Using Table Compression

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Objectives

By the end of this lecture, you should be able to perform the following:

- Describe and use the basic compression
- Describe and use the advanced compression
- Obtain information about compression used in a database
- Describe the Oracle Hybrid Columnar Compression (HCC)

Table Compression Types

- Basic Compression
- Advanced Compression

Basic Compression

Data Block

Col1	Col2	Col3	Col4
AAAA	BBBB	ZZZ	EFGH
CCCC	DDDD	ZZZ	YYY
EEEE	FFFF	ZZZ	YYY
GGGG	HHHH	ABCD	YYY

With no compression

Basic Compression

Data Block

Col1	Col2	Col3	Col4
AAAA	BBBB	ZZZ	EFGH
CCCC	DDDD	ZZZ	YYY
EEEE	FFFF	ZZZ	YYY
GGGG	HHHH	ABCD	YYY

With no compression

Data Block

ZZZ	link1
YYY	link2

Col1	Col2	Col3	Col4
AAAA	BBBB	link1	EFGH
CCCC	DDDD	link1	link2
EEEE	FFFF	link1	link2
GGGG	HHHH	ABCD	link2

With compression

About Basic Compression

- De-duplication of repeated values
- Works with bulk load operations only:
  - Direct path loading, like Direct path SQL*Loader and **`INSERT /*+ APPEND */`**
  - **`ALTER TABLE MOVE`** (after enabling the compression in the table)
  - Online table redefinition
- Does not compress data inserted by normal **`INSERT`** statements
- Best applied on tables that are loaded in bulk and rarely updated:
  - Better loading performance
  - Better queries performance
- Avoid using basic compression in scenarios other than the above

Implementing Basic Compression

- To implement basic compression (**PCTFREE** will set to 0):

```
CREATE TABLE <tname> ROW STORE COMPRESS [BASIC]
CREATE TABLE <tname> COMPRESS
```

- Can be changed for a table:

```
ALTER TABLE TABLE <tname> ROW STORE COMPRESS [BASIC]
ALTER TABLE <tname> COMPRESS
ALTER TABLE <tname> MOVE COMPRESS
```

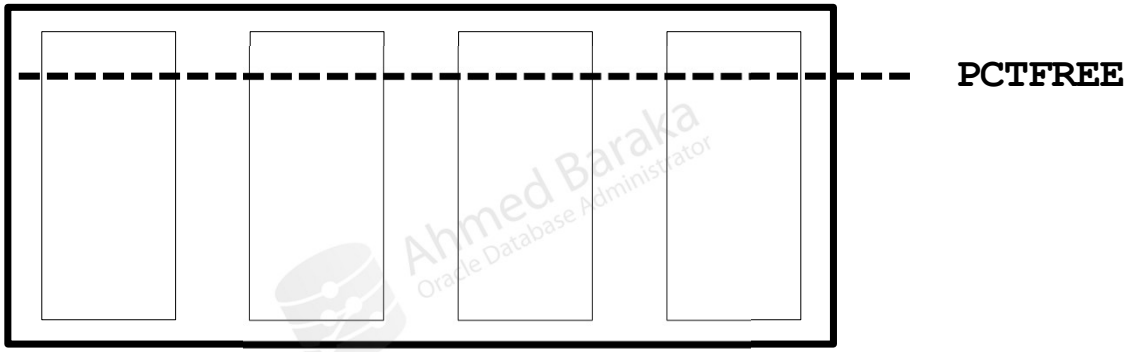
- Can be set at the tablespace level:

```
CREATE TABLESPACE my_tbs ... DEFAULT COMPRESS;
```

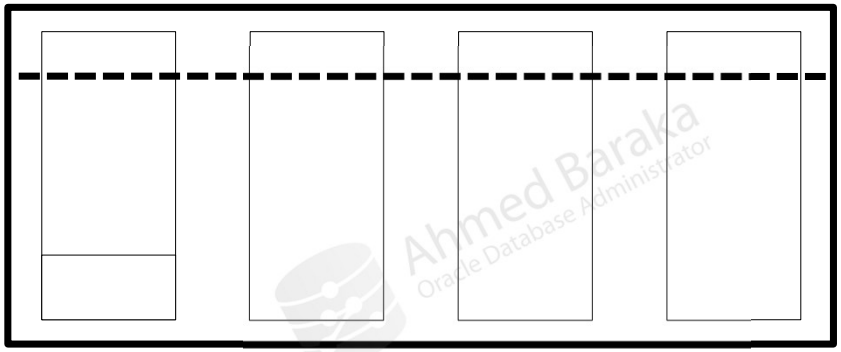
- To disable compression attribute:

```
ALTER TABLE <tname> NOCOMPRESS
```

