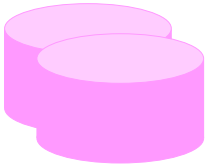
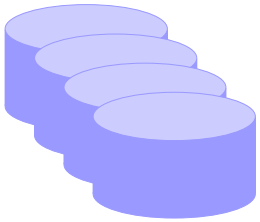
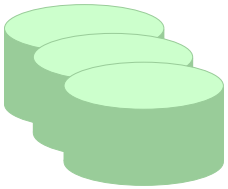
Physical Database Structure



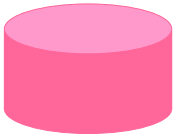
Control files



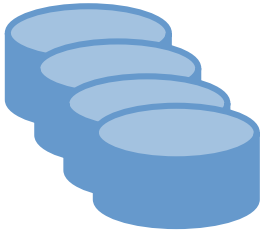
•Data files



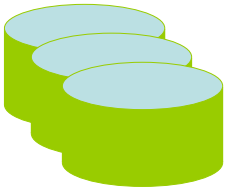
•Online redo log files



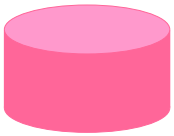
•Parameter file



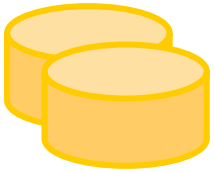
•Backup files



•Archive log files



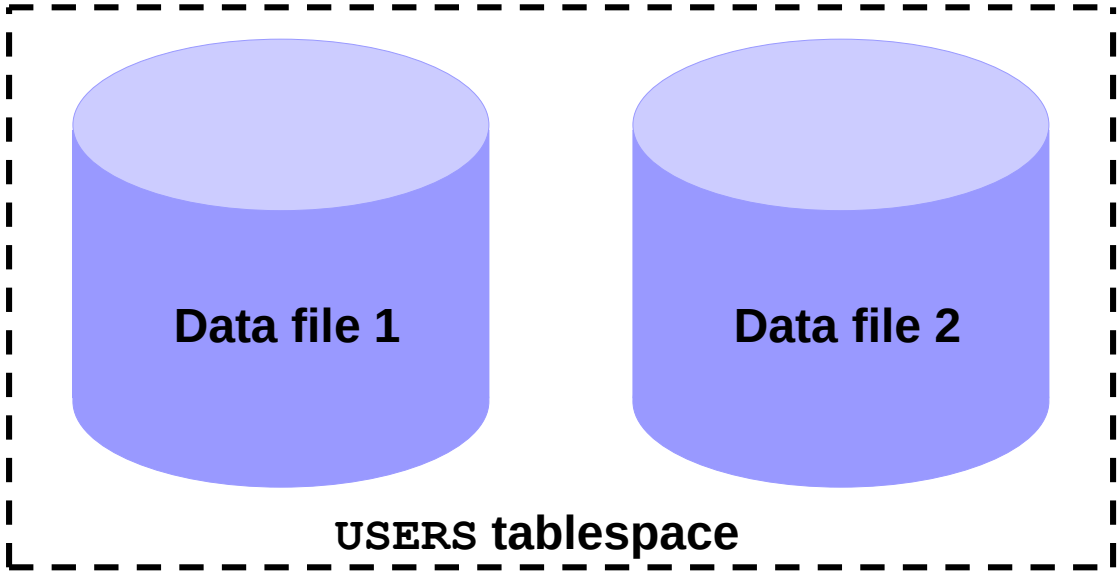
•Password file



•Alert and trace log files

Tablespaces and Data Files

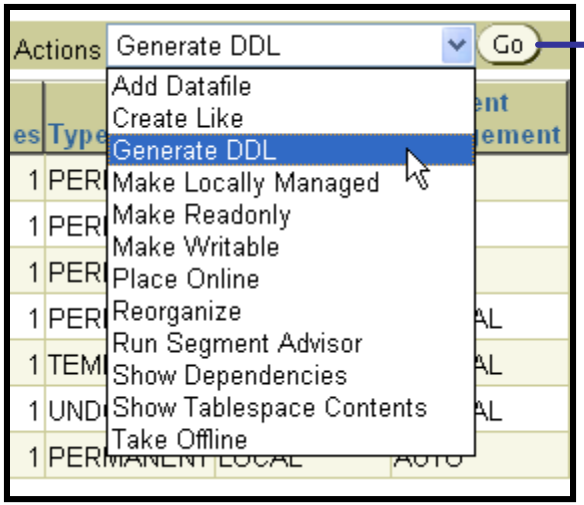
- Tablespaces consist of one or more data files.
- Data files belong to only one tablespace.



