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

Content

1. Introduction

The main goal for this mobile UI5 warehouse management application was to replace SAP standard RF transacations 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 libary 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:

	W..	Profil	PerformanceData	Split single TO	
	399	1ITEM0		✓	

Profile for Perform. Data

	WhN	Mv....	Source Stor....	DestStorType	Profile perf. data	Profile TO split
	399	601	001	916	1ITEM0	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

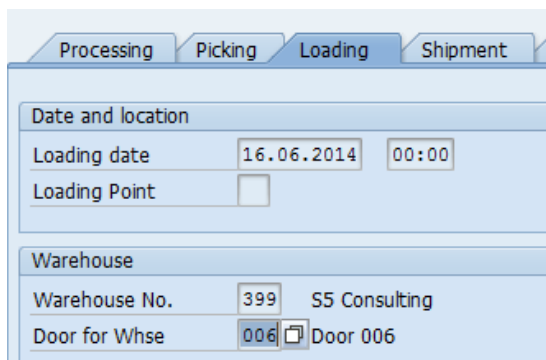|	W..	Warehouse no. description	Picking te...	Partial pick...	Compariso...	Pick&Pack	Delayed
	399	S5 Consulting	1	✓	1	☐	3

- 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			✓	✓
399	002	Door 002			✓	✓
399	003	Door 003			✓	✓
399	004	Door 004			✓	✓
399	005	Door 005			✓	✓
399	006	Door 006			✓	✓
399	007	Door 007			✓	✓
399	008	Door 008			✓	✓

In the delivery, the door is assigned here:

Processing	Picking	Loading	Shipment

Date and location

Loading date	16.06.2014	00:00
Loading Point		

Warehouse

Warehouse No.	399	S5 Consulting
Door for Whse	006	Door 006

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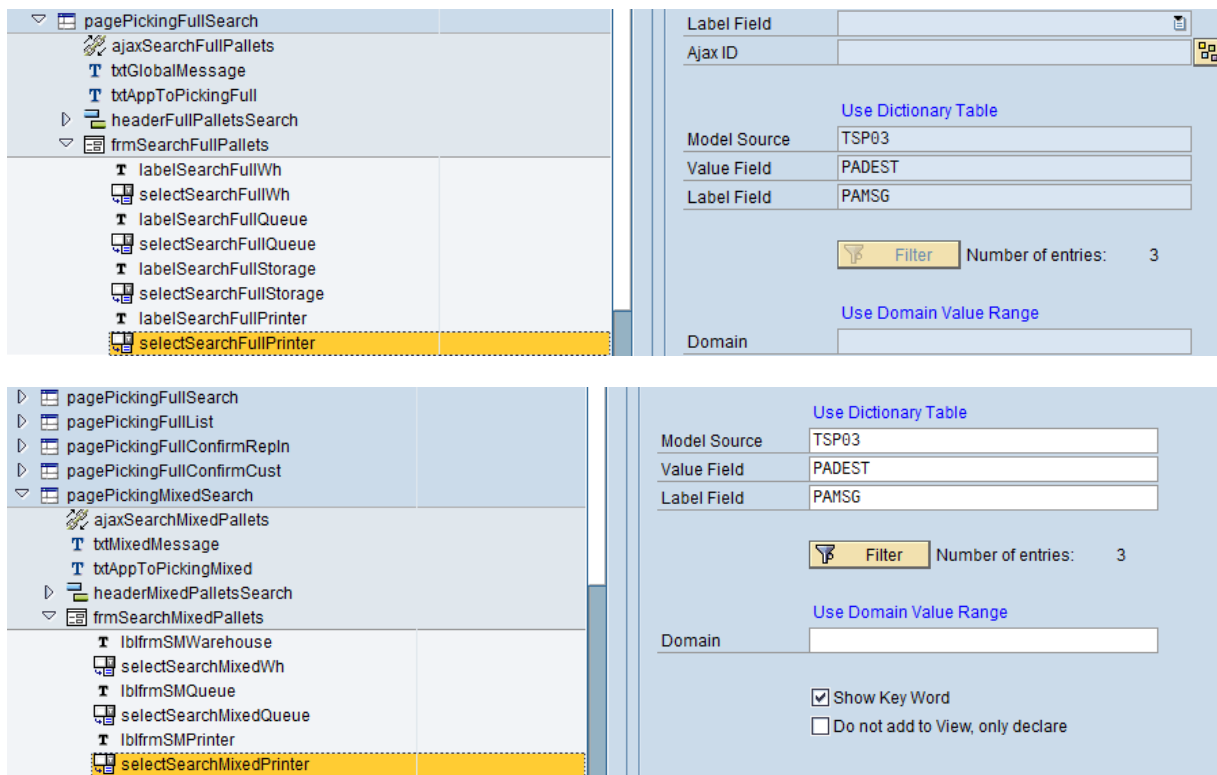
In the method POST_GOODS_RECEIPT parameters for the IDOC processing is needed changed according to the system setup.

