

JIT Experiment V0 - WMS

Background

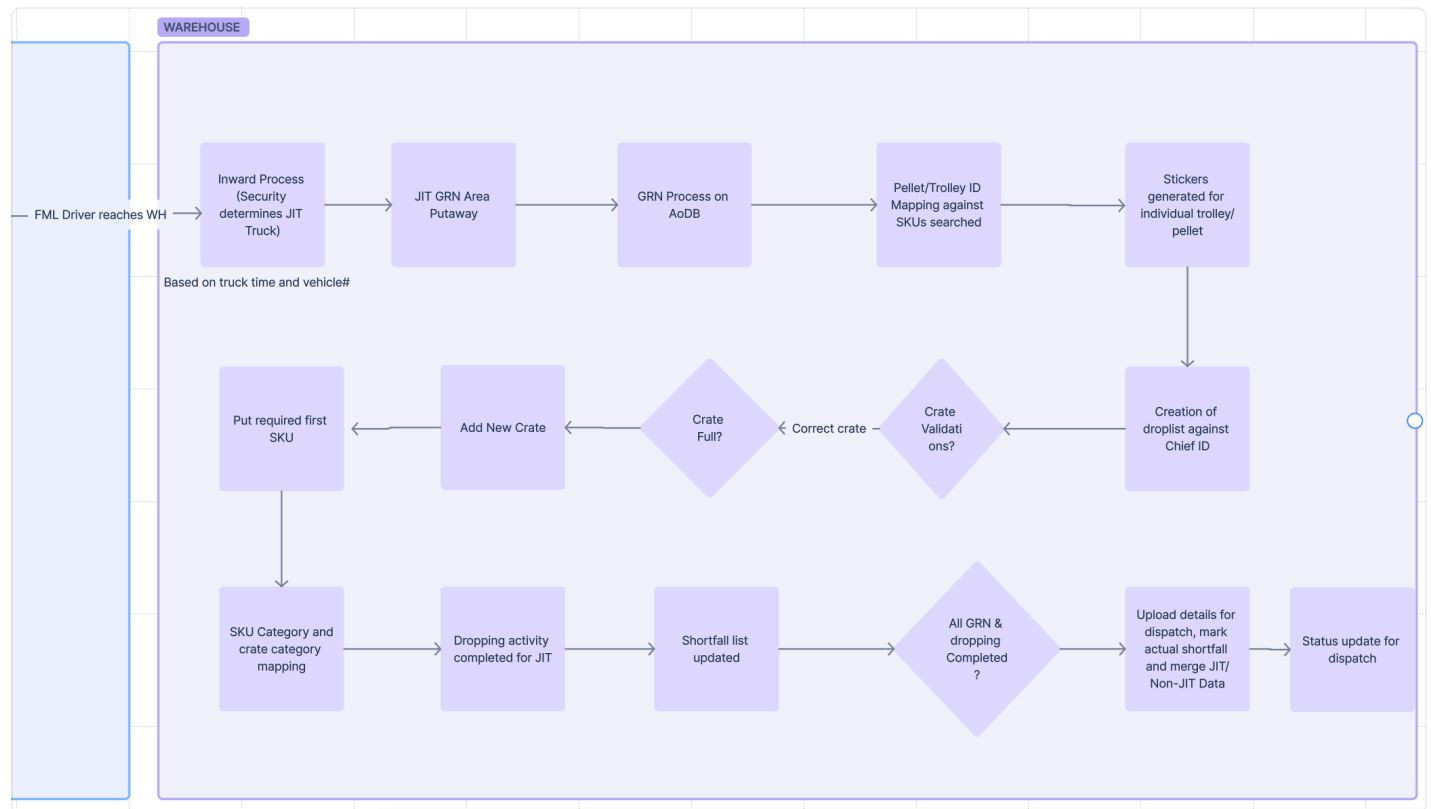
Just-In-Time (JIT) is an experiment designed with a focus on placing orders to sellers on actual user order placement and storing no inventory in the WH. The focus is on differentiating between JIT and non-JIT stock-keeping units (SKUs) within warehouse processes. Key aspects include:

