



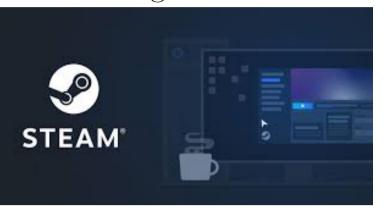
# Steam: A deconstruction of a virtual video-game store

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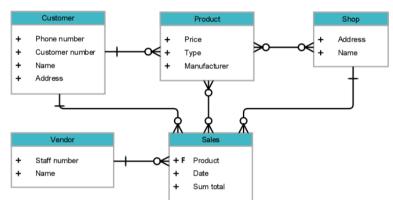
#### Introduction

Steam, developed by Valve Corporation, is one of the largest online platforms for buying and selling video games. Valve, founded in 1996 by former Microsoft employees Gabe Newell and Mike Harrington, initially launched Steam as a platform to distribute its own games. Over time, Steam grew into the most influential platform in the gaming industry, serving as a global hub for video game distribution. [1] This project explores the architecture and functionality of Steam's database system. Although Steam began as a modest website built with Java and C++ for downloading Valve games, it has since expanded to publish thousands of games from various developers. The focus of this project is to analyze how Valve designed Steam's database, understanding its key components, and how it serves as a model for developing database systems in the gaming industry. The goal is to deconstruct its structure and explore how its design can inform future projects in the field.



#### Goal

The project's goal is to apply database foundations, using Steam's system as our follow up objective, starting by the first phase of the design, the database model of Steam, so the project's first part will include the ten steps to design a Database ERM (Entity-Relationship Model) for the first version of the database model of Steam.



#### Proposed Solution

The Entity Relationship Model (ERM) also known as Entity Relationship Diagram (ERD), is a type of diagram for data modeling, which graphically illustrates the interrelationships of the entities of a database system. Said model, was proposed by the American-Taiwanese theoretical computer scientist, Peter Pin-Shan Chen in 1976. [2] For the Steam ERM Database Model we're gonna use ten steps to design the model:

- Step 1: Define Components • Step 2: Define entities
- Step 5:
- Define Relationship Step 8: Second ERM Diagram types • Step 9: Get ERM Data Struc-
- Step 3: Define attributes per
  - Step 6: First ERM Diagram
- Step 4: Define relationships
- to Many Relationships
- Step 7: First Division of Many Step 10: Define Constraint and Properties of Data

#### Results

### Step 1: Define Components

As our first step, the main components that are very relevant into Steam Platform are:

• Games

entity

- Users
- Communities

These components have a strong relationship between themselves, serving as our three pillars into this model.

#### Step 2: Define Entities

• User - E1

• Game - E2

• Genre - E3

- Badge E5
- Developer E8

• Forum - E10

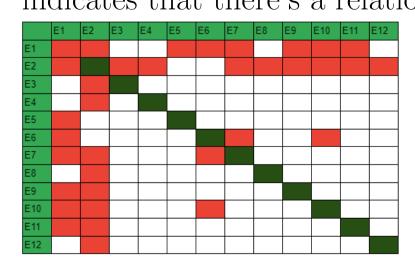
- Review E11
- Message E6
  - DLC (Downloadable • Achievement - E9 content) - E12
- Community E7 • Category - E4

# Step 3: Define Attributes per Entity

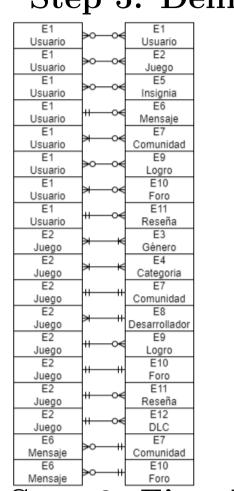
Step	3: Denne Attribu			
User (E1):	<ul> <li>Achievements</li> </ul>	Category (E4):	Achievement (E9):	
<ul><li>Nickname</li><li>Friends</li></ul>	Category	• Id • Name	• Name	
Shopping Cart     Downloads	• Genre	Badge (E5):	• ID	
Notifications	Genre	• Id	<ul> <li>Description</li> </ul>	
Notifications     Messages	• Review	<ul><li>Name</li><li>Experience</li></ul>	• Icon	
• Wallet		Description	Forum (E10):	
<ul> <li>Wishlisted</li> </ul>	• DLCs	• Icon	<ul> <li>Messages</li> </ul>	
Email     Password	• System Re-	Message (E6):	• Title	
• Level	quirements	• Id	<ul> <li>Author</li> </ul>	
• Country		• Title • Content	• Date	
<ul><li>Creation Date</li><li>SteamId</li></ul>	Community	• Author	Review (E11):	
• Status	• Developer	• Date Community	• Rating	
<ul><li>Phone</li><li>Subscriptions</li></ul>	Age Restric-	(E7): • Id	• Comment	
• Name	tion	<ul> <li>Subscribers</li> </ul>	• User	
Game (E2):		<ul> <li>Posts</li> </ul>	• Date	
• ID • Price	• Size	<ul> <li>Associated Game</li> </ul>	DLC (E12):	
Release Date	Genre (E3):	Developer	<ul> <li>Name</li> </ul>	
Release Date     Update Log	• Id	(E8): • Id	• Price	
• Name	- 414	Biography	Associated Game	
<ul> <li>Description</li> </ul>	• Name	<ul> <li>Associated</li> </ul>	Game	

