

# Jungheinrich WMS

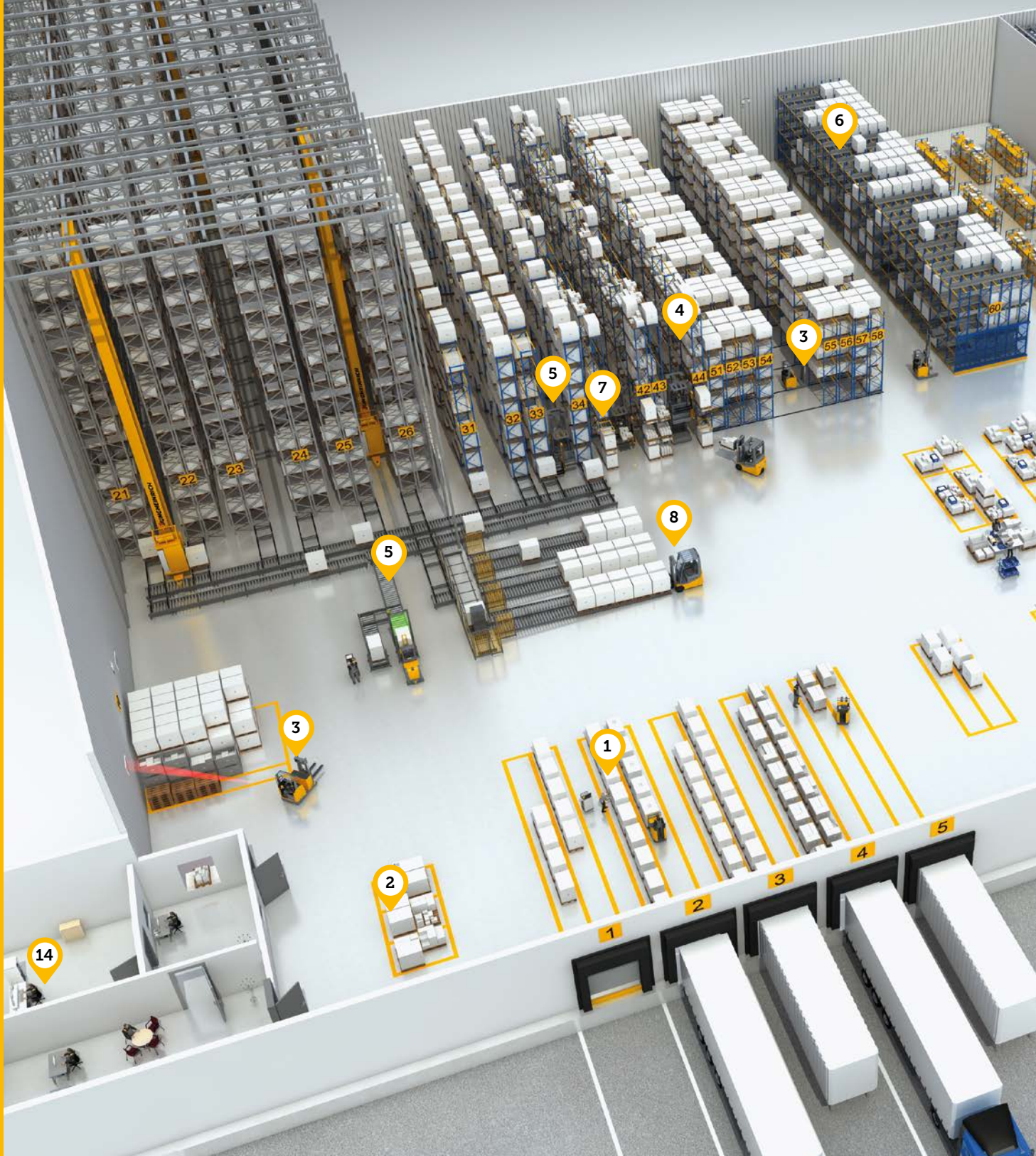
Future reliability and perfection for your warehouse