- 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:

- To be able to use external handling units in SAP when doing goods receipt, it is needed use of enhancment implementation. Enhancement spot ES_SAPLV51P in program SAPLV51P, function module V51P_PACKING_DETERMINATION (transaction SE19).
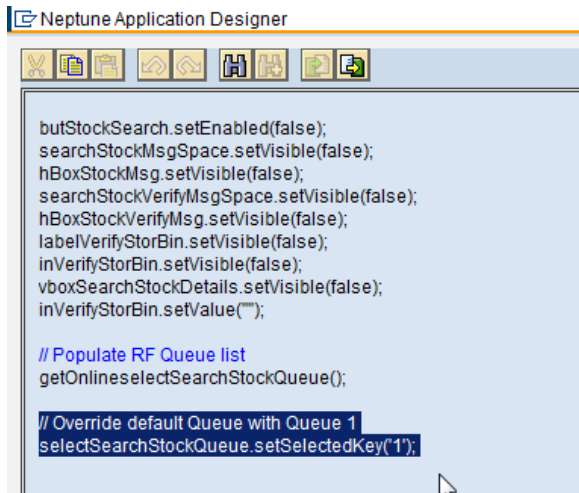
Example code where plant and storage location for the goods receipt is hardcoded:

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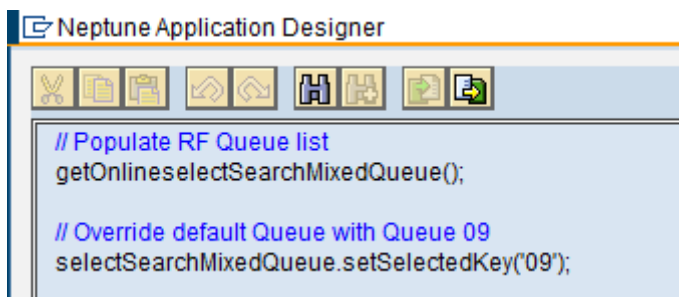
Here you can change the default RF queue for stock placement.

- 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.
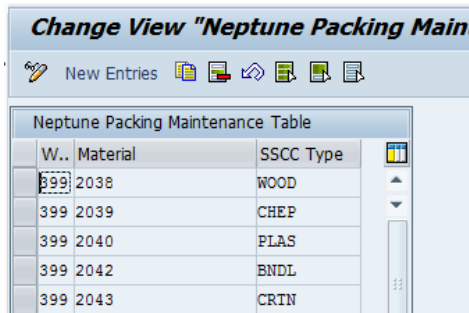