SYSTEM and SYSAUX Tablespaces

- The SYSTEM and SYSAUX tablespaces are mandatory tablespaces.
- They are created at the time of database creation.
- They must be online.
- The SYSTEM tablespace is used for core functionality (for example, data dictionary tables).
- The auxiliary SYSAUX tablespace is used for additional database components (such as the Enterprise Manager Repository).

Actions with Tablespaces

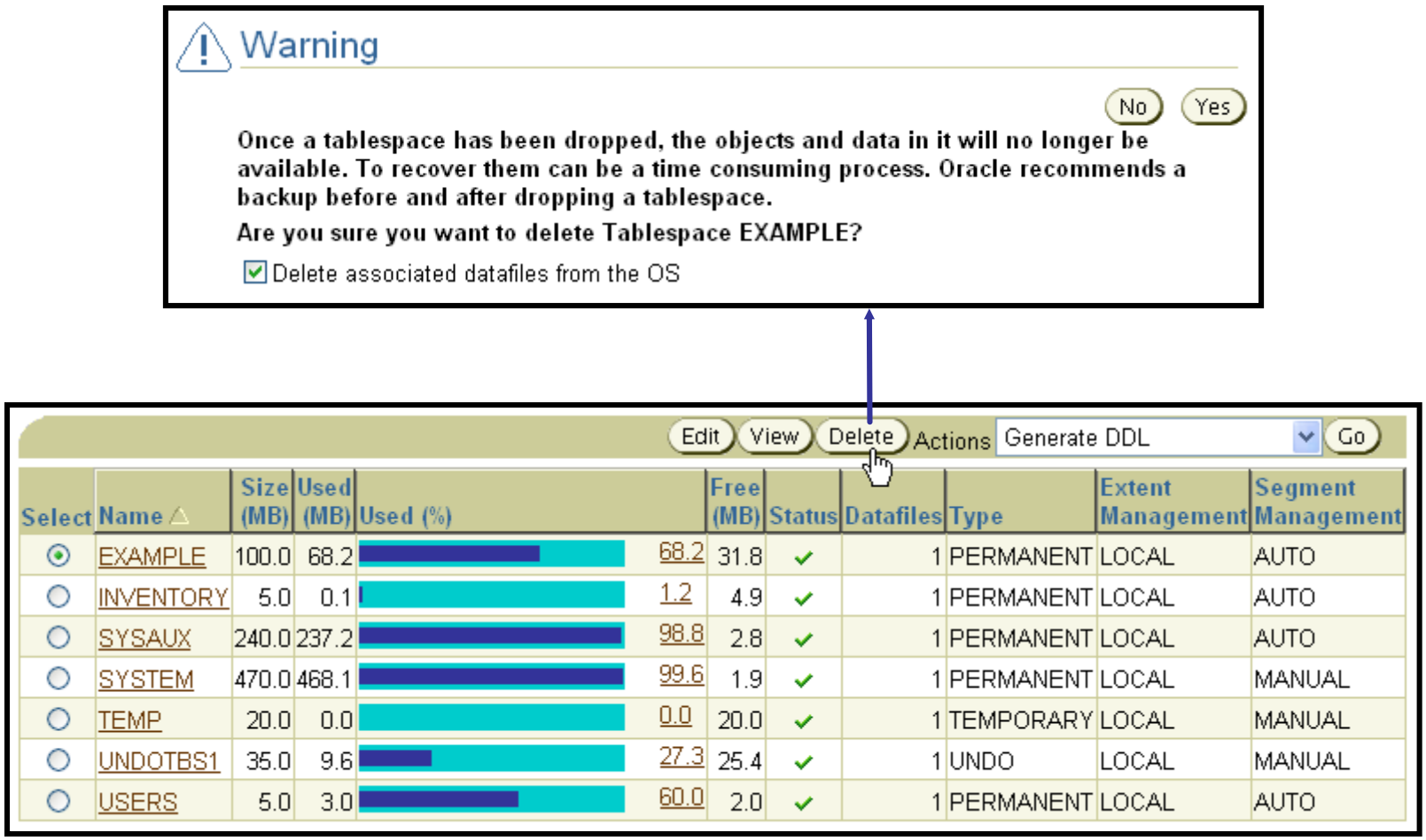


Show DDL

Return

```
CREATE SMALLFILE TABLESPACE "EXAMPLE" DATAFILE
'/u01/app/oracle/oradata/orcl/example01.dbf' SIZE 100M REUSE AUTOEXTEND ON
NEXT 640K MAXSIZE 32767M NOLOGGING EXTENT MANAGEMENT LOCAL SEGMENT SPACE
MANAGEMENT AUTO
```

