visibility
intelligence
value

Traceability System

Haldiram's

Techno-Solution Document

The document details the summary of scope solution architecture and approach for the development of Traceability System for Haldiram's. The document is based on the inputs, system study, discussions and meeting held between BCI & Haldiram's Teams.

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Revision History

Version	Date	Prepared By	Review	Comments
1.0	22-Mar-19	Kanishka Tanwar	Kuldeep Saini	Proposal Document for Traceability System
1.1	1-Apr-19	Kanishka Tanwar	Kuldeep Saini	Scope Change
1.2	16-Mar-20	Kanishka Tanwar	Sneha	Scope Change
1.3	16-Oct-20	Naresh Aneja	Kuldeep Saini	Scope Change
1.4	08-Jan-21	Naresh Aneja	Kuldeep Saini	Scope Change

Abbreviations:

Client: Haldiram's, henceforth will be referred as Haldiram's

Vendor: Bar Code India, henceforth will be referred as BCI.

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Contents

1 Client Introduction

Haldiram's is a major potato chips and Indian sweets and snacks manufacturer based out of Delhi and Nagpur. The company has manufacturing plants in a wide variety of locations such as Nagpur, New Delhi, Gurgaon, Rudrapur and Noida. Haldiram's has its own retail chain stores and a range of restaurants in Nagpur, Kolkata, Noida and Delhi.

Haldiram's was founded in 1937 by Shri Ganga Bhishen Agarwal, fondly known as Haldiram in his household; as a retail sweets and namkeen shop in Bikaner, Rajasthan. In 1970, a larger manufacturing plant was established in Jaipur. Another manufacturing plant was established in New Delhi, the capital of India, in the early 1990s. In 2003, the company began the process of developing convenience foods to be marketed to consumers. Haldiram's has over 400 products. Its product range includes traditional namkeens, western snacks, Indian sweets, cookies, sherbets, papads and pickles. The company also produces ready-to-eat food products.

2 Business Requirements

Haldiram's is currently looking for the solution which streamlines their product packing line and keep track of the same in real time. The company also wants to validate each item before being dispatched to the concerned customers.

BCI has studied and analyzed the Haldiram's existing process in depth and understands its requirement. In order to overcome the problems and challenges faced during item packing and processing, BCI would like to propose the solution which will help in the automation of product packing and tracking throughout the Warehouse. The solution provides infallible data updating, integrity, data accuracy and eliminates above stated problems.

2.1 Business Challenges

The challenges faced by the Haldiram's in performing their day-to-day operation are as follows:

- Difficulty in verifying and tracking the primary packs being packed in the cartons.
- No verification of barcode label pasted on the carton.
- No real time tracking
- Orders are maintained in SAP/ Excel
- Difficult to keep track and validate the items being dispatched to the Customers
- No cross verification of items against Dispatch Delivery.

3 Solution Scope

The scope of the project is to create Traceability System for Haldiram's using AIDC Technology which will facilitate the automation of all manual operations required in handling and managing material during its master packaging and dispatch from FG Warehouse.

The application will provide procedures to keep control and track of the primary packs being packed in cartons on conveyor at production line. Motion Sensors and Camera Scanner will be installed at packaging line to count and validate incoming cartons on conveyor, if readable/ valid, it will be moved forward at line else gets rejected. The solution will streamline the packing process through barcode label scanning.

At FG warehouse, the application will validate and keep track of the cartons being dispatched to the concerned customers against related Delivery Number, received from SAP.

The application will be integrated with SAP in order to get and transfer the associated transaction data in real time.

It will be beneficial for Haldiram's as it will improve data accuracy, increase processing speed and provide instant inventory and other types of pertinent reports which are needed to make effective decisions.

The automation of operations eliminates paper-work, maximize efficiency and reduces time consumption and effort. BCIL is pleased to submit this solution to Haldiram's requirements as per the on-going discussion. This would require development of **Wi-Fi enabled application for real time transaction.**

3.1 Functional Scope

The scope of the software would require the development of the front-end application, client application for mobile computers and Communication Server application for transferring real time data to database. The document lays down the specifications of the middleware application, its architecture and infrastructure requirements.

The entire solution consists of followings:

1. Front-end for Middleware Application
2. Communication Server Application
3. Mobile Computer Application

3.2 Out of Scope

The following activities are not in the scope of BCIL but, however, are important for the project development and hence needs to be taken care by Haldiram's:

1. Process Related Changes
2. Test Data Creation
3. RFC Interface Development

3.3 Assumptions

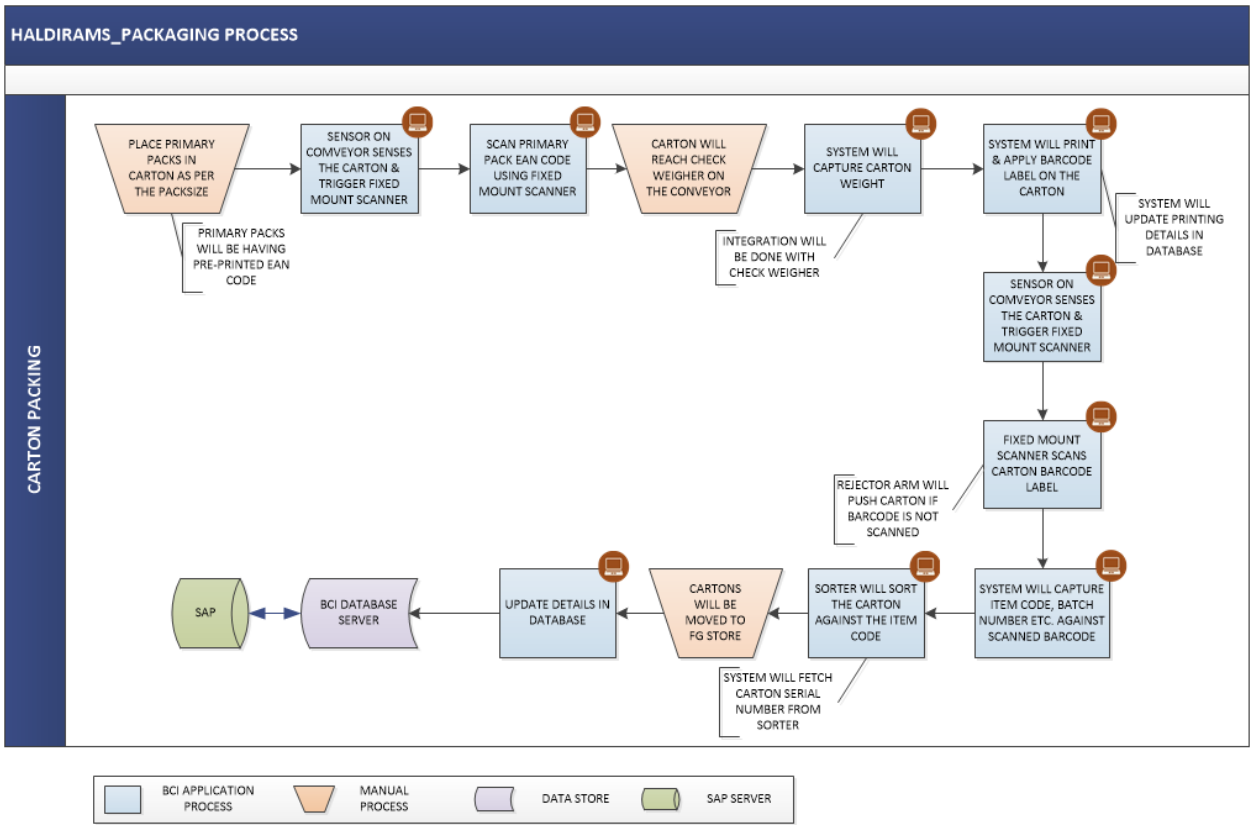
The following assumptions will be taken before implementation of the project:

1. All the Devices are on the network port.
2. Development of RFC/ BAPI/ XML/ API in ERP will be provided by Haldirams.

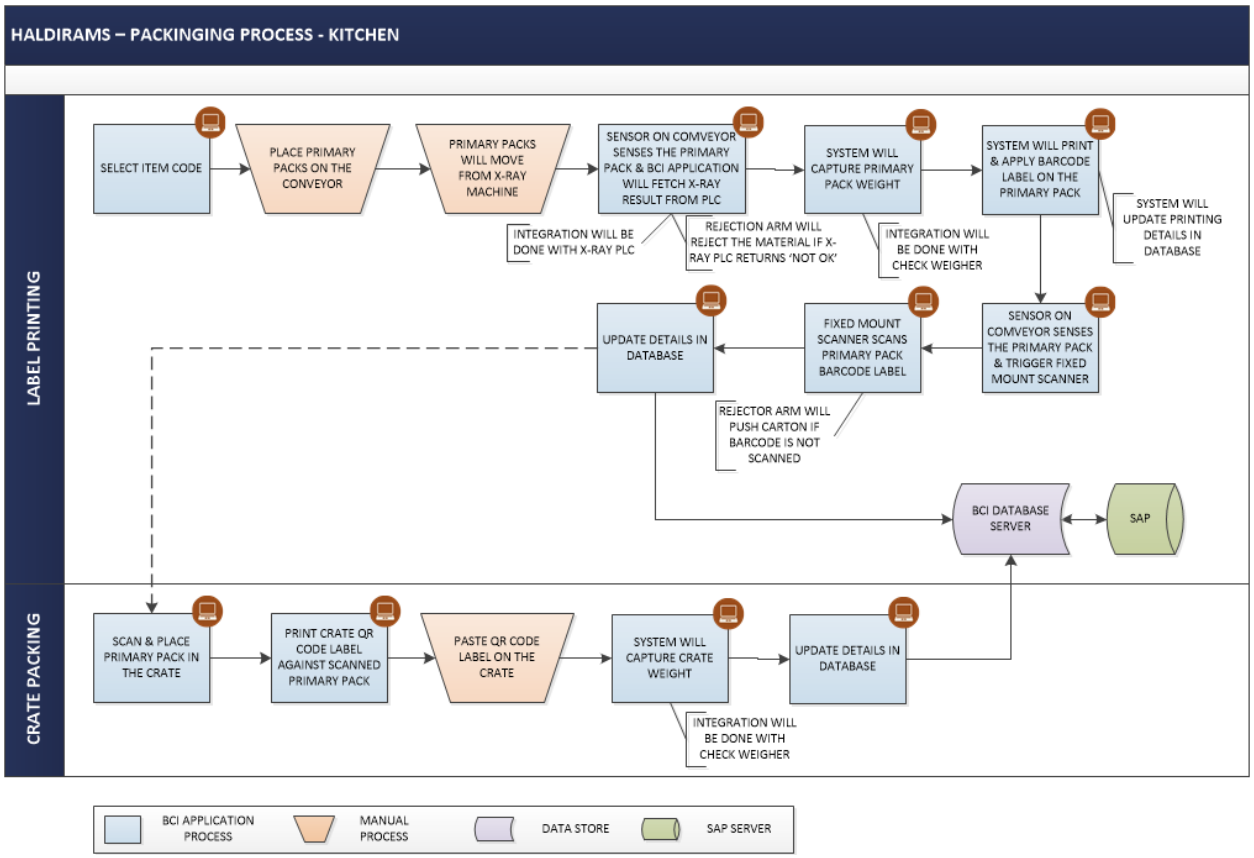
4 Operation Suites as per the Requirements