JUNGHEINRICH

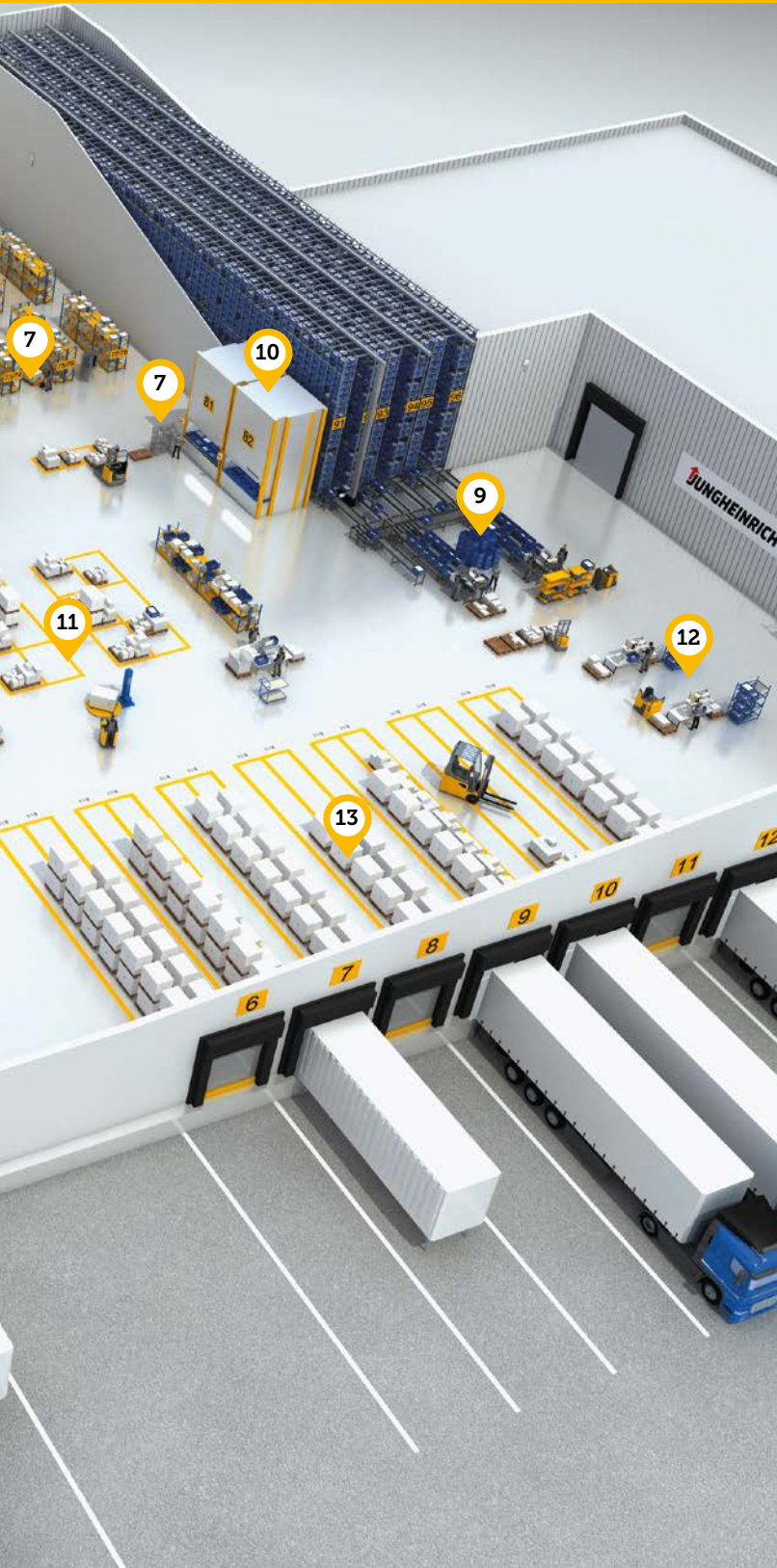




# The Jungheinrich Warehouse Management System







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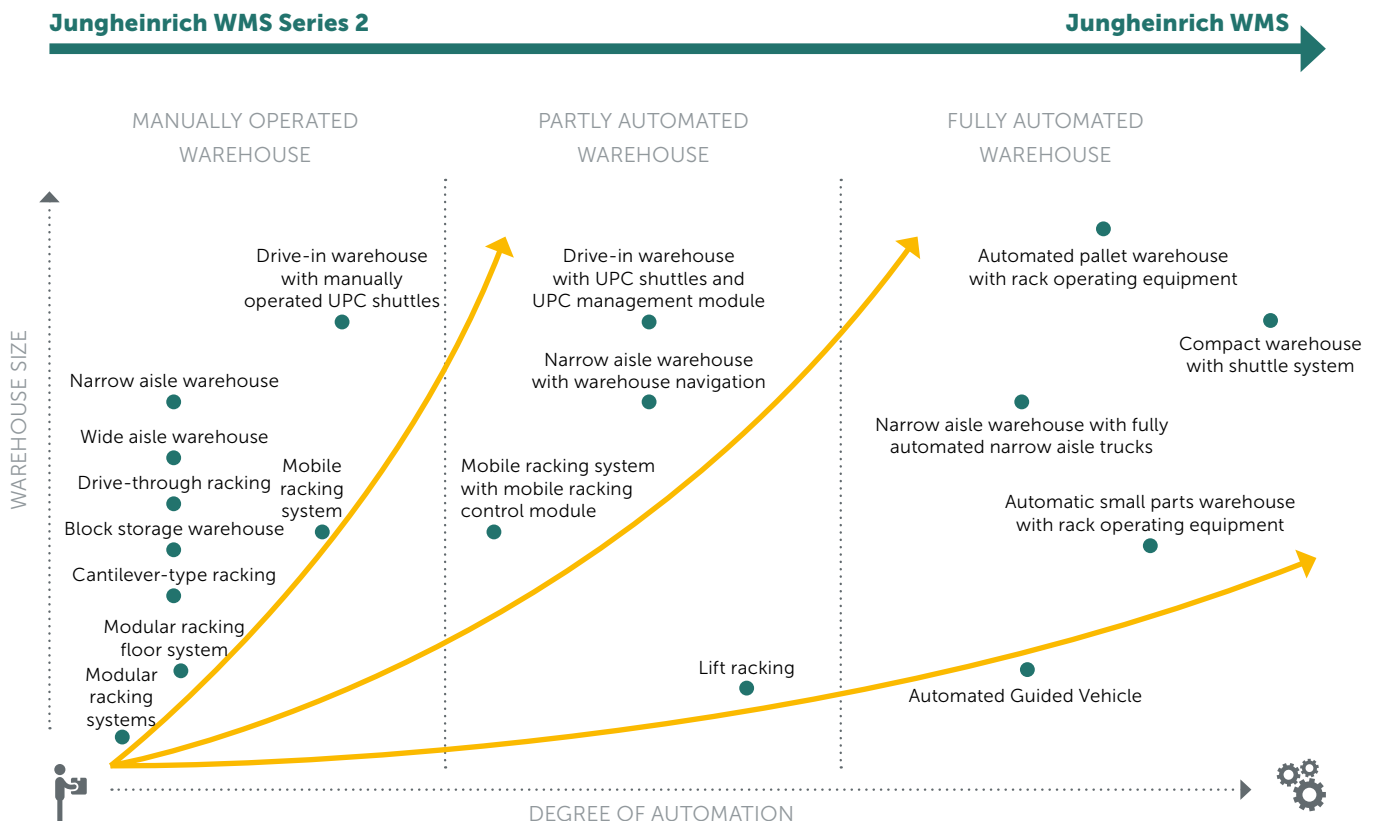
# Jungheinrich WMS.

## Your advantages at a glance.

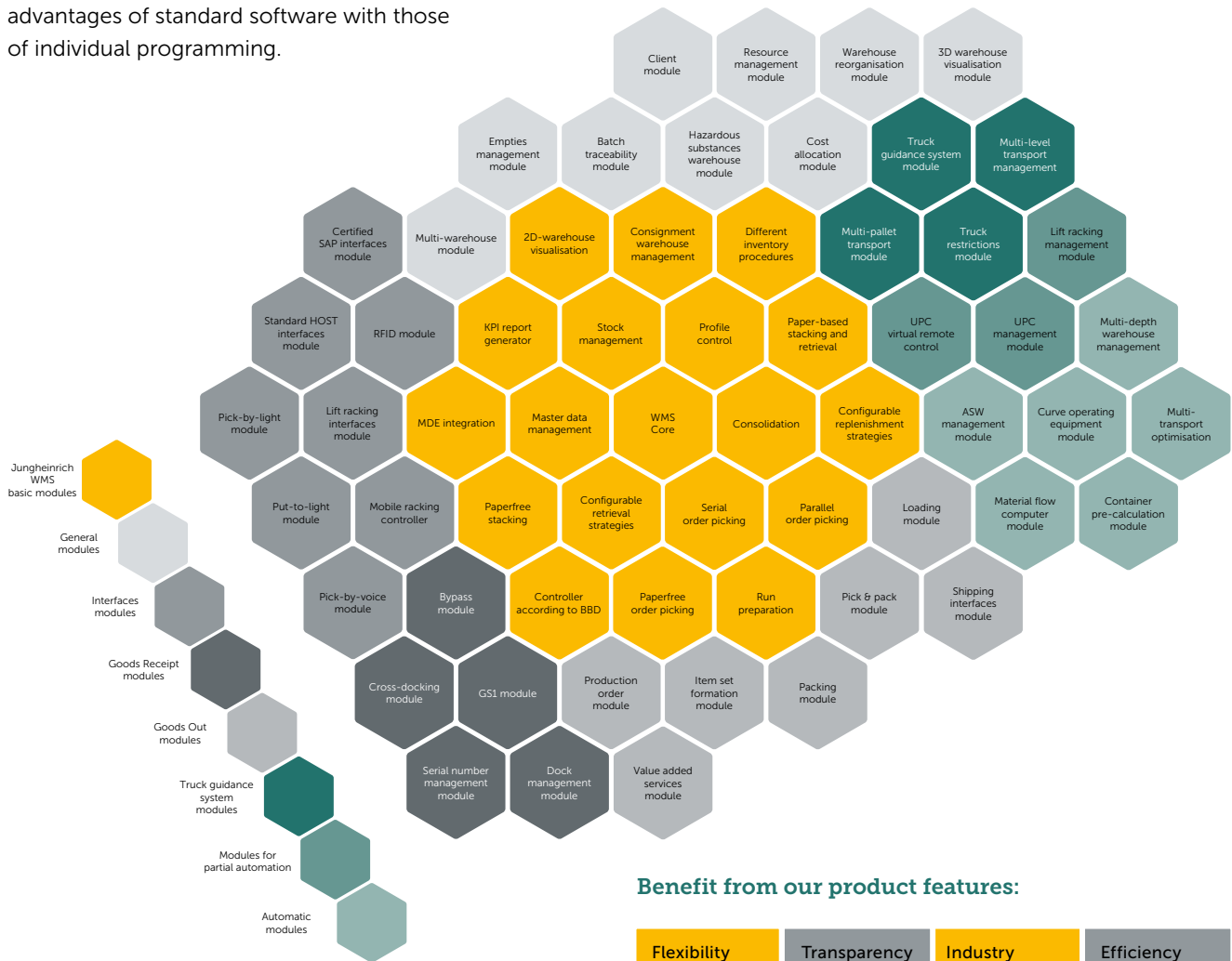
The Jungheinrich WMS is an intelligent, industry-independent software solution for intralogistics, which enables you to manage, control and optimise your warehouse efficiently. The Jungheinrich WMS has been undergoing constant development by our in-house software and logistics experts for more than 20 years now. Our support employees can provide you with help 365 days a year, 24 hours a day, if required and will provide you with reliable and fast responses to all your queries via a remote link. With the Jungheinrich WMS, you will also increase the efficiency of your intralogistics processes and reduce your costs by up to 70%. This is irrespective of the size or complexity of your system. Jungheinrich always has the right solution. For operators of standardised manual warehouses, the Jungheinrich WMS Series 2 offers all the necessary functionalities for mapping your requirements. Our proven, comprehensive Jungheinrich WMS is used for processes that go beyond this.

