

Oracle 11g data partitioning and compression capabilities

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IT Knowledge

За какво ще говорим?

- Interval Partitioning
- System Partitioning
- Composite Partitioning
- Virtual Column-based Partitioning
- Reference Partitioning
- Data Compression

Interval Partitioning

```
CREATE TABLE salestable
```

```
(s_productid NUMBER, s_saledate DATE,  
s_custid NUMBER, s_totalprice NUMBER)
```

```
PARTITION BY RANGE(s_saledate)
```

```
INTERVAL(NUMTOYMINTERVAL(1,'MONTH')) STORE IN (tbs1,tbs2,tbs3,tbs4)
```

```
(PARTITION sal05q1 VALUES LESS THAN (TO_DATE('01-APR-2005', 'DD-MON-YYYY')) TABLESPACE tbs1,  
PARTITION sal05q2 VALUES LESS THAN (TO_DATE('01-JUL-2005', 'DD-MON-YYYY')) TABLESPACE tbs2,  
PARTITION sal05q3 VALUES LESS THAN (TO_DATE('01-OCT-2005', 'DD-MON-YYYY')) TABLESPACE tbs3,  
PARTITION sal05q4 VALUES LESS THAN (TO_DATE('01-JAN-2006', 'DD-MON-YYYY')) TABLESPACE tbs4,  
PARTITION sal06q1 VALUES LESS THAN (TO_DATE('01-APR-2006', 'DD-MON-YYYY')) TABLESPACE tbs1,  
PARTITION sal06q2 VALUES LESS THAN (TO_DATE('01-JUL-2006', 'DD-MON-YYYY')) TABLESPACE tbs2,  
PARTITION sal06q3 VALUES LESS THAN (TO_DATE('01-OCT-2006', 'DD-MON-YYYY')) TABLESPACE tbs3,  
PARTITION sal06q4 VALUES LESS THAN (TO_DATE('01-JAN-2007', 'DD-MON-YYYY')) TABLESPACE tbs4);
```

Interval Partitioning

When using interval partitioning, consider the following restrictions:

- You can only specify one partitioning key column, and it must be of NUMBER or DATE type.
- Interval partitioning is not supported for index-organized tables.
- You cannot create a domain index on an interval-partitioned table.

You can create single-level interval partitioned tables as well as the following composite partitioned tables:

- Interval-range
- Interval-hash
- Interval-list

System Partitioning

- Creating a System-Partitioned Table

```
CREATE TABLE SystemPartitionedTable (c1 integer, c2 integer)
PARTITIONED BY SYSTEM
(
  PARTITION p1 TABLESPACE tbs_1,
  PARTITION p2 TABLESPACE tbs_2,
  PARTITION p3 TABLESPACE tbs_3,
  PARTITION p4 TABLESPACE tbs_4
);
```

- Both INSERT and MERGE statements **must** use the partition extended syntax to identify the partition to which the row should be added.

```
INSERT INTO SystemPartitionedTable PARTITION (p1) VALUES (4,5);
```

System Partitioning



Partition Number

- Using DATAOBJ_TO_PARTITION

```
INSERT INTO SystemPartitionedTable PARTITION  
(DATAOBJ_TO_PARTITION (base_table, :physical_partid))  
VALUES (...);
```

- Deleting and Updating Data in a System-Partitioned Table

While delete and update operations do not require the partition extended syntax, Oracle recommends that you use it if at all possible. Because there is no partition pruning, the entire table will be scanned to execute the operation if the partition extended syntax is omitted. This highlights the fact that there is no implicit mapping between the rows and the partitions.

Composite Partitioning

- Composite List-Hash Partitioning
- Composite List-List Partitioning
- Composite List-Range Partitioning
- Composite Range-Range Partitioning

Virtual Column-based Partitioning

- Virtual Columns

```
Create table sal(  
empid Number(10,2),  
Salary Number(10,2),  
Comm Number(10,2)  
Total Number(10,2) AS (Salary+Comm)  
);
```

```
select * from sal <=>
```

```
Select Salary,comm, salary+comm AS Total from sal
```

Virtual Column-based Partitioning

- In Oracle Database 11g, virtual columns allow the partitioning key to be defined by an expression
- Virtual column-based Partitioning is supported with all basic partitioning strategies, including interval and interval-* composite partitioning.

