NEX-G
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NEX-G AUTOMATION LLP

RFID WAREHOUSE MANAGEMENT SYSTEM

End-to-End Manufacturing & Lifecycle Material Tracking Subsystem

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Installation Configuration Operation Integration Maintenance

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1. Product Overview

The **Nex-G RFID Warehouse Management System** is an enterprise-grade platform designed for end-to-end manufacturing and lifecycle material tracking. Matching a web-based administrative monitoring dashboard with local RFID node scanners, the platform captures live workflow stages from raw goods ingest to final dispatch. It provides granular 5-stage production tracking, operator allocation, and relational traceability across complex factory and warehouse operations.

Core Software & System Features:

- Granular 5-stage lifecycle validation (Inward, Procurement, Production, Packaging, Dispatch).
- Non-line-of-sight RFID core ingest for rapid bulk scanning at plant checkpoints.
- REST API telemetry pipeline communicating structured JSON data strings.
- Asynchronous offline tag buffer supporting local queueing during network outages.
- Relational database schema ensuring 100% material history auditing and staff labor profiling.

2. System Operating Guidelines

> **Operating Guidance:** Position RFID node gates at natural material choke points (e.g., dock doors, assembly entrances). Ensure antenna orientations cover active conveyor paths to eliminate missed scans.

- **Operator Allocation:** Assign security credentials and worker badges in the admin portal to tie scan events directly to specific shift operators.
- **Offline Data Integrity:** When local scanners lose network connectivity, the offline tag buffer queues scan logs until connection is restored.
- **Tag Selection:** Utilize industrial metal-mount or flexible UHF RFID tags matching specific material containers.

3. Technical Specifications

Layer / Component	Specification Details	Notes
Manager Interface	HTML5, CSS3, JavaScript, Bootstrap Web UI	Responsive administrative monitoring dashboard
Web Engine & DB	PHP Framework with MySQLi Architecture	Relational workflows, assets, and logs database
Worker Client App	Native Java / XML Android Mobile Framework	Mobile workflow client for floor operators
Hardware Ingest Layer	Onboard RFID Scanner APIs & Driver Links	Integrates with fixed portal and handheld scanners
Telemetry Pipeline	Lightweight REST API (PHP + JSON Format)	Real-time synchronization across network nodes
Network Buffer	Asynchronous Offline Syncing Engine	Buffers scan events during network downtime
Lifecycle Validation	5-Stage Pipeline Tracking	Inward, Procurement, Production, Packaging, Dispatch
Deployment Layout	Centralized Enterprise Cloud Instance	High-availability scalable cloud architecture
Auditing & History	100% Relational Material Traceability	Complete audit trail from raw goods to dispatch
Operating Environment	Industrial Manufacturing & Warehouse Hubs	Designed for high-volume assembly lines

4. 5-Stage Lifecycle Architecture & Flow

Material movement and telemetry processing across the 5 granular production stages:

01. Inward / Procure
Raw materials scanned and tagged at receiving dock.

02. Production
Assembly line RFID gates record phase duration and staff logs.

03. Packaging
Finished goods bundled and mapped to master pallet tags.

04. Dispatch
Outbound gate scan validates shipment against order logs.

5. Web Admin Dashboard Capabilities

Centralized administrative features accessible through the browser portal:

Dashboard Module	Operational Capabilities
Production Stage Matrix	Configure custom stage boundaries, pass/fail rules, and transit time limits for batches.
Operator Allocation Hub	Assign worker badges and tie productivity logs directly to corresponding floor operator accounts.
Supervisor Check Desks	Review live checkpoint scans, approve completed batch phases, or flag anomaly events.
Inventory Analytics Engine	Generate comprehensive throughput reports, bottleneck diagnostics, and material history logs.

6. Strategic Solution Advantages

Complete Traceability
Traces any finished product batch straight back to its original raw material ingest checkpoint.

Minimized Entry Errors
Automated RFID scan passes eliminate manual keypad entry errors and serialization bottlenecks.

Bottleneck Diagnostics
Isolates specific assembly zones causing plant throughput delays through phase duration tracking.

Scalable Cloud Node
Handles high-velocity transaction inputs across dozens of terminal networks simultaneously.

7. Frequently Asked Questions (FAQ)

- **What does the RFID warehouse system track?** End-to-end manufacturing stages from raw goods inward to final dispatch.
- **Which production stages are supported?** Inward, Procurement, Production, Packaging, and Dispatch.
- **How is RFID data communicated?** Via REST API routing with structured JSON data payloads.
- **Does the system support offline operation?** Yes, asynchronous offline buffers hold scan data until network links restore.

8. Troubleshooting Guide

Symptom	Possible Cause	Recommended Action
Node scanner misses active RFID tags	Antenna misaligned / RF interference	Adjust RFID node antenna angle toward conveyor; verify tag orientation and power settings.
REST API sync error in worker client app	Network drop / server IP changed	Check Wi-Fi/Ethernet status; verify server IP and API key in mobile client configuration menu.
Batch stage fails to update on dashboard	Previous stage unvalidated	Verify in admin portal that the batch has completed all required preceding lifecycle stage passes.
Offline buffer not flushing upon reconnect	Database sync lock / service paused	Trigger manual sync override in worker mobile app or restart the local scanner service.

9. Maintenance & Care

- Inspect fixed RFID scanner node mountings and antenna cables monthly for physical tightness and wear.
- Perform regular cloud database backups and index optimizations through the Web Admin maintenance tab.
- Ensure mobile worker Android devices maintain updated client app binaries and active network profiles.
- Clean antenna radomes gently with a soft cloth to prevent dust build-up in high-particulate plants.

10. Support and Service Contact

For technical assistance, custom workflow mapping, REST API documentation, or deployment support, contact Nex-G Automation LLP:

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