# Step 4: Define Relationships

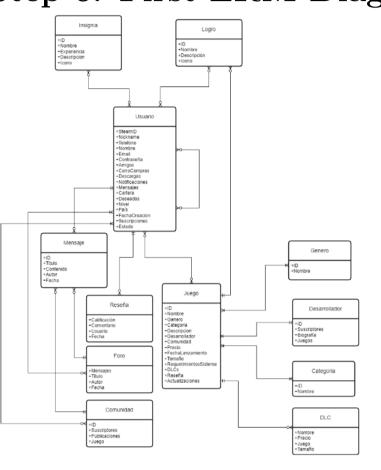
The following table contains all the entities and their possible relationship with each other, the red cell References indicates that there's a relationship between those entities.



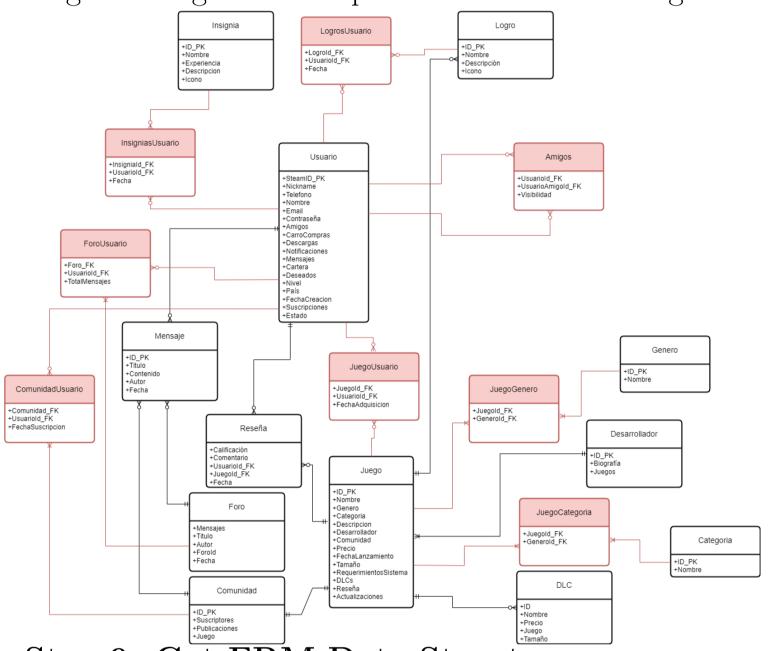
#### Step 5: Define Relationships types



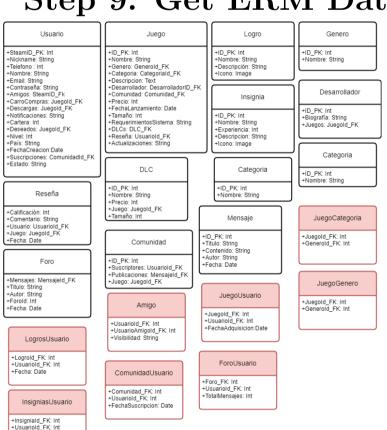
#### Step 6: First ERM Diagram



Step 7-8: First Division of Many to Many Relationships and Second ERM Diagram The red colored entities are the separations from many to many relationships, creating new entities each containing the foreign keys of the associated entities previously, and some attributes were slightly changed during the development of the second diagram.



