

PUSULA

Architecture, data model and evidence engine.

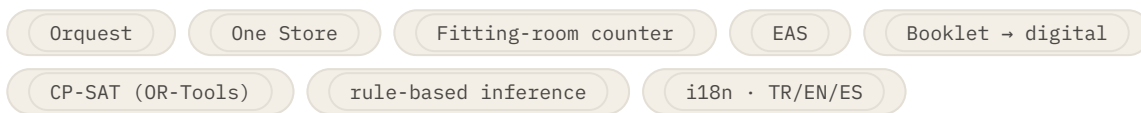
INDITEX · AI Hackathon · Project by Baran Bozkurt

01 Overview, Goals & Principles

This document specifies the technical design of Pusula for the Bornova pilot: what is produced from which data, how inference is performed, and how ethical limits are embedded in the architecture rather than bolted on as policy. Four principles act as hard constraints, not preferences:

- **Zero new data collection.** The system uses data the store already produces; it adds no sensors, forms or processes.
- **Explainability is mandatory.** Every suggestion is traceable back to the signal and evidence that produced it; no black box.
- **Scorelessness.** No single number or ranking is assigned to a person; this is a structural property of the data model.
- **Coach sovereignty.** Output is a suggestion; every action resolves through the coach's approval, edit or justified rejection.

Non-goals. Pusula is not a performance-scoring system, not a replacement for Orquest or One Store, and produces no input to selection or disciplinary processes.



02 System Architecture

Pusula is an **intelligence layer** over existing systems: a one-way evidence pipeline from data sources to the coach decision, plus a continuously fed learning loop. Two persistent structures surround the pipeline — a **governance layer** spanning every stage (scorelessness · purpose limit · GDPR/KVKK · audit trail) and an **institutional memory** that accumulates approved methods. Each stage is independently auditable and depends only on the output of the previous stage, which keeps the pipeline both testable and explainable.

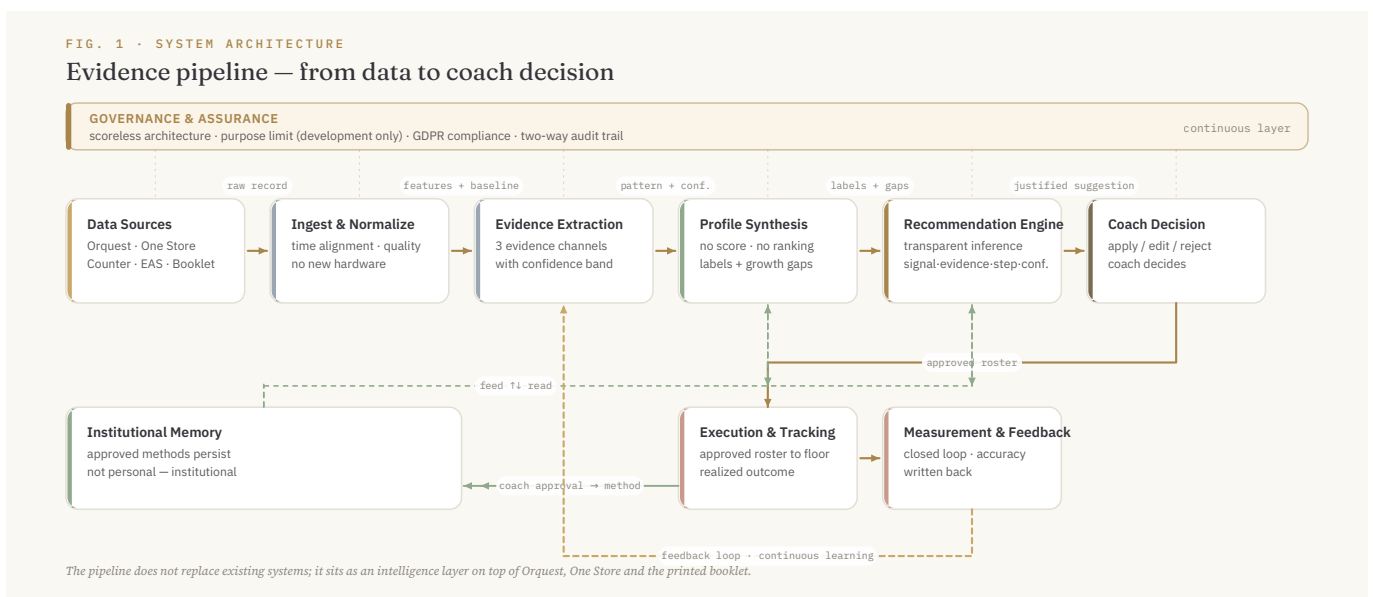


FIG. 1 · System architecture – evidence pipeline, governance layer, institutional memory and learning loop

Even a justified rejection trains the system: when the coach rejects, the reason is written back to the model and the weight for similar cases is updated. The human decision becomes the model's correction signal.

