Backend logic analysis before testing begins

General understanding

The game works through the Pragmatic Play backend service, which processes user actions (spins, winnings, balance updates) through a set of REST requests.

- All basic requests are sent to the domain:
  `https://demogamesfree.pragmaticplay.net/gs2c/`

This is the server part, which is responsible for the game logic, balance and settings.

- Telemetry data is sent separately to a third-party service:
  `https://clctr.ltguevmavv.com/collect`

It is only used to collect statistics and does not affect gameplay.

Main backend endpoints

Request type	**Endpoint**	**Appointment**
stats.do	/gs2c/stats.do?mgckey=<SESSION_KEY> (GET)	Sent on the game loads.
doSpin	`/ge/v3/gameService` (POST)	Spins the reels, places a bet, and receives the game result.
doCollect	`/ge/v3/gameService` (POST)	Confirms the winnings received and updates the balance.
reloadBalance	`/reloadBalance.do` (GET)	Returns the user's current balance after spins or page reloads.
saveSettings	`/saveSettings.do` (POST)	Save user settings (sound, game speed, bet size, etc.).
announcements/unread	`/announcements/unread/` (GET)	Checks for new messages or system announcements.
promo/frb/available	`/promo/frb/available/` (GET)	Checks for active bonuses (Free Rounds, promotions).
collect	`https://clctr.ltguevmavv.com/collect` (POST)	Sends technical information about the game's performance (response time, latency, browser data).

Session logic

All requests contain the parameter:

`mgckey=stylename@generic~SESSION@<UUID>`

This is a unique session key that identifies the player.
The key is passed in every request - without it, the server will not process the action.
Since the parameter is visible directly in the request (and not in a cookie or header), it can theoretically be replaced manually.
This is a potential risk area if the server does not check the validity or expiration of the session.

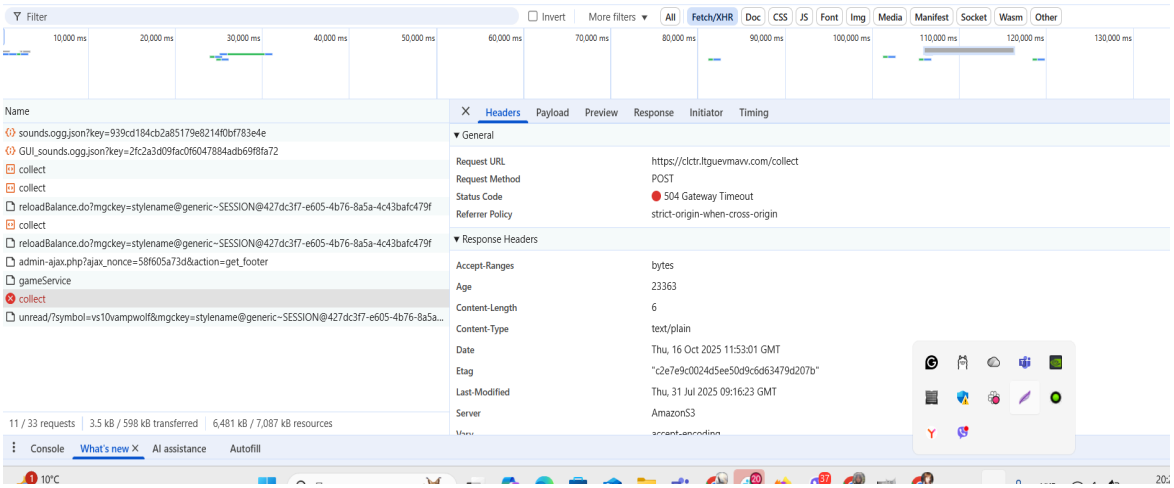
Bug reports

Bug 1- Telemetry POST Occasionally Returns 504 Timeout

Accepted result:

During gameplay, telemetry request occasionally fails with 504 Gateway Timeout instead of expected 202 Accepted.

`Telemetry request (POST https://clctr.ltguevmavv.com/collect) returns 504 Gateway Timeout`



Expected result:

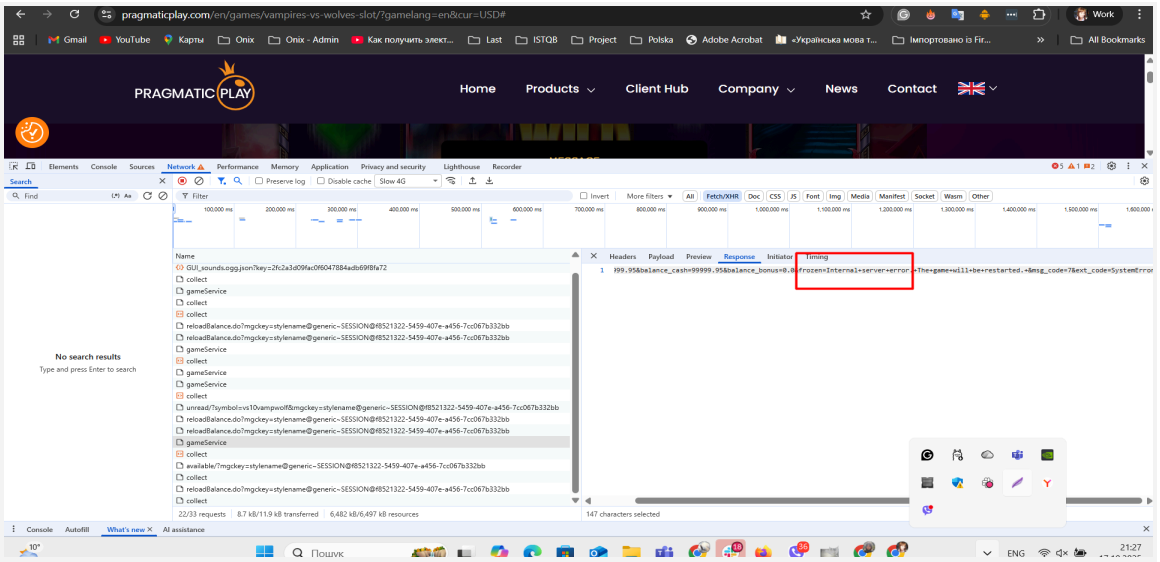
Telemetry service (POST https://clctr.ltguevmavv.com/collect) should always respond with **HTTP 202**

Bug 2 - Session freeze (Internal Server Error)

Accepted result:

When the old `doSpin` request is sent via Postman or another client using the same `mgckey` but with the previous index/counter, a 200 OK response is returned by the server:

`balance=99999.95&balance_cash=99999.95&balance_bonus=0.0&frozen=Internal+server+error.+The+game+will+be+restarted.&msg_code=11&ext_code=SystemError`



Pay attention The same issue bug if the request is sent via Postman with the previous index/counter and then the user returns to the website.

