# Cloudflare Worker Setup for ESP32 AI Chatbot

**What this does**

This project uses a Cloudflare Worker as a lightweight backend. The ESP32 sends a request to the Worker, the Worker calls a hosted AI model (Workers AI), and returns the response back to the device.

## 1) Create a Cloudflare account

1. Go to Cloudflare and log in.
2. Open the Cloudflare Dashboard.

## 2) Create a new Worker

3. Open Workers & Pages.
4. Click Create application.
5. Select Worker.
6. Click Create Worker.
7. Give it a name (example: esp32-llm).

## 3) Add Workers AI binding (required)

Our Worker code uses env.AI.run(...), so we must enable Workers AI and bind it to the variable name AI.

8. In your Worker page, open Settings.
9. Open Bindings.
10. Add a binding:

- Type: AI
- Variable name: AI
- Important: the variable name must be exactly AI.

## 4) Add AUTH_TOKEN secret (required)

This token protects your Worker so random people can't spam your endpoint or burn your quota.

11. In the same Worker page, go to Settings -> Variables.
12. Under Secrets, click Add.
13. Name: AUTH_TOKEN
14. Value: choose your own long random token.
15. Save.

## 5) Paste the Worker code

16. Go back to the Worker editor (the code tab).
17. Replace the default code with the provided worker.js code from the repo.
18. Click Save and Deploy.

## 6) Copy your Worker endpoint URL

After deploying, your endpoint will look like:

```
https://YOUR-WORKER-NAME.YOUR-SUBDOMAIN.workers.dev
```

This project expects the route /api/generate, so the full API endpoint is:

```
https://YOUR-WORKER-NAME.YOUR-SUBDOMAIN.workers.dev/api/generate
```

## 7) Update the ESP32 code (OLLAMA_URL)

In ai_client.cpp, set OLLAMA_URL to your Worker endpoint, for example:

```
OLLAMA_URL = "https://YOUR-WORKER...workers.dev/api/generate";
```

## 8) Set the same token on the ESP32 (Serial Monitor)

On first boot, the ESP32 will ask for your token. You only need to do this once because the token is stored in flash (NVS).

19. Upload the sketch to the ESP32.
20. Open Serial Monitor.
21. Set baud rate to 115200.
22. Paste the same token you saved in Cloudflare (AUTH_TOKEN).
23. Press Enter.

## Common issues

- 401 Unauthorized: Your ESP32 token does not match Cloudflare AUTH_TOKEN. Fix: run SET_TOKEN <your_token> in Serial Monitor.
- 404 Not found: Make sure your ESP32 URL ends with /api/generate.
- No response: Confirm you added the Workers AI binding named AI, and the ESP32 is connected to Wi-Fi.