### Future reliability and perfection

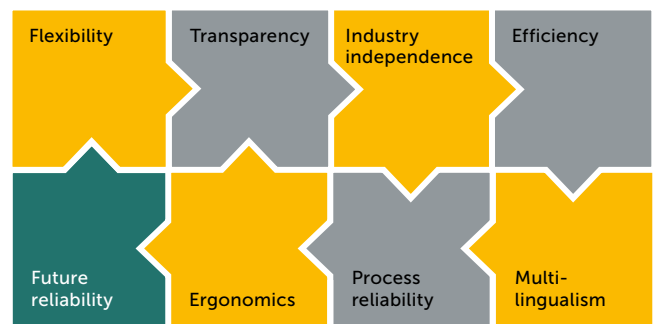
The requirements in modern warehouses are diverse and pose genuine challenges. The Jungheinrich WMS addresses these challenges and offers innovative solutions perfectly tailored to your individual needs. Whether manual, semi or fully automated warehouses: Regular further development ensures that the WMS always remains state-of-the-art. Unique in the industry is the forward compatibility that ensures that your Jungheinrich WMS will remain compatible with new releases and upgradeable in the future. The multi-dimensional configuration model of the Jungheinrich WMS also guarantees high process precision for mapping your individual needs even with future changes in your warehouse.



The profile control and the modular structure of the Jungheinrich WMS combine the advantages of standard software with those of individual programming.



#### Benefit from our product features:



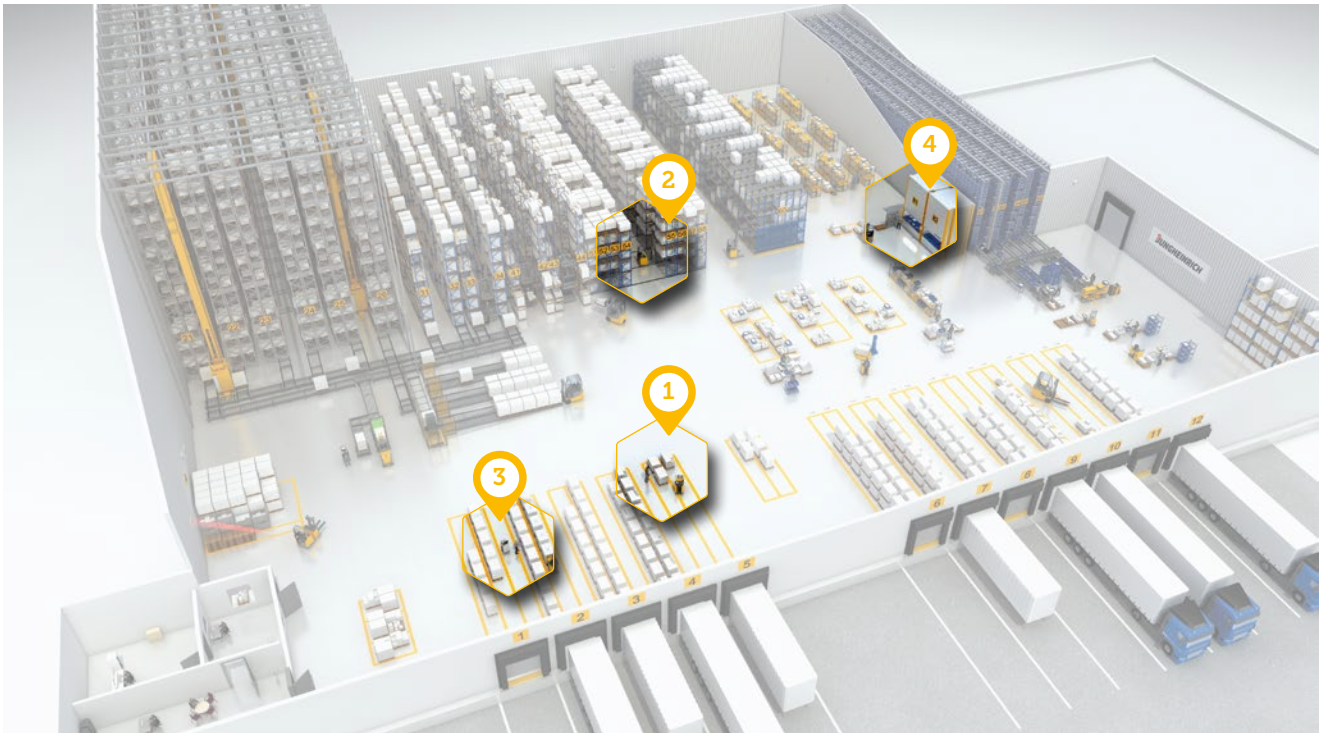
#### You can trust our references!

The independent validation of completed projects by the Fraunhofer Institute for Material Flow and Logistics confirms the reliable functional fulfilment of our implemented systems.



#### Validation and certification of the software

The Jungheinrich WMS is regularly validated by the Fraunhofer IML. The basis for the independent validation is an extremely comprehensive questionnaire, comprising more than 2700 individual aspects, which is adjusted annually to the market by the Fraunhofer IML. Warehouse Logistics is certified in accordance with DIN EN ISO 9001.

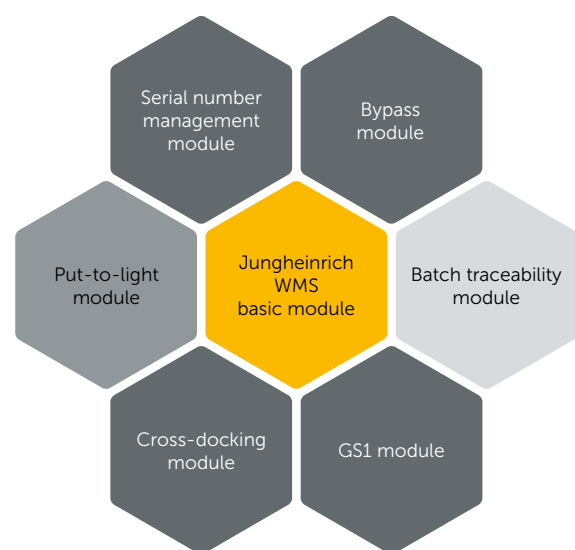


# Goods Receipt, quality assurance and stacking

Process reliability from the outset

**Goods receipts** can be assigned to an order based on the order number and very quickly and efficiently identified by a comparison of the key inspection criteria. All the necessary data for these notified orders is transferred from the host system to the Jungheinrich WMS via the interface. Of course, goods receipts can also be collected without notification. Among other things, a quality inspection can be carried out at Goods Receipt in order to block goods with quality defects for customer orders.

With the **single-level stacking** in Goods Receipt a collected load unit is picked up and brought directly to the displayed destination storage location. Identification of the storage locations in the racking is also possible via an RFID tag, for example. Such an approach is also supported in the Jungheinrich WMS.





„In addition, the Jungheinrich WMS plays a significant role in that the error rate is close to zero. Working conditions are also made easier: The WMS is very user-friendly for workers in the warehouse.“

CEO of an electrical wholesaler



When using the **GS1 module**, labels in the so-called Global Standard One format can be scanned or printed. This significantly simplifies the identification of the goods using their properties such as best-before dates, serial or batch numbers.