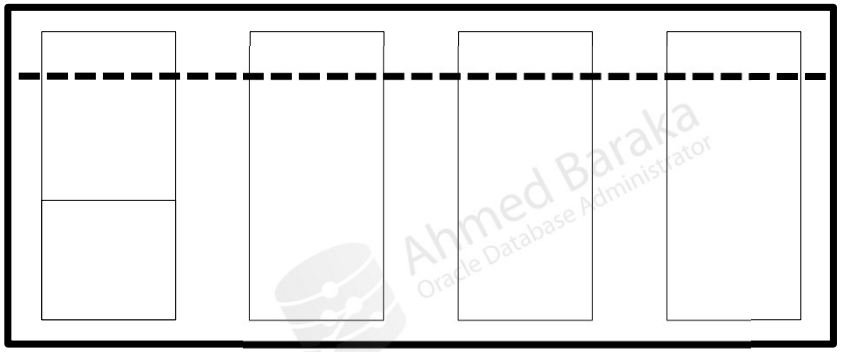
Advanced Compression



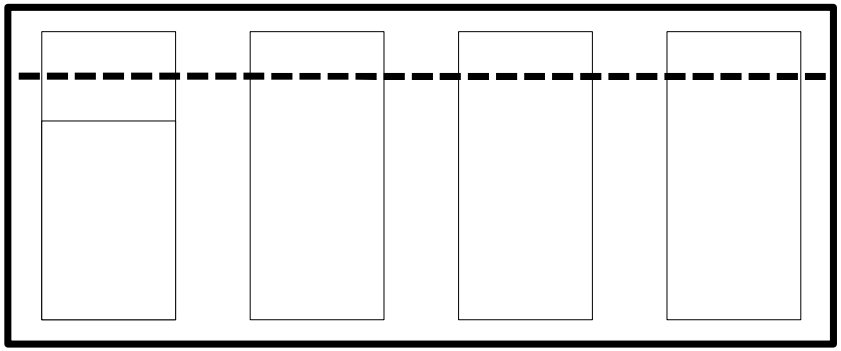
Advanced Compression



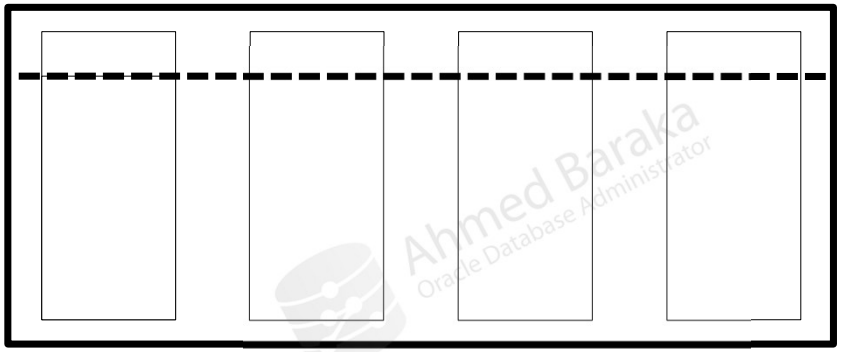
Advanced Compression



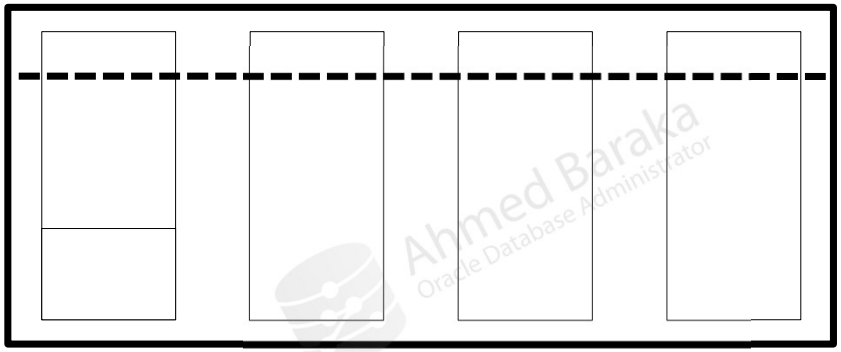
Advanced Compression



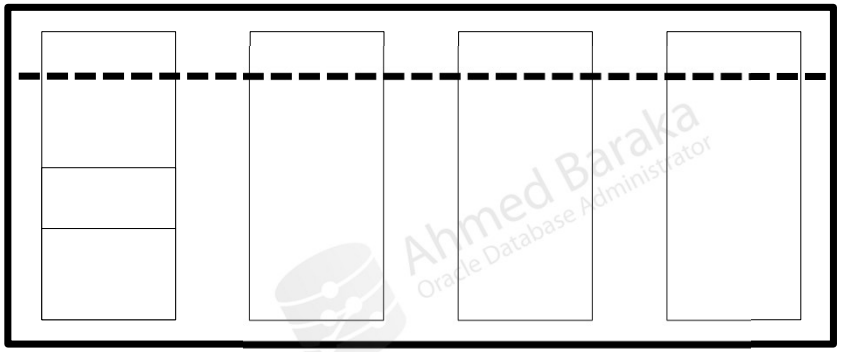
Advanced Compression



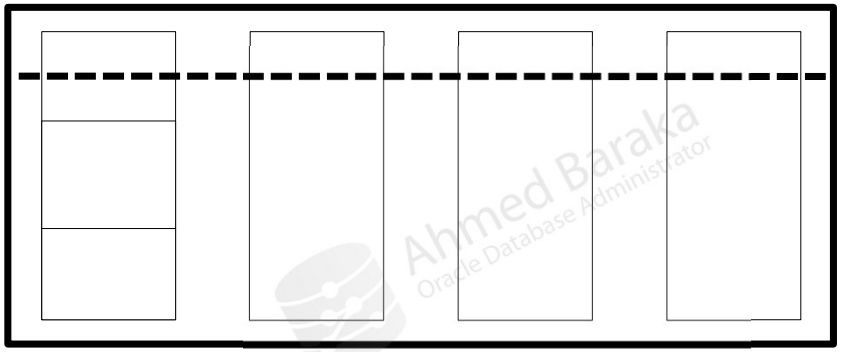
Advanced Compression



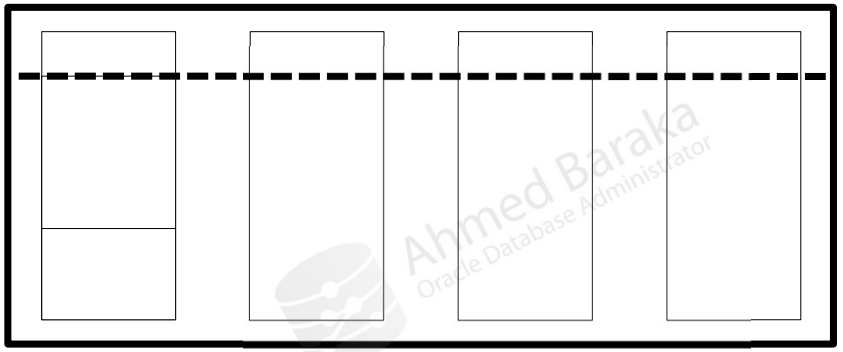
Advanced Compression



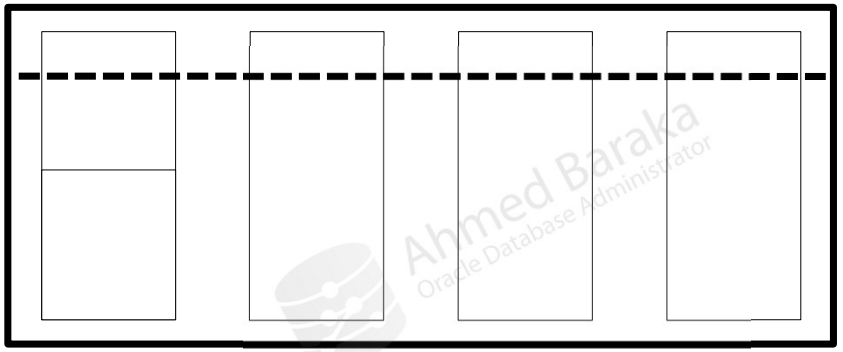
Advanced Compression



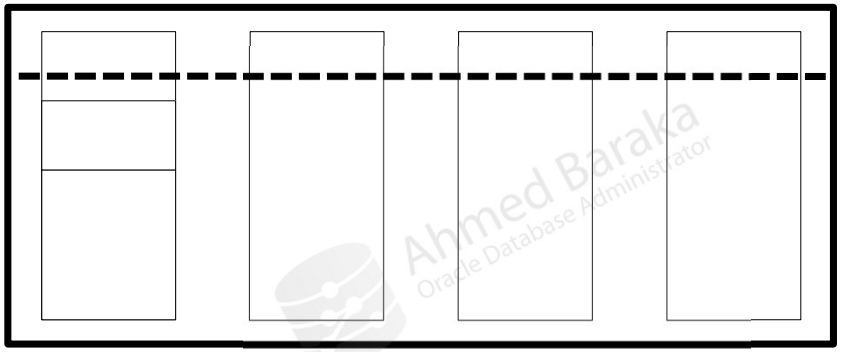
Advanced Compression



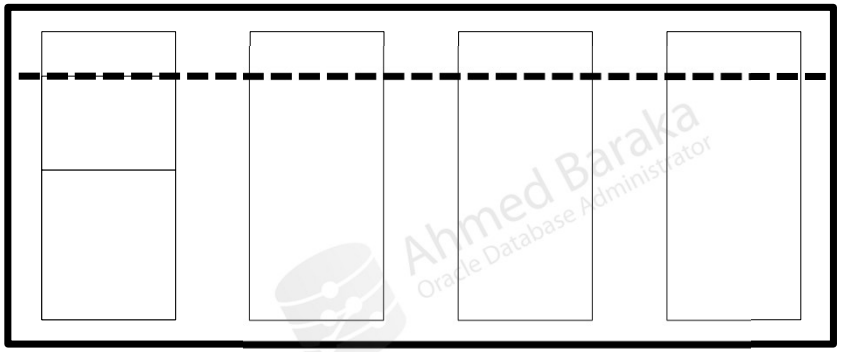
Advanced Compression



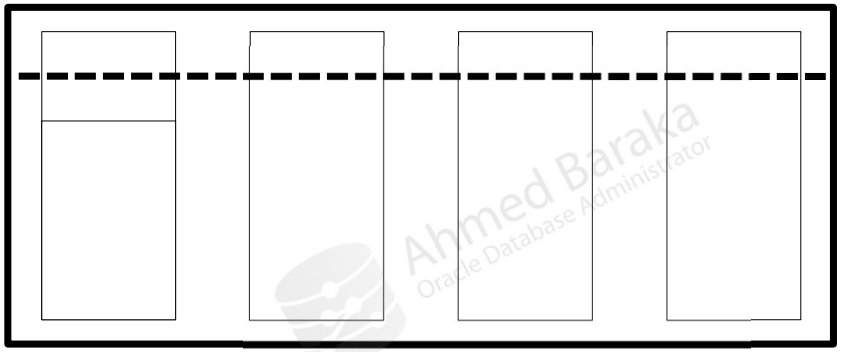
Advanced Compression



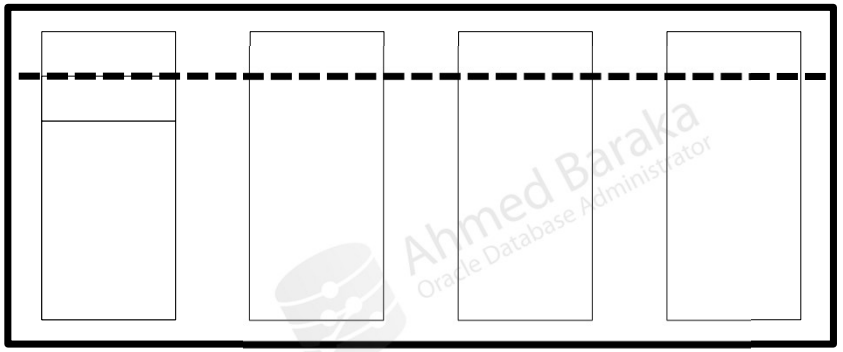
Advanced Compression