1. **Process Flow:** The document presents a detailed process flow for both forward and reverse logistics within the warehouse. It highlights the requirements for identifying JIT vehicles and managing the goods receipt note (GRN) process for JIT items.
2. **User Journey and App Requirements:** The document details the journey of warehouse executives through the process of managing JIT SKUs, including the use of a GRN app for accurate inventory tracking and a dropping app for chief level putaway.
3. **Data Management:** It specifies the creation and management of tables containing seller ID, SKU ID, and JIT flags, as well as the importance of real-time updates in the backend database. There's also a focus on handling rejected quantities and RTV (Return to Vendor) processes.
4. **Challenges and Risks:** The document identifies risks associated with the JIT process, such as inventory exposure, inefficiencies in the dropping method, potential errors due to changes in chief sequence order, and limitations of the AoDB (App Sheets on Database) system.
5. **Experimentation:** The document is structured as an experiment to evaluate the viability of JIT operations within the existing WMS framework, with ongoing adjustments and feature implementations described as either in progress or planned.

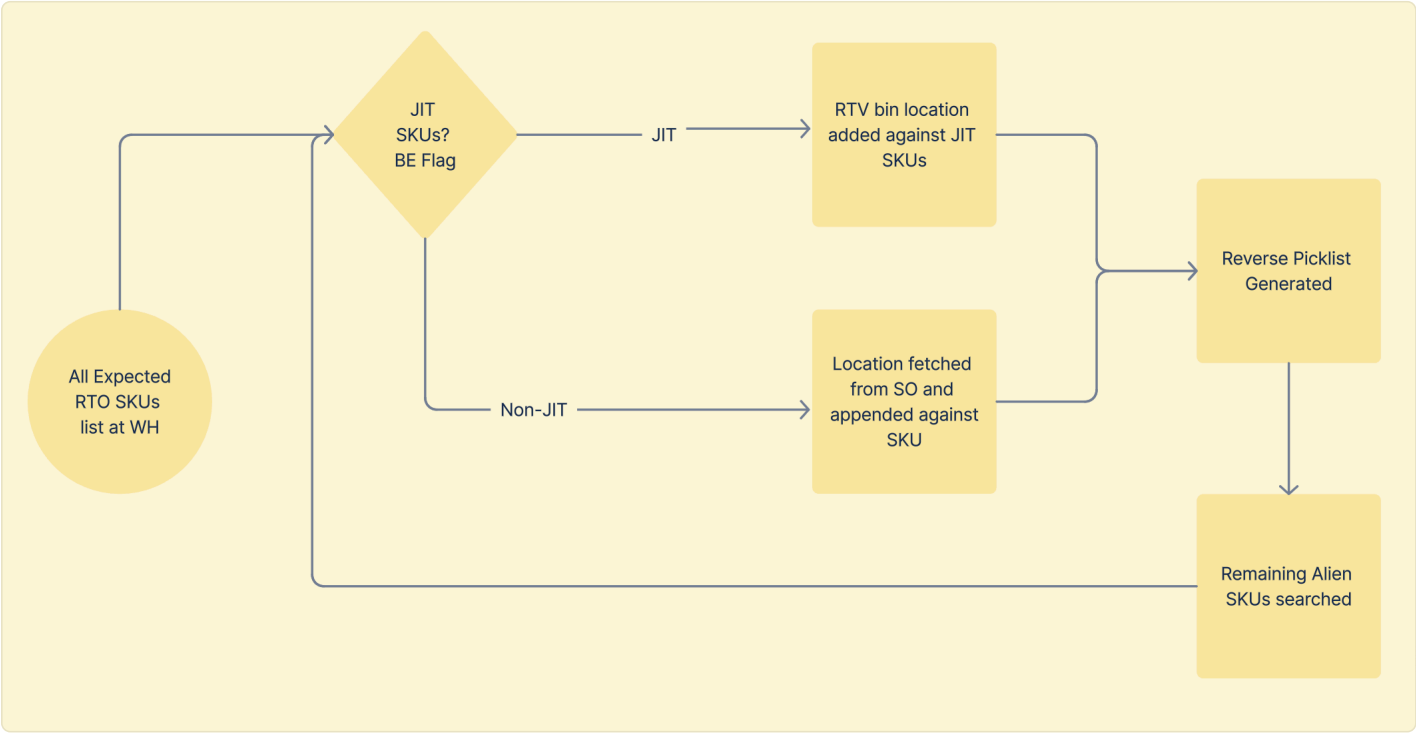
The document emphasizes the need for clear visibility of JIT operations, robust data management, and continuous monitoring of process efficiency and risk.

