Problem Setting:

Healthcare organizations often face challenges in effectively utilizing various sources of data such as patient satisfaction metrics, hospital ratings, performance comparisons, and other facility- related information. The issue lies in the fragmented nature of these data points, which hinders informed decision-making, impedes operational improvements, and affects patient care.

Problem Definition:

The key challenge in healthcare facility management is the fragmented data coming from multiple sources, including patient feedback, hospital ratings, and national performance comparisons. This fragmentation prevents healthcare administrators from gaining a comprehensive view of operations, patient satisfaction, and hospital performance. It also makes it difficult to streamline operational processes, improve patient outcomes, and comply with industry standards.

The goal is to consolidate these diverse sources of information, enabling healthcare administrators to make informed decisions, enhance patient experiences, and refine operational strategies. The integration of this data into a unified system will facilitate improved decision-making, allowing hospitals to meet patient care standards and enhance operational efficiency.

Operational Business Context:

- **Hospital Operations**: Managing hospital resources such as patient admissions, emergency services, and compliance with health service standards. Fragmented data on hospital performance metrics and patient satisfaction must be centralized to enable efficient planning and decision-making.
- **Patient Management**: Consolidating patient feedback, satisfaction scores, hospital ratings, and comparisons against national benchmarks will help healthcare providers focus on improving patient care quality, reducing readmission rates, and monitoring hospital performance effectively.
- **Patient Engagement**: Leveraging patient feedback, satisfaction surveys, and rating systems is crucial for improving patient experiences. Streamlined data can enable hospitals to engage more effectively with patients and foster strong patient-hospital relationships.
- **Healthcare Reporting**: Transparent reporting of hospital performance, patient survey results, and hospital ratings is critical for both internal stakeholders and regulatory bodies. Centralized data allows healthcare organizations to communicate this information efficiently, ensuring transparency and accountability.

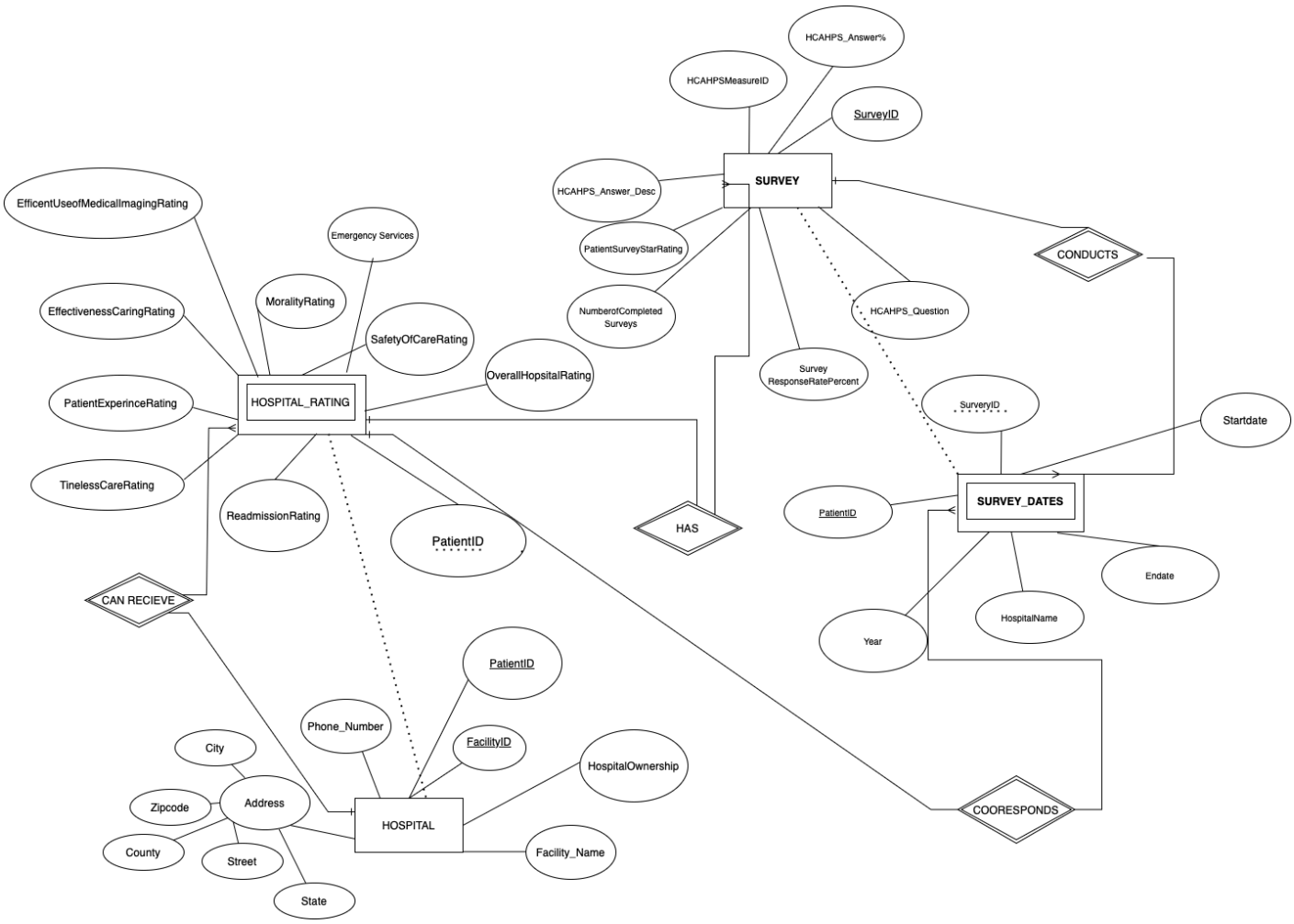
Data Description:

The data set contains 4 tables. The data types are Numeric and String.

Data Source:

We have generated our own data for some of the columns, but most of the data is sourced from Kaggle.
https://www.kaggle.com/datasets/abrambeyer/us-hospital-customer-satisfaction-20162020/code

ERD Diagram



RELATIONAL MODEL

1. **HOSPITAL DETAILS TABLE**
   Hospital_details(PatientID, FacilityID, Facility_Name, Phone_Number, Address, Street, City, County, State, Zipcode, HospitalOwnership, HospitalType*)*

   Here:

   - **Primary Keys**: PatientID, FacilityID
   - **Not Null Attributes**: All columns

2. **LOCATION TABLE**
   Location(LocationID, City, County, State, Zipcode, Address, *Facility_Name)*

   Here:

   - **Primary Key**: LocationID
   - **Foreign Key**: Facility_Name (references Hospital_details)
   - **Not Null Attributes**: All columns

3. **PATIENT DETAILS TABLE**
   Patient_details(PatientID*, Patient_Type, Insurance_Type*)

   Here:

   - **Primary Key**: PatientID
   - **Not Null Attributes**: All columns

4. **SURVEY DETAILS TABLE**
   Survey_details(SurveyID, *PatientID*, HCAHPSMeasureID, HCAHPS_Question, HCAHPS_Answer, PatientSurveyStarRating, SurveyResponseRatePercent, NumberofCompletedSurveys*)*

   Here:

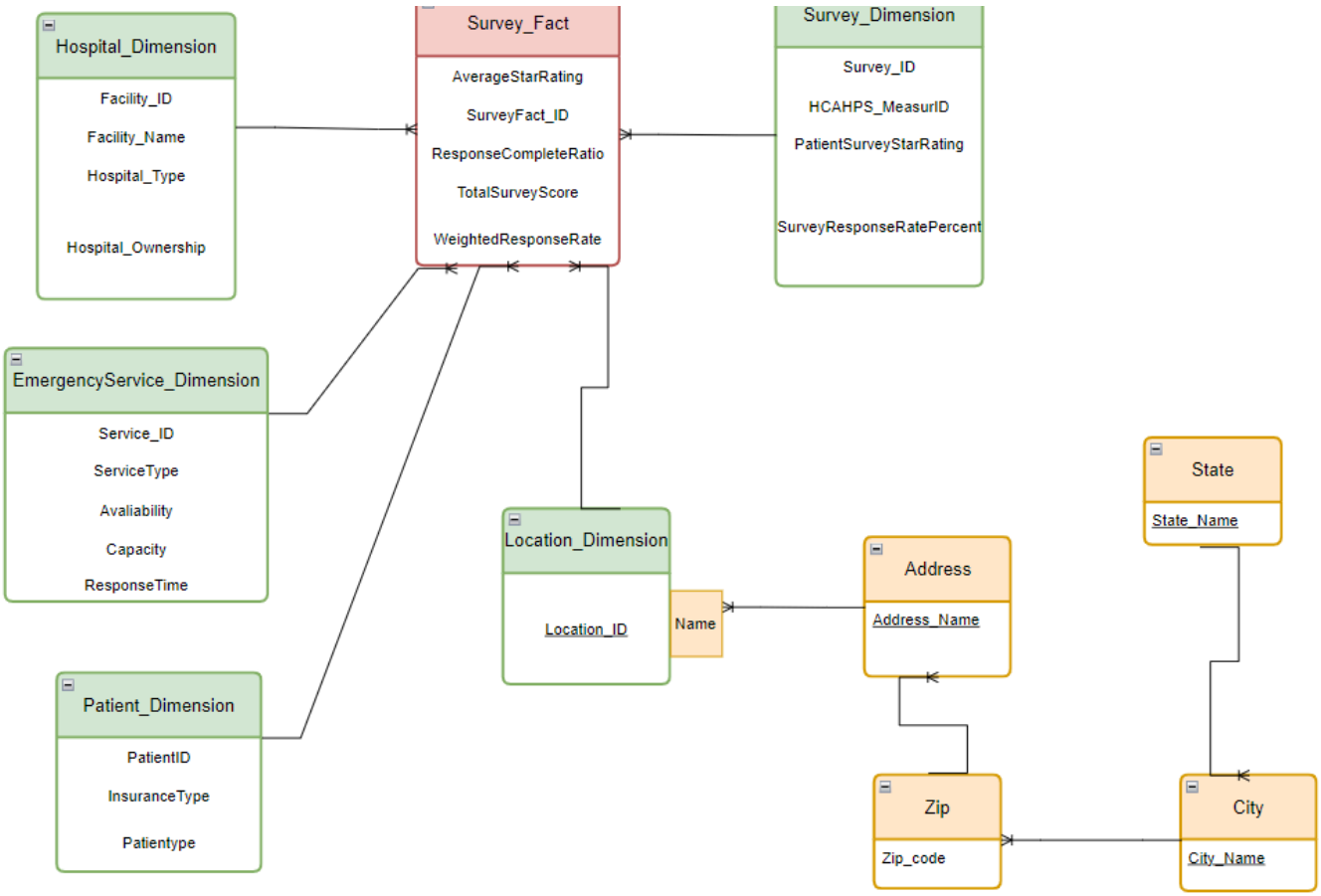
   - **Primary Key**: SurveyID
   - **Foreign Key**: PatientID (references Patient_details)
   - **Not Null Attributes**: All columns

5. **EMERGENCY SERVICES TABLE**
   Emergency_services(ServiceID, *ServiceType, Availability, ResponseTime, Capacity*)

   Here:

   - **Primary Key**: **ServiceID**
   - **Not Null Attributes**: All columns

CONCEPTUAL DATA WAREHOUSE MODEL :



Dimensions

1. **Hospital Dimension**
   Hospital_dimension(**FacilityID**, Facility_Name, Phone_Number, Address, City, State, HospitalOwnership, HospitalType)

   Here:

- **Primary Key**: **FacilityID** (Surrogate Key)
- **Not Null Attributes**: All

2. **Survey Dimension**
   Survey_dimension(**SurveyID**, HCAHPSMeasureID, HCAHPS_Question, HCAHPS_Answer, PatientSurveyStarRating, SurveyResponseRatePercent, NumberofCompletedSurveys, *LocationID, FacilityID, PatientID, ServiceID*)

   Here:

- **Primary Key**: **SurveyID** (Surrogate Key)
- **Foreign Key**: *FacilityID* (references Hospital_dimension)
  LocationID (references Location dimension)

PatientID (references Patient dimension)
ServiceID (references Emergency Service dimension)

- **Not Null Attributes**: All

3. **Location Dimension**
   Location_dimension(**LocationID**, City, County, State, Zipcode, Address, *Facility_Name*)

   Here:

- **Primary Key**: **LocationID** (Surrogate Key)
- **Foreign Key**: *Facility_Name* (references Hospital_dimension)
- **Not Null Attributes**: All

4. **Patient Dimension**
   Patient_dimension(**PatientID**, Patient_Type, Insurance_Type)

   Here:

- **Primary Key**: **PatientID**
- **Not Null Attributes**: All

5. **Emergency Services Dimension**
   Emergency_services_dimension(**ServiceID**, ServiceType, Availability, ResponseTime, Capacity)

   Here:

- **Primary Key**: **ServiceID**
- **Not Null Attributes**: All

<u>Slowly Changing Dimensions:</u>

1. Hospital
Dimension:
Attributes:
Facility_Name
HospitalType
HospitalOwnership

Facts:

1. **Survey Fact Table**
   Survey(**SurveyFactID**, *SurveyID , PatientID ,LocationID, ServiceID, FacilityID,* PatientSurveyStarRating, SurveyResponseRatePercent, NumberofCompletedSurveys)

   Surrogate Key (PK): SurveyFactID

   Foreign Keys (FK):

