boyum

DOCUMENTATION

Visual Advanced Production Scheduler (VAPS)

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Boyum IT Solutions GmbH Pascalstr. 17 52076 Aachen Germany

 Tel:
 +49 (2408) 141 0

 Fax:
 +49 (2408) 141 33

 Web:
 www.boyum-solutions.com

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1. Release and version status

1.1.Is the VAPS available for BC/NAV, for cloud/on-prem, for all partners? And when?

Learn about "all things availability" when it comes to the Visual Advanced Production Scheduler.

1.1.1. Is the VAPS available for Dynamics 365 Business Central and Dynamics NAV?

No, the VAPS is only available for Dynamics 365 Business Central. The minimum version required is Business Central v14 (cu4).

1.1.2. Is the VAPS available for Business Central on-prem and cloud?

The VAPS is available both for Business Central on-prem and cloud.

1.1.3. Is the VAPS available for sale?

Yes, the VAPS is available for sale and to be implemented at and used by customers. Version 1.0 was released on 17 January 2020.

1.1.4. Is the VAPS available for all NETRONIC partners?

No. The VAPS requires specific skills and expertise as it enhances and changes Business Central significantly.

Please reach out to <u>sales@netronic.com</u> if you want to achieve the VAPS certification.

1.2. Where can I find the VAPS release notes?

Learn how to find the release notes for the Visual Advanced Production Scheduler. Learn how you can check if you're on the latest version. Learn what is new.

The release notes of the Visual Advanced Production Scheduler can be found here:

https://www.netronic.com/microsoft-dynamics-365-business-central/visual-advanced-productionscheduler/release-notes

2. Installing the VAPS

2.1. How can I install the VAPS in my on-prem environment?

Learn where and how you get the runtime package of the VAPS

First, you as a partner need to become "VAPS certified". Talk to sales@netronic.com to find out details about the certification process.



Once you are VAPS certified, you'll get access to our "NETRONIC VAPS Partner Community". It is based on Microsoft Teams, and your place to go to get your demo version/ runtime package of the product as well as Marketing and Sales collateral.

2.1.1. Prerequisites to install the VAPS:

- An up and running full-fledged Dynamics 365 Business Central Installation
- Minimum required version: Business Central v14 (cu4).
- Access to the backend via the "Business Central Administration Shell" or the "NAV Container Helper"
- The Web Client needs to be enabled and using the Web Client is highly recommended

2.1.2. The VAPS D365 on-prem can be installed in two different ways:

I. THE NAVSERVER INSTANCE IS INSTALLED DIRECTLY ON THE COMPUTER

What is needed for the installation:

- Admin access to the NAV/BC server computer
- Access to the NAV/BC Admin Shell & Development Shell with admin rights on this computer
- The "Name" of the NAV/BC ServerInstance into which the extension should be installed
- An updated NAV/BC license installed, which has the extension objects included
- Access to the NAV/BC Web Client to test the installation
- Access as "SUPER" user to NAV/BC, to assign Permission Sets to other users

Installation instructions:

- Run the "Business Central Administration Shell" as administrator and enter the following commands:
- Publish-NAVApp -ServerInstance NAV -Path "NETRONIC Software GmbH_Visual Advanced Production Scheduler_1.x.y.z_runtime.app" -SkipVerification
- Sync-NAVApp -ServerInstance NAV -Name "Visual Advanced Production Scheduler"
- Install-NAVApp -ServerInstance NAV -Name "Visual Advanced Production Scheduler"
- If the install call gives an error regarding "DataUpgrade," try Start-NAVAppDataUpgrade -ServerInstance NAV -Name "Visual Advanced Production Scheduler"
- Open the NAV/BC Web Client as user with "SUPER" permissions
- Check the "extension management" page if the extension got installed properly
- Check if you can open/run the extension
- Assign the "NETRONIC VAPS" permission set to all users which should work with the extension.

II. THE NAVSERVER INSTANCE IS RUNNING FROM A DOCKER ENVIRONMENT

What is needed for the installation?

- Admin access to server computer and the corresponding Docker environment
- Access to a powershell with the NAVContainerHelper module installed
- The "Name" of the NAV/BC Container into which the extension should be installed



- An updated NAV/BC license installed, which has the VAPS objects included
- Access to the NAV/BC Web Client to test the installation
- Access as "SUPER" user to NAV/BC, to assign Permission Sets to other users

Installation Instructions:

- Please enter the following command with the help of the "NAV Container Helper":
- Publish-NavContainerApp -containerName navserver -appFile "NETRONIC Software GmbH_Visual Advanced Production Scheduler_1.x.y.z_runtime.app" -skipVerification sync -install
- If the publish call gives an error regarding "DataUpgrade," try Start-NAVContainerAppDataUpgrade -containerName navserver -Name "Visual Advanced Production Scheduler"
- Open the NAV/BC Web Client as user with "SUPER" permissions
- Check the "extension management" page if the extension got installed properly
- Check if you can open/run the extension
- Assign the "NETRONIC VAPS" permission set to all users which should work with the extension.

2.2. How can I deploy the VAPS into a cloud infrastructure?

If you want to use the VAPS in a cloud environment you can download the app from Microsoft or purchase it via your partner.

In both cases, the VAPS needs to be licensed. With the release of VAPS version 1.15.1.0, we have implemented a new licensing system within the extension. This update is specifically designed to ensure that proper licensing is maintained within SaaS environments. This also applies to existing customers migrating to the new licensing system.

To ensure a smooth and fault-free licensing process, we've included the necessary steps for you in the following instructions.

2.2.1. For existing customers migrating to the new licensing system as of VAPS version 1.15.1.1

How to license the VAPS - new licensing system .

2.2.2. For new customers wanting to purchase the VAPS via AppSource or directly from NETRONIC

How to purchase and license the VAPS via AppSource or NETRONIC.





3. Look and feel of the visual schedule

3.1.Info window shows progress

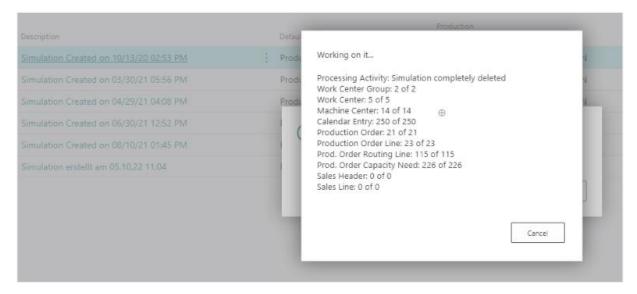
When a simulation gets loaded into the VAPS, multiple stages of data processing are executed until the visualization finally appears and the user can start working with it. Especially when there are large amounts of data to be loaded/reloaded, this can take some time during which the users do not know what is happening and are often unsure whether the application is still working.

To give the users more feedback as to what is happening during the loading process, we have implemented a new info window that:

- gives feedback that something is happening at all (meaning the extension has not crashed)
- informs about the amount of data getting loaded, thus explaining why the process might take so long
- informs about how long this process might take and how long the users might need to wait
- also helps our support team during customer trainings or support cases to get a better understanding of the customers' environment.

View - Visual Advanced Produc	ction Schedul	er				
NETRONIC VAPS 😨 Open in Excel	Actions Fewe January 2021 Wk 03 20 21	Working on it Processing Activity: 1/4 Reading Simulation from Business Central Work Center Group: 2 of 2 Work Center: 5 of 5 Machine Center: 14 of 14 Calendar Entry: 1638 of 2204 Production Order: 122 of 122 Prod. Order Routing Line: 588 of 588 Prod. Order Capacity Need: 1390 of 1390 Sales Header: 0 of 0 Sales Line: 0 of 0 Cancel	ny 2021 02 03	04 05	06 1	07 08

The info window also shows up when you create, delete, copy, publish, and close (with saving) a simulation.



3.2. The structure of the schedule

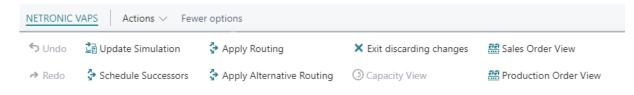
The VAPS provides you with a visual drag & drop frontend to manage your production schedule.

Visual Advanced Production Scheduler ~ X NETRONIC VAPS Actions V Fewer option 16 ebruary 2024 March 2024 Capacities Wk 05 Wk 0 Production ▲ Turning | Dreher • Standby (∞) 101074 (100 101 10 101076 (101077 (CTX400 018 (101029 (101 1010 101 101046 (4 10104 101036 (80) 1 1 101 1 1 CTX 2500 > 21016101021 (410 10110 101041 (80) 10101047 (100) Beta 500 110 101030 (5 101031 10105 101043 (90) 10 101 Þ Beta 800 101 101023 (48) 10 101 1(101042 (110) 10104 10 Sawing | Sägen Standby (co 1010 10 Saw | Säge • (710¹¹10⁻¹101031 (1201110<mark>1101</mark>1) 101048 (111<mark>1</mark> Þ C11C101 101 10 ▲ Gear Cutting | Verzahnen Standby (10 01 10 101 í 101075 (80) 10 10

Since the VAPS is a Gantt Chart, it naturally has all its characteristics and elements:

- A time scale at the top.
- A table at the left.
- On the right below the time scale, a diagram displaying the schedule with a calendar in the background indicating work free periods in grey while working times appear in white.
- A **menu ribbon** is placed above the plan, the item "NETRONIC VAPS" summarizing all menu options that we think are the most frequently used ones::





All options of the VAPS can be found under "Actions":

VAPS - C	jI ≤ F	inance 🗸	Ca	sh Manaqement \smallsetminus
Visual Advance	d Produc	tion Sche	dul	er
NETRONIC VAPS	Actions \lor	Fewer optio	ns	
Capacities	Edit		>	uary 2024
	Schedule	•	>	05 Wk 06
Production				
Turning Dreher	View		>	
Standby (∞)	Capacity	Managemen	t >	
	Timescal	e	>	
CTX400	Calendar		>	101029 (<mark>* 101</mark> 1010
CTX 2500	View Filte	er	>	101021 (210 10110)
Beta 500	Search		>	0 101030 (5 1010311)
Beta 800		•	10	1 <mark>,1</mark> 01023 (48) 10,101

In case the "Actions" item is not visible in the menu ribbon, click "More options". To hide it again, click "Fewer options."

Please note, that, depending on the task you are currently working on (setting-up the VAPS, working in a simulation etc., the contents of the menu ribbon will differ.

- An interactive **status area** can be shown below the visual schedule, providing the planners with useful information about
 - Whether new warehouse activity line or shopfloor data is available. Clickable to load the new data.
 - The active color mode, clickable to select another mode.
 - Whether a view filter or the focus mode is active. Clickable to choose another filter.

Active view filter: No view filter active

• The last time the EMAD was calculated.

Active color mode: Execution Status

 \circ $\;$ The last time the schedule was updated with shopfloor data.

The status area is activated by default but can be switched off in the "Appearance" area of the VAPS setup.

Last EMAD calc. time: 11/06/23 03:10 PM



Last shopfloor update: 01/31/24 01:29 PM

Appearance		
Zoom Factor(%)	100	Weekend Coloring
Layout · · · · · · · · · · · · · · · · · · ·	COMPACT \checkmark	Colorize Weekend
Tooltip Delay (ms)	1250	Weekend Color · · · · · · #DFFA9F ····
Standby Color	#F3F3B399	Bar coloring mode · · · · · Graded 🗸 🗸
Dateline Grid Mode	Weekly \checkmark	Hide Status Bar

3.3.Three different views

There are three different views in the VAPS: the Capacity View, the (read-only) Production Order View and the (read-only) Sales Order View.

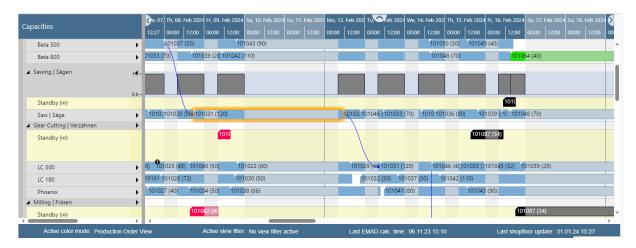
You can switch between the views by the corresponding context menu items:

View 🗸	Timescale \smallsetminus				
Enable I	Focus Mode				
🗟 Disable	Focus Mode				
🗟 Show Se	etup Times				
🗟 Hide Setup Times					
Capacity View					
🔝 Sales Order View					
🔝 Production Order View					
Ka View Color Mode					

3.3.1. The Capacity View

The capacity view shows capacity loads of work centers and machine centers, grouped by work center groups:



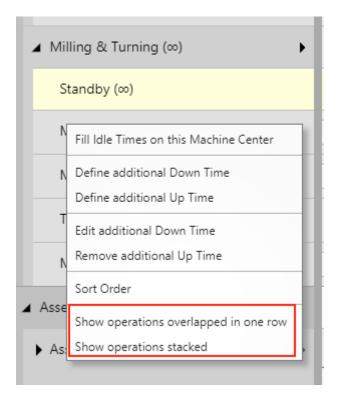


Select display mode for overlapping operations

Usually, overlapping operations are shown in an "optimized" way, meaning that the resource row with the respective operations gets extended in height so that the operations are completely visible. Since the VAPS schedules with finite capacity, overlapping operations are avoided, and hence this is a rare case.



However, some customers have contacted us with the following use case: They need to create operations with a length of zero to define a common starting point for parallel routings without blocking capacity. These operations will then be scheduled at the first possible position which will result in a very high stacked resource. For these cases, we added two new context menu items so that users can now decide whether overlapping operations are to be shown overlapped in one row or stacked. This also applies to resources on Standby.

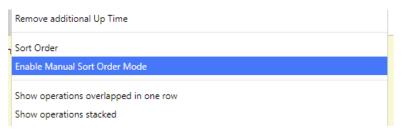


The picture below illustrates the different display modes:

Stacked view		Overlapped view	
1	10		<u>10</u> .

Reorder the table per drag and drop

The table context menu offers an option to enable manual sorting per drag and drop:



Once enabled, you can, e.g., drag the "Wagner BAZ" machine center easily to another place:

Wagner BAZ	•		
TC 229 Brother My very of Wagner BAZ	•		
Assembly - Team 1	•		

Visualization of the field "Earliest Start Date"



The VAPS comes with the convenient automatic scheduling functions "Add all", "Fill idle times", "Apply routing," and "Tighten operations". With the new version, users can limit these functions to only schedule production order routing lines/operations so that they start at or later than the date defined. This is done by the new field "Earliest Start Date", having been implemented on production order, production order line, and production order routing line level. Depending on the <u>configuration</u> in the "Appearance" section of the "Setup" menu, this line will appear when hovering over and/or clicking an operation with an earliest start date.

apacities	🔇, Jan 12, i	1024	Sa, Jan 13, 3	Su, Jan 14,	2024	Mo, Jan 15,	2024	Tu, Jan 16,	2024 👁	We, Jan 17,	, 2024
apacities	01:40 AM	12:00 PM	12:00 AM		12:00 PM	12:00 AM	12:00 PM	12:00 AM	12:00 PM	12:00 AM	12:0
Inventory department					5 - 10						
Assembly department					010005						
Standby (00)					Date 1				10		-
Mike Seamans					st Start						
Bryan Walton					Earlie						
Linda Mitchell											

If the earliest start date is defined on all levels, the latest available date will be used for scheduling and if the "Consider EMAD" option is activated, this date will also be taken into account, meaning that the latest of all four dates will be considered.

Operations with an earliest start date can nevertheless still be dragged manually to an earlier start.

3.3.2. The Production Order View (read only)

The Production Order View shows production orders categorized by their status.

Production Orders (read-only)	nuary 2	022	Wk 03	,				Wk 04					Fe Wk 05	bruary 20
readenen eracis (read enity)		15 16	17	, 18 19	20	21 22	23	24 2	s 26	27	28 📘	9 30	31 01	02
										Start				
▶ 109001 Bicycle										Scheduling	_	٠	-	l –
▲ Firm Planned										Sche				
⊿ 1010005 Bicycle									_			٠		l –
A 1010005 10000 16									1010005	10000	16		1	
10 (Wheel assembly)														
20 (Chain assembly)									20					
30 (Final assembly)													30 .	
40 (Control)														ł.
▶ 101001 Touring Bicycle							_							
▶ 1011002 Bicycle									_			•		
▶ 1011003 Bicycle									,		_	•		
▶ 1011004 Bicycle										-	-	•		
	_		-											



The categories are indicated by different colors:



Production orders, their production order lines, and production order routing lines are sorted in ascending numerical order. Within each production order, the relating production order lines with their production order routing lines are listed. The default sorting order for nearly all elements in the plan can be changed either by context menu or via the "Configurations" tab in the VAPS setup.

		Ø	+	۱.		Ľ
VAPS Setup						
New <u>Actions</u> Fewer op	otions					
Configurations \sim						
🕂 Tooltip						_
🔏 Label	3	M				
∕£ Sort Order		M				
∕£ Sort Order	igures the sort order.	M				
✓ Sort Order		M	Conside	er Send-Ahead		
Sort Order Conf Reset all configurations		M		er Send-Ahead	_	_

3.3.3. The Sales Order View (read only)

The Sales Order View shows those sales orders that have production orders against it and when those production orders (lines) are scheduled. A visual alert is given if the production order's finish date is past the sales order's requested delivery date.



ales Orders (read-only)	nuary 2022 Wk 04	Wk 05	Febru	ary 2022					Wk 06					
les orders (read-only)	29 30	31	01	02	03	04	05	06	07	08	09	10	11	
Open										e Date				
4 1041										Required Due Date		٠		
a 1000 20				٠						Requir				
a 101061 10000 20		1010	061 100	100 20]									
10 (Wheel assembly)		16												
20 (Chain assembly)		2	o 🧧											
30 (Final assembly)			3	0 🖕										
40 (Control)				5										
50 (Packing table 1)				1	0 .									
a 1100 20												٠		
∡ 101062 10000 20											101062 1	10000 20		
10 (Rim assembly)											5			
20 (Drilling)											-3			
30 (Deburr)														
40 (Machine Inspection)												5		
50 (Wheel assembly)												-E		

3.3.4. For better overview in large plans: the World View

Especially in large plans, it often happens that the planner loses herself a bit in the vastness of operations. To help them find their way and to not lose track of the overall situation, we implemented the "World View" that shows a small additional window underneath the actual plan and is available in all three views described above.

By dragging the red rectangle in the "World View", you can quickly shift your focus to another part of the plan.

boyum

ETRONIC VAPS 4 C	Open in Excel Actions Fewer options				
Edit \lor Schedule \lor					-
Machining	Carter Security Control Contro	25 26 27 28 29 30 :	31 01 02 03 04 05 06 0	7 08 09 10 11 12 13	14 15
-	🗟 Disable Focus Mode	0		- Be	
▲ Cutting	🗟 Show Setup Times	Sche dulin		Froze	
Standby (∞)	A Hide Setup Times	S		of ud	
Cutting #1	Show World View	111 <mark>30 1</mark> 0	10 3 10 30 10	10,130 10 110,130	• 130
Cutting #2	R Hide World View	<u>10</u> 1 0	1110, 10 110, 11130	∎##30 ∎10∎10 ∎#10	• 10
	③ Capacity View		30		
Cutting #3	🔠 Sales Order View	10 10		10 • 3 10 • 10	• 1 10
▲ Drilling	🔠 Production Order View				
Standby (∞)	K View Color Mode				
					,

3.4. The time scale part of the schedule

The time scale is one of the three main areas in your schedule and is positioned at the top of the view.

Capacities	o, 25. Jan 2021		Tu, 26. Jan 2021		We, 27. Jan 2	2021	Th, 28. Jan 2	021	Fr, 29. Jan 2021 🛛 🔊		
	05:55	12:00	00:00	12:00	00:00	12:00	00:00	12:00	00:00	12:00	

The time scale covers the period that was defined in the simulation's filter. This is the time from the earliest date to the latest date.

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CREATE SIMULATION		Ľ
Saved Settings		
Changes to the options and filters belo	w will be saved only to: 'Last used options and	filters'
Use default values from:	Last used options and filters	\sim
Filters		
Description	Simulation Created on 08/05/20 10:10 AM	
Minimum Status		•
Earliest/Latest Date Input Type	Absolute Date	۲
Earliest Date Formula		
Latest Date Formula		
Earliest Date	3/1/2020	
Latest Date	3/31/2020	
Default View Color Type	Item View	•

3.5. Zooming and scrolling

The VPS offers various options of adjusting the size of your working area and going directly to a particular place in your diagram.

3.5.1. Increase/reduce time scale solution

Depending on how much detail or summary is required, you can either increase or reduce the time scale solution by mouse wheel or touchpad (move two fingers up and down on your touchpad) within the time scale.



	Wednes	day, 20.	. Januar	y 2021	Thursda	y, 21. Ja	nuary 20	021	Friday,	22. Janı	uary 2021	1	Saturd	ay, 23. Ja	anuar	21	Sunday	y, 24. Janu
Capacities	01:00 0	6:00	12:00	18:00	00:00	06:00	12:00	18:00	00:00	06:00	12:00	18:00	00:00	06:00		18:00	00:00	06:00
▲ Machining																		
∡ Cutting ►																		
Standby (∞)																		
Cutting #1		1010?	21012	1012 <mark>1</mark> 0	1036	•												
Cutting #2																		
Cutting #3																		
▲ Drilling																		
Standby (∞)																		
Drilling #1				10	1035		<mark>0</mark> 101	036		•								
Drilling #2																		
▲ Milling & Turning																		
Milling & Turning																		

3.5.2. Show orders of a certain timespan only

A more precise way of showing certain parts of your plan is offered by the options of the "Timescale" menu items. Click the according one to show either

- all orders of your current workday
- all orders within a week starting from the current work date
- all orders of a month starting from the current work date

Actions Fewer opt	ions
Timescale \checkmark	
🔠 Fit into View	
Scroll to Workdate	22 23 24
🗔 Scale to 💦 👌	🚟 Work Day
>	Work Week
	Work Month

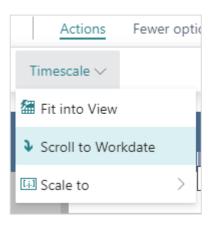
3.5.3. Scrolling

The VAPS offers the following options for quickly navigating to certain positions in the diagram:

- the common scrolling options by vertical and/or horizontal scrollbar
- dragging the timescale either right or left



• scroll directly to the Dynamics 365 Business Central work date by selecting the corresponding item from the "Actions" menu.

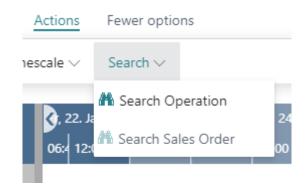


3.5.4. Return to default time range

Select "Fit into view" to switch directly to the timescale as defined in the filter settings of the simulation.

3.5.5. Search function

In both views, you can search for certain production orders:



- In the Capacity View, users can search for production orders and production order lines.
- In the Sales Order View, users can search for sales orders and sales item lines.
- The respective view then automatically scrolls to the first search result which gets highlighted as well.



	EARCH SIMULATION	4						Ľ
ene	eral							
atu	s Filter		None		~	Prod. Order No. Filter	101047	
	Status 1		Prod. Order No.↑▼	Routing Reference No. †	Operation No. ↑	Description	Starting Date	Ending Date
	Firm Planned	÷	101047	10000	10	Cutting #2	1/15/2021	1/18/2021
÷			101047	10000	20	Drilling #1	1/18/2021	1/19/2021
÷	Firm Planned					A 4101 0 4	1/19/2021	1/20/2021
÷	Firm Planned Firm Planned		101047	10000	30	Milling #1	1/15/2021	1/20/2021
÷			101047 101047	10000	30 40	Milling #1 Inspection Table #2	1/21/2021	1/22/2021



The search dialogs can be personalized the same way as is known from Business Central by adding columns in the fields list.

e 🕂 Field						Clear per	rsonalization Don	e ^ Less
🔎 Search 📲 Open in Excel	More options						Add Field to Page	×
SEARCH PRODUCTION ORDER LINE				2	, [⊭] ×		Place fields by dragging fr position on the page.	
General					Friday.			م
Status Filter None	▼ Pr	od. Order No. I	Filter · · · · ·		İİ		^{Code} <u>Variant Code</u>	Ready
							Text Description	Ready
Status ↑ → Firm Planned	Prod. Order No. 1 101023	Line No. 1	Item No. 3001	Routing Reference No.			Text Description 2	Ready
Firm Planned	101023	10000	3002	10000	10			
Firm Planned	101033	10000	3002	10000			Code Location Code	Ready
Firm Planned	101035	10000	3006	10000			Code	,
Firm Planned	101036	10000	3006	10000			Shortcut Dimension 1	I Code Ready
Firm Planned	101040	10000	1000	10000			Code	
Firm Planned	101042	10000	1100	10000			Shortcut Dimension 2	2 Code Ready
Firm Planned	101043	10000	1200	10000			Code	
Firm Planned	101044	10000	1300	10000			Bin Code	Ready
Firm Planned	101045	10000	1300	10000			Decimal	
Firm Planned	101046	10000	1300	10000			Quantity	Ready
Firm Planned	101047	10000	1700	10000			Decimal	
Firm Planned	101048	10000	1700	10000			Finished Quantity	Ready
Firm Planned	101049	10000	1900	10000			Decimal	
Firm Planned	101050	10000	1901	10000			Remaining Quantity	Ready
Firm Planned	101051	10000	1902	10000			Decimal	
Firm Planned	101052	10000	1903	10000			Scrap %	Ready
Firm Planned	101053	10000	1000	10000			Date	
Firm Planned	101054	10000	1001	10000			Due Date	Ready
Firm Planned	101055	10000	1300	10000 -			Date Starting Date	Ready
				OK Cancel			Time Starting Time	Ready

3.6. The table part of the schedule

The table is one of the three main areas in your schedule and is positioned at the left. It shows your resources grouped by work center groups, work centers, and machine centers.

3.6.1. The "Standby" resource

The standby resource does *not* exist in your Dynamics 365 Business Central work centers. It is a virtual machine center that we automatically create in every work center. It contains all production order routing lines/operations that are **not yet scheduled** from within the VAPS, and hence are just scheduled by the Business Central scheduling run. The standby resource gets highlighted by a yellow background and an infinity symbol next to its name:

		Febr	uary 202													
Capacities		Wk ()6	Wk 07							Wk 08					
		06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
▲ Machining																
▲ Cutting	►															
Standby (∞)							1	1								
Cutting #1	►			1	010010	1010 10	11010	11	101018							
Cutting #2	►					11	<mark>0</mark> 100 <mark>5</mark>									
Cutting #3	►															
▶ Drilling	•					1010 <mark>C 10</mark>	100 <mark>8 1</mark>		101011		_	101 <mark>01</mark> 1011				

Please note that

- the standby resource always is treated as a resource with infinite capacity
- all other machine centers are treated as finite capacity resources)

3.6.2. Collapsing and expanding

Symbols located to the left of the work center groups and work centers provide the ability to collapse or expand these centers. This feature allows you to conveniently hide or reveal specific details, making it easier to navigate through the information presented in the table.

4	►

In the picture below, the work center group "Machining" is expanded, and the related work centers are collapsed:



NETRONIC Promoted II Open	in Excel Actions	Fewer options			
Capacities	February Wk 06 06 1	2021 Wk 07 07 08 09 10 11	12 13 14	Wk 08 15 16 17	18 19 20 21
▲ Machining					
▶ Cutting	•	1010017(101010101 1010017(101010101010000000000	111 <mark>1</mark> 101018		
▶ Drilling	•		f 1 101011 1 01006 101005	110101. 101)	
Milling & Turning	•	1	100 <mark>8 1</mark>	1010 10 101005 101006 10 11	101 <mark>101</mark> 0101
▶ Painting	•	101 <mark>009</mark>	101002 101008 101009	10100101010 10 101008 101008	10 1010 11 101006 101008 1 101006

Now, the work center "Cutting" is expanded, showing all its operations

	Febr	uary 202 [°]	1												
Capacities	Wk 0	6	Wk 07							Wk 08					
	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
A Machining															
∡ Cutting ►															
Standby (∞)						1	1								
Cutting #1			1	010 <mark>0 10</mark> 1	010101	1010	11	101018		2					
Cutting #2					1 10	0100 <mark>5</mark>									
Cutting #3															
▶ Drilling ▶				1	1010 <mark>C 10</mark>	1008	11	101011			01 <mark>01</mark> 1010				

Please note, that in collapsed work center groups, no operations are shown:

		nuary 2021										
Capacities	Wk 03 2 24	Wk 04 25	26	27	28	29	30	31				
Machining	2 24	23	20	21	20	23	30	51				
Assembly & QC												
Assembly	•											
Standby (∞)				<mark>10</mark> 101								
Assembly station #1												
Assembly station #2												



The VAPS automatically saves the complete collapsed/expanded state of a view so that you can start exactly with the status you saw when you left the view.

