ISSN: 2181-3906 2024

International scientific journal
«MODERN SCIENCE AND RESEARCH»
VOLUME 3 / ISSUE 3 / UIF:8.2 / MODERNSCIENCE.UZ

TRANSACTION. TRANSACTION MANAGEMENT. TCL SECTION COMMANDS.

Ochilboyev Umidjon Ilxom o‘g‘li
Shamuratov Ulug‘bek Alisher Uli
Abduxalilboyev Alisher Abdug‘ani o‘g‘li
In the name of Muhammad al-Khorazmi,
Students of Tashkent University of Information Technologies.

https://doi.org/10.5281/zenodo.10825940

Abstract. *This article first introduces the concept of transactions and clearly explains about its commands. It clearly states when and under what conditions transaction orders are used. Also shown is the syntax of transaction commands. The differences between the commands are clearly highlighted.*

Keywords: *Transaction, DDL, DML, DQL, DCL, TCL, COMMIT, ROLLBACK and SAVEPOINT.*

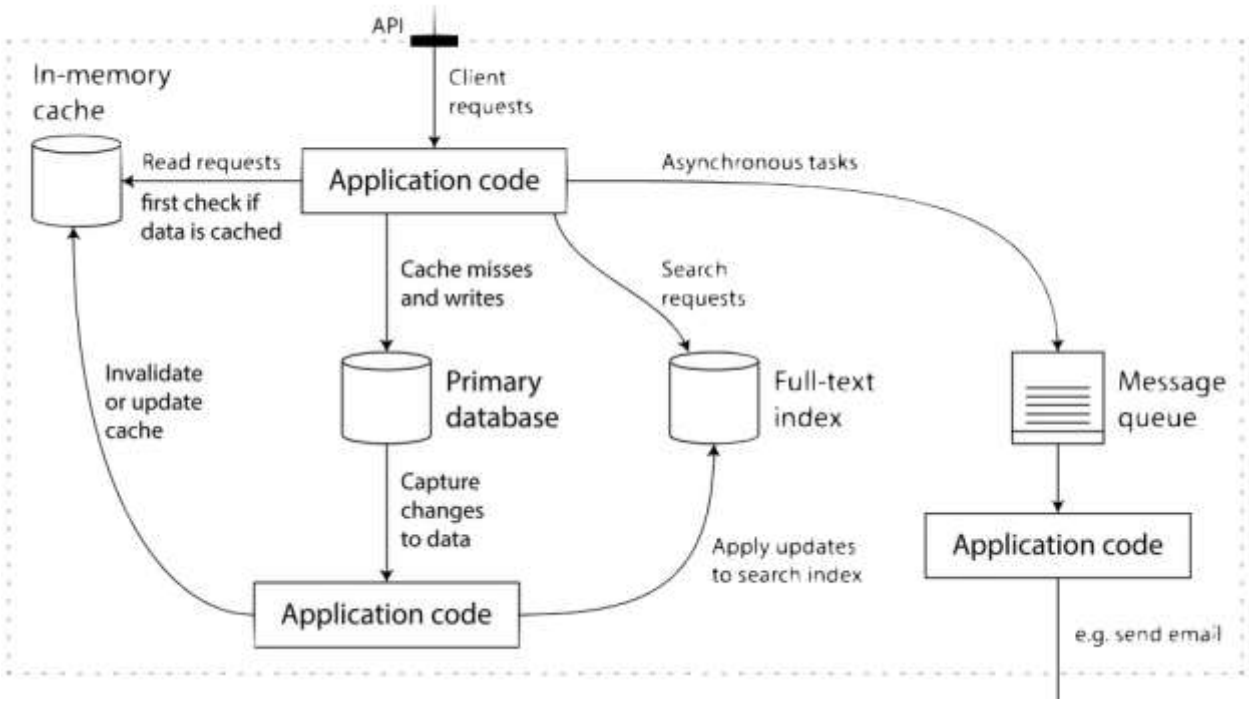
СДЕЛКА. УПРАВЛЕНИЕ ТРАНЗАКЦИЯМИ. КОМАНДЫ РАЗДЕЛА TCL.

