

# JSAL Sparrow Database Design Document

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## 1. Introduction

In this document JSAL presents the database design for the eVote Sparrow prototype. It explains the database implementation, the data description of the different database entities, the relationships that exist between these entities and the entity-relationship diagram.

## 2. Implementation

The database schema was implemented by using MySQL.

## 3. Data Description

### 3.1. Entities

3.1.1. **candidate** – This entity represents a candidate in the elections.

3.1.1.1. CanID – This unique primary key is an auto incremental that represents the candidate's identification number.

3.1.1.2. FirstName – The candidate's first name.

3.1.1.3. MiddleName – The candidate's middle name.

3.1.1.4. FirstLastName – The candidate's last name.

3.1.1.5. SecondLastname – The candidate's second last name (a.k.a. mother's maiden name).

3.1.1.6. Position – The position the candidate is running for.

3.1.1.7. Party – The political party the candidate is affiliated with.

3.1.1.8. Votes – The total amount of votes obtained in the elections by this candidate.

3.1.1.9. Barcode – The candidate's corresponding barcode, which is used in the case of a recount.

3.1.2. **candidatevotes** – This entity contains all the votes submitted for all candidates.

3.1.2.1. ID – This unique primary key is an auto incremental number.

3.1.2.2. CanID – This foreign key is the candidate's identification number, which is stored already encrypted.

3.1.2.3. Vote – A submitted vote for a specific candidate.

3.1.3. **kiosk** – This entity represents a kiosk utilized in a voting center.

- 3.1.3.1. kID – This unique primary key is an auto incremental which is used as the kiosk’s identification number.
- 3.1.3.2. Unit – The assigned unit of the kiosk.
- 3.1.3.3. Precinct – The assigned precinct of the kiosk.
- 3.1.3.4. Occupied – Indicates if a kiosk is occupied (“1”) or not (“0”).
- 3.1.3.5. LocalID – Represents the kiosk’s local identification number which is used inside the corresponding voting center.
- 3.1.3.6. Open – Indicates if a kiosk is open (“1”) or closed (“0”).
- 3.1.4. **masterkey** – This entity contains all the corresponding master keys to be utilized in the system.
  - 3.1.4.1. ID – This unique primary key is an auto incremental that represents the master key’s identification number.
  - 3.1.4.2. MasterKey – The master key utilized for the corresponding ID, which is stored already encrypted.
- 3.1.5. **official** – This entity represents an official working in the elections.
  - 3.1.5.1. OfficialID – This unique primary key is an auto incremental that represents the official’s identification number.
  - 3.1.5.2. FirstName – The official’s first name.
  - 3.1.5.3. MiddleName – The official’s middle name.
  - 3.1.5.4. FirstLastName – The official’s last name.
  - 3.1.5.5. SecondLastName – The official’s second last name (a.k.a. mother’s maiden name).
  - 3.1.5.6. Precinct – The official’s assigned precinct.
  - 3.1.5.7. Unit – The official’s assigned unit.
  - 3.1.5.8. Password – The official’s password, which is stored already encrypted.
- 3.1.6. **party** – This entity represents a political party in the elections.
  - 3.1.6.1. pID – This unique primary key is an auto incremental that represents the political party’s identification number.
  - 3.1.6.2. pName – The political party’s name.
  - 3.1.6.3. Votes – The total amount of votes obtained in the elections by this political party.

- 3.1.6.4. Barcode – The political party’s corresponding barcode, which is used in the case of a recount.
- 3.1.7. **partyvotes** – This entity contains all the votes submitted for all political parties.
  - 3.1.7.1. ID – This unique primary key is an auto incremental number.
  - 3.1.7.2. pID – This foreign key is the political party’s identification number, which is stored already encrypted.
  - 3.1.7.3. Vote – A submitted vote for a specific political party.
- 3.1.8. **writeln** – This entity contains all the votes submitted as direct nominations.
  - 3.1.8.1. ID – This unique primary key is an auto incremental number.
  - 3.1.8.2. Name – The name of nominated candidate, which is stored already encrypted.
  - 3.1.8.3. Position – The assigned position for the nominated candidate.
- 3.1.9. **voter** – This entity represents a registered voter.
  - 3.1.9.1. ElectoralNumber – This unique primary key is a seven digit number that is assigned to every voter.
  - 3.1.9.2. FirstName – The voter’s first name.
  - 3.1.9.3. MiddleName – The voter’s middle name.
  - 3.1.9.4. FirstLastName – The voter’s last name.
  - 3.1.9.5. SecondLastName – The voter’s second last name (a.k.a. mother’s maiden name).
  - 3.1.9.6. AlreadyVoted – Indicates if the voter has already voted (“1”) or not (“0”).
  - 3.1.9.7. Precinct – The voter’s assigned precinct.
  - 3.1.9.8. Unit – The voter’s assigned precinct.
  - 3.1.9.9. kID – The local identification number of kiosk used in the corresponding voting center.
  - 3.1.9.10. OfficialID – This foreign key is the identification number of the official who assisted the voter.

