



Tutorial for a short “quick” demo

IMS Quick-Demo with a empty IMS database (approx. 20 - 30 minutes)

One Pager „Quick-Example“

Explanation

- A company has two production areas. Once the "prefabrication" and secondly the "final assembly". Both areas are connected to each other via a bearing (buffer).

Prefabrication has a whole process time (cycle time) of 1 h, the final assembly takes a total of 4 hours. Task of the planner is to determine if 20 orders can be produced within one week. And what impact has it, when a new scheduled order with 5 parts of a customer pushed in between. And how the production capacity has to be adjusted, if necessary, in order to reach the target of the specified one week.

Production:

- Order volume, 20 contracts (1st Scenario 50 orders, 2nd Scenario 55 orders), only one product variant
- Production split into pre-assembly and final assembly
- Interim storage for decoupling of the pre- and final assembly
- Interim storage has a maximum capacity of 20 parts

Content

- | | | |
|--|---|--|
| <input type="checkbox"/> Group production | <input checked="" type="checkbox"/> IMD / IMV | <input checked="" type="checkbox"/> Bottleneck Analysis |
| <input type="checkbox"/> Flow production | <input type="checkbox"/> IMC Simulation | <input type="checkbox"/> Variation of shift schedules |
| <input type="checkbox"/> Large quantity | <input type="checkbox"/> IMC Line Balancing | <input type="checkbox"/> Optimization production scheduling |
| <input type="checkbox"/> Purchased parts | <input type="checkbox"/> VSM | <input checked="" type="checkbox"/> Optimization Station utilization |
| <input type="checkbox"/> KANBAN | <input type="checkbox"/> VSM Simulation | <input type="checkbox"/> Ramp-Up |
| <input type="checkbox"/> Process time on netplan | <input type="checkbox"/> Configuration management | |

Questions

1. Complete design and creation of the basic data in the IMD (product, process resource)
2. Set of the configuration and netplan
3. Creation of a simulation project (Orders, Scenario, Sim-model, simulation run)
4. First scenario with 50 orders, analysis with Excel whether contracts can be produced on time.
5. Create a new scenario, extend this with a order consisting of 5 parts.
6. Analysis with Excel or in IMV directly whether objective can be produced within the given week.

Customer benefits

- Simple introduction to the software and the main basic functions of IMS.
- Rapid built up of a simulation in IMS for simple analyzes is possible.
- Understand the method of IMS to create, perform and analysis a simulation.

Purpose of the document

This tutorial describes the creation of a short demo for IMS (IMD & IMV). The demo should perform not longer than round about 15 minutes (max. 20). To be able to reach this target, some “try runs” are necessary to reach this time. This tutorial should help you to consider all relevant steps and settings to perform a runnable simulation at the end of the presentation – with some simple analysis reports.

Intention of the demo: The demo should introduce a potential customer, that's possible to get quick-wins and reasonable results with IMS only with a simple structure and model. It's not necessary to know and use all features and functions of IMS to apply the tool. In next planning steps the complexity of the structure and model can be increase, corresponding to the needs and requirements. As example the process structure can have more detailed processes (times) or the simulation model (material flow-model) can have station-types with a higher granularity and complexity.

What are the professional targets (quick-wins) which can be shown with the illustration?

- assure the delivery targets of the existing production orders.
- impact of extraordinary production orders.
- Investigation of possible solutions (shift extension) to comply the scheduling dates.

Business Case

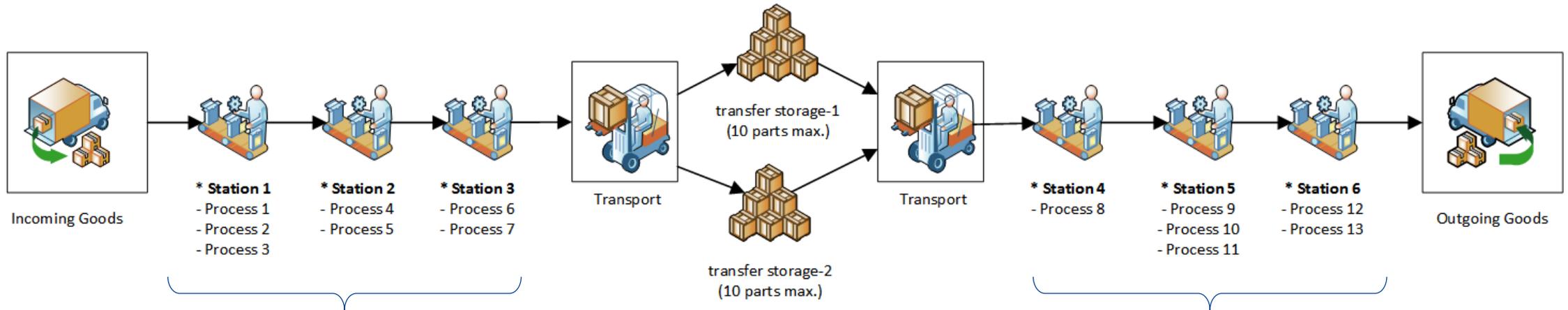
A company has two production sectors. The first is the “pre-assembly” and the second sector is the “final-assembly”. Both sectors are joint with a warehouse or stock (buffer) with a maximum capacity of 20 parts from the pre-assembly.

The pre-assembly has a total lead-time (cycle time) of 1 hour. The final assembly takes 4 hours. For the simplification of the structure in the pre- and final-assembly, there is only one process for pre- and one for the final-assembly. Therefore each sector has only one station in the simulation. Both sector have the same type of personal resource.

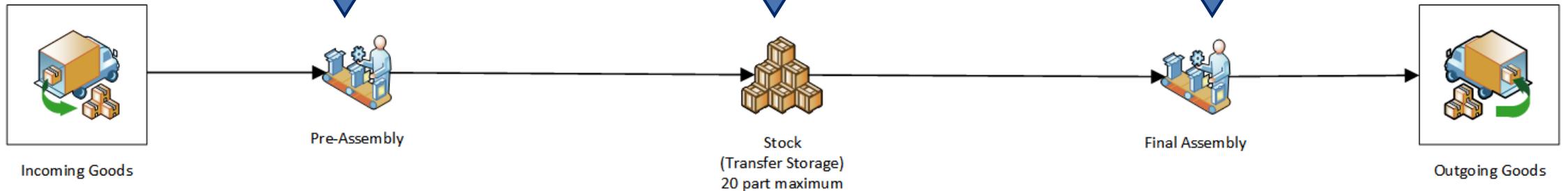
The task of the planer (customer) is, to check and verify if 40 orders which are already placed at the sales department can be arranged in time. And on the other hand, which consequences can have a new order with a high customer priority. In the example here (second scenario) there will be set a new task (high priority) with 5 parts which have to deliver by the existing production.

Illustration of the production line

real production line (example) (6 stations with different processes)



for simulation simplified production line (2 stations with one process)

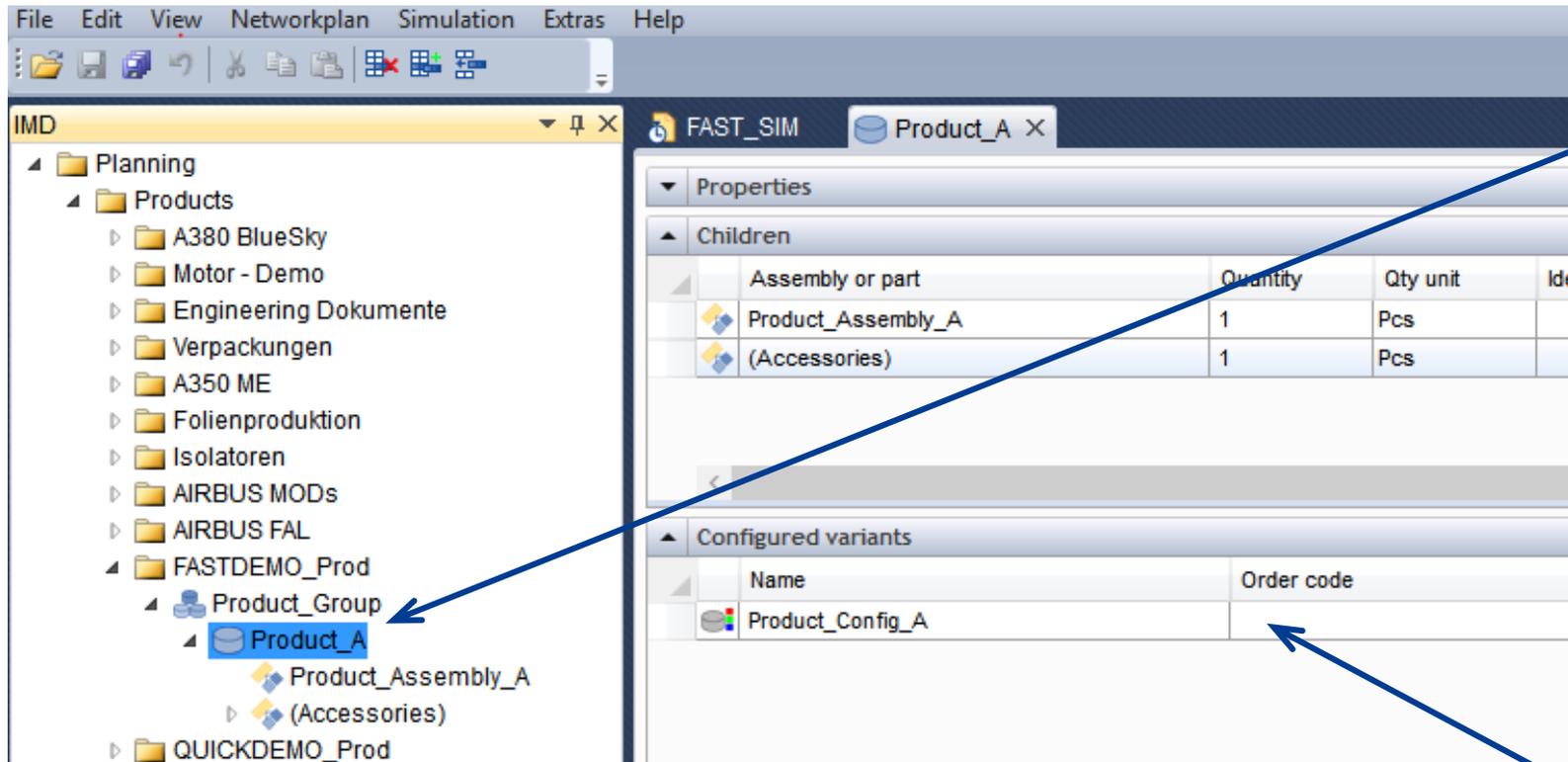


The times for transport will be reproduced in the assembly processes.

Overview procedures in IMD

1. Create a **product** folder structure (product group , product , assembly )
2. Create a **product** configurations on product nodes 
3. Create a **resource** structure and resources („logical“ stations , teams )
4. Create a **process** structure and processes (production , line  2 x work plan , process  per work plan)
5. Define **process** parameters
 - a. personal time (1 h pre assembly, 4 h final assembly)
 - b. link (logical) stations
 - c. link personal
6. link assembly group  to pre-assembly process  and define material flow  → 
 - a. Input: Source (order entry)
 - b. Output: Successor (next process)
7. link assembly group  to final-assembly process  and define material flow  → 
 1. Input: Predecessor (previous process)
 2. Output: Sink (order exit)
8. create a new network plan  on the “line”  process node
 1. link configuration to network plan

Create product structure



1. Create folder structure on assembly node.
2. Rename one of to two automatically created assembly nodes in e.g. „Product_Assembly_A“.

