

DIGITAL WAREHOUSE MANAGEMENT SOLUTION · CAPSTONE PROJECT

Digital twin-enable warehouse system 4.0

A deployed, traceable warehouse platform connecting inbound receipt, put away materials, reusable-packaging return, SAP posting and pallet-loading control.

Syntax Squad

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Problem Statement

- Manual checks slow inbound receiving and obscure quantity exceptions.
- Returnable packaging needs traceable handover and multi-party approval.
- Pallet loading requires an auditable PASS/BLOCK control.
- Optimize process efficiency: No handwritings, little manual input, all digitalize
- Putaway now scan + processed through app without manual input into SAP

Objective

- Digitize RF scanning from Delivery Order and supplier box to SAP Goods Receipt.
- Track and digitalize returnable boxes, pallet QR, proof and Receiver–Guard–Approver signatures.
- Deploy pallet interlocking with rule validation, live loading status and logged overrides.
- Implement Vision Model and OCR to speed up returnable and pallet interlock process
- Streamline putaway process and additional guardrails through the app without manual input into SAP

Methodology & System Architecture

4 deployed operational workflows · 1 platform · 1 audit trail

1. Warehouse-first design

Map the real receiving, return and loading controls before digitizing each decision point.

- RF handheld and desktop interfaces
- English / Vietnamese operation
- Role-based pages and approvals

2. Controlled data flow

Validate business identifiers and quantities at scan time, then preserve every action.

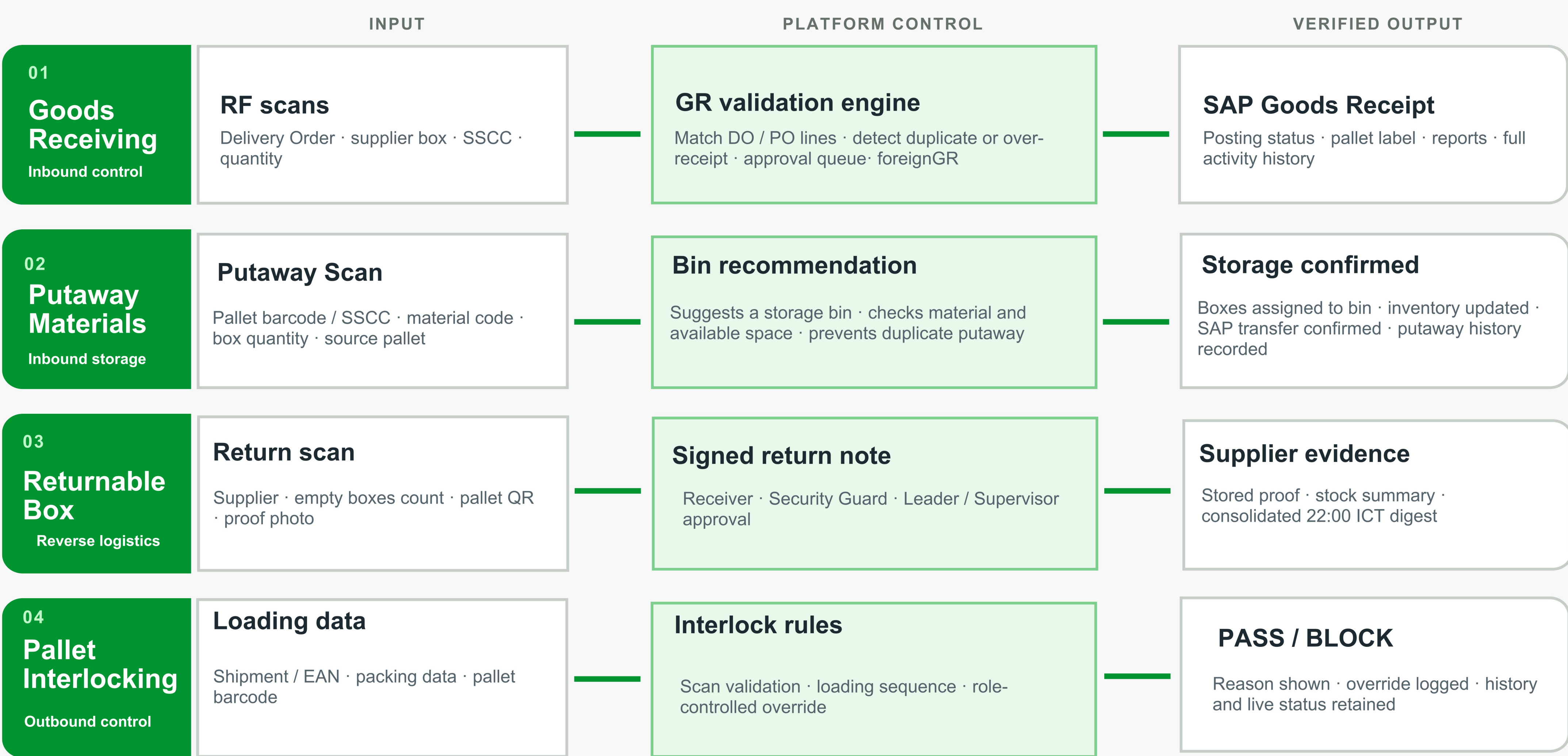
- SSCC, DO, PO and packing-data validation
- Shared sessions across warehouse devices
- Retry-safe SAP posting and audit history
- Foreign GR now post faster and easier to check data

