

# Database Normalization Report

## Among Us Galactic Registry

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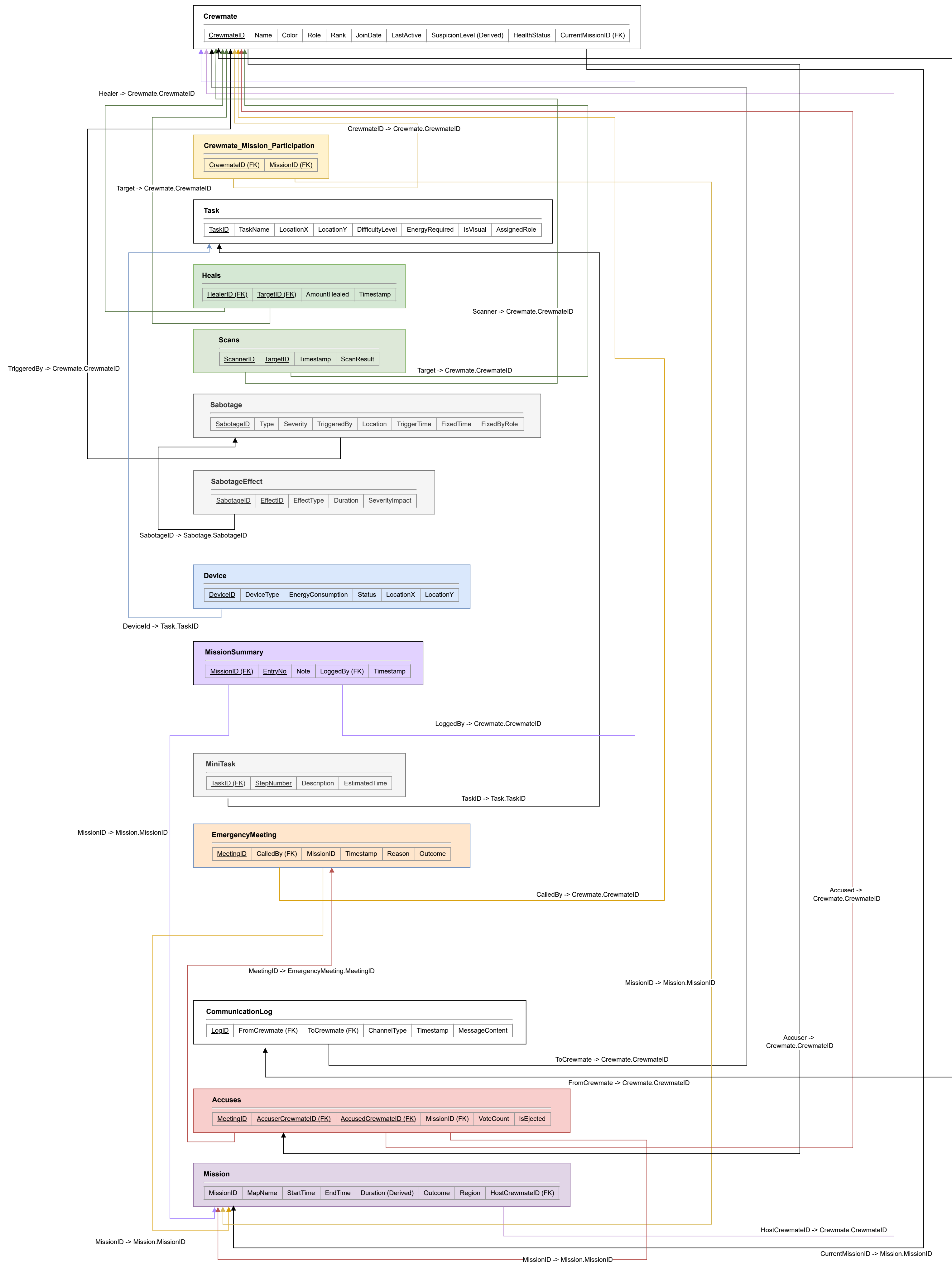
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### Abstract

This report details the process of normalizing the "Among Us Galactic Registry" database schema. Starting from an unnormalized form, the schema is progressively refined through First Normal Form (1-NF), Second Normal Form (2-NF), and Third Normal Form (3-NF). Each step documents the specific changes made to the relations and the logical reasoning for each transformation, such as eliminating multi-valued attributes, partial dependencies, and transitive dependencies, to achieve a robust and efficient database structure.

