Routewren

DEVELOPERS WHO CONNECT THEIR OWN SOFTWARE TO ROUTEWREN AND WANT TO KNOW WHAT HAPPENS TO A LOCATION PING

Tracking Pipeline

Developer guide

VERSION 1.0 · 6 NOV 2026 · OWNER ROUTEWREN DOCS

A van sends its position. A few seconds later a customer's server hears that the van has arrived. This guide follows one location ping through Routewren, part by part, and says what you can rely on at each step.

7 PARTS	AT LEAST ONCE	ABOUT 3 SEC
in one direction: the app sends, the API checks, the queue keeps order, the matcher decides.	is how events are delivered. Your server must ignore a copy.	from a ping to the Console map.

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SECTION ONE

The big picture

1.1 Seven parts, one direction

A ping enters on the left and an event leaves on the right. Plate 1 shows the parts. The numbers on the plate are used in the rest of this guide.

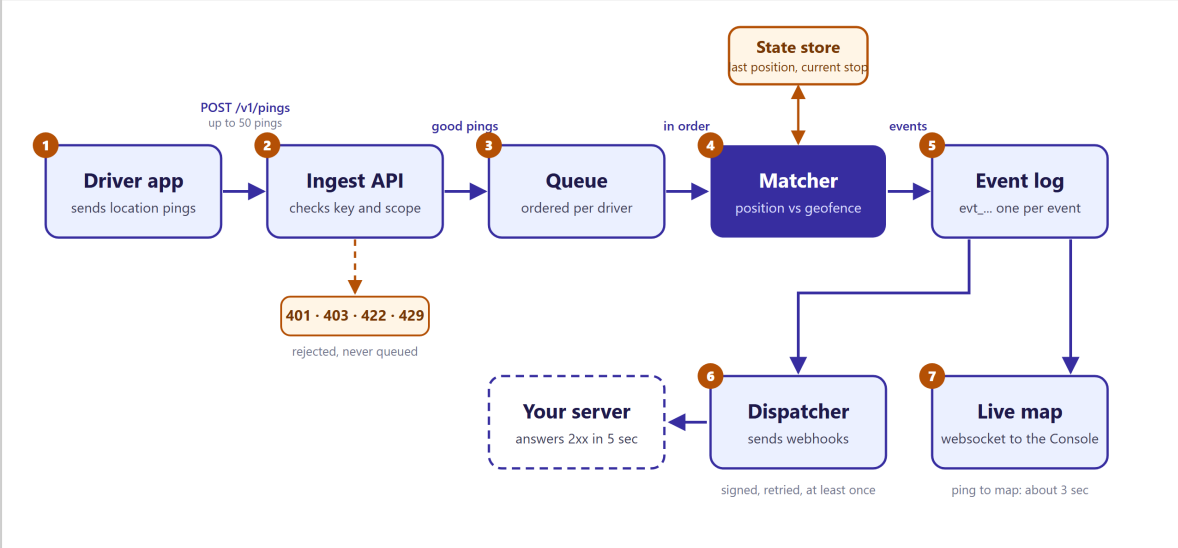


PLATE 1.1

Plate 1. The tracking pipeline, from the driver app to your server and the live map

PART	WHAT IT DOES	WHAT IT KEEPS
1 Driver app	Sends location pings in batches	Up to 200 pings when there is no signal
2 Ingest API	Checks the key, the scope and the ping	Nothing
3 Queue	Holds good pings in order, per driver	The pings until the matcher reads them
4 Matcher	Compares the position with the geofence of the next stop	State store: last position and current stop
5 Event log	Holds every event with its `evt_...` id	The events
6 Dispatcher	Calls your webhook, signed, with retries	Delivery log, 30 days
7 Live map	Pushes the event to the Console over a websocket	Nothing

1.2 Three promises

NOTE **Order.** Pings of one driver are handled in the order they arrive. Pings of different drivers have no order.

NOTE **At least once.** An event is delivered one time or more. Use its `id` to ignore a copy.

NOTE **Speed.** From a ping to the Console map takes about 3 seconds.

SECTION TWO

Sending pings

2.1 One request

The driver app, or your own tracker, sends pings to the API in a JSON body. `driver_id` is written once, then comes a list of `pings`.

```
curl -X POST https://api.example.com/v1/pings \
  -H "Authorization: Bearer <api_key>" \
  -H "Content-Type: application/json" \
  -d '{
    "driver_id": "D-0142",
    "pings": [
      { "lat": <lat>, "lng": <lng>, "speed": 41, "battery": 78,
        "accuracy": 12, "ts": "2026-11-09T10:19:04+08:00" }
    ]
  }'
```

The key needs the `pings:write` scope. The API answers `202 Accepted` and tells you how many pings it accepted.