Dropping Tablespaces



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

Viewing Tablespace Information

```
SELECT tablespace_name, status, contents, logging, extent_management,
allocation_type, segment_space_management
FROM dba_tablespaces
```

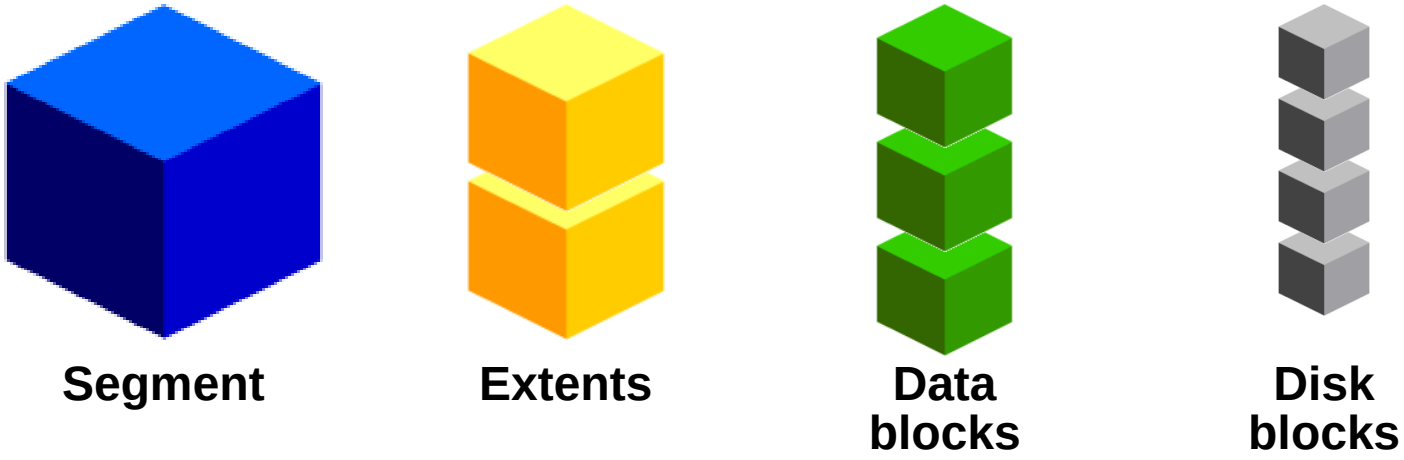
TABLESPACE_NAME	STATUS	CONTENTS	LOGGING	EXTENT_MAN	ALLOCATIO	SEGMEN
SYSTEM	ONLINE	PERMANENT	LOGGING	LOCAL	SYSTEM	MANUAL
UNDOTBS1	ONLINE	UNDO	LOGGING	LOCAL	SYSTEM	MANUAL
SYSAUX	ONLINE	PERMANENT	LOGGING	LOCAL	SYSTEM	AUTO
TEMP	ONLINE	TEMPORARY	NOLOGGING	LOCAL	UNIFORM	MANUAL
USERS	ONLINE	PERMANENT	LOGGING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

```
SELECT ts#, name FROM v$tablespace
```

