

## Queries used for solving the Analytical queries in the Redshift cluster:

1. Top 10 ATMs where most transactions are in the 'inactive' state.

```
select atm_number, atm_manufacturer, location, count(trans_id) as total_transaction_count,
count(f.atm_id) as inactive_count

from sparnod_schema.dim_location l inner join sparnod_schema.dim_atm a on l.location_id
= a.atm_location_id

inner join sparnod_schema.fact_atm_trans f on a.atm_id = f.atm_id

where f.atm_status = 'Inactive'

group by atm_number, atm_manufacturer, location

order by count(trans_id) desc, count(f.atm_id) desc

limit 10;
```

The screenshot displays the AWS Redshift query editor v2 interface. On the left, a sidebar shows the 'sparnod-redshift-cluster-1' database structure with folders for 'public' and 'sparnod\_schema'. The main editor area contains a SQL query that selects the top 10 ATMs based on the number of transactions and the number of inactive transactions. The query is as follows:

```
1 select atm_number, atm_manufacturer, location, count(trans_id) as total_transaction_count, count(f.atm_id) as inactive_count
2 from sparnod_schema.dim_location l inner join sparnod_schema.dim_atm a on l.location_id = a.atm_location_id
3 inner join sparnod_schema.fact_atm_trans f on a.atm_id = f.atm_id
4 where f.atm_status = 'Inactive'
5 group by atm_number, atm_manufacturer, location
6 order by count(trans_id) desc, count(f.atm_id) desc
7 limit 10;
```

Below the query, the results are displayed in a table with 10 rows. The columns are 'atm\_number', 'atm\_manufacturer', 'location', 'total\_transaction\_count', and 'inactive\_count'. The results are as follows:

atm_number	atm_manufacturer	location	total_transaction_count	inactive_count
16	NCR	Skive	44043	44043
12	NCR	ÅrEøsterÅrÅr Duus	33982	33982
2	NCR	Vejgaard	33725	33725
88	NCR	Storcenter indg. A	32183	32183
30	NCR	NykÅrÅbing Mors	30883	30883
52	NCR	FarsÅrÅ,	27361	27361
50	NCR	Aarhus	23416	23416
29	NCR	Skelagervej 15	20773	20773
81	NCR	Spar KÅrÅbmand Tomh...	20148	20148
102	NCR	Aalborg Storcenter Aid	18297	18297

The bottom of the interface shows the query ID (2077), elapsed time (69 ms), and total rows (10).

2. Number of ATM failures corresponding to the different weather conditions recorded at the time of the transactions

```
select weather_main,  
  
count(trans_id) as total_transaction_count,  
  
sum(case when atm_status = 'Inactive' then 1 else 0 end) as inactive_count,  
  
trunc((cast(inactive_count as numeric(10,2))/total_transaction_count)*100,4) as  
inactive_count_percentage  
  
from sparnod_schema.fact_atm_trans  
  
where weather_main IS NOT NULL AND weather_main <> ''  
  
group by weather_main  
  
order by inactive_count_percentage desc;
```

The screenshot displays the AWS Redshift Query Editor v2 interface. The left sidebar shows the 'sparnod-redshift-cluster-1' database structure with tables like 'dim\_atm', 'dim\_card\_type', 'dim\_date', 'dim\_location', and 'fact\_atm\_trans'. The main editor area contains a SQL query that calculates the percentage of inactive ATM transactions for each weather condition. The query is executed, and the results are displayed in a table with 10 rows and 4 columns: 'weather\_main', 'total\_transaction\_count', 'inactive\_count', and 'inactive\_count\_percent...'. The results show that 'Snow' has the highest percentage of inactive transactions at 20.5639%.

weather_main	total_transaction_count	inactive_count	inactive_count_percent...
Snow	23405	4813	20.5639
Fog	18174	3729	20.5183
Clouds	1181901	194027	16.4165
Rain	545135	86017	15.779
Clear	543949	85531	15.724
Mist	82801	12864	15.536
Thunderstorm	2549	361	14.1624
Drizzle	62530	8670	13.8653
TORNADO	38	1	2.6315
Haze	3	0	0