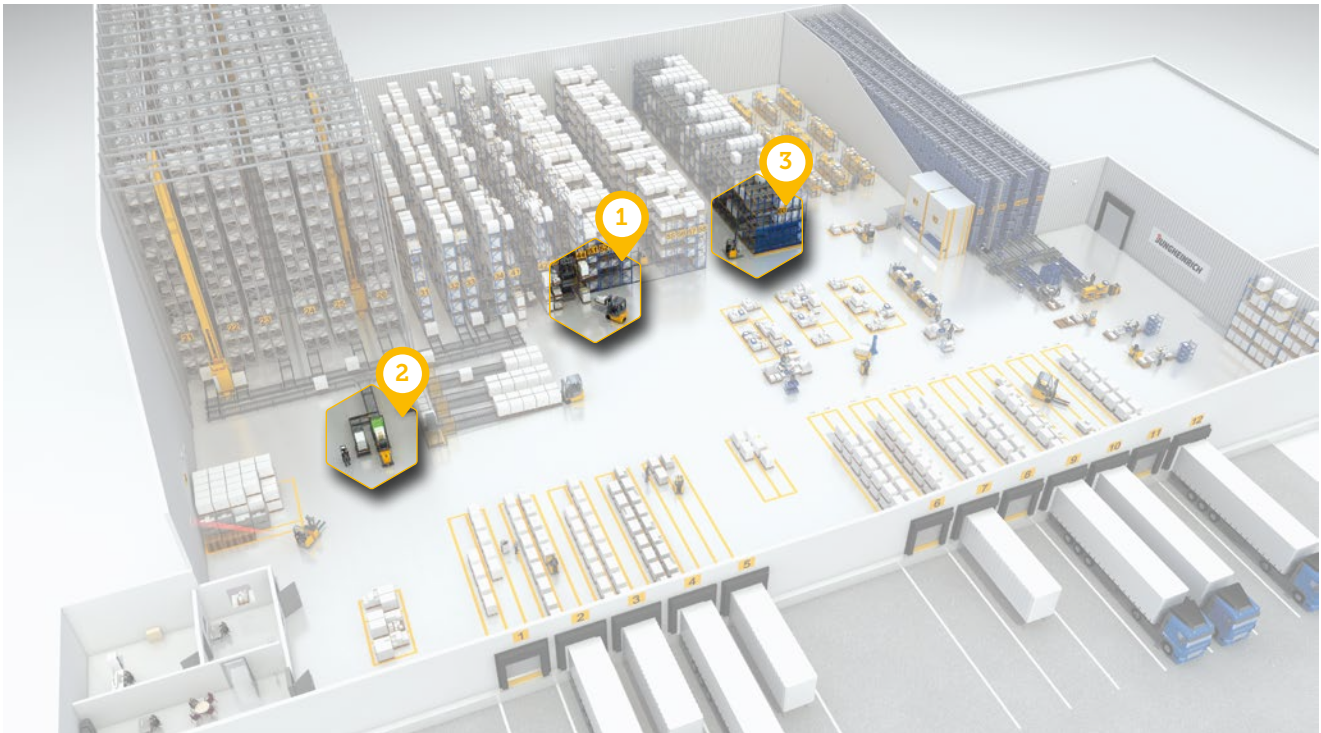
After collection, the stacking order can be created automatically or by the employee guided by the system. Then, in the course of the stacking, a mobile racking system, for example, is controlled by the Jungheinrich WMS and the corresponding destination aisle is opened. Other warehouse types such as drive-in or pushback racking, block storage warehouses, drive-through or cantilever-type racking can also be easily mapped in the Jungheinrich WMS.



The **bypass module** ensures that just delivered goods for which a retrieval order already exists need not be stacked and are therefore immediately available for customer orders. The **cross-docking** throughput type is also supported by the Jungheinrich WMS.



The **put-to-light module** increases process reliability by providing the employee with visual information for stacking.



# Multi-level stacking and retrieval in manual and automated warehouse areas

Flexibility – we grow with you

Both manually and automatically managed areas can be mapped and controlled in the Jungheinrich WMS. As a rule, narrow-aisle and high-bay warehouses involve a multi-level stacking or retrieval process. The management of automated guided vehicle systems is also possible with the Jungheinrich WMS.

Very flexibly adjustable warehousing strategies can be used in different warehouse areas in order to guarantee the optimal warehouse management for each requirement. Our strategies take into account both the physical properties of the warehouse areas as well as the logistical attributes of the goods to be stacked.

The **warehouse reorganisation module** facilitates a recalculation of the optimal assignment per storage location, thereby significantly contributing to improved performance in your warehouse – particularly in fully automated areas.

Should **hazardous substances** be moved in the warehouse, the Jungheinrich WMS takes into account the applicable statutory requirements.



The **empties management module** offers the possibility to manage and balance empty containers and pallets accordingly.



„On top of that, the selected concept is future-proof. Especially as the WMS allows parametrisation and adaptation to changed flow strategies at any time without great programming cost.“

CEO of a retail company



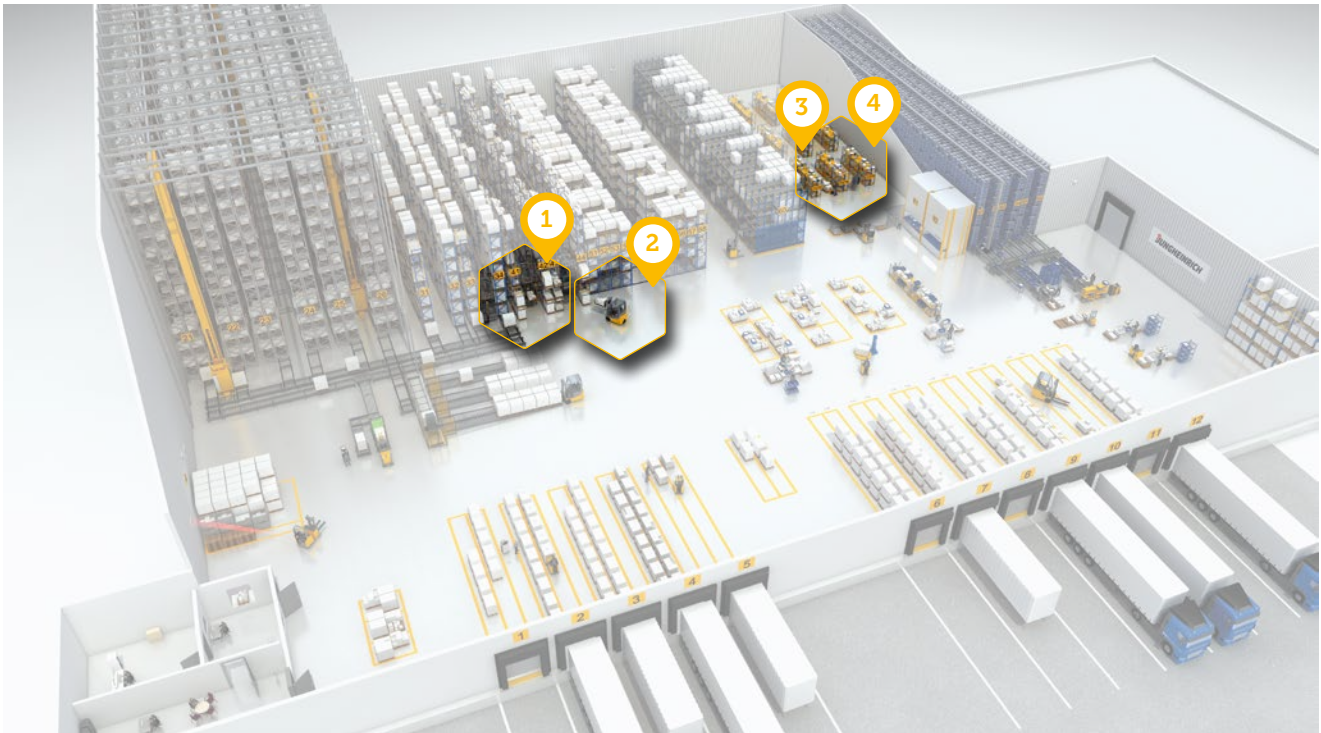
The **truck guidance system** module optimises transport for outstanding goods movements in a narrow-aisle warehouse for example. All work instructions for this appear directly on the truck terminal. This also means that double cycles are possible, thereby minimizing empty runs. Outstanding efficiency for narrow aisle trucks is also achieved through the use of the Jungheinrich warehouse navigation. The truck is permanently aware of its current position and the transport order is transmitted directly from the Jungheinrich WMS.



The **material flow computer** (MFC) integrated in the Jungheinrich WMS calculates the routes for automated guided vehicles such as the Jungheinrich Auto Pallet Mover (APM), for example. The transport orders are transferred from the MFC to the truck control system. After transferring a pallet onto the conveyor system, the material flow computer accepts responsibility for its subsequent stacking in the automated high-bay warehouse. In this way, the material flow computer controls the pallet on the conveyor system and via the rack operating equipment to its destination.



**Multi-level storage**, e.g. in drive-in warehouses, drive-through, pushback or drive-in racking, can also be mapped in the Jungheinrich WMS. When stacking or retrieving in multi-depth areas, the Jungheinrich UPC can be fully integrated and controlled via the Jungheinrich WMS.