(Note: the two assemblies *) will be created always automatically when set a “product nodes” and can’t be deleted in the first moment. Therefore let the assembly-note „Accessories“ as it is and don’t try to delete it.

3. create only one product configuration



Create resource structure



1. Create resource structure for two stations (pre- and final-assembly)
2. Create one team with one worker.

Create process structure

The screenshot displays the SAP interface for creating a process structure. On the left, a tree view shows the hierarchy: Planung > Prozesse > FASTDEMO_Proc > Processes_A > Prod_Line_A. The 'Prod_Line_A' folder is highlighted with a blue box. On the right, the 'Eigenschaften' (Properties) window for 'Prod_Line_A' is open. The 'Name' field contains 'Prod_Line_A'. The checkbox 'PERT- und Ganttwerkzeug für Prozessablauf verwenden' is checked. Below this, there are fields for 'Vorgabezeit' (0 Stunden) and 'Vorgabekosten' (0 €). At the bottom of the properties window, a PERT diagram is visible, showing a sequence of two work processes: 'WP_PreAssembl y' followed by 'WP_FinalAssem bly', connected by an arrow.

1. Create process structure under a brown process node. Create two processes, to better simulate a material flow with a buffer.
2. Define process order
 - a. activate checkbox „PERT- und Gantt...“.
 - b. join sequence relations between processes (arrows).

Assign process parameter 1

The screenshot shows the 'PreAssay_Process* X' window with the following settings:

- Properties:**
 - Name: PreAssay_Process
 - Active time values:
 - Use PERT and Gantt tools for process scheduling
 - Use time values from process instead from childrens values
 - Process time
 - Setup time
 - Setup time: 0 Minutes, estimated
 - Lot size [ex.]: 1
 - Machine time: 0 Hours, estimated
 - Execution order: Parallel, Sequential
 - Personal time: 1 Hours, estimated
 - Waiting time: 0 Minutes, estimated
 - Process time: 0 Minutes, estimated
 - Workers minimum: 1, Workers optimum: 1, Workers maximum: 2
 - Workstation: Station_PreAssey
- Children:** (Collapsed)
- Successors:** (Collapsed)
- Personnel:**

Team	Quantity (required)	Usage (%)
Workers	1	100
- Resources:** (Collapsed)
- Products:**

Assembly or part	Input	Output
Product_Assembly_A	Source	Successor

1. Activate check-Box „Use time values from processes ...“
2. Set process times (on brown processes) to 1 h for „**pre-assembly**“ and 4 h for „**final-assembly**“.
methods to set the times are directly on the (brown) process like shown left, or (after step 3) over the network plan.
3. Link personal (worker) from resource stricter node (tree view).
4. Set material flow for each process (Input and Output).

Assign process parameter 2

PreAssay_Process* X

Properties

Name
PreAssay_Process

Active time values

Use PERT and Gantt tools for process scheduling

Use time values from process instead from childrens values

Process time

Setup time

Setup time
0 Minutes estimated Lot size [ex.] 1

Machine time
0 Hours estimated Execution order
 Parallel Sequential

Personal time
1 Hours estimated Waiting time
0 Minutes

Process time
0 Minutes estimated

Workers minimum 1 Workers optimum 1 Workers maximum 2

Workstation
Station_PreAssey

- 2a) activate check-box „Use time values from processes ... “
- 2b) process times (times on brown processes) set 1 hour für „Pre-Assembly“ und and 4 hours for „Final-Assembly“.
- 2c) set „workers optimum“ to “1”
- 2d) select a logical work station (here: “Station_PreAssey”)
- 2e) link a person from the resource structure.
- 2f) link the assembly group “Product_Assembly_A” and set on Input „Source“ and for Output „Successor“.
- 2g) The same for process „FinalAssembly-Process“, but for Input now choose “Predecessor” and for Output “Sink”.

WP_PreAssembly PreAssay_Process X

Properties

Children

Successors

Personnel

Team	Quantity (required)	Usage (%)
Workers	1	100

Resources

Products

Assembly or part	Input	Output	Quantity	Qty unit	Usage type
Product_Assembly_A	Source	Successor	1	Pcs	-

Create network plan

IMD

Prod_Line_A Networkplan_Config_A

Planning

- Products
 - A380 BlueSky
 - Motor - Demo
 - Engineering Dokumente
 - Verpackungen
 - A350 ME
 - Folienproduktion
 - Isolatoren
 - AIRBUS MODs
 - AIRBUS FAL
 - FASTDEMO_Prod
- Processes
 - A380 PR04 CustoCoRe & BlueSky
 - A380 PLM Harmo
 - Motorproduktion - Demo
 - Engineering Prozesse
 - Herstellung Verpackung
 - A350 ME
 - Folien-Produktion
 - Isolatoren
 - AIRBUS MODs
 - AIRBUS FAL MCM
 - FASTDEMO_Proc
 - Processes_A
 - Prod_Line_A
 - WP_PreAssembly
 - PreAssay_Process
 - WP_FinalAssembly
 - FinalAssy_Process
 - Resources

Properties

Name: Networkplan_Config_A

In process: [dropdown]

Purpose: Master plan Logistic plan Pre assembly Final assembly

Compilation: All child processes Selection of child processes Any processes

Number of workers: Minimum Optimum Maximum

Description: [text area]

Orders

Product	Configuration	Quantity
Product_A	Product_Config_A	1

Gantt

0 5 10

- WP_PreAssembly (5 h)
- PreAssay_Process (0,2 d)
- WP_FinalAssembly
- FinalAssy_Process

Material flow

Process	Process no	Personal time	Workers opt.	Fixed Workload [h]	Fixed process time [h]	Duration [h]	Pr
WP_PreAssembly	11000				0,00		
PreAssay_Process	11100	1 h	2	16,00	1,00	1,00	>>
WP_FinalAssembly	12000						
FinalAssy_Process	12100	4 h	5	32,00	4,00	4,00	>

1. Create only one network plan on the “yellow-node” “Prod_Line_A” for the one given product configuration.
2. Use following settings when using the wizard or define it directly in the plan.
3. link product configuration to network plan
4. link the two green process nodes to the material flow view (list).
5. link both green process nodes into the network-plan („Material flow“ view) from the process tree view.
6. Balance (right mouse click in „Gantt“ view) and save the network-plan.

Overview process – IMV

1. Create simulation project 
2. Set simulation parameter
 - a. start time
 - b. end time
 - c. shift model (use default)
3. Link process from IMD
4. Define orders 
5. Adapt shift plan if necessary (8 h shift is standard) 
6. Create (set) scenario 
 - a. link network plans from IMD
7. Generate the simulation model 
 - a. add station objects and link them to the logical stations from IMD (resource view)
 - b. select/define the product configuration at the order entry and order exit
8. Create a simulation run 

Create simulation project

FAST_SIM X

▼ Eigenschaften

▲ Parameter

Parameter	Variable	Datentyp	Vorgabewert
Start date of simulation	\$start_date	Datum/Zeit	2014/03/31 00:00
End date of simulation	\$end_date	Datum/Zeit	2014/07/31 00:00
Default shift schedule	\$default_shiftschedule	Text	Default

▲ Prozesse

Prozess

Prod_Line_A

▼ Materialbereitstellung

▲ Aufträge

Farbe	Auftrags-ID	Produkt / Konfiguration	Gruppe	Termin: Art	Termin: Datum	Termin: Ende*	Zt	Bt	Menge / Rate
	OID_01	Product_A: Product_Config		Anfang nicht später als (SNLT)	31.03.2014 00:00	17.05.2014 00:00			1
	OID_02	Product_A: Product_Config		Anfang nicht später als (SNLT)	31.03.2014 00:00	17.05.2014 00:00			1
	OID_03	Product_A: Product_Config		Anfang nicht später als (SNLT)	31.03.2014 00:00	17.05.2014 00:00			1

▲ Schichtpläne

Schichtplan	Ident-Name
Default 8 hours	Default

▲ Szenarien

Szenario	Status
Default scenario	

▲ Modelle

Simulationsmodell	Status	Basis-Szenario	Kommentar
Matflow_Model			

1. Set standard parameters
 - a. Start date
 - b. End date
 - c. Shift model (use default)
2. Link process node on which the network plan are defined to the simulation project.
3. Define orders (see slide 13)
4. Adapt shift plan if necessary (Indent-Name „Default“ has a 8 h shift).
5. Create scenario (see slide 14)
6. Create simulation model (see slide 15)

Define orders

pre define orders in Excel first, then copy & paste them into the grid view in IMS
(sort columns first in IMS)

Color	Order ID	Product / Configuration	Scheduling target	Date start	Date end	Quantity/C
Green	OID_01	Product_A: Product_Config_A	Start no later than (SNLT)	31.03.2014 07:00	04.04.2014 00:00	1
Pink	OID_02	Product_A: Product_Config_A	Start no later than (SNLT)	31.03.2014 07:02	04.04.2014 00:00	1
Olive	OID_03	Product_A: Product_Config_A	Start no later than (SNLT)	31.03.2014 07:04	04.04.2014 00:00	1
Light Green	OID_04	Product_A: Product_Config_A	Start no later than (SNLT)	31.03.2014 07:06	04.04.2014 00:00	1
Purple	OID_05	Product_A: Product_Config_A	Start no later than (SNLT)	31.03.2014 07:08	04.04.2014 00:00	1
Grey	OID_06	Product_A: Product_Config_A	Start no later than (SNLT)	31.03.2014 07:10	04.04.2014 00:00	1

Neu
Mehrfaches erstellen 50
Entfernen
Aufgaben

1. define 50 orders („multi create“)
2. pre define orders in excel first. (marked table)
 - a. Set a specific start date and „end date“ for each order
 - b. pay attention to use unique order-IDs
 - c. copy columns (the matrix) from Excel to IMV
 - d. allocate the product configuration from IMD (product structure) to all orders.

***) Important: pay attention that there have to be a difference of approx. 1-2 minutes between the start time of the orders!**

Define scenario

FAST_SIM Default scenario

Eigenschaften

Name: Default scenario

Beschreibung:

Parameter

Ressourcen

Ressource	Anzahl	Ressourcenverfügbarkeit
Workers	5	workers

Ladungsträger

Netzpläne

Netzplan	Verwendungsart	Produkte / Konfigurationen
Networkplan_Config_A	Gesamtplan	Product_A: Product_Conf

1. Link network plans from IMD process node to the scenario
2. Link resource (personal) from resource structure
3. define resource calendar at the resources
 - set name for the calendar
 - set date when resource is available (e.g. 01.01.2000)

SIM-DEMO Scenario 2

Properties

Parameters

Resources

Resource	Station	Quantity
Workers		5

Context menu for Workers:

- Show details ...
- Remove
- Tasks
 - Define resource calendar
 - Define resource calendar for shift schedule
- Move up ... Control-Up

Define Resource Calendar ...