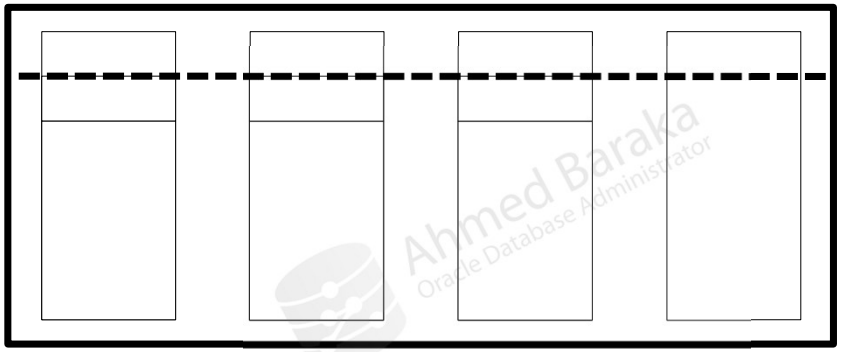
Advanced Compression



Advanced Compression



Advanced Compression



About Advanced Compression

- Compression is performed when **`PCTFREE`** limit is reached
- Supports regular **`INSERT`** operation (OLTP compression)
- Licensed separately
- **Pros:**
  - Bulk load by regular **`INSERT`** statement is more efficient
  - Provides performance gain for the queries
- **Cons:**
  - For the same data, basic compression may provide better compression ratio
  - Moves overhead caused by rows migration
- Test before you implement (specially in OLTP environment)

Creating Tables with Advanced Compression

- To implement advanced compression (**PCTFREE** will set to 10):

```
CREATE TABLE <tname> ROW STORE COMPRESS ADVANCED
ALTER TABLE <tname>  ROW STORE COMPRESS ADVANCED
