

DOCUMENTATION WAREHOUSE MANAGEMENT NEPTUNE APPLICATION WITH USE OF TECHNOLOGY SAPUI5 BY S5 CONSULTING

Content

1. Introduction.....	2
2. SAPUI5 information	2
3. Prerequisites.....	2
4. Supported SAP processes	3
5. Customizing/coding that is needed taken into consideration	3
6. User parameters used in the application	7
7. Z maintenance tables	8
8. Login procedure using Neptune SAPUI5	9
9. Start menu.....	10
10. Pick Full pallets/Replenishment	11
11. Picking from picking area (mix pallets).....	13
12. Reprint shipping label.....	15
13. Goods receipt purchase order.....	16
14. Stock placement SSCC (storage unit)	17
15. Stock overview SSCC (storage unit).....	18
16. Create transfer order for internal movement.....	19
17. Delivery overview	19
18. Monitoring the use of the mobile application	21

1. Introduction

The main goal for this mobile UI5 warehouse management application was to replace SAP standard RF transactions LMXX.

This template solution is based on SAP standard warehouse management with handling unit management integrated to storage unit management.

With the background of implementing SAP WM for different customers the last 15 years, we see that all warehouses are different in layout and the way they operate.

With this template we see in projects that 80-90 % can be reused for new implementations. There are always some adjustments that new customers would like to have.

The feedback from existing customers using this template:

- High satisfaction from the users with the new user experience
- Usertraining reduced to a minimum
- Better overview of the total workload for the users
- Support different type of devices
- Fast and predictable

2. SAPUI5 information

SAPUI5 (SAP user interface) is an open source library that SAP has developed. This is now total integrated into the newest Neptune release (released for customers 7/2-14).

Benefits:

- Looks the same as SAP standard SAP Fiori applications (SAP standard mobile applications)
- Very fast with app caching
- Easy and encrypted logon to SAP with pincode instead of user/password after first time login in SAP
- Change password integrated
- Lock of the application. Just enter pincode when unlocking the application

3. Prerequisites

- For use in browser, the Windows Internet explorer needs to be on version 9 or higher. Chrome and Firefox is also fine
- Screens are optimized for use from 10" size of screen, but can also be used on smaller devices
- Can be used on all type of mobile tablets

- When picking full pallets, this template solution requires one pallet per transfer order (then several users can work with the same customer order) (this is standard customizing).
- Replenishment to fixed bin is setup with 1-step confirmation, but with verification of both source storage bin and destination storage type in frontend. When the verification is OK, the transfer order is confirmed.

4. Supported SAP processes

This is a list of process steps that are included in the application:

- Goods receipt for purchase order with use of vendors pallet label
- Stock placement by storage unit
- Stock overview by storage unit
- Create transfer order for internal movement
- Picking from high rack/bulk storage types with print of shipping label
- Picking from fixed bin storage type with print of shipping label
- Replenishment to fixed bin storage type
- Reprint shipping label
- Delivery overview

5. Customizing/coding that is needed taken into consideration

- For picking for full pallet storage types, you need to setup in customizing that one transfer order is created per storage unit. This you can find in customizing: Logistics Execution -> Warehouse management -> Activities -> Transfers -> Processing Performance Data /TO split -> Define profiles/Control for Performance Data processing / Define TO Split. Example:

Profile for Perform. Data			
W..	Profil	PerformanceData	Split single TO
399	1ITEMO		<input checked="" type="checkbox"/>

WhN	Mv...	Source Stor....	DestStorType	Profile perf. data	Profile TO split
399	601	001	916	1ITEMO	OUT

- Delayed update of delivery. Then several users are picking for the same delivery, and you want shipping labels printed for each new handling unit created from fixed bin area, delayed update of delivery is customized. Customizing: Logistics execution -> Warehouse management -> Interfaces -> Shipping -> Define shipping control. Example:

Shipping Control per Warehouse Number							
W..	Warehouse no. description	Picking te...	Partial pick...	Compariso...	Pick&Pack	Delayed	
399	55 Consulting	1	<input checked="" type="checkbox"/>	1	<input type="checkbox"/>	3	

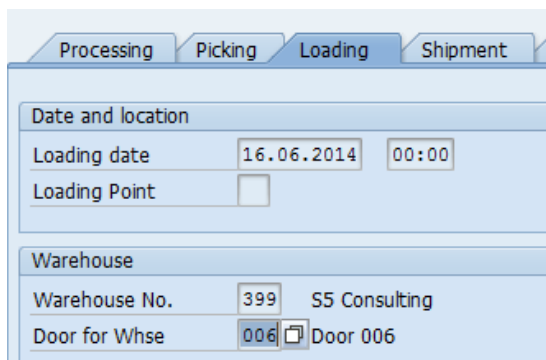
- When picking from high rack/bulk storage type shipping label is automatic printed when confirming the transfer order. This because it is installed printers on the vehicle trucks. This function can be disabled if it not suites the customer to have this automatic.
- The customizing of handling unit group 1 on the handling unit should have value "NO01" (mix pallets). This is used to identify picking of mix pallets for reporting. You find this hardcoded in method CREATE_SSCC_PALLET. You can delete it here or change the customizing to another value. This you can find in customizing: Logistics general -> Handling unit management -> Basics -> Use handling unit Supplements. Example:

Shipping Unit Group 1	
HU...	Description
NO01	Mix pallets

- For the picking process the solution use some logic for the door assigned to the delivery. All transfer orders for a delivery with assignment to a door is automatic sorted on the top in the application "Pick full pallets". In the delivery overview application only deliveries that is assigned to a door is displayed. Doors is created in customizing: Logistics execution -> Warehouse management -> Masterdata -> Define doors. Example:

Doors						
Whse No.	D...	Text for door	Staging Area	Matl stag. area txt	GI in...	GR ind
399	001	Door 001			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
399	002	Door 002			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
399	003	Door 003			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
399	004	Door 004			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
399	005	Door 005			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
399	006	Door 006			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
399	007	Door 007			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
399	008	Door 008			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

In the delivery, the door is assigned here:



- In the delivery overview the values for full pallets storage type from - to is hardcoded and the default delivery date from - to in method: GET_PID_DEFAULTS. This can be changed there.
- In method GOODSMVT_CREATE_WPRINT the handling unit output type is hardcoded to have print of label if the barcodes on the suppliers lables is not OK. Also the table 901 which is used will probably need to be changed.
- When doing goods receipt the standard IDOC with message type WMMBXY is used. This means that partner is needed setup in transaction WE20.

