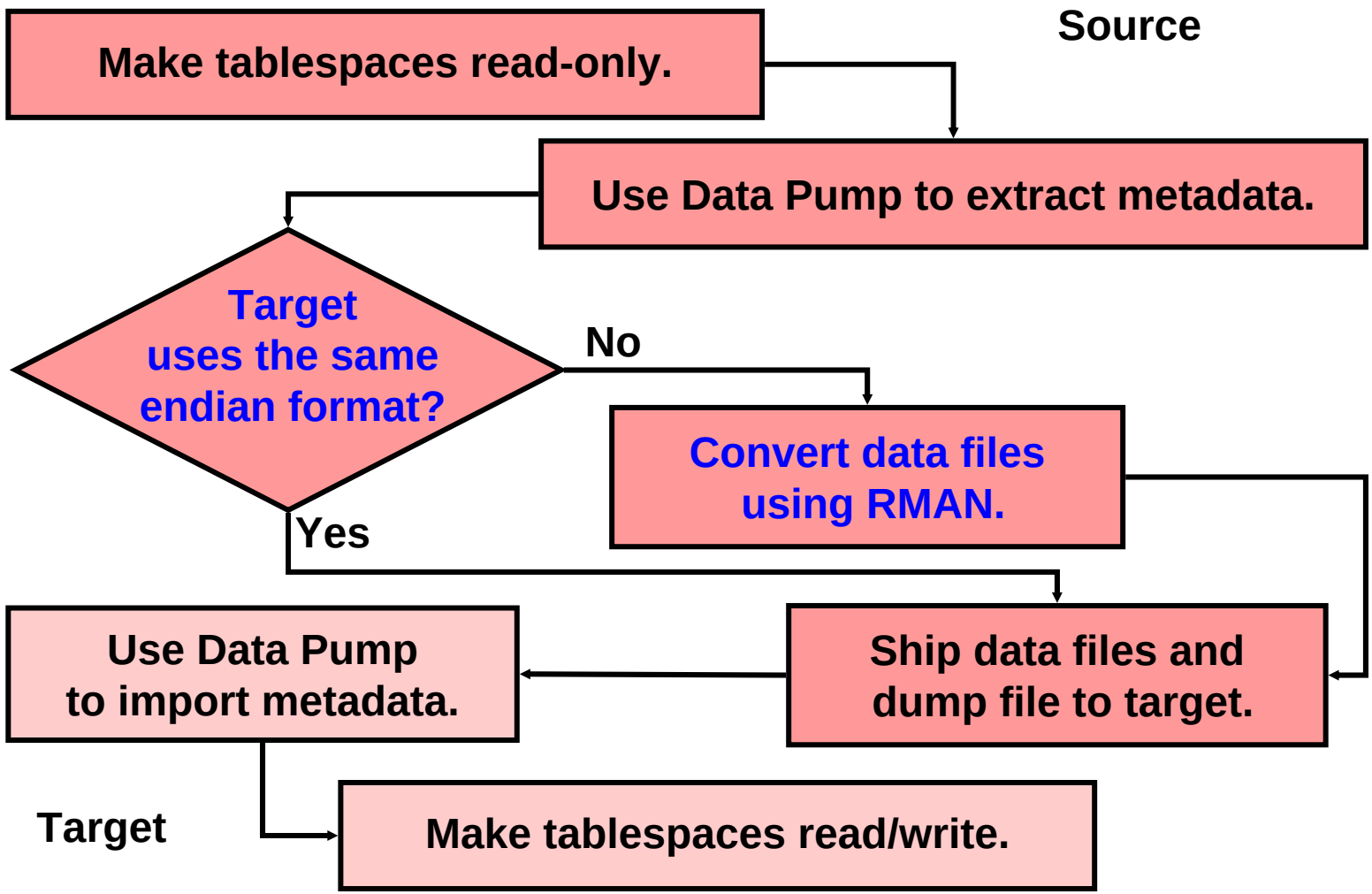
- RAC allows the use of nondeterministic connect strings.
- It simplifies the use of parallelism with RMAN in a RAC environment.
- It utilizes load-balancing characteristics of the grid environment.
  - Using Cluster Ready Services, the channels connect to RAC instances that are the least loaded.

Cross-Platform Transportable Tablespaces

- Simplify data distribution between data warehouse and data marts
- Allow database migration from one platform to another
- Supported platforms:

Solaris[tm] OE (32-bit)	HP-UX (64-bit)	Microsoft Windows IA (64-bit)
Solaris[tm] OE (64-bit)	HP Tru64 UNIX	IBM zSeries Based Linux
Microsoft Windows IA (32-bit)	HP-UX IA (64-bit)	Linux 64-bit for AMD
Linux IA (32-bit)	Linux IA (64-bit)	Apple Mac OS
AIX-Based Systems (64-bit)	HP Open VMS	Microsoft Windows 64-bit for AMD
		Solaris Operating System (x86)

Transportable Tablespace Procedure



Data File Conversion: Examples

Source

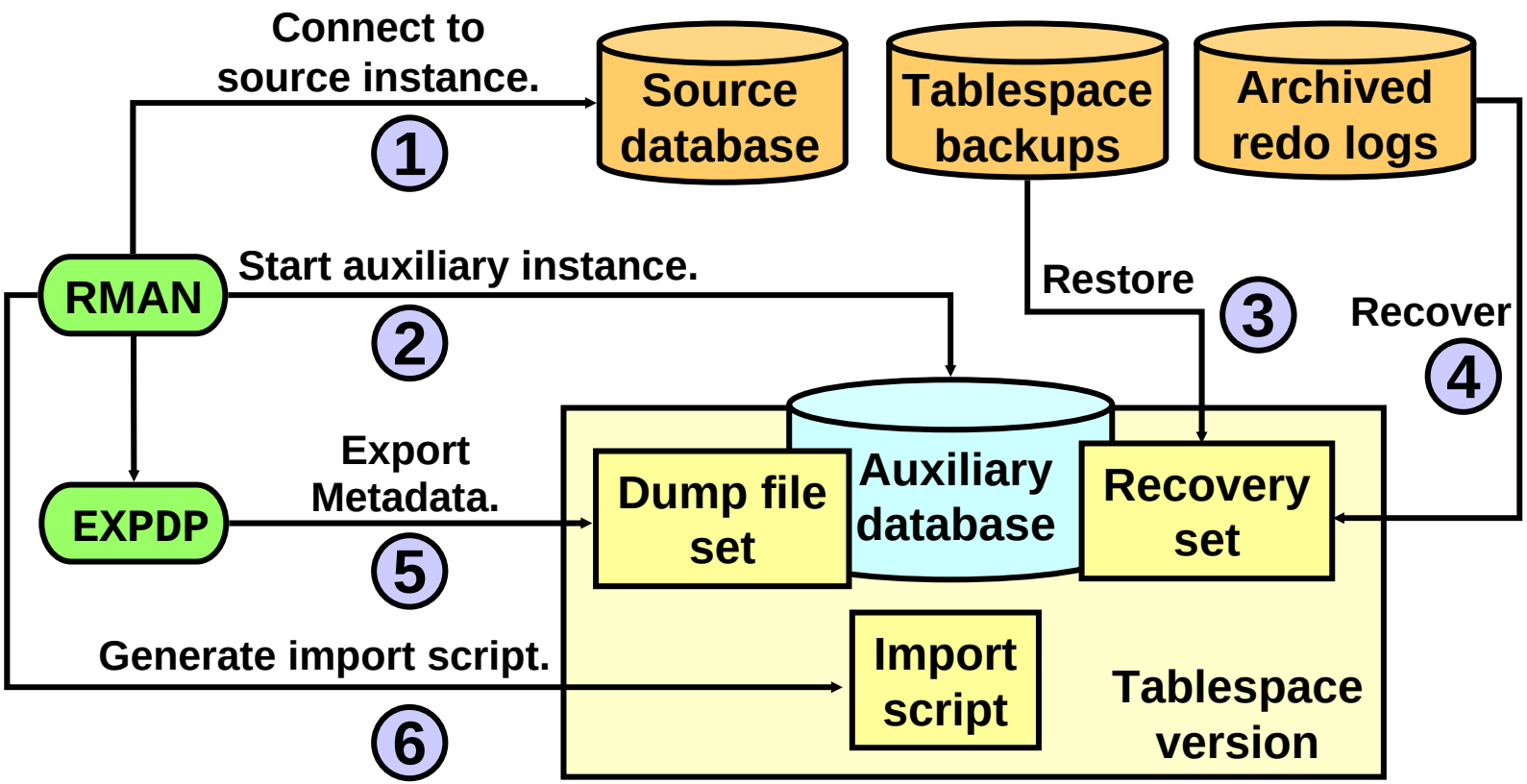
```
$ rman target=/
RMAN> CONVERT TABLESPACE 'FINANCE,HR'
      TO PLATFORM = 'AIX-Based Systems (64-bit)'
      DB_FILE_NAME_CONVERT =
    '/orahome/dbs1', '/orahome/dbs/transport_aix',
    '/orahome/dbs2', '/orahome/dbs/transport_aix';
```

