LAB - Update

In this lab, you will learn how to use the SQL Server `UPDATE` statement to change existing data in a table.

To modify existing data in a table, you use the following `UPDATE` statement:

```
UPDATE table_name
SET c1 = v1, c2 = v2, ... cn = vn
[WHERE condition]
```

In this syntax:

- First, specify the name of the table from which the data is to be updated.
- Second, specify a list of column c1, c2, ..., cn and values v1, v2, ... vn to be updated.
- Third, specify the conditions in the `WHERE` clause for selecting the rows that are updated. The `WHERE` clause is optional. If you skip the `WHERE` clause, all rows in the table are updated.

Examples

First, create a new table named `taxes` for demonstration.

```
CREATE TABLE sales.taxes (
    tax_id INT PRIMARY KEY IDENTITY (1, 1),
    state VARCHAR (50) NOT NULL UNIQUE,
    state_tax_rate DEC (3, 2),
    avg_local_tax_rate DEC (3, 2),
    combined_rate AS state_tax_rate + avg_local_tax_rate,
    max_local_tax_rate DEC (3, 2),
    updated_at datetime
);
```

Second, execute the following statements to insert data into the `taxes` table:

```
INSERT INTO sales.taxes(state,state_tax_rate,avg_local_tax_rate,max_local_tax_rate)
VALUES('Alabama',0.04,0.05,0.07);
INSERT INTO sales.taxes(state,state_tax_rate,avg_local_tax_rate,max_local_tax_rate)
VALUES('Alaska',0,0.01,0.07);
INSERT INTO sales.taxes(state,state_tax_rate,avg_local_tax_rate,max_local_tax_rate)
VALUES('Arizona',0.05,0.02,0.05);
INSERT INTO sales.taxes(state,state_tax_rate,avg_local_tax_rate,max_local_tax_rate)
VALUES('Arkansas',0.06,0.02,0.05);
INSERT INTO sales.taxes(state,state_tax_rate,avg_local_tax_rate,max_local_tax_rate)
VALUES('California',0.07,0.01,0.02);
```

```
INSERT INTO sales.taxes(state,state_tax_rate,avg_local_tax_rate,max_local_tax_rate)
VALUES('Colorado',0.02,0.04,0.08);
INSERT INTO sales.taxes(state,state_tax_rate,avg_local_tax_rate,max_local_tax_rate)
VALUES('Connecticut',0.06,0,0);
INSERT INTO sales.taxes(state,state_tax_rate,avg_local_tax_rate,max_local_tax_rate)
VALUES('Delaware',0,0,0);
INSERT INTO sales.taxes(state,state_tax_rate,avg_local_tax_rate,max_local_tax_rate)
VALUES('Florida',0.06,0,0.02);
INSERT INTO sales.taxes(state,state_tax_rate,avg_local_tax_rate,max_local_tax_rate)
VALUES('Georgia',0.04,0.03,0.04);
INSERT INTO sales.taxes(state,state_tax_rate,avg_local_tax_rate,max_local_tax_rate)
VALUES('Hawaii',0.04,0,0);
INSERT INTO sales.taxes(state,state_tax_rate,avg_local_tax_rate,max_local_tax_rate)
VALUES('Idaho',0.06,0,0.03);
INSERT INTO sales.taxes(state,state_tax_rate,avg_local_tax_rate,max_local_tax_rate)
VALUES('Illinois',0.06,0.02,0.04);
INSERT INTO sales.taxes(state,state_tax_rate,avg_local_tax_rate,max_local_tax_rate)
VALUES('Indiana',0.07,0,0);
INSERT INTO sales.taxes(state,state_tax_rate,avg_local_tax_rate,max_local_tax_rate)
VALUES('Iowa',0.06,0,0.01);
INSERT INTO sales.taxes(state,state_tax_rate,avg_local_tax_rate,max_local_tax_rate)
VALUES('Kansas',0.06,0.02,0.04);
INSERT INTO sales.taxes(state,state_tax_rate,avg_local_tax_rate,max_local_tax_rate)
VALUES('Kentucky',0.06,0,0);
INSERT INTO sales.taxes(state,state_tax_rate,avg_local_tax_rate,max_local_tax_rate)
VALUES('Louisiana',0.05,0.04,0.07);
INSERT INTO sales.taxes(state,state_tax_rate,avg_local_tax_rate,max_local_tax_rate)
VALUES('Maine',0.05,0,0);
INSERT INTO sales.taxes(state,state_tax_rate,avg_local_tax_rate,max_local_tax_rate)
VALUES('Maryland',0.06,0,0);
INSERT INTO sales.taxes(state,state_tax_rate,avg_local_tax_rate,max_local_tax_rate)
VALUES('Massachusetts',0.06,0,0);
