

LOADS AND SHIPMENTS AND WAVES, OH MY!

This blog series will cover scenarios which represent several common practices used in today's warehouses. These scenarios will illustrate how key D3650 Warehouse Management concepts and configuration considerations are used to enable the desired process design to meet the most simple and complex requirements.

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Part 1 of 3 – Single
Order Picking: one-
to-one relationship
between Sales
Order and
Shipment

Loads and Shipments and Waves, Oh My!

Part 1 of 3 – Single Order Picking: One-to-one relationship between Sales Order and Shipment

Manual Process

To enable this manual process, the configuration settings below must exist:

1. Warehouse management>Setup>Warehouse management parameters>Loads
 - a. Automatically create Load at SO entry: No
 - b. Consolidate loads during wave processing: No
2. Warehouse management>Setup>Waves>Wave templates
 - a. Automate wave creation: No
 - b. Process wave at release to warehouse: No
 - c. Automate wave release: No
3. Accounts receivables>Setup>Accounts receivables parameters>General>Sales default values>Reservation
 - a. NOTE: This is not a required setting. However, for loads and shipments to be created, reservations must exist for the sales order lines. By setting the Reservation parameter to Automatic, the reservation is made at SO line creation if the quantity is available.

The steps below show the procedure to fulfill a sales order using order based picking.

1. Create a sales order for an item(s) that is currently in stock in a WMS managed warehouse. DO NOT “release to Warehouse”.
2. In the Load Planning Workbench (Warehouse Management>Loads>Load Planning Workbench) select the relevant sales order and select **ADD >To new load**.



Scenario Summary



The objective in the two process scenarios was to demonstrate the key concepts of load, shipment, and wave as related to sales orders as well as the impact of the automated functionality available in the wave template. While both scenarios produce the same result, it is clear that the automation of wave creation, processing, and releasing has a huge advantage. While the manual process would most likely not be used as the primary process in practical application, knowing the components of the entire process is important to fully understand. This understanding will provide the ability to adjust loads, shipments, and waves to meet the dynamic demands of any warehouse.

Dynamics 365 Operations Warehouse management > Loads > Load planning workbench

Save SUPPLY AND DEMAND FILTERS OPTIONS

ADD
 To new load: Entire order to new load
 To existing load: Entire order to existing load

RELATED INFORMATION
 Rate route workbench
 Original document

CONSOLIDATE
 Load building workbench

Load planning workbench

Supply and demand filter

SHIPMENTS SALES LINES TRANSFER LINES PURCHASE ORDER LINES

Display dimensions

ZIP/postal code	City	Country/region	State	Sales order	Line number	Item number	Quantity	Inventory unit	Packing quantity	Quantity left to...	Weight	Volume	Requested ship date
92114	San Diego	USA	CA	000791	1.0000000000	A0001	2.00	Pcs	1.00	2.00	6.00	32.00	3/16/2017
35049	Cleveland	USA	AL	000751	1.0000000000	A0001	10.00	Pcs	1.00	10.00	30.00	160.00	1/14/2016

PICK UP DROP OFF

LOADS

Delete Release Actions Ship and receive Rating and routing Generate Related information Transportation

Load filter: Hide shipped and received

Load ID	Invalid	Direction	Site	Warehouse	Load lines	Shipments	Incomplete rese.	Load status	Scheduled load shipping date and time	Load template ID	Total freight pie...	Max. allowed nu...	Load co
USMF-000001	<input type="checkbox"/>	Outbound	2	24	1	1	<input type="checkbox"/>	Waved	1/13/2016 12:00:00 AM		10.00	0	
USMF-000002	<input type="checkbox"/>	Outbound	2	24	1	1	<input type="checkbox"/>	Waved	1/14/2016 12:00:00 AM		10.00	0	

3. Select the relevant Load Template and click OK.

Load template assignment

Load template ID: Update scheduled load ship date and... Yes

Reference	Order number	Item number
Sales order	000791	A0001

DETAILS WEIGHT VOLUME

Quantity	Quantity remaining	Direction	Inventory quantity
<input type="text" value="2.00"/>	<input type="text" value="2.00"/>	<input type="text" value="Outbound"/>	<input type="text" value="2.00"/>
Unit	Dimension number	Packing quantity	Inventory unit
<input type="text" value="Pcs"/>	<input type="text" value="000605"/>	<input type="text" value="1.00"/>	<input type="text" value="Pcs"/>

- The newly created load will be displayed in the Loads pane on the bottom of the form.
- Select the Load and click Release and select Release to Warehouse.

Save SUPPLY AND DEMAND FILTERS OPTIONS

ADD

To new load	Entire order to new load	RELATED INFORMATION	CONSOLIDATE
To existing load	Entire order to existing load	Rate route workbench	Load building workbench
		Original document	

Load planning workbench

Supply and demand filter

SHIPMENTS SALES LINES TRANSFER LINES PURCHASE ORDER LINES

Display dimensions

✓	ZIP/postal code	City	Country/region	State	Sales order	Line n
	35049	Cleveland	USA	AL	000751	1.000000

