San Francisco Fire Calls Case Study

Team 6

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Objective

“To Identify Best and Worst Battalion and Station Areas Based on Severe Incident Response”

Assumptions made for this Case Study

- Station Area Code - The station operating for an incident
- Battalion - The force unit(s) sent/assigned to incident
- Delay - Response Delay

How we conducted our analysis

Silver Table creation

Defining Severity

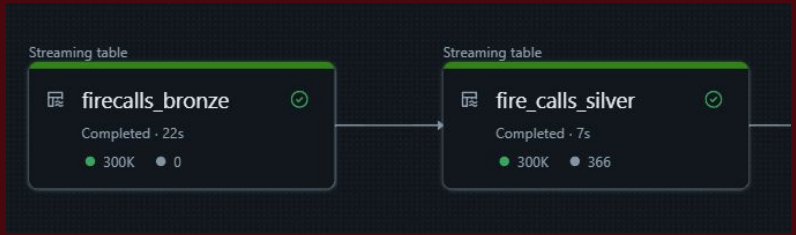
Delay Classification

StationArea Analysis and Performance Distribution

Battalion Analysis and Performance Distribution

Silver Table Creation (Fire Calls Data)

- Transform raw fire calls data (Bronze layer) into a clean, structured Silver table.
- Ensure quality and reliability of data for analysis.
- Focused on critical columns needed for incident severity and response analysis.



Relevant columns and Not NULL Constraints

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2

CREATE OR REFRESH STREAMING LIVE TABLE fire_calls_silver
(...
)
AS
SELECT IncidentNumber, Zipcode, Battalion, StationArea, ALSUnit, UnitType, Delay, CallType, Neighborhood, Location, CallDate
FROM STREAM(LIVE.firecalls_bronze);
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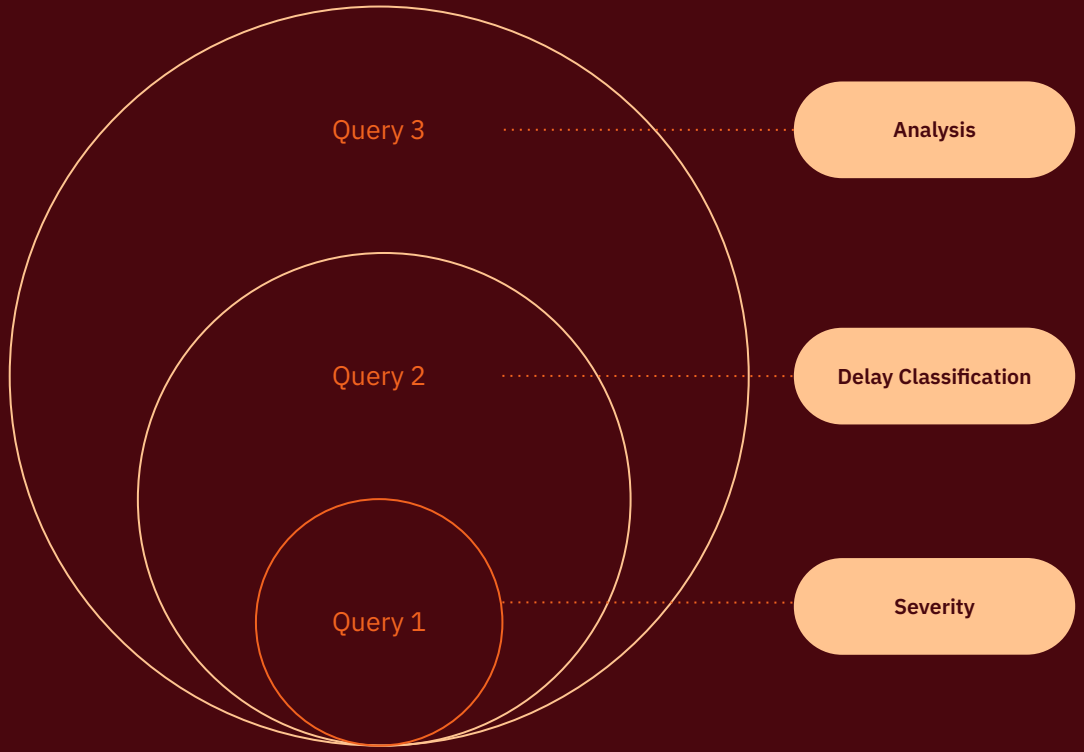


