In [ ]:

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import pandas as pd
import matplotlib.pyplot as plt
import matplotlib.dates as mdates
from datetime import datetime, timedelta
import random

# Step 1: Generate Synthetic Client Lifecycle Data
events = [
    "Signed Up",
    "Email Verified",
    "First Purchase",
    "Support Ticket Raised",
    "Renewal",
    "Churn Predicted"
]

# Generate random dates with incremental gaps
base_date = datetime(2024, 1, 1)
event_dates = [base_date + timedelta(days=15 * i + random.randint(0, 5)) for i in r

# Create a DataFrame
lifecycle_df = pd.DataFrame({
    "Event": events,
    "Date": event_dates
})

# Display the synthetic data (optional)
print("Synthetic Client Lifecycle Data:")
print(lifecycle_df)

# Step 2: Plot Timeline
plt.figure(figsize=(12, 3))
plt.plot(lifecycle_df["Date"], [1]*len(events), "o-", color="darkblue", markersize=

# Annotate each point with event name
for i, row in lifecycle_df.iterrows():
    plt.text(row["Date"], 1.02, row["Event"], ha='center', fontsize=9, rotation=45)

# Formatting the x-axis
plt.gca().xaxis.set_major_formatter(mdates.DateFormatter('%b %d, %Y'))
plt.gca().xaxis.set_major_locator(mdates.DayLocator(interval=10))
plt.ylim(0.95, 1.1)
plt.yticks([])  # Hide y-axis ticks
plt.title("Client Lifecycle Timeline", fontsize=14)
plt.grid(axis='x', linestyle='--', alpha=0.7)
plt.tight_layout()

# Show the plot
plt.show()
```