V0 Process Flow Diagrams

Forward Leg - WH



Reverse Leg - WH



Experiment Tech Requirements

JIT WMS V0 Requirements - Forward Flow

| Process | New App Required? | User stories | Features | Platform | Acceptance Criteria | Status |
|-------------------|-------------------|---|---|-------------|--|--------------|
| ▼ Pre-Requisite 1 | ▼ No 1 | ▼ As an experiment, clear visibility of JIT vs non-JIT SKUs must be visible to all users 1 | Creation of table with details seller ID, SKU id and JIT flag | Backend DB | 1. Any change in this list by ops must be communicated and accordingly updated. 2. Table should have visibility for multiple use cases [V0]: <ul style="list-style-type: none">Same seller might sell some JIT and some non-JIT SKUs [V1]Same SKU might be JIT or non-JIT [V1] | Not started |
| ▼ Inwarding 2 | ▼ No 2 | ▼ When JIT FML executive lands on the WH dock, security executive needs to be able to determine whether the given vehicle is JIT/Non-JIT. As a security executive, this can be done by completing any 2 of 3 checks: <ul style="list-style-type: none">WH landing time post 9 PMVehicle number listAbsence of physical invoice 1 | Vehicle number for JIT will be shared with the WH on day 0 and updated everyday | Excel Sheet | | For Ops team |
| | | ▼ The security executive should guide the unloading process 1 | | | | For Ops team |

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| | | | from JIT FML vehicle to the JIT GRN Area | | |
| ▼ GRN | 11 | ▼ Yes | 11 | <p>▼ As an GRN executive, when doing GRN from JIT putaway area, I will use GRN app.</p> <p>In case any mixing happens between JIT and non-JIT SKUs, I should not be able to find the same SKU for GRN on Stockone.</p> <p>User Journey:</p> <ol style="list-style-type: none"> 1. GRN executive will open GRN app. 2. GRN executive will login to the GRN app. 3. GRN executive can choose to search any JIT sku from search bar or from a pre-populated list post successful login. 4. GRN executive will select a SKU. 5. On selection, a new page/section will open with all the relevant details for that SKU. 6. The GRN executive will enter all details and save for that SKU. 7. The GRN executive will put the accepted SKUs on the mapped pallet and will put damaged and GRN issues SKUs on different pallets/areas respectively. 8. The GRN executive will complete the process for remaining SKUs. 9. The GRN executive will | <p>1. Create an app for GRN of JIT items containing the following information for each SKU:</p> <ul style="list-style-type: none"> • UOM (Pre-filled) • Mfg date • MRP • Expected Qty (Pre-filled, equals to orders placed for that SKU and updated based on accepted qty) • Received Qty • Damaged Qty • PO number (pre-filled) • Pallet ID for SKU <p>GRN App</p> <p>GRN Acceptance Criteria:</p> <ol style="list-style-type: none"> 1. Expiry date calculation based on Mfg date logic 2. UOM should be exact match else GRN executive cannot proceed with GRN for that SKU. This has to be input to GRN issues. 3. MRP mismatch should be rejected. This has to be input to GRN issues. 4. Alien SKUs input in GRN issues with product descriptiona and LID as null. This should be escalated to KAMs and solved operationally. 5. GRN Rejected SKUs to be sent to RTV. 6. GRN issues can be re-GRN'd in case of issue resolution. 7. Accepted Qty can't be greater than expected Qty. 8. RTV qty will be calculated on GRN issues calculation for a particular seller. 9. Excess Qty to be input in GRN Issues. 10. Mark an item as alien SKU only after checking on SO. 11. Rejected qty not to be captured for V0. Only error to be shown with putaway message in case of MRP and Expiry mismatch and the items to remain part of GRN list. This has to be input from issues app sheet. <p>Not started</p> |
| | | | | <p>2. Second Screen: SKU name search (V0 - must have)</p> <p>Show list of all SKUs (V0)</p> <p>GRN App</p> | <ol style="list-style-type: none"> 1. Partial string search should also work. 2. In case GRN executive unable to find relevant SKU from search, pre-populated list to be there. <p>Not started</p> |
| | | | | <p>3. Enter details and save for each SKU</p> <p>GRN App</p> | <ol style="list-style-type: none"> 1. All mandatory fields to be filled to enable saving option. 2. Rejection should be shown via popup and rejected GRN items should be part of the list till GRN completion trigger. 3. Partial GRN'd SKUs to be part of the list till accepted qty = expected qty. <p>Not started</p> |
| | | | | <p>4. Remaining Qty calculation per SKU = Expected - accepted (BE)</p> <p>Accepted Qty calculation = Received - Damaged</p> <p>GRN App</p> | <ol style="list-style-type: none"> 1. If expected qty = accepted qty, remove the SKU from GRN list. Move GRN status to terminal status, if accepted, for that SKU. 2. Accepted qty =< Expected Qty. <p>Not started</p> |

