

# TELECOM CUSTOMER CHURN ANALYSIS

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# OVERVIEW

- IN THE TELECOM INDUSTRY, CUSTOMER CHURN (WHEN CUSTOMERS SWITCH PROVIDERS) IS A MAJOR ISSUE, COSTING COMPANIES MILLIONS IN LOST REVENUE.
- THIS PRESENTATION SHARES INSIGHTS FROM ANALYZING 3,333 CUSTOMER RECORDS TO HELP REDUCE CHURN AND BOOST LOYALTY. WE'LL FOCUS ON SIMPLE, ACTIONABLE FINDINGS FROM DATA PATTERNS.



# BUSINESS AND DATA UNDERSTANDING

OUR GOAL: UNDERSTAND WHY CUSTOMERS LEAVE AND HOW TO KEEP THEM.

KEY QUESTIONS:

- HOW DO ADD-ON SERVICES LIKE INTERNATIONAL OR VOICE MAIL PLANS AFFECT LOYALTY?
- WHICH REGIONS HAVE THE HIGHEST CHURN, AND WHY?
- WHEN DO CUSTOMER SERVICE CALLS SIGNAL A RISK OF LEAVING?



## [CONT]

- THE DATA INCLUDES CUSTOMER DETAILS (E.G., STATE, PLANS), USAGE (MINUTES, CHARGES), AND INTERACTIONS (SERVICE CALLS). ABOUT 14.5% OF CUSTOMERS CHURNED.

### KEY INSIGHTS:

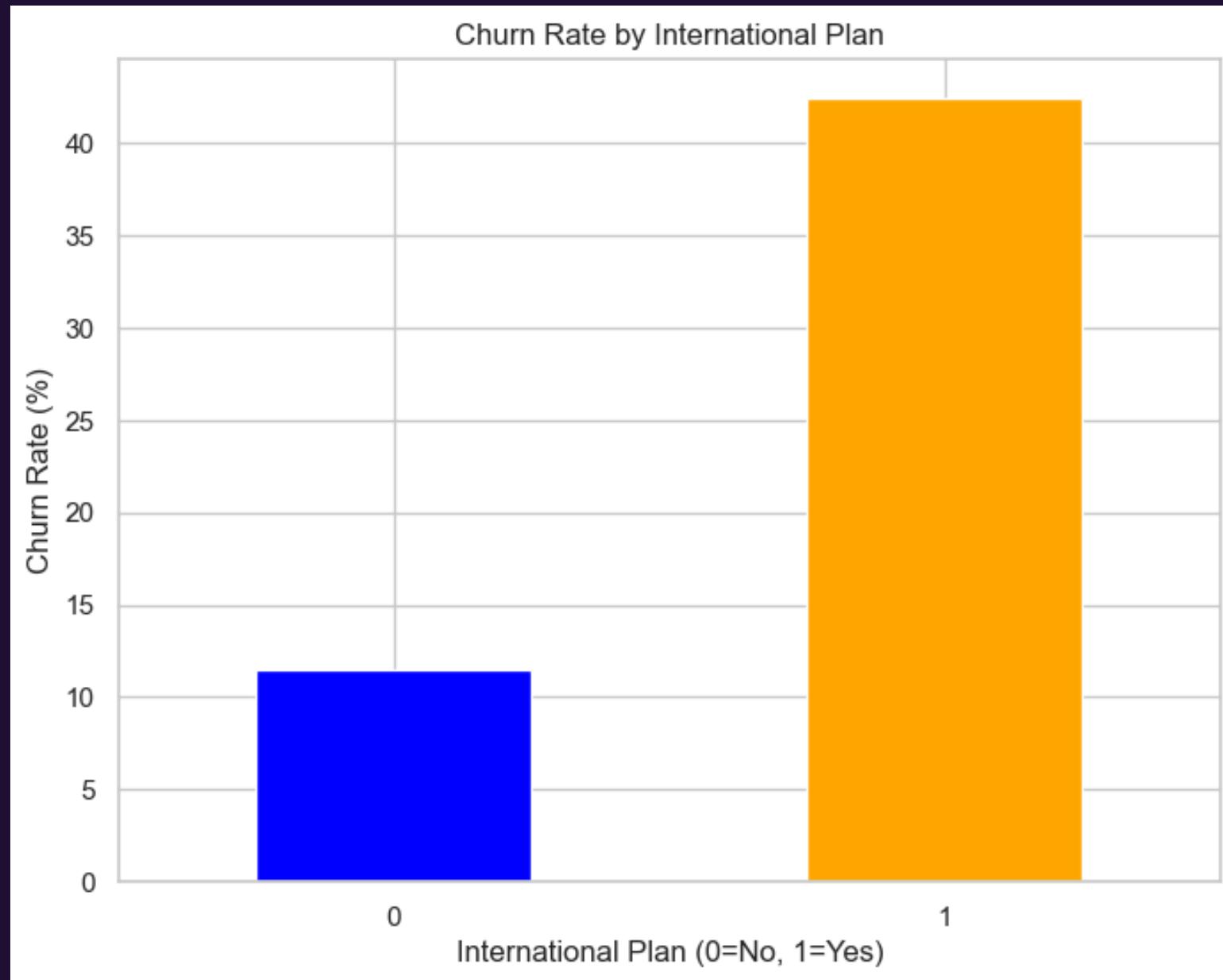
- INTERNATIONAL PLAN USERS CHURN AT 42% (VS. 11% WITHOUT)
- VOICE MAIL REDUCES CHURN TO 9% (VS. 17% WITHOUT)—IT ADDS VALUE.
- COMBINED: NO INTERNATIONAL + VOICE MAIL = LOWEST CHURN (5%).
- TOP CHURN STATES: CA, NJ, TX (25–26%)—HIGHER CHARGES MAY PLAY A ROLE.
- SERVICE CALLS: RISK JUMPS AT 4+ CALLS (46% CHURN).



