SAP Transportation Management Integration Based on EWM Transportation Units

Integration between Transportation Management (TM) and Extended Warehouse Management (EWM) based on EWM transportation units (TUs) is a critical aspect of logistics operations. The integration process involves fulfilling specific prerequisites and following supported processes.

This post outlines the integration procedure between Extended Warehouse Management (EWM) and Transportation Management (TM), based on the EWM transportation unit (TU). This article gives a summary of the supported procedures, prerequisites, and additional processes. The integration process is a crucial part of logistical operations.

Prerequisites:

Before integrating the TM and EWM systems, it is important to fulfill specific requirements.

- 1. Stock Transport Order Process
- 2. Early Updates from EWM
- 3. Delivery Split
- 4. Transportation Planning with Trailers
- 5. Early Picking
- 6. Multi-Pickup, Multi-Drop
- 7. Execution-Driven Planning (Outbound)

Supported Processes: The integration process between TM and EWM is based on the EWM transportation unit (TU) and supports several processes for road freight orders.

Delivery-Based and Order-Based Planning (Outbound):

In this process, transportation activities are planned based on an outbound delivery or an order. Freight orders are sent to EWM, where warehouse workers perform tasks like loading, picking, packing, and staging. Once the truck departs, EWM sends a message to update TM, which then updates the freight order and associated freight units. Early updates from EWM to TM can also be enabled with the status Loading Finished.

Delivery-Based and Order-Based Transportation Planning (Inbound):

Similarly, transportation activities can be planned based on an inbound delivery or an order. Freight orders are sent to EWM, and warehouse workers carry out tasks like unloading.

Further Processes: Apart from the processes mentioned above, several other processes are supported, including Transportation Planning with Trailers, Stock Transport Order Process, Early Picking, Multi-Pickup, Multi-Drop, Cross-Delivery Handling Units, and Execution-Driven Planning (Outbound).

DTR and OTR in TM System Integration

The transportation management (TM) system has some features that are only applicable when integrated with external logistics systems. These include delivery-based transportation requirements (DTR) or order-based requirements (OTR).

If your logistic systems such as Logistics Execution, Sales and Distribution, or Materials Management are not located in the same SAP S/4HANA system as TM, then you need to understand external TM system integration for more information.

System Update Schedule after Planning Transportation Activities

After planning your transportation activities in TM, you need to set the load plan status or unload plan status on stop level to Finalized. The system will send a loading or unloading instruction to the Extended Warehouse Management (EWM) with the message Loading Appointment Request. You can also choose to Follow Up Send Loading Instructions or Send Unloading Instructions, and the system will send a Loading Appointment Request message to EWM.

If you enable early updates, the system will send an additional Loading Appointment Notification message to TM when warehouse workers set statuses Arrival at Checkpoint and Departure from Checkpoint, and when they post the goods issue or goods receipt.

Data Display and Changes

In a delivery-based transportation requirement, warehouse numbers from EWM are displayed on the Locations and Dates/Times tab page. For freight orders, warehouse numbers from EWM are displayed on the Overview tab page for the stop. Data changes in EWM are replicated to TM, including item hierarchy, carrier, relevant dates and times, gross weight of the vehicle, and packaging material.

Data Updates and Freight Units

When warehouse workers pack items in different handling units in EWM, the system creates items for these handling units automatically in TM. Reassignment of freight units occurs when warehouse workers load deliveries from a different freight order, the system changes the assignment of the corresponding freight units. If you assign a freight unit to a transportation unit in EWM but the freight unit is not assigned to a freight order in TM, this information is also transferred to TM.

The system will automatically assign the freight unit to the corresponding freight order. Moreover, if you reassign a complete delivery in EWM from one transportation unit to another, the system will report the reassignment to TM. In TM, the delivery will be automatically reassigned from the original freight order to the other freight order corresponding to the assigned transportation unit in EWM.

Status Updates and Document Cancellation

When you set the load plan status on stop level to Load Plan Finalized for your freight order, the system triggers the event Ready for Loading. The same applies to the load plan status Unload Plan Finalized and the event Ready for Unloading. If TM receives the Loading Appointment Notification message during outbound-delivery-based transportation planning, the cargo receipt status for the item is automatically set to Shipped.

For inbound processes, you can still cancel freight orders until the goods have arrived in the warehouse and are reported by EWM as Arrived. If the status Unload Plan (Stop) Finalized has already been set, the system will send a cancellation request to EWM, and the life cycle status of the freight document will change to Canceled.

1 Overview

In this blog post, I will explain how the TM-EWM integration in the S4HANA 1909 system will work in an integrated way in outbound delivery process. The article will include more detailed information about the EWM side and more brief information about the TM-ERP sides.

While providing this integration, the following steps will be examined and exemplified.

- TM Side
  - Planning for outbound deliveries
  - Packaging
  - Determine the loading sequence

- EWM Side
  - Automatic creation of the transport unit with TM integration and PPF in the EWM system
  - Creation of planned transport handling units with TM reference in the EWM system
  - Using PSHU's as a reference during creating warehouse orders in the EWM system and creating PICK-HU with them.
  - Operation of collection steps in the warehouse with EWM PICK HU
  - Movement of the transport unit in YARD with Yard Management
  - Loading the HUs collected in the warehouse with the reference of TM loading sequence into the vehicle with transport unit

While the above scenarios are being operated, information about the configuration steps that are seemed important regarding the related steps will also be shared.

While preparing the document and making the system testable a few blog posts that are considered as references will also be shared.

2 ERP-TM Side Process Steps

2.1 Step 1: Create Sales Order & Outbound Delivery

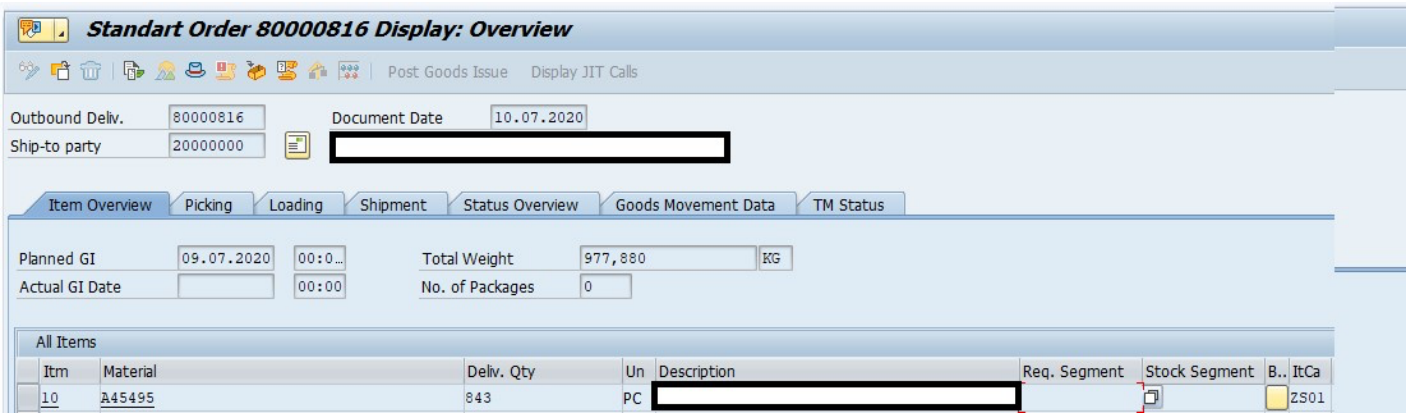
Since the related processes are known, details will not be given. The following documents have been created to operate the process.

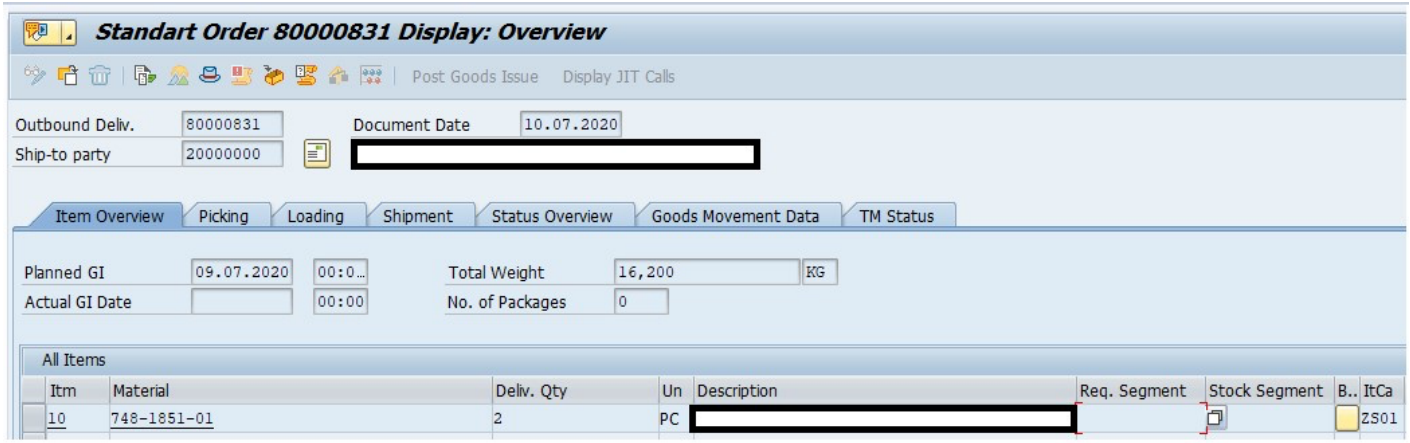
Sales Orders;

- 321, 373

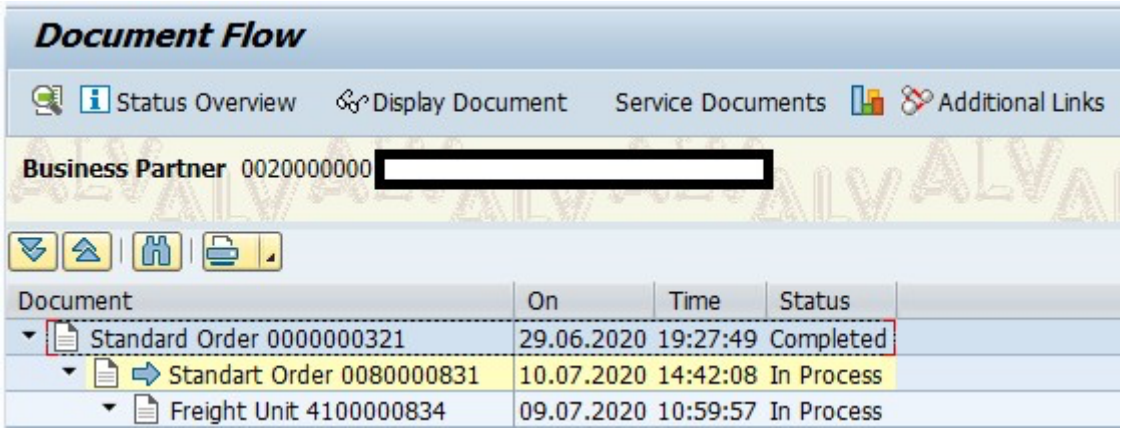
Outbound Deliveries;

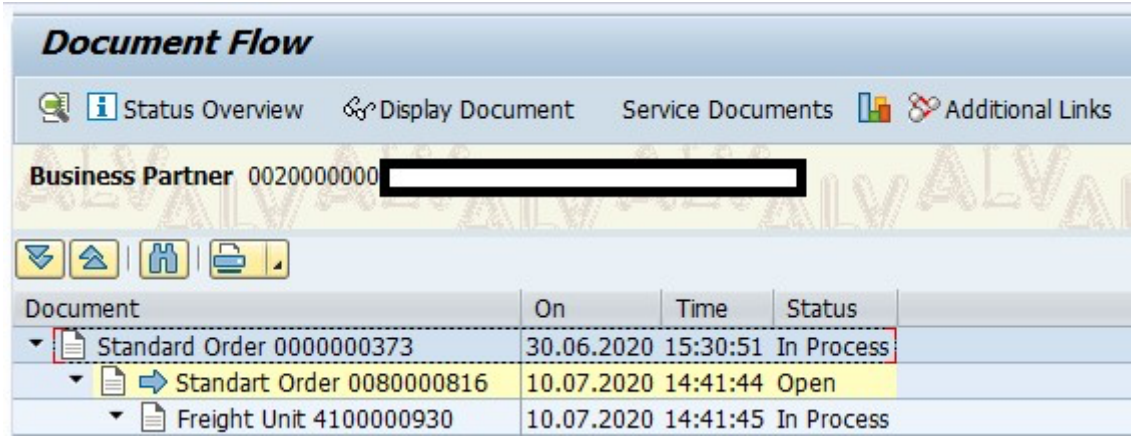
- 80000816, 80000831





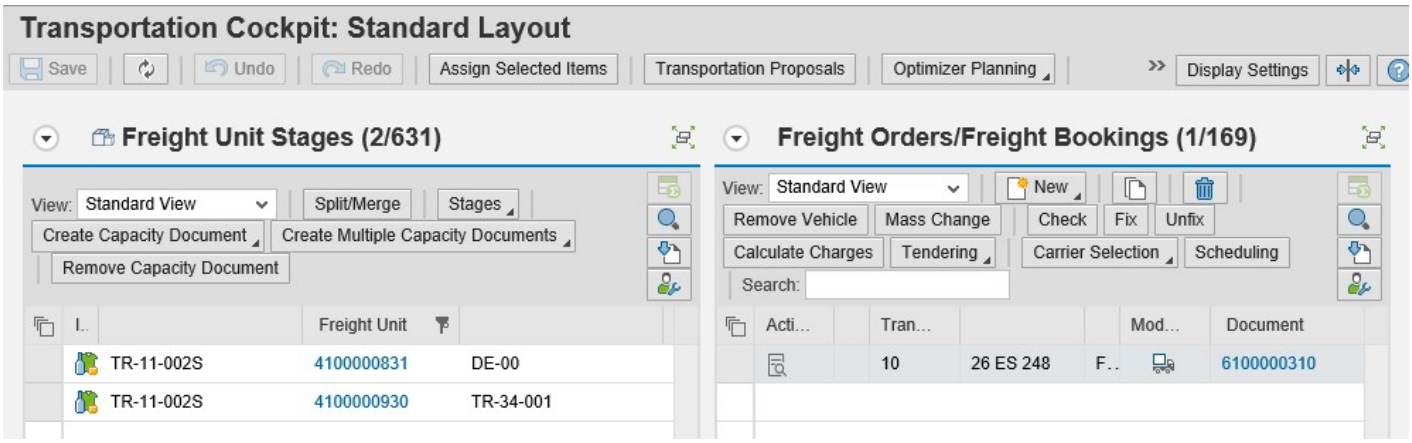
System creates freight units in this step for TM planning.