Аннотация. *В этой статье впервые представлено понятие транзакций и подробно объяснены их команды. В нем четко указано, когда и при каких условиях используются ордера на транзакции. Также показан синтаксис команд транзакции.*

Различия между командами четко выделены.

Ключевые слова: *транзакция, DDL, DML, DQL, DCL, TCL, COMMIT, ROLLBACK и SAVEPOINT.*

SQL - Transaction Control (TCL)



When using relational database management systems (RDBMSs) we often hear terms like DDL, DML, DQL, DCL, and TCL.

In the context of SQL, TCL stands for Transaction Control Language.

In SQL, TCL means Transaction Control and is a set of commands that manage the effectiveness of a DML action.

TCL is a subset of SQL. It's just one of the various initialisms we can find in SQL. Others include DDL (Data Definition Language), DML (Data Manipulation Language), DCL (Data Control Language), and DQL (Data Query Language).

Transaction Control Language is a subset of SQL that's used to manage transactions in a relational database.

A transaction begins when the first executable SQL statement is encountered. An executable SQL statement is a SQL statement that generates calls to a database instance, including DML and DDL statements and the SET TRANSACTION statement.

When a transaction begins, Oracle Database assigns the transaction to an available undo data segment to record the undo entries for the new transaction. A transaction ID is not allocated until an undo segment and transaction table slot are allocated, which occurs during the first DML statement.

TCL commands are important for maintaining the consistency, integrity, and reliability of the database in the event of errors or failures during transactions.

A transaction ID is unique to a transaction and represents the:

undo segment number,

slot,

and sequence number.

Transaction control involves using the following statements:

The COMMIT statement ends the current transaction and makes all changes performed in the transaction permanent. COMMIT also erases all savepoints in the transaction and releases transaction locks.

The ROLLBACK statement reverses the work done in the current transaction; it causes all data changes since the last COMMIT or ROLLBACK to be discarded. The ROLLBACK TO SAVEPOINT statement undoes the changes since the last savepoint but does not end the entire transaction.

The SAVEPOINT statement identifies a point in a transaction to which you can later roll back.

A commit ends the current transaction and makes permanent all changes performed in the transaction.

1. COMMIT

When a transaction commits, the following actions occur:

Purpose

Use the COMMIT statement to end your current transaction and make permanent all changes performed in the transaction. A transaction is a sequence of SQL statements that Oracle Database treats as a single unit. This statement also erases all savepoints in the transaction and releases transaction locks.

Until you commit a transaction:

ISSN: 2181-3906 2024

International scientific journal
«MODERN SCIENCE AND RESEARCH»
VOLUME 3 / ISSUE 3 / UIF:8.2 / MODERNSCIENCE.UZ

You can see any changes you have made during the transaction by querying the modified tables, but other users cannot see the changes. After you commit the transaction, the changes are visible to other users' statements that execute after the commit.

You can roll back (undo) any changes made during the transaction with the ROLLBACK statement (see ROLLBACK).

Oracle Database issues an implicit COMMIT under the following circumstances:

Before any syntactically valid data definition language (DDL) statement, even if the statement results in an error

After any data definition language (DDL) statement that completes without an error

You can also use this statement to:

Commit an in-doubt distributed transaction manually.

Terminate a read-only transaction begun by a SET TRANSACTION statement.

Oracle recommends that you explicitly end every transaction in your application programs with a COMMIT or ROLLBACK statement, including the last transaction, before disconnecting from Oracle Database. If you do not explicitly commit the transaction and the program terminates abnormally, then the last uncommitted transaction is automatically rolled back.

A normal exit from most Oracle utilities and tools causes the current transaction to be committed. A normal exit from an Oracle precompiler program does not commit the transaction and relies on Oracle Database to roll back the current transaction.