Queries Go through

Severity: Obtaining the incidents with high severity on basis of parameter (ALS count)

Delay: Avg time to respond for each incident followed by station area

Classification:

- **Above Average Delay** → slow response (slow incidents)
- **Below Average Delay** → fast response (fast incidents)

Severe Incidents

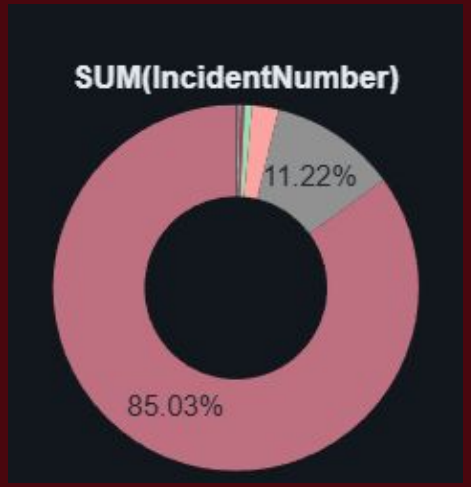
Number of ALS units per incident > 2 → higher = more severe

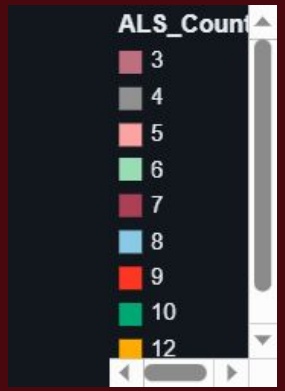
What is ALS (Advanced Life Support)?

ALS is a level of pre-hospital care that involves performing advanced medical procedures and using specialized equipment that goes beyond basic first aid.

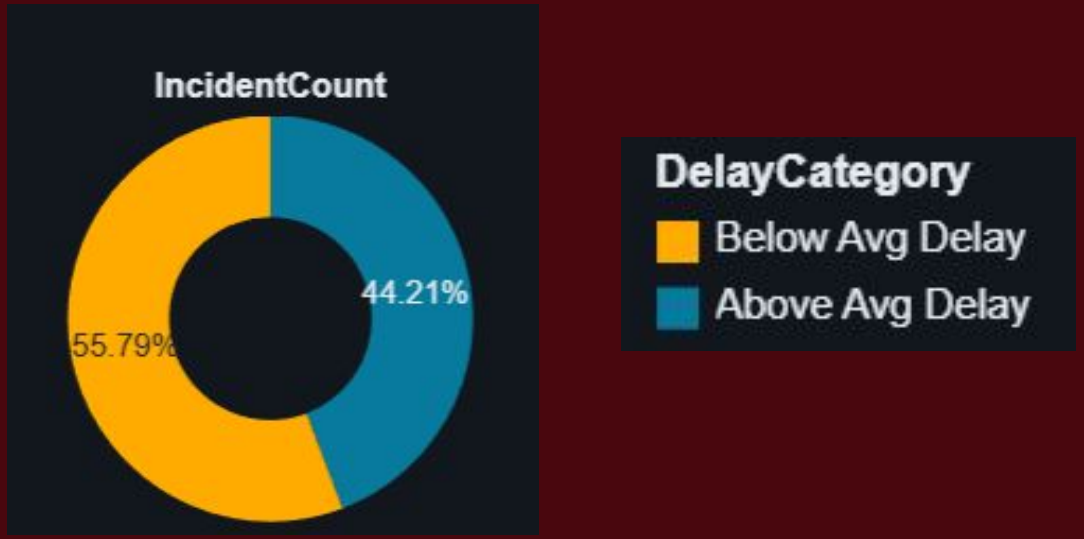
	IncidentNumber	ALS_Count
1	3021313	16
2	2022737	12
3	2090471	10
4	3043839	10
5	2022169	9
6	2088043	9
7	2093133	9
8	2097858	9
9	3028157	9
10	3038067	9
11	2072606	9
12	2010208	8
13	2020947	8