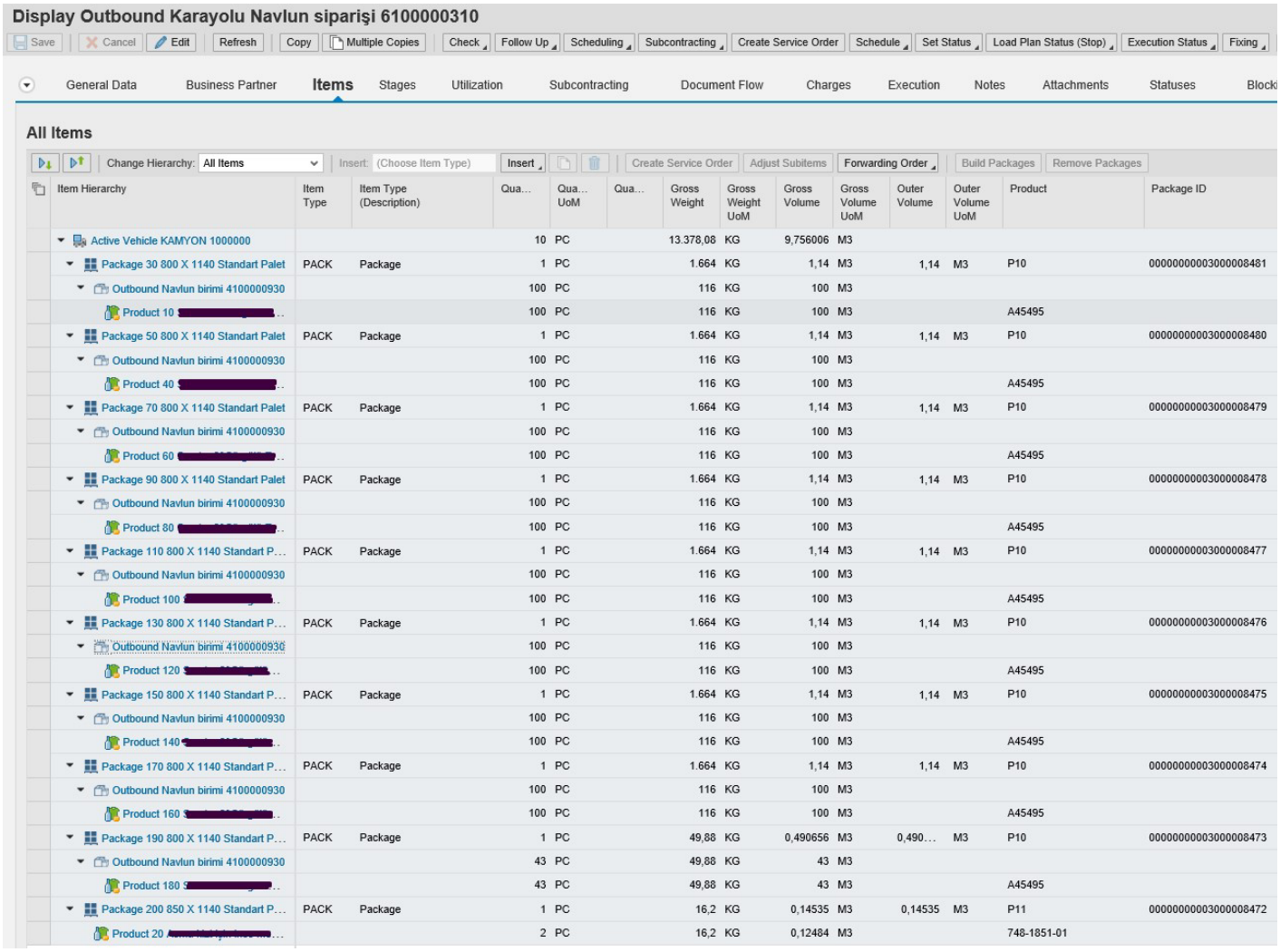
2.2 Step 2: Plan freight units with TM

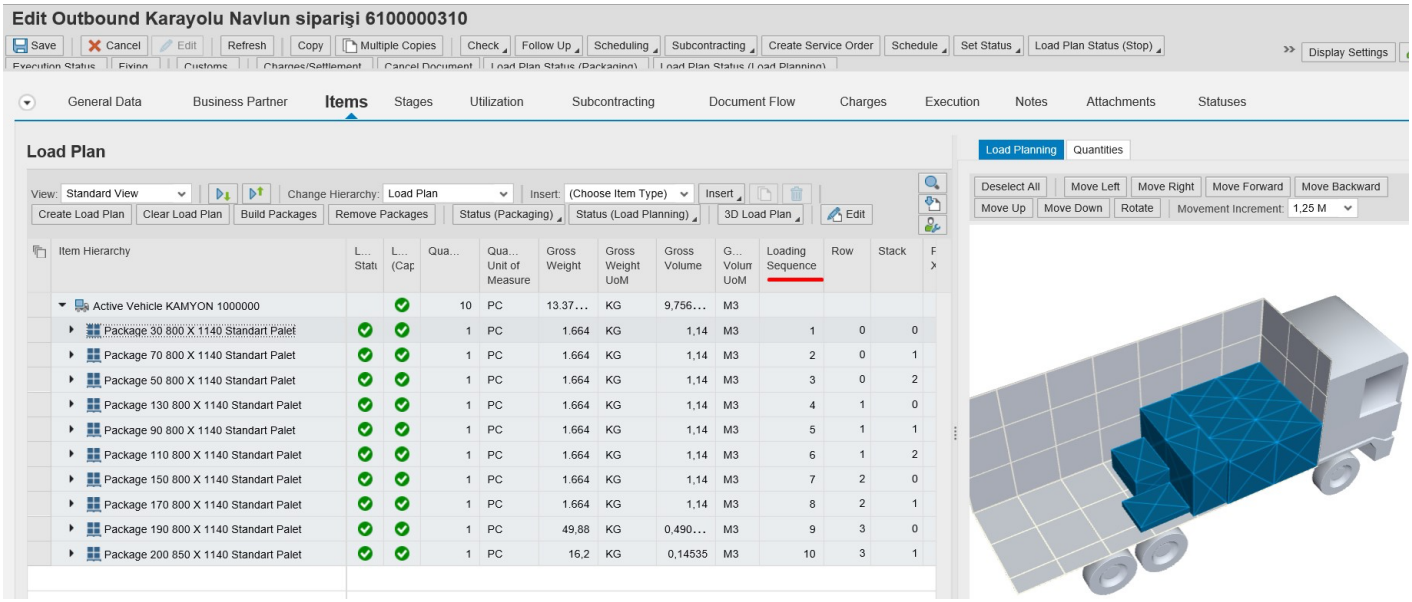
Generating TM's freight number.



2.3 Step 3: Create package units and loading squence for packages

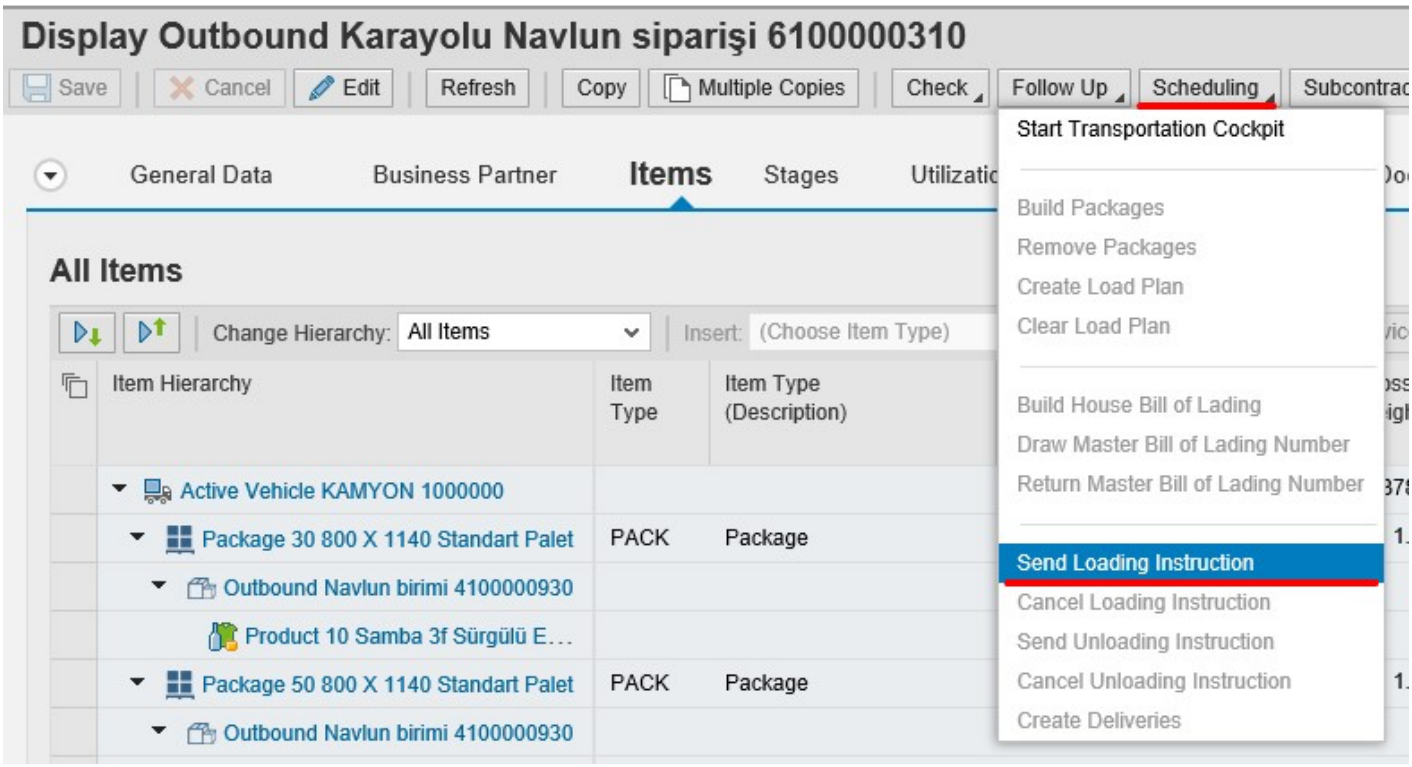
Packaging planning is made for TM freight number and in-vehicle loading sequence of the relevant HUs is determined.

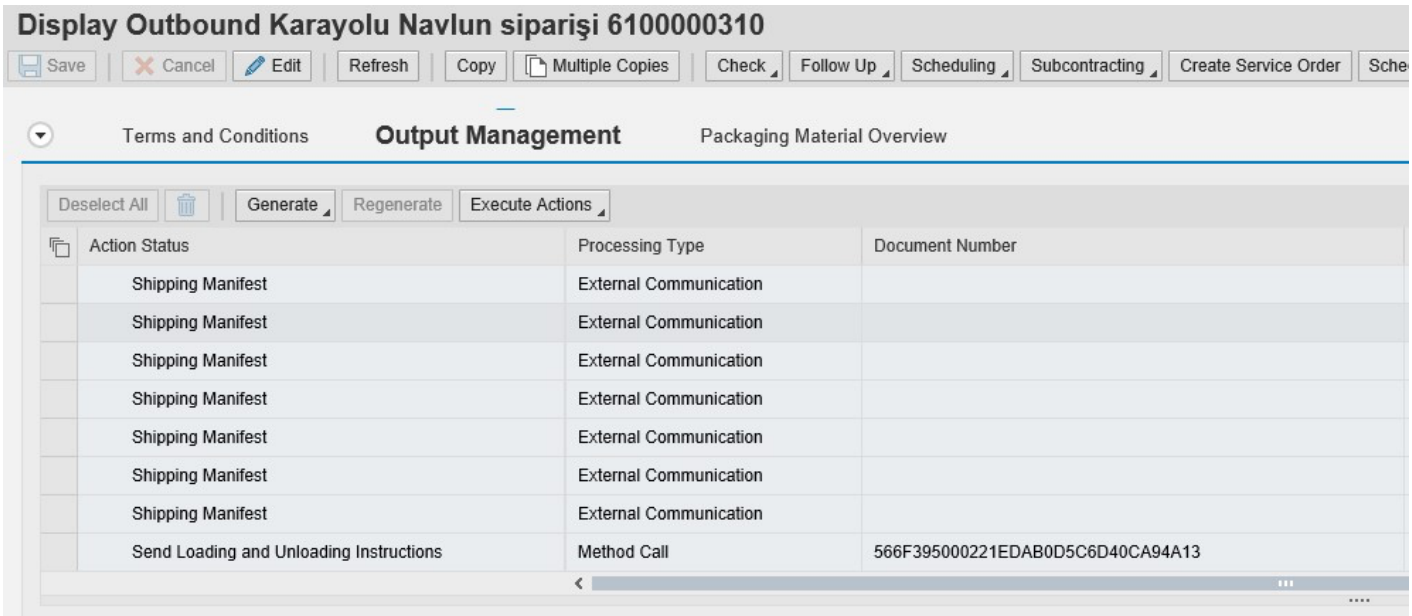




2.4 Step 4: Send Loading Instructions to EWM

The freight number is sent to EWM.





****** The steps after this step are arranged to include more detailed and technical explanations.**

A freight order is created for the relevant freight units in TM, and after planning, packaging and loading details are created, the process is now advanced in EWM.

After the loading instruction is sent, firstly the HU number is automatically generated for the EWM system by taking the freight order with the PPF's as reference.

3 EWM Side

3.1 Configuration Steps

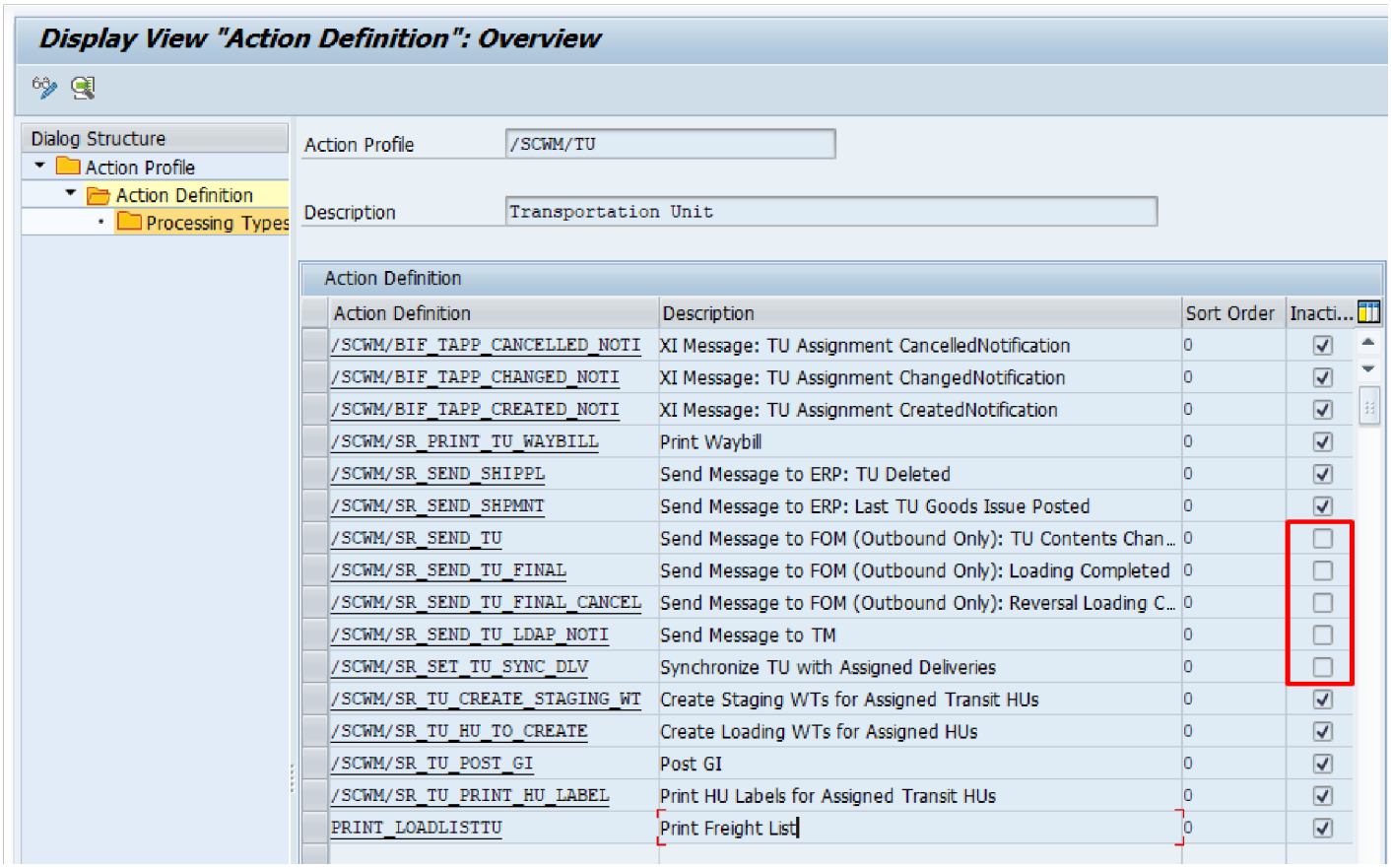
Apart from the configurations below, there are a few other minor configurations that can guide the movement of the system. As these are scenario based, more basic configurations will be shared below.

