**1️⃣ What is Customer Acquisition Rate (CAR)?**

Customer Acquisition Rate (CAR) measures **how many new customers** a business gains in a given period **relative to its existing customers**. It helps track **growth trends and marketing effectiveness**.

✅ **Formula for CAR:**

* **New Customers** = Customers appearing for the first time in a given month.
* **Total Customers Up to Previous Month** = Customers who existed before that month.
* **Multiplying by 100** converts it into a percentage.

**2️⃣ How Did We Calculate Monthly CAR?**

**🔹 Understanding the SQL Query (Step by Step)**

**1️⃣ Identify Unique Customers Per Month (monthly\_customers)**

**Why?** We need to track customers who are active in each month.

✔ **Extracts unique phone numbers per month**  
✔ **Ensures we don’t count duplicates**

**2️⃣ Identify Returning Customers (existing\_customers)**

**Why?** We need to count how many customers existed **before each month** to use as the denominator in the CAR formula.

✔ **Finds customers who existed before a given month**  
✔ **Ensures that we correctly track "returning customers"**

**3️⃣ Identify New Customers (new\_customers)**

**Why?** To calculate CAR, we need to count only **customers appearing for the first time** in a given month.

✔ **Filters out customers who were already present in previous months**  
✔ **Ensures only first-time customers are counted**

**4️⃣ Calculate the Customer Acquisition Rate (CAR)**

**Why?** To measure acquisition performance, we use the formula:

CAR=(New Customers in a MonthTotal Customers Up to the Previous Month)×100CAR = \left(\frac{\text{New Customers in a Month}}{\text{Total Customers Up to the Previous Month}}\right) \times 100CAR=(Total Customers Up to the Previous MonthNew Customers in a Month​)×100

✔ **Counts new customers in each month** (numerator)  
✔ **Counts returning customers up to that month** (denominator)  
✔ **Uses NULLIF(..., 0) to prevent division errors**  
✔ **Rounds the result to 2 decimal places for readability**

**🔹 Summary of the CAR Query**

| **Step** | **Purpose** |
| --- | --- |
| **1️monthly\_customers** | Extracts **unique customers per month** |
| **2️ existing\_customers** | Identifies **customers who existed before a given month** |
| **3️ new\_customers** | Identifies **customers appearing for the first time** in each month |
| **4️ Final CAR Calculation** | Measures how many **new customers** joined relative to the **existing customer base** |

**🚀 Business Insights from CAR**

* 📊 **A high CAR** → Strong marketing performance, high customer growth
* 📉 **A low CAR** → Customer acquisition struggles, possible market saturation
* ⚠️ **If CAR is 0%** → No new customers that month
* ⚠️ **If CAR is NULL** → No previous customer data available for calculation

This query **helps businesses track acquisition trends** and **adjust their growth strategies** accordingly.

**Conclusions!**

**1️. Strong Customer Growth in Early Months (Jan–May)**

* **January (90.69%) and February (270.85%)** had the **highest CAR values**, indicating a strong influx of new customers.
* **March (56.64%) and April (67.54%)** saw a decline but still had a healthy acquisition rate.
* **May (144.00%)** had another surge in new customers, suggesting a **successful campaign, product launch, or seasonal demand**.

**Possible reasons:** Strong marketing efforts, promotions, or business expansion.

**2️. Drastic Drop in New Customers from June Onward**

* **June to December** saw almost **no new customer acquisitions**, with CAR dropping to **0% in multiple months**.
* **July, September, October, November, and December all recorded 0% CAR**, meaning **no new customers were acquired**.
* **August had a tiny acquisition rate (0.93%)**, but it was insignificant compared to earlier months.

**Possible reasons:**  
✔️ Market saturation (business already acquired most potential customers).  
✔️ Reduced marketing efforts.  
✔️ Customer churn could be outpacing acquisition.

**3️. Business Shift: Retention Over Acquisition?**

* The **complete lack of new customers in the second half of the year** suggests a **shift in strategy**.
* If the business remained operational, it likely **focused on retaining existing customers** rather than acquiring new ones.
* A **high churn rate combined with no new acquisitions** could signal **business stagnation**.

**Next Steps for Investigation:**  
✔️ Were there **fewer marketing campaigns** in the second half of the year?  
✔️ Did the **business model change** (e.g., shifting from acquisition to retention)?  
✔️ Was there an **external market factor** affecting customer acquisition (e.g., economic downturn, competition)?

**🎯 Final Summary**

1️⃣ **Strong acquisition in the first 5 months** → Possible growth phase or marketing success.  
2️⃣ **Sharp decline from June onwards** → Business struggled to attract new customers.  
3️⃣ **Zero CAR in multiple months** → Likely focus on retention, or the business faced challenges in acquiring customers.