3.6.3. Show/hide the histogram

In the "Capacities" view, planners can easily get a visual representation of the workload by displaying a histogram. To access this feature, simply look for the symbol located on the right-hand side next to the name of the work center or machine center:

Clicking this symbol will either show or hide the capacity curve for this work or machine center. The picture below shows the histogram for the "Drilling" work center:

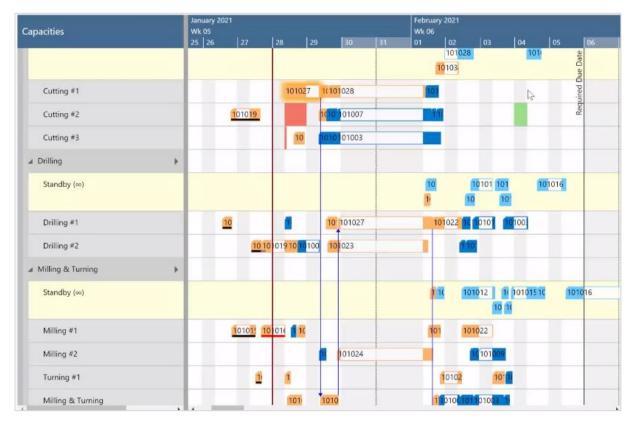
		Februa	ary 2021										
Capacities		Wk 06	Wk 07								Wk 08		
		06 07	08	09	10	11	12	1	13	14	15	16	
▲ Drilling													•
	2,098 -					_					_		
	1,049 -												
	0 -												
Standby (∞)								1					
								_					-
Drilling #1	•				101009 10	10 <mark>0</mark> 8	<mark>1 101</mark> 006	10	101011		1(1	01018	
Drilling #2	►				1	ţ	101 10100	05				<mark>1</mark> 0100	
Milling & Turning	►				10	10	<mark>1010</mark> 08	10			1	01005	10

	Actions \lor Fewer opti	ons										
	Edit	>	ember 2 48	2023	Wk 49)						1
	Schedule	>	02	03	04	05	06	07	08	09	10	
er	View	>										
	Capacity Manageme	nt >	CI	hange l	Jptime		>					
	Timescale	>	C	hange [Downti	me	>					
	Calendar	>	Ca	apacity	Aggreg	gation	>	🗰 Ву	Secon	d		
	View Filter	>						📰 By	Day			г
	Search	>					-	🔜 By	Week			L
1	•	E					-	Ву	Month	1		



3.7. The graphical part of the schedule

The graphical part - the diagram - is one of the three main areas in your schedule and is positioned in the middle of the view. It shows you which machine center is working on which production order routing line/operation and when.



3.7.1. The elements of the graphical part in detail

Bars

Each production order routing line/operation of a production order is represented by a bar that is either colored or white. The colored area of a bar indicates that this timespan is during the work time of the underlying machine center. The white area of a bar indicates that this timespan is during the non-work time of the underlying machine center (also see below "Calendar". The bar color depends on the selected color scheme (see below).

The following information can be gathered from optical indicators:

Currently marked operation
10
Operation changed but not saved yet

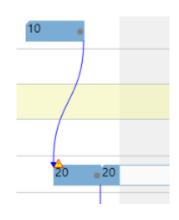




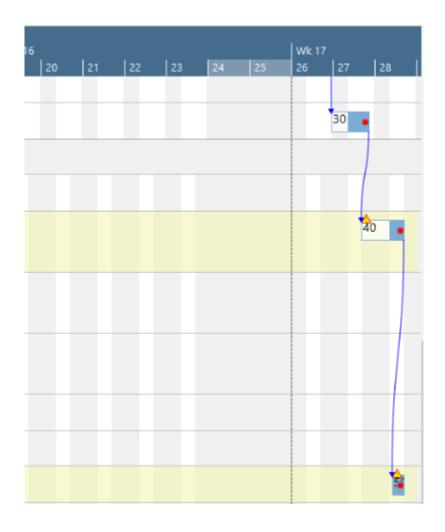
• Violated due date



• Violated routing links



• Operations potentially scheduled outside the visible time range In addition to being indicated by a warning symbol, these operations get moved to the standby resource.



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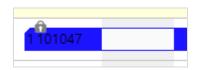
• Pinned operations, production order lines, production orders

The context menu allows to pin the above elements so that they can't be moved.

Unpin	, 010 101056
Pin with Capacity blocked	Pin Operation with Capacity blocked
Pin without Capacity Consumption	Pin Prod. Order Line with Capacity blocked
Move to Standby	Pin Production Order with Capacity blocked
Navigation	>
Schedule Successors	101066 (75)
Apply Routing	04 10104 1010 101
Apply alternative Routing	
Set Focus	
Remove Focus	
Change Prod Order Status	01036 (80) 1010 101064 (101047 (100) 10
Apply Shop Floor Changes	101044 (60)
Change Duration	
Move Pinned/Started Operation	1010501 101048 (70)
Standard MRP Behavior	
Exclude from MRP	
Include into MRP	
Show Additional Information	> 101047 (100) 101(101057 (56)
	1 101 101048 (70) 101049 (-1010

The different options are visually indicated as follows:

• Pin without consuming capacity

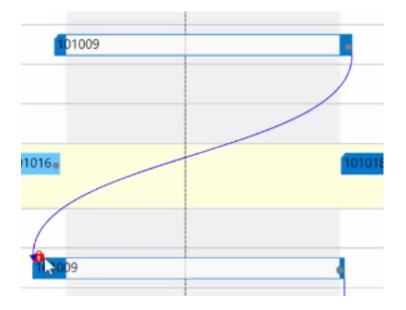


• Pin consuming capacity





• Link violation after having pinned an element. The picture below shows that the predecessor of a pinned operation was moved behind this operation



• Setup times

The setup times can be visualized as light grey section at the beginning of the bar.

101033	101 <mark>0</mark> :	34	
You can swit	ch between sh	nowin	ng and hiding
View 🗸	Timescale 🗸	/	
🗟 Enable F	ocus Mode		
🛕 Disable	Focus Mode		
🗟 Show Se	etup Times		
🗟 Hide Set	tup Times		
🛱 View Co	lor Mode	>	

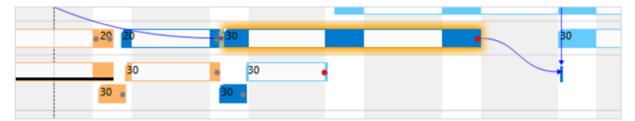
The color representing the setup time can be easily specified in the VAPS color settings:



Color Setu	цр			
General				
Default Item Color	#0008ff	 Default Production O	#0008ff	
Default Machine/Wor	#0008ff	 Setup Time Color	d0d0e1	

• Display mode for overlapping operations

Usually, overlapping operations are shown in an "optimized" way, meaning that the resource row with the respective operations gets extended in height so that the operations are completely visible. Since the VAPS schedules with finite capacity, overlapping operations are avoided, and hence this is a rare case.



However, some customers have contacted us with the following use case: They need to create operations with a length of zero to define a common starting point for parallel routings without blocking capacity. These operations will then be scheduled at the first possible position which will result in a very high stacked resource. For these cases, we added two new context menu items so that users can now decide whether overlapping operations are to be shown overlapped in one row or stacked.

⊿ Mi	▲ Milling & Turning (∞)							
s	tandby (∞)							
N	Fill Idle Times on this Machine Center							
_								
N	Define additional Down Time Define additional Up Time							
т	· · · ·							
-	Edit additional Down Time Remove additional Up Time							
N	· · · · · · · · · · · · · · · · · · ·							
🖌 Asse								
	Show operations overlapped in one row							
As:	Show operations stacked							

The picture below illustrates the different display modes:



Stacked view		1	Overlapped vi	I	
	Ļ	10		4	100

3.7.2. Calendar

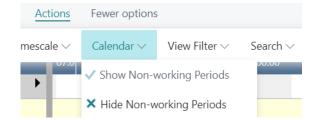
The grey and white area in the background visualizes the work and non-work periods of the respective work/machine center. They are derived from the respective shift calendars.

Fr, 29. J	an 2021	Sa, 30. Ja	n 2021	Su, 31. Jan 2021		Mo, 01. Feb 2021		Tu, 02. Fe	We, 03.	
00:00	12:00	00:00	12:00	00:00	12:00	00:00	12:00	00:00	12:00	00:00
	10	1046							•	

Show/hide non-working times

Some planning situations require to focus on the working periods of a work or machine center only.

To show or hide non-working periods, click the "Calendar" item in the "Actions" menu and select the desired option. This feature allows to hide or show the common non-working periods.



Non-working times are shown:

	🔮 e, 03. Feb 20)21 Th, 04. F	Th, 04. Feb 2021		Fr, 05. Feb 2021		Sa, 06. Feb 2021 🛛 🔨			Mo, 08. Feb 2021	
Capacities	07:0 12:00	00:00	12:00	00:00	12:00	00:00		00:00	12:00	00:00	12:00
Cutting	•										
Standby (∞)											
Cutting #1			<mark>,</mark> 30		<mark>,</mark> 10						• 16
Cutting #2	10		<mark>_</mark> 10		10 10 <u>-</u> 3	0					<mark>●</mark> 10 ●10●
	10 1		1 0								



NETRONIC VAPS I Open in Excel	Actions Fe	wer options						
Capacities	12:28	Mo, 01. Feb 2 08: 12:00	202 Tu, 02. Feb 20 08: 12:00	02 We, 03. Feb 2 08:(12:00	202 Th, 04. Feb 20 08: 12:00	2 [•] Fr, 05. Feb 202 08: 12:00	омо, 08. Feb 202 Tu, 0 08:0 12:00 08:0	
Standby (∞)								
Cutting #1	10		10 30 10		• 30	• 10	10 10 10	
Cutting #2	10	10 10 1	30 30	10	1	0 <mark>.</mark> 10 <u>1</u> 10	30 10 10 30	•10
Cutting #3	10	10 🖕	10	<mark>,</mark> 10 ,1	0 🖕 10		i 	1 0

Non-working times are not shown

• Handling of standby resources

Currently, the calendar of the related work center is applied to standby resources, so that when the non-working period is hidden, the non-working periods that are shared by all calendars will not be displayed and the timescale gets collapsed during these periods. On the other hand, switching the non-working periods on means that those periods that are common to all calendars will be displayed.

• Individual design of weekend colors and of date line grids

Some of our customers use a 24-hour working calendar and, as they told us, sometimes have difficulties to navigate and plan by day in the diagram area because the change between the days and/or weekends and working periods are not clearly visible. This, in turn, forces the planner to constantly look back and forth between the timescale and the plan. So, we set to work and implemented three new visual elements to create a better connection between timescale and diagram area:

- o vertical separation lines between individually selectable intervals
- o individual background and bar coloring, and transparency degree for weekends
- o an individual background color and transparency degree for the standby resource

In the picture below, the date line grid mode is set to "Daily", the background color for the weekend to a light blue, and the Standby color to a slightly darker yellow with a high degree of transparency:

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apacities	Ś	nuar Vk 03	ry 2021		Wk 04							Februar Wk 05	y 2021			<u>`</u>		
			23	24		26	27	28	29	30 3	1		02	03	04	05	06	07
Machining								Start										
 Cutting 	•							0 Scheduling Start										
Standby (∞)								10 ⁵				1(5 10				
Cutting #1	•					5						-						
Cutting #2	•																	
Cutting #3	•																	
Drilling	•																	
Standby (∞)	_								20	p		1	2		0 20			
												2		20				

The according settings can be found in the "Appearance" area of the VAPS setup dialog:

• Dateline Grid Mode

Dateline Grid Mode	Daily 🗸
Weekend Coloring	None
Weekend Coloring	Auto
Colorize Weekend	Daily
Colonze weekend	Weekly
Weekend Color	#9FD7FA

The "Auto" mode causes the grids to automatically adjust to the resolution of the time scale resulting from zooming in or out.

• Weekend coloring

Dateline Grid Mode	Daily	~
Weekend Coloring		
Colorize Weekend		
Weekend Color	#9FD7FA	()

If you want to color the weekends individually, you can activate this here.

- \circ $\;$ By clicking "..."you open the Color Picker dialog where you can
 - select the desired color
 - adjust the transparency:



Color Picker	2 ×
Selected Color ····· #9FD7FA	OK Cancel

reset the weekend color to default comfortably and at one click:

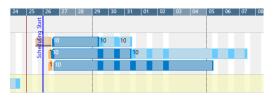
Color Picker			2 X
_	Manage	>	
	Actions	> 🔀 Reset Color to Default	
	Fewer options	Reset color to default.	
	✓ Show as menu		
Selected Color · · · · · ·		#9FD7FA	
		ок	Cancel

• Bar colors: Select individual bar color schemes that ensure that the label texts are always visible.



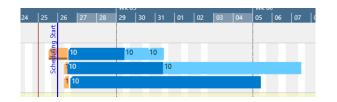
The options in detail:

 Graded (default): nonworking times are displayed in a lighter shade of the main color; in case there are assignments during non-working periods they are drawn in the main color



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Solid: draws a continuous block in the main color

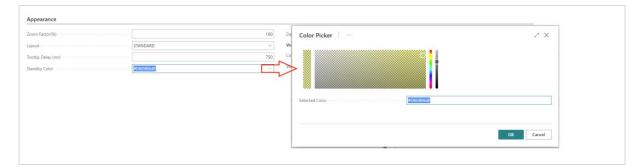


• Only Allocated Times: nonworking times appear with a white background

Image: state	25 2	26 2	7 28	29	30	31	01	02	03	04	05	06	07
	art												
	-5	10		10)	10							
5 1 0 10	ğ			_		_							_
	Sch	110					10						_

• Standby color

The procedure for editing the standby color is the same as for the weekend coloring:



A note on transparency: weekends, standby and calendar grids may overlap and by setting the transparency, the user can determine what should be hidden or what should shine through. For example, if you want to see the calendar grids or the weekends on the standby resource, you have to make the standby color translucent accordingly.

3.7.3. Progress

For production order routing lines of **released** production orders, a progress bar can be displayed below the actual bar being based on the posted quantity consumption or on the production time passed

General

Progress Calculation	Based on Time \sim
	None
	Based on Time
	Based on Quantity

The color of the progress bar depends on the routing status and the percentage of completion:

• finished: black



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- Status "none," "planned," "in progress":
 - Progress by quantity / by time < 100% : grey



Progress by quantity / by time > 100 % : red



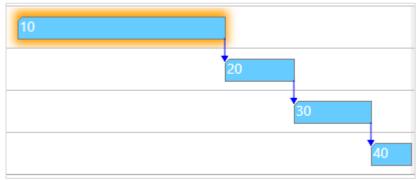
When attempting to move operations that are "in progress," a warning message appears, prompting whether scheduling should proceed with the original quantity or with the current remaining quantity. In the latter case, the input quantity will change, with a warning to the user that this action may result in misleading progress bar information.

(j	How should the input quantity of the changed operation be handled?							
	Keep the current input quantity of 26,4 OR Update the input quantity with current postings to 0							
CAUTION: If the input quantity gets updated, the progress bar information for this routing line will be misleading.								
C	Keep the input quantity							
C) Update the input quantity							
	OK Cancel							

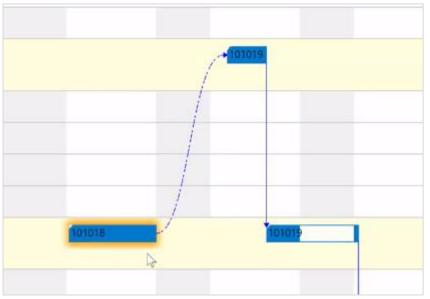
3.7.4. Links

Predecessor/successor relations are shown as arrows ("links") between the bars. They are only shown for the production order that is currently selected.

• links between operations of **one** production order

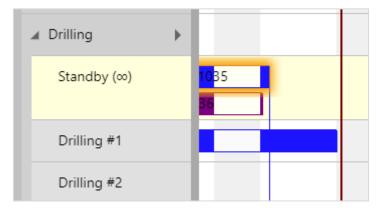


• links between operations of different production orders if they are linked to each other by reservations (make to order) OR links between production order lines coming from one production order (make to stock)



3.7.5. Work date

A red vertical line in the chart indicates the work date, this usually being the current date.



3.7.6. Required due date

The "Required Due Date" is a dedicated VAPS field that can be set on the "Production Order" card and is visually represented in the plan by a corresponding line. Depending on the <u>configuration in the</u> <u>"Appearance" section</u> of the "Setup" menu, this line will appear when hovering over and/or clicking the relevant operation.

Required Due Date	2/2/2021	1
Required Due Date	2/2/2021	

This date can only be set and modified by the user and is recommended for cases where specific production orders have strict due dates.

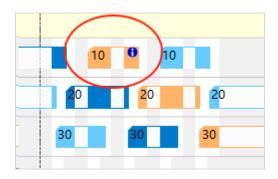
∡ Machining			e Date
Cutting	Þ	1	equired Due
⊿ Drilling	Þ		Re

3.7.7. Info symbol for additional information on operations

In Business Central, users can add additional information to a production order routing line by creating comments, tool information, personnel information, and quality measure information that are used, e.g., for describing certain specialties that need to be followed during the production process. As this is, of course, valuable information, the VAPS helps the planner to quickly recognize whether a production order line has such additional information so that the special requirements are not overlooked.



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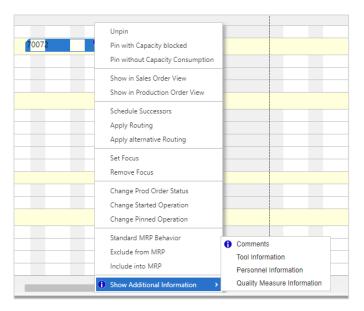


To activate this feature, tick the according option in the "General" settings of the VAPS setup dialog:

General	
Hide Links between Production Order Lines	Show Infosymbol on Additional Information
	Show Symbol on Comment · · · · · · · · · · · · · · · · · · ·
	Show Symbol on Tool Information
	Show Symbol on Personnel Information
	Show Symbol on Qlty Meas. Information

Shortcut to creating additional information

You can directly create and edit additional information by clicking the according item in the context menu.



3.7.8. The tooltip

	I I
No.:	3002
Item.:	3 Operations Subcontracing in Middle1 Operation Simple Subcontracting
Status:	Firm Planned
No.:	101034
Prod Order Descriptio	n: 3 Operations Subcontracing in Middle1 Operation Simple Subcontracting
Last Date Modified:	04/14/20
Quantity:	20
Required Due Date:	01/28/21
Operation No.:	20
Setup Time:	10
Starting Time:	11:50:00 AM
Starting Date:	01/27/21
Ending Time:	1:50:00 PM
Ending Date:	01/28/21
Alternate Routing Set:	
Category:	
Work Centre:	Subcontractor 1
Machine:	

The tooltip of the VAPS provides further details about an operation and is customizable.

3.7.9. The "Standby" resource

The standby resource does **not** exist in your Dynamics 365 Business Central machine centers. It is a virtual machine center that we automatically create in every work center. It contains all production order routing lines/operations that are **not yet scheduled** from within the VAPS, and hence are just scheduled by the Business Central scheduling run. The standby resource gets highlighted by a **yellow background** (and an infinity symbol next to its name in the table part):

			Jary 202													
Capacities		Wk 0		Wk 07							Wk 08					
		06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
∡ Machining																
∡ Cutting	+															
Standby (00)							2	1								
Cutting #1	+			1	<mark>010010</mark>	1010 <mark>101</mark>	01	1	101018							
Cutting #2	+					11	01005									
Cutting #3	+															
▶ Drilling	+					1010 <mark>010</mark>	1008	1	101011		1	10101				
								6				101				

Please note that

- the standby resource always is treated as a resource with infinite capacity
- all other machine centers are treated as finite capacity resources)



3.8. Navigating in the plan

The VAPS offers various options of adjusting the size of your working area and going directly to a specific position in your plan

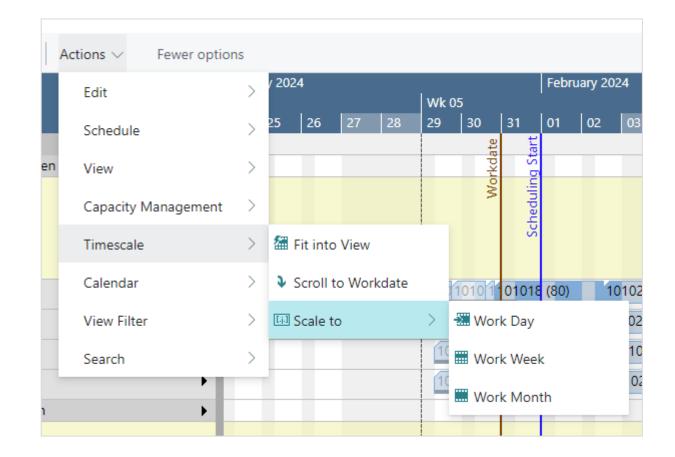
3.8.1. Adjust the time scale

Depending on how much detail or summary is required, you can either increase or reduce the time scale solution by mouse wheel or touch pad.

3.8.2. Show operations of a certain timespan only

Click the according item to show either

- all operations of your current workday
- all operations within a week starting from the current work date
- all operations of a month starting from the current work date



3.8.3. Scrolling

The VJS offers the following options for quickly navigating to specific positions in the diagram:

- the common scrolling options by vertical and/or horizontal scrollbar
- dragging the timescale either right or left by mouse



• scroll directly to the Dynamics 365 Business Central work date by selecting the corresponding item from the "Actions" menu.

A	ctions \checkmark Fewer option	ns						
	Edit	>	/ 2024	4			Wk0)5
	Schedule	>	25	26	27	28	29	30
hen	View	>						Morbdate
	Capacity Management	>						NV.
	Timescale	>	Æ F	it into	View			
	Calendar	>	2 ن	Scroll to	o Work	date	ł	1010 1
	View Filter	>	[j.] S	cale to	Scro	olls to t	he work	date.
	Search	>					10	1010

3.8.4. Navigate within one routing

This function allows you to navigate in your plan easily and quickly, integra especially if you have long routings with lots of operations. It can be found in the "Navigation" entry of the context menu.

3.8.5. Adjust the width ratio between table and diagram

You can modify the width ratio between the table and the diagram by moving the vertical splitter bar between them.

3.8.6. Return to default time range

Select "Fit into view" to switch directly to the timescale as defined in the simulation's settings.

3.9. The histogram provides capacity information

A histogram offers visual decision support by showing impending capacity problems. In the VAPS, you have the option to view histograms of work centers and their associated machine centers. These histograms allow you to easily identify available capacities, as well as any instances where capacities have been exceeded, indicated by red markings.

The histogram is a capacity utilization chart:

- The outer (black) line shows you the maximum available capacity per selected aggregation (derived from the capacity of the underlying machine centers).
- The grey-filled area indicates how much of that available capacity will be utilized by the current schedule.
- The red area indicates that, according to the current schedule, you will need more capacity than what is available on Friday, February 12th.



		Februar										
Capacities		Wk 06	Wk 07							Wk 08		
		06 07	08	09	10	11	12	13	14	15	16	
▲ Drilling	4											4
y	2,098 -											
	2,098 -					_		_				_
	1,049 -											
	0 -											
Standby (∞)							1					
							10					
Drilling #1	+				101009 10	1008	1101006	10 101011			1(101018	
Drilling #2	•				10	1	101 101005				<mark>1</mark> 0100	
Milling & Turning	•				10	1C	1010 <mark>08</mark>	C			<mark>10</mark> 100 <mark>5</mark>	10

By "Actions"-> Capacity Management" -> "Capacity Aggregation" you can select the aggregation that fits your requirements best.

	Actions \lor	Fewer optic	ns										
	Edit		>	ember 48	2023	Wk 49)						
	Schedule		>	02	03	04	05	06	07	08	09	10	
er	View		>										
	Capacity	Managemen	t >	C	hange U	lptime		>					
	Timescal	2	>	C	hange D	ownti	me	>					
	Calendar		>	C	apacity	Aggre	gation	>	🗰 By	Second	ł		
	View Filte	er	>						📰 By	Day			
	Search		>						By	Week			L
		•	H				-		Ву	Month			

3.9.1. Include/exclude standby operations for the load curve

Until version 15 of the VAPS, the workload shown in the histogram was determined by considering both the scheduled production orders and those on standby, as shown in the picture below:

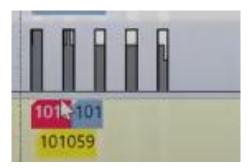


However, we have recognized that our customers have varying preferences. Some require a histogram that exclusively reflects the current workload, while others prefer to include standby operations for a comprehensive view, enabling them to identify potential bottlenecks or unrealistic delivery times. To accommodate these diverse needs, we have introduced a new switch in the VAPS setup dialog. This allows users to specify whether they want to include standby operations in the histogram or not.





This is what our example from above looks like when the operations on standby are excluded from the load curve:



4. The view color modes

The VAPS offers different views that let you stress different aspects of your plan by defining and using certain colors for the bars depending on the things you want to highlight. This will help you

tackle certain challenges and answer certain questions.

4.1.1. How to apply a view color mode

You can apply the view color modes in two ways:

• When **creating a new simulation**, you can choose the desired mode as the default view color type from a drop-down list:

	Description		Default View Color Type	Invalid	Outdated	С
	Simulation Created on 07/05/23 12:12 PM		Production Order			F
	Simulation Created on 07/05/23 12:13 PM		Availability			F
	Simulation Created on 07/05/23 12:13 PM		Availability			ι
	Simulation Created on 07/05/23 12:13 PM		Availability			ι
	Simulation Created on 26.09.23 11:07		Item View			ι
\rightarrow	Simulation Created on 10.07.24 14:52	÷	ltem View 🗸			ι
			Item View Machine/Work Centre Prod. Order Status Progress Availability Wait Times Production Order View MRP View Shop Floor Status Production Line Assig Production Line Seque Execution Status	v nment	5	

• In the visual schedule, select Actions --> View --> View Color Mode:

NETRONIC VAPS	Actions V Fewer option	ns						
Capacities	Edit	>	ber 2023 Wk 49		Wk 50		\sim	
	Schedule	>	02 03 04 05 06	07 08 09 10	11 12	13 14	15	16 1
 Production Turning Drehen 	View	>	Enable Focus Mode					
Standby (∞)	view							
Standby (00)	Capacity Management	>	🗟 Disable Focus Mode					
	Timescale	>	Show Setup Times	🗊 Item View				
	Timescale		le snow setup nines	nachine/Work Centre Vi	iew			
CTX400	Calendar	>	🛱 Hide Setup Times	Prod. Order View				
CTX 2500	View Filter	>	🗟 Show World View	Prod. Order View				
Beta 500	Search	>	R Hide World View	🚟 Prod. Order Status View				
Beta 800	Search		e, hide world view	Progress View				
▲ Sawing Sägen	•		🛱 View Color Mode 💦 🗧					
Standby (∞)			Other >	Chop Floor Status View				
Saw Säge	•		,	Execution Status View				
Gear Cutting Vera	zahnen 🕨			Availability View	Sets the m	ode to the ex	ecution s	tatus view.
Standby (∞)								
				📳 Wait Times View				
				III MRP View				
	mode: Item View	4	Active view filter: No	Production Line Assignm		ast EMAD		

4.1.2. How to change the default colors of a view color mode

The default colors of a view color mode can be specified in the VAPS Color Setup dialog.

4.2. The Item View (color mode)

The Item View helps you to focus on production orders for certain items.

The Item View highlights production orders for items that you want to visually stand out. For that reason, you can define a default item color in the color setup and item-specific colors on the item card.

The Item View is useful if you have certain items that require a specific attention. This could e.g., be items for production orders that are very time sensitive. Or it could be items where the cost of material are very high.

Important to know: the item color is applied to an entire production order (line).

4.2.1. Change color for individual items

If, for some reasons, you want to highlight one or more specific items, you can do so by changing their individual color on the respective item card:



ltem			Show more
No	1000	Base Unit of Measure	PCS ~
Description · · · · · · · · · · · · · · · · · · ·	Bicycle	Item Category Code	
Blocked · · · · · · · · · · · · · · · · · · ·		Color (VAPS)	#0cf151 ····
Туре	Inventory 🗸		

Example

The below screenshot shows a production schedule with the Item View applied. The following settings are used:

- Default item color = grey
- Item color "frame" = blue
- Item color "rim for mountain bike" = red

Capacities		Janua Wk 0	ary 2021 5			Febro Wk 0	uary 20)6)21					Wk 0	7						Wk (٦
		27	28 29	9 30	31	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	
▲ Machining																					Ì
▶ Cutting	•		11 10 10	_		10		Í	101 (1				10	10	100 1	1	Í				
▶ Drilling	•		10 10	_	07	Í			1 1	1				_	0100(10101			1 1010 5	11		
▶ Milling & Turning	•			1 11(1010	10	1	010 1		1	io [,] II	ł				1	1	101(0100	1 01000 1010			
Painting	•			1010	11	Ĩ	101¢ 1	1010 1	1 01							10 <mark>100</mark>	Ì	101002 101008 0(10100		1	

4.3. The Machine/Work Center View (color mode)

The Machine/Work Center View helps you to focus on production orders for certain items. It highlights production orders that are processed through certain work or machine centers. For that reason, you can define a default machine/work center color in the color setup and e.g., machine center-specific colors on the machine center card.