3.1.1 Step 1: PPF configurations for TU

Tcode: SPPFC

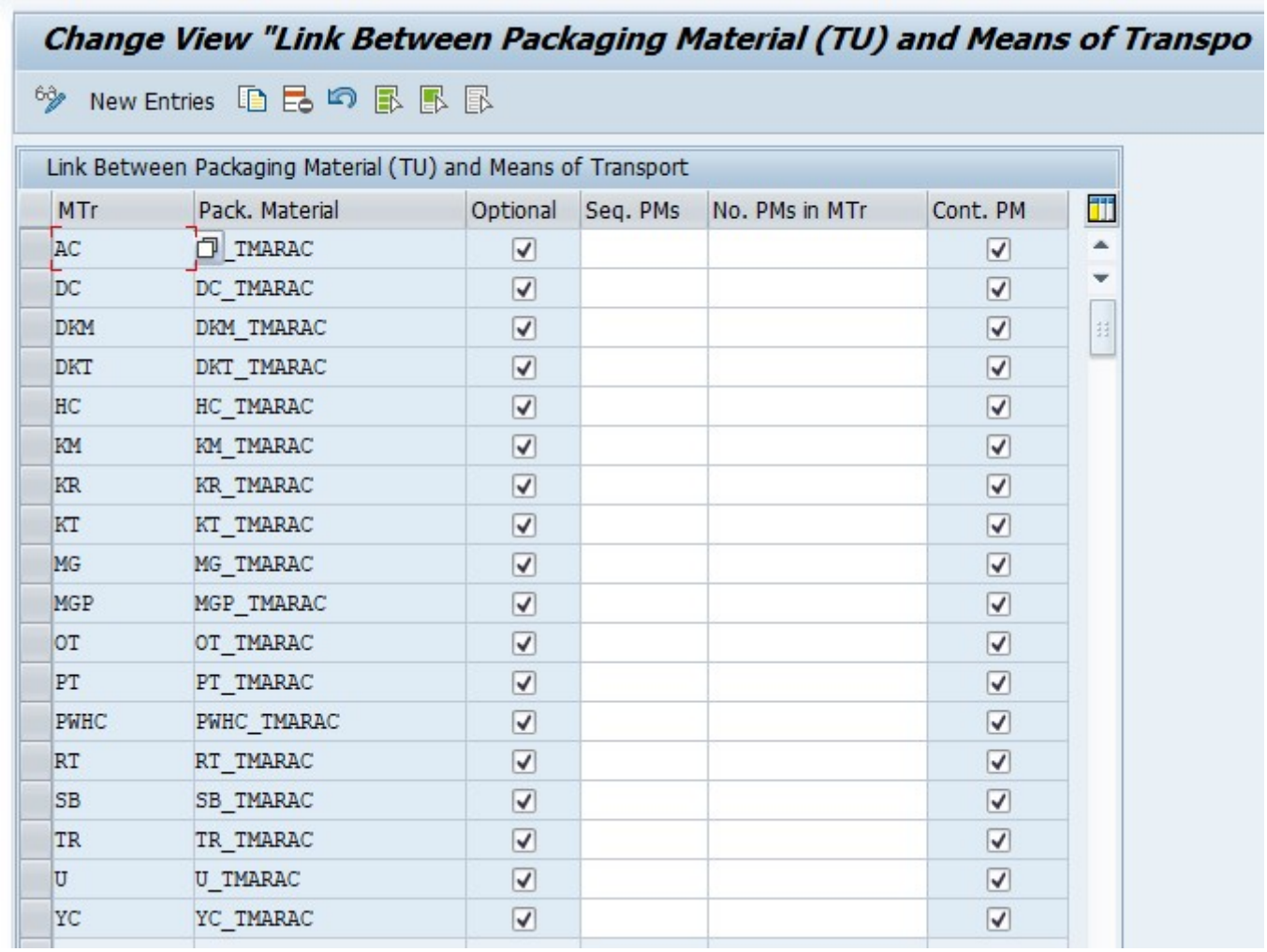
Application: /SCWM/SHP_RCV Action Profile: /SCWM/TU

In this action profile we need to active these actions;

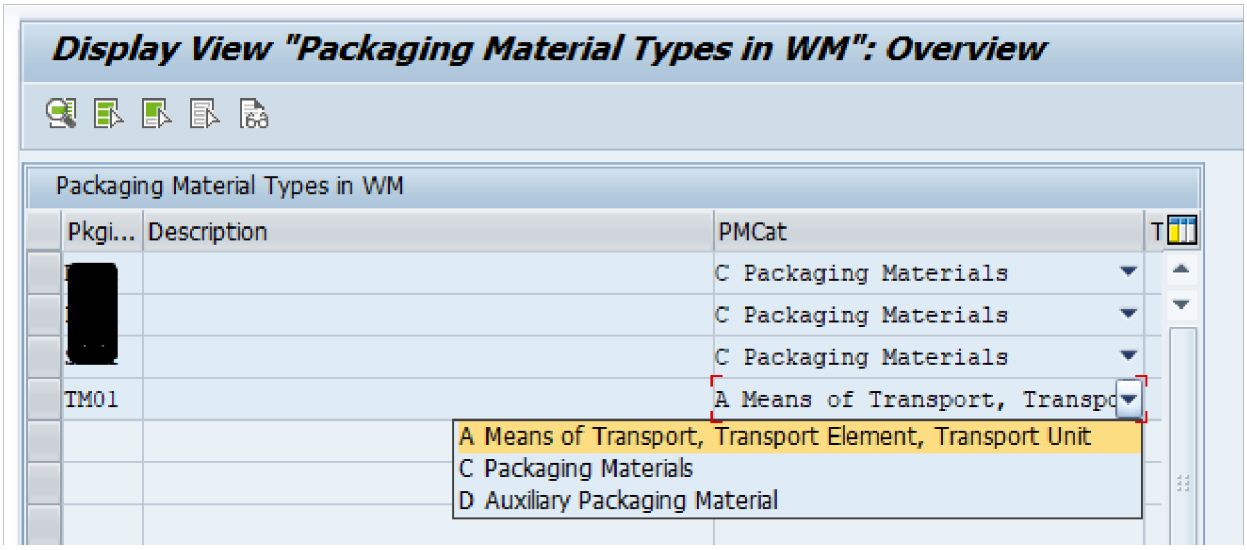


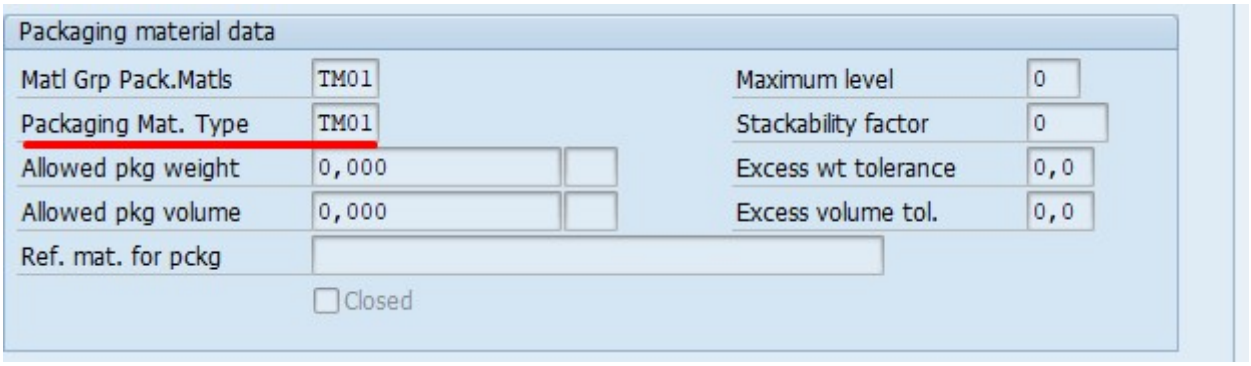
Accordingly, the system will try to create TU automatically. Here, while making a plan in TM, a necessary material is needed for the selected means of transport.

Tcode: /SCWM/PM_MTR



For each TM means type is selected the relevant TM means material. The packaging material type of this material should also be selected as “A”.



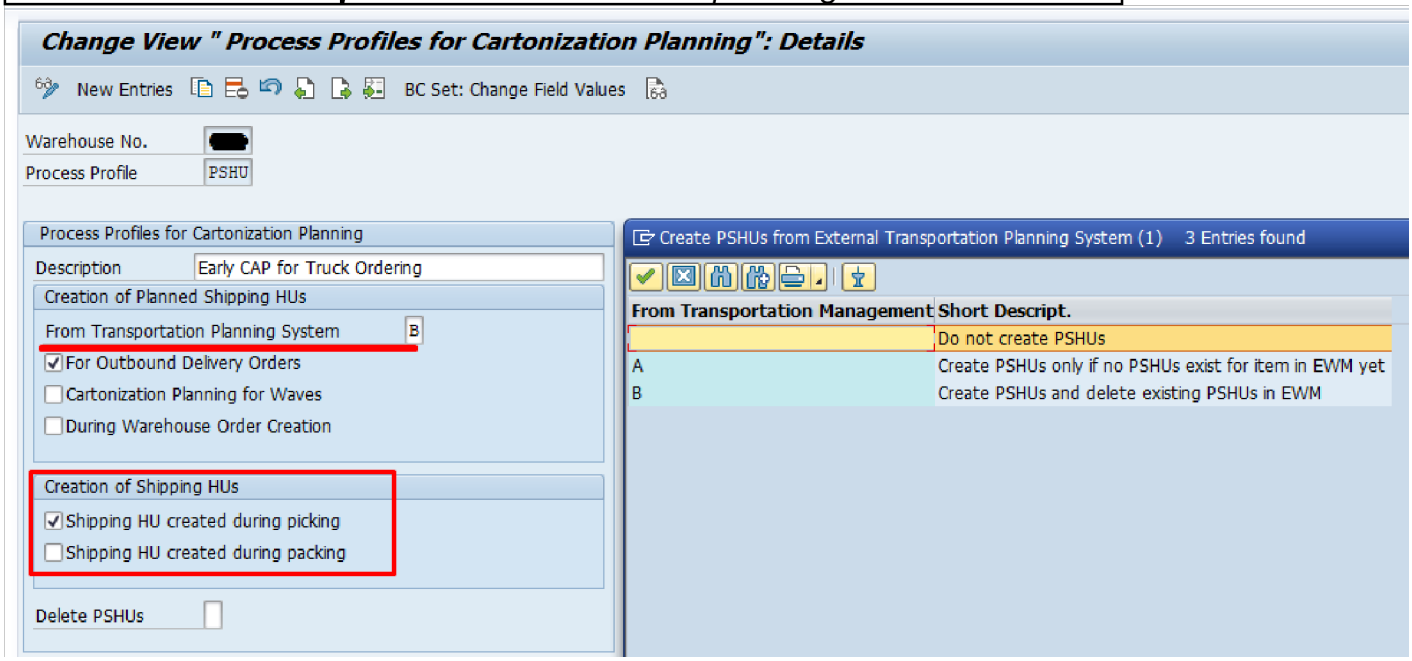


3.1.2 Step 2: Configurations for PSHU's creation from TM

At this stage, taking package plan made in TM as a reference the configuration steps required to automatically create PSHU for EWM will be explained.

The creation of PSHU in EWM for the HU for each plan in TM will be provided as follows.

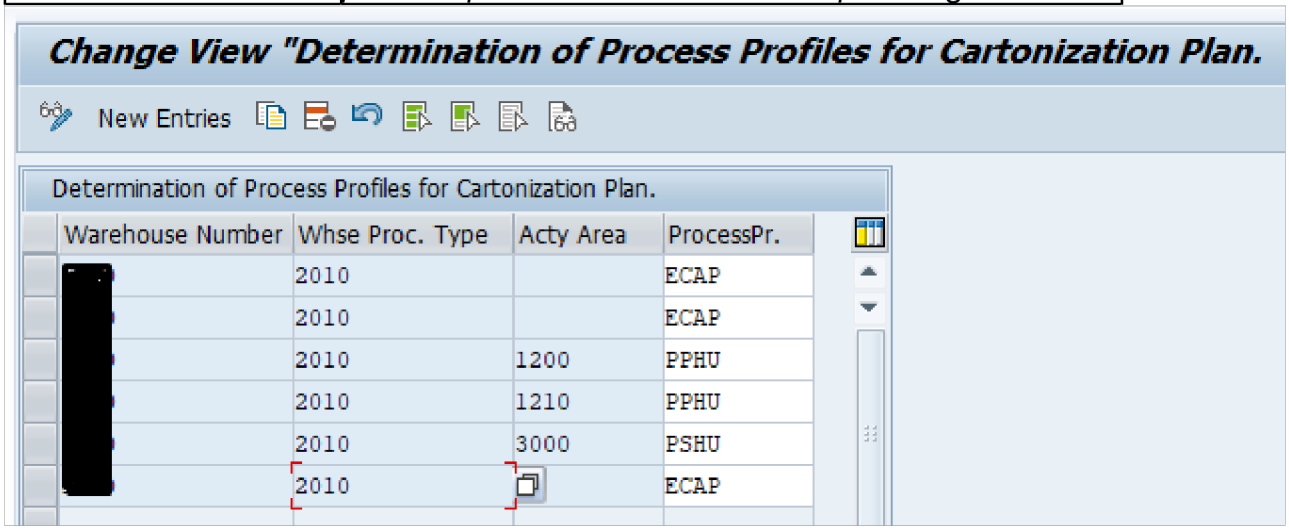
IMG Menu	*SCM Extended Warehouse Management ® Extended Warehouse Management ® Good Issue Process ® Cartonization Planning ® Define process profiles for cartonization planning*



IMG Menu	*SCM Extended Warehouse Management ® Extended Warehouse Management ® Good Issue*

In this step, a notification is given that PSHUs will be created from the TM system. And for this created PSHU, it is decided at which stage Pick-HU will be created. In our scenario, it is determined this Pick-HU will be created and used during picking in the configuration as above.

	Process ® Cartonization Planning ® Determine process profiles for cartonization planning



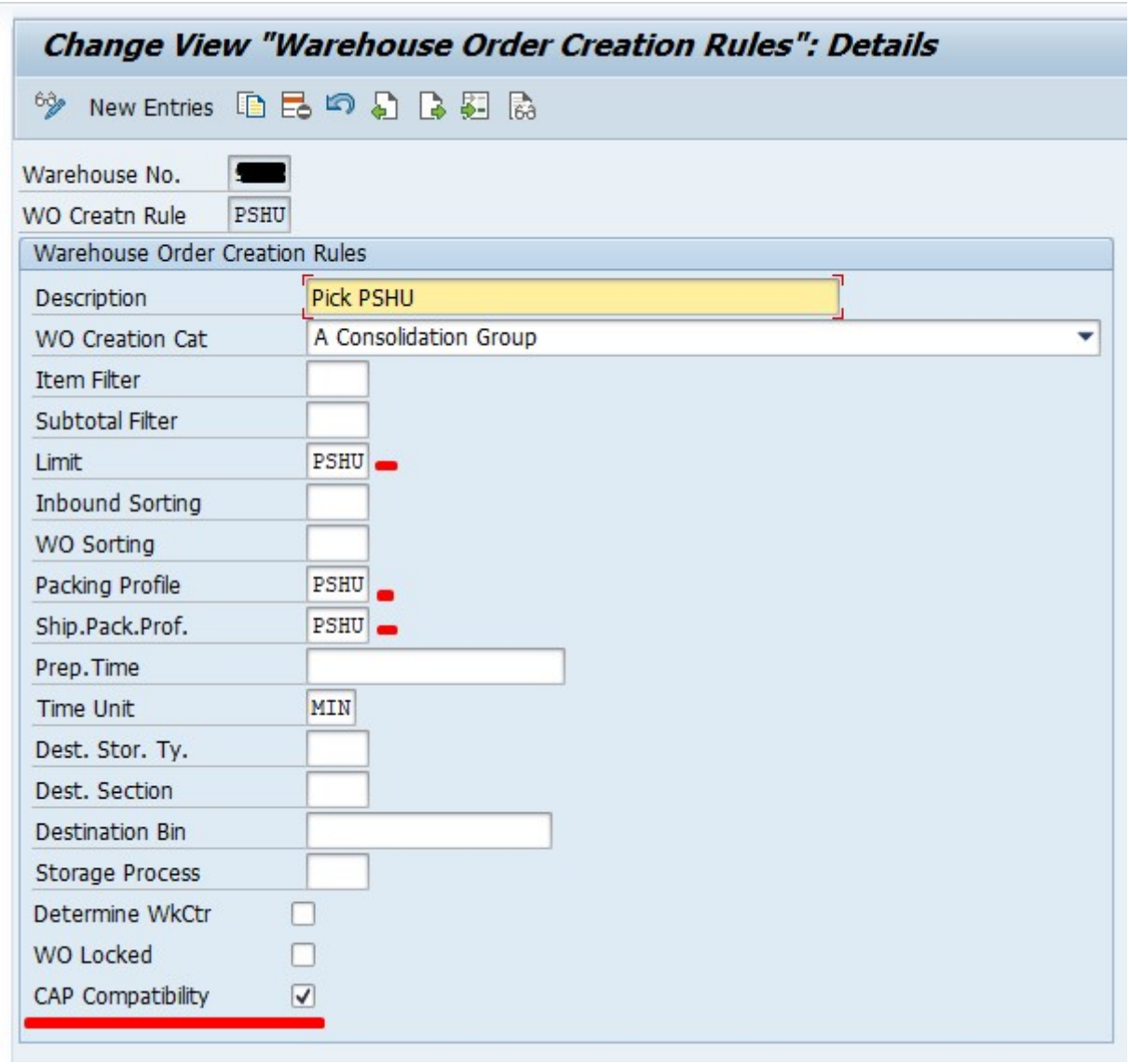
At this stage, in which warehouse numbers, which activity areas and which processes will be used during the removal from the warehouse task are specified at this stage.