PICK UP DROP OFF

LOADS

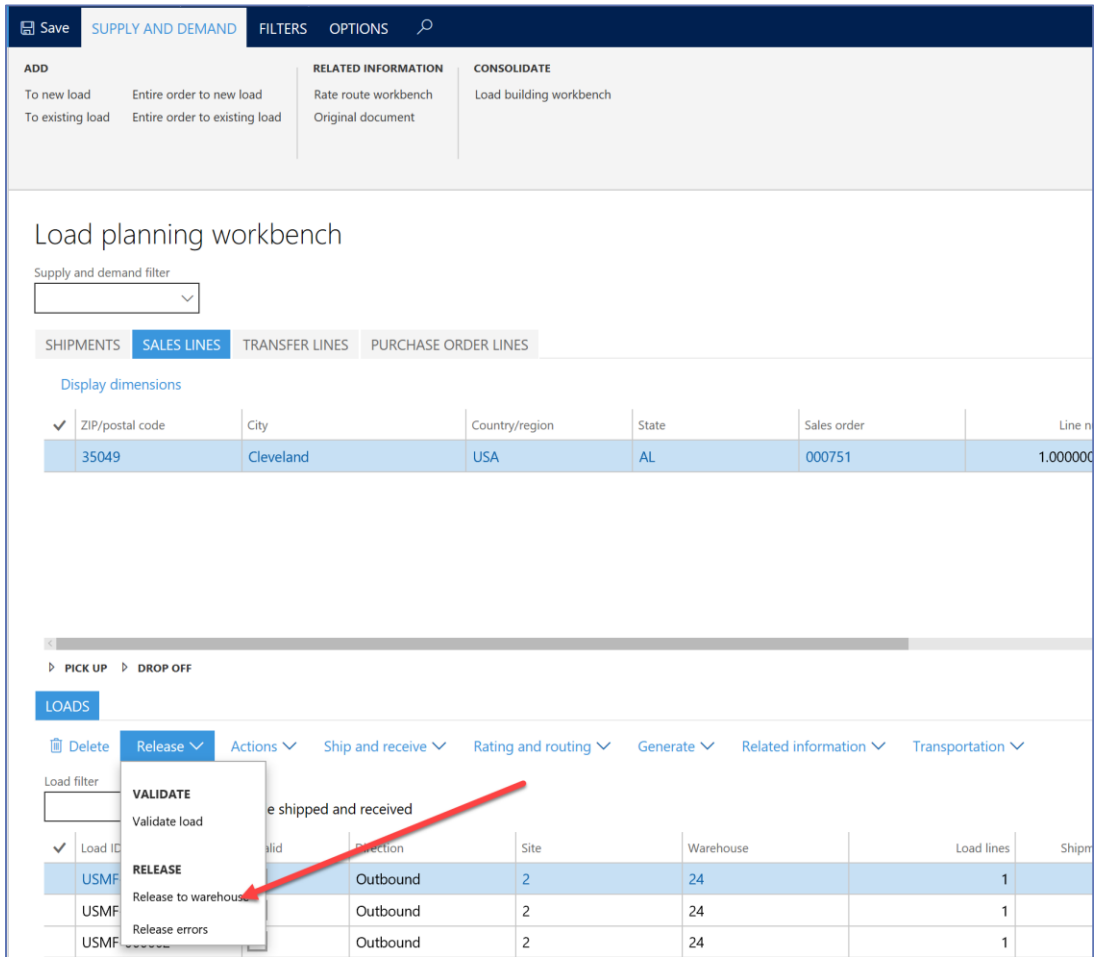
Delete Release Actions Ship and receive Rating and routing Generate Related information Transportation

Load filter

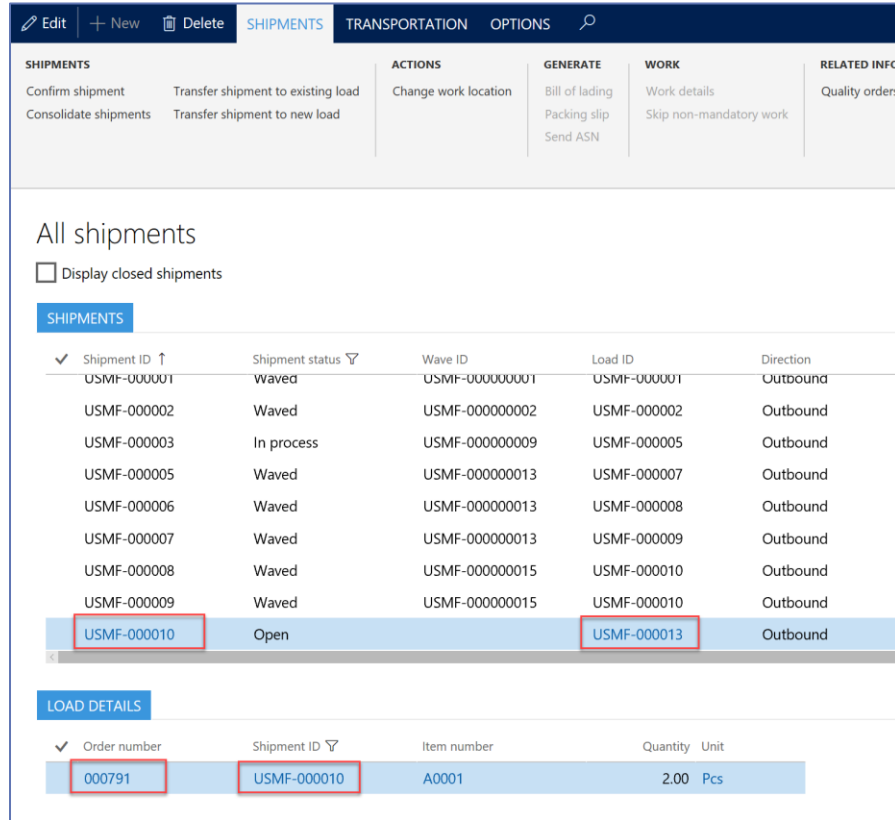
✓	Load ID	Valid	Direction	Site	Warehouse	Load lines	Shipm
	USMF		Outbound	2	24	1	
	USMF		Outbound	2	24	1	
	USMF		Outbound	2	24	1	

VALIDATE
Validate load

RELEASE
Release to warehouse
Release errors



6. Upon releasing the load to the warehouse the load status is changed to "Posted", and a ship and wave are created.
7. You can see the shipment in Warehouse Management>Shipments> All Shipments (among other places). Note the related Sales Order and Load numbers exist but the Wave does not yet exist.