   - SurveyID (from Survey Dimension Table)
   - PatientID (from Patient Dimension Table)
   - LocationID (from Location Dimension Table)
   - FacilityID (from Hospital Dimension Table)
   - ServiceID (from Emergency Service Dimension Table)

   Measures :

   - AvgPatientSurveyStarRating [Semi-additive]
   - AvgSurveyResponseRatePercent [Semi-additive]
   - TotalCompletedSurveys [Semi-additive]

Hierarchies

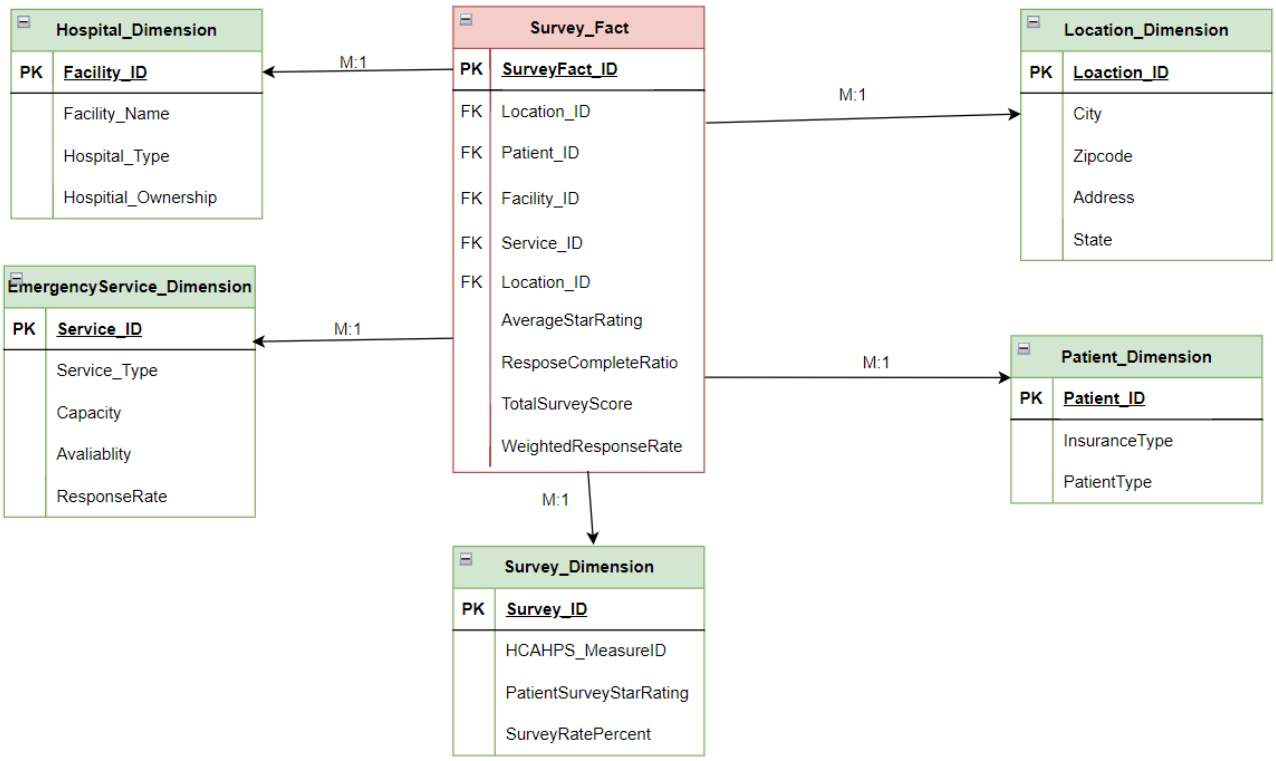
1. **Location Hierarchy**:

Levels: FacilityName -> Address -> ZipCode -> State -> County -> City

CARDINALITIES

LOGICAL IMPLEMENTATION OF THE DATA WAREHOUSE MODEL

Star Schema:



DB Implementation With Queries:

1)To Check Foreign Relationships:

```
SELECT h.Facility_Name, s.HCAHPS_Question
FROM Hospital h
JOIN Survey s ON h.FacilityID = s.FacilityID
LIMIT 2;
```

Data Output | Messages | Notifications

SQL

	facility_name character varying (100)	hcahps_question character varying (255)
1	MedSmile Hospital	How would you rate your experience?
2	HealthPlus Clinic	Was the hospital clean?

2)To Get Surveys Conducted for Each Hospital:

Query Query History

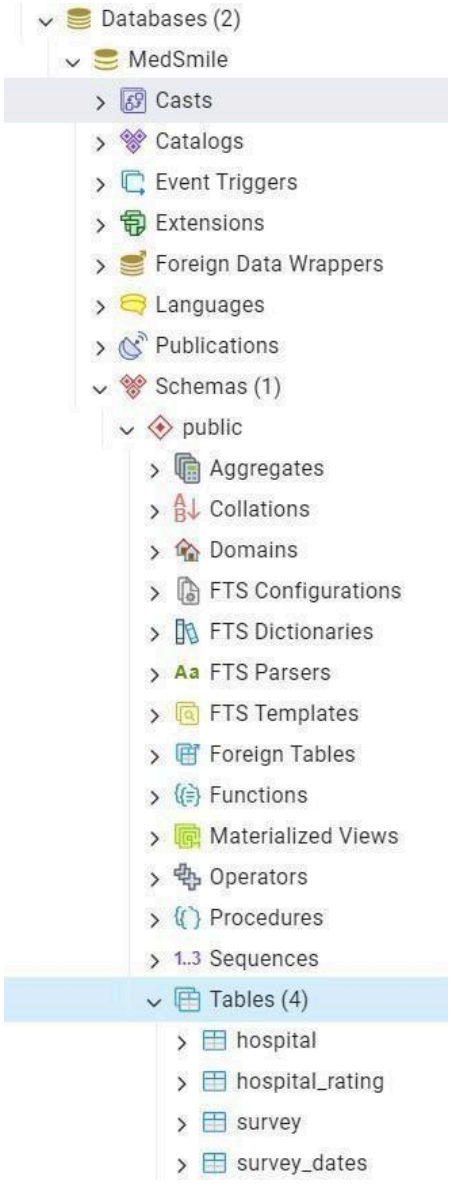
```
1  SELECT h.Facility_Name, COUNT(s.SurveyID) AS NumberOfSurveys
2  FROM Hospital h
3  LEFT JOIN Survey s ON h.FacilityID = s.FacilityID
4  GROUP BY h.Facility_Name
5
6  LIMIT 2;
7
```

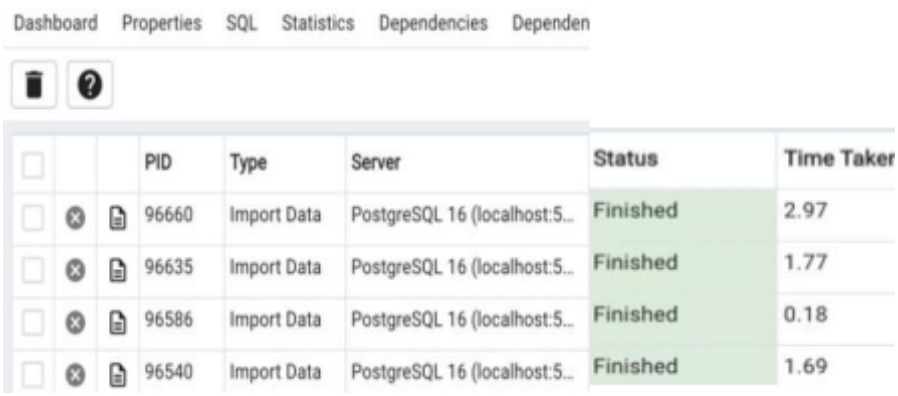
Data Output Messages Notifications

SQL

	facility_name character varying (100)	numberofsurveys bigint
1	MedSmile Hospital	1

Data Import Processes in PostgreSQL:





PID	Type	Server	Status	Time Taker
96660	Import Data	PostgreSQL 16 (localhost:5...	Finished	2.97
96635	Import Data	PostgreSQL 16 (localhost:5...	Finished	1.77
96586	Import Data	PostgreSQL 16 (localhost:5...	Finished	0.18
96540	Import Data	PostgreSQL 16 (localhost:5...	Finished	1.69

PRIMARY EVENTS

1. **Patient Satisfaction Surveys**:

Description: Gathering patient feedback regarding their experiences in hospitals. This includes responses to various questions about their care, treatment, and satisfaction.

Importance: This data is essential for understanding patient perceptions, identifying areas for improvement, and enhancing the quality of care provided by hospitals.

2. **Hospital Ratings**:

Description: Collecting and analyzing ratings given to hospitals based on patient feedback. This includes various metrics such as overall hospital rating, safety of care rating, patient experience national rating, effectiveness of care rating.

Importance: Hospital ratings are crucial for benchmarking performance against national standards and for guiding patients in their choice of healthcare providers.

3. **Data Aggregation for Reporting**:

Description: Compiling data from various surveys and ratings for reporting purposes, allowing stakeholders to review hospital performance metrics over time.

Importance: This aggregation enables healthcare administrators and stakeholders to make informed decisions based on comprehensive data analyses.

OLAP OPERATIONS

1. **Analyze the Average Patient Survey Star Rating by Hospital and Then by State**

   Query: ROLLUP(Survey_Fact (State, FacilityID), AVG(PatientSurveyStarRating))
   Purpose: To evaluate hospital performance geographically.

2. **Analyze the Relationship Between Survey Completion and Survey Star Ratings**

   Query: DRILLACROSS(Survey_Fact, Survey_Dimension (TotalCompletedSurveys, PatientSurveyStarRating))
   Purpose: To determine correlations between survey completion rates and patient satisfaction ratings.
3. **Identify Underperforming Hospitals Based on Multiple Ratings**

Query: SLICE(Survey_Fact (PatientSurveyStarRating < 3 AND SurveyResponseRatePercent < 50))
Purpose: To filter and identify hospitals that require improvement.

4. **Analyze Emergency Services Availability by State and Facility**

   Query: ROLLUP(Survey_Fact (State, FacilityID), COUNT(ServiceID))
   Purpose: To evaluate the availability of emergency services in hospitals across different states.

5. **Evaluate Trends in Survey Response Rates by Quarter and Facility**

   Query: DRILLDOWN(Survey_Fact (Quarter, FacilityID), AVG(SurveyResponseRatePercent))
   Purpose: To identify how survey response rates change over time.

6. **Analyze Completed Surveys by City and Hospital Type**

   Query: ROLLUP(Survey_Fact (City, HospitalType), SUM(TotalCompletedSurveys))
   Purpose: To observe patterns in survey completion rates based on location and hospital type.

7. **Analyze Trends in Survey Star Ratings Over Multiple Years**

   Query: ROLLUP(Survey_Fact (Year, FacilityID), AVG(PatientSurveyStarRating))
   Purpose: To track changes in patient satisfaction across years.

8. **Analyze Emergency Service Response Times by Facility**

   Query: ROLLUP(Survey_Fact (FacilityID), AVG(ResponseTime))
   Purpose: To assess the efficiency of emergency service responses for each hospital.

9. **Analyze Ratings and Survey Response Rates by State**

   Query: ROLLUP(Survey_Fact (State), AVG(PatientSurveyStarRating), AVG(SurveyResponseRatePercent))
   Purpose: To compare ratings and response rates across different states.

10. **Slice the Data to Analyze Hospitals with High Safety of Care Ratings**

    Query: SLICE(Survey_Fact (SafetyOfCareRating > 4))
    Purpose: To focus on hospitals with exceptional safety ratings.