Expected result:

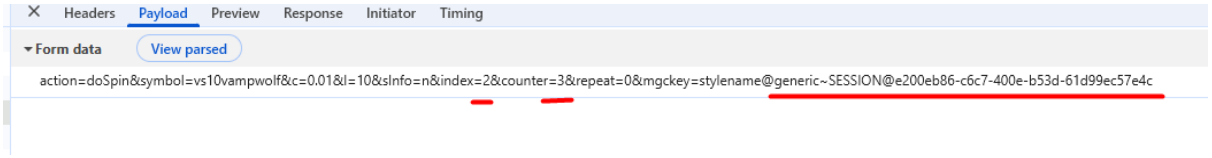
Server rejects duplicate or out-of-order requests without affecting the session.

Bug 3 - Duplicate spin request with the same `index` and `counter` is processed as the new spin instead of being ignored or replayed.

- `POST https://demogamesfree.pragmaticplay.net/gs2c/ge/v3/gameService`

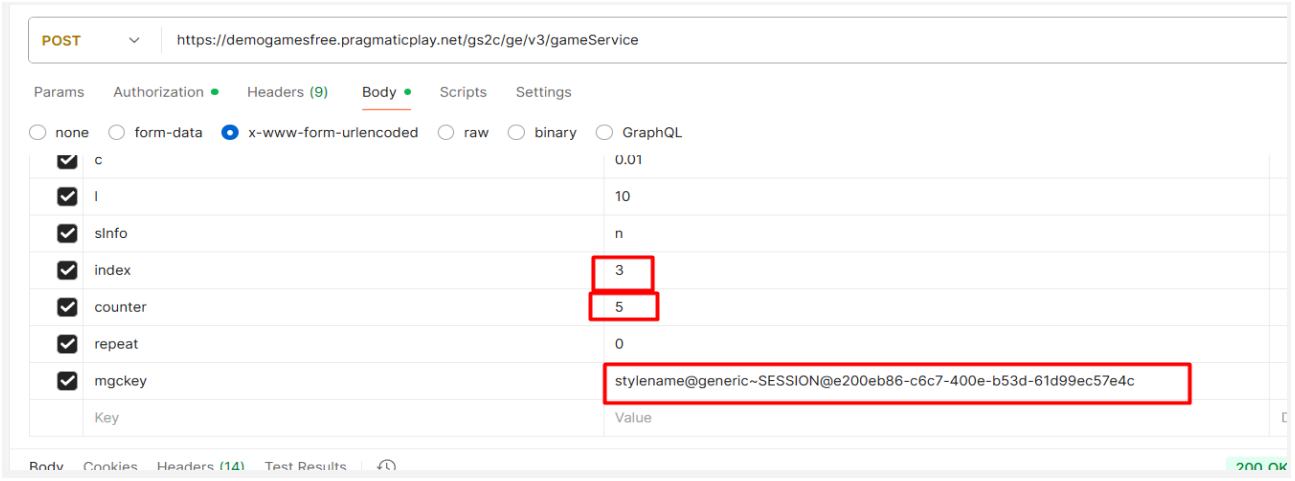
Steps for reproducing

1. Start the game "Vamp Wolf".
2. Send a spin request:
   `action=doSpin&symbol=vs10vampwolf&c=0.01&l=10&sInfo=n&index=2&counter=3`

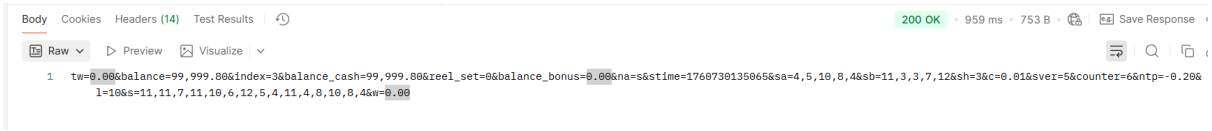


   → Server responds correctly (`index=2, balance=99999.90, ntp=-0.10`).

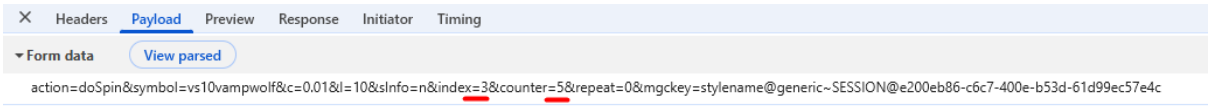
3. Send the next spin request manually via Postman:
   `index=3&counter=5`



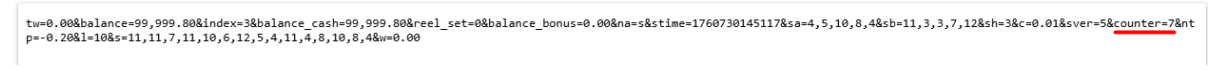
   → Server responds correctly (`balance=99999.80, ntp=-0.20`)



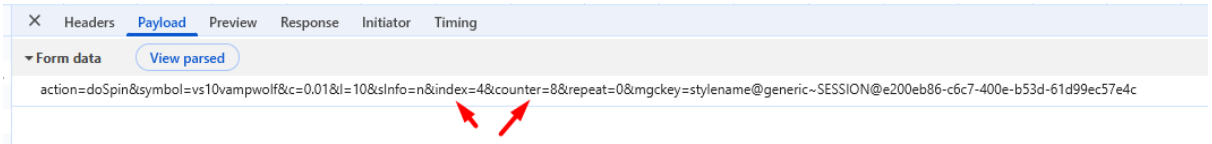
4. Resend the **same spin request** again with the same `index=3` and `counter=5` (from the game client).



5. Observe that the response contains an updated `counter=7` and a new `stime` value, instead of being treated as a duplicate request.



