Torkvik

Yard operations architecture

The principle

A yard already has cameras. TORKVIK turns them into an operator: it reads every plate at the gate, sees which doors are free, chooses the right dock for every truck and brings people only the exceptions. Agents act only when a person says yes.

See

Cameras the yard already has, at the gate and the docks.

Read

Plates read by two independent readers that must agree.

Decide

Door chosen from live occupancy, slots and trailer type.

Ask

Exceptions go to a person; agents wait for a yes.

Measured outcomes (November 2026 engineering sign-off)

99.2%

Dock occupancy accuracy

On an edge CPU (INT8) at 79 ms a frame, median. 6 false alarms, 0 misses.

Open data

0

Failures with 200 users

98.5 requests a second, median 86 ms, p99 1.7 s, four API processes.

Load test · simulated yard

1.03s

Tony's first words

Median time to first audio for a spoken yard question (p90 3.62 s).

Benchmark · simulated yard

The building blocks

1 Gate detection

Finds trucks on the approach, at night too.

41 / 42 trucks, near and mid range

Open, real video

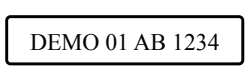


2 Plate reading

Two readers must agree before a plate is trusted.

20 / 22 exact · 0 wrong trusted

Open, real photos

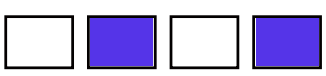


3 Dock occupancy

Free or taken, for every door, from the dock cameras.

96.4% / 99.3% unseen cameras

Open data



4 Decisions over frames

A door changes state only when 5 frames agree: no flicker, no lag.

With 15% spoiled frames: errors 10 → 5

Open + simulated



5 Arrival forecast

Trucks per hour ahead, so docks and staff are ready.

MAE 0.915 vs 1.216 (25% lower)

Simulated

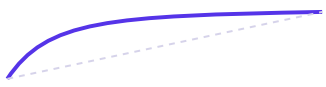


6 Arrival risk

Which trucks are likely to miss their slot.

ROC-AUC 0.862 · recall 86%

Open + simulated

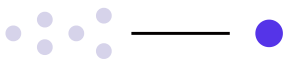


7 Exception agent

Turns raw events into the few things a person must decide.

40 / 40 cases usable

Simulated



8 Yard Q&A and Tony

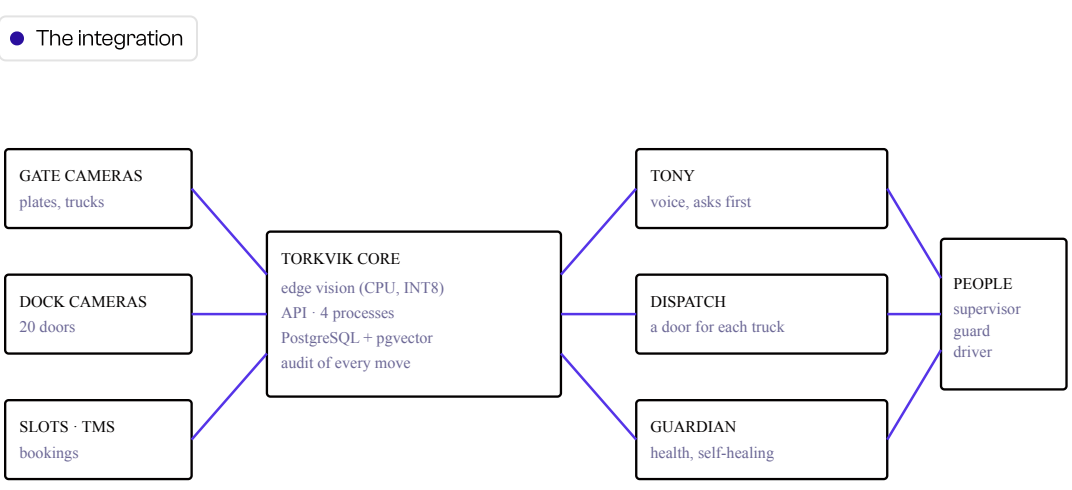
Answers only from facts it can check; acts only on a spoken yes.

139 / 140 pass · 20 / 20 injections refused

Simulated



The integration



Every number names its data

Open	Public datasets, licences in the dataset register
Open, real photos / video	Real images from open sources, labelled by us
Simulated	Our yard simulator or image degradation
Synthetic	Rendered scenes
Load / chaos / probe	Tests on the production stack, on a laptop

There is no real-yard footage yet. Nothing here should be read as validated at a real site; a pilot yard closes that gap.

Built to run a real yard

1. 422 of 423 tests passing (1 skipped) on every change, 80% coverage; PostgreSQL in CI.
2. Security probe 58 / 58; fuzzing: 0 server errors in 3,262 requests.
3. Database restart under load recovers on its own.
4. Guardian drops to manual mode on failure and comes back after 3 healthy checks.
5. Two-factor sign-in; drivers see only their own truck.

Open items

1. Plate automation on real two-line truck plates.
2. New-site occupancy at 90% on real footage (88% today, one site).
3. Night plates on a real infrared camera (simulated so far).
4. Tony's slowest answers (p90 3.62 s).
5. Real-site validation: the pilot.