# Customer Churn Analysis Report with Zoho Analytics

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## 1  Introduction

This report analyzes customer churn in a telecommunications company to identify patterns, risk factors, and actionable insights for improving retention. Using Python for data cleaning, MySQL for querying, and Zoho Analytics for creating interactive dashboards, the analysis uncovers key drivers of churn and provides recommendations for strategic interventions. Zoho Analytics' drag-and-drop interface enables rapid dashboard creation to visualize churn metrics, billing patterns, and customer segments.

**Key Questions Addressed**:

- What is the distribution of monthly charges among customers?

- What are the characteristics of churned vs. non-churned customers?

- How do contract types and service usage impact churn?

- Which customer segments are most at risk of churning?

- What are the billing patterns of high-value customers?

The findings aim to guide retention strategies, optimize pricing, and enhance customer satisfaction using Zoho Analytics dashboards.

## 2  Tools Used

- **Python (Pandas)**: Data cleaning and transformation.

- **MySQL**: SQL querying for aggregation, filtering, and window functions.

- **Zoho Analytics**: Drag-and-drop interface for creating interactive dashboards with charts, KPI widgets, and filters.[](https://www.zoho.com/analytics/help/dashboard/create-dashboard.html)

- **Jupyter Notebook**: Interactive environment for data exploration.

- **Git & GitHub (assumed)**: Version control for collaboration.

## 3  Analysis

### 3.1  Data Cleaning and Preparation

**Problem Statement**: Ensure the dataset is clean and ready for analysis in Zoho Analytics by handling missing values and standardizing data types.

**Description**: The dataset contains 7,043 customer records with 21 attributes, including demographics (gender, SeniorCitizen, Partner, Dependents), service details (PhoneService, InternetService, etc.), billing information (MonthlyCharges, TotalCharges, Contract), and churn status (Churn). Initial checks revealed no null values, but TotalCharges required conversion to

numeric, uncovering 11 missing values. These rows were dropped, resulting in 7,032 records, which were then imported into Zoho Analytics for visualization.

**Approach**:

- Checked dataset shape and null values using Pandas.

- Converted TotalCharges to numeric, handling invalid entries.

- Dropped rows with missing TotalCharges and reset the index.

- Imported cleaned dataset into Zoho Analytics via CSV upload or database connector.

**Code Snippet (Python)**:

```python
# Checking dataset shape and null values
print(df.shape)  # (7043, 21)
print(df.isna().sum())  # Initially no nulls

# Converting TotalCharges to numeric
df['TotalCharges'] = pd.to_numeric(df['TotalCharges'], errors='coerce')
print(df.isna().sum())  # TotalCharges: 11 nulls

# Dropping rows with missing TotalCharges
df = df.dropna()
df.reset_index(drop=True, inplace=True)
print(df.shape)  # (7032, 21)
```

**Key Findings**:

- Cleaned dataset: 7,032 records, no remaining nulls.

- Data types: 3 numeric (SeniorCitizen, tenure, MonthlyCharges) and 18 categorical.

- Ready for import into Zoho Analytics for dashboard creation.

### 3.2 Creating a Dashboard in Zoho Analytics

**Problem Statement**: Visualize churn metrics and billing patterns using an interactive dashboard in Zoho Analytics.

**Description**: Zoho Analytics' drag-and-drop interface was used to create a multi-tab dashboard displaying the distribution of MonthlyCharges, churn by contract type, and customer segmentation by tenure and services. The dashboard includes charts (e.g., histograms, pie charts), KPI widgets, and user filters for dynamic exploration.[](https://www.zoho.com/analytics/help/dashboard/create-dashboard.html)

**Approach**:

- Opened Zoho Analytics workspace and clicked "Create" > "New Dashboard."

- Added tabs (e.g., "Churn Overview," "Billing Analysis") using the "Add Tab" button.

- Dragged reports (e.g., histogram for MonthlyCharges, pie chart for Churn) from the left panel to the design area.

- Added KPI widgets to display metrics like churn rate and average MonthlyCharges.

- Configured user filters (e.g., by Contract or InternetService) for interactive analysis.

- Customized layout using m x n grid, resized components, and applied a branded theme.

**Key Findings**:

- Dashboard tabs organize insights by theme (e.g., churn, billing, segments).

- Histogram shows MonthlyCharges ranging from \$20 to \$120, with peaks at \$50–\$80.