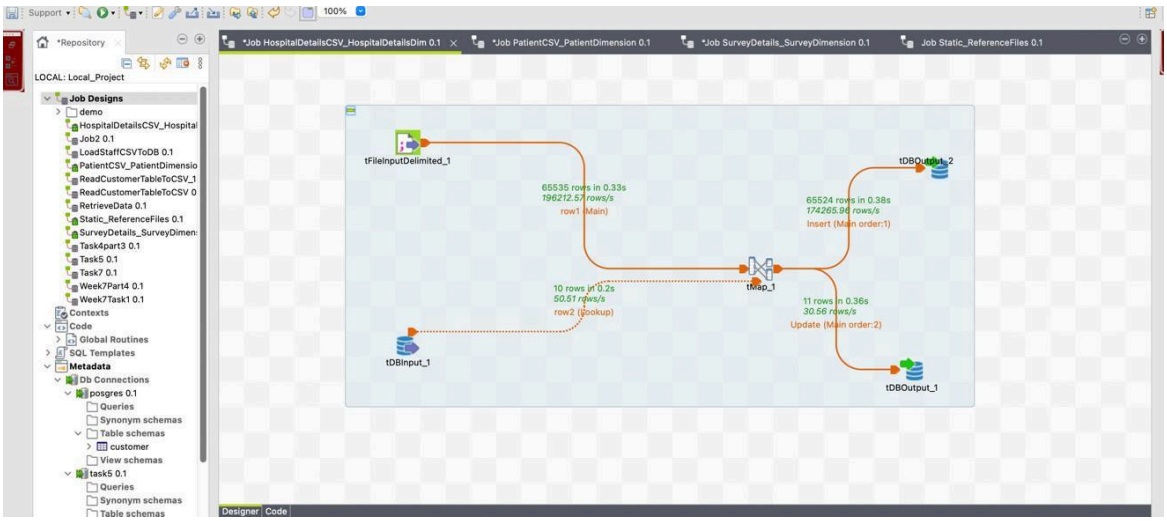
TALEND

1. LOAD TABLES INTO DIMENSION

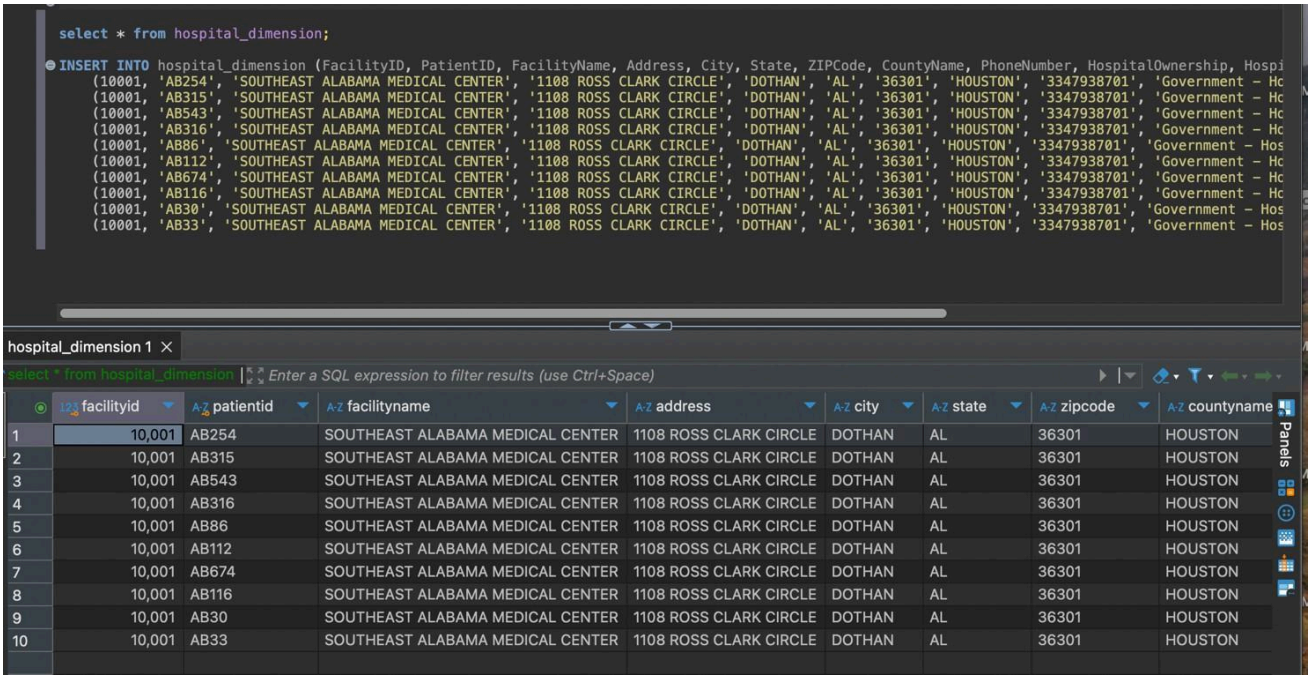
Prepopulating the dimension tables (5 sources of data)

1. **HospitalDimension**

HospitalDetails -> Hospital Dimension



The dimension table, before insertion/updating of data (10 records are added)



```
select * from hospital_dimension;

INSERT INTO hospital_dimension (FacilityID, PatientID, FacilityName, Address, City, State, ZIPCode, CountyName, PhoneNumber, HospitalOwnership, Hospi
    (10001, 'AB254', 'SOUTHEAST ALABAMA MEDICAL CENTER', '1108 ROSS CLARK CIRCLE', 'DOTHAN', 'AL', '36301', 'HOUSTON', '3347938701', 'Government – Hc
    (10001, 'AB315', 'SOUTHEAST ALABAMA MEDICAL CENTER', '1108 ROSS CLARK CIRCLE', 'DOTHAN', 'AL', '36301', 'HOUSTON', '3347938701', 'Government – Hc
    (10001, 'AB543', 'SOUTHEAST ALABAMA MEDICAL CENTER', '1108 ROSS CLARK CIRCLE', 'DOTHAN', 'AL', '36301', 'HOUSTON', '3347938701', 'Government – Hc
    (10001, 'AB316', 'SOUTHEAST ALABAMA MEDICAL CENTER', '1108 ROSS CLARK CIRCLE', 'DOTHAN', 'AL', '36301', 'HOUSTON', '3347938701', 'Government – Hc
    (10001, 'AB86', 'SOUTHEAST ALABAMA MEDICAL CENTER', '1108 ROSS CLARK CIRCLE', 'DOTHAN', 'AL', '36301', 'HOUSTON', '3347938701', 'Government – Hos
    (10001, 'AB112', 'SOUTHEAST ALABAMA MEDICAL CENTER', '1108 ROSS CLARK CIRCLE', 'DOTHAN', 'AL', '36301', 'HOUSTON', '3347938701', 'Government – Hc
    (10001, 'AB674', 'SOUTHEAST ALABAMA MEDICAL CENTER', '1108 ROSS CLARK CIRCLE', 'DOTHAN', 'AL', '36301', 'HOUSTON', '3347938701', 'Government – Hc
    (10001, 'AB116', 'SOUTHEAST ALABAMA MEDICAL CENTER', '1108 ROSS CLARK CIRCLE', 'DOTHAN', 'AL', '36301', 'HOUSTON', '3347938701', 'Government – Hc
    (10001, 'AB30', 'SOUTHEAST ALABAMA MEDICAL CENTER', '1108 ROSS CLARK CIRCLE', 'DOTHAN', 'AL', '36301', 'HOUSTON', '3347938701', 'Government – Hos
    (10001, 'AB33', 'SOUTHEAST ALABAMA MEDICAL CENTER', '1108 ROSS CLARK CIRCLE', 'DOTHAN', 'AL', '36301', 'HOUSTON', '3347938701', 'Government – Hos
```

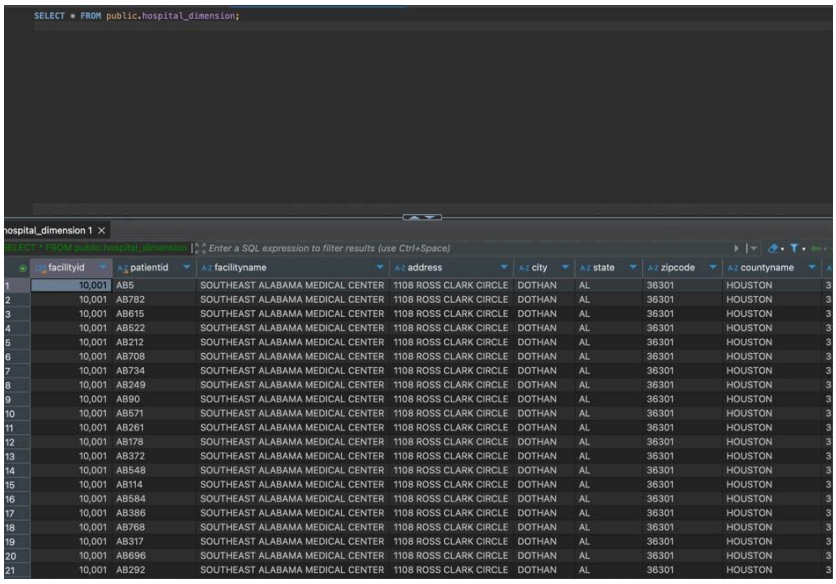
hospital_dimension 1

select * from hospital_dimension | Enter a SQL expression to filter results (use Ctrl+Space)

	facilityid	patientid	facilityname	address	city	state	zipcode	countyname
1	10,001	AB254	SOUTHEAST ALABAMA MEDICAL CENTER	1108 ROSS CLARK CIRCLE	DOTHAN	AL	36301	HOUSTON
2	10,001	AB315	SOUTHEAST ALABAMA MEDICAL CENTER	1108 ROSS CLARK CIRCLE	DOTHAN	AL	36301	HOUSTON
3	10,001	AB543	SOUTHEAST ALABAMA MEDICAL CENTER	1108 ROSS CLARK CIRCLE	DOTHAN	AL	36301	HOUSTON
4	10,001	AB316	SOUTHEAST ALABAMA MEDICAL CENTER	1108 ROSS CLARK CIRCLE	DOTHAN	AL	36301	HOUSTON
5	10,001	AB86	SOUTHEAST ALABAMA MEDICAL CENTER	1108 ROSS CLARK CIRCLE	DOTHAN	AL	36301	HOUSTON
6	10,001	AB112	SOUTHEAST ALABAMA MEDICAL CENTER	1108 ROSS CLARK CIRCLE	DOTHAN	AL	36301	HOUSTON
7	10,001	AB674	SOUTHEAST ALABAMA MEDICAL CENTER	1108 ROSS CLARK CIRCLE	DOTHAN	AL	36301	HOUSTON
8	10,001	AB116	SOUTHEAST ALABAMA MEDICAL CENTER	1108 ROSS CLARK CIRCLE	DOTHAN	AL	36301	HOUSTON
9	10,001	AB30	SOUTHEAST ALABAMA MEDICAL CENTER	1108 ROSS CLARK CIRCLE	DOTHAN	AL	36301	HOUSTON
10	10,001	AB33	SOUTHEAST ALABAMA MEDICAL CENTER	1108 ROSS CLARK CIRCLE	DOTHAN	AL	36301	HOUSTON

Panels

OUTPUT : HospitalDetails Dimension, loaded 65524 records into insert, 11 into update.

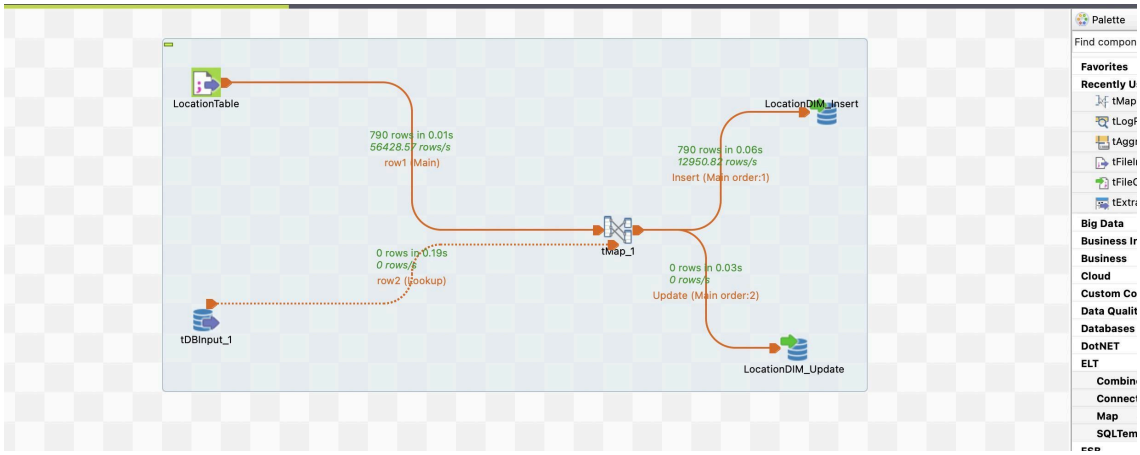


	facilityid	patientid	facilityname	address	city	state	zipcode	countyname
1	10,001	AB5	SOUTHEAST ALABAMA MEDICAL CENTER	1108 ROSS CLARK CIRCLE	DOTHAN	AL	36301	HOUSTON
2	10,001	AB782	SOUTHEAST ALABAMA MEDICAL CENTER	1108 ROSS CLARK CIRCLE	DOTHAN	AL	36301	HOUSTON
3	10,001	AB615	SOUTHEAST ALABAMA MEDICAL CENTER	1108 ROSS CLARK CIRCLE	DOTHAN	AL	36301	HOUSTON
4	10,001	AB522	SOUTHEAST ALABAMA MEDICAL CENTER	1108 ROSS CLARK CIRCLE	DOTHAN	AL	36301	HOUSTON
5	10,001	AB212	SOUTHEAST ALABAMA MEDICAL CENTER	1108 ROSS CLARK CIRCLE	DOTHAN	AL	36301	HOUSTON
6	10,001	AB708	SOUTHEAST ALABAMA MEDICAL CENTER	1108 ROSS CLARK CIRCLE	DOTHAN	AL	36301	HOUSTON
7	10,001	AB734	SOUTHEAST ALABAMA MEDICAL CENTER	1108 ROSS CLARK CIRCLE	DOTHAN	AL	36301	HOUSTON
8	10,001	AB249	SOUTHEAST ALABAMA MEDICAL CENTER	1108 ROSS CLARK CIRCLE	DOTHAN	AL	36301	HOUSTON
9	10,001	AB90	SOUTHEAST ALABAMA MEDICAL CENTER	1108 ROSS CLARK CIRCLE	DOTHAN	AL	36301	HOUSTON
10	10,001	AB571	SOUTHEAST ALABAMA MEDICAL CENTER	1108 ROSS CLARK CIRCLE	DOTHAN	AL	36301	HOUSTON
11	10,001	AB261	SOUTHEAST ALABAMA MEDICAL CENTER	1108 ROSS CLARK CIRCLE	DOTHAN	AL	36301	HOUSTON
12	10,001	AB178	SOUTHEAST ALABAMA MEDICAL CENTER	1108 ROSS CLARK CIRCLE	DOTHAN	AL	36301	HOUSTON
13	10,001	AB372	SOUTHEAST ALABAMA MEDICAL CENTER	1108 ROSS CLARK CIRCLE	DOTHAN	AL	36301	HOUSTON
14	10,001	AB548	SOUTHEAST ALABAMA MEDICAL CENTER	1108 ROSS CLARK CIRCLE	DOTHAN	AL	36301	HOUSTON
15	10,001	AB114	SOUTHEAST ALABAMA MEDICAL CENTER	1108 ROSS CLARK CIRCLE	DOTHAN	AL	36301	HOUSTON
16	10,001	AB584	SOUTHEAST ALABAMA MEDICAL CENTER	1108 ROSS CLARK CIRCLE	DOTHAN	AL	36301	HOUSTON
17	10,001	AB386	SOUTHEAST ALABAMA MEDICAL CENTER	1108 ROSS CLARK CIRCLE	DOTHAN	AL	36301	HOUSTON
18	10,001	AB768	SOUTHEAST ALABAMA MEDICAL CENTER	1108 ROSS CLARK CIRCLE	DOTHAN	AL	36301	HOUSTON
19	10,001	AB317	SOUTHEAST ALABAMA MEDICAL CENTER	1108 ROSS CLARK CIRCLE	DOTHAN	AL	36301	HOUSTON
20	10,001	AB696	SOUTHEAST ALABAMA MEDICAL CENTER	1108 ROSS CLARK CIRCLE	DOTHAN	AL	36301	HOUSTON
21	10,001	AB292	SOUTHEAST ALABAMA MEDICAL CENTER	1108 ROSS CLARK CIRCLE	DOTHAN	AL	36301	HOUSTON

