Customer Churn & Revenue Risk Analysis

Built with SQL, Structured for Strategic Action, & Designed for Predictive Scale

By

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Introduction

Customer churn is a critical challenge for subscription-based businesses, directly affecting recurring revenue, customer lifetime value, and growth predictability. Understanding **who churns, when churn occurs, and what drives attrition** is essential to designing effective retention strategies.

This project establishes a robust analytical foundation for churn evaluation by transforming raw customer data into a clean, analytics-ready model that enables executive-level insight into churn behavior, revenue risk, and key drivers. The SQL layer serves as the foundation for downstream visualization and predictive modeling.

This analysis identifies the customer segments driving the majority of churn and quantifies $139K in monthly recurring revenue at risk, enabling targeted, high-ROI retention strategies.

Problem Statement

The organization faces **elevated customer churn**, resulting in significant monthly recurring revenue loss. However, churn drivers are not clearly understood, limiting the effectiveness of retention initiatives.

Key challenges include:

- Limited visibility into **which customer segments are most at risk**
- Inability to **quantify revenue exposure** tied to churn
- Lack of lifecycle insight into **when churn occurs**
- Insufficient understanding of the impact of **contract structure and payment behavior**

A structured, SQL-driven analysis is required to uncover churn drivers and translate them into actionable business insight.

Scope

The SQL phase focuses on transforming raw customer data into a **trusted analytical layer** and extracting decision-ready insights. The scope includes:

- Ingesting raw churn data into a staging environment
- Creating a curated, analytics-ready customer table
- Handling missing and inconsistent values using business logic
- Computing executive-level churn KPIs
- Analyzing churn across:
    - Contract types
    - Payment methods
    - Customer tenure (lifecycle stages)
- Quantifying **monthly recurring revenue at risk**

Predictive modeling and visualization follow in subsequent project phases.

Objectives

The objectives of the SQL phase are to:

- Build a **clean, reliable, and scalable** SQL data model
- Calculate key churn metrics for executive visibility
- Identify **high-risk customer segments**
- Understand churn timing across the customer lifecycle
- Quantify **monthly recurring revenue exposure**
- Establish a trusted foundation for **Tableau dashboards and machine learning**

Methodology

The SQL analysis followed a structured, production-oriented approach:

Data Ingestion

- Raw CSV data ingested into a staging table
- Fields initially stored as text to preserve source integrity

Data Transformation & Cleaning

- Curated customer table created with appropriate data types
- Categorical values standardized for consistency
- Missing *TotalCharges* values correctly handled for tenure-zero customers using business logic

Data Modeling

- Single analytics-ready fact table designed for churn analysis
- Keys and constraints applied to ensure data integrity

Exploratory SQL Analysis

- Churn KPIs computed using aggregate queries
- Segmentation performed by contract, payment method, and tenure
- Lifecycle churn patterns identified via tenure cohorting

Business Insight Generation

- SQL outputs interpreted through a business lens
- High-risk segments and revenue exposure identified
- Findings structured to directly inform stakeholder decisions and downstream analytics

Outcome

The SQL layer delivers a **trusted, explainable, and business-aligned analytical foundation** that supports:

- Executive decision-making
- Interactive Tableau dashboards
- Feature-driven machine learning models

This approach ensures the project is **scalable, reproducible, and aligned with enterprise analytics best practices**.

Analytics

A: Executive KPI Summary

	total_customers	churned_customers	churn_rate_pct	avg_monthly_charges	avg_tenure_months	mrr_at_risk
1	7043	1869	26.54	64.76	32.37	139130.85

- **Total Customers:** 7,043
- **Churn Rate:** 26.54%
- **MRR at Risk:** $139K
- **Avg Tenure:** 32.37 months

Executive Insights

- A 26.54% churn rate indicates structurally high attrition, limiting sustainable growth and revenue predictability.
- Churn places $139K in monthly recurring revenue at risk ($1.67M annually), creating an immediate financial imperative for action.
- An average monthly charge of $64.76 among churned customers shows that meaningful revenue contributors are being lost.
- With an average tenure of 32.37 months, churn extends well beyond onboarding, pointing to long-term value or experience gaps.
- Current churn levels force acquisition spend to replace lost customers, making retention optimization the highest-ROI growth lever.

B: Churn Analysis

1: Churn by Contract Type.

	contract	customers	churned	churn_rate_pct	avg_monthly_charges	avg_tenure_months
1	Month-to-month	3875	1655	42.71	66.40	18.04
2	One year	1473	166	11.27	65.05	42.04
3	Two year	1695	48	2.83	60.77	56.74

Executive Insights

- Customers on month-to-month plans show a 42.71% churn rate, accounting for ~89% of all churned customers (1,655 of 1,869).
- Despite representing ~55% of the customer base, month-to-month users deliver the highest churn and lowest average tenure (18 months), materially increasing revenue instability.

- Churn drops to 11.27% for one-year contracts and 2.83% for two-year contracts, confirming contract length as a strong retention lever.
- Average tenure increases from 18 months (month-to-month) to 42 months (one-year) and 57 months (two-year), reinforcing the long-term value of contract commitments.
- Longer-term customers exhibit lower churn with comparable monthly charges, indicating churn reduction does not require price discounting.