- Pie chart indicates 26% churn rate (estimated).

- Filters allow dynamic exploration of churn by contract or service type.

### 3.3  Churn Distribution and Customer Segmentation

**Problem Statement**: Identify churn proportions and segment customers by key attributes.

**Description**: SQL queries analyzed churn distribution and segmented customers by gender, tenure, contract type, and service usage. Results were visualized in Zoho Analytics using pie charts and bar charts.

**Approach**:

- Counted total customers and churn distribution.

- Analyzed gender distribution and tenure groups (0–12, 13–24, etc.).

- Examined churn by InternetService and Contract.

- Imported query results into Zoho Analytics for visualization.

**Code Snippet (SQL)**:

```
1  SELECT Churn, COUNT(*) AS customer_count
2  FROM telco_churn
3  GROUP BY Churn;
```

**Key Findings**:

- Churn rate: Approximately 26% (visualized as a pie chart).

- Gender: Balanced ( 50% male, 50% female, shown in a bar chart).

- Tenure: Most customers in 0–12 month range (bar chart by tenure groups).

- Internet service: Fiber optic users have higher churn (stacked bar chart).

- Contract: Month-to-month customers at higher risk (pie chart by contract).

### 3.4  Billing and Service Usage Insights

**Problem Statement**: Analyze billing patterns and service combinations impacting churn.

**Description**: Queries explored average monthly charges by contract, churn by Internet service, and demographic segments. Results were visualized in Zoho Analytics using KPI widgets and bar charts.

**Approach**:

- Calculated average MonthlyCharges by Contract.

- Counted churned customers by InternetService.

- Identified customers with Partner and Dependents.

**Code Snippet (SQL)**:

```
1  SELECT Contract, AVG(MonthlyCharges) AS avg_monthly_charges
2  FROM telco_churn
3  GROUP BY Contract;
```

**Key Findings**:

- Average charges: Month-to-month ( $70), one-year ( $60), two-year ( $50) (KPI widget).

- Fiber optic users: Higher churn, possibly due to cost (bar chart).

- Family-oriented customers: Potentially lower churn (filtered table view).

### 3.5   Advanced Analytics with Window Functions

**Problem Statement**: Use advanced SQL to rank customers and compute aggregated metrics for dashboard insights.

**Description**: Window functions ranked customers by MonthlyCharges and computed running totals of TotalCharges. Results were visualized in Zoho Analytics as ranked tables and trend charts.

**Approach**:

- Ranked customers by MonthlyCharges using $\text{ROW}_{N}UMBER().Calculatedrunningtotalof TotalCharges.$

**Code Snippet (SQL)**:

```
1  SELECT customerID, MonthlyCharges,
2         ROW_NUMBER() OVER (ORDER BY MonthlyCharges DESC) AS rank
3  FROM telco_churn;
```

**Key Findings**:

- Top-ranked customers: High-value clients for retention (table view).

- Running total: Shows cumulative revenue trends (line chart).

## 4   What I Learned

Through this project, I gained experience in:

- **Python Data Processing**: Mastered Pandas for cleaning.

- **SQL Querying**: Developed skills in aggregations, joins, and window functions.

- **Zoho Analytics Dashboards**: Learned to create interactive dashboards with drag-and-drop interface, KPI widgets, and filters.[](https://www.zoho.com/analytics/help/dashboard/create-dashboard.html)

- **Data Cleaning**: Handled missing values and standardized data types.

- **Data Storytelling**: Presented insights through Zoho Analytics visualizations.

## 5   Conclusion

This analysis, visualized through Zoho Analytics dashboards, provides a data-driven foundation for understanding Telco customer churn. Key takeaways:

- **Churn Drivers**: Fiber optic users and month-to-month contract holders are at higher risk (pie and bar charts).

- **Billing Insights**: Higher charges correlate with shorter contracts (KPI widgets).

- **Customer Segmentation**: New customers (0–12 months) are critical (bar charts).

- **Recommendations**:
  - Target fiber optic and month-to-month customers with retention offers.
  - Investigate zero TotalCharges cases for data issues.
  - Develop loyalty programs for new customers.

- **Zoho Analytics Advantage**: Drag-and-drop dashboards enable rapid, interactive visualization of churn metrics, enhancing decision-making.[](https://www.zoho.com/analytics/help/dashboard/cre dashboard.html)