Surrogate keys : FacilityID & PatientID

2. **Location Dimension**

LocationTable -> LocationDimension



```
select * from location_dimension
```

location_dimension 1 ×

select * from location_dimension | Enter a SQL expression to filter results (use Ctrl+Space)

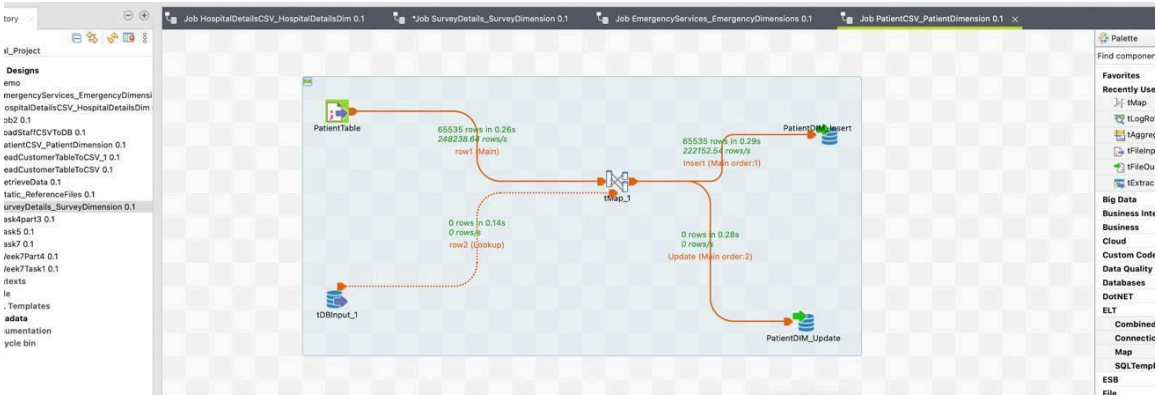
	locationid	facilityname	address	city	state	zipcode	countyname	pho
1	1	SOUTHEAST ALABAMA MEDICAL CENTER	1108 ROSS CLARK CIRCLE	DOTHAN	AL	36301	HOUSTON	33479
2	2	SOUTHEAST ALABAMA MEDICAL CENTER	2505 U S HIGHWAY 431 NORTH	BOAZ	AL	35957	MARSHALL	33479
3	3	SOUTHEAST ALABAMA MEDICAL CENTER	205 MARENGO STREET	FLORENCE	AL	35631	LAUDERDALE	33479
4	4	SOUTHEAST ALABAMA MEDICAL CENTER	702 N MAIN ST	OPP	AL	36467	COVINGTON	33479
5	5	SOUTHEAST ALABAMA MEDICAL CENTER	101 HOSPITAL CIRCLE	LUVERNE	AL	36049	CRENSHAW	33479
6	6	SOUTHEAST ALABAMA MEDICAL CENTER	50 MEDICAL PARK EAST DRIVE	BIRMINGHAM	AL	35235	JEFFERSON	33479
7	7	SOUTHEAST ALABAMA MEDICAL CENTER	200 MED CENTER DRIVE	FORT PAYNE	AL	35968	DE KALB	33479
8	8	SOUTHEAST ALABAMA MEDICAL CENTER	1000 FIRST STREET NORTH	ALABASTER	AL	35007	SHELBY	33479
9	9	SOUTHEAST ALABAMA MEDICAL CENTER	1720 UNIVERSITY BLVD	BIRMINGHAM	AL	35233	JEFFERSON	33479
10	10	SOUTHEAST ALABAMA MEDICAL CENTER	1300 SOUTH MONTGOMERY AVENUE	SHEFFIELD	AL	35660	COLBERT	33479
11	11	SOUTHEAST ALABAMA MEDICAL CENTER	126 HOSPITAL AVE	OZARK	AL	36360	DALE	33479
12	12	SOUTHEAST ALABAMA MEDICAL CENTER	400 NORTHWOOD DR	CENTRE	AL	35960	CHEROKEE	33479
13	13	SOUTHEAST ALABAMA MEDICAL CENTER	2105 EAST SOUTH BOULEVARD	MONTGOMERY	AL	36116	MONTGOMERY	33479
14	14	SOUTHEAST ALABAMA MEDICAL CENTER	1725 PINE STREET	MONTGOMERY	AL	36106	MONTGOMERY	33479
15	15	SOUTHEAST ALABAMA MEDICAL CENTER	2000 PEPPERELL PARKWAY	OPELIKA	AL	36801	LEE	33479
16	16	SOUTHEAST ALABAMA MEDICAL CENTER	209 NORTH MAIN STREET	WEDOWEE	AL	36278	RANDOLPH	33479
17	17	SOUTHEAST ALABAMA MEDICAL CENTER	619 SOUTH 19TH STREET	BIRMINGHAM	AL	35233	JEFFERSON	33479
18	18	SOUTHEAST ALABAMA MEDICAL CENTER	805 FRIENDSHIP ROAD	TALLASSEE	AL	36078	ELMORE	33479
19	19	SOUTHEAST ALABAMA MEDICAL CENTER	1912 ALABAMA HIGHWAY 157	CULLMAN	AL	35058	CULLMAN	33479
20	20	SOUTHEAST ALABAMA MEDICAL CENTER	849 SOUTH THREE NOTCH STREET	ANDALUSIA	AL	36420	COVINGTON	33479
21	21	SOUTHEAST ALABAMA MEDICAL CENTER	301 EAST 18TH ST	ANNISTON	AL	36201	CALHOUN	33479

OUTPUT : Data populated in location dimension at data warehouse (SQL), loaded 790 records into insert.

Surrogate keys : LocationID

3. Patient Dimension

PatientDetails -> PatientDimension



OUTPUT : Data populated in patient dimension at data warehouse (SQL), loaded 65535 records into insert.

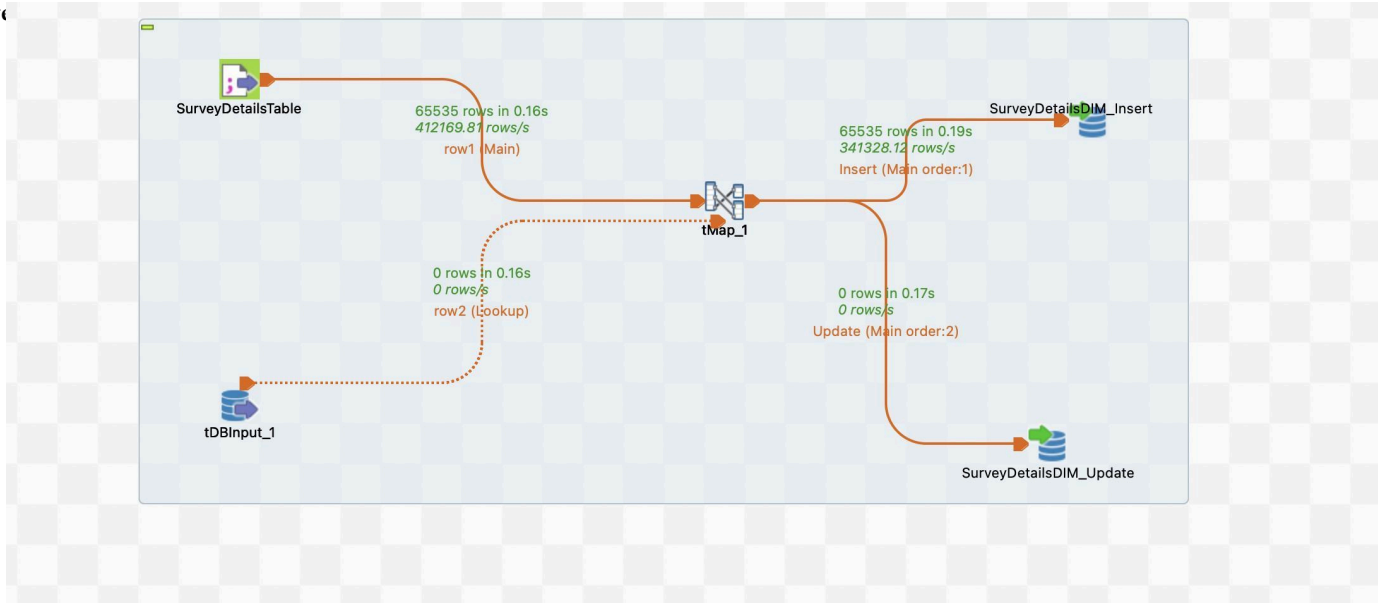
	patientid [PK] character varying (50)	patienttype character varying (50)	insurancetype character varying (50)
1	AB60	Inpatient	Medicare
2	AB259	Observation	Medicaid
3	AB703	Observation	Medicare
4	AB591	Inpatient	Self-Pay
5	AB400	Observation	Medicare
6	AB740	Emergency	Medicare
7	AB639	Outpatient	Private
8	AB162	Observation	Self-Pay
9	AB603	Observation	Medicaid
10	AB260	Observation	Medicaid
11	AB228	Outpatient	Self-Pay
12	AB625	Emergency	Private
13	AB654	Inpatient	Private
14	AB474	Observation	Self-Pay
15	AB119	Emergency	Private
16	AB178	Inpatient	Private

Surrogate Key : PatientID

4. SurveyDetails Dimension

SurveyDetailsTable ->

Surv

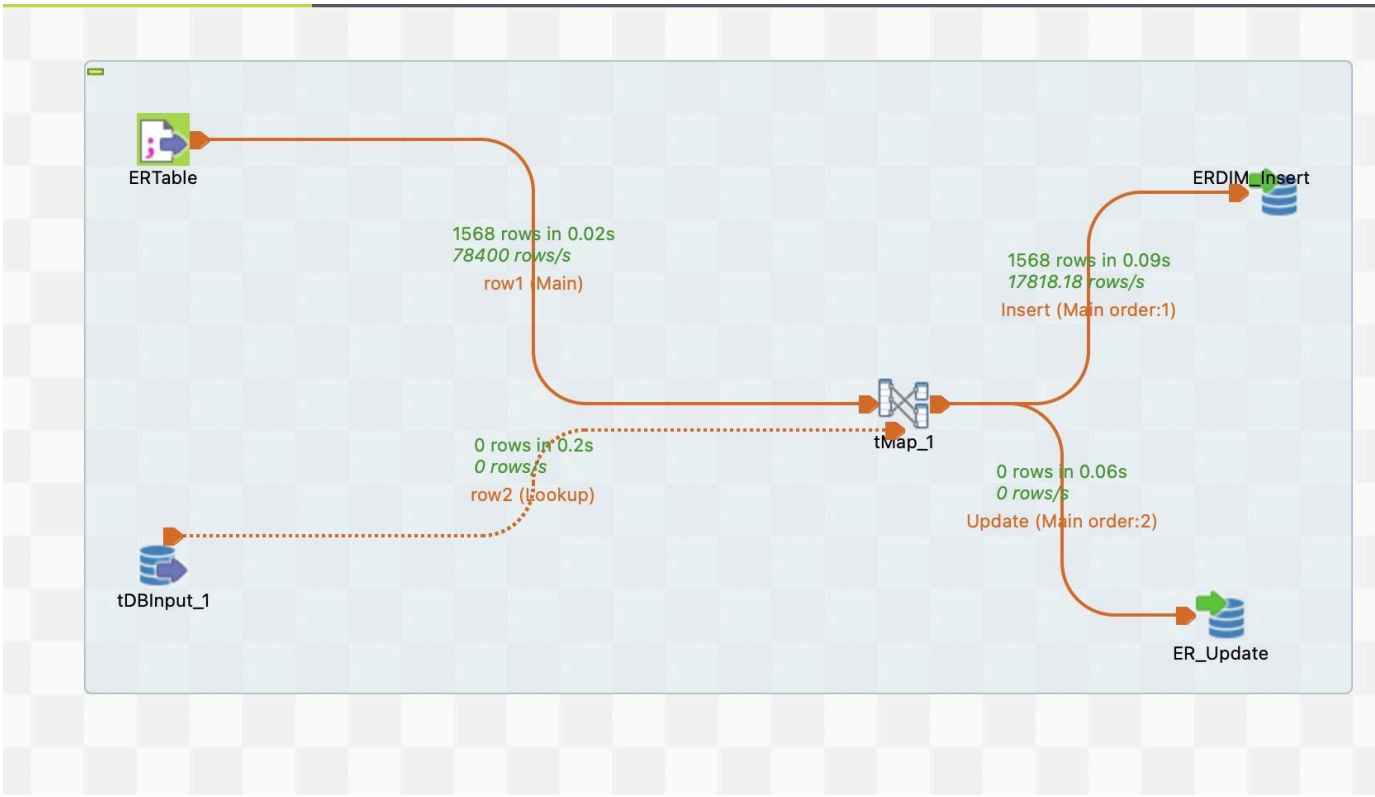


OUTPUT : Data populated in SurveyDetailsDimension at data warehouse (SQL), loaded 65535 records into insert.