or

```
$ rman target=/
RMAN> CONVERT DATAFILE '/tmp/transport_stage/*'
      FROM PLATFORM = 'Solaris[tm] OE (32-bit)'
      DB_FILE_NAME_CONVERT =
'/tmp/transport_stage/fin' , '/orahome/dbs1/fin',
'/tmp/transport_stage/hr'  , '/orahome/dbs2/hr';
```

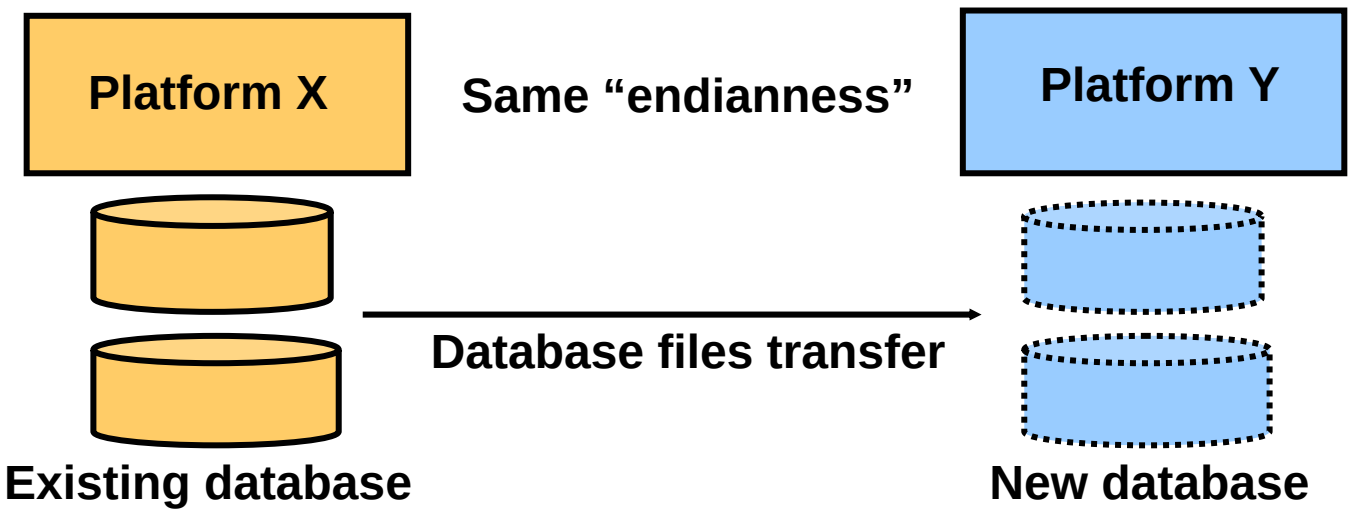
Target

Transport Tablespace from Backup: Implementation

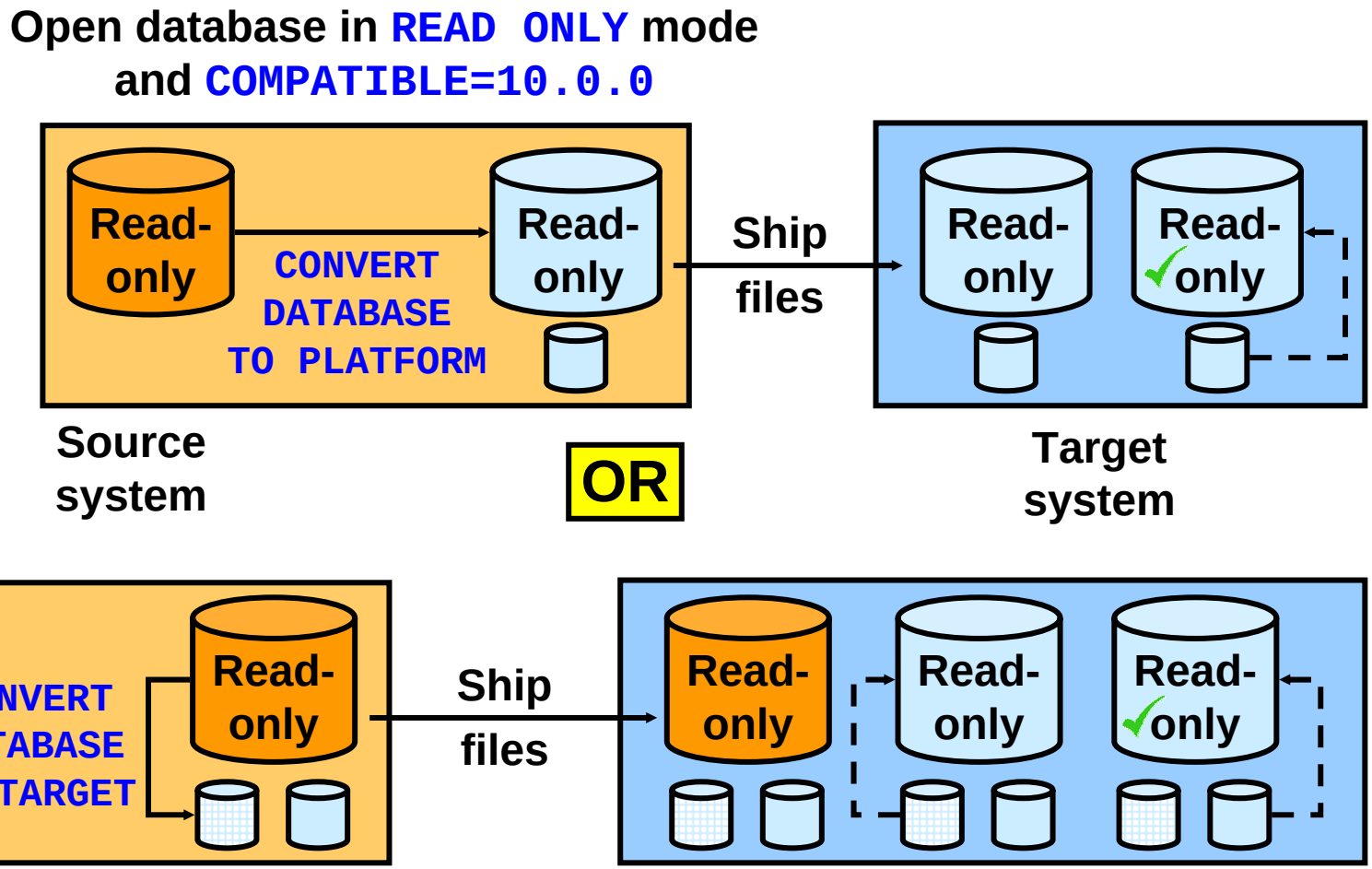


Database Transportation: Overview

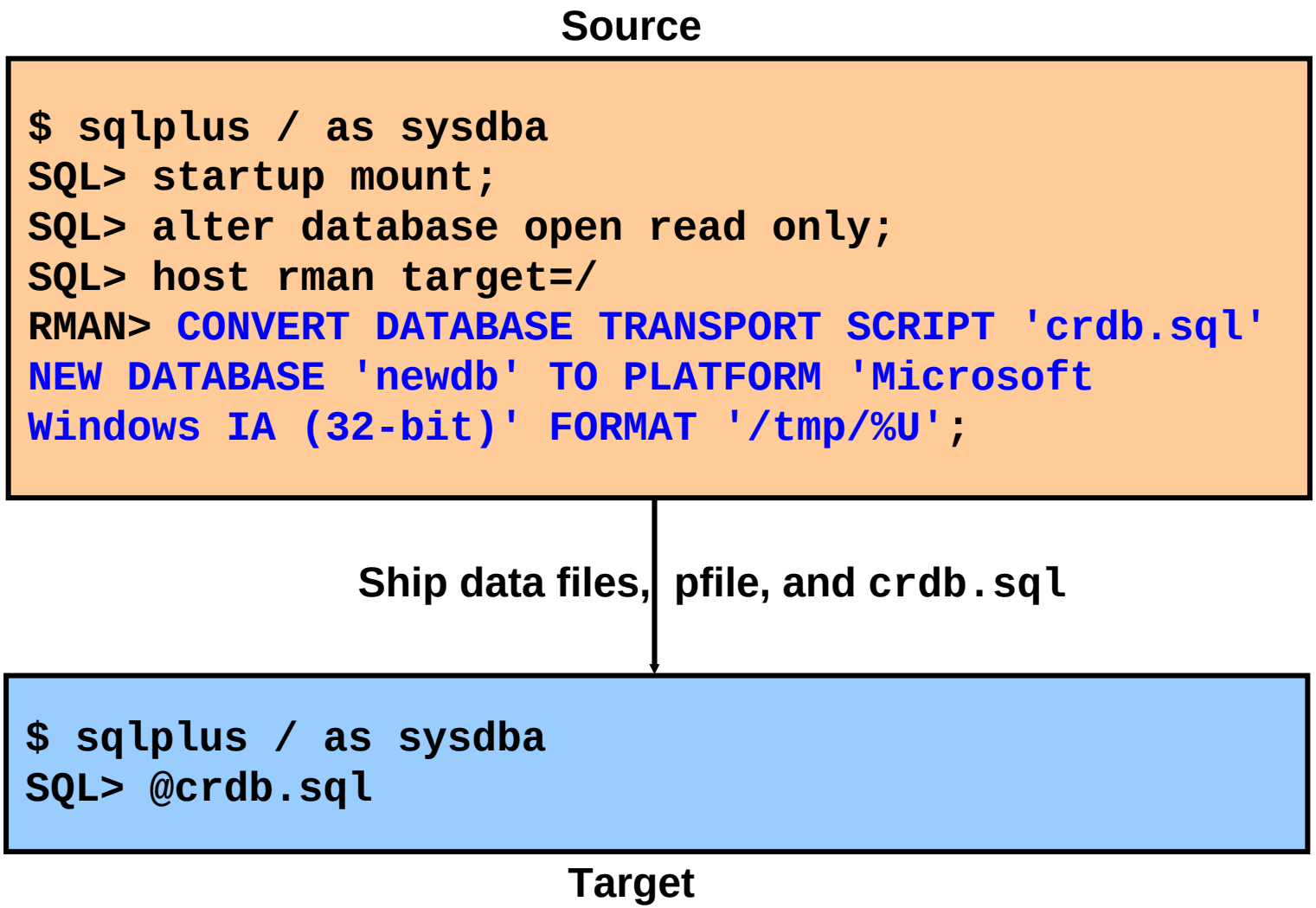
- Generalize the transportable tablespace feature.
- Data can easily be distributed from a data warehousing environment to data marts, which are usually on smaller platforms.
- A database can be migrated from one platform to another very quickly.



