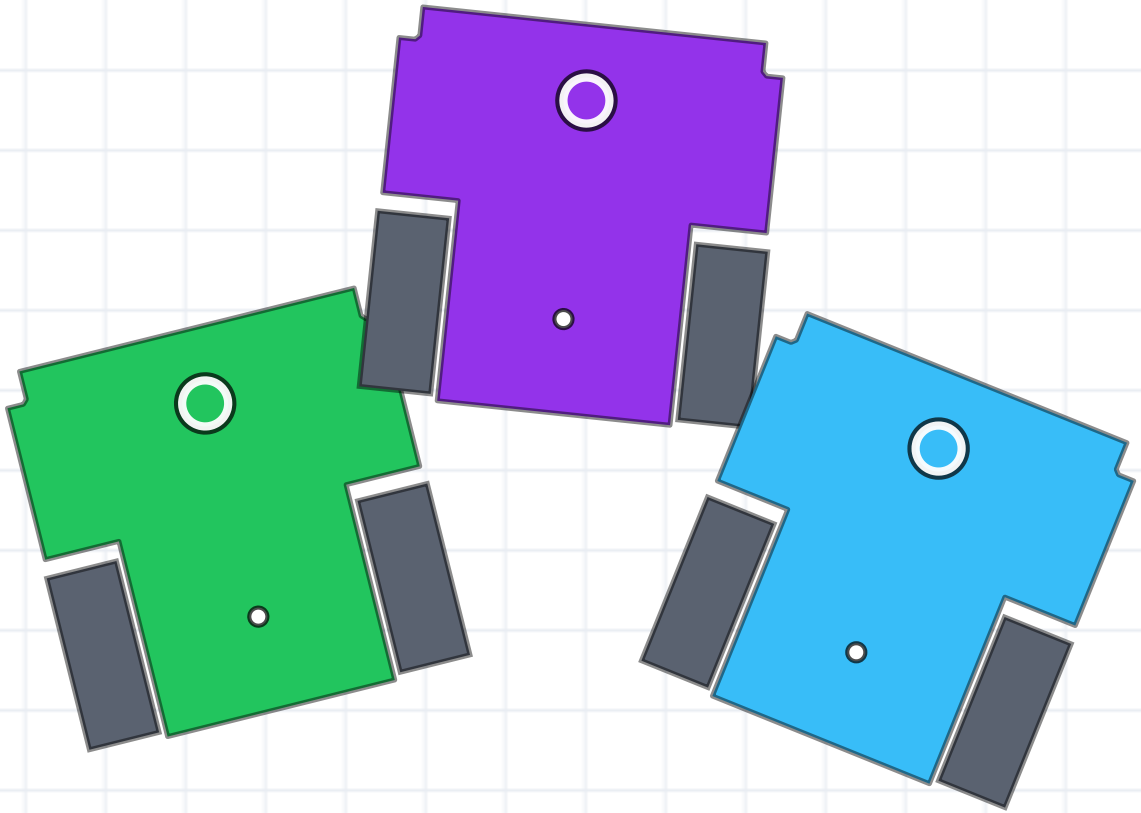
IETF 127 HACKATHON · LAKE WG

DotBots in the LAKE

The **LAKE** handshake (EDHOC, RFC 9528) on a swarm of robots, over the air.

