

WHITE PAPER

The Nursery Should Not Be in the Cloud

A local-first AI hub that watches, listens and understands — so parents can rest, and their child's data stays at home

Working name: Hearth | September 2026

A vision and product overview

1. Mission

Give every parent a calm, trustworthy second set of eyes on their baby — one that runs in their own home, answers to them alone, and never turns their child into a data product.

New parents are sold anxiety. The baby-monitor market has moved from a simple radio to a camera, an app, a subscription, and a cloud that stores months of nursery video and biometric data on a vendor's servers. The devices are good at making parents look at their phones and poor at telling them anything they didn't already know. And when the vendor changes its terms, discontinues the product, or has a breach, the family has no recourse.

We believe the intelligence belongs in the home. Modern low-cost hardware can run capable vision and audio models on a device the size of a paperback. Our mission is to package that capability into a product a tired parent can set up in an evening: a hub that watches the crib, listens for cries, tracks the room, and works with the vital-sign wearables families already own — with every frame of video and every heartbeat processed and stored inside the house.

2. The problem

- **Cloud dependence.** Leading connected monitors stream nursery video to remote servers by default. Core features stop working during outages, subscriptions rise, and some products have been bricked when the vendor moved on.
- **Fragmentation.** Camera, pulse-ox sock, room thermometer and sleep log each have their own app, none of which talk to each other. A parent gets four notifications about one event, or none about the one that mattered.
- **Alert fatigue.** Single-sensor alarms fire on a loose sock or a passing car. Parents learn to ignore them, which defeats the purpose of having a monitor.
- **Privacy as afterthought.** Infant biometric and video data is among the most sensitive a household produces, yet it is routinely retained, analysed, and in some cases shared under broad consent language.

The technically capable minority already solve this themselves with open-source home-automation tools. It takes weekends of work and a tolerance for tinkering. Everyone else is stuck with the cloud.

3. The product

Hearth is a small home hub and companion app. It connects to a nursery camera, a room sensor, and optionally an Owlet Dream Sock, and runs all analysis on the device.

3.1 What it does

Capability	What the parent gets
Movement & position	Knows whether the baby is asleep, restless, awake, rolled, or climbing — from the camera, on-device.
Sound & cry understanding	Distinguishes a brief fuss from a sustained cry, a cough from background noise, and tells you which.
Room environment	Tracks temperature, humidity, light and noise; can drive a fan or air-conditioner to keep the room in the safe range.

Capability	What the parent gets
Visual condition cues	Flags face-covered, uncovered, and — under controlled lighting — noticeable skin-tone change versus the child's own baseline, always with a snapshot for the parent to judge.
Vital signs (via Owlet)	Pulls heart rate, oxygen and skin temperature from the family's existing sock and cross-checks them against movement and sound, so a loose sock reads as a loose sock.
One calm notification stream	Fuses every signal into a single state and notifies on meaningful changes, not raw readings. Adult-in-room and quiet-hours awareness built in.
Plain-language summaries	"How did she sleep last night?" answered by a small language model running on the hub, from the day's event log.

3.2 What makes it different

- **Local by architecture, not by policy.** Video never leaves the LAN. Privacy is a property of the design, not a promise in a terms-of-service document.
- **Multi-signal fusion.** The product's core intellectual property is the logic that combines vision, audio, environment and vitals into one trustworthy state. Any one sensor is noisy; together they are not.
- **Open at the edges.** Works with any standard IP camera and any common room sensor. Parents are not locked into our hardware, and we are not locked into any one supplier.
- **Hardware that ages well.** Because the hub is a general-purpose computer, it becomes a toddler monitor, then a home hub. The customer relationship does not end at 12 months.

3.3 What it is not

Hearth is a parental awareness tool, not a medical device. It does not claim to detect or prevent SIDS, and it does not replace the independent alarms on the Owlet or the parent's own judgement. Every alert is a prompt to look. This positioning is a deliberate regulatory and ethical choice, and it is also the honest one.

4. Why now

1. **Edge AI is cheap.** A sub-USD-200 mini PC or single-board computer can now run real-time object detection, pose estimation and audio classification simultaneously. Three years ago this required a cloud GPU.
2. **Privacy has become a purchase criterion.** Camera-vendor breaches and subscription backlash have made "local" a feature consumers ask for by name, well beyond the enthusiast niche.
3. **The open-source stack is mature.** Home Assistant, Frigate and the surrounding ecosystem have proven the architecture with millions of installs. Our job is to productise it for a specific, high-value moment in a family's life, not to invent it.
4. **The wearable exists; the integration does not.** Owlet is in hundreds of thousands of nurseries. No product today combines its vitals with camera context. Community integrations show the demand; a supported product does not yet exist.