3.1.3 Step 3: Warehouse Order Creation Rules Configuration

A separate warehouse order creation is provided for each PSHU so that the system can take into account the TM plan when creating warehouse tasks for shipping. In this way, HU's which are coming out of the warehouse will be prepared on the basis of PSHUs.

There are several configuration steps that need to be done at this stage. Their details are as follows.

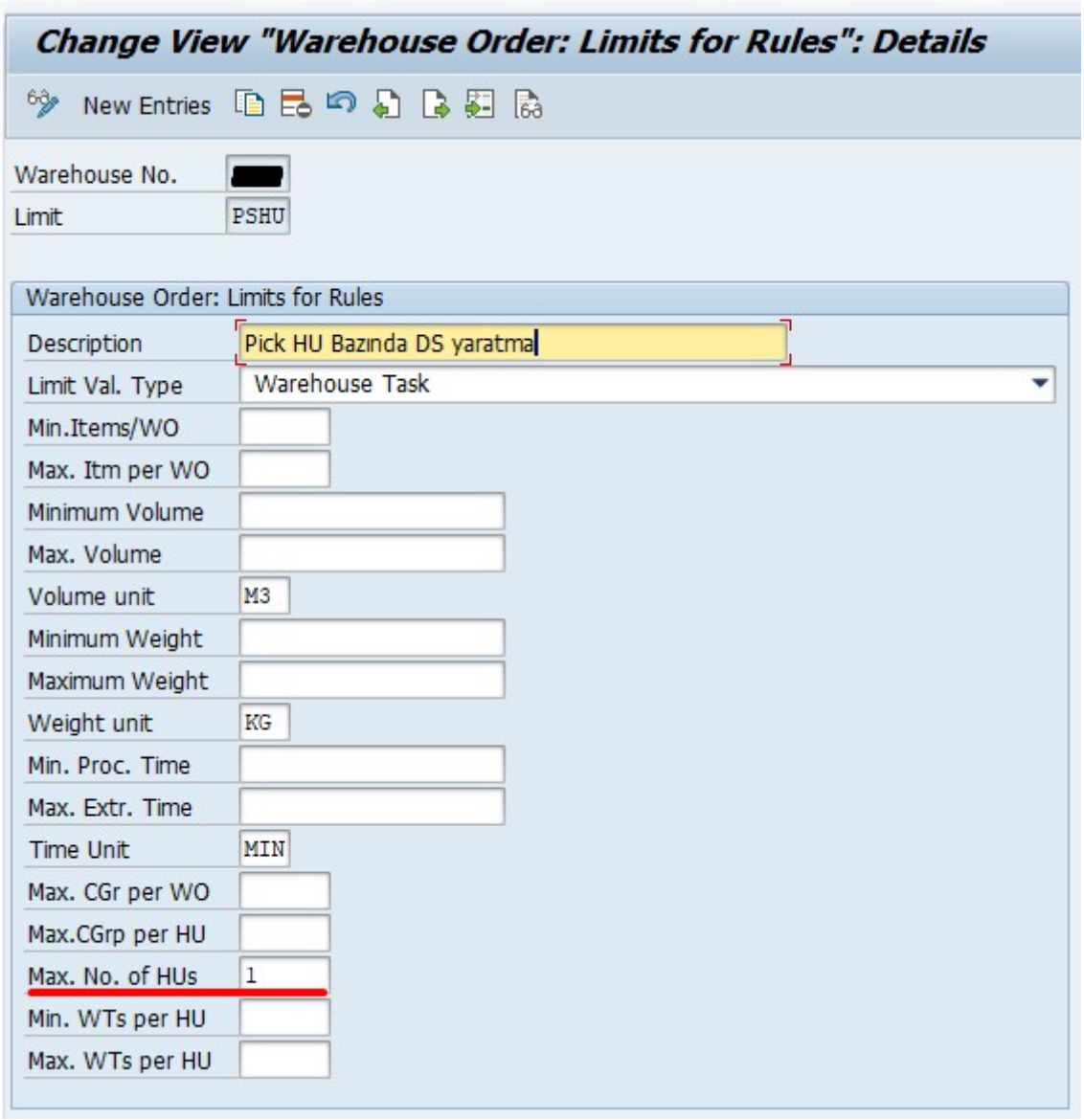
MG Menu	*SCM Extended Warehouse Management ® Extended Warehouse Management ® Cross-Process Settings ® Warehouse Order ® Define Creation Rule For WO*



The marked areas in the screenshot above are important. These configurations need to be made.

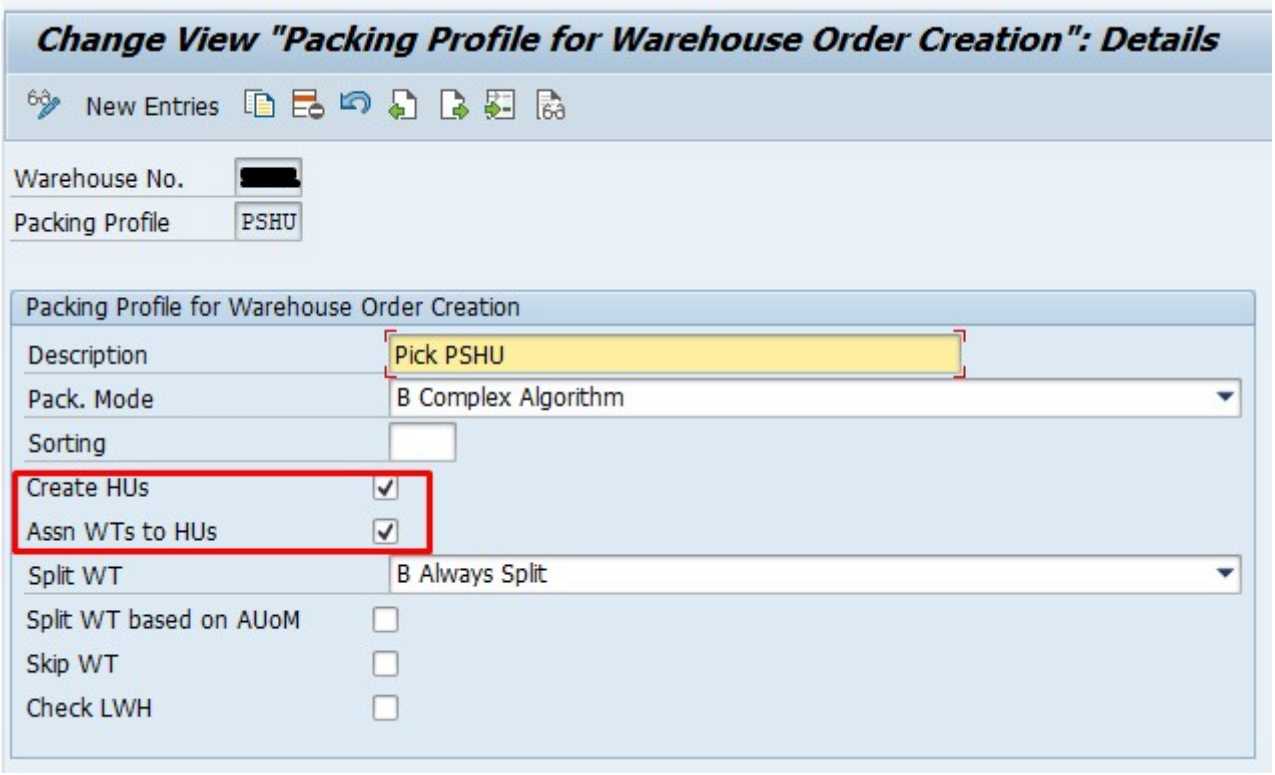
Limit: PSHU

Owing to the configuration below, the system will divide the warehouse orders on the basis of PSHU.



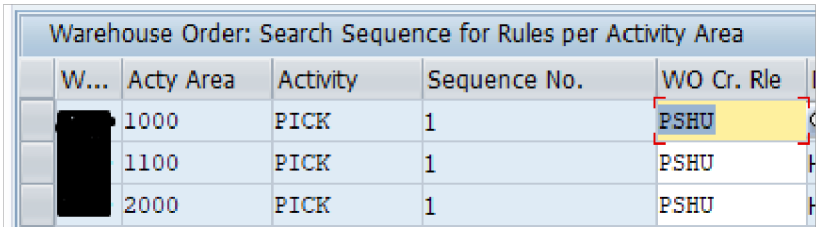
Packing Profile&Ship Pack Profile: PSHU

Owing to the configuration below, the system will create Pick-HU and assign them to the warehouse order when creating warehouse orders and creating references to PSHUs.



IMG Menu	*SCM Extended Warehouse Management ® Extended Warehouse Management ® Cross-Process Settings ® Warehouse Order ® Define Search Sequence of Creation Rules for activity areas*

Finally, with this configuration, we indicate which warehouse order creation rule we use when creating warehouse orders from which activity areas.

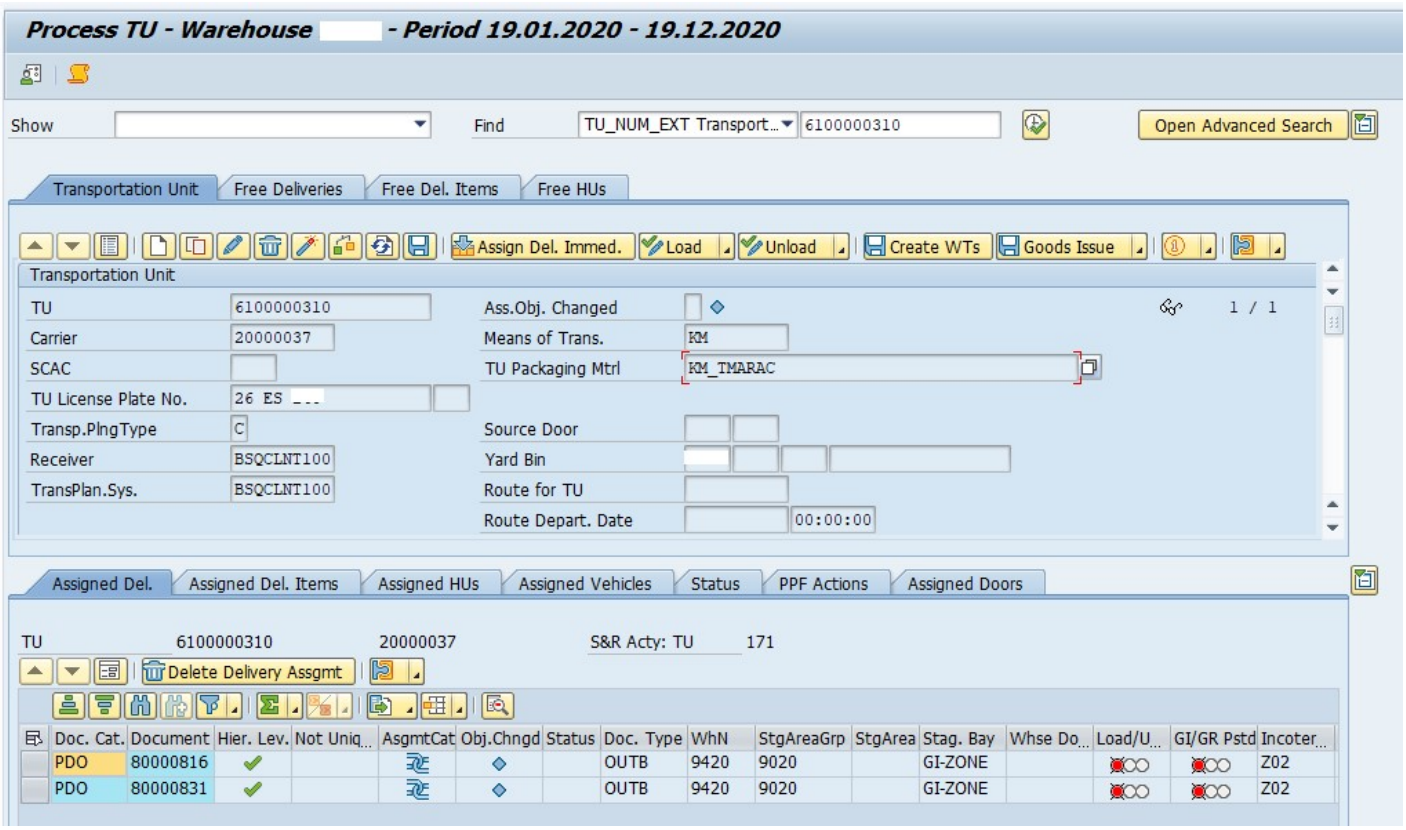


3.2 Process Steps

3.2.1 Step 1: Check the TU Created in EWM

Tcode: /SCWM/TU

TU was created automatically and planned deliveries from TM were assigned.

