DATA WAREHOUSE MODELS AND APPROACHES- 17301

INDIVIDUAL CASE STUDY ASSESSMENT

TOPIC:

IMPLEMENTATION OF DATAWAREHOUSE/MART SYSTEM

CASE STUDY: **North-West Yorkshire Elderly Social & HealthCare**

School of Built Environment, Engineering and Computing

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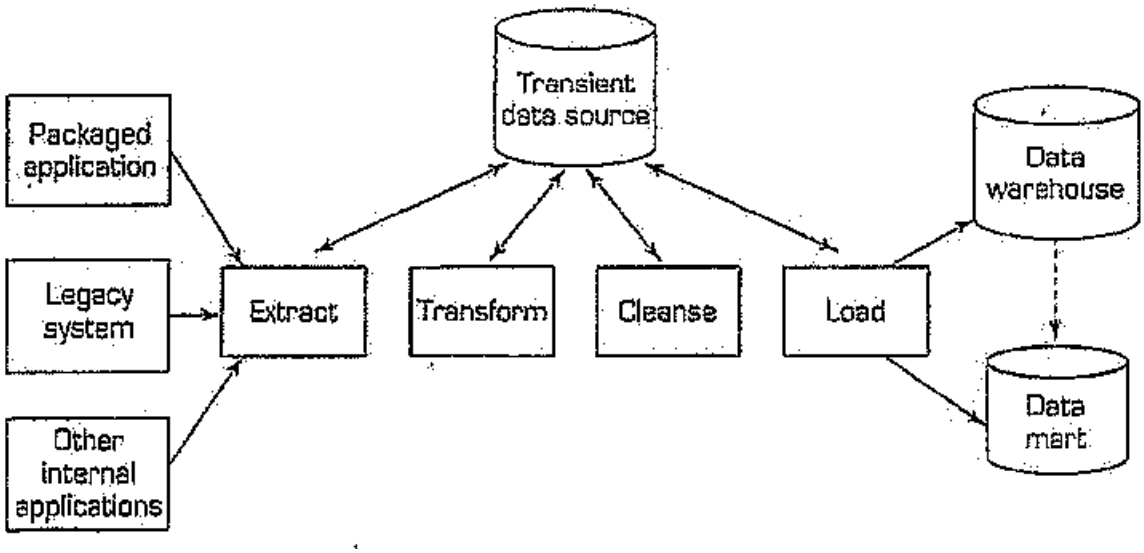
INTRODUCTION

The aim of this case study of the North and West Yorkshire Elderly and Social Health Care System report is to implement a centralized database solution that would assist in providing a solution that is associated with the integration of data from the West Yorkshire and North Yorkshire health and social care datasets whilst implementing the Extract, Transform and Load (ETL) processes and maintenance. To develop a comprehensive and real time view of bed occupancy rate which is considered the key performance indicator and optimizing the bed resources to meet patient's needs, create a data mart/data warehouse and enable the business owner who is the stakeholder in making a better data driven decision in providing quality care, improve the business reputation and the effectiveness of care homes.

All evidence codes, **screenshot of codes running successfully would be in the Appendix.**

TASK 1-DATA INTEGRATION(ETL)AND MAINTENANCE

Extract, Load and Transform (ETL) processes are important in the component of data integration which enables data to be extracted and transformed from various sources of data to a final location referred to as a data mart or data warehouse. Data from its sources would possibly have "inconsistence and redundancies" which is required to be solved to enable an organisation to have a collective view of their data (Calvanese, D.et al,2001).Bill Inmon, the father of Data warehousing, referred to data warehouse as the," A Data Warehouse is a subject oriented, integrated, time variant, non-volatile collection of data"(N.K. Karthikeyan, 2013).



ETL PROCESS: (Source: From Decision Support and Business Intelligence System -Efraim Turban,2011)

Original data sets that are used for star schema includes the table and columns highlighted and would be used in the staging area. This phase of the ETL process involved the extraction of data from the West Yorkshire and North Yorkshire datasets as a multiple source of data which would help contribute to the analytical report process.

SOURCE 1: WYR_CARE CENTRE (care_Id, **Care_centre_name**, address, **postcode, town**, email)

WYR_Bed (ward_no**,** bed_no**, bed_status**)

WYR_RESERVATION (Reservation_Id, **Admission_Date**)

WYR_Bed Assigned(reservation_Id,bed_no)

WYR_WARD (**WARD_NO**, **WARD_NAME**, **CARE_ID**)

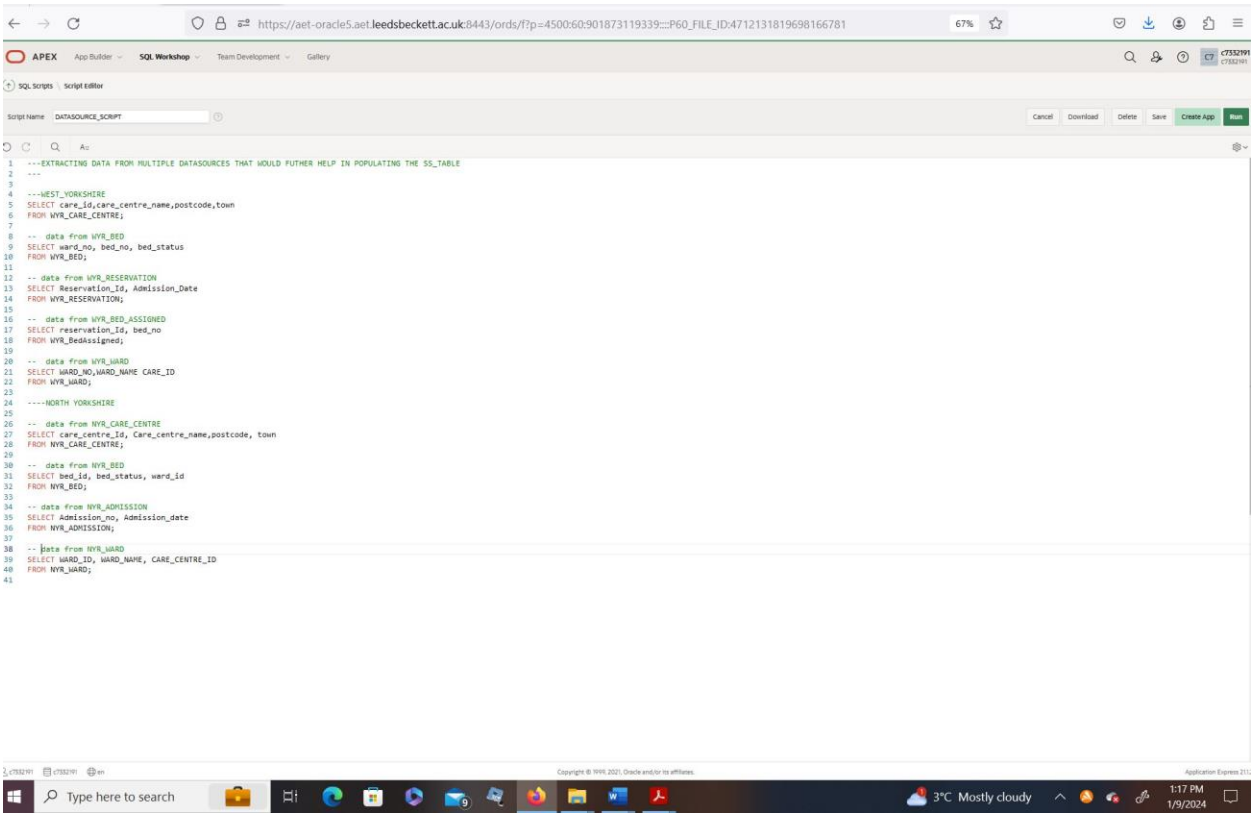
SOURCE 2: NYR_CARE CENTRE (care_centre_Id, **Care_centre_name**, address, **postcode, town**, email)

NYR_BED (bed_id, **bed_status**, ward_id, bed_type)

NYR_ADMISSION (Admission_no ,**Admission_date**)

NYR_WARD (**WARD_ID**, **WARD_NAME, CARE_CENTRE_ID**)

In this screenshot below I explore the data for the West Yorkshire and North Yorkshire data using SELECT, FROM STATEMENT to have a view of data for extraction process.

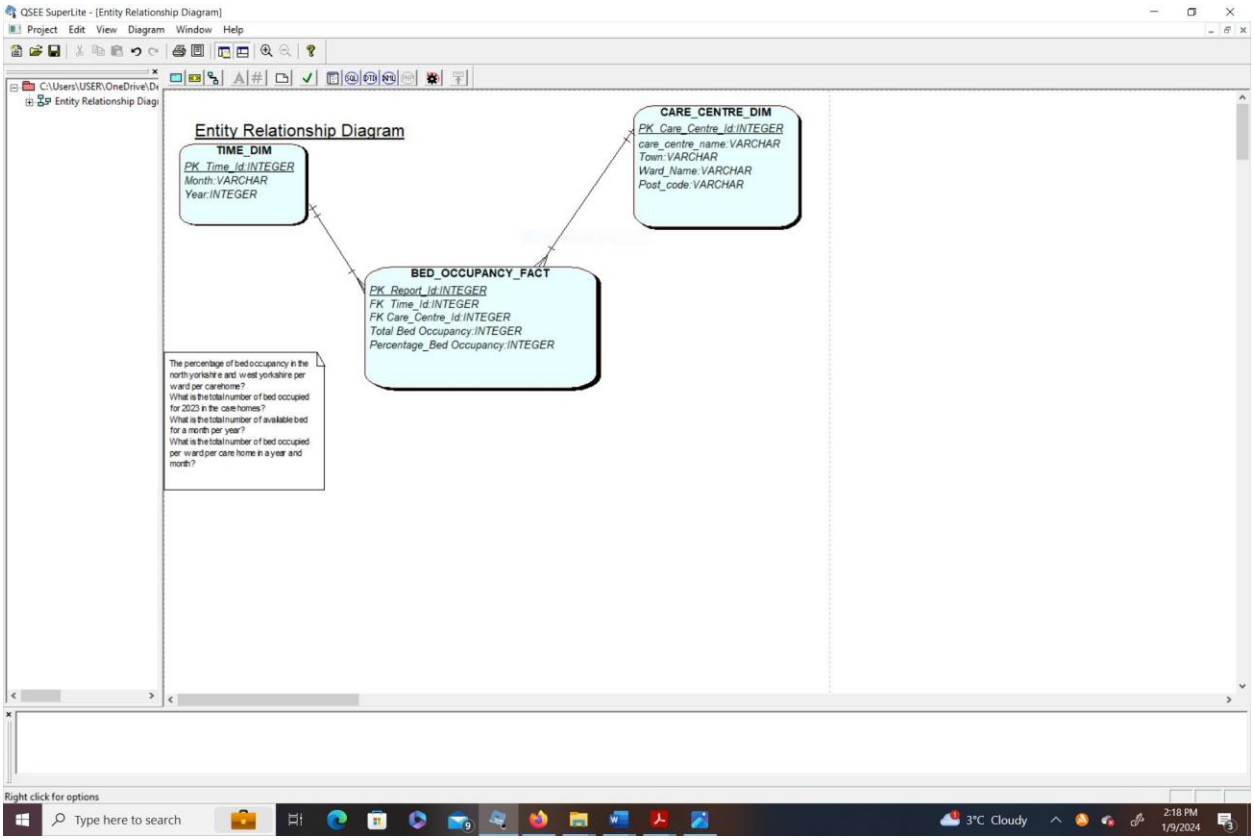


STAR SCHEMA IMPLENTATION

Star schema includes dimensional design for relational database are categorized as columns of the dimension table and the fact table contains facts that are stored as columns (Christopher Adams ,2010). A data warehouse design involves the conceptualization of dimensional modelling and a dimensional modelling is the “retrieval based system” which allows a huge amount of query accessibility. The fact table contains the features required for analytical process for decision, foreign keys are connected to the dimensional tables and attributes are used for querying a report (Turban, E., 2011).

The star schema below was designed, and I proceeded to forward engineer my star schema and implemented sequence for my surrogate key .The measures in the Bed_Occupancy_Fact table would be percentage of bed occupied which would be drilled down to per ward per care centre and total bed occupied per ward per care centre.The evidence code would be showed along side the Load process below.

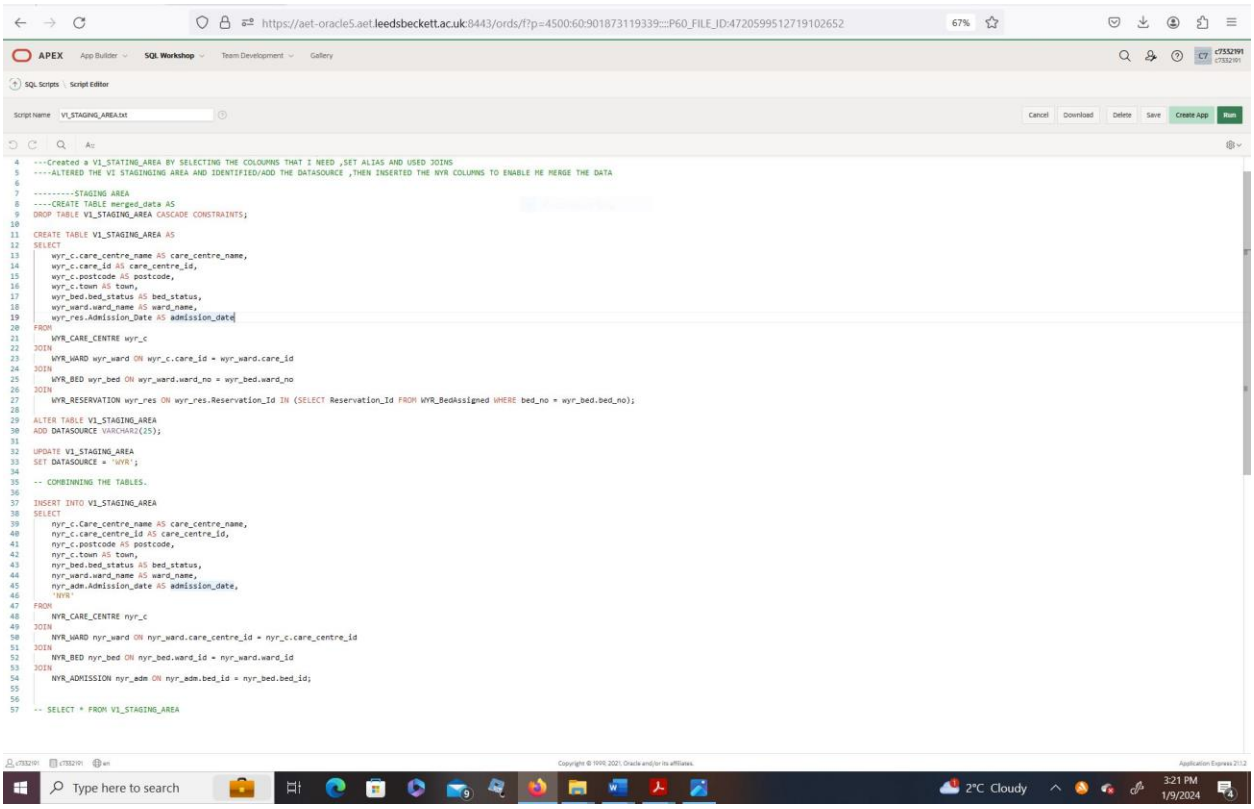
The Time_Dim contains the Time_Id Month and Year and the Care_centre_Dim contains the Care_centre_Id, care_centre_name, town, ward_name and post_code.

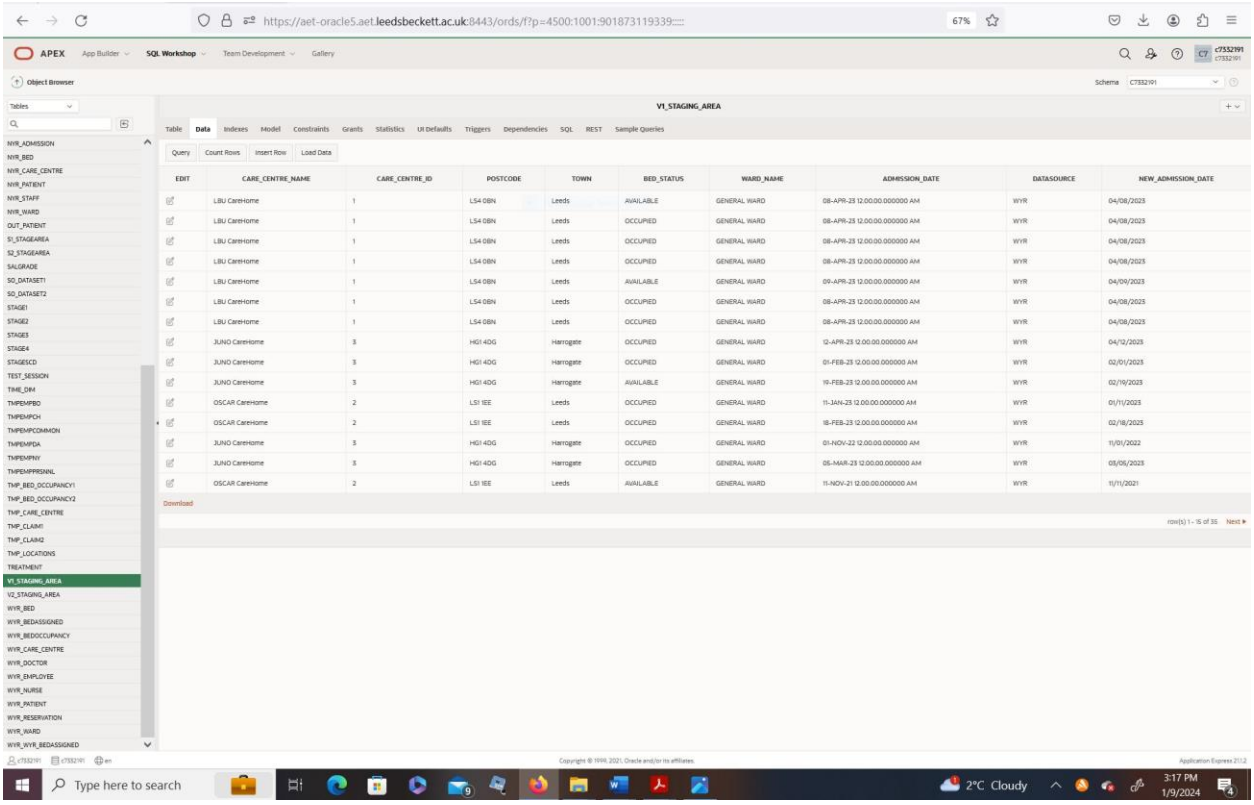


STAGING AREA

The staging area approach was implemented as V1_staging_area to serve as an intermediate stage of combining the data extracted from multiple sources before the load process in the star

schema.