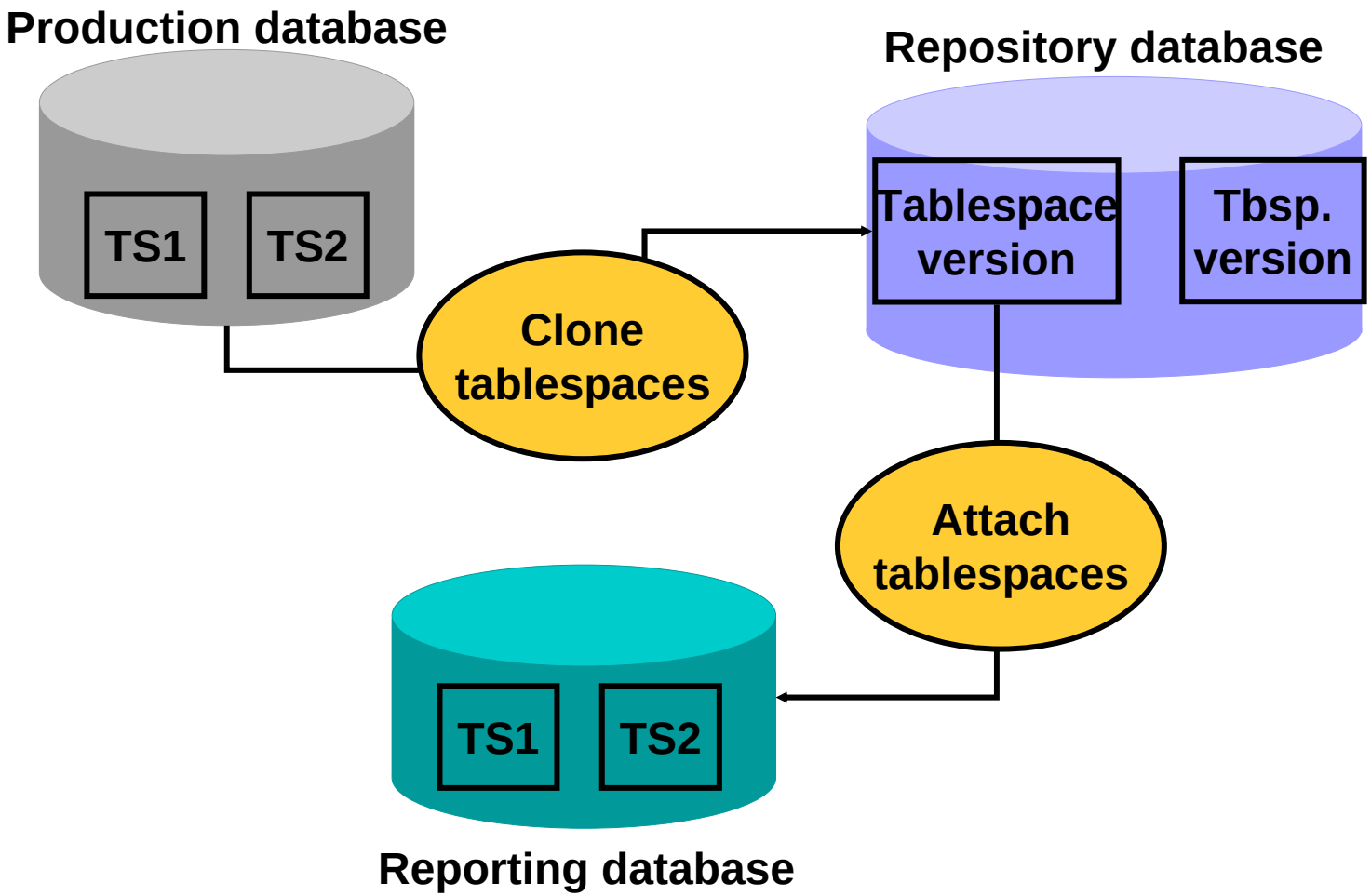
Database Transportation Procedure



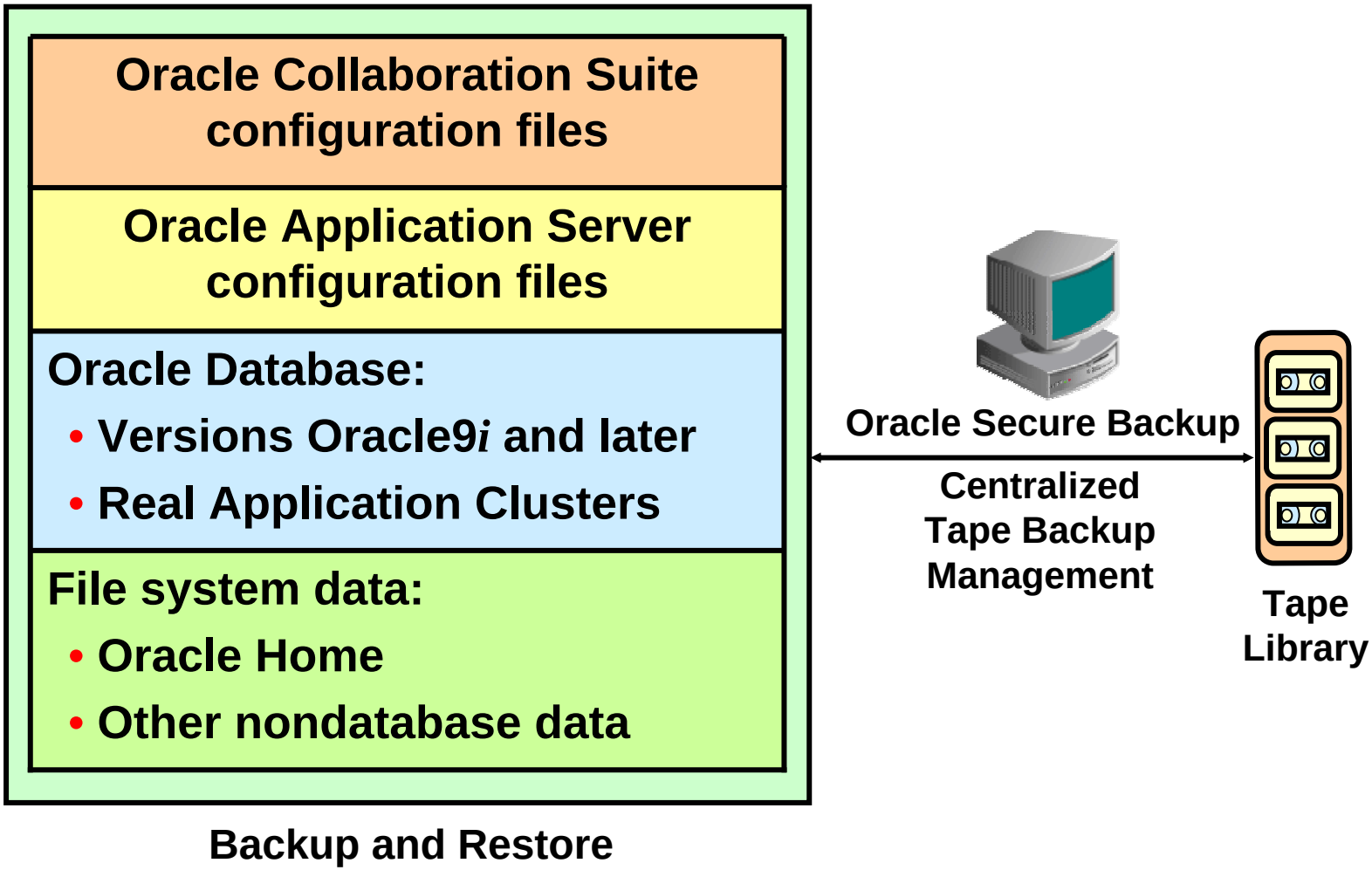