The Machine/Work Center View is particularly useful if you have one (or a few) bottleneck resources that require your special attention. In such a case, you can make them visual stand out with this view.

Important to know: the machine center color is applied to single production order routing lines/operations.



4.1. Change color for an individual Machine/Work Center

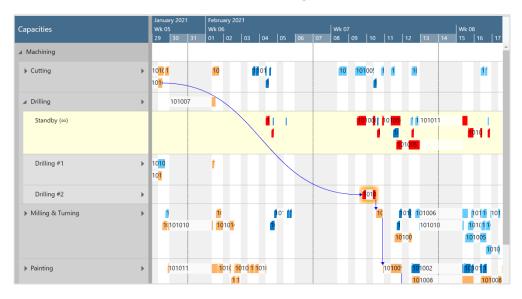
If, for some reasons, you want to highlight one or more specific machine/work centers, you can do so by changing their individual color on the respective machine/work center card:

General	
No	Blocked ·····
Name · · · · · Cutting #1	Last Date Modified 9/3/2019
Work Center No	Color (VAPS)
Search Name · · · · · · CUTTING #1	

Example

The below screenshot shows a production schedule with the Machine/Work Center View applied. The following settings are used:

- Default machine/work center color = by production order status
- Machine center color for machine center "drilling #2" = red



4.2. The Production Order View (color mode)

The Production Order View helps you to focus on certain production orders. It highlights production orders that you want to visually stand out. For that reason, you can define a default production order color in the color setup and production order-specific colors on the production order card.

The Production Order View is useful to recognize certain production orders at a glance. This could be the case, e.g., if your orders are typically both make-to-order as well as make-to-stock. Then, if things get tight because a deadline approaches and you need to shift out some order, you might want to shift out your stock orders, because with them, there is usually more time flexibility. If you have defined a unique color for your stock orders you can quickly and easily recognize them.

Important to know: the production order color is applied to an entire production order (line).



4.2.1. Change color for an individual production order

If you want to highlight one or more production orders in your plan, because, perhaps, they are urgent or belong to quite important customers, you can change the color on the Production Order Card:

General			
No		Due Date	Ħ
Description · · · · · · · · · · · 1 Operation Simple		Required Due Date 1/28/2021	
Description 2		Assigned User ID · · · · · · · · ·	\sim
Source Type	~	Blocked · · · · · · · · · · · · · · · · · ·	
Source No	\sim	Last Date Modified · · · · · · · · · · · · 4/16/2020	
Search Description · · · · · · · · 1 OPERATION SIMPLE		Color (VAPS)	
Quantity	180		

Example

The below screenshot shows a production schedule with the Production Order View applied. The following settings are used:

- Default production order color = blue
- Production order color for orders no. 101034 and 101036 = red

c 11	3	onday,	, 25. Jar	nuary 20) Tuesda	ay, 26. Ja	nuary 2	021					Wedne	ay, 27	'. Januai	y 2021				
Capacities	15	:00	18:00	21:00	00:00	03:00	06:00	09:00	12:00	15:00	18:00	21:00	00:00	03:00	06:00	09:00	12:00	15:00	18:00	21:00
∡ Cutting																				
Standby (∞)									10103	5										
Cutting #1	E																			
Cutting #2	L																			
Cutting #3	L	1	101034	4 . .				101036	5 •											
Drilling																				
Standby (∞)	Т									101	035									
																1010	36		•	
Drilling #1							1	01046												

4.3. The Production Order Status View (color mode)

The Production Order Status View helps you to quickly see where in your scheduling & execution process your production orders are. It differentiates production orders by their respective status and lets you define different colors for the following statuses:

- Planned
- Firm planned
- Released

The Production Order Status View is particularly useful if you want to quickly see where in your scheduling & execution process your production orders are.



Important to know: the production order status color is applied to an entire production order.

The picture below shows the default colors coming with the VAPS.

Example

The below screenshot shows a production schedule with the Production Order Status View applied with the default colors coming with the VAPS.

Capacities		anuary 2 Nk 05	2021			February Wk 06	2021					Wk 07	,				
		27 28	3 29	30	31	01 0	2 03	04	05	06	07	08		10	11	12	R
▲ Machining																	Â
Cutting	•		1 10	Þ		11 10'		1101 1 1		<mark>1</mark> 01019		10	1010	005	1 1	10	
				<mark>1</mark> 01009													
Drilling	•		10 <mark>1(</mark>	101007	7	10	101	10	1 1			10	101006	10	1005	11	0
			10 <mark>10</mark>	101007	7	101 10	008	1	i						11		I
Milling & Turning	•		1			<mark>1(</mark> 101	0(1010		1010 101	1			101	10	1 00€ 1	1(10 <mark>10 1</mark>	_
									10							101005	
Painting	•			101010	0		101009	1010 <mark>0</mark> 1	1010 <mark>1</mark> 0	01 <mark>002</mark>		10	101 (1 (101	006 1	0
				101011		10	101 101 <mark>0</mark>	(<mark>1</mark> 01 <mark>00</mark> 8	3	<mark>10</mark> 1008			101 <mark>(10</mark> 1	00		1	0
						1010	1(1										
▲ Assembly & QA																	
Assembly	•		<mark>1(</mark> 1	01011		1010	11					Ì					
▶ Q&A	×						1) (10101	10100 <mark>1</mark>	Ì			1	1(010 <mark>0</mark> 10	100 <mark>8</mark>	10)1

4.4.The Progress View (color mode)

The Progress View helps you to quickly see which productions are late. This is both with respect to production orders that start late and those that finish late. It differentiates production orders by their lateness and lets you define different colors for the following statuses:

- Progress status **missed**. It indicates production orders that are planned to finish past a requested date. Hence, this is the default color that is used if the end date of an operation is past the required due date.
- Progress status **not started**. It indicates production orders that should have been started by now but are not. Hence, this is the default color that is used if the start date of a planned operation is before the current date/time.
- Progress status **OK**. It indicates those production orders that neither start nor finish too late. Hence, this is the default color that is used if none of the above mentioned two colors get applied.

The Production Order Status View is particularly useful if you want to quickly see if you are running late.

Important to know: the progress status color is applied to an entire production order.



Example

The below screenshot shows a production schedule with the Progress View applied and using the default colors coming with the VAPS:

	February	2021								
Capacities	Wk 06	Wk 07							Wk 08	
	06	07 08	09	10	11	12	13	14	15	16
Machining										Â
▶ Cutting	•	11	010 <mark>0 10100</mark>		10 10 101	10	0			
▶ Drilling	•		1010 <mark>06</mark>	1010						I
▶ Milling & Turning	•			<mark>1010</mark>	00 <mark>6</mark> 1	_	0 ¹ 101005 10 <mark>101005</mark>			0 <mark>1</mark> 018
▶ Painting	•	10	101002 <mark>10</mark> 10100 <mark>8 1010</mark>	<mark>0</mark> 8	101	006	<mark>1</mark> 01006 <mark>1</mark> 01010		r	
▲ Assembly & QA										
Assembly	•	Ì								1005 1005
▶ Q&A	•	10	10	1002			101011			

4.5. The Shop Floor Status View

The Shop Floor Status View helps you to quickly highlight and recognize deviations between actual data from the shopfloor and the schedule.

The Shop Floor Status View lets you recognize how incidents that happen on the shopfloor impact your schedule.

Important to know: the shop floor status color is applied to an entire production order routing line.

Example

The screenshot below shows a schedule with the Shop Floor Status View applied with the -described default colors. Please note that this view also comes with a vertical line indicating when the last "update according to actuals" was made.

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C		¢	Mo, 29.	Jan 202	Tu, 30.	Jan 2024	We, 31	. Jan 202	4 Th, 01.	Feb 2024	Fr, 02.	Feb 20
Capacities		18	00:00	12:00	00:00	12:00	00:00	12:00	00:00	12:00	00:00	12:0
Production						ate		24	Start			
Turning Drehen	•					Workdate		603				
Standby (∞)						Wo		pfloor Refresh: 16:09:24	Scheduling			
CTX400	•		10	100 <mark>101</mark>	008 (<mark>30</mark>) 101 <mark>10</mark>	1018 <mark>(8</mark>	02				10
CTX 2500	•		10	1005 10	1007 (7	(0)	1	01016 (7	D)			10
Beta 500	•		10	1006 (1	0101 <mark>1</mark> ((80)			1(0102 10	1012 <mark>(4</mark>	0)
Beta 800	•		10	1010 10)1017 (3	30)	10101 <mark>3</mark>	(2101	10	01019 (40	D)	1
▲ Sawing Sägen	•											
Standby (∞)												
Saw Säge	•				1	01 101	1(010 101	06 (6 <mark>0</mark>	1010110	1007 <mark>(7</mark>	0) 1
▲ Gear Cutting Verzahnen	•											

4.6. The Execution Status View (color mode)

The VAPS offers the "Shop Floor Status" color scheme to highlight deviations between the planned schedule and actual data from the shop floor. To offer even more transparency, we implemented the "Execution Status" color scheme to give feedback on the operations' status on the shop floor: "ready to get in progress", "in progress", "finished", operation with posting issues, and "rest"

The direct predecessors and successors are taken into account

Example

The below screenshot shows a schedule with the Execution Status View applied with the default colors.

10 10100 1 101018 (80)	101029 (40)	101014 (7 <mark>101040 (50) 101022 (</mark> 101046 (40)	101044 (60) 101 <mark>036 (8</mark> 0)	101 1010
101 101007 101016 (70)	101021 (40)	10103 101015 (101035 (🕄 101041 (80)	101045 101047 (100)	
101(¹ 01011 (80) 10 101	012 <mark>10</mark> 1030 (50)	101031 (120) 101037 (50) 101043 (90)	101050101049 (
101 101017 1010 11 101019	(4 101023 (48)	101032 101033 (7 1010 <mark>: 1010</mark> 42 (110)	101048 (70) 101064 (40)	

4.7.The Availability View (color mode)

The Availability View helps you to focus on the material availability of your production orders. It lets you see which production orders have or don't have the needed material when the first operation is meant to start.

The Availability is useful to recognize the material availability of your production orders at a glance.

Important to know: the availability color is applied to an entire production order (line).



Example

In the picture below ,the Availability View is applied. The default settings are:

- production orders where the material is available = green
- production orders that are scheduled before the required material is available = red

		anuary 2021			Febru	ary 2021			
Capacities		Nk 05 18 29	30	31	01	R 02	03	04	05
A Machining									
a Cutting	+								
Standby (∞)					-	01012 01 (101028 (101034)	. "	<mark>10</mark>	
Cutting #1		12.7	101028						
Cutting #2			100 01007						
Cutting #3			01003						

4.8.The Wait Times View (color mode)

The Wait Times View helps you to recognize bottlenecks quickly and gives you an overview of critical and uncritical waiting times of operations at the machines.

The idea behind this view: operations might need to wait for other operations to finish as the other operations have (an implicit) higher priority.

Important to know: the wait times color is applied to an entire production order (line).

The below screenshot shows a production schedule with the Wait Times View applied. The default settings are:

- no waiting times = grey
- waiting times, but the production order finishes in time = orange
- waiting time and part of a late production order = red



DOCUMENTATION VISUAL ADVANCED PRODUCTION SCHEDULER

Capacities		We, 27. Jan 20 03:19 12:00			Fr, 29. 00:00	Jan 2021	5a, 30. 00:00	Jan 2021 12:00	Su, 31. 00:00	Mo, 01 00:00		Tu, 02. 00:00	Feb 2021	We, 03. 00:00
Machining														
a Cutting	×.													
Standby (∞)										1	01012		10	10
											101	10102 <mark>8</mark>)34		
Cutting #1			1	01027		10-10102	8				1010C			
Cutting #2		19			1	0.10101	01007	>			16			
Cutting #3				101	1	01010 10	01003							
a Drilling	×.													
Standby (∞)											1010 0		101 101(014 1
Drilling #1			1	0		1010	01027				1010	2	101 10	1010

4.9.The MRP View (color mode)

The MRP View helps you to quickly differentiate production orders that belong to the VAPS area of responsibility from those that belong to the MRP area of responsibility.

The MRP view lets you recognize production orders that are not touched by the planning worksheet since they belong into the VAPS area of responsibility.

Important to know: the MRP color is applied to an entire production order (line).

The below screenshot shows a production schedule with the MRP View applied. The orders planned by the VAPS appear in orange, the ones planned by MRP in blue.

	anuary 2021				February 2021	
Capacities	Wk 01 Wk 02		Wk 03	Wk 04	Wk 05	Wk 06
	09 10 11 12 13	14 15 16 17	18 19 20 21 22 23 24	25 26 27 28 29 30 31	01 02 03 04 05 06 07	08 09 10 11 1
▲ Assembly ►	g Start					Period
Standby (∞)	redulin					Frozen
Assembly station #1	Sd	10 20	50 5 0	3 0		End of
Assembly station #2		20 20	1 1	20	30	3
Assembly station #3		1 0 3 0	<u>30</u>	1 0 4 0		
Assembly Station #4		PQ	1 30 1 20	8 0	30 0	
▲ Quality Control						

The darker red shows that for this production order you have set an exception to the standard rule by context menu

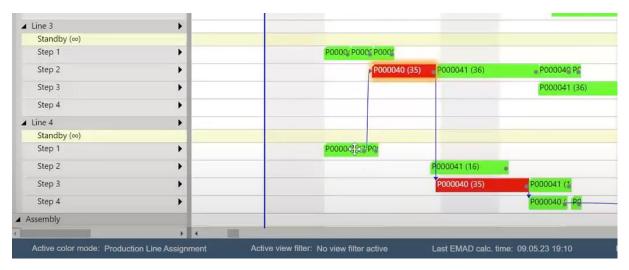


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4.10. The Production Line Assignment View

The Production Line Assignment View lets you quickly recognize assignment errors when you work with production lines.

If you work with production lines, the Production Line Assignment View will visually indicate if there is a violation of the "line dependency" restriction, such as multiple operations from one production order switching between lines.



4.11. The Production Line Sequence View

The Production Line Sequence View lets you quickly recognize sequence errors when you work with production lines.

If you work with production lines, the Production Line Sequence View will visually indicate if there is a violation of the "physical dependency" restriction, such as one production order overtaking the other.

Line 3	
Standby (∞)	
Step 1	POOC POC POC
Step 2	P000041 P0000
Step 3	P000041 (36) P00 P00
Step 4	P0@ P0@ P000042 (15)
Line 4	
Standby (∞)	
Step 1	P000040 P2
Step 2	P000040 (35) P000041 (16) 🖕
Step 3	P000040 (35) P000041
Step 4	P000044 Ps
Assembly	
F K	Active view filter: No view filter active Last EMAD calc, time; 09.05.23 19:10 Last shopfloor upda

5. Setting up the VAPS

5.1. How can I define the default colors?

Define default colors at one central page so that you can quickly apply different color schemes in the planning board.

The Visual Advanced Production Scheduler allows you to quickly change the coloring in the planning board. This enables you to focus on different kinds of information at one glance - quicker. Overall, we support the following color schemes:

- Item view
- Machine/ work center view
- Production order view
- Production order status view
- Progress view
- Shopfloor status view
- Availability view
- Wait times view
- MRP view
- Production line assignment view
- Production Line Sequence view
- Execution Status view

All these color schemes are based on default colors. You can define them on the "color setup" page, which you can access from the NETRONIC VAPS menu, or by simply searching for "color setup". The color setup page looks as follows:

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Color Set	1		
Actions V Automate V	/		
Default Machine/Wor	#0008ff	Setup Time Color	#d0d0e1
Progress Status			
Progress Status Missed 🕔	#ff0000	Progress Status Ok	#04ff00
Progress Status Not S	#ff9100		
Shop Floor Status			
Plan Not Changed Co	#20ff20	Quantity Exceeded C	#fffb00
Start Changed Color	#ff8111	Plan Changed Color	#ffbd00
Resource Changed C	#ff0000		
Execution Status			
Ready to get in Progr	#00ee00	Finished Operations	#eeeee
In Progress Operations	#999999	Rest of Operations	#0008ff
MRP Domain			
Color when planned	#0080ff	Color when planned	#ff8000
Production Status			

5.1.1. General information

You can define colors either by their hex value or by clicking the three dots in each color-related line. This opens a color picker.

All colors that you define here are always only applied to the bars in the planning board. Hence, these colors are used to determine the color or a production order routing line (operation) in the planning board.

5.1.2. Specific settings and what they are for

Let's look at all the settings that you can make in more detail.

General



- Default **item color**: This is relevant for the **Item View**. This is the color in which every bar is shown in the Item View. If you want to focus on certain items, you have to define itemspecific colors on the item page.
- Default machine/ work center color: This is relevant for the Machine/ Work Center View. This is the color in which every bar is shown in the Machine/ Work Center View. If you want to focus on certain machines, you have to define machine-specific colors on the machine center (or work center) page.
- Default **production order color**: This is the color in which every bar is shown in the Production Order View. If you want to focus on certain production orders, you have to define production order-specific colors on the production order page.
- **Setup time color**: The color being used for the small rectangle at the beginning of the bar that visualizes setup times of an operation.

Progress status

These colors are relevant for the **Progress View**.

- Progress status missed: Indicates production orders that are planned to finish past a requested date. Hence, this is the default color that is used if the end date of an operation is past the required due date. The required due date is a new data field provided by the VAPS. It is fixed and will not be changed by any Business Central scheduling run. The "progress status missed" color will be applied to all operations of a production order of which a minimum of one operation ends past the required due date.
- Progress status **not started**: Indicates production orders that should have been started by now but are not. Hence, this is the default color that is used if the start date of a planned operation is before the current date/time. The "progress status not started" color will be applied to all operations of a production order of which a minimum of one operation ends past the required due date.
- Progress status **OK**: Indicates those production orders that neither start nor finish too late. Hence, this is the default color that is used if none of the above mentioned two colors get applied.

Shopfloor Status

These colors are relevant for the Shop Floor Status View

- Here you can define the standard colors for deviations from the plan:
 - No deviations
 - Start date changed
 - Changed resource
 - Exceeded quantity
 - Any other deviations from the plan

Execution Status

These colors are relevant for the **Execution Status View**. You can specify the default colors for the operations' different processing status on the shop floor:

- Ready to get in progress
- In progress operations
- Finished operations
- All other operations



MRP Domain

These colors are relevant for the **MRP View**.

• Specify the default colors for bars that are planned by MRP or by the VAPS.

Production Status

These colors are relevant for the **Production Order Status View**.

- **Planned** order: Defines the color in which all planned production orders are shown.
- **Firm planned** order: Defines the color in which all firm planned production orders are shown.
- **Released** order: Defines the color in which all released production orders are shown.

Material Availability

These colors are relevant for the **Availability View**.

- Material **available**: Defines the color in which production orders are shown when the material is available.
- Material **not available**: Defines the color in which production orders are shown when the material is not available.

Waiting Times

These colors are relevant for the Wait Times View.

- **Due date warning**: Defines the color in which production orders are shown that have operations that need to wait AND the production order runs late.
- Wait time warning: Defines the color in which production orders are shown that have operations that need to wait, but the production order finishes in time.
- Wait time default: Defines the color in which production orders are shown that have no waiting times.

Work center

• Subcontract work center color: Defines the default color for subcontract work centers.

Production Line

These colors are relevant for the **Production Line Assignment View** and the **Production Line Sequence View** and are important when you work with <u>production order lines</u>.

Specify the default color for

- No conflict
- Operations that are not assigned to a production line
- Operations assigned to a wrong production line
- Operations that are sequenced in the wrong order

5.2. How can I define individual colors for specific items?

Define item colors on the item card. This helps you to make production orders visually stand out in the "Item View".



You can make production orders visually stand out in the Item View. That means you can define specific colors for specific items that you do not want to be shown in the default item color.

You can do this from the item card. We added a color field to the item header.

You can either type in the color's name:

ITEM CARD WORK	DATE: 1/28/2021			+ 🖻	
1000 · E	sicycle				
Process Item	History Special Sales Pc	es & Discounts	Request Approval	Show Attached	
ltem				Show me	ore
No	1000	··· Base Ur	nit of Mea PCS		\sim
Description · · · · ·	Bicycle	ltem Ca	tegory Co	~	\sim
Blocked		Colour	yellov	N .	
Туре	Inventory	•			

Or you can specify and color via color picker if you click the three dots at the end of the color field:

ITEM CARD WORK DATE: 1/28/2021	COLOUR PICKER	\swarrow
1000 · Bicycle	General	A
Process Item History Special Sales P.		
Item		
No		
Description Bicycle		
Blocked		
Type Inventory		
Inventory		

This populates the color field with the respective hex code (you also can type in the hex code directly if you know it):



\leftarrow	ITEM CARD WORK DA	ATE: 1/28/2021		·) + 🖻
	1000 · Bi	cycle		
	Process Item H	listory Special Sales Pces	& Discounts Request App	proval Show Attached
	ltem			Show more
	No	1000	Base Unit of Mea	PCS ~
	Description	Bicycle	Item Category Co	~
	Blocked · · · · · · ·		Colour	#dede1a ····
	Туре	Inventory •		

5.3. How can I define individual colors for specific machine centers?

You can make production orders visually stand out in the Machine/ Work Center View. That means you can define specific colors for specific machine and/or work centers that you do not want to be shown in the default item color. If an operation is assigned to that machine/work center, it will be shown in the color you select for it.

You can do this from the machine/ work center card. We added a color field to the machine/work center header.

• You can either type in the color's name:

MACHINE CENTER CA	RD WORK DATE: 1/28/2021) + 🛍	
1101 · Cu				
Process Machine Center Show Attached Navigate Fewer options				
General				
Contentia				
No	1101	Blocked · · · · · · · · ·		
	1101 ···· Cutting #1	Blocked · · · · · · · · · · · · · · · · · · ·	5/6/2019	
No	Cutting #1		5/6/2019	

• Or you can specify and color via color picker if you click the three dots at the end of the color field:



	ARD WORK DATE: 1/28/2021	COLOUR PICKER	2
1101 · Cu	utting #1	General	-
Process Machine	Center Show Attached	0	
General		and the second second second second second second second second second second second second second second second	
No	1101		
Name	Cutting #1		
Work Center No.	1100	•	
Search Name	CUTTING #1		

This populates the color field with the respective hex code (you also can type in the hex code directly if you know it):

MACHINE CENTER CAR	RD WORK DATE: 1/28/2021		P) + ₪		
1101 · Cutting #1					
Process Machine Center Show Attached Navigate Fewer options					
General					
No	1101	Blocked			
Name	Cutting #1	Last Date Modified	5/6/2019		
	1100 ~	Colour	#ed1010		
Work Center No.	1100 \$	Colodi	#ediolo		

5.4. How can I define individual colors for specific production orders?

If you want to highlight certain production orders you can define specific colors for specific production orders that you do not want to be shown in the default item color.

This is done on the production order card where we added a color field to the production order header.

Specify the color by either



• Entering the color's name

101035 · 3 Operations	Subcontracting in Middle	as A	Iternative			
101035 · 3 Operations Subcontracting in Middle as Alternative						
Process Order More options						
General						
No	101035		Quantity			
Description	3 Operations Subcontracting in Middle as Alternative	2	Due Date · · · · · · · · · · · · · · · · · · ·	1/28/2021		
Description 2			Required Due Date	1/28/2021		
Source Type	Item	~	Assigned User ID · · · · · · · · · · · · · · · · · ·			
Source No.	3006	\sim	Last Date Modified	4/16/2020		
Search Description	3 OPERATIONS SUBCONTRACTING IN MIDDLE AS AL	TEE	Color (VAPS)	purple		

- Clicking on *** in the color field and select the color via color picker the color's respective hex code will be entered.
- Type in the hex code.

5.5. How to configure tooltips

The tooltips of the VAPS provide further information on the following items of your production schedule:

Machine Center
Production Order Line
Operations
Sales Order Status
Sales Order Number
Sales Line Item Number
Sales Line Item Number
Work Center Group
Work Center

You can specify which information is to be shown in the tooltip of the respective item in the "Tooltip" dialog - to be reached by clicking "Configurations" in the "Actions" menu of the "VAPS Setup" dialog:



New	Actions	Fewer options
Configu	rations \vee	
📌 Tooltij	p	
📌 Label.		
S Reset	all configurat	ions

In the dialog popping up, you select the item for which you want to customize the tooltip and then either delete, edit, or add fields and then click the "Edit" item from the "Actions" menu:

VIEW - SELECT TOOLTIP	2	\times
Description		
Machine Center	:	
Production Order Line		
Operations		
Sales Order Status		
Sales Order Number		
Sales Line Item Number		
Sales Line Item Number		
Work Center Group		
Work Center		
	Clo	ose

EDIT	- DEFINE CONFIGURATION			2
Product	ion Order Line			
	Table Name	Field Name		
	Production Order Line	Status		
	Production Order Line	Description		
	Production Order Line	Prod. Order No.		
	Production Order Line	Line No.		
	Production Order Line	Starting Date-Time		
	Production Order Line	Ending Date-Time		
	Production Order Line	Due Date		
	Production Order Line	Routing No.		
	Production Order Line	Quantity (Base)		
\rightarrow	Production Order Line ····	 Routing Reference No.		
			Clos	e



Here you can:

• Add a new field:

either click +NEW or just click in the last row. You can select the desired Dynamics 365 BC data by clicking "..." either for table and field name.

AVAILABL	LE VALUES	\swarrow
	Value 1	
\rightarrow	Production Order	:
	Production Order Line	
	ок	Cancel

• Insert a new field:

Select the field above which you want to insert a new one and proceed as described above.

• Delete a field:

Click and select "Delete line"

		1
₽##	New Line	I.
×	Delete Line	ł
20.0		F
<i>3</i>	Select More	F

5.6. How to configure bar labels

You can decide which D365 BC information is to be shown as bar label.

Bar labels are shown on

- operations in the Production View
- operations in the Capacity View

In the picture below, you see the bar label of a production order line in the Sales View, showing

- the production order number
- the number of the production order line
- the quantity

101053 | 10000 | 20



You can specify which information is to be shown on the bar label of the respective item in the according dialog to be reached by clicking "Configurations" in the "Actions" menu of the "Setup" dialog:

New	Actions	Fewer options	
Configura	tions 🗸		
📌 Tooltip			
🕂 Label			
S Reset all	configurat	tions	

• In the "View - select label" dialog, select the item and/or view for which you want to customize the bar label - in our case "Production Order Line":

✓ Search III Open in Excel More options		
VIEW - SELECT LABEL	≣ 8	$ \mathbb{Z} \times $
Description		
Operation in Capacity View		
Production Order Line		÷
Operation in Sales View		
		Close

• The "Edit – Define Configuration" dialog pops up:



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. م	Search	+ New	🐯 Edit List	📋 Delete	🕈 Move Up	V Move D	own	💶 Open in Excel		
EDIT	- DEFINI	E CONFIGUI	RATION						≣ 88	2
Producti	on Orde	r Line								
	Table N	ame					Field N	lame		
	Produc	tion Order	Line				Prod. (Order No.		
	VAPS F	ormat Strin	gs							
	Produc	tion Order	Line				Line N	lo.		
	VAPS F	ormat Strin	gs							
\rightarrow	Produc	tion Order	Line] :	Quanti	ity (Base)		
										Close

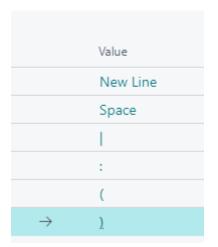
• Here you can add, insert, edit, and delete fields as well as change their order. You can select the desired table name and field name from your Dynamics 365 BC data by clicking "..."

,	rch 🛛 🗱 Open in Excel	
AVAILABL	LE VALUES	2
	Value 1	
	Machine Center	
	Production Order	
	Production Order Line	
	Production Order Routing Line	
\rightarrow	VAPS Format Strings	:
	Work Center	
		OK Cancel

5.6.1. Formatting the labels

Separate the field contents in the table label by a line break, a blank or other separators by selecting the according separator from the "VAPS Format Strings" table.

AVAILABLE VALUES





5.7. Configure table texts

You can decide which D365 BC information is to be shown as labels in the table for:

- Machine centers
- Production order lines
- Production order routing lines
- Production orders
- Sales order lines
- Sales orders
- Work centers
- Work center groups

The picture below shows the table text for a production order routing line, containing:

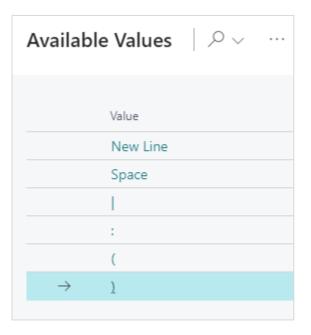
- the operation number
- a blank
- the description in brackets

10 (Assembly station #1)

5.7.1. How to proceed

For customizing the table label, proceed as follows:

• Click "Configurations" in the "Actions" menu of the "User Setup" dialog:





• In the "View - select table text" dialog, select the item for which you want to customize the table label which, in our case, would be "Production Order Routing Line":

View - Select Table Text	2 ×
	i ≡
Description	
Machine Center	:
Production Order Line	
Production Order Routing Line	
Production Order	
Sales Order Line	
Sales Order	
Work Center Group	
Work Center	

The "Edit – Define Configuration" dialog pops up:

Edit - Define Configuration							
,⊂ s	Search + New	🐯 Edit List	📋 Delete	1 Move	Up 📢	Move Down	🖽 Open in Excel
Produc	Production Order Routing Line						
	Table Name					Field Name	
	Production Order	Routing Line				Operation No.	
	VAPS Format Stri	ngs				Space	
\rightarrow	Production Order	r Routing Line			:	Description	

Here you can add, insert, edit, and delete fields as well as change their order. You can select the desired table name and field name from your Dynamics 365 BC data by clicking "...".