4.1 Process Flow

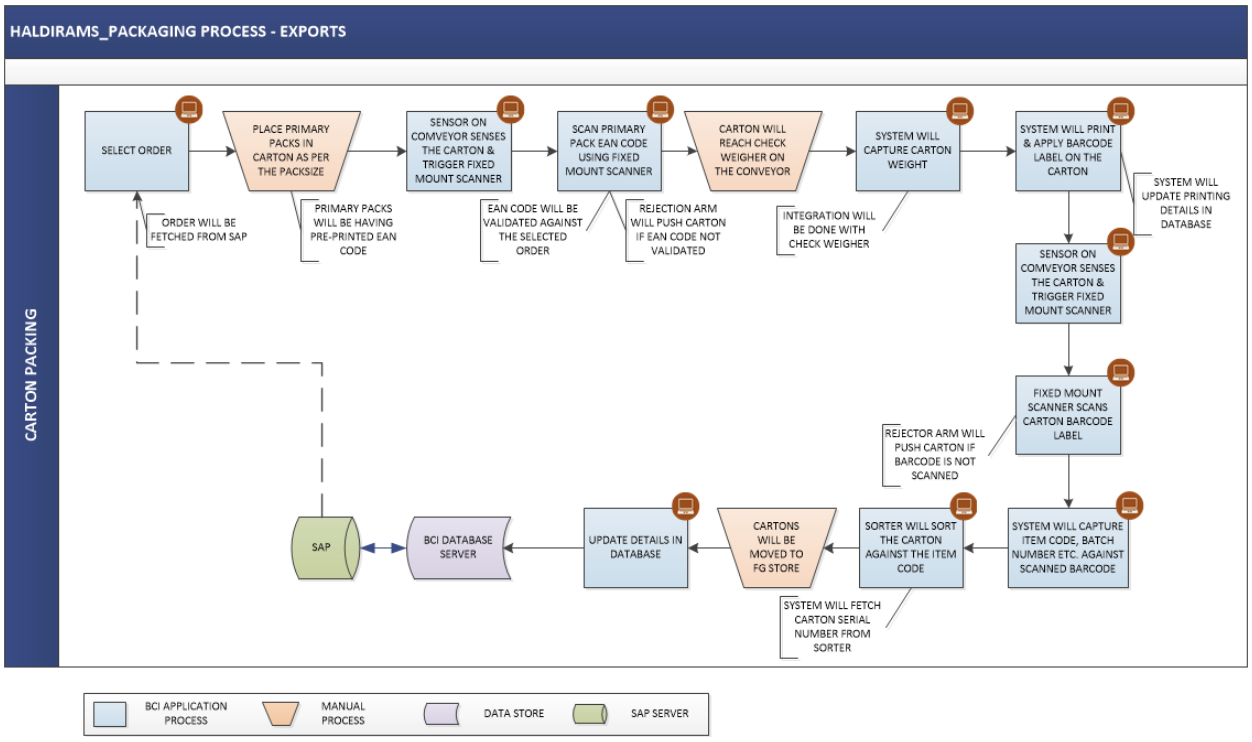
4.1.1 Master Packaging - Namkeen



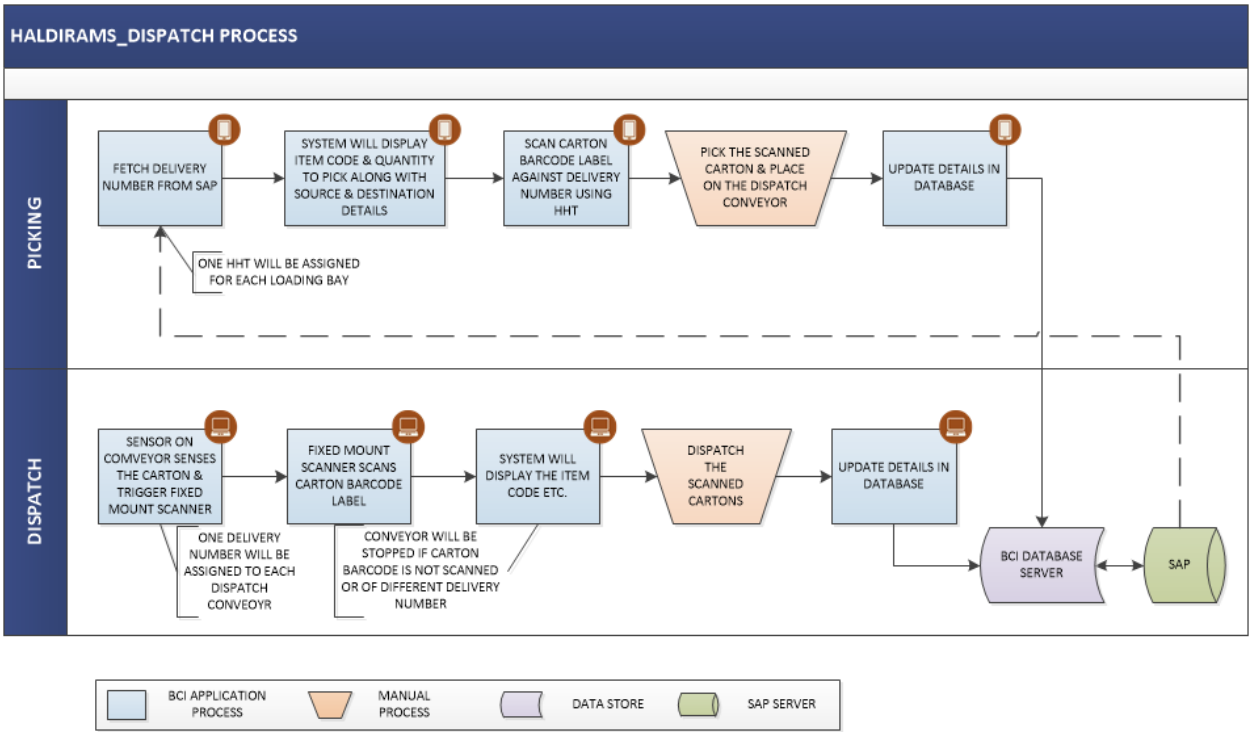
4.1.2 Master Packaging - Kitchen



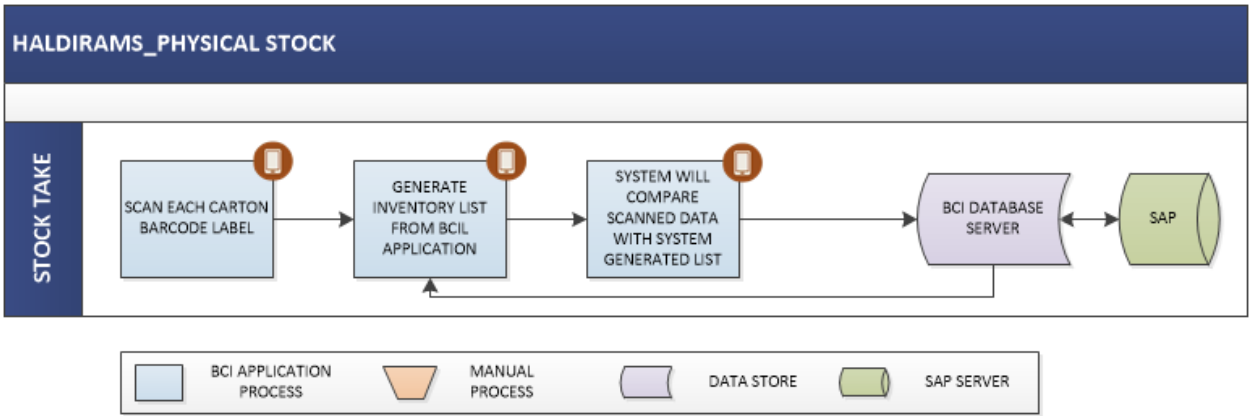
4.1.3 Master Packaging - Export



4.1.4 Dispatch Process



4.1.5 Physical Stock Process



5 Solution Application Modules

5.1 User Management

The User Management module will provide stage/ process wise authorization to each user created by Admin. The application will let Admin to create users and to assign access rights to each user. A login screen will be created to provide access to the application. Only authorized users can access the application

Steps involved in Login process are:

1. Enter credentials i.e. User Id and Password.
2. System will authenticate the valid User Id and Password; in case invalid credentials are entered, an alert will be displayed.

5.2 Master Data