Reference Partitioning

```
CREATE TABLE orders
( order_id      NUMBER(12),
  order_date    TIMESTAMP WITH LOCAL TIME ZONE,
  order_mode    VARCHAR2(8),
  customer_id   NUMBER(6),
  order_status  NUMBER(2),
  order_total   NUMBER(8,2),
  sales_rep_id  NUMBER(6),
  promotion_id  NUMBER(6),
  CONSTRAINT orders_pk PRIMARY KEY(order_id)
)
PARTITION BY RANGE(order_date)
( PARTITION Q1_2005 VALUES LESS THAN (TO_DATE('01-APR-2005','DD-MON-YYYY')),
  PARTITION Q2_2005 VALUES LESS THAN (TO_DATE('01-JUL-2005','DD-MON-YYYY')),
  PARTITION Q3_2005 VALUES LESS THAN (TO_DATE('01-OCT-2005','DD-MON-YYYY')),
  PARTITION Q4_2005 VALUES LESS THAN (TO_DATE('01-JAN-2006','DD-MON-YYYY'))
);
```

Reference Partitioning

```
CREATE TABLE order_items  
  
  ( order_id      NUMBER(12) NOT NULL,  
  
    line_item_id  NUMBER(3)  NOT NULL,  
  
    product_id    NUMBER(6)  NOT NULL,  
  
    unit_price    NUMBER(8,2),  
  
    quantity      NUMBER(8),  
  
    CONSTRAINT order_items_fk  
  
    FOREIGN KEY(order_id) REFERENCES orders(order_id)  
  
  )  
  
  PARTITION BY REFERENCE(order_items_fk);
```

Reference Partitioning

```
CREATE TABLE order_items  
  
  ( order_id      NUMBER(12) NOT NULL,  
  
    line_item_id  NUMBER(3)  NOT NULL,  
  
    product_id    NUMBER(6)  NOT NULL,  
  
    unit_price    NUMBER(8,2),  
  
    quantity      NUMBER(8),  
  
    CONSTRAINT order_items_fk  
  
    FOREIGN KEY(order_id) REFERENCES orders(order_id)  
  
  )  
  
  PARTITION BY REFERENCE(order_items_fk);
```

Reference Partitioning

- **Benefits of Reference Partitioning**

Tables with a parent-child relationship can be logically equi-partitioned by inheriting the partitioning key from the parent table without duplicating the key columns.

- **Partition Wise Joins**

Data Compression

In Oracle 10g

- The Oracle Database table compression feature compresses data by eliminating duplicate values in a database block.
- Compression occurs when data is inserted with a bulk (direct-path) insert operation.
- Conventional DML operations cause records to be stored uncompressed afterward the operations
- Create table <table specification> compress

Data Compression

In Oracle 11g

- Compression can occur while data is being inserted, updated, bulk inserted, or bulk loaded into a compressed table.
- Deleting compressed data is as fast as deleting uncompressed data. In
- Inserting new data is also as fast.
- Updating compressed data can be slower in some cases
- Selects should be faster due to the less I/O
- Blocks are loaded compressed into the DB Buffer cache, so memory is saved as well
- Significant savings in disk storage, I/O, and redo logs (50% to 75% disk savings in the data files)

Data Compression

In Oracle 11g – How it works

- **CREATE TABLE <table name> (...) COMPRESS FOR ALL OPERATIONS;**
- 2) Blocks needs to be self contained, so that each block can compress/uncompress independently
- DMLs goes as usual – data not compressed
- 4) When PCTFREE is reached, compression is triggered and space is freed up as a result
- Go to 2)

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That's all folks