5.7.2. Formatting the text

Separate the field contents by a blank, or by the separators shown below by selecting the according character from the "VAPS Format Strings" table.



AVAILABLE VALUES
Value
Space
:
(
\rightarrow)

5.8. How to use flow fields for tooltips, table, and label texts in NETRONIC'S simulation tables

With certain conditions met, flow fields can also be created directly in NETRONIC's own simulation tables, and be used for tooltips, bar labels, and table labels.

Important: Please note that only persistent records can be used as the foundation for calculating the values in the flow field formulas. This means that values resulting from interactive rescheduling in the planning board are not considered in the calculation. Additionally, there is no event triggered before the flow field value is calculated, making it impossible to apply a date filter to restrict the calculation to dynamic values, for example. Therefore, we recommend utilizing this feature only together with values from standard Business Central tables.

5.9. The "General "settings

General	
Hide Links between P	Show Infosymbol on Additional Information
Include Operations o	Show Symbol on Co
Progress Calculation · · · Based on Quantity · · ·	Show Symbol on Tool ·
Disable Warehouse A	Show Symbol on Pers
	Show Symbol on Qlty

- Decide whether you want to see links between production order lines or whether you want to hide them.
- Choose whether standby operations are to be included in the histogram
- Select whether a progress bar is shown and hether the progress should be calculated based on the time consumed or the quantity produced. The calculation of the consumed quantity is derived from the input quantity, allowing consideration for scrap as well.



Based on Time	\sim
None	
Based on Time	
Based on Quantity	

• Specify whether an info symbol will be shown on the according production order routing lines when additional information was added to this routing lines in BC.

10	10	
20	20	20
30	30	30

5.10. The "Scheduling" settings in the VAPS

Scheduling Parameters

The VAPS offers two semi-automatic scheduling tools, the functions "Add all" and "Fill idle times" either with or without considering the EMAD. The settings described below make sure that these functions work properly.

granning randomer	
Consider EMAD · · · · · · ·	Max. Number of Sche 3
Consider Queue Time	Add all default behavior for linked Production Orders
Consider Send-Ahead \cdots 💽	Default for Add unpla · 💽
Scheduling Start (rela 1D	Default for Do not ad ·

- **Consider EMAD:** Tick this option, if the EMAD shall also be considered when using "Add all" and "Fill idle times.
 - With the function "Add all" you can schedule a bunch of production orders in one go.
 - The function "Fill Idle Times" helps you to avoid idle times on machine centers and thus fully use your capacities.

Recommendation: If material availability is crucial for you, switch on this option, so that you never schedule without having material available.

- **Consider queue time**: Decide whether the queue time specified in Business Central on the work/machine center card is to be considered for the scheduling process.
- **Consider send-ahead time**: Decide whether the send-ahead time specified in Business Central when defining a routing is to be considered for the scheduling process.
- Scheduling Start: Here you can define the scheduling start for the two functions, starting from the current work date. This will be indicated in the plan by a blue vertical line.
 Recommendation: We recommend to initially set it to "2D" or "3D" to the short-term schedule as stable as possible.
- Maximal Number of Scheduling Iterations: This option is mostly related to the "Fill idle times" functions and lets you specify how often the scheduling process shall be carried out. No matter



which number you have entered here, the process will be stopped, when it brings no more change to the schedule.

Recommendation: We recommend starting with 5, if this takes too long, reduce to 3. But at least enter 1 here.

• Add all default behavior for linked Production Orders: With this option you can determine the default behavior of preceding and succeeding linked production orders when adding them from standby to the plan.

5.11. How to set the parameters for EMAD calculation

When you want to setup an EMAD (= Earliest Material Availability Date) calculation, you need two settings:

• Define the "Look ahead window" i.e., specify how far from now (= today) you would like to make the allocation of component supply to component demand. This is done in the "VAPS Setup":

Material Availability		
Look Ahead Window	3M	Use Routing Links
		Exclude None-Inventory Items

 Define which kind of demand type should get supplied first, second, third etc. This is done in the "EMAD Demand" dialog under "Manage -> Edit List". Here you can also change the priority order:

✓ Search	+ New	🐯 Edit List	📋 Delete	V Open	in Excel		7 =
				Priority		Document Type ↑	
\rightarrow				1	:	Sales Line	
				2		Sales Line	
						Service Line	
						Job Planning Line	
						Prod. Order Component Assembly Component	
						Transfer Line	

5.11.1. Consider EMAD on production order routing line level

Without any further specification, the VAPS calculates the EMAD on production order line level with no EMAD per operation at all. You can, however, have the VAPS also <u>consider routing links</u> so that the EMAD can be calculated by the production order routing line which means that a production order line can be started even when the material for one (or more) operations is not yet available.

This option has to be switched on the VAPS Setup page:

Exclude None-Invent
Exclude Blocked Inve

5.11.2. Exclude item type "non-inventory"

By clicking the according option, you can specify that the item type "non-inventory" is to be excluded from the EMAD calculation.

Material Availability	
Look Ahead Window · · · 12W	Exclude None-Invent
Use Routing Links · · · · ·	Exclude Blocked Inve

5.11.3. Exclude blocked inventory

You can easily and quickly block certain lots from the EMAD calculation. This could become necessary, e.g., if you have items the material of which is on-site but need a further quality inspection. Then you could block them from the EMAD calculation, and we would treat them as not available.

5.11.4. Exclude not fully promised receipt date from automatic functions like Add All

You can exclude production orders without a promised delivery date from the planning with "Add all" and "Add all incl. alternatives". You can still plan these orders manually per drag and drop. You can still plan these orders manually per drag and drop

Material Availability			
Look Ahead Window · · · 12W	Exclude Blocked Inve		
Use Routing Links · · · · ·	Exclude Not Fully Pro •		
Exclude None-Invent 🕐 💶 💽	Include Fully Consum 🕐 🌑		

5.11.5. Include fully consumed items into EMAD calculation

Planners can decide whether to include or exclude fully consumed items into/from the EMAD calculation by ticking the according option:



Material Availability	
Look Ahead Window · · · 12W	Exclude Blocked Inve
Use Routing Links · · · · ·	Exclude Not Fully Pro
Exclude None-Invent 🔹 🌅	Include Fully Consum 🔹 💽

5.11.6. Consider EMAD in semi-automatic scheduling

The VAPS offers two semi-automatic scheduling tools, the functions "Add all" and "Fill idle times" either with or without taking into account the EMAD. The settings below make sure that these functions work properly. All settings can be found in the <u>scheduling settings</u> of the VAPS Setup:

Scheduling Parameters	
Consider EMAD ·····	Scheduling Start (relative to Workdate) · · 1D
Consider Queue Time	Max. Number of Scheduling Iterations · · · 3
Consider Send-Ahead	

5.11.7. Apply EMAD tolerance to an item

As is commonly known, the EMAD calculation provides a date from which the required quantity of component demand is available and before which the production order must not start. The newly implemented EMAD tolerance allows defining the criterion not too narrowly so that, e.g., an order could already start if only 95% of the required material is available. To be able to do so, we have enhanced the item card with the respective setting option. When calculating the demand, the entered value is multiplied by the available quantity.

1001 · Touring Bicycle	
Process Item Prices & Discounts Request Approval More options	
Item	Show more
No	Show in VJS · · · · · · · · · · · · · · · · ·
Description · · · · · · · · · · · · · · · · · · ·	Item Category Code
Blocked · · · · · · · · · · · · · · · · · · ·	Color (VAPS)
Type · · · · · · · Inventory 🗸	EMAD Tolerance Percentage 5,00
Base Unit of Measure · · · · · · · · PCS · · ·	Exclude from EMAD (VAPS)

5.11.8. Consider sub-locations when calculating EMAD

With this feature, we resolve the challenge faced by manufacturing companies that store materials in multiple locations. Treating different location codes as one tackles the issue of supply shortages at the production facility by offering a consolidated view of inventory across all relevant locations. Here's why this approach works:



- **Unified inventory view**: By treating all involved location codes as one, the system views the combined inventory levels, thus recognizing the overall available supply instead of seeing a possible shortage at one or two particular locations.
- Elimination of short-notice transfers: The need for short-notice transfer orders is minimized since the inventory system accounts for the combined stock at all locations. This reduces the frequency of urgent transfers and the associated disruptions.
- Accurate production scheduling: The VAPS will now schedule production orders based on the total available inventory, preventing the orders from showing up in red due to perceived shortages. This ensures a smoother production workflow.
- **Improved planning efficiency**: With a comprehensive view of inventory, planning and replenishment processes become more efficient, leading to better stock management and reduced risk of supply gaps.

We have implemented this in the VAPS by enabling locations to have sub-locations, which is done on the Location Card:

Location Card	Ø) 🖻	+ 🖻	I		√ Saved	۲ <i>2</i>
BLUE · Blu	ie Warehou	lse					
🛃 Zones 🛛 🚍 Bins	🔆 Inventory Posting Setup	🖷 Warel	nouse Employees	🕄 Onl	ne Map	Dimension	s
General				🖏 Compl	ementary Ir	nventory Locatio	ons
Code · · · · · · · · · · · · · · · · · · ·	BLUE		Use As In-Trans	Related	ł		Specifies linked
			Use As In-Trans	Autom	ate		>
Name	Blue Warehouse			Fewer	options		
Address & Contact			Contact			S	Show more
Address	South East Street, 3		Contact · · · · ·		Jeff Smith		
Address 2			Phone No.		+44-(0)20	8207 4533	
Post Code	B27 4KT		Email · · · · · ·				
City	Birmingham		Home Page				
Country/Region Code	GB	\sim					
Show on Map							

Another dialog appears, where the user can define the needed additional locations:

imes Remin	der: your worl	k date is 31.01.	2024 Use today	Change to Turn	off reminder	~	… ⊮ ⊽ ≣
	+ New	🐯 Edit List	🗎 Delete			┢ 7 ≣	
	Main Location	t T			Complementary Location ↑	Name	Basefilter ID
\rightarrow	BLUE			:			2
					Code 1	Name	~
					BLUE	Blue Warehouse	
					GREEN	Green Warehouse	
					OUT. LOG.	Outsourced Logistics	
					OWN LOG.	Own Logistics	
					RED	Red Warehouse	
					+ New	en 100 1	Select from full list

When calculating EMAD, the sub-locations are consolidated with the main location, enabling inventory checks across all defined locations if the demand originates from the main one.

5.11.9. Shortcut to EMAD demand

On the Item card you can directly navigate to the EMAD demand entries.

\leftarrow	Item Card Work Date: 28.01	.2021			-	+ m						
	1000 · Bicycle											
	Process Item Prices &	L Discounts Request	App	oroval Actic	ons <u>Related</u> Fewer options							
	${igside}$ History \lor Item \lor	🔄 Availability 🗸	a P	Purchases 🗸 📲	Sales 🗸 🛛 🛲 Bill of Materials 🗸	🏧 Warehouse 🗸	🙀 Service 🗸	🖲 R				
	No	Items by Location Item Availability by			Item Category Code			~				
	Description	Statistics	>	>	Service Item Group			\sim				
	Туре	EMAD Demand	s	Show Demand Entries	Common Item No	Date process.						
	Base Unit of Measure	PCS		\sim	Purchasing Code			\sim				
	Show in VJS				Color (VAPS)	#0cf151						
	Last Date Modified	08.11.2019			EMAD Tolerance Percentage			0,00				
	GTIN · · · · · · · · · · · · · · · · · · ·	-			Exclude from EMAD (VAPS)							

5.11.10. Run EMAD calculation from Job Queue

With the help of the Business Central job queue, you can schedule certain background jobs for regular execution. The EMAD calculation, which until now could only be called via the VAPS (interactively with - depending on the data volume - long calculation times), can now be triggered via the job queue as soon as the VAPS is installed. Thus, it could be run at night, for example, without supervision and without the need for someone to log on to the system to start the VAPS.

Setting up the job queue has to be done within Business Central by the administrator



5.12. Settings for integrating MRP/planning worksheet

Please note, that the concept of MRP/planning worksheet is described in detail in this chapter.

Here, you can:

- enable/disable the MRP/VAPS integration
- define a frozen period relative to the work date, meaning the period in which the VAPS is responsible and production orders remain untouched by the planning worksheet.

MRP Setup	
Enable MRP/VAPS Int	Frozen Period 2W

5.13. How to set up the automatic calculation of the earliest start date

Usually, the fields "Earliest Start Date" on production order, production line, and production order routing line level have to be filled manually.

We have improved the handling on the production order level so that the "Earliest Start Date" on this level can be calculated and filled automatically. In particular, customers who often have orders whose required due date is relatively far in the future will appreciate this functionality.

The settings for this can be found in th area "Earliest Start Date Calculation" Here you can define which mode of calculation should be used along with the associated custom values:

- None same behavior as previously Recommended usage: If the shopfloor can manage the current production order volume, allowing for immediate ASAP planning without any need to "bench" tasks to align with the required due date so that storage cost will be minimized.
- Simple Date Formula will be applied to the "Required Due Date" to fill the Earliest Start Date.

Recommended usage: If the shop floor must delay production orders to prevent longterm storage of components or finished items until delivery, AND if the average production order can be completed within a day or a few days of entering the shop floor with minimal variation between orders.

• Weighted Production Order Time Demand - encompasses all times (setup time, run time multiplied by quantity, wait time, and move time) to represent the total raw duration of the production order. This total is then multiplied by a user-defined factor and subtracted from the "Required Due Date" in real time (without using work/shift calendars).

Recommended usage: If the shop floor must delay production orders to prevent longterm storage of components or finished items until delivery, AND if the average production order spans several days, albeit with significant variation between orders. Recommended multiplication factor: on a one-shift Mo-Fr shopfloor, a factor of 8 would give the best results.



The settings of the VAPS dialog are taken as default. However, users also have the option to customize settings for individual production orders on the related production order card, which will overwrite the default settings from the dialog.

VAPS	
Color (VAPS)	
Selected Earliest Calculati	Inherit from VAPS Setup \sim
Earliest Start Date Formula	Inherit from VAPS Setup None
Weighted Demand Factor	Simple Date Formula Weighted Prod Order Time Demand

This allows users to establish a "one size fits all" setting that applies broadly, while still having the flexibility to apply unique settings for specific production orders.

The calculation of the Earliest Start Date will be performed:

- whenever a "Refresh Production Order..." is run
- on changing the required due date
- on changing the custom value (date formula or multiplication factor)
- on performing a new action "Recalculate Earliest Start Date" on both the production order card and production order list as well as in the VAPS setup which the user can activate

5.14. The "Sales order handling" settings

Decide whether you want to

- keep reservations when production order due dates get shifted
- show the sales order number on the production order line
- automatically update the due date of a connected production order when sales order dates (Planned Delivery Date, Planned Shipment Date, Shipment Date) are postponed.

Sales Order Handling	
Change Sales Lines	Update the Required 🕐 💽
Sales Order on Prod 🕤 💽	

For more information, see <u>here</u>.

5.15. The "Appearance" settings

This area offers various setting options that affect the appearance of your plan

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Appearance

Zoom Factor(%)	100	Weekend Coloring	
Layout · · · · · · · · · · · · · · · · · · ·	COMPACT \checkmark	Colorize Weekend	
Tooltip Delay (ms)	1250	Weekend Color	#DFFA9F
Standby Color	#F3F3B399	Bar coloring mode	Graded \checkmark
Dateline Grid Mode	Weekly \checkmark	Hide Status Bar	
		Asynchronous Time	
		Asynchronous Rende	
		Date Line Behavior	Show on Hover \checkmark

Here you can:

- Specify a **zoom factor** in percent.
- Choose a **layout**: In the "Compact" layout, the display is reduced as much as possible to provide a better overview, especially with large plans.
 - unuary 2021 Wk 02 0 Capacities Wk03 18 19 20 13 14 15 16 17 23 24 ▲ Machining Start ▲ Cutting Þ 1 10 1 Standby (∞) 1 Cutting #1 16 Cutting #2 10 10 Cutting #3 10 10 ▲ Drilling Þ 20 20 Standby (∞) Drilling #1 10 20 20 20 200 Drilling #2
 - Standard layout, zoom factor 100 %:

Compact layout, zoom factor 100 %

		nuary 2021 Wk 02 Wk 03 Wk 04														^
Capacities	Wk 13	:02 14	15	16	17	Wk ()3 19	20	21	22	23	24	Wk 25	04 26	27	1.20
Machining			15	10	17	10	19	20	21	22	25	24	23	20	21	28
-	<u>ک</u>	5														
Standby (∞)	Cehoduling Start												1	10 1		
Cutting #1	, i i i	1	۵ 1													
Cutting #2		1(10													11
Cutting #3		10	D C											10)	
▲ Drilling	•															-
Standby (∞)															20 20	
Drilling #1			20) 20		•								10)	
Drilling #2			20	220		2										
▲ Milling & Turning	•															
Standby (∞)																
Milling #1						30	30									
Milling #2				<mark>3</mark> 0			1									
Turning #1						4	40									
Milling & Turning			2	30		đ	40									1

• Standard view, zoom factor 80 %

Capacities		nuary 20 c 02	021			Wk	13		_			_	F Wk 04 V							
Capacities		14		16	17			20	21	22	23	24		26	27	28	29	30	31	
⊿ Machining		Start																		
⊿ Cutting	•	Scheduling Start																		
Standby (∞)		5											1	10 1						
Cutting #1		1	• 1																	
Cutting #2	I.	10	10													1				
Machine Center		10												10	Ċ.					
No.: 120	8.		Ŧ.											17	r.	-				
Name: Cutting #2	•																			
Work Center Name: Cutting														2	0					
														1	20					
Drilling #1			20) 20		•								10	P	1				
Drilling #2			20	220		2														
▲ Milling & Turning	۶.																			
Standby (∞)																				
Milling #1						30	9 30													
Milling #2				30			1													
Turning #1						4	40													
Milling & Turning			1	30		3	40									1				



• Specify a tooltip delay: give a time in milliseconds after which the tooltip shall appear

Appearance				
Zoom Factor(%)	10	00	Tooltip Delay (ms)	750
Layout · · · · · · · · · · · · · · · · · · ·	STANDARD			

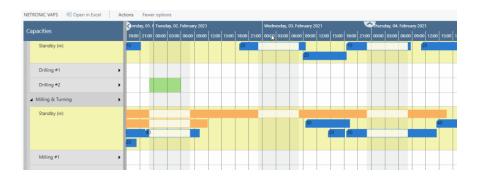
- Support of visual connection between timescale and diagram/ planning area
 - Select an individual background color and transparency degree for the standby resource. The procedure for editing the standby color is the same as for the weekend coloring (please see description there):

Appearance		
Coom Factor(%)	100	Color Picker
ayout STANDARD	~ V	w
ooltip Delay (ms)	750 0	
andby Color PDBDBD54F		
		Selected Color PD808064F
		6
		OK Cancel

 Chose a date line grid mode for the vertical separation lines between individually selectable intervals

Dateline Grid Mode	Daily 🗸
Weekend Coloring	None Auto
Colorize Weekend	Daily Weekly
Weekend Color	#9FD7FA

• The "Auto" mode causes the grids to automatically adjust to the resolution of the time scale resulting from zooming in or out.



- o Make settings for the weekend coloring
 - Decide, whether you want to color the weekends individually:

Weekend Coloring

Colorize Weekend





 \circ $\;$ Specify weekend color and transparency by clicking to $\;$ open the "Color Picker" $\;$

• reset the weekend color to default comfortably and at one click:

Color Picker			∠ ×
	Manage	>	
	Actions	> Seset Color to Default	
	Fewer options	Reset color to default.	
	✓ Show as menu		
		• •	
Selected Color · · · · ·		#9FD7FA	
		ок	Cancel
		OK.	Cancel

• Bar colors: Select individual bar color schemes that ensure that the label texts are always visible.

Colorize Weekend	Graded	
Weekend Color	Solid Only Allocated Times	
Bar coloring mode	Graded	\sim

The options in detail:

 Graded (default): nonworking times are displayed in a lighter shade of the main color; in case there are assignments during non-working periods they are drawn in the main color



24	25	26	27	28	29	30	31	01	02	03	04	05	06	07	08
	Start														
	Sche <mark>duti</mark> ng	10)		10	10	0								
	ed 1				_		10		_				_		
	Š	10					10								
		11	0												
														_	

• Solid: draws a continuous block in the main color

			-		WK 05			-	-	-		WK OC	, ,	
24	25	26	27	28	29	30	31	01	02	03	04	05	06	07 0
	Start													
	Ë						_							
	Sche <mark>d ut</mark> ing	10			10	1	D							
	he	110					10					1		
	Ň													
		11)											

o Only Allocated Times: nonworking times appear with a white background

25	26	27	28	29	30	31	1 C	1	02	03	04	05	06	07
Start														
Scheduting	10)		10		10								
e e	110					_	10							
S.	110						10							
	1 1	0												
												_	_	_

A note on transparency: weekends, standby and calendar grids may overlap and by setting the transparency the user can determine what should be hidden or what should shine through. For example, if you want to see the calendar grids or the weekends on the standby resource, you have to make the standby color translucent accordingly.

• Show/hide the status area below the visual schedule



- Improve visual responsiveness and performance when navigating big plans by ticking off/on the options:
 - o Asynchronous Time-Area Stretching
 - o Asynchronous Rendering



• Specify whether the date lines "Required Due Date" and "Earliest Start Date" get visualized by hovering above and/or by clicking the corresponding operation.

Asynchronous Time	Show on Click
	Show on Hover
Asynchronous Rende	Show on Click and Hover
Date Line Behavior	Show on Hover \sim

5.16. Show/hide the notifications window

When simulations get **outdated or invalidated**, e.g., when you add or delete production orders, the VAPS shows a notification window, informing you about this:



If you don't want this notification window to be shown tick the according option in the VAPS Setup dialog:

Show Notification	
Enable Notification)

5.17. Define alternative routings/ alternative work/machine centers

You might have work/machines that can do the same job. With the alternate routing sets, you can define these alternatives. Plus: you can also define production (and setup!) coefficients if some work /machine centers can run faster than the others.

You can define alternative routings/ alternative work/machine centers on the "alternate routing set" page, which you can access from the NETRONIC VAPS menu, or by simply searching for "alternate routing set". The alternate routing set setup page looks as follows:



Alternate Routing Lines ~ Type Center No. Machine Center Name Multiplier	
Type Center No. Machine Center Name Multiplier	
Type Center No. Machine Center Name Multiplier	
	Run Time Multiplier
→ Work Center • : 100 Cutting 1 Work Center 1	1
Machine Center	

You then can create a new alternative routing set by clicking the "+" icon which you find at the top of the page. Then you need to give your routing set a unique number:

		+	1		7
Alternate Routi	ng Set				
Show Attached					
Header					_
No. Set#1 - Cutt	ing	Versio	n No. • • • • • • • • • [~]
Description		Blocke	ed · · · · · · (

After that, you can add all those machines and/or work centers to the alternate routing set that can work as alternative resources within one routing.

However, you not just define the respective alternative resources. In addition to this you can also define two different types of production coefficients:

- The setup multiplier
- The runtime multiplier



Show Attached				
Header				
No	SET#1 - CUTTING	Version No.		\sim
Description		Blocked		
Alternate Routing Lines	~			
Alternate Routing Lines MACHINE CENTER NO.	MACHINE CENTER NAM	ME	SETUP TIME MULTIPLIER	RUN TIME MULTIPLIER
MACHINE CENTER		ME		

In the above example, the alternate routing set "SET#1 - CUTTING" determines the following:

- 1. The machine centers 1101, 1102 and 1103 (cutting #1, cutting #2, and cutting #3) are alternative machines.
- 2. The machine center cutting #1 is the reference machine (both setup time multiplier and run time multiplier equal 1).
- 3. Cutting #2 takes 25% longer to set-up than cutting #1 but can run 20% faster (only takes 80% of the run time).
- 4. Cutting #3 can be set-up 20% faster than cutting #1 but runs 2x longer.

Once you defined an alternate routing set, you can add it to any routing that you have.

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				\bigcirc						
1300 · F	rame									
Copy Routing	Versions	🚭 Where-u	sed Show At	tached Page	Actions Navigate	e Report	Fewer o	ptions		
General										
No		1300			Search Description		FRAME			
Description · · · ·		Frame			Version Nos.					
				•	Active Version					
Туре		Serial		•	Active version					
Type · · · · · · · · · · · · · · · · · · ·		Serial Certified		•	Last Date Modified		7/20/20 ⁻	19		
51	age Operatio	Certified n Fewer opt	tions		J 1					
Status		Certified	tions TYPE		J 1		S AT [19 SE DE SE	SETUP TIME	RI
Status	age Operation PREVIOUS OPERATI	Certified n Fewer opt NEXT 0PERATI		NO.	Last Date Modified	ALTERN	S AT [SE DE	SETUP TIME	RI
Status Lines Mana OPERATI NO.	ege Operation PREVIOUS OPERATI NO.	Certified n Fewer opt NEXT OPERATI NO.	TYPE	NO.	Last Date Modified	ALTERN. SET	S AT [SE DE SE		RI
Status Mana OPERATI NO. 10	age Operation PREVIOUS OPERATI NO.	Certified Fewer opt NEXT OPERATI NO. 20	TYPE Machine Cent	NO. 1101 1202	Last Date Modified · DESCRIPTION Cutting #1	ALTERN. SET	S AT [SE DE SE	60	RI

The above example shows the routing 1300 for the item frame. Operation 10 by default is assigned to machine center 1101 (cutting #1). However, you see that the "SET#1 - CUTTING" is also defined as the alternate set.

When you now create a new production order using this routing, and when you then (re)calculate the production order via the standard Business Central scheduling, the alternate set is added to the production order routing line of that production order.

Consequently, all alternative machine centers will get highlighted when you drag operation 10 of the routing in the planning board. Also, when you reassign it from cutting #1 to one of the alternative machine centers, the setup time multiplier and the runtime multiplier will get taken into account.

6. Integrating with Microsoft Dynamics 365 Business Central

6.1. Integrating with Business Central standard manufacturing

The VAPS integrates with some standard Business Central tables & function:

- Work/machine centers
- Shop calendars
- Production orders
- Routings



6.1.1. How does the VAPS integrate with work/machine centers?

In the plan, work center groups, work centers and machine centers are shown as follows:

Capacities		Ç o, 25. Jan 202	Tu, 26. Ja	n 2021	We, 27. Ja	in 2021	Th, 28. Jai	n 2021	Fr, 29. Ja
Capacilies		05:3 12:00	00:00	12:00	00:00	12:00	00:00	12:00	00:00
▲ Machining Work	Center Group							e Date	
✓ Cutting Work C	Center 🕨 🕨							Required Due Date	
Standby (∞)	Machine Center "Sta	ndby resource	", automa	tically add	ded to ead	ch work c	enter	Requir	
Cutting #1	Machine Center								
Cutting #2	Machine Center						1		
Cutting #3	Machine Center	16	1	06					

By double-clicking you can open the according Business Central card:

	Operations S	SUDCONTACT	ng in ivilo	laie
as Alterna	tive			
Process Order	More options			(i
General				
No	101035	Quantity		25
Description	3 Operations Subcontracting in M	Due Date	1/28/2021	
Description 2		Required Due Date	1/28/2021	
Source Type	ltem 🗸	Assigned User ID · · · · ·		\sim
Source No.	3006 ~	Last Date Modified	8/12/2020	
Search Description	3 OPERATIONS SUBCONTRACTIN	Color (VAPS)	#9d00ff	
Lines Manage M	More options			63
				0
	Due Date Description /28/2021 3 Operations Subco	Starting Date-Time ntracting i 1/26/2021 12:15	Ending Date-Time	Quantity 25
		.,,		

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Shop calendars

In Business Central, the work times come via the work center. This means, that you have to specify a shop calendar code on the Work Center card and this shop calendar code then defines the work times/non-work times.

Scheduling				
Unit of Measure Code · · · · · · · MINUTES V	Shop Calendar Code	1	~	
Capacity	Queue Time	Code 1	Description	
Efficiency 100	Queue Time Unit of Meas. Code	\rightarrow 1	One shift Monday-Friday	
Consolidated Calendar		2	Two shifts Monday-Friday	
		+ New		Select from full list

Please note that you need at least one shop calendar code. If you have multiple work centers with multiple shifts you need multiple shop calendar codes.

Add capacity to machine center

In addition, you'll have to update the capacity of the machine center. The machine center inherits the calendar of the work center, but you need to specify this on the machine center card.