## **1 Original Schema (Pre-Normalization)**



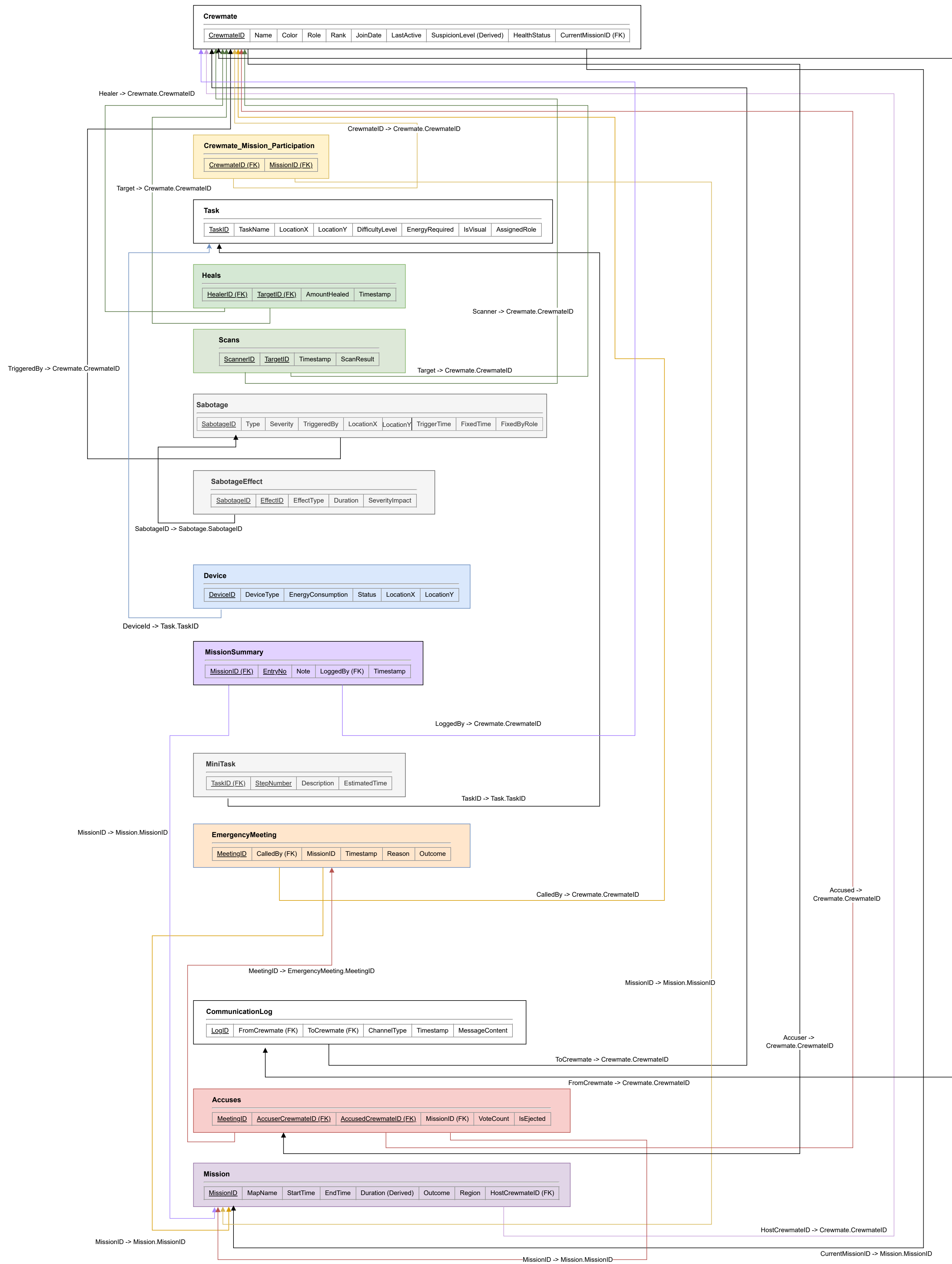
## **2 First Normal Form (1-NF)**

### **2.1 Changes Made**

In the Sabotage relation, the multi-valued attribute Location was replaced with two atomic attributes: LocationX and LocationY.

### **2.2 Reason**

The original Location attribute was multi-valued, which violates the 1-NF requirement that all attribute values in a relation must be atomic.



## 3 Second Normal Form (2-NF)

### 3.1 Changes Made

The SabotageEffect relation was decomposed to resolve a partial dependency.