As result, got 4831 rows out of 299634





Delay Classification by Incident



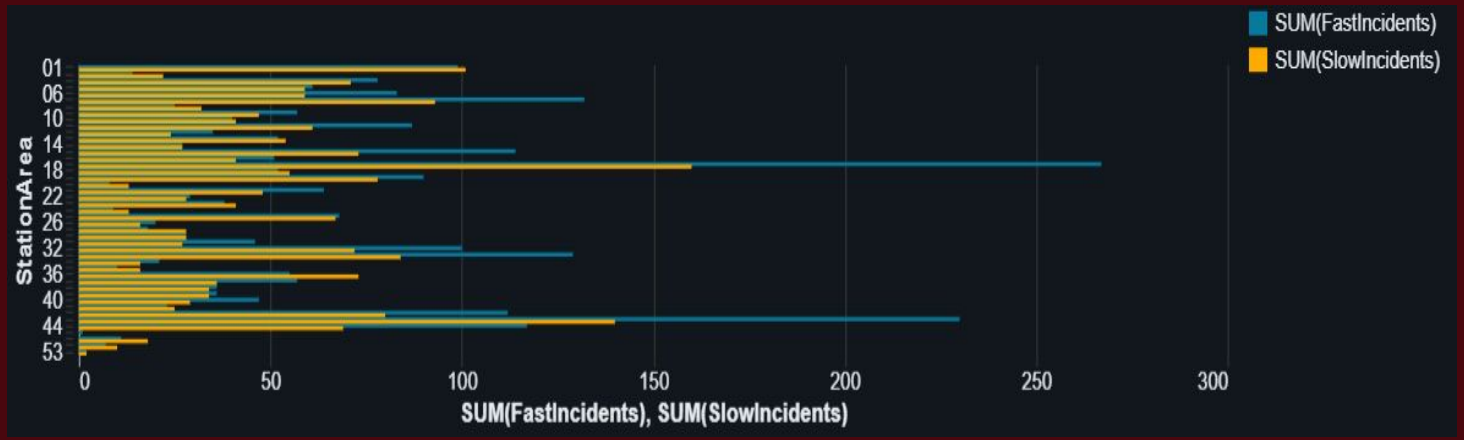
Classifying Severe Incidents by Delay

Above Average Delay → incident took longer than global average.

Below Average Delay → incident handled faster than global average.

**global delay = average delay based on all the data for unique Incident Number*

Delay Classification combined with Station Area



Classifying Severe Incidents by Delay per Station Area

Above Average Delay → Slow Incidents

Below Average Delay → Fast Incidents.

StationArea Analysis

$$\text{WeightedScore} = \text{FastIncidents} \times \frac{\text{FastIncidents}}{\text{TotalIncidents}}$$

Why it’s reliable?

Avoids small-sample bias: Stations/Battalions with very few incidents don’t dominate rankings.

Balances speed and experience: A unit that handles many incidents slowly gets penalized; one that handles many incidents quickly ranks higher.

Easy to interpret: Higher WeightedScore → more fast responses and more incidents handled.