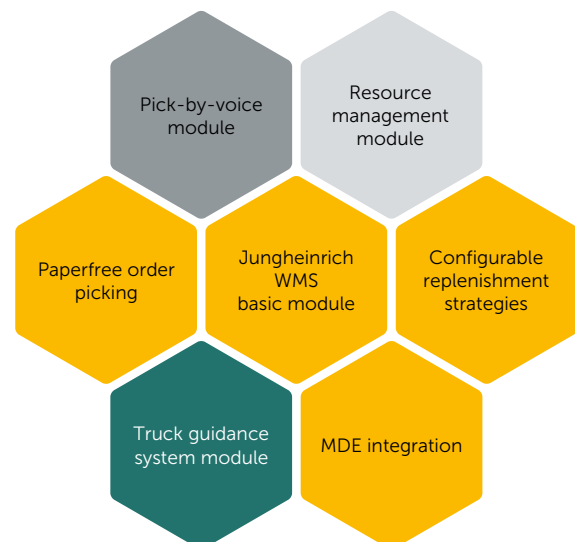


# Order picking – Operator to goods

Efficiency – for your most important process in the warehouse

Irrespective of whether you are active in distribution or production, order picking is the key process in any logistics system.

Jungheinrich increases your efficiency with a number of order picking strategies, for example, order-oriented (single-level), item-oriented (multi-level) or parallel order picking as well as multi-order picking, thereby guiding employees around the warehouse on optimised routes. In addition to an availability check of the ordered item, the software also takes into account item or order-specific requirements such as FIFO, batch requirements, but also quantity optimisations when calculating the optimum picking actions.





„The introduction of the WMS enabled us to discover untapped potential in the management and control of the warehouse, with the result that our entire process is now more efficient.“

CEO of a logistics services provider



The **resource management module** provides you with access to utilisation and control of your resources at any time. Simultaneously, you have the option to process your orders in a timely manner and with significantly lower resource expenditure.



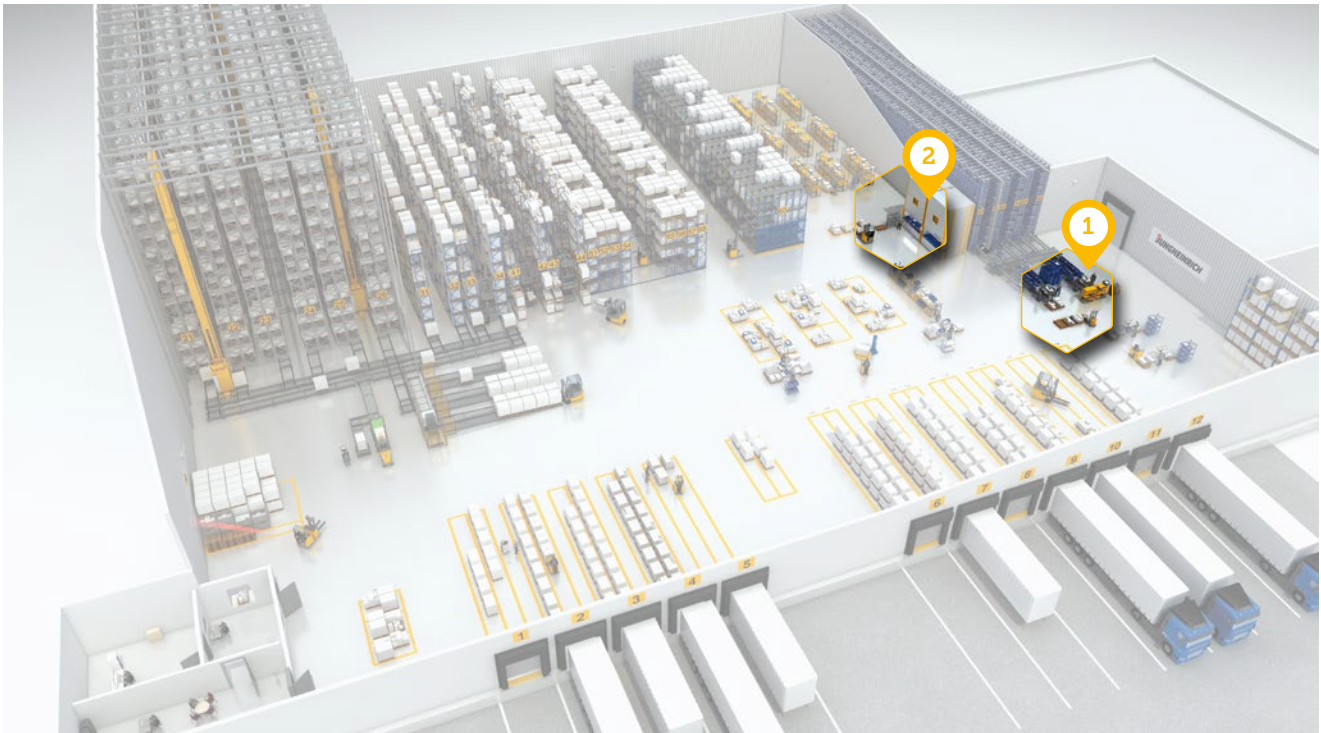
**Replenishment strategies** can be configured for every warehouse area. Based on the predefined characteristics, the system is able to detect whether replenishment is necessary and initiates this automatically. When using the **truck guidance system module (TGS)**, the replenishment order appears directly on the terminal of the user. The distribution of the orders to the appropriate employees takes place based on predefined criteria such as optimisation of routes and resources.



Are you using a **wireless terminal** for order picking? Then your employees receive all relevant information for retrieval in a clear, paperless form on the device – and in real time. The integrated scanner increases the efficiency of information acquisition.



As an alternative to the wireless terminal, the employee can also be supported through **pick-by-voice** when order picking. The corresponding module ensures that your employees are able to keep their hands free for this. The result: Improved ergonomics with a simultaneously lower error rate.



# Order picking – Goods to operator

## Ergonomics – Focusing on removal

The **material flow computer** enables the WMS to also take over the control and management of complex automatic warehouse systems. For example, the ASW management module supports the ergonomic workstations with context-sensitive user interfaces.

Thanks to our more than **25 years of experience** of interacting with automated systems, Jungheinrich offers many different control and optimisation strategies:

Single cycles	Relocation minimisation
Double cycles	Item-oriented characteristics
Multiple cycles with n-fold LHAs	Order picking-oriented characteristics
Priorities	
Work zones	Sequences
Aisles	Bypasses
Multiple stacking	ABC
Nearby location	... and much more





„The picking stations facilitate flexible, yet simultaneously very efficient work. This releases our workers from monotonous work, contributing not only to the efficiency of our processes but also to the motivation of our employees.“

Logistics manager at a leading wholesaler



Automatic small parts warehouse (ASW) are always used when there are high performance requirements. The control and optimisation of the ASW is executed entirely by the Jungheinrich WMS. Both filling and order picking takes place in ASWs at upstream workstations. When order picking, using the **pick & pack** module, for example, enables the goods to be packed directly into a shipping

