

Sizar Simaan Home Assignment

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In this TP I will scope on :

- Functional validation of the scheduled job and API triggers
- Database validation for accurate updates to subscription status, expiration dates, and payment attempts
- Notification system verification.
- Edge cases, performance, and recovery testing.

ENV Setup :

- Database : Use MongoDB or SQL to store subscription data
- API Testing : Use Postman tool to trigger the `/api/renew_subscriptions` endpoint
- Email Validation : Set up a test email inbox for notification verification.

Test Scenarios :

1. Renewal Trigger

Test ID	Scenario	Steps	Expected Result
TC1-1	Scheduled job runs automatically.	Wait for the daily job execution or schedule a task.	Job runs without errors; logs confirm successful execution.
TC1-2	Trigger job via API	Use Postman to send a POST request to <code>/api/renew_subscriptions</code> .	API responds with 200 status; job processes subscriptions as expected.
TC1-3	Invalid API request	Trigger the API with missing/invalid parameters (for example , malformed JSON).	API responds with 400 status and an error message; no changes made in the database.

2. Renewal of Expired Subscriptoins

Test ID	Scenario	Steps	Expected Result
TC2-1	Renew valid expired subscriptions	Insert a subscription with an expired date and card_a_success .	- Status updated to "active". - Expiration date extended by one year. - Invoice sent via email.
TC2-2	Charge failed for expired subscriptions	Insert a subscription with an expired date and card_b_failure	- Status remains "inactive". - Expiration date unchanged. - Failure email sent to the client.
TC2-3	Future-dated subscriptions	Insert a subscription with an expiration date in the future.	Subscription is skipped; no updates made; logs confirm the subscription was ignored.

3. Renewal Failure – Payment Declined

Test ID	Scenario	Steps	Expected Result
TC3-1	Payment declined during renewal	Insert a subscription with card_b_failure and trigger the job.	- Subscription remains inactive. - Expiration date unchanged. - Failure email sent.
TC3-2	Expired credit card	Insert a subscription with an expired credit card and trigger the job.	- Subscription remains inactive. - Expiration date unchanged. - Expired card email sent.
TC3-3	Invalid card format	Insert a subscription with a malformed credit card number and trigger the job.	- Subscription remains inactive. - Expiration date unchanged. - Invalid card email sent.
TC3-4	Multiple declined attempts	Simulate multiple failed payment attempts (less than 10).	- Subscription remains inactive. - Payment attempts counter incremented.
TC3-5	Missing card details	Insert a subscription missing credit card details and trigger the job.	- Subscription remains inactive. - Expiration date unchanged. - Email requesting payment details sent.

4. Renewal Failure – 10 Consecutive Attempts

Test ID	Scenario	Steps	Expected Result
TC4-1	Repeated payment failures	Insert a subscription with a payment failure history of 9 attempts and card_b_failure. Trigger the job.	- 10th attempt fails. - Subscription flagged as "canceled". - Cancellation email sent.
TC4-2	Mixed success and failure	Insert subscriptions with varying payment statuses and histories.	Each subscription processes independently; logs confirm individual results.

5. Notifications

Test ID	Scenario	Steps	Expected Result
TC5-1	Successful renewal notification	Verify the email sent after a successful renewal.	Email contains correct renewal details (subscription ID, amount charged, expiration date).
TC5-2	Payment failure notification	Verify the email sent after a failed renewal.	Email explains the payment failure and suggests next steps.
TC5-3	Cancellation notification	Verify the email sent after cancellation due to repeated failures.	Email confirms subscription cancellation after 10 failed attempts.

6. Performance Testing

Test ID	Scenario	Steps	Expected Result
TC6-1	High-volume subscriptions	Insert 1 million subscriptions and trigger the job.	Job completes within acceptable time; no errors in logs.
TC6-2	Concurrency handling	Simultaneously trigger the API multiple times.	Only one instance processes subscriptions; others exit gracefully.

7. Recovery and Rollback

Test ID	Scenario	Steps	Expected Results
TC7-1	Job fails midway	Simulate a job failure by killing the process during execution.	Job resumes correctly on next execution; no duplicate processing.
TC7-2	Database connectivity issue	Simulate a database connection failure during the job.	Job retries connection as per configuration; logs capture detailed error messages.

8. Logs

Test ID	Scenario	Steps	Expected Result
TC8-1	Log validation	Trigger the job and verify logs for each step (subscription processing, payment attempts).	Logs accurately record all activities, including successes, failures, and skipped subscriptions.
TC8-2	Alert generation	Simulate a critical failure (database down).	Monitoring tools generate alerts for system admins.