

## Transactions and Tables

### Database Fundamentals

Name of presenter

Date

© 2019, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Welcome to Updating and Deleting Tables.

## What you will learn

### At the core of the lesson

You will learn how to:

- Define the characteristics of a transaction
- Use the COMMIT and ROLLBACK commands when you update a table
- Use the DROP TABLE statement to delete a table
- Identify common database design problems and good design practices

Key terms:

- Transaction
- START TRANSACTION
- COMMIT
- ROLLBACK
- DROP TABLE
- Database anomalies



2

aws re/start

You will learn how to:

- Define the characteristics of a transaction
- Use the COMMIT and ROLLBACK commands when you update a table
- Use the DROP TABLE statement to delete a table
- Identify common database design problems and good design practices

A **database transaction** is the reproduction of one or more changes that are performed on a database.

## Transactions

### Transactions:

- Run a set of operations so that the database never contains the result of partial operations
- Denote any alteration in a database
- Will never be complete unless each operation is successful

### Transactions enable you to run a set of operations so that:

- If one operation fails, the database is restored to its original state
- If no errors occur, the full set of statements is bound to the database



aws re:start

4

Transactions enable you to:

- Run a set of operations so that the database never contains the result of partial operations. If one operation fails, the database is restored to its original state. If no errors occur, the full set of statements is bound to the database.
- Provide isolation between programs that access a database simultaneously. If this isolation does not happen, the outcomes could prove to be incorrect.

## Properties of transactions

Transactions follow four standard properties, which are known as **ACID**.

- **Atomicity:** Ensures that all changes are successfully completed.
- **Consistency:** Ensures that any changes will not violate the integrity of the database, including any constraints.
- **Isolation:** All transactions happen in isolation. Transactions are isolated so that they do not interfere with the other transactions.
- **Durability:** As soon as a transaction is committed, any interruption to the database's availability, such as a restart or system failure, does not affect the consistency of the data.

Syntax for SQL transactions

## START TRANSACTION: BEGIN

### Transaction keywords

Start a new transaction by using the following keywords:

`START TRANSACTION`

```
USE emp_table;  
START TRANSACTION;  
UPDATE emp_ID  
SET lgID = '--';
```

## COMMIT and ROLLBACK

### ROLLBACK ;

To roll back a transaction, use **ROLLBACK**

If mistakes happen, or your results are not correct, you can undo any work that is performed since **START TRANSACTION**.

### COMMIT ;

To commit the transaction, use **COMMIT**

If you are satisfied with the outcome of the transaction or the transaction is successful, use this command to save all changes.



## Deleting tables

To delete a table, use the following **DROP TABLE** statement.

```
DROP [TEMPORARY] TABLE [IF EXISTS] table_name [, table_name] ...  
[RESTRICT | CASCADE]
```

Note: This statement removes the table and data permanently from the database.

To delete multiple tables, separate each table by a comma in your **DROP TABLE** statement.

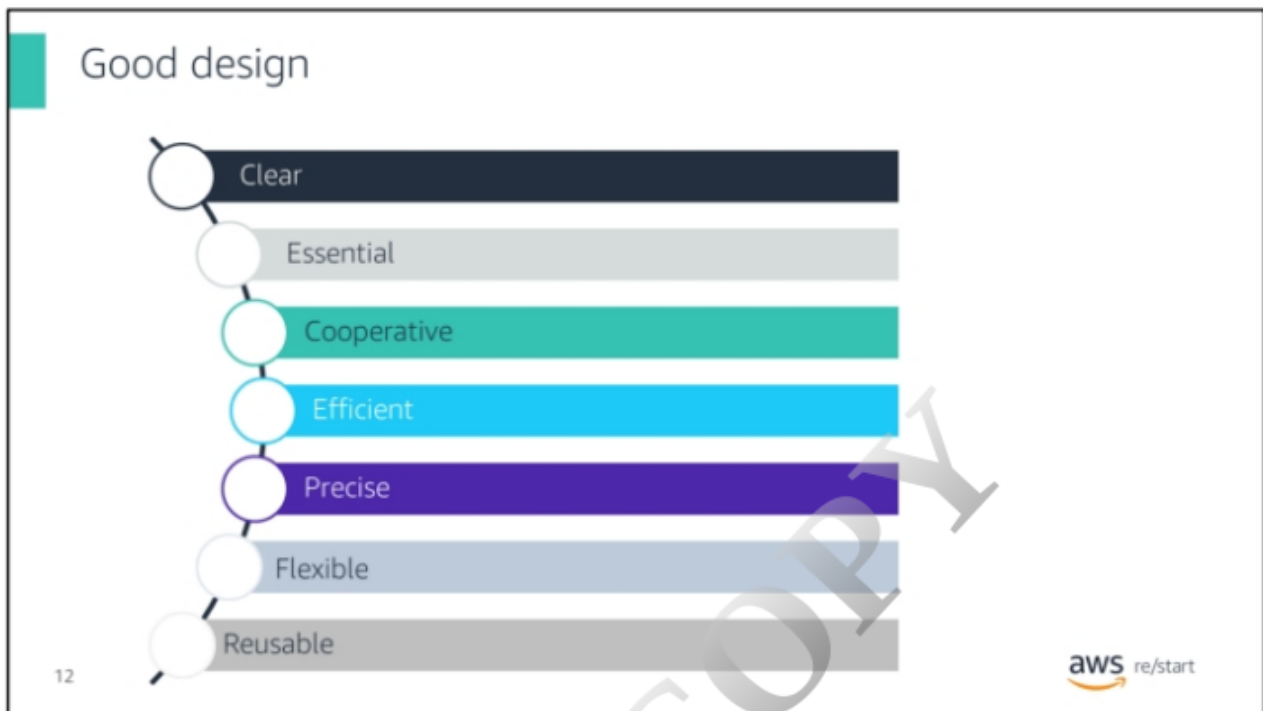
**Note:** When you perform a **DELETE** and **UPDATE**, be careful with delete and update clauses—like COUNTS, SELECT, and others—and verify that the output is as expected.