The proposed application will have master data to store details in database. Masters will be created as per the application's requirement and details will be stored in database.

Master data can also be uploaded in application via excel/ CSV file in a defined format.

The application would have

1. Company Master,
2. Plant Master
3. Line Master
4. Product Master
5. Process Master
6. Machine Master
7. User Master
8. Group Master
9. Group Rights Master
10. Printer Master

5.3 Packaging Line Operation – Namkeen

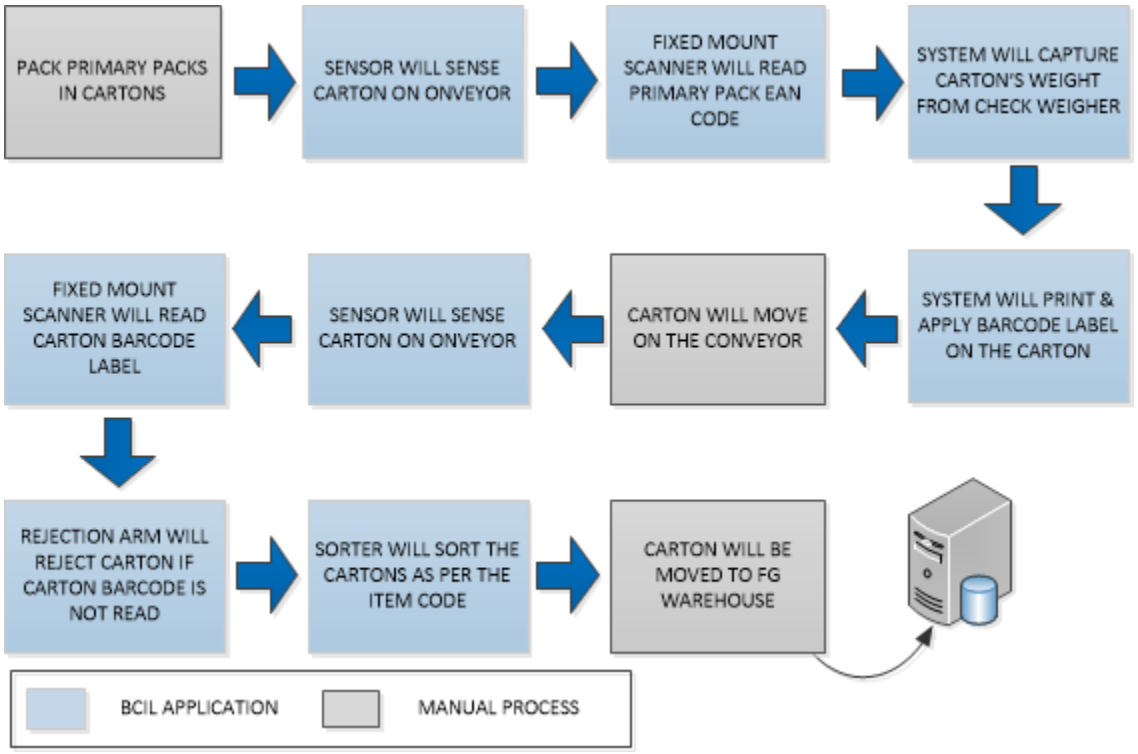
5.3.1 Carton Packing

5.3.1.1 Solution

In this process, primary packets will be placed in Carton as per defined pack size. Each primary pack will have a pre-printed EAN Code label which will be scanned and validated by Fixed Mount Scanner on Conveyor. The conveyor will also have sensors to notify system about incoming carton. A Carton label will be printed and applied via existing Print & Apply system.