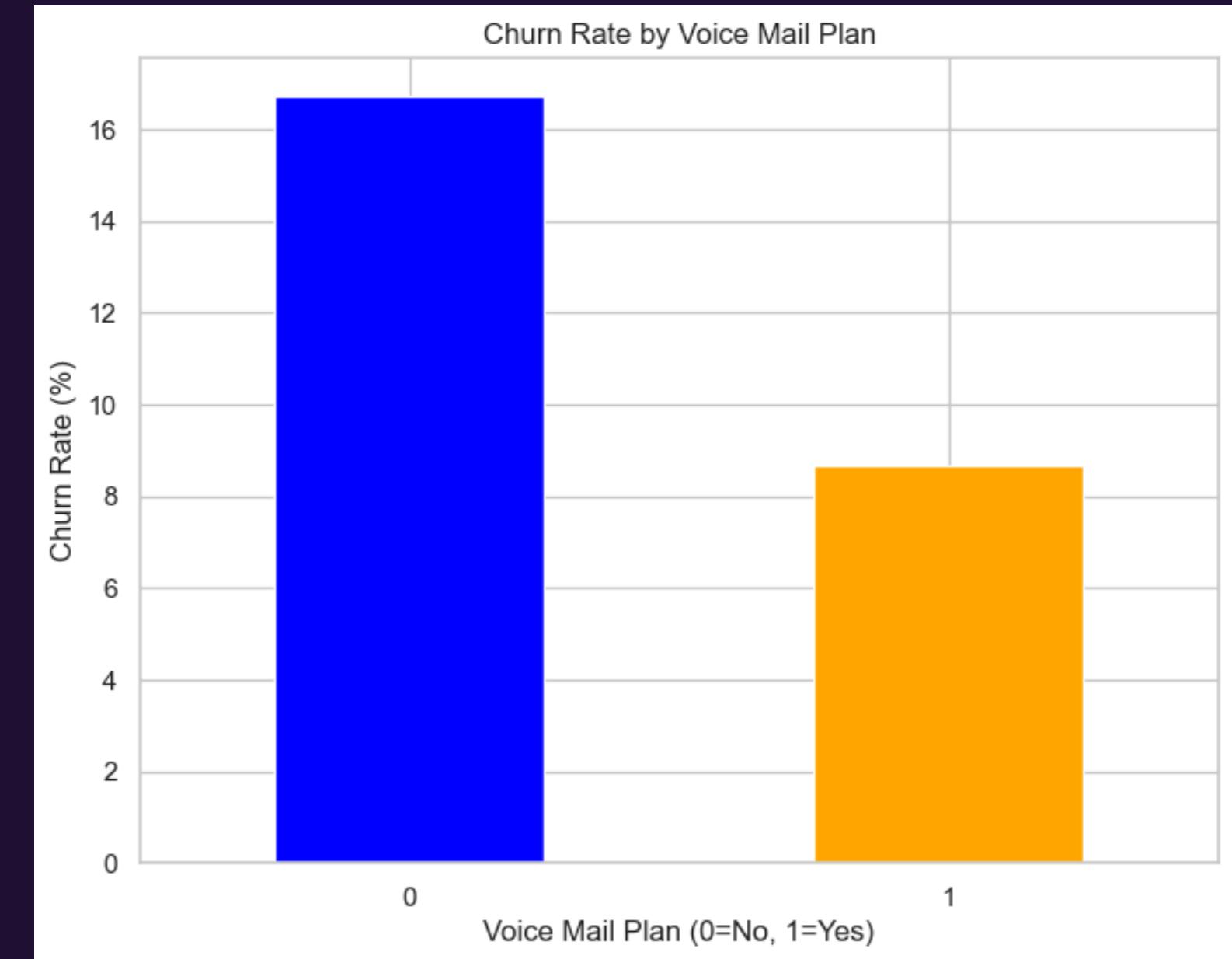
# VISUALISATION



# SERVICE ADOPTION AND CHURN

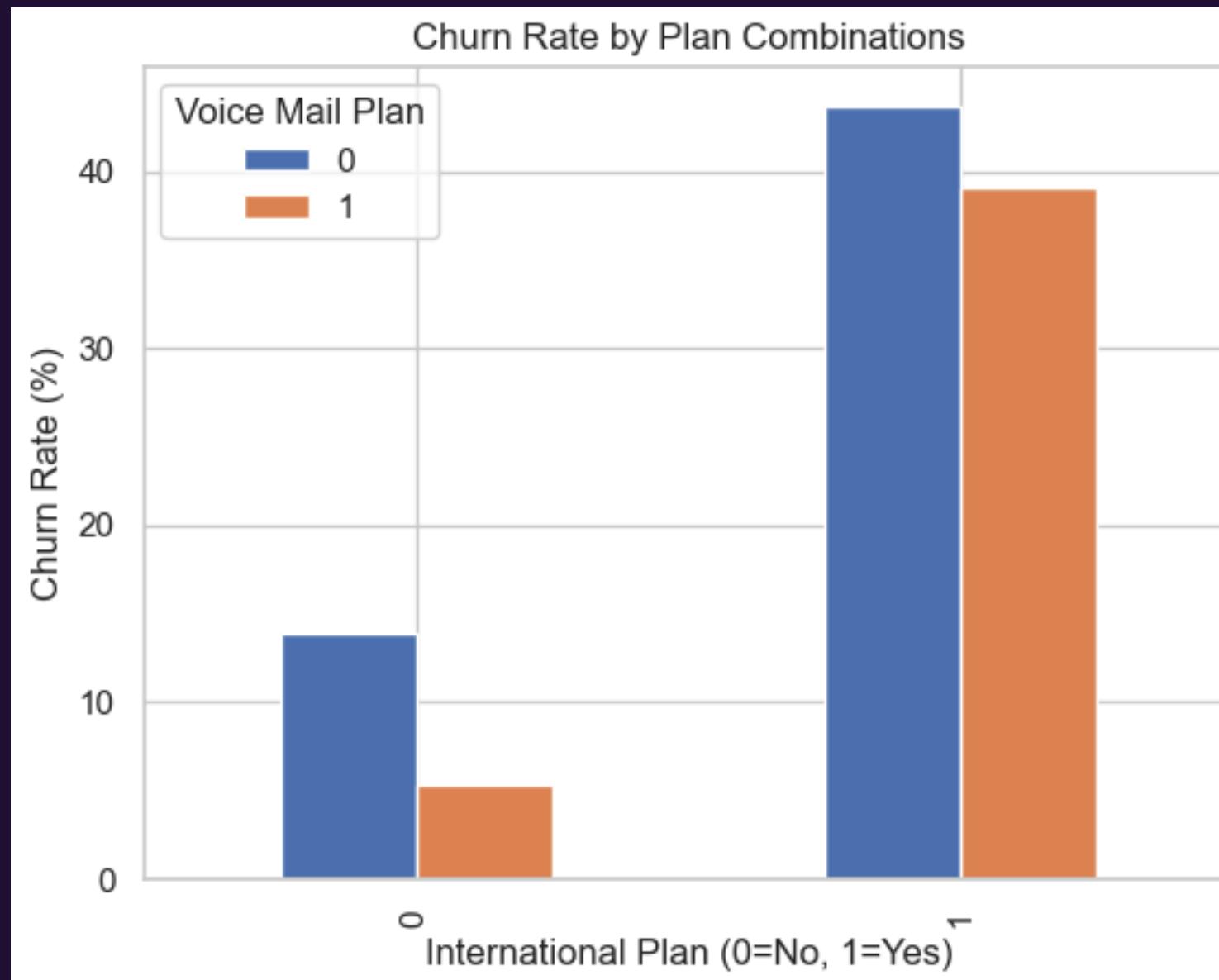


BAR SHOWS 11% FOR NO  