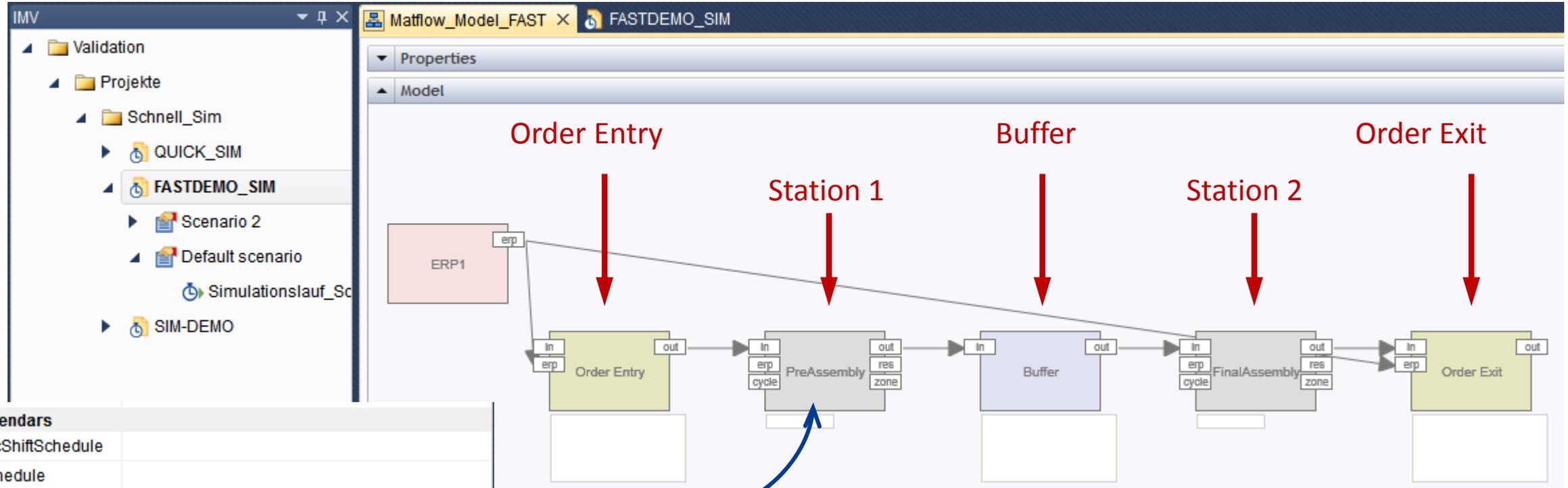
Name: workers

From Date	Quantity Available
> 01.01.2014 00:00:00	5
31.12.2100 00:00:00	0

No Calendar

OK Cancel

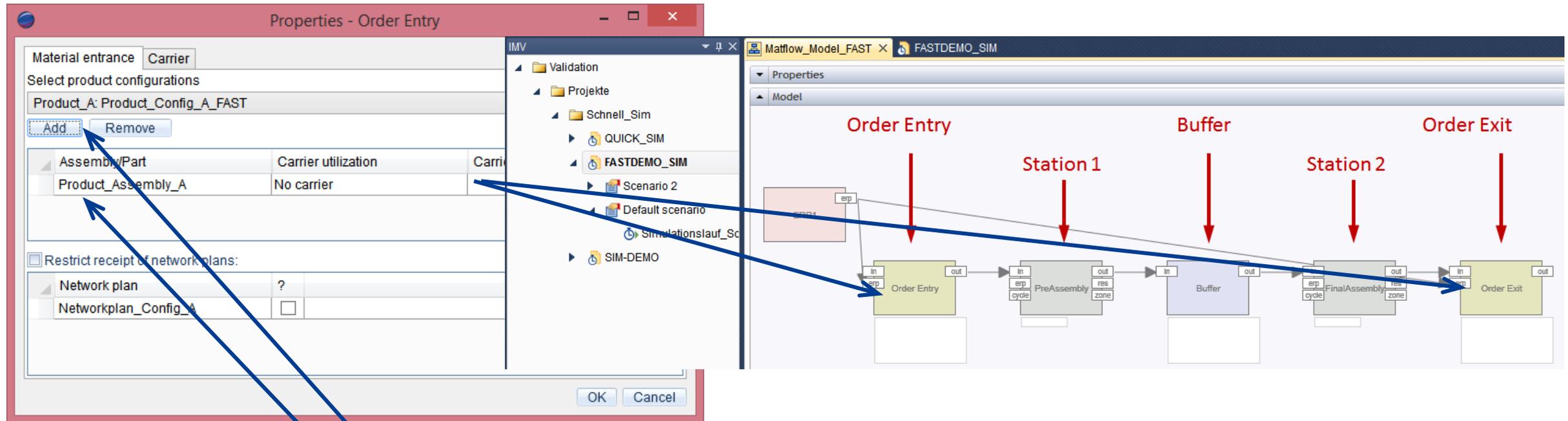
Create simulation model



Shift Calendars	
LogisticShiftSchedule	
ShiftSchedule	
Station	
AcceptOrderAt	ASAP
AcceptOrderPriority	FCFS
LearningCurve	...
PushIntermediates	Direct
Station	Station_PreAssey
WaitForCompleteInput	Station_FinalAssey
WorkersMax	Station_PreAssey

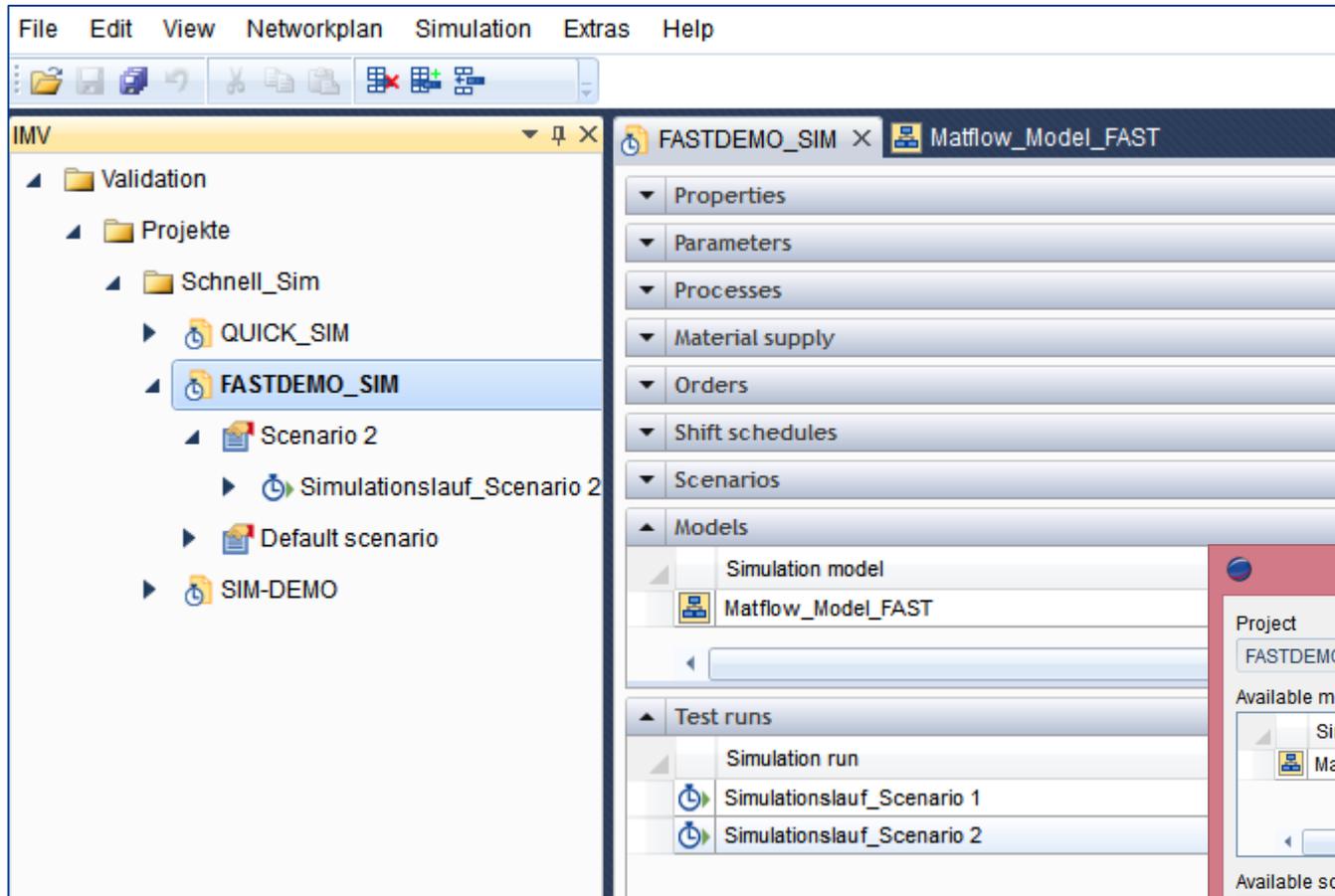
1. Add the object shown in the map above and connect them in sequence.
2. Connect the ERP node with the order entry and order exit only.
3. Apply the stations the corresponding logical station from IMD
4. ... next slide

Create simulation model

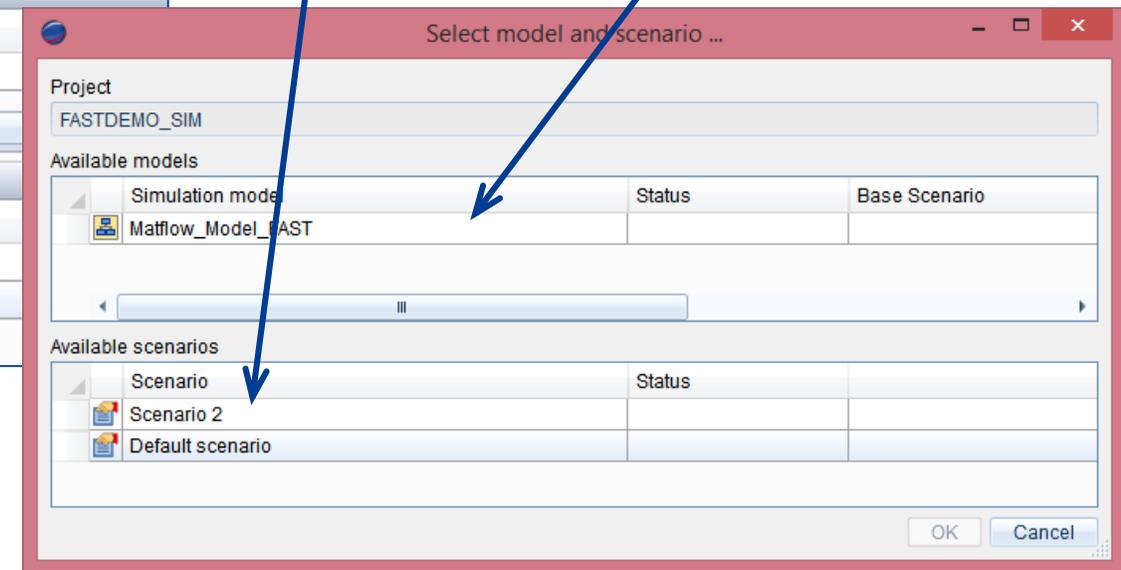


5. Apply the product configurations from IMD which have to produce (there is only one in this demo) to the “order entry” and “order exit” objects -> (right mouse button, „Advanced properties“)
 - a. Select product configuration („Add“)
 - b. In case attach the part/assembly manually (right mouse „new“) to the configuration. Normally it’s should be already applied automatically.