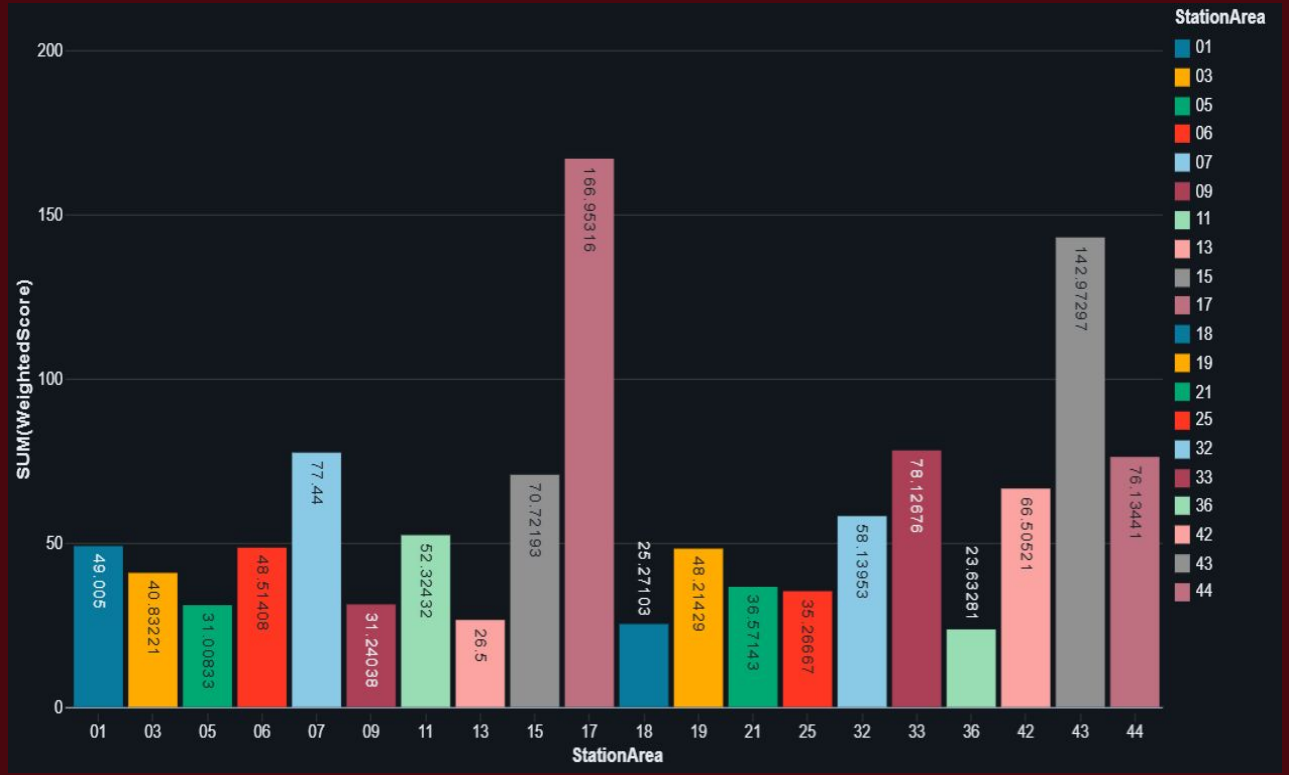
Flexible: We can add a minimum threshold for TotalIncidents to further reduce noise.

StationArea Analysis

	StationArea	FastIncidents	SlowIncidents	TotalIncidents	WeightedScore
1	17	267	160	427	166.95316159250586
2	43	230	140	370	142.97297297297297
3	33	129	84	213	78.12676056338027
4	07	132	93	225	77.44
5	44	119	67	186	76.13440860215053
6	15	115	72	187	70.72192513368984
7	42	113	79	192	66.50520833333333
8	32	100	72	172	58.139534883720934
9	11	88	60	148	52.32432432432433
10	01	99	101	200	49.005
11	06	83	59	142	48.514084507042256
12	19	90	78	168	48.214285714285715
13	03	78	71	149	40.83221476510067
14	21	64	48	112	36.57142857142857
15	25	69	66	135	35.266666666666666
16	09	57	47	104	31.240384615384617
17	05	61	59	120	31.008333333333333
18	13	53	53	106	26.5
19	18	52	55	107	25.27102803738318
20	36	55	73	128	23.6328125

Filtering out stations with >= 100 incidents to avoid small-sample bias.

StationArea Analysis



Highest Performer:

StationArea 17 has the highest score by a significant margin, with a value of approximately 166.95. This indicates it is the top-performing station based on the weighted score.