	surveyid [PK] character varying (50)	hcahpsmeasureid character varying (50)	hcahps_question text	hcahp text
1	SCDAB308	H_STAR_RATING	Summary star rating	Sumr
2	SCDAB150	H_CLEAN_HSP_A_P	Patients who reported that their room and bathroom were Always clean	Roon
3	SCDAB366	H_CLEAN_HSP_SN_P	Patients who reported that their room and bathroom were Sometimes or Never clean	Roon
4	SCDAB2360	H_CLEAN_HSP_U_P	Patients who reported that their room and bathroom were Usually clean	Roon
5	SCDAB2558	H_CLEAN_LINEAR_SCORE	Cleanliness - linear mean score	Clear
6	SCDAB3422	H_CLEAN_STAR_RATING	Cleanliness - star rating	Clear
7	SCDAB3116	H_COMP_1_A_P	Patients who reported that their nurses Always communicated well	Nurs
8	SCDAB1304	H_COMP_1_LINEAR_SCORE	Nurse communication - linear mean score	Nurs
9	SCDAB898	H_COMP_1_SN_P	Patients who reported that their nurses Sometimes or Never communicated well	Nurs
10	SCDAB2282	H_COMP_1_STAR_RATING	Nurse communication - star rating	Nurs
11	SCDAB2770	H_COMP_1_U_P	Patients who reported that their nurses Usually communicated well	Nurs
12	SCDAB983	H_COMP_2_A_P	Patients who reported that their doctors Always communicated well	Doct
13	SCDAB2777	H_COMP_2_LINEAR_SCORE	Doctor communication - linear mean score	Doct
14	SCDAB2772	H_COMP_2_SN_P	Patients who reported that their doctors Sometimes or Never communicated well	Doct
15	SCDAB955	H_COMP_2_STAR_RATING	Doctor communication - star rating	Doct
16	SCDAB2905	H_COMP_2_U_P	Patients who reported that their doctors Usually communicated well	Doct
17	SCDAB3066	H_COMP_3_A_P	Patients who reported that they Always received help as soon as they wanted	Patie
18	SCDAB1555	H_COMP_3_LINEAR_SCORE	Staff responsiveness - linear mean score	Staff
19	SCDAB3363	H_COMP_3_SN_P	Patients who reported that they Sometimes or Never received help as soon as they wanted	Patie

Surrogate Keys : SurveyID

5. **EmergencyServices Dimension**
EmergencyServicesTable -> EmergencyServicesDimensions



OUTPUT : Data populated in Emergency Dimension Table at data warehouse (SQL), loaded 1568 records into insert.

	serviceid [PK] character varying (50)	servicetype character varying (50)	availability boolean	responsetime integer	capacity integer
1	SS001	Trauma Center	true	55	42
2	SS002	Stroke Unit	true	25	94
3	SS003	Pediatric ER	true	53	22
4	SS004	Burn Unit	true	33	20
5	SS005	Burn Unit	true	54	67
6	SS006	Pediatric ER	true	26	96
7	SS007	Psychiatric Emergency	true	25	66
8	SS008	Burn Unit	true	15	23
9	SS009	Emergency Room	true	44	17
10	SS010	Cardiac Emergency Unit	true	23	89
11	SS011	Burn Unit	true	19	56
12	SS012	Burn Unit	true	59	84
13	SS013	Pediatric ER	true	10	108
14	SS014	Trauma Center	true	60	55
15	SS015	Cardiac Emergency Unit	true	54	87
16	SS016	Stroke Unit	true	36	19
17	SS017	Pediatric ER	true	13	117
18	SS018	Stroke Unit	true	44	64
19	SS019	Emergency Room	true	22	115
20	SS020	Pediatric ER	true	21	37
21	SS021	Ambulance Service	true	40	25

Total rows: 100 of 100 Query complete 00:00:00.332 Ln 3, Col 1

Surrogate Keys : ServiceType

2. TRANSFORMATIONS

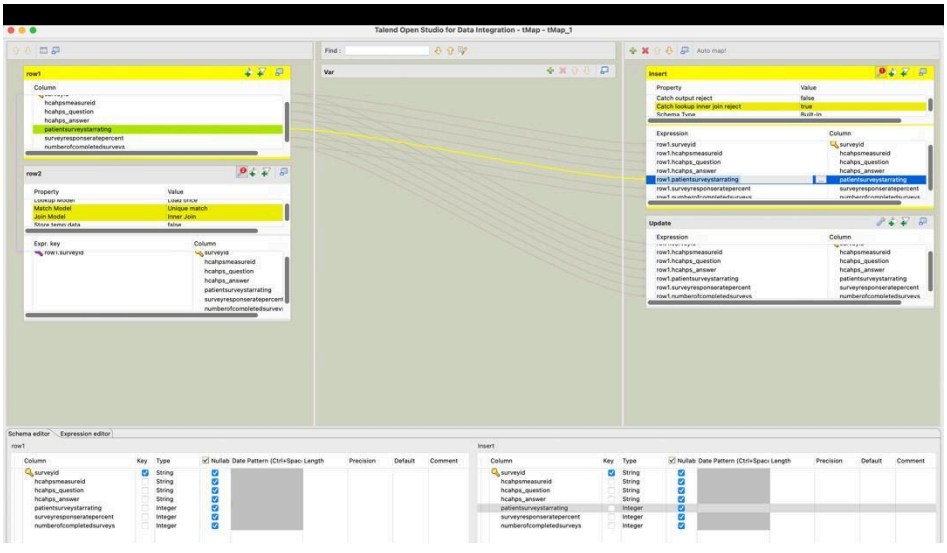
a) DATA CLEANING

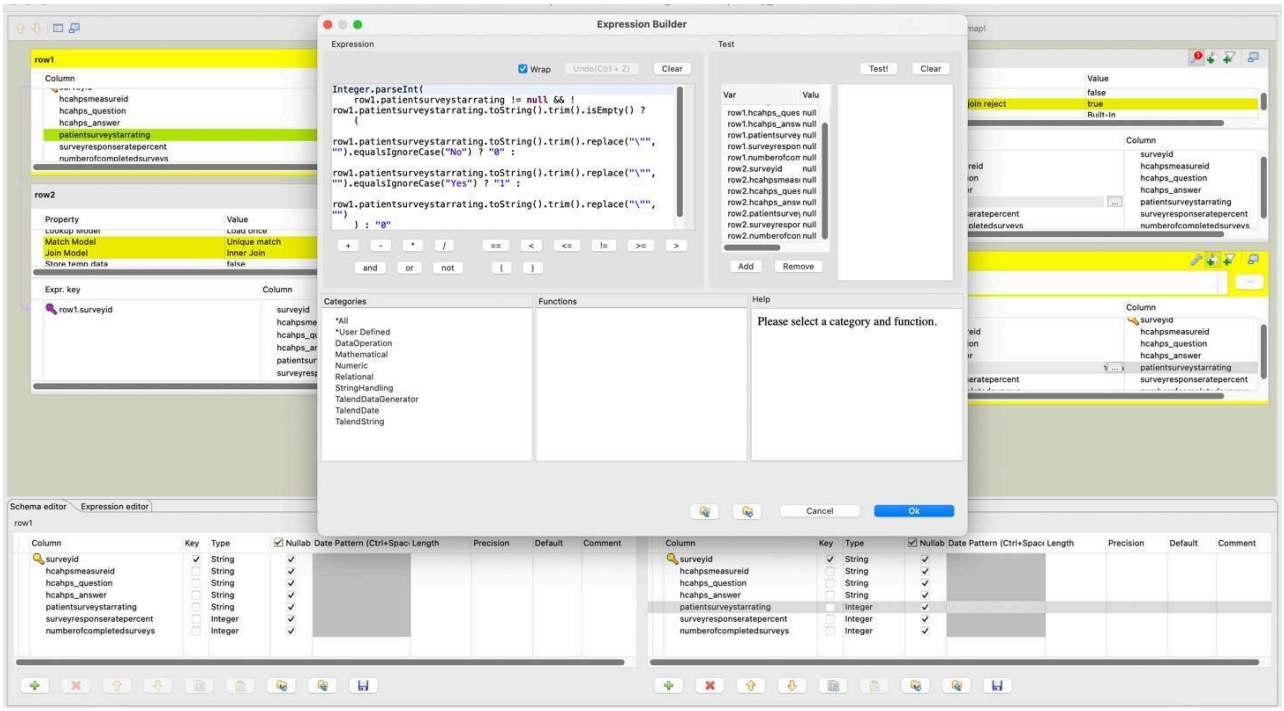
INPUT FILE:

Survey Table

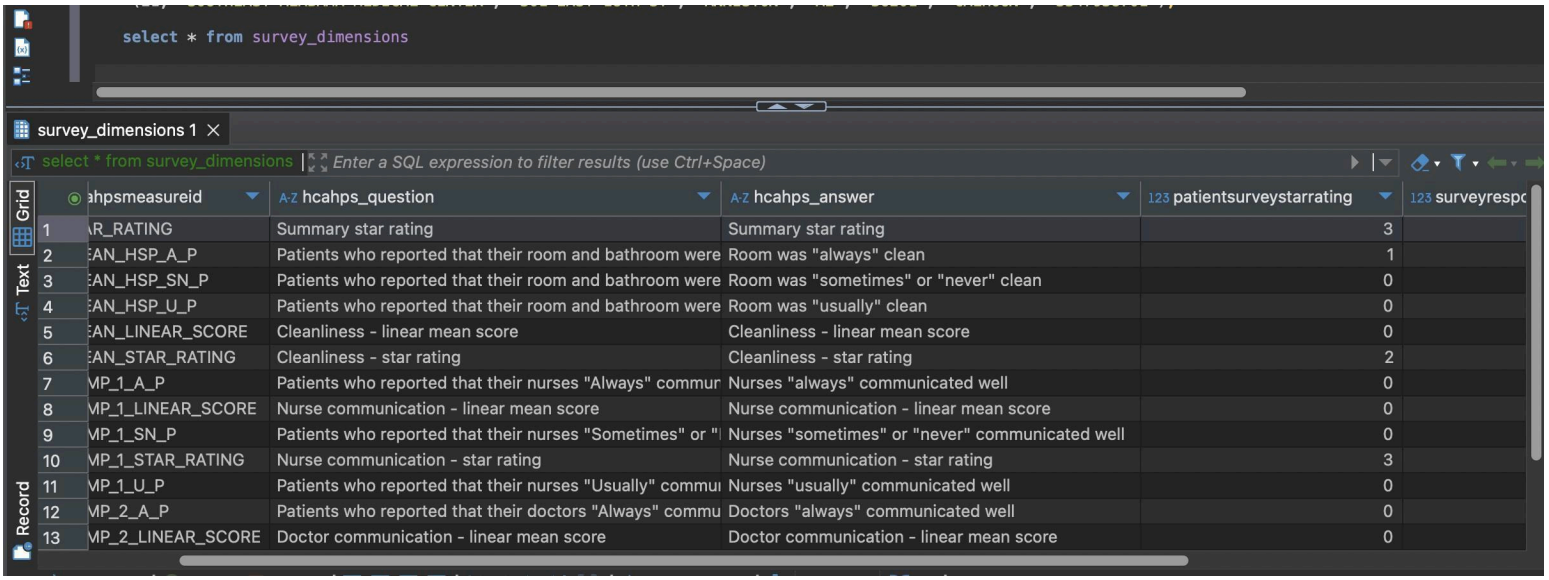
	A	B	C	D	E	F	G
1	surveyid	hcahpsmeasureid	hcahps_ques	hcahps_answer	patientsurveystarrating	surveyrespor	numberofcom
2	SCDAB308	H_STAR_RATING	Summary sta	Summary star rating	"" YES ""	27	1213
3	SCDAB150	H_CLEAN_HSP_A_P	Patients who	Room was "always" clean	"" NO ""	27	1213
4	SCDAB366	H_CLEAN_HSP_SN_P	Patients who	Room was "sometimes" or "nev	"" NO ""	27	1213
5	SCDAB2360	H_CLEAN_HSP_U_P	Patients who	Room was "usually" clean	"" NO ""	27	1213
6	SCDAB2558	H_CLEAN_LINEAR_SCORE	Cleanliness -	Cleanliness - linear mean scor	"" NO ""	27	1213
7	SCDAB3422	H_CLEAN_STAR_RATING	Cleanliness -	Cleanliness - star rating	3	27	1213
8	SCDAB3116	H_COMP_1_A_P	Patients who	Nurses "always" communicate	"" NO ""	27	1213
9	SCDAB1304	H_COMP_1_LINEAR_SCORE	Nurse comm	Nurse communication - linear	"" NO ""	27	1213
10	SCDAB898	H_COMP_1_SN_P	Patients who	Nurses "sometimes" or "never"	"" NO ""	27	1213
11	SCDAB2282	H_COMP_1_STAR_RATING	Nurse comm	Nurse communication - star ra	"" YES ""	27	1213
12	SCDAB2770	H_COMP_1_U_P	Patients who	Nurses "usually" communicate	"" NO ""	27	1213
13	SCDAB983	H_COMP_2_A_P	Patients who	Doctors "always" communicat	"" NO ""	27	1213
14	SCDAB2777	H_COMP_2_LINEAR_SCORE	Doctor comn	Doctor communication - linea	"" NO ""	27	1213
15	SCDAB2772	H_COMP_2_SN_P	Patients who	Doctors "sometimes" or "never	"" NO ""	27	1213
16	SCDAB955	H_COMP_2_STAR_RATING	Doctor comn	Doctor communication - star r	"" YES ""	27	1213
17	SCDAB2905	H_COMP_2_U_P	Patients who	Doctors "usually" communicat	"" NO ""	27	1213
18	SCDAB3066	H_COMP_3_A_P	Patients who	Patients "always" received hel	"" NO ""	27	1213
19	SCDAB1555	H_COMP_3_LINEAR_SCORE	Staff respons	Staff responsiveness - linear m	"" NO ""	27	1213
20	SCDAB3363	H_COMP_3_SN_P	Patients who	Patients "sometimes" or "neve	"" NO ""	27	1213
21	SCDAB2811	H_COMP_3_STAR_RATING	Staff respons	Staff responsiveness - star rati	3	27	1213
22	SCDAB2599	H_COMP_3_U_P	Patients who	Patients "usually" received hel	"" NO ""	27	1213
23	SCDAB2357	H_COMP_4_A_P	Patients who	Pain was "always" well controll	"" NO ""	27	1213
24	SCDAB1331	H_COMP_4_LINEAR_SCORE	Pain manage	Pain management - linear mea	"" NO ""	27	1213
25	SCDAB1505	H_COMP_4_SN_P	Patients who	Pain was "sometimes" or "neve	"" NO ""	27	1213
26	SCDAB611	H_COMP_4_STAR_RATING	Pain manage	Pain management - star rating	3	27	1213
27	SCDAB187	H_COMP_4_U_P	Patients who	Pain was "usually" well controll	"" NO ""	27	1213
28	SCDAB1414	H_COMP_5_A_P	Patients who	Staff "always" explained	"" NO ""	27	1213
29	SCDAB962	H_COMP_5_LINEAR_SCORE	Communicat	Communication about medicir	"" NO ""	27	1213
30	SCDAB2610	H_COMP_5_SN_P	Patients who	Staff "sometimes" or "never" ex	"" NO ""	27	1213
31	SCDAB1900	H_COMP_5_STAR_RATING	Communicat	Communication about medicir	"" YES ""	27	1213
32	SCDAB1982	H_COMP_5_U_P	Patients who	Staff "usually" explained	"" NO ""	27	1213
33	SCDAB3373	H_COMP_6_LINEAR_SCORE	Discharge int	Discharge information - linear	"" NO ""	27	1213
34	SCDAB936	H_COMP_6_N_P	Patients who	No, staff "did not" give patients	"" NO ""	27	1213
35	SCDAB845	H_COMP_6_STAR_RATING	Discharge int	Discharge information - star ra	"" ""	27	1213
36	SCDAB547	H_COMP_6_Y_P	Patients who	Yes, staff "did" give patients thi	"" NO ""	27	1213
37	SCDAB3063	H_COMP_7_A	Patients who	Patients who ¬ìAgree¬î they un	"" NO ""	27	1213

Transform using tMAP





OUTPUT : SurveyDimension Table



```
select * from survey_dimensions
```

survey_dimensions 1

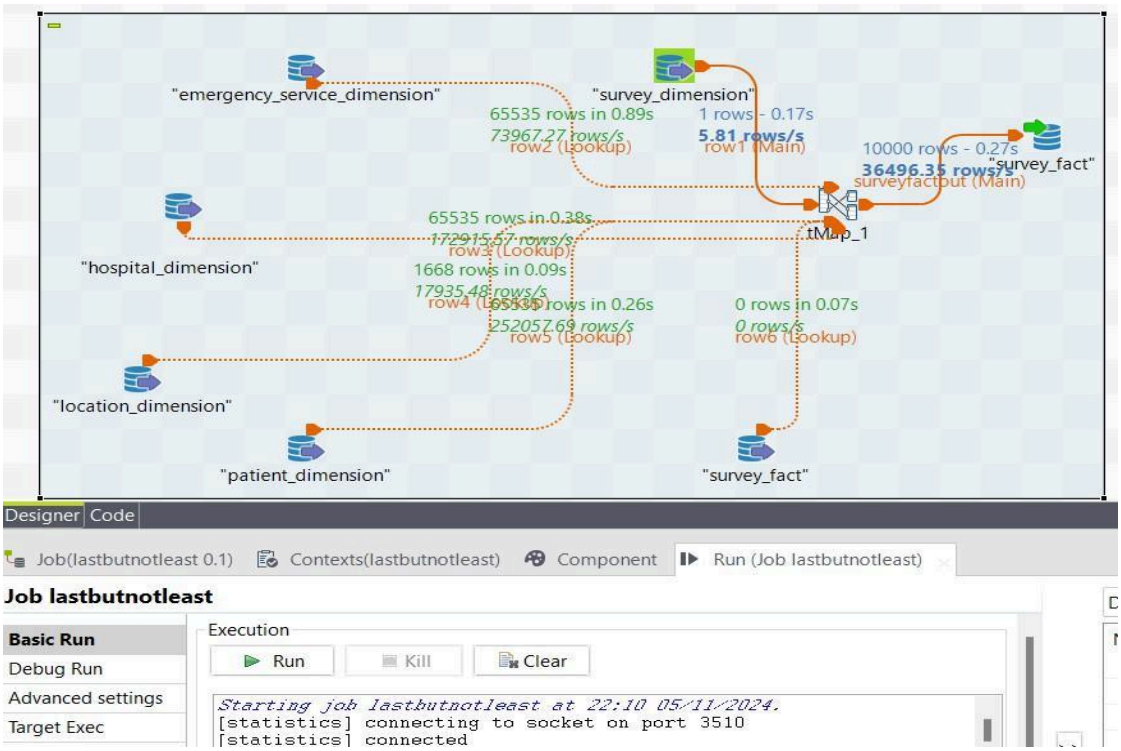
select * from survey_dimensions | Enter a SQL expression to filter results (use Ctrl+Space)

	ahpsmeasureid	A-Z hcahps_question	A-Z hcahps_answer	123 patientsurveystarrating	123 surveyresp
1	AR_RATING	Summary star rating	Summary star rating	3	
2	EAN_HSP_A_P	Patients who reported that their room and bathroom were	Room was "always" clean	1	
3	EAN_HSP_SN_P	Patients who reported that their room and bathroom were	Room was "sometimes" or "never" clean	0	
4	EAN_HSP_U_P	Patients who reported that their room and bathroom were	Room was "usually" clean	0	
5	EAN_LINEAR_SCORE	Cleanliness - linear mean score	Cleanliness - linear mean score	0	
6	EAN_STAR_RATING	Cleanliness - star rating	Cleanliness - star rating	2	
7	MP_1_A_P	Patients who reported that their nurses "Always" commur	Nurses "always" communicated well	0	
8	MP_1_LINEAR_SCORE	Nurse communication - linear mean score	Nurse communication - linear mean score	0	
9	MP_1_SN_P	Patients who reported that their nurses "Sometimes" or "	Nurses "sometimes" or "never" communicated well	0	
10	MP_1_STAR_RATING	Nurse communication - star rating	Nurse communication - star rating	3	
11	MP_1_U_P	Patients who reported that their nurses "Usually" commu	Nurses "usually" communicated well	0	
12	MP_2_A_P	Patients who reported that their doctors "Always" commu	Doctors "always" communicated well	0	
13	MP_2_LINEAR_SCORE	Doctor communication - linear mean score	Doctor communication - linear mean score	0	

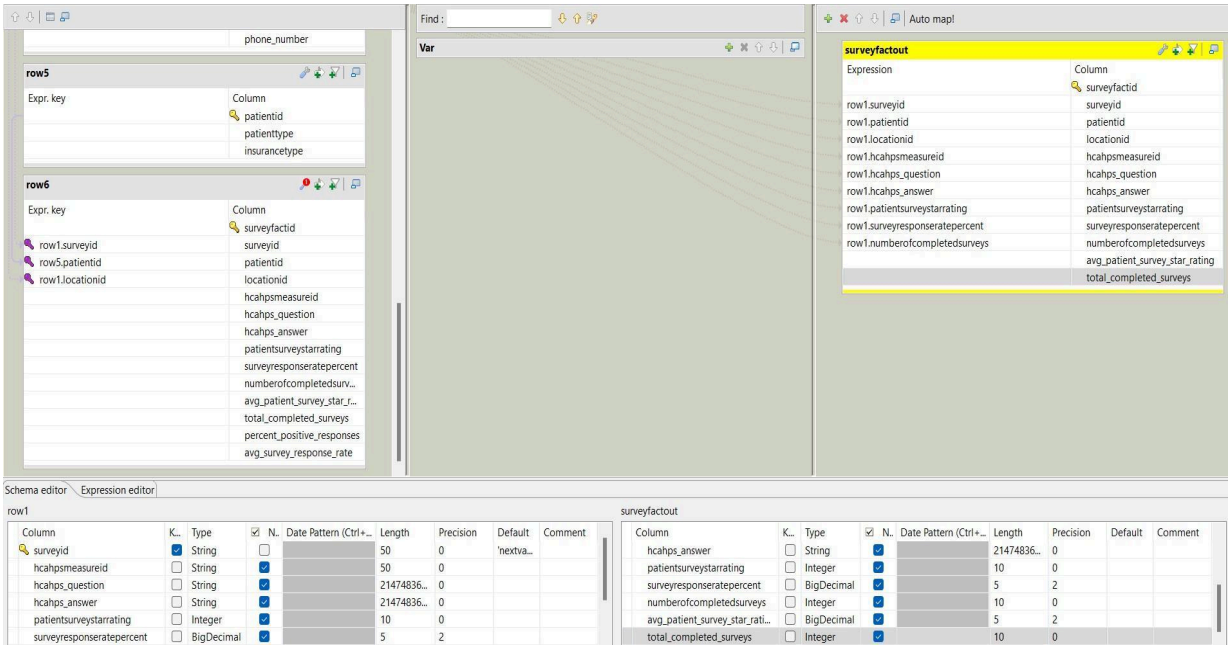
The transformations performed are :

1. Trimming the “” to ensure consistency.
2. Replace all the “”YES””, “”NO”” with 1, 0 respectively.
3. if NULL/BLANK, we replace it by 0.
4. Converting from String to INT, as it is patient survey star rating column.

ETL PROCESS FROM DIMENSION TABLES TO FACT TABLE :



This figure shows the Talend job setup for an ETL process that pulls data from several dimension tables and loads it into the survey_fact table.