✓ Search	🔁 Statistics 🛛 🚺	CALC. MACHINE CENTER CALENDAR		
VIEW - MACHI	INE CENTER CALENE	Options	· E 88	\swarrow \times
No. 1	Name	Starting Date 1/1/2021 Ending Date 12/31/2021	/31/21	02/01/21 0
110	Cutting #1		-	900.00
120	Cutting #2		-	900.00
130	Cutting #3	Filter: Machine Center	-	900.00
210	Drilling #1	× No	-	900.00
220	Drilling #2		-	900.00
310	Milling #1	+ Filter	-	900.00
315	Milling #2	Filter totals by:	-	900.00
320	Turning #1	+ Filter	-	900.00
330	Milling & Turning		-	900.00
410	Assembly station		-	480.00
420	Assembly station	Schedule OK Cancel	-	480.00
430	Assembly station		// _	480.00
440	Assembly Station	#4 480.00 480.00 _	_	480.00

The capacity curve

The capacity curve shows the capacity of a work center group. It is calculated by taking the capacity per day from the shop calendar and multiply it by the number of machine centers.



Capacities		ebruary 2021 /k 06 Wk 07							Wk 08		
·	06	07 08	09	10	11	12	13	14	15	16	
▲ Drilling											1
	2,098 -					_	_				
	1,049 -										
	0							_			
Standby (∞)						1					
						10					
Drilling #1	+			101009 1010	08	101006	0 101011		1	(<mark>10</mark> 1018	ī
Drilling #2	+			10	1(01 101005				<mark>1</mark> 0100	
Milling & Turning	•			1010	1	1010 <mark>08 1</mark>				10100 <mark>5</mark>	10

Add/remove work time

With the VAPS, you can comfortably define variations in capacity for multiple machine/work centers or entire shifts in one go.

The VAPS lets you

- add/remove work time for multiple machine/work centers in one interaction
- add/remove work time for entire shifts by work shift codes for one or multiple machine/work centers

Both options can be found under the "Actions" menu entry "Capacity Management"

	Actions \checkmark Fewer option	ns														
	Edit	>	/ 2024				Febru	iary 20	24				$\mathbf{\hat{\mathbf{v}}}$	/		
			25 26 27 28	Wk 05 29	30	31	01	02	03	04	Wk (06	07	08	09	11
	Schedule	>														
en	View	>			orkdate	ng St										
	Capacity Management	>	Change Uptime	>		Add Ad	ditior	nal Upt	time	>	By	Date/T	ime			
	Timescale	>	Change Downtime	>		Edit Ad	ldition	al Upt	ime		By	Shift				
	Calendar	>	Capacity Aggregatio	n >	01	01018	(80)	1	01029	(40)	1	01014	1010	40 (5(1	01022	2 ['] 10'
	View Filter	>		101	0100	101	016 (7	0) 10	01021	(40)	1	010 10	0101!1	01035	10104	41 (
	Search	>		101	10101	1 (80)	10	10101	10103	0 (50)		10103	1 <mark>(1</mark> 20) 1010	37 (50	0.10
				10	10101	101/1	101	019 1	<mark>0</mark> 1023	8 (48)		10	0103 10	01033	101(1(010

In the picture below, downtimes have been added by date/time for two machine centers:

Add Downtime by	Date/Time				2 X
Downtime					
Start Time	08:00:00		End Time	23:00:00	
Timeframe					
Start Date	04.03.2024	Ē	Capacity Type	Machine Center	\sim
End Date	08.03.2024		Capacity No.	M00050 M00060	
Absent Details					
Absent Details		Mainten	ance		
				Dk	Cancel

This is what the result looks like:

Gear Cutting Verzahnen	•			
Standby (∞)			101152 (* 101155 101156 (80)	10108116
LC 500	•	1-101047 (1101150 (120)	101151 (80) 101211 (77)	
LC 180	•	10		
Phoenix	•)48		43

In the "Edit" dialog, you can change all your up/downtimes:

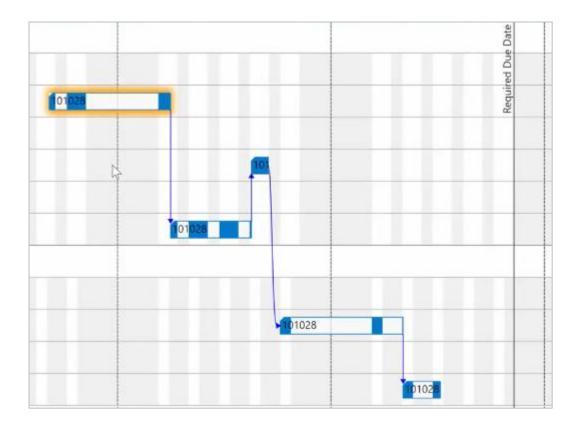
p	Search	5	Edit	List 🗇	Delete	Rela	ted V Fewer options			1	R	
	Date †			Starting Time †	Ending †	I Time	Description	Capacity	Upd	No. 1		Сара Туре
>	21.02.20		:	08:00:00	13:00	:00	Wartung	1	12	M00010		Mad
	04.03.202	4		16:00:00	23:59	:59	Lack of worker	1	12	M00040		Ma
	05.03.202	4		16:00:00	23:59	:59	Lack of worker	1	USL.	M00040		Mad
	06.03.202	4		16:00:00	23:59	:59	Lack of worker	1	03	M00040		Ma
	07.03.202	4		16:00:00	23:59	:59	Lack of worker	1	6	M00040		Ma
	08.03.202	4		16:00:00	23:59	:59	Lack of worker	1	12	M00040		Ma
	04.03.202	4	÷	08:00:00	23:00	:00	Maintenance	1	82	M00050		Ma
	05.03.202	4		08:00:00	23:00	:00	Maintenance	1	61	M00050		Mad
	06.03.202	4		08:00:00	23:00	:00	Maintenance	1	12	M00050		Ma
	07.03.202	4		08:00:00	23:00	:00	Maintenance	1	12	M00050		Ma
	08.03.202	4		08:00:00	23:00	:00	Maintenance	1	63	M00050		Ma
	04.03.202	4		08:00:00	23:00	:00	Maintenance	1	13	M00060		Ma
	05.03.202	4		08:00:00	23:00	:00	Maintenance	1	8	M00060		Ma
	06.03.202	4		08:00:00	23:00	:00	Maintenance	1	15	M00060		Mad
	07.03.202	4		08:00:00	23:00	:00	Maintenance	1	- 83	M00060		Mad
	08.03.202	4		08:00:00	23:00	:00	Maintenance	1	13	M00060		Mad

6.1.2. Production orders

Production orders are represented in the VAPS by the bars of the single operations. Double-clicking a bar will open the respective card:

The following production order data are visualized in the plan:

- production order number: displayed on the bars
- starting date/time when the first operation of the production order starts
- ending date/time when the last operation of the production order starts
- required due date, a field added by us : symbolized by a vertical line, shown for the production order just selected
- order in which operations are worked off, coming from the routing visualized by links



• Earliest start date calculation type: the VAPS allows to calculate the earliest start date on production order level automatically. The default settings being valid for all production orders are made in the according area in the VAPS setup dialog. However, users also have the option to customize settings for individual production orders, which will overwrite the default settings from the dialog.

١	IΑ	۱P	S

Color (VAPS)	
Selected Earliest Calculati	Inherit from VAPS Setup \sim
Earliest Start Date Formula	Inherit from VAPS Setup None
Weighted Demand Factor	Simple Date Formula Weighted Prod Order Time Demand

Detailed information about the automatic calculation of the earlies start date can be found <u>here</u>.

6.1.3. Standby resource

The standby resource contains all production order routing lines/operations that are not yet scheduled from within the VAPS, and hence are just scheduled by the Business Central scheduling run.



The standby resource gets highlighted by a yellow background (and an infinity symbol next to its name in the table part):

		Febr	uary 202													
Capacities		Wk		Wk 07							Wk 08					
		06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
.∡ Machining																
⊿ Cutting	+															
Standby (00)							P	1								
Cutting #1	•			1	010 <mark>010</mark>	1 010 <mark>10</mark>	01	1	101018	3						
Cutting #2	•					11	<mark>0</mark> 100 <mark>5</mark>									
Cutting #3	•															
▶ Drilling	•					1010 <mark>01</mark> 0	01008	1	101011		_	101 <mark>01</mark>				
						1	10	1				101				

You can also get an overview of orders that are not yet scheduled by the VAPS in the simulation data:

Schedu by VAPS	StandBy
~	
	V
~	
~	

6.2. Output and consumption postings

Output and consumption postings can be seen as information about the progress of your production execution. When you post output or consumption on your production order line you basically tell your system that you started or finished an operation or that you have achieved a certain percentage of completion.

6.2.1. Fundamentals on output/consumption postings:

- Output/consumption postings can happen very often, sometimes, even automatically
- They reflect a constant data updating process
- No impact on an existing simulation:
 - The simulation doesn't get outdated
 - The simulation doesn't get invalid
- The progress information you see in the visual schedule is about the moment in time when you created your simulation.
- After posting output/consumption you have to create a new simulation



6.2.2. The impact of the production order status

- You can only post output and consumption to a released production order
- Any output/consumption posting on a released production order results in showing a progress bar in the VAPS

6.2.3. Visualization of progress information in the VAPS

For production order routing lines of released production orders, a slim progress bar is displayed below the actual bar being based on the posted quantity consumption. The color of the progress bar appears as follows:

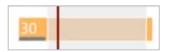
• finished: black and grayed out



• still in progress and output/consumption <= originally planned quantity: grey



• still in progress and output/consumption > originally planned quantity: red



Please note, that

- you can only post output and consumption to a released production order
- Operations that are already in progress, cannot be moved any more
- the percentage of completion is shown in relation to the net working time.

6.2.4. Special case: Posting on an operation that is still on the standby resource

This is a rare case that normally should not happen, but you need to be aware of it.

Important to know

- If you post output/consumption on an operation that is still on the standby resource, this operation gets automatically moved to the machine center that is specified in the routing because if an operation is started (what the posting means) it de facto cannot be on the standby resource any longer.
- If there already is another operation on this specific machine, this could result in an overload which the planner has to fix manually.

6.3. Integration with MRP/planning worksheet

The VAPS/MRP integration establishes clear rules as to which production orders belong into the VAPS area of responsibility and hence have to be untouched by the planning worksheet.



With this functionality we wanted to overcome the constant battle between planning and scheduling, and the VAPS offers a close cooperation and interweaving between the finite capacity scheduling (VAPS) and the planning worksheet (MRP).

The VAPS is responsible for the shorter-term finite capacity scheduling, whereas MRP and the planning worksheet are responsible for the mid-term demand planning. The VAPS/MRP integration establishes clear rules as to which production orders belong into the VAPS area of responsibility and hence have to be untouched by the planning worksheet.

We determine this by two parameters:

- Timeframe (we introduce a "frozen period" as a period in which production orders will not get changed by MRP)
- Production order status

		PRODUCTION ORDER STATUS	
	Released	Firm Planned	Planned
TIMEFRAME frozen iod period	VAPS 冒	VAPS "Planning flexibility" is set to "none" when simulation is published and next regenerative plan is created	MRP / planning worksheet
TIMEF After frozen period	VAPS	MRP / planning worksheet	MRP / planning worksheet

The below chart summarizes these areas of responsibility:

6.3.1. Here is how we implemented this concept in the VAPS:

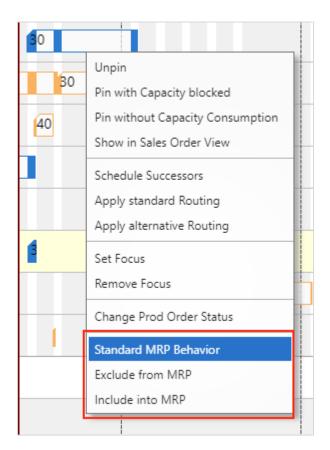
For the needed settings, we have implemented a corresponding area in the VAPS Setup dialog:

MRP Setup	
Enable MRP/VAPS Int	Frozen Period 2W

Here, you can

- enable/disable the MRP/VAPS integration
- Define a **frozen period** relative to the work date, meaning the period in which the VAPS is responsible and production orders remain **untouched** by the planning worksheet.
- Select the according options from the enhanced context menu which fits your situation to **allow deviations from standard rules** concerning the VAPS/MRP integration:





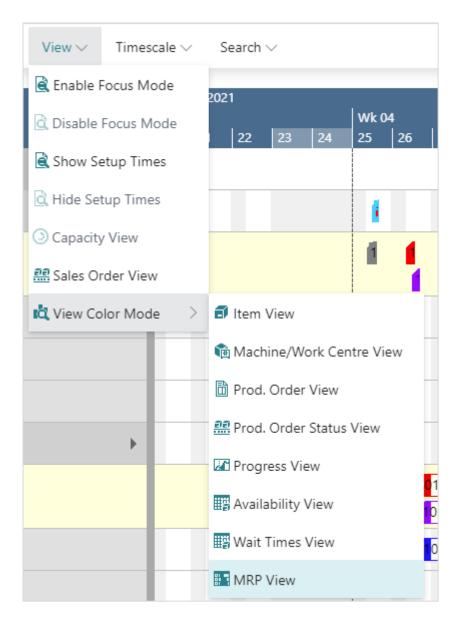
• Check in the enhanced planning worksheet which production orders are scheduled by VAPS.

Warning		No.	Scheduled VAPS	Action Message
]:	1000		Cancel
		LS-10PC		New
		LS-10PC		New
Emergency		LS-120		New
		LS-120		New
		LS-150		New

• When action messages are carried out, a warning message is given that this might change production orders that are scheduled by the VAPS.

Warning	No.	Sch VAPS	Action Message	Ref. Line No.	Acti Mes	Original Due Date	Due Date	Starting Date-Time
÷	 3008	Ξ.	Cancel	10000	×.		2/20/2021	2/15/2021 9:43 AM
	3009		New		8		3/2/2021	2/15/2021 12:25
	1		e or more of t you want to c	he affected orde	ers is alre	ady scheduled	by VAPS.	-

• The color scheme "MRP" view helps you to quickly differentiate production orders that belong to the VAPS area of responsibility from those that belong to the MRP area of responsibility.



boyum

The darker red shows that for this production order you have set an exception to the standard rule by context menu as described above



6.4. Integration with shopfloor data

Customers need and want to update their schedule based on actual data and if unexpected incidents happen on the shopfloor, they want to quickly see the impact on the schedule. This is exactly what this functionality offers. For easy and comfortable use, we implemented the following features:

- Capability to load recent shop floor data (capacity ledger entries) into simulation
- Special color mode "<u>Shop Floor Status View</u>" to highlight deviations between actuals and schedule. The below screenshot shows the "Shop Floor Status View" with the default colors applied

Conscition	K	и Мо, 2	9. Jan 202	Tu, 30	Jan 2024	We, 31.	. Jan 2024	Th, 01.	Feb 2024	Fr, 02. I	Feb 20
Capacities		8 00:00	12:00	00:00	12:00	00:00	12:00	00:00	12:00	00:00	12:00
Production					ate		24	Start			
Turning Drehen	۶.				Workdate		16:09:24				
Standby (∞)			10100 101		Wo		ofloor Refresh: 1(Scheduling			
CTX400	•		10100 101	008 (<mark>3</mark>	D) 10 10	1018 <mark>(8</mark>	02				1010
CTX 2500	•	Í	01005 1	01007 (70)	10	01016 (7	0)			1010
Beta 500	•	(101006 (10101 <mark>1</mark>	(80)			1	0102 10	1012 <mark>(4</mark>	0) 1

Color mode "<u>Execution Status View</u>" to give feedback on the operations' status on the shop floor: "ready to get in progress", "in progress", "finished", and the "rest".
 The screenshot below shows the "Execution Status" view with the default colors applied:

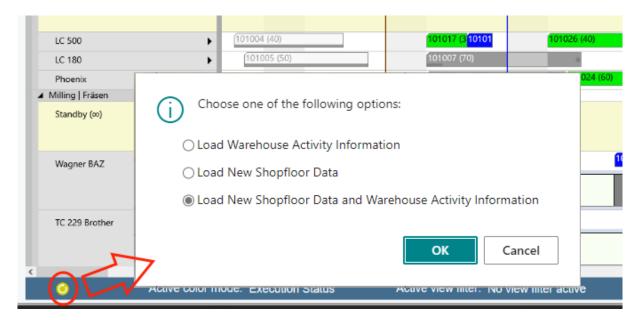
10:10100(11101018 (0) 101029 (40)	101014 (7 <mark>101040 (50) 101022 (</mark> 101046 (40)	i 101 <mark>044 (60) 101036 (80)</mark>	1010
101 101007 1010 16 (70) 101021 (40)	້ <mark>101</mark> 03 <mark>_101015</mark> _101 <mark>035 (ຢີ 1</mark> 01 <mark>041 (</mark> 80)	10104 <mark>5 101</mark> 047 (100)	
101(101011 (80) 10: 101012 101030 (50)	101031 (120) 101037 (50) 101043 (90)	10105 <mark>0 101</mark> 049 (
101 101017 (1010 11 101019 (4 101023 (48)	1010 <mark>32 101033 (7 10</mark> 10 <mark>: 1010</mark> 42 (110)	101048 (70) 101064 (40)	

- Option to (automatically) update the schedule based on actuals, either via the "Actions" menu or via the context menu
 - information from capacity ledger entries gets written into the production order routing lines
- Vertical line indicating when the last "update according to actuals" was made



Constitute	Edit	>	Load New Shop Flo	or Data	Ines	day, 05.	April 20	23	Thursd	lay, 00
Capacities	Schedule	>	Apply Shop Floor C	hanaas	0	06:00	12:00	18:00	00:00	06:0
A Production	Schedule		Apply shop root o	nanges			56	Start		
▲ Turning Drehen	View	>	Other	>			16:32:56	1 St		
Standby (∞)			Descenter()	281	-		16	-		
CTX400	Capacity Management	>	(101077 (38)		-	1010	64 🥳)	重	101065	i (80)
CTX 2500	Timescale	>	60)	/		10	107	n N	1	
Beta 500	Calendar	>	/				Pres -		Ì	N.
Beta 800	Calendar	1					1	1		X
Sawing Sägen	View Filter	>					1	Lan		1
Standby (∞)	Search	>								
Saw Säge		-	1010 101065	(80)			10107	7 (3) 10	073 (4)	8)

• Button in the status bar that turns yellow, when new warehouse acitvity line or shopfloor data is available. By clicking this button, users can also initiate these actions in addition to using the existing "Action" menu entries.



6.5.Integration of sales orders and production orders

Planners do not want reservations between production orders and sales orders to break if there are delays in production. Finite Capacity Scheduling Instruments. Instead, they want to quickly understand which sales orders run late due to material and/or capacity constraints.

To solve these problems, the VAPS offers an (optional) integration of sales orders and production orders with the following functionalities:

- The automatic shift of sales order expected shipment date in case production orders have to get shifted
- Reservation between production orders and sales orders is being kept although the production order due date > original sales order expected shipment date



• Comprehensive report to see which sales orders have been shifted due to production order shifts

Simulations Sale:	s Line Cha	nges Alterna	te Routings	Color Setu	p VAPS Setup	EMAD Deman	d Priority					Fe
Sales Line Changes:	All <	, ♀ Search	🗊 Delete	📴 Edit List	朦 Sales Order	More options					₫ 7 =	020
Shift Date-Time	Done T	Done Date-Time	Done User		Sales Order Number	Sales Line Number	Old Shipment Date	Shifted Shipment Date	item No.	Customer	Salesperson Code	Contact
05.04.2023 16:46	E (0)				50-000016	10000	11.02.2024	08.03.2024	P000007	The Cannon Group PLC	OL	Mr. And

This functionality has to be enabled in the "Sales Order Handling" area of the VAPS setup:

Sales Order Handling	
Change Sales Lines · · · ·	Update the Required
Sales Order on Prod 🕐 💽	

6.6. Show sales order number on production order line

With this function we further expanded the integration of production orders and sales orders, making the connection shown already on the according production order line card. What is more, you can also directly open the sales order from here:

× keminder: yo	our work date is 31.01.2024 Use	today Change to	Turn off reminder							
	New Manage <u>Home</u> Rep	oorts Mor	e options							
🗳 Change Statu	is 🛛 🚭 Update Unit Cost 🛛 🗋	Statistics								
No. †	Description	Source No.	Routing No.	Quantity	Starting Date-Time	Ending Date-Time	Due Date	Assigned User ID	Status ↑	Search Description
101052	Prod 9 - type 5a	P000009	P000009	40	04.03.2024 08:00	07.03.2024 14:00	08.03.2024		Firm Planned	PROD 9 - T
101055	Comp 0 - Prod 000009 - type 4	COMP-P0000	COMP-P0000	40	20.02.2024 12:19	21.02.2024 23:06	22.02.2024		Firm Planned	COMP 0 - P
101056	Comp 1 - Prod 000009 - type 2	COMP-P0000	COMP-P0000	40	20.02.2024 12:06	21.02.2024 12:01	22.02.2024		Firm Planned	COMP 1 - P
101057	Prod 10 - type 1c	P000010	P000010	56	21.02.2024 23:06	29.02.2024 13:52	01.03.2024		Firm Planned	PROD 10
101058	Prod 11 - type 1	P000011	P000011	40	12.03.2024 08:39	14.03.2024 13:59	15.03.2024		Firm Planned	PROD 11
101059	Prod 12 - type 7a	P000012	P000012	50	19.02.2024 13:19	29.02.2024 08:12	01.03.2024		Firm Planned	PROD 12
101062	Prod 13 - type 2c	P000013	P000013	40	08.02.2024 15:41	14.02.2024 10:16	15.02.2024		Firm Planned	PROD 13
101064	Prod 14 - type 5d	P000014	P000014	40	16.02.2024 15:08	01.03.2024 08:12	02.03.2024		Firm Planned	PROD 14
101066	Prod 15 - type 4b	P000015	P000015	75	21.02.2024 23:19	04.03.2024 10:57	05.03.2024		Firm Planned	PROD 15
101067	Prod 16 - type 3c	P000016	P000016	50	11.03.2024 08:00	14.03.2024 10:09	15.03.2024		Firm Planned	PROD 16
101068	Prod 17 - type 2f	P000017	P000017	50	13.03.2024 08:00	18.03.2024 14:55	19.03.2024		Firm Planned	PROD 17
101069	Prod 18 - type 1	P000018	P000018	80	26.02.2024 20:29	12.03.2024 15:19	13.03.2024		Firm Planned	PROD 18
101070	Prod 18 - type 1	P000018	P000018	120	22.02.2024 20:29	13.03.2024 11:14	14.03.2024		Firm Planned	PROD 18
101071	Prod 10 - type 1c	P000010	P000010	60	28.02.2024 22:10	07.03.2024 16:00	08.03.2024		Firm Planned	PROD 10
101072	Prod 19 - type 1	P000019	P000019	75	27.02.2024 18:45	07.03.2024 16:00	08.03.2024		Firm Planned	PROD 19
101073	Prod 20 - type 1	P000020	P000020	50	28.02.2024 13:55	06.03.2024 16:00	07.03.2024		Firm Planned	PROD 20
101074	Prod 10 - type 1c	P000010	P000010	100	27.02.2024 18:50	12.03.2024 16:00	13.03.2024		Firm Planned	PROD 10
101075	Prod 19 - type 1	P000019	P000019	80	29.02.2024 21:50	12.03.2024 16:00	13.03.2024		Firm Planned	PROD 19

This function has also to be activated in the "Sales Order Handling" area of the VAPS setup.

Sales Order Handling	
Change Sales Lines · · · · •	Update the Required ·
Sales Order on Prod 🕐 💽	

6.7.Reflect sales department updates in the production schedule

This feature automatically updates the due date of a connected production order when sales order dates (Planned Delivery Date, Planned Shipment Date, Shipment Date) are postponed. This ensures that the production schedule accurately reflects updates made by the sales department. Please note that the new feature only covers situations where sales lines are postponed. If they are moved to an earlier date, the production orders are not rescheduled automatically, which may result in schedule conflicts and the removal of reservations. The feature is disabled by default and can be activated in the VAPS Setup dialog:

Sales Order Handling

Change Sales Lines	Update the Required
Sales Order on Prod ·	Update the Required Due Date from Sales Order Line Changes
Show Notification	Specifies if the required due date of production orders should be updated from sales order line shipment date changes.
Enable Notifications	Learn more

6.8. Planning per sales orders

Sales orders can have different priorities and planners often like to schedule them en bloc based on these priorities. This would ensure that the next free capacity is used in the best possible way for the corresponding sales order.

But, however, what if a sales order consists of, let's say, 40 items that on the other hand lead to 40 production orders? This is where it gets difficult because these 40 production orders are on Standby with the other production orders.

Two according options in the "Add all" and "Add all incl. alternatives" menus offer to solve this problem:



A	ctions \checkmark Fewer option	ns			
	Edit	>	ry 2024 Wk 07		
	Schedule	>	Add All	>	Add All from Standby
en	View	>	Add All incl. Alternatives	>	Add All from Selected Production Orders
	Capacity Management	>	Fill Idle Times		Add All from Selected Sales Orders
	Timescale	>	Fill Idle Times incl. Alternative	es	
	Calendar	>	Tighten Queues		101036 (80)
	View Filter	>	Move to Standby	>	(32) 101047 (100)
	Search	>	Recalculate Current Schedule		101050 (30) 101049 (40)
	•				101048 (70) 101064 (40)

The options in detail:

• "Add all from selected production orders" shows a list where you can select from all production orders where at least one operation is still on standby:

×	Reminder:	your w	vork date is 31.01.2024	Use tod	ay Change t	o Turn off remi	nder		~
	No.		Description	~	Source No.	Routing No.	Quantity	Starting Date-Time	Ending Da
\rightarrow	101033	:	Prod 6 - Type 1a		P000006	P000006	70,00	07.02.2024 09:34	01.03.20
	101071		Prod 10 - type 1c		P000010	P000010	60,00	28.02.2024 22:10	07.03.20
	101072		Prod 19 - type 1		P000019	P000019	75,00	27.02.2024 18:45	07.03.20
	101073		Prod 20 - type 1		P000020	P000020	50,00	28.02.2024 13:55	06.03.20
	101074		Prod 10 - type 1c		P000010	P000010	100,00	27.02.2024 18:50	12.03.20
	101075		Prod 19 - type 1		P000019	P000019	80,00	29.02.2024 21:50	12.03.20
	101076		Prod 20 - type 1		P000020	P000020	70,00	01.03.2024 15:05	12.03.20
	101077		Prod 10 - type 1c		P000010	P000010	50,00	29.02.2024 17:00	07.03.20
	101078		Prod 19 - type 1		P000019	P000019	30,00	04.03.2024 23:00	07.03.20
	101082		Prod 21 - type 4d		P000021	P000021	25,00	12.03.2024 15:55	14.03.20
	101083		Prod 5 - Type 2c		P000005	P000005	30,00	04.03.2024 19:30	07.03.20
	101087		Prod 20 - type 1		P000020	P000020	34,00	15.02.2024 08:11	20.02.20
	101066		Prod 15 - type 4b		P000015	P000015	75,00	21.02.2024 23:19	04.03.20
	101062		Prod 13 - type 2c		P000013	P000013	40,00	08.02.2024 15:41	14.02.20
•									•

• "Add all from selected sales orders" shows a list where you can select from all sales orders with an assigned production order where at least one operation is still on Standby:



Sel	ect Sales Oro	der	s to be Ad	ded │ ዖ ∨			Z ×
×	Reminder: your v	work	date is 31.01.20	024 Use today	C 🕈 Move Up	r	~
	,				🔸 Move Do	wn	
	Status		No.	Requested Delivery Date	✓ Show as	menu	Salesperson Code
\rightarrow	<u>Open</u>	÷	SO-000005	20.02.2024	32789456	Lovaina Contractors	OF
	Released		SO-000011	08.03.2024	35122112	Bilabankinn	OF
	Released		SO-000012	13.03.2024	41597832	Möbel Scherrer AG	OF
	Open		SO-000014	15.03.2024	21245278	Maronegoce	OF
							OK Cancel

In both dialogs, you can change the order by "Move up" and "Move down".

6.9. Use sales order line information in tooltip, label, and table texts

Tooltip, label, and table texts of production order lines can be equipped with information about connected sales order lines.