Steps involved in this process are:

1. User will place primary packets in carton as per defined pack size.
   **Each Packet will have pre-printed EAN Code label.*
2. Place Carton on Conveyor.
3. Sensor on conveyor will sense incoming Cartons
4. Scan Primary Pack using Fixed Mount Scanner.
5. System will capture Carton Weight
   **Integration with check weigher is required to capture weight.*
6. System will Print & Apply barcode label on the Carton.
7. Carton will move forward on Conveyor.
8. Sensor will sense the incoming carton and trigger Fixed Camera Scanner.
9. Fixed Mount Scanner will scan Carton barcode label.
10. In case carton is not scanned/ missed, rejector arm will reject the carton.
11. System will capture the Item Code, Batch Number etc.
12. Sorter will sort the carton against the Item Code. Carton serial number will be fetched from sorter.
13. Cartons will be moved to FG Warehouse
14. Corresponding details will get updated in database.



5.3.1.2 Saving Matrices

Best Practice	Saving Metrics
1. Authorized access to the application 2. Eliminates manual data recording 3. Online data updating 4. Real time item validation 5. Removes data entry in registers 6. Item tracking in real time 7. Auto rejection of cartons whose barcode not read 8. Auto sorting of cartons item code wise 9. Auto update to server	#Number of hours reduces. #Number of labors reduces #Labor cost reduces #Save Stationaries such as registers, papers etc.

5.4 Packaging Line Operation – Kitchen

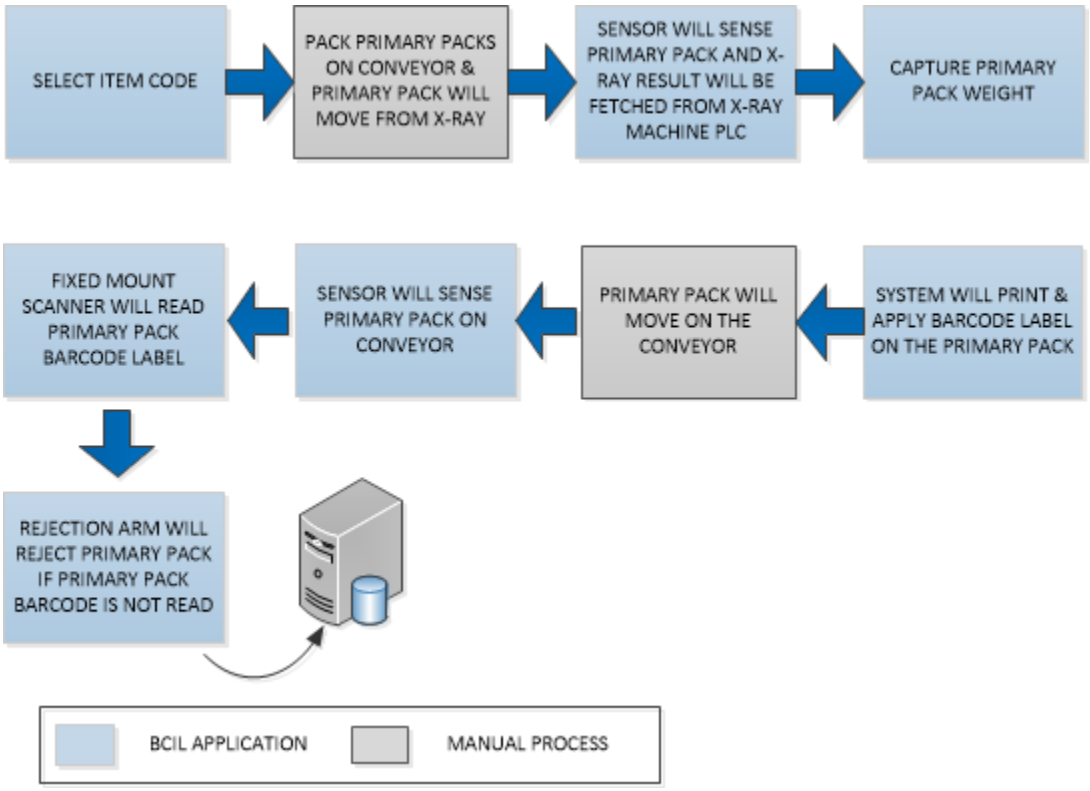
5.4.1 Label Printing

5.4.1.1 Solution

In this process, each primary pack will pass from the X-Ray Machine and BCI Application will fetch the X-Ray result from X-Ray PLC. Rejection arm will reject the material if PLC return Not OK result. The check weigher will weigh the primary pack and a primary pack barcode label will be printed and applied via existing Print & Apply system.

Steps involved in this process are:

1. Select Item Code.
2. Place Primary Pack on the conveyor.
3. Primary Packs will move from the X-Ray machine.
4. Sensor on conveyor will sense Primary Pack and Rejection Arm will reject the material if X-Ray PLC returns 'Not OK'.
   **Integration with X-Ray PLC is required*
5. System will capture Primary Pack Weight.
   **Integration with check weigher is required to capture weight.*
6. System will Print & Apply barcode label on the Primary Pack.
7. Primary Pack will move forward on Conveyor.
8. Sensor will sense the incoming Primary Pack and trigger Fixed Camera Scanner.
9. Fixed Mount Scanner will scan Primary Pack barcode label.
10. In case carton is not scanned/ missed, rejector arm will reject the Primary Pack.
11. Corresponding details will get updated in database.



5.4.1.2 Saving Matrices

Best Practice	Saving Metrics
• Authorized access to the application • Eliminates manual data recording • Online data updating • Real time item validation • Removes data entry in registers • Item tracking in real time • Auto rejection of Primary Packs whose barcode not read • Auto update to server	#Number of hours reduces. #Number of labors reduces #Labor cost reduces #Save Stationaries such as registers, papers etc.