TS#	NAME
0	SYSTEM
1	UNDOTBS1
2	SYSAUX
4	USERS
3	TEMP
6	EXAMPLE
7	INVENTORY

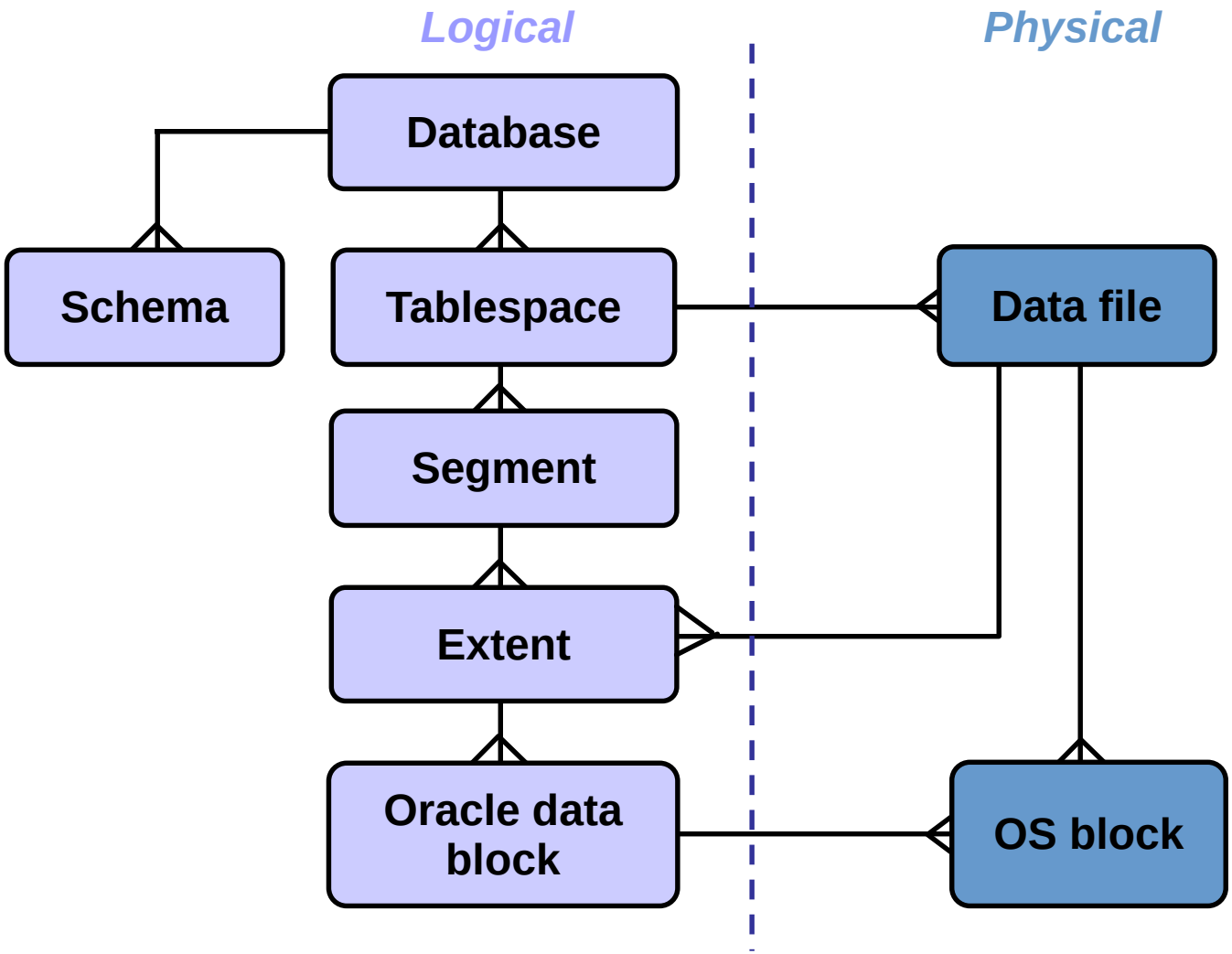
Segments, Extents, and Blocks

- Segments exist within a tablespace.
- Segments are made up of a collection of extents.
- Extents are a collection of data blocks.
- Data blocks are mapped to disk blocks.