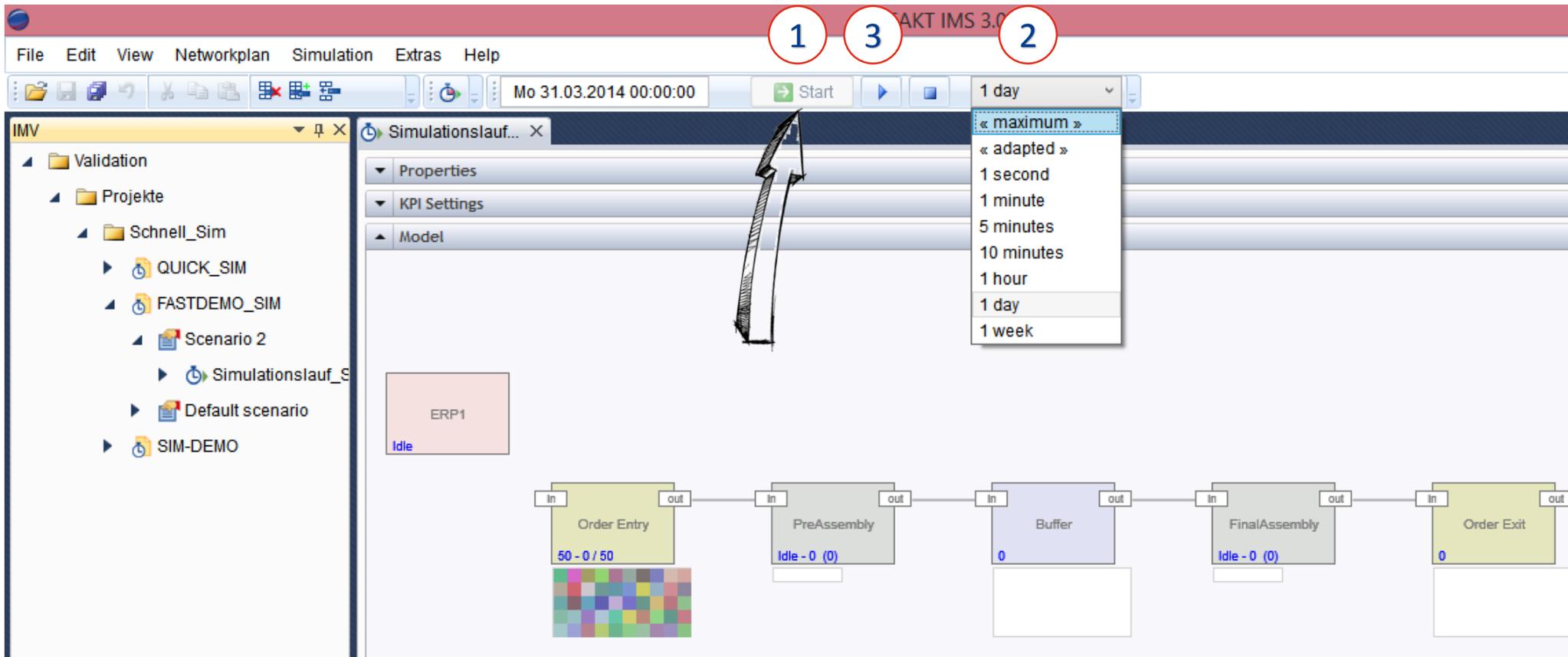
Define simulation run



1. Create a simulation run in “Test runs” by „right mouse click” -> New.
2. Select corresponding simulation model and scenario.
3. Confirm with „OK“

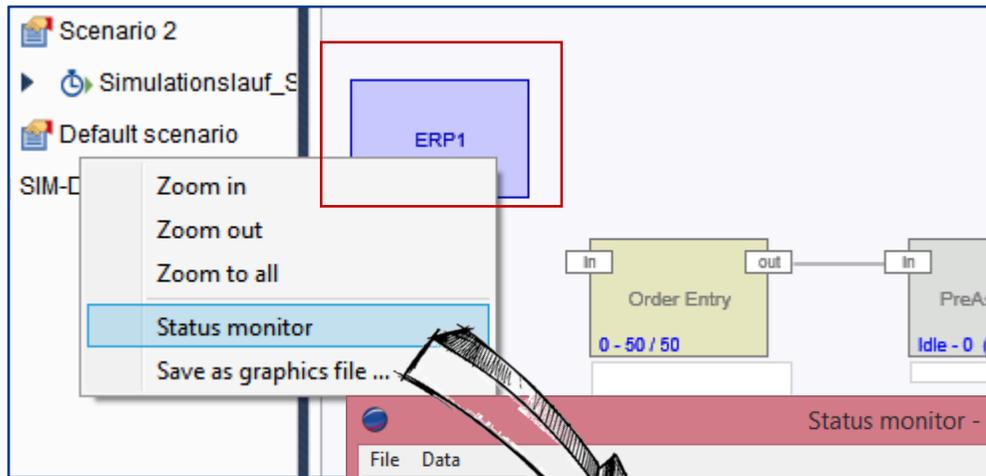


Start simulation



1. Press „start“-bottom (activates simulation)
2. set time interval to “maximum”
3. start simulation run by pressing “play”-bottom (start sim run)
4. Alternative: Press F9 (Quick-Sim)

Analysis scenario 1 – order analysis



1. After the simulation run, all data from the ERP object, register „Production plan“ will be copied into a prepared Excel table (select only “Copy” if you already have the headers in the table!)
2. Select cell „A2“ in the Excel-work sheet „ERP_Data“ and paste the data without format into the table

The screenshot shows the 'Status monitor - ERP1' window. It has a menu bar with 'File' and 'Data'. Below the menu bar are tabs for 'Production plan', 'Production orders', and 'Planning table (material)'. The 'Production plan' tab is active, showing a table with columns: Order ID, Configuration, Serial no., Start (planned), and End (planned). A context menu is open over the table, with 'Copy' selected. The table data is as follows:

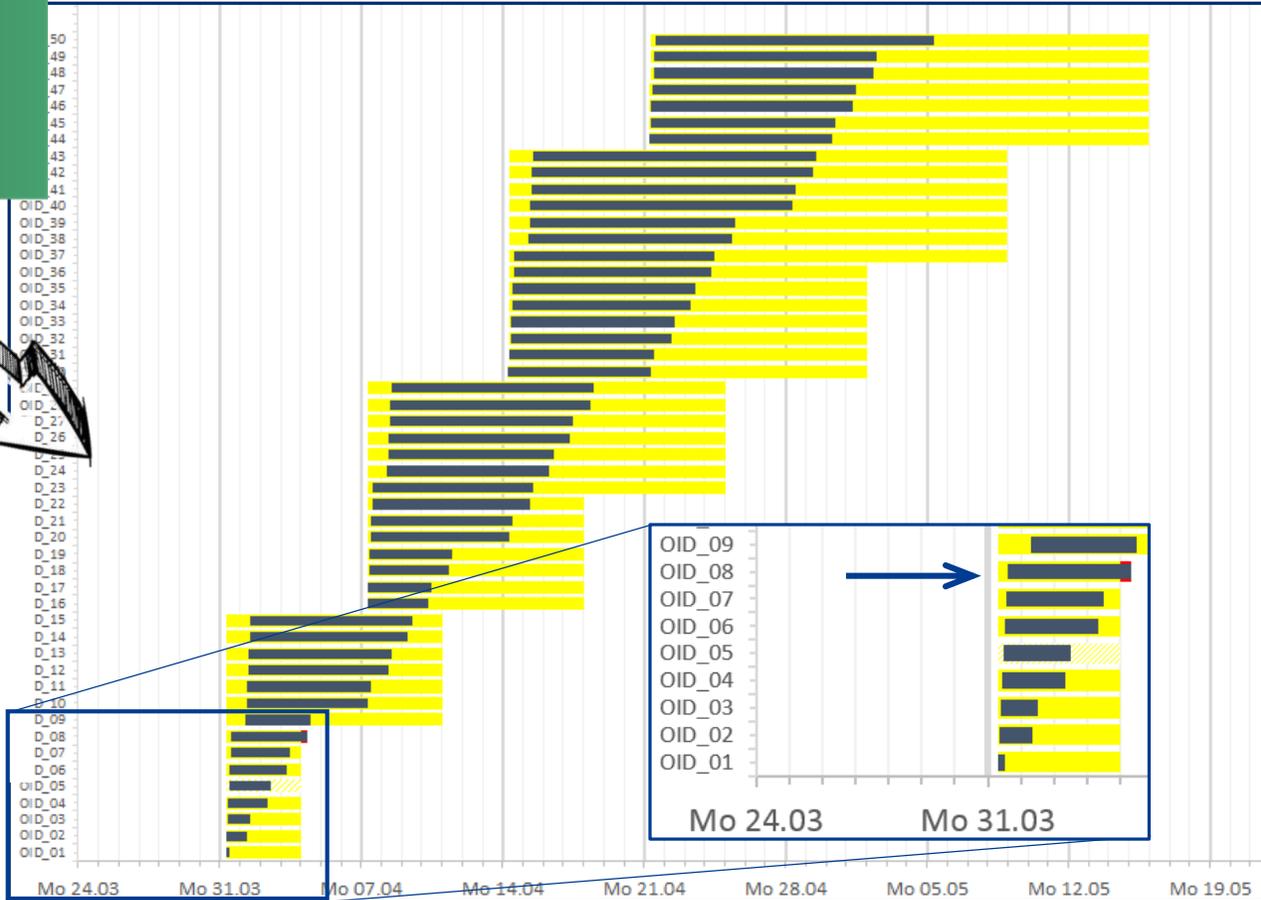
Order ID	Configuration	Serial no.	Start (planned)	End (planned)
OID_01	Product_A: Product_Config_A_FAST	1	31.03.2014 07:00:00	04.04.2014 00:00:00
OID_02	Product_A: Product_Config_A_FAST	2	31.03.2014 07:02:00	04.04.2014 00:00:00
OID_03	Product_A: Product_Config_A_FAST	3	31.03.2014 07:04:00	04.04.2014 00:00:00
OID_04	Product_A: Product_Config_A_FAST	4	31.03.2014 07:06:00	04.04.2014 00:00:00
OID_05	Product_A: Product_Config_A_FAST	5	31.03.2014 07:08:00	04.04.2014 00:00:00
OID_06	Product_A: Product_Config_A_FAST	6	31.03.2014 07:10:00	04.04.2014 00:00:00
OID_07	Product_A: Product_Config_A_FAST	7	31.03.2014 07:12:00	04.04.2014 00:00:00
OID_08	Product_A: Product_Config_A_FAST	8	31.03.2014 07:14:00	04.04.2014 00:00:00
OID_09	Product_A: Product_Config_A_FAST	9	31.03.2014 07:16:00	04.04.2014 00:00:00
OID_10	Product_A: Product_Config_A_FAST	10	31.03.2014 07:18:00	04.04.2014 00:00:00
OID_11	Product_A: Product_Config_A_FAST	11	31.03.2014 07:20:00	04.04.2014 00:00:00
OID_12	Product_A: Product_Config_A_FAST	12	31.03.2014 07:22:00	04.04.2014 00:00:00
OID_13	Product_A: Product_Config_A_FAST	13	31.03.2014 07:24:00	04.04.2014 00:00:00
OID_14	Product_A: Product_Config_A_FAST	14	31.03.2014 07:26:00	04.04.2014 00:00:00

The screenshot shows an Excel spreadsheet with the following data:

A1	Auftrags-ID						
A	B	C	D	E	F		
1	Auftrags-	Konfiguration	Serien-Nr.	Start (Plan)	Ende (Plan)	Start (term.)	Ende
2	OID_01	Product_A: Product_Config_A	1	31.03.2014 00:00	17.05.2014 00:00	31.03.2014 00:00	17.05
3	OID_33	Product_A: Product_Config_A	4	31.03.2014 00:00	17.05.2014 00:00	31.03.2014 00:00	17.05
4	OID_36	Product_A: Product_Config_A			5.2014 00:00	31.03.2014 00:00	17.05
5	OID_37	Product_A: Product_Config_A			5.2014 00:00	31.03.2014 00:00	17.05
6	OID_27	Product_A: Product_Config_A			5.2014 00:00	31.03.2014 00:00	17.05
7	OID_25	Product_A: Product_Config_A			5.2014 00:00	31.03.2014 00:00	17.05
8	OID_40	Product_A: Product_Config_A			5.2014 00:00	31.03.2014 00:00	17.05
9	OID_21	Product_A: Product_Config_A			5.2014 00:00	31.03.2014 00:00	17.05
10	OID_41	Product_A: Product_Config_A			5.2014 00:00	31.03.2014 00:00	17.05
11	OID_20	Product_A: Product_Config_A			5.2014 00:00	31.03.2014 00:00	17.05
12	OID_19	Product_A: Product_Config_A	24	31.03.2014 00:00	17.05.2014 00:00	31.03.2014 00:00	17.05
13	OID_18	Product_A: Product_Config_A	25	31.03.2014 00:00	17.05.2014 00:00	31.03.2014 00:00	17.05
14	OID_42	Product_A: Product_Config_A	26	31.03.2014 00:00	17.05.2014 00:00	31.03.2014 00:00	17.05
15	OID_17	Product_A: Product_Config_A	27	31.03.2014 00:00	17.05.2014 00:00	31.03.2014 00:00	17.05
16	OID_43	Product_A: Product_Config_A	28	31.03.2014 00:00	17.05.2014 00:00	31.03.2014 00:00	17.05
17	OID_16	Product_A: Product_Config_A	29	31.03.2014 00:00	17.05.2014 00:00	31.03.2014 00:00	17.05