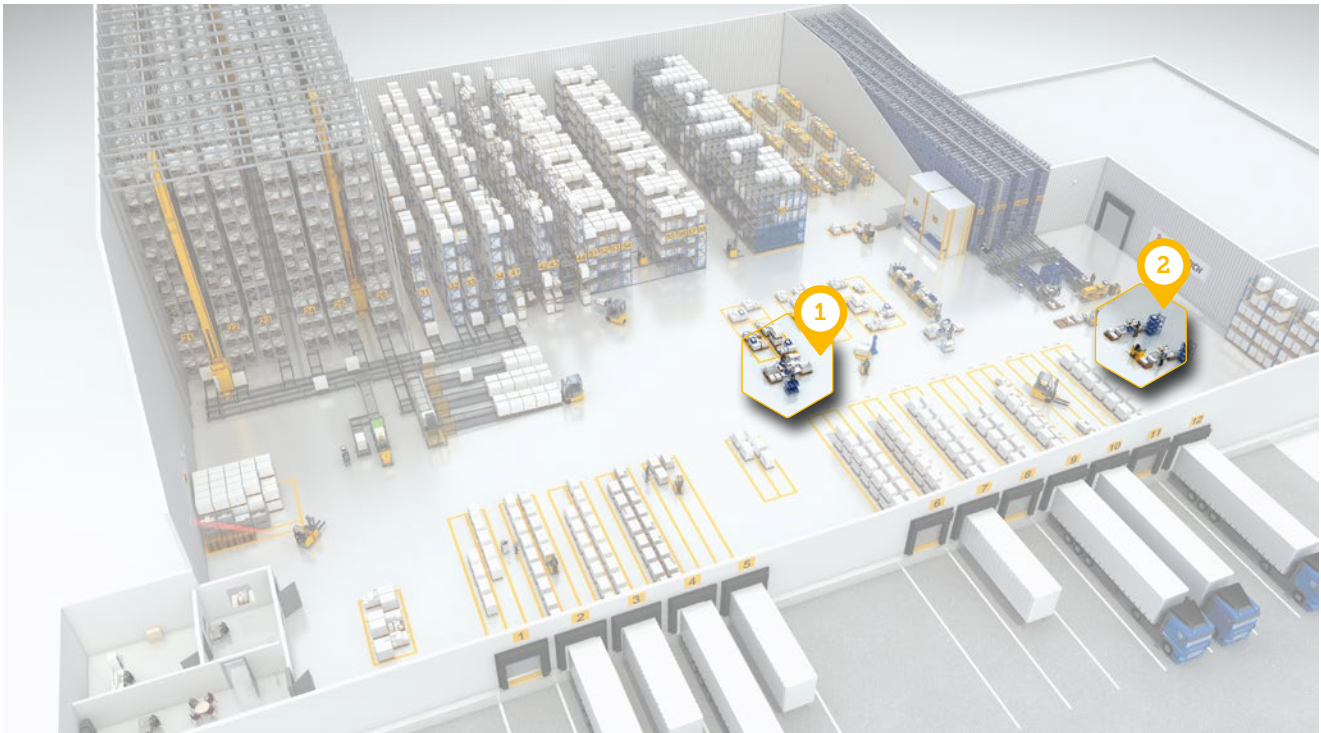
unit during the picking process. As a result, two work steps are merged into one.

The **container pre-calculation** module calculates in advance the optimal loading pattern for goods in shipping containers and combines the packing and order picking sequence with the aim of increasing the utilisation of volume and weight in shipping containers.



In addition to all other warehouse types in the Jungheinrich portfolio, the Jungheinrich lift racking (LRK) and the Jungheinrich paternoster racking (PRK) shuttle warehouses can also be fully integrated in the Jungheinrich WMS. In order to execute the item movements without

errors, the Jungheinrich WMS provides control of all the important functions of the shuttle warehouse such as the positioning aid via a light in the removal area. Additional picking-relevant information such as the item number or picking quantity can be displayed on a removal bar.



# Workstations for consolidation, value added services and packing

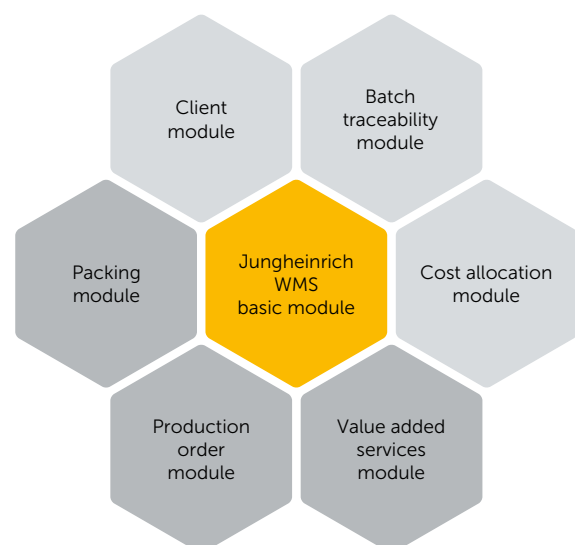
Industry independence – From producer to service provider

Utilise another strength of the Jungheinrich WMS – industry independence. Benefit from our experience in very diverse industries and from perfectly coordinated processes.

The **client module** enables several clients to be managed in parallel using the Jungheinrich WMS. In addition to corresponding master data, process and interface-specific settings can be made. This ranges, for example, from different inventory processes to the individual generation of delivery notes.

The **cost allocation module** can be used to create the basis for executing performance-based invoices for the warehouse services.

The recorded data can be exported from the Jungheinrich WMS at any time via an interface. This ensures that nothing stands in the way of a timely settlement of the service to your clients.





„We have reduced our delivery time from six to two weeks. Optimised shipment control has also made it possible for us to improve our delivery quality by around 50 percent. And this is without additional employees.“

Logistics manager of a furniture manufacturer



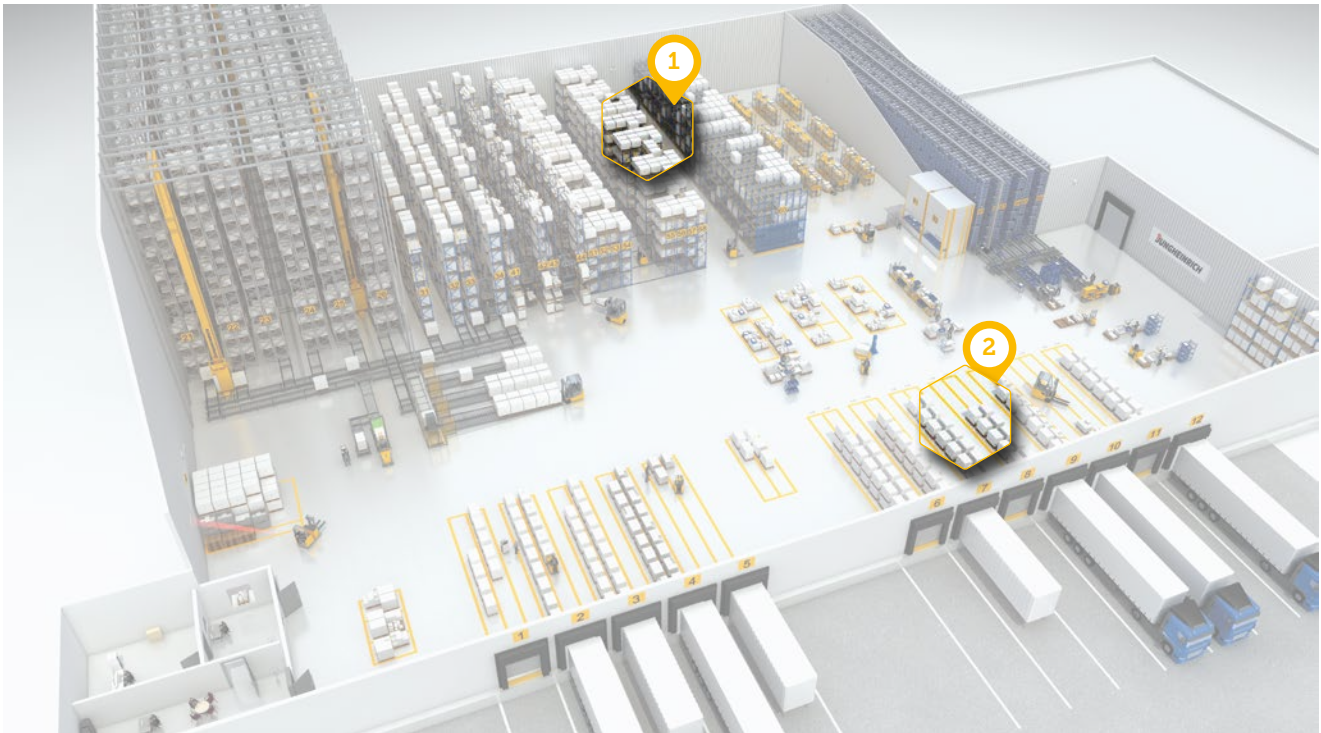
After removal, items from different warehouse areas are brought together at the consolidation area for the respective customer order. The **packing process** itself is, as a

rule, controlled via a user dialog at a PC workstation. All the necessary documents such as the packing slips or shipping labels are printed in the course of the packing.



