Table spaces and operation with table spaces

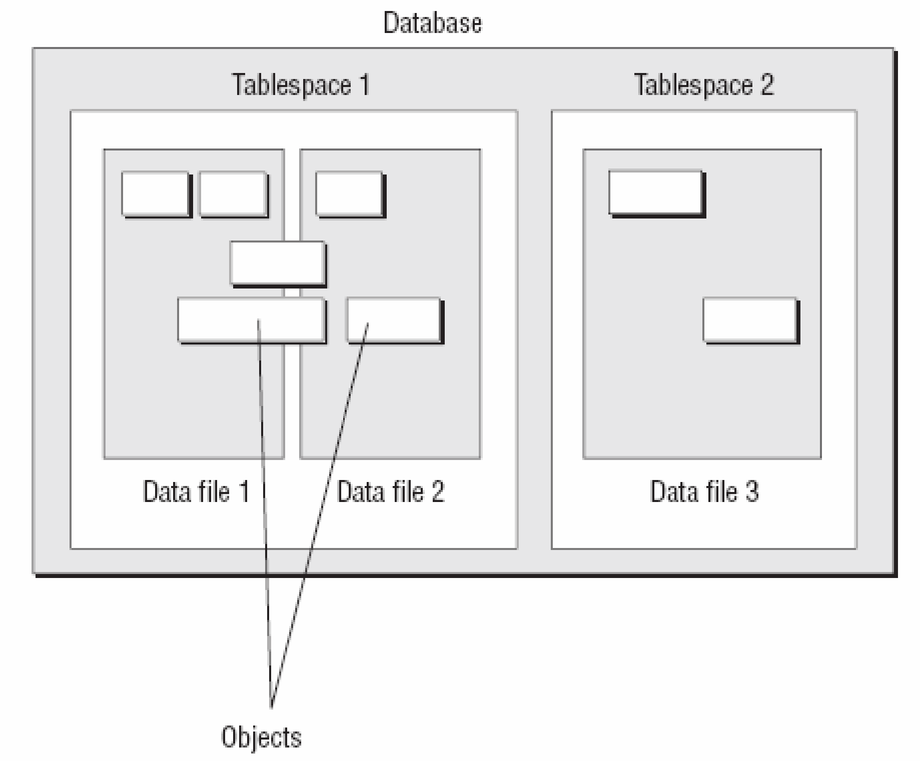
What is Tablespace

- Table space is collection of data files.
- One data file belongs to one table space
- But a table space contains many data files.
- That's physical structure of table space
- But logically table space contains segments.
- A segment can represent a table, indexes, objects etc.
- In 10 g or onward minimum two tablespace are required.

These are:

1- SYSTEM tablespace
2- SYSAUX tablespace

By defaults system create 6 tablespaces.



Special Kind of Tablespaces

1- Big file Tablespace

- Maximum size could be 128 TB
- Manage whole tablespace as unit
- Does not worry about its size

2- Temporary tablespace

- Used to contains temporary segments

- Like UNION, JOIN, ORDER BY

3- System Tablespace

- By defaults system tablespace used as temporary tablespace.
- Permanent in nature but segments are temporary in nature.
- Mandatory in the system
- Contains very important data

It contains Data dictionary: it is a Meta data, means data about data

- For example: when we create a table, who create the table, what columns are there in the table.

Tablespaces and Data Files

- The size of tablespace is the total size of all the data files in the tablespace.
- Smallest unit of storage is a Block in database.
- We can define the Block size when database created, and we can’t alter it.
- You can add more space to a tablespace by adding more data files in the tablespace.

Types of Table Spaces:

- **Permanent**
  You use permanent tablespaces to store your user and application data. Each user is assigned a default permanent tablespace.
  Example: System Table Space

- **Undo**
  It Create and manage undo data in the undo tablespace. In Oracle it is use to role back the transactions and to help with database recovery. A database instance can have only one active undo tablespace.

- **Read only**

It is a permanent tablespace that can only be read, no writes can take place, but the tablespace can be made read/write.