Result Scenario 1 – order analysis

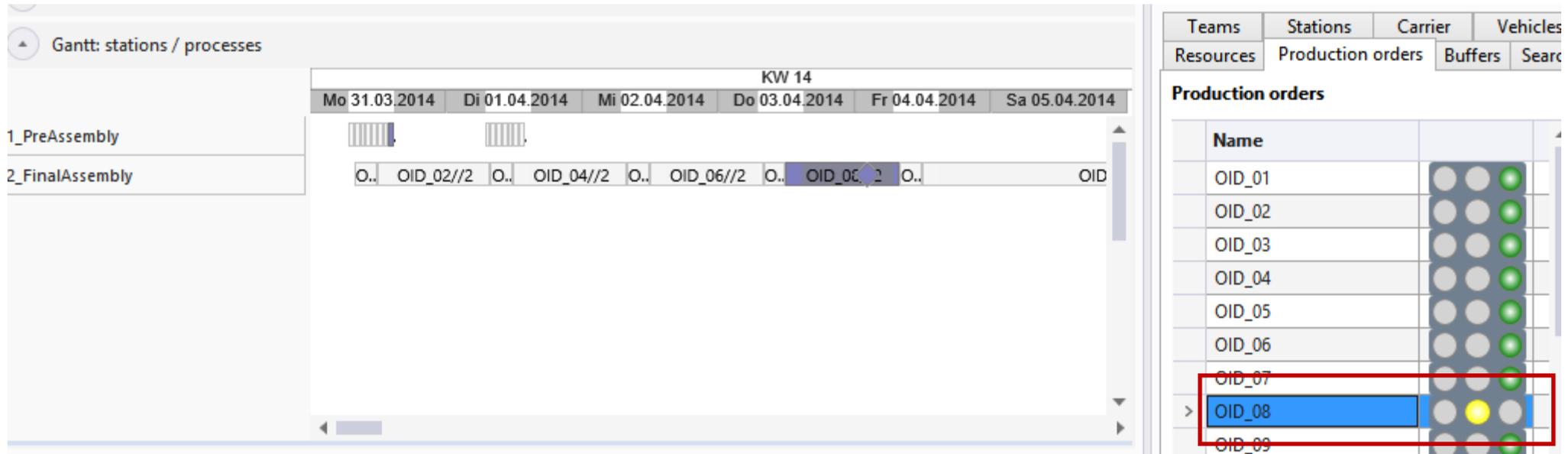
A	B	C	D	E	F	G
1	Auftrags-Konfiguration	Serien-Nr.	Start (Plan)	Ende (Plan)	Start (term.)	Ende (term.)
2	OID_01 Product_A: Product_Config_A	1	31.03.2014 00:00	17.05.2014 00:00	31.03.2014 00:00	17.05.2014 00:00
3	OID_33 Product_A: Product_Config_A	4	31.03.2014 00:00	17.05.2014 00:00	31.03.2014 00:00	17.05.2014 00:00
4	OID_36 Product_A: Product_Config_A	6	31.03.2014 00:00	17.05.2014 00:00	31.03.2014 00:00	17.05.2014 00:00
5	OID_37 Product_A: Product_Config_A	10	31.03.2014 00:00	17.05.2014 00:00	31.03.2014 00:00	17.05.2014 00:00
6	OID_27 Product_A: Product_Config_A	13	31.03.2014 00:00	17.05.2014 00:00	31.03.2014 00:00	17.05.2014 00:00
7	OID_25 Product_A: Product_Config_A	16	31.03.2014 00:00	17.05.2014 00:00	31.03.2014 00:00	17.05.2014 00:00
8	OID_40 Product_A: Product_Config_A	18	31.03.2014 00:00	17.05.2014 00:00	31.03.2014 00:00	17.05.2014 00:00
9	OID_21 Product_A: Product_Config_A	21	31.03.2014 00:00	17.05.2014 00:00	31.03.2014 00:00	17.05.2014 00:00
10	OID_41 Product_A: Product_Config_A	22	31.03.2014 00:00	17.05.2014 00:00	31.03.2014 00:00	17.05.2014 00:00
11	OID_20 Product_A: Product_Config_A	23	31.03.2014 00:00	17.05.2014 00:00	31.03.2014 00:00	17.05.2014 00:00
12	OID_19 Product_A: Product_Config_A	24	31.03.2014 00:00	17.05.2014 00:00	31.03.2014 00:00	17.05.2014 00:00
13	OID_18 Product_A: Product_Config_A	25	31.03.2014 00:00	17.05.2014 00:00	31.03.2014 00:00	17.05.2014 00:00
14	OID_42 Product_A: Product_Config_A	26	31.03.2014 00:00	17.05.2014 00:00	31.03.2014 00:00	17.05.2014 00:00
15	OID_17 Product_A: Product_Config_A	27	31.03.2014 00:00	17.05.2014 00:00	31.03.2014 00:00	17.05.2014 00:00
16	OID_43 Product_A: Product_Config_A	28	31.03.2014 00:00	17.05.2014 00:00	31.03.2014 00:00	17.05.2014 00:00
17	OID_16 Product_A: Product_Config_A	29	31.03.2014 00:00	17.05.2014 00:00	31.03.2014 00:00	17.05.2014 00:00



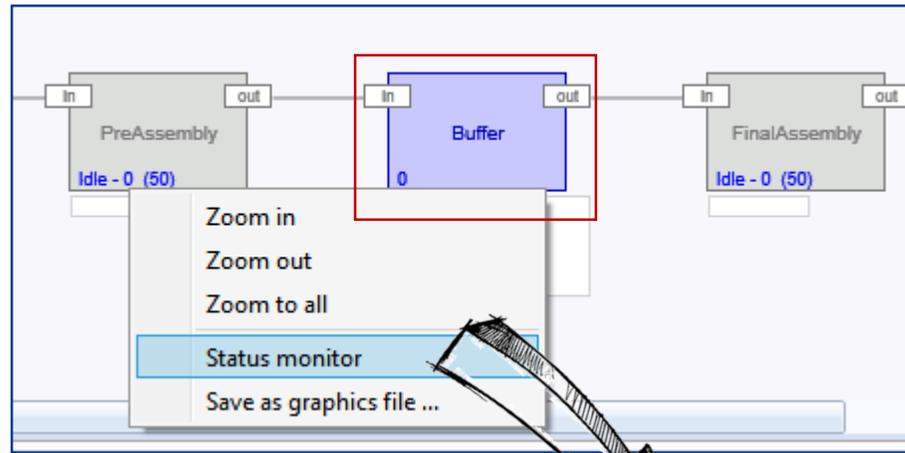
1. The first simulation run (scenario 1) will get the result shown in the picture right.
 - a. yellow bar is the given target date scope
 - b. dark blue is the simulated date scope
2. Almost all orders are in time (target date). Only order no. eight is be hard up outside the target.

Result Scenario 1 – order analysis

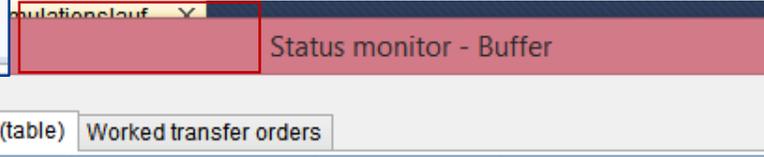
This can also be displayed very quickly in the “Production orders” list, right hand in the dashboard. But only as a quantity value not with exact times.



Analysis Scenario 1 – buffer analysis



1. After the simulation run the data from the Buffer object, register „Buffer history (table)“ will be copied to an prepared sample Excel table (select only “Copy” if you already have the headers in the table!).
2. Select cell „A2“ in the Excel work sheet „Buffer state“ and paste the data without format into the table



Time stamp	Time (sec.)	Quantity
31.03.2014 08:00:00	28800	1
31.03.2014 08:00:00	28800	0
31.03.2014 08:00:00	32400	1
31.03.2014 09:00:00	36000	2
31.03.2014 11:00:00	39600	3
31.03.2014 12:00:00	43200	3
31.03.2014 13:00:00	46800	4
31.03.2014 14:00:00	50400	5
31.03.2014 14:00:00	54000	6
01.04.2014 08:00:00	115200	6
01.04.2014 09:00:00	118800	7
01.04.2014 10:00:00	122400	8
01.04.2014 11:00:00	126000	9

A	B	C	D	E
Time stamp	Time (sec.)	Quantity	Orders	Prozent
31.03.2014 08:00:00	28800	1	OID_01//2: Product_Assembly_A(1)	5%
31.03.2014 08:00:00	28800	0	OID_01//2: Product_Assembly_A(1)	0%
31.03.2014 09:00:00	32400	1	OID_02//2: Product_Assembly_A(1)	5%
31.03.2014 10:00:00	36000	2	OID_02//2: Product_Assembly_A(1) OID_03//2: Product_Assembly_A(1)	10%
31.03.2014 11:00:00	39600	3	OID_02//2: Product_Assembly_A(1) OID_04//2: Product_Assembly_A(1)	15%
31.03.2014 12:00:00	43200	3	OID_03//2: Product_Assembly_A(1) OID_05//2: Product_Assembly_A(1)	20%
31.03.2014 13:00:00	46800	4	OID_03//2: Product_Assembly_A(1) OID_05//2: Product_Assembly_A(1)	25%
31.03.2014 14:00:00	50400	5	OID_03//2: Product_Assembly_A(1) OID_05//2: Product_Assembly_A(1)	30%
31.03.2014 14:00:00	54000	6	OID_03//2: Product_Assembly_A(1) OID_05//2: Product_Assembly_A(1)	35%
01.04.2014 08:00:00	115200	6	OID_04//2: Product_Assembly_A(1) OID_06//2: Product_Assembly_A(1)	40%
01.04.2014 09:00:00	118800	7	OID_04//2: Product_Assembly_A(1) OID_06//2: Product_Assembly_A(1)	45%
01.04.2014 10:00:00	122400	8	OID_04//2: Product_Assembly_A(1) OID_06//2: Product_Assembly_A(1)	50%
01.04.2014 11:00:00	126000	9	OID_04//2: Product_Assembly_A(1) OID_06//2: Product_Assembly_A(1)	55%
01.04.2014 12:00:00	129600	9	OID_05//2: Product_Assembly_A(1) OID_07//2: Product_Assembly_A(1)	50%
01.04.2014 13:00:00	133200	10	OID_05//2: Product_Assembly_A(1) OID_07//2: Product_Assembly_A(1)	55%
01.04.2014 14:00:00	136800	11	OID_05//2: Product_Assembly_A(1) OID_07//2: Product_Assembly_A(1)	50%
02.04.2014 08:00:00	201600	10	OID_06//2: Product_Assembly_A(1) OID_07//2: Product_Assembly_A(1)	45%
02.04.2014 12:00:00	216000	9	OID_07//2: Product_Assembly_A(1) OID_08//2: Product_Assembly_A(1)	40%
03.04.2014 08:00:00	288000	8	OID_08//2: Product_Assembly_A(1) OID_09//2: Product_Assembly_A(1)	35%
03.04.2014 12:00:00	302400	7	OID_09//2: Product_Assembly_A(1) OID_10//2: Product_Assembly_A(1)	30%