---Created a V1_STATING_AREA BY SELECTING THE COLOUMNS THAT I NEED ,SET ALIAS AND USED JOINS
---ALTERED THE V1 STAGINGING AREA AND IDENTIFIED/ADD THE DATASOURCE ,THEN INSERTED THE NYR COLUMNS TO ENABLE HE MERGE THE DATA
---------STAGING AREA
----CREATE TABLE merged_data AS
DROP TABLE V1_STAGING_AREA CASCADE CONSTRAINTS;
CREATE TABLE V1_STAGING_AREA AS
SELECT
wyr_c.care_centre_name AS care_centre_name,
wyr_c.care_id AS care_centre_id,
wyr_c.postcode AS postcode,
wyr_c.town AS town,
wyr_bed.bed_status AS bed_status,
wyr_ward.ward_name AS ward_name,
wyr_res.Admission_Date AS admission_date
FROM
WYR_CARE_CENTRE wyr_c
JOIN
WYR_WARD wyr_ward ON wyr_c.care_id = wyr_ward.care_id
JOIN
WYR_BED wyr_bed ON wyr_ward.ward_no = wyr_bed.ward_no
JOIN
WYR_RESERVATION wyr_res ON wyr_res.Reservation_Id IN (SELECT Reservation_Id FROM WYR_BedAssigned WHERE bed_no = wyr_bed.bed_no);
ALTER TABLE V1_STAGING_AREA
ADD DATASOURCE VARCHAR2(25);
UPDATE V1_STAGING_AREA
SET DATASOURCE = 'WYR';
-- COMBINNING THE TABLES.
INSERT INTO V1_STAGING_AREA
SELECT
nyr_c.Care_centre_name AS care_centre_name,
nyr_c.care_centre_id AS care_centre_id,
nyr_c.postcode AS postcode,
nyr_c.town AS town,
nyr_bed.bed_status AS bed_status,
nyr_ward.ward_name AS ward_name,
nyr_adm.Admission_date AS admission_date,
'NYR'
FROM
NYR_CARE_CENTRE nyr_c
JOIN
NYR_WARD nyr_ward ON nyr_ward.care_centre_id = nyr_c.care_centre_id
JOIN
NYR_BED nyr_bed ON nyr_bed.ward_id = nyr_ward.ward_id
JOIN
NYR_ADMISSION nyr_adm ON nyr_adm.bed_id = nyr_bed.bed_id;
-- SELECT * FROM V1_STAGING_AREA


V1_STAGING_AREA
EDIT
CARE_CENTRE_NAME
CARE_CENTRE_ID
POSTCODE
TOWN
BED_STATUS
WARD_NAME
ADMISSION_DATE
DATASOURCE
NEW_ADMISSION_DATE

Further discussion, the V1_staging_are was created and selected columns care_centre_name, centre_centre_id, postcode,town,bed_status,ward_name,admission_date and used a JOIN based on the relationship between the tables ,altered and updated with a datasource and perform an insert and select statement into the V1_staging area.

```
ALTER TABLE V1_STAGING_AREA ADD NEW_ADMISSION_DATE DATE;
```
This was used to add a new_admission_date column considering the format of the initial admission_date column by separating the date and time using the code below.

```
UPDATE V1_STAGING_AREA
SET NEW_ADMISSION_DATE = TO_DATE(TO_CHAR(ADMISSION_DATE, 'DD-MON-YY'), 'DD-MON-YY');
```

TRANSFORMATION, QUALITY CHECKS AND TEMPORAL TABLE

The transformation involves data undergoing cleaning, data validation, normalization, ensuring accuracy and consistency of data to avoid data quality issues and maintain data integrity.

Further discussion, missing data was checked using SELECT *
FROM V1_STAGING_AREA WHERE CARE_CENTRE_NAME IS NULL OR POSTCODE I S NULL OR TOWN IS NULL OR BED_STATUS IS NULL OR WARD_NAME IS NULL OR ADMISSION_DATE IS NULL.
The Admission_date appeared that there were missing values and other showed no missing values. DELETE FROM V1_STAGING_AREA WHERE ADMISSION_DATE IS NULL;was used to delete null values.

```
-- Code was used in checking for Duplicates values
--SELECT CARE_CENTRE_NAME, CARE_CENTRE_ID, POSTCODE,
TOWN, BED_STATUS, WARD_NAME, ADMISSION_DATE, COUNT(*)
--FROM V1_STAGING_AREA
--GROUP BY CARE_CENTRE_NAME,
CARE_CENTRE_ID, POSTCODE, TOWN, BED_STATUS, WARD_NAME, ADMISSION_D
ATE
--HAVING COUNT(*) > 1;
```

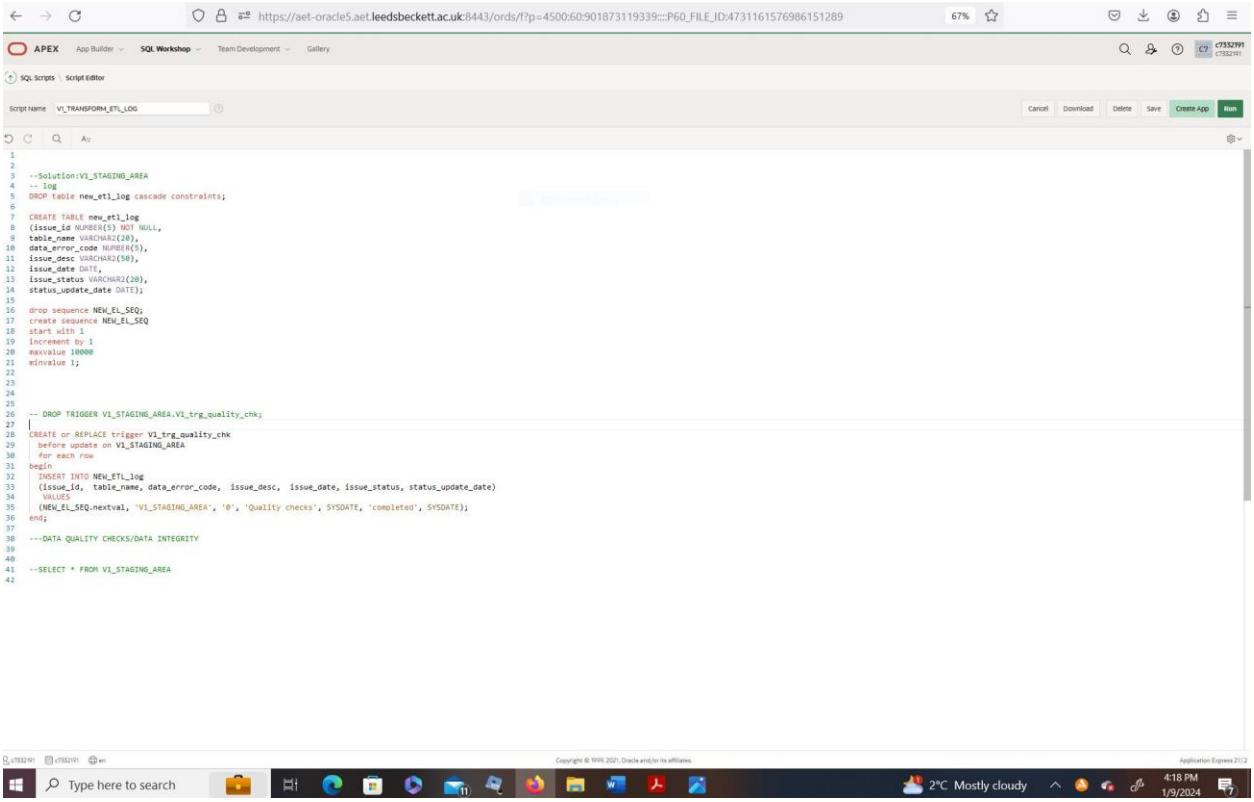
Consistency of data was checked such as :
Checking for Consistency in BED_STATUS

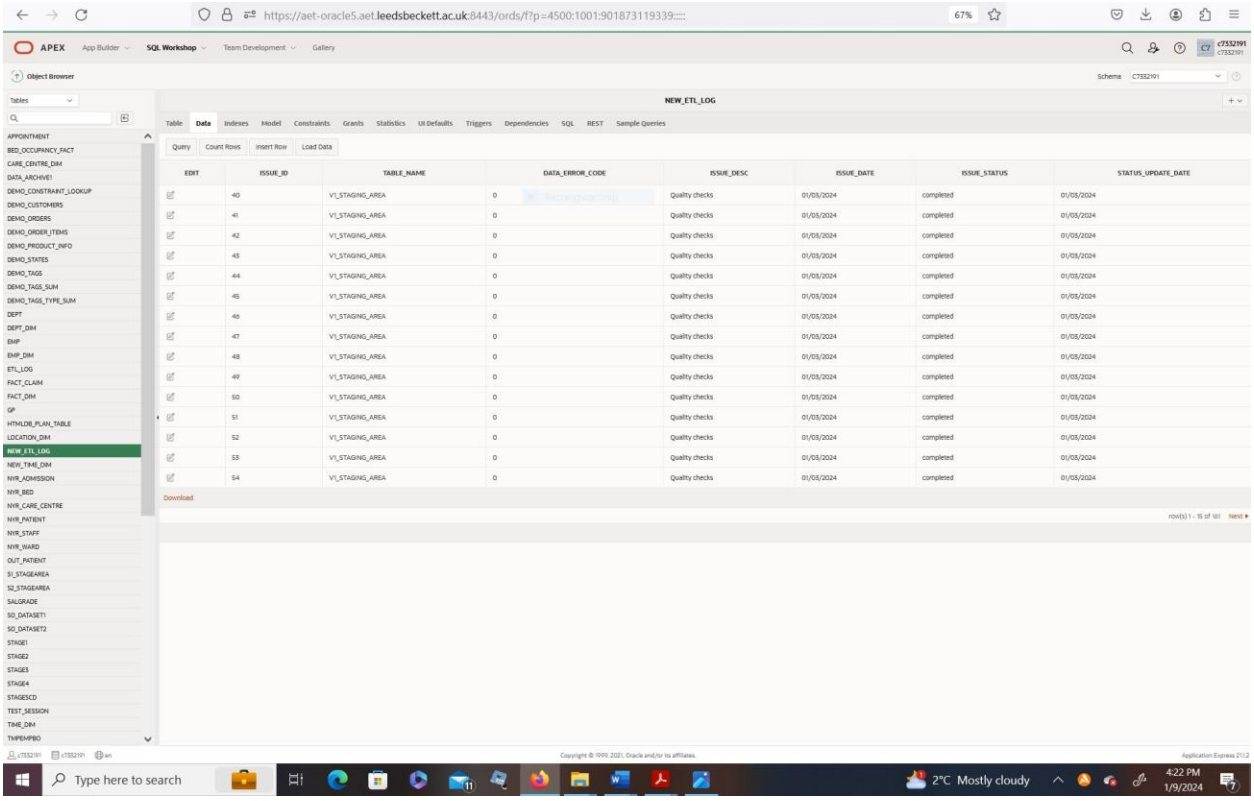
```
--SELECT DISTINCT BED_STATUS
--FROM V1_STAGING_AREA;

-- Check for Consistency in WARD_NAME
--ELECT DISTINCT WARD_NAME
--FROM V1_STAGING_AREA;
```

---Quality checks were also done, updating bed status for integrity, standardizations and all lowercase occupied to uppercase occupied

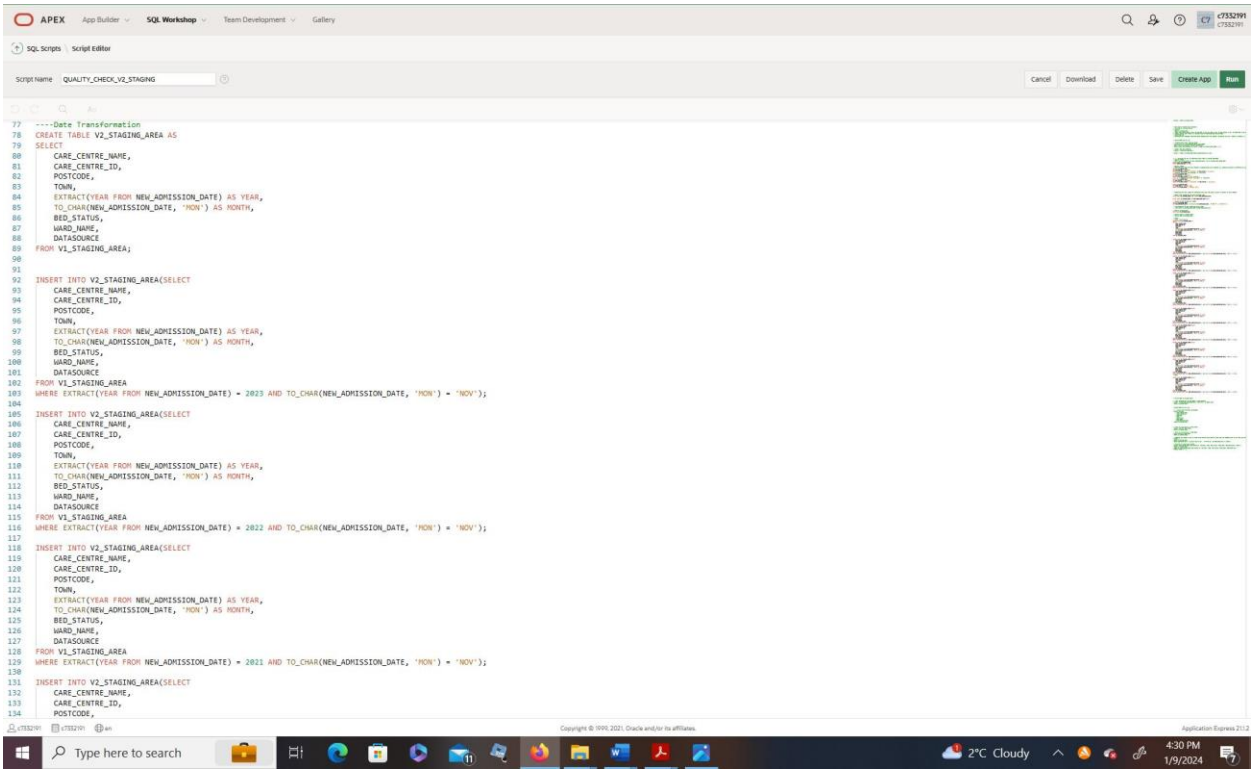
```
UPDATE V1_STAGING_AREA
SET BED_STATUS = 'OCCUPIED'
WHERE UPPER(BED_STATUS) = 'OCCUPIED' OR BED_STATUS = 'Occupied';
----Updated rows with 'NOT OCCUPIED' to 'Available'
UPDATE V1_STAGING_AREA
SET BED_STATUS = 'AVAILABLE'
WHERE UPPER(BED_STATUS) = 'NOT OCCUPIED';
-------------Updated lowercase 'Available' to 'AVAILABLE'
UPDATE V1_STAGING_AREA
SET BED_STATUS = 'AVAILABLE'
WHERE UPPER(BED_STATUS) = 'AVAILABLE' OR BED_STATUS = 'Available';

UPDATE V1_STAGING_AREA
SET WARD_NAME = 'GENERAL WARD'
WHERE UPPER(WARD_NAME) = 'GENERAL CARE';
```

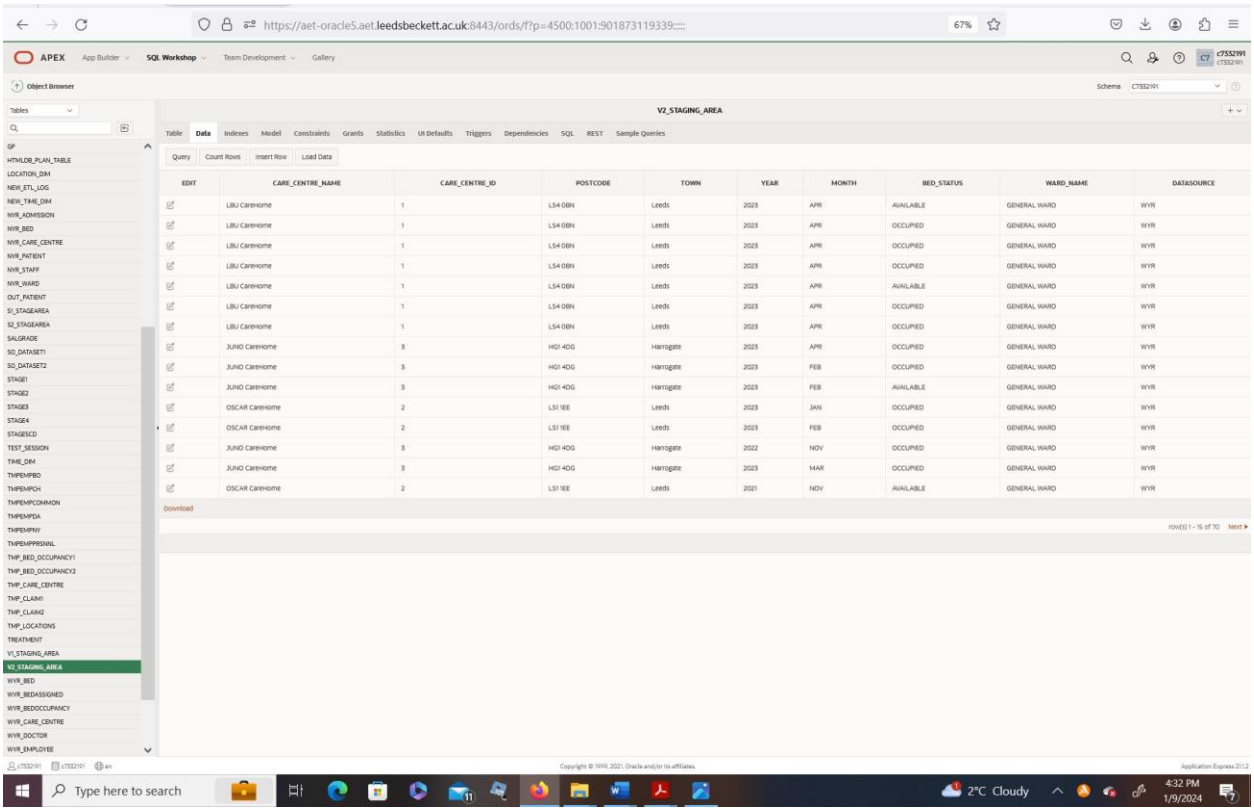
An ETL log was created to log in changes made in the data, created a trigger and NEW_ETL_LOG





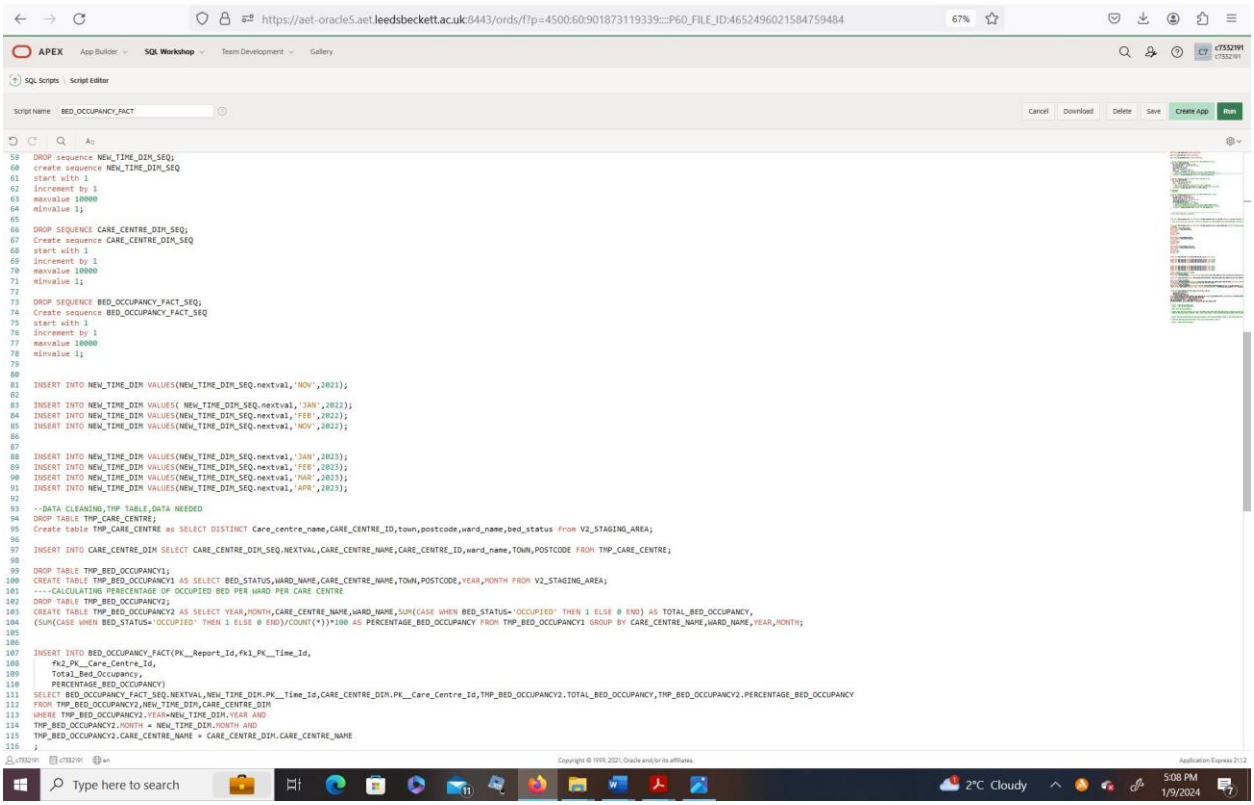
Transformation was done on the New_Admission_Date to extract Month and Year into separate columns and created a V2_Staging_Area .



