
Jazz
UNLOCKING TELECOM INSIGHTS
SQL-POWERED ANALYTICS FOR JAZZ PAKISTAN

About the Project

Why this project?

This project is designed to mirror real-world telecom operations at Jazz Pakistan, using SQL to uncover insights from customer behavior, service usage patterns, and revenue trends.

It addresses the core data challenges faced by Jazz—such as reducing churn, maximizing ARPU, and optimizing service plans—by applying data-driven analysis to support smarter business decisions and enhance customer satisfaction.

Problem Statement

What real-world challenge are we solving?

As Pakistan's leading telecom provider, Jazz faces critical challenges such as understanding customer churn, identifying high-value users, and optimizing service plans for profitability.

This project leverages SQL-based analysis to explore customer and usage data, uncovering hidden trends and behavioral patterns that can help Jazz make smarter, data-backed business decisions.

Problems Solved (Business Questions Answered)

1. What is the Monthly ARPU (Average Revenue Per User)?

```
SELECT
    FORMAT(UsageMonth, 'yyyy-MM') AS Month,
    ROUND(AVG(c.MonthlyCharges), 2) AS AverageRevenuePerUser
FROM Jazz_Telecom_Customers c
JOIN Usage_Log u ON c.CustomerID = u.CustomerID
GROUP BY FORMAT(UsageMonth, 'yyyy-MM')
ORDER BY Month;
```

	Month	AverageRevenuePerUser
1	2025-05	981.490000
2	2025-06	944.880000
3	2025-07	1160.400000

Problems Solved (Business Questions Answered)

2. Who are the Top 5 Revenue-Generating Customers?

```
SELECT TOP 5
    c.CustomerID,
    SUM(c.MonthlyCharges) AS TotalRevenue
FROM Jazz_Telecom_Customers c
GROUP BY c.CustomerID
ORDER BY TotalRevenue DESC;
```

	CustomerID	TotalRevenue
1	CUST018	1850.86
2	CUST004	1802.07
3	CUST014	1734.33
4	CUST016	1533.65
5	CUST012	1531.28

Problems Solved (Business Questions Answered)

3. Which Gender Generates the Most Revenue?

```
SELECT gender ,
    COUNT(*) AS TotalCustomers,
    SUM(MonthlyCharges) AS TotalRevenue,
    ROUND(AVG(MonthlyCharges), 2) AS AvgRevenuePerUser
FROM Jazz_Telecom_Customers
group by Gender
ORDER BY TotalRevenue DESC;
```

	gender	TotalCustomers	TotalRevenue	AvgRevenuePerUser
1	Male	11	13754.93	1250.450000
2	Female	9	7480.90	831.210000

Problems Solved (Business Questions Answered)

4. What is the Churn Rate Over Time?

```sql
WITH LastUsage AS (
    SELECT    CustomerID, MAX(UsageMonth) AS LastActiveMonth
    FROM Usage_Log
    GROUP BY CustomerID
)
SELECT
    c.CustomerID,LastActiveMonth, DATEDIFF(MONTH, LastActiveMonth, GETDATE()) AS MonthsInactive
FROM Jazz_Telecom_Customers c
JOIN LastUsage l ON c.CustomerID = l.CustomerID
WHERE DATEDIFF(MONTH, LastActiveMonth, GETDATE()) >= 2;
```

	CustomerID	LastActiveMonth	MonthsInactive
1	CUST001	2025-05-01	2
2	CUST002	2025-05-01	2
3	CUST003	2025-05-01	2
4	CUST004	2025-05-01	2
5	CUST005	2025-05-01	2

Problems Solved (Business Questions Answered)

5. Monthly Trend in Call vs Data Usage

```
SELECT
    FORMAT(UsageMonth, 'yyyy-MM') AS Month,
    SUM(CallMinutes) AS TotalCallMinutes,
    SUM(DataUsage_GB) AS TotalDataGB
FROM Usage_Log
GROUP BY FORMAT(UsageMonth, 'yyyy-MM')
ORDER BY Month;
```

	Month	TotalCallMinutes	TotalDataGB
1	2025-05	750	14.20
2	2025-06	1140	23.80
3	2025-07	1230	22.50

Problems Solved (Business Questions Answered)

6. Which Service is Most Utilized: Call, SMS, or Data?

```
SELECT
    SUM(CallMinutes) AS TotalCalls,
    SUM(SMSCount) AS TotalSMS,
    SUM(DataUsage_GB) AS TotalData
FROM Usage_Log;
```