Query ID 3389 Elapsed time: 9657 ms Total rows: 10

3. Top 10 ATMs with the most number of transactions throughout the year

```
select atm_number, atm_manufacturer, location, count(trans_id) as total_transaction_count
from sparnod_schema.dim_location l inner join sparnod_schema.dim_atm a on l.location_id = a.atm_location_id inner join sparnod_schema.fact_atm_trans f on a.atm_id = f.atm_id
group by atm_number, atm_manufacturer, location
order by total_transaction_count desc
limit 10;
```

The screenshot displays the AWS Redshift Query Editor v2 interface. On the left, the 'Filter resources' pane shows the database structure: 'awsdatacatalog' > 'dev' > 'public' > 'sparnod\_schema' > 'Tables' (5 tables listed: dim\_atm, dim\_card\_type, dim\_date, dim\_location, fact\_atm\_trans). The main editor area shows a SQL query titled 'Untitled 1' with the following code:

```
1 select atm_number, atm_manufacturer, location, count(trans_id) as total_transaction_count
2 from sparnod_schema.dim_location l inner join sparnod_schema.dim_atm a on l.location_id = a.atm_location_id
3     inner join sparnod_schema.fact_atm_trans f on a.atm_id = f.atm_id
4 group by atm_number, atm_manufacturer, location
5 order by total_transaction_count desc
6 limit 10;
```

Below the query editor, the 'Result 1 (10)' table is displayed, showing the top 10 ATMs by transaction count. The table has 5 columns: atm\_number, atm\_manufacturer, location, and total\_transaction\_count. The results are as follows:

atm_number	atm_manufacturer	location	total_transaction_count
39	NCR	Svenstrup	55380
20	NCR	Bispensgade	54211
10	NCR	NÅfÅresundby	53794
24	NCR	Hobro	53378
45	NCR	Abildgaard	53198
16	NCR	Skive	44043
40	Diebold Nixdorf	Frederikshavn	43767
1	NCR	NÅfÅstved	42787
41	Diebold Nixdorf	Skagen	42732
48	Diebold Nixdorf	BrÅfÅnderslev	42493

At the bottom right, the status bar indicates 'Query ID 1920', 'Elapsed time: 715 ms', and 'Total rows: 10'.

4. Number of overall ATM transactions going inactive per month for each month

```
select year, month, count(trans_id) as total_transaction_count,  
       sum(case when atm_status = 'Inactive' then 1 else 0 end) as inactive_count,  
       trunc((cast(inactive_count as numeric(10,2))/total_transaction_count)*100,4) as  
inactive_count_percentage  
  
from sparnod_schema.dim_date d inner join sparnod_schema.fact_atm_trans f on d.date_id  
= f.date_id  
  
group by year, month  
  
order by year, month;
```

The screenshot shows the AWS Redshift Query Editor v2 interface. On the left, the 'Queries' panel displays a tree view of the database schema, including 'sparnod-redshift-cluster-1', 'public', 'sparnod\_schema', and 'fact\_atm\_trans'. The main editor area contains a SQL query that calculates the number of inactive ATM transactions per month. The query is executed, and the results are displayed in a table with 12 rows and 6 columns: year, month, total\_transaction\_count, inactive\_count, and inactive\_count\_percentage. The results show data for the year 2017 across all months, with the highest total transaction count in April (218,865) and the lowest inactive count in September (289,13).

year	month	total_transaction_count	inactive_count	inactive_count_percentage
2017	April	218865	41830	19.1122
2017	August	217218	36713	16.9014
2017	December	197048	20476	10.3913
2017	February	182659	36656	20.0679
2017	January	180195	35953	19.9522
2017	July	227682	38139	16.7509
2017	June	225166	36789	16.3386
2017	March	209586	41046	19.5843
2017	May	222418	37679	16.9406
2017	November	193967	21684	11.1792
2017	October	191667	21780	11.3634
2017	September	202101	28913	14.3062