## 3.2. Relations

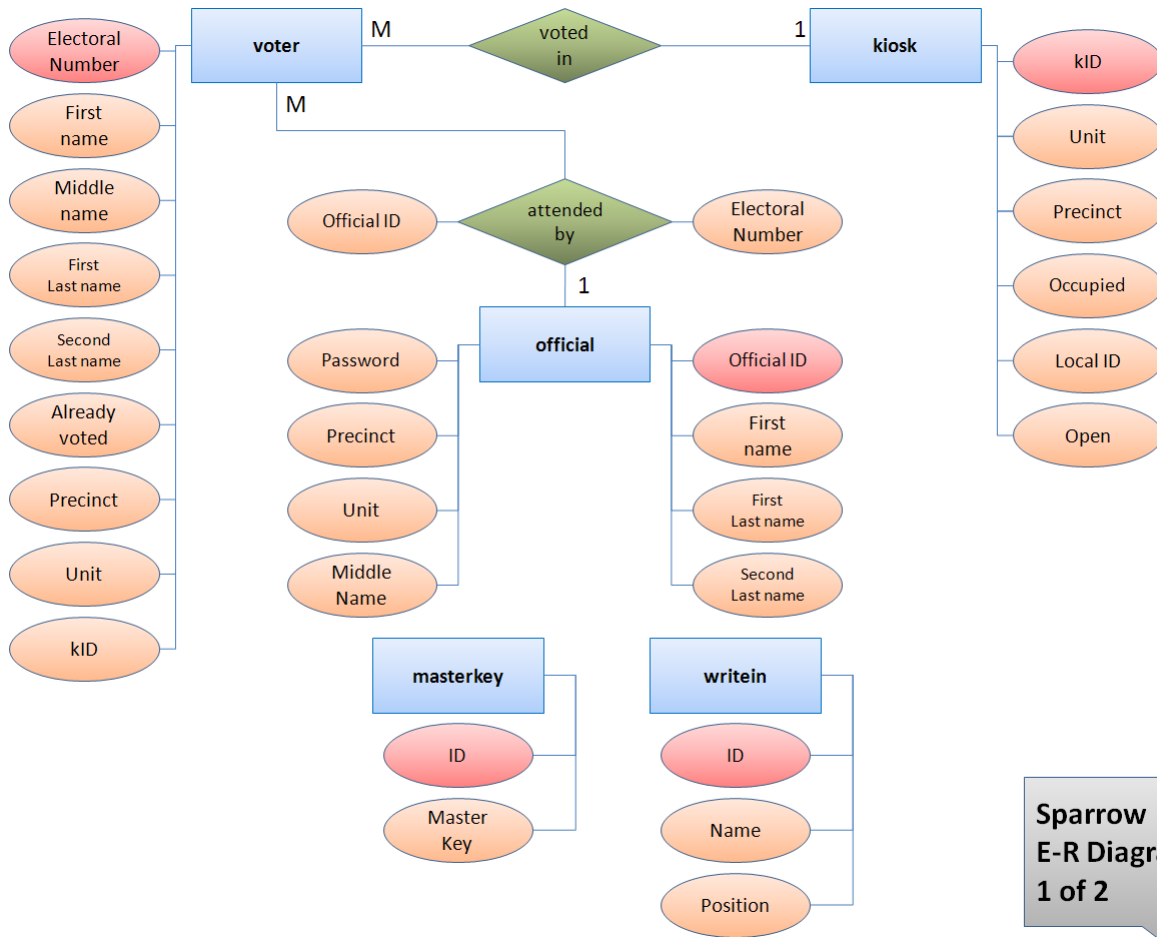
- 3.2.1. **voted in** – This relation states that one or more voters can vote in one kiosk. It is a one to many relationship from the entity *kiosk* to the entity *voter*.