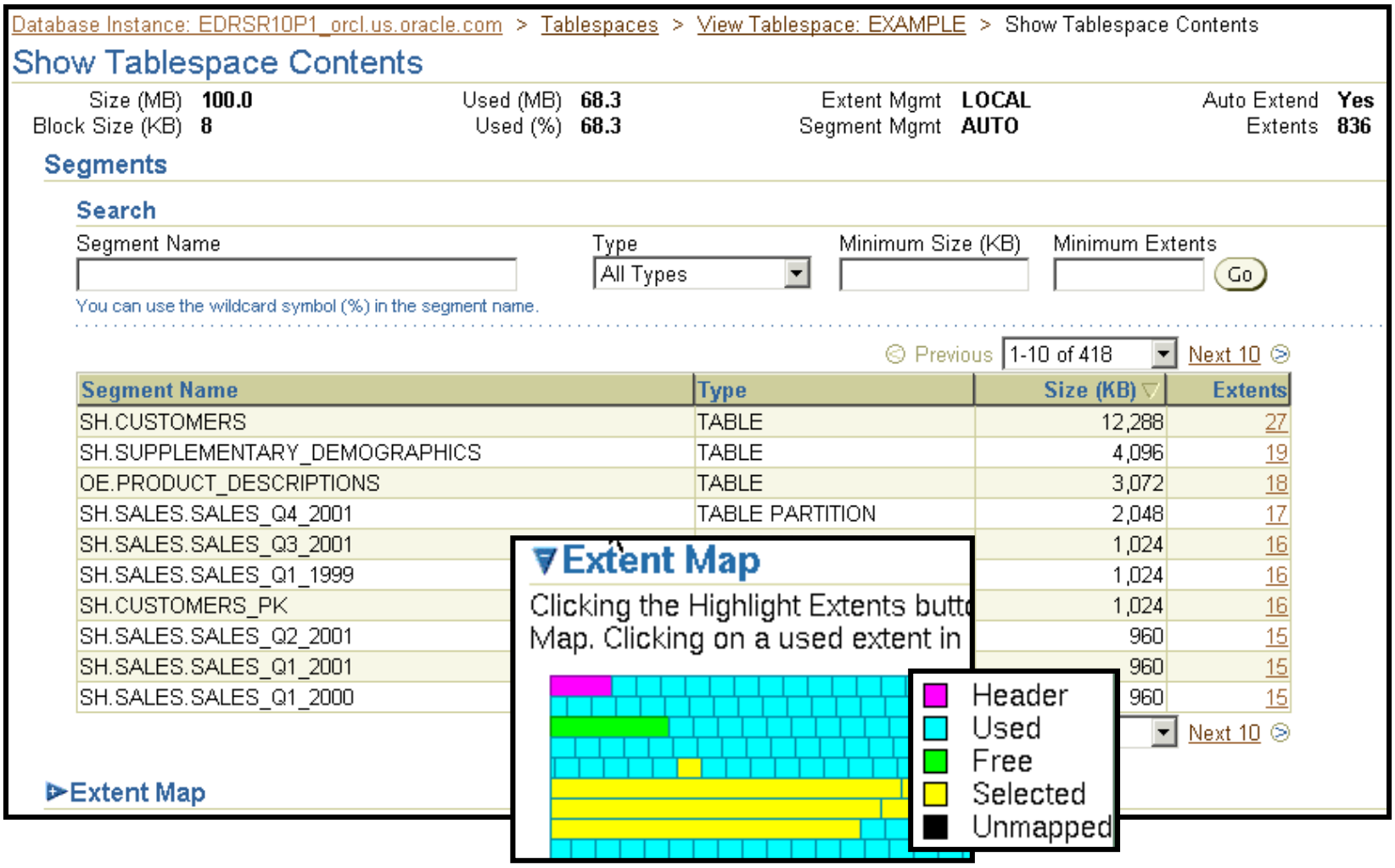


Segment **Extents** **Data blocks** **Disk blocks**