Database Transportation: Example 1



Versioning Tablespaces



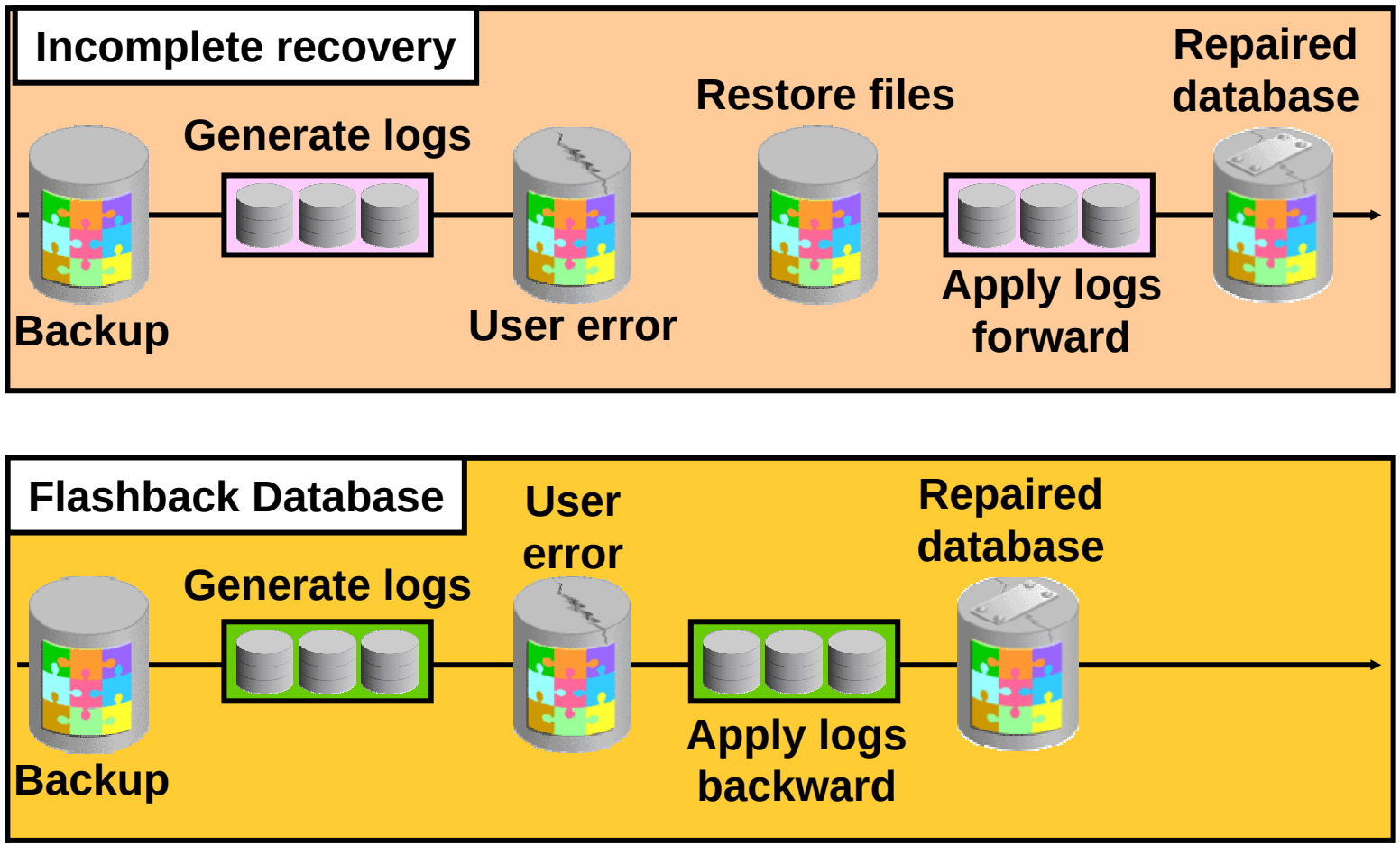
Data Protection to Tape for the Oracle Stack