PLAN, 42% FOR YES



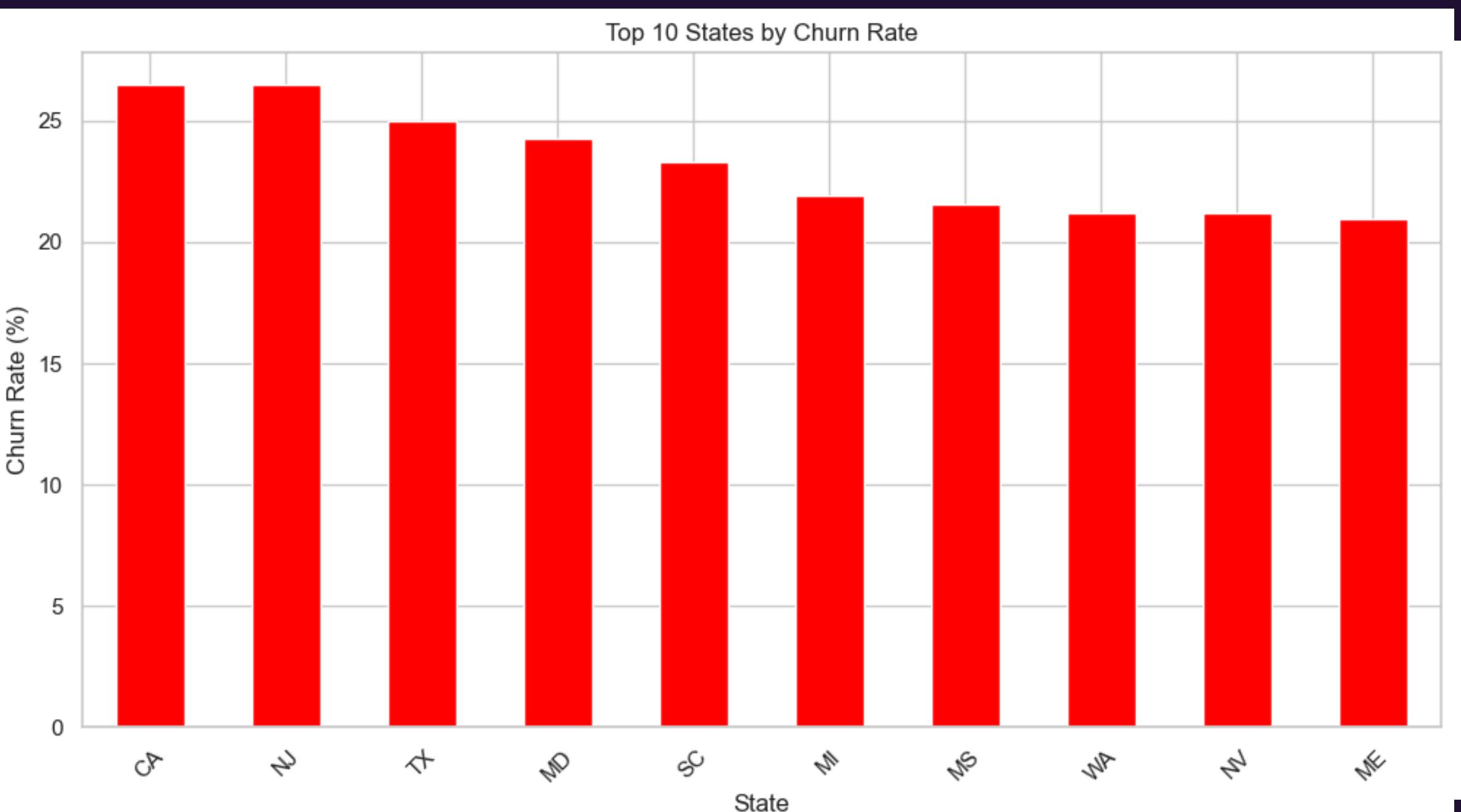
BAR SHOWS 17% FOR NO  
PLAN, 9% FOR YES

# SERVICE ADOPTION AND CHURN