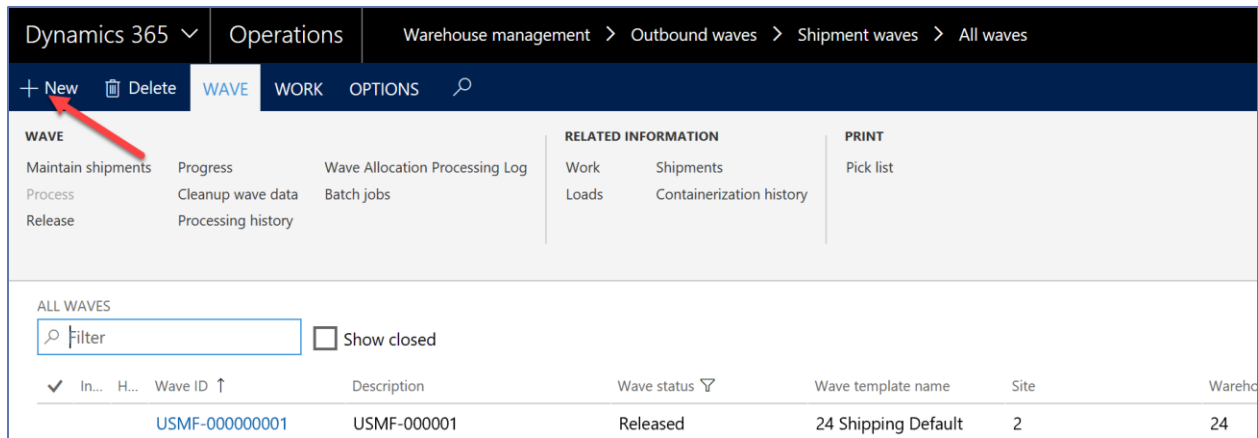


The screenshot shows the 'All shipments' view in Dynamics 365. The top navigation bar includes 'Edit', '+ New', and 'Delete'. Below the navigation bar are tabs for 'SHIPMENTS', 'TRANSPORTATION', and 'OPTIONS'. The 'SHIPMENTS' tab is active, showing a list of shipments. The 'Open' shipment with ID 'USMF-000010' is highlighted, and its 'LOAD DETAILS' are shown below. The 'New' button is highlighted with a red box.

Shipment ID	Shipment status	Wave ID	Load ID	Direction
USMF-000001	Waved	USMF-000000001	USMF-000001	Outbound
USMF-000002	Waved	USMF-000000002	USMF-000002	Outbound
USMF-000003	In process	USMF-000000009	USMF-000005	Outbound
USMF-000005	Waved	USMF-000000013	USMF-000007	Outbound
USMF-000006	Waved	USMF-000000013	USMF-000008	Outbound
USMF-000007	Waved	USMF-000000013	USMF-000009	Outbound
USMF-000008	Waved	USMF-000000015	USMF-000010	Outbound
USMF-000009	Waved	USMF-000000015	USMF-000010	Outbound
USMF-000010	Open		USMF-000013	Outbound

Order number	Shipment ID	Item number	Quantity	Unit
000791	USMF-000010	A0001	2.00	Pcs

- To create, process and release a wave go to Warehouse Management>Outbound Waves> Shipment Waves>All Waves and click "New".



The screenshot shows the 'All waves' view in Dynamics 365. The top navigation bar includes 'Dynamics 365', 'Operations', and 'Warehouse management > Outbound waves > Shipment waves > All waves'. The 'WAVE' tab is active, showing a list of waves. The 'New' button is highlighted with a red arrow. The 'Released' wave with ID 'USMF-000000001' is highlighted, and its details are shown below. The 'New' button is highlighted with a red box.

In...	H...	Wave ID	Description	Wave status	Wave template name	Site	Wareho
		USMF-000000001	USMF-000001	Released	24 Shipping Default	2	24

- Name the wave (in this case the wave is named after the SO #) and select a the appropriate wave template.

Create shipment wave

Wave ID
USMF-000000016

Description
Wave SO 791

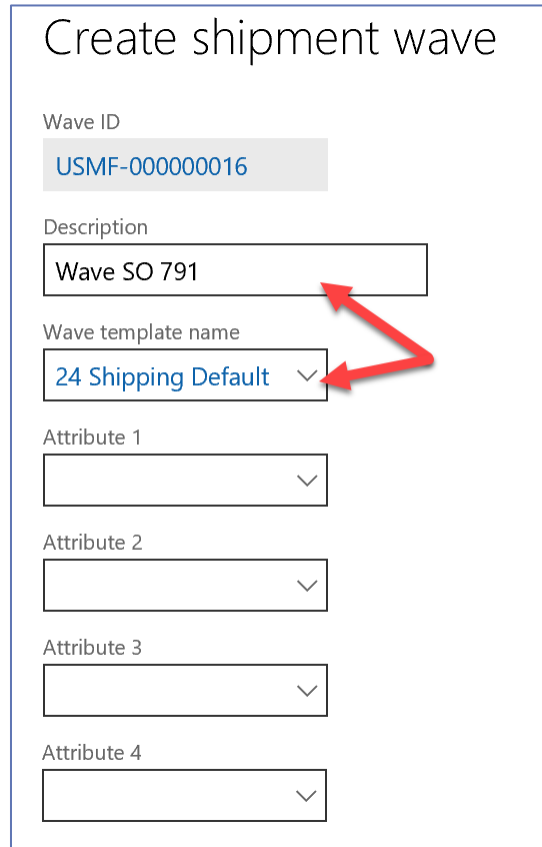
Wave template name
24 Shipping Default

Attribute 1
[]

Attribute 2
[]

Attribute 3
[]

Attribute 4
[]



10. A wave has now been created. We must now link to a Shipment. Click "Maintain Shipments" then select shipment from the list and click "Add to Wave".