INSERT INTO sales.taxes(state,state_tax_rate,avg_local_tax_rate,max_local_tax_rate)
VALUES('Michigan',0.06,0,0);
INSERT INTO sales.taxes(state,state_tax_rate,avg_local_tax_rate,max_local_tax_rate)
VALUES('Minnesota',0.06,0,0.01);
INSERT INTO sales.taxes(state,state_tax_rate,avg_local_tax_rate,max_local_tax_rate)
VALUES('Mississippi',0.07,0,0.01);
INSERT INTO sales.taxes(state,state_tax_rate,avg_local_tax_rate,max_local_tax_rate)
VALUES('Missouri',0.04,0.03,0.05);
INSERT INTO sales.taxes(state,state_tax_rate,avg_local_tax_rate,max_local_tax_rate)
VALUES('Montana',0,0,0);
INSERT INTO sales.taxes(state,state_tax_rate,avg_local_tax_rate,max_local_tax_rate)
VALUES('Nebraska',0.05,0.01,0.02);
INSERT INTO sales.taxes(state,state_tax_rate,avg_local_tax_rate,max_local_tax_rate)
VALUES('Nevada',0.06,0.01,0.01);
INSERT INTO sales.taxes(state,state_tax_rate,avg_local_tax_rate,max_local_tax_rate)
VALUES('New Hampshire',0,0,0);
INSERT INTO sales.taxes(state,state_tax_rate,avg_local_tax_rate,max_local_tax_rate)
VALUES('New Jersey',0.06,0,0);
INSERT INTO sales.taxes(state,state_tax_rate,avg_local_tax_rate,max_local_tax_rate)
VALUES('New Mexico',0.05,0.02,0.03);
```

```
INSERT INTO sales.taxes(state,state_tax_rate,avg_local_tax_rate,max_local_tax_rate)
VALUES('New York',0.04,0.04,0.04);
INSERT INTO sales.taxes(state,state_tax_rate,avg_local_tax_rate,max_local_tax_rate)
VALUES('North Carolina',0.04,0.02,0.02);
INSERT INTO sales.taxes(state,state_tax_rate,avg_local_tax_rate,max_local_tax_rate)
VALUES('North Dakota',0.05,0.01,0.03);
INSERT INTO sales.taxes(state,state_tax_rate,avg_local_tax_rate,max_local_tax_rate)
VALUES('Ohio',0.05,0.01,0.02);
INSERT INTO sales.taxes(state,state_tax_rate,avg_local_tax_rate,max_local_tax_rate)
VALUES('Oklahoma',0.04,0.04,0.06);
INSERT INTO sales.taxes(state,state_tax_rate,avg_local_tax_rate,max_local_tax_rate)
VALUES('Oregon',0,0,0);
INSERT INTO sales.taxes(state,state_tax_rate,avg_local_tax_rate,max_local_tax_rate)
VALUES('Pennsylvania',0.06,0,0.02);
INSERT INTO sales.taxes(state,state_tax_rate,avg_local_tax_rate,max_local_tax_rate)
VALUES('Rhode Island',0.07,0,0);
INSERT INTO sales.taxes(state,state_tax_rate,avg_local_tax_rate,max_local_tax_rate)
VALUES('South Carolina',0.06,0.01,0.02);
INSERT INTO sales.taxes(state,state_tax_rate,avg_local_tax_rate,max_local_tax_rate)
VALUES('South Dakota',0.04,0.01,0.04);
INSERT INTO sales.taxes(state,state_tax_rate,avg_local_tax_rate,max_local_tax_rate)
VALUES('Tennessee',0.07,0.02,0.02);
INSERT INTO sales.taxes(state,state_tax_rate,avg_local_tax_rate,max_local_tax_rate)
VALUES('Texas',0.06,0.01,0.02);
INSERT INTO sales.taxes(state,state_tax_rate,avg_local_tax_rate,max_local_tax_rate)
VALUES('Utah',0.05,0,0.02);
INSERT INTO sales.taxes(state,state_tax_rate,avg_local_tax_rate,max_local_tax_rate)
VALUES('Vermont',0.06,0,0.01);
INSERT INTO sales.taxes(state,state_tax_rate,avg_local_tax_rate,max_local_tax_rate)
VALUES('Virginia',0.05,0,0);
INSERT INTO sales.taxes(state,state_tax_rate,avg_local_tax_rate,max_local_tax_rate)
VALUES('Washington',0.06,0.02,0.03);
INSERT INTO sales.taxes(state,state_tax_rate,avg_local_tax_rate,max_local_tax_rate)
VALUES('West Virginia',0.06,0,0.01);
INSERT INTO sales.taxes(state,state_tax_rate,avg_local_tax_rate,max_local_tax_rate)
VALUES('Wisconsin',0.05,0,0.01);
INSERT INTO sales.taxes(state,state_tax_rate,avg_local_tax_rate,max_local_tax_rate)
VALUES('Wyoming',0.04,0.01,0.02);
INSERT INTO sales.taxes(state,state_tax_rate,avg_local_tax_rate,max_local_tax_rate)
VALUES('D.C.',0.05,0,0);
```