6. The game then continues to process the next spin normally (`index=4, counter=8`).



Actual Result:

The backend processes a repeated spin request with the same `index` and `counter` as a **new spin** and returns a response with a different `counter` and `stime`.
This can cause:

- double bet deduction,
- inconsistent player balance,
- desynchronization between client and server.

Expected Result:

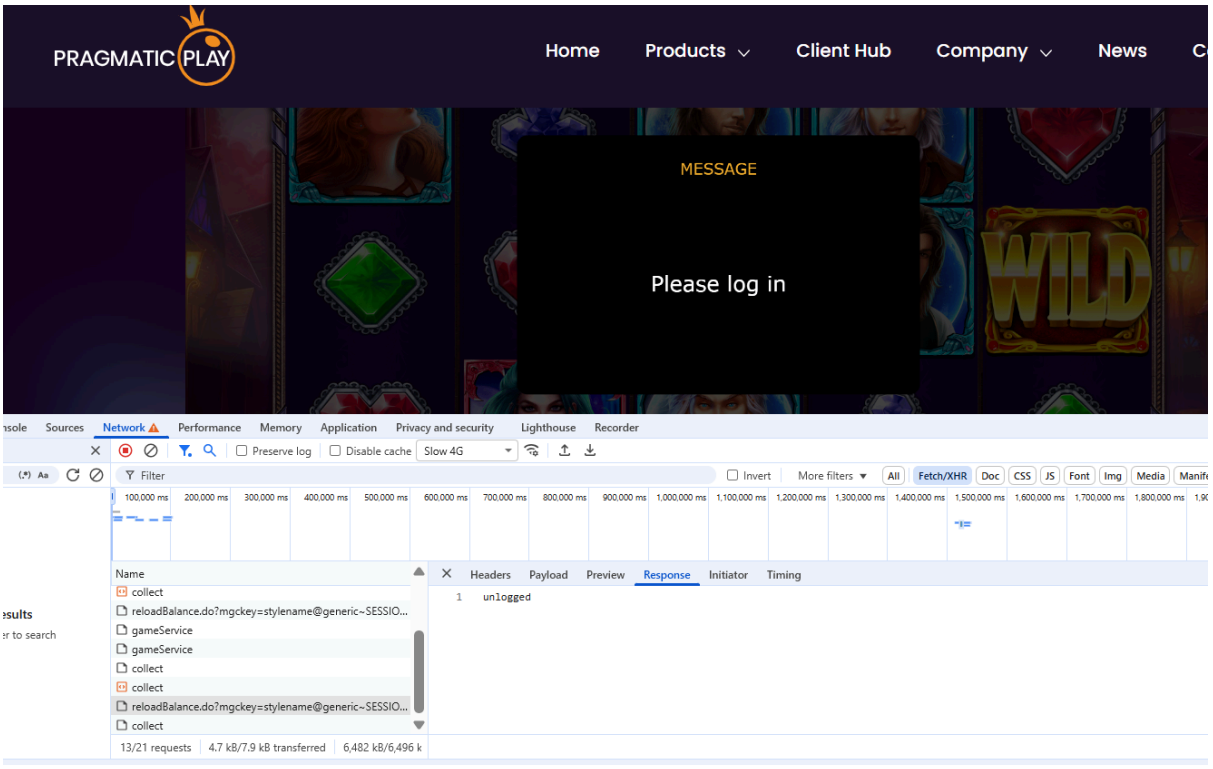
The backend should recognize repeated requests (same `index` and `counter`) as **duplicates** and either:

- return the **same response** as before (replay protection) OR
- return an error / flag such as **"`duplicate request detected`"**, without changing the game state or balance.

Bug 4 - Misleading "Please log in" on demo session expiry

Actual Result:

When the game session expires in demo mode, the backend returns a generic *"Please log in"* response, causing misleading behavior on the client side.



Expected Result:

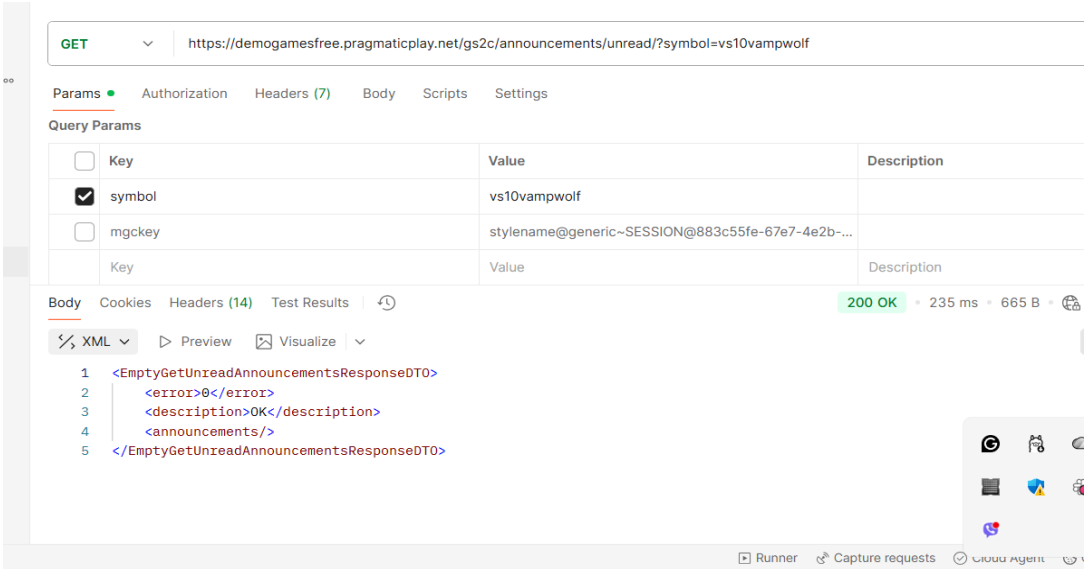
When the demo session expires, the server should return a clear message such as "Session expired, please reload the page"" or "Demo session expired, please reload", rather than "Please log in" which implies real account authentication.