USMF-000000016 : WAVE SO 791

Maintain shipments

Wave filter code []

DETAILS

Wave ID
USMF-000000016

Wave template name
24 Shipping Default

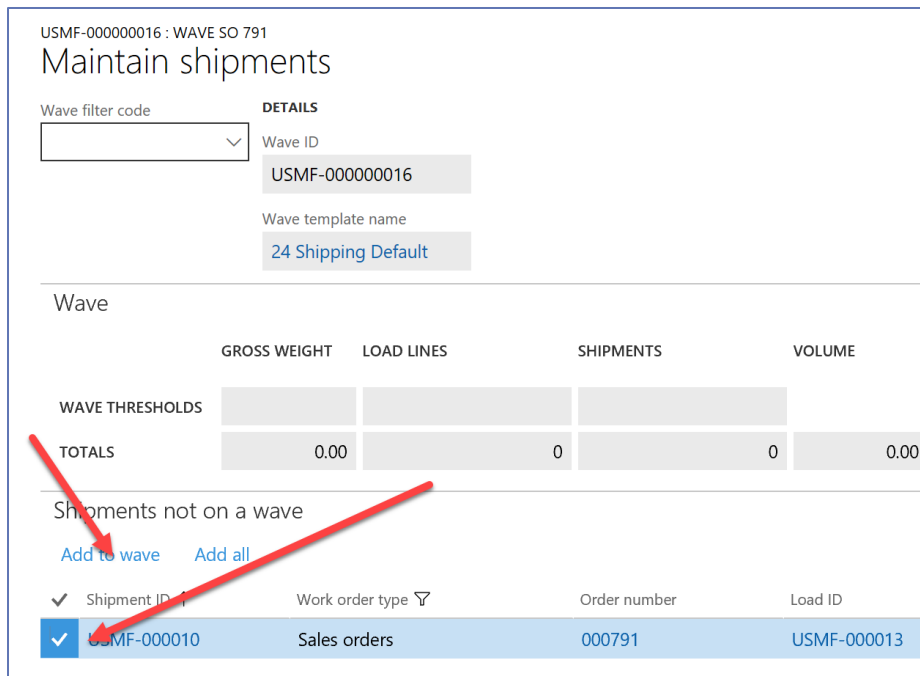
Wave

	GROSS WEIGHT	LOAD LINES	SHIPMENTS	VOLUME
WAVE THRESHOLDS	[]	[]	[]	[]
TOTALS	0.00	0	0	0.00

Shipments not on a wave

[Add to wave](#) [Add all](#)

<input checked="" type="checkbox"/>	Shipment ID	Work order type	Order number	Load ID
<input checked="" type="checkbox"/>	USMF-000010	Sales orders	000791	USMF-000013



11. You will now see the shipment reflected in the Wave lines tab. Exit the form.

USMF-00000016 : WAVE SO 791

Maintain shipments

Wave filter code ▼

DETAILS

Wave ID
USMF-00000016

Wave template name
24 Shipping Default

Wave

	GROSS WEIGHT	LOAD LINES	SHIPMENTS	VOLUME	INVENTORY QUANTITY
WAVE THRESHOLDS					
TOTALS	6.00	1	1	32.00	2.00

Shipments not on a wave

Load lines

Wave lines

[Remove](#) [Remove all](#) [Shipment](#)

✓ Shipment ID	Load ID	Work order type	Order number
USMF-000010	USMF-000013	Sales orders	000791

12. Now that the shipment is added to the wave, the wave number will be displayed in the shipment. The wave must now be processed and released. Note the wave status is "Created". Now click "Process".

[Edit](#) [+ New](#) [Delete](#) **WAVE** WORK OPTIONS

WAVE **RELATED INFORMATION** **PRINT**

Maintain shipments Progress Wave Allocation Processing Log Work Shipments Pick list

Process Cleanup wave data Batch jobs Loads Containerization history

Release Processing history

Click the edit button to make changes.

WAVES : USMF-00000016 : WAVE SO 791

USMF-00000016 : Wave SO 791

Wave

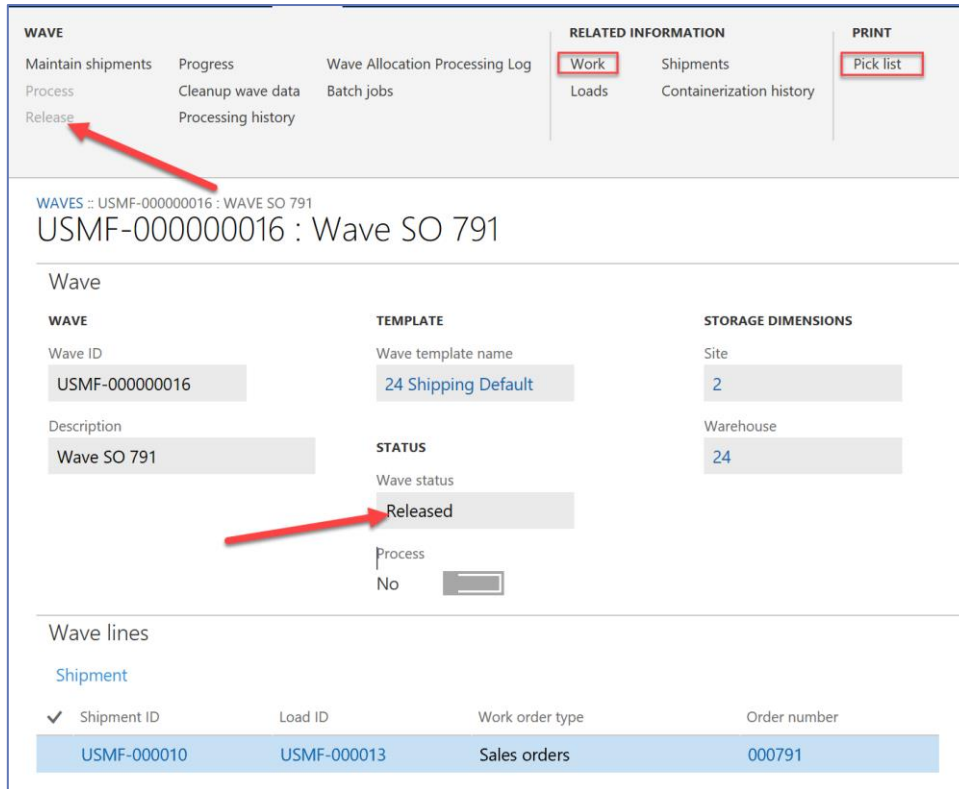
WAVE	TEMPLATE	STORAGE DIMENSIONS
Wave ID USMF-00000016	Wave template name 24 Shipping Default	Site 2
Description Wave SO 791	STATUS	Warehouse 24
	Wave status Created	
	Process No <input type="checkbox"/>	