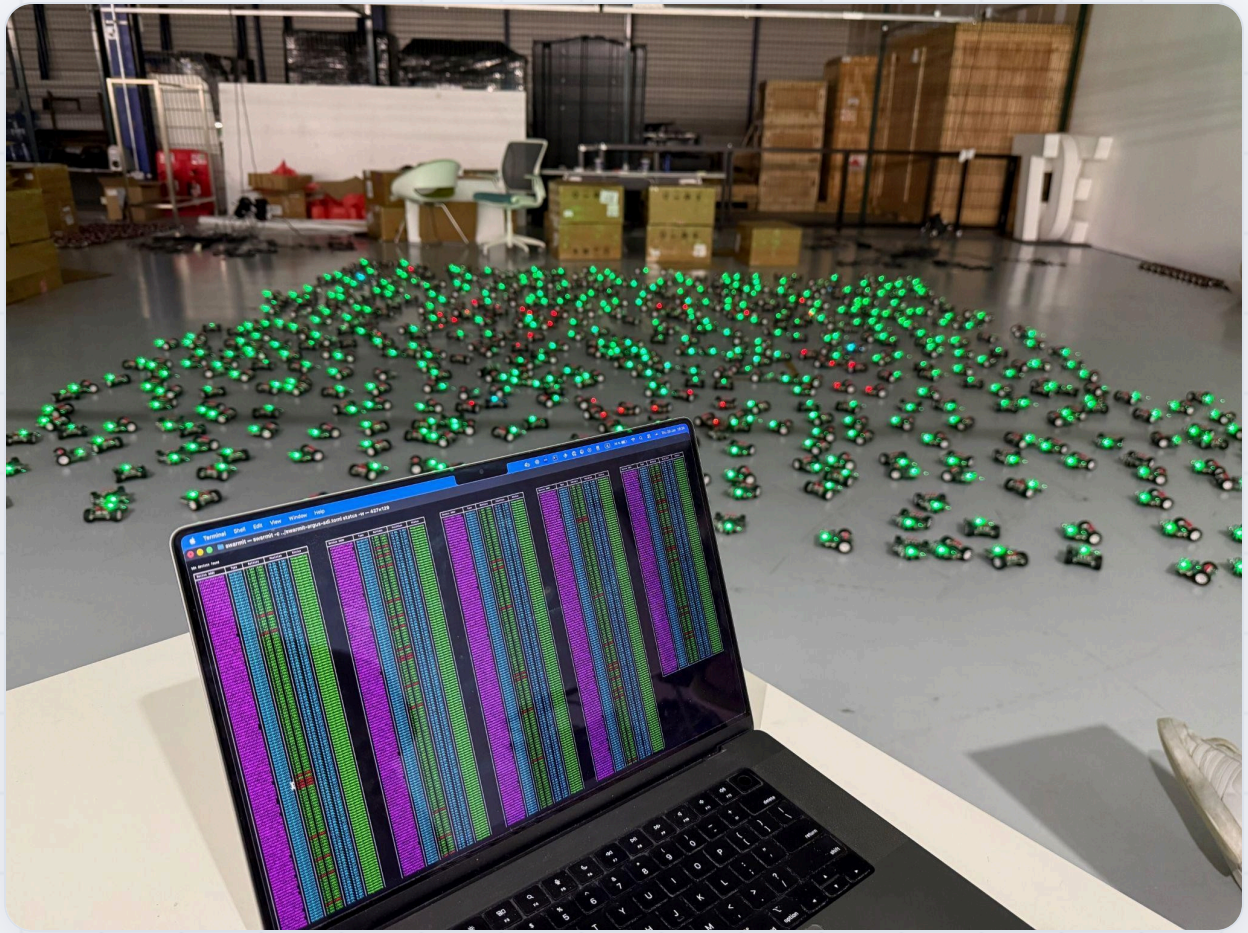
Geovane Fedrecheski
geovane.fedrecheski@inria.fr

San Francisco · November 2026



CONTEXT

A testbed of up to 1,000 robots



1,000

DotBots in the Inria testbed

We want IETF protocols to run on **all of them**.

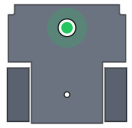
`pydotbot.readthedocs.io`

PROBLEM

From one robot to a swarm

IETF 126 · Vienna

One robot, loopback



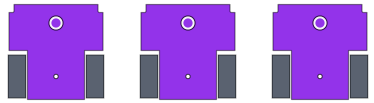
Initiator ⇄ Responder
inside one sandbox

813 ms

→

IETF 127 · now

A swarm, over the air



each robot with **its own key**

why A charging station must know **which robot** is charging, to bill it. Next step: **ELA** (lake-authz).

APPROACH

Every robot is a LAKE Initiator

robot **Initiator**
lakers (Rust), in the TrustZone sandbox
`$ cargo add lakers`

server **Responder**
lakers-python backend
`$ pip install lakers-python`

PER-ROBOT IDENTITY

device id 8 B → **HKDF** demo secret → **P-256 key** → **CRED_I** kid = device id → **server check** kid == radio address

ONE CLICK

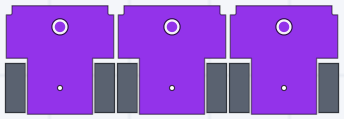
Run all from the live web page

ROBOT LED

idle **handshake** **OK** **fail**

ARCHITECTURE

From robot to browser



3 DotBots · Initiators

Mari radio

gateway
USB

broker
MQTT / TLS

LAKE Responder
lakers-python

live page
browser

Robot (Initiator)