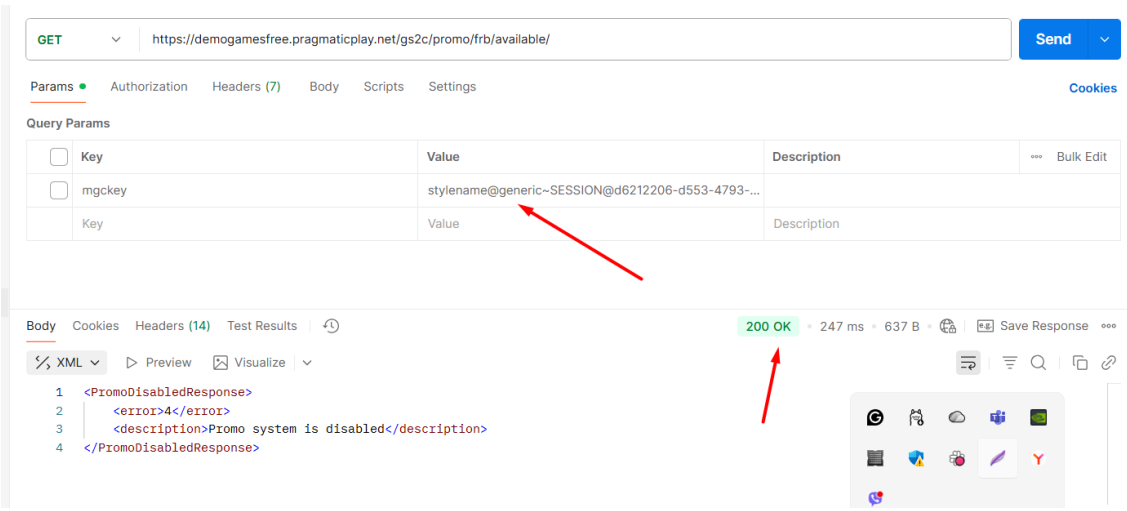
Bug 5 - Endpoint does not validate session key (`mgckey`)

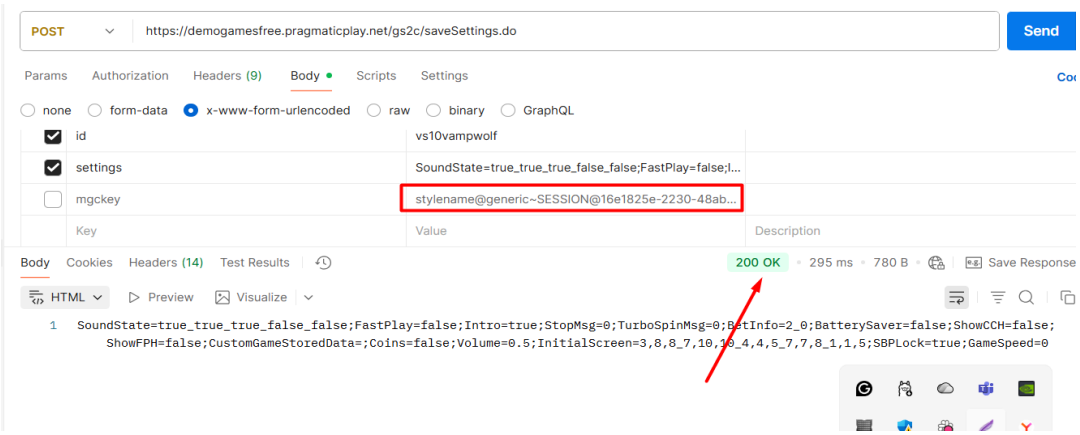
- `GET /announcements/unread`
- `GET /promo/frb/available`
- `POST /saveSettings.do`

Actual Result:

Endpoint does not validate session key (`mgckey`) and returns 200 OK even without authentication. It is possible to send requests with an invalid, expired, or missing `mgckey.`







Expected Result:

Each endpoint (`/announcements/unread, /promo/frb/available, /saveSettings.do`) must validate `mgckey`.

Requests with missing, invalid, or expired keys should return unlogged.

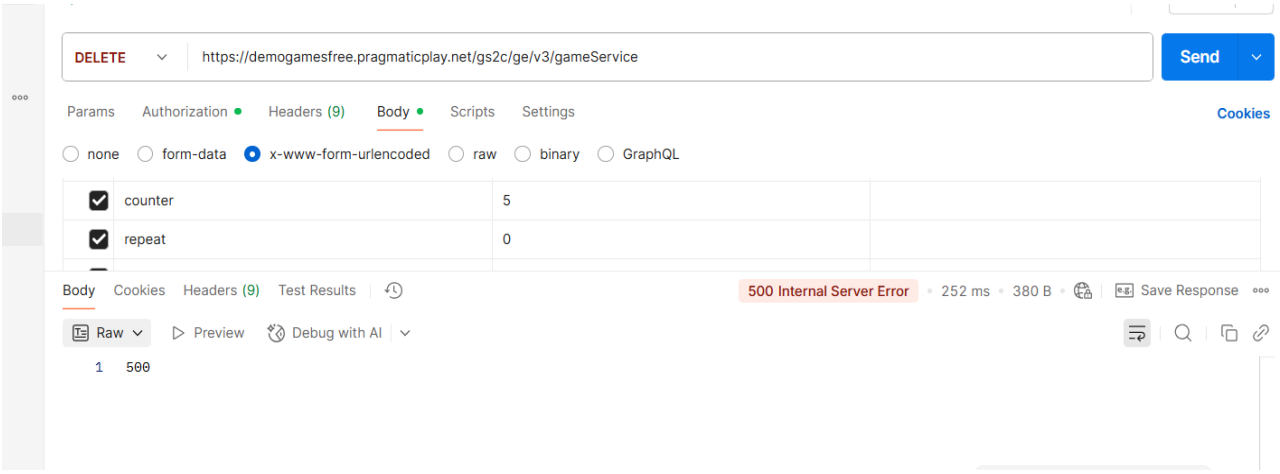
Bug 6 - The 500 Internal Server Error returns after changing the HTTP method for all endpoints

Actual result:

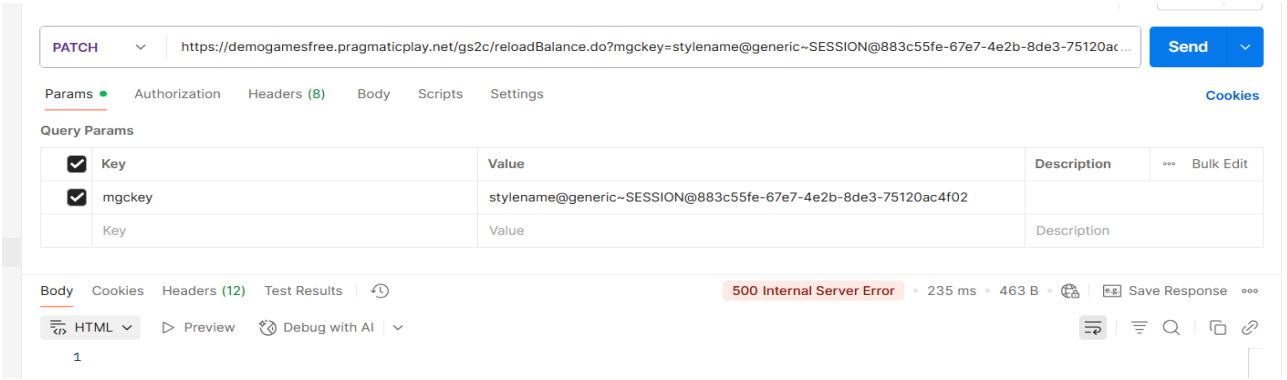
Server returns 500 Internal Server Error when unsupported HTTP methods (GET, PUT, PATCH, DELETE) are sent to endpoints such as `/ge/v3/gameService`, `/reloadBalance.do`, `/saveSettings.do`, `/announcements/unread/`, `/promo/frb/available/`.

Instead of rejecting invalid methods, the backend fails internally without a clear validation message.

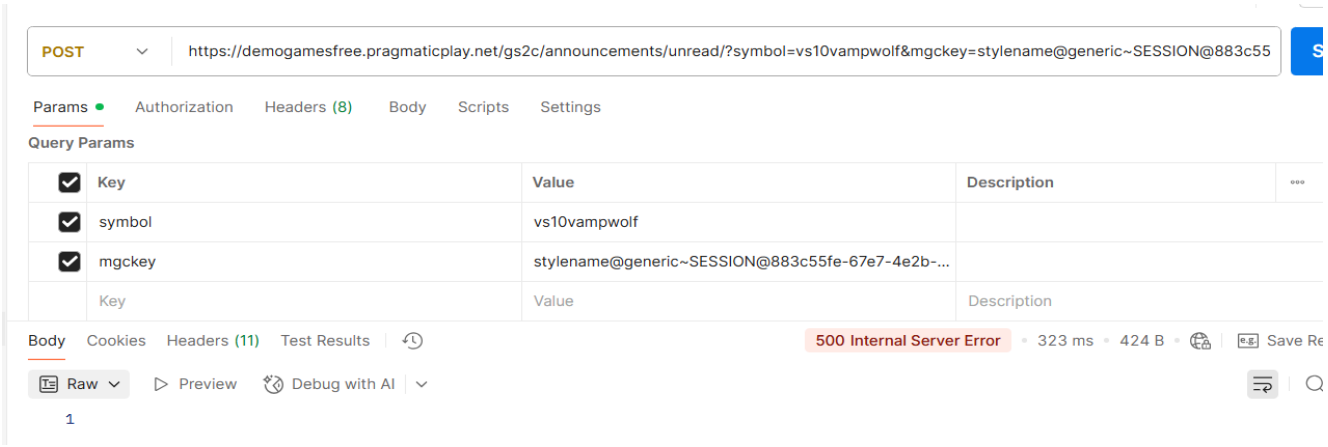
- `POST /ge/v3/gameService` from POST to GET/DELETE/PUT/PATH



- `GET /reloadBalance.do` - change to PATCH, PUT, DELETE



- GET `/announcements/unread/ -` change to PATCH, PUT, DELETE



- The same situation to GET `/promo/frb/available/` , POST `/saveSettings.do`

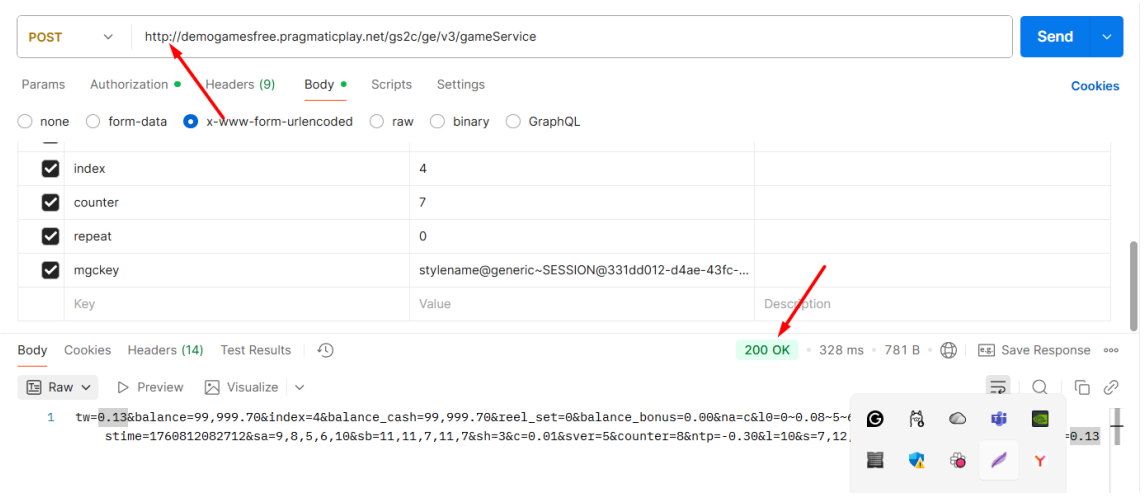
Expected Result:

Server must reject unsupported methods with a `405 Method Not Allowed` or a clear error response.
No 500 Internal Server Error should occur.

Bug 7 - Non-secure HTTP request accepted – no HTTPS enforcement

Actual result:

Server accepts non-secure (HTTP) requests and returns 200 OK instead of rejecting or redirecting to HTTPS. The bug is repeated for all endpoints.



Expected Result:

Server should reject all non-secure (HTTP) requests with `400 Bad Request` or `301 Redirect to HTTPS.`

Only HTTPS traffic must be processed successfully.