) Sea	rch + New	🐯 Edit List	📋 Delete	🕈 Move Up	🔸 Mov	e Down		Ŕ	■					
oductio	on Order Line													
1	Table Name					Field Name			_					
	Production Orc	ler Line				Status								
	Production Orc	ler Line				Description								
	Production Ord	ler Line				Prod. Order No.								
	Production Orc	ler Line				Line No.								
→ I	Production Orc	ler Line			1	Connected Sales Lir	ies							
							NETRONIC VAPS	Actions	 Fewer opt 	tions				
										nuary 202	4		Februa	ary 202
							Sales Orders (read	l-only)		Wk 03	Wk 04	Wk0	I.	wk
							▲ Released							
							▲ SO-000002					Workdate	g Start	
							▲ P000010 56					Ň	cheduling	
							▲ 101057 100	00 56			_		Sche	
							Prod	. Order L	ne					
							Status:	Firm	Planned					
							Description:	Prod	10 - type 1c					
								1010	57		_			-
							Prod. Order No.:							
							Line No.:	1000	0					
								1000	0	00				



7. Finite capacity scheduling instruments

7.1. What is finite capacity scheduling?

The VAPS works with finite capacity scheduling. Finite capacity scheduling means to schedule with limited capacities:

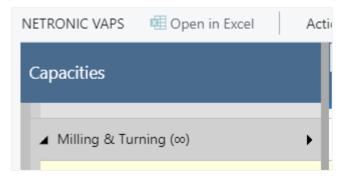
- It makes sure that you do NEVER overload a machine center (exception see above under 7.2).
- Any change in the schedule leads to automatic recalculation of the entire schedule.
- This principle is also applied to complex routings:
 - o serial
 - o parallel
- Dependencies are considered:
 - o dependencies between operations (of one production order)
 - o dependencies between production orders (if made from reservations)

7.1.1. Working with infinite capacity on certain work/machine centers

As mentioned above, finite capacity scheduling makes sure that you do NEVER overload a machine center. However, there are cases, where it could be useful to have work centers/machine centers with infinity capacity. Some customers have e.g., certain clearly defined bottleneck areas in which it is imperative to plan with limited capacity and other areas in which it is perfectly possible to plan with unlimited capacity. Moreover, in cases of orders being late, this feature helps to find out more easily where the bottleneck is, based on the overload that has occurred (when setting a machine center to infinite). The according option can be found on the respective work center/machine center cards.

Scheduling	
Unit of Measure Code · · · · · · MINUTES · ·	Shop Calendar Code · · · · · · 2 · · · · ·
Capacity · · · · · · · · ·	Queue Time 0
Efficiency 100	Queue Time Unit of Meas ·
Consolidated Calendar	Schedule with Infinite Capa 🔹 💽

Having activated this setting will be indicated by the ∞ symbol on the respective work/machine center:



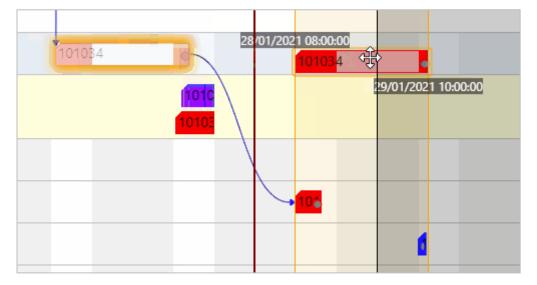
The behavior on such an "infinite" center is the same as on standby resources and subcontractor work centers. Operations may overlap without driving out each other. Switching on or off this option will affect the respective center in all existing simulations but operations having been scheduled already will not be rescheduled automatically.

7.2. Move operations

Operations can easily be scheduled and rescheduled either interactively by drag & drop or via context menu considering the rules of finite capacity scheduling.

7.2.1. Change timing of an operation

If you move an operation horizontally along the time scale, you'll change the timing. While moving the operation, a "phantom" bar will remain at the original place until the mouse gets released.



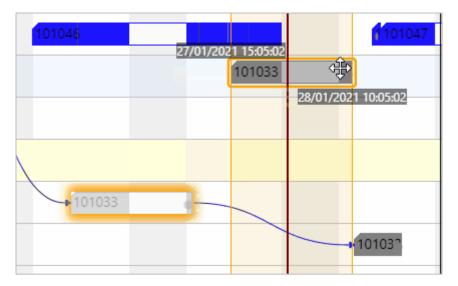
Consider move and wait times when calculating ending date-times

The scheduling logic of the VAPS is adapted to that of Dynamics Business Central 365 so that also move and wait times are taken into account for scheduling. In the picture below, operation 30 ends at 1:00 pm and the following operation 40 starts at 1:30 pm. The tooltip explains the gap: operation 30 has a move time of 30 minutes which isn't visualized at the bar but gets considered for scheduling and so the ending date-time of operation 30 is calculated as 1:30 pm.

									<	7		
08:00	08:30	09:00	09:30	10:00	10:30	11:00	11:30	12:00	12:30	13:00	13:30	14:00
10			•									50
												1
				20			•					
								30				
								50				
							Prod. Order	-			40	
						atus:			Planned			
					O	peration No	d in the		30	_		
					Pr	od. Order N	0.:		101001			
					De	escription:		1	Deburr			
						escription: arting Date-	Time:		Deburr 01/19/21 11:	55 AM		
					St							
					Sta En	arting Date-			01/19/21 11:			
					Sta En Me	arting Date- Iding Date-1			01/19/21 11: 01/19/21 01:			
					Sta En M	arting Date- Iding Date-1 ove Time: ait Time:	lime:		01/19/21 11: 01/19/21 01: 30			
					Sta En W	arting Date- iding Date-1 ove Time:	lime: ration No.:		01/19/21 11: 01/19/21 01: 30 0			

7.2.2. Change resource of operation

If you move an operation vertically you can change the machine center where the operation is to be worked upon. While moving the operation, a "phantom" bar will remain at the original place until the mouse gets released.



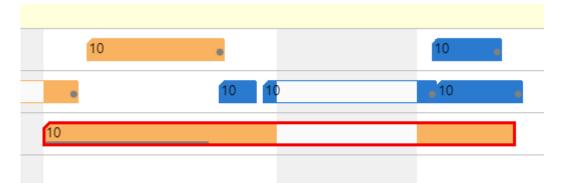
7.2.3. Move operations that have already been started

Operations that have already been started, i.e., operations having postings already, can also be changed interactively. For this, click "Move Pinned/Started Operation" in the context menu:

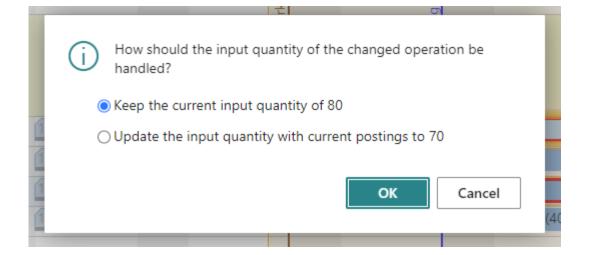


	We, 31.	lan (0024		rh, 01. I	Eab 2	024	Fr, 02. Feb 2024			
	00:00		12:00		00:00		Unpin	1			
Workdate				Scheduling Start			Pin with Capacity blocked Pin without Capacity Consumption				
				Sched			Navigation Schedule Su Apply Routir		`		
101	018 (80)						Apply altern	ative Routing	(40		
		101	016 (70)			1010	Set Focus Remove Foc	us	(40)		
1	01013 (2	20)	1010	5		101		d Order Status Floor Changes	3 (4		
							Change Dura	ation			
004		101	005 101	006	(60)	10	Move Pinned	d/Started Operation	4 (7		
							Standard MF Exclude from Include into	n MRP			
							Show Additi	onal Information	>		

The operation gets a **red frame** and can be moved to another point in time and/or another machine center. :



In both cases, the following dialog pops up:



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Here you can decide whether you want to schedule the operation at the new date and/or place with the remaining quantity or virtually start anew with the original quantity. A possible scenario for this could be that a machine broke down and the already produced items are defective.

7.3. Change the duration of operations

The duration of operations can be changed interactively. For this, click "Change Duration" in the context menu:

		Pebruar	v 2024	4																Mar	ch 202	24	-
apacities		Wk 06							V	Vk 08						Wk)9						
		1(11	12	13		15 [·]		7 1	18 1	9 20	21	22	23	24	25	26	27	28	29	01	02	03	
Beta 500	•	043 (90)			10	1 <mark>C 10</mark> 1	04										jod						
Beta 800	•	12 (110)			10	1048	(<mark>7 1</mark> 01	064 ((40)								of Frozen Period						
Sawing Sägen	•																oze						1
Standby (∞)												1010)66 (of E			101			
Saw Säge	•	120)	1(1	0 101	10110	010.10	101	A48 ((70)	10 10	1	1	10				End						
Gear Cutting Verzahnen	•							\$															
Standby (∞)																		0107	101	0			
																				1010	75 (8	D)	
LC 500	•	022 (60)) 10	1101	03 10	01 <mark>10</mark> 1	01(10	1039	(28)	1010	1(101	10104	1010	70 (12	0)		1010	i9					
LC 180	•	030 (50)	1	01(1	010 1	01042	(110))		1010)44 (1 101											
Phoenix	•)38 (66)		10	1041 ((8(101	043 (90)	!	10	1010								T	T			
Milling Fräsen	•																		T.				
Standby (∞)													1	0106	6 (75))		0107	74 (1	1	0107	3 (50))
													11						1010	071			
																				1010			
Wagner BAZ	•	028 (72)		101	03 10	01031	(1101	034 (50)	1 101	047	1 1010	057 <mark>10</mark>				1010	70 (1	010				
TC 229 Brother	•	35 (65)	0	1(1	0110	1 10 1	01033	3 (70)	1	1 101	0 101	1	1										
My very old mill (eff = 20%)	•		F 1								10		17										
Assembly																							-
Assembly - Team 1	•)62 (40)			<mark>1</mark> 01	02	<mark>1</mark> 010	32 (5	0)	Í	101 <mark>03</mark>	6 (<mark>80</mark>)	1	01059	(50)		1	1052	26				
)	10)1 <mark>0</mark> 22	(<mark>60</mark>)	1010	0 <mark>3</mark> 0 (5	0)		10103	4 (5 <mark>0</mark>	101 <mark>0</mark> 3	9 (<mark>1</mark> 0	1048 ((70)		10	10 <mark>6</mark> 4	(4)				
		0)		101	0 <mark>28</mark> (7	72	101	031 (120)							10	10 <mark>57</mark>	56					
		26 (40)				1010)			10103	3 (70)	10104	2 (11)	D)									

7.3.1. Pin operations, production order lines, production orders

If you want to make sure that a certain element doesn't get moved any more by any automatic scheduling, you can pin (and unpin) it by the according context menu option:

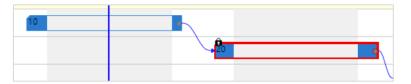
Unpin 3	010 101056
Pin with Capacity blocked	Pin Operation with Capacity blocked
Pin without Capacity Consumption	Pin Prod. Order Line with Capacity blocked
Move to Standby	Pin Production Order with Capacity blocked
Navigation	
Schedule Successors	1010 <mark>66 (75)</mark>
Apply Routing	04 10104 1010 101
Apply alternative Routing	
Set Focus	
Remove Focus	
Change Prod Order Status	01036 (80) 1010 101064 (101047 (100) 10
Apply Shop Floor Changes	101044 (60)
Change Duration	
Move Pinned/Started Operation	1010501 101048 (70)
Standard MRP Behavior	
Exclude from MRP	
Include into MRP	
Show Additional Information	101047 (100) 101(101057 (56)
1	101101048 (70) 101049 (1010

These pinned elements can be seen as being dealt with manually by the scheduler working with the VAPS

Allow moving of pinned operations

However, in case operations are dealt with manually, some customers need an extra portion of flexibility as exception from the overall automatic scheduling. This is offered by the above-described context menu item "Move Pinned/Started Operations" which allows to move a pinned operation without unpinning it.

The according operation gets a red frame and can now be moved without any restrictions.

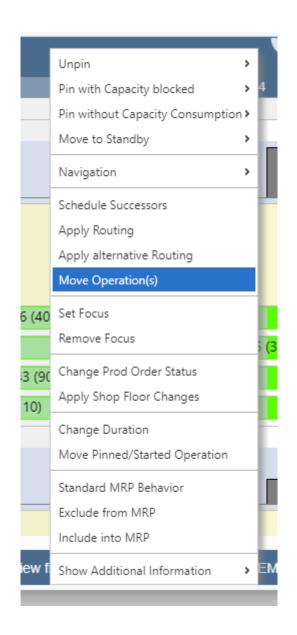


This means that it also can get placed manually in a way the automatic scheduler would never place it. For example, you can drag & drop a pinned operation so that the start date of the successor is before the end date of the predecessor.



	10	
20 0		

7.3.2. Move (multiple) operations via dialog



With this function, you can move multiple operations individually, rather than as a single block.

By clicking the "Move Operation(s)" item in the context menu, the dialog "Select Production Order Routing Line(s) to move" will appear, allowing you to precisely choose the desired operation(s) and even change their order. Following this selection, all further adjustments can be made in the dialog "Move Production Order Routing Line(s) Settings." Here, you can define parameters such as the new start date, capacity type, target machine center, and more.



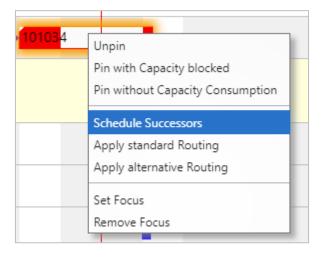
	ebruary 2024 Wk 06		~		5
Capacities	₩k 06 07 08 09 10 11	Wk 07	5 16 17 18	Wk 08 19 20 21 22	23 24 25
Production		- 1			
 Turning Drehen 	•				
Standby (00)			PO	PI P00:08 (78)	P000008 (20)
CTX400	P000007 (50) P000003 (6 P000008 (40)	P0000	007 (60) P000010 (60)	P000003 (80) P0000 P000002 (5
CTX 2500	► 13 (P000002 (65) • P000007 (80)	P000007 (P000	0008 (100)	P000020	P006019 (75)
Beta 500	▶ 5 (120) P000004 (50)	P000007 (90)	P000008 P000008 (40)	PIP P00002 P000022 (P000010 (50)
Beta 800	P000006 (70 P00000 P000007 (110)	P000			
▲ Sawing Sägen	•		Pin with Capacity blocked		
Standby (∞)			Pin without Capacity Consumption >	POO	POO
Saw Säge	 > 3003 P00000 P000 P000006 (120) 	P00000 P1P000006 P01P0	Move to Standby	P000008 P1 P000015 (75)	P000014 (40)
▲ Gear Cutting Verzahnen			Navigation >		
Standby (∞)	•		Schedule Successors		
	0		Apply Routing		
LC 500	► P00000× P000007 (50)	P00000: P000006 (12	Apply alternative Routing	P0000 P000003 F F	2000008 (1(P000018 (120)
	POO		Move Operation(s)		
LC 180	POC PO0000 P000005 (72)	P000006 P000006 P000004	Set Focus	P000007 (60) P00	P000014 P000020 (50)
Phoenix	P000005 (P000001 (P000007 (80)	Set Focus Remove Focus	F P0 P000008	000019 (7 <mark>7</mark> 000019 (80)
▲ Milling Fräsen	•				
Standby (00)	12)	P000	Change Prod Order Status		
	005 (6	_	Apply Shop Floor Changes		
			Change Duration		
Wagner BAZ	(iP00 P000005 (120)	P000005 (72	Move Pinned/Started Operation	1 POOCPOQOO POODOOS (100 POOS	P000010 (56)
			Standard MRP Behavior		
TC 229 Brother	005P000010 (6 P0000005 P000002 (65)	P00000 P000	Exclude from MRP	P001 P9 P000008 (P00000 P00	0010 2000015 (75)
My very old mill (eff = 20%)	•		Include into MRP		
Data filter test			Show Additional Information		
A Silver - 130				POO	

7.3.3. The underlying principles of drag & drop

- The sequence on a machine can be changed.
- Can have an impact on other machines (as successors might get moved).
- We do not allow you to violate the routing structure (exception: if operations are pinned)
 - o predecessors will never be impacted
 - right move -> successors will get moved
 - left move -> successors will not get moved

7.4. Schedule successors

With this instrument you tell the software to give the current production order the highest priority from here. The function "Schedule successors" can be found in the bar's context menu:



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By ticking this item, you schedule all successors of the currently marked operation (if you marked the first operation of a production order then, of course, the complete production order will get scheduled).

7.4.1. The underlying principles of "Schedule Successors"

- Changes the timing (start date; hence: end date) of all successors.
- Will not change the sequence on the machine where it is triggered.
- Has an impact on other machines (as successors will get moved).
- Will not violate the routing structure.

7.5. Apply standard routing

This instrument is meant to help you efficiently bring production orders from the standby resource to a dedicated machine center.

The function "Apply Standard Routing" can be found in the bar's context menu:

	Unpin
1	Pin with Capacity blocked
	Pin without Capacity Consumption
	Schedule Successors
	Apply standard Routing
	Apply alternative Routing
	Set Focus
	Remove Focus

By ticking this item, you add the operations of a production order to the schedule starting at least at the current work date, or later, if requested by a linked predecessor without changing the schedule and using the standard machines from the standard Business Central routing.

7.5.1. The underlying principles of "Apply Standard Routing"

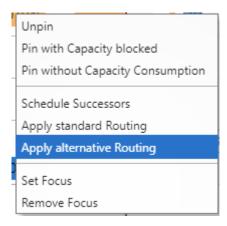
- Changes the assigned machine center of the triggering operation and all successors (move
- from standby to a concrete machine center).
- Changes the timing (start date; hence: end date) of all successors.
- Adds this production order to the schedule with the lowest priority.
- Will not change the sequence on any machine.
- Will not violate the routing structure.

7.6. Apply alternative routing

This instrument is meant to help you efficiently bring production orders from the standby resource to a dedicated machine center simultaneously looking for the best alternatives (i.e., earliest completion)



The function "Apply Alternative Routing" can be found in the bar's context menu:



By ticking this item, you add the operations of a production order to the schedule starting at least at the current work date, or later, if requested by a linked predecessor, without changing the schedule but making sure that it will be finished as early as possible. For this, the alternative routing you have defined will be used.

7.6.1. The underlying principles of "Apply Alternative Routing"

- Changes the assigned machine center of the triggering operation and all successors (move from standby to a concrete machine center).
- Changes the timing (start date; hence: end date) of all successors.
- Adds this production order with the lowest priority applying an ASAP strategy
- Will not change the sequence on any machine.
- Will not violate the routing structure.

7.7.Schedule production orders from standby in one go by the "Add all" function

With the function "Add all" you can schedule a bunch of production orders in one go, considering alternate machine centers, if desired.

Production orders that are not yet scheduled in the VAPS, are shown on the respective standby resource - a collection, so to say, of production orders that need to be added from the scheduler to the schedule. With the function "Add all" you can add them to the schedule all at once.



Actions \checkmark Fewer option	ns		
Edit	>	/ 2024 February 20 Wk 05)24 🔨 🔨
Schedule	>	Add All >	Add All from Standby
View	>	Add All incl. Alternatives $>$	Add All from Selected Production Orders
Capacity Management	>	Fill Idle Times	Add All from Selected Sales Orders
Timescale	>	Fill Idle Times incl. Alternatives	
Calendar	>	Tighten Queues	101014 101040 (5([*] 101022 [*] 1010
View Filter	>	Move to Standby	1021 (40) 1010 10101 101035 101041 (80
Search	>	Recalculate Current Schedule	01030 (50) 101031 (120) 101037 (50 1010
		1010101 101-1 101019 1	101023 (48) 10103 101033 101(101042

Of course, this doesn't happen at random, but follows strict prioritization rules.

7.7.1. How it works

- Based on the assumption that late production orders are to be avoided, the VAPS automatically creates a prioritized list of the production orders that are on standby, proceeding as follows:
 - calculating a buffer time per production order, following the formula:
 - buffer time = [required due date] [end date of last operation as per BC]
 - \circ $\;$ starting with released production orders, then firm planned, then planned
 - within each category, assigning the highest priority to production orders with the lowest buffer, the next highest to those with the next lower buffer, etc.
- The orders are added to the schedule according to their priority
- The following settings can be made in the VAPS setup:
 - o define the "schedule start" date
 - $\circ \quad$ decide whether you want to take into account EMAD
 - o specify the number of iterations

7.7.2. More efficiency by planning per sales orders

Sales orders can have different priorities and planners often like to schedule them en bloc based on these priorities. This would ensure that the next free capacity is used in the best possible way for the corresponding sales order.

But, however, what if a sales order consists of, let's say, 40 items that on the other hand lead to 40 production orders? This is where it gets difficult because these 40 production orders are on Standby with the other production orders.

Two according options in the "Add all" and "Add all incl. alternatives" menus offer to solve this problem:



A	tions ~ Fewer option	ns			
	Edit	>	ry 2024 Wk 07		
	Schedule	>	Add All	>	Add All from Standby
en	View	>	Add All incl. Alternatives	>	Add All from Selected Production Orders
	Capacity Management	>	Fill Idle Times		Add All from Selected Sales Orders
	Timescale	>	Fill Idle Times incl. Alternativ	es	
	Calendar	>	Tighten Queues		10103 <mark>6 (80)</mark>
	View Filter	>	Move to Standby	>	(32) 101047 (100)
	Search	>	Recalculate Current Schedule	2	101050 (30) 101049 (40)
	•				101048 (70) 101064 (40)

The options in detail:

• "Add all from selected production orders" shows a list where you can select from all production orders where at least one operation is still on standby:

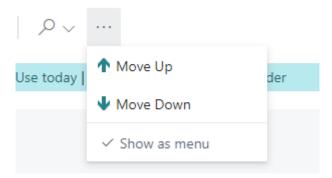
Select Prod	ucti	on Orders to be	Added $\wp \lor$				2 X	1
\times Reminder:	your v	work date is 31.01.2024	Use today Change t	to Turn off remi	nder		~	
Add All Options Add unplanned preced Do not add unplanned								
No.		Description	Source No.	Routing No.	Quantity	Starting Date-Time	Ending [
→ <u>101033</u>	- :	Prod 6 - Type 1a	P000006	P000006	70,00	07.02.2024 09:34	01.0	
101071		Prod 10 - type 1c	P000010	P000010	60,00	28.02.2024 22:10	07.0	
101072		Prod 19 - type 1	P000019	P000019	75,00	27.02.2024 18:45	07.0	
101073		Prod 20 - type 1	P000020	P000020	50,00	28.02.2024 13:55	06.0	
101074		Prod 10 - type 1c	P000010	P000010	100,00	27.02.2024 18:50	12.0	
						ОК	Cancel	

• "Add all from selected sales orders" shows a list where you can select from all sales orders with an assigned production order where at least one operation is still on Standby:



Sel	ect Sales Or	de	rs to be Ad	ded 、P ~				2 X
×	Reminder: your	wor	k date is 31.01.2	024 Use today	/ Change to	Turn off reminder		~
Add All Options Add unplanned preced Do not add unplanned								
	Status		No.	Requested Delivery Date	Bill-to Customer No.	Bill-to Name	Sales Code	person
\rightarrow	<u>Open</u>	÷	SO-000005	20.02.2024	32789456	Lovaina Contractors	OF	
	Released		SO-000011	08.03.2024	35122112	Bilabankinn	OF	
	Released		SO-000012	13.03.2024	41597832	Möbel Scherrer AG	OF	
	Open		SO-000014	15.03.2024	21245278	Maronegoce	OF	
							ОК	Cancel

In both dialogs, you can change the order by "Move up" and "Move down".



7.7.3. Regulate the behavior of preceding and succeeding linked production orders

Two options allow for regulating how preceding and/or succeeding linked production orders are treated:

- add unplanned preceding production orders first
- do not add unplanned succeeding production orders

These options can be defined as default settings via the VAPS setup:

Scheduling Parameters	
Consider EMAD · · · · · · ·	Max. Number of Sche 3
Consider Queue Time \cdots 💽	Add all default behavior for linked Production Orders
Consider Send-Ahead \cdots 💽	Default for Add unpla ·
Scheduling Start (rela 1D	Default for Do not ad



Max. Number of Scheduling Iterations · · · · Add all default behavior for linked Production Orders Default for Add unplanned preceding · •	NEVER schedule predecessors/ Always schedule ALL successors Upstream prod. orders ("preceding") do NOT get scheduled Downstream prod. orders ("succeeding") get scheduled
Max. Number of Scheduling Iterations	Always schedule ALL predecessors
Add all default behavior for linked Production Orders Default for Add unplanned preceding Default for Do not add unplanned suc	Upstream prod. orders ("preceding") get scheduled Downstream prod. orders ("succeeding") get scheduled
Max. Number of Scheduling Iterations	NEVER schedule successors or predecessors
Default for Add unplanned preceding · •	Upstream prod. orders ("preceding") do NOT get scheduled Downstream prod. orders ("succeeding") do NOT get scheduled
Max. Number of Scheduling Iterations	NEVER schedule successors
Add all default behavior for linked Production Orders Default for Add unplanned preceding Default for Do not add unplanned suc	Upstream prod. orders ("preceding") get scheduled Downstream prod. orders ("succeeding") do NOT get scheduled

The overview below lists all possible combinations and their respective effects.

However, in the "Add all" dialog, you can also spontaneously determine a deviation from the standard specifications every time you schedule new production orders via the "add all" function.

A Reminder.	: your v	vork date is 31.01.2024	Use today Change t	o Turn off remi	nder		~
Add All Options		I ()	[Do not add unplan	ned)	
No.							
		Description	Source No.	Routing No.	Quantity	Starting Date-Time	Ending [
			P000006	P000006	70,00	07.02.2024 09:34	01.0
→ <u>101033</u>	÷	Prod 6 - Type 1a					
	:	Prod 6 - Type 1a Prod 10 - type 1c	P000010	P000010	60,00	28.02.2024 22:10	07.0
→ <u>101033</u>	:			P000010 P000019	60,00 75,00	28.02.2024 22:10 27.02.2024 18:45	07.0: 07.0:
→ <u>101033</u> 101071	:	Prod 10 - type 1c	P000010				

All procedures described above, also apply when you want to take into account **alternate machine centers:**

Edit	×	/ 2024	Februar	y 202	4						5		
Edit		Wk 05	•			Wk	06						Wk 0
Schedule	>	Add All		>	03 04	05	06	07	08	09	10	11	12
View	>	Add All incl. Alterna	atives	>	Add A	from	Standb	y incl. A	Alterna	tives			
Capacity Management	>	Fill Idle Times			Add A	from	Selecte	d Drod	uction	0	ind (ltornat	tivor
		The force that co			Auu A	mom	Selecte		uction	Orders	inci. P	hiternat	lives
Timescale	>	Fill Idle Times incl. A	Alternative	25			Selecte						lives
Timescale Calendar	>		Alternative	95		l from		d Sales	Order	s incl. /	Alterna	atives	lives
	>	Fill Idle Times incl. A	Alternative			l from	Selecte	d Sales	Order	s incl. <i>i</i> 0 <mark>1022</mark>	Alterna 10104	atives 6 (40)	lives

7.8. Move unhandled production orders, production order lines, or operations to standby in one go

The VAPS allows moving unhandled production orders, production order lines, or operations back to standby in one go.

7.8.1. Definition of "unhandled"

• Unhandled future processes that are to start after the scheduling start date. In case users have "played around" a lot and then they may realize that they are no longer 100% satisfied with the plan, this feature helps them to quickly replan starting from a certain date by moving the operations to standby and then applying the "add all" function.



• Unhandled past processes, i.e., operations the routing status of which is not "in progress" or "finished," meaning operations that should have started before the current work date but haven't.

1043 (90)	10105101045	
142 (110)	101048 (70) 101064 Unpin > Pin with Capacity blocked > Pin without Capacity Consumption > > Move to Standby > Navigation > Schedule Successors >	4 (40) 101066 (75 70) 40110147 Move Operation to Standby Move Prod. Order Line to Standby Move Production Order to Standby
1022 (60) 1030 (50) 038 (66)	Apply Routing Apply alternative Routing Set Focus Remove Focus	39 (28) 10105 10 <mark>1011</mark> 101047 101070 (120) 101044 (60 10 10104 10104
1028 (72)	Change Prod Order Status Apply Shop Floor Changes Change Duration Move Pinned/Started Operation	7 (34) (50) 1 101047 (1/1(101057 (10
)35 (65)	Standard MRP Behavior Exclude from MRP Include into MRP Show Additional Information	

7.8.2. Move unhandled operations to Standby per work or machine center

Sometimes planners don't want to move operations of the whole plan but are focusing just on a single work or machine center and want a more granular version of this functionality.

Saw | Säge 1010.10104(101033 (70)101 101036 (80) 101 ۲ ▲ Gear Cutting | Ve rzahnor Fill Idle Times on this Work Center Standby (∞) 1010 Tighten Queue on this Work Center Move Unhandled Future Operations on this Work Center to Standby LC 500 Move Unhandled Past Operations on this Work Center to Standby 101046 (101033 1 Move Operations Without Fully Promised Receipt Dates on this Work Center to Standby LC 180 0) 101042 (110) Define additional Down Time 10104 Phoenix Define additional Up Time Milling | Fräsen Standby (∞) Edit additional Down Time Remove additional Up Time Sort Order 101031 (120) Wagner BAZ Show operations overlapped in one row TC 229 Brother 101030 (5(10103 1 Show operations stacked My very old mill (ett = 20%)

The context menu of the work/machine center in the capacity view offers according options:

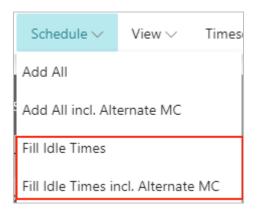
7.9.Fill idle times

Typically, scheduling with finite capacities, will often lead to idle times on machine centers and of course, for the sake of efficiency and cost cutting, everybody in planning wants to use their capacities to the fullest extent possible. The function "Fill idle times" helps to avoid idle times on machine centers.