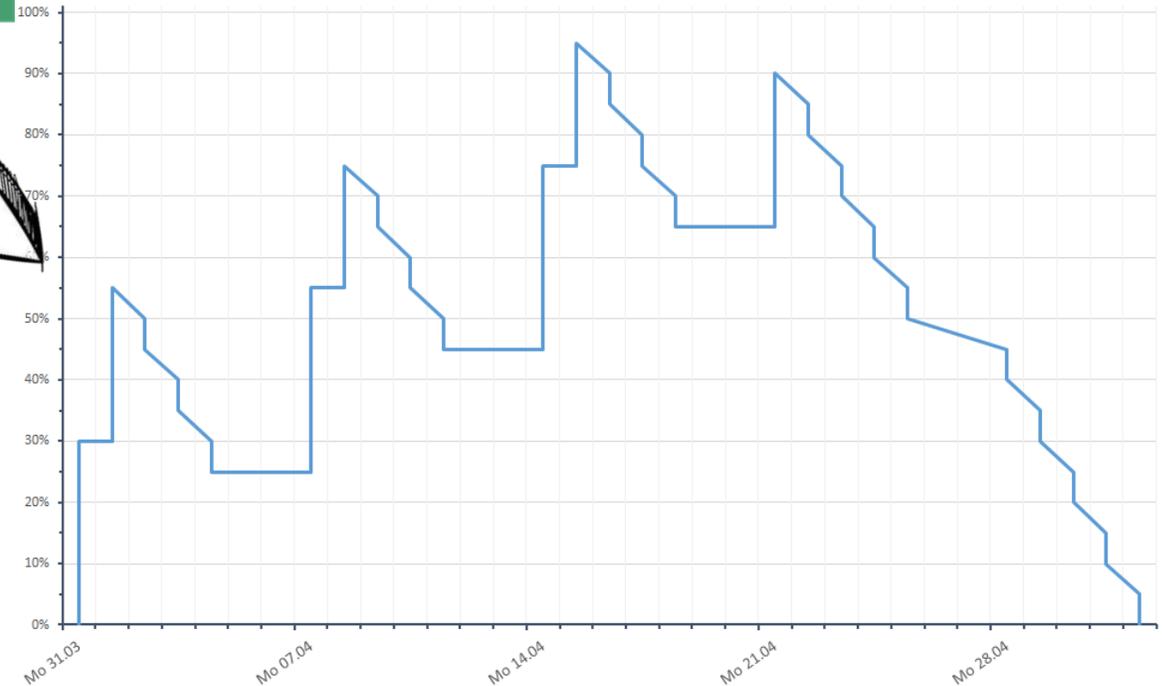
first select all with **Ctrl + A**

Result Scenario 1 – buffer analysis

	A	B	C	D	E	F	
1	Auftrags-	Konfiguration	Serien-Nr.	Start (Plan)	Ende (Plan)	Start (term.)	Ende (term.)
2	OID_01	Product_A: Product_Config_A	1	31.03.2014 00:00	17.05.2014 00:00	31.03.2014 00:00	17.05.2014 00:00
3	OID_33	Product_A: Product_Config_A	4	31.03.2014 00:00	17.05.2014 00:00	31.03.2014 00:00	17.05.2014 00:00
4	OID_36	Product_A: Product_Config_A	6	31.03.2014 00:00	17.05.2014 00:00	31.03.2014 00:00	17.05.2014 00:00
5	OID_37	Product_A: Product_Config_A	10	31.03.2014 00:00	17.05.2014 00:00	31.03.2014 00:00	17.05.2014 00:00
6	OID_27	Product_A: Product_Config_A	13	31.03.2014 00:00	17.05.2014 00:00	31.03.2014 00:00	17.05.2014 00:00
7	OID_25	Product_A: Product_Config_A	16	31.03.2014 00:00	17.05.2014 00:00	31.03.2014 00:00	17.05.2014 00:00
8	OID_40	Product_A: Product_Config_A	18	31.03.2014 00:00	17.05.2014 00:00	31.03.2014 00:00	17.05.2014 00:00
9	OID_21	Product_A: Product_Config_A	21	31.03.2014 00:00	17.05.2014 00:00	31.03.2014 00:00	17.05.2014 00:00
10	OID_41	Product_A: Product_Config_A	22	31.03.2014 00:00	17.05.2014 00:00	31.03.2014 00:00	17.05.2014 00:00
11	OID_20	Product_A: Product_Config_A	23	31.03.2014 00:00	17.05.2014 00:00	31.03.2014 00:00	17.05.2014 00:00
12	OID_19	Product_A: Product_Config_A	24	31.03.2014 00:00	17.05.2014 00:00	31.03.2014 00:00	17.05.2014 00:00
13	OID_18	Product_A: Product_Config_A	25	31.03.2014 00:00	17.05.2014 00:00	31.03.2014 00:00	17.05.2014 00:00
14	OID_42	Product_A: Product_Config_A	26	31.03.2014 00:00	17.05.2014 00:00	31.03.2014 00:00	17.05.2014 00:00
15	OID_17	Product_A: Product_Config_A	27	31.03.2014 00:00	17.05.2014 00:00	31.03.2014 00:00	17.05.2014 00:00
16	OID_43	Product_A: Product_Config_A	28	31.03.2014 00:00	17.05.2014 00:00	31.03.2014 00:00	17.05.2014 00:00
17	OID_16	Product_A: Product_Config_A	29	31.03.2014 00:00	17.05.2014 00:00	31.03.2014 00:00	17.05.2014 00:00



Pufferauslastung

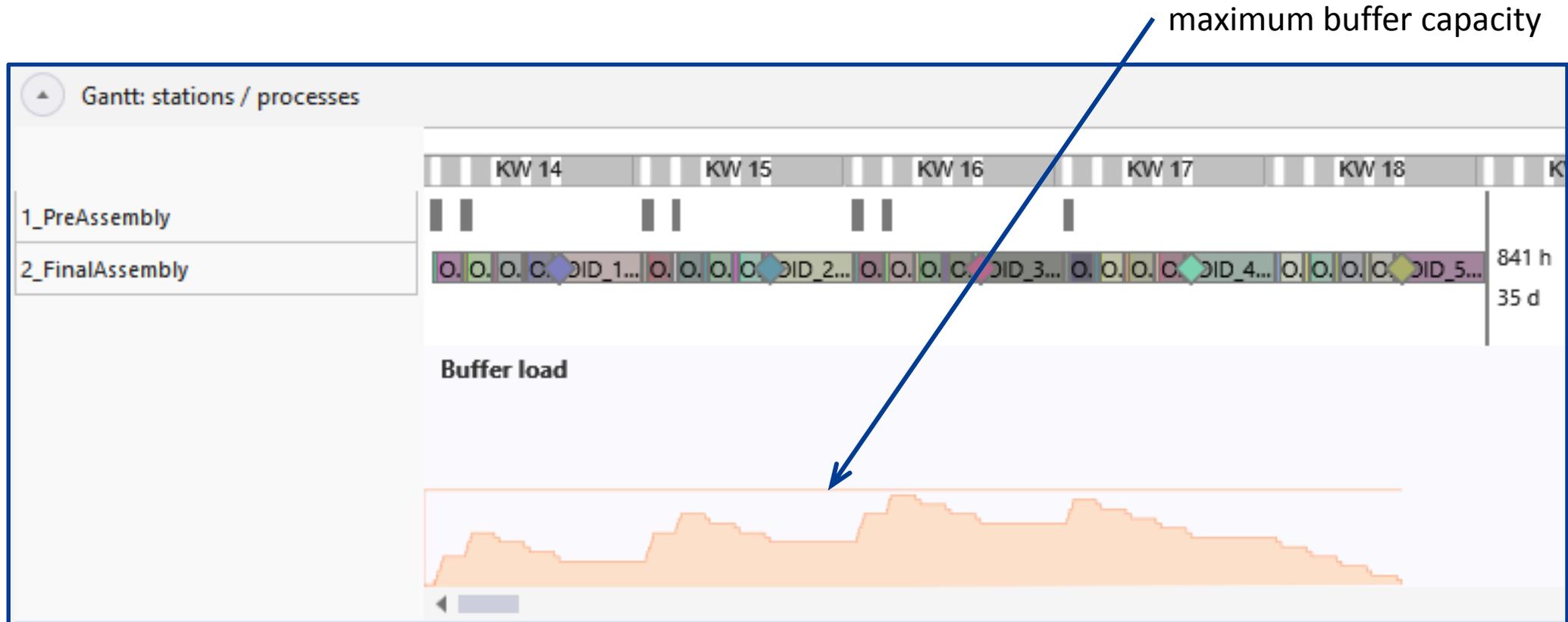


The result of the first simulation (scenario 1)) will get the result shown in the picture right.

Because the final assembly needs more time than the preassembly, the buffer capacity is increasing. But is not reaching the limit of 20 parts.

Result Scenario 1 – buffer analysis

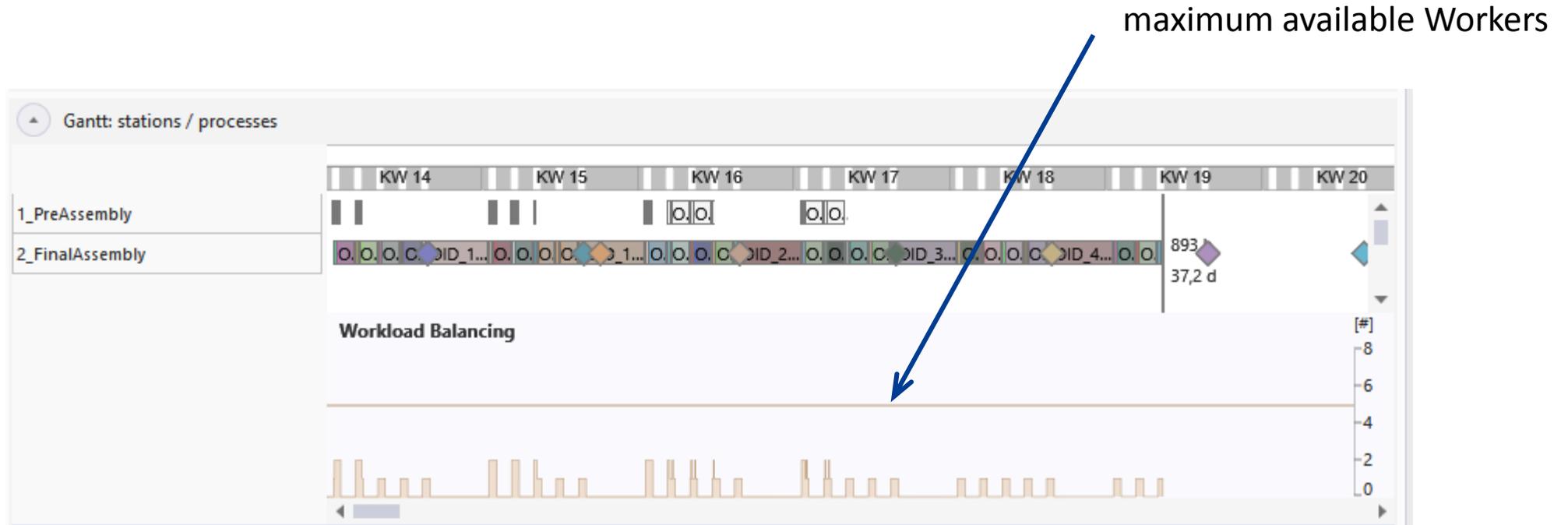
It's also possible to activate the buffer analysis in the simulation GANTT.
For this press right mouse button and select "Show buffer analysis".