3. Operational deployment

Deploy each workflow with accountable exception handling and supervisor control.

IMPLEMENTED: Goods Receiving · Returnable Boxes · Pallet Interlocking · Putaway

Warehouse workflow



Results

Local July 2026 app-load measurements and implemented workflow facts — not production warehouse KPIs

Save 900 million VND+/YEAR

Estimated monetary value saved from labour cost + paper cost + printing cost
Confirm by industry supervisor

Save 7800 hours++/ year

Estimated warehouse workflow time saved using our project

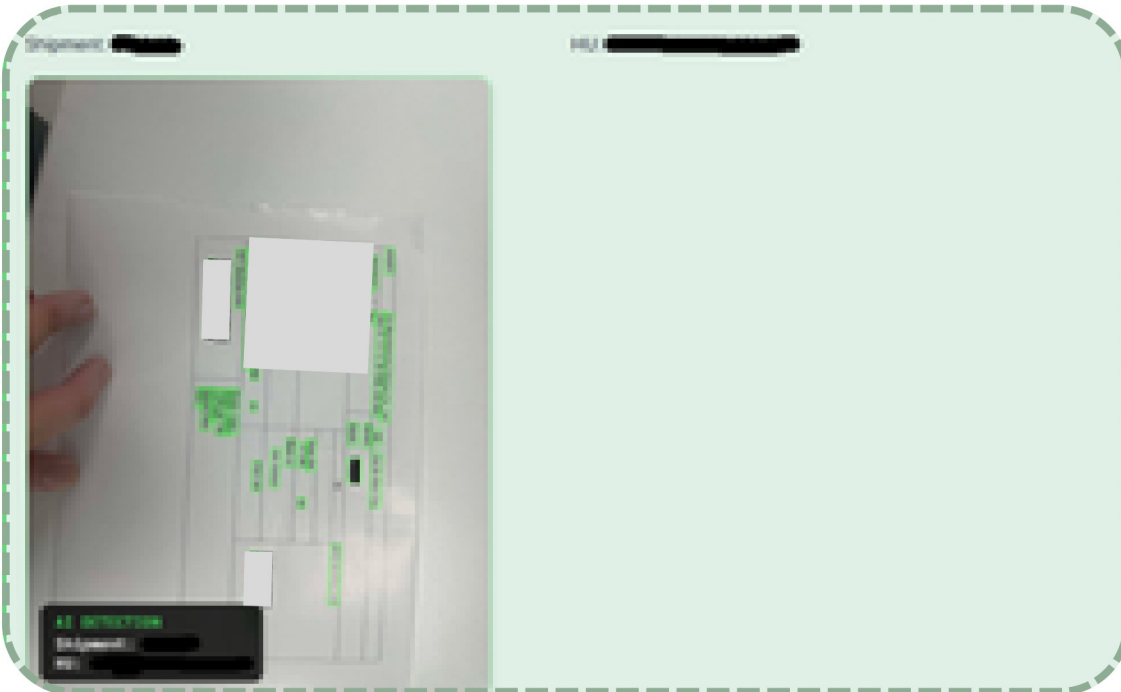
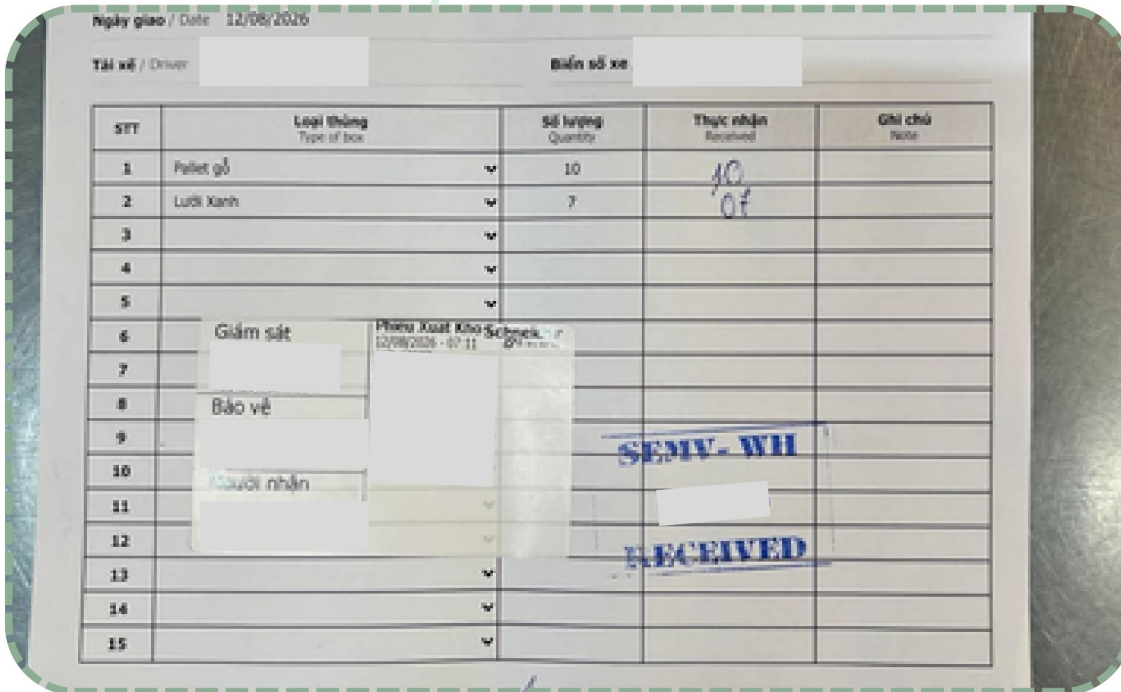
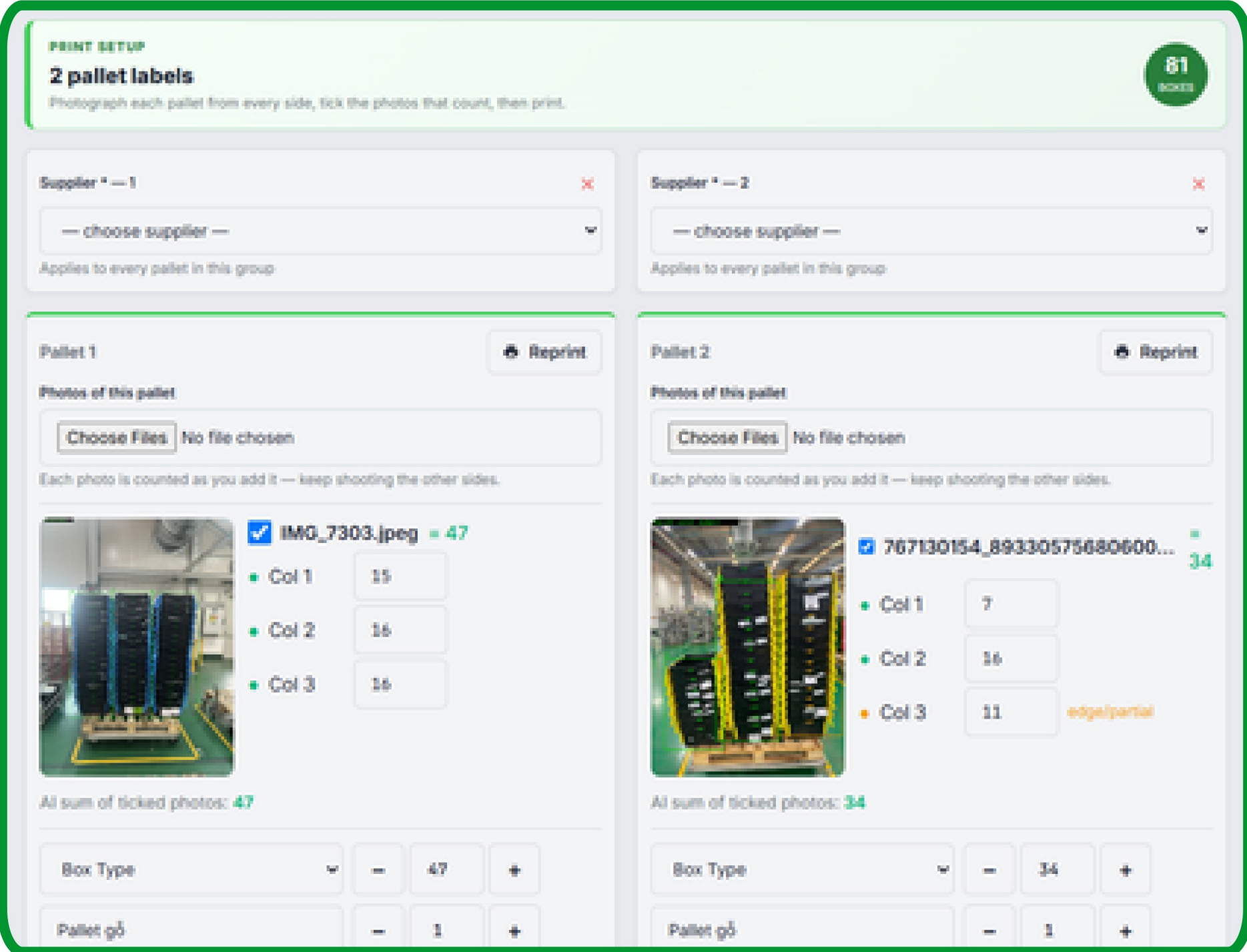