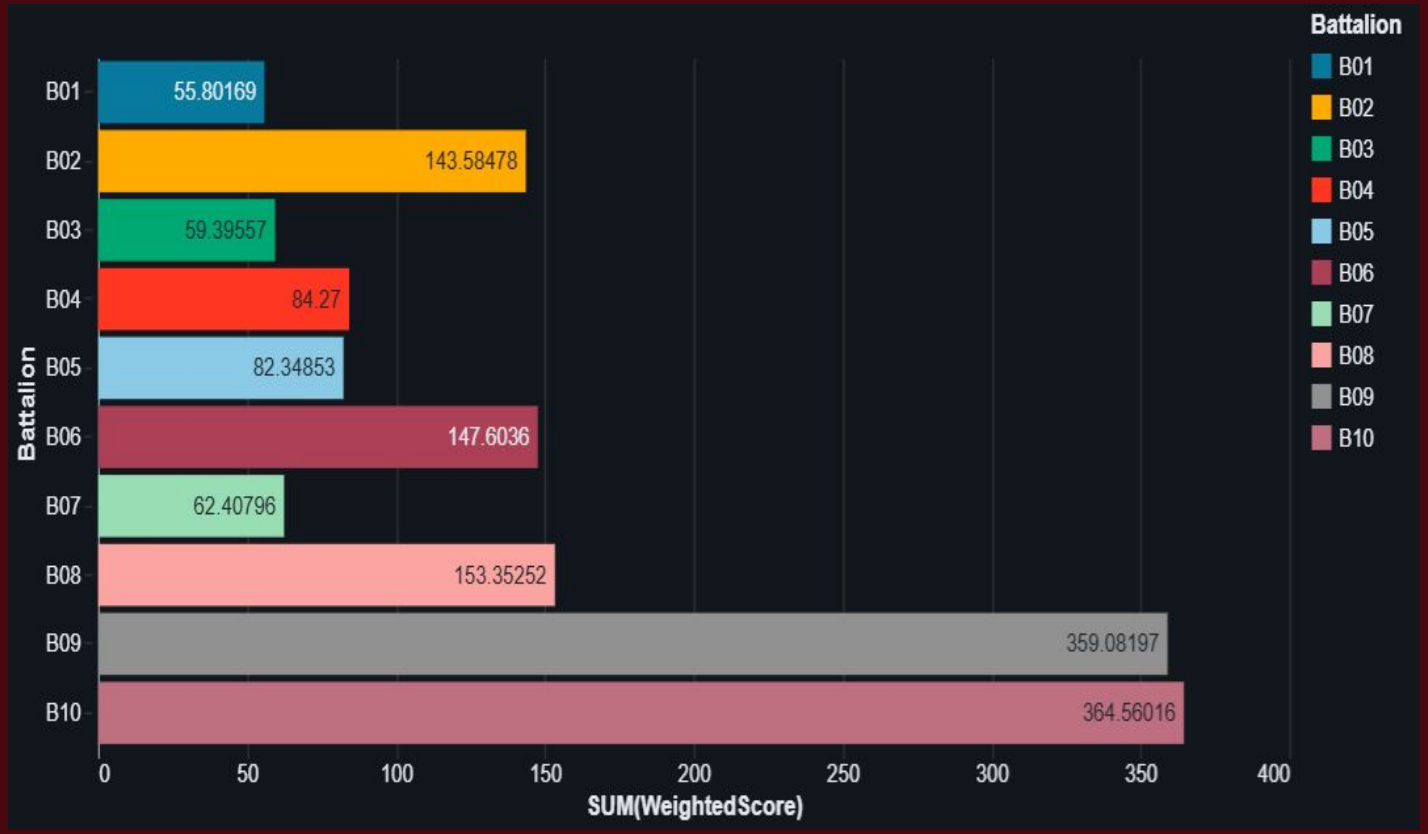
Battalion Analysis

Raw results | Bar 1 | +

	Battalion	FastIncidents	SlowIncidents	TotalIncidents	WeightedScore
1	B10	608	406	1014	364.560157790927
2	B09	592	384	976	359.08196721311475
3	B08	292	264	556	153.35251798561148
4	B06	256	188	444	147.6036036036036
5	B02	257	203	460	143.58478260869566
6	B04	159	141	300	84.27000000000001
7	B05	159	148	307	82.3485342019544
8	B07	112	89	201	62.407960199004975
9	B03	137	179	316	59.39556962025316
10	B01	115	122	237	55.80168776371308

Filtering out batallion with >= 100 incidents to avoid small-sample bias.

Battalion Analysis



Highest Performer:

Battalion B10 is the top performer with the highest score of 364.58. This indicates it is the top-performing station based on the weighted score.

Key Analysis

High workload (B10, B09), and (Stations - 17, 43) does not reduce efficiency - proving strong operational frameworks.

Areas of Concern:

- Stations 18, 36, and 13 show the lowest weighted scores (<27), suggesting delays in severe incident handling.
- These could be priority areas for resource optimization, training, or better dispatch coordination.
- B03 and B01 record the lowest weighted scores (≈59 and 56), showing inefficiency despite lower incident counts.
- Indicates possible operational challenges, resource gaps, or training needs.

Thank you!