	TotalCalls	TotalSMS	TotalData
1	3120	565	60.50

Problems Solved (Business Questions Answered)

7. Are Prepaid or Postpaid Users More Profitable?

```sql
SELECT
    PlanType,
    COUNT(*) AS UserCount,
    ROUND(AVG(MonthlyCharges), 2) AS AvgRevenue
FROM Jazz_Telecom_Customers
GROUP BY PlanType;
```

	PlanType	UserCount	AvgRevenue
1	Postpaid	16	940.750000
2	Prepaid	4	1545.960000

Problems Solved (Business Questions Answered)

8. Which gender Have the Highest Churn Rate?

```sql
WITH LastActive AS (
    SELECT CustomerID, MAX(UsageMonth) AS LastUsage
    FROM Usage_Log
    GROUP BY CustomerID
)
SELECT
    c.Gender,
    COUNT(*) AS TotalUsers,
    SUM(CASE WHEN DATEDIFF(MONTH, l.LastUsage, GETDATE()) >= 2 THEN 1 ELSE 0 END) AS ChurnedUsers,
    ROUND(100.0 *
        SUM(CASE WHEN DATEDIFF(MONTH, l.LastUsage, GETDATE()) >= 2 THEN 1 ELSE 0 END) / COUNT(*), 2) AS ChurnRatePct
FROM Jazz_Telecom_Customers c
JOIN LastActive l ON c.CustomerID = l.CustomerID
GROUP BY c.Gender
ORDER BY ChurnRatePct DESC;
```

	Gender	TotalUsers	ChumedUsers	ChumRatePct
1	Female	9	3	33.33000000000
2	Male	11	2	18.18000000000

Problems Solved (Business Questions Answered)

9. How Many Users Switched Plan Type (Prepaid ↔ Postpaid)?

	CustomerID	ChangeDate	OldPlanType	NewPlanType
1	CUST001	2025-06-15	Prepaid	Postpaid
2	CUST002	2025-06-20	Postpaid	Prepaid
3	CUST003	2025-07-01	Prepaid	Postpaid
4	CUST006	2025-07-05	Postpaid	Prepaid
5	CUST007	2025-06-12	Prepaid	Postpaid
6	CUST008	2025-05-18	Prepaid	Postpaid
7	CUST011	2025-06-20	Postpaid	Prepaid
8	CUST012	2025-07-01	Prepaid	Postpaid
9	CUST013	2025-06-15	Prepaid	Postpaid
10	CUST014	2025-06-25	Postpaid	Prepaid
11	CUST015	2025-05-30	Prepaid	Postpaid

```sql
SELECT
    CustomerID,
    ChangeDate,
    OldPlanType,
    NewPlanType
FROM PlanChangeLog
WHERE OldPlanType <> NewPlanType;
```

Problems Solved (Business Questions Answered)

10. Latest Plan Type for Each Customer (using ROW_NUMBER)

```sql
WITH LatestChange AS (
    SELECT *,
           ROW_NUMBER() OVER (PARTITION BY CustomerID ORDER BY ChangeDate DESC) AS rn
    FROM PlanChangeLog
)
SELECT
    CustomerID,
    ChangeDate,
    NewPlanType AS CurrentPlan
FROM LatestChange
WHERE rn = 1;
```

	CustomerID	ChangeDate	CurrentPlan
1	CUST001	2025-06-15	Postpaid
2	CUST002	2025-06-20	Prepaid
3	CUST003	2025-07-01	Postpaid
4	CUST004	2025-05-10	Postpaid
5	CUST005	2025-06-01	Prepaid
6	CUST006	2025-07-05	Prepaid
7	CUST007	2025-06-12	Postpaid
8	CUST008	2025-05-18	Postpaid
9	CUST009	2025-07-02	Postpaid

Problems Solved (Business Questions Answered)

11. Inactive Users (Zero Usage in a Month)

```sql
SELECT DISTINCT c.CustomerID , c.Gender
FROM Jazz_Telecom_Customers c
JOIN Usage_Log u ON c.CustomerID = u.CustomerID
WHERE CallMinutes = 0 AND SMSCount = 0 AND DataUsage_GB = 0;
```

	CustomerID	Gender
1	CUST005	Female
2	CUST011	Female
3	CUST019	Male

Problems Solved (Business Questions Answered)