When **processing production orders or during set formation**, the Jungheinrich WMS controls the creation of a new item from two or more items. Following this, a new product label or other documents can then be printed by the Jungheinrich WMS.

The **batches** of the individual components are saved when processing a production order and can be viewed at any time. This guarantees optimum traceability back to the individual component.

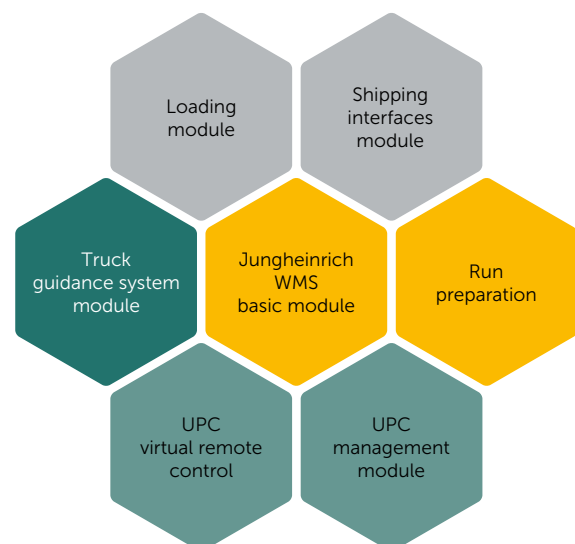


# Optimised material flows at Goods Out

## Transparency that you see in the warehouse

The modelling of your material flows in the Jungheinrich WMS gives you a high degree of consistent transparency. As a result, the integrated profile technology makes a significant contribution to the complete recording of all relevant information. You are able to schedule resources for compliance with important upcoming deadlines, while also easily identifying order backlogs at any time.

After the order picking, the optional packing and **loading modules** may take over the control and optimisation of Goods Out. Not only does the Jungheinrich WMS enable you to print the relevant documents during the corresponding process steps, but it also creates an overview of how the goods are packed and when they left the warehouse, i.e. when they are en route to your customers.





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„Our processes have become leaner and more reliable. We now have full warehouse transparency at all times and have been able to realise enormous cost savings.“

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CEO of a logistics services provider



Jungheinrich Under Pallet Carriers (UPC) can be used with great flexibility in conjunction with the WMS in drive-in warehouses.

With the **UPC virtual remote control** module, you can replace the physical remote control for controlling the UPC with a virtual remote control on the wireless terminal. The **UPC management module** manages all UPCs directly in the Jungheinrich WMS and saves your employees from having to search for a free UPC.

The Jungheinrich WMS then automatically assigns the correct commands to the UPC.

The **truck guidance system** first gives the truck operator the order to lift the UPC and deliver it to the correct channel. After successful delivery, the UPC controller automatically receives the orders for the pallet transports from the Jungheinrich WMS.



After consolidation, the packages produced in the Jungheinrich WMS can be brought to a Goods Out door and outgoing goods to be released there. The loading of the load carriers is then carried out, documented and the necessary documents such as a dispatch note made available in the Jungheinrich WMS. When using **run preparation**, several orders can be grouped together as runs. This

means that the calculation of removals can already be controlled in advance, so that all orders in a run are picked together and in the correct sequence. In the course of loading, the orders in a run are then loaded according to the run sequence. All the relevant data for the packages is then prepared in digital form, e.g. for a shipping provider or shipping software, via the **shipping interface**.



# Your IT solution for the warehouse management

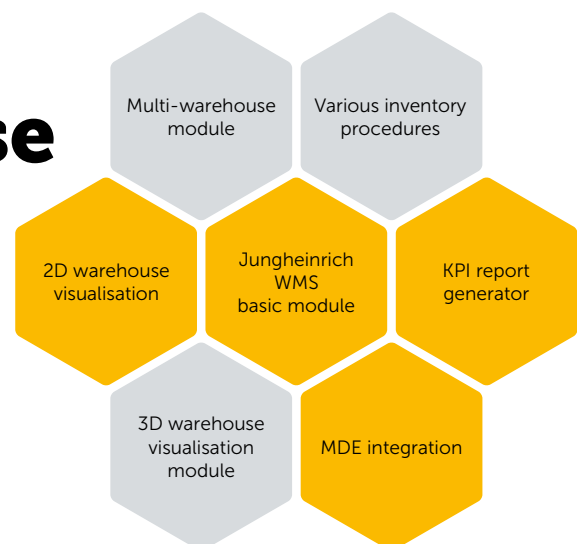
International locations –  
We speak your language

Warehouse managers can obtain a great deal of information from the control panel including a graphical representation of the current system in the warehouse. In addition to updating master data and profile settings, orders can also be started and warehouse access be monitored at any time with the aid of the control panel in the Jungheinrich WMS.

The **multi-warehouse module** enables the Jungheinrich WMS to manage different warehouses at several company locations. This ensures that all profiles and master data are available across all locations.

Save time with the correct **inventory procedures**. The Jungheinrich WMS also provides numerous inventory support functions, regardless of whether a reference date or a permanent process is to be applied.

The Jungheinrich WMS is available in **12 languages**. The language can be changed online via the user interface.



**1** The conveyor system and rack operating equipment are shown in full detail up to the controller and sensor level in the system visualisation. This gives you an overview of the operating conditions of the different system components at any time.

**2** The **KPI report generator** provides you with an overview of your most important data/assessments at any time. Your individual evaluations can be represented in tabular or graphical form.

**3** The Jungheinrich WMS offers you both a **2D** as well as a **3D** visualisation of manual or automated warehouses.



# What prerequisites are required by the Jungheinrich WMS?

## PC client

A PC client is required on the control panel or at Goods Receipt or packing stations. Due to the better display options, workstations with a PC client offer the user a greater range of functions than on a wireless terminal screen.

## Minimum requirements

Operating system: Windows XP, Windows 7 (32 or 64-bit), Windows 8.1 (32 and 64-bit), Windows 10 (64-bit)

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## Truck and hand-held terminals

As a rule, truck terminals are used on fork lift trucks. Moreover, these are also used at mobile workstations in Goods Receipt or Goods Out.

Hand-held terminals can be used with great flexibility along the entire process chain. Due to their smaller size, they offer greater mobility.

## Minimum requirements

	TRUCK TERMINAL	HAND-HELD TERMINAL
Operating system:	Windows XP/7/8.1/10 embedded	Windows CE 6.0 Mobile 6.5
Recommended resolution:	at least 800 x 600 pixels	at least 320 x 240 pixels
Free memory:	1 GB Flash	1 GB Flash
Network:	WLAN 802.11a/b/g/n (Connection with at least 10 Mbit)	WLAN 802.11a/b/g/n (Connection with at least 10 Mbit)

We are pleased to offer you a selection of suitable truck and hand-held terminals. Existing devices already in use at your company can be tested for compatibility with the Jungheinrich WMS.

In addition, we offer a broad portfolio of WLAN and wireless data solutions as well as the associated services, such as WLAN simulations or system and performance analyses.

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## Pick-by-voice

When choosing pick-by-voice solutions, Jungheinrich works with Vocollect among others to find the right solution for you.

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## WMS server

Both the WMS database and the necessary server services are installed on the server. All data is transmitted from the central server via LAN and WLAN to the PCs and terminals.

## Minimum requirements

Operating system:	Windows Server 2003, 2008, 2008R2, 2010 or 2012 (32 or 64-bit)
Processor:	2 x CPU with at least 2.4 GHz
RAM:	8 GB RAM
Hard disk:	2 x 500 GB HDD (for WMS and database installation)
Network connection:	100 Mbit
RAID controller:	at least 256 MB cache for RAID1 or RAID5

The Jungheinrich WMS can also be operated in a virtualised environment, e.g. Microsoft Hyper-V or VMware vSphere, and supports cluster and high availability solutions. Jungheinrich works with the customer to determine the precise specifications of the server during the course of the project.

Both **Oracle** and a **Microsoft SQL Server** can be used as a database. We will be happy to answer any questions you may have about the respective licensing.

