

# PUZZLE<sup>®</sup>

## Software for shipping and palletization



- ▶ Browser based
- ▶ Picking module
- ▶ Integration with WMS

order: 248Items, sty15: PUZZLE-Berechnung abgeschlossen. Es wurden 6 Lösungen berechnet.

Volumen: 491%  
Gewicht: 30%

Deutsch

Packstücke gestapelt: 0 / 304

Auftragszellen

Färbung: Packstück

Ansichten

Ladeneinheiten		Palette [mm]			Ladung [m]	
Num...	Anzahl	Inhalt [Stk.]	L	B	H	L
1	32	32	1.200	800	144	1.200
2	73	73	1.2...	800	144	1.2...
3	66	66	1.200	800	144	1.200
4	64	64	1.200	800	144	1.200
5	52	52	1.200	800	144	1.200
6	17	17	1.200	800	144	1.183

Auftragszellen					
Num...	Name	Anzahl	Länge [mm]	Breite [m...]	Höhe [m]
0011	Artikel ...	2 (2)	299	180	1
0004	Artikel ...	4 (10)	400	300	2
0013	Artikel ...	10 (10)	390	270	3
0014	Artikel ...	18 (18)	400	200	1
0008	Artikel ...	2 (10)	385	299	2
0016	Artikel ...	8 (20)	370	185	2
0015	Artikel ...	10 (10)	386	191	2
0007	Artikel ...	7 (34)	380	298	1

# PUZZLE - optimizing loading and transport units

Based on the article data, additional customer specifications and master data, a complex algorithm a complex algorithm calculates an optimal arrangement for the packages to be loaded, including the loading sequence.

## PUZZLE optimises the space on load carriers such as boxes and pallets.

In addition to calculating the most favorable arrangement of packages in a defined space, the software also supports the selection of a suitable packing material and thus enables optimal support in order picking. The software can be accessed both via a browser and via an interface directly from the customer's own IT systems (WMS; ERP...).

PUZZLE works reliably even with large article assortments. Optimization results can be made available in various ways - e.g. in the form of interactive 3D graphics.

## Following PUZZLE modules are available:

### ▶ PUZZLE Box

Optimized filling of boxes with identical items

### ▶ PUZZLE Pack

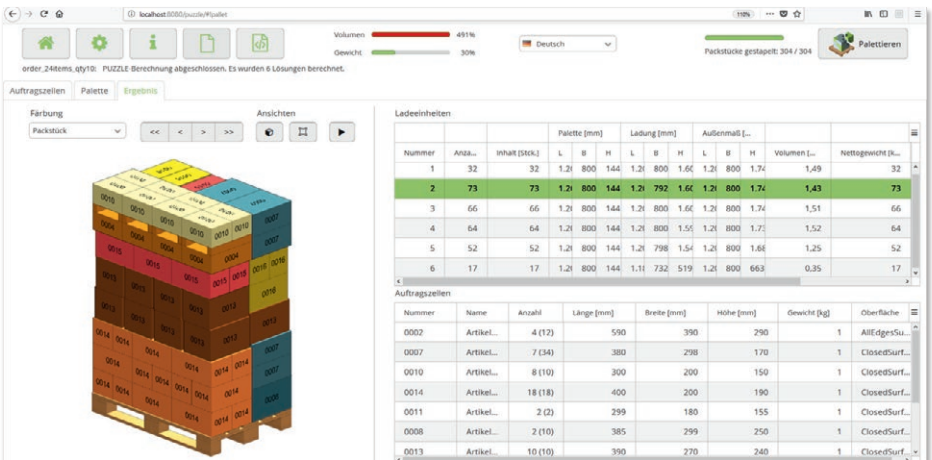
Palletization of identical packages

### ▶ PUZZLE Pack+

2-step Optimization by combining the Modules Box and Pack

### ▶ PUZZLE SHIP-IT

Palletization of mixed orders (includes module Pack)



The screenshot displays the PUZZLE software interface. At the top, there are navigation icons and status indicators: 'Volumen: 491%' (Volume), 'Gewicht: 30%' (Weight), 'Deutsch' (Language), and 'Päckstücke gestapelt: 304 / 304' (Packages stacked). Below this, the 'Auftragszellen' (Order cells) section shows a 'Palette' (Pallet) and 'Ergänzung' (Supplement) tab. A 3D visualization of a palletized load is shown, with individual packages labeled with article numbers and quantities. To the right, a table titled 'Ladeeinheiten' (Loading units) provides detailed data for each article.