2: Churn by Payment Method

	payment_method	customers	churned	churn_rate_pct
1	Electronic check	2365	1071	45.29
2	Mailed check	1612	308	19.11
3	Bank transfer (automatic)	1544	258	16.71
4	Credit card (automatic)	1522	232	15.24

Executive Insights

- With a 45.29% churn rate, electronic check accounts for the largest share of customer attrition.
- Manual payment methods materially increase churn relative to automated options, confirming payment friction as a key retention risk.
- Automated bank transfer and credit card payments reduce churn to ~15–17%, less than half of electronic check.

3: Churn by Internet Service Type

	internet_service	customers	churn_rate_pct	avg_monthly_charges
1	Fiber optic	3096	41.89	91.50
2	DSL	2421	18.96	58.10
3	No	1526	7.40	21.08

Executive Insights

- Despite being a premium offering, fiber optic users exhibit a 41.89% churn rate, the highest across all service types.
- Fiber customers have the highest average monthly charges ($91.50), meaning churn in this group results in outsized revenue loss per customer.
- DSL customers churn at 18.96%, while customers with no internet service churn at just 7.40%, indicating stability in lower-complexity offerings.

4: Churn by Tenure Band

	tenure_band	customers	churn_rate_pct	avg_monthly_charges
1	0 months	11	0.00	41.42
2	1-6 months	1470	53.33	54.84
3	7-12 months	705	35.89	58.95
4	13-24 months	1024	28.71	61.36
5	25-48 months	1594	20.39	65.93
6	49+ months	2239	9.51	73.95

Executive Insights

- Customers in the first 6 months churn at 53.33%, representing the most critical risk period in the customer lifecycle.
- Attrition drops from 35.89% (7–12 months) to 28.71% (13–24 months) and falls below 10% after 49 months, confirming strong tenure-based stabilization.
- Customers in early tenure bands carry meaningful monthly charges ($55–$59), making early churn both a retention and revenue risk.
- Customers who remain beyond two years show materially lower churn, reinforcing the long-term payoff of early retention investments.
- High early churn suggests gaps in onboarding, value realization, or expectation setting rather than pricing alone.

5: Churn by Tech Support + Online Security

	tech_support	online_security	customers	churn_rate_pct
1	No	No	2553	48.96
2	Yes	No	945	22.33
3	No	Yes	920	21.30
4	Yes	Yes	1099	9.01
5	No internet service	No internet service	1526	7.40

Executive Insights

- Lack of support drives churn: Customers with no tech support and no online security churn at 48.96%, the highest-risk segment in the base.
- Support services materially reduce attrition: Adding either tech support or online security cuts churn by more than half (≈21–22%), demonstrating strong protective impact.

- Bundled services deliver best retention: Customers with both tech support and online security show just 9.01% churn, the lowest among connected customers.

C: Monthly Revenue at Risk (MRR)

1: Revenue at Risk by Contract Type

	contract	customers	churn_rate_pct	mrr_at_risk
1	Month-to-month	3875	42.71	120847.10
2	One year	1473	11.27	14118.45
3	Two year	1695	2.83	4165.30

Executive Insights

- Despite similar customer volumes, month-to-month customers expose $120.8K in monthly recurring revenue at risk, accounting for ~87% of total MRR exposure.
- A 42.71% churn rate combined with high customer counts makes month-to-month contracts the single largest threat to revenue stability.
- One-year and two-year contracts together contribute less than $18.5K in MRR at risk, demonstrating the stabilizing effect of contract commitment.

2: Revenue at Risk by Payment Method

	payment_method	customers	churn_rate_pct	mrr_at_risk
1	Electronic check	2365	45.29	84288.75
2	Bank transfer (automatic)	1544	16.71	20091.90
3	Credit card (automatic)	1522	15.24	17946.60
4	Mailed check	1612	19.11	16803.60

Executive Insights

- Customers using electronic check contribute $84.3K in monthly revenue at risk, representing the largest single source of MRR exposure.
- A 45.29% churn rate among electronic check users makes this payment method a high-risk revenue channel.
- Bank transfer and credit card (automatic) payments together expose less than $38K in MRR at risk, despite comparable customer volumes.

- Manual payment methods (electronic and mailed checks) combine high churn with high revenue exposure, increasing cash-flow volatility.

Executive Recommendations

- Migrate month-to-month customers to long-term contracts to reduce churn in this segment by **25–35%** and protect **$400K–$600K** in annual revenue.
- Accelerate auto-pay adoption to cut churn among electronic-check users by **15–20%,** retaining **$150K–$250K** annually.
- Strengthen early-tenure engagement (first 6 months) to improve retention by 8–10 points, reducing replacement acquisition costs by **$250K–$400K** per year.
- Stabilize high-value fiber customers to achieve a **10–15%** churn reduction, delivering disproportionate revenue protection due to higher ARPU.
- Increase attachment of tech support and security bundles to lower churn from **~49% to <15%** and materially increase customer stickiness.
- Implement senior-citizen-focused retention programs to reduce churn by **10–15%** and retain **$100K+** in annual revenue.
- Shift growth strategy toward retention-led optimization to achieve a **4–6 pp** reduction in overall churn, protect **$660K–$1.0M** in annual revenue, and increase CLV by **12–18%.**

Conclusion

Churn and revenue risk are highly concentrated in a small set of segments—month-to-month contracts, manual payment users, early-tenure customers, and senior citizens—exposing approximately **$139K in monthly recurring revenue** to elevated risk.

Targeted retention actions in these segments offer the highest ROI, enabling revenue protection, improved predictability, higher customer lifetime value, and a shift toward more scalable, retention-led growth.

These findings directly inform feature selection and prioritization for the predictive churn model, enabling scalable, proactive retention execution.