Partner No. WMS
 Partn.Type Logical system
 Partner Role

Message type IDoc report: goods movem
 Message code
 Message function Test

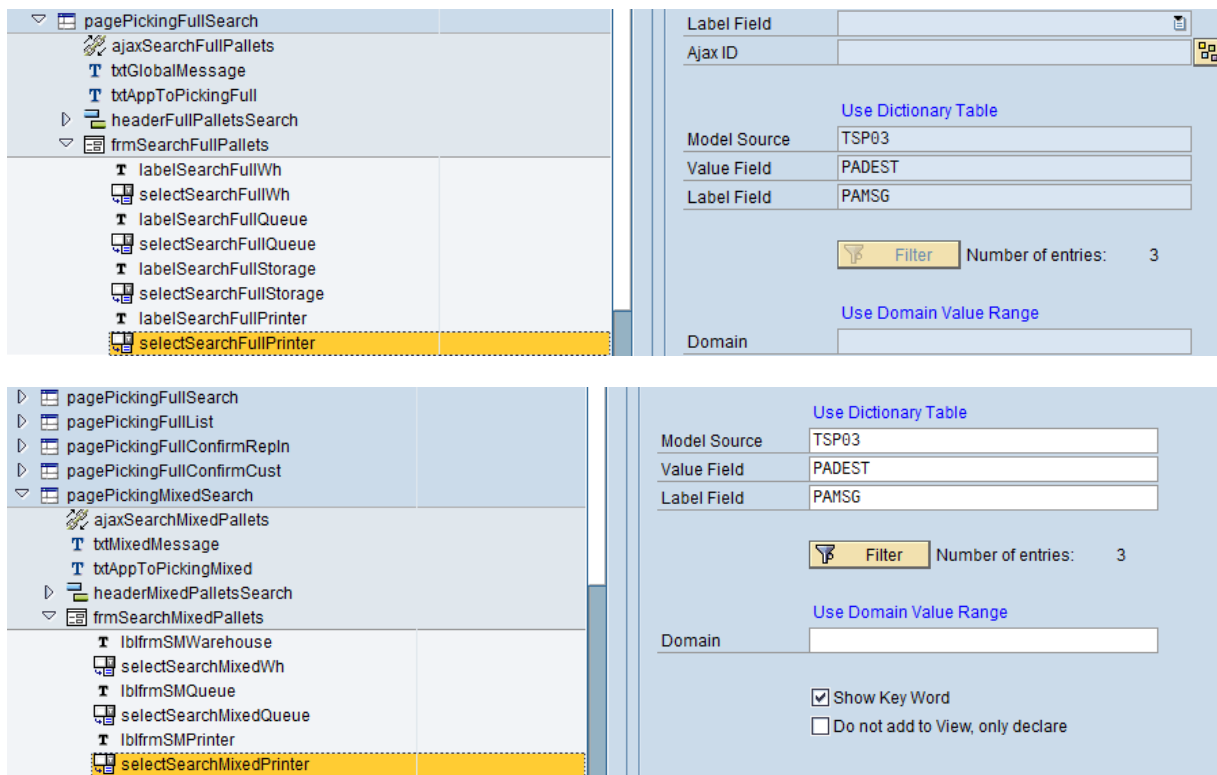
Inbound options | Post processing: permitted agent | Telephony

Process code WMMBXY IDOC Report: goo
 Cancel Processing After Syntax Error

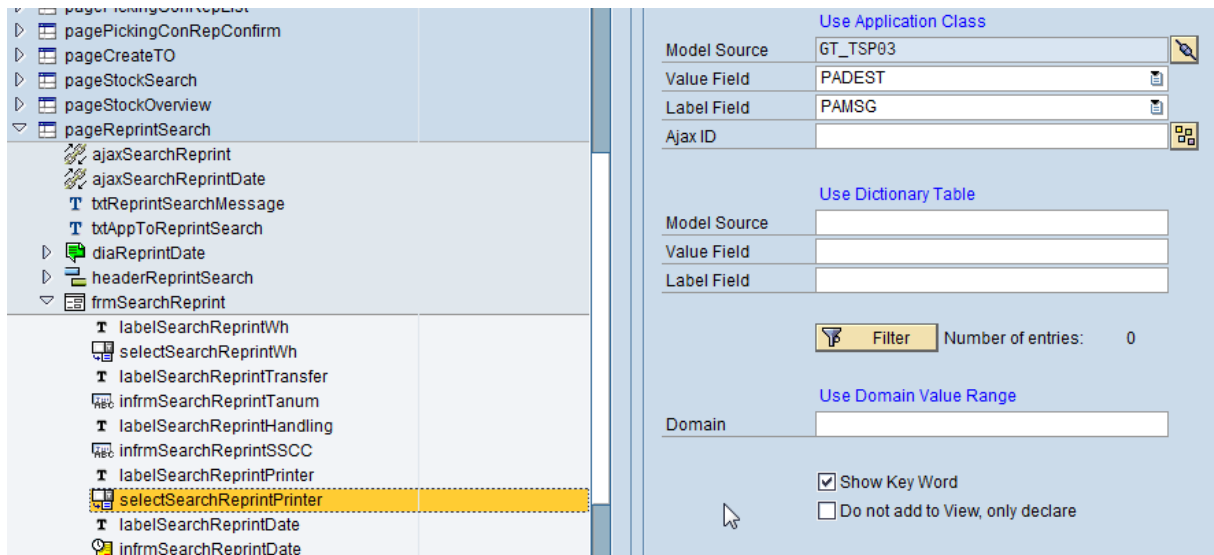
Processing by Function Module
 Trigger by background program
 Trigger Immediately [Options](#)

In the method POST_GOODS_RECEIPT parameters for the IDOC processing is needed changed according to the system setup.