5. Top 10 ATMs with the highest total amount withdrawn throughout the year

```
select atm_number, atm_manufacturer, location, sum(transaction_amount) as  
total_transaction_amount
```

```
from sparnod_schema.dim_location l inner join sparnod_schema.dim_atm a on l.location_id  
= a.atm_location_id
```

```
inner join sparnod_schema.fact_atm_trans f on a.atm_id = f.atm_id
```

```
group by atm_number, atm_manufacturer, location
```

```
order by total_transaction_amount desc
```

```
limit 10;
```

The screenshot shows the AWS Redshift Query Editor v2 interface. The left sidebar displays the database structure for 'sparnod-redshift-cluster-1', including schemas like 'public' and 'sparnod\_schema', and tables like 'dim\_atm', 'dim\_card\_type', 'dim\_date', 'dim\_location', and 'fact\_atm\_trans'. The main editor area contains a SQL query that selects the top 10 ATMs by total transaction amount. The query is as follows:

```
1 select atm_number, atm_manufacturer, location, sum(transaction_amount) as total_transaction_amount
2 from sparnod_schema.dim_location l inner join sparnod_schema.dim_atm a on l.location_id = a.atm_location_id
3 inner join sparnod_schema.fact_atm_trans f on a.atm_id = f.atm_id
4 group by atm_number, atm_manufacturer, location
5 order by total_transaction_amount desc
6 limit 10;
```

The results are displayed in a table with 4 columns: atm\_number, atm\_manufacturer, location, and total\_transaction\_amount. The results are sorted in descending order of total\_transaction\_amount.

atm_number	atm_manufacturer	location	total_transaction_amount
39	NCR	Svenstrup	277097637
20	NCR	Bispensgade	271008803
24	NCR	Hobro	268289882
10	NCR	NÅ/Å/resundby	267379103
45	NCR	Abildgaard	265639616
16	NCR	Skive	220677013
40	Diebold Nixdorf	Frederikshavn	219812287
41	Diebold Nixdorf	Skagen	214127315
1	NCR	NÅ/Å/stved	213721117
48	Diebold Nixdorf	BrÅ/Å/nderslev	212883099

Query ID 2042 Elapsed time: 476 ms Total rows: 10

6. Number of failed ATM transactions across various card types

```
select card_type, count(trans_id) as total_transaction_count,  
       sum(case when atm_status = 'Inactive' then 1 else 0 end) as inactive_count,  
       trunc((cast(inactive_count as numeric(10,2))/total_transaction_count)*100,4) as  
inactive_count_percentage  
  
from sparnod_schema.dim_card_type c inner join sparnod_schema.fact_atm_trans f on  
c.card_type_id = f.card_type_id  
  
group by card_type  
  
order by inactive_count_percentage desc;
```

The screenshot shows the AWS Redshift Query Editor v2 interface. On the left, the 'Filter resources' pane shows the database structure: `awsdatacatalog` > `dev` > `public` > `sparnod_schema` > `Tables` (5 tables). The tables listed are `dim_atm`, `dim_card_type`, `dim_date`, `dim_location`, and `fact_atm_trans`. The main editor displays a SQL query. The 'Run' button is highlighted, and the query is executed. The results are shown in a table with 12 rows and 5 columns: `card_type`, `total_transaction_count`, `inactive_count`, and `inactive_count_percent...`. The status bar at the bottom indicates 'Query ID 2087', 'Elapsed time: 7025 ms', and 'Total rows: 12'.

card_type	total_transaction_count	inactive_count	inactive_count_percent...
Mastercard - on-us	458226	86000	18.768
VISA	170828	30713	17.9789
Dankort - on-us	143813	24680	17.1611
CIRRUS	17362	2953	17.0084
HÅ/Åvekort - on-us	62487	10331	16.533
Dankort	28581	4557	15.9441
MasterCard	400507	63482	15.8504
Visa Dankort - on-us	748805	112972	15.0869
HÅ/Åvekort	8459	1208	14.2806
Visa Dankort	427840	60547	14.1517
VisaPlus	1134	150	13.2275
Maestro	530	65	12.2641