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| | | mark the process as complete | 5. Completion of GRN (input from GRN executive) as an activity trigger | GRN App | <div>1. GRN shortfall to be calculated at the end of this trigger</div> <div>2. This will run slack alert for Sumegh for Nagpur.</div> <div>3. Make the GRN complete button relatively hidden and completion confirmation.</div> | <div>Not started</div> | | | |
| | | | 6. Enter and store trolley/pallet location for the SKU GRN'd | GRN App | <div>1. This should be done against GRN'd qty i.e. in case of same SKU and new pallet, a new pallet ID will be stored.</div> <div>2. Droplist will be generated against the GRN'd qty (expected to be on the pallet operationally).</div> | <div>Not started</div> | | | |
| | | | 7. (Optional for V0) Status of GRN attempt to terminal state movement. Terminal states: <ul style="list-style-type: none">• Success• Failed• Shortfall | GRN App | <div>1. After 24 hours, if GRN is in initiated state but not reached a terminal state, mark it as failed in db (optional)</div> <div>2. The initiated state data should not be visible next day.</div> | <div>Not started</div> | | | |
| | | | 8. GRN credentials creation and login page | GRN App | Credentials validation should be present. | <div>Not started</div> | | | |
| | | | 9. GRN issues quantity to be updated as RTV quantity against seller post GRN completion | GRN App | Partially accepted batch and partially rejected batch is allowed in two separate entries. | <div>Not started</div> | | | |
| | | | 10. Popup for damaged and GRN Issues qty | GRN App | <div>1. Popup should show: Damaged Qty: Note: Move to damaged Zone. Rejected Qty: Note: Move to RTV Zone/Staging Area.</div> <div>2. Damaged and Issues Qty can be present together. Popup should reflect both.</div> <div>3. Assumption that once popup is shown, physical movement will take place accordingly.</div> | <div>Not started</div> | | | |
| | | | 11. Movement from GRN Issues staging area to RTV zone | GRN App | <div>1. Seller location to be suggested for SKU putaway.</div> <div>2. Movement completion to be saved for calculating final RTV qty.</div> <div>3. Damaged qty to be separately handled.</div> | <div>Not started</div> | | | |
| ▼ Pallet/Trolley Mapping for Dropping | 4 | ▼ Yes | 4 | ▼ As a GRN executive, after completing GRN, will need to segregate it with the rest of the SKUs, hence, pallet mapping can be done at this stage. | 4 | 1. Pallet Location Scan for drop loading during GRN | GRN App | <div>1. As GRN gets completed for a SKU, the GRN executive will place GRN'd qty of this SKU on a pallet/trolley. In case the pallet is not full, then the GRN executive may place multiple SKUs on one pallet/trolley.</div> <div>2. Post partial GRN is done for a SKU, for next partial GRN, pallet location must be scanned again.</div> <div>3. On saving, details must be updated in real-time.</div> | <div>Not started</div> |
| | | | | | | 2. Pallet id and SKU mapping (Many: Many) [V0] | GRN App | For every entry in GRN app for each SKU, one pallet ID should be mapped. | <div>Not started</div> |