2.2 The fields of a ping

FIELD	MEANING	NOTE
`driver_id`	The driver, for example `D-0142`	Written once for the whole batch
`lat` , `lng`	The position	Use `<lat>` and `<lng>` in your own tests
`speed`	How fast the van moves	Sent by the app
`battery`	Battery level of the phone	Sent by the app
`accuracy`	How exact the position is, in metres	Worse than 100 m is ignored for arrived
`ts`	When the position was taken	ISO time. Part of the duplicate check

2.3 Batches and no signal

Send up to **50 pings** in one call. When the phone has no signal, the driver app keeps up to **200 pings** and sends them when the signal comes back. Those late pings are still handled in order (see 3.3).

2.4 What the API answers

CODE	MEANING
`202`	Accepted. The body has the number of accepted pings
`401`	The key is wrong or revoked
`403`	The key has no `pings:write` scope
`422`	A ping is not valid. It is rejected and never queued
`429`	More than 600 requests a minute for this key. Wait for `Retry-After`

SECTION THREE

The ingest API

The ingest API is the only door into the pipeline. Everything it rejects stops here.

3.1 What it checks

1. The key is valid and not revoked.
2. The key has the scope `pings:write`.
3. The body is valid JSON and every ping has its fields.
4. The key is under 600 requests a minute.

A ping that passes all four goes onto the queue. Plate 1 shows the other path, the dashed one, with the four answers.

3.2 The same ping twice

A phone may send a batch again when it is not sure it arrived. Routewren ignores a ping when it has already seen the same `driver_id` and `ts`. You do not need to remove copies yourself.

3.3 Late pings

HOW LATE	WHAT HAPPENS
Up to 10 minutes	Accepted and handled in order. Events can still come from it
More than 10 minutes	Stored for the history, but it makes no events

SECTION FOUR

The matcher

The matcher reads the queue one driver at a time. It is the only part that knows what a stop is.

4.1 State for each driver

For each driver the state store keeps the **last position** and the **current stop**. A new ping is compared with the geofence of the current stop. The radius is a depot rule, 150 m by default.

4.2 Arrived, delivered, left

Plate 2 shows how one stop is decided. Two pings in a row inside the radius mean arrived. The driver taps **Delivered** in the app to finish the stop.

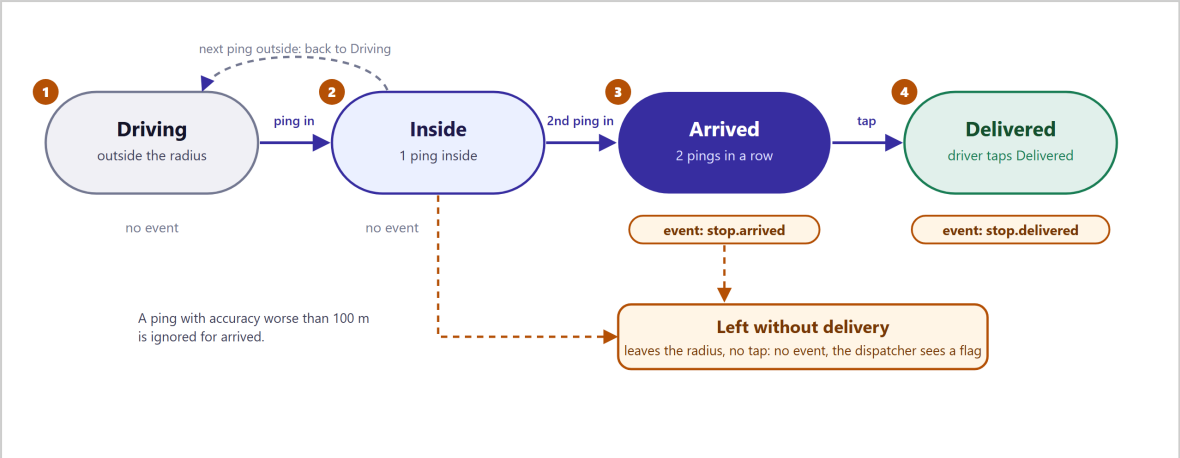


PLATE 4.1

Plate 2. How the matcher decides that a van has arrived, delivered or left

> CAREFUL *A driver who leaves the radius without tapping **Delivered** makes no event. The dispatcher sees a flag in the Console: left without delivery. Your server hears nothing about that stop.*

4.3 Why two pings

One ping can be a GPS jump, a position a long way from the real one. Two pings in a row inside the radius are much harder to fake by accident. *[A faster ping interval makes two pings come sooner, so arrived comes sooner too.]* A ping with an accuracy worse than 100 m is ignored for arrived.