Server (Responder)

message_1 **37 B** →

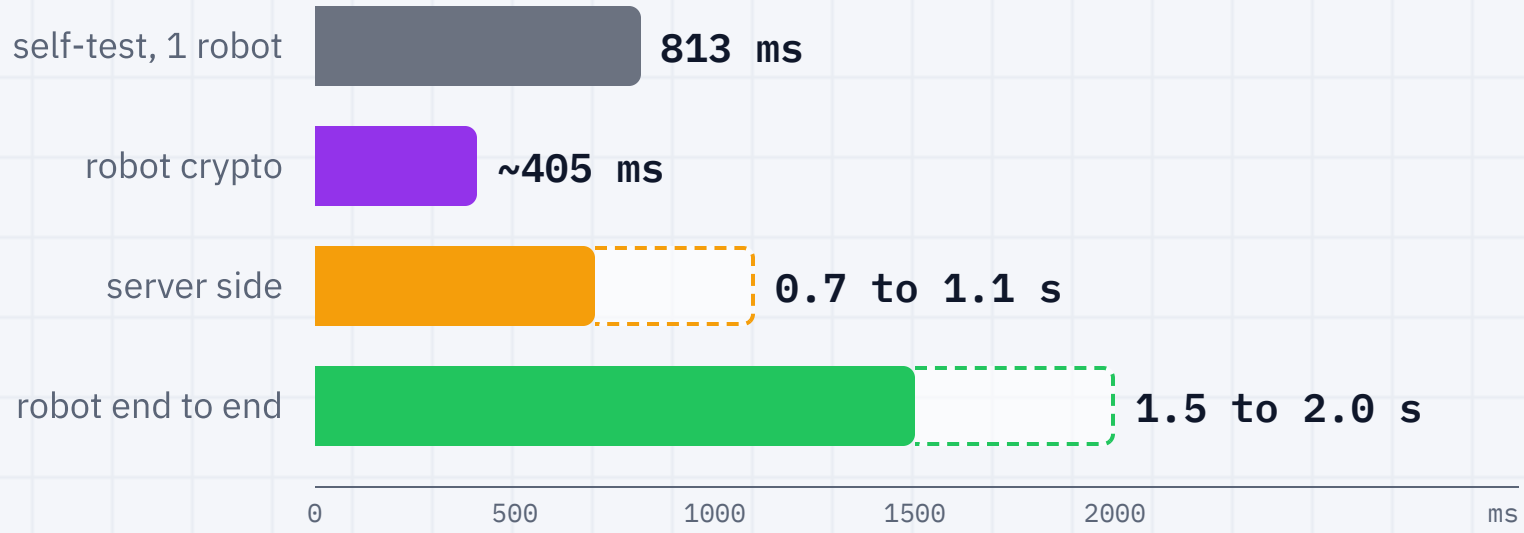
message_2 **45 B** ←

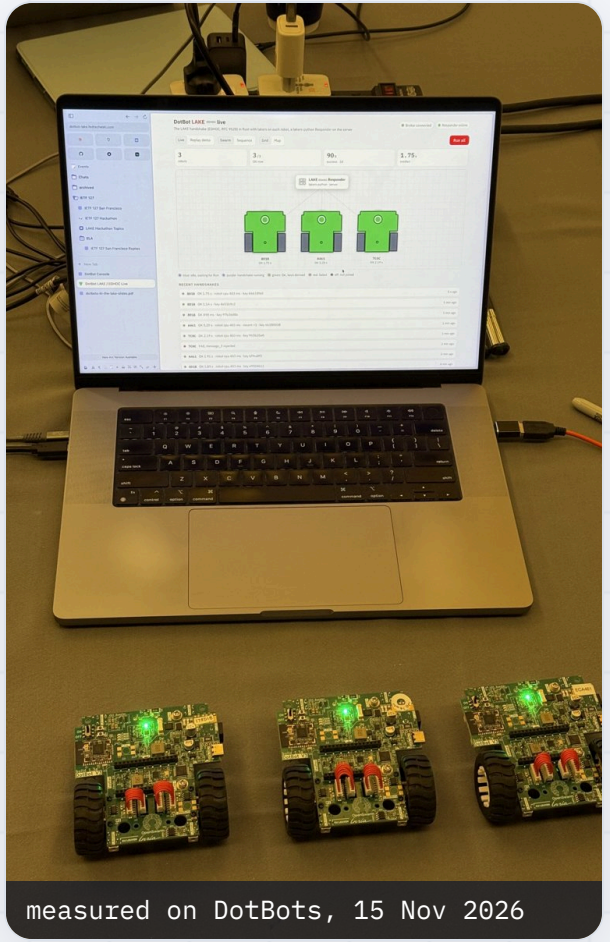
message_3 **28 B** →

message_4 **9 B** ←

RESULTS

A full handshake in under 2 s