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| | | | 3. Sticker Generation for Pallet location (static and V0) | Pallet location will be present for each pallet | For Ops team | | | | |
| | | | 4. Pallet ID not to be used post droplist generation | GRN App | Validation check in GRN process | Not started | | | |
| ▼ Supervisor shortfall data from query | 2 | ▼ No | 2 | ▼ As supervisor, I need to have visibility on the shortfall reported in various processes such as GRN, Dropping and Re-inventorization. | 1 | GRN completion slack alert for GRN shortfall data | 1. Query to be provided for GRN shortfall against FML shortfall. 2. Slack alerting to be added. 3. GRN completion + all droplist completion → data merge and insert into tables for JIT and non-JIT | Not started | |
| | | | | ▼ As a KAM, I need to be aware about shortage received from seller for payment recon and seller penalty. | 1 | Shortfall data to be stored in db | Query to be provided for WH executives and live dashboard is for KAMs | Not started | |
| ▼ Dropping to chief staging area | 13 | ▼ Yes | 13 | ▼ Post GRN, the dropping executive will generate a droplist and proceed to the chief staging area. Finally, once all putaway has been done, he will complete the droplist so the pallet can be used for other mappings. Any excess has to be dropped into the RTV zone and RTV qty to be updated. | 13 | Create a new app for drop list generation | Drop App | 1. First Screen: Login Screen 2. Second Screen: Pallet Scan and confirm option 3. Third Screen: Show all SKUs on the pallet with qty and generate droplist option. 4. Show the droplist for that pallet in another tab in the same app. 5. To show all chief sequential location. 6. The dropper will click on the first chief and go to first chief location. 7. The dropping executive will show all SKUs list to be dropped for that chief, sorted for qty. 8. The dropper will choose the SKU to be putaway. A new list will open, which shows: <ul style="list-style-type: none">scan crate (mandatory)expected qty to be put away (Pre-filled)input field for actual qty put away, if the actual qty putaway =< expected put away qty (GRN'd qty for that pallet ID), then the remaining putaway qty to remain part of the list of SKUs (will require another crate scan)(optional) in case of unmapped crate ID: (mandatory) scan chief location and (mandatory) map SKU category and crate categoryall mappings to be done in real-time 9. Save putaway qty for each SKU in each chief 10. Partial putaway allowed with reason, SKU to remain in list until expected = putaway 11. Complete the droplist 12. Partial putaway reasons: damaged, new crate, not found | Not started |