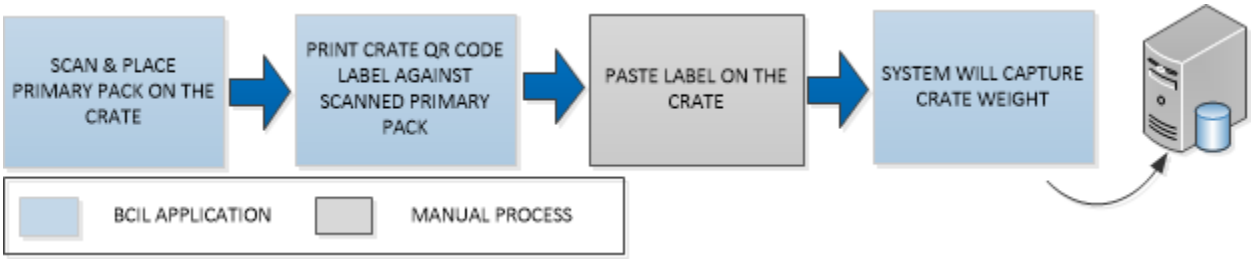
5.4.2 Crate Packing

5.4.2.1 Solution

In this process, primary packs will be placed in Crate as per defined pack size. The check weigher will weigh the carton and a carton barcode label will be printed and applied via existing Print & Apply system.

Steps involved in this process are:

1. Scan & place Primary pack on the crate.
2. Print Crate QR Code Label against scanned Primary Pack.
3. Paste Label on the Crate.
4. System will capture Crate Weight.
   **Integration with check weigher is required to capture weight.*
5. Corresponding details will get updated in database.



5.4.2.2 Saving Matrices

Best Practice	Saving Metrics
• Authorized access to the application • Eliminates manual data recording • Online data updating • Real time item validation • Removes data entry in registers • Item tracking in real time • Auto Primary Pack- Crate mapping. • Auto update to server	#Number of hours reduces. #Number of labors reduces #Labor cost reduces #Save Stationaries such as registers, papers etc.

5.5 Packaging Line Operation – Export

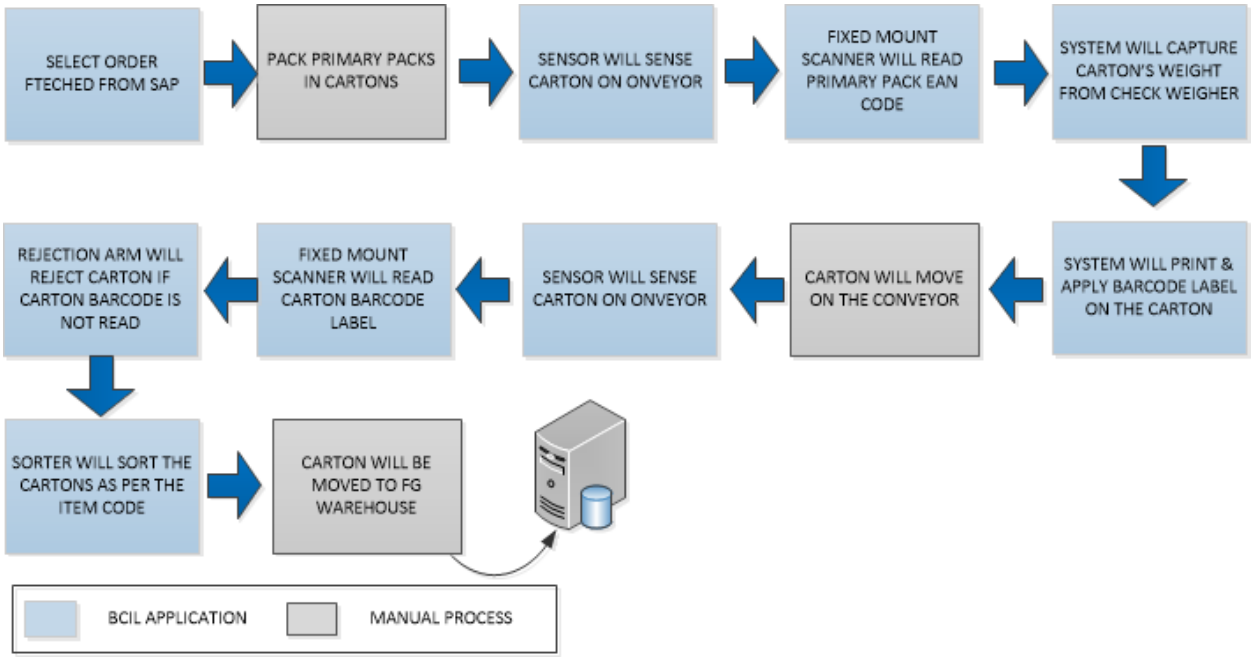
5.5.1 Carton Packing

5.5.1.1 Solution

In this process, primary packets will be placed in Carton as per defined pack size. Each primary pack will have a pre-printed EAN Code label which will be scanned and validated by Fixed Mount Scanner on Conveyor. The conveyor will also have sensors to notify system about incoming carton. A Carton label will be printed and applied via existing Print & Apply system.