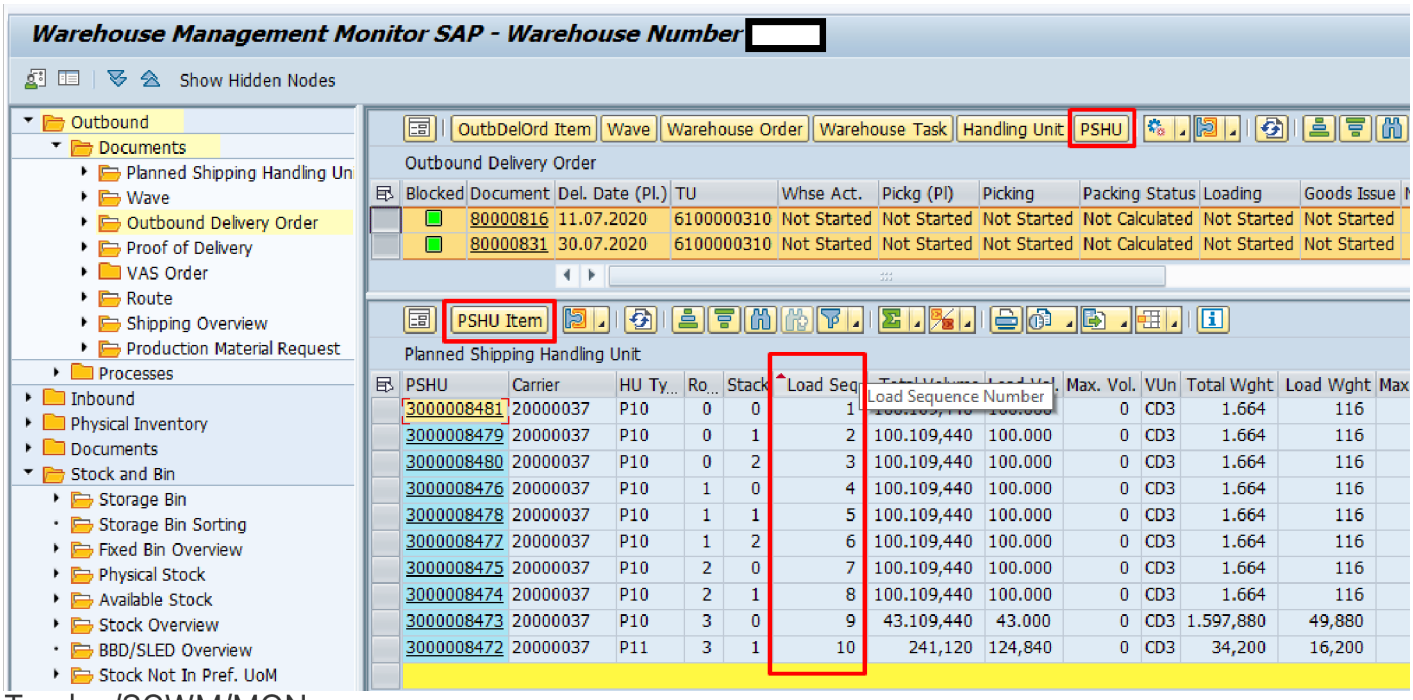


3.2.3 Step 3: Create Warehouse order referring to PSHU's

3.2.2 Step 2: Check the PSHU's Created From TM

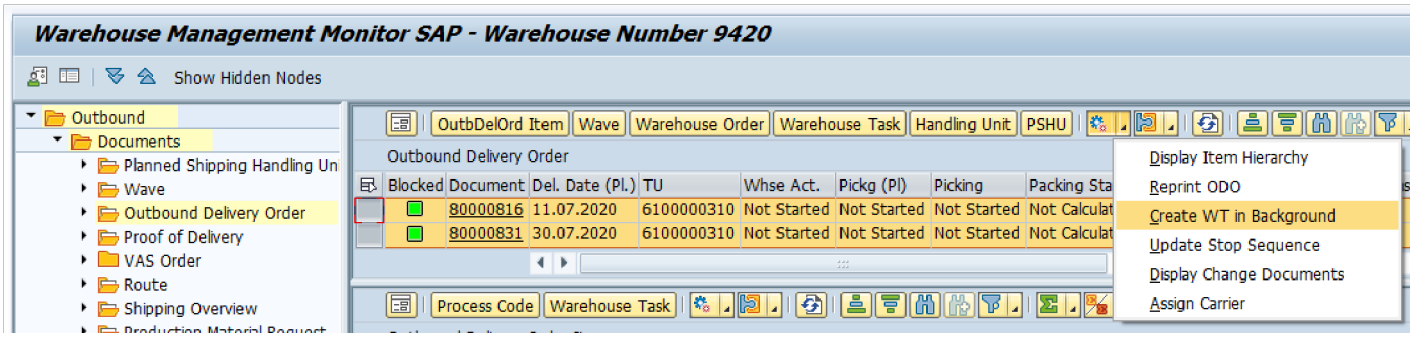
Tcode: /SCWM/MON

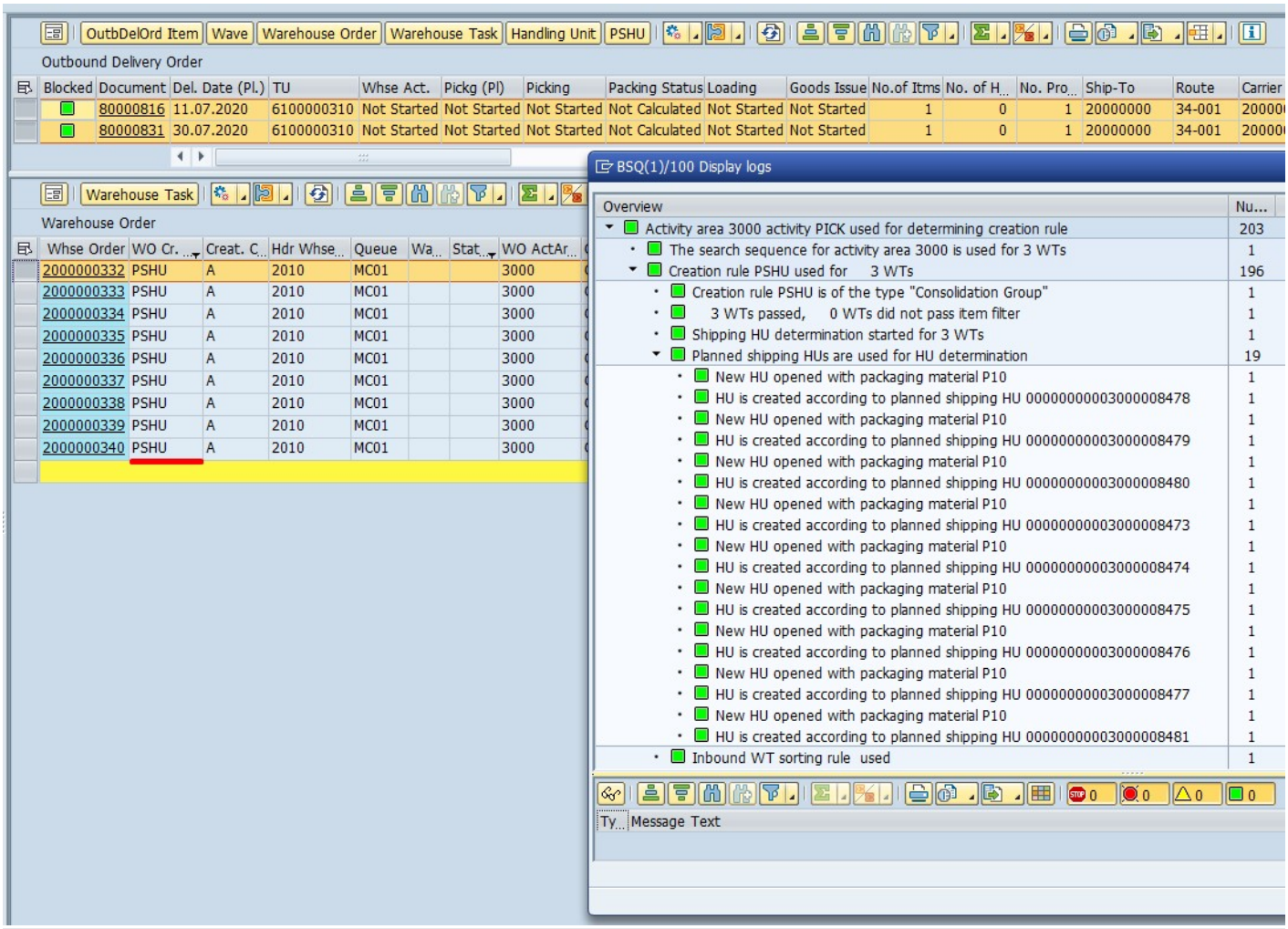
With TM plan HUs, it is checked whether PSHU's is created in the EWM system. The loading sequence detail also looks like the following.

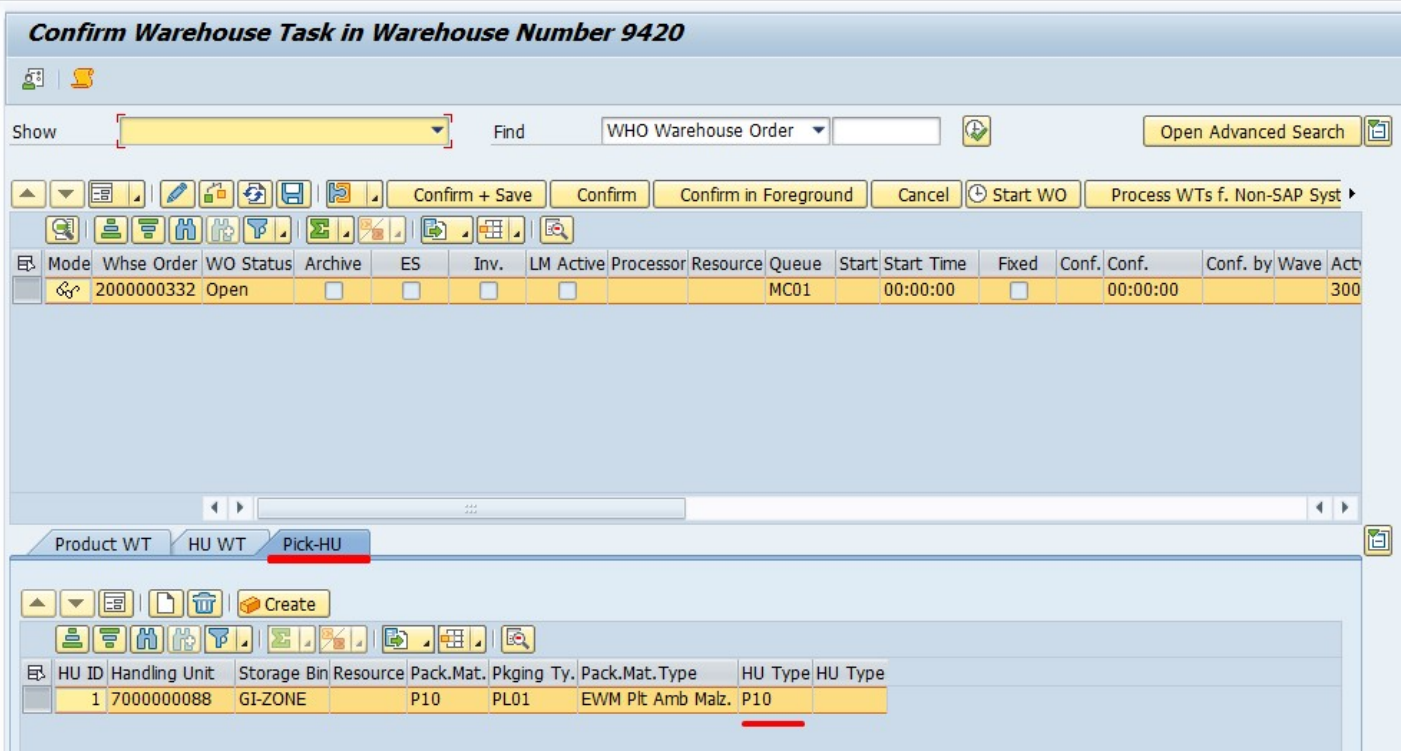


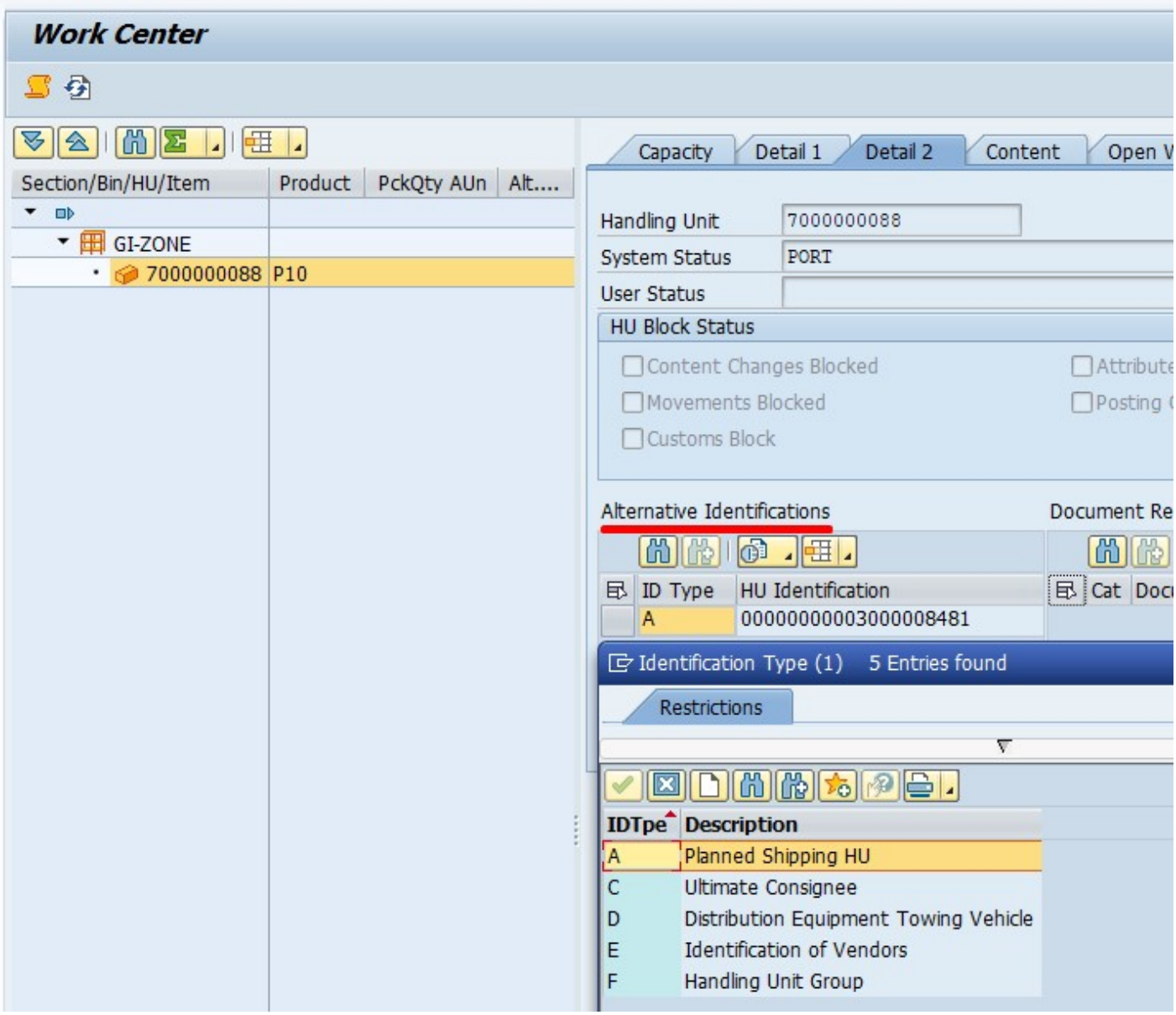
Tcode: /SCWM/MON

Warehouse orders are created on the basis of the freight number. The system separates the warehouse orders it creates at the moment on the basis of PSHU's and creates a Pick-HU for each warehouse order. It also writes to this Pick-HU content which PSHU reference as taken when this created. In the next steps, this reference will determine the loading sequence.




OutbDelOrd Item
Wave
Warehouse Order
Warehouse Task
Handling Unit
PSHU
Outbound Delivery Order
Blocked Document Del. Date (Pl.) TU Whse Act. Pickg (Pl) Picking Packing Status Loading Goods Issue No.of Itms No. of H... No. Pro... Ship-To Route Carrier
80000816 11.07.2020 6100000310 Not Started Not Started Not Started Not Calculated Not Started Not Started 1 0 1 20000000 34-001
80000831 30.07.2020 6100000310 Not Started Not Started Not Started Not Calculated Not Started Not Started 1 0 1 20000000 34-001
Warehouse Task
Warehouse Order
Whse Order WO Cr. ... Creat. C... Hdr Whse... Queue Wa... Stat... WO ActAr...
2000000332 PSHU A 2010 MC01 3000
2000000333 PSHU A 2010 MC01 3000
2000000334 PSHU A 2010 MC01 3000
2000000335 PSHU A 2010 MC01 3000
2000000336 PSHU A 2010 MC01 3000
2000000337 PSHU A 2010 MC01 3000
2000000338 PSHU A 2010 MC01 3000
2000000339 PSHU A 2010 MC01 3000
2000000340 PSHU A 2010 MC01 3000
BSQ(1)/100 Display logs
Overview
Nu...
Activity area 3000 activity PICK used for determining creation rule 203
The search sequence for activity area 3000 is used for 3 WTs 1
Creation rule PSHU used for 3 WTs 196
Creation rule PSHU is of the type "Consolidation Group" 1
3 WTs passed, 0 WTs did not pass item filter 1
Shipping HU determination started for 3 WTs 1
Planned shipping HUs are used for HU determination 19
New HU opened with packaging material P10 1
HU is created according to planned shipping HU 00000000003000008478 1
New HU opened with packaging material P10 1
HU is created according to planned shipping HU 00000000003000008479 1
New HU opened with packaging material P10 1
HU is created according to planned shipping HU 00000000003000008480 1
New HU opened with packaging material P10 1
HU is created according to planned shipping HU 00000000003000008473 1
New HU opened with packaging material P10 1
HU is created according to planned shipping HU 00000000003000008474 1
New HU opened with packaging material P10 1
HU is created according to planned shipping HU 00000000003000008475 1
New HU opened with packaging material P10 1
HU is created according to planned shipping HU 00000000003000008476 1
New HU opened with packaging material P10 1
HU is created according to planned shipping HU 00000000003000008477 1
New HU opened with packaging material P10 1
HU is created according to planned shipping HU 00000000003000008481 1
Inbound WT sorting rule used 1
Ty...
Message Text


Confirm Warehouse Task in Warehouse Number 9420
Show
Find
WHO Warehouse Order
Open Advanced Search
Confirm + Save
Confirm
Confirm in Foreground
Cancel
Start WO
Process WTs f. Non-SAP Syst
Mode Whse Order WO Status Archive ES Inv. LM Active Processor Resource Queue Start Start Time Fixed Conf. Conf. Conf. by Wave Acty
2000000332 Open MC01 00:00:00 00:00:00 300
Product WT
HU WT
Pick-HU
Create
HU ID Handling Unit Storage Bin Resource Pack.Mat. Pkging Ty. Pack.Mat.Type HU Type HU Type
1 7000000088 GI-ZONE P10 PL01 EWM Plt Amb Malz. P10


Work Center
Section/Bin/HU/Item
Product
PckQty AUn
Alt....
GI-ZONE
7000000088
P10
Capacity
Detail 1
Detail 2
Content
Handling Unit
7000000088
System Status
PORT
User Status
HU Block Status
Content Changes Blocked
Movements Blocked
Customs Block
Alternative Identifications
ID Type
HU Identification
A
00000000003000008481
Identification Type (1)
5 Entries found
Restrictions
IDTpe
Description
A
Planned Shipping HU
C
Ultimate Consignee
D
Distribution Equipment Towing Vehicle
E
Identification of Vendors
F
Handling Unit Group

