



Search



Essential Guide

Browse Sections ▼

Search the TechTarget Network

This content is part of the Essential Guide:

Evolution of Windows Azure SQL Database

DEFINITION

relational database

Posted by: [Margaret Rouse](#) WhatIs.comContributor(s): [Jacqui Biscobing](#)

A relational database is a set of formally described tables from which data can be accessed or reassembled in many different ways without having to reorganize the database tables. The standard user and application programming interface (API) of a relational database is the Structured Query Language ([SQL](#)). SQL statements are used both for interactive queries for information from a relational database and for gathering data for reports.

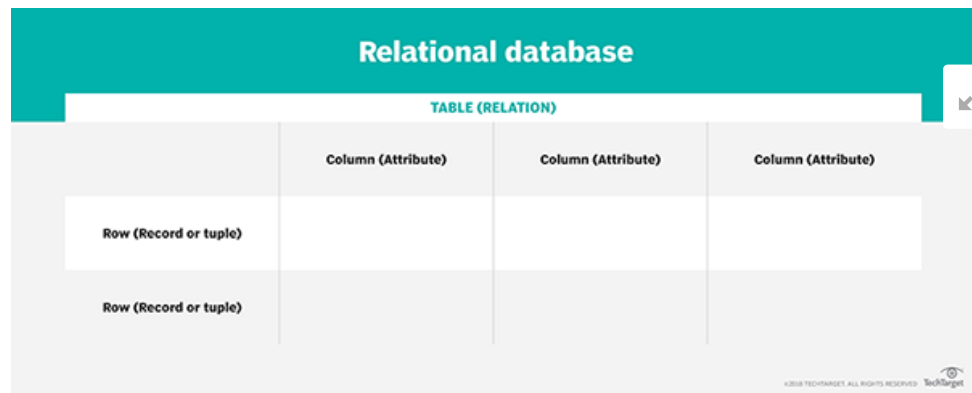
What's in a relational database model?

The relational database was invented in 1970 by [E. F. Codd](#), then a young programmer at IBM. In his paper, "A Relational Model of Data for Large Shared Data Banks," Codd proposed shifting from storing data in hierarchical or navigational structures to organizing data in tables containing rows and columns.

Each table, which is sometimes called a *relation*, in a relational database contains one or more data categories in columns, also called *attributes*. Each [row](#), also called a *record* or [tuple](#), contains a unique

instance of data, or *key*, for the categories defined by the columns. Each table has a unique [primary key](#), which identifies the information in a table. The relationship between tables can then be set via the use of [foreign keys](#) -- a field in a table that links to the primary key of another table.

For example, a typical business order entry database would include a table that described a customer with columns for name, address, phone number and so forth. Another table would describe an order: product, customer, date, sales price and so forth. A user of a relational database can then obtain a [view](#) of the database to fit their needs. For example, a branch office manager might like a view or report on all customers that bought products after a certain date. A financial services manager in the same company could, from the same tables, obtain a report on accounts that need to be paid.



The diagram illustrates a table within a relational database. It features a teal header bar labeled "Relational database". Below this, a white box labeled "TABLE (RELATION)" contains a table structure. The table has three columns, each labeled "Column (Attribute)", and two rows, each labeled "Row (Record or tuple)". The table is presented in a light gray frame with a small arrow icon in the top right corner. At the bottom right of the frame, there is a small logo and the text "© 2018 TECHTARGET. ALL RIGHTS RESERVED. TechTarget".



A relational database includes tables containing rows and columns.

When creating a relational database, you can define the [domain](#) of possible values in a data column and further [constraints](#) that may apply to that data value. For example, a domain of possible customers could allow up to 10 possible customer names but be constrained in one table to allowing only three of these customer names to be specifiable. Two constraints relate to data integrity and the primary and foreign keys:

- **Entity integrity** ensures that the primary key in a table is unique and that the value is not set to [null](#).
- **Referential integrity** requires that every value in a foreign key column will be found in the primary key of the table from which it originated.

Types of databases

There are a number of database categories, from basic [flat files](#) that aren't relational to NoSQL to newer [graph databases](#) that are considered even more relational than standard relational databases.

A flat file database consists of a single table of data that has no interrelation -- typically text files. This type of file enables users to specify data attributes, such as columns and data types.

 Pros and cons of flat file vs. relational database



Flat file vs. relational database

Standard relational databases enable users to manage predefined data relationships across multiple databases. Popular relational databases include Microsoft SQL Server, [Oracle](#) Database, MySQL and IBM DB2. Cloud-based relational databases, or database as a service (DBaaS), are also widely used because they enable companies to outsource database maintenance, patching and infrastructure support requirements. Cloud relational databases include Amazon Relational Database Service ([RDS](#)), Google Cloud SQL, IBM DB2 on Cloud, Microsoft Azure SQL Database and Oracle Database Cloud Service.

A NoSQL database is an alternative to relational databases that's especially useful for working with large sets of distributed data. These databases can support a variety of data models, including key-value, document, columnar and graph formats.