🚀 **Recommendation:** Investigate customer churn, marketing efforts, and external factors affecting acquisition in the latter half of the year.

**What is Customer Conversion Rate (CCR)?**

The **Customer Conversion Rate (CCR)** measures how many newly acquired customers **become engaged customers** by making a **significant number of transactions** (in this case, **more than 3 completed transactions**).

*CCR:*

 **Converted Customers** → Customers who **completed more than 3 transactions** in a given month.

 **Total Acquired Customers** → Customers who were **newly acquired** in that month.

2️⃣ Breaking Down the SQL Query

✅ **What this does:**

* Extracts **unique customers** (phone\_number) who appeared in each month.
* Ensures each customer is counted **only once per month**.
* Creates a **list of newly acquired customers per month**.

✅ **What this does:**

* **Filters transactions where state = 'complete'** (i.e., only completed transactions count).
* **Groups transactions by phone\_number, month, and month\_number**.
* **Uses HAVING COUNT(\*) > 3** to keep only customers who completed **more than 3 transactions** in that month.

✅ **Final Calculation of CCR**

* **Counts distinct converted customers (cc.phone\_number) per month.**
* **Counts distinct acquired customers (ac.phone\_number) per month.**
* **Computes CCR using the formula:** CCR=(Converted CustomersAcquired Customers)×100CCR = \left( \frac{\text{Converted Customers}}{\text{Acquired Customers}} \right) \times 100CCR=(Acquired CustomersConverted Customers​)×100
* **NULLIF(..., 0)** prevents division by zero when no customers exist.
* **COALESCE(..., 0)** ensures months with no conversions display **0% instead of NULL**.
* **Results are ordered by month\_number** to align with the calendar year.

📌 **Key Insights from CCR:**

* **Tracks how effectively new customers become repeat users.**
* **Highlights seasonal trends in engagement and purchases.**
* **Helps businesses optimize marketing and retention strategies.**

Conclusion insights

**1️ Strong and Stable Conversion Performance in Mid-to-Late Year (Jun–Dec)**

* **From June to December**, the **CCR consistently stayed above 59%**, peaking at **62.62% in June and November**.
* This suggests a **highly efficient conversion process**, meaning that once leads were generated, a majority converted into customers.

**Possible reasons:**  
✔️ A more refined sales funnel or improved targeting strategies.  
✔️ Returning customers or strong brand loyalty.  
✔️ Seasonal factors or promotions driving high conversions.

**2️. Lower Conversion Rates in Early Months (Jan–May)**

* **January to May** had significantly lower CCR values (between **13% and 22%**), meaning that **more leads were generated but fewer converted**.
* February had the highest early-year CCR (**22.26%**), possibly due to strong post-January marketing efforts.

**Possible reasons:**  
✔️ Higher competition or customer hesitation early in the year.  
✔️ New customer acquisition strategies that needed optimization.  
✔️ The business may have been **focused more on acquiring customers** than converting them.

**3️. Sharp Drop in October (9.72%)**

* **October's CCR plummeted to just 9.72%**, the lowest in the dataset.
* This suggests a major **breakdown in conversion efficiency**, meaning that even if leads were generated, very few became customers.

**Possible reasons:**  
✔️ Change in marketing strategy or messaging failure.  
✔️ External factors (e.g., economic downturn, seasonal decline).  
✔️ Operational or service-related issues affecting customer trust.

**🎯 Final Summary**

1️⃣ **Early-year (Jan–May) had lower conversion rates** → Business may have been prioritizing **acquisition over efficiency**.  
2️⃣ **Mid-year (Jun–Dec) had extremely strong CCRs (~60%)** → Highly effective lead conversion.  
3️⃣ **October was an anomaly (9.72%)** → **Critical issue in sales or marketing that needs investigation.**

🚀 **Recommendation:** Investigate **why October’s CCR collapsed** and whether the strong **June–December performance** was due to **returning customers, seasonal trends, or marketing refinements**.

**1️⃣ Understanding the Concept of MRR Growth Rate**

**What is Monthly Recurring Revenue (MRR)?**

MRR is the **total revenue generated from recurring transactions in a given month**. It helps businesses track **steady income from subscriptions or repeat customers**.

✅ **Formula for MRR Growth Rate:**

* **MRR in Current Month** → Sum of bs\_revenue for the given month.
* **MRR in Previous Month** → Sum of bs\_revenue from the previous month.

A **positive growth rate** means MRR **increased**, while a **negative rate** means revenue **declined**.

**2️⃣ Breaking Down the SQL Query**

**Step 1: Calculate Total MRR for Each Month**

✅ **What this does:**

* Groups data by **month and month\_number**.
* Sums up the **bs\_revenue** column to get **total MRR for each month**.

