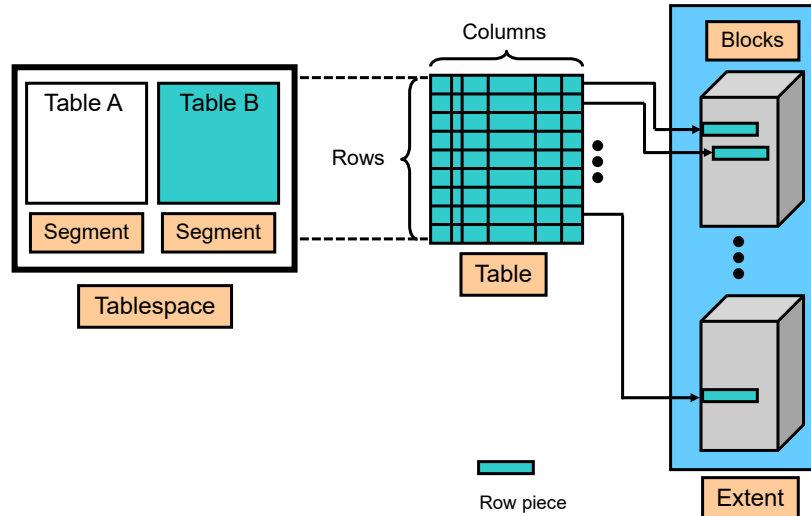# Managing Database Storage Structures

*7*

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# Objectives

After completing this lesson, you should be able to:

- Describe the storage of table row data in blocks
- Create and manage tablespaces
- Obtain tablespace information

# How Table Data Is Stored

Columns

Blocks

Table A | Table B

Rows

Segment | Segment

Table

Tablespace

Row piece

Extent

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# Exploring the Storage Structure

ORACLE Enterprise Manager  Database Express 12c

ORCL (12.1.0.1.0)   Configuration ▼   Storage ▼   Security ▼   Performance ▼

**Database Home**

☑ Status

Tablespaces

Undo Management

Redo Log Groups

Archive Logs

Control Files

Up Time    9 days, 2 hours, 32 minu
Type       Single instance (orcl)
Version    12.1.0.1.0 Enterprise Edi
Database Name  ORCL

1.2

ORACLE Enterprise Manager  Database Express 12c          Help ▼   SYSTEM  Log Out ⏻

ORCL (12.1.0.1.0)   Configuration ▼   Storage ▼   Security ▼   Performance ▼          EDRSR11P1

**Tablespaces**          Page Refreshed 11:12:01 AM GMT+00  ⟳

Actions ▼   View ▼   Create   Drop   Add Datafile          Permanent   Tablespace Name

| Name | Size | Free Space | Used (%) | Auto... | Max... | Status | Type | Group ... | Auto... | Directory |
|------|------|-----------|----------|---------|--------|--------|------|-----------|---------|-----------|
| ⊞ EXAMPLE | 350MB | 35MB | 90.2 | ✓ | Unlimit | ● |  |  | ✓ | /u01/app/oracle/oradata/... |
| ⊞ SYSAUX | 1GB | 55MB | 95 | ✓ | Unlimit | ● |  |  | ✓ | /u01/app/oracle/oradata/... |
| ⊞ SYSTEM | 800MB | 6MB | 99.3 | ✓ | Unlimit | ● |  |  |  | /u01/app/oracle/oradata/... |
| ⊞ TEMP | 103MB | 102MB | 1 | ✓ | Unlimit | ● |  |  |  | /u01/app/oracle/oradata/... |
| ⊞ UNDOTBS1 | 150MB | 137MB | 8.9 | ✓ | Unlimit | ● |  |  |  | /u01/app/oracle/oradata/... |
| ⊞ USERS | 5MB | 3MB | 33.8 | ✓ | Unlimit | ● |  |  | ✓ | /u01/app/oracle/oradata/... |