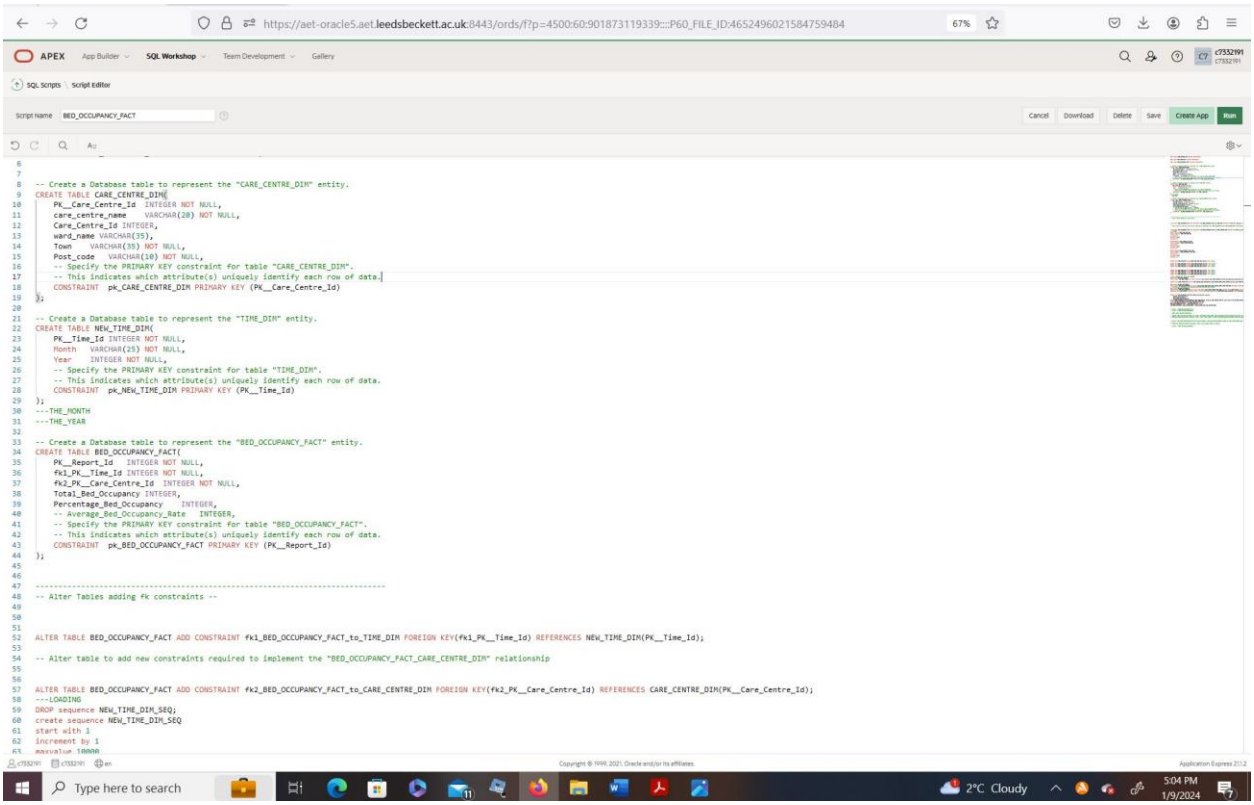


LOADING AND TEMPORAL TABLE

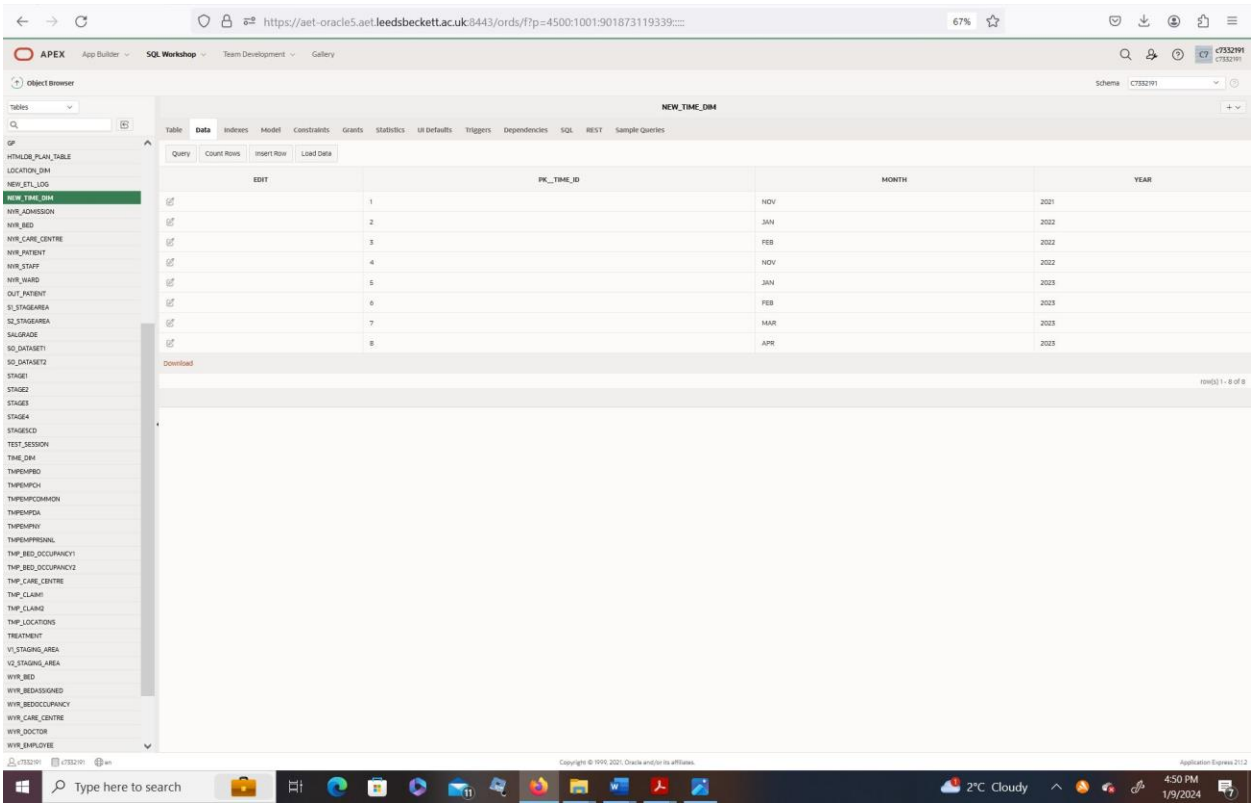
The loading phase of this ETL process would involve populating the dimension table(Time dimension), the fact table(Bed_Occupancy_fact),the surrogate keys are defined, the measures in the fact table would be calculated, sequences created, temporal table would be created, and insertion into the bed_occupancy_fact.



```
DROP sequence NEW_TIME_DIM_SEQ;
create sequence NEW_TIME_DIM_SEQ
start with 1
increment by 1
maxvalue 10000
minvalue 1;

DROP SEQUENCE CARE_CENTRE_DIM_SEQ;
Create sequence CARE_CENTRE_DIM_SEQ
start with 1
increment by 1
maxvalue 10000
minvalue 1;

DROP SEQUENCE BED_OCCUPANCY_FACT_SEQ;
Create sequence BED_OCCUPANCY_FACT_SEQ
start with 1
increment by 1
maxvalue 10000
minvalue 1;


INSERT INTO NEW_TIME_DIM VALUES(NEW_TIME_DIM_SEQ.nextval,'NOV',2021);

INSERT INTO NEW_TIME_DIM VALUES( NEW_TIME_DIM_SEQ.nextval,'JAN',2022);
INSERT INTO NEW_TIME_DIM VALUES(NEW_TIME_DIM_SEQ.nextval,'FEB',2022);
INSERT INTO NEW_TIME_DIM VALUES(NEW_TIME_DIM_SEQ.nextval,'NOV',2022);


INSERT INTO NEW_TIME_DIM VALUES(NEW_TIME_DIM_SEQ.nextval,'JAN',2023);
INSERT INTO NEW_TIME_DIM VALUES(NEW_TIME_DIM_SEQ.nextval,'FEB',2023);
INSERT INTO NEW_TIME_DIM VALUES(NEW_TIME_DIM_SEQ.nextval,'MAR',2023);
INSERT INTO NEW_TIME_DIM VALUES(NEW_TIME_DIM_SEQ.nextval,'APR',2023);

--DATA CLEANING,TMP TABLE,DATA NEEDED
DROP TABLE TMP_CARE_CENTRE;
Create table TMP_CARE_CENTRE as SELECT DISTINCT Care_centre_name,CARE_CENTRE_ID,town,postcode,ward_name,bed_status from V2_STAGING_AREA;

INSERT INTO CARE_CENTRE_DIM SELECT CARE_CENTRE_DIM_SEQ.NEXTVAL,CARE_CENTRE_NAME,CARE_CENTRE_ID,ward_name,TOWN,POSTCODE FROM TMP_CARE_CENTRE;

DROP TABLE TMP_BED_OCCUPANCY1;
CREATE TABLE TMP_BED_OCCUPANCY1 AS SELECT BED_STATUS,WARD_NAME,CARE_CENTRE_NAME,TOWN,POSTCODE,YEAR,MONTH FROM V2_STAGING_AREA;
----CALCULATING PERECENTAGE OF OCCUPIED BED PER WARD PER CARE CENTRE
DROP TABLE TMP_BED_OCCUPANCY2;
CREATE TABLE TMP_BED_OCCUPANCY2 AS SELECT YEAR,MONTH,CARE_CENTRE_NAME,WARD_NAME,SUM(CASE WHEN BED_STATUS='OCCUPIED' THEN 1 ELSE 0 END) AS TOTAL_BED_OCCUPANCY,
(SUM(CASE WHEN BED_STATUS='OCCUPIED' THEN 1 ELSE 0 END)/COUNT(*))*100 AS PERCENTAGE_BED_OCCUPANCY FROM TMP_BED_OCCUPANCY1 GROUP BY CARE_CENTRE_NAME,WARD_NAME,YEAR,MONTH;


INSERT INTO BED_OCCUPANCY_FACT(PK__Report_Id,fk1_PK__Time_Id,
    fk2_PK__Care_Centre_Id,
    Total_Bed_Occupancy,
    PERCENTAGE_BED_OCCUPANCY)
SELECT BED_OCCUPANCY_FACT_SEQ.NEXTVAL,NEW_TIME_DIM.PK__Time_Id,CARE_CENTRE_DIM.PK__Care_Centre_Id,TMP_BED_OCCUPANCY2.TOTAL_BED_OCCUPANCY,TMP_BED_OCCUPANCY2.PERCENTAGE_BED_OCCUPANCY
FROM TMP_BED_OCCUPANCY2,NEW_TIME_DIM,CARE_CENTRE_DIM
WHERE TMP_BED_OCCUPANCY2.YEAR=NEW_TIME_DIM.YEAR AND
TMP_BED_OCCUPANCY2.MONTH = NEW_TIME_DIM.MONTH AND
TMP_BED_OCCUPANCY2.CARE_CENTRE_NAME = CARE_CENTRE_DIM.CARE_CENTRE_NAME
;
```



```
-- Create a Database table to represent the "CARE_CENTRE_DIM" entity.
CREATE TABLE CARE_CENTRE_DIM(
    PK__Care_Centre_Id  INTEGER NOT NULL,
    care_centre_name    VARCHAR(20) NOT NULL,
    Care_Centre_Id INTEGER,
    ward_name VARCHAR(35),
    Town     VARCHAR(35) NOT NULL,
    Post_code   VARCHAR(10) NOT NULL,
    -- Specify the PRIMARY KEY constraint for table "CARE_CENTRE_DIM".
    -- This indicates which attribute(s) uniquely identify each row of data.
    CONSTRAINT  pk_CARE_CENTRE_DIM PRIMARY KEY (PK__Care_Centre_Id)
);

-- Create a Database table to represent the "TIME_DIM" entity.
CREATE TABLE NEW_TIME_DIM(
    PK__Time_Id INTEGER NOT NULL,
    Month    VARCHAR(25) NOT NULL,
    Year     INTEGER NOT NULL,
    -- Specify the PRIMARY KEY constraint for table "TIME_DIM".
    -- This indicates which attribute(s) uniquely identify each row of data.
    CONSTRAINT  pk_NEW_TIME_DIM PRIMARY KEY (PK__Time_Id)
);
---THE_MONTH
---THE_YEAR

-- Create a Database table to represent the "BED_OCCUPANCY_FACT" entity.
CREATE TABLE BED_OCCUPANCY_FACT(
    PK__Report_Id   INTEGER NOT NULL,
    fk1_PK__Time_Id INTEGER NOT NULL,
    fk2_PK__Care_Centre_Id  INTEGER NOT NULL,
    Total_Bed_Occupancy INTEGER,
    Percentage_Bed_Occupancy    INTEGER,
    -- Average_Bed_Occupancy_Rate   INTEGER,
    -- Specify the PRIMARY KEY constraint for table "BED_OCCUPANCY_FACT".
    -- This indicates which attribute(s) uniquely identify each row of data.
    CONSTRAINT  pk_BED_OCCUPANCY_FACT PRIMARY KEY (PK__Report_Id)
