# Translating Business Rules

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WHAT'S COVERED

This lesson explores the steps to translate business rules into databases, in two parts. Specifically, this lesson will cover:

1. Translating Business Rules Into Database Features
2. Identifying Constraints

## 1. Translating Business Rules Into Database Features

Business rules can be translated into database relationships by defining the logic and constraints that govern how data is related and how it should behave in various scenarios. For most companies with established business rules and workflows, these are well-established database relationships. When starting a new project, implementing a new system, or even a new workflow, understanding the entire business process from start to stop, from supply chain to finished product in the store, is where the database designer and programmer will have the most impact on the company. Here are a few examples:

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| **Entity-Relationship Modeling** | Business rules help identify entities (objects or concepts) in the business domain and their relationships. For example, a business rule in a customer and order management system may state that each order is associated with a single customer. This translates into a one-to-many relationship between the "Customer" table and the "Order" table in the database. If it were a many-to-many relationship, an associative (bridge) table would be required for the connection to achieve normalization. |
| **Referential Integrity** | Business rules often require **referential integrity**, which ensures data relationships remain valid and consistent. For instance, a business rule might state that an order must have a valid customer associated with it. The database enforces this through foreign key constraints that link the order to a valid customer record. |
| **Cardinality and Multiplicity** | Business rules define the cardinality and multiplicity of relationships. For example, a business rule might specify that a product can be associated with multiple categories. This translates |

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| | into a many-to-many relationship between the "Product" table and the "Category" table, often implemented using an associative or junction table in the database. |
| **Data Validation** | Business rules determine data validity and constrain data entry. For instance, a business rule may require that the unit price of a product cannot be negative. This constraint can be enforced in the database using a check constraint or a validation rule. Data can also be validated by unique customer IDs, ZIP codes, or even GPS coordinates of delivery vehicles at regular intervals. |
| **Triggers and Stored Procedures** | Complex business rules that involve multiple tables or require specific actions can be implemented using database triggers and stored procedures. For example, a business rule might specify that a discount should be applied when a customer's order amount exceeds a certain threshold. This logic can be encapsulated in a database stored procedure that triggers when an order is inserted or updated. |
| **Data Derivation** | Business rules often involve deriving original data from existing data. For instance, a business rule might dictate that the total amount of an order should be calculated as the sum of the individual line items' prices. This calculation can be performed in the database using queries or views. Other kinds of calculations come in the form of **decision support systems (DSS)** that help define entire product life cycles. |

Organizations can ensure data integrity, enforce consistency, and implement complex business logic by translating business rules into database relationships and constraints. This guides the application's behavior and supports overall business objectives effectively. This kind of data and workflow is a company's competitive advantage in many ways. To lose this or have it misconfigured could cost the company.

TERMS TO KNOW

**Referential Integrity**

Rules ensuring that data relationships remain valid and consistent.

**Decision Support System (DSS)**

A computer-based tool that helps individuals and organizations make informed decisions by providing access to data, analysis, and interactive tools to support the decision-making process.

# 2. Identifying Constraints

Constraints are rules that limit what data can be stored in a record. For example, each invoice might have a constraint that counts the number of line items and ensures that the count is between 1 and 100.

Or perhaps there is an order system that tracks product shipping. There might be a constraint requiring that the shipping date (if entered) must be equal to or later than the order date because it wouldn't make sense to have an order ship before it was ordered.

EXAMPLE Here's another example. When a customer creates a new account on an online retailer's website, they enter their email address as their username on the system, so each account must have a

unique value in the Email column. However, the email address is not the primary key field in the Customer table; the primary key field is an automatically generated, unique number in the CustomerID column. The database designer could set the Email column up with NOT NULL and UNIQUE constraints to ensure that each record has a unique email address.

Identifying and translating business rules into database structures and constraints is key to ensuring that the database is designed to meet the needs of the underlying database system. Remember that not all business rules directly apply to the database, as they may apply to the application system where data is input or modified.

## SUMMARY

In this lesson, you learned about **translating business rules into database features**, specifically that creating relationships and **identifying constraints** based on business rules can help define and optimize a database's structure and performance. Some of the ways business rules can be implemented include entity-relationship modeling, referential integrity, cardinality, data validation, triggered and stored processes, and data derivation.

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## TERMS TO KNOW

**Decision Support System (DSS)**
A computer-based tool that helps individuals and organizations make informed decisions by providing access to data, analysis, and interactive tools to support the decision-making process.

**Referential integrity**
Rules ensuring that data relationships remain valid and consistent.