Wave lines

[Shipment](#)

✓ Shipment ID	Load ID	Work order type	Order number
USMF-000010	USMF-000013	Sales orders	000791

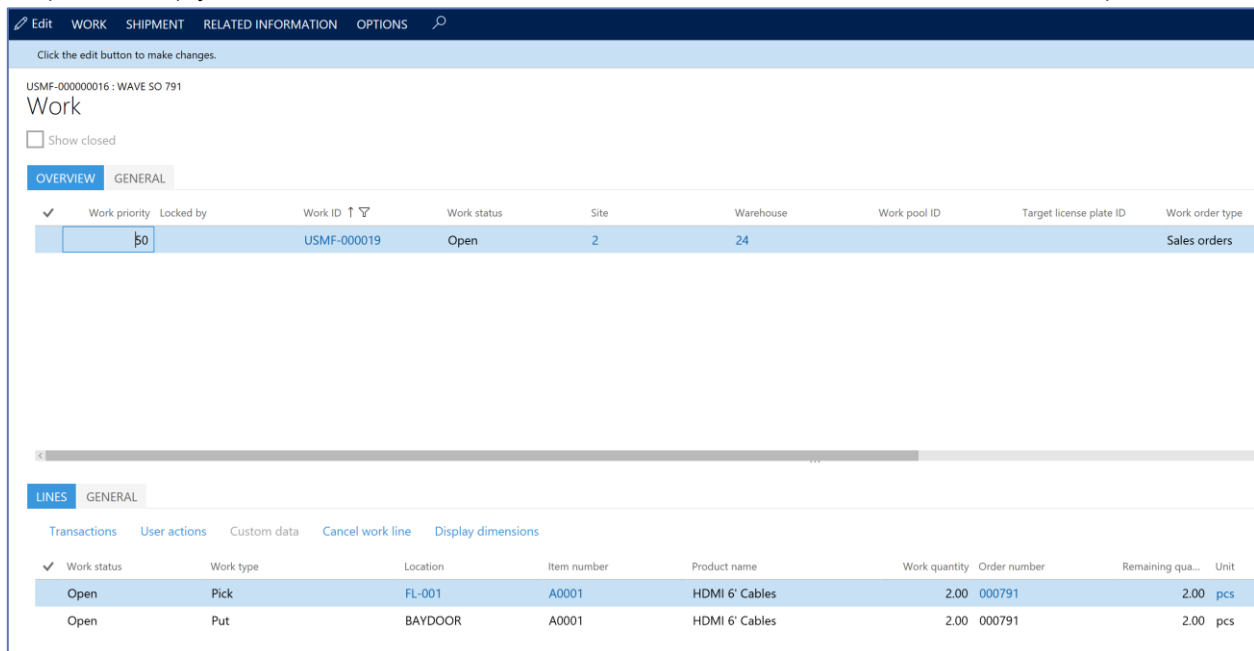
13. The wave status as now been changed to "Held". This means the wave has been completed and "approved," but has not been released for picking. The picking work has been created at this point but it is not yet available to be performed . To release the wave, click "Release". The wave status is now released.



The screenshot shows the 'WAVE' interface for 'USMF-00000016 : Wave SO 791'. The 'WAVE' section includes buttons for 'Maintain shipments', 'Process', and 'Release'. The 'RELATED INFORMATION' section includes 'Work' and 'Loads'. The 'PRINT' section includes 'Pick list'. The 'Wave' section shows 'Wave ID' as 'USMF-00000016', 'Wave template name' as '24 Shipping Default', 'Site' as '2', 'Warehouse' as '24', and 'Wave status' as 'Released'. The 'Wave lines' section shows a table with columns for 'Shipment ID', 'Load ID', 'Work order type', and 'Order number'.

Shipment ID	Load ID	Work order type	Order number
USMF-000010	USMF-000013	Sales orders	000791

14. As an optional step you can view the work created for the wave. This work is the source of the pick list.



The screenshot shows the 'Work' interface for 'USMF-00000016 : WAVE SO 791'. The 'Work' section includes a 'Show closed' checkbox. The 'OVERVIEW' section shows a table with columns for 'Work priority', 'Locked by', 'Work ID', 'Work status', 'Site', 'Warehouse', 'Work pool ID', 'Target license plate ID', and 'Work order type'. The 'LINES' section shows a table with columns for 'Work status', 'Work type', 'Location', 'Item number', 'Product name', 'Work quantity', 'Order number', and 'Remaining qua... Unit'.

Work priority	Locked by	Work ID	Work status	Site	Warehouse	Work pool ID	Target license plate ID	Work order type
50		USMF-000019	Open	2	24			Sales orders


Work status	Work type	Location	Item number	Product name	Work quantity	Order number	Remaining qua...	Unit
Open	Pick	FL-001	A0001	HDMI 6' Cables	2.00	000791	2.00	pcs
Open	Put	BAYDOOR	A0001	HDMI 6' Cables	2.00	000791	2.00	pcs


15. Now the wave/order is ready to be picked. Click Print>Print Picklist to print the picklist. The picklist will then be picked using the Dynamics 365 for Operations Warehousing App on a mobile device. Once the picking work is complete the shipment must be confirmed. Below is the related pick list.