Nummer	Anzahl	INNHAlt (Stück)	L [mm]	B [mm]	H [mm]	L [mm]	B [mm]	H [mm]	Volumen [m³]	Nettogewicht [kg]			
1	32	32	1.21	800	144	1.21	800	1.66	1.21	800	1.74	1.49	32
2	73	73	1.21	800	144	1.21	792	1.66	1.21	800	1.74	1.43	73
3	66	66	1.21	800	144	1.21	800	1.66	1.21	800	1.74	1.51	66
4	64	64	1.21	800	144	1.21	800	1.55	1.21	800	1.72	1.52	64
5	52	52	1.21	800	144	1.21	798	1.54	1.21	800	1.84	1.25	52
6	17	17	1.21	800	144	1.11	732	519	1.21	800	663	0.35	17

Nummer	Name	Anzahl	Länge [mm]	Breite [mm]	Höhe [mm]	Gewicht [kg]	Oberfläche
0002	Artikel...	4 (12)	590	390	290	1	AllEdgesSur...
0007	Artikel...	7 (34)	380	298	170	1	CloseSurf...
0010	Artikel...	8 (10)	300	200	150	1	CloseSurf...
0014	Artikel...	18 (18)	400	200	190	1	CloseSurf...
0011	Artikel...	2 (2)	299	180	155	1	CloseSurf...
0008	Artikel...	2 (10)	385	299	250	1	CloseSurf...
0013	Artikel...	10 (10)	390	270	240	1	CloseSurf...

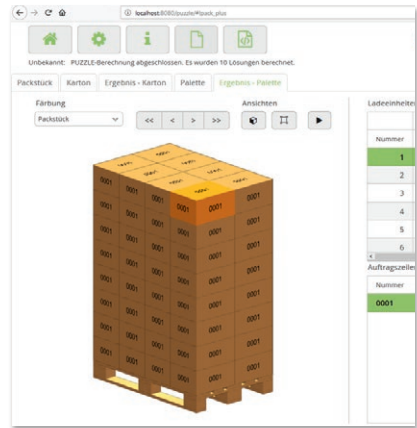
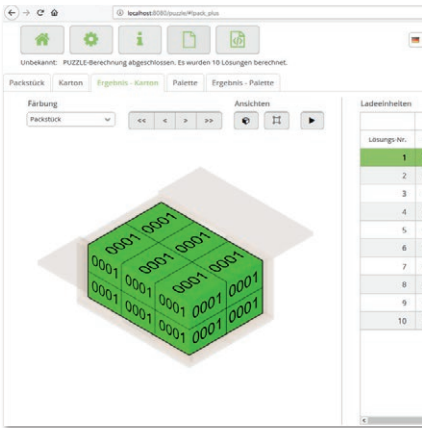
# PUZZLE Box / Pack / Pack+

The modules PUZZLE Box and Pack optimize the filling of boxes and pallets with identical items. As a combination of these two modules, PUZZLE Pack+ offers a 2-step optimization process.

## Optimization of single-item orders / 2-step optimization.

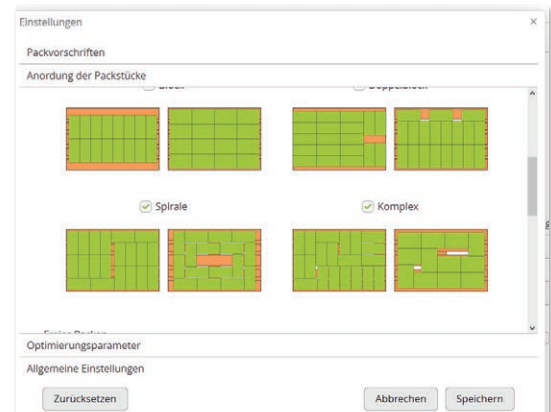
With the PUZZLE Box and Pack modules, customers can calculate the optimal arrangement of their single-item goods in boxes or pallets.