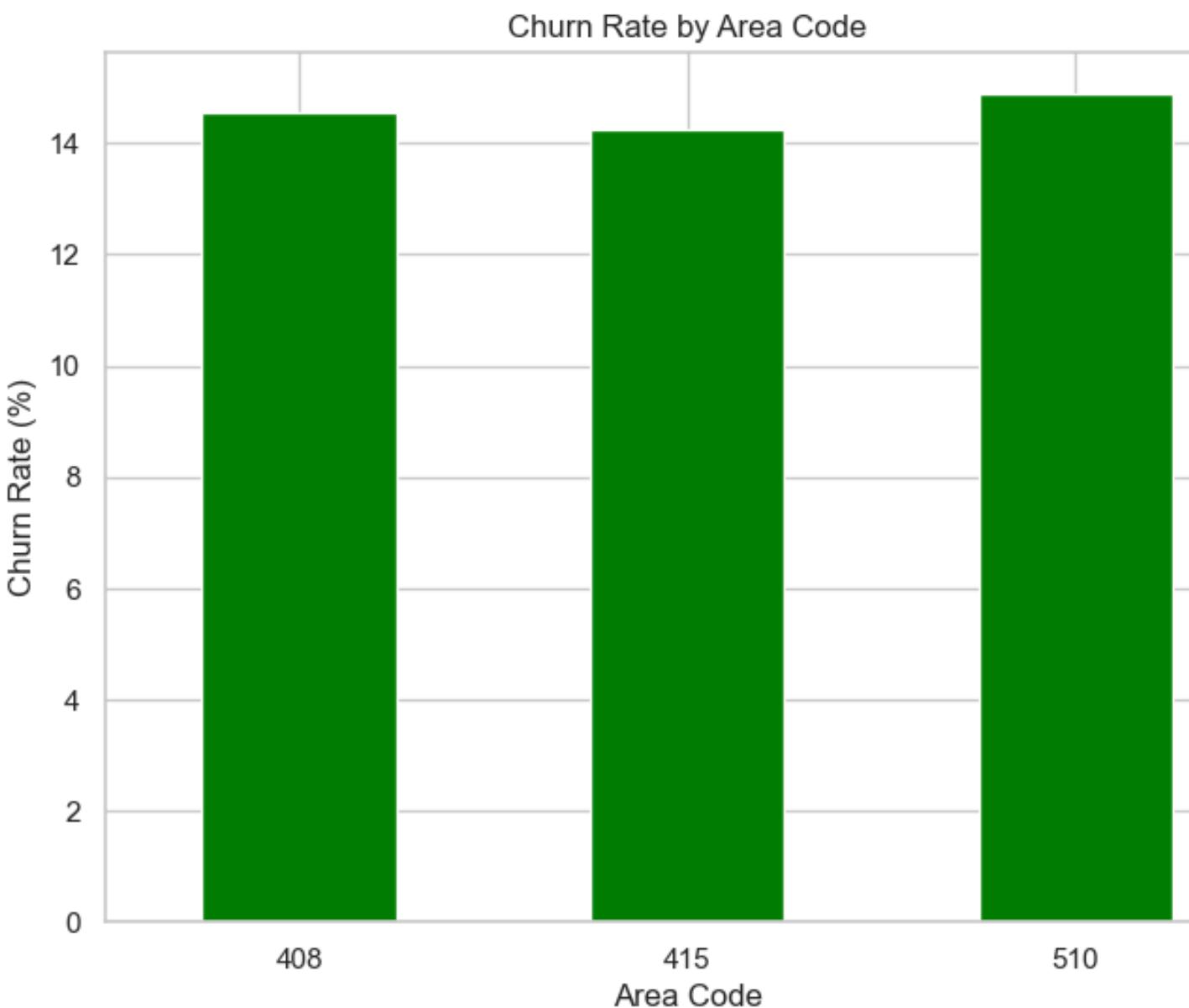


Lowest (5%) for no international and yes voice; highest (approximately 44%) for yes international + no voice.