T-Map Component for ETL Process

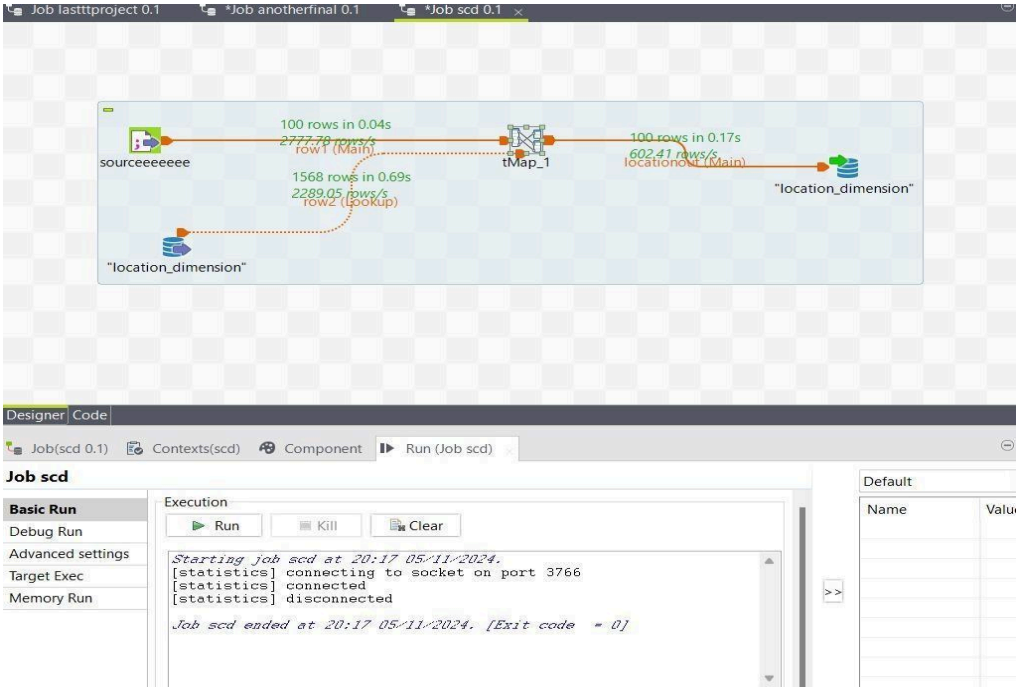
Output:

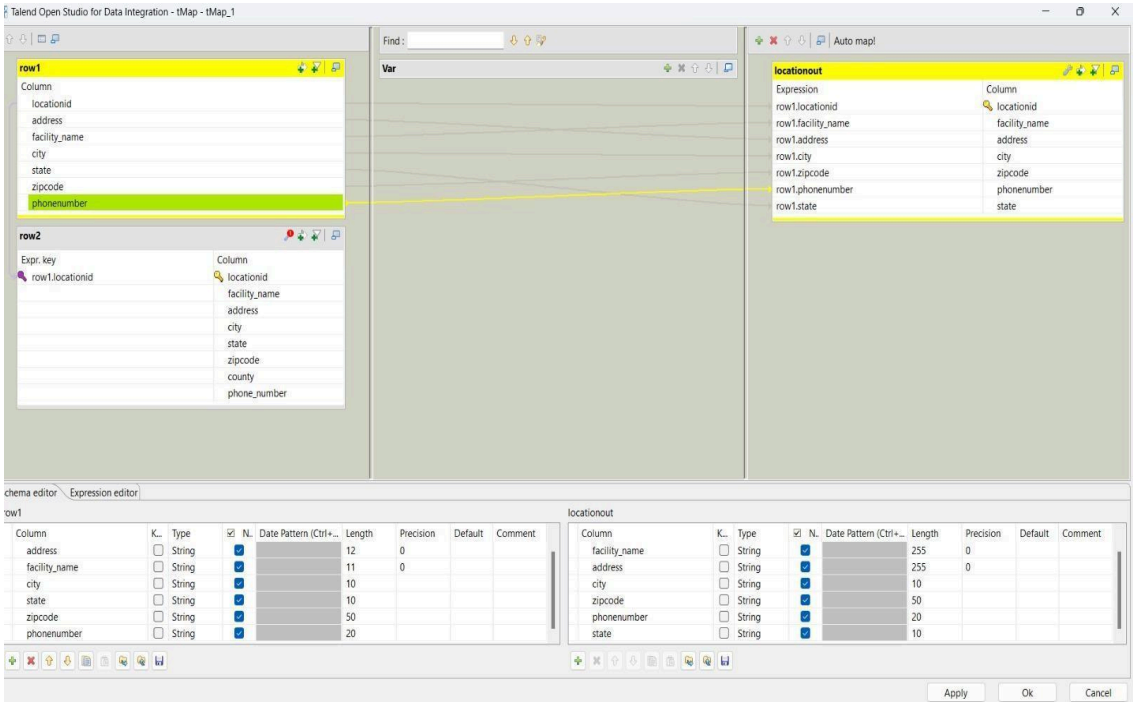
	surveyid character varying (50)	patientid character varying (50)	locationid integer	hcahpsmeasureid character varying (50)	hcahps_question text
1	SCDAB308	AB60	1	H_STAR_RATING	Summary star rating
2	SCDAB150	AB259	2	H_CLEAN_HSP_A_P	Patients who reported that their room and bathroom were Always clean
3	SCDAB366	AB703	3	H_CLEAN_HSP_SN_P	Patients who reported that their room and bathroom were Sometimes or Never
4	SCDAB2360	AB591	4	H_CLEAN_HSP_U_P	Patients who reported that their room and bathroom were Usually clean
5	SCDAB2558	AB400	5	H_CLEAN_LINEAR_SCORE	Cleanliness - linear mean score
6	SCDAB3422	AB740	6	H_CLEAN_STAR_RATING	Cleanliness - star rating
7	SCDAB3116	AB639	7	H_COMP_1_A_P	Patients who reported that their nurses Always communicated well
8	SCDAB1304	AB162	8	H_COMP_1_LINEAR_SCORE	Nurse communication - linear mean score
9	SCDAB898	AB603	9	H_COMP_1_SN_P	Patients who reported that their nurses Sometimes or Never communicated w
10	SCDAB2282	AB260	10	H_COMP_1_STAR_RATING	Nurse communication - star rating
11	SCDAB2770	AB228	11	H_COMP_1_U_P	Patients who reported that their nurses Usually communicated well
12	SCDAB983	AB625	12	H_COMP_2_A_P	Patients who reported that their doctors Always communicated well
13	SCDAB2777	AB654	13	H_COMP_2_LINEAR_SCORE	Doctor communication - linear mean score
14	SCDAB2772	AB474	14	H_COMP_2_SN_P	Patients who reported that their doctors Sometimes or Never communicated v
15	SCDAB955	AB119	15	H_COMP_2_STAR_RATING	Doctor communication - star rating
16	SCDAB2905	AB178	16	H_COMP_2_U_P	Patients who reported that their doctors Usually communicated well
17	SCDAB3066	AB13	17	H_COMP_3_A_P	Patients who reported that they Always received help as soon as they wanted
18	SCDAB1555	AB409	18	H_COMP_3_LINEAR_SCORE	Staff responsiveness - linear mean score
19	SCDAB3363	AB457	19	H_COMP_3_SN_P	Patients who reported that they Sometimes or Never received help as soon as
20	SCDAB2811	AB225	20	H_COMP_3_STAR_RATING	Staff responsiveness - star rating

cahps_answer ext	patientsurveystarrating integer	surveyresponseratepercent numeric (5,2)	numbero integer
Summary star rating	3	27.00	
Room was always clean	0	27.00	
Room was sometimes or never clean	0	27.00	
Room was usually clean	0	27.00	
Cleanliness - linear mean score	0	27.00	
Cleanliness - star rating	2	27.00	
Nurses always communicated well	0	27.00	
Nurse communication - linear mean score	0	27.00	
Nurses sometimes or never communicated well	0	27.00	
Nurse communication - star rating	3	27.00	
Nurses usually communicated well	0	27.00	
Doctors always communicated well	0	27.00	
Doctor communication - linear mean score	0	27.00	
Doctors sometimes or never communicated well	0	27.00	
Doctor communication - star rating	3	27.00	
Doctors usually communicated well	0	27.00	
Patients always received help as soon as they wanted	0	27.00	
Staff responsiveness - linear mean score	0	27.00	
Patients sometimes or never received help as soon as they wanted	0	27.00	
Staff responsiveness - star rating	2	27.00	

Implementation OF SCD:

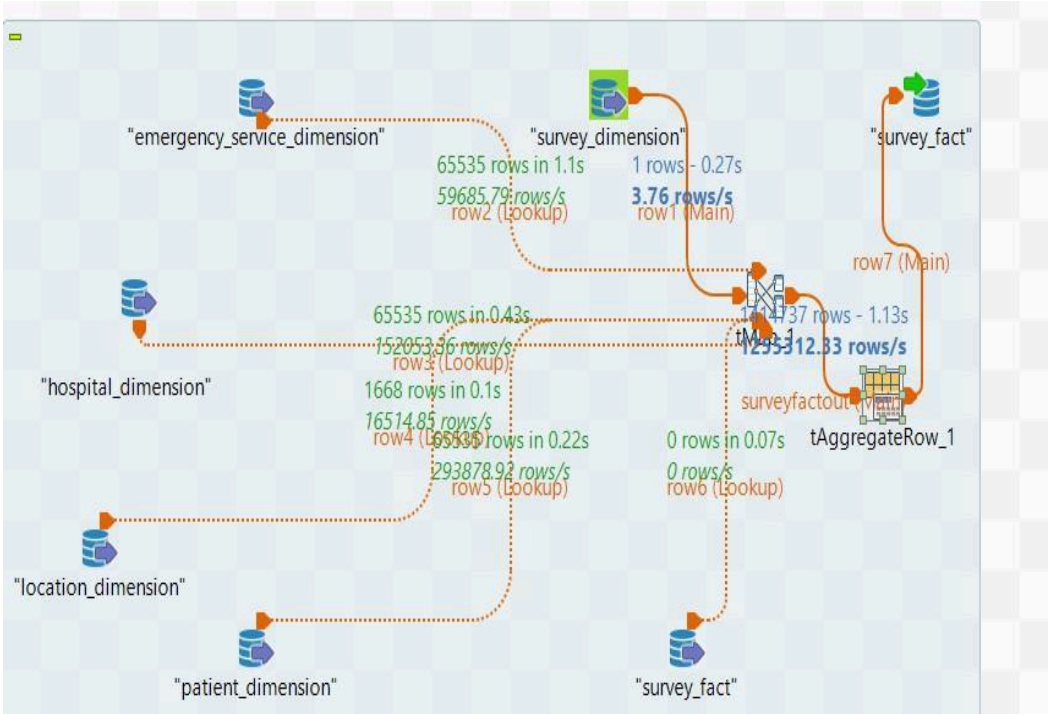
Slowly Changing Dimension (SCD) Type 1, was configured by Talend to update existing records in the dimension table with the latest data from a source file. This approach overwrites any old data with new values, ensuring that only the current information is stored, with no historical data retained.

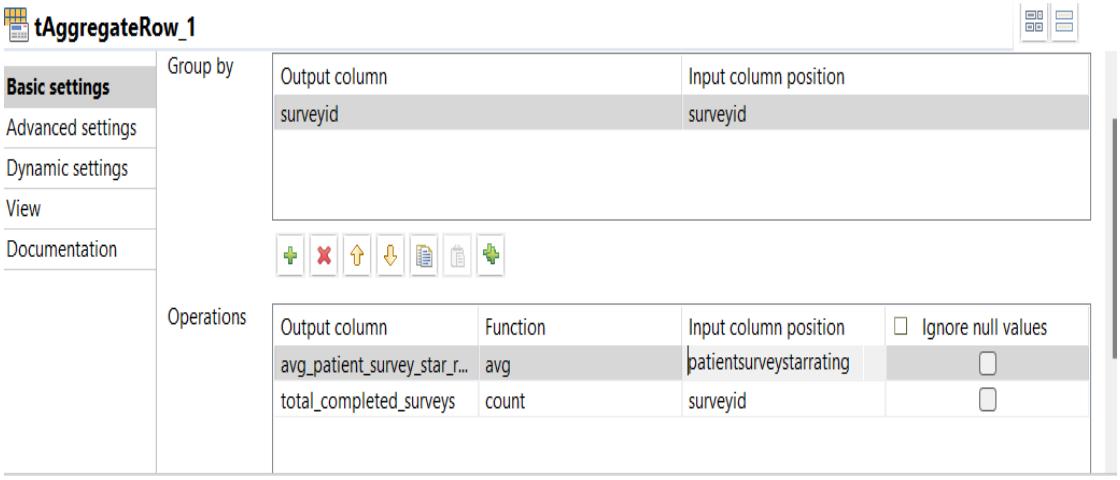




Implementation Of Calculated Measures :

Calculated Total Completed Surveys & Average Patient Survey Star Rating



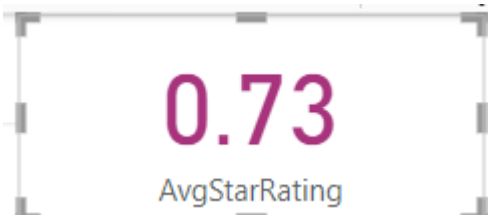


Output:

total_completed_surveys bigint	avg_patient_survey_star_rating numeric
1	0.00000000000000000000
1	0.00000000000000000000
1	[null]
1	0.00000000000000000000
1	2.0000000000000000
1	4.0000000000000000
1	0.00000000000000000000
1	0.00000000000000000000
1	0.00000000000000000000
1	0.00000000000000000000
1	0.00000000000000000000
1	0.00000000000000000000
1	0.00000000000000000000
1	0.00000000000000000000
1	0.00000000000000000000
1	0.00000000000000000000
1	0.00000000000000000000
1	0.00000000000000000000
1	0.00000000000000000000
1	0.00000000000000000000
1	2.0000000000000000
1	0.00000000000000000000

Dashboard:

KPI:

1) 

This KPI represents the average star rating provided by patients across all healthcare facilities, indicating the overall satisfaction level of the services offered.

OLAP Operation: Aggregation

ROLL-UP(survey_fact, [State, FacilityID], AVG(AverageStarRating))

2) 

This percentage indicates the proportion of surveys that received positive feedback, reflecting patient satisfaction trends.