7.9.1. How it works

- The VAPS automatically creates a prioritized list of the production orders that are already assigned to machine centers, following the same strict prioritization rules as in the "Add all" function.
- All operations are tried to be moved forward to avoid idle times.
- Already scheduled production orders are not getting pushed out (they are only squeezed in).
- The following settings can be made in the VAPS setup
 - o define the "schedule start" date
 - o decide whether you want to take into account EMAD
 - o specify the number of iterations
- When you start the scheduling process under "Actions -> Schedule", click the according
 option to determine whether you want to take into account alternate machine centers or
 not.





7.9.2. Fill idle times on a single work or machine center

If you want to fill the idle times on a certain work/machine center only, select the according item from the center's context menu.

7.10. Tighten Queues

With this feature you can minimize gaps between operations on a resource by shifting all operations to the scheduling start position as far as possible. The function differs from "Fill idle times" in that it does not change the order of the operations. Please note that operations before the scheduling start will not be affected.

The picture below shows an example with operations before they were tightened:

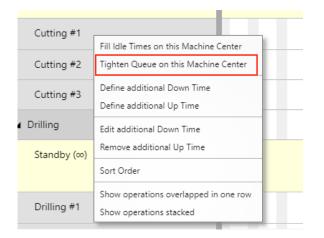
10 10	C 10	10	< 10	• 10 • • • • • •	• 10	
20	🗗 🔜 20 💻	20	20	20 6 20 10 10 10 10 10 10 10 10 10 10 10 10 10	•20 🖸 🗾	
	30 📕 🞒 📕 30		30	📫 🖬 🖣 💈 📕 🕴	30 📢 📕 🕴 во	

And this is how it looks after tightening the operations:

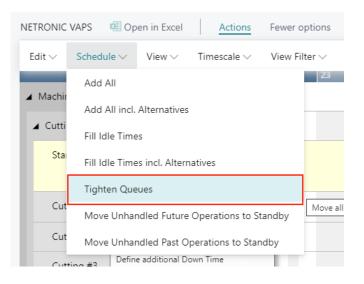
10 10		10 1 0 1 0 1 0 1 0	
20	20 20 4 <mark>20 6</mark> 20	20 20 20 20	2 20 - -
	30 20 20 30 20	30 B0 30 30	

You can activate this feature

• for a single resource via context menu



• for all resources by clicking the according item in the "Schedule" menu:



7.11. Calculating and working with earliest material availability

The VAPS takes into account the earliest material availability date = EMAD.

7.11.1. Material availability: Fundamentals

Without any further specification, the VAPS calculates the EMAD just on production order line level. Hence, there is no EMAD per operation at all. You can, however, have the VAPS <u>also consider routing</u> <u>links</u> so that the EMAD can be calculated by the production order routing line which means that a production order line can be started even when the material for one (or more) operations is not yet available. • We calculate a value that we call EMAD = earliest material availability date

7.11.2. Basics of the EMAD calculation

- We create a unique list of component demand day by day
- We take into account



- Demand from production orders
- Demand from sales orders
- Demand from transfer lines
- Demand from job planning lines
- Demand from service lines
- Demand from assembly orders
- Then we create a unique list of component supply day by day
- We take into account
 - Supply on inventory
 - Supply from purchase orders
 - o Supply from production orders
 - \circ etc.
- Then we allocate component supply to component demand

7.11.3. How we allocate

- First we remove any reservations because reserved components will never get allocated
- Then, day by day, we allocate an available component to a component demand
- You can define the priority which demand to supply first Example: sales orders first, then production orders, then transfer orders

✓ Search	+ New	🐯 Edit List	📋 Delete	🛛 Open	n Excel		~	7 =
				Priority		Document Type 1		
				1		Sales Line		
				2		Prod. Order Component		
\rightarrow				3		Sales Line		
						Sales Line Service Line Job Planning Line Prod. Order Component Assembly Component Transfer Line		

• If there is enough component supply on a certain day, we allocate that supply to the component line, and have an earliest material availability date for that component.



Supply	Monday	Tuesday	Wednesday	Thursday	Friday
Component 1	100	500	300	50	600
Demand	Monday	Tuesday	Wednesday	Thursday	Friday
Component 1	50	600	300	250	601
Allocation	Monday	Tuesday	Wednesday	Thursday	Friday
Component 1	YES (50)	NO	YES (300)	NO	NO
EMAD	Monday	Tuesday	Wednesday	Thursday	Friday
Component 1	Monday	none	Wednesday	none	none

7.11.4. Setting the EMAD

A production order typically requires multiple components. If all components are available in the look ahead window timeframe, each component line gets an EMAD. We take the latest EMAD of all component lines as the EMAD for the production order. Example:

- Production order 1
 - Component 1 EMAD = December 1
 - Component 2 EMAD = November 20
 - Component 3 EMAD = December 4
- EMAD for production order 1 = December 4

7.11.5. Consider the EMAD on the production order routing line level

Without any further specification, the VAPS calculates the EMAD on production order line level with no EMAD per operation at all. You can, however, have the VAPS also consider routing links so that the EMAD can be calculated by the production order routing line which means that a production order line can be started even when the material for one (or more) operations is not yet available.

Let's assume you have three operations. Let's also assume that this requires a very expensive raw material, but only at the third. Hence, you want that expensive material to be there only when you plan that third operation to start. In other words: you can start the first two operations without that precious raw material available. If you assign that particular raw material to the third operation via a routing link, you now get EMAD information as follows (on the production order routing line level):

	Operation No.↑		Туре	No.	Description	Alternate Routing Set	Earliest Start Date	Earliest Material Availability Date
\rightarrow	10	1	Machine Ce	110	Drilling Bohren #1			28.01.2021
	20		Machine Ce	210	Milling Fräse #1			28.01.2021
	30		Machine Ce	410	Welding Schweißen #1			16.02.2021



Per default, after having calculated the EMAD allocation, the VAPS would schedule all three operations starting after the EMAD of the latest operation. For the sake of clarity, I switched on the Availability View where you see operations with available material in green, the ones with unavailable material in red:

NETRONIC VAPS - 🦉 Open in Excel	Act	tions	Fewer optior	IS								
Capacities		ebruary Wk 06 1 13	2021	Wk 07	16	17	18	19	20	21	Wk 08 22	23
Machining Fertigung												
Drilling Bohren	•											
Standby (∞)												
Drilling Bohren #1	•				700	72	•					
Drilling Bohren #2	•											
▲ Milling & Turning Fräsen & Drehen	•											
Standby (∞)												
Milling Fräse #1	•						7007 <mark>2</mark>					
Milling Fräse #2	►											
Turning Drehen #1	►											
Milling & Turning Fräsen & Drehen	►											
▲ Sawing Sägen	•											
Standby (∞)												
Saw Säge #1	•											
Welding Schweißen	•											
Standby (∞)												
Welding Schweißen #1	•							70	072		•	

As stated above, you can instruct the VAPS to consider the routing links. This is done on the VAPS Setup page:

Exclude None-Invent
Exclude Blocked Inve

Further steps needed:

• Create the desired routing link code

\leftarrow	Routing L	.inks	Work Date			
	,⊂ Sea	rch	+ New	4 Open in Excel		
		Cod	le î			Description
		100				Assembling
		200				CNC/Axle
		300				Inspection
	\rightarrow	999			:	EMAD example



• Enter this routing link code on the according routing page and in the BOM

• Routing:

	es Ma	nage	WOR	e options					
	Operation No. ↑		Previ Oper No.	Next Opera No.	Туре	No.	Description	AlternateRou Set	Routing Link Code
\rightarrow	10	÷		20	Machine Ce	110	Drilling Bohren #1		
	20		10	30	Machine Ce	210	Milling Fräse #1		
	30		20		Machine Ce	410	Welding Schweißen #1		999

o BOM

ines	Manage	More o	options					
	Туре		No.	Description	Quantity per	Unit of Measure Code	Scrap %	Routing Link Code
\rightarrow	ltem	1.1	70073	Teil 1 - EMAD Routing Link Test	1	PCS	0	
	Item		70074	Teil 2 - EMAD Routing Link Test	1	PCS	0	
	ltem		70075	Teil 3 - EMAD Routing Link Test	1	PCS	0	
	Item		70076	Teil 4 - EMAD Routing Link Test	1	PCS	0	999

As a result, two of your operations start at their earlier EMAD, the last one at its own, later EMAD, this, of course, saving you time in your production processes.

NETRONIC VAPS 🕮 Open in Excel 🛛 A	ctions Fe	wer optio	ns																
Capacities	00000000000000000000000000000000000000)21 28 2	9 30	31	February Wk 05 01 03	04	05	06	07	Wk 0	6 09	10	11	12	13	14	Wk 0 15		17
Machining Fertigung		art										Po							
▲ Drilling Bohren		g St										Per							
Standby (00)		<u>_</u>										cen							
Drilling Bohren #1		70072	•									f Fro:							
Drilling Bohren #2		S										0 P							
▲ Milling & Turning Fräsen & Drehen →												5							
Standby (∞)																			
Milling Fräse #1			70072	2															
Milling Fräse #2																			
Turning Drehen #1									$\overline{}$										
Milling & Turning Fräsen & Drehen 🕨																			
▲ Sawing Sägen																			
Standby (∞)																			
Saw Säge #1																			
▲ Welding Schweißen																			
Standby (∞)														-	_				
Welding Schweißen #1																		•70	72

In the Availability View, the VAPS even provides an optical warning, if you drag an operation to a point of time that is before its EMAD by showing the according operation in red:

Capacities		nuary 20 /k 04	21				Febr Wk (uary 20)5	021					Wko	06				
	26	5 27	28	29	30	31	01	02	03	04	05	06	07	08	09	10	11	12	1
Machining Fertigung			ar T														8		
▲ Drilling Bohren	•		St														ν ν		
Standby (∞)			-E														Ξ.		
Drilling Bohren #1	•		700	72 (2 L		
Drilling Bohren #2	•		Ň														5		
▲ Milling & Turning Fräsen & Drehen	•																5		
Standby (∞)																			
Milling Fräse #1	•				70072														
Milling Fräse #2	•																		
Turning Drehen #1	•																		
Milling & Turning Fräsen & Drehen	•																		
▲ Sawing Sägen	•																		
Standby (∞)																			
Saw Säge #1	•																		
▲ Welding Schweißen	•																		
Standby (∞)															~				
Welding Schweißen #1	•																-	7007	

Tip: If you work with routing link codes you should define priorities in the dialogs "EMAD demand priority" and "Routing demand priority".

7.11.6. Exclude items from EMAD calculation

In the current EMAD calculation logic, "all" components of a production order are considered when calculating the availability date.

With very detailed BOMs and having even low priority material in these BOMs (meaning material which could be replenished very easily e.g., by a local dealer around the corner), this could create some downsides:

- material that is out of stock but could easily be replenished might render a production order as "unable to allocate"
- all these materials need to be calculated, although they won't be a blocker for the production process

Because of this, you can exclude certain items from the EMAD calculation by ticking the option "Exclude from EMAD (VAPS)" on the item card and related pages. You can also exclude complete item categories from EMAD, by ticking the option on the respective category card. In this case, the setting is passed on to all associated articles and does not have to be made separately for each article.



1000 · Bicycle	
Process Item Prices & Discounts Request Approval More of	ptions
ltem	Show more
No	Show in VJS · · · · · · · · · ·
Description · · · · · · Bicycle	Item Category Code · · · · · · · · · · · · · · · · · · ·
Blocked · · · · · · · · · ·	Color (VAPS) #911d1d
Type · · · · · · · · Inventory 🗸	Exclude from EMAD (VAPS)
Base Unit of Measure · · · · · · PCS · ·	

7.11.7. Consideration of the supplier's delivery date promises in planning

In times of uncertain supply chains, information about material availability has become more and more important. When parts are ordered, it is important to know whether the supplier has confirmed a delivery date and what that date is. Production planners need to know for which production order lines (still to be planned) there are unconfirmed required materials. What is more, they only want to specifically schedule the production order lines for which the supplier has confirmed a specific date. We have taken care of these planning requirements and implemented a new functionality.

The "VAPS Setup" dialog offers a new option that allows to exclude production orders without a promised delivery date from the planning with "Add all" and "Add all incl. alternatives":

Material Availability									
Look Ahead Window · · · 12W	Exclude Blocked Inve								
Use Routing Links · · · · ·	Exclude Not Fully Pro								
Exclude None-Invent	Include Fully Consum 🔹 🌅								

Please note that you can still plan these orders manually per drag and drop.

Handling of operations without promised receipt date that are already allocated

In case operations of a production order with missing promised receipt date are already allocated to resources, they can be made directly visible. For this, we have added a new option to the "Availability View". Now operations needing material that is not fully promised are shown in orange (default).



Actions \lor Fewer optic	ns											
Edit	>	ry 2024 Wk 07							Wk 08	\sim		
Schedule	>	11 12	13	14	15	16	17	18	19	20	21	22
n View	>	🗟 Enable Focus Mode										
Capacity Management	>	🛱 Disable Focus Mode			101							
Timescale	>	🗟 Show Setup Times										
Calendar	>	🛱 Hide Setup Times	(60)		10103 <mark>6 (80)</mark>			1	010	101056	
View Filter	>	🗟 Show World View	101	1045 (32) 10	1047 (100)							
Search	>	🗟 Hide World View			01050 (30) 101							
•	_	Capacity View		1	01048 (70)	10	064 (40)					
		📰 Sales Order View				101						101
•		🕮 Production Order Vi	ew 101	033 (70) 101	101036 (80) 1	101035 [°] 1(^{°°} 10'	048 (70)		101	04 ^{.*} 10104! [*]	101(101
/erzahnen		🛱 View Color Mode	> a	Item View		(3						
		Use short menu	¢	Machine/W	ork Centre Vie	w						
€	50)	1010)29 (1	Prod. Orde	r View	045 (32	101039 (2)	8)	10)1036 (80)	1010 <mark>1</mark> 01064	(101047
•	D)	1	01032 🏥	Prod. Orde	r Status View					101044 (6	0)	101(
•]				Progress Vi	ew	90)				1010501	101048	(70)
•				Shop Floor	Status View	1	0 <mark>1087 (34</mark>))				
				Availability	View							
►	2)		1	Wait Times	View Se	ts the mode to	the availabi	ility view.	101	101047	(100)	101(101)
er 🕨		<u>i</u>	1 📰	MRP View		033 (70)					70) 101049	
-:II (-ff 200() >			_									

You can change the default color in the VAPS setup:

	Edit	>	/ 2024			Febr	uary 2	024				\sim				
	Lan	· ·	Wk 05	1						Wk	06					_
	Schedule	>	Add All >	3	ť	01	02	03	04	05	06	07	08	09	10	11
n	View	>	Add All incl. Alternatives		ng Sta											
	Capacity Management	>	Fill Idle Times		Scheduling											
	Timescale	>	Fill Idle Times incl. Alternatives		Ň											
_	Calendar	>	Tighten Queues	0	1018	(80)		101029	(40)		01014	1010	40 (5(1	01022	101046	5 (40
	View Filter	>	Move to Standby		Μ	ove l	Jnhan	dled Fu	ture Op	peratio	ons to	Standb	у			
	Search	>	Recalculate Current Schedule		Μ	ove l	Jnhan	dled Pa	st Oper	ation	s to Sta	andby				

The planner can move these operations back to Standby by an according menu item:



Edit		>	/ 2024			Febru	uary 20)24				\sim				
2011		· ·	Wk 05	5					_	WkC						_
Schee	lule	>	Add All	>	31 t	01	02	03	04	05	06	07	08	09	10	11
View		>	Add All incl. Alternatives	>	na Ste											
Capa	tity Management	>	Fill Idle Times		Scheduling											
Time	cale	>	Fill Idle Times incl. Alternati	ives	S											
Caler	dar	>	Tighten Queues		0101	(80)	1	01029	(40)	1	01014	10104	40 (5(1	01022	10104	6 (40
View	Filter	>	Move to Standby	>	N	love U	nhano	dled Fu	ture Op	eratio	ons to	Standb	у			
Searc	h	>	Recalculate Current Schedu	ıle	N	love U	nhanc	dled Pa	st Oper	ations	s to Sta	andby				

More options to exclude/include certain items from EMAD calculation can be found on the Setup page.

7.11.8. Handling of operations with missed EMAD

The picture below shows a production order that is scheduled to start on the 14th (of February)



However, when you have a look at the EMAD calculation, you'll see that the earliest availability date is the 16th.

	Item No.		Starting Date-Time	Ending Date-Time	Quant		Planning Flexibility	Unit of Measure Code	Sales Order No.	Sales Order Line No.	Earliest Material Availability Date
->	P000014	:	14.02.2024 18:40	01.03.2024 08:30	40	40	None	PCS	SO-000006	10000	16.02.2024

The VAPS provides a helpful feature in the "Schedule" menu that allows you to easily move any production orders that violate their earliest material availability date back to standby. This ensures that your production process stays on track and avoids any delays caused by unavailable materials.

boyum

	Edit	5	uary 2024			-				5			2		
	EGH	-	06		Wk							Wk 0			
	Schedule	>	Add All >	1	12	13	14	15	16	17	18	19	20	21	22
	View	>	Add All incl. Alternatives												
	Capacity Management	>	Fill Idle Times	:0)		10104	14 (60)	10106	10			a		101	
	Timescale	>	Fill Idle Times incl. Alternatives					01047		1					
	Calendar	>	Tighten Queues	90)			ĺ	101051	01049	10103	6 (80)				1
	View Filter	>	Move to Standby		Move	Unhar	ndled	Future	Opera	tions t	o Stand	iby			-
	Search	>	Recalculate Current Schedule		Move	Unhar	ndled	Past O	peratio	ins to	Standby	V			10
	۲		10101110101101010101031 (120)		Move	Opera	itions	Withou	ut Fully	Prom	ised Re	ceipt D	ates t	o Stan	dby
120	ahnen 🕨	-	1		Move	Ppera	ations '	With a	Misse	d EMA	D to St	andby			
	•		1010101010101010101040101022	(60)		10103		(1010	1010	10103	39 (28)	10	1010	1010	101047

7.11.9. Handling of completely picked items

Completely picked (i.e., taken from inventory) items are treated with a higher priority than unpicked ones

7.11.10. Apply EMAD tolerance to an item

As is commonly known, the EMAD calculation provides a date from which the required quantity of component demand is available and before which the production order must not start. The newly implemented EMAD tolerance allows defining the criterion not too narrowly so that, e.g., an order could already start if only 95% of the required material is available.

To be able to do so, we have enhanced the item card with the respective setting option. When calculating the demand, the entered value is multiplied by the available quantity.

1001 · Touring Bicycle	
Process Item Prices & Discounts Request Approval More options	
Item	Show more
No	Show in VJS
Description · · · · · · · Touring Bicycle	Item Category Code
Blocked · · · · · · · · · · · · · · · · · · ·	Color (VAPS)
Type · · · · · · Inventory 🗸 🗸	EMAD Tolerance Percentage 5,00
Base Unit of Measure · · · · · · · PCS · · ·	Exclude from EMAD (VAPS) · · · · · · · · ·

7.11.11. Shortcut to EMAD demand entries

We enhanced the Item card so that you can directly navigate to the EMAD demand entries.



Process Item Prices &	Discounts Request A	pproval Ac	tions <u>Rela</u>	Fewer options		
$\textcircled{1}$ History \lor Item \lor	📳 Availability 🗸	b Purchases \vee	🔓 Sales 🗸	📰 Bill of Materials 🗸	$rac{1}{2}$ Warehouse \lor	🙀 Service 🗸
No	Items by Location Item Availability by	,	• Item	Category Code		
Description	Statistics	>		ice Item Group		
Blocked · · · · · · · · · · · · · · · · · · ·	🖫 EMAD Demand			omatic Ext. Texts		
type	inventory	Show Demand Entri		om Earliest Material Availability	Date process.	
Base Unit of Measure	PCS	~	/ Purc	hasing Code		
Show in VJS			Colo	or (VAPS)	#0cf151	
Last Date Modified	08.11.2019		ENAA	D Tolerance Percentage		

7.11.12.Run EMAD calculation from Job Queue

With the help of the Business Central job queue, you can schedule certain background jobs for regular execution. The EMAD calculation, which until now could only be called via the VAPS (interactively with - depending on the data volume - long calculation times), can now be triggered via the job queue as soon as the VAPS is installed. Thus, it could be run at night, for example, without supervision and without the need for someone to log on to the system to start the VAPS.

Setting up the job queue has to be done within Business Central by the administrator.

7.12. Sequence-dependent setup times

Reduce downtimes and operational costs while optimizing resource use with (lightweight) SDST = Sequence Dependent Setup Times.

With the VAPS, we typically schedule by production order to help customers complete their orders on time through prioritization methods like "apply all" and "fill idle times." However, optimizing the sequence of operations on key machines to reduce setup times can also increase throughput and reduce late orders. Sequence-dependent setup times (SDST) support this by grouping certain operations on specific machines to minimize overall setup times.

The SDST function of the VAPS works based on item attributes, so we enhanced the "Item Attributes" card accordingly:

boyum

×R	eminder: your work date is 31.01.2024 Use to	day Change to Turi	n off remind	der		
,₽ Se	arch 💽 Analyze 🕂 New 🐺 Edit List	ᆒ Delete 🖉 Edit	[⊙] View	🚛 Item Attribute Values	🕃 Translations	🖉 Attribute Dependent Setup Times 🦷
	Name			Туре	Values	
\rightarrow	Color		÷	Option	Red,Ora	nge,Yellow,Green,Blue,Violet,Purple,Black,Wl
	Depth			Decimal	_	
	Width			Decimal	_	
	Height			Decimal	_	
	Material Description			Text	_	
	Model Year			Integer	_	

Clicking on this button will open the new SDST configuration list for the selected attribute:

÷	Attibute	Dependent Setup Time Configuration	List Work	Date: 1/22/2026						✓ Saved	П	۵,	,e
	РC	🗧 🕂 New 🔯 Edit List 🗎 De	elete 🖉 Er	dit Exceptions More options							Ŀ	7	=
	Item Attr	ibute Name			Color								
		No †		Description	Hand	idling Rule	Default Setup Time	Sa	me Value Setup Time	Setup Time Unit of Me	tasure		
	\rightarrow	COLOR1	1.1	Mike Color	Bigg	gest Only	15.00		10.00	MINUTES			

Meaning of the columns in detail:

- No: Used for identifying and referencing configurations for work and machine centers that will follow the SDST configuration.
- **Description**: Provides additional information for users.
- Handling Rule: Can be set to "Additive" or "Biggest Only."
 - "Additive" means the regular setup time of the production order routing line, the default setup time defined in the next column, and either the same value setup time or special case exception setup time will all be summed up.
 - "Biggest Only" will choose the longest setup time from the list.
- Setup Time Unit of Measure: Defines the unit of measure for all setup times on this page or for the exceptions.

To add special cases for switching between distinct attribute values, click "Edit Exception" on the action bar or click the "..." in the "No" column.

5 Busin	ess Central					
Attibute	Dependent Setu	p Time Config	uration List	Work Date:	1/22/2026	
ρ.	9 + New	🐯 Edit List	📋 Delete	🖉 Edit Exc	ceptions	More or
ltem Attr	ibute Name					
	No 1		_	Desc	ription	
\rightarrow	COLOR1			: Mike	e Color	
			Drill do	own to record	for No	
	Attibute	P ■ + New Item Attribute Name No ↑	Attibute Dependent Setup Time Config	Attibute Dependent Setup Time Configuration List	Attibute Dependent Setup Time Configuration List Work Date:	Attibute Dependent Setup Time Configuration List Work Date: 1/22/2026

In the Exceptions list, you can define exceptions to the rule when one operation with a certain attribute value follows another with a different attribute value. Enter the values to check against in the "from" and "to" columns. Clicking "..." here will give you a list of all attribute values entered in regular BC so far, including option attributes, number (integer, decimal), and text attributes. You can also enter values directly via the keyboard. The setup time here follows the same unit of measure defined in the main SDST configuration for this attribute.

Q	🕃 🛛 + New	🐯 Edit List	📋 Delete		Ŕ	Y
Attri	bute Unit Of Measur	e				
	From Attribute Value			To Attribute Value	5	Setup Tin
	Yellow			White		15.0
	Black			White		800.0
\rightarrow						0.0

After setting up the SDST attributes, you need to assign the resources to which SDST will be applied. This can be done either

• on the Item Attributes List page:

Item Att	ributes									
× Re	eminder:	your work dat	e is 31.01.20	24 Use tod	ay Change	to Turr	n off remind	der		
,∕⊃ Sea	arch (Analyze	+ New	🐯 Edit List	📋 Delete	🖉 Edit	⊙ View	🐴 Item Attribute Values	🕃 Translations	🖉 Attribute Dependent Setup Times 🛛 …
										WC/MC Attribute SDST Assoctiation
	Name							Туре	Values	More options
\rightarrow	<u>Color</u>						- E	Option	Red,Orang	e, e,
	Depth							Decimal	_	
	Width							Decimal	_	
	Heigh							Decimal	_	

or

• on the MC/WC cards:

Work Center Card		
100 · Assembly department		
\times Reminder: your work date is 31.01.2024 Use today Change to	Turn off reminder	
Home Work Center More options		
③ Load I Calendar Absence C Item Attribute SDST Asso	octiation	
General		No
No	Search Name · · · · ASSEMBLY DEPARTMENT	
No	Search Name · · · · · ASSEMBLY DEPARTMENT	
Name · · · · · · · · · · · · · · · · · · ·	Blocked · · · · · · · · · ·	
Name Assembly department Work Center Group Code 99	Blocked · · · · · · · · · · · · · · · · · · ·	



In both cases, a dialog appears where you can define which Item Attribute SDST Configuration should be applied to which work or machine center. Note that you can set the same configuration for multiple work and machine centers and set multiple configurations for one work or Machine Center.

\leftarrow	WC/MC /	Attribute SDST Assoctiation			Not saved 🔲 🗖 🖉
	,∕⊃ Sea	rch 💽 Analyze + New	🐺 Edit List	🛍 Delete	☞ 7 ≣
		Configuration No. 1		Туре ↑	Work Center/Machine Center No.↑
	\rightarrow	COLOR1		Work Center	100

Once the setup is complete, add the relevant attributes and values to items to be used in production orders. After that, you can load a simulation with the configured data and apply the SDST Configuration. This will prompt the scheduler to go through the operations and apply the correct setup times according to their sequence on the resources.

Capacities	Edit	>	ember 2023 18 Wk 49 Wk 50
	Schedule	>	Add All > 08 09 10 11 12 13 1
▲ Turning Dreher Standby (∞)	View	>	Add All incl. Alternatives >
CTX400 (∞)	Capacity Managen	nent >	Fill Idle Times
	Timescale	>	Fill Idle Times incl. Alternatives
CTX 2500	Calendar	>	Tighten Queues
Beta 500	View Filter	>	Move to Standby
Beta 800	Search	>	Apply SDST Information
Sawing Sägen),0 -	Recalculate Current S Apply the SDST information to all operations.

Please note:

I.

- Currently, there is no easy way to see which operation or production order line has which attributes and values but we are working on a solution. For the time being, we recommend using item colors.
- Making changes to the SDST Configuration does not automatically update the simulations. However, clicking "Update Simulation" in an open simulation will load any changes made.

7.13. Resolve conflicts due to overloads or link constraints

It goes without saying that planners want - and need - to work with a schedule free from obvious conflicts such as sequence conflicts and overloads. On the other hand, due to the complex structure of Business Central data, production simulations, and updating the simulations with changed Business Central data, these conflicts cannot be fully avoided.

We solved this problem with the function "Recalculate current schedule":



-	Edit	>	y 2024	March 2024	~	
Capacities	e 1		T I	wk 10	Wk 11	w
Production	Schedule	>	Add All			
▲ Turning Drehen	View	>	Add All incl. Alternatives			
Standby (∞)				10115555500 10110	1	
CTX400	Capacity Management	>	Fill Idle Times		101 1	
CTX 2500	Timescale	>	Fill Idle Times incl. Alternatives			
Beta 500	Calendar	>	Tighten Queues			
Beta 800	a se circo aestaciono					
▲ Sawing Sägen	View Filter	2.	Move Unhandled Future Operations to Standby			
Standby (∞)	Search	>	Move Unhandled Past Operations to Standby	10	1	
Saw Säge	•	C 1 1 10	Recalculate Current Schedule		101 10	
▲ Gear Cutting Verz	ahnen 🕨					
Standby (∞)	_		Resolve conflicts due to overloads o	r link constraints	1	
LC 500	•	(110101	101110 101039 (10 1 10101 101150 (120) 1011 1012			
LC 180	•	(5 10 10	0*101042 (110) 1010 1			
Phoenix	•	(66) 101	104 101043 (90) 11 10			
▲ Milling Fräsen	•					
Standby (00)			101143 (101149 (75) 0110	10 101155 (! 1(101		
Wagner BAZ	•	(7. 101	10103101034 (1 1010 1101 1 10111 101		10 101	
TC 229 Brother	•	110	10 1 101033 (70 101101			

This function ensures that

- the schedule will be literally "cleaned up" so that there will be no more sequence conflicts and overloads
- no operation will be pushed to the left the earliest start date for each operation is the start date as of the current simulation

It can be very helpful after

- updating the schedule with shopfloor data
- changing the work/machine center capacity settings

8. Simulations

8.1. What is this simulation idea all about?

The Visual Advanced Production Scheduler does not just support one version of the schedule. You can create multiple simulations and scenarios, then compare them, and then publish the one that fulfills your purpose best.