Shipping pick list


Go to ▾ | ◀ ◁ ▷ ▶ | Find ▾ | Zoom ▾ | ↻ | Export ▾ | 🖨

Pick list

Load ID

 USMF-000013

Shipment ID

 USMF-000010

Order number

 000791

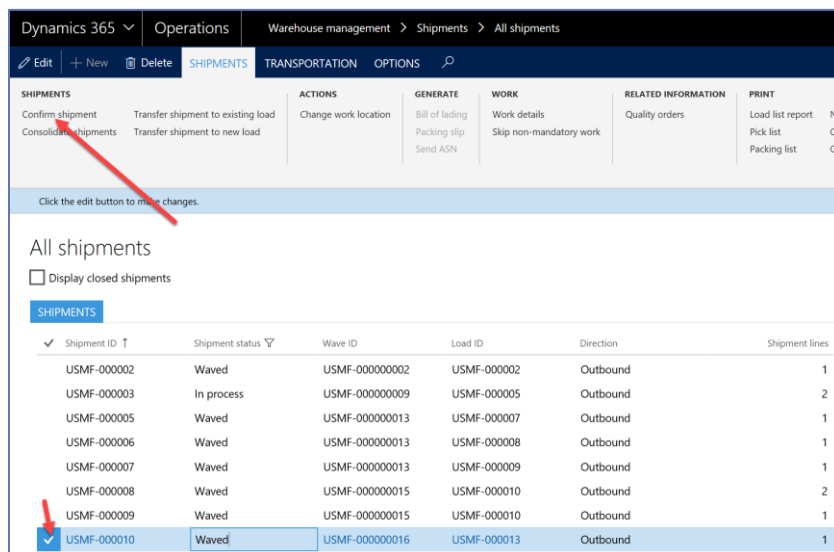

 Work ID USMF-000019
 To location BAYDOOR
 Order type Sales

	Work type	Item number	Item name	Order number	Location	Qty
	Pick	A0001	HDMI 6' Cables	000791	FL-001	2 pcs
	Put	A0001	HDMI 6' Cables	000791	BAYDOOR	2 pcs

Page 1 of 1

16. The shipment confirmation can be done in either the shipment itself or in the load/load planning workbench.

a. Confirm a shipment from the shipment:



Dynamics 365 ▾ | Operations | Warehouse management > Shipments > All shipments

SHIPMENTS: Confirm shipment, Consolidate shipments, Transfer shipment to existing load, Transfer shipment to new load
 ACTIONS: Change work location
 GENERATE: Bill of lading, Packing slip, Send ASN
 WORK: Work details, Skip non-mandatory work
 RELATED INFORMATION: Quality orders
 PRINT: Load list report, Pick list, Packing list

Click the edit button to make changes.

All shipments

Display closed shipments

SHIPMENTS	Shipment ID ↑	Shipment status ▾	Wave ID	Load ID	Direction	Shipment lines
<input checked="" type="checkbox"/>	USMF-000002	Waved	USMF-00000002	USMF-000002	Outbound	1
<input type="checkbox"/>	USMF-000003	In process	USMF-00000009	USMF-000005	Outbound	2
<input type="checkbox"/>	USMF-000005	Waved	USMF-00000013	USMF-000007	Outbound	1
<input type="checkbox"/>	USMF-000006	Waved	USMF-00000013	USMF-000008	Outbound	1
<input type="checkbox"/>	USMF-000007	Waved	USMF-00000013	USMF-000009	Outbound	1
<input type="checkbox"/>	USMF-000008	Waved	USMF-00000015	USMF-000010	Outbound	2
<input type="checkbox"/>	USMF-000009	Waved	USMF-00000015	USMF-000010	Outbound	1
<input checked="" type="checkbox"/>	USMF-000010	Waved	USMF-00000016	USMF-000013	Outbound	1

b. Confirm a shipment from the Load:

Dynamics 365 > Operations > Warehouse management > Loads > All loads

DELETE LOADS SHIP AND RECEIVE TRANSPORTATION OPTIONS

CONFIRM
Inbound shipment
Outbound shipment

RECEIVE
Product receipt
Packing structure

GENERATE
Bill of lading
Packing slip
Send ASN

REVERSE
Reverse shipment confirmation
Cancel packing slips
Cancel product receipt.

ALL LOADS
Filter Show closed

Load ID ↑	Invalid	St...	Site	Warehouse	Direction	Load status	Scheduled load ship
USMF-000001		2	24	24	Outbound	Waved	1/13/2016 12:00:00
USMF-000002		2	24	24	Outbound	Waved	1/14/2016 12:00:00
USMF-000005		6	63	63	Outbound	In process	4/15/2016 07:00:00
USMF-000007		2	24	24	Outbound	Waved	3/14/2017 07:00:00
USMF-000008		2	24	24	Outbound	Waved	3/14/2017 07:00:00
USMF-000009		2	24	24	Outbound	Waved	3/14/2017 07:00:00
USMF-000010		2	24	24	Outbound	Waved	3/14/2017 07:00:00
USMF-000013		2	24	24	Outbound	Waved	3/16/2017 07:00:00

c. Confirm a shipment from the Load Planning Workbench:

Dynamics 365 > Operations > Warehouse management > Loads > Load planning workbench

Save SUPPLY AND DEMAND FILTERS OPTIONS

ADD
To new load Entire order to new load
To existing load Entire order to existing load

RELATED INFORMATION
Rate route workbench
Original document

CONSOLIDATE
Load building workbench

Load planning workbench

Supply and demand filter

SHIPMENTS SALES LINES TRANSFER LINES PURCHASE ORDER LINES

Shipment ID ↑	Account number	Order number	Weight	Volume	Delivery recipient
USMF-000007					
USMF-000008					
USMF-000009					
USMF-000010					
USMF-000013					

CONFIRM
Inbound
Outbound shipment
Outbound shipment

RECEIVE
Product receipt
Packing structure
Create cross docking packing structure

REVERSE CONFIRMATION
Reverse shipment confirmation

DELETE Release Actions Ship and receive Rating and routing Generate Related information Transportation

Load filter Hide shipped and received

Load ID ↑	Invalid	Direction	Site	Warehouse	Load line
USMF-000007	<input type="checkbox"/>	Outbound	2	24	
USMF-000008	<input type="checkbox"/>	Outbound	2	24	
USMF-000009	<input type="checkbox"/>	Outbound	2	24	
USMF-000010	<input type="checkbox"/>	Outbound	2	24	
USMF-000013	<input type="checkbox"/>	Outbound	2	24	

17. The shipment has now been confirmed. Packing Slip, Bill-of-Lading and/or other required documentation can now be printed to be shipped with the order. The process is complete.