- To limit the number of output devices used in the dropdowns there have been defined filter values in the designer of the application. This can be changed here:



The image shows two screenshots of an application designer interface. The left screenshot shows a tree view with 'selectSearchFullPrinter' selected. The right screenshot shows the configuration for this search filter, including 'Model Source' (TSP03), 'Value Field' (PADEST), 'Label Field' (PAMSG), and a 'Filter' button with 'Number of entries: 3'. The second screenshot shows 'selectSearchMixedPrinter' selected in the tree view, with its configuration panel showing 'Model Source' (TSP03), 'Value Field' (PADEST), 'Label Field' (PAMSG), and a 'Filter' button with 'Number of entries: 3'. It also includes checkboxes for 'Show Key Word' (checked) and 'Do not add to View, only declare' (unchecked).



- To be able to use external handling units in SAP when doing goods receipt, it is needed use of enhancement implementation. Enhancement spot ES_SAPLV51P in program SAPLV51P, function module V51P_PACKING_DETERMINATION (transaction SE19).

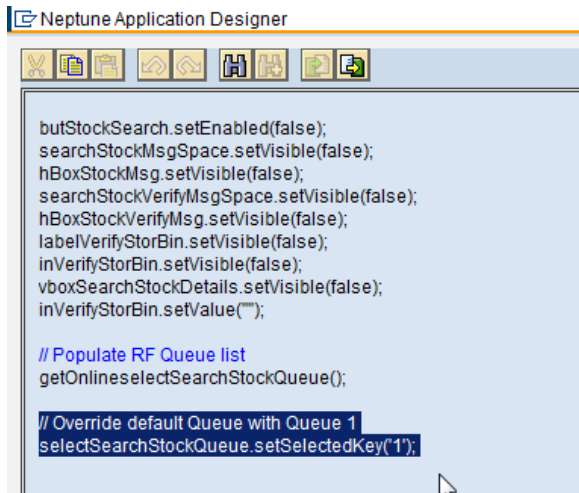
Example code where plant and storage location for the goods receipt is hardcoded:

```

ENHANCEMENT-POINT V51P_PACKING_DETERMINATION_01 SPOTS ES_SAPLV51P STATIC.
*$$$-Start: V51P_PACKING_DETERMINATION_01-----
-----$$$$
ENHANCEMENT 65 EXTERNAL_SSCC.      "active version
* Set SSCC like ABLAD WM
  LOOP AT IT_KOMPV INTO LS_KOMPV WHERE VELIN = '1'.
    IF LS_KOMPV-werks EQ '3999' AND
      LS_KOMPV-lgort = '0002'.
      GS_HEADER51-EXIDV_HIGH = ls_KOMPV-ABLAD.
    ENDIF.

```

- In the application for creating transfer order, the movement type 970 is hardcoded in the method CREATE_TRANSFER_ORDER. This is needed changed to the movement type that the customer use. It is also possible to add it as a selection parameter to the frontend application, so the user can choose when creating transfer order.
- Overwrite PID value RF queue in the stock placement application. The method get_pid_defaults is still being run, but after the method I overwrite default value of queue with value "01" in the ajax success of pageStockSearch in the Neptune designer.



```

butStockSearch.setEnabled(false);
searchStockMsgSpace.setVisible(false);
hBoxStockMsg.setVisible(false);
searchStockVerifyMsgSpace.setVisible(false);
hBoxStockVerifyMsg.setVisible(false);
labelVerifyStorBin.setVisible(false);
inVerifyStorBin.setVisible(false);
vboxSearchStockDetails.setVisible(false);
inVerifyStorBin.setValue("");

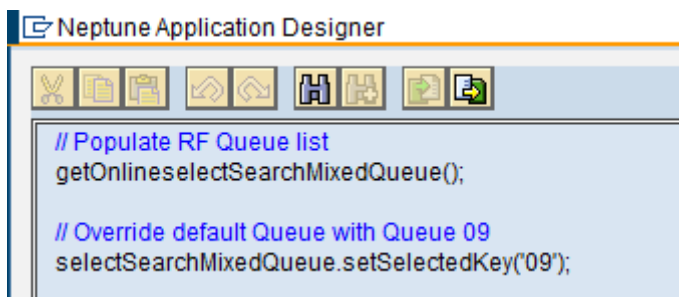
// Populate RF Queue list
getOnlineselectSearchStockQueue();

// Override default Queue with Queue 1
selectSearchStockQueue.setSelectedKey("1");

```

Here you can change the default RF queue for stock placement.

- Overwrite PID value RF queue in the pick mix pallet application. The method `get_pid_defaults` is still being run, but after the method we overwrite default value of queue with value "09" in the ajax success of `pagePickingMixedSearch` in the Neptune designer.



```

// Populate RF Queue list
getOnlineselectSearchMixedQueue();

// Override default Queue with Queue 09
selectSearchMixedQueue.setSelectedKey("09");

```

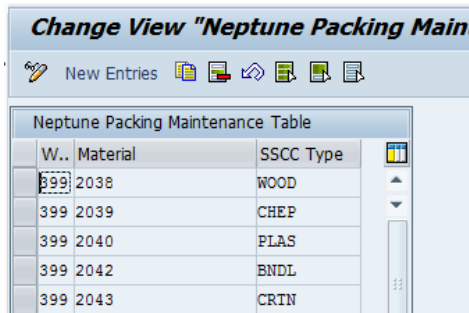
6. User parameters used in the application

- Parameter LGN = Default warehouse number
- Parameter VST = Default shipping point
- Parameter ZRF = Default RF queue
- Parameter DYL = Default language used in the frontend application (Example 'E' = English, 'O' = Norwegian). All the fixed texts that is used in the frontend Neptune application can be translated to any language
- Parameter PRI = Default printer used for printing shipping labels

7. Z maintenance tables

There are some Z maintenance tables that we use in the application.