Simulations are somewhat a cornerstone of the Visual Advanced Production Scheduler. In essence, the idea is as follows:

- 1. You can create a snapshot of the current production schedule.
- 2. This snapshot is saved as a copy of the production schedule. That way, your Dynamics 365 Business Central database does not get impacted.
- 3. You then can work with that snapshot (i.e., that copy) and check how certain changes to your schedule would impact your entire production schedule.
- 4. You can take as many snapshots as you like. Hence, you can build as many schedule scenarios as you need.



- 5. If you have a simulation/ scenario that you want to use as a new production schedule going forward, you can publish it. That way, your Dynamics 365 Business Central database gets updated.
- 6. As long as you do not publish, the Business Central database does not get changed.

Some additional facts that are important to know:

- You can view each simulation both in tabular form and as a visual planning board,
- You can use the visual schedule to make drag & drop changes to a simulation.
- Any change that you do to a simulation gets automatically saved in the simulation table.

8.2. How does the production simulations page work?

We have our own page to manage simulations. It is called "production simulations". Here, you can create, change and publish simulations.

You can access the "production simulations" page from the NETRONIC VAPS menu, or by simply searching for "production simulations". The production simulations page looks as follows:

imulations: All 🗸 🛛 🔎 Search 📋 Delete	Bedit List Demo	🔣 Create Simulation	n 5	View Si	mulation	🔢 Update Simulation	≡	02[
						🔅 Publish Simulation	Show the rest	
Description	Default View Color Type	Production Order Count	nva	Out	Creator	🔁 Compare Simulations	Basefilter ID	Datafilter ID
Simulation Created on 13.10.22 19:14	Prod. Order Status	36			ADMIN	🔊 View Simulation Data	1	(
Simulation Created on 13.10.22 20:18	Prod. Order Status	36			ADMIN	5 Copy Simulation	1	(
Copy of Simulation Created on 13.10.22 20:18	Prod. Order Status	36			ADMIN	🕮 Open in Excel	1	(
Simulation Created on 02.11.22 10:35	Prod. Order Status	37			ADMIN	More options	2	
Simulation Created on 02.11.22 10:36	Prod. Order Status	1		1	ADMIN	02.11.2022 10:37	2	
Simulation Created on 02.11.22 10:39	Prod. Order Status	1		1	ADMIN	02.11.2022 10:39	2	:
Simulation Created on 02.11.22 13:35	Prod. Order Status	1		V	ADMIN	02.11.2022 13:35	2	
Simulation Created on 02.11.22 14:28	Prod. Order Status	1		1	ADMIN	02.11.2022 14:28	2	:
Simulation Created on 03.11.22 16:30	Prod. Order Status	37			ADMIN	03.11.2022 16:31	3	1
Copy of Simulation Created on 02.11.22 14:28	Prod. Order Status	1			ADMIN	07.11.2022 11:27	2	2
Simulation Created on 07.11.22 11:29	Prod. Order Status	1		V	ADMIN	07.11.2022 11:29	3	2

As you can see, this page consists of certain functions and a specific table. Let's have a look at both separately.

8.2.1. Functions of the simulations page

The following functions are available on the "production simulations" page:

- **Search**: The search field starts a dynamic search within the description column of the simulations overview table below. The list of simulations is automatically adapted while you type in your search term.
- **Delete**: You can delete the selected simulation. You can also select multiple simulations (press edit list first) and then delete them in one go. Please note *you cannot undo a deletion.*.
- Edit list: This is standard Dynamics 365 Business Central functionality and allows you to edit the list below
- EMAD Allocations: Opens the EMAD calculate allocations" page



- **Create a simulation**: Create a new simulation that is based on certain criteria such as timeframe and production order status. Here is more detailed information about how to create a simulation.
- View simulation: Select a simulation in the table below and click "view simulation" to open the visual schedule in which you can manage your production simulation via drag & drop.
- **Update simulation:** You can update a simulation here or also directly in the planning board. If you select more than one simulation, all selected simulations will be updated.
- **Publish simulation**: Select a simulation from the table below and publish it. A publish updates the underlying Dynamics 365 Business Central database. Once published, the respective simulation is removed from this table on the "production simulations" page.
- **Compare simulations**: You can compare different simulations and decide which one suits you best.
- View simulation data: With "view simulation data" you open a tabular view of all data that are part of the selected simulation.
- **Copy simulation**: If you want to create a new simulation that has lots of settings in common with an older one, just copy this simulation.
- Filter: Click on the filter icon \square to define and apply a filter to the table below.
- Layout options :: You can choose whether to show your overview of simulations as list or in form of tiles.
- Notes ⁽¹⁾: by clicking this icon in the menu ribbon, you open a small window where you can add, edit, and delete notes for a specific simulation to provide additional information.

8.2.2. Content of the simulations overview table

- Description: You can name a simulation with any description that you want. You can do this when you create the simulation. Or you can just click on a table cell in the "description" column and type in any name for that specific simulation. If you do not give a description on your own, the VAPS will determine one (like in the above table, where it says, "Simulation No. 0 on 07/22/19".
- **Default view color type**: Select the color scheme (see separate article on color schemes) that you want to apply when you view the simulation.
- **Created on**: Date on which this specific simulation was created.
- **Production order lines count**: Number of production orders that are included in this specific simulation.
- **Production routing lines count**: Number of production order routing lines that are included in this specific simulation.

8.3. How do I create a new simulation?

We have our own page to manage your simulations. It is called "production simulations". Here, you can create a simulation by applying various criteria.

You can create as many simulations as you like. Each simulation is a snapshot of your current schedule, which you then can change via drag & drop in the visual scheduler. We keep each simulation persistent as long as you either publish or delete it.



You can create a new simulation on the "production simulations" page, which you can access from the NETRONIC VAPS menu, or by simply searching for "production simulations". The production simulations page looks as follows:

Simulations: All 🗸 🔎 Search 📋 Delete	🐺 Edit List 🛛 🍃 EMAD Allocations	Create Simulation	i 0	View Si	mulation	📰 Update Simulation		\bigtriangledown	
Description	Default View Color Type	Production Order Count In	ıva	Out	Creator	Created On ↑	Show Bas Filter Dial	Basefilter ID	Datafilter ID
Simulation Created on 13.10.22 19:14	Prod. Order Status	36		~	ADMIN	13.10.2022 19:14		1	0
Simulation Created on 13.10.22 20:18	Prod. Order Status	36			ADMIN	13.10.2022 20:18		1	0
Copy of Simulation Created on 13.10.22 20:18	Prod. Order Status	36		~	ADMIN	27.10.2022 17:55		1	0
Simulation Created on 02.11.22 10:35	Prod. Order Status	37		~	ADMIN	02.11.2022 10:36		2	1
Simulation Created on 02.11.22 10:36	Prod. Order Status	1 [~	ADMIN	02.11.2022 10:37		2	2
Simulation Created on 02.11.22 10:39	Prod. Order Status	1 🗌			ADMIN	02.11.2022 10:39		2	2

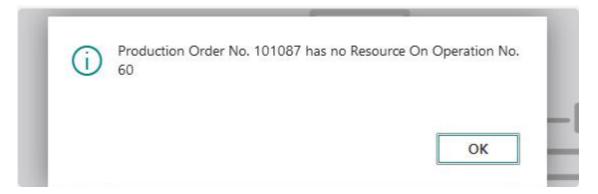
If you click "create simulation", a new page opens:

Create Simulation	$_{n^{\ell}}$ \times
Use default values from	Last used options and filters $\qquad \checkmark$
Filters	
Description	Simulation Created on 15.11.22 15:44
Minimum Status	Planned 🗸
Earliest/Latest Date Input Type	Relative Date 🗸
Earliest Date Formula	-1W
Latest Date Formula	10W
Earliest Date	21.01.2021
Latest Date	08.04.2021
Default View Color Type	Prod. Order Status
Data Filter	
No	2 🗸
Name	One prod order
	OK Cancel

With this page, you define - in the **filters** section - certain criteria that should get applied for your simulation.

By clicking OK, a new simulation is created.

In case of inconsistent data, a warning message pops up:



8.3.1. The Filter settings

• **Minimum status**: Define which status the production orders included in the simulation shall have. Minimum status "planned" as in the picture above means that this simulation includes all production orders with the status planned, firm planned and released.

Minimum Status	Planned 🗸
Earliest/Latest Date Input Type	Planned Firm Planned
Farliast Data Formula	Released

• **Time range** for the simulation: In the time fields relating to earliest/latest date you can specify either absolute or relative data.

We recommend working with relative date settings.

Please note that if you select "relative date", the absolute date fields get updated automatically!

Earliest/Latest Date Input Type	Relative Date 🗸	
Earliest Date Formula	Absolute Date Relative Date	

• Absolute time range: If you select "Absolute Date", you enter the desired dates in the according fields:

Earliest Date	1/20/2021	
Latest Date	6/30/2021	

In the picture above, the simulation (remember this is the snapshot of your overall schedule that you then want to work with) includes all production orders with the minimum production order status "planned that start on or after 20 January 2021 and finish on or before 30 June 2021.

• **Relative time range**: If you select "Relative date", you have to enter an according data formula. In the picture below, we look four days back and three months into the future:

Earliest Date Formula	-4D	
Latest Date Formula	ЗМ	



• **Default view color type**: Select the default color type for this simulation

		_
Default View Color Type	Prod. Order Status	-
Data Filter	Item View Machine/Work Centre View	
No	Prod. Order Status	
NO.	Progress	
Name	Availability	
Name	Wait Times	
	Production Order View	
	MRP View	
	OK Cance	- L

• Data filter

The settings in this area allow you to load only data that you really need (e.g., if you only need to work with data from your department). This means that these filter settings work as a Dynamics 365 BC data filter on loading the data into the simulation. Data filters are already effective at the data interface to make sure that only filtered data are handed over from Dynamics 365 BC to the VAPS. You create and edit filters as is described below under "Base view filter."

	Design - Suparities - Seca
VAPS Data Filter	∠ ×
Filter: Work Center Group	
× Code · · · · · · · 2	\sim
×Name ·····	
+ Filter	
Filter totals by:	
+ Filter	
Filter: Work Center	
× No	\sim
×Name ·····	
+ Filter	
	OK Cancel

Read more about using data filters in this chapter

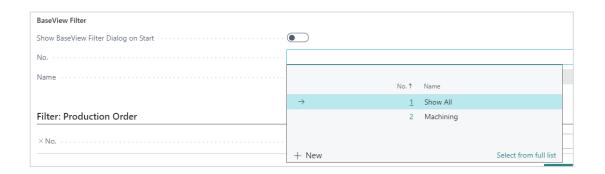
• Base view filter

A base view filter is assigned to a simulation. This means that by opening the according simulation, the settings of the base filter come into play in addition to the data filter, but in contrast to the data filter, the data filtered out by the base filter are nevertheless taken into account for the planning. Please note that the settings of the base filter cannot be changed while the simulation is running.

A base filter can be created directly upon creating a new simulation or via the simulations page

- Decide whether the base view filter dialog pops up at the start of the simulation
- Select an existing filter from the drop drown list
- Create a new one by clicking "Select from full list". For details, please see the description below on "How to define regularly used filters".



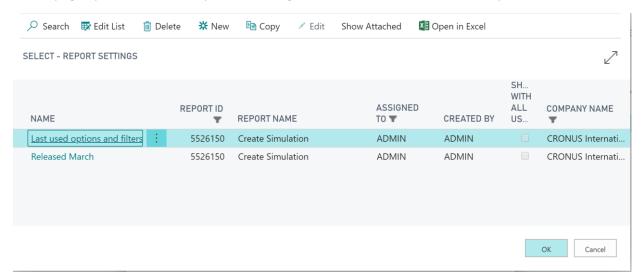


8.3.2. How to define regularly used base view and production order filters

If you have filters that you want to apply multiple times, it makes sense to define them once. In order to do so, click the downward-facing triangle in the dropdown menu under "saved settings" and then click "select from full list".

	7	∽ SAVI			
		Data …	5		
w will be saved only to: 'Last used options and filte	rs'	ER LINES	PROD. ROUTING L		
Last used options and filters	/	23	-		
NAME					
Released March		Se	lect from full list		
	Last used options and filters NAME Last used options and filters	Last used options and filters NAME Last used options and filters Released March	ow will be saved only to: 'Last used options and filters' Last used options and filters \checkmark 23 NAME Last used options and filters Released March Se		

A new page opens, from where you can manage (i.e., create, edit, and delete) all your filters:



When you click "new", you can create a new filter with certain criteria. Here is how the "Released March" filter was defined:

EDIT - CREATE SIMULATION

Filters

Minimum Status	Released	•
Earliest Date	3/1/2021	
Latest Date	3/31/2021	

Once defined, you can also apply this filter if you create a new simulation:

EDIT - CREATE SIMULATION	
Saved Settings	
Changes to the options and filters belo	w will be saved only to: 'Last used options and filters'
Use default values from:	Released March 🗸
Filters	
Minimum Status	Released •
Earliest Date	3/1/2021
Latest Date	3/31/2021
	OK Cancel



 \checkmark

8.4. How changes to a simulation are managed

While working in a simulation, multiple changes can happen that are treated in different ways

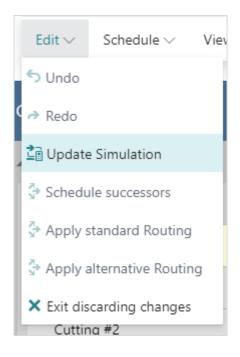
8.4.1. General changes to production orders

General changes to production orders while there are simulations (opened or not opened) that do not include these production orders are

- add new production orders
- delete production orders
- change "general" production order data, like
 - due date
 - $\circ \quad \text{required due date} \quad$
 - \circ color
 - o quantity
 - setup time for one routing line etc.

Effects of general changes

- the simulation gets outdated
- you get a notification if this happens while a simulation is open
- you can directly update the simulation



8.4.2. A specific change to a production order: the status change

Changing the production order status can lead to a change of the production order ID, this making the handling of simulations rather tough.



Impacts of changing the production order status

- If you change the production order status from within the VAPS, we will seamlessly update the open (and all other simulations)
- If you change the production order status from another session/as another user
 - all **not opened simulations** get silently updated
 - in the **open simulation**: if you made a schedule change to the production order and somebody else changed the status while you did so, you will not be able to save your changes because the production order ID got changed.

8.4.3. A change to the production order routing line status

Changes to the production order routing line status can happen if

- somebody starts posting output/consumption on an operation from a released production order
- somebody finishes an operation from a released production order

Impacts of changing the production order routing line status

• the simulation silently updates

8.5. Compare simulations

With version 1.3 of the VAPS we introduced a (first) set of KPIs so that you can compare different simulations and decide which suits you best.

Click "Compare Simulations" on the simulations page:

D 1	View Simulation Data	
	Compare Simulations	
Created	Open in Excel	_
6/30/2 6/30/2		-
	Fewer options	-

The "Simulations KPI" pages opens up:

Simulations KPI					
📢 Previous Set 🕨 Next Set 🛛 👼 Refresh KPI	ls 📌 Setu	p			
Options					
Show Code		Last Update Da	te-Time 9/30/	2020 2:34 PM	
Simulation KPI Matrix Manage					E
Simulation KPI Matrix Manage		No. Prod. Orders	No. Ops. on Standby	No. Late Prod. Orders	E2 Tot
	:	No. Prod. Orders			
Description		No. Prod. Orders 22			
Description → Simulation Created on 07/06/20 02:45 PM	:	_	Standby	Orders	
Description → Simulation Created on 07/06/20 02:45 PM Simulation Created on 09/15/20 11:22 AM	÷	- 22	Standby	Orders 2	То

This page shows the following KPIs per simulation:

- Number of production orders
- Number of operations on standby
- Number of late production orders
- Total delay (hours)
- Total setup time
- Total buffer time (time between end of production order and required due date)
- Number of production orders without required due date

On the "Simulations KPI" page you can

- refresh the KPIs: if you have added a new simulation, the KPIs of this simulation remain empty until you have refreshed them
- call the "KPI Setup" dialog, where you can exclude/include outdated simulations from/in your comparison
- call another dialog via Setup-->Navigate-->Measures where you can administrate your KPIs (delete, hide, change order)

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2	Search + New	B	Edit List 📋 Delete 関	Open in Excel		Y
	Code †		Description	Caption	Sequence	Show Mart
\rightarrow	LATEPRODORD	÷	Number of Late Production O	rders No. Late Prod. Orders	3	
	NOREQUDATE		Number of Prod. Orders missi	ing No. Prod. Orders Missing Due Date	8	
	NUMPRODORD		Number of Production Orders	s No. Prod. Orders	1	
	STANDBYOPS		Number of Standby Operation	ns No. Ops. on Standby	2	
	TOTALBUFFER		Total Buffer Time	Total Buffer Time (hours)	7	
	TOTALDELAY		Total Hours Delay	Total Delay (hours)	4	
	TOTALSETUP		Total Setup Time	Total Setup Time (hours)	6	

8.6. How do I publish a simulation?

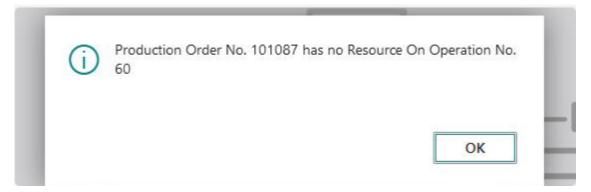
We have our own page to manage your simulations. It is called "production simulations". From here, you can publish a simulation. "Publish" means that we update the underlying Dynamics 365 Business Central database.

You can publish a simulation from the "production simulations" page, which you can access from the NETRONIC VAPS menu, or by simply searching for "production simulations". The production simulations page looks as follows:

✓ Searce	:h 🐺 Edit List	📋 Delete	民 Create	Simulatio	n 🛛 🔅 Publish Simulati	on 🛛 🗭 View Simulation	ӯ View Si	mulation Data 🛛 …	Y 1
DE	SCRIPTION				DEFAULT VIEW COLOUR TYPE	CREATED ON	PF	ROD. ORDER LINES COUNT	PROD. ROUTING LINES
Sim	ulation No. 0 on (07/22/19			Prod. Order Status	7/22/2019 10:40 AM		23	13
Rel	eased production	orders - 07/22	/19	1	Item View	7/22/2019 11:48 AM		6	43

If you click "**publish simulation**", the selected simulation gets published. Once it is published, it gets automatically deleted and removed from the above-shown table.

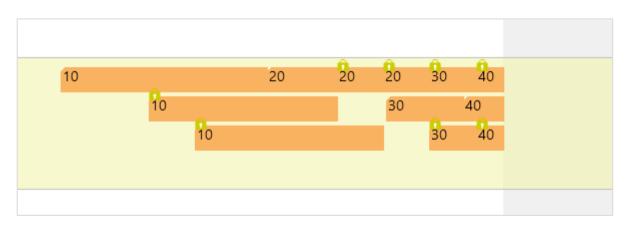
In case of inconsistent data, a warning message pops up:



Please remember: "publish" means that we update the Dynamics 365 Business Central database. "Publish" means that the simulation becomes your new production schedule.

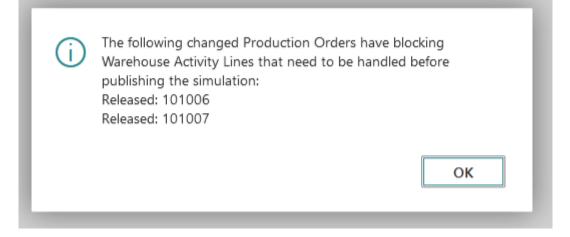
8.7. Handling of simulations with warehouse activity lines

When a production order contains a warehouse activity line, the order cannot be modified, and the associated simulation cannot be published. To provide more meaningful user information in these cases than the generic error message from Business Central, the VAPS offers the following support:



• a symbol for blocked production order routing lines

• an info window telling the users which production orders have been blocked



Since checking for affected production orders could consume excessive time in environments with a high volume of orders, the "Disable Warehouse Activity Line Check" option in the "General" section of the VAPS setup dialog allows for disabling the checking process. Please note, however, that in this case, the affected orders will still be blocked from modification.



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how Symbol on Co 🕐 🌑
how Symbol on Tool
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9. Day-to-day use cases

9.1. Working with subcontracting work centers

The VAPS supports setting up and visualizing subcontract work centers

Many manufacturers seem to use the subcontracting functionality of Dynamics 365 Business Central which implies setting up a work center as a subcontract work center. In general, two major use cases can be differentiated:

1. Subcontractor as standard operation

In some cases, manufacturers need to outsource certain steps of their production process, because they don't have the needed machines. In this case, they set up a routing and have a subcontracting work center (which equals their supplier) as usual step of this routing.

2. Subcontractor as option to deal with bottlenecks

In this case, manufacturing companies do everything on their own. But there might be cases in which they want to outsource something to a subcontractor because all their machines are busy. In that case, their standard routing is on their own machines, but they can change it manually so that then they send one operation to a subcontractor.

Since working with subcontractors is a really fundamental functionality for manufacturers, the VAPS enables visualizing and handling subcontractors as follows:

- Subcontract work centers are treated as work centers with infinite capacities because capacities and availability of the subcontractors are unknown to us.
- Subcontract work centers can be made part of alternate routing sets (although the rest of the VAPS currently still focuses machine centers when scheduling).

Header				
No		Version No.		
Description		Blocked		
Machine Cer 💙			1,00	1,00
ζlm	n			
2)			



After having set up a subcontractor work center, operations can be assigned just the same as is done with "normal" work centers. However, please note that there is no Standby machine center.

Capacities		January 2021 Wk 04							
		25	26	27	28	29	30		
Standby (∞)					orart				
Milling #1									
Milling #2				4	SCIEC				
Turning #1									
Milling & Turning					1				
Subcontractor 1	•		l (01033	10	1023			
🔺 Assembly & QC									

The default color of the subcontract work centers can be set in the "Color Setup":

Workcenter	
Subcontract Workcenter Color	#00a0a0

9.1.1. Handling of subcontractor production orders with related purchase orders

If a purchase order mirrors a certain production order (and is used for communication with the subcontractor/vendor), the due date from the subcontractor production order is used for EMAD calculation. The reasons for this are as follows:

in this constellation, the purchase order has no quantity (and hence cannot be used for EMAD calculation).

There is also no reservation/tracking between the purchase order and the production order.

9.2. Infinite capacity for work centers/machine centers

This feature is helpful for customers who have, e.g., certain clearly defined bottleneck areas in which it is imperative to plan with limited capacity and other areas in which it is perfectly possible to plan with unlimited capacity.

Moreover, in cases of orders being late, this feature helps to find out more easily where the bottleneck is, based on the overload that has occurred (when setting a machine center to infinite).

The respective work center and machine cards were enhanced to activate the "Schedule with infinite capacity" option.



Scheduling			
Unit of Measure Code	MINUTES ~	Shop Calendar Code	2 ~
Capacity · · · · · · · · · · · · · · · · · · ·	4	Queue Time	0
Efficiency	100	Queue Time Unit of Meas	V
Consolidated Calendar		Schedule with Infinite Capa	

Having activated this setting will be indicated by the ∞ symbol on the respective work/machine center:



The behavior on such an "infinite" center is the same as on standby resources and subcontractor work centers. Operations may overlap without driving out each other. Switching on or off this option will affect the respective center in all existing simulations but operations having been scheduled already will not be rescheduled automatically.

9.3. Using data filters: filter on capacities

With a data filter you can load only data that you really need (e.g., if you only need to work with data from your department). This means that these filter settings work as a Dynamics 365 BC data filter on loading the data into the simulation. Data filters are already effective at the data interface to make sure that only filtered data are handed over from Dynamics 365 BC to the VAPS. Read more on creating and editing filters in <u>this chapter</u>.

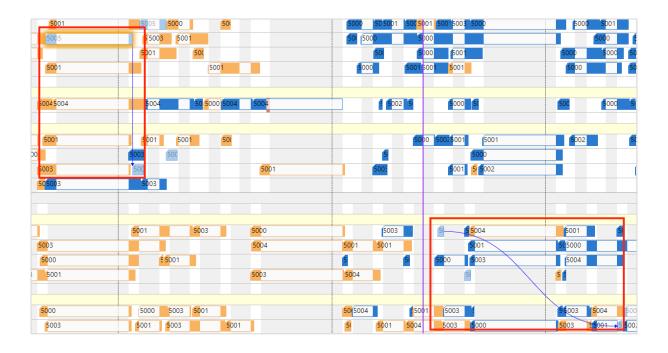
boyum

Let's say, in your overall plan there is a capacity "Subcontractors" but in your individual day-to-day work, this capacity does not matter so that you don't need to load it. So, what would be more obvious than creating a data filter for this with the settings shown below?

VAPS Data Filter		Z ×	
Filter: Work Center Group		-	_
× Code · · · · · · · · · · · · · · · · · · ·	1 2	~	2 X
×Name ·····	Code ↑	Name	
+ Filter	\rightarrow 1	Machining Fertigung	
Filter totals by:	2	Finishing Endbearbeitung	
+ Filter	+ New		Select from full list
Filter: Work Center			
× No		~	
×Name ·····			
+ Filter			_
Filter totals by:			

Filtering by capacities results in loading only production order lines that are assigned to these capacities via routing. Production order lines that, due to filtering, have no child elements are not loaded. If lines that are not complete because, for example, an operation is missing because its capacity is filtered out, the remaining operations are displayed paler and can no longer be moved, i.e., they are treated as "pinned with blocked capacity". The same applies to production orders.

After opening our newly created simulation with the filter "No subcontractors", you'll recognize some operations appearing in a pale color and some links being somewhat "interrupted" because the operations of this production order that are handled by the subcontractors get, of course, filtered out. The paler color indicates that these operations can't be moved.



9.4.(Basic) production line scheduling

This feature is helpful for customers with a line-type scheduling approach.

We've encountered certain customers who follow a line-type scheduling approach. Through collaborative sessions with these customers and their partners and a deep understanding of their processes, we've identified specific requirements that posed challenges with our initial VAPS design. This process revealed a plethora of potential features that could enhance the VAPS for more effective production line scheduling.

Recognizing the substantial amount of work involved, we opted to begin with a minimum viable set of features that would enable these customers to benefit from the VAPS immediately. Naturally, we plan to gradually expand this functionality with future releases.

As a first step in this direction, here's what we've implemented (and what we haven't):

9.4.1. Business Central setup

- Define the line as work center
- Define each "workstation" (i.e., each process step) as a machine center
- Flag the work center as "Production Line (VAPS)"
- Example:
 - Work center = line 1
 - Machine centers of that work center
 - Step 1
 - Step 2
 - Step 3
 - Step 4
 - Step 5
 - ...



	rch Name · · · · · · LINE 1
Load Calendar Absence General No. Vo. Vo. Searc	rch Name · · · · · · LINE 1
General No W00010 Searc	
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	cked · · · · · · · · · · · · · •
Work Center Group Code 🕤 1 Value Last [Date Modified · · · · · 25.10.2023
Alternate Work Center · · · · Color	or (VAPS)
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9.4.2. Scheduling: We take the "line dependency" into account

Example:

- 2 work centers flagged as "production line"
- Both with 5 machine centers: step 1 ... step 5
- If the first operation of a production order is assigned to the machine center "step 1" within work center 2, all subsequent operations will also get assigned ONLY to machine centers within that same work center 2

9.4.3. Visualization: We also monitor the "physical dependency"

• Once production order 1 is on a certain line, it cannot be overtaken by production order 2

Hence, on each machine center in that work center, the operations of production order 1 must start and end earlier than the operations of production order 2



The line dependency is taken into account as hard restrictions, when you do the following:

- Apply alt. routing (if prod order is on standby)
- Add all incl. alternatives
- (Apply routing and add all only work if your default routing keeps the line assignment)

Notice: All other scheduling tools currently do not take the line dependency into account.

<u>Attention</u>: you can violate any of these restrictions via drag & drop.

DANGER: "fill idle times" will most likely break up all line dependencies.

9.4.4. How to cope with the limitations

- Two new color schemes
 - Production Line Assignment -> gives a visual warning if the "line dependency" restriction is violated (e.g., multiple operations from one production order flipping between lines)
 - Production Line Sequence -> gives a visual warning if the "physical dependency" restriction is violated (e.g., one production order overtaking the other)
- Recommendations
 - \circ $\;$ Set your default routings in a way that the line assignment is granted
 - \circ ~ Set alternate routing sets so that you can efficiently "fill" all your lines
 - \circ $\;$ When doing line scheduling, trust the automatic scheduling
 - Avoid drag & drop as much as you can
 - If there are issues (sequence or line assignment violation), move the production order to standby and reschedule -> all line restrictions will be considered again