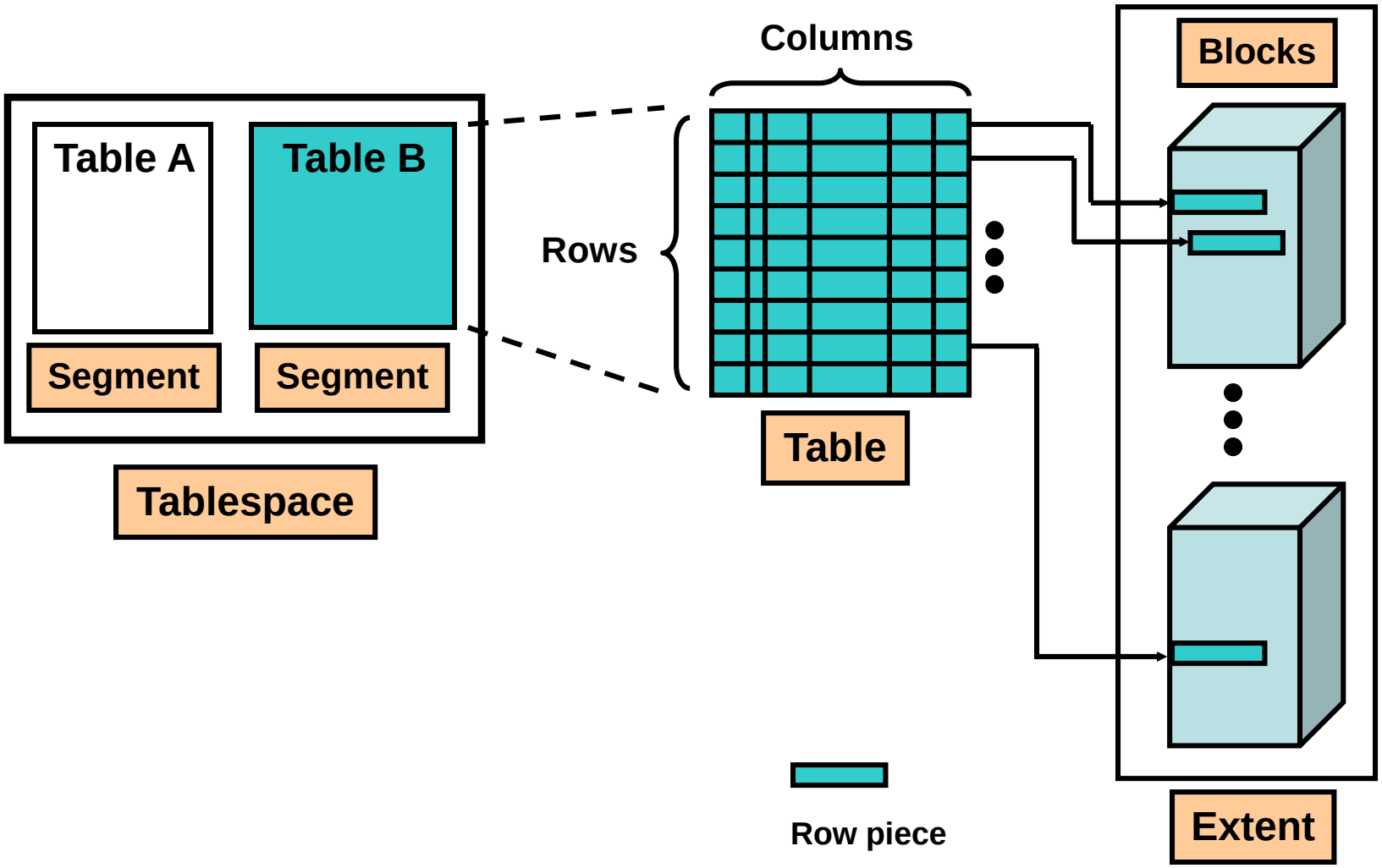
Logical and Physical Database Structures