Automated Process

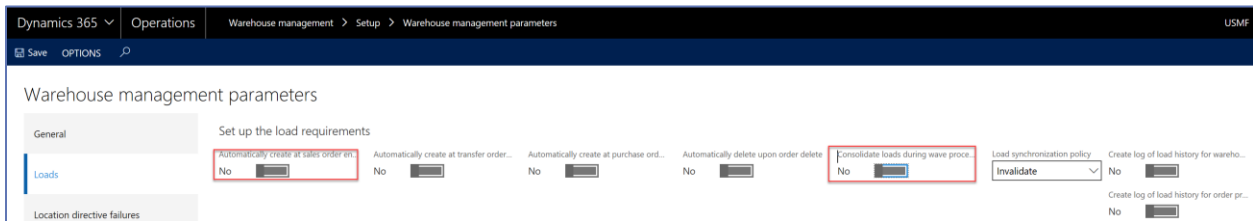
As noted previously, the above process will most likely never be used as the main process in a practical application. The process was demonstrated to illustrate the functions and/or relationships between sales order, loads, shipments, waves and work.

The process below will show the same scenario using some automated functionality that will create loads, shipments and waves at "release to warehouse". Additionally, the waves will be automatically processed and released.

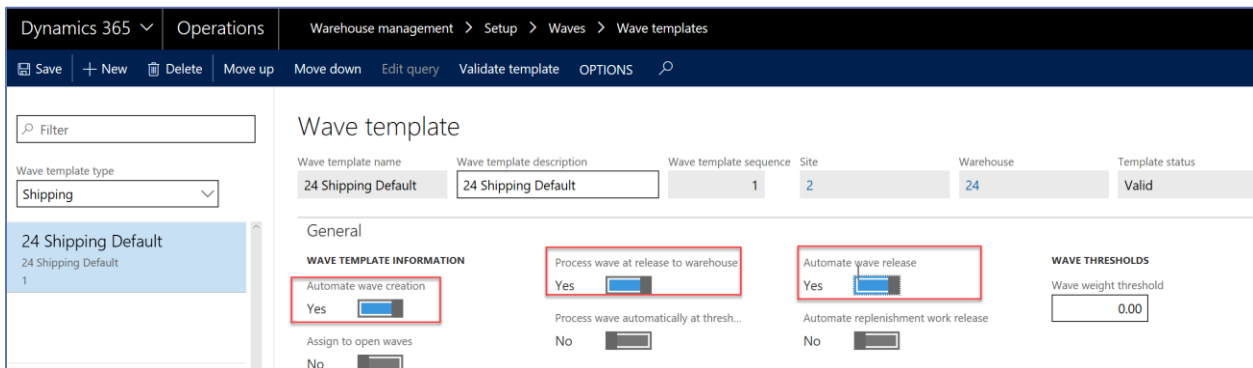
First, some configuration considerations to the wave template must be made to facilitate this automated process.

To enable this manual process, the configuration settings below must exist:

1. Warehouse management> Setup>Warehouse management parameters>Loads (unchanged from prior scenario)
 - a. Automatically create Load at SO entry: No
 - b. Consolidate loads during wave processing: No

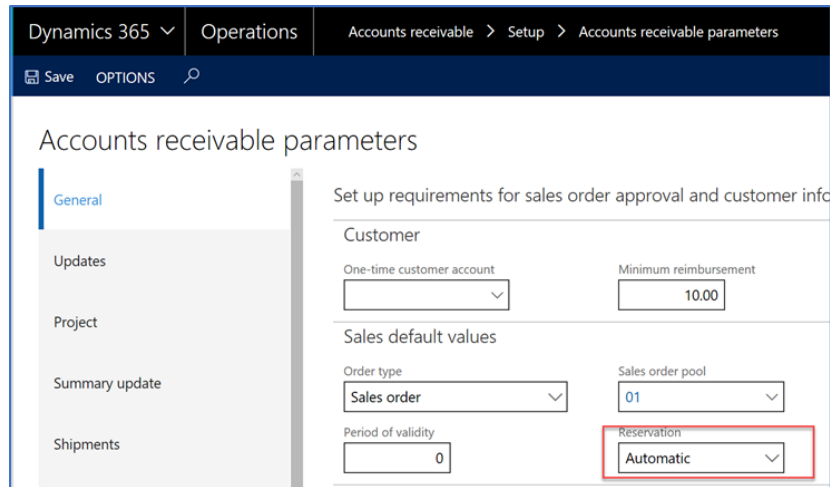


2. Warehouse management>Setup>Waves>Wave templates
 - a. Automate wave creation: Yes
 - b. Process wave at release to warehouse: Yes
 - c. Automate wave release: Yes

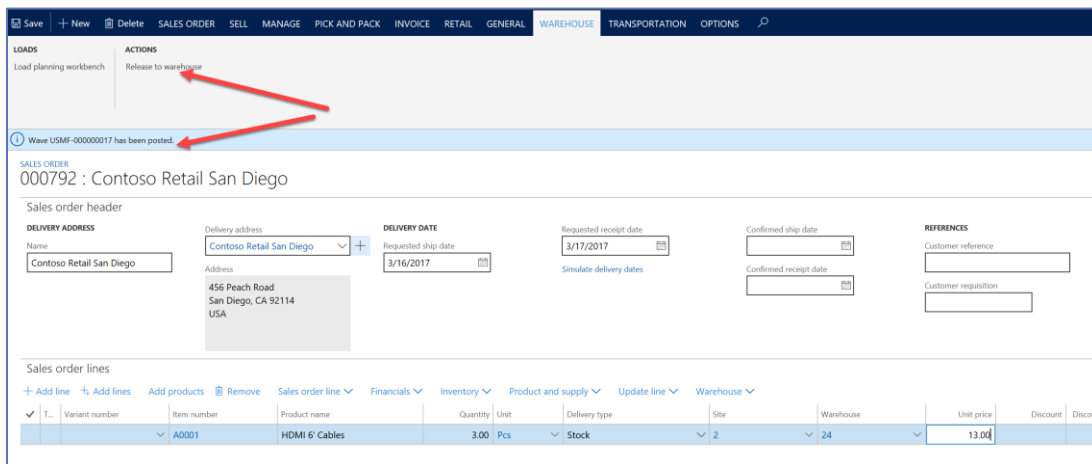


3. Accounts receivables>Setup>Accounts receivables parameters>General>Sales default values>Reservation (unchanged from prior scenario).