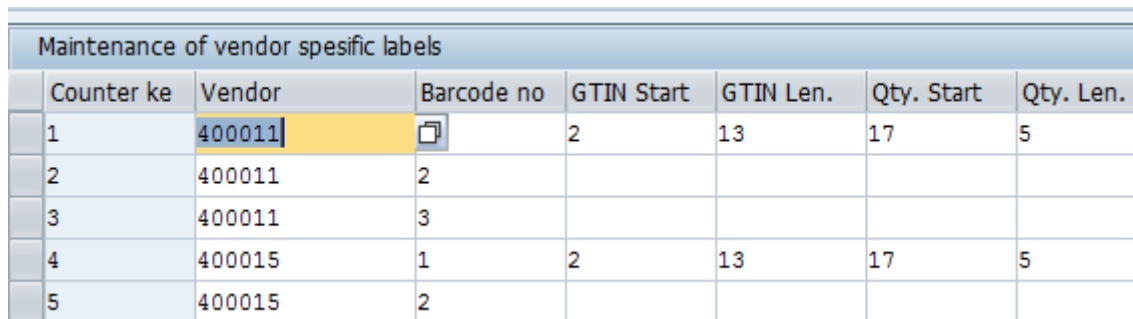
- Transaction ZWM_PACK_NEPTUNE. Maintaining packing material when picking mix pallets. The packing material is linked to each button when picking:



W.	Material	SSCC Type
399	2038	WOOD
399	2039	CHEP
399	2040	PLAS
399	2042	BNDL
399	2043	CRTN

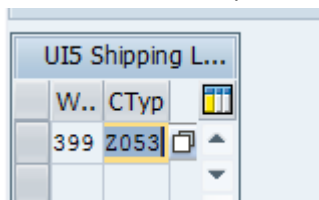
WOOD = Euro pallet, CHEP = Chep pallet, PLAS = Plastic pallet, BNDL = Bundle, CRTN = Carton. It is possible to extend the application to include more or less type of packing types.

- Transaction ZWM_NEPTUNE_LBL. The transaction goods receipt for purchase order is based on scanning the vendors pallet label. It is then a table for maintaining how the barcodes for the vendor pallets are defined. You define vendor and the number of barcodes on the label. Define where the different information is in the barcode label.





Counter ke	Vendor	Barcode no	GTIN Start	GTIN Len.	Qty. Start	Qty. Len.
1	400011	1				
2	400011	2				
3	400011	3				
4	400015	1	2	13	17	5
5	400015	2				

- Transaction ZWM_NEPTUNE_PR. Is used to define which shipping label output on the handling unit that should be printed when picking full pallets and mix pallets:



W.	CTyp	
399	2053	<input type="checkbox"/>

- Transaction ZWM_NEPTUNE_CUST. Is used to define which customers that should not have any shipping label printed automatic when picking from full pallet area.


Exclude customer label print		
W..	Ship-to party	
399	100214	

8. Login procedure using Neptune SAPUI5

First time login:

Username:


Password:

 Logon

Username and password in SAP



New Passcode:

Repeat Passcode:

 Set Passcode

Define 4 digit passcode that should be used for later login to the application

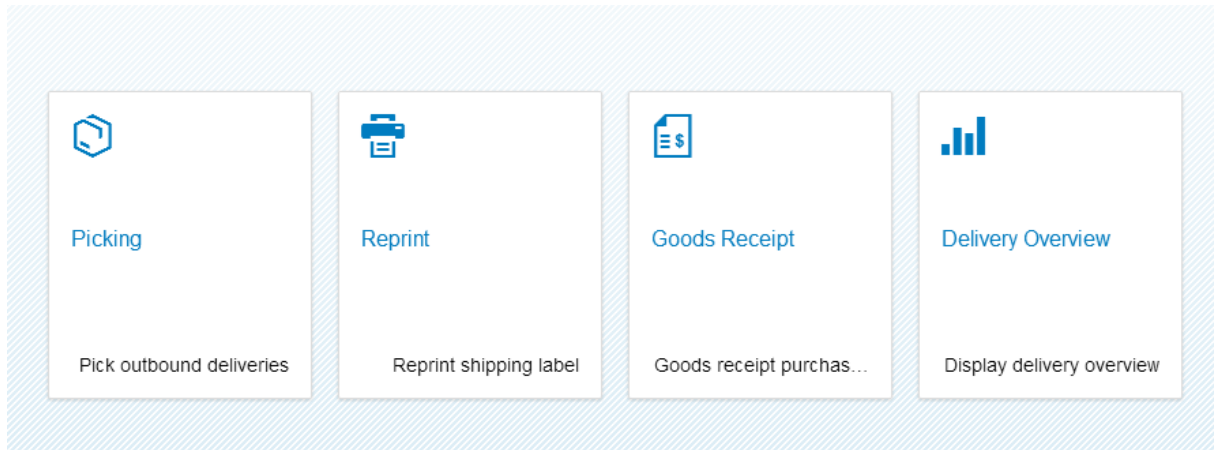
PASSCODE

1	2	3
4	5	6
7	8	9
	0	

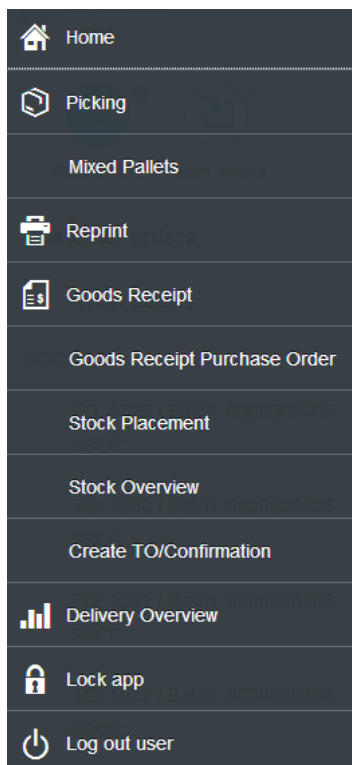
This is then used for later logon when you lock the application

