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NF Layers in Database Servers

When it comes to databases, many companies use normalization to sort out and organize their data. Normalization reduces the need for space in a database. Depending on how many rules and constraints are put into normalizing the database, there are different levels that categories call NFs or Normal Forms. Certain NFs come with different costs or return of investments.

In the most simple terms, normalization is an elimination procedure to remove complicated domains from relations. Some goals of normalization include minimizing data redundancy, enforcing referential integrity constraints, making the maintenance of data easier and providing a design representing the real world better on the basis of better for future growth. The differences in levels of normalization are categorized by NF or normal form. This is the database designer's degree or quality of performance.

There are nine levels of normalization. Each level is based on the type of the relation the tables have in the database. Relations are referred to how the tuples in a table are used or the dimension that the tuples are being multiplied in (C.J.Date 92). The levels act like checkpoints for how the data is structured. At level 0NF, the table is not proven to have a true relation. At this level tuples are just points in a table. Level 1NF is a true relation where each row and attribute of the row is unique. Level NF2 and NF3 depend on primary keys to call up their table.

The most recommended ideal for most businesses is NF3. This is because the normal normal is not too esoteric for students to learn but at the same time provides enough constraints from the primary key for decent data structure.   An example of this is that the entire primary key

is needed to find the customerid representing the customer who placed the order(Ben-Gan, 9). This is different from 2NF which splits the original relation before it into two relations.

Many businesses and large corporations that upgrade to a higher normalization helps sort out anomalies or outliers in the data. These are pieces of data that do not help the database in representing the real world. In general, the return of the investment on time spent on normalization becomes less significant striving for the higher forms. One article by the Journal of Information Systems Education writes "The problem of stopping short of achieving higher normal forms is that the anomalies associated with those normal forms are not removed...If such 5NF anomalies are encountered at a later date, software routines can be written to work around them"(381). There's only so reduction in anomalies that can be made by upgrading to a higher normal form and at level 5NF. At the same time, the article somewhat contradicts itself by saying those anomalies.

Carpenter, Donald A. "Clarifying Normalization." Journal of Information Systems Education, vol. 19, no. 4, Winter 2008, pp. 379–382. EBSCOhost,

Ben-Gan, Itzik. "T-SQL Fundamentals (3rd Edition)." T-SQL Fundamentals (3rd Edition), p. 9.

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