The Customer Advantage
Complete Oracle Solution

- **Oracle Secure Backup and RMAN provide an end-to-end backup solution for Oracle environments:**
  - **Centralized backup management to tape for file system data and the Oracle database**
  - **Provides most well-integrated media management layer for RMAN backups**
  - **Backup of any data anywhere on the network**
- **A single technical support resource for the entire backup solution expedites problem resolution.**
- **This ensures reliable data protection at lower cost and complexity.**

Flashback Database: Eliminating Restore Time



Guaranteed Restore Points

- **Guaranteed restore points:**
  - **Provide a guaranteed flashback database point**
  - **Utilize space in the flash recovery area**
  - **Do not require Flashback Database to be explicitly enabled**
- **Database must be in `ARCHIVELOG` mode.**
- **Flash recovery area must be defined.**
- **Use guaranteed restore point to back out risky application changes.**

RMAN Encrypted Backups: Considerations

- Image copy backups cannot be encrypted.
- `COMPATIBLE` must be set to at least `10.2.0`.
- `V$RMAN_ENCRYPTION_ALGORITHMS` contains the list of possible encryption algorithms.

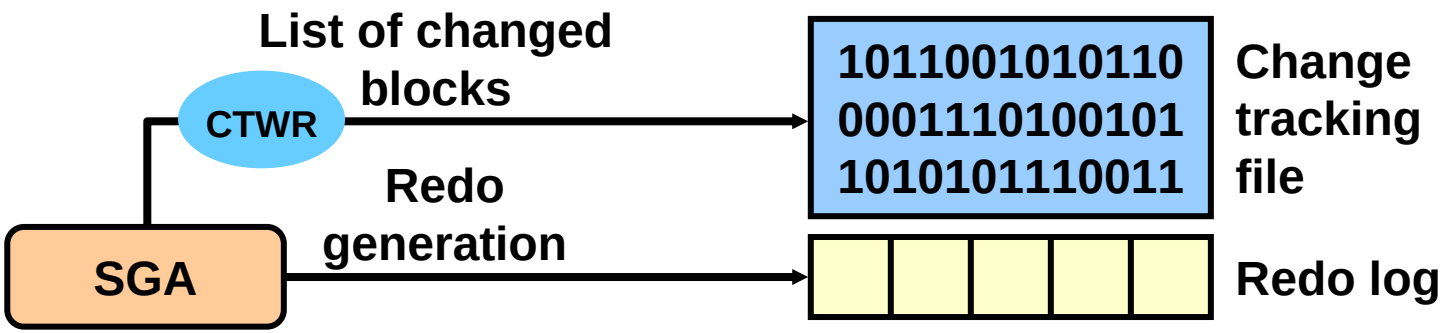
```
CONFIGURE ENCRYPTION ALGORITHM 'algorithmname'
```

```
SET ENCRYPTION ALGORITHM 'algorithmname'
```

- Backup encryption is available only with Oracle Enterprise Edition.
- One new encryption key is used for each new encrypted backup.
- You can increase disk performance by using multiple channels.
- You can change the master key anytime without affecting your transparent encrypted backups.

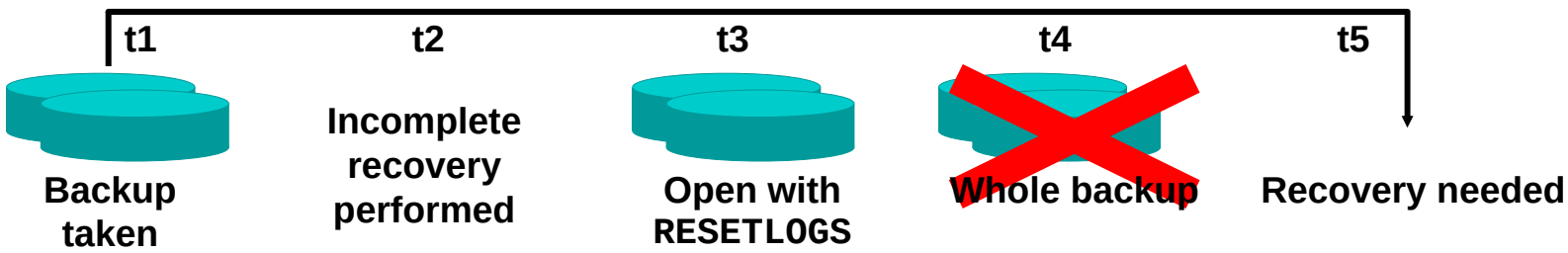
Fast Incremental Backup

- **Optimizes incremental backups**
  - **Tracks which blocks have changed since the last backup**
- **Oracle Database 10*g* has integrated change tracking:**
  - **A change tracking file is introduced.**
  - **Changed blocks are tracked as redo is generated.**
  - **Database backup automatically uses the changed block list.**



Simplified Recovery Through RESETLOGS

- The database can be opened immediately after RESETLOGS.
  - No longer need to take a full backup
- You do not need to make changes to existing scripts.
- Usage scenarios:
  - Incomplete recovery
  - Recovery using backup control file



Setting Duration and Throttling Option

Copy database in 10 hours with minimum impact.

```
RMAN> BACKUP AS COPY
   2> DURATION 10:00
   3> MINIMIZE LOAD DATABASE ;
```

Back up tablespace in 4 hours.

```
RMAN> BACKUP DURATION 4:00
   2> FILESPERSET 1
   3> TABLESPACE USERS ;
```

Back up as many files as possible in 4 hours.

```
RMAN> BACKUP
   2> DURATION 4:00 PARTIAL
   3> FILESPERSET 1 DATABASE ;
```

Miscellaneous Features

Faster Instance Startup for Ultralarge Buffer Caches

- Database available at 10% initialization of buffer cache
- Remaining 90% formatted in the background by CKPT
- Leverages the dynamic buffer cache infrastructure
- Especially useful for very large buffer caches