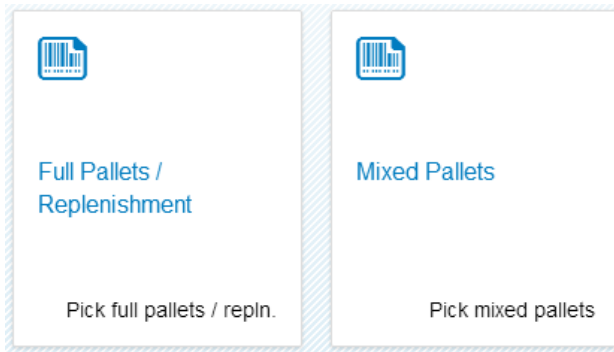
9. Start menu

First screen:

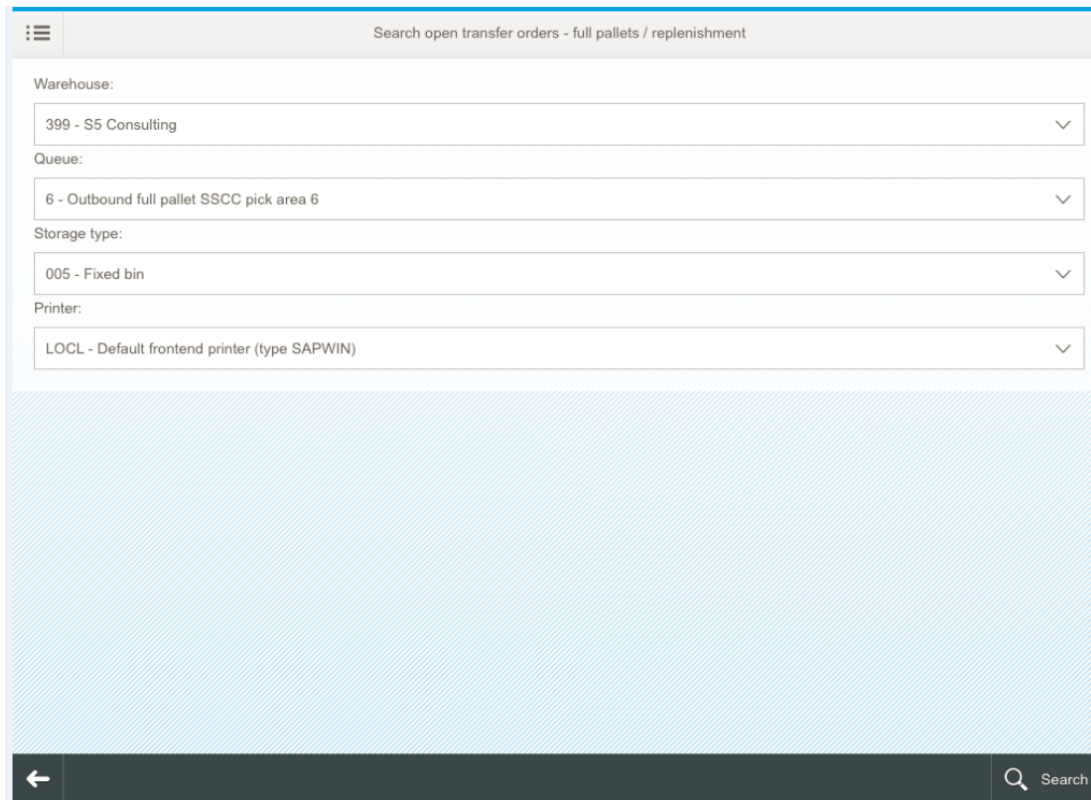


Also quick menu on top left:





10. Pick Full pallets/Replenishment



The screenshot displays a mobile application interface for searching open transfer orders. The title bar reads 'Search open transfer orders - full pallets / replenishment'. Below the title bar, there are four dropdown menus for selection:

- Warehouse: 399 - S5 Consulting
- Queue: 6 - Outbound full pallet SSCC pick area 6
- Storage type: 005 - Fixed bin
- Printer: LOCL - Default frontend printer (type SAPWIN)

The main content area below these menus is currently empty and has a light blue background. At the bottom of the screen, there is a dark navigation bar with a back arrow on the left and a search icon labeled 'Search' on the right.

Default values from user parameters (can change in the drop down menu)

OPPDATER

10 Cust. orders 1 Repln. orders

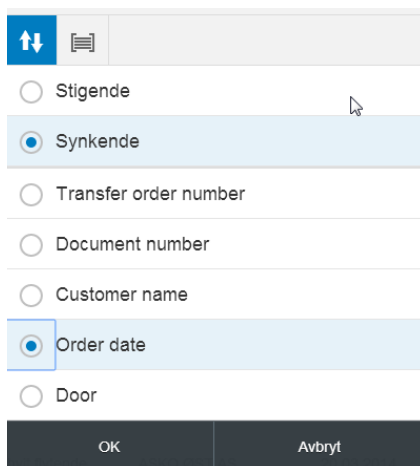
Customer orders ↑↓

Order details	Material	Customer	Information	Location
DOOR 002				
TO: 1529 / Batch: 0000000405 SSCC: [lock icon]	CRISPO 65 G PLATE Material no.: 2059	REMA Distribusjon Bergen Delivery no.: 80017212	16.06.2014 Pick qty.: 6 804	Door 002 Storage bin: 003
TO: 1530 / Batch: 0000000406 SSCC: [lock icon]	EXTRA EUCALYPTUS Material no.: 2060	REMA Distribusjon Bergen Delivery no.: 80017212	16.06.2014 Pick qty.: 47 520	Door 002 Storage bin: 002
TO: 1531 / Batch: 0000000406 SSCC: [lock icon]	EXTRA EUCALYPTUS Material no.: 2060	REMA Distribusjon Bergen Delivery no.: 80017212	16.06.2014 Pick qty.: 47 520	Door 002 Storage bin: 002

Screen separated in two. User can switch between customer orders and replenishment orders.

You will also see a lock to the left if blocked by other user.

At the top right you have different sort options of the list:



↑↓ [lock icon]

- Stigende
- Synkende
- Transfer order number
- Document number
- Customer name
- Order date
- Door

OK Avbryt

The sort option will be default for that user after changing.