```

- Can be set at the tablespace level:

```
CREATE TABLESPACE my_tbs ... DEFAULT ROW STORE COMPRESS ADVANCED;
```

Obtaining Information about Compressed Tables

- To retrieve the compression information on existing tables:

```
SQL> SELECT TABLE_NAME, COMPRESSION, COMPRESS_FOR FROM USER_TABLES;


TABLE_NAME         COMPRESS COMPRESS_FOR
------------------ -------- ------------------------------
ORDERS             DISABLED
ORDER_ITEMS        DISABLED
SALES_HISTORY      ENABLED  BASIC
EXPENSES_HISTORY   ENABLED  ADVANCED
```

Determining Which Rows Are Compressed

```
SELECT DECODE(DBMS_COMPRESSION.GET_COMPRESSION_TYPE(
 OWNNAME => 'SOE',
 TABNAME => 'SALES_HISTORY',
 SUBOBJNAME => '',
 ROW_ID => 'AAAKEIEEGBBADBTDEDD'),
 1, 'No Compression',
 2, 'Advanced Row Compression',
 4, 'Hybrid Columnar Compression for Query High',
 8, 'Hybrid Columnar Compression for Query Low',
 16, 'Hybrid Columnar Compression for Archive High',
 32, 'Hybrid Columnar Compression for Archive Low',
 4096, 'Basic Table Compression',
 'Unknown Compression Type') COMPRESSION_TYPE
FROM DUAL;
```

Oracle Hybrid Columnar Compression (HCC)

- Combines Row and Column compression techniques for 5 to 15X compression ratios and remarkable performance
- Only in Oracle Storage:
  - Solaris ZFS
  - Axiom Pillar
  - Exadata Storage Cell

Summary

In this lecture, you should have learnt how to perform the following:

- Describe and use the basic compression
- Describe and use the advanced compression
- Obtain information about compression used in a database
- Describe the Oracle Hybrid Columnar Compression (HCC)