# GEOGRAPHIC REGION AND CHURN

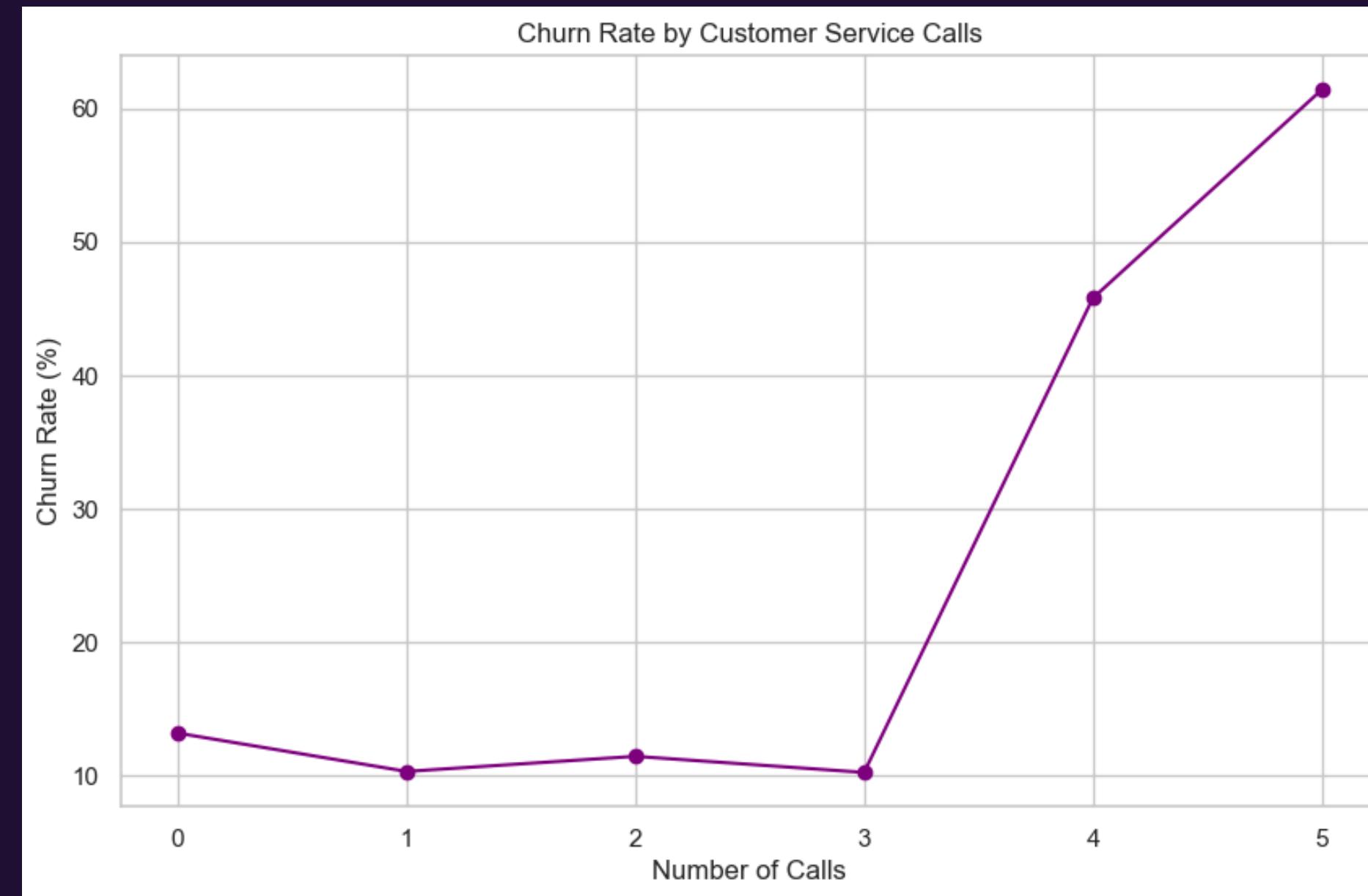


Bar shows CA/NJ at 26.5%, TX 25%, MD 24%  
text



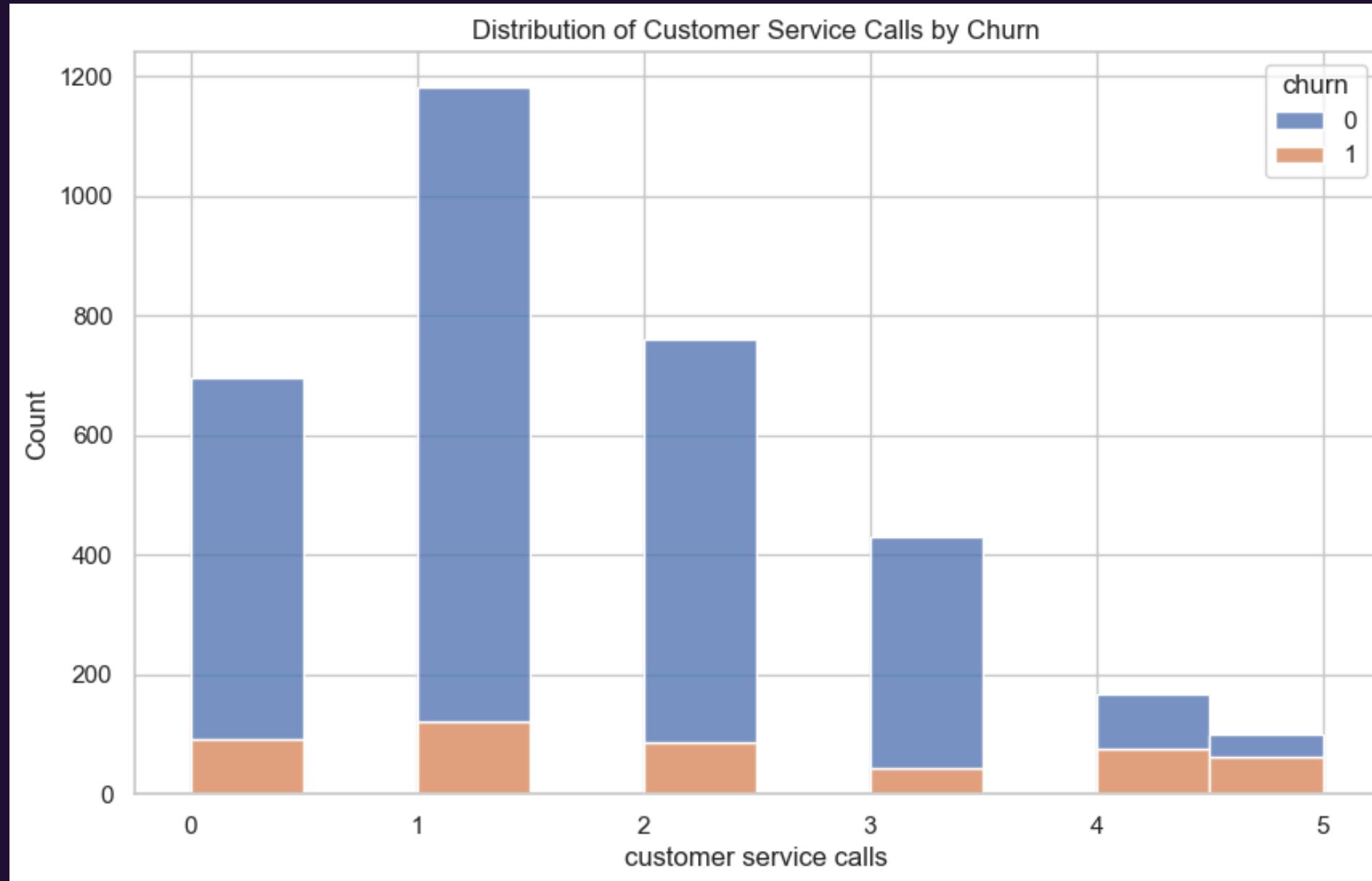
The area codes have similar rates  
(14-15%)

# CUSTOMER SERVICE CALLS AND CHURN



HIGHER MEDIAN CHARGES IN HIGH-CHURN STATES.

