

Overview

This project is a law enforcement database that helps organize and manage police reports. With large amounts of crime in a variety of major cities and an increasing amount of police brutality around the country, it is necessary to have a statewide database that keeps track of reports and the persons involved, including officers and regular citizens. Implementing such a database would allow states to find trends in crime and locate crime hot-spots. In cases of police brutality, a law enforcement database would be able to identify police officers involved to ensure accountability.

Identify the users and business needs:

The four main users of the database would be law enforcement officials, journalists, private investigators, and government officials. The primary user of the database would be law enforcement officials. They would also play a role in managing the database system since they are involved in the report writing process and reports play a large role in the database. Law enforcement officials would expect our database to help keep track of the reports and citizens involved with the reports. A law enforcement database would greatly benefit police officers because it would ease their everyday duties. For instance, they would be able to find the address of an offender or victim in seconds, allowing them to follow up on a report. Furthermore, if an officer responded to a crime with another officer from a different precinct, they would be able to use the database to find the officer's precinct. Some users may be able to access certain parts of the database, but not all of it. One example of this would be a journalist, and they would have similar expectations as law enforcement officers. They would expect to be able to access victims and suspects in the reports, but not specific details that may be confidential. With access to the database, journalists would be able to find content for stories and publish crime statistics by searching through the reports. Moreover, they would be able to easily find the victims, suspects, and officers involved using our database including information such as the names of people and the precincts of officers. Another potential user with limited access to the database would be private investigators. Private investigators would primarily be interested in the reports and the people involved. With access to the database, private investigators could discover incidents that they weren't aware of through reports. Furthermore, it could help them gather basic information on people involved in their case such as their age and address. The final user of our database would be government officials, and their interests and uses of the database are far different than the other users discussed so far. Government officials would expect our database to keep track of crimes and where they are being committed. As a government official, one of your top priorities is to keep crime at low-levels. Using the database, government officials would be able to identify areas with particularly high levels of crime and implement appropriate changes and programs in an attempt to combat crime levels. Additionally, government officials would be able to use this information to regulate law enforcement departments, precincts, and officers and enforce changes as necessary.

Identify the data requirements:

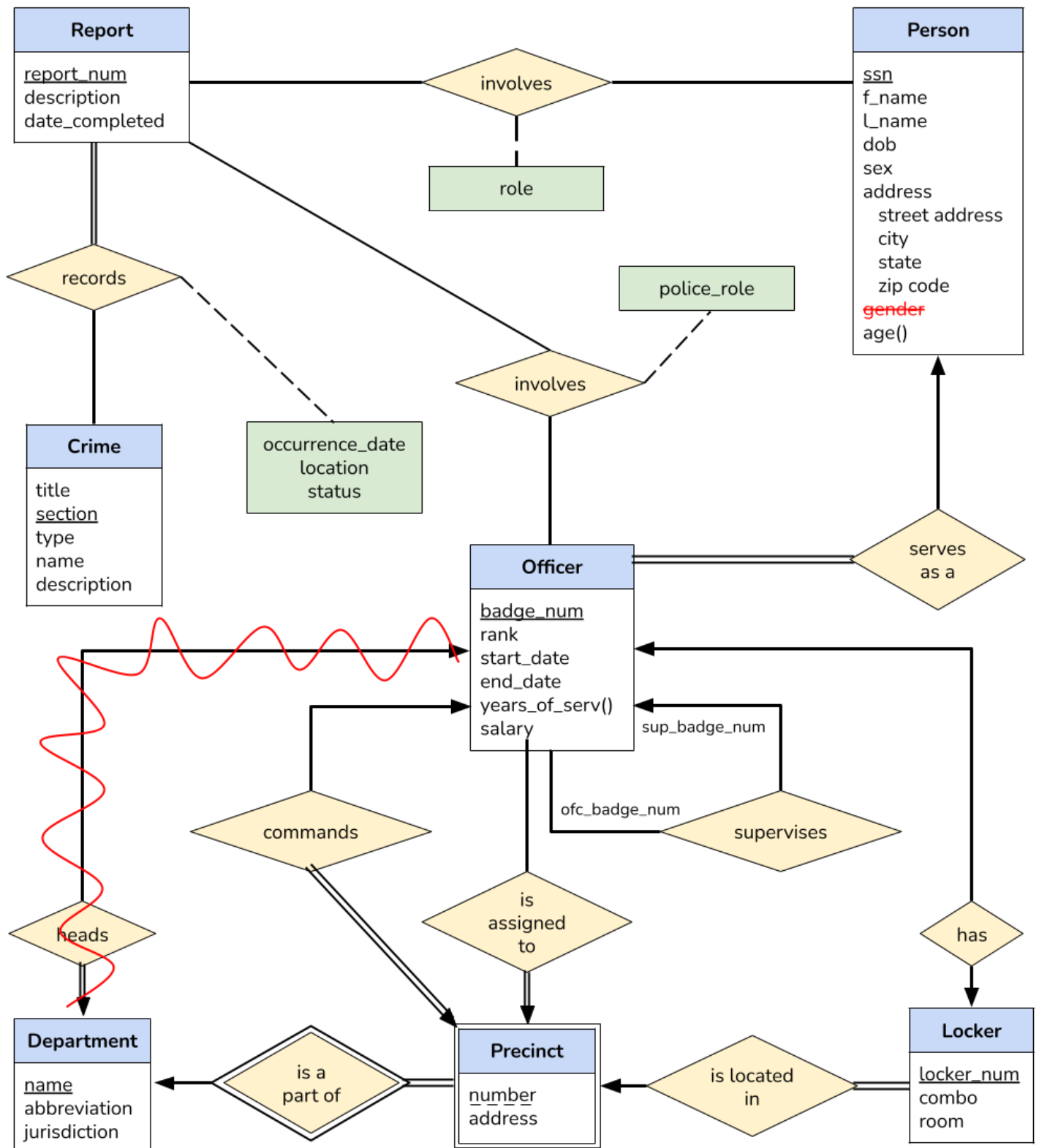
This database would represent law enforcement agencies, including the officers which work for a specific department, the precinct they work in, their lockers, the reports they write, the crimes that may or may not be committed, and the people involved in these reports (including their role in the report, such as a suspect, victim, witness, etc.). The officers would have information stored about them including their badge numbers, as identifying information, as well as other attributes specific to their role as an officer. The people in the database, including the officers, will be identified by their social security number and the database will store other relevant information about people such as their age, name, address, etc. Officers,

suspects, victims, and witnesses are all people. A person may or may not be an officer, and an officer must be one person (additionally, an officer may have served in two different precincts during two periods of time). If a report has suspect(s), witness(es) and/or victim(s), their information will be represented by the person entity. Officers can have one supervisor, but may not have a supervisor in the case that they are the department's chief, commissioner, sheriff, etc. Officers are supervised by another officer (of a different rank). Each officer has their own locker. Many officers are assigned to one precinct, and a precinct must have officers to work at it. One officer (a captain for example) commands one precinct and each precinct needs one commanding officer. Additionally, one officer is the head of one department (as mentioned before), and each department needs one officer to head it. For the purposes of our database, however, the department head officer is assigned a precinct and a department as a relationship with a precinct (a weak entity), though they head the entire department. The precinct (a police station within a police department) is led by a commanding officer, who reports to the department head. A precinct cannot exist without the department it belongs to. When an officer writes a report, there is one or several crime(s) involved. Each report is written on a certain date (the report's date), and each crime in a given report occurred on a certain date, at a certain location, with a certain status, represented by relational attributes between report and crime. Data such as the officer's start and end dates of service, badge numbers, and other relevant officer information must be kept up to date to ensure accurate records. Changes in city, state, or federal laws must be then appropriately updated in the database as well to ensure the crime data is up to date. Furthermore, keeping track of crime reports and ensuring that new reports are being continuously added to the database is central to the functioning of this database.

Identify the scope of your solution:

In order to create a law enforcement database, we found it necessary to simplify several aspects of law enforcement. For instance, our database only tracks crimes and doesn't account for accidents, incidents, or arrests. Due to this limitation, events such as missing cats, car crashes, and arrests of criminals would not be documented. Furthermore, many attributes of people are not tracked such as height, weight, eye color, relatives, and more. People simply have too many traits and listing all of them is not a reality. A similar argument can be made about the officer entity. Furthermore, a law enforcement database would most likely include a list of inmates and their cells; however, for the purpose of having a thorough database, we have chosen to not include these elements in our scope.