measured on DotBots, 15 Nov 2026

96 ms
key derivation

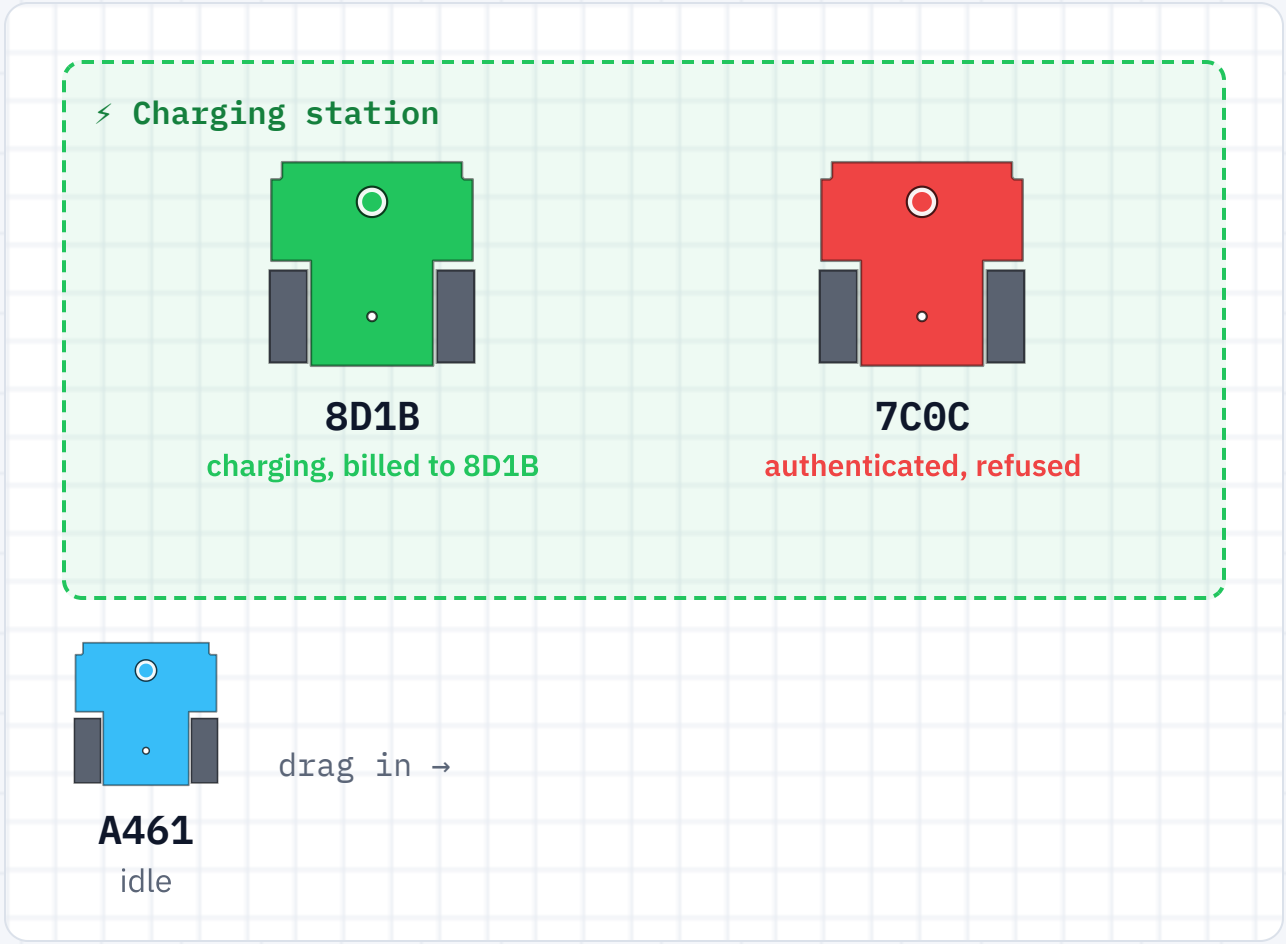
3
robots

kid
= radio address

29 s
OTA flash, 47 KB

NEW · LIVE ON THE SITE

Charging zone: who is charging?