Step 9: Get ERM Data Structure



Step 10: Define Constraint and Properties of Data

Usuario	Juego	Logro	Genero
SteamID_PK: Int PRIMARY KEY NOT NULL UNIQUE Nickname: String(50) NOT NULL UNIQUE Telefono : Int OPTIONAL Nombre: String(100) NOT NULL	Nombre: String(50) NOT NULL UNIQUE     Genero: Generold_FK NOT NULL FOREIGN KEY     Categoria: Categoriald_FK NOT NULL FOREIGN KEY	+ID_PK: Int PRIMARY KEY NOT NULL UNIQUE +Nombre: String(50) NOT NULL +Descripción: String(255) NULL +Iosno: Image NULL	*ID_PK: Int PRIMARY KEY NOT NULL UNIQUE *Nombre: String(50) NOT NULL
- Email: String NOT NULL UNIQUE - Contrasefa: String NOT NULL - Amigos: SteamID_FK NULL FOREIGN KEY - CarroCompras: Juagold, FK NULL FOREIGN KEY - CarroCom	Descripcion: String(255) NULL     Desarrollador: DesarrolladoriD_FK NOT NULL FOREIGN KEY     Comunidad: Comunidad_FK NOT NULL FOREIGN KEY     Precis: Int NOT NULL DEFAULT 0	Insignia	Desarrollador
Descargas: Juegold_FK NULL FOREIGN KEY     Notificaciones: String(255) NULL     Carter: Int NOT NULL DEFAULT 0     Deseados: Juegold_FK NULL FOREIGN KEY     Nivel: Int NOT NULL DEFAULT 0     Pais: String(50) NOT NULL	Fechal anzamiento: Date NOT NULL Famalio: Ite NOT NULL Requerimientos Sistema: String(255) NOT NULL OLC: DLC_FK NULL FOREION KEY Resena: Usuaridd_FK NULL FOREION KEY Actualizaciones: String(255) NOT NULL	+ID_PK: Int PRIMARY KEY NOT NULL UNIQUE -Nombre: String(50) NOT NULL -Experiencia: Int NOT NULL DEFAULT 0 -Descripcion: String(255) NOT NULL -Icono: Image NULL	+ID_PK: Int PRIMARY KEY NOT NULL UNIQUE +Biografia: String(255) NOT NULL +Juegos: Juegotd_FK NULL FOREIGN KEY
FechaCreacion: Date NOT NULL     Suscripciones: Comunidadid_FK NULL FOREIGN       Festado: String NOT NULL DEFAULT 'Desconected'	Y	Total mayor rock	Categoria
+Estado: String NOT NULL DEFAULT "Desconected	DLC	Categoria	+ID_PK: Int PRIMARY KEY NOT NULL UNIQUE +Nombre: String(59) NOT NULL
Reseña	+ID_PK: Int PRIMARY KEY NOT NULL UNIQUE +Nombre: String(50) NOT NULL +Precio: Int NOT NULL DEFAULT 0	+ID_PK: Int PRIMARY KEY NOT NULL UNIQUE +Nombre: String(50) NOT NULL	JuegoCategoria
+Calificación: Int PRIMARY KEY NOT NULL UNIQUE +Comentario: String	+Juego: Juegold_FK FOREIGN KEY NOT NULL UNIQUE +Tamaflo: Int NOT NULL	Mensaje	+Juegold FK: Int FOREIGN KEY NOT NULL UNIQU
+Usuario: Usuariold_FK +Juego: Juegold_FK +Fecha: Date	Comunidad	+ID_PK: Int PRIMARY KEY NOT NULL UNIQUE +Titulo: String(50) NULL	+Generold_FK: Int FOREIGN KEY NOT NULL UNIO
Foro	+ID_PK: Int PRIMARY KEY NOT NULL UNIQUE +Suscriptores: Usuariold_PK FOREIGN KEY NULL UNIQUE	Contenido: String(255) NOT NULL     Autor: Usuariold_FK NOT NULL FOREIGN KEY     Fecha: Date NOT NULL	
ensales: Mensaleid FK FOREIGN KEY NOT NULL UNIQUE	+Publicaciones: Mensajeld_FK FOREIGN KEY NULL UNIQUE +Juego: Juegold_FK FOREIGN KEY NOT NULL UNIQUE	*Fecial Date NOT NOLL	JuegoGenero
itulo: String(50) NOT NULL utor: Usuariold_FK FOREIGN KEY NOT NULL UNIQUE orold: Int PRIMARY KEY NOT NULL UNIQUE	Amigo	JuegoUsuario	+Juegold_FK: Int FOREIGN KEY NOT NULL UNIQU +Generold_FK: Int FOREIGN KEY NOT NULL UNIQ
LogrosUsuario	+Usuariold_FK: Int FOREIGN KEY NOT NULL UNIQUE +(	Juegold_FK: Int FOREIGN KEY NOT NULL UNIQUE Usuarloid_FK: Int FOREIGN KEY NOT NULL UNIQUE FechaAdquisicion.Date NOT NULL	
ogrold_FK: Int FOREIGN KEY NOT NULL UNIQUE suariold_FK: Int FOREIGN KEY NOT NULL UNIQUE echa: Date NOT NULL	ComunidadUsuario	ForoUsuario	
InsigniasUsuario	+Comunidad_FK: Int FOREIGN KEY NOT NULL UNIQUE +(	Fore_FK: Int FOREIGN KEY NOT NULL UNIQUE Usuarioid_FK: Int FOREIGN KEY NOT NULL UNIQUE TotalMensajes: Int NOT NULL DEFAULT 1	
signiald_FK: Int FOREIGN KEY NOT NULL UNIQUE susriold_FK: Int FOREIGN KEY NOT NULL UNIQUE			

#### Conclusions

- It has been concluded that Steam relies heavily on games and users, meaning that the database model relationships usually aim to the users and the games.
- It was also concluded that the design of this model might be just a lite version of the actual database of steam due to it's complexity and size.

- [1] Valve Corporation. Valve Corporation: About Us. https://www.valvesoftware.com/es/ about, September 27th, 2021.
- [2] SQLearning. Entity Relationship Model (ERM). https://sqlearning.com/ sql-server-introduction/entity-relationship-model/, July 11th, 2022.

October 4th, 2024