Transfer order 1529 Storage bin 003
Door 002

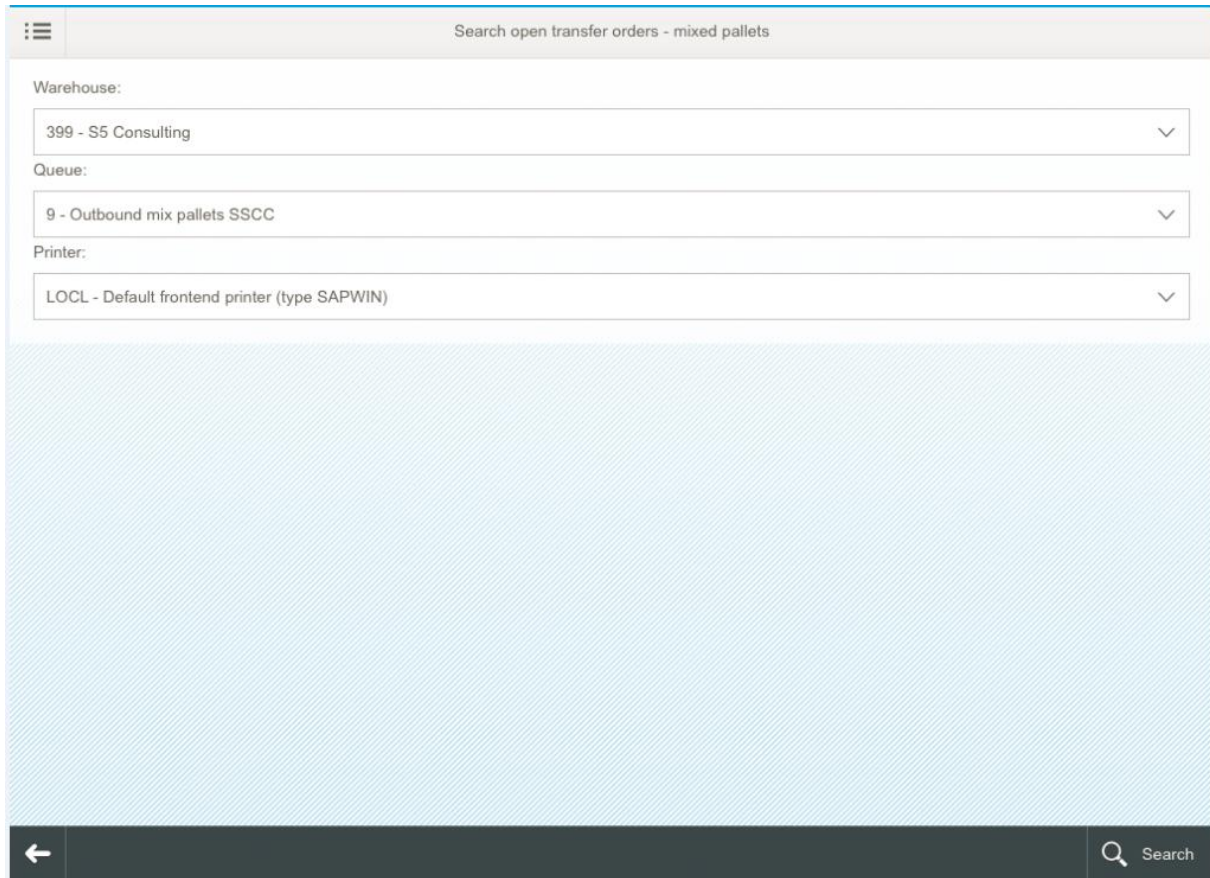
Customer: REMA Distribusjon Bergen
Material: 2059 - CRISPO 65 G PLATE (6804 PC)
Batch: 0000000405
Delivery: 80017212 (mandag 16.06.2014)

Verification:
[input field]

When you click on a transfer order, it is setup to verify by scanning the source storage bin or the source storage unit for bulk storage.

When confirming the transfer order, the shipping label is printed automatically

11. Picking from picking area (mix pallets)



Search open transfer orders - mixed pallets

Warehouse:
399 - S5 Consulting

Queue:
9 - Outbound mix pallets SSCC

Printer:
LOCL - Default frontend printer (type SAPWIN)












← Search

Default values from user parameters (can change in the drop down menu)

Order details		Information	Quantity	Location
DOOR 007				
Transfer order: 1551	ASKO MIDT-NORGE AS	Unconfirmed items: 1	Door 007	
Delivery no.: 80017215	Date: 16.06.2014	Unconfirmed qty: 30 200	Storage bin: 40-08-01	

Lists all the transfer orders that are open with header data of the order.

Display also the first unconfirmed storage bin on the order, and the number of items and quantity that is not confirmed

Delivery items: 5				
 Wood pallet	 Plastic pallet	 Chep pallet	 Bundle	 Carton
ASKO ØST AS		370005670000013530 Packing handling unit EUR pallet		
Transfer order: 1122 at Door 008 Delivery: 80017178 (torsdag 20.03.2014)				
Source location	Material	Information		
Storage bin: 40-01-01 Storage unit: 370005670000005214	Omo color 2,5 kg Material no.: 2044	EAN: 2050000002267 Pick qty.: 8	<input checked="" type="checkbox"/>	
Storage bin: 40-01-01 Storage unit: 370005670000005221	Omo color 2,5 kg Material no.: 2044	EAN: 2050000002267 Pick qty.: 2	<input checked="" type="checkbox"/>	
Storage bin: 40-02-01 Storage unit: 370005670000005467	Blenda hvit flytende Material no.: 2045	EAN: - Pick qty.: 15	<input checked="" type="checkbox"/>	
Storage bin: 40-04-01 Storage unit: 370005670000005818	MILO Tøyvask 7,5 dl Material no.: 2047	EAN: 2050000002281 Pick qty.: 22	<input checked="" type="checkbox"/>	
Storage bin: 40-05-01 Storage unit: 370005670000005979	KRYSTAL Original 7,5 dl Material no.: 2048	EAN: 2050000002298 Pick qty.: 27	<input checked="" type="checkbox"/>	
←			 Print / Continue	

When clicking on a transfer order all the unconfirmed lines are displayed.