Drag a robot into the zone

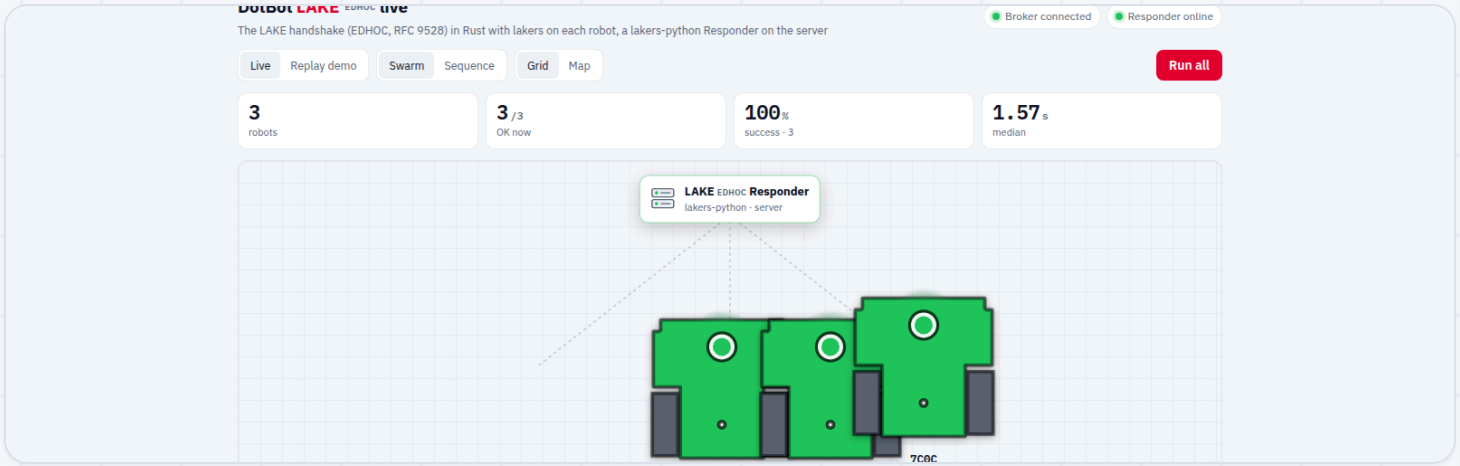
It runs the **LAKE** handshake

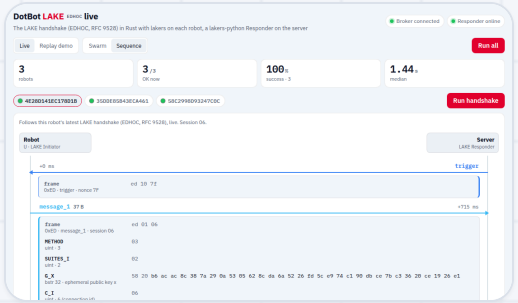
- **Allowed**: green, billed to its id
- **Not on the list**: authenticated but refused, flagged as an intrusion

Positions are simulated by drag for now. Lighthouse positions next.

LIVE PAGE

Press Run, watch them go purple, then green





Swarm view with the 3 live robots, and a Sequence view with every byte on the air. **?demo=1** replays 5 simulated robots.

try it live

`dotbot-lake.fedrecheski.com`

FINAL

LAKE runs on a robot swarm

> **Over the air**, in **under 2 s**.

NEXT STEPS

1
Charging zone
with Lighthouse positions

→

2
ELA
lake-authz, enrollment

→

3
10 · 100 · 1000
DotBots

Want to test your protocol on the testbed? Send me a message!

geovane.fedrecheski@inria.fr

DotBots
pydotbot.readthedocs.io

lakers
github.com/lake-rs/lakers