7. Top 10 records with the number of transactions ordered by the ATM\_number, ATM\_manufacturer, location, weekend\_flag and then total\_transaction\_count, on weekdays and on weekends throughout the year

```
select atm_number, atm_manufacturer, location,  
  
case when weekday in ('Saturday', 'Sunday') then 1 else 0 end as weekend_flag,  
  
count(trans_id) as total_transaction_count  
  
from sparnod_schema.dim_atm a inner join sparnod_schema.dim_location l on  
a.atm_location_id = l.location_id  
  
inner join sparnod_schema.fact_atm_trans f on f.weather_loc_id = l.location_id  
  
inner join sparnod_schema.dim_date d on f.date_id=d.date_id  
  
group by atm_number, atm_manufacturer, location, weekend_flag  
  
order by atm_number, atm_manufacturer, location, weekend_flag, total_transaction_count  
  
limit 10;
```

The screenshot displays the AWS Redshift Query Editor v2 interface. On the left, a sidebar shows the 'sparnod-redshift-cluster-1' with a tree view of databases and tables. The main editor area contains a SQL query that selects the top 10 records based on transaction count, ordered by ATM number, manufacturer, location, and weekend flag. The query is executed, and the results are shown in a table with 10 rows and 6 columns: atm\_number, atm\_manufacturer, location, weekend\_flag, and total\_transaction\_count. The results show various ATM locations and their transaction counts, with the highest count being 32711 for ATM number 1 on a weekday.

atm_number	atm_manufacturer	location	weekend_flag	total_transaction_count
1	NCR	NÅfÅstved	0	32711
1	NCR	NÅfÅstved	1	10076
10	NCR	NÅfÅresundby	0	49694
10	NCR	NÅfÅresundby	1	12127
100	NCR	Intern Skive	0	17812
100	NCR	Intern Skive	1	1
101	NCR	Bryggen Vejle	0	11693
101	NCR	Bryggen Vejle	1	3247
102	NCR	Aalborg Storcenter Afd	0	14556
102	NCR	Aalborg Storcenter Afd	1	3741

8. Most active day in each ATMs from location "Vejgaard"

```
select atm_number, atm_manufacturer, location, weekday, count(trans_id) as
total_transaction_count

from sparnod_schema.fact_atm_trans f inner join sparnod_schema.dim_atm a on
f.atm_id=a.atm_id

inner join sparnod_schema.dim_location l on a.atm_location_id = l.location_id

inner join sparnod_schema.dim_date d on f.date_id=d.date_id

where location = 'Vejgaard' AND weekday IN (

select weekday

from sparnod_schema.dim_date d inner join sparnod_schema.fact_atm_trans f
on d.date_id=f.date_id

group by weekday

order by count(trans_id) desc

limit 1

)

group by atm_number, atm_manufacturer, location, weekday

order by total_transaction_count;
```

The screenshot shows the AWS Redshift Query Editor v2 interface. The left sidebar displays the 'sparnod-redshift-cluster-1' database structure, including tables like 'dim\_atm', 'dim\_card\_type', 'dim\_date', 'dim\_location', 'fact\_atm\_trans', and 'sample\_data\_dev'. The main editor area contains a SQL query that finds the most active day in each ATM from the location 'Vejgaard'. The query uses a subquery to identify the weekday with the highest transaction count for each location, then joins this back to the fact table to get the specific ATM details. The results are displayed in a table at the bottom, showing two rows of data for the location 'Vejgaard'.

atm_number	atm_manufacturer	location	weekday	total_transaction_count
103	Diebold Nixdorf	Vejgaard	Friday	4757
2	NCR	Vejgaard	Friday	6290