- a. NOTE: This is not a required setting. However, for loads and shipments to be created, reservations must exist for the sales order lines. By setting the Reservation parameter to Automatic, the reservation is made at SO line creation if the quantity is available.



- 1. We are now ready to create a sales order. The one key difference is the fact that, with the automated process, the sales taker will release the order to the warehouse from within the SO. Sales Order>Warehouse tab>Release to Warehouse. Once released, a message displaying that the wave has been posted will be displayed.



- 2. Upon releasing the order to the warehouse, a load and shipment has been created. Also, a wave for the shipment has been created, processed and released.
 - a. LOAD:

LOAD DETAILS :: 000792 : A0001
USMF-000014 : Outbound

Load

INFORMATION

Load ID: USMF-000014

Load template ID: [dropdown]

Equipment: [text]

Invalid: No

Load status: **Waved**

Load lines

[Delete](#)
[Reduce picked quantity](#)
[Display dimensions](#)
[Sales line serials](#)

✓	Invalid	Order number	Shipment ID	Item number	Code 1
<input type="checkbox"/>		000792	USMF-000011	A0001	

b. SHIPMENT: Note the shipment status of Waved.

SHIPMENT DETAILS :: 000792 : A0001
USMF-000011

General

INFORMATION

Shipment ID: USMF-000011

Shipment status: **Waved**

Wave ID: USMF-00000017

Volume: 48.00

Load ID: USMF-000014

Direction: Outbound

Weight: 9.00

Order

Work order type: Sales orders

Order number: 000792

Account number: US-001

Customer reference: [text]

Transportation

Load lines

[Delete](#)
[Remove line](#)
[Reduce picked quantity](#)

✓	Load ID	Item number	Quantity	Unit	Work created q...	Packing quantity	Ready to ship	In
<input checked="" type="checkbox"/>	USMF-000014	A0001	3.00	Pcs	3.00	1.00	3/16/2017 07:00:00 AM	

c. WAVE: Note the wave status of Released.

WAVES
USMF-000000017 : USMF-000011

Wave

WAVE

Wave ID: USMF-000000017

TEMPLATE

Wave template name: 24 Shipping Default

STATUS

Wave status: **Released**

Process: No

STORAGE DIMENSIONS

Site: 2

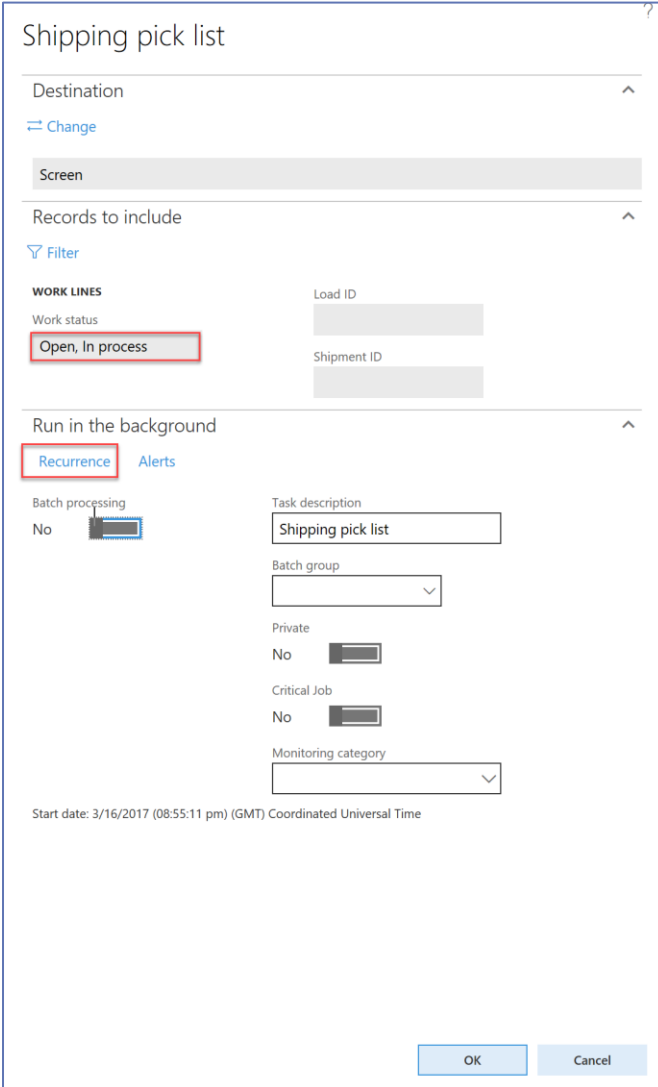
Warehouse: 24

Wave lines

Shipment

✓	Shipment ID	Load ID	Work order type	Order number
<input checked="" type="checkbox"/>	USMF-000011	USMF-000014	Sales orders	000792

3. By releasing the order to the warehouse within the SO and changing the Wave template parameters as described above, steps 2-14 from the manual process are eliminated.
4. At this point the pick list is ready to be printed. There are multiple ways to print the picklist. The pick list can be printed from within the shipment or wave. To stay with the automation theme, pick list printing can be run in a batch either ad-hoc or at scheduled times in Warehouse Management>Inquiries and Reports>Pick List Reports.



Shipping pick list

Destination ^

[Change](#)

Screen

Records to include ^

[Filter](#)

WORK LINES	
Work status	Load ID
Open, In process	
	Shipment ID

Run in the background ^

Recurrence Alerts

Batch processing

No

Task description

Shipping pick list

Batch group ^

Private

No

Critical Job

No

Monitoring category ^

Start date: 3/16/2017 (08:55:11 pm) (GMT) Coordinated Universal Time

OK Cancel

5. Now the wave/order is ready to be picked. Click Print>Print Picklist to print the picklist. The picklist will then be picked using the Dynamics 365 for Operation Warehousing App on a mobile device. Once the picking work is complete the shipment must be confirmed.
6. See step 15 in the prior process to confirm the shipment. The process is now complete.