5. Market and customer

Our first customer is the parent who already owns, or is about to buy, a premium connected monitor and a pulse-ox wearable — a household that has demonstrated willingness to spend several hundred dollars on infant monitoring and is now discovering the limits of what they bought. This segment is small relative to all births but is concentrated, reachable through the same channels that sell the wearables, and highly motivated by privacy and reliability.

The connected baby-monitor category is a multi-billion-dollar global market growing with the shift from audio to video and smart devices; sourced sizing is provided in the companion documentation rather than as a headline figure here. What matters for the thesis is the direction of travel: the category is consolidating around cloud subscriptions, which leaves the local-first position uncontested.

5.1 Expansion path

- Toddler and child-room monitoring (the same hub, new detection profiles).
- Elder care: the identical fusion of movement, sound, environment and wearable vitals maps directly onto ageing-in-place monitoring, a larger market with the same privacy sensitivities.
- Pet and general home awareness as a low-cost retention play once the hub is in the house.

6. Business model

Revenue line	Description
Hub hardware	A pre-configured hub with accelerator, sold at a healthy margin over commodity components. One-time purchase; the customer owns it outright.
Starter bundle	Hub plus a vetted camera and room sensor for parents who want one box.
Optional Hearth Plus	Not required for core function. Covers secure remote access, cloud-free backup coordination between family devices, priority support and early model updates. Explicitly designed so that a customer who never pays a cent after purchase still has a fully working monitor.
Partner integrations	Co-marketing and, where possible, supported integration agreements with wearable and camera vendors.

The model is intentionally the inverse of the incumbents: hardware is the product and the subscription is a convenience. This is cheaper to support, aligns with the privacy promise, and earns trust that compounds into referrals in a category driven almost entirely by parent-to-parent recommendation.

7. Technology overview

Four layers, connected by open protocols so every part is replaceable:

Layer	Role
Sensing	Standard IP camera with night vision and microphone; Zigbee or Bluetooth room sensor; Owlet sock via its base station; optional low-cost thermal module.
Perception	On-device object detection, pose estimation, audio classification and colour analysis producing discrete events and measurements.
Fusion & logic	A single "baby state" model combining all signals with hysteresis, context (adult

Layer	Role
	present, quiet hours) and self-monitoring of sensor health.
Interaction	Mobile app with live view, two-way audio, snapshots in every alert, history and plain-language daily summaries.

Defensibility lies in the fusion layer and the tuned detection profiles, not in any single model. The perception models are commodities; the judgement about what their outputs mean for a sleeping infant, refined across thousands of nights of anonymised, opt-in event data (never video), is the asset. A detailed technical specification is available as a companion document.

8. Roadmap

Phase	Milestone	Timing
Prototype	Working hub on reference hardware: movement, cry, environment, Owlet cross-check, single notification stream. Founding-team nurseries.	Complete / in progress
Pilot	50–100 households from parent communities and wearable-owner groups. Measure false-alert rate, setup time, and retention.	Next 6 months
Launch	Pre-configured hub and starter bundle; companion app on iOS and Android; direct-to-consumer and one retail partner.	12 months
Partnerships	Supported integration with at least one wearable vendor; camera vendor bundle.	12–18 months
Adjacent markets	Toddler profiles; elder-care pilot.	18–24 months

9. Key risks and how we manage them

- **Wearable API dependency.** Owlet offers no official third-party interface; integration relies on a community-maintained one that can break. Mitigation: the product is fully functional without vitals, degrades visibly and gracefully, and we pursue a formal partnership early.
- **Regulatory perception.** Anything near infant vital signs invites medical-device scrutiny. Mitigation: consistent non-medical positioning, conservative language in product and marketing, and legal review of every claim.
- **Trust and liability.** A missed event is a reputational catastrophe. Mitigation: self-monitoring that alerts loudly on any sensor failure, alerts that always include a snapshot, and a design rule that the system fails toward "go and look".
- **Incumbent response.** A major vendor could add local processing. Mitigation: they are structurally committed to subscription revenue and cloud data; our openness to third-party cameras and sensors is something they cannot easily match.
- **Setup complexity.** The enthusiast stack is hard. Mitigation: the entire company exists to remove that; pilot success is measured in minutes-to-first-alert.

10. Closing

Hearth moves from working prototype to pilot and launch over the next year: hardware design and certification for the hub, the companion app, a pilot programme with real families, and the first partnership conversations with wearable and camera vendors.

We are building the baby monitor we wanted and could not buy: one that is smart enough to be useful, honest enough to be trusted, and private enough that the nursery stays a nursery.

The full technical white paper is available as a companion document.