Steps involved in this process are:

1. Select Order.
   **Order will be fetched from SAP*
2. User will place primary packets in carton as per defined pack size.
   **Each Packet will have pre-printed EAN Code label.*
3. Place Carton on Conveyor.
4. Sensor on conveyor will sense incoming Cartons
5. Scan Primary Pack using Fixed Mount Scanner to validate EAN against selected Order. Rejection Arm will reject the Carton if scanned EAN is not the Item as mentioned in the selected Order.
6. System will capture Carton Weight
   **Integration with check weigher is required to capture weight.*
7. System will Print & Apply barcode label on the Carton.
8. Carton will move forward on Conveyor.
9. Sensor will sense the incoming carton and trigger Fixed Camera Scanner.
10. Fixed Mount Scanner will scan Carton barcode label.
11. In case carton is not scanned/ missed, rejector arm will reject the carton.
12. System will capture the Item Code, Batch Number etc.
13. Sorter will sort the carton against the Item Code. Carton serial number will be fetched from sorter.
14. Cartons will be moved to FG Warehouse
15. Corresponding details will get updated in database.



5.5.1.2 Saving Matrices

Best Practice	Saving Metrics
• Authorized access to the application • Eliminates manual data recording • Online data updating • Validate Item against the Order. • Real time item validation • Removes data entry in registers • Item tracking in real time • Auto rejection of cartons whose barcode not read • Auto sorting of cartons item code wise • Auto update to server	#Number of hours reduces. #Number of labors reduces #Labor cost reduces #Save Stationaries such as registers, papers etc.

5.6 Dispatch Operation

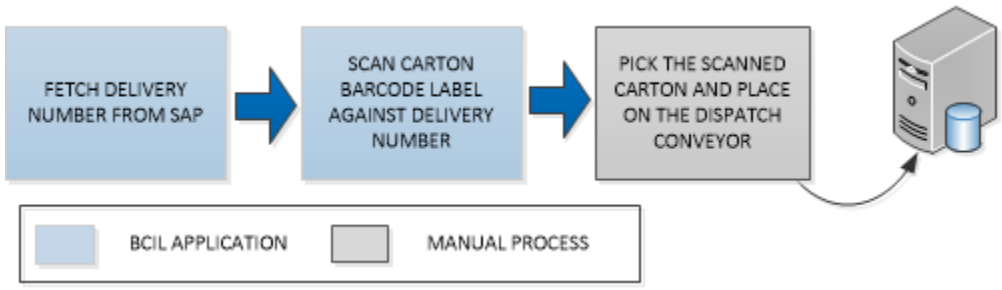
5.6.1 Picking

5.6.1.1 Solution

In this process, requested material will be picked as suggested by system. System will verify the material against Picklist and details for the same will be updated in database. Once picked, inventory will get updated accordingly. System will also notify user about pending Picklists, if any.

Steps involved in this process are:

1. User will receive Delivery Number from SAP in device, corresponding material picking details will appear on screen.
2. Scan Carton Barcode Label against Delivery Number using HHT. One HHT will be used for each loading bay.
3. System will verify material scanned against Delivery Number.
   **An alert/ error message will be displayed in case invalid material is scanned or more qty. than defined picking qty. of material is being picked.*
4. If partial crate is required then
   a. Scan Primary Pack Barcode Label against the Delivery Number.
   b. Place scanned Primary Pack in new Crate.
   c. Print & paste Crate QR Code Label.
5. Pick the scanned cartons and place the carton on the dispatch conveyor.
6. Once picked, warehouse inventory will get updated (reduced) accordingly.



5.6.1.2 Saving Metrics

Best Practice	Saving Metrics
• Eliminates data entry. • Material tracking at highly detailed level • Easy to pick required material • System based verification against picking document • Real time data updating on server	#Number of Labor reduced. #Number of hours reduced in performing activity. #Cost of labor is reduced #paperless data recording

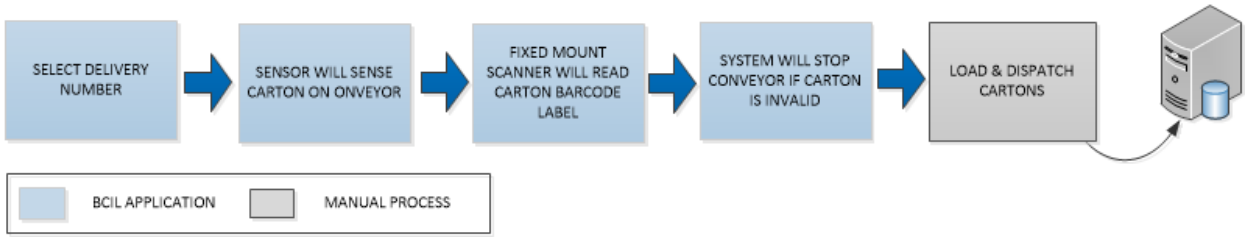
5.6.2 Dispatch

5.6.2.1 Solution

This module let user to ship cartons against Dispatch Delivery Number to the concerned customer. Each carton will be validated before being dispatched.

Steps involved in this process are as follows:

1. Place Carton on Conveyor. One Delivery Number will be assigned to each of the Dispatch Conveyor.
2. Sensors on conveyor will sense the incoming Carton and trigger Fixed Mount Scanner.
3. Fixed Mount Scanner will scan the Carton barcode label against Delivery Number.
4. If carton is invalid/ not scanned, system will stop the conveyor.
5. Load and Dispatch Cartons.
6. Update details in the database



5.6.2.2 Saving Matrices

Best Practice	Saving Metrics
1. Authorized access to the application 2. Eliminates manual data recording 3. Online data updating 4. Real time item validation 5. Removes data entry in registers 6. Item tracking in real time	#Number of hours reduces. #Number of labors reduces #Labor cost reduces #Save Stationaries such as registers, papers etc.