1) Update a single column in all rows example

The following statement updates a single column for all rows in the `taxes` table:

```
UPDATE sales.taxes
SET updated_at = GETDATE();
```

In this example, the statement changed the values in the `updated_at` column to the system date time returned by the `GETDATE()` function.

SQL Server issued the following message:

```
(51 rows affected)
```

It means that 51 rows have been updated successfully.

Let's verify the update:

```
SELECT * FROM sales.taxes;
```

Here is the partial output:

tax_id	state	state_tax_rate	avg_local_tax_rate	combined_rate	max_local_tax_rate	updated_at
1	Alabama	0.04	0.05	0.09	0.07	2020-02-28 21:24:15.260
2	Alaska	0.00	0.01	0.01	0.07	2020-02-28 21:24:15.260
3	Arizona	0.05	0.02	0.07	0.05	2020-02-28 21:24:15.260
4	Arkansas	0.06	0.02	0.08	0.05	2020-02-28 21:24:15.260
5	California	0.07	0.01	0.08	0.02	2020-02-28 21:24:15.260
6	Colorado	0.02	0.04	0.06	0.08	2020-02-28 21:24:15.260
7	Connecticut	0.06	0.00	0.06	0.00	2020-02-28 21:24:15.260
8	Delaware	0.00	0.00	0.00	0.00	2020-02-28 21:24:15.260
9	Florida	0.06	0.00	0.06	0.02	2020-02-28 21:24:15.260
10	Georgia	0.04	0.03	0.07	0.04	2020-02-28 21:24:15.260
11	Hawaii	0.04	0.00	0.04	0.00	2020-02-28 21:24:15.260
12	Idaho	0.06	0.00	0.06	0.03	2020-02-28 21:24:15.260
13	Illinois	0.06	0.02	0.08	0.04	2020-02-28 21:24:15.260
14	Indiana	0.07	0.00	0.07	0.00	2020-02-28 21:24:15.260
15	Iowa	0.06	0.00	0.06	0.01	2020-02-28 21:24:15.260
16	Kansas	0.06	0.02	0.08	0.04	2020-02-28 21:24:15.260
17	Kentucky	0.06	0.00	0.06	0.00	2020-02-28 21:24:15.260

As can be seen clearly from the output, the `updated_at` column has been updated with the current date value.

2) Update multiple columns example

The following statement increases the max local tax rate by 2% and the average local tax rate by 1% for the states that have the max local tax rate 1%.

```
UPDATE sales.taxes
SET max_local_tax_rate += 0.02,
    avg_local_tax_rate += 0.01
WHERE
    max_local_tax_rate = 0.01;
```

Here is the message returned by the SQL Server:

```
(7 rows affected)
```

It means that the taxes of 7 states have been updated.

In this lab, you have learned how to use the SQL Server `UPDATE` statement to modify the existing data in a table.