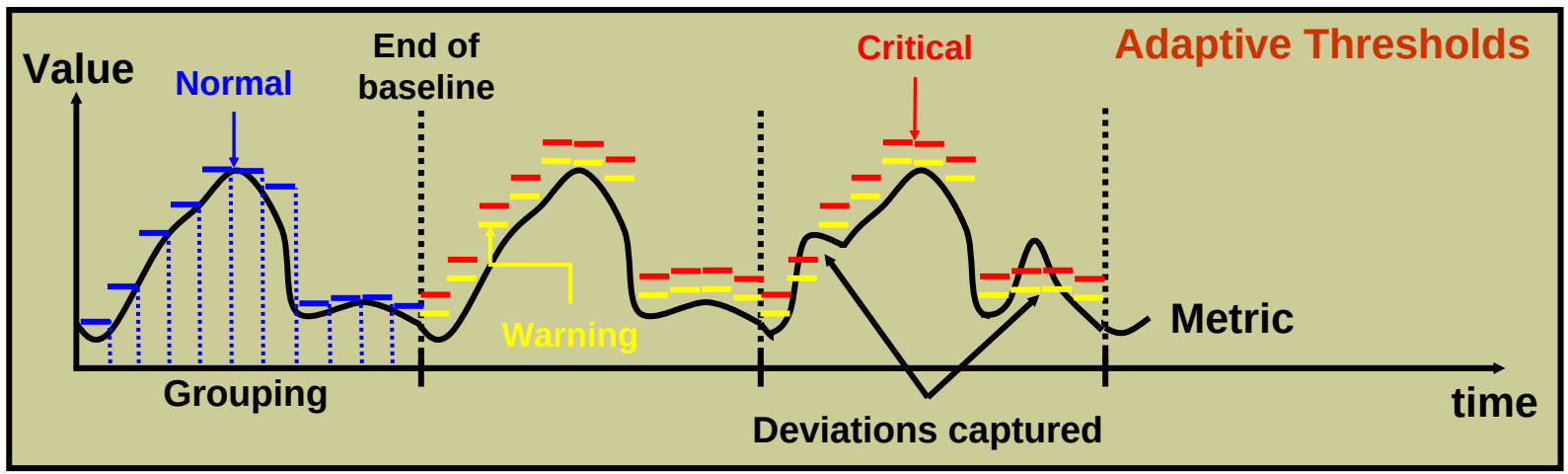
Asynchronous COMMIT

- The default COMMIT behavior is to wait until redo is saved in the redo log files.
- The default behavior can now be changed to “not wait.”
- Asynchronous COMMIT is useful for high transaction throughput.
- However, transactions may be lost:
  - Machine crashes
  - File I/O problems with redo log files

Diagnosis of Hung or Extremely Slow Databases

- New functionality for problem analysis when the database is performing very slowly, or is hung:
  - Direct access to SGA for performance monitoring (memory access mode)
    - `V$SESSION`
    - `V$SESSION_WAIT`
    - `V$SYSTEM_EVENT`
    - `V$SYSSTAT`
  - Hang analysis using Enterprise Manager
- Also supported for Oracle9*i* databases

Thresholds and Metric Baselines Overview: Adaptive Thresholds



LogMiner Enhancements

- **Automatically add log for mining:**

```
EXECUTE DBMS_LOGMNR.START_LOGMNR( -
OPTIONS => DBMS_LOGMNR.CONTINUOUS_MINE, -
STARTTIME => ('25-Sep-2003 12:00:00'));
```

- **Generate reconstructed statements without a row ID:**

```
EXECUTE DBMS_LOGMNR.START_LOGMNR( -
OPTIONS => DBMS_LOGMNR.NO_ROWID_IN_STMT);
```

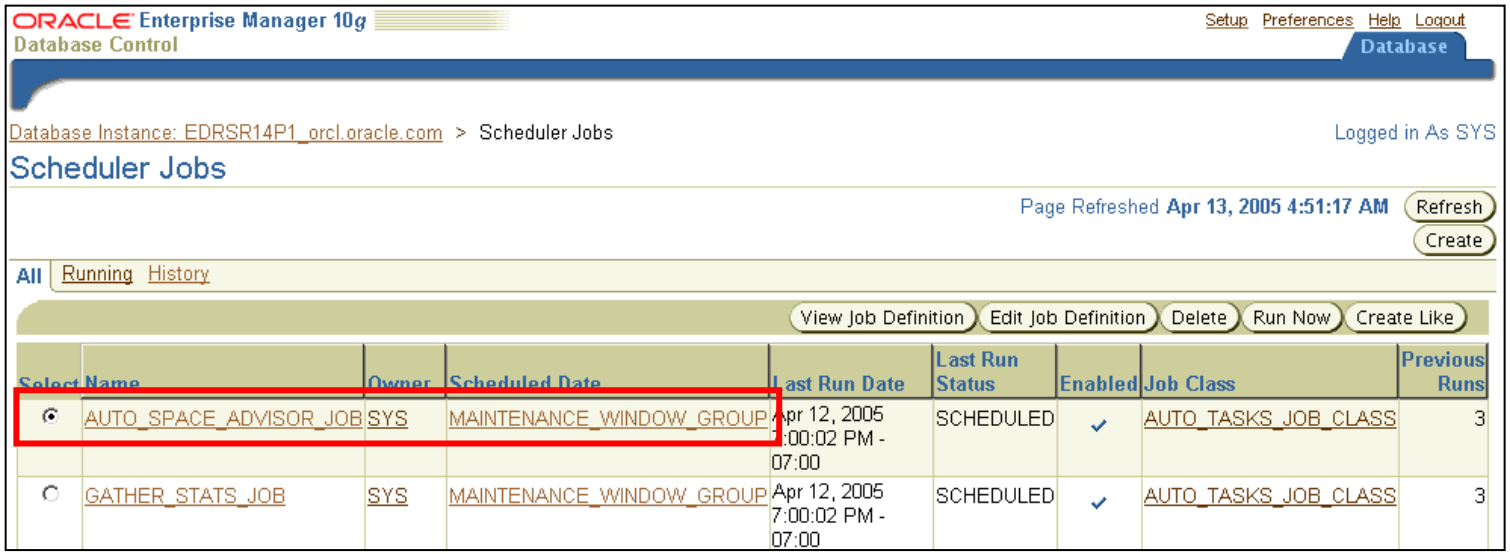
- **Remove redo logs from analysis:**

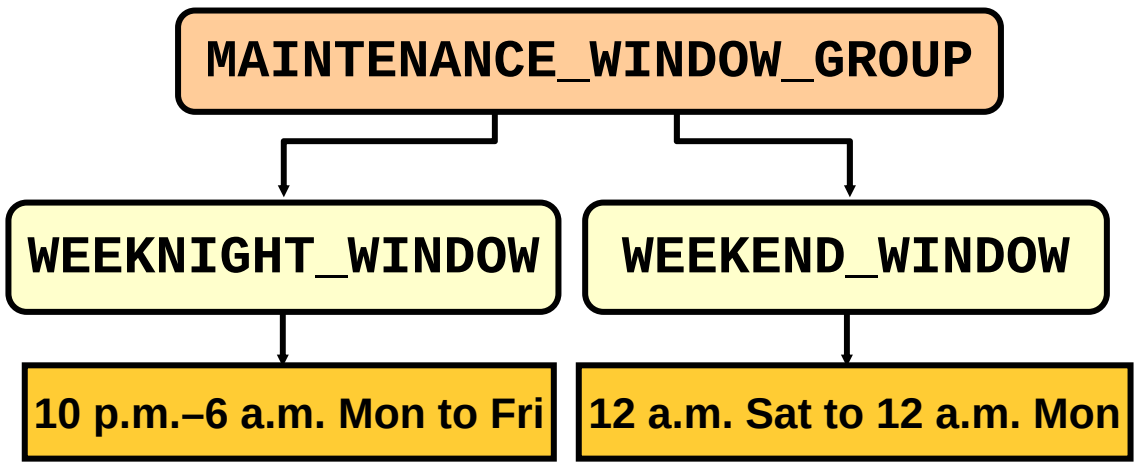
```
EXECUTE DBMS_LOGMNR.REMOVE_LOGFILE( -
LOGFILENAME => '/oradata/arch012.rdo');
```

Enabling *i*SQL*Plus DBA Access

```
$ isqlplusctl stop

$ JAVA_HOME=$ORACLE_HOME/jdk
$ export JAVA_HOME
$ cd $ORACLE_HOME/oc4j/j2ee/isqlplus/application-deployments/isqlplus
$ $JAVA_HOME/bin/java -
Djava.security.properties=$ORACLE_HOME/oc4j/j2ee/home/config/jazn.security.p
rops -jar $ORACLE_HOME/oc4j/j2ee/home/jazn.jar -user "iSQL*Plus DBA/admin" -
password welcome –shell

JAZN:> adduser "iSQL*Plus DBA" jfv jfv
JAZN:> grantrole webDba "iSQL*Plus DBA" jfv
JAZN:> exit

$ isqlplusctl start
```