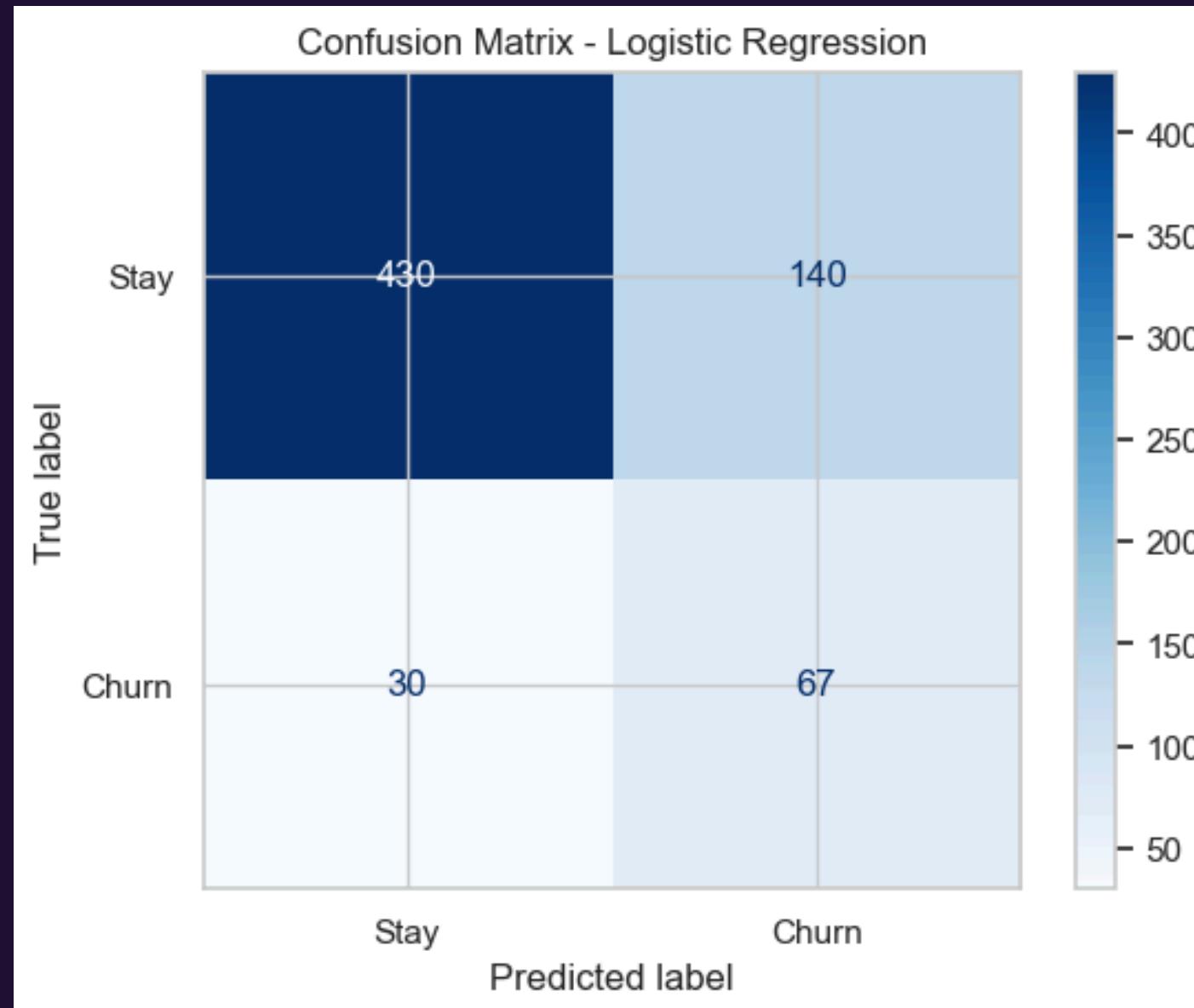
# CUSTOMER SERVICE CALLS AND CHURN



- MOST NON-CHURNERS HAVE 1-2 CALLS; CHURNERS SKEWED TO 4+.

# LINEAR REGRESSION

Accuracy -  $(430+67)/667$  - Overall correct predictions  
(but misleading due to imbalance)



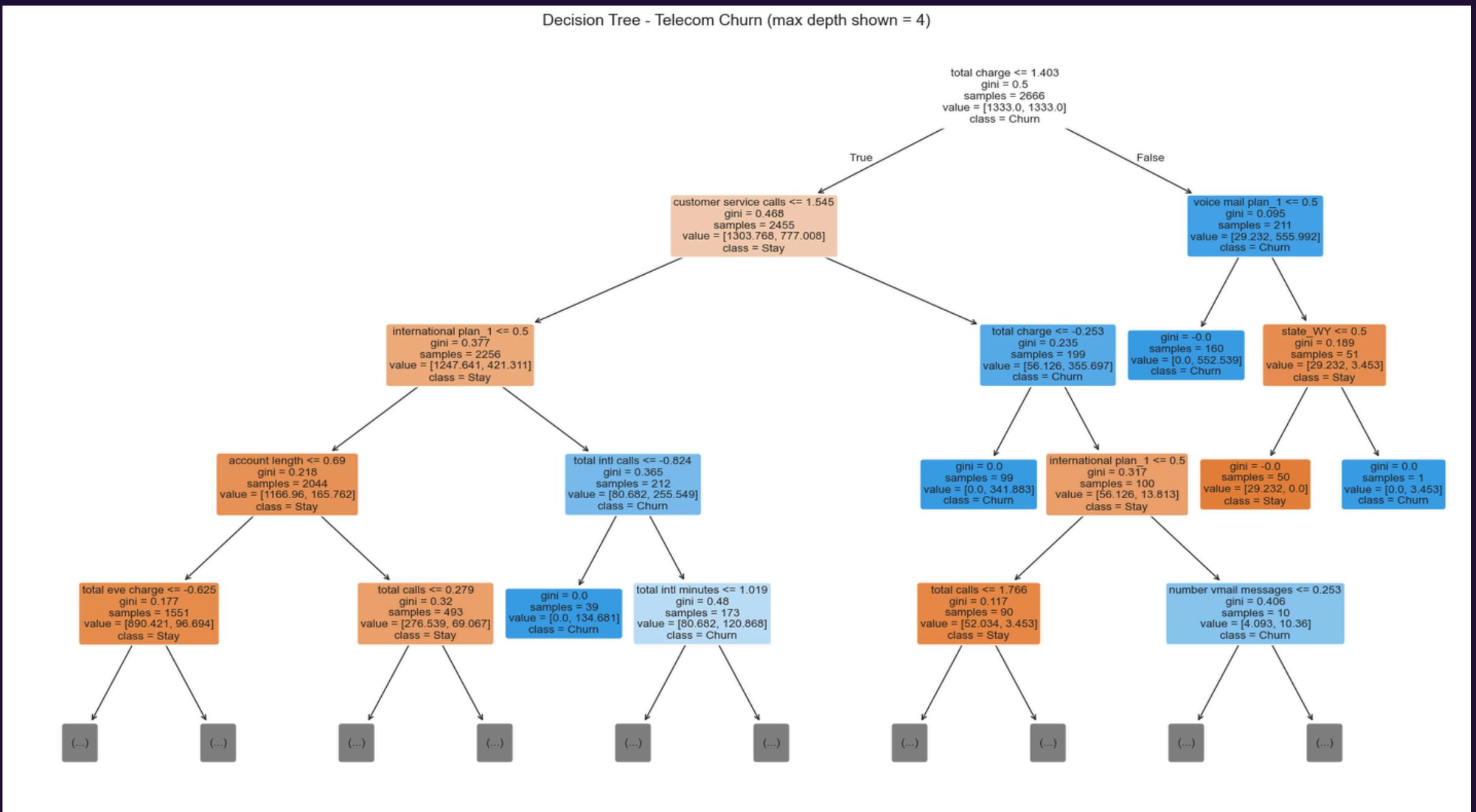
Churn Recall (sensitivity)  $67/(67+30)$  - Caught actually approximately 69% of the people who were actually going to leave.