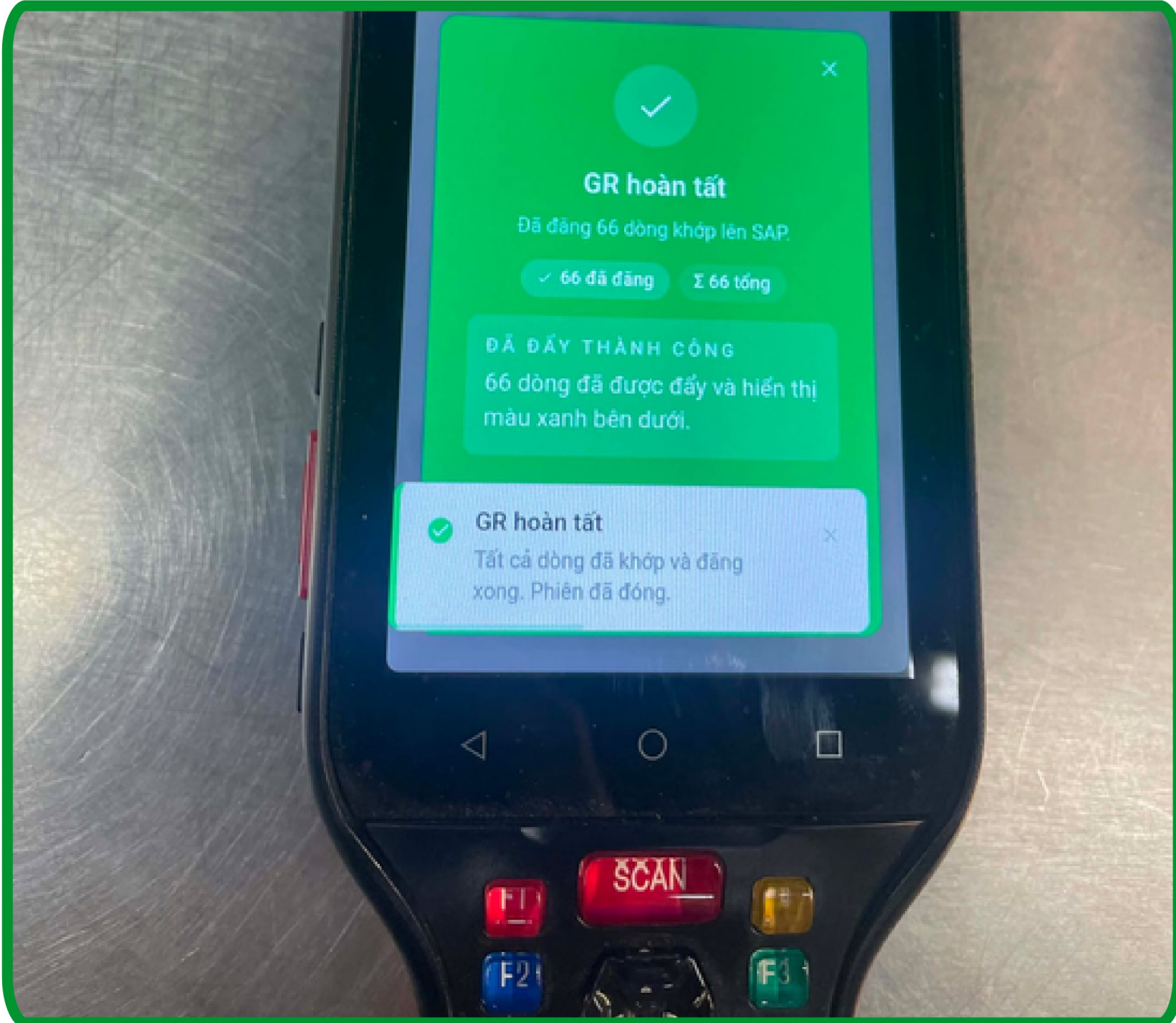
All digital / 95% paperless

Full warehouse workflow works digitally, reduce paper usage + manual writing by 95%

100% Data traceability

All transactions, data in/out of the app 100% accuracy and traceable

Product & Deployment Evidence (hide details in compliance with SEMV)



CONCLUSION

One platform now connects inbound receiving, putaway materials, reusable-packaging returns and deployed pallet-loading control through shared, role-based and auditable workflows.

FUTURE WORK

Optimize Ai features speed + accuracy · Clean up Source Code · capture production receiving-time, accuracy and reuse-rate KPIs.