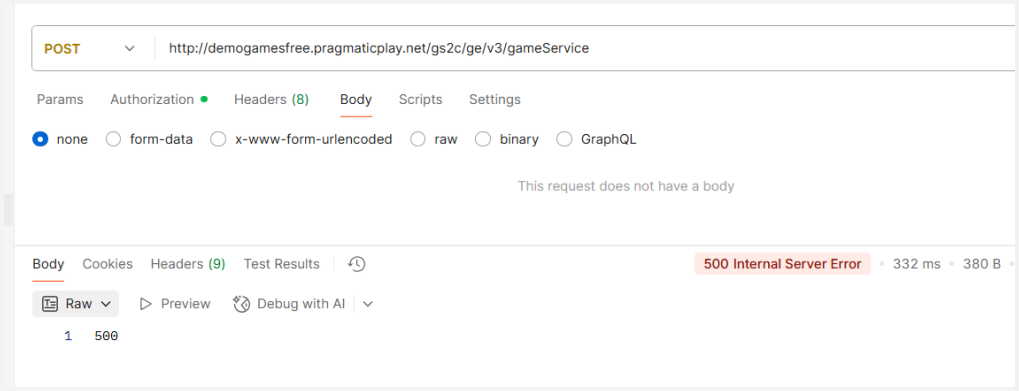
Bug 8 - the 500 Internal Server Error when sending with the empty body

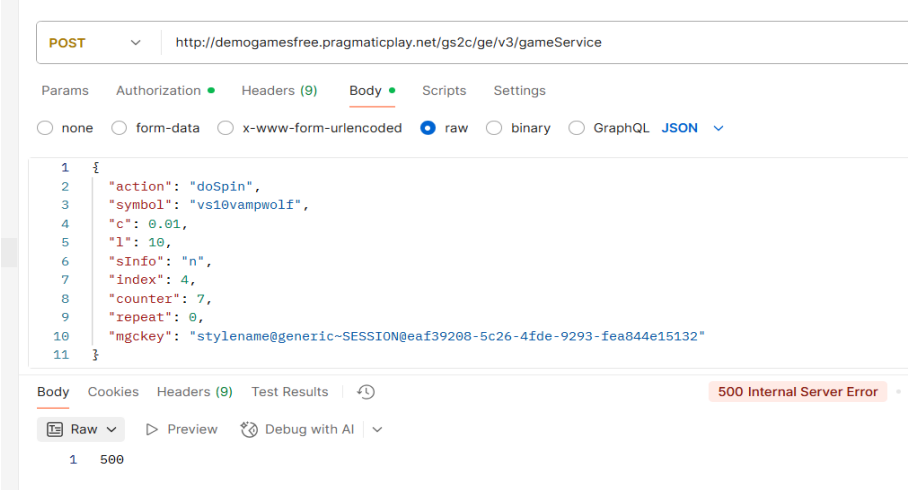
Actual result:

The 500 Internal server error returns after sending the request with empty body.

The same situation after sending body with the wrong format using application/json instead of form-data.

- POST /ge/v3/gameService





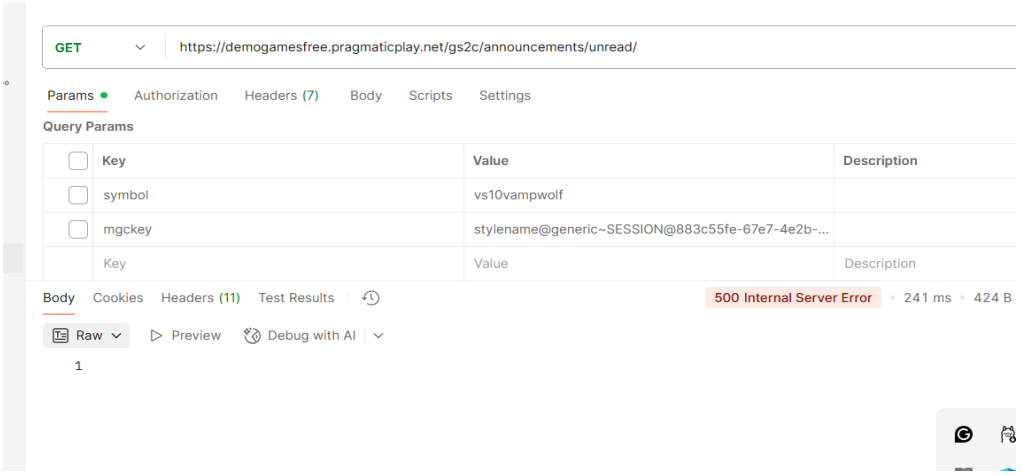
Expected Result:

Server should handle missing or malformed request bodies gracefully — returning a 400 Bad Request or 422 Unprocessable Entity error.
The system must not return 500 Internal Server Error or crash.

Bug 9 - The Internal Server error when required parameter symbol is missing.

Actual Result:
Server returns 500 Internal Server Error when the required parameter symbol is missing.
No descriptive validation message is provided in the response body.