AUTO_SPACE_ADVISOR_JOB

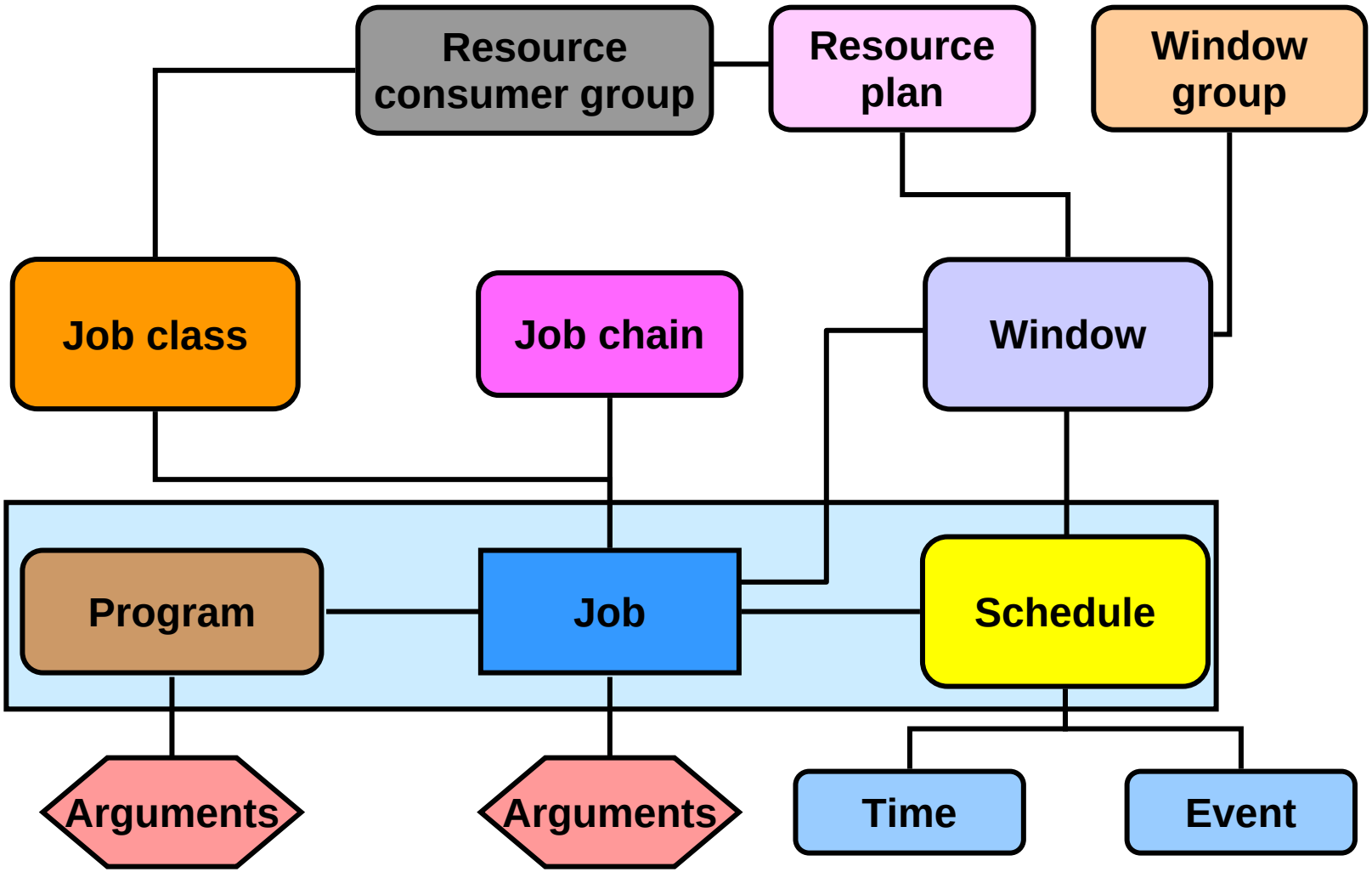




Automatically Tuned Multiblock Reads

- **`DB_FILE_MULTIBLOCK_READ_COUNT` is now automatically tuned.**
- **This simplifies the determination of the best value.**
- **Optimal I/O size is platform dependent.**
  - **Cannot exceed 10% of the cache**
    - **Prefetch limited to 64 KB**
  - **Prevents swamping of the cache**
- **Automatically enabled if not set or set to zero**

Scheduler Concepts



Creating an Event-Based Job

Example: Create a job that runs if a batch load data file arrives on the file system before 9:00 a.m.

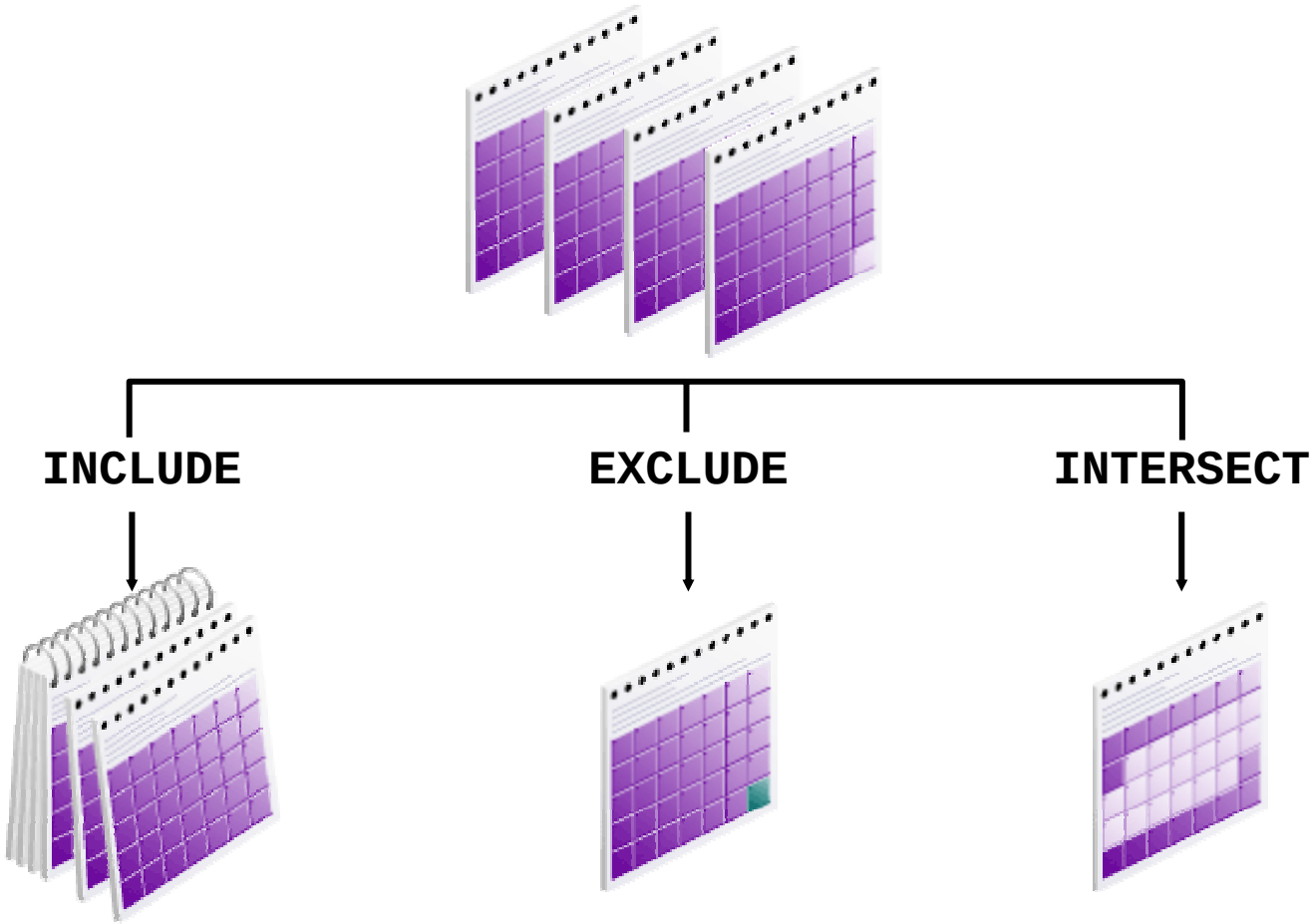
```
BEGIN
 DBMS_SCHEDULER.CREATE_JOB(
  job_name=>'ADMIN.PERFORM_DATA_LOAD',
  job_type => 'EXECUTABLE',
  job_action => '/home/usr/dba/rman/report_failure.sh',
  start_date => SYSTIMESTAMP,
  event_condition => 'tab.user_data.object_owner =
  ''HR'' and tab.user_data.object_name = ''DATA.TXT''
  and tab.user_data.event_type = ''FILE_ARRIVAL''
  and tab.user_data.event_timestamp < 9 ',
  queue_spec => 'HR.LOAD_JOB_EVENT_Q');
END;
```