SECTION FIVE

Events and webhooks

5.1 An event

The matcher writes an event to the event log. The dispatcher sends it to every endpoint that asked for its type.

```
{
  "id": "evt_<id>",
  "type": "stop.arrived",
  "depot": "nth-depot-01",
  "driver_id": "D-0142",
  "stop_id": "stop_<id>",
  "occurred_at": "2026-11-09T10:19:08+08:00"
}
```

The types are `stop.arrived`, `stop.delivered`, `route.completed` and `driver.offline`.

5.2 Sign and check

Every call has the header `Routewren-Signature: t=<timestamp>,v1=<signature>`. The signature is the HMAC-SHA256 of `<timestamp>.<body>`, made with the signing secret of the endpoint. Reject a call when the timestamp is more than 5 minutes old.

```
import hashlib, hmac, time

def is_valid(header, body, signing_key):
    parts = dict(p.split("=", 1) for p in header.split(","))
    if abs(time.time() - int(parts["t"])) > 300:
        return False                       # older than 5 minutes
    signed = f'{parts["t"]}.{body}'.encode()
    expected = hmac.new(signing_key, signed, hashlib.sha256).hexdigest()
    return hmac.compare_digest(expected, parts["v1"])
```

5.3 Retries

Your server must answer with a 2xx code within 5 seconds. If it does not, the dispatcher tries again 6 times. After the last try the endpoint turns **Failing** and the admin gets an e-mail.

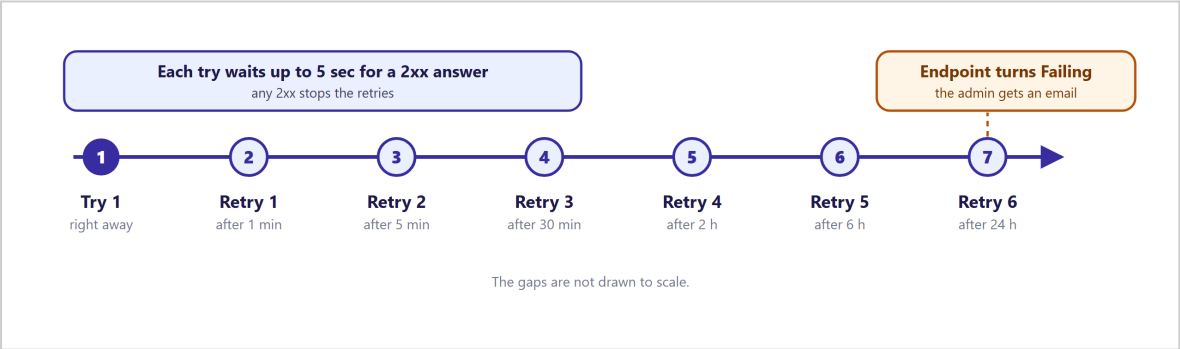


PLATE 5.1

Plate 3. The tries of one event: right away, then six retries

5.4 At least once

Delivery is at least once. The same event can come twice, for example when your answer was slow and the retry crossed it. Keep the `id` of every event you handled, and skip one you have seen.

SECTION SIX

The live map

The Console map does not poll. It opens a websocket and the event log pushes new events down it. The badge says **Live** while the websocket is up. From a ping to a moving van on the map takes about 3 seconds.

SECTION SEVEN

Numbers to remember

WHAT	VALUE
Pings in one call	Up to 50
Pings kept on the phone without signal	Up to 200
Requests for one key	600 a minute
Duplicate ping	Same `driver_id` and `ts`, ignored
Late ping that still makes events	Up to 10 minutes late
Accuracy that counts for arrived	100 m or better
Arrived	2 pings in a row inside the radius
Your answer to a webhook	A 2xx code within 5 seconds
Retries	6: after 1 min, 5 min, 30 min, 2 h, 6 h, 24 h
Signature age	Reject when older than 5 minutes
Ping to map	About 3 seconds

Change log

VERSION	DATE	CHANGE	BY
1.0	2026-11-06	First version	Routewren Docs