License-Plate Recognition (LPR / ANPR) - One-Page Reference

How the read works, why its accuracy is two numbers multiplied, how a plate event surfaces in the VMS, and why a plate is personal data but not biometric. Representative 2025-2026 figures - all move with angle, speed, lighting, plate condition, and plate diversity.

A. What LPR is (and the words people mix up)

- LPR (License-Plate Recognition) = ANPR (Automatic Number-Plate Recognition). ALPR usually names the law-enforcement / mass-collection version of the same thing.
- LPC (License-Plate CAPTURE) records a legible image for a human; LPR adds RECOGNITION - the text the computer can search, match, and alarm on. Buy the right one.
- A read identifies a VEHICLE, and via a registry its registered KEEPER - not the person driving. A plate read says 'this car passed here', not 'this individual was here'.

B. The four-step pipeline

- 1 Find the plate: a detector boxes the plate in the frame. 2 Clean the image: deskew, scale, boost contrast; infrared makes the retroreflective plate readable in the dark.
- 3 Read (OCR): optical character recognition turns the plate picture into a text string (e.g. AB12CDE). The model internals live in the AI for Video Engineering section.
- 4 Validate & match: apply the region's plate syntax, take a multi-frame vote, then match to a watchlist or allowlist. The whole read finishes in under a second.

C. Accuracy is two numbers, not one - and never 100%

- Capture rate = did the camera get a usable image of the plate? (often ~98%). Read rate = did the OCR get the characters right? (often ~95%).
- System accuracy is the PRODUCT: 0.98 x 0.95 = ~93% in good conditions. A single advertised 'accuracy' usually names just one gate - ask which, and under what conditions.
- Controlled lane (slow, good angle, IR, local plates): ~95-99%. Free-flow / adverse (speed, weather, mixed plates, angle): lower. Never 100%.
- A dedicated LPR camera needs a fast shutter (~1/500-1/2000s) to freeze motion, IR tuned to the plate, and a tight angle - usually paired with a context/overview camera.

D. How a plate event surfaces - and where it runs

- ONVIF Profile M defines standardized license-plate metadata and a license-plate-recognition event into the VMS (over the stream, the ONVIF event service, or MQTT).
- ONVIF standardizes the EVENT, not the accuracy or the algorithm - the OCR model and confidence threshold live in the vendor SDK. Conformance is a baseline.
- Edge: the camera reads on-device and sends only the plate + thumbnail (low bandwidth, raw video stays local). Central: frames go up to match a large hotlist and correlate across cameras.

E. The legal line: personal data, but NOT biometric

- A plate is PERSONAL DATA under GDPR when it identifies the keeper (Art. 4(1)) - so you need a lawful basis (Art. 6), notice, and a DPIA (Art. 35) for systematic monitoring (EDPB Guidelines 3/2019).
- A plate is NOT biometric (Art. 9): biometric data measures a body. So the special-category rules and US biometric laws (Illinois BIPA, Texas CUBI) that gate FACE recognition do NOT attach to the plate itself.
- The real risk is the stored MOVEMENT PROFILE: EFF found >99.9% of mass-ALPR data is unconnected to any crime. Design to retention, access, and sharing law.
- EU: GDPR + DPIA. UK: ICO + Surveillance Camera Code (national ANPR ~60M reads/day, 12-month retention). US: California SB 34, a state patchwork, no federal law. Engineering guidance, not legal advice.

The clean rule: a plate clears a LOWER legal bar than a face (it is not biometric), but the stored history is where the liability lives - so set a defined, defensible retention period and delete on schedule, log and limit who can query the history, don't share outside the lawful purpose, post notice, and run the DPIA for any systematic deployment. The OCR MODEL is engineered in the AI for Video Engineering section; this is the surveillance APPLICATION, the camera, the standard, and the law. Sources: ONVIF Profile M; GDPR Reg. (EU) 2016/679 Art. 4(1), 6, 9, 35; EDPB Guidelines 3/2019; California Civil Code 1798.90.5 (SB 34); UK National ANPR Service DPIA + ICO ANPR guidance; EFF Street-Level Surveillance (ALPRs); IPVM (LPR camera config).