6. User parameters used in the application

- 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.
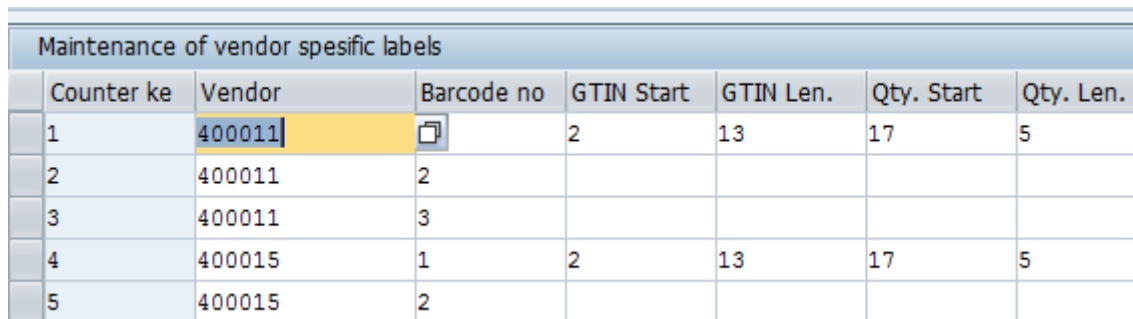
- Transaction ZWM_PACK_NEPTUNE. Maintaining packing material when picking mix pallets. The packing material is linked to each button when picking:
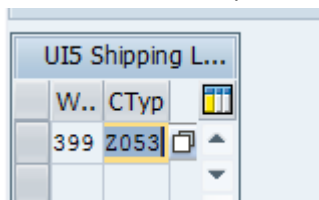
WOOD = Euro pallet, CHEP = Chep pallet, PLAS = Plastic pallet, BNDL = Bundle, CRTN = Carton. It is possible to extend the application to include more or less type of packing types.

- 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		2	13	17	5
2	400011	2				
3	400011	3				
4	400015	1	2	13	17	5
5	400015	2				

Maintenance of vendor spesific labels

- 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:

- 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.

8. Login procedure using Neptune SAPUI5

First time login:

Username and password in SAP

Define 4 digit passcode that should be used for later login to the application
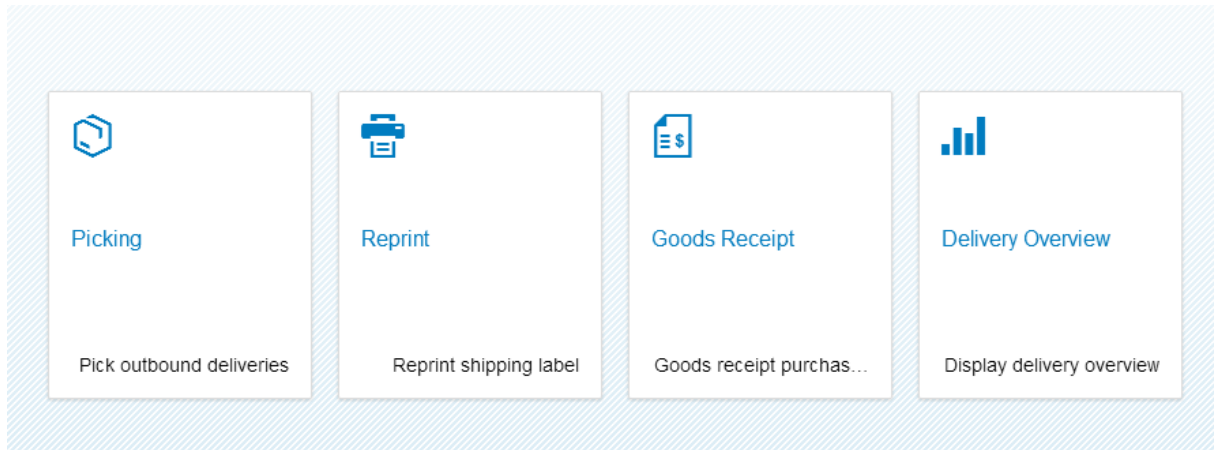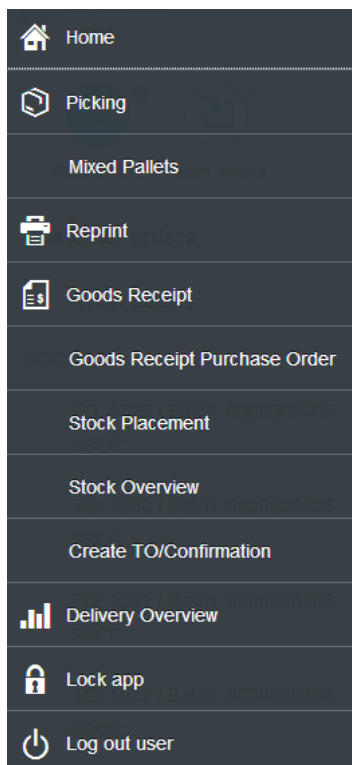
This is then used for later logon when you lock the application