Here you start by creating an empty handling unit by clicking of one of the buttons. The empty handling unit is then created and displayed in the screen.

Before the last item is confirmed you need to confirm the number of pallet spaces. This because it can be different from the number of handling unit you have created. The pallet spaces will be updated on the delivery in the field Means of transport ID (LKP-TRAIID).

Then it is possible to confirm an item or change the quantity picked if it is not enough stock in the bin. The difference will be posted in the storage type 999 (differences).

It is not setup any verification of storage bin etc. when picking from fixed bin.

When pushing the button Print/change it is possible to print the shipping label for the mix pallet:



Created handling units: 1		
Handling unit details	Information	Quantity
SSCC: 370005670000013530	23.04.2014 at 00:52:15	Confirmed quantity: 8
Assigned transfer order: 1122	Packing handling unit EUR pallet	Confirmed items: 1
		 

You can either print or continue picking on the handling unit. When printed it is deleted from the list.

12. Reprint shipping label

Reprint shipping label	
Warehouse:	399 - S5 Consulting
Transfer order number:	
SSCC number:	
Printer:	LOCL - Default frontend printer (type SAPWIN)


You can either input the transfer order or the handling unit (SSCC-number). The other parameters is default values from the user parameters.

Confirmed handling units: 2			↑↓
Order details	Quantity	Created	
TERJE PEDERSEN			
SSCC: 370005670000013530 Assigned transfer order: 1122	Confirmed quantity: 310 Confirmed items: 2	23.04.2014 at 00:52:15 User: Terje Pedersen	
NICOLAY WILDHAGEN			
SSCC: 370005670000013493 Assigned transfer order: 1122	Confirmed quantity: 310 Confirmed items: 2	22.04.2014 at 15:57:07 User: Nicolay Wildhagen	

Here you can reprint the shipping label again for the handling unit.


13. Goods receipt purchase order

Warehouse Management




Create Goods Receipt

Purchase order



Stock Placement - SSCC

Stock placement - SSCC



Stock Overview - SSCC

Stock overview - SSCC

Goods receipt

Header

Purchase order: Delivery note:


Items

Barcode 1: Barcode 2: Barcode 3:

GTIN: Quantity: Exp. date: Batch: SSCC:

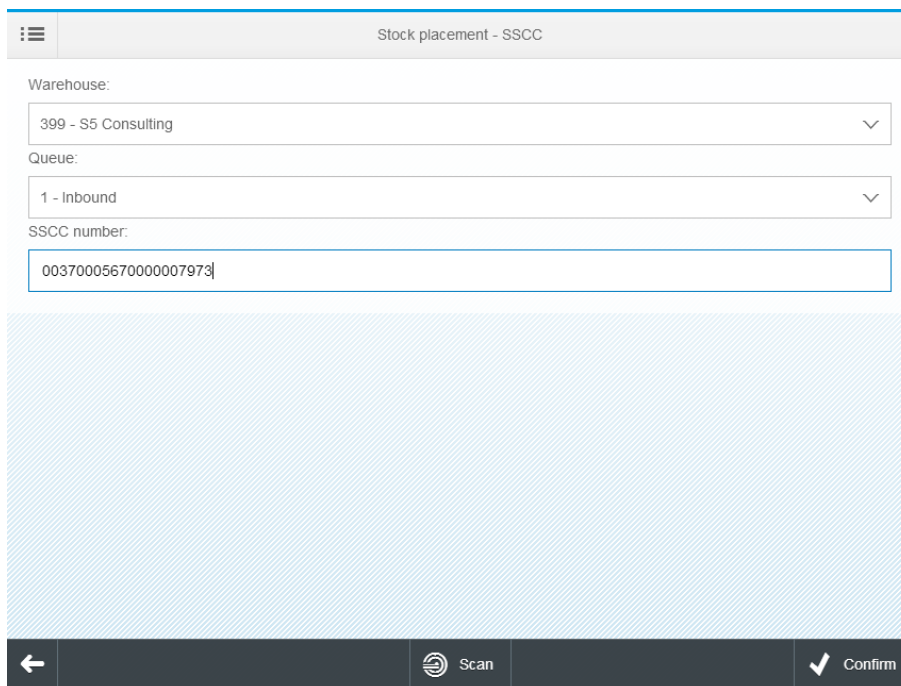
This is used for executing goods receipt with use of external vendors pallet label. It automatic calculates the number of pallets for the combination Purchase order and Delivery Note both on header an item level. Then you will have an overview of how many pallets that are scanned.

The user input purchase order and delivery note from vendor and scan the barcodes on the label. The label needs to include GTIN, quantity, expiration date, batch and SSCC-number in barcode for using this functionality. A Z table is maintained for vendor spesific barcodes:

Maintenance of vendor spesific labels							
	Counter ke	Vendor	Barcode no	GTIN Start	GTIN Len.	Qty. Start	Qty. Len.
1		400011		2	13	17	5
2		400011	2				
3		400011	3				
4		400015	1	2	13	17	5
5		400015	2				

When you have scanned and everything is OK, inbound delivery is created with automatically creation of transfer order for placement into the warehouse. If some of the barcodes can't be scanned, the user can input the data manually and receive a label print from SAP.

14. Stock placement SSCC (storage unit)



The screenshot shows the 'Stock placement - SSCC' mobile application interface. It features a header with a menu icon and the title 'Stock placement - SSCC'. Below the header, there are three input fields: 'Warehouse:' with a dropdown menu showing '399 - S5 Consulting', 'Queue:' with a dropdown menu showing '1 - Inbound', and 'SSCC number:' with a text input field containing '00370005670000007973'. At the bottom of the screen, there is a dark navigation bar with three icons: a back arrow, a circular 'Scan' icon, and a checkmark 'Confirm' icon.