- GET `/announcements/unread/`

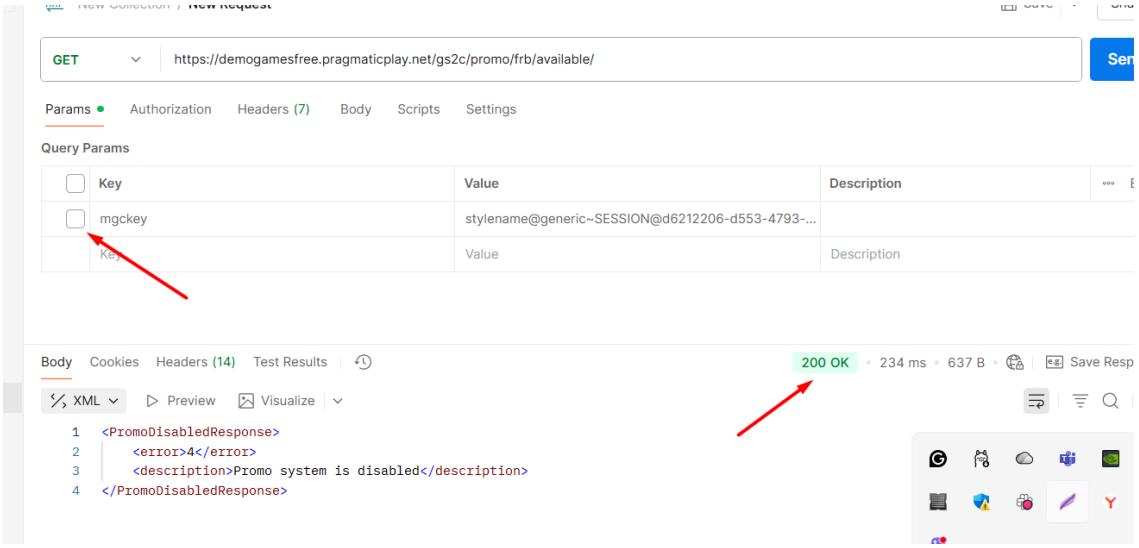


Expected Result:
When required parameters (e.g. `symbol`) are missing, the server should return a structured 4xx validation error (e.g. `"error": "missing parameter"`) without crashing or returning 500.

Bug 10 - the 200 OK status after sending the request without params

Actual Result:
Server returns 200 OK even when the request contains no parameters or payload.
No validation error or warning is triggered.

- GET `/promo/frb/available`



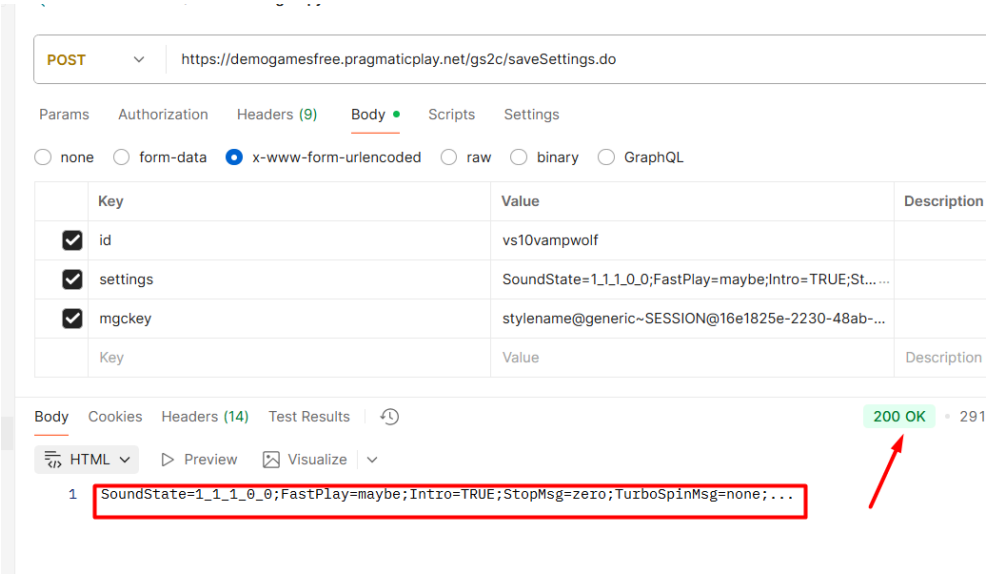
Expected Result:
If no parameters are provided, the backend should respond with a 4xx error `(400 Bad Request)` indicating invalid or missing input. It should never return `200 OK`.

Bug 11 - No validation in saveSettings endpoint

Actual Result:

The server accepts and returns any settings values (`saveSettings`) without validation - it responds with 200 OK and echoes the data sent. This is a lack of server validation/sanitization, which leads to stability and security risks (should return 4xx for invalid or malicious input).

- POST `/saveSettings.do`



Expected Result:

The `/saveSettings.do` endpoint should validate incoming user preferences. Invalid, out-of-range, or malicious values must trigger a **4xx validation error**; the server must not echo or store arbitrary data.

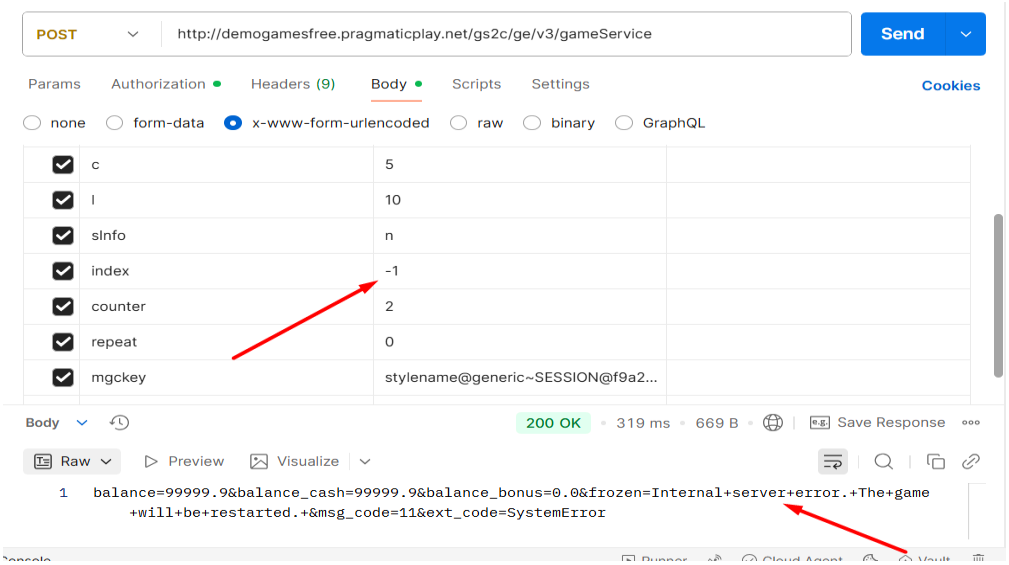
Bug 12 - The session is frozen after sending endpoint with invalid params

Actual Result:

Negative input validation: server must return 4xx on invalid parameters; currently it accepts/echoes values (or returns 200) - validation missing.

Session stability: sending malformed/out-of-order requests causes sessions to become `frozen` (Internal Server Error); expected behaviour is to reject input without corrupting session.

- `POST /ge/v3/gameService`



Expected Result:

Requests containing invalid parameter types or negative values should be rejected with 4xx errors, without affecting active sessions.