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| (Identification) Login credentials and page for the dropping executives | Drop App | Login Validation to be present | Not started |
| Pallet ID scanning to get all SKUs on that pallet and create droplist option | Drop App | <ol style="list-style-type: none"> 1. In case drop list has already been created and some putaway has been done, then the list should continue from last putaway location. 2. Multiple droplists can be generated for one pallet/trolley once dropping activity for that pallet/trolley has been completed. Example: P-1's droplist generated for SKU 1 and SKU 2. Now, I will not let the GRN executive map any other line item with P-1 until droplist for P-1 has been marked completed. | Not started |
| Creation of a drop path based on first chief location with SKU list | Drop App | <ol style="list-style-type: none"> 1. First chief should be decided based on the sequence of chiefs given by ops. 2. First chief location logic: if droplist created for SKU 1 (Chief 3, 5 and 7) and SKU 2 (Chief 2, 6 and 9), then the first chief location for putaway should be chief 2 for SKU 2. | Not started |
| SKU selection page with qty to be dropped (for that chief, pre-filled) and actual qty dropped (for that chief, input) | Drop App | <ol style="list-style-type: none"> 1. Partial drop qty for a SKU to be accepted. 2. Reason → New crate → SKU to remain in the list for chief until dropped qty = expected qty for chief or droplist completion selected. 3. Reason should be present for partial drop off | Not started |
| Mappings to be created in system: <ol style="list-style-type: none"> 1. Crate ID to chief mapping 2. Crate Id category to SKU category mapping 3. All SKUs and quantity of each SKU against a crate ID should be stored | Drop App | <ol style="list-style-type: none"> 1. Mandatory mappings for each SKU and crate. 2. Any crate ID should have chief and SKU details. | Not started |
| crate scan option to be added for each SKU, new crate ID needs to be mapped to chief | Drop App | <ol style="list-style-type: none"> 1. Any SKU can be dropped into multiple crates in partial quantities if the reason is new crate. 2. All mappings need to be created whenever a new crate has been added. | Not started |
| Crate ID scan and SKU scan options to be added | Drop App | Crate ID Scan mandatory for V0; SKU scan moved to V1 | Not started |

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| | | | Validations for right category put away and right SKU scanned | Drop App | <ol style="list-style-type: none"> 1. Once a SKU has been dropped into a new crate, SKU's category should be auto-mapped to crate category i.e. food, non-food, NC etc. 2. Different category SKUs should not be mixed in one crate, validations on crate scan mandatory. | Not started |
| | | | Dropping shortfall data updated | Drop App | <ol style="list-style-type: none"> 1. Query to be provided to ops for Drop Shortfall 2. Alert to be triggered on slack to Sumegh | Not started |
| | | | Droplist status to be maintained for last saved location and droplist completion trigger | Drop App | <ol style="list-style-type: none"> 1. After the droplist trigger, the pallet can be used for mapping of other GRN items. 2. Once droplist has been generated for a pallet, then that pallet should not be validated for GRN putaway until droplist completion. 3. In case of an incomplete dropping activity, pallet scan should provide next steps from last saved action by the dropper. 4. Any excess should be moved to RTV before remapping. | Not started |
| | | | All GRN and droplist completion should be a trigger for dispatch start (crates to be dispatched state once confirmation given) | Drop App | <ol style="list-style-type: none"> 1. Once GRN list and all droplists completed (based on GRN completed), dispatch data should be updated (given NON-JIT picking has also been | Not started |
| ▼ Dispatch from 1 WH | ▼ No 1 | ▼ As a chief, I need minimum friction in my everyday processes. 1 | Add details to dispatch app in the same manner post merging for JIT and non-JIT | | No change for chief and LM nodes. | Not started |
| ▼ Non-JIT Requirements 4 | ▼ No 4 | ▼ As a WH executive, I also need to process non-JIT SKUs on time. 4 | ODQ and python changes to run at 6 PM in one wave | | <ol style="list-style-type: none"> 1. No concept of multiple waves going forward. 2. Wave to run with orders till 5 PM. 3. All cancellation crons till 5 PM orders must run by 5:30 PM. 4. Post 5 PM orders must show timeline of NDD+1. | Done |
| | | | Picklist for non-JIT to be generated at 5:30 PM | | Picklist will represent 24 hours orders i.e. last day 5 PM to today 5 PM. | Not started |

Risks Associated: Forward Flow

- No QC process in JIT design.
- Chief sequence order can be changed on ground without changing in code, can lead to errors.
- Supervisor communication is query based, supervisor does not have visibility on short quantity otherwise.
- Excess quantity remaining at the end is at the discretion of the dropper. This may lead to short fulfillments at particular LM nodes.
- SKU level stickers are not done on pallet level in V0. This may lead to increased WFR.
- Dropping method may be less efficient in scaled state with added chiefs and added SKUs. Detailed TMS can be done post experimentation.
- AoDB has sync time limitations and therefore is not scalable beyond 10k orders.