Churn Precision -  $67/(67+140)$  - Only approximately 32% of the people flagged as 'at risk' actually left

False Negative Rate -  $30/97$  - missed approximately 31% of the real churners

False Positive Rate -  $140/570$  - Approximately 25% of loyal customers wrongly flagged

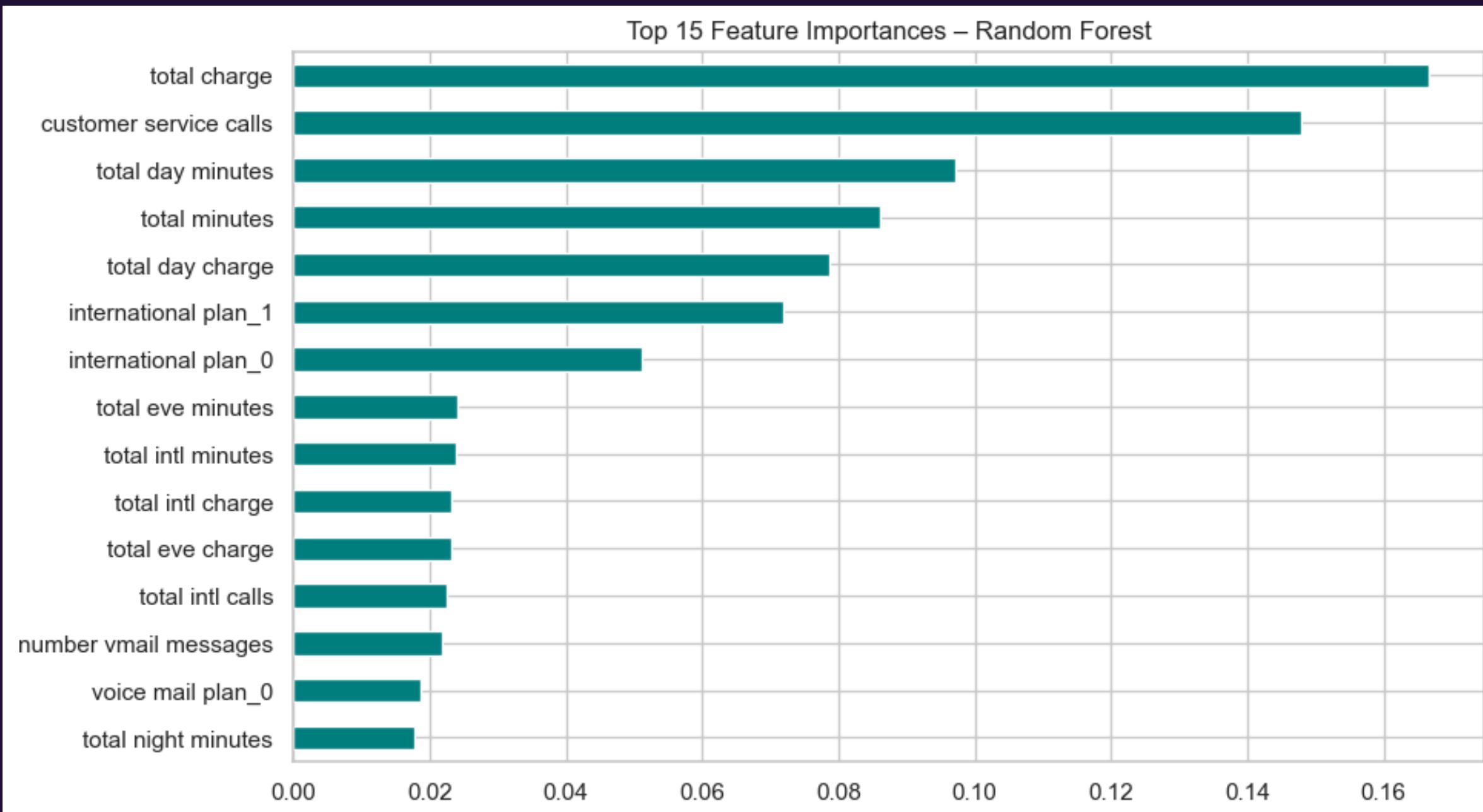
# DECISION TREE



THE DECISION TREE CONFIRMS THE SAME STRONG SIGNALS WE SAW IN EDA, BUT NOW SHOWS PRIORITIES AND COMBINATIONS. IT SHOWS THAT:

- \* VERY HIGH TOTAL MONTHLY BILL
  - CUSTOMERS PAYING SIGNIFICANTLY MORE ARE MUCH MORE LIKELY TO LEAVE.
- \* MULTIPLE CUSTOMER SERVICE CALLS ( $\geq 2$ )
  - FRUSTRATION / PROBLEMS NOT BEING SOLVED QUICKLY IS A MASSIVE RED FLAG.
- \* HAVING INTERNATIONAL PLAN (WITHOUT OFFSETTING BENEFITS LIKE VOICE MAIL)
  - LIKELY EXPENSIVE ADD-ON THAT DOESN'T DELIVER ENOUGH VALUE.
- \* STRONG PROTECTIVE FACTOR: HAVING VOICE MAIL PLAN
  - ACTS LIKE A LOYALTY ANCHOR.