3.2.4 Step 4: Picking Warehouse order with Pick-HU's

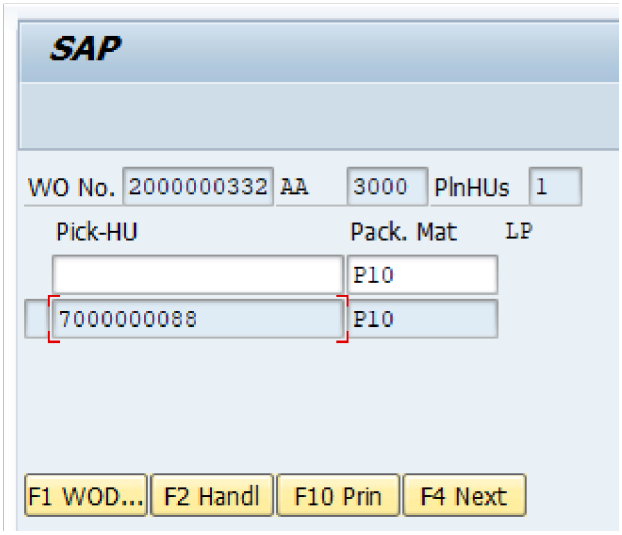
Tcode: /SCWM/RFUI

04-Outbound Processes

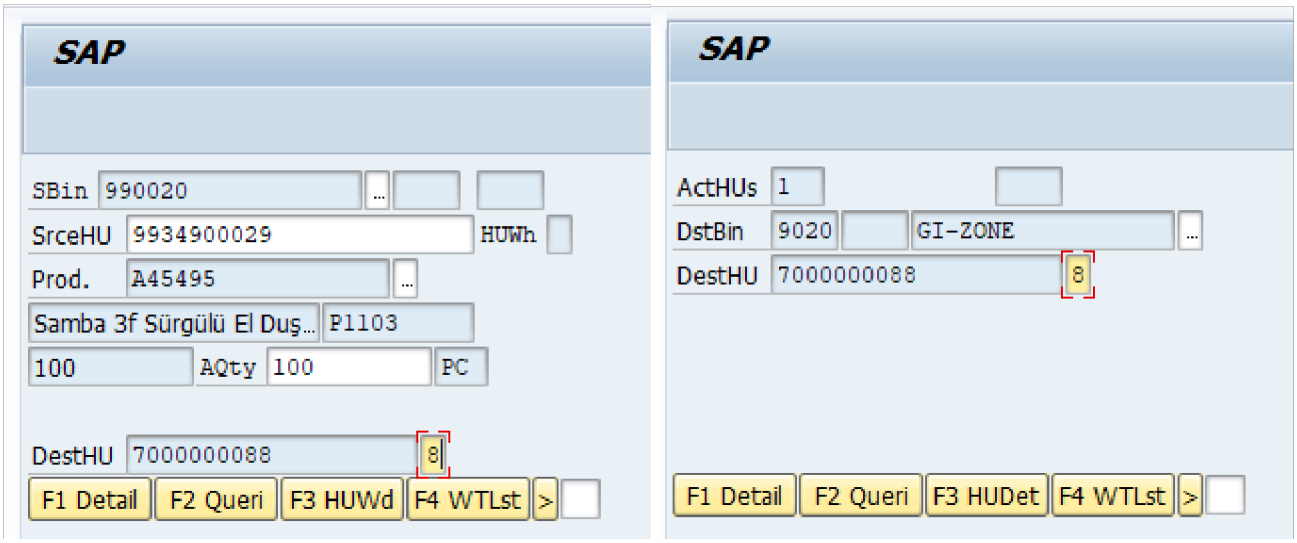
01-Picking

01-System Guided

The created warehouse orders are processed.

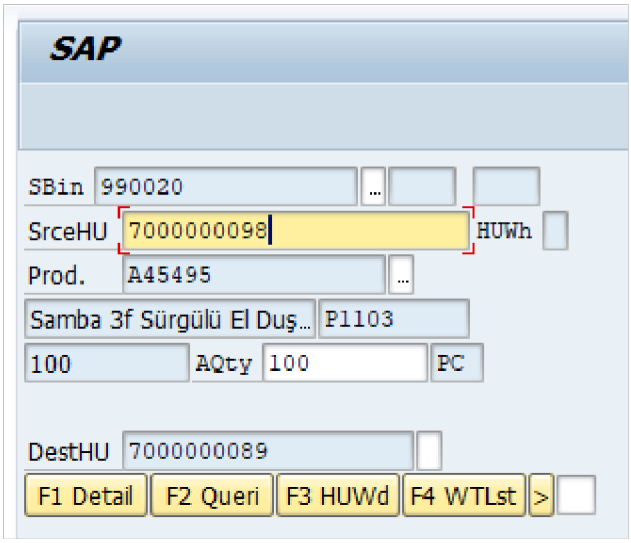


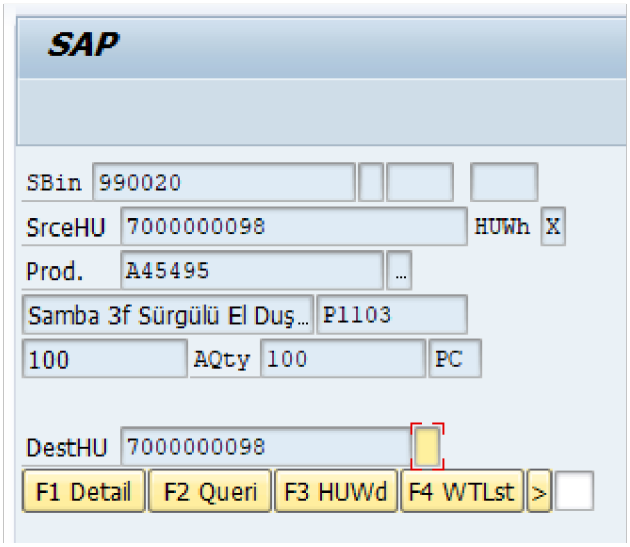
- Pick HU's WO – At this stage, the same HU is not available in our warehouse with the features specified by PSHU & Pick-HU, we transfer over an existing HU.



- Pick HU's WO – At this stage, our warehouse has the same HU with the features specified by PSHU & Pick-HU. When we scan this HU, the system replaces the scanned HU with PICK HU if the HU contents are the same. While making this change, it continues to keep the TM reference number on the storage HU. This reference is important because, if you

want to apply the means of transport loading sequence the way that comes in TM, this reference needs to be kept on the HUs which prepared for deliveries. In this way you don't miss the loading sequence.

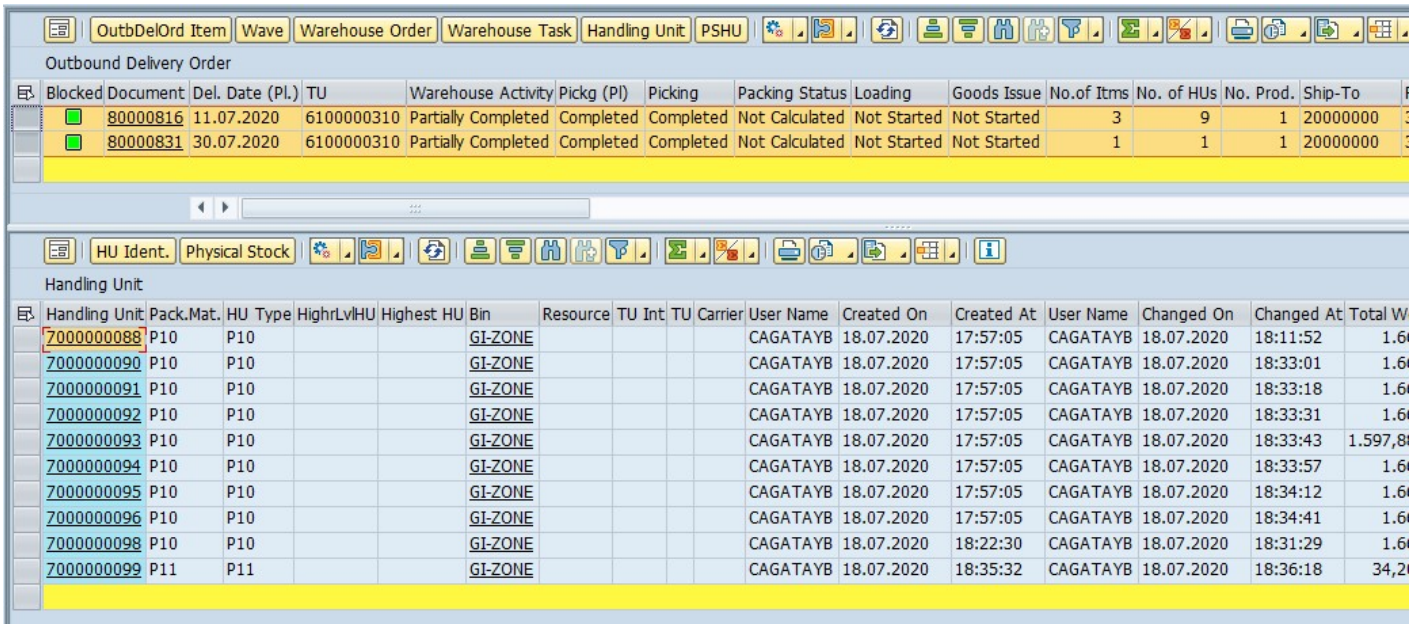




3.2.5 Step 5: Check HU's and PSHU's

Tcode: /SCWM/MON

The created handling units are checked on deliveries.



Outbound Delivery Order

Blocked	Document	Del. Date (Pl.)	TU	Warehouse Activity	Pickg (Pl)	Picking	Packing Status	Loading	Goods Issue	No.of Itms	No. of HUs	No. Prod.	Ship-To
	80000816	11.07.2020	6100000310	Partially Completed	Completed	Completed	Not Calculated	Not Started	Not Started	3	9	1	20000000
	80000831	30.07.2020	6100000310	Partially Completed	Completed	Completed	Not Calculated	Not Started	Not Started	1	1	1	20000000

Handling Unit

Handling Unit	Pack.Mat.	HU Type	HighrLvlHU	Highest HU	Bin	Resource	TU Int	TU	Carrier	User Name	Created On	Created At	User Name	Changed On	Changed At	Total W
7000000088	P10	P10			GI-ZONE					CAGATAYB	18.07.2020	17:57:05	CAGATAYB	18.07.2020	18:11:52	1.6
7000000090	P10	P10			GI-ZONE					CAGATAYB	18.07.2020	17:57:05	CAGATAYB	18.07.2020	18:33:01	1.6
7000000091	P10	P10			GI-ZONE					CAGATAYB	18.07.2020	17:57:05	CAGATAYB	18.07.2020	18:33:18	1.6
7000000092	P10	P10			GI-ZONE					CAGATAYB	18.07.2020	17:57:05	CAGATAYB	18.07.2020	18:33:31	1.6
7000000093	P10	P10			GI-ZONE					CAGATAYB	18.07.2020	17:57:05	CAGATAYB	18.07.2020	18:33:43	1.597,8
7000000094	P10	P10			GI-ZONE					CAGATAYB	18.07.2020	17:57:05	CAGATAYB	18.07.2020	18:33:57	1.6
7000000095	P10	P10			GI-ZONE					CAGATAYB	18.07.2020	17:57:05	CAGATAYB	18.07.2020	18:34:12	1.6
7000000096	P10	P10			GI-ZONE					CAGATAYB	18.07.2020	17:57:05	CAGATAYB	18.07.2020	18:34:41	1.6
7000000098	P10	P10			GI-ZONE					CAGATAYB	18.07.2020	18:22:30	CAGATAYB	18.07.2020	18:31:29	1.6
7000000099	P11	P11			GI-ZONE					CAGATAYB	18.07.2020	18:35:32	CAGATAYB	18.07.2020	18:36:18	34,2

3.2.6 Step 6: Yard activities for TU

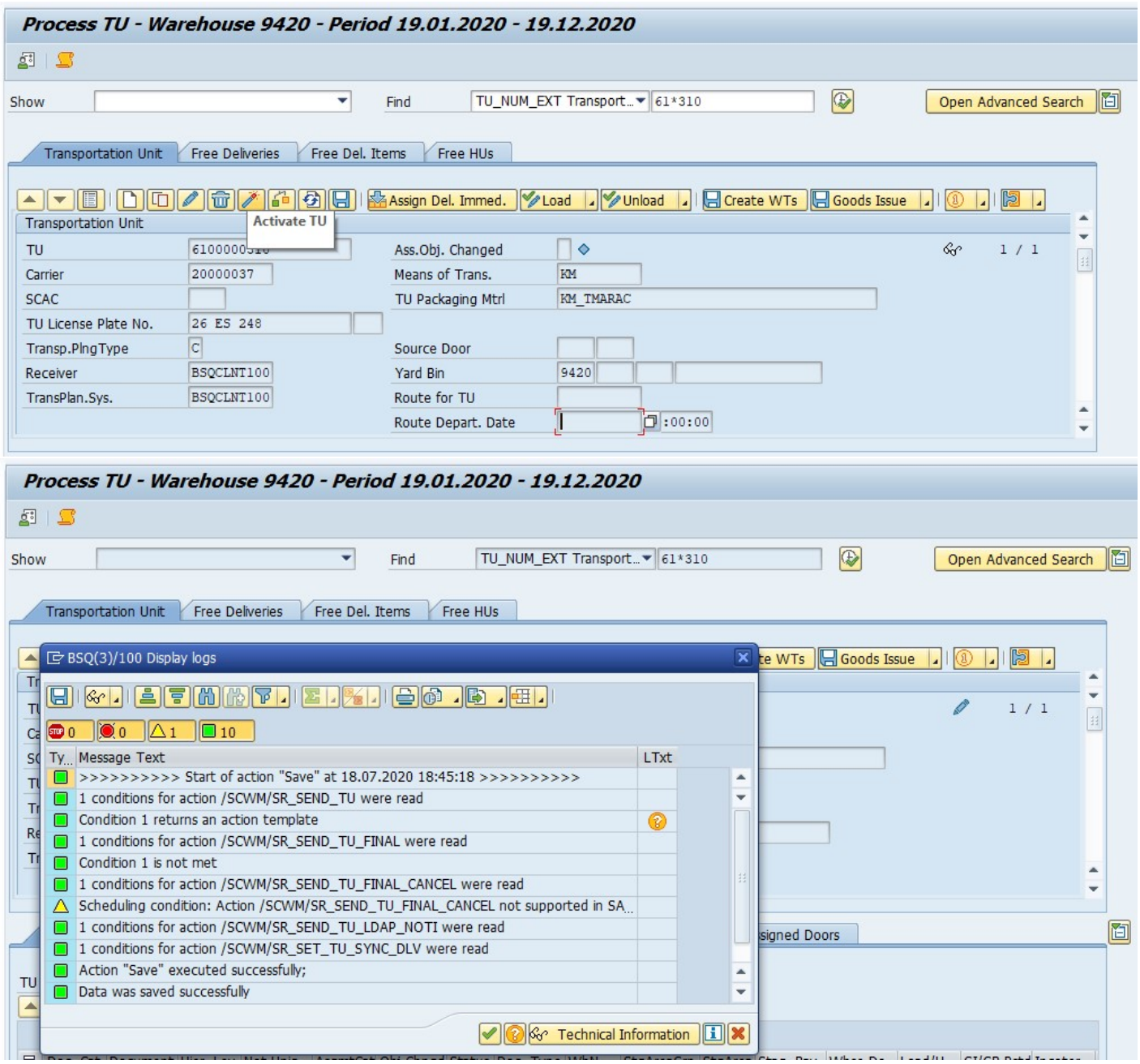
Tcode: /SCWM/TU

3.2.6.1 TU enters the YARD

At this stage, vehicle's yard entry notification is given. Usually, the user who performs this operation will be a security guard at the yard entrance.