9. Start menu

First screen:
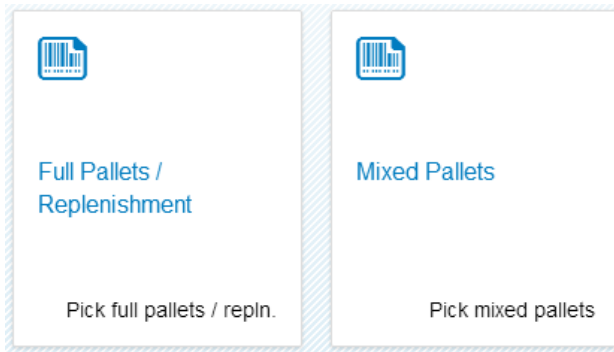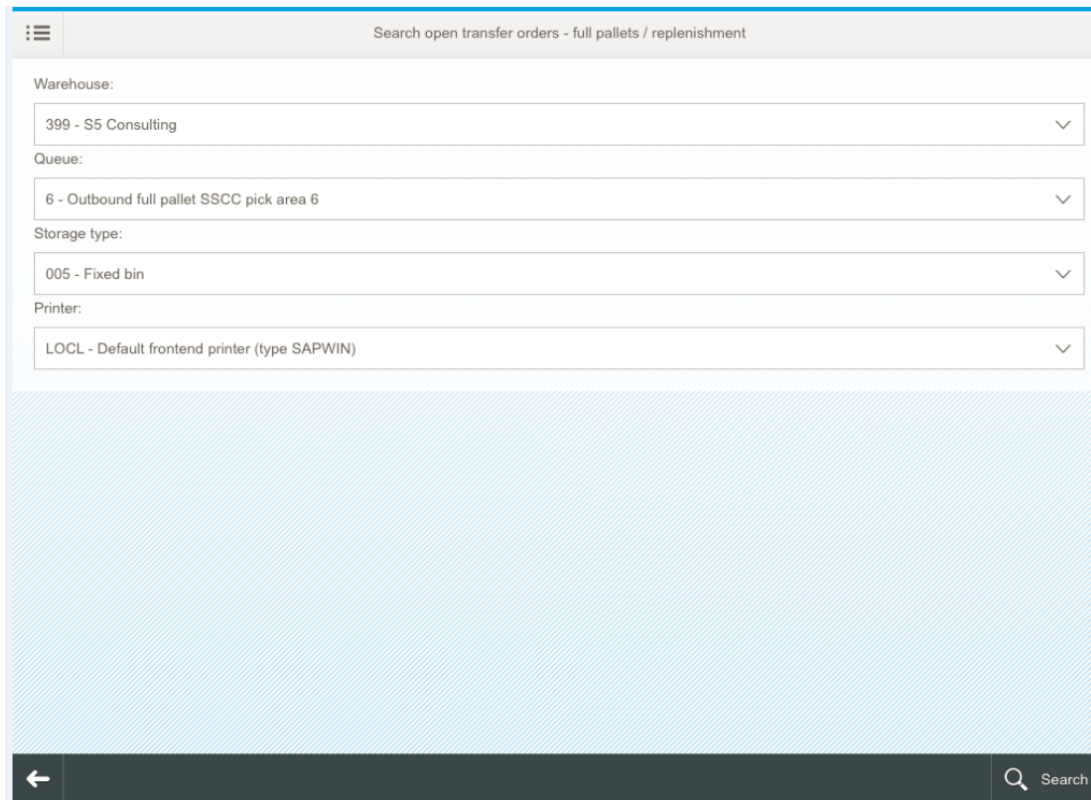