- 3.2.2. ***attended by*** – This relation states that one or more voters can be attended by one official. It is a one to many relationship from the entity *official* to the entity *voter*.
- 3.2.3. ***candidate has*** – This relation states that one or more candidate votes correspond to one candidate. It is a one to many relationship from the entity *candidate* to the entity *candidatevotes*.
- 3.2.4. ***party has*** - This relation states that one or more political party votes correspond to one political party. It is a one to many relationship from the entity *party* to the entity *partyvotes*.

### 3.3. Relations not mapped to a relational table

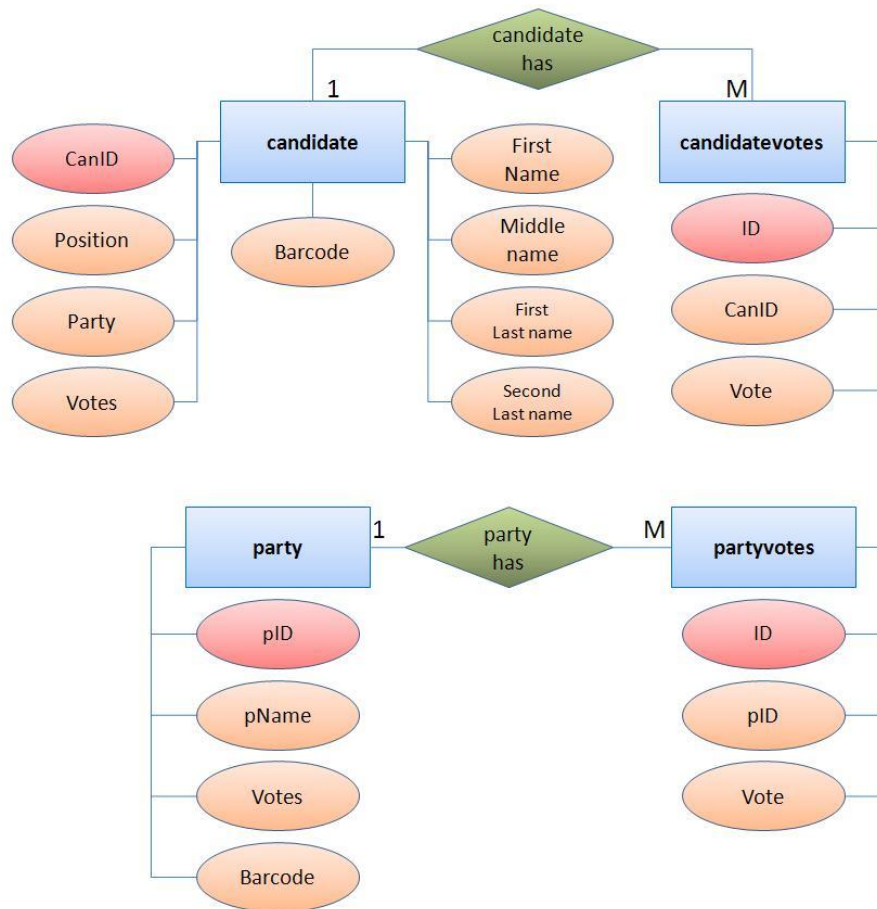
- 3.3.1. ***voted in*** – This relation between *voter* and *kiosk* was not mapped because it is a one to many relation from *kiosk* to *voter*. The primary key of *kiosk* kID can be used as a foreign key in the *voter* entity to represent the *voted in* relationship.
- 3.3.2. ***attended by*** – This relation between *voter* and *official* was not mapped because it is a one to many relation from *official* to *voter*. The primary key of *official* OfficialID can be used as a foreign key in the *voter* entity to represent the *attended by* relationship.
- 3.3.3. ***candidate has*** – This relation between *candidate* and *candidatevotes* was not mapped because it is a one to many relation from *candidate* to *candidatevotes*. The primary key of *candidate* CanID can be used as a foreign key in the *candidatevotes* entity to represent the *candidate has* relationship.
- 3.3.4. ***party has*** – This relation between *party* and *partyvotes* was not mapped because it is a one to many relation from *party* to *partyvotes*. The primary key of *party* pID can be used as a foreign key in the *partyvotes* entity to represent the *party has* relationship.

## 4. E-R Diagram



Sparrow  
E-R Diagram  
1 of 2

Sparrow ER Diagram - Figure 1



**Sparrow**  
E-R Diagram  
2 of 2

Sparrow ER Diagram - Figure 2