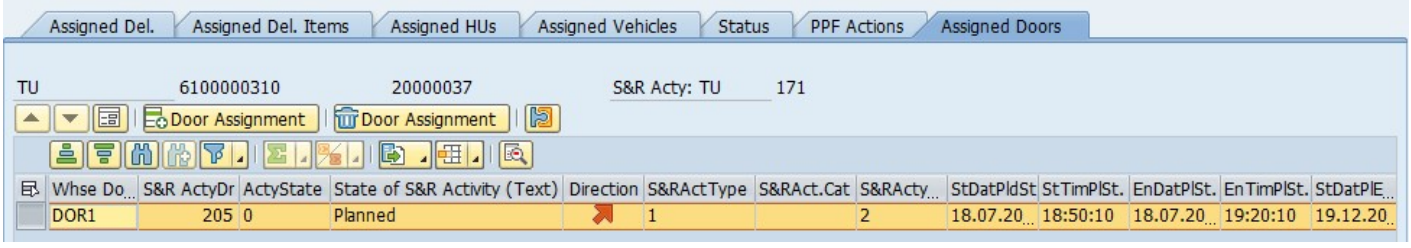
After;

Before the activation



3.2.6.2 Door Assignment

It is assigned through which door the freight will be loaded.



3.2.6.3 Yard move checkpoint to door

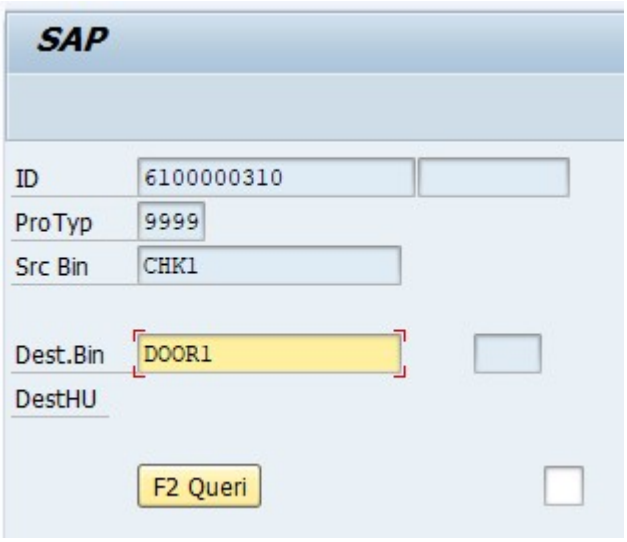
Tcode: /SCWM/RFUI & /SCWM/TU & /SCWM/YMOVE

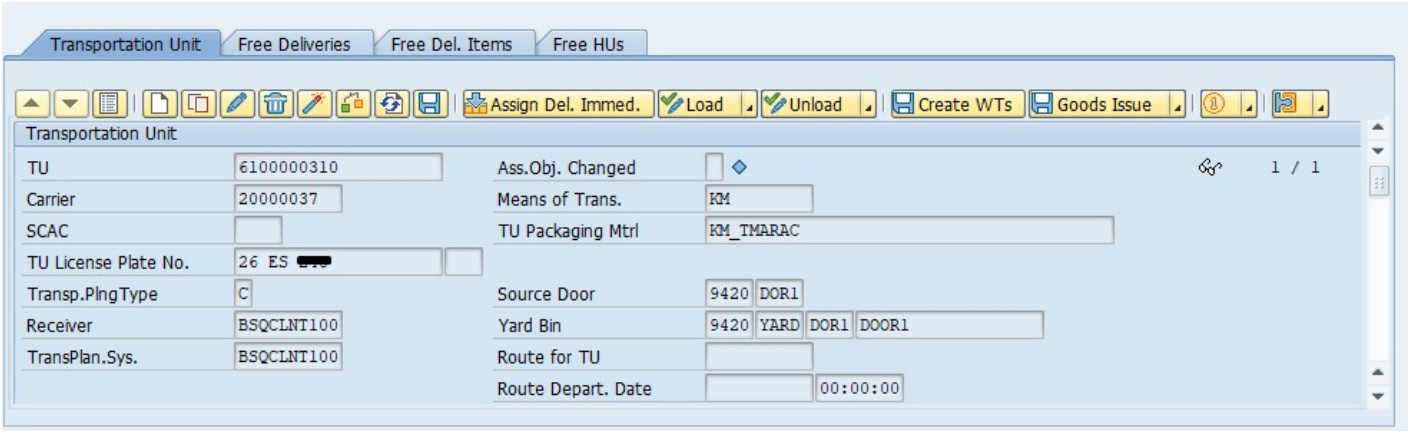
The transfer of the vehicle to the door which it was assigned from the checkpoint will be operated by the hand terminal.

05- Internal Processes

06- Yard Movements

02- Create&Confirm Yard WT





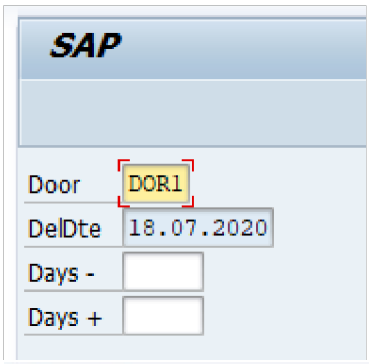
3.2.7 Step 7: Loading referring to TM load sequence

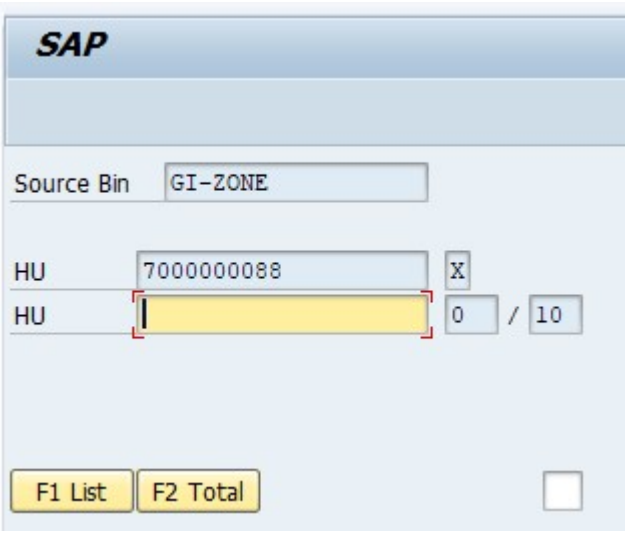
Tcode: /SCWM/RFUI

04- Outbound Processes

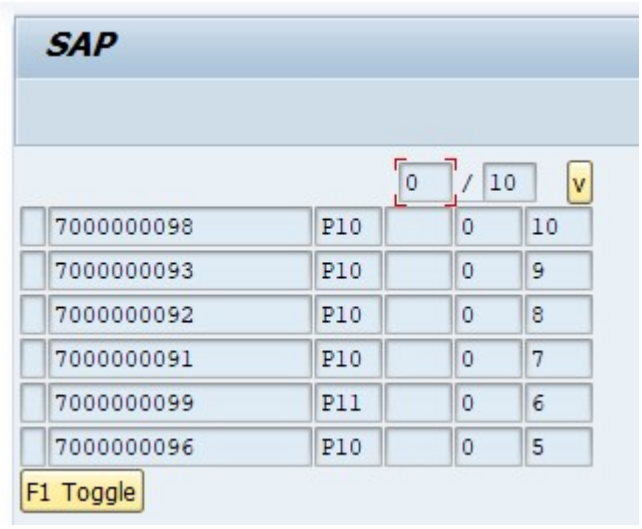
06- Loading

You can choose whatever you want, i'm going to do with by door.

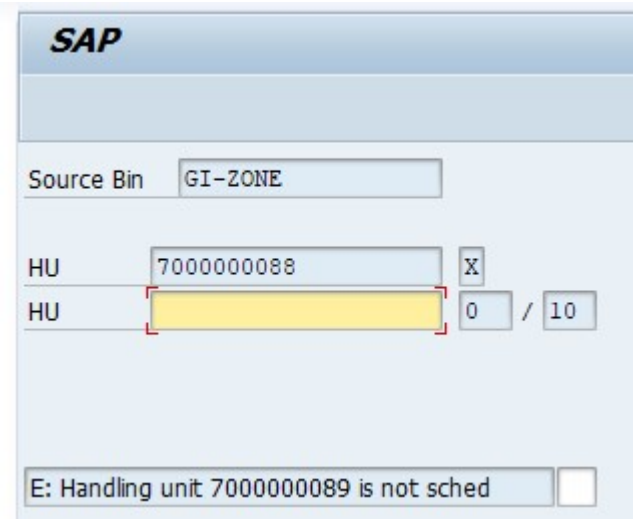




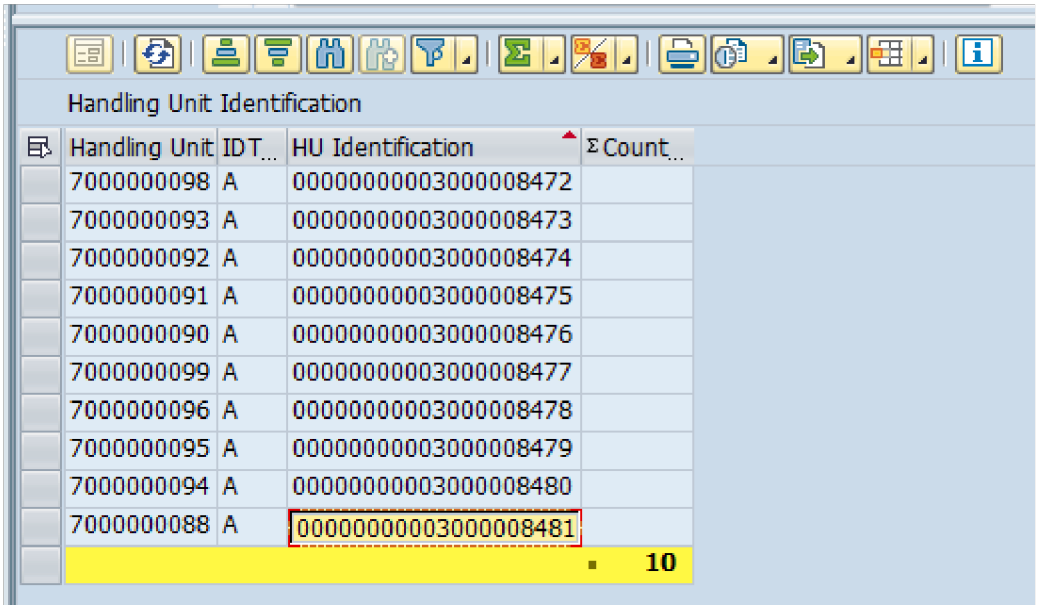
When you press the list button you can see whole HUs and load sequence.



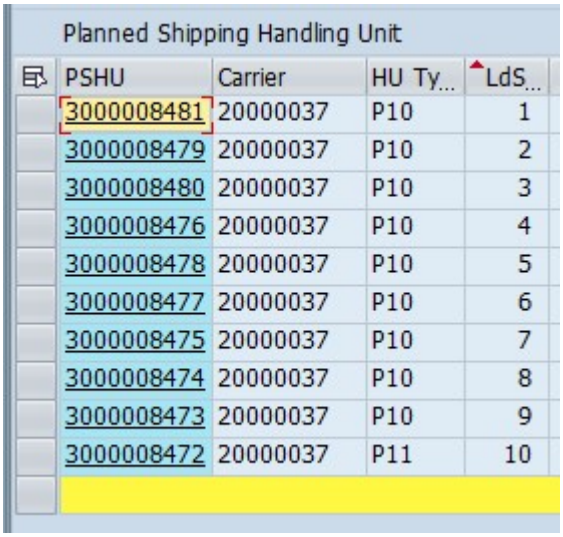
When a HU other than the one to be loaded is scanned, it will give an error as follows.



HU number 7000000088 is requested to be scan first because this HU was created based on PSHU number 00000000003000008481.



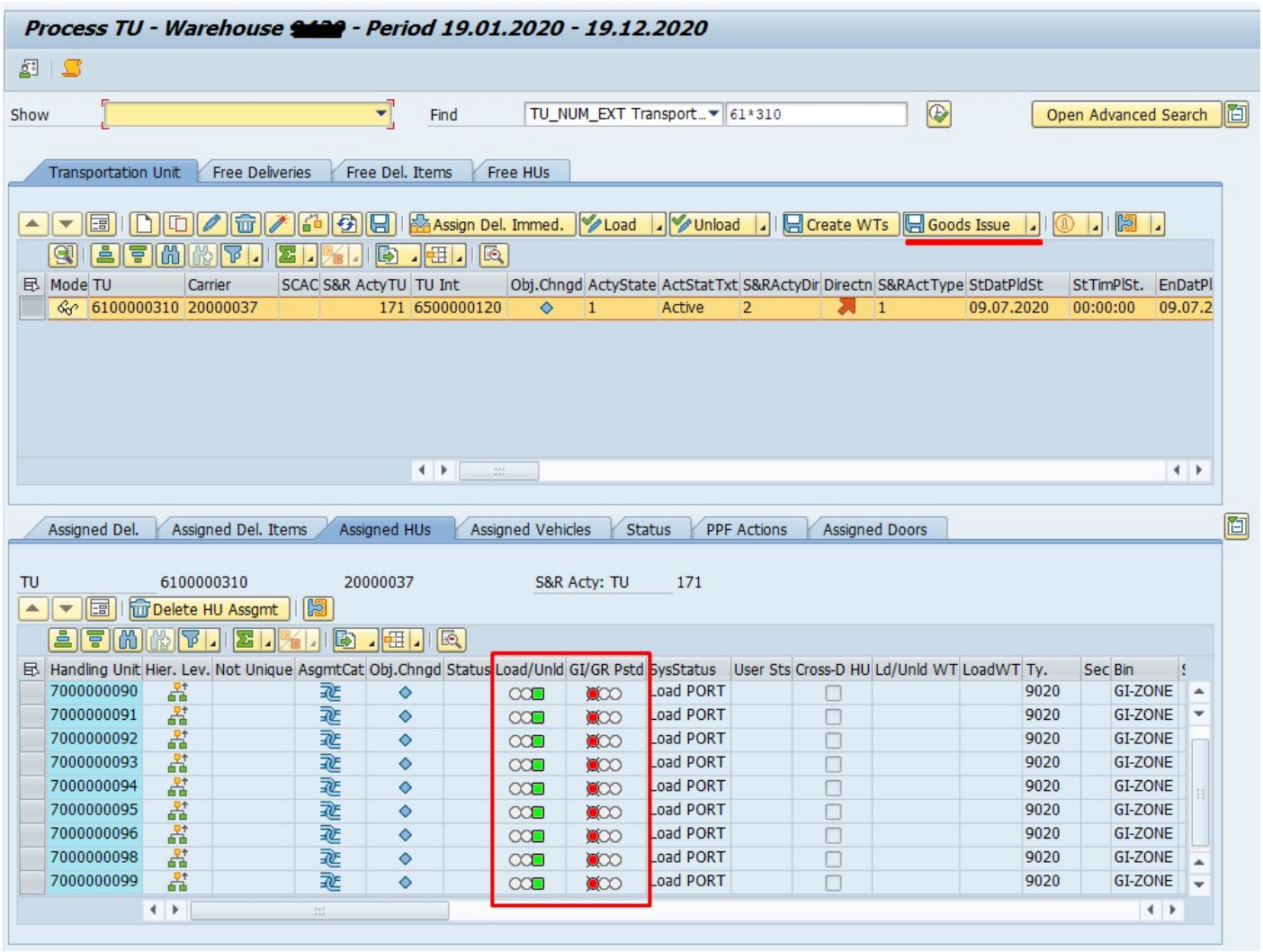
PSHU 00000000003000008481 is the first HU number in means of transport loading sequence coming from TM.