Result Scenario 1 – resource analysis

The same with the resource (worker) analysis.

For this press right mouse button an select “Show buffer analysis”.



Modifications for Scenario 2

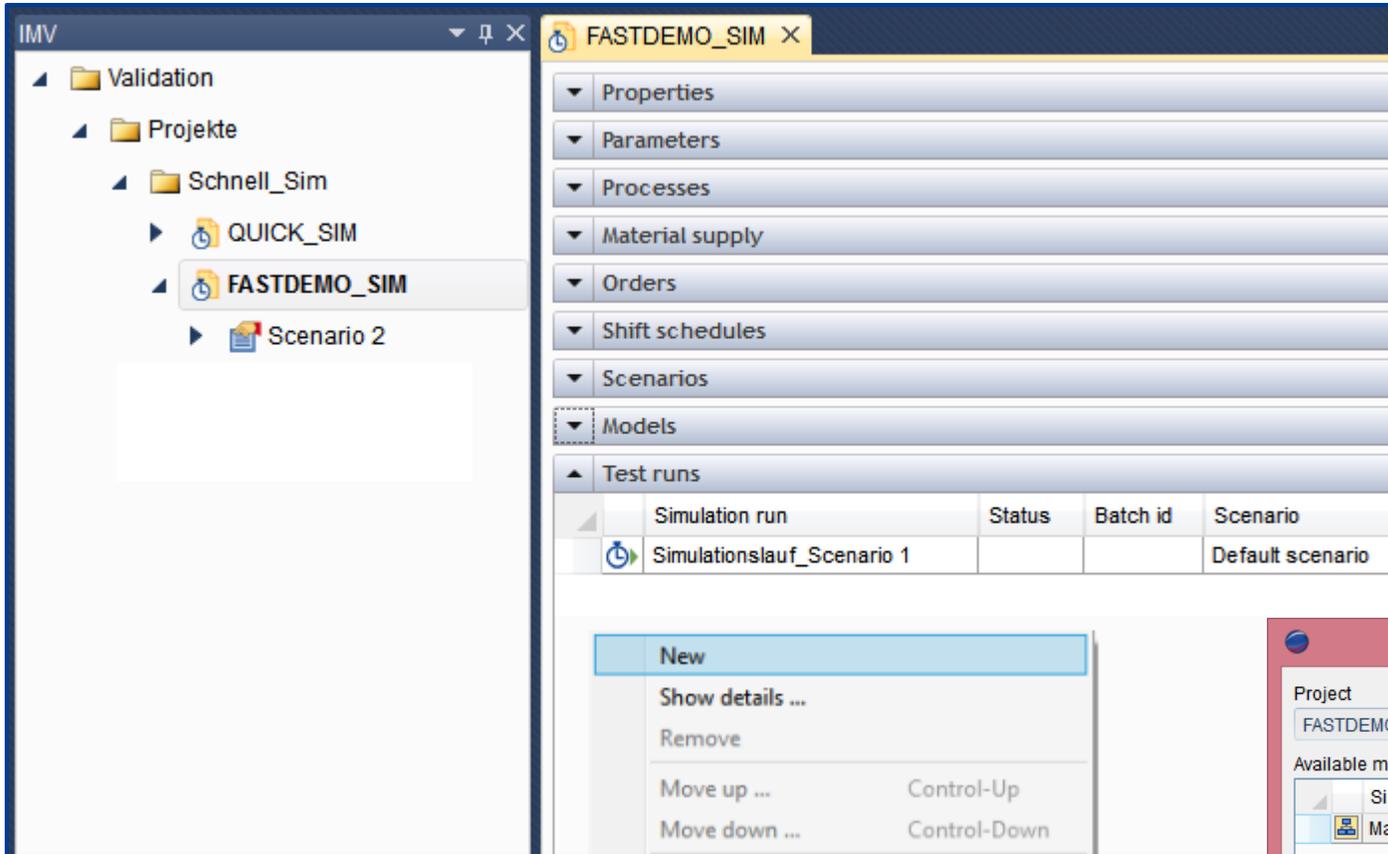
The screenshot displays the FASTDEMO_SIM software interface. On the left, a 'Scenarios' tree view shows 'Scenario 2' selected. A yellow box highlights the 'Scenario 2' tab in the main window. The 'Orders' section is expanded, showing a table with the following data:

Color	Order ID	Product / Configuration	Date start	Date end	Scheduling target	Quantity
	OID_17N	Product_A: Product_Config	07.04.2014 07:00	11.04.2014 18:00	Start no later than (SNLT)	5

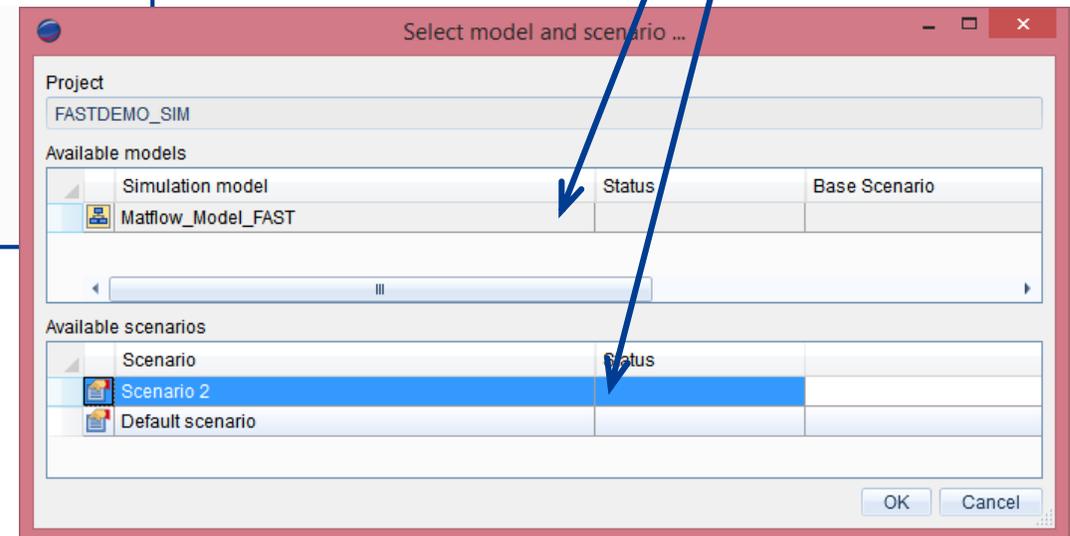
Hand-drawn arrows indicate the flow of information: one arrow points from 'Scenario 2' in the tree to the 'Scenario 2' tab, and another points from the 'Date start' and 'Date end' columns of the order table to the text below.

1. Copy the existing scenario, rename it to e.g. "Scenario 2").
2. Define of an unscheduled order (name e.g. „OID_17N“) with a start date (Date start) of **07.04.2014 7:00** and an end date (Date end) of **11.04.2014 18:00** in the 2nd scenario. Therefore the date is between 17th and the 18th order.
3. **The new order has an order quantity of 5 parts (important!).**
4. Link the product configuration from IMD.
5. Save everything

Define simulation run for scenario 2

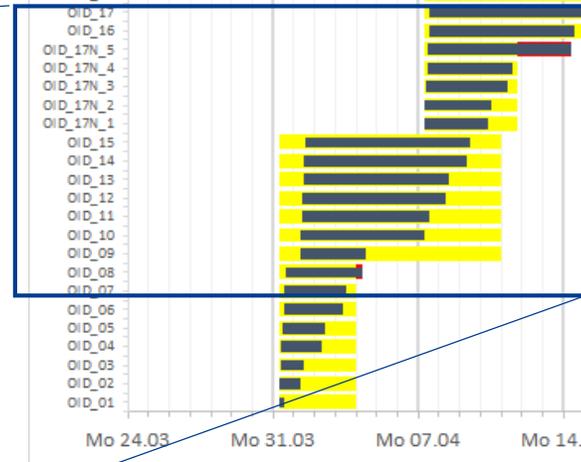
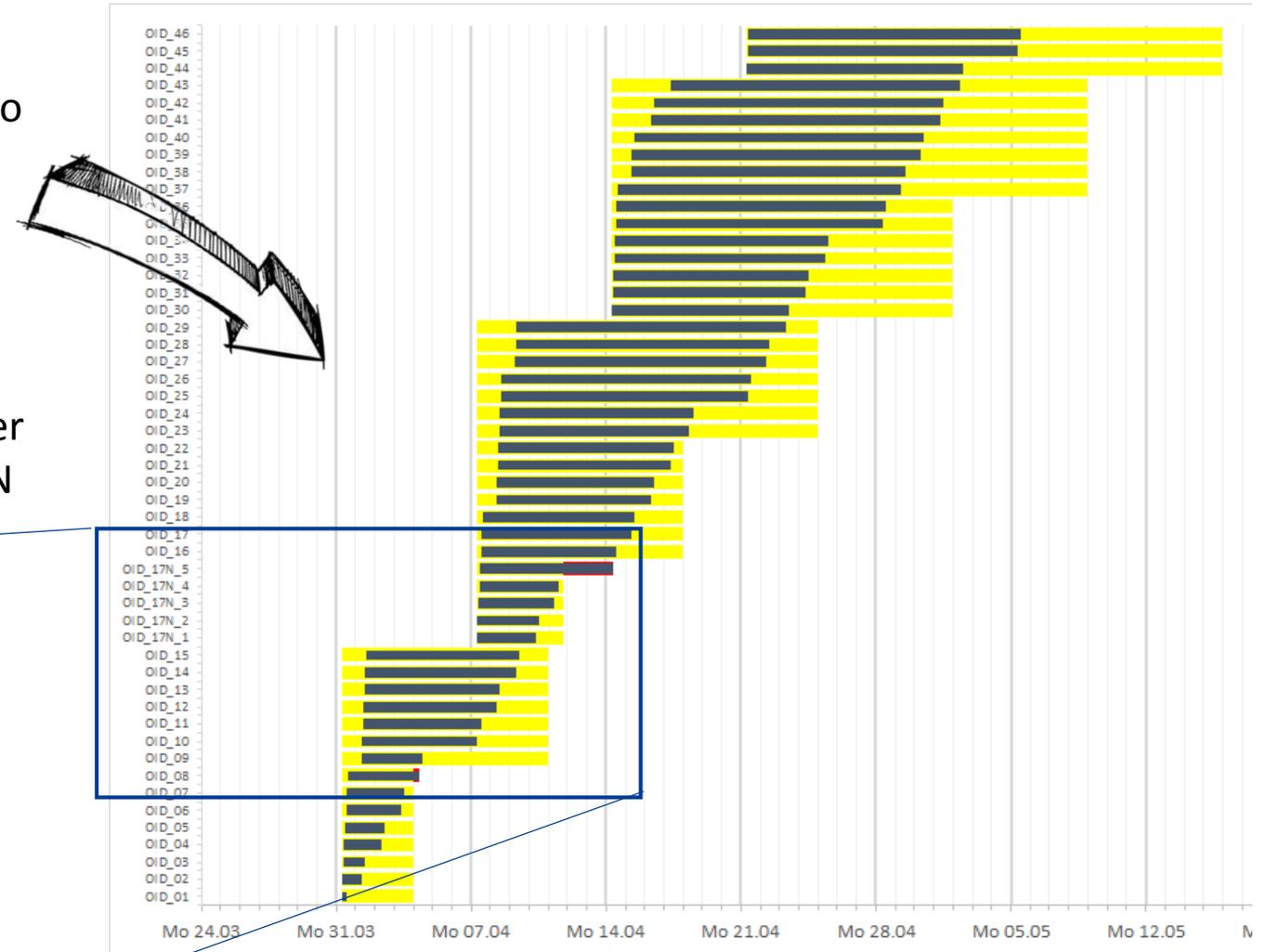


1. Define a new simulation run in „Test runs“ by the right mouse button.
2. Select the same simulation model like before and now the 2nd scenario („Scenario 2“).
3. Confirm with „OK“ and save.
4. Open the simulation run and start the simulation (like described on page 17).