Step 2: Retrieve the Previous Month's MRR

✅ **What this does:**

* Uses the **LAG() function** to get the **MRR from the previous month** (prev\_mrr).
* This allows us to **compare MRR across months** and compute growth trends.

Step 3: Compute the MRR Growth Rate

✅ **What this does:**

* **Calculates the MoM Growth Rate** using the formula: (Current MRR−Previous MRR)Previous MRR×100\frac{(\text{Current MRR} - \text{Previous MRR})}{\text{Previous MRR}} \times 100Previous MRR(Current MRR−Previous MRR)​×100
* **Handles missing values:**
  + NULLIF(prev\_mrr, 0) → Prevents division by zero.
  + COALESCE(..., 0) → Ensures months with no growth data display **0% instead of NULL**.
* **Sorts results by month\_number** to align with the calendar year.

Conclusion insights

**1️. Strong Growth in Early & Late Year, But Inconsistent Revenue Trends**

* **March (51.54%) and November (134.42%) saw the biggest revenue spikes.**
  + **March's jump** suggests a **successful expansion, campaign, or new customer sign-ups.**
  + **November's 134.42% surge** is massive—possibly a **seasonal effect, major sales event, or high customer acquisition.**
* **Several months (April, May, September, October, December) had revenue drops**, signaling **inconsistent retention or business slowdowns.**

**Possible reasons:**  
✔️ March & November **had strong acquisition strategies or promotions**.  
✔️ Some months saw **higher churn or lost contracts.**  
✔️ Business might be **seasonally affected**, depending on the industry.

**2️. Periods of Revenue Decline Indicate Retention Challenges**

* **April (-1.69%), May (-9.96%), September (-8.60%), October (-5.50%), and December (-13.34%)** all had declining MRR.
* **December’s -13.34% drop after a strong November suggests high churn**, meaning many customers did not renew.

**Possible reasons:**  
✔️ Customers are **leaving faster than being acquired.**  
✔️ **Seasonal slowdowns** in some months.  
✔️ **Pricing changes or customer dissatisfaction.**

**3️. Missing Data for June Shows a Potential Gap in Revenue Tracking or Business Pause**

* **There is no data for June**, and July’s revenue is **lower than May**, suggesting either:
  + A **reporting gap (data missing for June).**
  + A **temporary pause in business activity or revenue reporting.**

**Action Required:**  
✔️ Confirm **if June data is missing** or if the business had **zero revenue that month.**

**🎯 Final Summary & Actionable Insights**

1️⃣ **March & November were strong growth months**, possibly due to successful campaigns.  
2️⃣ **Declining MRR in multiple months signals customer churn or retention issues.**  
3️⃣ **Missing data for June should be investigated** to ensure accurate trend tracking.

🚀 **Next Steps:** Investigate **customer churn, retention strategies, and reasons behind revenue fluctuations** for better forecasting and stability.

**1️⃣ Understanding the Monthly Retention Rate (%) Calculation**

**What is Retention Rate?**

Retention Rate measures the **percentage of customers from the previous month who remained active in the current month**.

✅ **Formula:**

* **Retained Customers** → Customers active in both the previous and current month.
* **Total Customers in Previous Month** → All unique customers who were active in the previous month.

📌 **Why This Matters:**

* High retention = **Loyal customers & strong engagement**.
* Low retention = **Churn problem (customers leaving)**.

**2️⃣ Query Breakdown (Step-by-Step)**

**🔹 Step 1: Extract Unique Customers per Month**

✅ **What this does:**

* Extracts **unique phone numbers (customers)** per month.
* Ensures each customer appears **only once per month**.
* Builds a **baseline dataset** for tracking retention.

🔹 Step 2: Identify Retained Customers

✅ **What this does:**

* Uses a **SELF JOIN** to find customers present in **both the current and previous month**.
* **month\_number = month\_number + 1** ensures that we match each customer in the current month with their past record.
* Creates a list of **retained customers** month by month.

🔹 Step 3: Count Retained Customers & Get Previous Month’s Customer Count

✅ **What this does:**

* **Counts distinct retained customers** (rc.phone\_number).
* **Uses LAG() to get the previous month’s total customers** (prev\_month\_customers).
* **Ensures each month's retention is compared to its previous month's customers**.

🔹 Step 4: Compute the Monthly Retention Rate

✅ **Final Calculation**

* **Divides retained customers by previous month’s customers**.
* **Multiplies by 100 to get a percentage**.
* **Handles NULL values:**
  + NULLIF(prev\_month\_customers, 0) **prevents division by zero**.
  + COALESCE(..., 0) ensures missing values are replaced with **0%** instead of NULL.

**What is Churn Rate?**

Churn Rate measures the percentage of **customers lost** each month relative to the previous month's customer base.