As a combination of the two modules PUZZLE Pack+ first optimizes the arrangement of packages in a box and then determines the optimal optimal stacking of the boxes on a pallet.



## Individual parameters

For customized solutions, users can specify both permitted orientations of the packages (rotations), as well as different packing patterns (e.g. block or spiral).



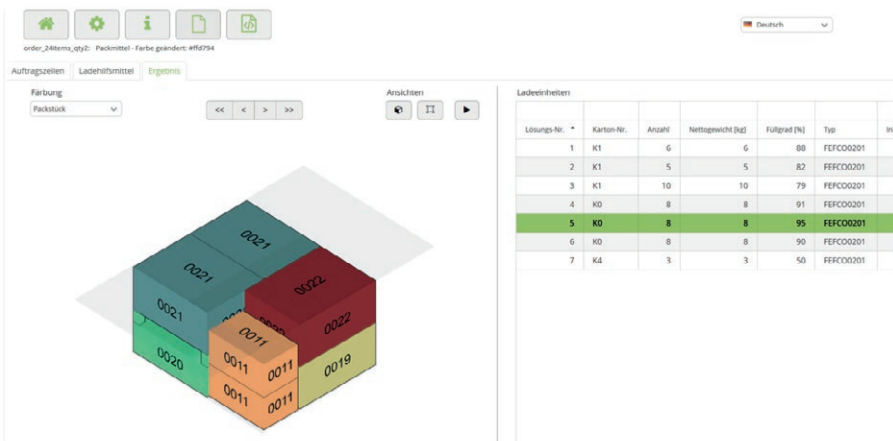
# PUZZLE SHIP-IT: Picking of mixed orders

The PUZZLE SHIP-IT module enables pallet and carton optimization for a given range of packing material. Especially large orders of mixed articles can be planned optimally, taking all packing requirements into account.

Which outer carton is best suited for an order?

How many and which pallets are necessary for the shipping order?

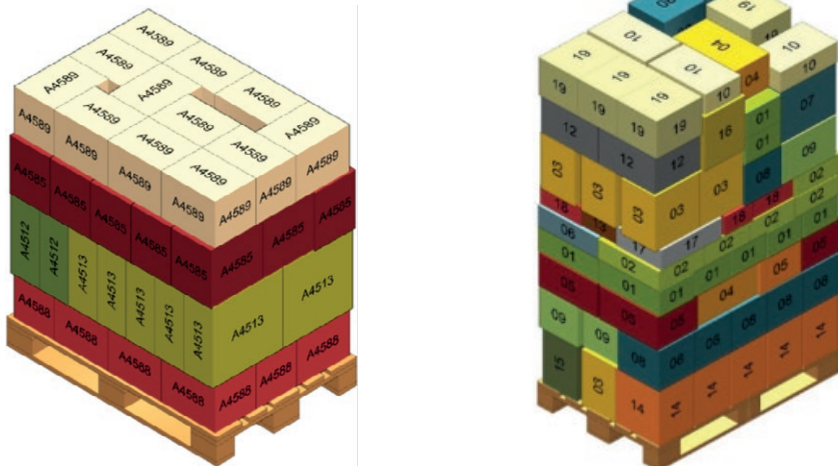
- ▶ Picking orders will be read in
- ▶ Customer-specific outer cartons and/or pallets are selected
- ▶ Results with optimal arrangements are displayed
- ▶ Direct connection to WMS/ERP systems via API possible



The screenshot displays the PUZZLE SHIP-IT software interface. On the left, a 3D visualization shows a pallet layout with various colored blocks representing different carton types and quantities. The blocks are labeled with numbers like 0021, 0020, 0011, and 0019. On the right, a table titled 'Ladereinheiten' (Loading Units) provides detailed data for each unit.