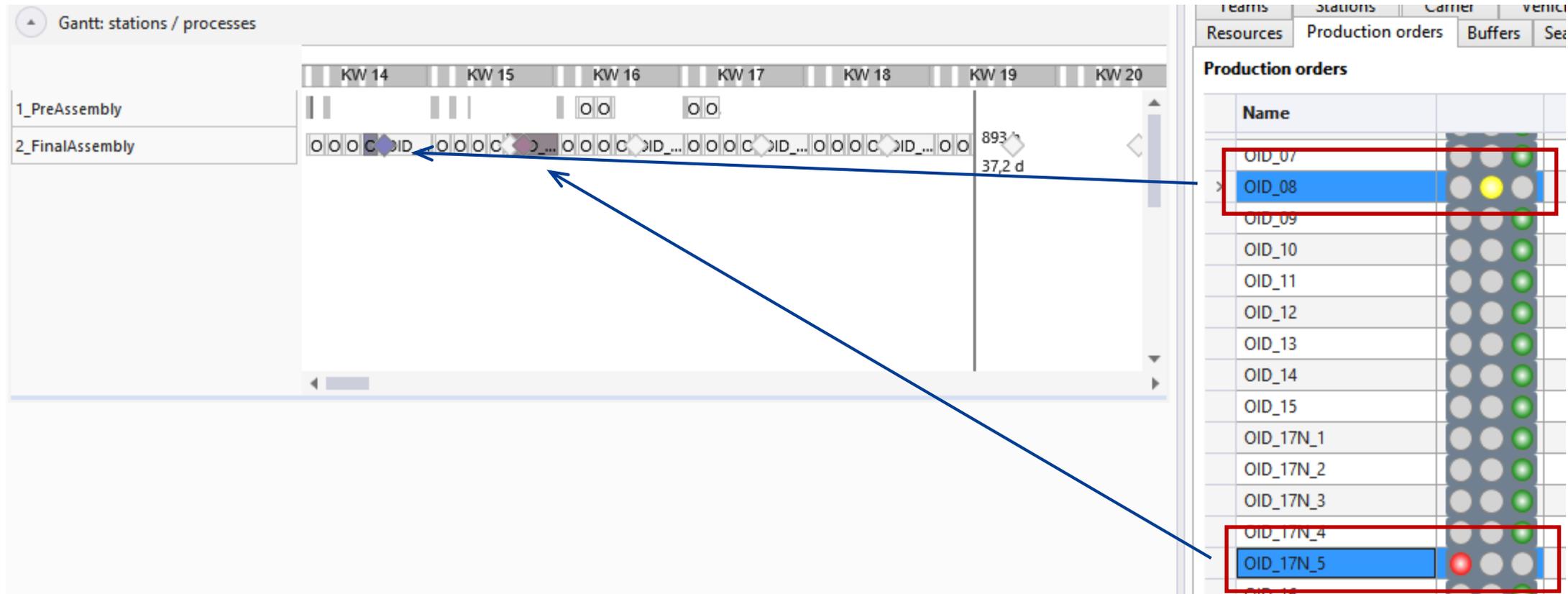
Result Scenario 2 – order analysis

1. Open new, empty („prepared“) Excel sheet.
2. Copy the simulation data from the ERP node into the Excel sheet (like scenario 1)
3. Result is shown in the picture right.
4. For the 8th order and order 17_5 occur delays from round about 8 h and 2 days. Otherwise no delays are expected.
5. In a next step the point is now to move the other orders in a way that the „important“ order 17_N can be delivered in time.



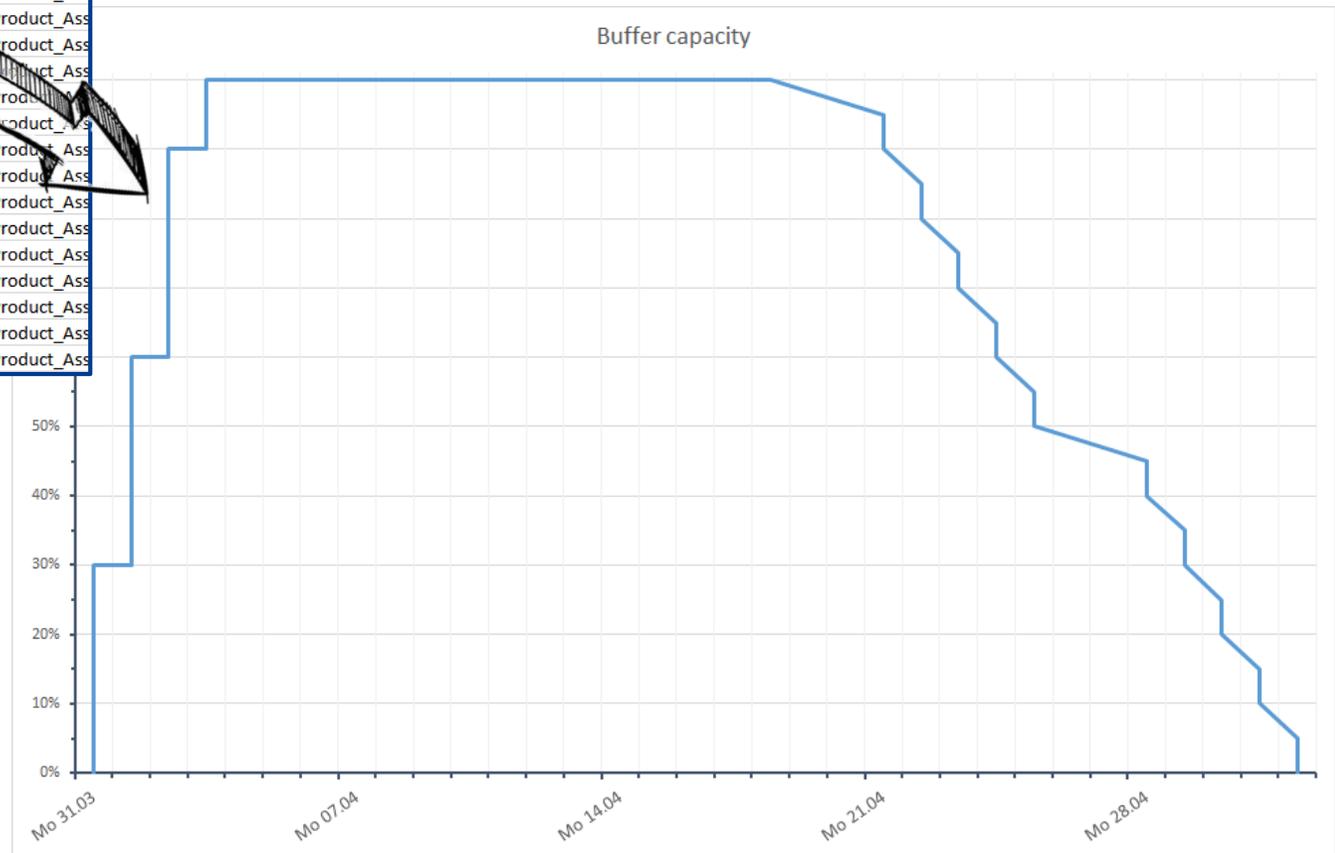
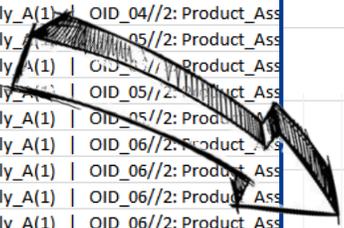
Result Scenario 2 – order analysis

This can also be displayed very quickly in the “Production orders” list, right handed in the dashboard. But only as a quantity value not with exact times.



Buffer Analysis

	A	B	C	D
1	Time stamp	Time (sec.)	Quantity	Orders
2	31.03.2014 08:00	28800	1	OID_01//2: Product_Assembly_A(1)
3	31.03.2014 08:00	28800	0	
4	31.03.2014 09:00	32400	1	OID_02//2: Product_Assembly_A(1)
5	31.03.2014 10:00	36000	2	OID_02//2: Product_Assembly_A(1) OID_03//2: Product_Assembly_A(1)
6	31.03.2014 11:00	39600	3	OID_02//2: Product_Assembly_A(1) OID_03//2: Product_Assembly_A(1) OID_04//2: Product_Ass
7	31.03.2014 12:00	43200	3	OID_03//2: Product_Assembly_A(1) OID_04//2: Product_Assembly_A(1) OID_05//2: Product_Ass
8	31.03.2014 13:00	46800	4	OID_03//2: Product_Assembly_A(1) OID_04//2: Product_Assembly_A(1) OID_05//2: Product_Ass
9	31.03.2014 14:00	50400	5	OID_03//2: Product_Assembly_A(1) OID_04//2: Product_Assembly_A(1) OID_05//2: Product_Ass
10	31.03.2014 15:00	54000	6	OID_03//2: Product_Assembly_A(1) OID_04//2: Product_Assembly_A(1) OID_05//2: Product_Ass
11	01.04.2014 08:00	115200	6	OID_04//2: Product_Assembly_A(1) OID_05//2: Product_Assembly_A(1) OID_06//2: Product_Ass
12	01.04.2014 09:00	118800	7	OID_04//2: Product_Assembly_A(1) OID_05//2: Product_Assembly_A(1) OID_06//2: Product_Ass
13	01.04.2014 10:00	122400	8	OID_04//2: Product_Assembly_A(1) OID_05//2: Product_Assembly_A(1) OID_06//2: Product_Ass
14	01.04.2014 11:00	126000	9	OID_04//2: Product_Assembly_A(1) OID_05//2: Product_Assembly_A(1) OID_06//2: Product_Ass
15	01.04.2014 12:00	129600	9	OID_05//2: Product_Assembly_A(1) OID_06//2: Product_Assembly_A(1) OID_07//2: Product_Ass
16	01.04.2014 13:00	133200	10	OID_05//2: Product_Assembly_A(1) OID_06//2: Product_Assembly_A(1) OID_07//2: Product_Ass
17	01.04.2014 14:00	136800	11	OID_05//2: Product_Assembly_A(1) OID_06//2: Product_Assembly_A(1) OID_07//2: Product_Ass
18	02.04.2014 08:00	201600	10	OID_06//2: Product_Assembly_A(1) OID_07//2: Product_Assembly_A(1) OID_08//2: Product_Ass
19	02.04.2014 12:00	216000	9	OID_07//2: Product_Assembly_A(1) OID_08//2: Product_Assembly_A(1) OID_09//2: Product_Ass
20	03.04.2014 08:00	288000	8	OID_08//2: Product_Assembly_A(1) OID_09//2: Product_Assembly_A(1) OID_10//2: Product_Ass



- Additionally the buffer capacity which is located between the two production sites can be analyzed.
- How it can be seen on the left, the buffer reaches its capacity limits in the calendar week 16th and 17th. Accordingly this needs a temporary expansion of the buffer to be sure that the order 17_N can be delivered in time.

Result Scenario 2 – buffer analysis

The same view than in scenario 1, when the buffer analysis will be again activated in the simulation GANTT. For this press again right mouse button and select “Show buffer analysis”.