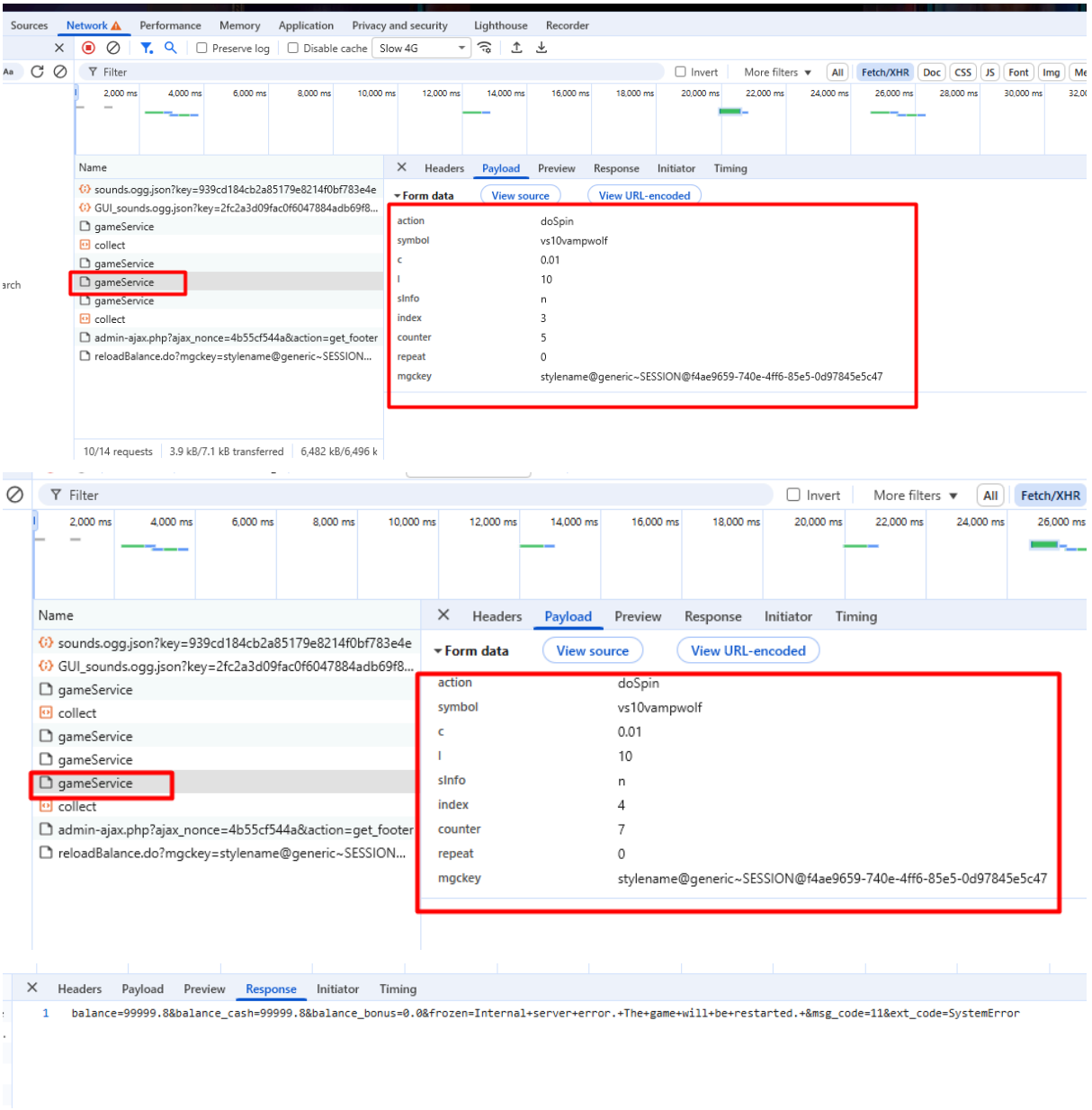
The backend must maintain session integrity and avoid Internal Server Errors.

Bug 13 - The session is frozen after sending the duplicate request from the Network.

Actual result:

When duplicate doSpin or doCollect requests are sent from the network, the backend processes them repeatedly instead of ignoring duplicates. As a result, the session becomes frozen, and further requests stop being processed correctly.

- `POST doSpin /ge/v3/gameService`
- `POST doCollect /ge/v3/gameService`



Expected Result:

Backend should detect and ignore **duplicate network requests** (for `doSpin` or `doCollect`) to prevent double balance updates or crashes.

Only one request should be processed; repeated ones should be ignored or return the same response safely.

Test Design Techniques Used

During backend and functional testing of *the Vampires vs Wolves game*, the following ISTQB test design techniques were applied:

- **Equivalence Partitioning (EP)**

Used to validate API parameters and input data ranges (e.g. bet size `c`, lines `l`, valid/invalid `mgckey`).
Applied in tests verifying correct and incorrect parameter values, missing parameters, and invalid types (Bugs 9-12).

- **Boundary Value Analysis (BVA)**

Applied to test edge values for numeric inputs (e.g. minimum/maximum bet amount, line count, session lifetime).
Used in spin and balance validation scenarios where bet or balance limits are reached.

- **Decision Table Testing**

Used to verify combinations of valid/invalid conditions, such as request method + authentication + mgckey state.
For example, verifying responses for valid/expired/missing session keys (Bugs 2, 5) or method change behavior (Bug 6).

- **State Transition Testing**

Applied to verify correct state changes between "Idle → Spinning → Win → Collect → Idle" and session transitions.
Used in replay protection, duplicate requests (Bugs 2, 3, 13), and session expiration (Bug 4).

- **Error Guessing**

Based on tester intuition and experience to find unhandled errors like internal server errors (500), timeouts, or incorrect error messages.
Applied in tests for invalid HTTP methods, empty bodies, and non-secure HTTP requests (Bugs 6-8).

- **Use Case Testing**

Used to simulate realistic player behavior: spin, win, collect, reload balance, and adjust settings.
Ensured backend logic worked correctly across normal game flow and promo availability scenarios.

- **Exploratory Testing**

Performed to investigate unexpected backend behavior during concurrent sessions and replayed requests.
Helped uncover race conditions, duplicate handling issues, and inconsistent balance updates (Bugs 2, 3, 13).