);


-----------------------------------------------------------------------------
-- Alter Tables adding fk constraints --


ALTER TABLE BED_OCCUPANCY_FACT ADD CONSTRAINT fk1_BED_OCCUPANCY_FACT_to_TIME_DIM FOREIGN KEY(fk1_PK__Time_Id) REFERENCES NEW_TIME_DIM(PK__Time_Id);

-- Alter table to add new constraints required to implement the "BED_OCCUPANCY_FACT_CARE_CENTRE_DIM" relationship


ALTER TABLE BED_OCCUPANCY_FACT ADD CONSTRAINT fk2_BED_OCCUPANCY_FACT_to_CARE_CENTRE_DIM FOREIGN KEY(fk2_PK__Care_Centre_Id) REFERENCES CARE_CENTRE_DIM(PK__Care_Centre_Id);
---LOADING
DROP sequence NEW_TIME_DIM_SEQ;
create sequence NEW_TIME_DIM_SEQ
start with 1
increment by 1
maxvalue 10000
```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APEX
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NEW_TIME_DIM
Table
Data
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Triggers
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SQL
REST
Sample Queries
Query
Count Rows
Insert Row
Load Data
EDIT
PK_TIME_ID
MONTH
YEAR
1 NOV 2021
2 JAN 2022
3 FEB 2022
4 NOV 2022
5 JAN 2023
6 FEB 2023
7 MAR 2023
8 APR 2023
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GP
HTMLDB_PLAN_TABLE
LOCATION_DIM
NEW_ETL_LOG
NEW_TIME_DIM
NYR_ADMISSION
NYR_BED
NYR_CARE_CENTRE
NYR_PATIENT
NYR_STAFF
NYR_WARD
OUT_PATIENT
S1_STAGEAREA
S2_STAGEAREA
SALGRADE
SO_DATASET1
SO_DATASET2
STAGE1
STAGE2
STAGE3
STAGE4
STAGESCD
TEST_SESSION
TIME_DIM
TMPEMPBO
TMPEMPCH
TMPEMPCOMMON
TMPEMPDA
TMPEMPNY
TMPEMPRISNNL
TMP_BED_OCCUPANCY1
TMP_BED_OCCUPANCY2
TMP_CARE_CENTRE
TMP_CLAIM1
TMP_CLAIM2
TMP_LOCATIONS
TREATMENT
V1_STAGING_AREA
V2_STAGING_AREA
WYR_BED
WYR_BEDASSIGNED
WYR_BEDOCCUPANCY
WYR_CARE_CENTRE
WYR_DOCTOR
WYR_EMPLOYEE
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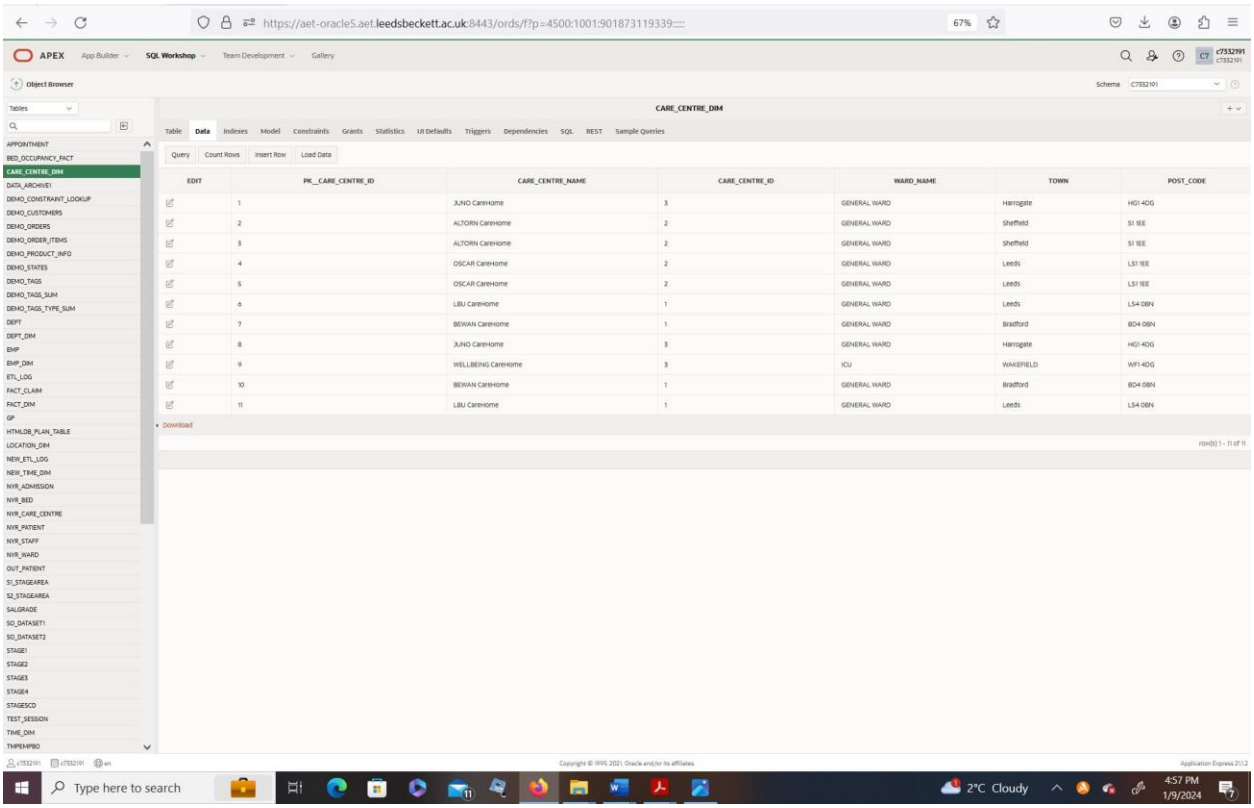
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CARE_CENTRE_DIM
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Statistics
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Triggers
Dependencies
SQL
REST
Sample Queries
Query
Count Rows
Insert Row
Load Data
EDIT
PK_CARE_CENTRE_ID
CARE_CENTRE_NAME
CARE_CENTRE_ID
WARD_NAME
TOWN
POST_CODE
1 JUNO CareHome 3 GENERAL WARD Harrogate HG1 4DG
2 ALTORN CareHome 2 GENERAL WARD Sheffield S1 1EE
3 ALTORN CareHome 2 GENERAL WARD Sheffield S1 1EE
4 OSCAR CareHome 2 GENERAL WARD Leeds LS1 1EE
5 OSCAR CareHome 2 GENERAL WARD Leeds LS1 1EE
6 LBU CareHome 1 GENERAL WARD Leeds LS4 0BN
7 BEWAN CareHome 1 GENERAL WARD Bradford BD4 0BN
8 JUNO CareHome 3 GENERAL WARD Harrogate HG1 4DG
9 WELLBEING CareHome 3 ICU WAKEFIELD WF1 4DG
10 BEWAN CareHome 1 GENERAL WARD Bradford BD4 0BN
11 LBU CareHome 1 GENERAL WARD Leeds LS4 0BN
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APPOINTMENT
BED_OCCUPANCY_FACT
CARE_CENTRE_DIM
DATA_ARCHIVE1
DEMO_CONSTRAINT_LOOKUP
DEMO_CUSTOMERS
DEMO_ORDERS
DEMO_ORDER_ITEMS
DEMO_PRODUCT_INFO
DEMO_STATES
DEMO_TAGS
DEMO_TAGS_SUM
DEMO_TAGS_TYPE_SUM
DEPT
DEPT_DIM
EMP
EMP_DIM
ETL_LOG
FACT_CLAIM
FACT_DIM
GP
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LOCATION_DIM
NEW_ETL_LOG
NEW_TIME_DIM
NYR_ADMISSION
NYR_BED
NYR_CARE_CENTRE
NYR_PATIENT
NYR_STAFF
NYR_WARD
OUT_PATIENT
S1_STAGEAREA
S2_STAGEAREA
SALGRADE
SO_DATASET1
SO_DATASET2
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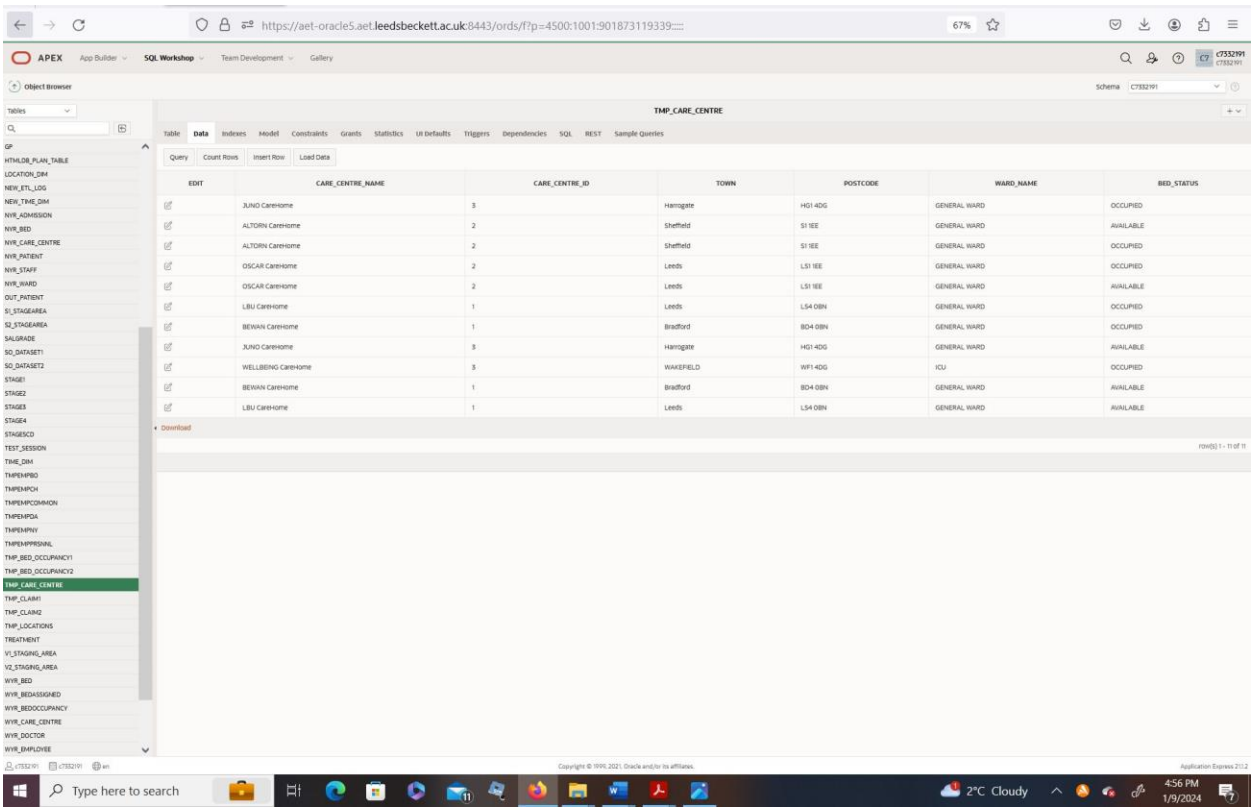
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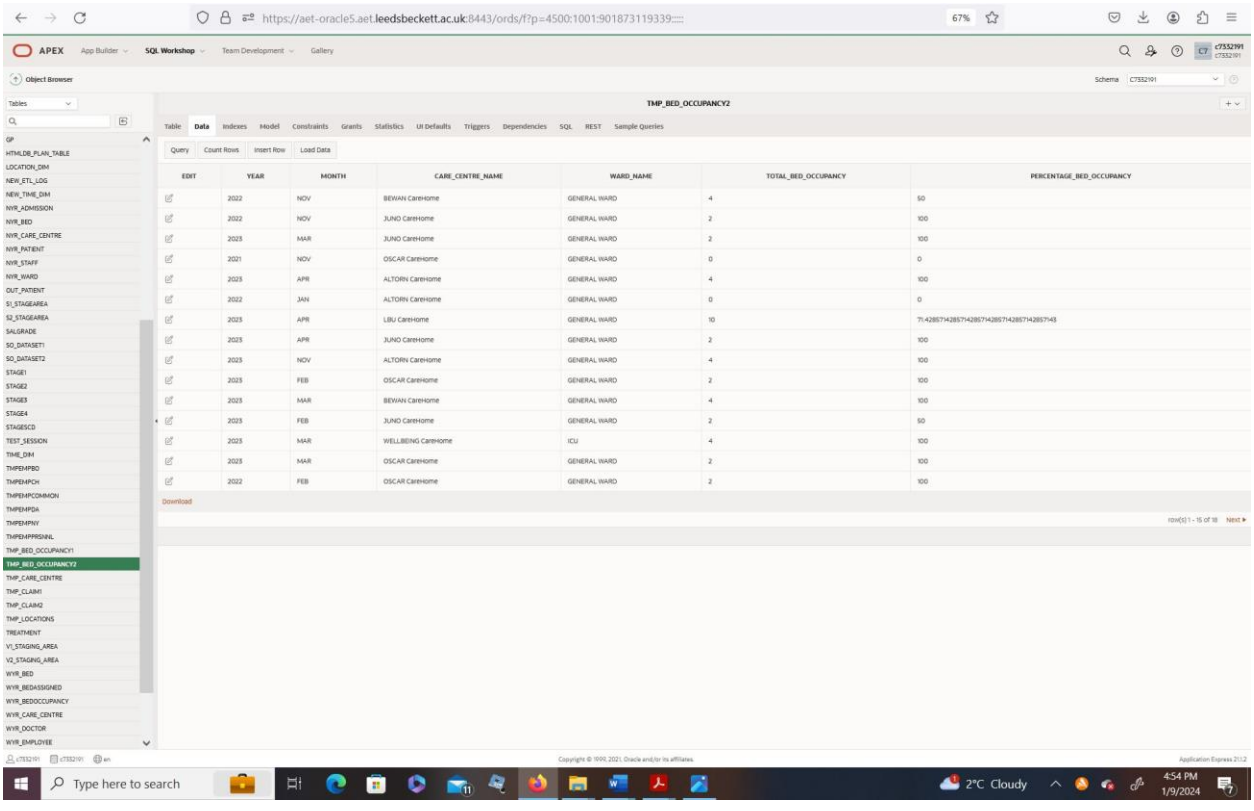
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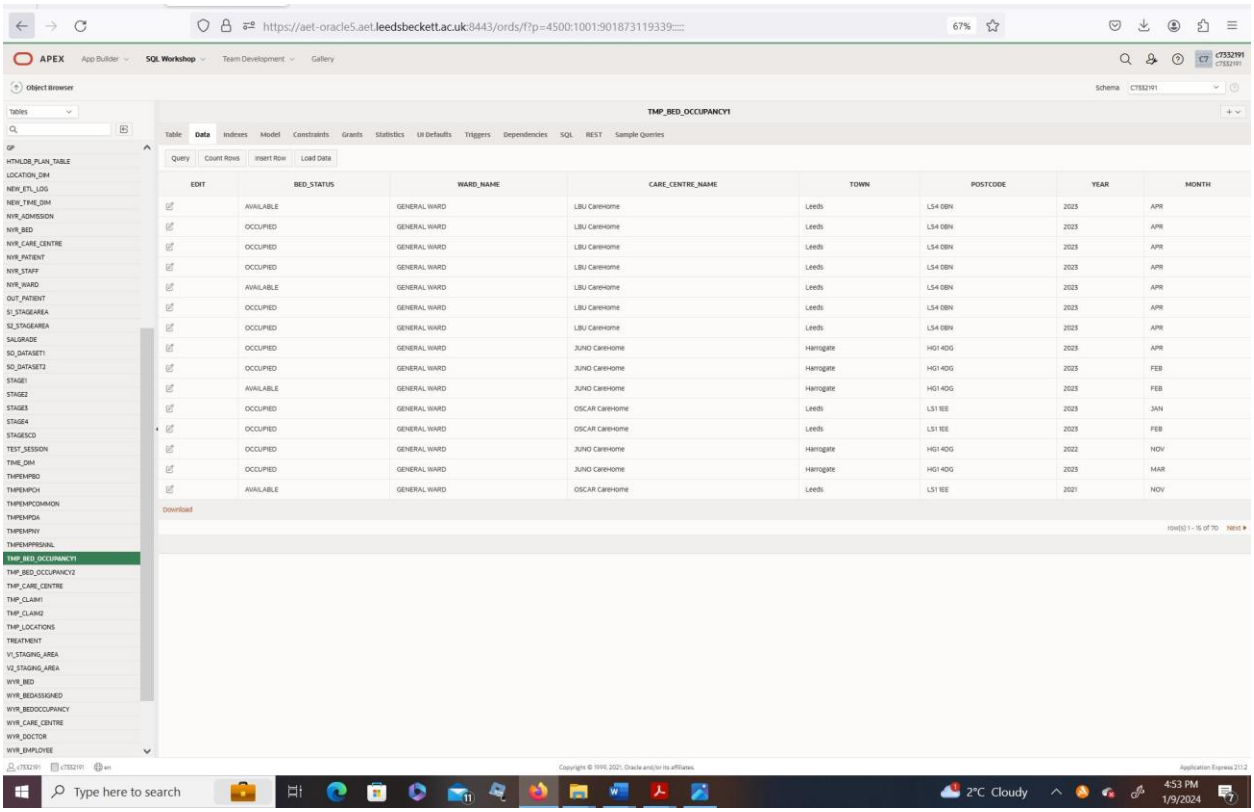
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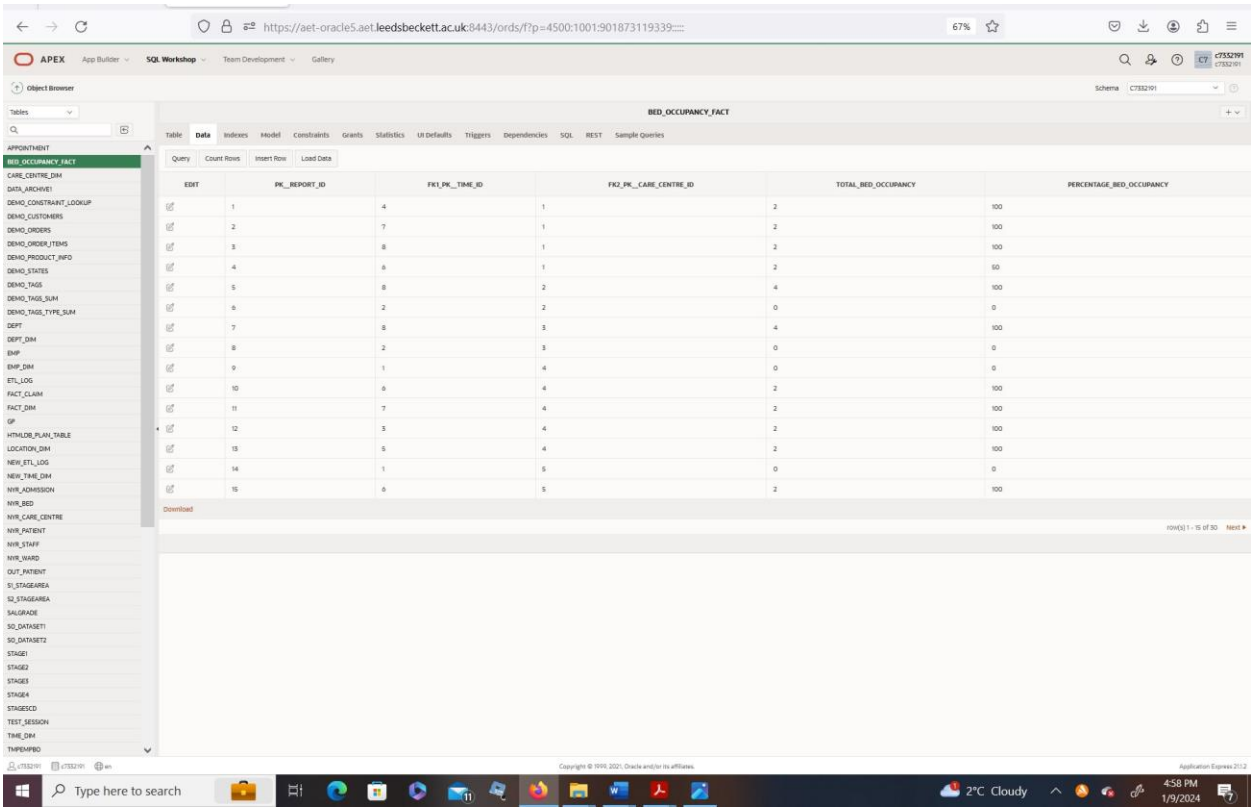


Further discussion: I insert into New_Time_Dim sequence,month and year individually ,progressed to create a Temporal Care Centre using Distinct to select columns ensuring no duplicate values are inserted from the V2_Staging_Area.I inserted from the TMP_CARE_CENTRE INTO THE CARE_CENTRE_DIM,created the TMP_BEDOCCUPANCY1 AND TMP_BEDOCCUPANCY2,performed the calculations for percentage of bed occupied per ward per carehome and total bed occupied per ward per carehome and loaded into the star schema.

The Slowing Changing Dimension suitable for maintenance would be the type 2 slowing dimension where both the old and the new record would be present in the Care_centre_dimension. The new added column would contain its primary key and effective date column would also be present.

