SQL Server CREATE TRIGGER

Summary: in this tutorial, you will learn how to use the SQL Server `CREATE TRIGGER` statement to create a new trigger.

Introduction to SQL Server CREATE TRIGGER statement

The `CREATE TRIGGER` statement allows you to create a new trigger that is fired automatically whenever an event such as `INSERT` (https://www.sqlservertutorial.net/sql-server-basics/sql-server-insert/) , DELETE (https://www.sqlservertutorial.net/sql-server-basics/sql-server-delete/), or `UPDATE` (https://www.sqlservertutorial.net/sql-server-basics/sql-server-update/) occurs against a table.

The following illustrates the syntax of the `CREATE TRIGGER` statement:

```
CREATE TRIGGER [schema_name.]trigger_name
ON table_name
AFTER  {[INSERT],[UPDATE],[DELETE]}
[NOT FOR REPLICATION]
AS
{sql_statements}
```

In this syntax:

The `schema_name` is the name of the schema to which the new trigger belongs. The schema name is optional.

The `trigger_name` is the user-defined name for the new trigger.

The `table_name` is the table to which the trigger applies.

The event is listed in the `AFTER` clause. The event could be `INSERT`, `UPDATE`, or `DELETE`. A single trigger can fire in response to one or more actions against the table.

The `NOT FOR REPLICATION` option instructs SQL Server not to fire the trigger when data modification is made as part of a replication process.

The `sql_statements` is one or more Transact-SQL used to carry out actions once an event occurs.

"Virtual" tables for triggers: INSERTED and DELETED

SQL Server provides two virtual tables that are available specifically for triggers called `INSERTED` and `DELETED` tables. SQL Server uses these tables to capture the data of the modified row before and after the event occurs.

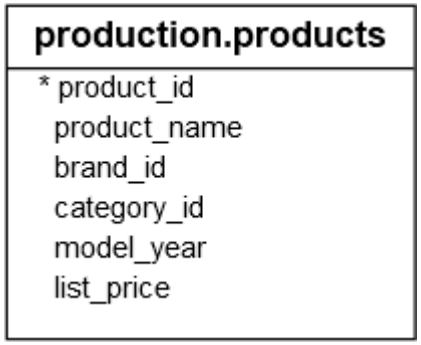
The following table shows the content of the `INSERTED` and `DELETED` tables before and after each event:

DML event	INSERTED table holds	DELETED table holds
INSERT	rows to be inserted	empty
UPDATE	new rows modified by the update	existing rows modified by the update

DML event	INSERTED table holds	DELETED table holds
DELETE	empty	rows to be deleted

SQL Server CREATE TRIGGER example

Let's look at an example of creating a new trigger. We will use the `production.products` table from the sample database for the demonstration.



1) Create a table for logging the changes

The following statement creates a table (https://www.sqlservertutorial.net/sql-server-basics/sql-server-create-table/) named `production.product_audits` to record information when an `INSERT` or `DELETE` event occurs against the `production.products` table:

```
CREATE TABLE production.product_audits(
    change_id INT IDENTITY PRIMARY KEY,
    product_id INT NOT NULL,
    product_name VARCHAR(255) NOT NULL,
```

```
    brand_id INT NOT NULL,
    category_id INT NOT NULL,
    model_year SMALLINT NOT NULL,
    list_price DEC(10,2) NOT NULL,
    updated_at DATETIME NOT NULL,
    operation CHAR(3) NOT NULL,
    CHECK(operation = 'INS' or operation='DEL')
);
```

The `production.product_audits` table has all the columns from the `production.products` table. In addition, it has a few more columns to record the changes e.g., `updated_at` , `operation` , and the `change_id` .

2) Creating an after DML trigger

First, to create a new trigger, you specify the name of the trigger and schema to which the trigger belongs in the `CREATE TRIGGER` clause:

```
CREATE TRIGGER production.trg_product_audit
```

Next, you specify the name of the table, which the trigger will fire when an event occurs, in the `ON` clause:

```
ON production.products
```

Then, you list the one or more events which will call the trigger in the `AFTER` clause:

```
AFTER INSERT, DELETE
```

The body of the trigger begins with the `AS` keyword:

```
AS
BEGIN
```

After that, inside the body of the trigger, you set the `SET NOCOUNT` to `ON` to suppress the number of rows affected messages from being returned whenever the trigger is fired.

```
SET NOCOUNT ON;
```