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# WMS – Integration into the system landscape

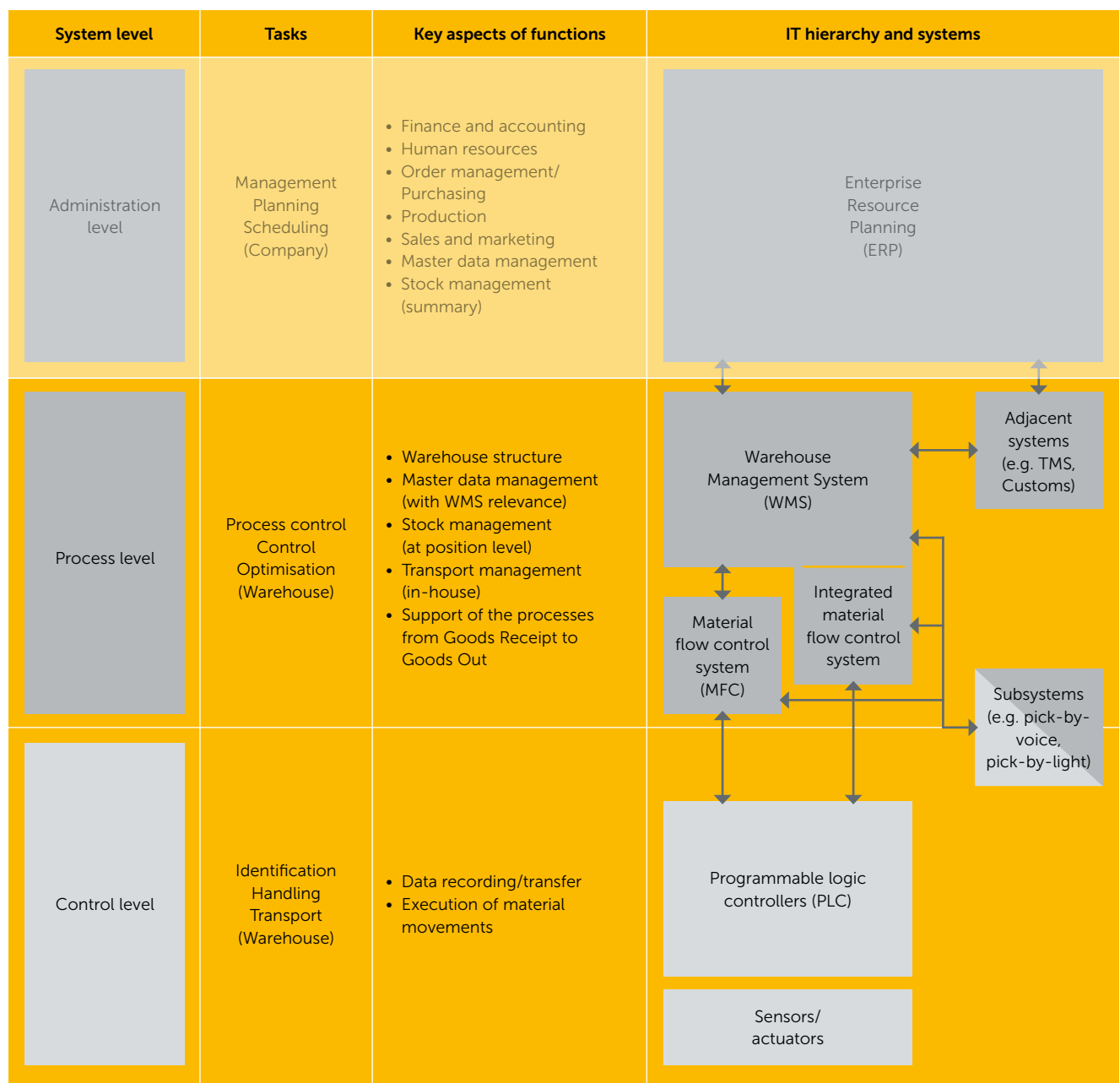
## Clear demarcation – clear responsibilities

### Tasks of an enterprise resource planning system

An enterprise resource planning (ERP) system is a software system for the comprehensive planning and coordination of corporate, especially managerial, tasks with the aim of utilising the resources (staff, equipment etc.) already existing in a company as efficiently as possible.

### Tasks of a warehouse management system

As part of a system environment in the company, the WMS communicates with neighbouring systems via interfaces. In doing so, the position of these systems within the IT hierarchy orients itself towards the tasks and key functional aspects of the software systems involved. The following figure shows a plane model of the system landscape as per VDI 3601. The figure also describes the tasks and key functional aspects of the different systems.



Source: VDI Guideline 3601



## Interface module for the connection of SAP and all common host systems

The Jungheinrich WMS ensures the data exchange and communication via standard interfaces to all common host and ERP systems, while simultaneously providing a certified interface to SAP.

### Interface types for connection to SAP

- SAP R/3 (file)
- SAP R/3 (trRFC – transactional remote function calls)
- SAP Media (file)

### General interfaces types to other

#### ERP systems

- Data exchange (file)
- Database access (DB)
- Socket connection (TCP)

**SAP® Certified**  
Integration with SAP Applications

## Extract of the already successfully connected ERP systems

<b>A</b>	<b>M</b>
abas	MAPICS
Aberon (DB)	mesonic WinLine (DB)
AP+	Microsoft Dynamics AX (Axapta)
ASP-XTrend	MOVEX (File)
Atos Origin (LLS)	myBusiness (DB)
Autostore WMS	<b>N</b>
Axapta	Navision (DB)
<b>B</b>	<b>O</b>
Biceps	Oracle JD Edwards EnterpriseOne
Brain (File)	ORDAT
<b>C</b>	oxaion
CD2000 von CAUSA	<b>P</b>
cimdata	P2 (PA AG)
Commendo	Perftech (DB)
CSB	POLLEX
<b>E</b>	proAlpha
EDBS	<b>S</b>
Eximco	Sage New Classic (File)
<b>G</b>	SAP Business One
godesys SO	SAP R/3 (File)
<b>I</b>	SAP Media (File)
IN:ERP	SHCware
Infor ERP LN (Baan)	SOPRA
Infor ERP PRISM	SP solution
IOS (DB)	<b>U</b>
<b>L</b>	Unit4 Multivers
LBP	<b>W</b>
LLS (TCP)	WAWI
Locus	

# The Jungheinrich WMS – Service from beginning to end\*

\*Example sequence for the integration of a close-to-standard Jungheinrich WMS in manual warehouses.

 Jungheinrich

 Sold-to party





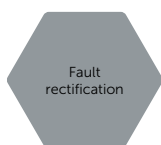


Logistics systems from Jungheinrich have been proven to be highly reliable. Our many years of experience in working with customers from the most diverse of operations shows that investment in service and support services pays dividends. It leads to increased productivity, reduced operating costs and maximised availability of your logistics system. Our support employees can provide you with assistance and answer your questions **365 days a year, 24 hours a day**, quickly and reliably via remote link. The contact persons and service engineers in your immediate vicinity are also happy to help.

We offer you three support models tailored to meet your needs.

#### Jungheinrich care support

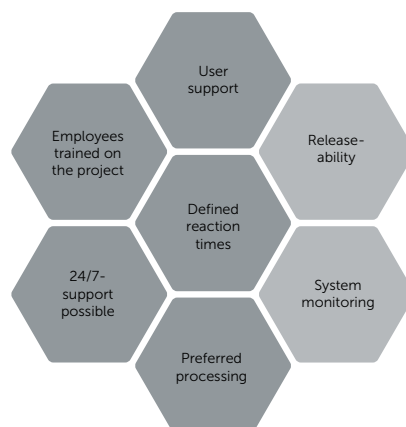
Use of support during office hours without taking out a support contract for an event fee plus hourly rate.



For customers with simple, non-critical logistics processes or their own support team.

#### Jungheinrich basic support

Flat-rate basic support package with guaranteed response times and with support hours charged for according to use.



For customers with simple to complex logistics processes requiring basic support coverage.

#### Jungheinrich premium support

Coverage of all support services for a flat rate, regardless of duration and scope.



For customers with complex to highly complex logistics processes requiring maximum security.

We are available at any time to help you with the configuration of a suitable support model. You can benefit from our expertise and experience, enabling you to focus on your core business. We look after your logistics system.

**ISO 9001** The German production facilities  
**ISO 14001** in Norderstedt, Moosburg  
and Landsberg are certified.

 Jungheinrich trucks  
conform to the European  
Safety Requirements.

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