Here you scan the pallet for stock placement. The following information is displayed automatic:

Warehouse:
399 - S5 Consulting

Queue:
1 - Inbound

SSCC number:
00370005670000017453

Verify Storage Bin:
010505

Details

Transfer order:	1563	Destination str. bin:	01-05-05
Delivery:	180000264	Material number:	2061
Vendor:	WRIGLEY SCANDINAVIA 2	Material:	EXTRA STRAWBERRY
Date:	18.06.2014	Quantity:	47520
		Batch number:	4098

The cursor is focused in the field Storage bin where you can verify by scanning the storage bin. For bulk storage, you only need to push the button save. You don't need to verify the storage bin that is suggested for this pallet if you would like to place the pallet in another bin.

15. Stock overview SSCC (storage unit)

Stock Overview - SSCC

*Warehouse: 399 - S5 Consulting

*SSCC number:

Scan the storage unit number for getting the details:

Warehouse:
399 - S5 Consulting

SSCC number:

Details

Material number:	2061	Storage type:	001
Material:	EXTRA STRAWBERRY	Storage bin:	01-05-05
Storage Unit:	00370005670000017453	Movement date:	18.06.2014
Total stock:	47520	Movement time:	09:39
		Batch number:	4098

This display data of the storage unit. If for example it is not in stock, it will be display which delivery and customer it is assigned to.

16. Create transfer order for internal movement

Warehouse:

SSCC number:

Details

SSCC number:	00370005670000017453	Storage type:	001
Material:	2061 - EXTRA STRAWBERRY	Storage bin:	01-05-05
Quantity:	47520		

When scanning the handling unit, the data for this pallet is displayed. You can then push a button "Create transfer order". It uses then a special movement type 970 for creating the transfer order, and the stock placement strategy defined on material master for setting the destination storage type and storage section. When the transfer order is created, you will automatically be forwarded to the stock placement app.

Warehouse:

Queue:

SSCC number:

Verify Storage Bin:

Details

Transfer order:	1569	Destination str. bin:	01-06-04
Delivery:		Material number:	2061
Vendor:		Material:	EXTRA STRAWBERRY
Date:	18.06.2014	Quantity:	47520
		Batch number:	4098

Then you can verify the storage bin, or hit save if it is bulk storage type.

17. Delivery overview

Delivery overview

Shipping point:
3999 - S5 Consulting

Warehouse:
399 - S5 Consulting

Full pallets storage type:
001 - High-rack storage

To:
001 - High-rack storage

Delivery date:
søndag 23.02.14

To:
onsdag 23.04.14

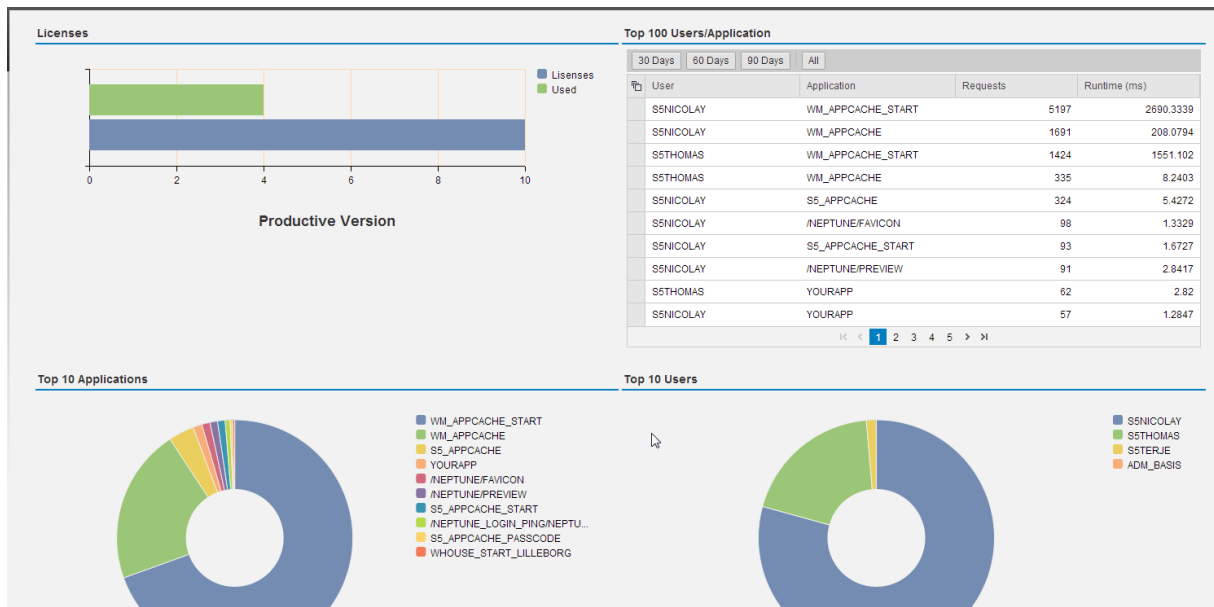
Mixed pallet storage type:
005 - Fixed bin

Deliveries: 3

Information	Customer	Picked	Quantity
Delivery no.: 80017177 24.03.2014 at Door 006	ASKO MIDT-NORGE AS Customer no: 100214	Picked from full pallet area: 11 Picked from mix pallet area: 5	Pallets from full pallet area: 12
Delivery no.: 80017178 24.03.2014 at Door 008	ASKO ØST AS Customer no: 100212	Picked from full pallet area: 12 Picked from mix pallet area: 6	Pallets from full pallet area: 13
Delivery no.: 80017176 14.03.2014 at Door 003	REMA Distribusjon Norge AS Customer no: 100215	Picked from full pallet area: 5 Picked from mix pallet area: ?	

This list show all deliveries that is not posted with goods issue and are assigned to a door on the outbound delivery. It display the total number of full pallets that should be picked, the number of full pallets that are picked and the number of mix pallets that are picked. Can click on a refresh button in the top of screen to update the data.

18. Monitoring the use of the mobile application



This shows the activity by user and application. Here it is possible to monitor which user is most active and in which application (example picking full pallets, picking mix pallets etc.)