05 Profile Synthesis (Scoreless)

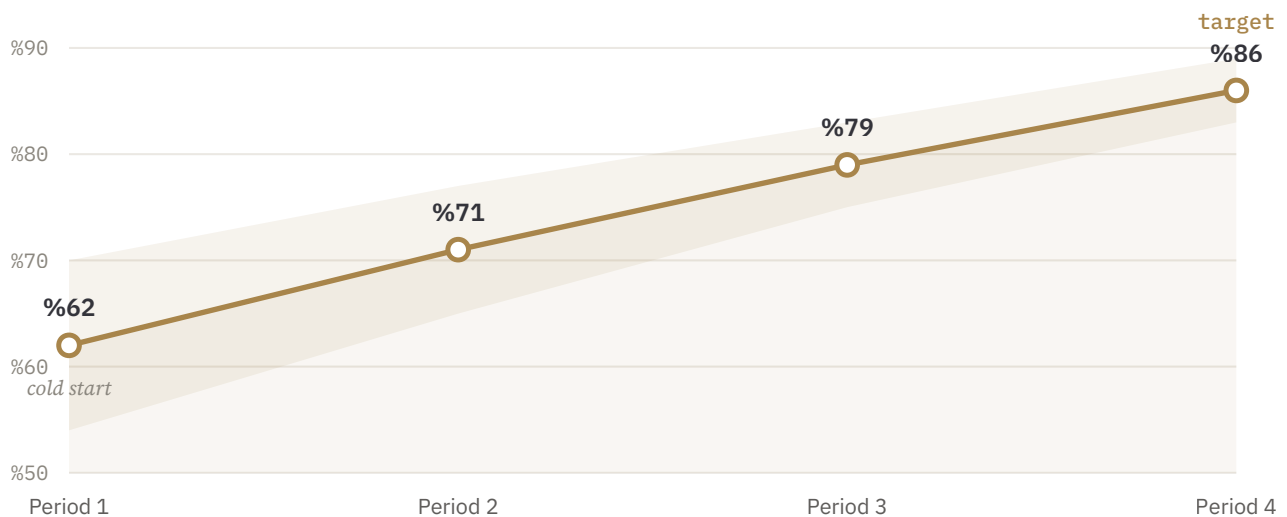
A profile describes a person without reducing them to a single number; the output is not a ranking but an evidence-based strength distribution and a trajectory. Competency is shown on a 0–5 scale by label, never a printed number; an untried area is marked no data, not weak.

COMPONENT	DEFINITION
ASA strength map	0–100 bar for 4 core responsibility areas + this-period gain (+Δ) + evidence KPI; by label, produces no ranking.
Growth trajectory	past 4 weeks (measured) + 2 weeks forecast (dashed) + ETA to the mastery threshold.
Role fitness	readiness per role: ready / developing / early.

06 Cold-Start & Confidence Model

The system does not pretend to know everything on day one. The cold-start limit is written into the product's language and the maturation curve is shown on screen. Early on, evidence is sparse, so suggestions are generic and the confidence band is wide; as channels feed in, suggestions personalize and the band narrows. Under low evidence the system automatically falls back to a generic suggestion, reducing the risk of a misleading signal on a small sample.

SUGGESTION ACCURACY · FOUR-PERIOD PROJECTION



Shaded band = confidence interval; it narrows as evidence accrues. Values are representative, validated on the floor by backtesting.

Suggestion-accuracy projection – the shaded band is the confidence interval and narrows as evidence accrues (representative, validated on the floor).

07 Placement & Floor Plan

The floor plan knows the store by its real architecture: **19 zones, 19 distinct metrics**. Each zone is driven by a different metric – Welcome by footfall and EAS, fitting rooms by fitting-room traffic and conversion, tills by queue and processing speed, sales floor by sell-through. The roster suggestion is produced by a constraint-programming engine built on OR-Tools **CP-SAT**, weighing competency levels, staff groups, the buddy rule for new starters, and the store's physical zone topology together.

```
# competency levels YOK · KRIZ · DESTEK · ANA · TERCIH_PLUS
# staff groups CORE · FULL_JOKER · NEW · MANAGER
# rule new staff ⇒ buddy (experienced pairing) required
```

The solver is proven: over a ten-period backtest it reproduced existing decisions with ~64% overlap and a 79/100 self-evaluation. It does not copy the floor's decision; it offers a reasonable, explainable, editable alternative — the coach has the final say.

08 Security, Privacy & Compliance

Privacy is a structural result of the data model rather than an added feature: because the system does not produce a metric that could feed a selection decision, it cannot be used for one.

CONTROL	IMPLEMENTATION
Purpose limitation	Development only; no input to selection/discipline — the comparison metric is never computed.
Audit trail	Every approval and justified rejection is timestamped; two-way traceable.
Data scope	Processing limited to operational data the store already produces; no new personal data is collected.
Access & KVKK/GDPR	Employees see their own profile; information obligations completed at pilot start.

09 Integration & Internationalization

- **Orquest / One Store.** Traffic, conversion and KPI data are read; planning and indicators stay in place.
- **Booklet.** 120 topics digitize with the same marking logic; the coach's habit does not change.
- **Internationalization.** The interface is fully TR · EN · ES — not just headings but content and coach notes; proper names (One Store, ITX, zone names) are preserved.

10 Validation, Testing & Deployment

Every build pass clears static checks (tsc · eslint · build); the UI additionally passes a separate visual-review step for overflow, alignment, contrast and harmony. The solver side is measured by backtest, the suggestion side by closed-loop and accuracy metrics.

Static

tsc + eslint + build clean every pass; no release ships with type/lint errors.

Visual

separate review: overflow · alignment · contrast · harmony.

Model

backtest ~64% / 79; accuracy continuously measured on floor data.

The architecture is ready; the pilot can be deployed on existing infrastructure.

PUSULA · Technical · v1.0