The trigger will insert a row (https://www.sqlservertutorial.net/sql-server-basics/sql-server-insert/) into the `production.product_audits` table whenever a row is inserted into or deleted from the `production.products` table. The data for insert is fed from the `INSERTED` and `DELETED` tables via the `UNION ALL` (https://www.sqlservertutorial.net/sql-server-basics/sql-server-union/) operator:

```
INSERT INTO
    production.product_audits
        (
            product_id,
            product_name,
            brand_id,
            category_id,
```

```
            model_year,
            list_price,
            updated_at,
            operation
        )
SELECT
    i.product_id,
    product_name,
    brand_id,
    category_id,
    model_year,
    i.list_price,
    GETDATE(),
    'INS'
FROM
    inserted AS i
UNION ALL
    SELECT
        d.product_id,
        product_name,
        brand_id,
        category_id,
        model_year,
        d.list_price,
        getdate(),
        'DEL'
```

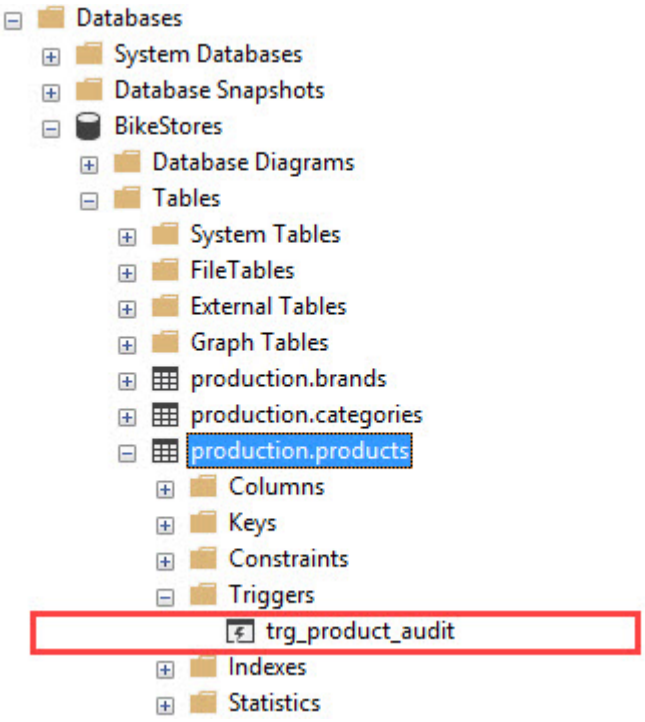
```
    FROM
        deleted AS d;
```

The following put all parts together:

```
CREATE TRIGGER production.trg_product_audit
ON production.products
AFTER INSERT, DELETE
AS
BEGIN
    SET NOCOUNT ON;
    INSERT INTO production.product_audits(
        product_id,
        product_name,
        brand_id,
        category_id,
        model_year,
        list_price,
        updated_at,
        operation
    )
    SELECT
        i.product_id,
        product_name,
        brand_id,
```

```
        category_id,
        model_year,
        i.list_price,
        GETDATE(),
        'INS'
    FROM
        inserted i
    UNION ALL
    SELECT
        d.product_id,
        product_name,
        brand_id,
        category_id,
        model_year,
        d.list_price,
        GETDATE(),
        'DEL'
    FROM
        deleted d;
END
```

Finally, you execute the whole statement to create the trigger. Once the trigger is created, you can find it under the triggers folder of the table as shown in the following picture:



3) Testing the trigger

The following statement inserts a new row (https://www.sqlservertutorial.net/sql-server-basics/sql-server-insert/) into the `production.products` table:

```
INSERT INTO production.products(
    product_name,
    brand_id,
    category_id,
    model_year,
    list_price
)
```

```
VALUES (
    'Test product',
    1,
    1,
    2018,
    599
);
```

Because of the `INSERT` event, the `production.trg_product_audit` trigger of `production.products` table was fired.

Let's examine the contents of the `production.product_audits` table:

```
SELECT
    *
FROM
    production.product_audits;
```

Here is the output:

change_id	product_id	product_name	brand_id	category_id	model_year	list_price	updated_at	operation
1	322	Test product	1	1	2018	599.00	2018-10-14 15:23:46.837	INS

The following statement deletes a row from the `production.products` table:

```
DELETE FROM
    production.products
WHERE
    product_id = 322;
```

As expected, the trigger was fired and inserted the deleted row into the `production.product_audits` table:

```
SELECT
    *
FROM
    production.product_audits;
```

The following picture shows the output:

change_id	product_id	product_name	brand_id	category_id	model_year	list_price	updated_at	operation
1	322	Test product	1	1	2018	599.00	2018-10-14 15:23:46.837	INS
2	322	Test product	1	1	2018	599.00	2018-10-14 15:26:34.050	DEL

In this tutorial, you have learned how to create a trigger in SQL Server to respond to one or more events such as insert and delete.