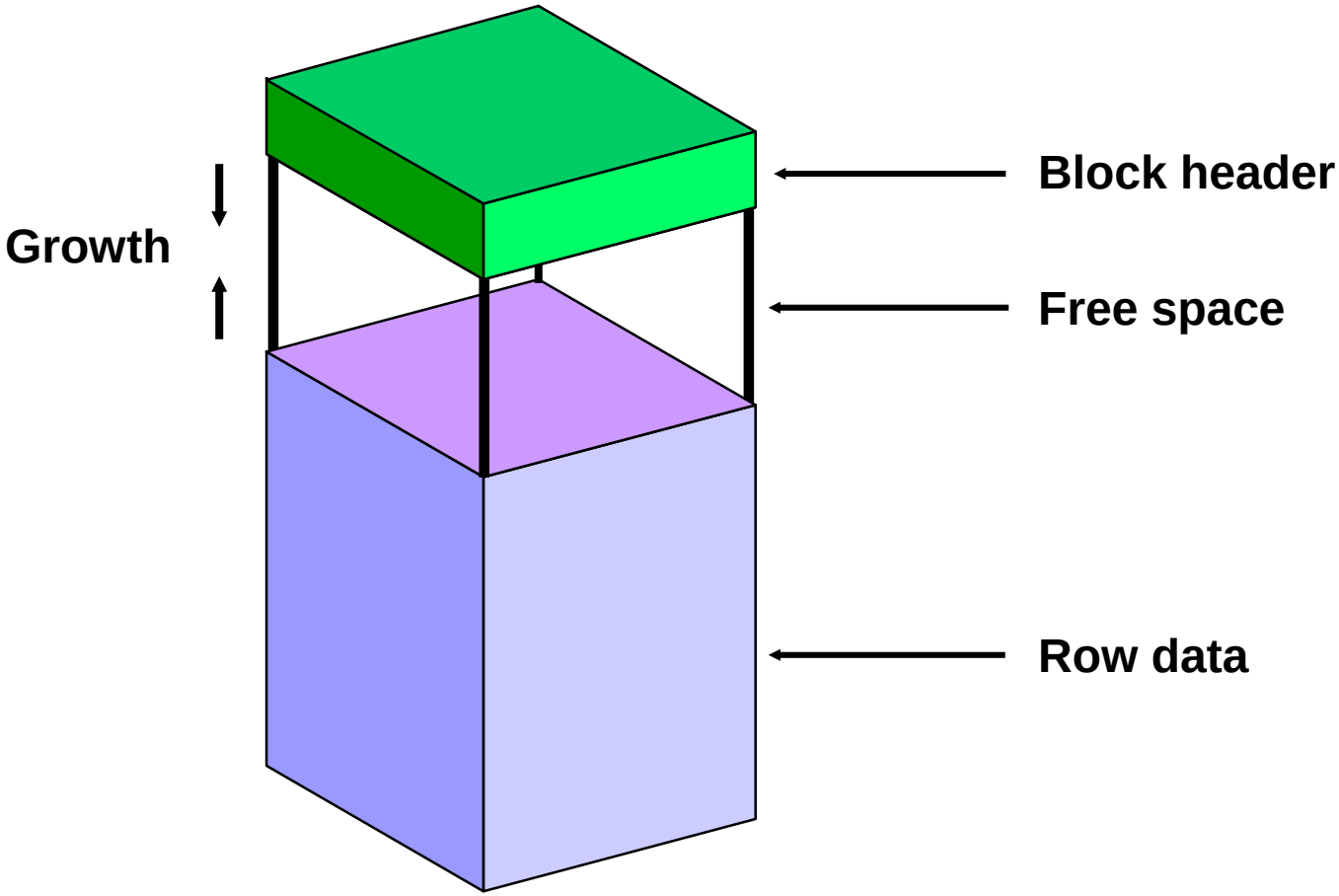
Viewing Tablespace Contents



How Table Data Is Stored

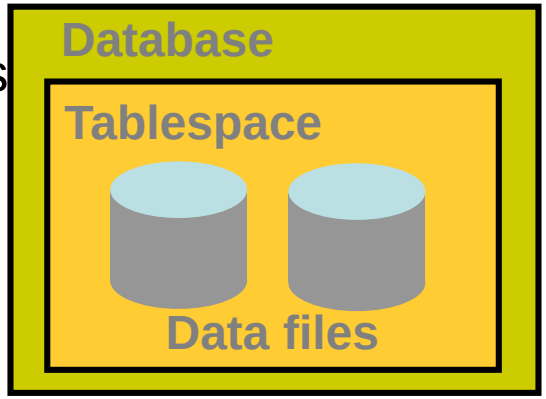


Anatomy of a Database Block



Tablespaces and Data Files

- The Oracle database stores data logically in tablespaces and physically in data files.
  - Tablespaces:
    - Can belong to only one database
    - Consist of one or more data files
    - Are further divided into logical units
  - Data files:
    - Can belong to only one tablespace and one database
    - Are a repository for schema object data