5.7 Physical Stock Operations

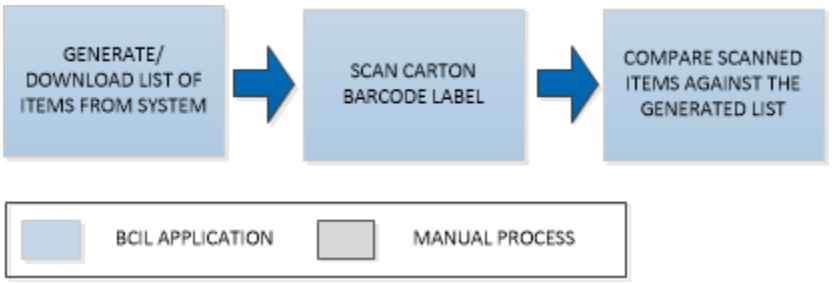
5.7.1 Stock Take

5.7.1.1 Solution

The module will be used to perform a complete physical inventory check. User will generate the list of items in inventory and will scan and validate the physical inventory against the list; user will know about the discrepancies in inventory (if there is, any), accordingly user may flag for later or correct it immediately.

Steps involved in this process are:

1. User will Download/ generate list of items from system
2. User will Scan Carton barcode label
3. Compares the scanned Item against the generated list
4. Update details, if discrepancy is found.



5.7.2 Saving Metrics

Best Practice	Saving Metrics
• Eliminates manual data recording. • Easy to count and verify inventory items • Accurate inventory counting • Auto inventory update • System based verification • Eliminates human error	#Number of hours reduced in performing activity. #paperless data recording

5.8 Reports

Reporting module will provide access to the data that will be helpful in making well-informed strategic decisions, reduces risk, and increases productivity. The reporting interface will be user-friendly, application users can easily generate, and view required data.

The application will generate customized reports based on required data fields and time interval selected / entered by users and can be exported into defined excel file/ PDF format, whenever required.

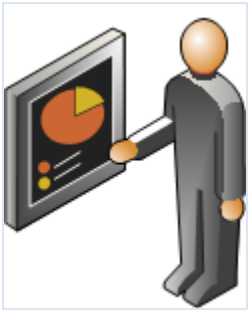
Reports can be defined as private for restricted viewing – or made public, giving access to information on the basis of access rights assigned to the particular user / group.

Reports to be provided are:

- Inventory Value
- Daily Packing Report
- Item-wise Report
- Daily Rejection Report
- Daily Dispatch
- Item-wise Dispatch
- Ageing

5.9 Dashboard

The dashboard screen will display content relating to operational efficiency of a warehouse and material utilization. You can view data related to



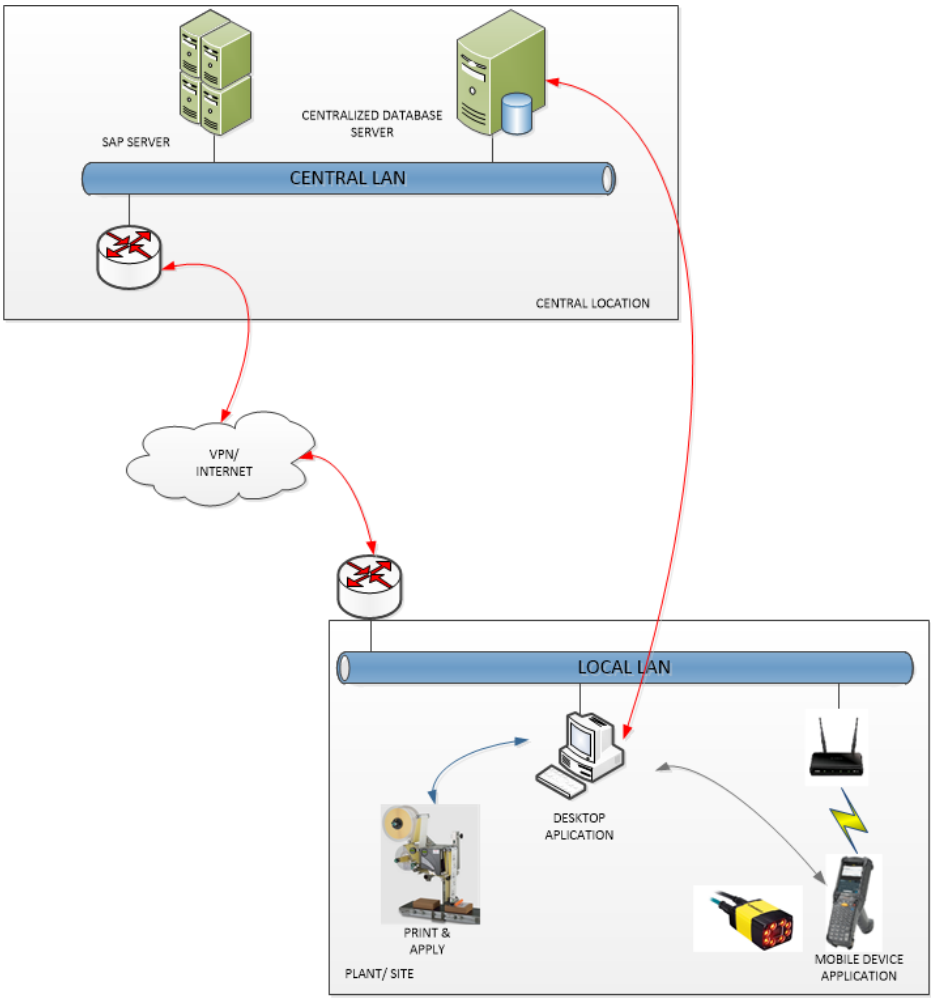
- Items Packed,
- Pending dispatches and
- Dispatch

Dashboard can be customized as per the requirements i.e. what data should be displayed and how information can be represented. It will pull together all the critical data you need from database server, centralize and display it on application screen. Data will get refreshed in set time intervals and displayed on screen in real time. The dashboard will clearly represent the information which can be combined into an integrated overview.

6 Technical Proposal

The entire solution is based on 3-tier architecture where the mobile devices communicate to database through a data synchronization application.

6.1 Solution Architecture



LOCAL LAN CONNECTION	
SERIAL/ PARALLEL USB	
WAN	

SOLUTION ARCHITECTURE		
HALDIRAMS	JAN 2021	VER1.0