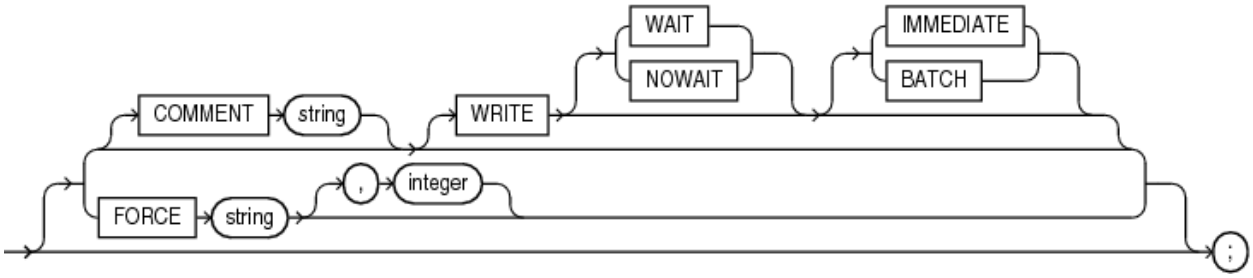
Prerequisites

You need no privileges to commit your current transaction.

To manually commit a distributed in-doubt transaction that you originally committed, you must have FORCE TRANSACTION system privilege. To manually commit a distributed in-doubt transaction that was originally committed by another user, you must have FORCE ANY TRANSACTION system privilege.

Syntax

***commit*::=**



COMMIT

All clauses after the COMMIT keyword are optional. If you specify only COMMIT, then the default is COMMIT WORK WRITE WAIT IMMEDIATE.

The WORK keyword is supported for compliance with standard SQL. The statements COMMIT and COMMIT WORK are equivalent.

ISSN: 2181-3906 2024

International scientific journal
«MODERN SCIENCE AND RESEARCH»
VOLUME 3 / ISSUE 3 / UIF:8.2 / MODERNSCIENCE.UZ

This clause is supported for backward compatibility. Oracle recommends that you use named transactions instead of commit comments.

Usage syntax:

This statement inserts a row into the hr.regions table and commits this change:

INSERT INTO regions VALUES (5, 'Antarctica');

COMMIT WORK;

Commenting on COMMIT: Example

The following statement commits the current transaction and associates a comment with it:

COMMIT

COMMENT 'In-doubt transaction Code 36, Call (415) 555-2637';

ROLLBACK

Purpose

Use the ROLLBACK statement to undo work done in the current transaction or to manually undo the work done by an in-doubt distributed transaction.

Oracle recommends that you explicitly end transactions in application programs using either a COMMIT or ROLLBACK statement. If you do not explicitly commit the transaction and the program terminates abnormally, then Oracle Database rolls back the last uncommitted transaction.

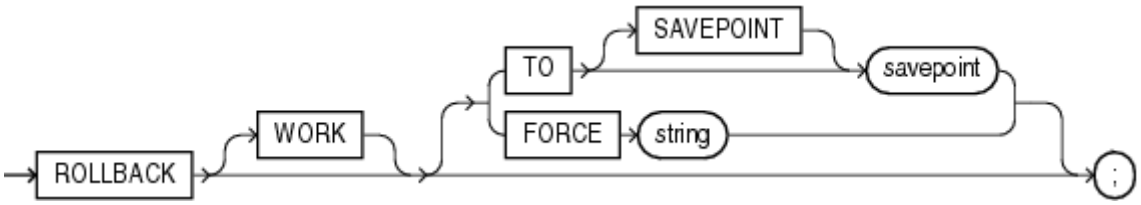
Prerequisites

To roll back your current transaction, no privileges are necessary.

To manually roll back an in-doubt distributed transaction that you originally committed, you must have the FORCE TRANSACTION system privilege. To manually roll back an in-doubt distributed transaction originally committed by another user, you must have the FORCE ANY TRANSACTION system privilege.