Anomalies and good database design

## Identifying database anomalies

Anomalies might occur when database content changes.

- **Insertion anomaly** – Occurs when you cannot insert important data into the database because other data is missing. For example, a clerk cannot add customer information for a new customer who has not made a purchase.
- **Update anomaly** – Occurs when data is stored redundantly within the same table. This anomaly makes it difficult to ensure that all copies of a particular information value are updated when the value must be changed.
- **Deletion anomaly** – Occurs when you delete unwanted information, but the action also results in deleting information that you want to keep.



Good design can prevent anomalies. The first step is to identify where you might have a problem.

## Activity: Identifying Data Anomalies

### Overview

The following sample has several rows from the Orders table of a database that tracks sales orders. This table contains various anomalies that affect the user's ability to manage the data that it contains.

### Instructions

Step one:

Identify any anomalies in the table.

Step two:

Redesign the following table so it reflects **entity integrity** and **referential integrity**.

**Hint:** Consider separating the table.

## Identifying anomalies in database design

This table contains various anomalies that affect the ability to manage the data that it contains. Redesign the table so it reflects entity integrity and referential integrity.

Orders				
Customer	PhoneNumber	OrderNum	ItemNum	Item
AnyCompany Tool	312-555-0123	07456	2246	Desktop computer
AnyCompany Toll	312-555-0123	08622	3145	Color printer
AnyCompany Tool Co.	312-555-0123	08622	3967	Computer monitor
Example Corp. Toys	917-555-0188	06755	2246	Desktop computer
EXAMPLE CORP TOYS	917-555-0187	08134	3145	Color printer
AnyCompany Consulting	206-555-0158	09010	0446	Network router

This table contains various anomalies that affect the user's ability to manage the data that the table contains.

## Better design

### Customers

CustomerNum	Customer	PhoneNumber
7822	AnyCompany Consulting	206-555-0158
8755	Example Corp. Toys	917-555-0188
9123	AnyCompany Tool Co.	312-555-0123

### Orders

CustomerNum	OrderNum
7822	09010
8755	06755
8755	08134
9123	07456
9123	08622

### Products

ItemNum	Item
2246	Desktop computer
3145	Color printer
3967	Computer monitor
0446	Network router

### ItemsOrdered

OrderNum	ItemNum
06755	2246
07456	2246
08134	3145
08622	3145
08622	3967
09010	0446

## Checkpoint questions



What are the four standard properties of transactions, which are also known as ACID?



1. What is a database transaction?

16

aws re/start

Answers:

1. The four standard properties of transactions are **A**tomicity, **C**onsistency, **I**solation, and **D**urability.
2. A database transaction is the reproduction of one or more changes that are performed on a database.



## Key takeaways



© 2020, Amazon Web Services, Inc. or its affiliates. All rights reserved.

17

- A database transaction is the reproduction of one or more changes that are performed on a database.
- Transactions follow four standard properties, which are also known as ACID.

aws re/start

Some key takeaways from this lesson include:

- A database transaction is the reproduction of one or more changes that are performed on a database.
- Transactions follow four standard properties, which are also known as ACID.