

Moodle auto-grading flow

Authors: M. Bovel, B. Jobstmann, H. Remmal

Date: September 1, 2023

1. Request /grade

When a student submits their code on Moodle, our plugin makes an HTTP request to moodle-autograde.epfl.ch with the submission ID. This request is secured through authentication using a secret token, which is configured within the Moodle course settings. Moreover, the connection to moodle-autograde.epfl.ch is safeguarded by EPFL's official load balancer and encryption is provided through SSL.

2. Launch Grading job

Upon receipt of the request, the web service launches a grading job. Each grading job comprises three sequentially running containers:

1. **Setup Container:** Tasked with fetching the submitted files.
2. **Grading Container:** The core component that evaluates the student's code.
3. **Teardown Container:** Manages the upload of feedback post-evaluation.

Note that the Moodle token is not shared with the containers. These containers do not have access to the Moodle API directly, but instead communicate with moodle-autograde.epfl.ch endpoints. These endpoints are secured using a secret HMAC passed only to the Setup and Teardown containers, ensuring the grading job accesses only the specific submission it's meant to evaluate, guaranteeing data integrity and security.

3. Request /download

At this stage, the Setup Container sends a request to moodle-autograde.epfl.ch to fetch the student's submitted files. This request is secured using the HMAC mentioned in step 2.

4. Call download_submission

Responding to the aforementioned request, moodle-autograde.epfl.ch channels the call towards the `mod_assignsubmission_autograde_download_submission` Moodle function.

This specific function is a component of the AUTOGRADE service. It's designed to be active only for the AUTOGRADE BOT, which is confined to

accessing specified courses (notably CS-107 and CS-214 during the pilot phase).

The call's legitimacy is verified through an authentication token, uniquely generated for the AUTOGRADE BOT by Moodle's administrator.

5. Grading container

The student code's evaluation is conducted within the Grading container. This container environment is isolated, ensuring it doesn't possess any direct communication capabilities with the web service, thus maintaining the integrity and security of the grading process.

6. Request /upload

This request is dispatched to submit the feedback files and the respective grade, similarly to step 3. This request is secured using the HMAC mentioned in step 2.

7. Call upload_feedback

Concluding the process, moodle-autograde.epfl.ch redirects the request to the `mod_assignsubmission_autograde_upload_feedback` Moodle function, similarly to step 4.