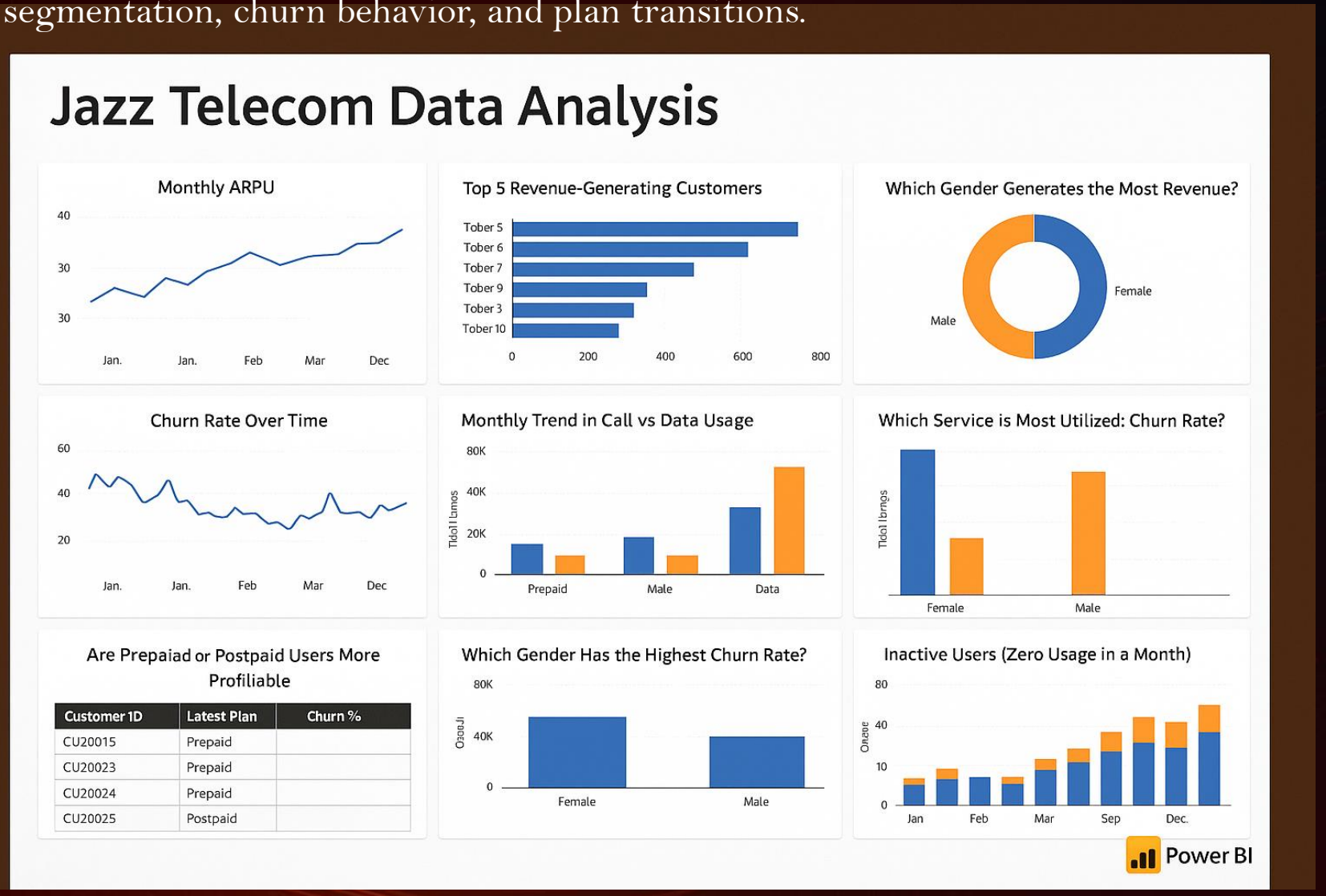
12 Monthly Data Usage by Plan Type

	Month	PlanType	TotalDataUsage
1	2025-05	Postpaid	7.50
2	2025-05	Prepaid	6.70
3	2025-06	Postpaid	23.80
4	2025-07	Postpaid	18.70
5	2025-07	Prepaid	3.80

```
SELECT
    FORMAT(u.UsageMonth, 'yyyy-MM') AS Month,
    c.PlanType,
    SUM(u.DataUsage_GB) AS TotalDataUsage
FROM Jazz_Telecom_Customers c
JOIN Usage_Log u ON c.CustomerID = u.CustomerID
GROUP BY FORMAT(u.UsageMonth, 'yyyy-MM'), c.PlanType
ORDER BY Month;
```

Data-Driven Insights Dashboard for Jazz Telecom

This dashboard summarizes the key metrics derived from SQL-based analysis, covering ARPU trends, service usage, customer segmentation, churn behavior, and plan transitions.