TASK 2-OLAP

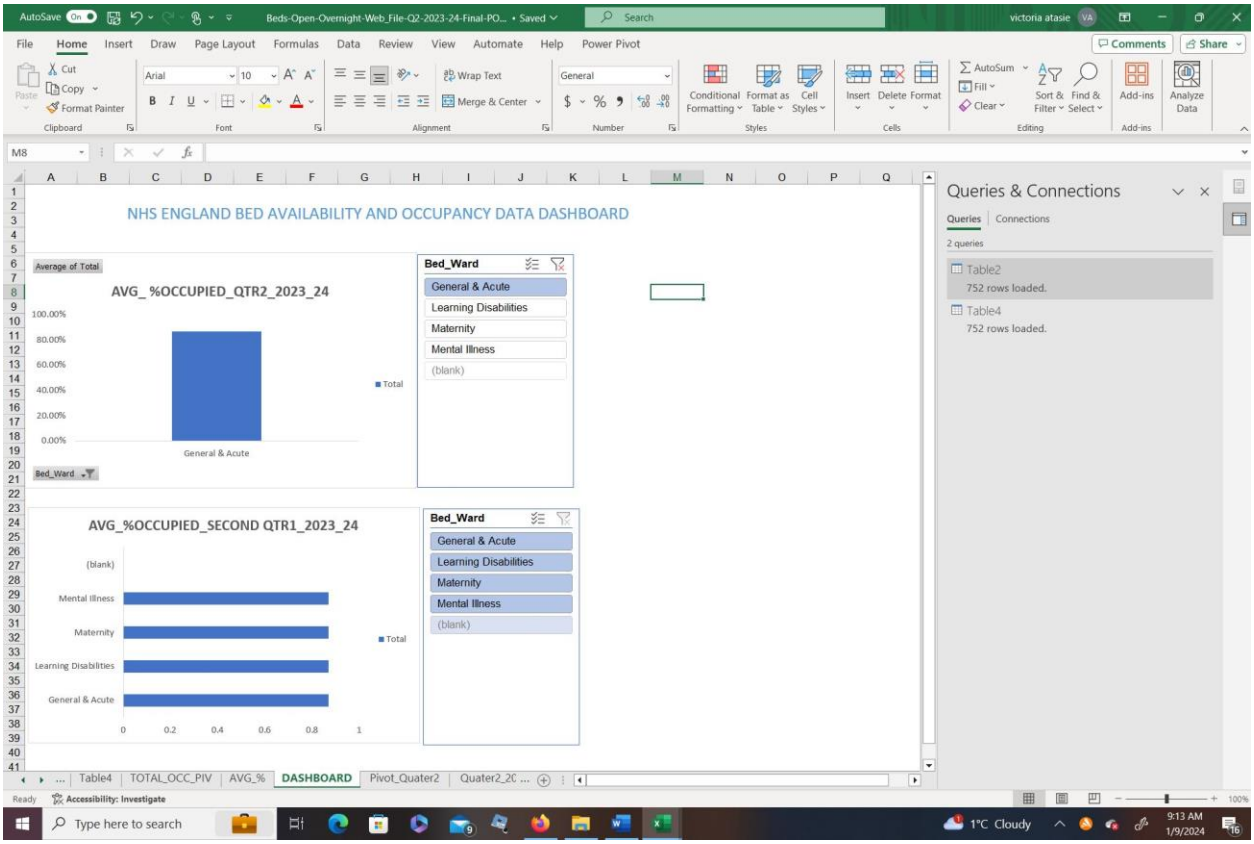
Business Intelligence (BI) Systems depends on “integrated, consistent and certified information repository “referred as the Data Warehouse (D W) that is updated regularly with day-to-day operations of an organisation. In decision making process the data that are analyzed are stored in the data warehouse in multidimensional cubes and the cubes are queried by the decision makers which correspond to the online analytical processing paradigms (Djiroun, R. et al.,2019)

Data warehousing and On-Line analytical processing (OLAP) are considered important elements of decision-making processes and had continuously become a relevant centre of attention in the database industry (Chaudhuri, S. and Dayal, U., 1997). The Online Analytical Processing tool enables decision-making by granting it users the chance to analyse huge amount of historical data using the roll-up or drill down operations. This requires a hierarchical order to make ready automatic calculations although there are different kind of compound hierarchies evolving in the real world are not resolved with online analytical processing implementation (Malinowski, E. and Zimányi, E., 2004).

The additional dataset for NHS Bed Availability and Occupancy Data would be used visualizing the NHS organization in England, Quarter 1 and Quarter 2 for the average percentage of bed occupancy.

Power query, Pivot table and Pivot chart in Excel were used to make visualizations.

The Column and Bar Chart where preferred for visualizing the average percentage bed occupied for each quarter to compare the related categories and a slicer was inserted.


NHS ENGLAND BED AVAILABILITY AND OCCUPANCY DATA DASHBOARD
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TASK 3: FINDINGS AND REFELECTION, SOCIAL AND ETHICAL IMPLICATIONS, DATA GOVERNANCE, AND AS A DATA SCIENTIST

(Choice of the implementation for the centralised db solution, reconsider other options)

The choice of implementing the centralised database solution as a BI consultant that would resolve the issues associated with integrating data from the West Yorkshire and North Yorkshire health and social care datasets revolves around creating a comprehensive and real time view of the bed occupancy rate, optimizing allocation of bed resources to meet patient's needs and assist the business owner in making better data driven decision in the provision of quality care, enhance their business reputation and increase demand for care home services.

In considering the findings, some care homes in the North Yorkshire and West Yorkshire care homes may be experiencing a high level of bed occupancy rate and a lack of bed availability can have its consequences in the health and social care sector. The findings involve the business objectives such as the effectiveness of care homes, the optimization and utilization of beds leading to high bed occupancy rates and whilst minimizing the possible bed vacancy, improving quality of care, an effective cost of managing resources allocation with the rate of bed occupancy ensuring a reduction in expenses and enhancing patients' satisfaction whilst creating positive satisfaction and long-term occupancy.

The identification of the business stakeholder, which is the business owner, would also ensure that the implementation of the centralized database solution meets the needs of the business.

The methodology and processes in implementing the centralized database solution would follow the Kimball lifecycle approach in planning which includes setting the framework of managing the project, defining the scope and objectives of the implementation of the database solution. The business requirements would be identified such as the key performance indicators and various factors that affects the business needs, the identification of useful technology to aid the process, designing a dimensional model that relates to the business requirements and measures such as star schemas and based on the dimensional model created , extraction of data from multiple sources, cleaning the data ensuring data integrity and perform transformation and loading (ETL)processes would be considered, business intelligence reports would be implemented, deployment and continuous maintenance would be considered in the implementation of the database solution(Kimball, R et al.,2008)

The architecture considered as the most appropriate to implement for case study organization is the Three-tier Architecture and Dependent DataMart. The advantage of considering the three-tier architecture includes the separating of Datawarehouse, application server and the client layers contributing performance optimization, enabling multi-dimensional database analysis of data and presentation to provide insights for a better decision making (Efraim Turban,2011).The

dependent DataMart incorporate the use of the single enterprise-wide data model as a concept whilst the end user views the same data which can promote consistency(Efraim Turban,2011).

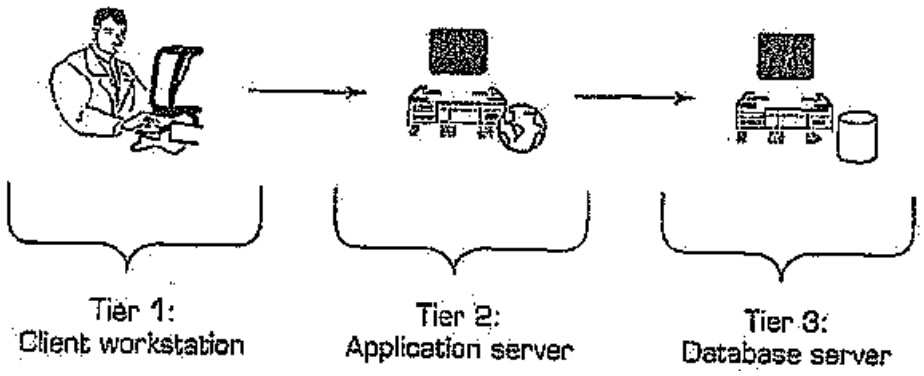


Figure: Three Tier Architecture Data Warehouse (Source: From Decision Support and Business Intelligence System -Efraim Turban)

In conclusion, considering other options would be a centralized data warehouse architecture. The centralized data warehouse architecture creates access to users to every data in the warehouse rather than limiting to DataMart only and can also assist in data management and administrative procedures. (Efraim Turban,2011)

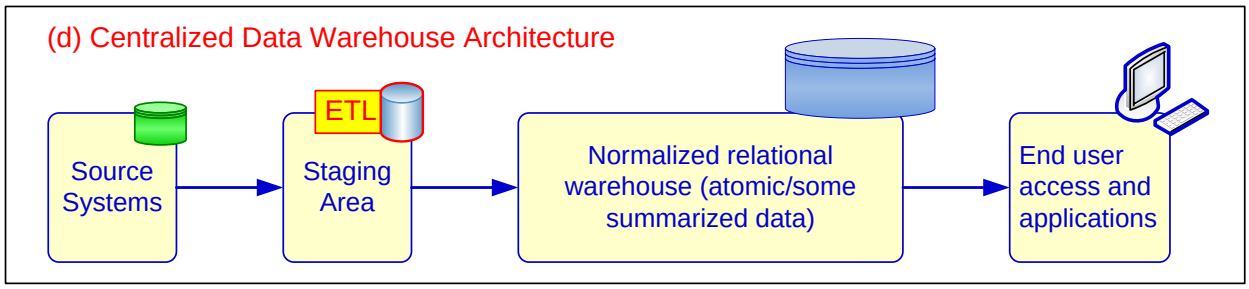


Figure : Centralized Data Warehouse Architecture (Source: The DW Design and Architecture Slides)

SOCIAL AND ETHICAL IMPLICATIONS AND ROLE OF GOVERNANCE

In a data driven world, developing a database solution is as important as considering social and ethical issues, data governance associated with the implementation and data privacy should be considered in data collection. Floridi, L. and Taddeo, M. (2016) highlights that data ethics involves various ethical issues in the collection or gathering and vast number of datasets for analyses.

Evaluating the current and potential social and ethical implications around the implementation of the centralised system and the role of data governance in the health sector that is associated with care of patients, occupancy of bed can be seen from the aspect of privacy issues with the health and social dataset of the case study organization. The privacy and protection of sensitive data is paramount with patient whilst maintaining trust with their private information such as patient's names, details of health conditions, the particular ward/care home that patients resides and so on. The PAPA framework Mason 1986 emphasizes the four ethical issues in society which are "privacy, accuracy, property and accessibility "(Young, J.et al.,2020). The privacy of the PAPA framework highlights what information of individual can be reviewed to other people, how can individual privacy can be protected, what information can individuals make private to themselves .Accuracy was stressed on ensuring how accurate information are utilized and the error consequences associated with it, Property emphasis on ownership of the information, how appropriate is it for information to be trade off ,accessibility highlights on what information is accessible and obtainable((Mason, 1986).Relating PAPA framework in the implementation of the database solution privacy policies ,obtaining consents ,creating encryption would be considered to protect various identities in the datasets. Data validation to address inaccurate data that might affect better decisions, information ownership of health and social datasets would be adhere to, gaining authorized access to enable protection over information that are sensitive and ensuring that health and social carers can have access to system data following ethical standards.

Big PAPA which stands as an extension of the PAPA framework addressing issues with data in term of "behavioral surveillance, interpretation, and governance" on how individuals can be aware before sharing vital information, how ethical issues associated with data be controlled, how can substandard analysis be identified (Young, J.et al.,2020).The BigPAPA concept relating to the implementation of the centralised database solution which involves data of health and social care, ethical considerations would be put in place to address security issues and data are analysed properly and its advantages are distributed among involved parties.

In conclusion the EU General Data Protection Regulation (GDPR) which took effect in May 2018, is stated to be important to every organisation which regulates how personal data is stored, collected, and processed (Gruschka, N.et al 2018) The centralised data store should comply with the GDPR regulations ensuring individual data are protected. According to Freeman, R.et al., (2018), the theory of stakeholder involves stakeholders as group of individuals who affects or have impacts in the various activities of an organization. The major stakeholder here is the business owner and other stakeholders' interest should be considered in the ethical considerations, constant engagement and addressing issues in the implementation of the database solution.

Reflect upon your own understanding of the importance as a data scientist.

I recognize the importance as a data scientist in contributing to the decision-making processes and considering social and ethical implications and the role of governance. Data Science creates

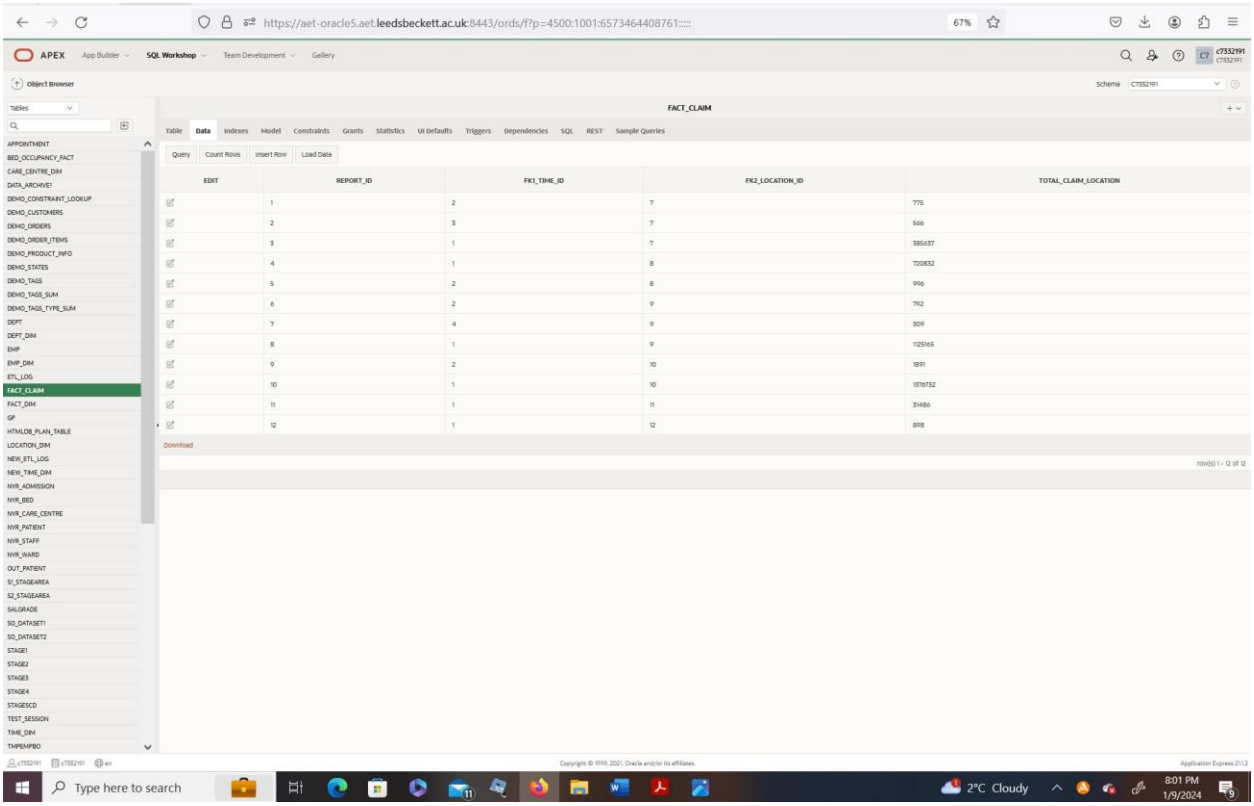
a vast opportunity in improving public and private lives and social environments as well, there is an increasing utilisation of data of recent which can be associated with its ethical issues. These issues can be resolved properly as data science advances. It should be done to protect human rights and not considering ethical issues may result in negative implications and social exclusion (Floridi, L. and Taddeo, M., 2016). Adhering to ethical standards in considering data privacy, maintaining integrity, fairness and transparency is imperative and it's an ethical obligation as a data scientist to implement security measures to protect sensitive data to avoid the consequences of breaching individual privacy.

A substandard data quality can liable have an essential social and economic effects (Wang, R et al.,1996) The importance of data governance practice can assist in ensuring data is secure, conducting quality checks to maintain data accuracy, consistency, and data validations. This practice can help organisations maintain data integrity, correctness, and accuracy of data in their database, addressing bias which can lead to excellent analytical results and better decision-making. Compliance with the general data protection regulation GDPR that secure and protect personal data is an important practice. Stakeholder engagement and regulatory bodies are important in understanding the use of data which would help ensure database solutions adhere to ethical standards.

In conclusion, the importance of identifying social and ethical issues, considering data governance is of great importance when implementing a centralised database solution for the case study organization as a data scientist or business intelligence consultant by ensuring that organization make careful consideration related to ethical issues and data scientist or IT personnel and everyone in the organization ensure that data is always protected and secured.

TASK 4:

EVIDENCE OF COMPLETED TUTORIAL ON DM DESIGN AND IMPLENTATION



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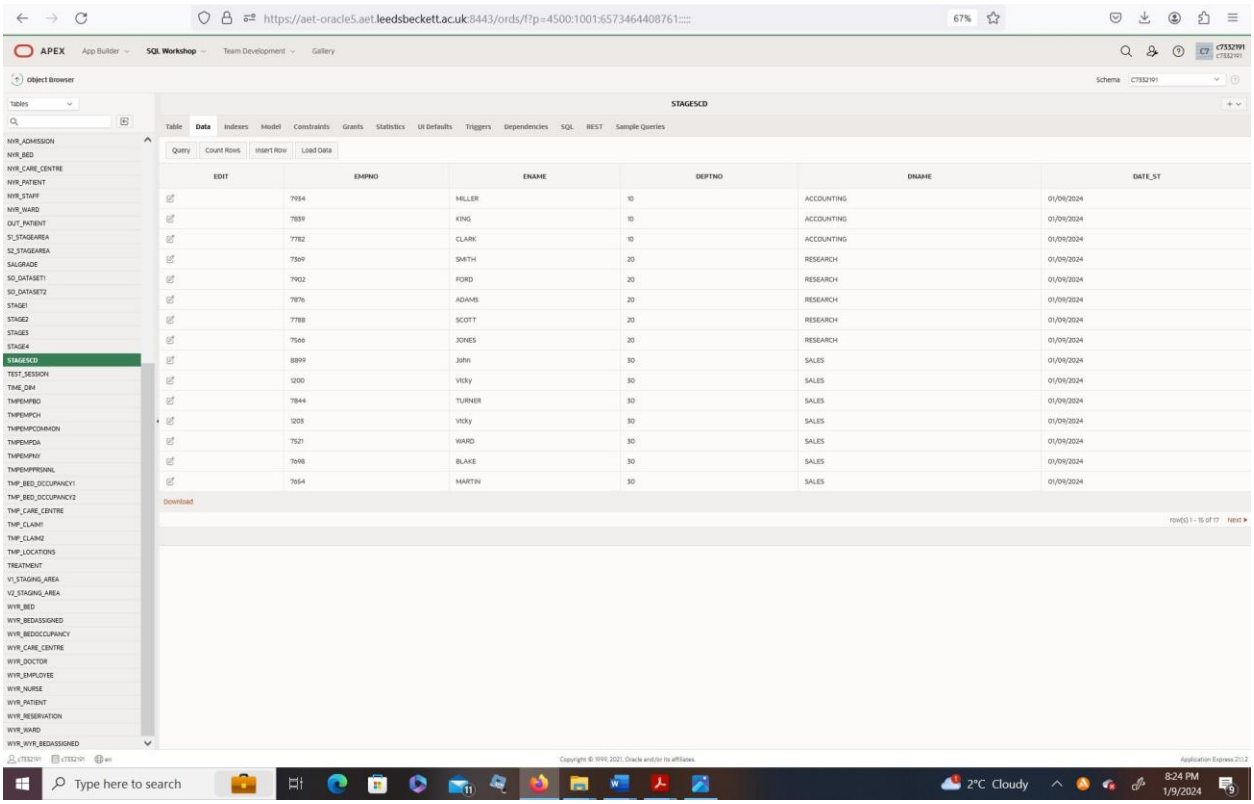
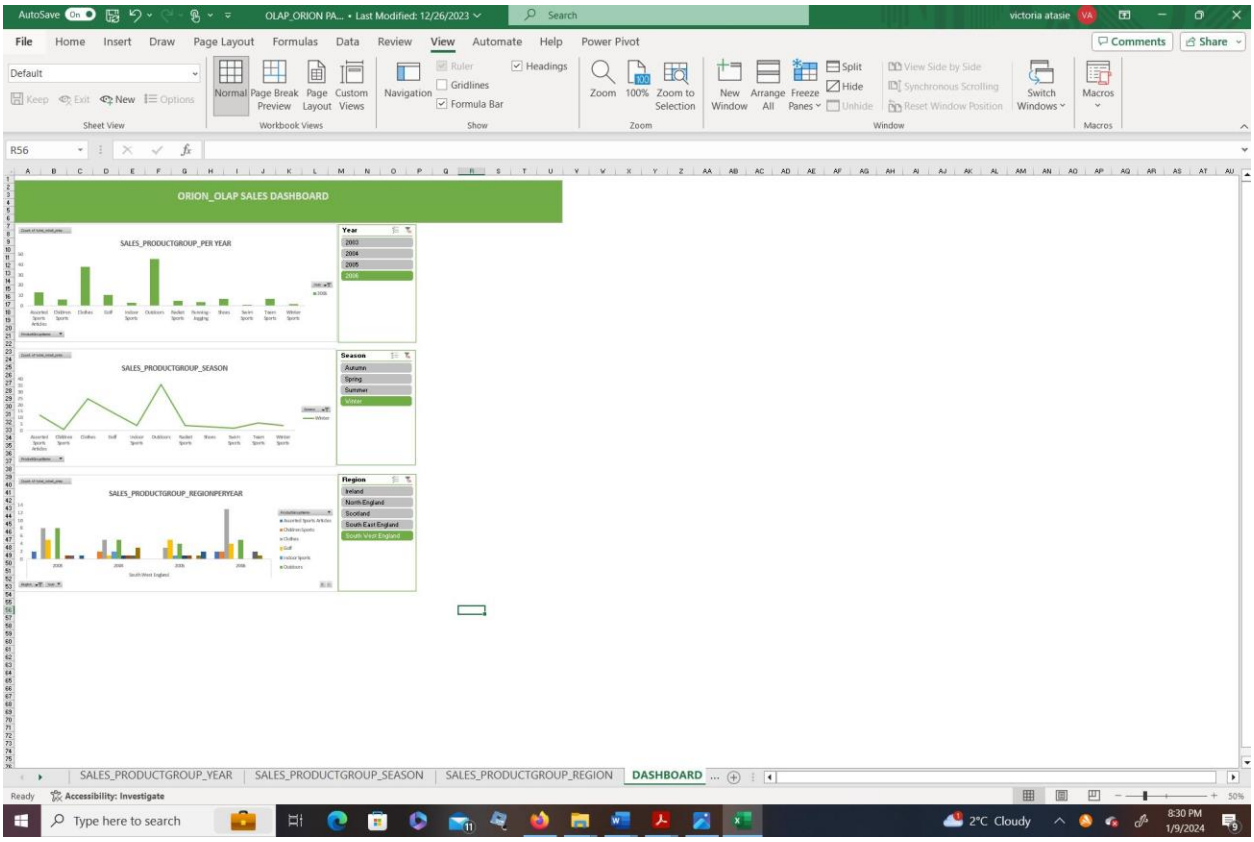


EVIDENCE OF COMPLETED TUTORIAL ON OLAP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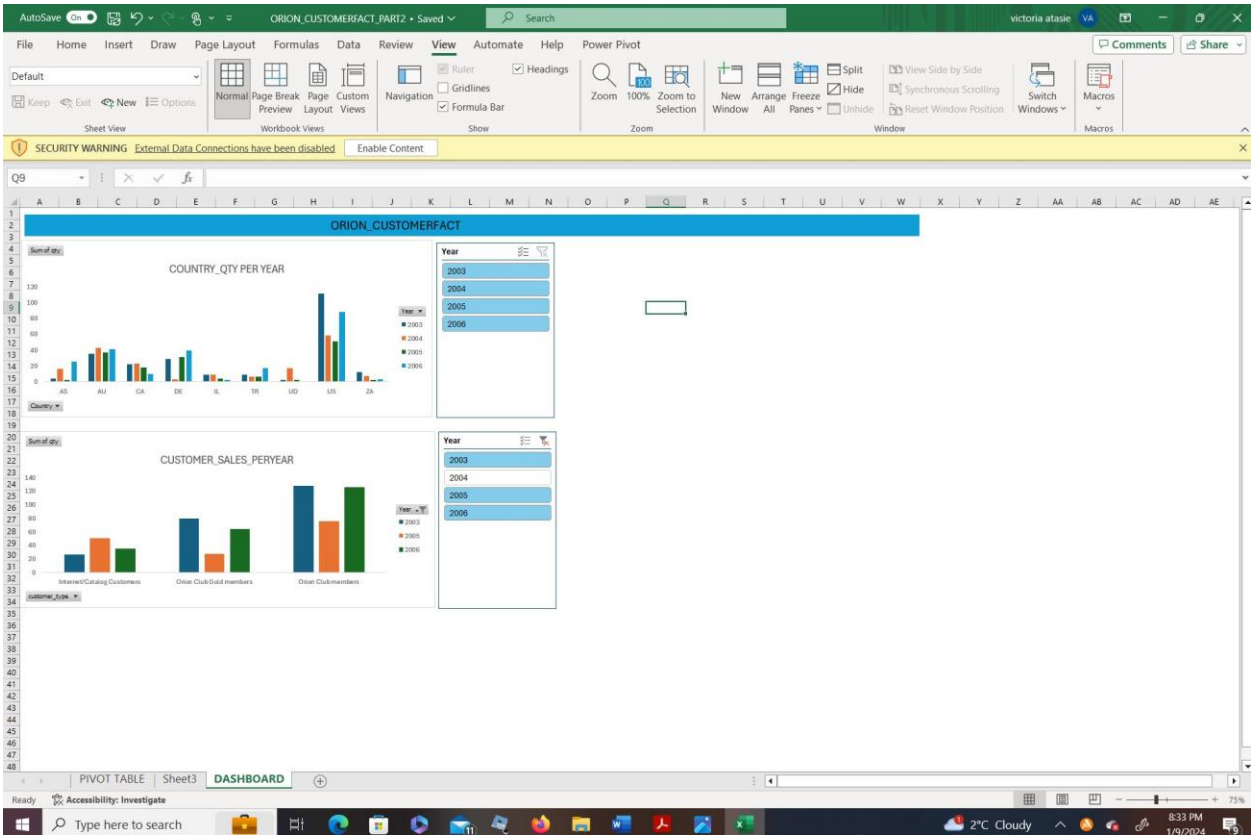

BIG PAPA FRAMEWORK PAPER

The Big PAPA paper emphasizes on the Richard Mason's in the 1986 as regards the Papa schema that was provided for the four possible ethical concerns that included "privacy, accuracy, property and accessibility "shorten to PAPA(Young, J.et al.,2020).In addition to the previously stated four possible ethical concerns ,three more ethical concerns was included as an expansion to the PAPA schema for big data which are viably associated to the initial Manson's PAPA schema that includes governing ,behavioural monitoring and the interpretation which lead to the founding of BIG PAPA.
Young, J.et al.(2020)stated that the importance of considering ethical issues as related to big data and not disregarding the Mason initial framework as they are useful for research and practice .

Mason's PAPA Framework discussed the major four aspects of concerns which are privacy, accuracy, property, and accessibility.

Mason's discussion on privacy focuses on the idea that every individual should be free from disclosing their private information to others. Florida legislature's effort was cited to investigate vacant properties and for the Chicago computer centres to investigate employee debts as two

instances of issues with privacy. Mason proceeded to discuss the risk of divulging information without authorization by users and stated that information can be abused which can be used for blackmailing and encouraged the value of privacy and security of personal data (Young, J.et al.,2020)

Mason emphasized how imperative it is for information to be accurate involving large datasets in processes of transaction and forecasting weather. The consequence of the error was highlighted in a situation of bank refuse to accept mortgage payment because of computer system not displaying it being paid for. Mason stated that information systems require proper development and testing to avoid mistakes reoccurring (Young, J.et al.,2020)

Property was stated focuses on artificial intelligence and communication bandwidth that revolves about extracting human thought and creativity whilst incorporating it into machines. Accessibility was stated to be essential for organization and individual, literacy, Intellectual skills, technology, and information. Mason talks about the necessity of accessing stored information in modern databases (Young, J.et al.,2020)

The BIG aspect of the PAPA on the seven(7) issues such as "Behavioural surveillance, Interpretation, Governance, Privacy, Accessibility, Accuracy, Property "that contributed to the founding of Big PAPA ,the societal impact of Big Data with relative questions such how can a person's freedom be protected when there is a monitoring of behaviour, how can people be aware of analysis that is substandard ,what restriction are available for issues associated with big data, how can information be detected as being accurate, who take ownership of transmission of information ,how accessible is information allowed for companies or individuals that requires them and many others questions(Young, J.et al.,2020)

"Behavioural surveillance" can have effects on behaviour which can expose the activities such location, interaction, and communication of individuals (Lashmar, 2017; Richards, 2012; Stoycheff,2016)

"Interpretation" was based on the importance of avoiding models that are defective because of inaccurate or insufficient data, reducing the possibility of incorrect conclusions and educating others to identify analyses that are substandard. (Young, J.et al.,2020)

According to Smith, Milberg, & Burke (1996), "Governance" involves making sure procedures are available to deal with ethical issues. People should also be shieled from unethical behaviour (Mason,1986)

Conclusively, the Paper emphasized the consideration of the advancement of modern technology such as social media platforms, artificial intelligence and prediction, health electronic records, personal computer, smartphones, search engines with respect to the Mason 'Papa published in 1986 and its impact on data in deriving information (Young, J.et al.,2020)

SIX PROVOCATIONS FOR BIG DATA

The six provocations can be related to the potential issues as regards the current development of Artificial Intelligence impact on the society is stated below:

1.Automating Research Changes the Definition of Knowledge:

Henry Ford created a mass production of systems for manufacturing with expert machines and goods of standards in the 20th century which led to the dominance of assembly lines and automation accepted in manufacturing industries (Baca 2004). Big Data was described as a huge amount of data and analysing it with the required tools and in computerized ways in research and thoughts (Burkholder 1992). Big Data created a thorough way of how we envision, offering an unheard-of breadth, depth, scale in research (Lazer et al,2009). "Petabyte Age" was praised by Chris Anderson, who stated that the enormous amount of data and mathematics have replaced the possibility of other tools (Anderson, C. 2008)

It is imperative to take note of the inherent shortcomings of machines and how they can possibly alter the definition of learning, new opportunities, and constraints of the systems (Boyd, D. and Crawford, K., 2011). Related issues in the development of Artificial Intelligence can be envisaged in the aspect of the algorithms of machine learning aiding analysis of data and decisions.

2.Claims to Objectivity and Accuracy are Misleading and Bigger Data are Not Always Better (3)

The problem with the assumption that utilizing Big Data will always produce accurate results. It draws attention to how the opinion of working with Big Data can be when handling data from social media (Boyd, D. and Crawford, K., 2011). Bigger data are not always better emphasizing that researcher utilize quantitative techniques for statistical significance whilst some researchers assumes that individual who embraces data that the methods in social sciences has been resolved and that bigger data equates to higher quality and usefulness (Boyd, D. and Crawford, K., 2011).Related issues in the development of Artificial Intelligence can be envisaged in the interpretation of data ,accuracy of data and predictions.

4. Not All Data Are Equivalent

"Not all data are equivalent" addresses the perception that a small amount of data can be improved better with the use of large data during analysis with the assumption that data are exchangeable (Boyd, D. and Crawford, K., 2011). Envisaging the issues in the development of Artificial Intelligence can be attributed to machine learning models training on the assumption of huge datasets compared to smaller datasets.

5.Just Because it is Accessible Doesn't Make It Ethical.

Accessible data does not mean it is ethical for use by every individual (boyd & Marwick, 2011). This provocation addresses the various challenges associated with ethical approval of data as Big Data is becoming an important area and how important accountability is to be considered (Boyd, D. and Crawford, K., 2011). In relating this similar provocation in envisaging the issues in development of Artificial Intelligence requires data which may have issues with ethical approval.

6. Limited Access to Big Data Creates New Digital Divides

A growing number of studies utilize data from social media which concerns the context, its limitations, access, and purpose (Boyd, D. and Crawford, K., 2011). The emergence of big data is seen as an innovative kind of "digital divide" initiated by the existence of Big Data "ecosystems" (Boyd, D. and Crawford, K., 2011). In this context, the development of Artificial Intelligence models may have issues with constraint access to data.

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APPENDIXES:

```
---------STAGING AREA
----CREATE TABLE merged_data AS
DROP TABLE V1_STAGING_AREA CASCADE CONSTRAINTS;

CREATE TABLE V1_STAGING_AREA AS
SELECT
```

```
    wyr_c.care_centre_name AS care_centre_name,
    wyr_c.care_id AS care_centre_id,
    wyr_c.postcode AS postcode,
    wyr_c.town AS town,
    wyr_bed.bed_status AS bed_status,
    wyr_ward.ward_name AS ward_name,
    wyr_res.Admission_Date AS admission_date
FROM
    WYR_CARE_CENTRE wyr_c
JOIN
    WYR_WARD wyr_ward ON wyr_c.care_id = wyr_ward.care_id
JOIN
    WYR_BED wyr_bed ON wyr_ward.ward_no = wyr_bed.ward_no
JOIN
    WYR_RESERVATION wyr_res ON wyr_res.Reservation_Id IN (SELECT Reservation_Id F
ROM WYR_BedAssigned WHERE bed_no = wyr_bed.bed_no);

ALTER TABLE V1_STAGING_AREA
ADD DATASOURCE VARCHAR2(25);

UPDATE V1_STAGING_AREA
SET DATASOURCE = 'WYR';

-- COMBINNING THE TABLES.

INSERT INTO V1_STAGING_AREA
SELECT
    nyr_c.Care_centre_name AS care_centre_name,
    nyr_c.care_centre_id AS care_centre_id,
    nyr_c.postcode AS postcode,
    nyr_c.town AS town,
    nyr_bed.bed_status AS bed_status,
    nyr_ward.ward_name AS ward_name,
    nyr_adm.Admission_date AS admission_date,
    'NYR'
FROM
    NYR_CARE_CENTRE nyr_c
JOIN
    NYR_WARD nyr_ward ON nyr_ward.care_centre_id = nyr_c.care_centre_id
JOIN
    NYR_BED nyr_bed ON nyr_bed.ward_id = nyr_ward.ward_id
JOIN
    NYR_ADMISSION nyr_adm ON nyr_adm.bed_id = nyr_bed.bed_id;
```

```
-- SELECT * FROM V1_STAGING_AREA


- ETL_log
DROP table new_etl_log cascade constraints;

CREATE TABLE new_etl_log
(issue_id NUMBER(5) NOT NULL,
table_name VARCHAR2(20),
data_error_code NUMBER(5),
issue_desc VARCHAR2(50),
issue_date DATE,
issue_status VARCHAR2(20),
status_update_date DATE);

drop sequence NEW_EL_SEQ;
create sequence NEW_EL_SEQ
start with 1
increment by 1
maxvalue 10000
minvalue 1;




-- DROP TRIGGER V1_STAGING_AREA.V1_trg_quality_chk;

CREATE or REPLACE trigger V1_trg_quality_chk
  before update on V1_STAGING_AREA
  for each row
begin
  INSERT INTO NEW_ETL_log
  (issue_id,  table_name, data_error_code,  issue_desc,  issue_date, issue_status
, status_update_date)
   VALUES
  (NEW_EL_SEQ.nextval, 'V1_STAGING_AREA', '0', 'Quality checks', SYSDATE, 'comple
ted', SYSDATE);
end;



DELETE FROM V1_STAGING_AREA
WHERE ADMISSION_DATE IS NULL;
```

```sql
---QUALITY CHECKS
---UPDATING THE BED STATUS FOR DATA INTEGRITY,
STANDARDLIZING DATA CHANGING ALL LOWERCASE OCCUPIED TO UPPERCASE Occupied
UPDATE V1_STAGING_AREA
SET BED_STATUS = 'OCCUPIED'
WHERE UPPER(BED_STATUS) = 'OCCUPIED' OR BED_STATUS = 'Occupied';
----Updated rows with 'NOT OCCUPIED' to 'Available'
UPDATE V1_STAGING_AREA
SET BED_STATUS = 'AVAILABLE'
WHERE UPPER(BED_STATUS) = 'NOT OCCUPIED';
-------------Updated lowercase 'Available' to 'AVAILABLE'
UPDATE V1_STAGING_AREA
SET BED_STATUS = 'AVAILABLE'
WHERE UPPER(BED_STATUS) = 'AVAILABLE' OR BED_STATUS = 'Available';

UPDATE V1_STAGING_AREA
SET WARD_NAME = 'GENERAL WARD'
WHERE UPPER(WARD_NAME) = 'GENERAL CARE';



---
ADMISSION DATE WAS CLEANED BY SEPERATING DATE AND TIME USING TO_DATE TO CONVERT T
O DATE FORMATE

---ADDED A NEW COLUMN FOR THE DATE EXCLUDING TIME
ALTER TABLE V1_STAGING_AREA DROP COLUMN NEW_ADMISSION_DATE;

ALTER TABLE V1_STAGING_AREA ADD NEW_ADMISSION_DATE DATE;

----UPDATE MY NEW COLUMN DATE FORMAT
UPDATE V1_STAGING_AREA
SET NEW_ADMISSION_DATE = TO_DATE(TO_CHAR(ADMISSION_DATE, 'DD-MON-YY'), 'DD-MON-
YY');

----FOR DROPPING THE REAL ADMISSION DATE COLUMN
-- ALTER TABLE V1_STAGING_AREA DROP COLUMN ADMISSION_DATE;

---DROP V2_STAGING_AREA
DROP TABLE V2_STAGING_AREA;

---CREATE TABLE V2_STAGING AREA;
---DELETE FROM V2_STAGING_AREA;

-- #DONE
```

```sql
----Date Transformation
CREATE TABLE V2_STAGING_AREA AS
SELECT
    CARE_CENTRE_NAME,
    CARE_CENTRE_ID,
    POSTCODE,
    TOWN,
    EXTRACT(YEAR FROM NEW_ADMISSION_DATE) AS YEAR,
    TO_CHAR(NEW_ADMISSION_DATE, 'MON') AS MONTH,
    BED_STATUS,
    WARD_NAME,
    DATASOURCE
FROM V1_STAGING_AREA;


INSERT INTO V2_STAGING_AREA(SELECT
    CARE_CENTRE_NAME,
    CARE_CENTRE_ID,
    POSTCODE,
    TOWN,
    EXTRACT(YEAR FROM NEW_ADMISSION_DATE) AS YEAR,
    TO_CHAR(NEW_ADMISSION_DATE, 'MON') AS MONTH,
    BED_STATUS,
    WARD_NAME,
    DATASOURCE
FROM V1_STAGING_AREA
WHERE EXTRACT(YEAR FROM NEW_ADMISSION_DATE) = 2023 AND TO_CHAR(NEW_ADMISSION_DATE
, 'MON') = 'NOV');

INSERT INTO V2_STAGING_AREA(SELECT
    CARE_CENTRE_NAME,
    CARE_CENTRE_ID,
    POSTCODE,
    TOWN,
    EXTRACT(YEAR FROM NEW_ADMISSION_DATE) AS YEAR,
    TO_CHAR(NEW_ADMISSION_DATE, 'MON') AS MONTH,
    BED_STATUS,
    WARD_NAME,
    DATASOURCE
FROM V1_STAGING_AREA
WHERE EXTRACT(YEAR FROM NEW_ADMISSION_DATE) = 2022 AND TO_CHAR(NEW_ADMISSION_DATE
, 'MON') = 'NOV');

INSERT INTO V2_STAGING_AREA(SELECT
    CARE_CENTRE_NAME,
```

```
    CARE_CENTRE_ID,
    POSTCODE,
    TOWN,
    EXTRACT(YEAR FROM NEW_ADMISSION_DATE) AS YEAR,
    TO_CHAR(NEW_ADMISSION_DATE, 'MON') AS MONTH,
    BED_STATUS,
    WARD_NAME,
    DATASOURCE
FROM V1_STAGING_AREA
WHERE EXTRACT(YEAR FROM NEW_ADMISSION_DATE) = 2021 AND TO_CHAR(NEW_ADMISSION_DATE
, 'MON') = 'NOV');

INSERT INTO V2_STAGING_AREA(SELECT
    CARE_CENTRE_NAME,
    CARE_CENTRE_ID,
    POSTCODE,
    TOWN,
    EXTRACT(YEAR FROM NEW_ADMISSION_DATE) AS YEAR,
    TO_CHAR(NEW_ADMISSION_DATE, 'MON') AS MONTH,
    BED_STATUS,
    WARD_NAME,
    DATASOURCE
FROM V1_STAGING_AREA
WHERE EXTRACT(YEAR FROM NEW_ADMISSION_DATE) = 2022 AND TO_CHAR(NEW_ADMISSION_DATE
, 'MON') = 'JAN');


INSERT INTO V2_STAGING_AREA(SELECT
    CARE_CENTRE_NAME,
    CARE_CENTRE_ID,
    POSTCODE,
    TOWN,
    EXTRACT(YEAR FROM NEW_ADMISSION_DATE) AS YEAR,
    TO_CHAR(NEW_ADMISSION_DATE, 'MON') AS MONTH,
    BED_STATUS,
    WARD_NAME,
    DATASOURCE
FROM V1_STAGING_AREA
WHERE EXTRACT(YEAR FROM NEW_ADMISSION_DATE) = 2023 AND TO_CHAR(NEW_ADMISSION_DATE
, 'MON') = 'JAN');

INSERT INTO V2_STAGING_AREA(SELECT
    CARE_CENTRE_NAME,
    CARE_CENTRE_ID,
    POSTCODE,
```