# RANDOM FOREST



TOTAL CHARGE AND DAYTIME USAGE/CHARGE DOMINATE THE TOP RANKS. CUSTOMERS WITH THE HIGHEST OVERALL MONTHLY BILL ARE FAR MORE LIKELY TO LEAVE.

CUSTOMER SERVICE CALLS IS THE SECOND MOST IMPORTANT FEATURE. NUMBER OF TIMES THE CUSTOMER CONTACTED SUPPORT. MULTIPLE CALLS = VERY HIGH CHURN RISK (FRUSTRATION, UNRESOLVED ISSUES).

HIGH TOTAL MINUTES / DAY MINUTES MATTER BECAUSE THEY DRIVE UP THE BILL NOT BECAUSE OF USAGE ITSELF.



# EVALUATION

THE MODELS WERE TESTED ON UNSEEN DATA TO ENSURE RELIABILITY.

IN PLAIN TERMS:

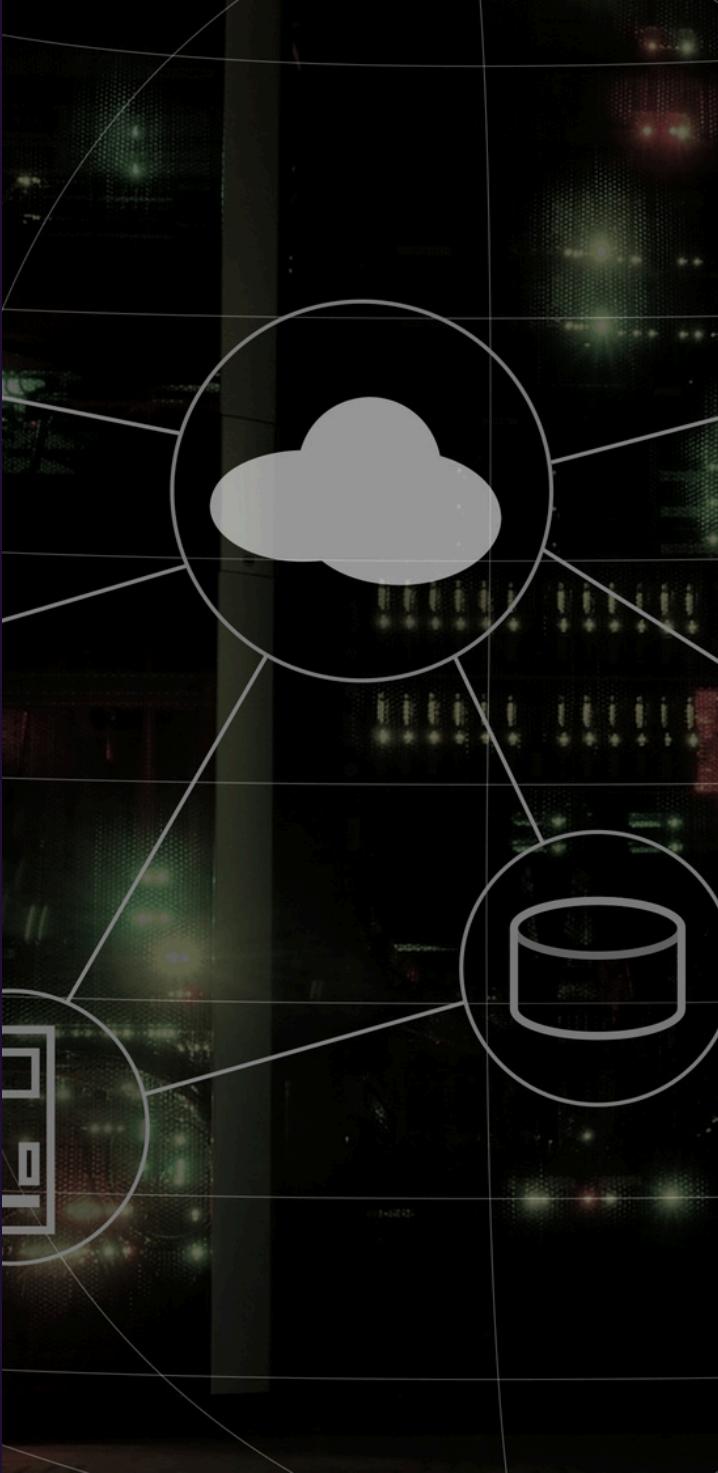
- ACCURACY: HOW OFTEN THE PREDICTION IS RIGHT OVERALL.
- RECALL FOR CHURN: HOW MANY ACTUAL LEAVERS WE CATCH (KEY FOR RETENTION).



## EVALUATION

- RANDOM FOREST: 91% CONFIDENCE (ROC-AUC 0.908), CATCHES 79% OF CHURNERS, 96% ACCURATE.
- DECISION TREE: 87% CONFIDENCE, CATCHES 78% OF CHURNERS, 97% ACCURATE.
- LOGISTIC: 80% CONFIDENCE, CATCHES 69% OF CHURNERS, 75% ACCURATE.

THIS MEANS THAT RANDOM FOREST IS THE MOST RELIABLE FOR SPOTTING RISKS WITHOUT FALSE ALARMS



# RECOMMENDATIONS

BASED ON THE DATA:

- BUNDLE SERVICES: OFFER VOICE MAIL FREE WITH INTERNATIONAL PLANS WHICH COULD HALF THE CHURN
- TARGET REGIONS: FOCUS PROMOTIONS IN CA, NJ, TX BY CHARGING DISCOUNTS.
- PROACTIVE SUPPORT: FLAG CUSTOMERS WITH MORE THAN 4 SERVICE CALLS FOR IMMEDIATE OUTREACH (FOR EXAMPLE, CREDITS)
- TOP DRIVERS: HIGH CHARGES AND CALLS. REVIEW PRICING AND IMPROVE FIRST-CALL RESOLUTION.
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# THANK YOU