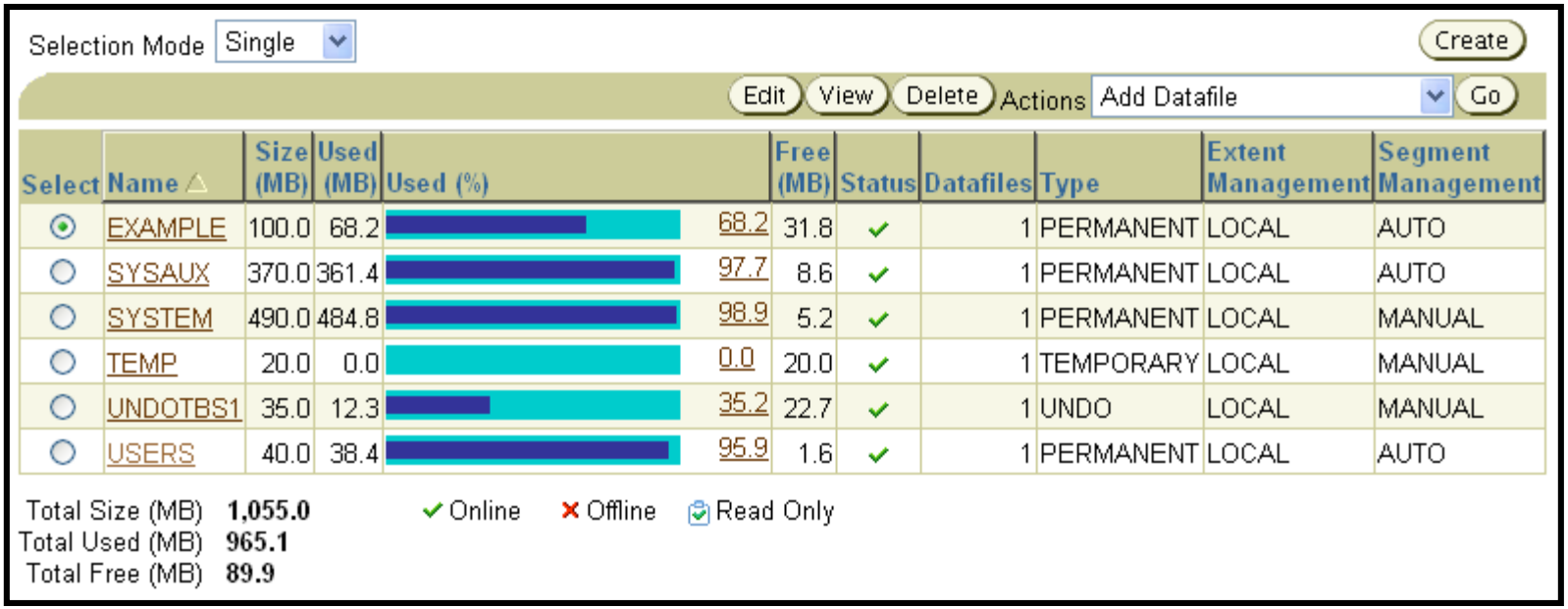


Space Management in Tablespaces

- Locally managed tablespace:
  - Free extents are managed in the tablespace.
  - A bitmap is used to record free extents.
  - Each bit corresponds to a block or group of blocks.
  - The bit value indicates free or used extents.
  - The use of locally managed tablespaces is recommended.
- Dictionary-managed tablespace:
  - Free extents are managed by the data dictionary.
  - Appropriate tables are updated when extents are allocated or unallocated.
  - These tablespaces are supported only for backward compatibility.

Tablespaces in the Preconfigured Database

- SYSTEM
- SYSAUX
- TEMP
- UNDOTBS1
- USERS
- EXAMPLE



Enlarging the Database

– You can enlarge the database in the following ways:
  - Creating a new tablespace
  - Adding a data file to an existing tablespace
  - Increasing the size of a data file
  - Providing for the dynamic growth of a data file