A graph database expands beyond traditional column- and row-based relational data models; this NoSQL database uses nodes and edges that represent connections between data relationships and can discover new relationships between the data. Graph databases are more sophisticated than relational databases, and thus, their uses include fraud detection or web [recommendation engines](#).

Advantages of relational databases

The main advantages of relational databases are that they enable users to easily categorize and store data that can later be queried and filtered to extract specific information for reports. Relational databases are also easy to extend and aren't reliant on physical organization. After the original database creation, a new data category can be added without all existing applications being modified.




[Margaret Rouse](#) asks:

Prev

1

Next

How does your organization utilize relational databases, and have you considered alternatives like NoSQL?



[Join the Discussion](#)

Other relational database advantages include:

- **Accurate:** Data is stored just once, which eliminates [data deduplication](#).
- **Flexible:** Complex queries are easy for users to carry out.
- **Collaborative:** Multiple users can access the same database.
- **Trusted:** Relational database models are mature and well-understood.
- **Secure:** Data in tables within relational database management systems ([RDBMSes](#)) can be limited to allow access by only particular users.


This was last updated in [May 2018](#)

➤ Continue Reading About relational database

- [Expert tips for relational database design](#)
- [Quiz yourself on relational vs. NoSQL databases](#)
- [How different databases tackle big data workloads](#)
- [An overview of relational databases](#)

Related Terms


data catalog

A data catalog is a metadata management tool designed to help organizations find and manage large amounts of data – including ... [See complete definition](#) 

data management-as-a-service (DMaaS)

Data Management-as-a-Service (DMaaS) is a type of cloud service that provides protection, governance and intelligence across a ... [See complete definition](#) 

database automation

Database automation is the use of unattended processes and self-updating procedures for administrative tasks in a database. [See complete definition](#) 

 **Join the conversation**

 **9 comments**

☒ Send me notifications when other members comment.

Add My Comment

Oldest ▼

 **Margaret Rouse** - 20 Apr 2006 6:59 AM



How does your organization utilize relational databases, and have you considered alternatives like NoSQL?

Reply

 **lewgarmas** - 22 Jan 2015 6:07 PM



As I read the Bible on a daily basis I want to capture my thoughts of different words or topics to a 'database' so later I can search by either word, scripture reference, or my thoughts. Basically I want to build my own 'concordance' of my study. I want to be able to open, for instance, the topic of 'wind' where I have previously entered a scripture reference and add another reference under 'wind'. I understand that a database can do this, but I get confused by how to do this. Can anyone help?

Reply

 **LowellIT** - 26 Jan 2016 10:28 AM



I couldn't remember what a relational database was. Your definition sufficed! It was well written.

Reply

 **Jbiscobi** - 17 May 2018 12:05 AM



Thanks for the feedback! It's greatly appreciated.

Reply

 **abdulmoiz** - 16 Oct 2016 11:43 PM



This was not helpful at all. You guys need to work on it and come up with new and more precise information. This kind of information is of no use. I hope you will take my feedback seriously. Thank You. Abdul Moiz

Reply

 **Jbiscobi** - 17 May 2018 12:07 AM



Hi Abdul! I wanted to let you know that we're updating this definition to be more informative, and we absolutely take feedback seriously.

Thanks for taking the time to reach out.

Reply

 **abdulmoiz** - 17 Oct 2016 11:24 PM



Hey! Me again xD

Can anyone here help me with DBMS?

Reply

 **AndrewSmith1956** - 13 Jun 2018 4:00 AM



At present our company uses Access with back end tables to capture details on customers generators and parts - prices. We then can generate quotations and cost sheets from word and excel. This is all locally based on a server. Due to it is success I have been asked to enable it to go nationally. Microsoft are no longer recommending "Access Services for new web apps and web databases". Can you please recommend the best route I should take as I have 9 relationship table. I have no experience in Power Apps Azure etc so I am not sure where to start to develop and how to transfer or link to my existing details.

Reply

 **li888zh** - 21 Feb 2019 12:23 PM



Here, how to design a relational database for a sports company? how to describe a transaction table in sports relational database?

[Reply](#)

-ADS BY GOOGLE

Latest TechTarget resources

[BUSINESS ANALYTICS](#)

[AWS](#)

[CONTENT MANAGEMENT](#)

SearchBusinessAnalytics



Equifax and FICO unite to move into alternative data market

ORACLE

SAP

SQL SERVER

With the Equifax-FICO alliance, the credit giants are offering a combined Data Decisions Cloud suite they hope can solidify their...



\$1 billion SAS AI investment recharges vendor's mission

SAS' new AI initiative includes a \$1 billion investment and partnership with AI chip vendor Nvidia. The goal is to bring advanced...

About Us

Meet The Editors

Contact Us

Privacy Policy

Advertisers

Business Partners

Media Kit

Corporate Site

Contributors

Reprints

Archive

Site Map

Answers

Definitions

E-Products

Events

Features

Guides

Opinions

Photo Stories

Quizzes

Tips

Tutorials

Videos