Syntax

***rollback*::=**



TO SAVEPOINT Clause

Specify the savepoint to which you want to roll back the current transaction. If you omit this clause, ten the ROLLBACK statement rolls back the entire transaction.

Using ROLLBACK without the TO SAVEPOINT clause performs the following operations:

Ends the transaction

Undoes all changes in the current transaction

Erases all savepoints in the transaction

Releases any transaction locks.

Rolling Back Transactions: Examples

The following statement rolls back your entire current transaction:

ROLLBACK;

The following statement rolls back your current transaction to savepoint banda_sal:

ROLLBACK TO SAVEPOINT banda_sal;

The following statement manually rolls back an in-doubt distributed transaction:

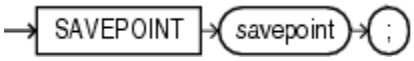
ROLLBACK WORK
FORCE '25.32.87';

2. SAVEPOINT

Purpose

Use the SAVEPOINT statement to create a name for a system change number (SCN), to which you can later roll back.

- Oracle Database Concepts for information on savepoints.
- ROLLBACK for information on rolling back transactions
- SET TRANSACTION for information on setting characteristics of the current transaction
- Syntax
- savepoint::=



savepoint

Specify the name of the savepoint to be created.

Savepoint names must be distinct within a given transaction. If you create a second savepoint with the same identifier as an earlier savepoint, then the earlier savepoint is erased. After a savepoint has been created, you can either continue processing, commit your work, roll back the entire transaction, or roll back to the savepoint.

Creating Savepoints: Example

To update the salary for Banda and Greene in the sample table hr.employees, check that the total department salary does not exceed 314,000, then reenter the salary for Greene:

```
UPDATE employees
SET salary = 7000
WHERE last_name = 'Banda';
SAVEPOINT banda_sal;
UPDATE employees
SET salary = 12000
WHERE last_name = 'Greene';
SAVEPOINT greene_sal;
SELECT SUM(salary) FROM employees;
ROLLBACK TO SAVEPOINT banda_sal;
UPDATE employees
SET salary = 11000
WHERE last_name = 'Greene';
COMMIT;
```

Difference between Commit, rollback and savepoint of TCL commands

Sno.	Rollback	Commit	Savepoint
1	Rollback means the database is restored to the last committed state	DML commands saves modification and it permanently saves the transaction.	Savepoint helps to save the transaction temporarily.
2	Syntax- ROLLBACK [To SAVEPOINT_NAME];	Syntax- COMMIT;	Syntax- SAVEPOINT [savepoint_name;]
3	Example- ROLLBACK Update5;	Example- SQL> COMMIT;	Example- SAVEPOINT table_create;

In summary, the above definition for TCL is one of many possible definitions.TCL is a simple initialism, and it could mean many different things, depending on the context it is being used. Even in the relatively specific field of software, TCL has many potential definitions. Here are some common ones:

TCl (pronounced “tickle” or as an initialism) can be an initialism for Tool Command Language, a scripting language commonly used for creating and controlling various software applications.

TCL can also refer to Terminal Control Language, used to program Verifone devices.

TCL can refer to Tiny Core Linux, a minimal Linux operating system.

TCL can refer to Tymshare Conversational Language, a former experimental interactive language.

TCL can also be used in the context of Think Class Library, a class library for Macintosh featured in think.

REFERENCES

1. Patrick O’Neil and Elizabeth O’Neil, Database Principles, Programming and Performance, Harcourt Asia Pte. Ltd., First Edition, 2001.
2. Peter Rob and Carlos Coronel, Database Systems Design, Implementation and Management, Thomson Learning-Course Technology, Seventh Edition, 2007.
3. C. J. Date, A. Kannan and S. Swamynathan, An Introduction to Database Systems, Pearson Education, Eighth Edition, 2009.
4. Abraham Silberschatz, Henry F. Korth and S. Sudarshan, Database System Concepts, McGraw-Hill Education (Asia), Fifth Edition, 2006.
5. Atul Kahate, Introduction to Database Management Systems, First Edition, 2006.