- **Original Relation:**

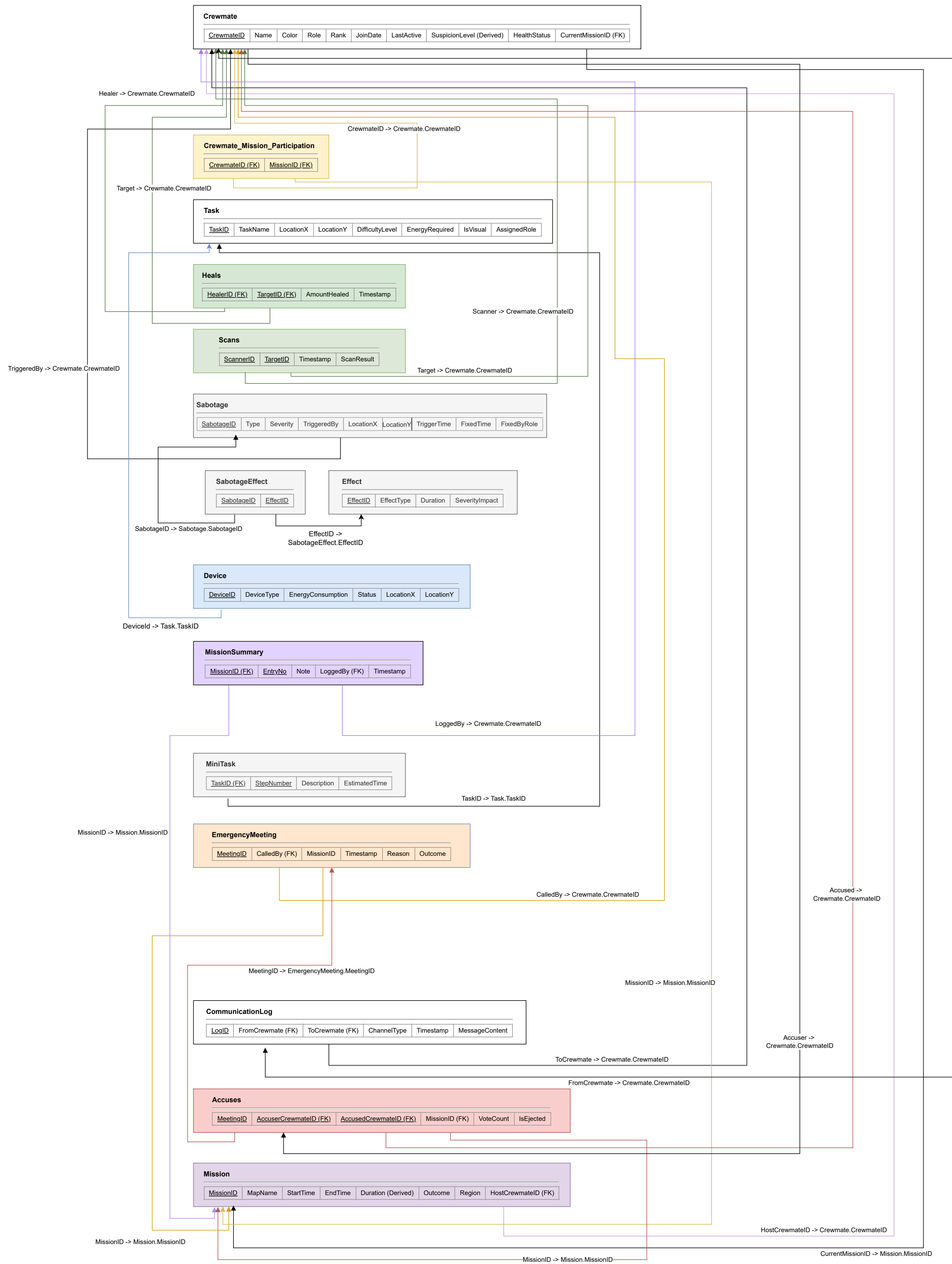
SabotageEffect(SabotageID (PK), EffectID (PK), EffectType, Duration, SeverityImpact)

- **Decomposed into:**

1. SabotageEffect(SabotageID (PK,FK), EffectID (PK,FK))
2. Effect(EffectID (PK), EffectType, Duration, SeverityImpact)

### 3.2 Reason

The original table had a composite primary key (SabotageID, EffectID), and the attributes EffectType, Duration, and SeverityImpact were functionally dependent only on EffectID, which is just a part of the primary key. This partial dependency violates 2-NF.



## 4 Third Normal Form (3-NF)

To eliminate transitive dependencies, the following relations were decomposed:

### 4.1 i. Crewmate Relation

- **Changes:** Broke down Crewmate(CrewmateID (PK), ..., Role, Rank, ...) into:
  1. Crewmate(CrewmateID (PK), ..., Role (FK), ...)
  2. RoleDetails(Role (PK), Rank, BaseSuspicionLevel)

### 4.2 ii. Task Relation

- **Changes:** Broke down Task(TaskID (PK), TaskName, ..., DifficultyLevel, ...) into:
  1. Task(TaskID (PK), TaskName (FK), LocationX, LocationY)
  2. TaskBlueprint(TaskName (PK), DifficultyLevel, EnergyRequired, ...)

### 4.3 iii. Sabotage Relation

- **Changes:** Broke down Sabotage(SabotageID (PK), Type, Severity, ...) into:
  1. Sabotage(SabotageID (PK), Type (FK), TriggerBy, ...)
  2. SabotageType(Type (PK), Severity, DefaultFixedByRole)



