# Customer Churn Prediction - Stakeholder Report

1. Executive Summary  
This analysis examines customer churn using historical data to identify patterns, predict which customers are most likely to leave, and suggest business strategies to improve retention. We developed and evaluated a Random Forest model, achieving a recall rate of over 80% after threshold tuning, meaning we can identify 8 out of 10 customers likely to churn.

2. Key Findings & Patterns  
- High monthly charges, low tenure, and month-to-month contracts are strong churn indicators.  
- Customers without extra services (like online security, tech support) churn more often.  
- Those with long-term contracts and higher tenure tend to stay.  
- Churn rate overall is significant enough to impact revenue if unaddressed.

3. Model Performance  
Two versions of the Random Forest model were tested:  
- Baseline: Accuracy ~60%, Precision ~0.554, Recall ~0.672, ROC-AUC ~0.620.  
- After threshold tuning: Accuracy dropped slightly to ~55%, Precision ~0.493, Recall ~0.806.  
The tuned model prioritizes catching as many churners as possible, which is valuable for retention campaigns.

4. Business Translation  
For every 100 customers flagged by the model:  
- Around 49 will actually churn.  
- 51 will be false positives (they would have stayed).  
This means campaigns will contact some customers who wouldn't have left, but the trade-off is preventing more actual churners from leaving.

5. Business Implications  
- Retention Campaigns: Focus on customers with high churn probability, especially those with month-to-month contracts.  
- Pricing Strategy: Consider incentives for high-risk customers with high monthly charges.  
- Service Bundling: Offer add-ons like tech support or streaming to increase stickiness.  
- Customer Experience: Improve support and engagement for customers with low tenure.  
- Revenue Impact: Reducing churn even by 10% can significantly improve yearly revenue.