- **Temporary**
  Temporary tablespaces are used for storing temporary data. An Oracle database gets a temporary tablespace when the database is created. You would create another temporary tablespace if you were creating a temporary tablespace group
  To create temporary table Space:
  - ➢ CREATE TABLESPACE TEMPDATAFILE'/disk5/oradata/MYDB01/temp01.dbf' SIZE 300M

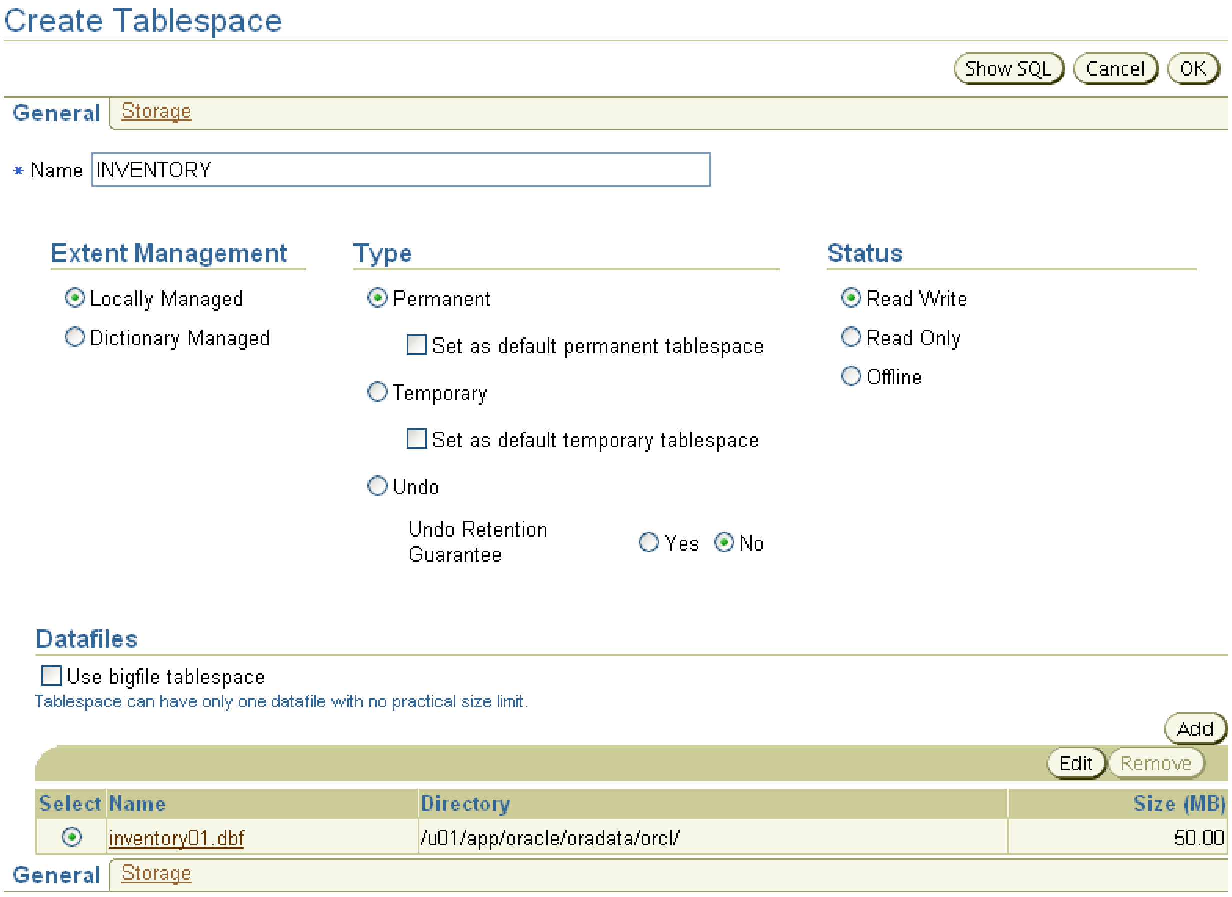
DEFAULT STORAGE (INITIAL 2M NEXT 2M PCTINCREASE 0
MAXEXTENTS UNLIMITED) TEMPORARY;

Creating a Tablespace

- Using the CREATE TABLESPACE statement creates a tablespace.
- CREATE TABLESPACE APPLICATION_DATA,

TIP:

- The tablespace name cannot exceed 30 characters.
- The name should begin with an alphabetic character and can contain alphabetic characters, numeric characters, and the special characters #, _, and$.