✅ **Formula:**

* **Churned Customers** → Customers active in the previous month but **not active in the current month**.
* **Total Customers in Previous Month** → All unique customers who were active in the previous month.

📌 **Why This Matters:**

* **High churn means customers are leaving, which affects revenue.**
* **Low churn means strong customer retention and loyalty.**

2️⃣ ✅ SQL Query for Monthly Churn Rate (%)

**3️⃣ Explanation of the Query**

**🔹 Step 1: Extract Unique Customers per Month**

✅ **Extracts all unique customers per month** for tracking retention and churn.

🔹 Step 2: Identify Churned Customers

✅ **Uses LEFT JOIN to compare each month to the next month.**  
✅ **If a customer appears in month\_number but not in month\_number + 1, they churned.**  
✅ **Filters out customers who continued into the next month.**

🔹 Step 3: Count Churned Customers & Get Previous Month’s Total

✅ **Counts distinct churned customers per month** (cc.phone\_number).  
✅ **Uses LAG() to get the previous month’s total customers** (prev\_month\_customers).

🔹 Step 4: Compute the Monthly Churn Rate

✅ **Final Calculation**

* **Divides churned customers by previous month’s customers**.
* **Multiplies by 100 to get a percentage**.
* **Handles NULL values:**
  + NULLIF(prev\_month\_customers, 0) **prevents division by zero**.
  + COALESCE(..., 0) ensures missing values are replaced with **0%** instead of NULL.

**1️⃣ What is Customer Lifetime Value (CLV)?**

Customer Lifetime Value (**CLV**) is a key business metric that estimates **the total revenue a company can expect from a customer over their entire engagement period**.

✅ **CLV Formula Used in the Query:**

**🔹 Why is CLV Important?**

* Helps **predict long-term revenue potential** from existing customers.
* Guides **customer acquisition & retention strategies**.
* Helps businesses determine how much they should **spend on customer acquisition (CAC)** to remain profitable.

**2️⃣ How the Query Computes Monthly CLV**

The SQL query **calculates CLV per month** by following these logical steps:

**🔹 Step 1: Calculate Total Monthly Revenue & Unique Customers**

✅ **Why This Step?**

* This step **aggregates** the total revenue (SUM(bs\_revenue)) for each month.
* It also **counts unique customers** per month (COUNT(DISTINCT phone\_number)).
* This gives us the **average revenue per customer per month** in the later calculation.

🔹 Step 2: Estimate the Average Customer Lifespan

✅ **Why This Step?**

* Counts **how many months each customer has been active** in the dataset.
* Represents the **customer lifespan (how long they stay engaged before leaving)**.
* Essential for **predicting long-term value per customer**.

🔹 Step 3: Compute the Average Customer Lifespan

✅ **Why This Step?**

* Takes the **average lifespan across all customers**, giving us a **generalized customer lifespan estimate**.
* Used later in the formula to estimate **future revenue per customer**.

🔹 Step 4: Compute the Monthly CLV

✅ **Final CLV Formula Used:**

✅ **Why These Calculations?**

* **Divides total revenue by active customers** to find **monthly revenue per customer**.
* **Multiplies by the average lifespan** to predict **total revenue expected from each customer**.
* Uses **COALESCE(..., 0)** to **prevent NULL values**, ensuring **clean data reporting**.
* Uses **NULLIF(mr.total\_customers, 0)** to **avoid division by zero errors** when no customers exist in a given month.

📌 **Key Business Insights from CLV:**

* **CLV increasing** → Customers are generating more value, leading to **higher profitability**.
* **CLV decreasing** → Customers are churning faster or spending less, indicating **potential retention issues**.
* **Stable CLV** → Business has **consistent revenue flow from existing customers**.

**4️⃣ Key Business Applications of CLV**

📊 **Optimizing Marketing Spend**

* If **CLV is higher than customer acquisition cost (CAC)**, the business is making a **profit on each new customer**.
* If CLV < CAC, the business is **spending too much to acquire customers** and needs to optimize.

📉 **Customer Retention & Loyalty**

* If **CLV is decreasing**, it may indicate **higher churn or reduced spending** from repeat customers.
* A higher CLV suggests **customers stay engaged for a longer time**, contributing to **better retention**.

🚀 **Revenue Forecasting & Business Growth**

* A stable or increasing CLV means the business can **predict long-term revenue growth** more accurately.
* Helps **investors and stakeholders** assess whether the company is profitable **long-term**.

**📌 Conclusion**

🔹 **This SQL query calculates monthly CLV** by considering **total revenue, unique customers, and customer lifespan**.  
🔹 **It helps businesses understand long-term customer value, optimize acquisition costs, and improve retention strategies**.  
🔹 **Tracking CLV over time provides insights into business growth, customer engagement, and profitability trends**.