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Creating a New Tablespace

7 - 5



Creating a New Tablespace

7 - 6

3

# Creating a New Tablespace

# Creating a New Tablespace

# Creating a New Tablespace

# Overview of Tablespaces Created by Default

- EXAMPLE (optional)
- SYSAUX
- SYSTEM

- TEMP
- UNDOTBS1
- USERS

**5**

# Altering a Tablespace
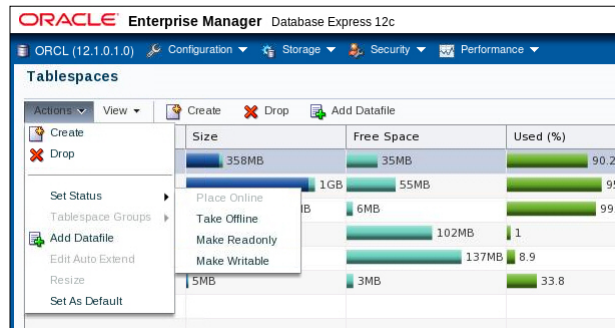
# Adding a Data File to a Tablespace

6
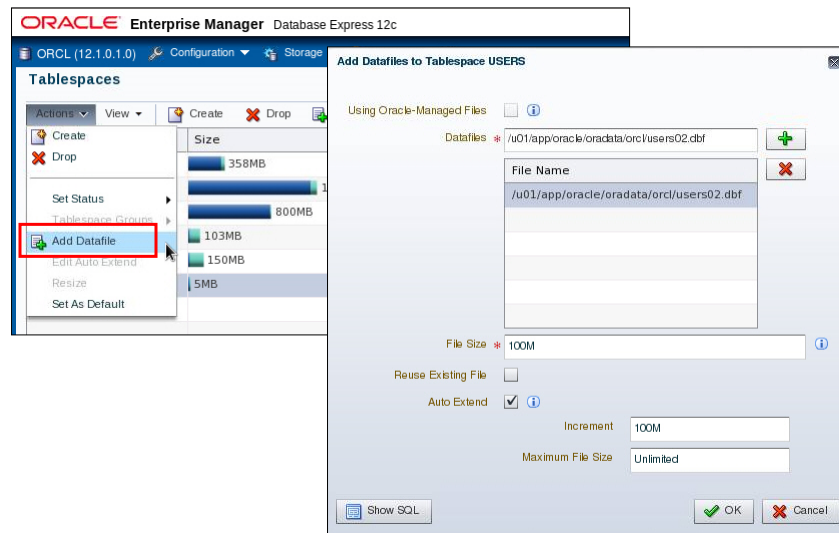
## Making Changes to a Data File

## Dropping Tablespaces

7

## Viewing Tablespace Information

```
SQL> SELECT tablespace_name, status, contents, logging,
  2  extent_management, allocation_type,
  3  segment_space_management
  4  FROM dba_tablespaces;

TABLESPACE_NAME STATUS  CONTENTS  LOGGING   EXTENT_MAN ALLOCATIO SEGMEN
--------------- ------- --------- --------- ---------- --------- -----
SYSTEM          ONLINE  PERMANENT LOGGING   LOCAL      SYSTEM    MANUAL
SYSAUX          ONLINE  PERMANENT LOGGING   LOCAL      SYSTEM    AUTO
UNDOTBS1        ONLINE  UNDO      LOGGING   LOCAL      SYSTEM    MANUAL
TEMP            ONLINE  TEMPORARY NOLOGGING LOCAL      UNIFORM   MANUAL
USERS           ONLINE  PERMANENT LOGGING   LOCAL      SYSTEM    AUTO
EXAMPLE         ONLINE  PERMANENT NOLOGGING LOCAL      SYSTEM    AUTO

SQL> SELECT file_name, file_id, tablespace_name
  2  FROM dba_data_files;
FILE_NAME                                   FILE_ID    TABLESPACE_NAME
------------------------------------------- ---------- ----------------
/u01/app/oracle/oradata/orcl/system01.dbf         1 SYSTEM
/u01/app/oracle/oradata/orcl/sysaux01.dbf         3 SYSAUX
/u01/app/oracle/oradata/orcl/users01.dbf          6 USERS
/u01/app/oracle/oradata/orcl/example01.dbf        2 EXAMPLE
/u01/app/oracle/oradata/orcl/undotbs01.dbf        4 UNDOTBS1
```

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## Oracle Managed Files (OMF)

Specify file operations in terms of database objects rather than file names.

| Parameter | Description |
|---|---|
| DB_CREATE_FILE_DEST | Defines the location of the default file system directory for data files and temporary files |
| DB_CREATE_ONLINE_LOG_DEST_n | Defines the location for redo log files and control file creation |
| DB_RECOVERY_FILE_DEST | Default location for the fast recovery area |

Example:

```
SQL> ALTER SYSTEM
  2  SET DB_CREATE_FILE_DEST='/u01/app/oracle/oradata';
SQL> CREATE TABLESPACE tbs_1;
```
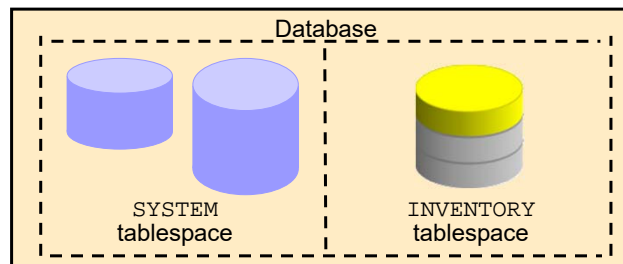
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# Enlarging the Database

You can enlarge the database in the following ways:
- Create a new tablespace.
- Add a data file to an existing smallfile tablespace.
- Increase the size of a data file.
- Provide for the dynamic growth of a data file.

Database

SYSTEM
tablespace

INVENTORY
tablespace

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# Summary

In this lesson, you should have learned how to:
- Describe the storage of table row data in blocks
- Create and manage tablespaces
- Obtain tablespace information

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