Also quick menu on top left:

10.   Pick Full pallets/Replenishment

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

Screen seperated 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:

The sort option will be default for that user after changing.
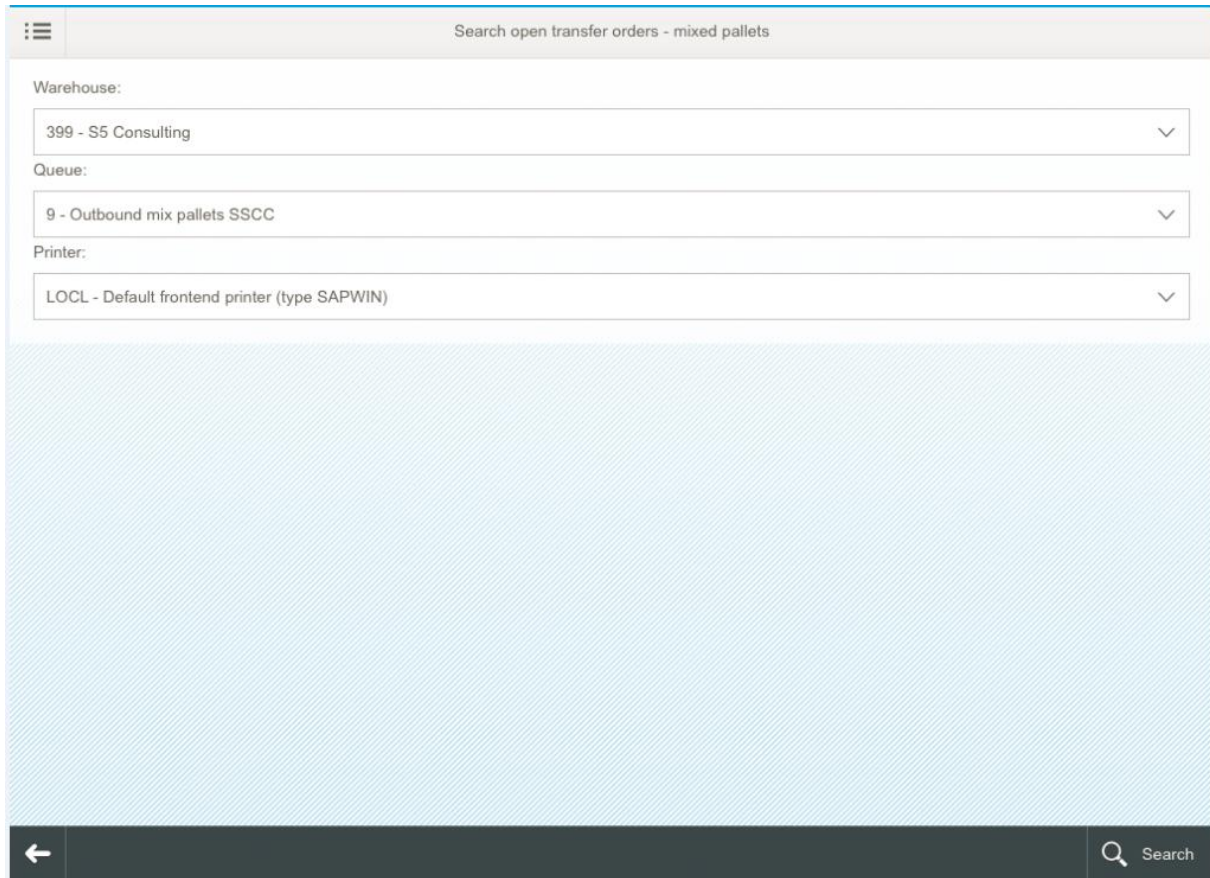
When you click on a transfer order, it is setup to verify by scanning the source storage bin or the source storage unit for bulk storage.