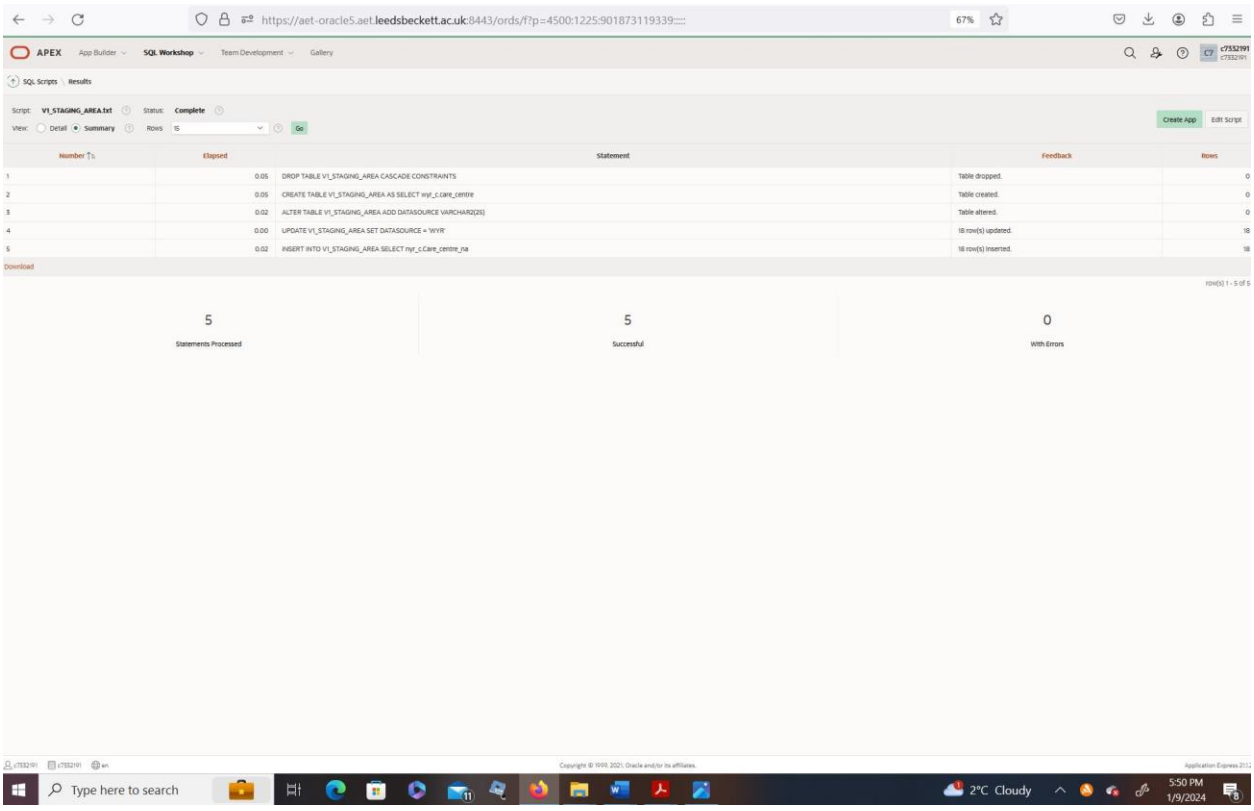
```
    TOWN,
    EXTRACT(YEAR FROM NEW_ADMISSION_DATE) AS YEAR,
    TO_CHAR(NEW_ADMISSION_DATE, 'MON') AS MONTH,
    BED_STATUS,
    WARD_NAME,
    DATASOURCE
FROM V1_STAGING_AREA
WHERE EXTRACT(YEAR FROM NEW_ADMISSION_DATE) = 2023 AND TO_CHAR(NEW_ADMISSION_DATE
, 'MON') = 'FEB');

INSERT INTO V2_STAGING_AREA(SELECT
    CARE_CENTRE_NAME,
    CARE_CENTRE_ID,
    POSTCODE,
    TOWN,
    EXTRACT(YEAR FROM NEW_ADMISSION_DATE) AS YEAR,
    TO_CHAR(NEW_ADMISSION_DATE, 'MON') AS MONTH,
    BED_STATUS,
    WARD_NAME,
    DATASOURCE
FROM V1_STAGING_AREA
WHERE EXTRACT(YEAR FROM NEW_ADMISSION_DATE) = 2022 AND TO_CHAR(NEW_ADMISSION_DATE
, 'MON') = 'FEB');

INSERT INTO V2_STAGING_AREA(SELECT
    CARE_CENTRE_NAME,
    CARE_CENTRE_ID,
    POSTCODE,
    TOWN,
    EXTRACT(YEAR FROM NEW_ADMISSION_DATE) AS YEAR,
    TO_CHAR(NEW_ADMISSION_DATE, 'MON') AS MONTH,
    BED_STATUS,
    WARD_NAME,
    DATASOURCE
FROM V1_STAGING_AREA
WHERE EXTRACT(YEAR FROM NEW_ADMISSION_DATE) = 2023 AND TO_CHAR(NEW_ADMISSION_DATE
, 'MON') = 'APR');
---DONE

INSERT INTO V2_STAGING_AREA(SELECT
    CARE_CENTRE_NAME,
    CARE_CENTRE_ID,
    POSTCODE,
    TOWN,
    EXTRACT(YEAR FROM NEW_ADMISSION_DATE) AS YEAR,
```

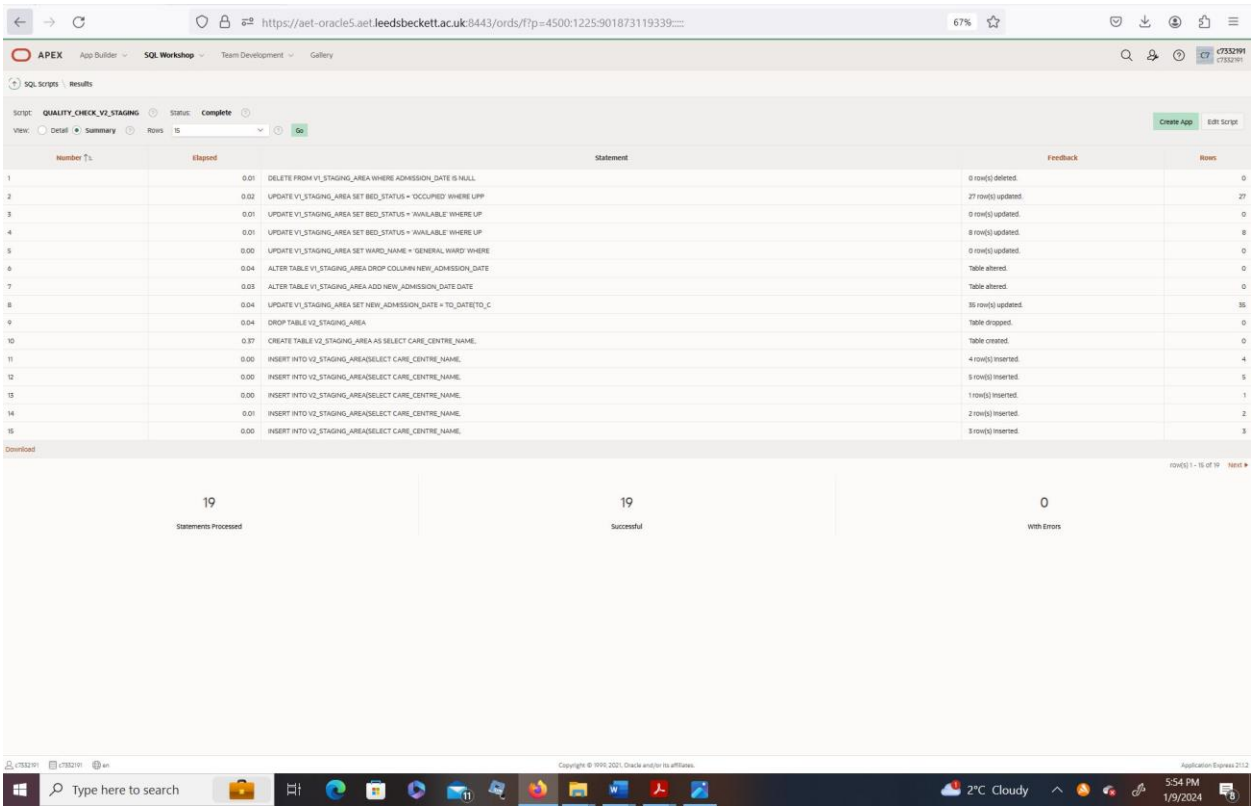
```
    TO_CHAR(NEW_ADMISSION_DATE, 'MON') AS MONTH,
    BED_STATUS,
    WARD_NAME,
    DATASOURCE
FROM V1_STAGING_AREA
WHERE EXTRACT(YEAR FROM NEW_ADMISSION_DATE) = 2023 AND TO_CHAR(NEW_ADMISSION_DATE
, 'MON') = 'MAR');



DROP TABLE CARE_CENTRE_DIM CASCADE CONSTRAINTS;

DROP TABLE NEW_TIME_DIM CASCADE CONSTRAINTS;

DROP TABLE BED_OCCUPANCY_FACT CASCADE CONSTRAINTS;


-- Create a Database table to represent the "CARE_CENTRE_DIM" entity.
CREATE TABLE CARE_CENTRE_DIM(
    PK__Care_Centre_Id  INTEGER NOT NULL,
    care_centre_name    VARCHAR(20) NOT NULL,
    Care_Centre_Id INTEGER,
    ward_name VARCHAR(35),
    Town    VARCHAR(35) NOT NULL,
    Post_code   VARCHAR(10) NOT NULL,
    -- Specify the PRIMARY KEY constraint for table "CARE_CENTRE_DIM".
    -- This indicates which attribute(s) uniquely identify each row of data.
    CONSTRAINT  pk_CARE_CENTRE_DIM PRIMARY KEY (PK__Care_Centre_Id)
);

-- Create a Database table to represent the "TIME_DIM" entity.
CREATE TABLE NEW_TIME_DIM(
    PK__Time_Id INTEGER NOT NULL,
    Month   VARCHAR(25) NOT NULL,
    Year    INTEGER NOT NULL,
    -- Specify the PRIMARY KEY constraint for table "TIME_DIM".
    -- This indicates which attribute(s) uniquely identify each row of data.
    CONSTRAINT  pk_NEW_TIME_DIM PRIMARY KEY (PK__Time_Id)
);
---THE_MONTH
---THE_YEAR

-- Create a Database table to represent the "BED_OCCUPANCY_FACT" entity.
CREATE TABLE BED_OCCUPANCY_FACT(
```

```
    PK__Report_Id   INTEGER NOT NULL,
    fk1_PK__Time_Id INTEGER NOT NULL,
    fk2_PK__Care_Centre_Id  INTEGER NOT NULL,
    Total_Bed_Occupancy INTEGER,
    Percentage_Bed_Occupancy    INTEGER,
    -- Average_Bed_Occupancy_Rate   INTEGER,
    -- Specify the PRIMARY KEY constraint for table "BED_OCCUPANCY_FACT".
    -- This indicates which attribute(s) uniquely identify each row of data.
    CONSTRAINT  pk_BED_OCCUPANCY_FACT PRIMARY KEY (PK__Report_Id)
);


-------------------------------------------------------------------------------
-- Alter Tables adding fk constraints --



ALTER TABLE BED_OCCUPANCY_FACT ADD CONSTRAINT fk1_BED_OCCUPANCY_FACT_to_TIME_DIM
FOREIGN KEY(fk1_PK__Time_Id) REFERENCES NEW_TIME_DIM(PK__Time_Id);

-
- Alter table to add new constraints required to implement the "BED_OCCUPANCY_FAC
T_CARE_CENTRE_DIM" relationship


ALTER TABLE BED_OCCUPANCY_FACT ADD CONSTRAINT fk2_BED_OCCUPANCY_FACT_to_CARE_CENT
RE_DIM FOREIGN KEY(fk2_PK__Care_Centre_Id) REFERENCES CARE_CENTRE_DIM(PK__Care_Ce
ntre_Id);
---LOADING
DROP sequence NEW_TIME_DIM_SEQ;
create sequence NEW_TIME_DIM_SEQ
start with 1
increment by 1
maxvalue 10000
minvalue 1;

DROP SEQUENCE CARE_CENTRE_DIM_SEQ;
Create sequence CARE_CENTRE_DIM_SEQ
start with 1
increment by 1
maxvalue 10000
minvalue 1;

DROP SEQUENCE BED_OCCUPANCY_FACT_SEQ;
Create sequence BED_OCCUPANCY_FACT_SEQ
```

```
start with 1
increment by 1
maxvalue 10000
minvalue 1;


INSERT INTO NEW_TIME_DIM VALUES(NEW_TIME_DIM_SEQ.nextval,'NOV',2021);

INSERT INTO NEW_TIME_DIM VALUES( NEW_TIME_DIM_SEQ.nextval,'JAN',2022);
INSERT INTO NEW_TIME_DIM VALUES(NEW_TIME_DIM_SEQ.nextval,'FEB',2022);
INSERT INTO NEW_TIME_DIM VALUES(NEW_TIME_DIM_SEQ.nextval,'NOV',2022);


INSERT INTO NEW_TIME_DIM VALUES(NEW_TIME_DIM_SEQ.nextval,'JAN',2023);
INSERT INTO NEW_TIME_DIM VALUES(NEW_TIME_DIM_SEQ.nextval,'FEB',2023);
INSERT INTO NEW_TIME_DIM VALUES(NEW_TIME_DIM_SEQ.nextval,'MAR',2023);
INSERT INTO NEW_TIME_DIM VALUES(NEW_TIME_DIM_SEQ.nextval,'APR',2023);

--DATA CLEANING,TMP TABLE,DATA USED
DROP TABLE TMP_CARE_CENTRE;
Create table TMP_CARE_CENTRE as SELECT DISTINCT Care_centre_name,CARE_CENTRE_ID,t
own,postcode,ward_name,bed_status from V2_STAGING_AREA;

INSERT INTO CARE_CENTRE_DIM SELECT CARE_CENTRE_DIM_SEQ.NEXTVAL,CARE_CENTRE_NAME,C
ARE_CENTRE_ID,ward_name,TOWN,POSTCODE FROM TMP_CARE_CENTRE;

DROP TABLE TMP_BED_OCCUPANCY1;
CREATE TABLE TMP_BED_OCCUPANCY1 AS SELECT BED_STATUS,WARD_NAME,CARE_CENTRE_NAME,T
OWN,POSTCODE,YEAR,MONTH FROM V2_STAGING_AREA;
----
CALCULATING PERECENTAGE OF OCCUPIED BED PER WARD PER CARE CENTRE,TOTAL BED OCCUPI
ED
DROP TABLE TMP_BED_OCCUPANCY2;
CREATE TABLE TMP_BED_OCCUPANCY2 AS SELECT YEAR,MONTH,CARE_CENTRE_NAME,WARD_NAME,S
UM(CASE WHEN BED_STATUS='OCCUPIED' THEN 1 ELSE 0 END) AS TOTAL_BED_OCCUPANCY,
(SUM(CASE WHEN BED_STATUS='OCCUPIED' THEN 1 ELSE 0 END)/COUNT(*))*100 AS PERCENTA
GE_BED_OCCUPANCY FROM TMP_BED_OCCUPANCY1 GROUP BY CARE_CENTRE_NAME,WARD_NAME,YEAR
,MONTH;


INSERT INTO BED_OCCUPANCY_FACT(PK__Report_Id,fk1_PK__Time_Id,
    fk2_PK__Care_Centre_Id,
    Total_Bed_Occupancy,
    PERCENTAGE_BED_OCCUPANCY)
```

```
SELECT BED_OCCUPANCY_FACT_SEQ.NEXTVAL,NEW_TIME_DIM.PK__Time_Id,CARE_CENTRE_DIM.PK
__Care_Centre_Id,TMP_BED_OCCUPANCY2.TOTAL_BED_OCCUPANCY,TMP_BED_OCCUPANCY2.PERCEN
TAGE_BED_OCCUPANCY
FROM TMP_BED_OCCUPANCY2,NEW_TIME_DIM,CARE_CENTRE_DIM
WHERE TMP_BED_OCCUPANCY2.YEAR=NEW_TIME_DIM.YEAR AND
TMP_BED_OCCUPANCY2.MONTH = NEW_TIME_DIM.MONTH AND
TMP_BED_OCCUPANCY2.CARE_CENTRE_NAME = CARE_CENTRE_DIM.CARE_CENTRE_NAME
;
```