OLAP Operation: **Roll-up**

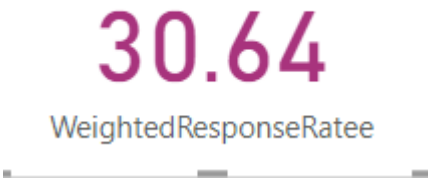
SLICE(survey_fact, FeedbackType = 'Positive')

3) 

This KPI shows the total number of surveys completed across all facilities, providing insight into the survey response volume

OLAP Operation: **Roll-up**

ROLL-UP(survey_fact, [State], COUNT(*))

4) 

This metric measures the adjusted response rate, considering factors such as survey type and patient feedback volume

OLAP Operation: **Roll-up**

DRILL-DOWN(survey_fact, [FacilityID], WeightedResponseRate)

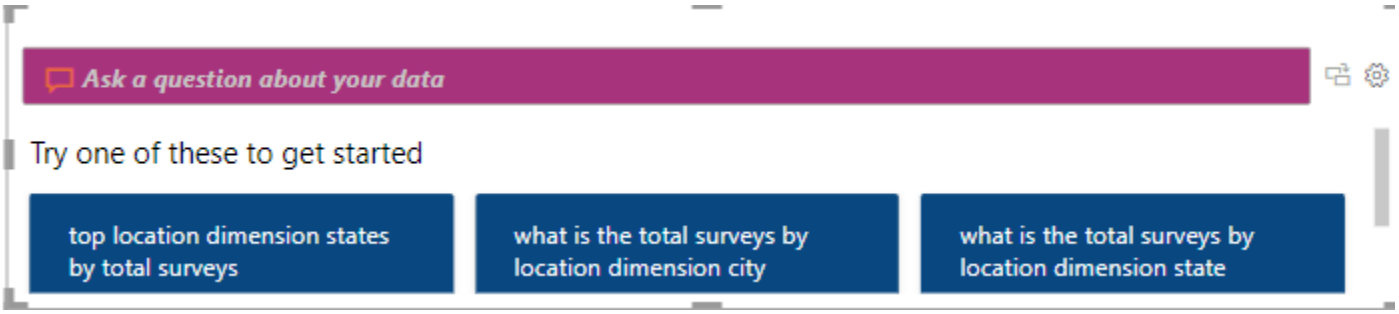
5) 

This score combines star ratings and total survey responses to provide an aggregated measure of facility performance.

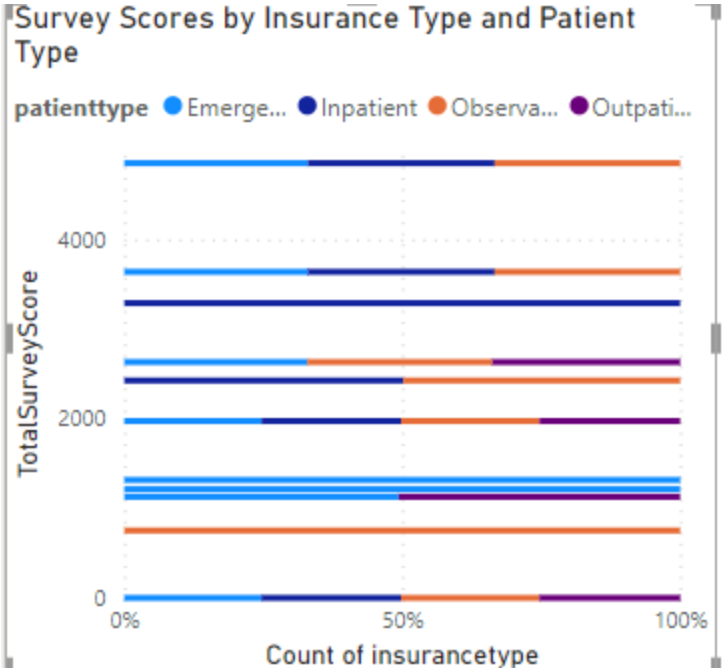
OLAP Operation: **Roll-up**

ROLL-UP(survey_fact, [FacilityID], (SUM(AverageStarRating * TotalSurveys) / SUM(TotalSurveys)))

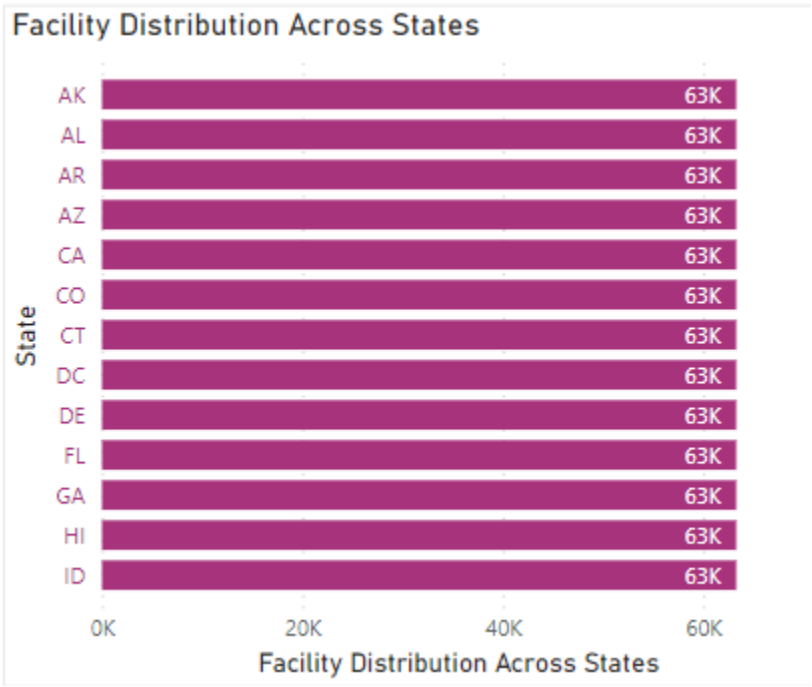
Graphs & Visualizations:



This interactive feature allows users to explore specific data insights by typing queries or using predefined questions.

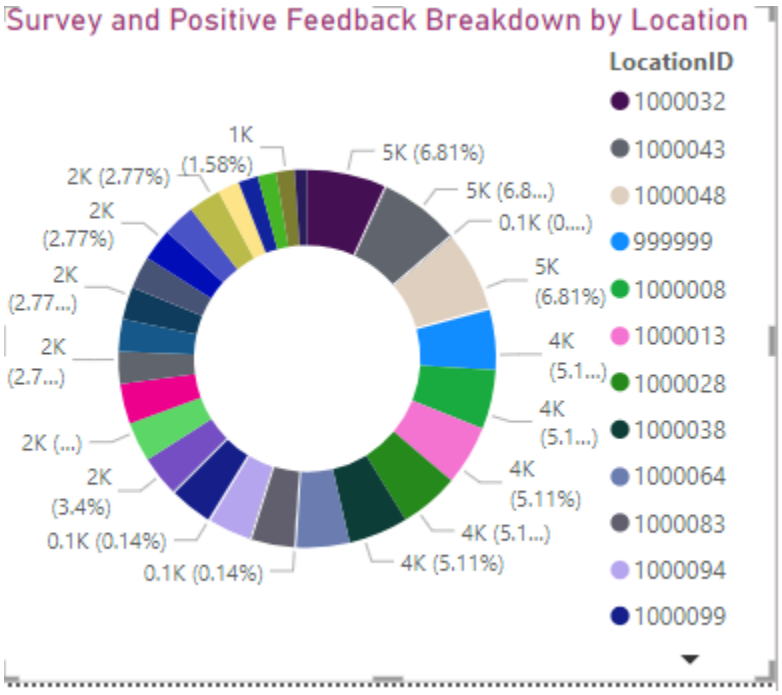


This chart compares survey scores by patient type and insurance type, highlighting patterns in patient experiences.
OLAP Operation: **Drill-down**
SLICE(patient_dimension, InsuranceType AND PatientType)



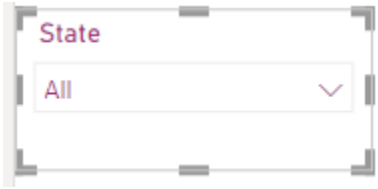
This bar chart shows the distribution of facilities across states, providing a geographical overview of survey coverage.
OLAP Operation: **Slice + Roll-up**

ROLL-UP(hospital_dimension, [State], COUNT(FacilityID))

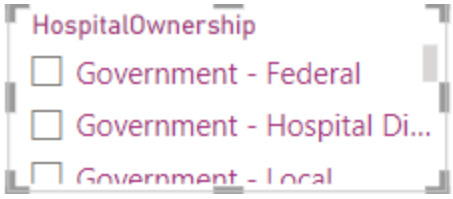


This donut chart visualizes survey and feedback distribution across various facility locations.
OLAP Operation: **Drill-through + Roll-up**

DRILL-DOWN(survey_fact, [LocationID], COUNT(TotalSurveys), PositiveFeedbackPercentage)



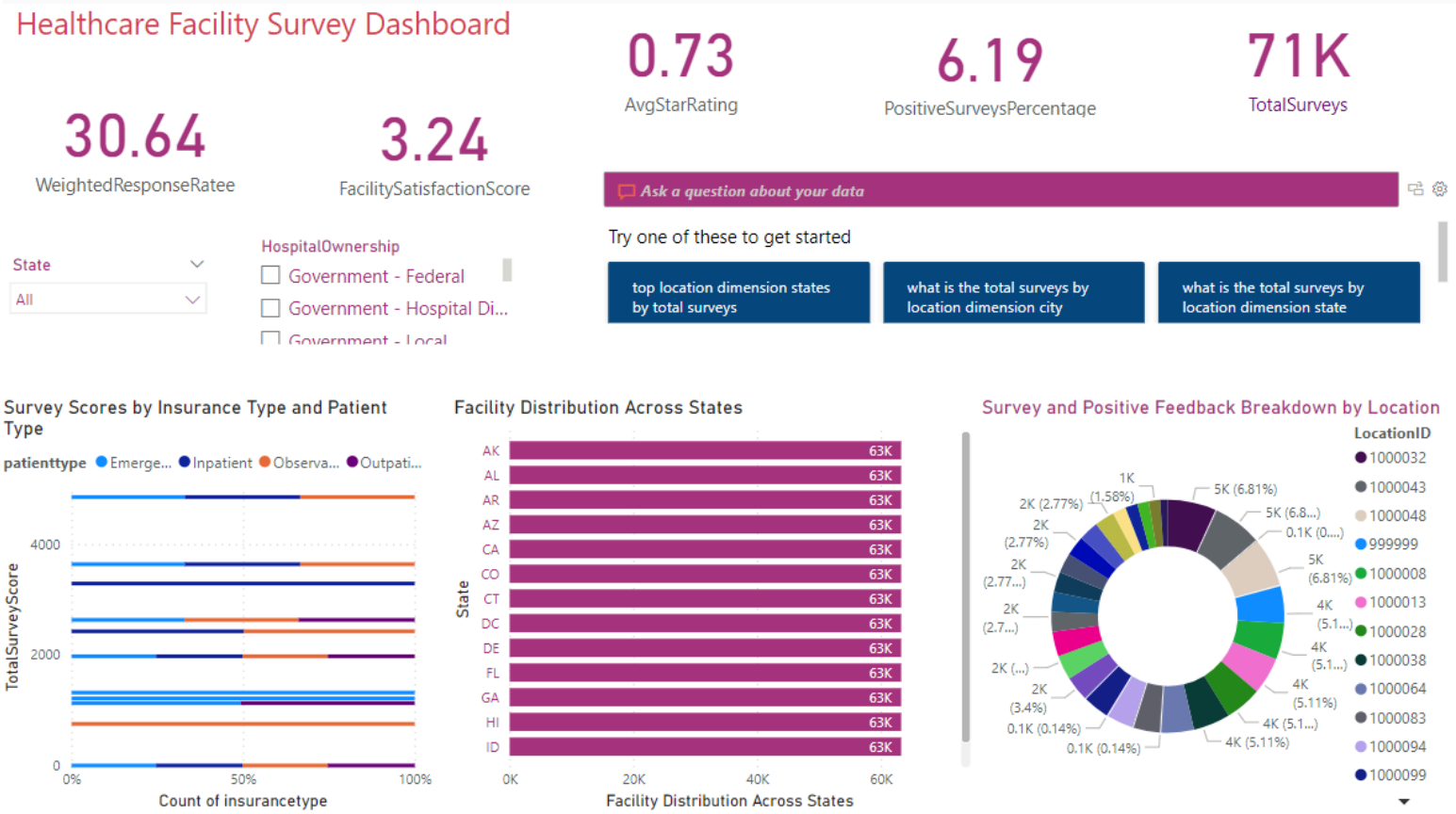
This slicer enables users to filter data by specific states for targeted analysis
OLAP Operation: **Dice**
SLICE(location_dimension, State)



This slicer allows filtering by ownership type, such as government or private, for detailed segmentation.
OLAP Operation: **Dice**

SLICE(hospital_dimension, HospitalOwnership)

Interactive Dashboard:



Our Healthcare Facility Survey Dashboard is designed to provide a comprehensive and interactive analysis of patient feedback and facility performance across various dimensions. We have included key metrics such as Average Star Rating, Positive Surveys Percentage, Total Surveys, Weighted Response Rate, and Facility Satisfaction Score, which help in understanding overall patient satisfaction and survey engagement. To make the dashboard interactive, we've added slicers for State and Hospital Ownership, allowing users to filter data dynamically and explore specific trends. The visualizations, including bar charts, donut charts, and stacked bar charts, effectively present insights like survey scores by insurance type, patient type, and facility distribution across states.. This dashboard serves as a powerful tool for identifying trends, uncovering insights, and driving improvements in healthcare facility performance.