Create Tablespace

* Name INVENTORY

Extent Management

● Locally Managed

○ Dictionary Managed

Type

● Permanent

□ Set as default permanent tablespace

○ Temporary

□ Set as default temporary tablespace

○ Undo

Undo Retention Guarantee ○ Yes ● No

Status

● Read Write

○ Read Only

○ Offline

Datafiles

□ Use bigfile tablespace

Tablespace can have only one datafile with no practical size limit.

Select	Name	Directory	Size (MB)
●	inventory01.dbf	/u01/app/oracle/oradata/orcl/	50.00

Dictionary-Managed Tablespaces

In dictionary-managed tablespaces, all extent information is stored in the data dictionary. A simple example of a dictionary-managed tablespace creation command is as follows:

- ➢ CREATE TABLESPACE APPL_DATA DATAFILE '/disk3/oradata/DB01/appl_data01.dbf' SIZE 100M;

EXTENT MANAGEMENT DICTIONARY;

You may need to create more files if there are any operating system limits on the file size. For example, if you need to allocate 6GB for the tablespace, and the operating system allows only a 2GB maximum, you need three data files for the tablespace. The statement is then as follows:

-
  ```
  CREATE TABLESPACE APPL_DATADATAFILE
  '/disk3/oradata/DB01/appl_data01.dbf' SIZE 2000M,
  '/disk3/oradata/DB01/appl_data02.dbf' SIZE 2000M,
  '/disk4/oradata/DB01/appl_data03.dbf' SIZE 2000M;
  ```

DEFAULT STORAGE

Specifies the default storage parameters for new objects that are created in the tablespace.

BLOCKSIZE

Specifies the block size that is used for the objects created in the tablespace.
By default, this block size is the database block size, which you define using the DB_BLOCK_SIZE parameter when creating the database.

INITIAL

Specifies the size of the object’s (segment’s) first extent. NEXT specifies the size of the segment’s next and successive extents. The size is specified in bytes. You can also specify the size in KB by post-fixing the size with K, or you can specify MB by post-fixing the size with M.

MINEXTENTS

Specifies the total number of extents allocated to the segment at the time of creation. Using this parameter, you can allocate a large amount of space when you create an object, even if the space available is not contiguous.

MINIMUM EXTENT

Specifies that the extent sizes are a multiple of the size specified. You can use this clause to control fragmentation in the tablespace by allocating extents of at least the size specified and as always a multiple of the size specified.

LOGGING

Specifies that the DDL operations and direct-load INSERT are recorded in the redo log files. LOGGING is the default, and you can omit the clause. When you specify
NOLOGGING, data is modified with minimal logging and hence the commands complete faster.

ONLINE

Specifies that the tablespace be created online or available as soon as it is created. ONLINE is the default,

PERMANENT

Specifies whether the tablespace is to be used to create permanent objects such as tables, indexes, and so on. PERMANENT is the default, and hence you can omit it.