Lösungs-Nr.	Karton-Nr.	Anzahl	Nettopgewicht [kg]	Füllgrad [%]	Typ
1	K1	6	6	88	FEFCO0201
2	K1	5	5	82	FEFCO0201
3	K1	10	10	79	FEFCO0201
4	K0	8	8	91	FEFCO0201
5	K0	8	8	95	FEFCO0201
6	K0	8	8	90	FEFCO0201
7	K4	3	3	50	FEFCO0201

Optimal distribution of the packages on the relevant pallet types and/or cardboard boxes



# PUZZLE REST API – easy integration in WMS/ERP systems!

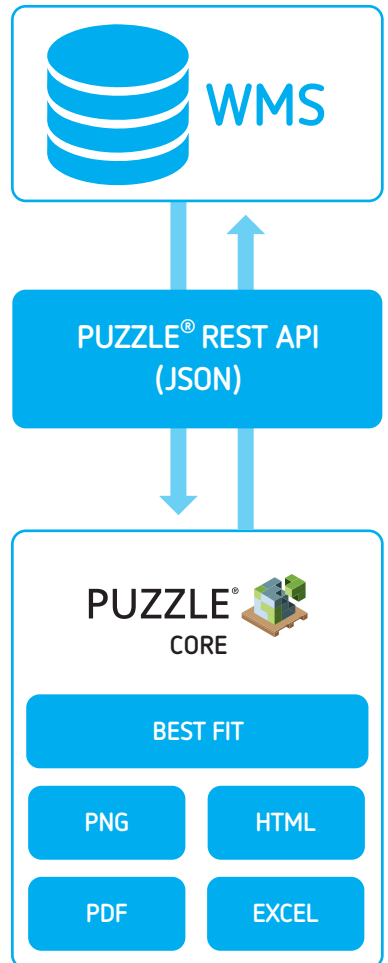
Via the new REST API, PUZZLE can be accessed and integrated by other IT systems. Thus, this interface enables WMS manufacturers and end users to automatically use the functions of PUZZLE.

## Our offer for WMS providers: Extend your product portfolio with the functionalities of PUZZLE!

- ▶ PUZZLE REST API for an easy integration
- ▶ DIY documentation incl. examples:
  - Transfer of the order data
  - Processing of the order data by PUZZLE
  - Return of the results to the WMS system
  - and much more
- ▶ Optional plug-ins provided on request e.g. PNG graphics or reports in PDF format.

The minimal configuration to connect to a system consists of the REST API and a PUZZLE CORE license. Depending on your needs, this configuration can be extended with the following plug-ins:

- ▶ **BEST FIT** – Determination of the best result from a combination of all possible load carriers
- ▶ Export formats:
  - **PNG** – output as PNG file
  - **Excel** – output as Excel list
  - **HTML** – output as HTML file
  - **PDF** – output as PDF report.



# PUZZLE® - technology developed by Fraunhofer! Fraunhofer IML

PUZZLE has been optimizing the space on load carriers such as boxes and pallets since 1992. Numerous companies have already used licensed versions of the software and benefited from the more efficient allocation of shipping space. PUZZLE not only calculates the most optimal arrangement of geometric objects in a defined space but it also helps the user select the right packing material for the job.

## Functionality of all PUZZLE modules:

- Multilingual (German, English, French)
- Interactive visualization of the optimized loading units
- Determination of the number of containers required for a specified transport volume
- Planning of the required transportation capacity
- Calculation of the volume-optimized arrangement of items on a pallet
- Provides support to the picking/loading areas with detailed picking lists or packing instructions
- Detailed packaging reports (PDF, DOCX, XLSX, PPTX or RTF)



Further information and a demo version of PUZZLE can be found at [www.mypuzzle.de](http://www.mypuzzle.de)

Distributed by



[www.scapos.com](http://www.scapos.com)

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