Entity-Relationship Diagram



Attribute Clarifications

Attribute	Example/Clarification	Attribute	Example/Clarification
Report date_completed	Date report was written	Crime title	Title 8
involves role	Suspect, Victim, Witness	Crime section	160
involves police_role	Investigator, Supervisor	Crime type	Felony
records status	Acquitted, Jailed	Crime name	Robbery
records occurrence_date	Date crime occurred	Department jurisdiction	Boston

Changes to Our ER Diagram

Two changes were made to the ER diagram since phase 2. We removed gender as an attribute of the person table, as we felt it was unnecessary for what this database is for. It should be noted that sex is still an attribute which is represented in this database. Additionally, we removed one unnecessary relationship from our ERD. The relationship from Officer to Department (i.e. one officer is the head of one department, and the department must have one officer as its head officer) was removed as it was deemed redundant due to a design decision to have all officers, including chiefs, to be assigned to a precinct. If every officer has a precinct, then every officer's department will be determined through joining the officer table with the precinct table and then joining this table with the department table. We made this change because it resulted in a simpler, more intuitive representation of the relationship between department chiefs and their departments. Without this change, we were unable to store the department name of the chief in the officer table, which is counter-intuitive, especially when it comes to accessing this information in queries.

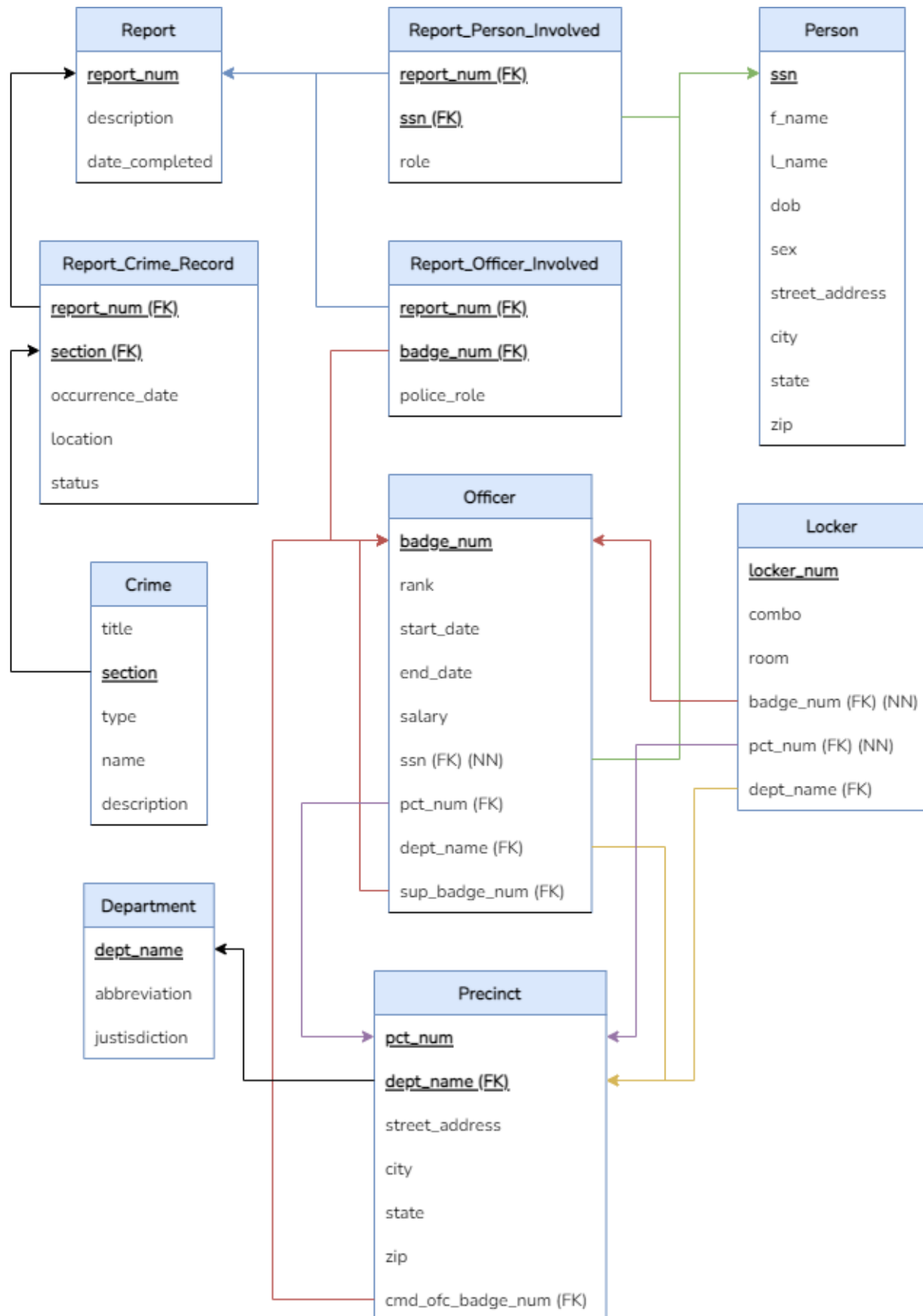
To keep the data within our database simple, our data differs from what we described in phase 2. Crime titles do not include their full name ("Title 8" instead of "Title 8. Fraud Offenses"), crime sections are now integers, felony and misdemeanor classes (e.g. Class C Felony) are now grouped together as felonies and misdemeanors, crime names are made simpler ("Robbery" instead of "Robbery in the third degree"), and jurisdictions are simpler ("Boston" instead of "Boston, MA").