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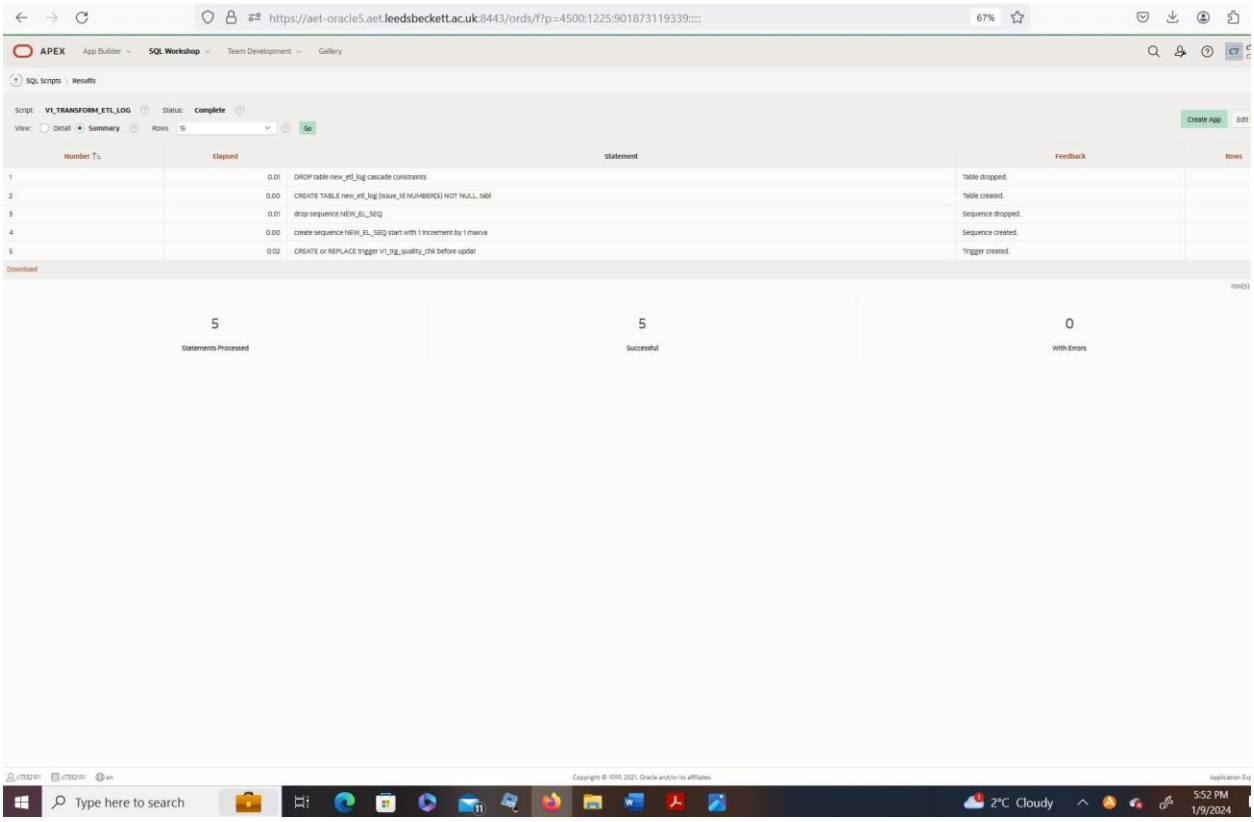
APEX
App Builder
SQL Workshop
Team Development
Gallery
SQL Scripts
Results
Script: QUALITY_CHECK_V2_STAGING
Status: Complete
View: Detail Summary
Rows 15
Go
Create App
Edit Script
Number
Elapsed
Statement
Feedback
Rows
1 0.01 DELETE FROM V1_STAGING_AREA WHERE ADMISSION_DATE IS NULL 0 row(s) deleted. 0
2 0.02 UPDATE V1_STAGING_AREA SET BED_STATUS = 'OCCUPIED' WHERE UPP 27 row(s) updated. 27
3 0.01 UPDATE V1_STAGING_AREA SET BED_STATUS = 'AVAILABLE' WHERE UP 0 row(s) updated. 0
4 0.01 UPDATE V1_STAGING_AREA SET BED_STATUS = 'AVAILABLE' WHERE UP 8 row(s) updated. 8
5 0.00 UPDATE V1_STAGING_AREA SET WARD_NAME = 'GENERAL WARD' WHERE 0 row(s) updated. 0
6 0.04 ALTER TABLE V1_STAGING_AREA DROP COLUMN NEW_ADMISSION_DATE Table altered. 0
7 0.03 ALTER TABLE V1_STAGING_AREA ADD NEW_ADMISSION_DATE DATE Table altered. 0
8 0.04 UPDATE V1_STAGING_AREA SET NEW_ADMISSION_DATE = TO_DATE(TO_C 35 row(s) updated. 35
9 0.04 DROP TABLE V2_STAGING_AREA Table dropped. 0
10 0.37 CREATE TABLE V2_STAGING_AREA AS SELECT CARE_CENTRE_NAME, Table created. 0
11 0.00 INSERT INTO V2_STAGING_AREA(SELECT CARE_CENTRE_NAME, 4 row(s) inserted. 4
12 0.00 INSERT INTO V2_STAGING_AREA(SELECT CARE_CENTRE_NAME, 5 row(s) inserted. 5
13 0.00 INSERT INTO V2_STAGING_AREA(SELECT CARE_CENTRE_NAME, 1 row(s) inserted. 1
14 0.01 INSERT INTO V2_STAGING_AREA(SELECT CARE_CENTRE_NAME, 2 row(s) inserted. 2
15 0.00 INSERT INTO V2_STAGING_AREA(SELECT CARE_CENTRE_NAME, 3 row(s) inserted. 3
Download
row(s) 1 - 15 of 19 Next
19
Statements Processed
19
Successful
0
With Errors
Type here to search
2°C Cloudy
5:54 PM
1/9/2024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App Builder
SQL Workshop
Team Development
Gallery
SQL Scripts
Results
Script: V1_TRANSFORM_ETL_LOG
Status: Complete
View: Detail Summary
Rows 15
Go
Create App
Number
Elapsed
Statement
Feedback
Rows
1 0.01 DROP table new_etl_log cascade constraints Table dropped.
2 0.00 CREATE TABLE new_etl_log (issue_id NUMBER(5) NOT NULL, tabl Table created.
3 0.01 drop sequence NEW_EL_SEQ Sequence dropped.
4 0.00 create sequence NEW_EL_SEQ start with 1 increment by 1 maxva Sequence created.
5 0.02 CREATE or REPLACE trigger V1_trg_quality_chk before updat Trigger created.
Download
5
Statements Processed
5
Successful
0
With Errors
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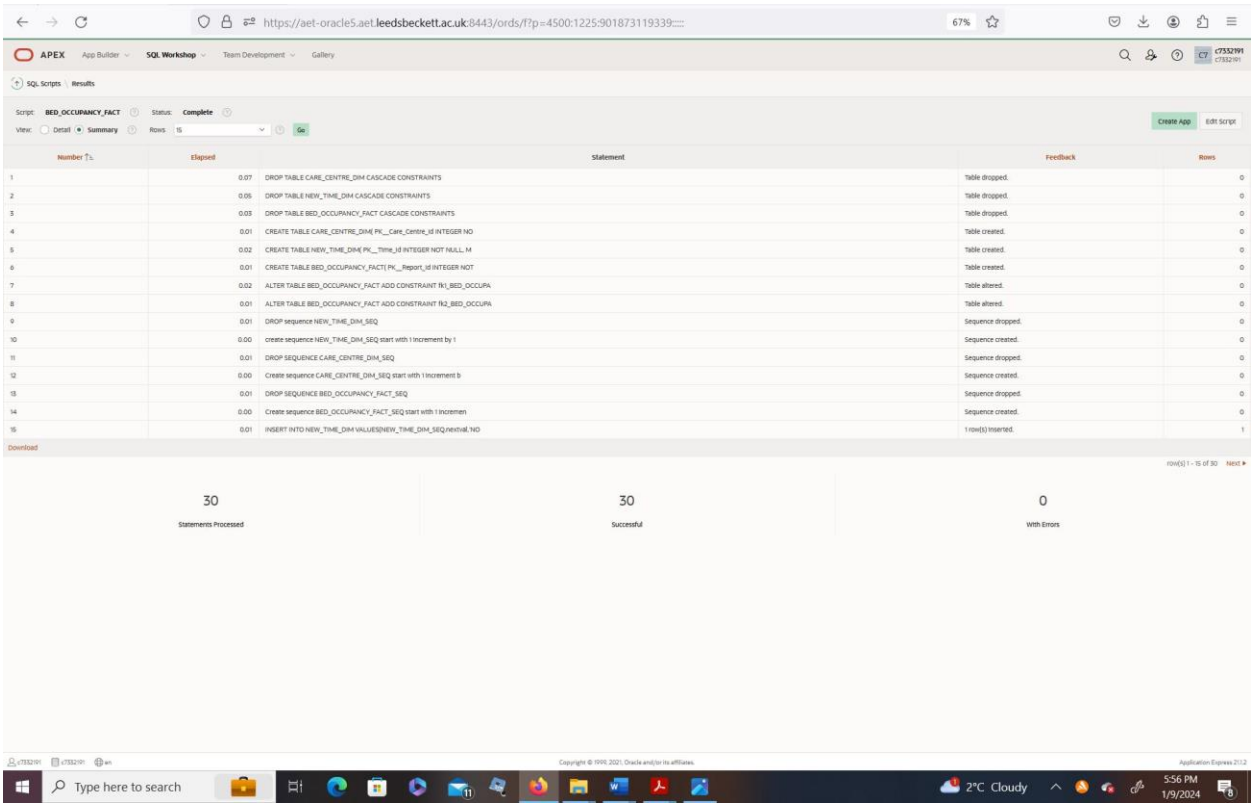
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APEX
App Builder
SQL Workshop
Team Development
Gallery
SQL Scripts
Results
Script: BED_OCCUPANCY_FACT
Status: Complete
View: Detail Summary
Rows: 15
Go
Create App
Edit Script
Number
Elapsed
Statement
Feedback
Rows
1 0.07 DROP TABLE CARE_CENTRE_DIM CASCADE CONSTRAINTS Table dropped. 0
2 0.05 DROP TABLE NEW_TIME_DIM CASCADE CONSTRAINTS Table dropped. 0
3 0.03 DROP TABLE BED_OCCUPANCY_FACT CASCADE CONSTRAINTS Table dropped. 0
4 0.01 CREATE TABLE CARE_CENTRE_DIM(PK__Care_Centre_id INTEGER NO Table created. 0
5 0.02 CREATE TABLE NEW_TIME_DIM(PK__Time_id INTEGER NOT NULL, M Table created. 0
6 0.01 CREATE TABLE BED_OCCUPANCY_FACT(PK__Report_id INTEGER NOT Table created. 0
7 0.02 ALTER TABLE BED_OCCUPANCY_FACT ADD CONSTRAINT fk1_BED_OCCUPA Table altered. 0
8 0.01 ALTER TABLE BED_OCCUPANCY_FACT ADD CONSTRAINT fk2_BED_OCCUPA Table altered. 0
9 0.01 DROP sequence NEW_TIME_DIM_SEQ Sequence dropped. 0
10 0.00 create sequence NEW_TIME_DIM_SEQ start with 1 increment by 1 Sequence created. 0
11 0.01 DROP SEQUENCE CARE_CENTRE_DIM_SEQ Sequence dropped. 0
12 0.00 Create sequence CARE_CENTRE_DIM_SEQ start with 1 increment b Sequence created. 0
13 0.01 DROP SEQUENCE BED_OCCUPANCY_FACT_SEQ Sequence dropped. 0
14 0.00 Create sequence BED_OCCUPANCY_FACT_SEQ start with 1 incremen Sequence created. 0
15 0.01 INSERT INTO NEW_TIME_DIM VALUES(NEW_TIME_DIM_SEQ.nextval, NO 1 row(s) inserted. 1
Download
row(s) 1 - 15 of 30 Next
30
Statements Processed
30
Successful
0
With Errors
Type here to search
2°C Cloudy
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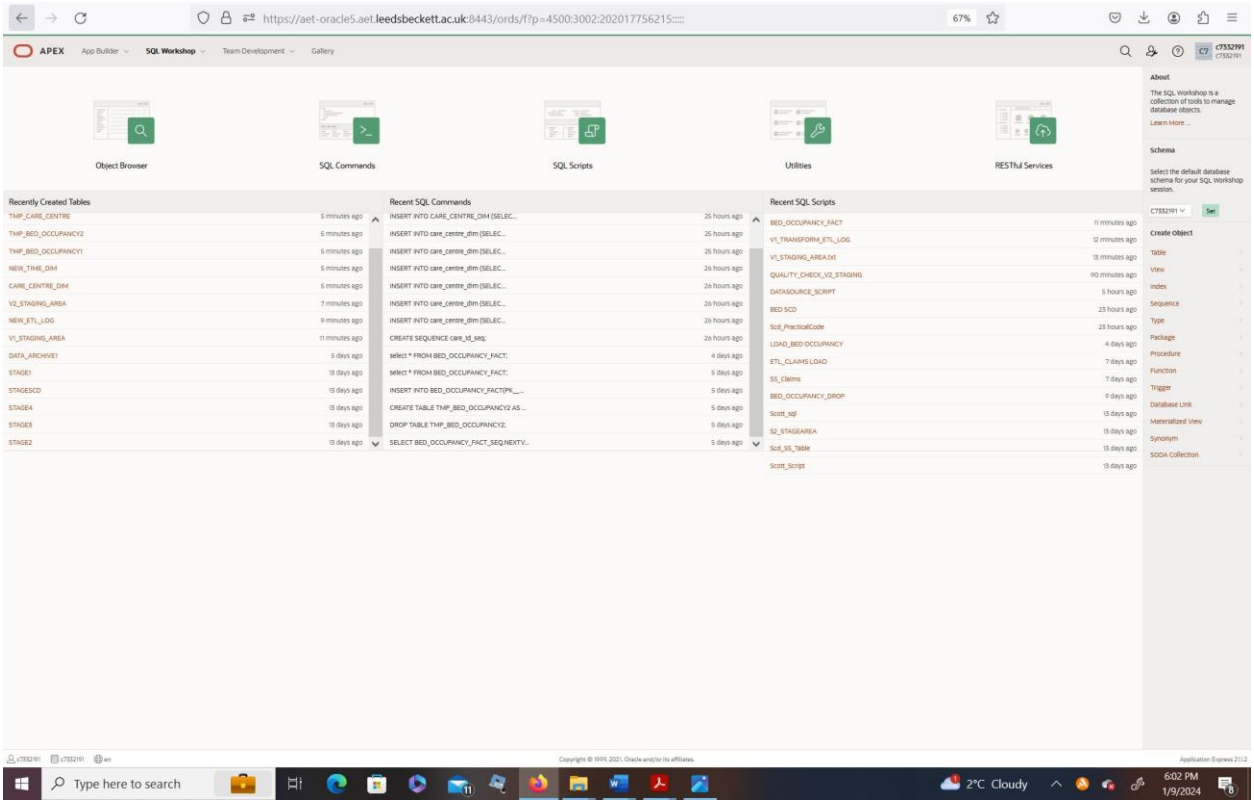
1/9/2024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APEX
App Builder
SQL Workshop
Team Development
Gallery
Object Browser
SQL Commands
SQL Scripts
Utilities
RESTful Services
Recently Created Tables
TMP_CARE_CENTRE 5 minutes ago
TMP_BED_OCCUPANCY2 5 minutes ago
TMP_BED_OCCUPANCY1 5 minutes ago
NEW_TIME_DIM 5 minutes ago
CARE_CENTRE_DIM 5 minutes ago
V2_STAGING_AREA 7 minutes ago
NEW_ETL_LOG 9 minutes ago
V1_STAGING_AREA 11 minutes ago
DATA_ARCHIVE1 5 days ago
STAGE1 13 days ago
STAGESCD 15 days ago
STAGE4 13 days ago
STAGE3 13 days ago
STAGE2 15 days ago
Recent SQL Commands
INSERT INTO CARE_CENTRE_DIM (SELEC... 25 hours ago
INSERT INTO care_centre_dim (SELEC... 25 hours ago
INSERT INTO care_centre_dim (SELEC... 25 hours ago
INSERT INTO care_centre_dim (SELEC... 26 hours ago
INSERT INTO care_centre_dim (SELEC... 26 hours ago
INSERT INTO care_centre_dim (SELEC... 26 hours ago
INSERT INTO care_centre_dim (SELEC... 26 hours ago
CREATE SEQUENCE care_id_seq; 26 hours ago
select * FROM BED_OCCUPANCY_FACT; 4 days ago
select * FROM BED_OCCUPANCY_FACT; 5 days ago
INSERT INTO BED_OCCUPANCY_FACT(PK__... 5 days ago
CREATE TABLE TMP_BED_OCCUPANCY2 AS ... 5 days ago
DROP TABLE TMP_BED_OCCUPANCY2; 5 days ago
SELECT BED_OCCUPANCY_FACT_SEQ.NEXTV... 5 days ago
Recent SQL Scripts
BED_OCCUPANCY_FACT 11 minutes ago
V1_TRANSFORM_ETL_LOG 12 minutes ago
V1_STAGING_AREA.txt 13 minutes ago
QUALITY_CHECK_V2_STAGING 90 minutes ago
DATASOURCE_SCRIPT 5 hours ago
BED SCD 23 hours ago
Scd_PracticalCode 23 hours ago
LOAD_BED OCCUPANCY 4 days ago
ETL_CLAIMS LOAD 7 days ago
SS_Claims 7 days ago
BED_OCCUPANCY_DROP 9 days ago
Scott_sql 13 days ago
S2_STAGEAREA 13 days ago
Scd_SS_Table 13 days ago
Scott_Script 13 days ago
About
The SQL Workshop is a collection of tools to manage database objects.
Learn More ...
Schema
Select the default database schema for your SQL Workshop session.
Set
Create Object
Table
View
Index
Sequence
Type
Package
Procedure
Function
Trigger
Database Link
Materialized View
Synonym
SODA Collection
Type here to search
2°C Cloudy
6:02 PM
1/9/2024