Events Raised by the Scheduler

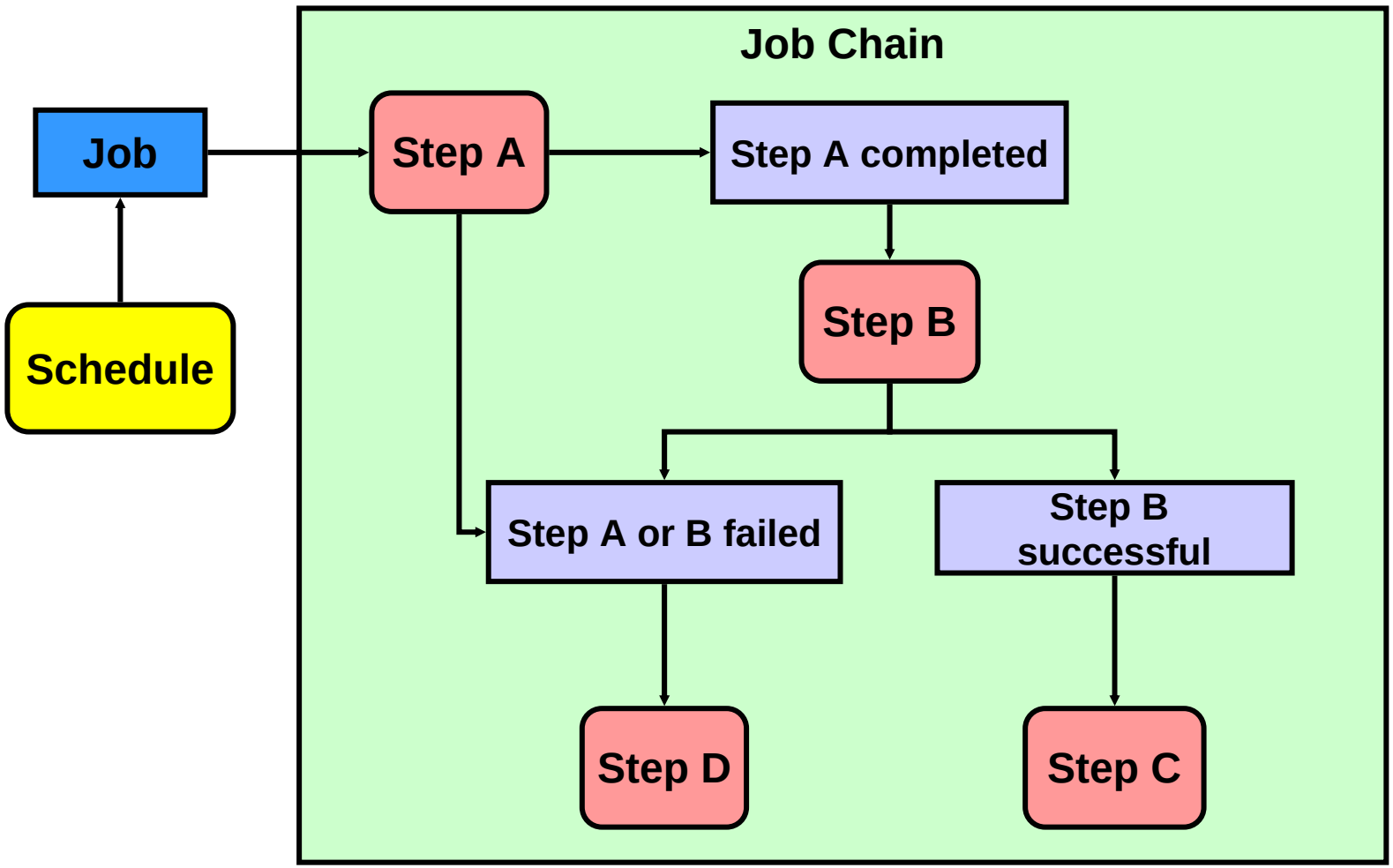
The following events can be raised by jobs that are managed by the Scheduler:

- **JOB_START**
- **JOB_SUCCEEDED**
- **JOB_FAILED**
- **JOB_BROKEN**
- **JOB_COMPLETED**
- **JOB_STOPPED**
- **JOB_OVER_MAX_DUR**
- **JOB_SCH_LIM_REACHED**

Creating Complex Schedules

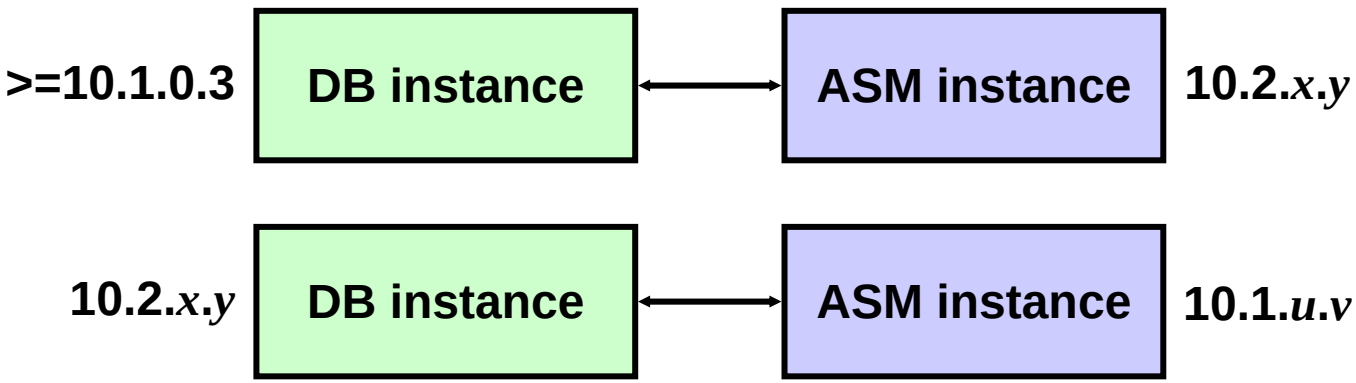


Scheduler Job Chain Concepts



Transparent Multiversion Support

- Any combination of ASM/DB instance supported
- No need for migration or administrative action
- Earliest version between ASM/DB always used
- V$ASM_CLIENT:
  - SOFTWARE_VERSION
  - COMPATIBLE_VERSION



That's all folks

Thank You