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

11. Picking from picking area (mix pallets)

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

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

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 (LIKP-TRAID).

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:

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

12. Reprint shipping label

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	Confirmed quantity: 310	23.04.2014 at 00:52:15
Assigned transfer order: 1122	Confirmed items: 2	User: Terje Pedersen
NICOLAY WILDHAGEN		
SSCC: 370005670000013493	Confirmed quantity: 310	22.04.2014 at 15:57:07
Assigned transfer order: 1122	Confirmed items: 2	User: Nicolay Wildhagen

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

13. Goods receipt purchase order

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:

	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				

Maintenance of vendor spesific labels

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)

Stock placement - SSCC

Warehouse:

399 - S5 Consulting

Queue:

1 - Inbound

SSCC number:

00370005670000007973

←   Scan   ✓ Confirm

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:		
399 - S5 Consulting		
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 the push a button "Create transfer order". It use 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 automatic be forwareded to the stock placement app.

Warehouse:	
399 - S5 Consulting	
Queue:	
1 - Inbound	
SSCC number:	
00370005670000017453	
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:		To:	
001 - High-rack storage ⌄		001 - High-rack storage ⌄	

Delivery date:	To:
søndag 23.02.14	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
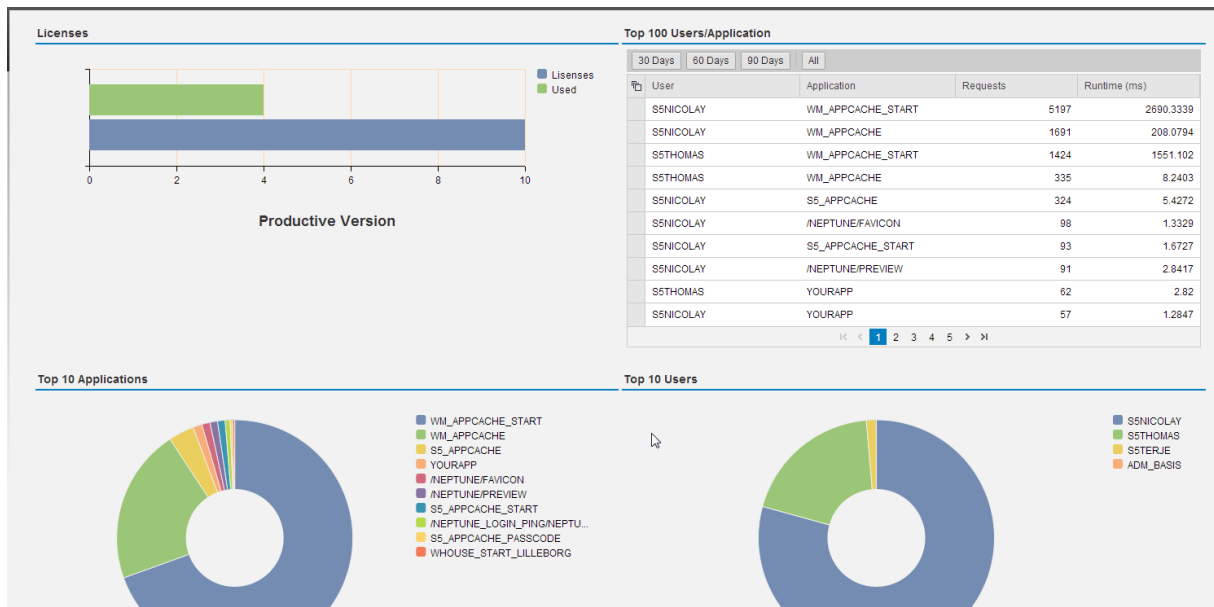
This show the activity by user and application. Here it is possible to monitor which user is most active and in which application (example picking full pallets, picking mix pallets etc.)