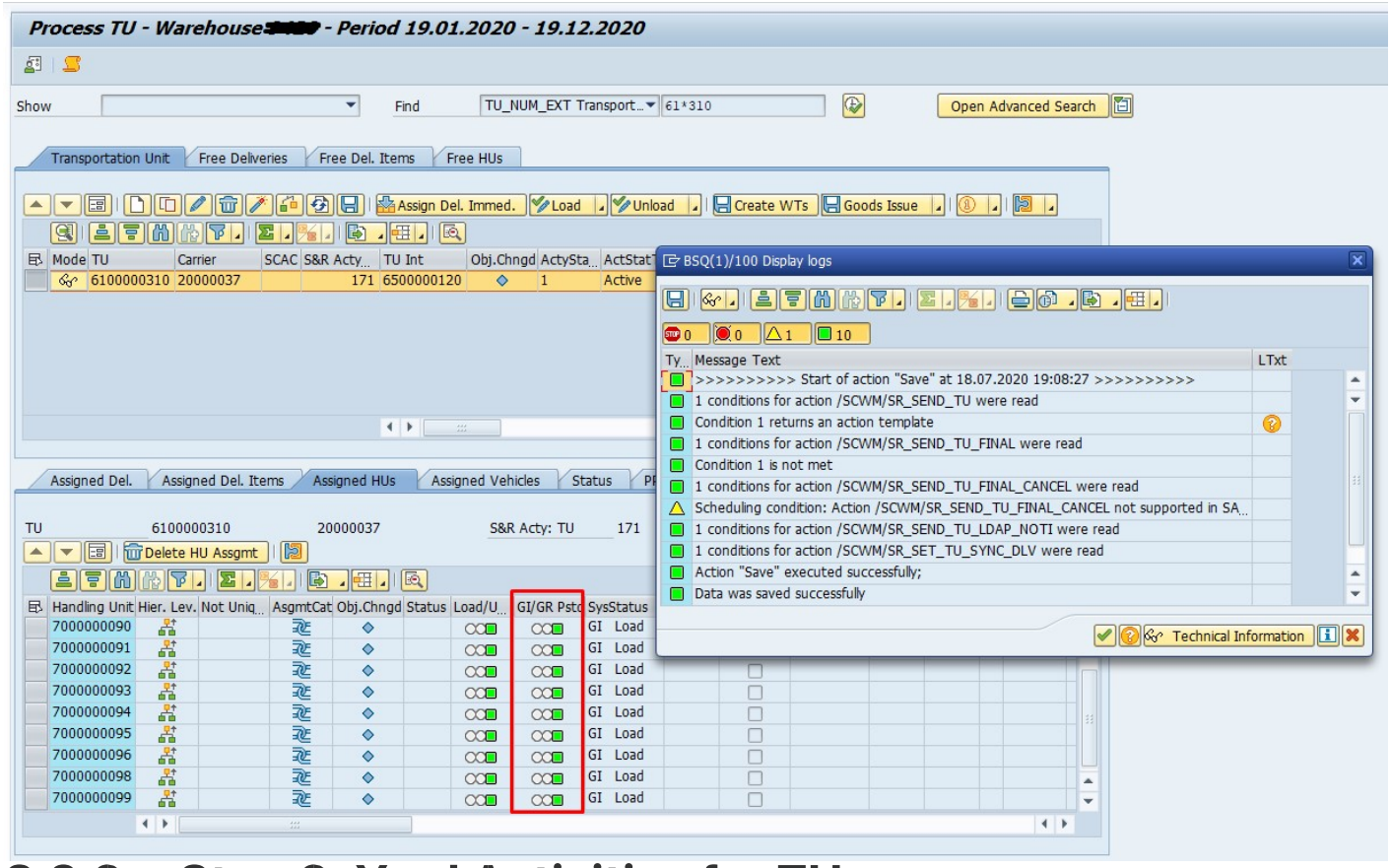


3.2.8 Step 8: Good's Issue

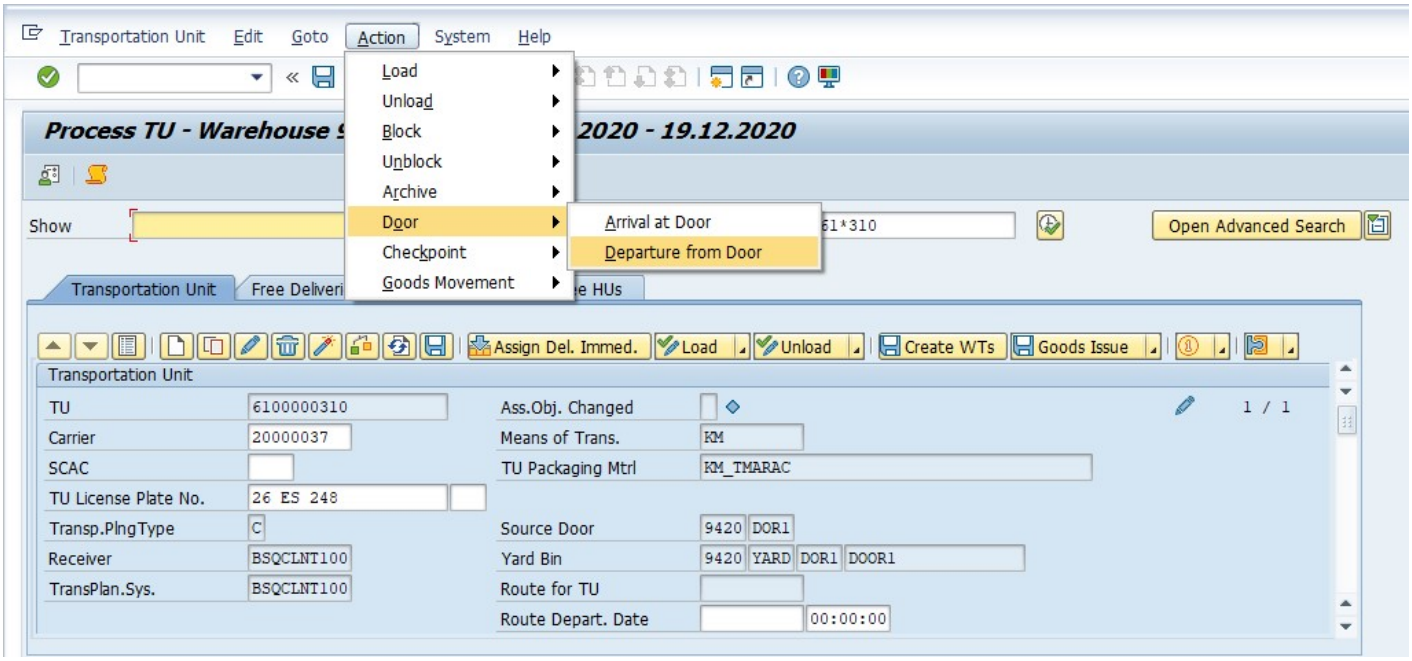
Tcode: /SCWM/TU

Goods issue transactions are made on the basis of transportation unit.

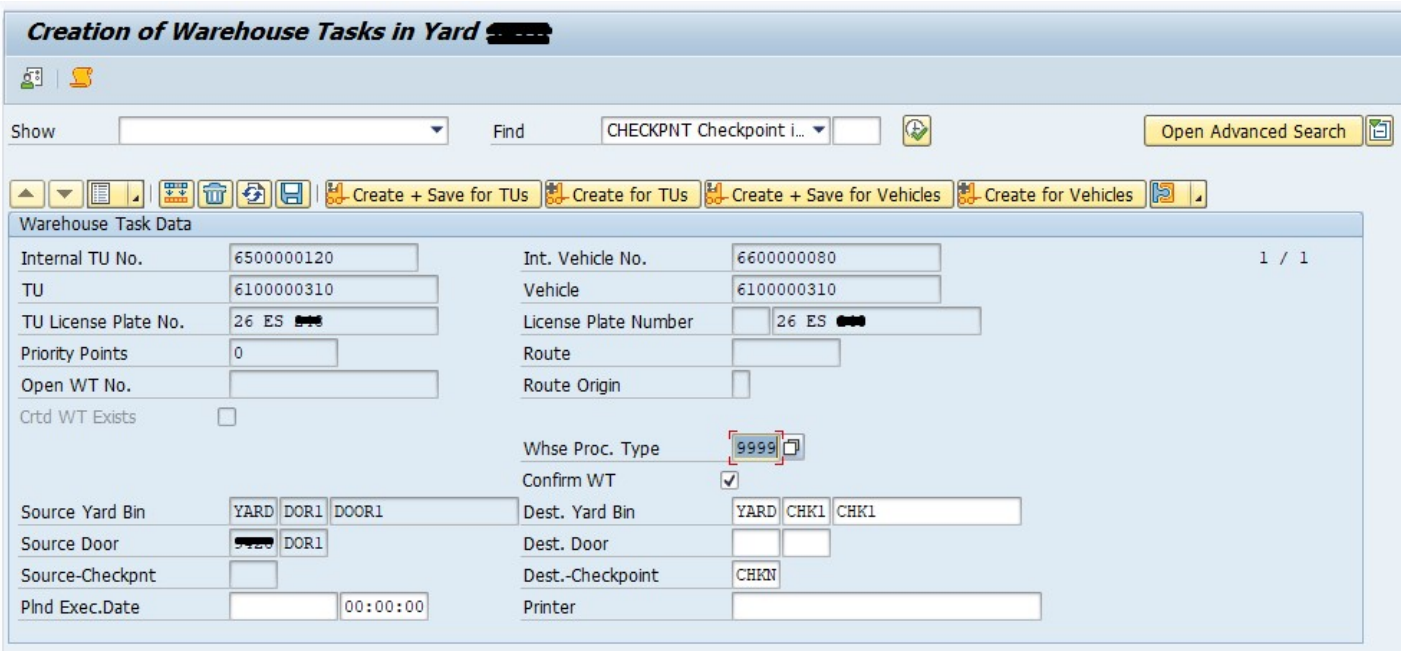




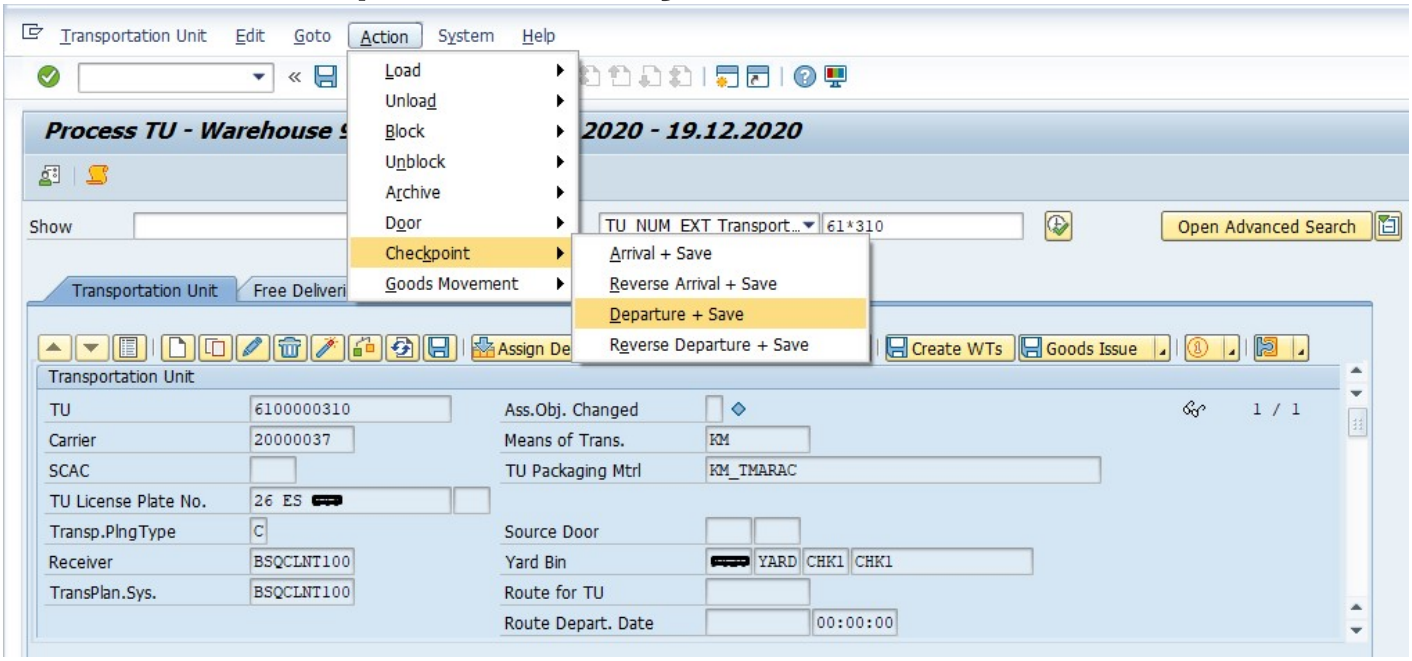
3.2.9 Step 9: Yard Activities for TU



3.2.9.1 TU moves door to checkpoint

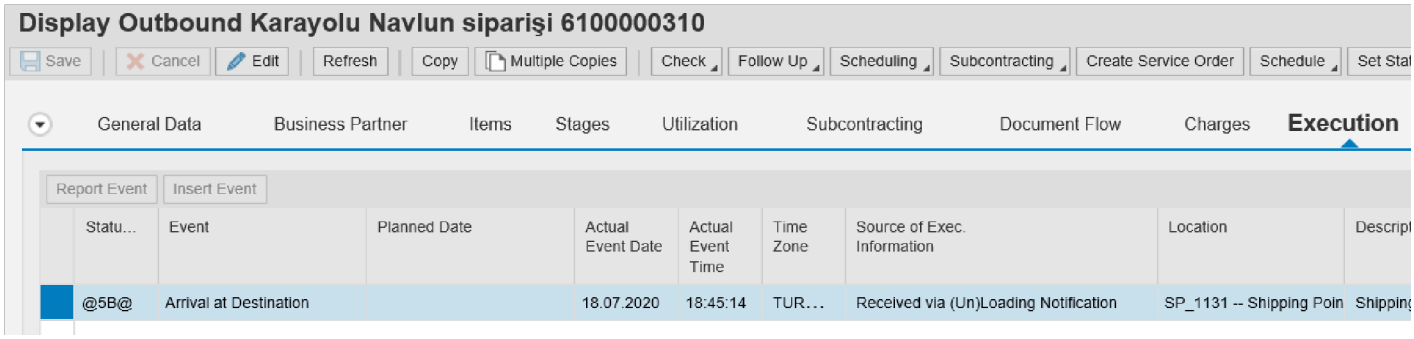


3.2.9.2 TU departures from yard



3.2.10Step 10: TM status updates from EWM

As soon as the yard entry notification is given for the transportation unit on the EWM side, it updates this status on the TM side. An example is shared below for yard entry.



The system also triggers notifications in such events as loading start, loading completion, TU leaving the yard etc. The example is shared only for the above.

Apart from this, the first numbers in TM regarding the HUs collected in the warehouse and their quantities were replaced with HU numbers in the warehouse. This section contains some improvement.

Package 250 800 X 1140 Stand...	1 PC	1.664 KG	100,10944 M3	P10	7000000088	
Product 420 Samba 3f Sürgül...	100 PC	116 KG	100 M3	A45495		
Package 260 800 X 1140 Stand...	1 PC	1.664 KG	100,10944 M3	P10	7000000090	
Product 410 Samba 3f Sürgül...	100 PC	116 KG	100 M3	A45495		
Package 270 800 X 1140 Stand...	1 PC	1.664 KG	100,10944 M3	P10	7000000091	
Product 400 Samba 3f Sürgül...	100 PC	116 KG	100 M3	A45495		
Package 280 800 X 1140 Stand...	1 PC	1.664 KG	100,10944 M3	P10	7000000092	
Product 390 Samba 3f Sürgül...	100 PC	116 KG	100 M3	A45495		
Package 290 800 X 1140 Stand...	1 PC	1.597,88 KG	43,10944 M3	P10	7000000093	
Product 380 Samba 3f Sürgül...	43 PC	49,88 KG	43 M3	A45495		
Package 300 800 X 1140 Stand...	1 PC	1.664 KG	100,10944 M3	P10	7000000094	
Product 370 Samba 3f Sürgül...	100 PC	116 KG	100 M3	A45495		
Package 310 800 X 1140 Stand...	1 PC	1.664 KG	100,10944 M3	P10	7000000095	
Product 360 Samba 3f Sürgül...	100 PC	116 KG	100 M3	A45495		
Package 320 800 X 1140 Stand...	1 PC	1.664 KG	100,10944 M3	P10	7000000096	
Product 350 Samba 3f Sürgül...	81 PC	93,96 KG	81 M3	A45495		
Product 430 Samba 3f Sürgül...	19 PC	22,04 KG	19 M3	A45495		
Package 330 800 X 1140 Stand...	1 PC	1.664 KG	100,10944 M3	P10	7000000098	
Product 340 Samba 3f Sürgül...	100 PC	116 KG	100 M3	A45495		

4 Additional Notes & References

After the configuration, process test is done. For error checking, the following transaction code will help you to look at the logs.

– SRT_MONI : EWM side log control

– SBGRFCMON : TM side inbound, outbound log control

– SLG1 : User based application log

– SMQ1 : Outbound Queue

– SMQ2 : Inbound Queue

Apart from the configurations described above, systematic master data should also be maintained. For example, the system is looking for a maintenance in PACKSPEC according to the route information in the TM freight plan. It is also important to perform this maintenance, if not done, system cannot take into account PSHU at the time of creating warehouse orders.

Apart from these, we have also received a lot of support from our basic teams, while running the process the work that needs to be done on that side will be the subject of a separate blog posts.