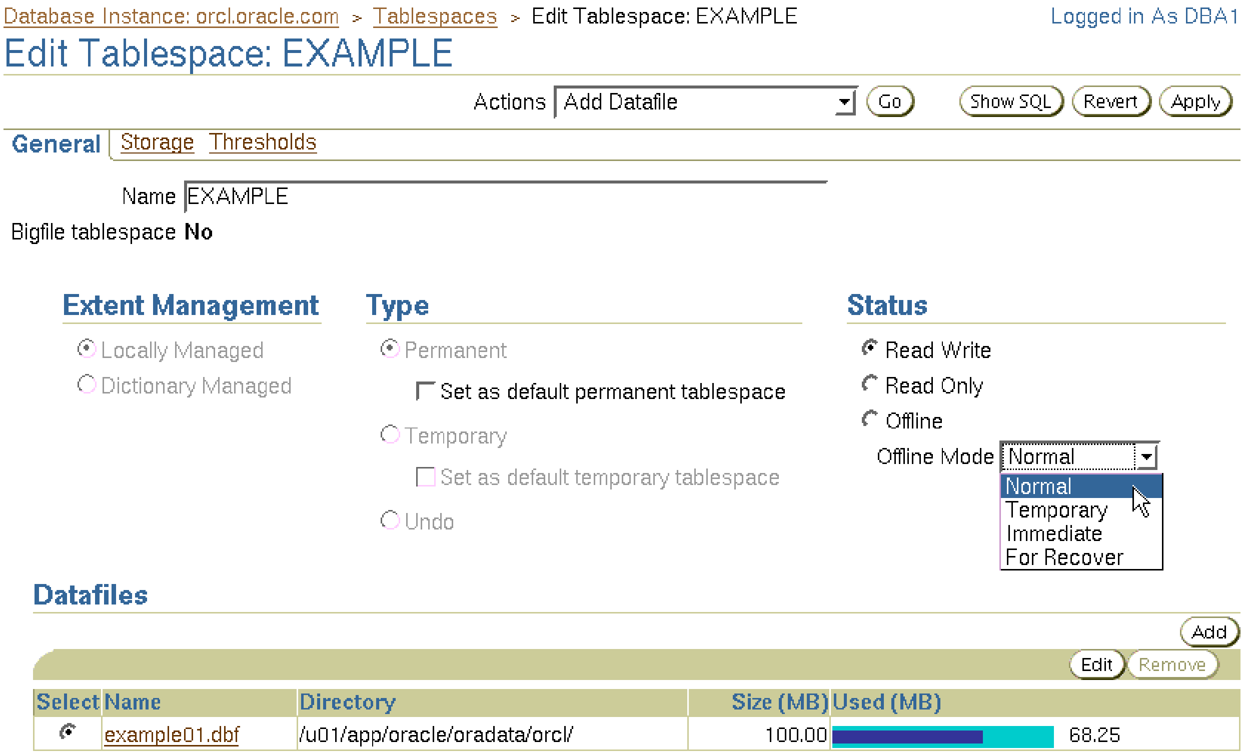
Using Non-standard Block Sizes

When creating the database, you specify the block size in the initialization parameter using the parameter
DB_BLOCK_SIZE
This specification is known as the standard block size for the database. When creating a tablespace with a non-standard block size, you must specify the BLOCKSIZE clause in the CREATE TABLESPACE statement. The initialization parameter is
DB_nK_CACHE_SIZE
; n is the non-standard block size. It can have the values
2, 4, 8, 16, or 32,

Altering a Tablespace

You can alter a tablespace using the ALTER TABLESPACE command. This command allow you to do the following:

- Change the default storage parameters of a dictionary-managed tablespace
- Change the extent allocation and LOGGING/NOLOGGING modes
- Change the tablespace from PERMANENT to TEMPORARY or vice versa
- Change the availability of the tablespace
- Make the tablespace read-only or read-write
- Coalesce the contiguous free space
- Add more space by adding new data files or temporary files
- Rename files belonging to the tablespace
- Begin and end a backup



Database Instance: orcl.oracle.com > Tablespaces > Edit Tablespace: EXAMPLE   Logged in As DBA1

Edit Tablespace: EXAMPLE

Actions: Add Datafile

Name: EXAMPLE
Bigfile tablespace **No**

Extent Management
● Locally Managed
○ Dictionary Managed

Type
● Permanent
□ Set as default permanent tablespace
○ Temporary
□ Set as default temporary tablespace
○ Undo

Status
● Read Write
○ Read Only
○ Offline
Offline Mode: Normal

Datafiles

Select	Name	Directory	Size (MB)	Used (MB)
●	example01.dbf	/u01/app/oracle/oradata/orcl/	100.00	68.25

Table Space Availability

OBJECTIVE: Change the status of tablespaces: You can control the availability of certain tablespaces by placing them offline or online. When you make a tablespace offline, the segments in that tablespace are not accessible. The data stored in other tablespaces is available for use. When making a tablespace unavailable, you can use the following four options:

NORMAL

This option is the default. By normally we can change the state of the tablespace to offline or online. To offline the tablespace:

ALTER TABLESPACE USER_DATA OFFLINE NORMAL

TEMPORARY

Oracle performs a checkpoint on all online data files. It does not ensure that the data files are available. You might need to perform a media recovery on the offline data files when the tablespace is brought online. For example:

- ALTER TABLESPACE USER_DATA OFFLINE TEMPORARY

IMMEDIATE

Oracle does not perform a checkpoint and does not make sure that all data files are available. You must perform a media recovery when the tablespace is brought back online. For example:

- ALTER TABLESPACE USER_DATA OFFLINE IMMEDIATE;

FOR RECOVER

This option places the tablespace offline for point-in-time recovery. You can copy the data files belonging to the tablespace from a backup and apply the archive log files. For example:

- ALTER TABLESPACE USER_DATA OFFLINE FOR RECOVER;

Read-Only Tablespace

If you do not want users to change any data in the tablespace, you can specify that it is read only. All objects in the tablespace are available for queries. INSERT, UPDATE, and DELETE operations on the data are not allowed.

- ALTER TABLESPACE USERS READ ONLY;

To change a tablespace to read-write mode, use the following command:

- ALTER TABLESPACE USERS READ WRITE;

Adding Space to a Tablespace

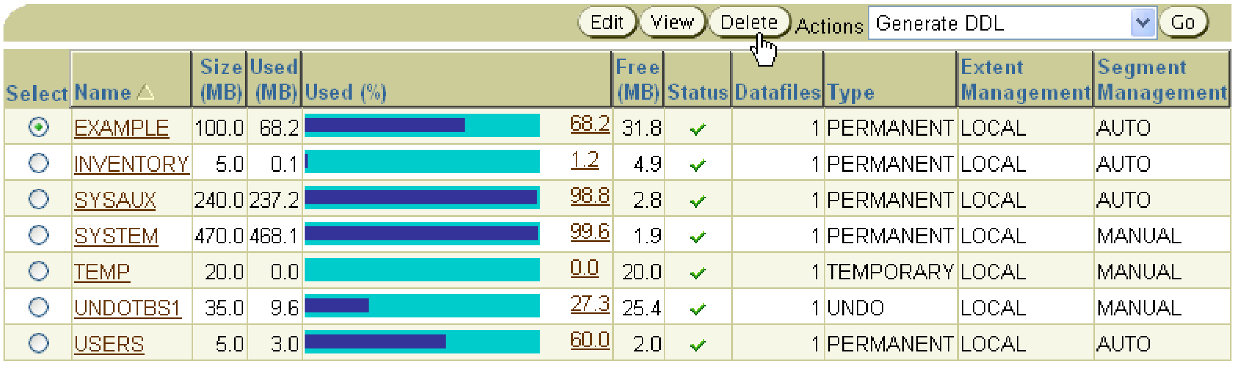
OBJECTIVE: Change the size of the tablespace

- ALTER TABLESPACE USERS ADD DATAFILE'/disk5/oradata/DB01/users02.dbf' SIZE 25M For temporary Tablespace
- ALTER TABLESPACE USER_TEMP ADDTEMPFILE'/disk4/oradata/DB01/user_temp01.dbf' SIZE 100M;

Dropping a Tablespace

You use the DROP TABLESPACE statement to drop a tablespace from the database.

- DROP TABLESPACE USER_DATA;



Select	Name △	Size (MB)	Used (MB)	Used (%)	Free (MB)	Status	Datafiles	Type	Extent Management	Segment Management
●	EXAMPLE	100.0	68.2	68.2	31.8	✓	1	PERMANENT	LOCAL	AUTO
○	INVENTORY	5.0	0.1	1.2	4.9	✓	1	PERMANENT	LOCAL	AUTO
○	SYSAUX	240.0	237.2	98.8	2.8	✓	1	PERMANENT	LOCAL	AUTO
○	SYSTEM	470.0	468.1	99.6	1.9	✓	1	PERMANENT	LOCAL	MANUAL
○	TEMP	20.0	0.0	0.0	20.0	✓	1	TEMPORARY	LOCAL	MANUAL
○	UNDOTBS1	35.0	9.6	27.3	25.4	✓	1	UNDO	LOCAL	MANUAL
○	USERS	5.0	3.0	60.0	2.0	✓	1	PERMANENT	LOCAL	AUTO

----------------------The End----------------------