Query Explanations

All of our queries also have practical uses. Our first query, finding all departments that spend over \$400,000 on salaries, is essential to business processes because it helps government officials see how much money every department is spending on their payroll. For example, officials from Boston may realize that they are spending twice as much on their officer payroll as New York does, despite being a smaller city. From here, Boston's officials could look into the way New York's Police Department operates, adopting any practices that make New York's police so much more efficient than Boston's. Our second query, finding the longest serving officer at each precinct for Boston's police department, could also help Boston's Police Department's in its operations. This query could help find officers that are up for potential promotion. For example, the chief of the Boston Police Department may have recently retired and the city of Boston needs to find a new chief. A good place to start looking for that chief could be by finding the most experienced officers in every precinct. Furthermore, finding all non-officers that have a name that starts with 'J', our third query, could also assist officers in doing their jobs because it could help find potential suspects. For example, a witness may remember very little about a potential

suspect; however, one thing they remember is that their name started with a J. From here, the police could search for all non-officers that have a name that starts with J in hopes of finding some potential leads. Another example of a query that can be helpful to the police is finding the people who are listed as suspects in multiple crimes. This is our fourth query. This query is relevant to business processes as it can help policemen identify repeat suspects, as well as patterns of offenses. For instance, if a certain individual has been suspected of assaulting people on several occasions, this is useful information for further investigation into this suspect. Moreover, another query, our fifth query, that assists police in protecting the community is a query that finds all officers that have been involved with a report that involved a kidnapping. This query can help schedule a meeting with all the officers that have been involved with the kidnapping cases. It is possible that there has been an increase in kidnappings recently, and it is essential that all these officers meet to discuss their reports in hopes of finding trends and ultimately discovering what is causing the increase in kidnappings. Our sixth query finds people who are suspected of committing a crime in which that crime occurred in a city other than the city they live in. This is interesting information to access as it is uncommon for suspects to reside in a different city than the one they committed the crime in, but it is possible. This information can encourage collaboration between different police departments in order to solve a particular crime. Our 7th, final query finds how many lockers are in each precinct. This is useful as a given police department can determine if there is a need for more lockers in order to accommodate the amount of officers they have.

Relational Schema



Final Statement

After working on this database design project, we have learned a variety of new things about database design. First of all, we learned about the importance of planning before constructing the database. Our database incorporates several entities and relationships. Being able to reference our ER diagram and relationship schema was vital for inserting data and completing searches. Without having these models to reference, we would have a significantly harder time coming up with potential queries. In order to create these models, we also had to learn how to use a variety of new planning tools. We researched several of these resources, ultimately settling on diagrams.net. Even though none of us had any experience using this resource, we were able to pick it up quickly and use it to create our models.

Furthermore, from each other, we were able to learn about the different ways to approach a problem. Very rarely would the members of our group come up with the same solution. As each member explained their approach, the rest of the group would listen carefully. Sometimes, a member would even adopt the approach of another group member due to the approach being significantly simpler. Moreover, we taught each other pgAdmin tricks that we have picked up over the last semester such as completing searches by highlighting the select statement or checking the schemas tab to make sure the table was created properly.