Extend a Tablespace in Oracle

Summary: In this lab, you will learn how to extend the size of a tablespace in the Oracle Database.

When tablespaces of the database are full, you will not able to add or remove data on these tablespaces anymore.

There are a few ways you can extend a tablespace.

Extending a tablespace by adding a new datafile

The first way to extend a tablespace is to add a new datafile by using the `ALTER TABLESPACE` statement

If you use the `AUTOEXTEND ON` clause, Oracle will automatically extend the size of the datafile when needed.

Let's see the following example.

First, `create a new tablespace` called `tbs10` with the size 1MB:

```
CREATE TABLESPACE tbs10
    DATAFILE 'tbs10.dbf' SIZE 1m;
```

Next, `create a new table` `t1` whose tablespace is `tbs10` :

```
CREATE TABLE t1(id INT PRIMARY  KEY)
TABLESPACE tbs10;
```

Then, insert `1,000,000` rows into the `t1` table:

```
BEGIN
    FOR counter IN 1..1000000 loop
        INSERT INTO t1(id)
        VALUES(counter);
    END loop;
END;
/
```

Oracle issued the following error:

```
ORA-01653: unable to extend table T1 by 8 in tablespace TBS10
```

So the tablespace `tbs10` does not have enough space for the 1 million rows.

After that, use the `ATLER TABLESPACE` statement to add one more datafile whose size is 10MB with the `AUTOEXTEND ON` option:

```
ALTER TABLESPACE tbs10
    ADD DATAFILE 'tbs10_2.dbf'
    SIZE 10m
    AUTOEXTEND ON;
```

Finally, insert 1 million rows into the `t1` table. It should work now.

```
BEGIN
    FOR counter IN 1..1000000 loop
```

```
        INSERT INTO t1(id)
        VALUES(counter);
    END loop;
END;
/
```

This query returns the number of rows from the `t1` table:

```
SELECT count(*) FROM t1;
```

Here is the output:

```
COUNT(*)

1000000
```

Extending a tablespace by resizing the datafile

Another way to extend a tablespace is to resize the data file by using the `ALTER DATABASE RESIZE DATAFILE` statement.

Consider the following example.

First, `create a new tablespace` called `tbs11`:

```
CREATE TABLESPACE tbs11
    DATAFILE 'tbs11.dbf'
    SIZE 1m;
```

Next, `create a new table` called `t2` that uses `tbs11` as the tablespace:

```
CREATE TABLE t2(
    c INT PRIMARY KEY
) TABLESPACE tbs11;
```

Then, query the size of the tablespace `tbs11`:

```
SELECT
    tablespace_name,
    bytes / 1024 / 1024 MB
FROM
    dba_free_space
WHERE
    tablespace_name = 'TBS11';
```

The following illustrates the output:

```
TABLESPACE_NAME         MB

TBS11                .9375
```

After that, use the `ALTER DATABASE` to extend the size of the datafile of the tablespace to 15MB:

```
ALTER DATABASE
    DATAFILE 'tbs11.dbf'
    RESIZE 15m;
```

Finally, query the size of the `tbs11` tablespace:

```
SELECT
    tablespace_name,
    bytes / 1024 / 1024 MB
FROM
    dba_free_space
WHERE
    tablespace_name = 'TBS11';
```

Here is the output:

```
TABLESPACE_NAME          MB

TBS11               14.8125
```

As you can see, the size of the tablespace `tbs11` has been extended to 15MB.

Note that Oracle does not allow you to add a datafile to a bigfile tablespace, therefore, you only can use `ALTER DATABASE DATAFILE RESIZE` command.

In this lab, you have learned how to extend the tablespace by adding a new datafile to the tablespace or resizing an existing datafile.