- Excess qty, alien SKUs and UOM mismatch data is to be maintained in GSheets. Any mismatch can lead to recon breaking.

JIT WMS V0 Requirements - Reverse Flow

[illegible]

| | | | | | | | | | |
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| | | | Generate a reverse picklist for the unexpected SKUs in the same manner. | AoDB | Total qty to be added against seller for recon | Not Started | | | |
| | | | Alien SKUs (LID does not exist in system) to be handled operationally | GSheets | | | | | |
| | | | Seller location Scan for putaway | AoDB | | Not Started | | | |
| ▼ RTV | 4 | ▼ No | 4 | ▼ As a WH executive, I am expected to put multiple SKUs in RTV and add/remove their quantity for recon purposes. | 4 | RTV data sources merge across sources to compute total quantity of RTV expectancy per SKU per seller: <ul style="list-style-type: none">GRN Issues RTV SKUsRTO to RTV putaway for JITUnexpected SKUs in RTO flowAlien SKUs in RTO → operationally handledAlien SKUs in GRN IssuesExcess post ddrolist completion → operationally handled | AoDB | <ol style="list-style-type: none">Format of GSheet to be consistent.GRN RTV to be excluded in case of further corrections post GRN completion.This data should be input to FML driver:<ul style="list-style-type: none">Location of seller in WH/RTV BinTotal qty expected with seller code per SKUGRN RTV to be calculated once GRN marked as completed and movement happens to RTV zone.Option to remove any GRN mistakes from RTV calculation. Example: if someone puts wrong expiry but later corrects it in another input, then RTV calculation should not include wrong expiry input. | Not Started |
| | | | | | Creation of fixed mapping between location and seller code based on which reverse picklist and RTV expectancy to be created for each seller | Any changes in this mapping to be called out in V0 | Not Started | | |
| | | | | | RTV shortfall to be calculated per seller | Alert to be triggered | Not Started | | |
| | | | | | GSheet, RTV from reverse picklist and GRN RTV data to be merged | <ol style="list-style-type: none">GSheet should be in a given format.GSheet should be manually uploaded in time else qty should be assumed to be 0.RTV calculation | Not Started | | |

Risks Associated: Reverse Flow

- No visibility of number of cases/crates. This may create problems in crate recon.

- Manual entries in GSheet are not a reliable way to track leakages.
- GSheet upload not done on time can lead to additional seller payments.
- Alien SKUs search and mapping can be a time-consuming process and is to be optimised with scale.

Data Funnels Needed

1. Orders placed post cancellation → (JIT)Total FML picked up qty → (JIT) Total GRN Accepted Quantity, (JIT)Total Damaged Qty →(JIT) Total Dropped Qty → JIT Dispatched qty → JIT Chief received Qty → (JIT)Delivered Qty, (JIT)Undelivered Qty, (JIT)RTO, (JIT)Reattempt
2. (JIT) RTO total qty → (JIT) RTV total qty → (JIT) FML driver RTV qty picked → (JIT) Seller received total qty
3. Dropping Efficiency (JIT) vs Picking Efficiency (Non-JIT) in avg #SKUs/hour
4. % increase in customer cancellations
5. Total RTO and returns% for JIT vs non-JIT
6. Change in fill rate %, change in OOS%

Summary

Success in this JIT experiment would mean achieving a zero-inventory model where products are delivered precisely when needed, eliminating the need for warehousing stock. This would involve efficient coordination between suppliers and the warehouse, real-time tracking, and flawless execution of the GRN, dropping and dispatching process, ensuring that goods arrive and leave the WH just in time for use or shipment, with no inventory stored on-site and minimum damages and RTV.