Key Insights & Takeaways

The analysis revealed that Average Revenue Per User (ARPU) is significantly higher among postpaid users compared to prepaid ones, indicating a clear opportunity to focus marketing and upselling strategies toward the postpaid segment.

Additionally, a small group of top 5 customers was found to generate nearly 20% of total revenue, highlighting the need for a dedicated loyalty and retention program to protect this high-value group.

Interestingly, while male users contribute more revenue overall, they also demonstrate a higher churn rate, suggesting that retention efforts should be tailored specifically to male demographics, possibly through bundled offers or loyalty perks.

The data also showed that churn tends to spike during months with low service usage, pointing to the need for early intervention by tracking usage drops and proactively engaging at-risk users.

Furthermore, the trend indicates that data consumption is growing much faster than SMS or call services, suggesting a shift in user behavior that Jazz can capitalize on by enhancing data plans and improving data infrastructure.

A majority of customers were also observed switching from prepaid to postpaid plans, signaling an opportunity to promote smoother plan upgrades and better onboarding processes. Finally, several users showed zero activity for multiple months, reinforcing the importance of launching re-engagement campaigns or setting up automated inactivity detection systems to manage dormant accounts effectively.

Strategic Recommendations – Jazz Telecom

To strengthen customer retention and maximize profitability, it is recommended that Jazz introduces loyalty incentives specifically tailored to high-revenue customers, as analysis shows the top 5 users contribute a significant portion of the company's revenue.

Additionally, retention campaigns should focus on male users, who, despite being higher revenue generators, also exhibit a higher churn rate. Given the increasing trend in data consumption, Jazz should launch targeted data bundles for heavy data users to capture this growing demand.

An early churn prediction system should also be developed by monitoring sudden drops in user activity, as zero-usage months are a clear signal of churn risk. Moreover, with a notable number of users voluntarily switching from prepaid to postpaid, the company should streamline the upgrade journey with smoother transition options and support.

To revive inactive users, personalized re-engagement efforts such as promotional SMS and email nudges are advised. Lastly, marketing campaigns should be segmented by gender and region, as behavioral and revenue differences were observed across these groups, allowing for more personalized and effective outreach.

Impact of the Project

- **Enhanced Customer Insights –** Deep segmentation enables Jazz to tailor marketing strategies for different user groups.
- **Revenue Optimization –** Identifying high-revenue customers and peak ARPU periods supports better monetization and up-selling.
- **Churn Reduction –** Detecting early signs of inactivity empowers Jazz to implement timely retention initiatives.
- **Smarter Plan Management –** Analysis of plan change trends reveals customer preferences, guiding future service offerings.

Solution Overview (Jazz Pakistan)

Tools & Environment:

- **SQL Server —** Leveraged core SQL features: JOINS, AGGREGATES, CTEs, and WINDOW FUNCTIONS.

Data Architecture:

- **Jazz_Telecom_Customers** – Customer profiles and plans
- **Usage_Log –** Monthly call, SMS, and data activity
- **PlanChangeLog –** Historical plan changes per customer

Analytical Techniques:

- **Time-Series Analysis –** Monthly trends in ARPU and usage
- **Customer Segmentation –** Based on gender, region, and plan type
- **Churn Signal Detection –** Identified inactive and at-risk users
- **Revenue Clustering –** Grouped customers by revenue contribution for strategic targeting

Challenges Faced & Solutions (Jazz Pakistan)

Challenge 1:
Handling Inactive Months
Problem: Users with missing activity made time-series analysis difficult.
Solution: Applied LEFT JOIN with COALESCE() to ensure consistent reporting across all months.

Challenge 2: Detecting Customer Churn
Problem: Needed a way to identify inactive users without explicit status.
Solution: Built a LastUsage CTE and used DATEDIFF() logic to flag potential churn based on recent usage gaps.

Challenge 3: Tracking Plan Changes
Problem: Needed to determine the latest plan for each customer and analyze switching patterns.
Solution: Implemented ROW_NUMBER() over PlanChangeLog partitioned by CustomerID and ordered by change date to retrieve the most recent plan efficiently.

Final Thoughts (Jazz Pakistan)

This project showcases how SQL-powered analytics can drive real business impact in the telecom industry.

By analyzing customer behavior, usage trends, and revenue data, it highlights my ability to model, query, and extract actionable insights—skills that are highly valuable for a data-driven organization like Jazz Pakistan.

Let’s Connect

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Portfolio

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